Catalogue

Fixing Systems

fischer

innovative solutions

Dear partner,

There are many trends affecting the fixings industry: the growing number of construction materials, the joining of different materials, increasing requirements for design and execution, and digitalisation. As one of the world's leading specialists in fixing systems, we set the direction and shape the market. In the process, we provide you with the best and most cost-effective solution for your fixings project quickly and flexibly. We are also a reliable partner for you when it comes to individual requests and customised solutions.

Our product portfolio includes chemical systems, steel anchors and plastic fixings. We also provide a wide range of screws, drill bits, adhesives, sealants, foams and product ranges tailored to specific applications, such as façade and thermal insulation systems, or the installation of sanitary, heating, ventilation and electrical systems. We attach high value to quality, safety and easy installation.

Our goal is to be the best in our respective industries with regard to both our products and our services. With our own national subsidiaries, sales partners, qualified sales representatives and engineers providing technical advice, we have a particularly dense network for providing individual consultation and support throughout the world. We are also amongst the pioneers in the industry in the digital environment and provide modern software tools, such as the design and construction software FIXPERIENCE and the Product Finder apps for end users and pros.

Our comprehensive range of training courses enables us to keep you up to date with regard to fixings solutions and regulations – at the fischer akademie, in more than 70 competence centres throughout Germany, on site at the user's premises, and in various locations in Germany and Europe with the help of the fischer TourTruck.

We hope you enjoy discovering and using our products.

Florian Birkenmayer

Good reasons to choose fischer

A brand and its promise to perform

„Whoever chooses fischer receives more than a range of safe products. The aim is to always develop the best solutions for our customers across the globe."

Besides the innovative products, this predominantly concerns support that is focused on the customer, and services designed to improve customer benefit.

Continious improvement

With the fischer ProcessSystem (fPS), we ensure that we are adapting and optimising our processes in line with customer requirements in a flexible manner and on a continuous basis. Thus we are glad having been awarded with the 1. place "Excellence in Operations" within the challenging contest "Factory of the Year".

DIE FABRIK DES JAHRES
Global Excellence in Operations
Produktion ATKearney

Award 2016
Exellence in Operations

Always with its finger on the pulse of the times

At fischer, innovation is more than just a sum of the patents. We are open to new things and are prepared for change – always with the aim of offering our customers the greatest possible benefits. Over the years, our own development and production sites have been developing numerous fixing solutions for the most wide-ranging applications.

Be it new production procedures or materials, such as renewable raw materials: We are carrying out the research for your safety and will continue to do so in the future. This gives us such great flexibility that we can even develop tailor-made customer solutions. This power to innovate has seen fischer become market leader in anchor technology and the fixing industry.

Safety that connects – Decisive quality

We don't make any compromises when it comes to the safety of our products. A whole host of our products are distinguished by comprehensive, up-to-date and international approvals. The fischer product range is well-positioned in all sectors of fixing technology – Steel, Nylon and Chemical fixings. In award-winning quality which continues to impress both professional clients and private customers with equal measure.

ICC ES ESR-1990 — See ICC-ES Evaluation Report at www.icc-es.org
ETA CE

International approvals
characterise many of our products

We take responsibility

Our active environment management policy means that we are helping to maintain an intact environment for our generation and for those that follow. The environment management policy at the Tumlingen site has been certified in line with DIN EN ISO 14001.

We are a member of the German Sustainable Building Council (DGNB), and our products have been successively certified in line with the guidelines provided by the Institute for Construction and the Environment (IBU). With our greenline products, we have introduced the first fixing assortment in the market, based on over 50% of regrowing raw materials.

Managementsystem DQS ISO 9001:2008 ISO 14001

Institut Bauen und Umwelt e.V.

DGNB
Deutsche Gesellschaft für Nachhaltiges Bauen e.V.
German Sustainable Building Council

BIOBASED 50 - 15 %
DIN Geprüft
8C029

UX GREEN based on over 50% of regrowing raw materials

Our service to you

We are a reliable partner, one that will stand at your side and address your individual requirements with advice and action:

- Our products range from **chemical systems to steel anchors** through to **plastic anchors.**
- **Competence and innovation** through own research, development and production.
- **Global presence** and active sales service in over 100 countries.
- **Qualified technical consulting** for economical and compliant fastening solutions. Also on-site at the construction site requested.
- **Training sessions,** some with accreditation, at your premises or at the fischer academy.
- **Design and construction software** for demanding applications.

fischer 360°-Service

Innovations to inspire professionals

01 fischer DUO-Line assortment
Clever combinations for more power and intelligence.
Page 406 **Page 348** **Page 394**

02 fischer FIS EM Plus
The powerful injection mortar for rebar connections and cracked concrete.
Page 86

03 fischer bolt anchor FAZ II
For highest demands. Powerful and flexible.
Page 202

04 fischer ULTRACUT FBS II 8, 10 and 12 A4 stainless steel
The powerful concrete screw for top installation comfort in external areas.
Page 232

05 fischer ULTRACUT FBS II 6 zinc-plated steel
The high-performance concrete screw for absolute installation ease.
Page 242

06 fischer hollow drill bit FHD
Hollow drill bit for drilling with low dust as well as for efficient and approved anchoring.
Page 561

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2 greenline

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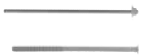
Accessories for push-trough installation 	164
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Non-cracked concrete

			Single fixings for non-cracked concrete		
			Chemical systems		
Product	Type		Epoxi mortar-system FIS EM Plus	Superbond-System FSB	Injection mortar FIS V
	Page		86	64	113
	Image				
Connection thread or Screw diameter	Anchor rod or anchor size		M8 - M30	M8 - M30	M6 - M30
	Internal thread		M8 - M20	M8 - M20	M8 - M20
	Reinforcing bar		Ø 8 - 40 mm	Ø 8 - 32 mm	Ø 8 - 28 mm
	Screw diameter				
Steel/material	gvz		●	●	●
	A4		●	●	●
	C		●	●	●
	Nylon				
Usable length	up to		∞	∞	∞
Approvals / Certificates	Approvals	ETA	●	●	●
		ICC	●	●	●
		DiBt			
		Seismic	●	●	●
		Dynamic			
	Certificates	Shock			
		Fire resistance reports	●	●	●
Type of installation	Pre-positioned installation		●	●	●
	Push-through installation		●	●	●
	Stand-off installation		●	●	●
Drilling method	Hammer drilling		●	●	●
	Hollow drilling		●	●	●
	Diamod-drilling		●	●	
Waiting time until loading at 20 °C	none				
	short	< 5 Minutes			
	middle	≤ 20 Minutes		●	●
	long	> 20 Minutes	●	●	●
Substrate			+5 °C	-30 °C	-10 °C
Special features	approved without borehole cleaning				
	Installation in concrete < C20/25 acc. certificate				
	Installation in concrete > C50/60 acc. certificate				
	approved in water-filled drill holes		●	●	
	Installation in steel fibre concrete possible		●	●	●
	Installation possible in narrow members ≤ 120 mm		●	●	●
	removable	flush with the surface	●*	●*	●*
		completely			

* With internal threaded anchor

Single fixings for non-cracked concrete				Redundant fixtures (multiple fixtures)		
Steel anchors				Steel anchors		Frame fixings
Bolt anchor FAZ II	Bolt anchor FBN II	Concrete Screw FBS II	High performance anchor FH II	Nail anchor FNA II	Drop-in anchor EA II	SXR / SXRL
202	267	232	209	256	247	294
M8 - M24	M8 - M20	Ø 6 - 14 mm	Ø 10 - 32 mm	Ø 6 mm M6 - M8		Ø 8 - 14 mm
●			M6 - M12		M6 - M12	
						Ø 5 - 10 mm
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●				●		
						●
300 mm	300 mm	205 mm	100 mm	120 mm	∞	290 mm
●	●	●	●	●	●	●
●			●			
						●
●		●	●			
●			●			
●	●	●	●	●	●	●
●	●		●*		●	
●	●	●	●	●		●
●	●		●*		●	
●	●	●	●	●	●	●
●	●	●	●			
●		●				
●	●	●	●	●	●	●
-40 °C	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C
		●				
●						
●						
●	●	●	●	●	●	●
●	●	●	●	●	●	●
		●	●*		●	●
		●				●

* With internal threaded anchor

Cracked concrete

			Single fixings for cracked concrete		
			Chemical systems		
Product	Type		Highbond-System FHB II	Superbond-System FSB	Injection mortar FIS V
	Page		52	64	113
	Image				
Connection thread or Screw diameter	Anchor rod or anchor size		M8 - M24	M8 - M30	M10 - M30
	Internal thread			M 8 - M 20	
	Reinforcing bar			Ø 8 - 32 mm	Ø 10 - 28 mm
	Screw diameter				
Steel/material	gvz		●	●	●
	A4		●	●	●
	C		●	●	●
	Nylon				
Usable length	up to		165 mm	∞	∞
Approvals / Certificates	Approvals	ETA	●	●	●
		ICC		●	●
		DiBt			
		Seismic		●	●
		Dynamic			
	Certificates	Shock	●		
		Fire resistance reports	●	●	●
Type of installation	Pre-positioned installation		●	●	●
	Push-through installation		●	●	●
	Stand-off installation		●	●	●
Drilling method	Hammer drilling		●	●	●
	Hollow drilling		●	●	●
	Diamond-drilling			●	
Waiting time until loading at 20 °C	none				
	short	< 5 Minutes	●		
	middle	≤ 20 Minutes	●	●	●
	long	> 20 Minutes		●	●
Substrate			-5 °C	-30 °C	-10 °C
Special features	approved without drill-hole cleaning		●		
	Installation in concrete < C20/25 acc. certificate		●	●	●
	Installation in concrete > C50/60 acc. certificate		●	●	●
	approved in water-filled drill holes		●	●	
	Installation in steel fibre concrete possible		●	●	●
	Installation possible in narrow members ≤ 120 mm		●	●	●
	removable	flush with the surface		●*	
		completely			

* With internal threaded anchor

Single fixings for cracked concrete				Redundant fixtures (multiple fixtures)		
Steel anchors			Frame fixings	Steel anchors		Frame fixings
Bolt anchor FAZ II	Concrete Screw FBS II	High performance anchor FH II	SXRL 10	Nail anchor FNA II	Drop-in anchor EA II	SXR / SXRL
202	232	209	294	256	247	294
M8 - M24	Ø 6 - 14 mm	Ø 10 - 32 mm	Ø 10 mm	Ø 6 mm M6 - M8		Ø 8 - 14 mm
		M6 - M12			M6 - M12	
			7 mm			Ø 5 - 10 mm
●	●	●	●	●	●	●
●	●	●	●	●	●	●
●				●		
			●			●
300 mm	205 mm	100 mm	220 mm	120 mm	∞	290 mm
●	●	●		●	●	●
●		●				
			●			●
●	●	●				
●		●				
●	●	●		●	●	
●		●*		●	●	
●	●	●	●	●		●
●		●*			●	
●	●	●	●	●	●	●
●	●					
●	●					
●	●	●	●	●	●	●
-40 °C	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C
	●					
●	●			●	●	●
●						
●	●	●	●	●	●	●
●				●	●	●
	●	●*	●		●	●
	●		●			●

* With internal threaded anchor

Aircrete concrete

			Chemical systems	Steel-anchor	Frame fixings	General fixings		
Product	Type		Injection mortar FIS V	Aircrete anchor FPX-I	SXRL	Aircrete anchor GB	DUOPOWER	Turbo aircrete anchor FTP K/M
	Page		113	288	294	376	348	380
	Image							
Connection thread or Screw diameter	Anchor rod or anchor size		M6 - M16		Ø 8 - 14 mm	GB 10	Ø 5 - 14 mm	Ø 4 - 10 mm
	Internal thread		M6 - M12	M6 - M12				M6 - M10
	Screw diameter				Ø 5 - 10 mm	Ø 5 - 10 mm	Ø 3 - 12 mm	Ø 5 - 10 mm
Steel/material	gvz		●	●	●			●
	A4		●		●			
	Nylon				●	●	●	●
Usable length	up to		∞	∞	290 mm	105 mm	∞	∞
Approvals / Certificates	Approvals	ETA	●	●	●			
		DiBt			●	●		
	Certificates	Fire resistance reports	●	●				
Type of installation	Pre-positioned installation		●	●		●	●	●
	Push-through installation		●		●		●	
	Stand-off installation		●	●				
Drilling method	Hammer drilling		●		●			
	Rotary drilling		●	●	●	●	●	●
Waiting time until loading at 20 °C	none			●	●	●	●	●
	short	< 5 Minutes						
	middle	≤ 20 Minutes	●					
	long	> 20 Minutes	●					
Minimum component temperature			-10 °C	-40 °C	-40 °C	-20 °C	-40 °C	-40 °C
Special features	approved without borehole cleaning							
	applicable in aircrete concrete ceilings			●				
	removable	flush with the surface	●*	●	●	●	●	●
		completely			●	●	●	●

* With internal threaded anchor

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Solid- & perforated brick

			Chemical systems	Frame fixings				General fixings
Product	Type		Injection mortar FIS V	SXR	SXRL	FUR	Nail plug N	DUOPOWER
	Page		113	320	294	306	311	348
	Image							
Connection thread or Screw diameter	Anchor rod or anchor size		M6 - M16	Ø 6,8,10 mm	Ø 8 - 14 mm	Ø 10 mm	Ø 5-10 mm	Ø 5 -14 mm
	Internal thread		M6 - M12					
	Screw diameter			Ø 6 - 7 mm	Ø 6 - 10 mm	Ø 7 mm	3,5 - 7 mm	Ø 3 - 12 mm
Steel/material	gvz		●	●	●	●	●	
	A4		●	●	●	●	in A2	
	Nylon			●	●	●	●	●
Usable length	up to		∞	210 mm	290 mm	160 mm	180 mm	∞
Approvals / Certificates	Approvals	ETA	●	●	●	●		
		DiBt			●			
	Certificates	Fire resistance reports	●					
Type of installation	Pre-positioned installation		●					●
	Push-through installation		●	●	●	●	●	●
	Stand-off installation		●					
Drilling method	Hammer drilling		●	●	●	●	●	●
	Rotary drilling		●	●	●	●	●	●
Waiting time until loading at 20 °C	none			●	●	●	●	●
	short	< 5 Minutes						
	middle	≤ 20 Minutes	●					
	long	> 20 Minutes	●					
Minimum component temperature			-10 °C	-40 °C	-40 °C	-40 °C	-40 °C	-40 °C
Special features	approved without borehole cleaning							
	removable	flush with the surface	●*	●	●	●	●	●
		completely		●	●	●	●	●

* With internal threaded anchor

Panel building materials

			Cavity fixings					General fixings
Product	Type		Metal cavity fixing HM	Gravity toggle/ spring toggle KD	DUOTEC	Board fixing PD	Plasterboard fixing GK/GKM	DUOPOWER
	Page		397	400	394	404	408	348
	Image							
Connection thread or diameter of the screw	anchor size		M4 - M8	M3 - M10	Ø 10 and Ø 12 mm	Ø 8-12 mm		Ø 5,6,8 and10 mm
	Screw diameter		Metric Screw M4 - M6; Hexagon-headed screw M8; Angle hook M4 and M5	Metric thread M3 - M10; Round hook M3 - M8	Metric thread M5 - M6 Chipboard screws 4,5- 6 mm	Chipboard screw 4,0-6,0 mm	Chipboard screw 4,0-5,0 mm	Chipboard screw 3,0-8,0 mm
Steel/material	gvz		●	●			●	
	A4							
	Nylon				●	●	●	●
Panel thickness			3-50 mm	9,5-90 mm	9,5-55 mm	min. 6 mm	min. 9,5 mm	min. 9,5 mm
Usable length	up to		30 mm	63 mm	∞	∞	∞	∞
required cavity depth by 12,5 mm board thickness			min. 19 mm	min. 27 mm	min. 40 mm	min. 23 mm	min. 13 mm	min. 18 mm
Type of installation	Pre-positioned installation		●	●	●	●	●	●
	Push-through installation							●
	Stand-off installation			●	●			
Drilling method	Rotary drilling		●	●	●	●	●	●
Waiting time until loading	none		●	●	●	●	●	●
Special features	removable	flush with the surface		●		●		
		completely					●	●

Insulated building materials (e.g. ETICS)

			Stand-off installation system		Insulation fixing FID
Product	Type		Thermax 12 and 16	Thermax 8 and 10	FID 50 and 90
	Page		337	334	494
	Image				
Connection thread or Screw diameter	Anchor rod or anchor size		M12 and M16	M8 and M10	
	Screw diameter			4,5 - 6 mm, M6 - M10	4,5-6 mm
Steel/material	gvz		●	●	●
	A4		●		
	Nylon			●	
Usable length	up to		∞	∞	∞
Approvals / Certificates	Approvals	ETA			
		DiBt	●		
Type of installation	Pre-positioned installation		●	●	●
	Push-through installation				
	Stand-off installation		●	●	
Drilling method	Hammer drilling		●	●	
	Rotary drilling		●		
Waiting time until loading at 20°C	none			●	●
	short	< 5 Minutes	depends on the injection mortar		
	middle	≤ 20 Minutes	depends on the injection mortar		
	long	> 20 Minutes	depends on the injection mortar		
Minimum component temperature			-10 °C	-40 °C	-40 °C
Special features	removable	flush with the surface	●	●	●
		completely			●

fischer
innovative solutions

2 greenline

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Environmentally friendly and secure

Sustainable building

With the introduction of its greenline products, fischer is the first manufacturer worldwide to offer a range of bio-based fixing systems.

We are adapting to the demands of processors and builders who greatly value sustainability when building and renovating, even when it comes to installation.

Grown naturally

All greenline products are produced with at least 50 % renewable raw materials. These do not compete with food and feed products or with corresponding cultivation areas. The regenerative material percentage is always confirmed by independent testing and certification by the DIN CERTCO / TÜV Rheinland.

All products are in the „BIOBASED 50 - 85 %" class.

Durably secure

With the introduction of its greenline products, fischer is the first manufacturer worldwide to offer a range of bio-based fixing systems.

We are adapting to the demands of processors and builders who greatly value sustainability when building and renovating, even when it comes to installation.

Ecological proof of performance

The FIS GREEN has an Environmental Product Declaration from the Institute of Building and Environment (IBU) and thereby a data basis for ecological building rating.

Furthermore, it has been classified in the best possible emission class: A+ „very low emission" for volatile substances as per the French VOC directive. Ecological advantages that also pay dividends in competition.

We take responsibility

For decades fischer has been actively practising environmental protection and taking on responsibility so that the environment remains intact for future generations.

We have an environmental management system certified according to DIN ISO 14001 and are a member of the German Sustainable Building Council (DGNB).

The first range of fixing products with renewable resources

General fixings

Universal plug UX GREEN
The nylon plug for all construction materials

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Chemical fixings

Injection mortar FIS GREEN 300 T
Injection mortar for high loads

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Special fixings

Expansion plug SX GREEN
The powerful nylon plug with 4-way expansion

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Plasterboard fixing GK GREEN
The fastest installation in gypsum plasterboard

Page 30

Hammerfix N GREEN
The hammer-in plug for simple, fast and economic installation

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Aircrete anchor GB GREEN
Secure in aerated concrete

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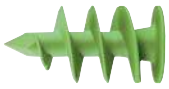
Insulation fixing FID GREEN
Thermal bridgefree installation in insulation materials

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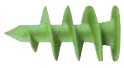
The fischer greenline product line has a green solution for every building material.

		Concrete	Solid brick	Perforated brick	Aerated concrete	Natural stone	Panel building materials	Gypsum plasterboard	Insulation panels
UX GREEN		✓	✓	✓	✓	✓	✓	✓	
SX GREEN		✓	✓	✓	✓	✓			
GK GREEN								✓	
N GREEN		✓	✓	✓	✓	✓			
GB GREEN					✓				
FID GREEN									✓
FIS GREEN		✓	✓	✓	✓	✓			

Universal plug UX GREEN

The nylon plug for all building materials

Mirror fixings

Pictures

BUILDING MATERIALS

- Concrete
- Gypsum plasterboard and gypsum fibreboards
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone
- Aerated concrete
- Chipboard
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

CERTIFICATES

BIOBASED 50 - 85% DIN Geprüft 8C029

ADVANTAGES

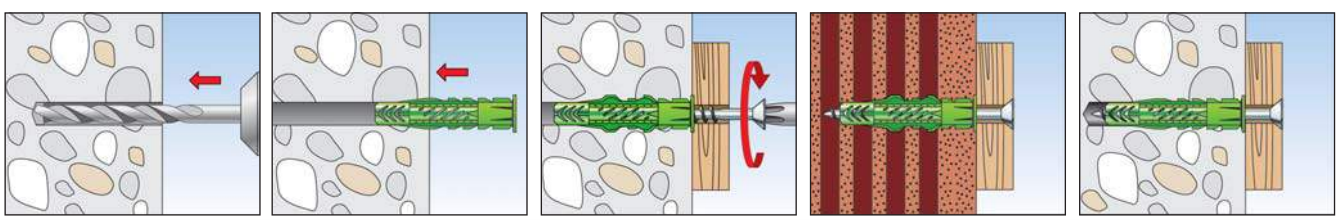
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular UX plugs.
- The universal operating principle (knotting or expanding) allows for use in all solid, hollow and board building materials. Thus the UX GREEN is the correct choice for unknown base materials.
- Plug collar for anti-slip safety and saw tooth sides as turning lock ensure the highest installation safety.

APPLICATIONS

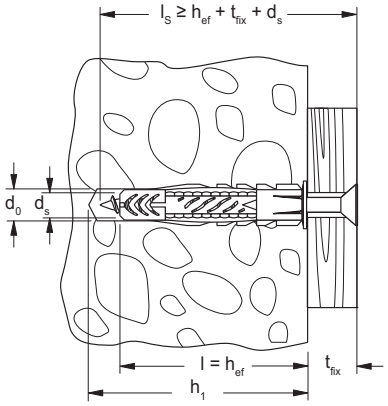
- Pictures
- Lighting
- Skirting
- Light cabinets
- Towel rails
- Mirror cabinets
- Curtain rails
- Wash basin fixings
- TV consoles
- Plumbing and heating fixings

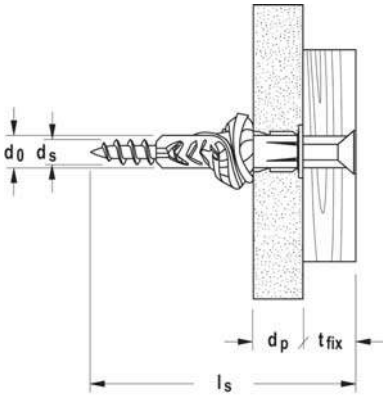
FUNCTIONING

- The Universal plug UX with rim is suitable for pre-positioned installation; the UX without rim is suitable for push-through installation.
- When screwing in the screw, the UX GREEN expands in solid building materials and knots itself into cavities.
- Suitable for wood and chipboard screws, as well as stud screws.
- The required screw length is given by: the plug length + fixture thickness + 1 x screw diameter.
- In the case of board building materials, the threadless part of the screw must not be longer than the fixture.
- The edge distance must be at least one plug length.



TECHNICAL DATA





Universal plug **UX GREEN R** - with rim

	With rim	Without rim	Drill hole diameter	Min. drill hole depth	Min. panel thickness	Anchor length	Wood and chip-board screws	Sales unit
	Art.-No.	Art.-No.	d_0 [mm]	h_1 [mm]	d_p [mm]	l [mm]	d_s / d_s x l_s [mm]	[pcs]
Item	**UX R**	**UX**						
UX GREEN 6 x 35	**518885**	–	6	45	9,5	35	4 - 5	40
UX GREEN 6 x 50	**524855**	–	6	60	9,5	50	4 - 5	40
UX GREEN 8 x 50	**518886**	–	8	60	9,5	50	4,5 - 6	40
UX GREEN 10 x 60	**518887**	–	10	75	12,5	60	6 - 8	20
UX GREEN 12 x 70	–	**524858**	12	85	–	70	8 - 10	18

LOADS

Universal plug UX GREEN

Highest recommended loads[1] for a single anchor.

The given loads are valid for wood screws with the specified diameter.

Type			UX GREEN 6 x 35	UX GREEN 6 x 50	UX GREEN 8 x 50	UX GREEN 10 x 60	UX GREEN 12 x 70
Screw diameter	Ø	[mm]	5	5	6	8	10
Recommended loads in the respective base material F_{rec}[2]							
Concrete	≥ C20/25	[kN]	0,40	0,60	0,60	1,00	1,50
Solid brick	≥ Mz 12	[kN]	0,20	0,30	0,30	0,50	0,70
Perforated sand-lime brick	≥ KSL 12	[kN]	0,40	0,40	0,50	0,60	0,80
Vertically perforated brick	≥ Hlz 12	[kN]	0,20	0,20	0,20	0,20	0,30
Aerated concrete	≥ AAC 4	[kN]	0,20	0,20	0,30	0,40	0,60
Gypsum plasterboard	12,5 mm	[kN]	0,10	0,10	0,10	0,10	-
Gypsum plasterboard	25 mm	[kN]	0,15	0,15	0,15	0,15	-
Gypsum fibreboard	(Fermacell)	[kN]	0,20	0,20	0,20	0,25	-
Gypsum block	$\rho \geq 0,9$ kg/dm³	[kN]	-	-	0,15	0,35	0,45

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

The powerful nylon plug with 4-way expansion

Mirror fixings

Wall consoles

BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

CERTIFICATES

BIOBASED 50 - 85% DIN Geprüft 8C029

ADVANTAGES

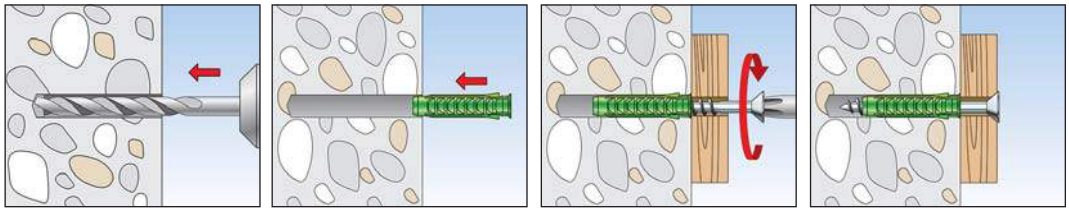
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular SX plugs.
- The powerful 4-way expansion provides optimum force transmission in the building material, thus enabling high load values and security.
- The anti-rotation lock prevents the plug from spinning in the drill hole.
- The expansion-free plug neck prevents the creation of expansion forces on the material whilst screwing in the screw. This helps to prevent damage to tiles and plaster.
- Fast and easy push-through installation reduces installation time.

APPLICATIONS

- Lighting
- Wardrobes
- Motion detectors
- Skirting
- Light shelves
- Mirror cabinets
- Letter boxes
- TV consoles
- Trellis
- Folding shutters
- Bath and toilet installations

FUNCTIONING

- The SX GREEN is suitable for pre-positioned and push-through installation.
- When screwing in the screw, the SX GREEN expands in four directions, thus providing a secure anchoring in the building material.
- The required screw length is given by the plug length + fixture thickness + 1 x screw diameter.
- Suitable for wood, chipboard and spacing screws.

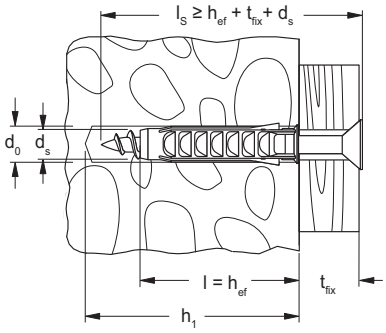


TECHNICAL DATA

Plug **SX GREEN** - with rim

Plug **SX GREEN** - with greater anchorage depth, without rim

Plug **SX GREEN S** - with rim and screw



	With rim Art.-No.	Without rim and large anchorage depth Art.-No.	With rim and screw Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Anchor length l [mm]	Max. fixture thickness t_{fix} [mm]	Wood and chip-board screws d_S / d_S x l_S [mm]	Sales unit [pcs]
Item	**SX**	**SX**	**SX-S**						
SX GREEN 5 x 25	**524859**	–	–	5	35	25	–	3 - 4	90
SX GREEN 6 x 30	**524860**	–	–	6	40	30	–	4 - 5	90
SX GREEN 6 x 30	–	–	**524866**	6	40	30	5	4,5 x 40	45
SX GREEN 6 x 50	–	**524861**	–	6	60	50	–	4 - 5	90
SX GREEN 8 x 40	**524862**	–	–	8	50	40	–	4,5 - 6	90
SX GREEN 8 x 40	–	–	**524867**	8	60	40	15	5 x 60	45
SX GREEN 8 x 65	–	**524863**	–	8	75	65	–	4,5 - 6	45
SX GREEN 10 x 50	**524864**	–	–	10	70	50	–	6 - 8	45
SX GREEN 12 x 60	**524865**	–	–	12	80	60	–	8 - 10	20

LOADS

Expansion plug SX GREEN

Highest recommended loads[1] for a single anchor.

The given loads are valid for wood screws with the specified diameter.

Type			SX GREEN 5 x 25	SX GREEN 6 x 30 SX GREEN 6 x 50	SX GREEN 8 x 40 SX GREEN 8 x 65	SX GREEN 10 x 50	SX GREEN 12 x 60
Wood screw diameter	Ø	[mm]	4	5	6	8	10
Min. edge distance concrete	c_{min}	[mm]	25	35	40	50	65
Recommended loads in the respective base material F_{rec}[2]							
Concrete	≥ C20/25	[kN]	0,30	0,65	0,70	1,20	1,70
Solid brick	≥ Mz 12	[kN]	0,25	0,30	0,60	0,65	0,70
Solid sand-lime brick	≥ KS 12	[kN]	0,30	0,50	0,60	1,20	1,70
Aerated concrete	≥ AAC 2	[kN]	0,03	0,03	0,04	0,09	0,14
Aerated concrete	≥ AAC 4	[kN]	0,09	0,09	0,14	0,30	0,45
Vertically perforated brick	≥ Hlz 12 ($\rho \geq 1.0$ kg/dm³)	[kN]	0,07	0,07	0,17	0,17	0,26
Perforated sand-lime brick	≥ KSL 12	[kN]	0,17	0,30	0,35	0,30	0,35
Gypsum block		[kN]	-	-	0,26	0,37	1,00

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

The fastest installation in gypsum plasterboard

Wall lamps

Pictures

BUILDING MATERIALS

- Gypsum plasterboard, single and double-planked

CERTIFICATES

BIOBASED 50 - 85% DIN Geprüft 8C029

ADVANTAGES

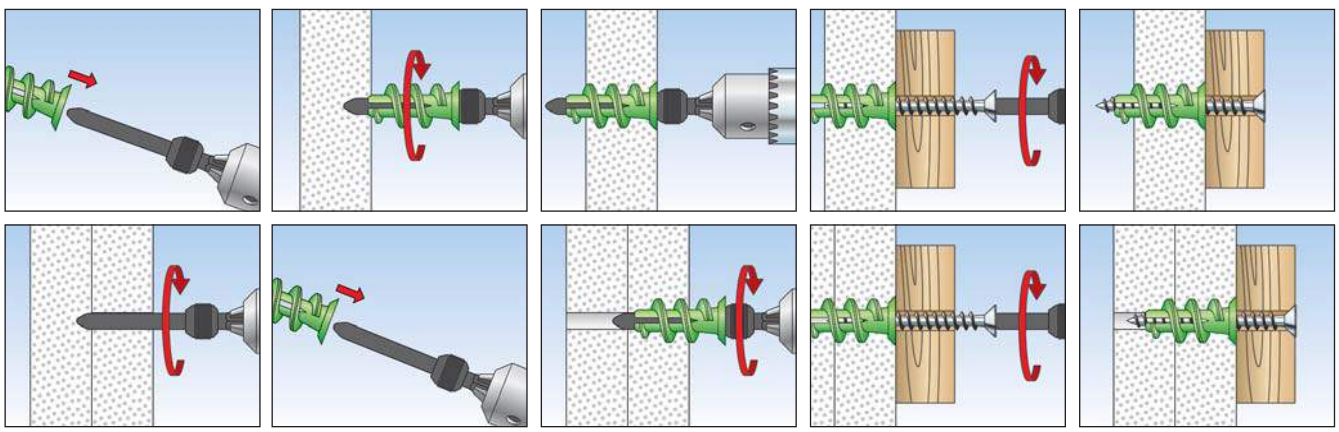
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular GK plugs.
- The included setting tool combine the functions of drilling and setting fixings for direct and easy installation.
- Sharp, self-tapping thread for a positive-fit connection with a high load-bearing capacity.
- The cross-drive recess in the head of the fixing means that the GK GREEN can also easily be screwed out like a screw.
- The GK GREEN can be used with various screws, hooks and eye screws, making it very versatile in its applications.

APPLICATIONS

- Pictures
- Lighting
- Electrical installations
- Fitting accessories
- Series installations

FUNCTIONING

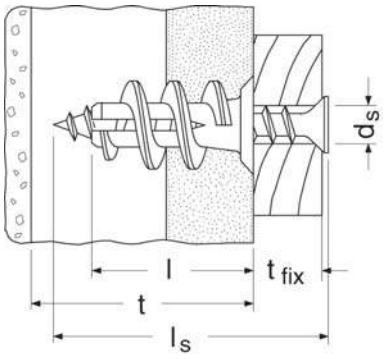
- The gypsum plasterboard fixing GK GREEN is suitable for pre-positioned installation.
- The GK GREEN is screwed flush into the gypsum plasterboard using the setting tool provided. Avoid manual and machine-aided overtightening.
- For board thicknesses greater than 15 mm, drill a hole first by using the setting tool.
- Adapted for wood, sheet metal and chipboard screws with a diameter of 4.0 to 5.0 mm.
- Not suitable for gypsum fibreboard and tiled plasterboard.



TECHNICAL DATA

Plasterboard fixing **GK GREEN**

Plasterboard fixing **GK GREEN S**



Item	Art.-No.	Anchor length l [mm]	Min. thickness to first supporting layer t [mm]	Max. fixture thickness t_{fix} [mm]	Screw $d_S \times l_S$ [mm]	Drive	Sales unit [pcs]
GK GREEN	**524868** 1) 2)	22	25	–	4,0 - 5,0 x Ls	–	90
GK GREEN S	**524869** 1) 3)	22	25	13	4,5 x 35	PZ2	45

1) Including installation tool GKW.

2) Min. screw length = length of plug 22 mm + thickness of building component.

3) Supplied with plasterboard screw.

LOADS

Plasterboard fixing GK GREEN

Highest recommended loads[1)] for a single anchor.

The given loads are valid for chipboard screws with the specified diameters.

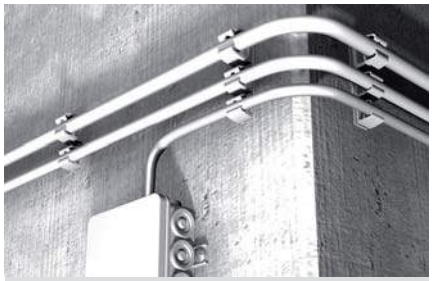
Type			GK GREEN
Chipboard screw	Ø	[mm]	4,0 - 5,0
Recommended loads in the respective base material F_{rec}[2)]			
Gypsum plasterboard	9,5 mm	[kN]	0,07
Gypsum plasterboard	12,5 mm	[kN]	0,08
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,11

[1)] Required safety factors are considered.

[2)] Valid for tensile load, shear load and oblique load under any angle.

The hammer-in plug for simple, fast and economic installation

Timber substructures



Cable fixing

BUILDING MATERIALS

- Concrete
- Solid sand-lime brick
- Building brick
- Natural stone
- Solid brick made from lightweight concrete
- Aerated concrete
- Solid panel made from gypsum
- Vertically perforated brick
- Perforated sand-lime brick
- Hollow blocks made from lightweight concrete

CERTIFICATES

BIOBASED 50 - 85% DIN Geprüft 8C029

ADVANTAGES

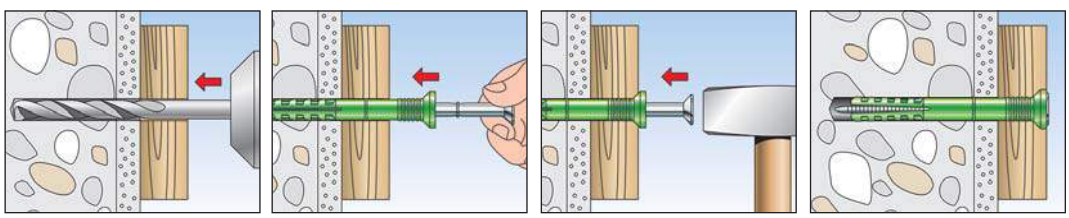
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular hammerfix N plugs.
- The rapid push-through and hammer-set installation reduces the amount of work required and allows for economic series installation.
- The integrated hammer-in stop prevents the plug from expanding prematurely, thus enabling problem-free installation.
- Together with the cross-slot recess, the thread of the nail screw allows the screw to be removed, thus allowing for subsequent dismantling.

APPLICATIONS

- Substructures made of wood and metal
- Wall connection or plaster profiles
- Slides
- Sheets
- Cable and pipe clips
- Perforated tapes

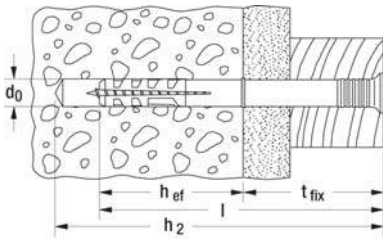
FUNCTIONING

- The hammerfix N GREEN is suitable for push-through installation.
- The easiest installation: drill, knock in and you're done.
- When being hammered in, the nail screw causes the plug to expand in two directions, thus providing a secure anchoring in the building material.



TECHNICAL DATA

Hammerfix **N GREEN S** with countersunk head and zinc-plated nail



Item	Art.-No.	Drill hole diameter d_0 [mm]	Effect. anchorage depth h_{ef} [mm]	Anchor length l [mm]	Min. drill hole depth for through fixings h_2 [mm]	Max. fixture thickness t_{fix} [mm]	Drive	Sales unit [pcs]
N GREEN 6 x 40/10 S	**524845**	6	30	40	55	10	PZ2	45
N GREEN 6 x 60/30 S	**524847**	6	30	60	75	30	PZ2	45
N GREEN 6 x 80/50 S	**524848**	6	30	80	95	50	PZ2	45
N GREEN 8 x 80/40 S	**524849**	8	40	80	95	40	PZ3	45
N GREEN 8 x 100/60 S	**524850**	8	40	100	115	60	PZ3	45

LOADS

Hammerfix N GREEN S

Highest recommended loads[1] for a single anchor.

The given loads are valid for screw nails with the specified diameter.

Type			N GREEN 6	N GREEN 8
Screw nail diameter	Ø	[mm]	4	5
Recommended loads in the respective base material F_{rec}[2]				
Concrete	≥ C20/25	[kN]	0,25	0,27
Solid brick	≥ Mz 12	[kN]	0,18	0,24
Solid sand-lime brick	≥ KS 12	[kN]	0,22	0,24
Solid brick of lightweight aggregate concrete	≥ V 4	[kN]	0,12	0,15
Aerated concrete	≥ AAC 2	[kN]	0,04	0,05
Aerated concrete	≥ AAC 4	[kN]	0,10	0,13

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

Secure in aerated concrete

Radiators

Suspended ceilings

BUILDING MATERIALS

Suitable for:

- Aerated concrete ≥ AAC 2
- Aerated concrete and ceiling panels of compressive strength ≥ 3.3

CERTIFICATES

BIOBASED 50 - 85%
DIN Geprüft
8C029

ADVANTAGES

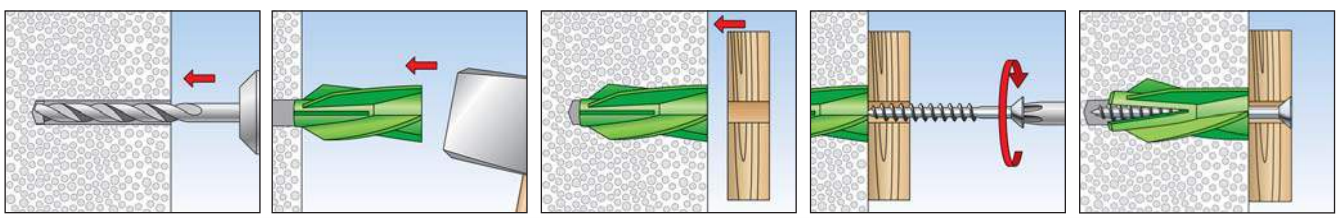
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- The spiral-shaped outer ribs cut a positive fit in the soft building material, thus ensuring best pressure distribution and load-bearing capacity.
- Can be applied with a hammer – there is no need for special tools, thus saving time and money for the installation.

APPLICATIONS

- Suspended ceilings
- Cable trays
- Pipelines
- Guard rails
- Façade and roof constructions made of wood and metal
- Anopy brackets
- Letter boxes
- Trellis

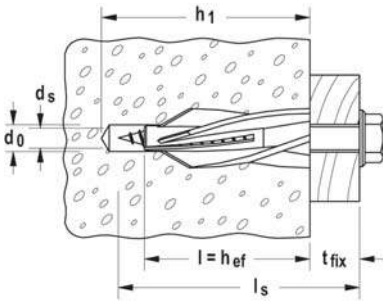
FUNCTIONING

- The aircrete anchor GB GREEN is suitable for pre-positioned installation.
- The spiral-shaped outer ribs cut a positive fit into the soft building material when knocked in, thus ensuring optimal pressure distribution and load-bearing capacity.
- The required screw length is given by the plug length + fixture thickness + 1 x screw diameter.
- Rotary drilling of the hole is required.
- Can be used in unplastered aerated concrete.



TECHNICAL DATA

Aircrete anchor **GB GREEN**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Plug length = min. anchorage depth $l = h_{ef}$ [mm]	fischer safety screw $d_s \times l_s$ [mm]	Sales unit [pcs]
GB GREEN 8	**524870**	8	60	50	5	20
GB GREEN 10	**524871**	10	65	55	7	18

LOADS

Aircrete anchor GB GREEN

Highest recommended loads[1] for a single anchor in aerated concrete.
The given loads are valid for fischer safety screws[4] acc. attached table.

Type			GB GREEN 8	GB GREEN 10
Diameter fischer safety screw	Ø	[mm]	5	7
Min. spacing[6]	smin	[mm]	150 (100)[7]	100
Min. edge distance[2]	cmin	[mm]	100 (75)[7]	100
Minimum member thickness	hmin	[mm]	75	120
Anchorage depth	h_{ef} (h_V)	[mm]	50	55
Recommended load in the respective base material F_{rec}[3]				
Aerated concrete	AAC 2	[kN]	0,20	0,21
Aerated concrete	AAC 3	[kN]	0,30	0,32 (0,43)[5]
Aerated concrete	AAC 4	[kN]	0,40	0,54 (0,71)[5]

1) Required safety factors are considered.
2) Minimum possible edge distance.
3) Valid for tensile load, shear load and oblique load under any angle.
4) Galvanised steel (gvz) and stainless steel A4.
5) The values in brackets are decisive for member thickness ≥ 150 mm.
6) Minimum possible axial spacing while r educing the recommended load.
7) Values in brackets apply to AAC 2.

Thermal bridge-free installation in insulation materials

Fixings in ETICS

Fixings in ETICS

BUILDING MATERIALS

- Non-plastered, pressure-resistant insulating boards
- Plastered, pressure-resistant insulating boards
- ETICS insulating boards

CERTIFICATES

BIOBASED 50 - 85% DIN Geprüft 8C029

fischer PURE MATERIAL NYLON QUALITY HIGH-QUALITY NYLON

ADVANTAGES

- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular FID plugs. To fix lightweight fixtures in plastered and non-plastered insulating boards.
- Thermal bridge-free mounting when exclusively set in insulation material.
- Installation without pre-drilling even through thin plaster layers, thus saving a work step.
- Easy to set using a standard bit.

APPLICATIONS

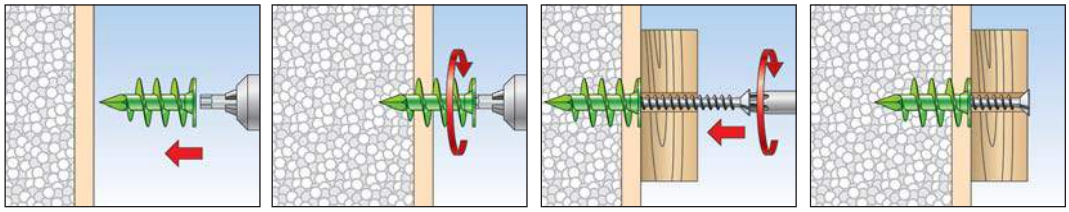
To fix lightweight fixtures in plastered and non-plastered insulating boards.

The areas of application are:

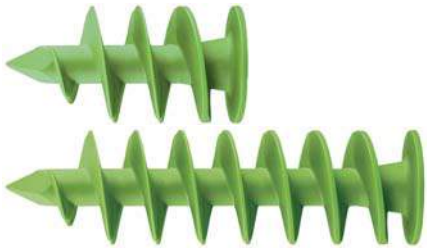
- Façade construction (ETICS)
- Insulating construction
- Electric construction
- Refrigerated and climate construction
- Acoustic construction

FUNCTIONING

- The FID GREEN can be set in pre-positioned installation with a cordless screwdriver or by hand.
- With its strong drill tip, the insulation fixing FID GREEN breaks through thin plaster layers and cuts a positive fit into the insulation panel with its specially shaped spiral thread.
- From a plaster thickness of 5 mm, we recommend to create a 6 mm hole. This serves for better guidance of the fastener in the setting process.
- Water ingress in the insulation material can be prevented by sealing the plug collar after successful installation.
- Attachment parts can be easily attached with screws.
- We recommend to predrill an 6 mm hole in ETICs rendering.

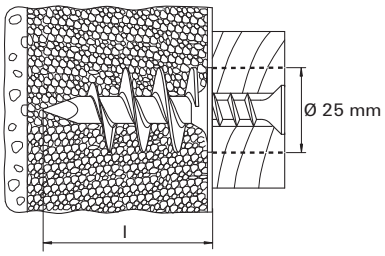


TECHNICAL DATA



Insulation fixing **FID GREEN 50**

Insulation fixing **FID GREEN 90**



Item	Art.-No.	Anchor length l [mm]	Min. bolt penetration [mm]	Wood and chipboard screws d_S [mm]	Drive	Sales unit [pcs]
FID GREEN 50	**524851**	50	50	4,5 - 5	T40	45
FID GREEN 90	**524852**	90	90	6	Inbus 6 mm	20

LOADS

Insulation fixing FID GREEN

Highest recommended loads[1] for a single anchor.

The given loads are valid for chipboard screws with maximum diameter.

Type			FID GREEN 50	FID GREEN 90
Screw diameter	Ø	[mm]	4,5 - 5,0	6,0
Recommended loads in the respective base material N_{rec}[2]				
Polystyrene	PS 15	[kN]	0,07	0,17
Polystyrene	PS 20	[kN]	0,10	0,20

[1] Required safety factors are considered.

[2] Valid for tensile load.

The first approved injection mortar made with renewable raw materials

Building renovation

Staircase

BUILDING MATERIALS

Approved for anchorings in:

- Concrete C20/25 to C50/60, non-cracked
- Solid brick
- Vertically perforated brick
- Solid sand-lime brick
- Perforated sand-lime brick
- Aerated concrete

CERTIFICATES

ETA-14/0408
ETAG 001
Option 7 for non-cracked concrete

ETA-14/0471
ETAG 029
Masonry
Use categories b, c, d and w/w

Fire resistance classification
R 120
Anchor types see test report

THIRD-PARTY VERIFIED EPD
ISO 14025 and EN 15804
Institut Bauen und Umwelt e.V.

BIOBASED 50 - 85%
DIN Geprüft
8C048

ÉMISSIONS DANS L'AIR INTÉRIEUR*
A+
A+ A B C
* Information sur le niveau d'émission de substances volatiles dans l'air intérieur, présentant un risque de toxicité par inhalation, sur une échelle de classe allant de A+ (très faibles émissions) à C (fortes émissions).

NSF
Certified to NSF/ANSI 61

ADVANTAGES

- The worldwide first injection mortar with renewable raw materials. The share of renewable raw materials is certified by DIN CERTCO / TÜV Rheinland.
- Because of the European Technical Assessment it is possible to use the injection system in the area of public buildings.
- The low content of volatile organic compounds (VOC) has a positive effect for the evaluation of fixings in „Green Building"-projects.
- Biobased raw materials increase the residential and workplace quality and preserve valuable resources for future generations.
- The injection system is not mandatory for indication and thus reduces risks for installers and the environment.
- FIS GREEN is suitable for the use with the complete fischer injection accessories.

APPLICATIONS

Injection mortar for use with:

- Threaded rods FIS A, see page 144
- Internal threaded anchor RG MI, see page 159
- Rebar anchor FRA, see page 179
- Concrete steel bars, see page 185
- Injection anchor sleeves FIS H, see page 167
- NSF certificate verifies its suitability for applications in drinking water

FUNCTIONING

- FIS GREEN is a 2-component injection mortar.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion trough the static mixer.
- The injection cartridges are quick and easy to use with the fischer dispensers.
- Partially used cartridges can be reused by changing the static mixer.
- Related accessories for the various applications can be found on pages „non-cracked concrete" and „masonry".

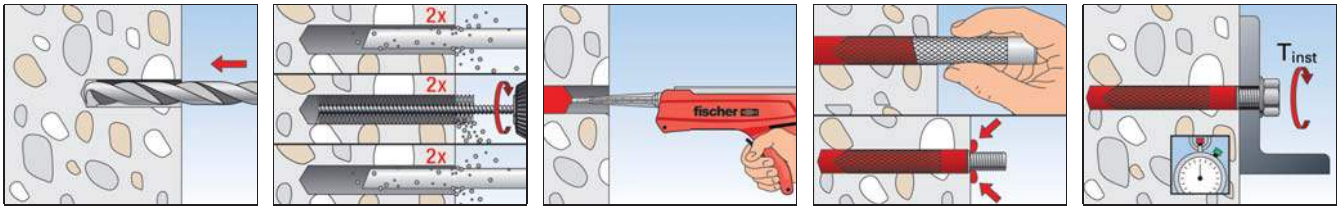
SEE ALSO

ANCHORS + SLEEVES
Page 144

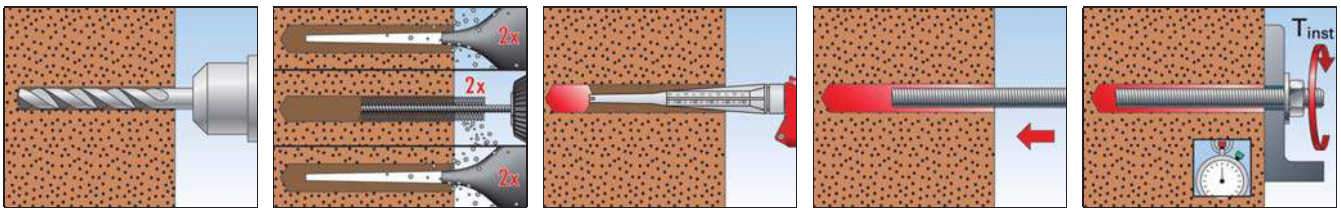
DISPENSER
Page 195

ACCESSORIES
Page 198

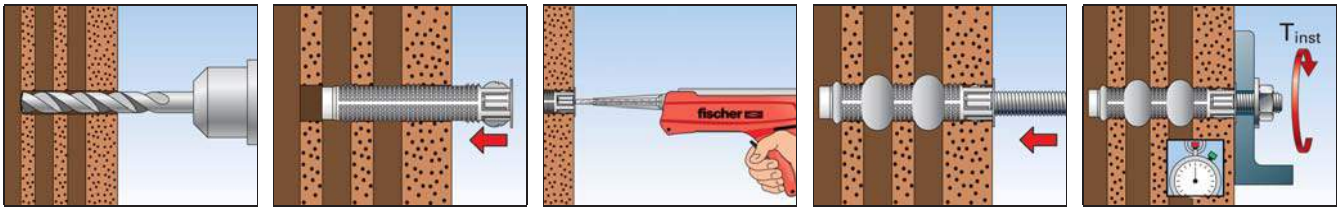
INSTALLATION WITH FIS EB, FIS GREEN



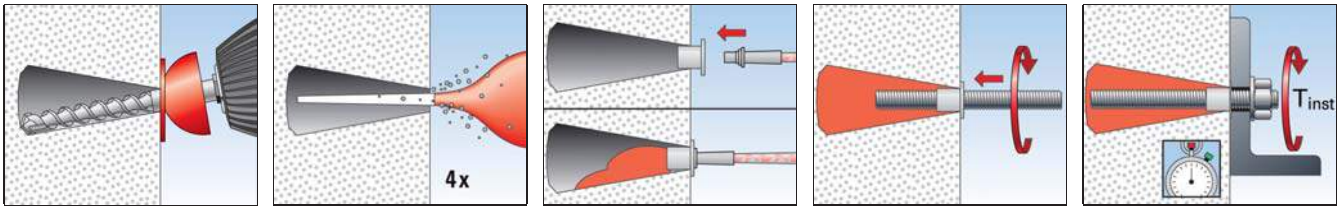
INSTALLATION



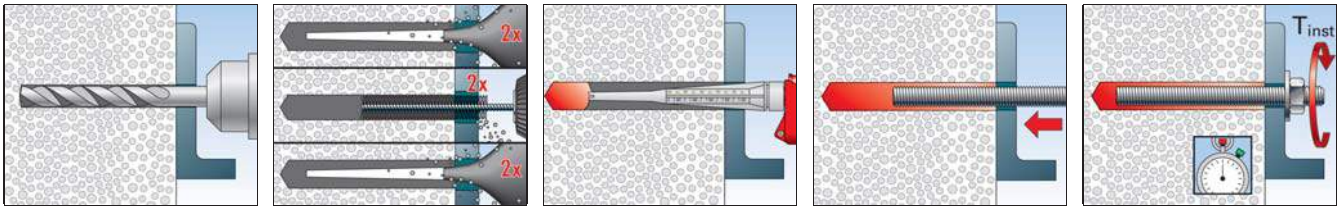
INSTALLATION



INSTALLATION - UNDERCUT DRILL HOLE



INSTALLATION - CYLINDRICAL DRILL HOLE



TECHNICAL DATA

FIS GREEN 300 T

Static mixer **FIS MR Plus**

		Approval	Languages on the cartridge	Scale unit	Contents	Sales unit
Item	**Art.-No.**	**ETA**				**[pcs]**
FIS GREEN 300 T	**522223**	■	DE	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS GREEN 300 T K	**523244**	■	DE	150	1 Cartidge 300 ml, 2 x Static mixer (incl. clip with europerforation)	4
FIS GREEN 300 T	**522989**	■	FR	150	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	4
FIS GREEN 300 T	**523245**	■	IT	150	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	12
FIS GREEN 300 T	**538219**	■	CS, SK	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS GREEN 300 T	**532972**	■	DA, SV, NO, FI	150	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	12
FIS MR Plus	**545853**	–	–	–	10 static mixer FIS MR Plus	10

LOADS

Injection system FIS GREEN: Injection mortar FIS GREEN with Threaded rod FIS A [1)]

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [2)3)4)5)]										Minimum spacings while reducing the load	
Type	**Material fixing element**	**Min. member thickness** h_{min} [mm]	**Effective anchorage depth** h_{ef} [6)] [mm]	**Maximum torque moment** T_{max} [Nm]	**Permissible tensile load** N_{perm} [7)] [kN]	**Permissible shear load** V_{perm} [7)] [kN]	**Required edge distance (with one edge) for** Max. tension load c [mm]	Max. shear load c [mm]	**Required spacing for** Max. Load s_{cr} [mm]	**Min. spacing** s_{min} [8)9)] [mm]	**Min. edge distance** c_{min} [8)9)] [mm]
M8	5.8	100	60	10	5,7	5,1	90	70	180	40	40
		110	80		7,6				240		
		190	160		9,0		40	60	480		
	8.8	100	60		5,7	8,6	90	130	180		
		110	80		7,6			115	240		
		190	160		14,3		85	90	480		
	A4-70	100	60		5,7	6,0	90	85	180		
		110	80		7,6			75	240		
		190	160		9,9		50	70	480		
	C-70	100	60		5,7	7,4	90	110	180		
		110	80		7,6			100	240		
		190	160		12,4		70	80	480		
M10	5.8	100	60	20	6,7	8,6	90	125	180	45	45
		120	90		10,1		110	105	270		
		230	200		13,8		55	85	600		
	8.8	100	60		6,7	13,1	90	200	180		
		120	90		10,1		110	170	270		
		230	200		22,4			115	600		
	A4-70	100	60		6,7	9,2	90	135	180		
		120	90		10,1		110	110	270		
		230	200		15,7		65	90	600		
	C-70	100	60		6,7	11,4	90	170	180		
		120	90		10,1		110	145	270		
		230	200		19,5		95	105	600		

LOADS

Injection system FIS GREEN: Injection mortar FIS GREEN with Threaded rod FIS A [1]

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [2] [3] [4] [5]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [6] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [7] [kN]	Permissible shear load V_{perm} [7] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [8] [9] [mm]	Min. edge distance c_{min} [8] [9] [mm]
M12	5.8	100	70	40	8,9	12,0	105	175	210	55	55
		140	110		14,0		130	130	330		
		270	240		20,5		70	100	720		
	8.8	100	70		8,9	19,4	105	295	210		
		140	110		14,0		130	230	330		
		270	240		30,5			150	720		
	A4-70	100	70		8,9	13,7	105	200	210		
		140	110		14,0		130	155	330		
		270	240		22,5		85	115	720		
	C-70	100	70		8,9	17,1	105	260	210		
		140	110		14,0		130	200	330		
		270	240		28,1		115	135	720		
M16	5.8	120	80	60	12,0	22,3	125	305	240	65	65
		170	125		18,7		160	235	375		
		360	320		37,6		115	150	960		
	8.8	120	80		12,0	28,7	125	405	240		
		170	125		18,7	36,0	160		375		
		360	320		47,9			220	960		
	A4-70	120	80		12,0	25,2	125	350	240		
		170	125		18,7		160	270	375		
		360	320		42,0		135	165	960		
	C-70	120	80		12,0	28,7	125	405	240		
		170	125		18,7	31,4	160	350	375		
		360	320		47,9			195	960		
M20	5.8	140	90	120	14,6	34,9	135	435	270	85	85
		220	170		27,6		190	300	510		
		450	400		58,6		165	195	1200		
	8.8	140	90		14,6	35,0	135	440	270		
		220	170		27,6	56,0	190	525	510		
		450	400		64,8			290	1200		
	A4-70	140	90		14,6	35,0	135	440	270		
		220	170		27,6	39,4	190	350	510		
		450	400		64,8			215	1200		
	C-70	140	90		14,6	35,0	135	440	270		
		220	170		27,6	49,1	190	455	510		
		450	400		64,8			260	1200		

For the design the complete assessment ETA-14/0408 has to be considered. [10]

[1] Also valid for anchor rod RG M in the same property class.

[2] The partial safety factors for material resistance as regulated in the ETA-14/0408 as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-14/0408.

[3] The given loads are valid for injection mortar FIS GREEN for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-14/0408.

[4] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[5] Drill method hammer drilling.

[6] For the sizes M8 - M20 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

[7] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-14/0408.

[8] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[9] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-14/0408.

[10] The given loads refer to the European Technical Assessment ETA-14/0408, issue date 19/12/2014. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

LOADS

Injection system FIS GREEN: Injection resin FIS GREEN with Internal threaded anchor RGMI

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~ B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Screw steel property/ surface	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [5)] [mm]	Min. edge distance c_{min} [5)] [mm]
RG M8 I	5.8	120	90	10	9,0	5,3	95	65	270	55	55
	8.8				11,9	8,3	135	95			
	A4-70				9,9	5,9	110	70			
RG M10 I	5.8	130	90	20	13,8	8,3	145	90	270	65	65
	8.8				13,9	13,3		155			
	A4-70					9,3		100			
RG M12 I	5.8	170	125	40	20,2	12,1	190	110	375	75	75
	8.8					19,3		190			
	A4-70					13,5		125			
RG M16 I	5.8	210	160	80	27,8	22,4	240	180	480	95	95
	8.8					30,9		265			
	A4-70					25,1		205			

For the design the complete assessment ETA-14/0408 has to be considered. [6)]

[1)] The partial safety factors for material resistance as regulated in the ETA-14/0408 as well as a partial safety factor for load actions of γ_L = 1.4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3-h_{ef} and an edge distance c ≥ 1.5-h_{ef}. Accurate data see ETA-14/0408.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling. For further allowable application conditions see ETA-14/0408.

[4)] For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[8)] The given loads refer to the European Technical Assessment ETA-14/0408, issue date 19/12/2014. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

LOADS

Injection system FIS GREEN with threaded rod FIS A[4)]

Highest permissible loads[1) 5)] for a single anchor in solid brick masonry (without injection anchor sleeve) for pre-positioned or push-through installation.

For the design the complete assessment ETA-14/0471 has to be considered.

Type	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions [6)] (L x W x H) [mm]	Min. effective anchorage depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\,\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing [2)] $s_{min\,\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Solid brick Mz, NF acc. to EN 771-1												
M8	≥10	≥1,8	240x115x71 (NF)	50	80	10	0,71	0,71	150	150	150	100
M10				50	80		0,86	1,14	150	150	150	100
M10				80	110		1,29	1,14	240	240	240	100
M10				200	230		3,14	2,43	300	300	300	150
M12				50	80		0,86	1,14	150	150	150	100
M12				80	110		1,43	1,14	240	240	240	100
M12				200	230		2,00	3,29	300	300	300	150
M8	≥20			50	80		0,71	1,14	150	150	150	100
M10				50	80		1,29	1,71	150	150	150	100
M10				80	110		1,71	1,71	240	240	240	100
M10				200	230		3,43	3,43	300	300	300	150
M12				50	80		1,14	1,57	150	150	150	100
M12				80	110		2,00	1,57	240	240	240	100
M12				200	230		2,86	3,43	300	300	300	150

LOADS

Injection system FIS GREEN with threaded rod FIS A[4)]

Highest permissible loads[1) 5)] for a single anchor in solid brick masonry (without injection anchor sleeve) for pre-positioned or push-through installation.

For the design the complete assessment ETA-14/0471 has to be considered.

Type	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions [6)] (L x W x H) [mm]	Min. effective anchorage depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing [2)] $s_{min\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Solid sand-lime brick KS acc. to EN 771												
M8	≥10	≥1,8	240x115x71 (NF)	50	80	10	0,71	1,14	150	150	150	100
M10				50	80		0,71	1,14	150	150	150	100
M10				80	110		0,86	1,14	240	240	240	100
M10				200	230		2,57	1,14	300	300	300	150
M12				50	80		0,57	1,43	150	150	150	100
M12				80	110		0,86	1,43	240	240	240	100
M12				200	230		2,57	1,43	300	300	300	150
M8	≥20			50	80		0,71	1,57	150	150	150	100
M10				50	80		0,86	1,57	150	150	150	100
M10				80	110		1,14	1,57	240	240	240	100
M10				200	230		3,43	1,57	300	300	300	150
M12				50	80		0,86	2,00	150	150	150	100
M12				80	110		1,29	2,00	240	240	240	100
M12				200	230		3,43	2,00	300	300	300	150

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

5) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

6) Hole patterns see assessment.

LOADS

Injection system FIS GREEN with threaded rod FIS A[5)] **and anchor sleeve FIS H..K**

Highest permissible loads[1) 6)] for a single anchor in solid brick masonry (with injection anchor sleeve) for pre-positioned installation.

For the design the complete assessment ETA-14/0471 has to be considered.

Type of anchor sleeve with anchor rod	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions [6)] (L x W x H) [mm]	Min. effective anchorage depth[4)] h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing [2)] $s_{min\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Solid sand-lime brick KS acc. to EN 771												
12x85 M8	≥ 10	≥ 1,8	240x115x113	85	115	2	0,86	0,86	255	255	255	100
16x85 M10						4	0,57	1,00				
20x85 M12						4	1,57	1,00				
12x85 M8	≥ 20			85	115	2	1,29	1,29				
16x85 M10						4	0,86	1,57				
20x85 M12						4	2,29	1,57				

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

5) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

6) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

7) Hole patterns see assessment.

LOADS

Injection system FIS GREEN with threaded rod FIS A[5] and anchor sleeve FIS H..K

Highest permissible loads[1) 6)] for a single anchor in perforated brick masonry (with injection anchor sleeve) for pre-positioned installation.
For the design the complete assessment ETA-14/0471 has to be considered.

Type of anchor sleeve with anchor rod	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick-dimensions[7)] (L x W x H) [mm]	Min. effevtive-anchorage depth[4)] h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\,\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing[2)] $s_{min\,\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Vertically perforated brick Hlz, acc. to EN 771-1												
12x85 M6/M8	≥ 8	≥ 1,4	230x108x55	85	115	2,0	0,57	0,71	230	55	230 / 55	100
16x85 M8/M10												
20x85 M12/M16												
12x85 M6/M8	≥ 10	≥ 0,9	240x175x113	85	175	2,0	0,57	1,14	240	115	240 / 115	120
16x85 M8/M10							0,57	1,57				
20x85 M12/M16							0,71	1,71				
Perforated sand-lime brick KSL acc. to EN 771-2												
12x85 M6/M8	≥ 12	≥ 1,4	240x175x113	85	175	2,0	0,34	0,71	240	115	240 / 115	100
16x85 M8/M10							0,57	1,57				
20x85 M12/M16							0,57	1,29				
12x85 M6/M8	≥ 20						0,57	1,29				
16x85 M8/M10							1,00	2,29				
20x85 M12/M16							1,00	2,14				

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

5) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

6) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

7) Hole patterns see assessment.

LOADS

Injection system FIS GREEN with threaded rod FIS A[4]

Highest permissible loads[1) 5)] for a single anchor in aerated concrete.
For the design the complete assessment ETA-14/0471 has to be considered.

Type anchor rod	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions (L x W x H) [mm]	Min. effective-anchorage depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\,\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing[2)] $s_{min\,\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Aerated concrete acc. to EN 771-4												
M8	≥ 2	≥ 0,35	-	100	130	1	0,71	0,32	240	115	240 / 115	80
M10						2	0,71	0,32				
M12						2	0,89	0,32				
M16						2	0,89	0,43				
M8	≥ 4	≥ 0,50				1	0,89	0,54				
M10						2	1,07	0,54				
M12						2	1,07	0,54				
M16						2	1,07	0,54				
M8	≥ 6	≥ 0,65				1	1,25	0,89				
M10						2	1,43	0,89				
M12						2	1,43	0,89				
M16						2	1,43	0,71				

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

5) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

fischer
FIS SB
390 S
SUPERBOND-MÖRTEL
SUPERBOND-MALTER
SUPERBOND MALTA
РАЗТВОР SUPERBOND
fischer
FIS V
360 S

3 Chemical fixings

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Mortars and Applications

Mortar Cartridges

	Positioning	Approved Substrates (ETA)					Approved Features									Page
		Cracked Concrete	Non-cracked Concrete	Solid Masonry	Perfo-rated Masonry	Aerated Concrete	Post-installed Rebar Connection	ICC	Fire Resistance R120	Seismic Approval	Waterfilled drill hole	Diamond drilling	Hollow drilling	Dynamic loads	Others	
Highbond-System FHB II	The best performance in cracked concrete	■	■						■				■	■	ZTV 1200 °C, BZS shock tested	52
Superbond-System FSB	The concrete all-rounder	■	■				■	■	■	C1, C2			■		Under-water applica-tions	64
Epoxy mortar FIS EM Plus	The powerful injection mortar for rebar con-nections and cracked concrete	■	■				■	■	■	C1, C2	■	■	■			86
Epoxy mortar FIS EB	The basic epoxy mortar for applications in concrete	■	■				■		■	C1, C2	■	■	■			95
Injection mortar FIS V	The versatile injection mortar for anchorings in masonry und cracked concrete	■	■	■	■	■	■	■	■	C1, C2	■		■			101
Injection mortar FIS VL	The solid injection mortar for standard applications in cracked concrete and masonry	■	■	■	■	■	■		■		■		■			117
Injection mortar FIS GREEN	The first approved mortar made with renewable raw materials		■	■	■	■			■						Biobased, EPD, Émission Dans L'Air Intérieur, NSF	126
Injection mortar FIS P Plus	The approved injection mortar for anchorings in masonry		■	■	■	■			■		■		■			133
Injection mortar FIS P	The reliable injection mortar for anchorings in masonry			(■)	(■)	(■)										140

■ = approved
(■) = recommendation

Mortars and Applications

	Positioning	Approved Substrates (ETA)					Approved Features									Page
		Cracked Concrete	Non-cracked Concrete	Solid Masonry	Perfo-rated Masonry	Aerated Concrete	Post-installed Rebar Connection	ICC	Fire Resistance R120	Seismic Approval	Waterfilled drill hole	Diamond drilling	Hollow drilling	Dynamic loads	Others	
Mortar Capsules																
Resin capsules FHB II-P, FHB II-PF High Speed	The best performance in cracked concrete	■	■						■		■		■			53
Resin capsules RSB	The concrete all-rounder	■	■						■	C1	■	■	■			73
Resin capsules RM II	Bonded anchor for cracked concrete without drill hole cleaning	■	■						■		■		■			80
UMV-P	The capsule system for the anchoring of dynamic loads	■	■											■		176

Mortars and Anchors

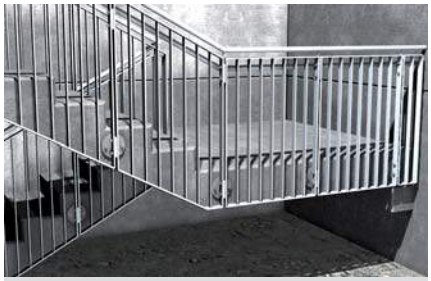
Mortar Cartridges	FIS HB	FIS SB	FIS EM Plus	FIS EB	FIS V	FIS VL	FIS GREEN	FIS P Plus	FIS P	Page
Positioning	**Best performance in concrete**	**Concrete all-rounder**	**Powerful rebar connections + cracked concrete**	**Basic Epoxy mortar for concrete**	**Versatile mortar for masonry und cracked concrete**	**Solid mortar for standard anchorings in masonry and cracked concrete**	**First approved mortar made with renewable raw materials**	**Approved for Masonry**	**Reliable in masonry**	
Threaded Rod FIS A		■	■	■	■	■	■	■	(■)	146
Threaded Rod RG M		■	■	■	■	■	■	■	(■)	154
Internal Threaded Anchor RG M I		■	■		■	■	■			159
Internal Threaded Socket FIS E					■	■	■	■	(■)	161
Highbond Anchor FHB II-A L / FHB II-AS	■									26
Highbond Anchor FHB II-A L Inject / FHB II-A S Inject	■									59
FHB dyn	■									170
FDA	■									174
UMV-A dyn										176

■ = approved · (■) = recommendation

Mortars and Anchors

Mortar Capsules	FHB II-P, FHB II-PF High Speed	RSB	RM II	UMV-P	Page
Positioning	Best performance in concrete	Concrete all-rounder	Bonded anchor for cracked concrete without drill hole cleaning	Capsule system for dynamic loads	
Threaded Rod FIS A					140
Threaded Rod RG M		■	■		154
Internal Threaded Anchor RG M I		■	■		159
Internal Threaded Socket FIS E					161
Highbond Anchor FHB II-A L / FHB II-AS	■				26
Highbond Anchor FHB II-A L Inject / FHB II-A S Inject					59
FHB dyn					170
FDA					174
UMV-A dyn				■	176

The best performance in cracked concrete



Banisters

Steel girders

VERSIONS

- Zinc-plated steel
- Stainless steel
- Highly corrosion-resistant steel

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

Also suitable for:

- Concrete C12/15

CERTIFICATES

ETA-05/0164
ETAG 001-5
Option 1 for cracked concrete

PROTEZIONE CIVILE PROTECTION CIVILE ZIVILSCHUTZ

Shock-tested; BZS approval for shockproof fixings in civilian shelters.

Fire resistance classification R 120
Anchor types see test report

ZTV
1200 °C
anchor types see test report

ADVANTAGES

- The Highbond system FHB II achieves the highest load values in cracked concrete. Thus fewer fixing points and smaller anchor plates are required.
- The injection mortar FIS HB and the capsules FHB II-P/PF offer the same performance and can be used with the FHB II-A S (short version) or L (long version) anchor rods. Thus, you can select the most economical solution based on requirements.
- The large cartridge size of the injection mortar FIS HB is ideally suited for serial installation.
- The pre-portioned resin capsule FHB II-P / PF HIGH SPEED is the economical solution for single applications or under water. A cleaning of the borehole during processing with capsule is not required.
- The special formulation used in the capsule FHB II-PF HIGH SPEED ensures especially fast curing and allows installation without waiting times.

APPLICATIONS

- Guard rails
- Façades
- Staircases
- Steel brackets
- Machines
- Silo installations
- Masts
- Rash protection
- Steelwork constructions
- Timber constructions

FUNCTIONING

- The FHB II is a bonded anchor with torque-controlled expansion for pre-positioned and push-through installation.
- The anchor rod can be set either with injection mortar FIS HB or with the capsule FHB II-P / FHB II-PF HIGH SPEED, and is fully bonded in the drill hole.
- When tightening the hexagon nut, the anchor rod cones are pulled into the mortar shell, which expands against the drill hole wall.
- The styrene-free vinyl ester mortar fully seals the drill hole.
- When using the resin capsule, set the anchor rod through rotating and hitting motions with a hammer drill. The RA-SDS setting tool, item no. 62420 is used.

SEE ALSO

DISPENSER
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ACCESSORIES
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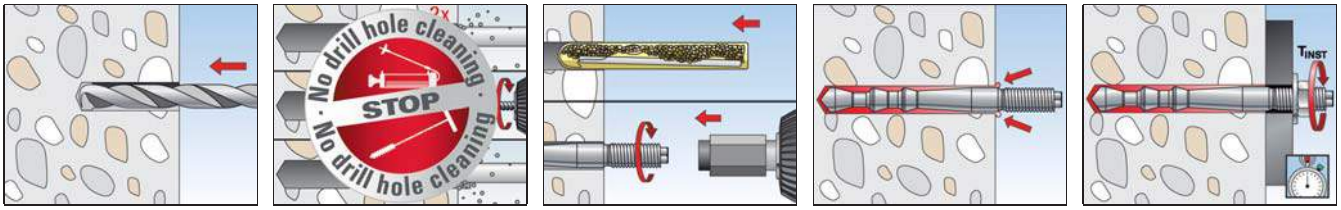
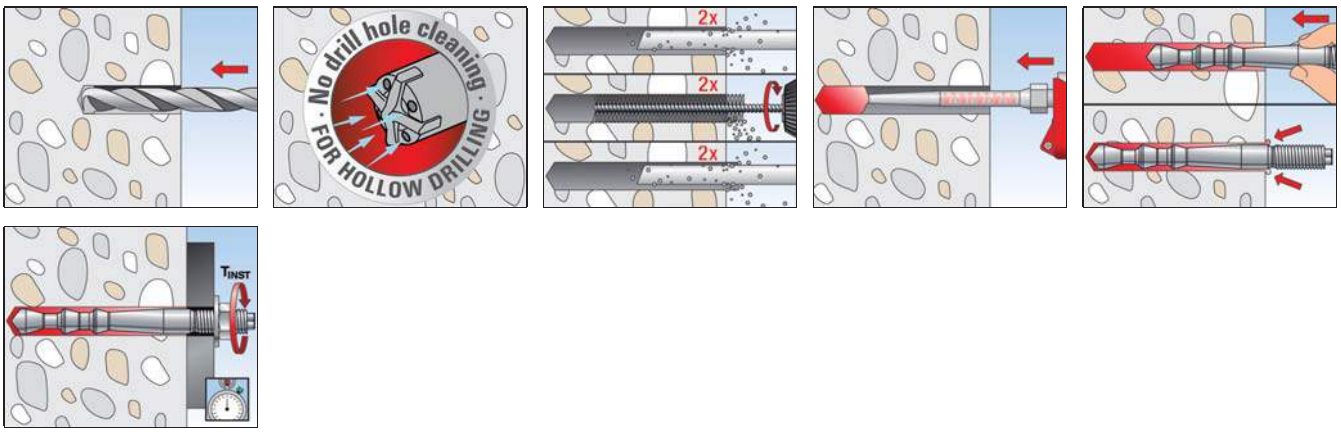
INSTALLATION IN CONCRETE WITH CAPSULE FHB II-P



INSTALLATION IN CONCRETE WITH FIS HB



TECHNICAL DATA

Injection mortar **FIS HB 345 S** + static mixer **FIS MR Plus**

Injection mortar **FIS HB 150 C**

		Approval	Languages on the cartridge	Scale unit	Contents	Sales unit
Item	**Art.-No.**	**ETA**				**[pcs]**
FIS HB 345 S	**033211**	■	DE, GB, FR, ES, NL, CS	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS HB 150 C	**519665**	■	DE, FR, NL	70	1 cartridge 145 ml, 2 x FIS MR Plus	6
FIS MR Plus	**545853**	–	–	–	10 static mixer FIS MR Plus	10

TECHNICAL DATA

Resin capsule **FHB II-P** (standard)

Item	Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Drill hole depth h_0 [mm]	Anchorage depth h_{ef} [mm]	Match	Sales unit [pcs]	
FHB II-P 8 x 60	**096824**	■	10	75	60	FHB II-A L M 8 x 60	10	
FHB II-P 10 x 60	**096847**	■	10	75	60	FHB II-S M 10 x 60	10	
FHB II-P 10 x 75	**508016**	■	10	90	75	FHB II-A S M 10 x 75	10	
FHB II-P 10 x 95	**096843**	■	12	110	95	FHB II-A L M 10 x 95	10	
FHB II-P 12 x 75	**096848**	■	12	90	75	FHB II-A S M 12 x 75	10	
FHB II-P 12 x 100	**507922**	■	14	115	100	FHB II-A L M 12 x 100	10	
FHB II-P 12 x 120	**096844**	■	14	135	120	FHB II-A L M 12 x 120	10	
FHB II-P 16 x 95	**096849**	■	16	110	95	FHB II-A S M 16 x 95	10	
FHB II-P 16 x 125	**507923**	■	18	145	125	FHB II-A L M 16 x 125	10	
FHB II-P 16 x 145	**507924**	■	18	165	145	FHB II-A L M 16 x 145	10	
FHB II-P 16 x 160	**096845**	■	18	175	160	FHB II-A L M 16 x 160	10	
FHB II-P 20 x 170	**507925**	■	25	190	170	FHB II-A S M 20 x 170	4	
FHB II-P 20 x 210	**096846**	■	25	235	210	FHB II-A L M 20 x 210	4	
FHB II-P 24 x 170	**096851**	■	25	190	170	FHB II-A S M 24 x 170	4	
FHB II-P 24 x 210	**507926**	■	25	235	210	FHB II-A L M 24 x 210	4	

TECHNICAL DATA

Resin capsule **FHB II-PF HIGH SPEED** (quick version)

Item	Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Drill hole depth h_0 [mm]	Anchorage depth h_{ef} [mm]	Match	Sales unit [pcs]	
FHB II-PF 8 x 60	**500542**	■	10	75	60	FHB II-A L M 8 x 60	10	
FHB II-PF 10 x 60	**500547**	■	10	75	60	FHB II-S M 10 x 60	10	
FHB II-PF 10 X 75	**507999**	■	10	90	75	FHB II-A S M 10 x 75	10	
FHB II-PF 10 x 95	**500543**	■	12	110	95	FHB II-A L M 10 x 95	10	
FHB II-PF 12 x 75	**500548**	■	12	90	75	FHB II-A S M 12 x 75	10	
FHB II-PF 12 x 100	**508000**	■	14	115	100	FHB II-A L M 12 x 100	10	
FHB II-PF 12 x 120	**500544**	■	14	135	120	FHB II-A L M 12 x 120	10	
FHB II-PF 16 x 95	**500549**	■	16	110	95	FHB II-A S M 16 x 95	10	
FHB II-PF 16 x 125	**508001**	■	18	145	125	FHB II-A L M 16 x 125	10	
FHB II-PF 16 x 145	**508002**	■	18	165	145	FHB II-A L M 16 x 145	10	
FHB II-PF 16 x 160	**500545**	■	18	175	160	FHB II-A L M 16 x 160	10	
FHB II-PF 20 x 170	**508003**	■	25	190	170	FHB II-A S M 20 x 170	4	
FHB II-PF 20 x 210	**500546**	■	25	235	210	FHB II-A L M 20 x 210	4	
FHB II-PF 24 x 170	**500550**	■	25	190	170	FHB II-A S M 24 x 170	4	
FHB II-PF 24 x 210	**508004**	■	25	235	210	FHB II-A L M 24 x 210	4	

CURING TIME - FIS HB

Cartridge temperature FIS HB (minimum + 5°C)	Gelling time FIS HB	Temperature at anchoring base	Curing time FIS HB
		- 5°C - ± 0°C	360 min.
		± 0°C - + 5°C	180 min.
+ 5°C - +20°C	15 min.	+ 5°C - +20°C	90 min.
+20°C - +30°C	6 min.	+20°C - +30°C	35 min.
+30°C - +40°C	4 min.	+30°C - +40°C	20 min.
> +40°C	2 min.	> +40°C	12 min.

Please note: The curing times apply for dry anchoring bases, in damp anchoring bases they should be doubled. Remove water from drill hole.

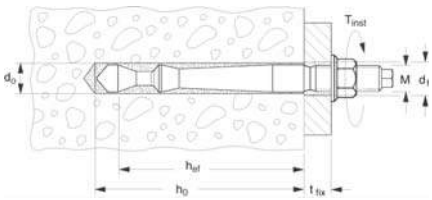
CURING TIME - FHB II P / FHB II-PF HIGH SPEED

Temperature at anchoring base	Curing time	
	FHB II-P	FHB II-PF HIGH SPEED
- 5°C - ± 0°C	240 min.	8 min.
± 0°C - +10°C	45 min.	6 min.
+10°C - + 20°C	20 min.	4 min.
≧ + 20°C	10 min.	2 min.

Please note: The curing times apply for dry anchoring bases, in damp anchoring bases they should be doubled.

TECHNICAL DATA

Highbond anchor **FHB II-A S** (short version)

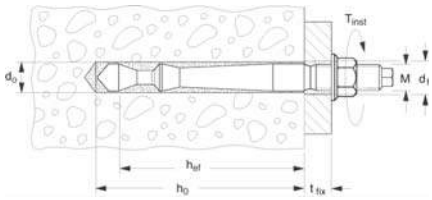


Item	Zinc-plated steel Art.-No. gvz	Stainless steel Art.-No. A4	Highly corrosion resistant steel Art.-No. C	Approval ETA	Drill hole diameter d_0 [mm]	Drill hole depth h_0 [mm]	Anchorage depth h_{ef} [mm]	Usable length t_{fix} [mm]	Thread M	Width across nut ○ SW [mm]	Sales unit [pcs]
FHB II-A S M10 x 60/10	**097072**	**097630**	**097704** 1)	■	10	75	60	10	M 10	17	10
FHB II-A S M10 x 60/20	**097073**	**097631**	—	■	10	75	60	20	M 10	17	10
FHB II-A S M10 x 60/40	—	**097632**	—	■	10	75	60	40	M 10	17	10

1) Delivery time on request.

TECHNICAL DATA

Highbond anchor **FHB II-A S** (short version)

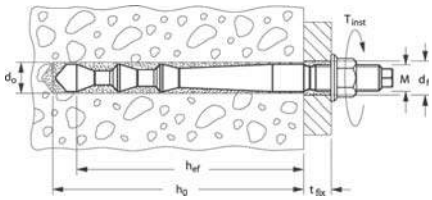


	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Approval	Drill hole diameter	Drill hole depth	Anchorage depth	Usable length	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_0 [mm]	h_{ef} [mm]	t_{fix} [mm]	M	⬡ SW [mm]	[pcs]
Item	gvz	A4	C								
FHB II-A S M10 x 60/60	097074	097633	–	■	10	75	60	60	M 10	17	10
FHB II-A S M10 x 60/100	097206	097634	–	■	10	75	60	100	M 10	17	10
FHB II-A S M10 x 75/10	506884	506888	–	■	10	90	75	10	M 10	17	10
FHB II-A S M10 x 75/20	506885	506889	–	■	10	90	75	20	M 10	17	10
FHB II-A S M10 x 75/40	–	506890	–	■	10	90	75	40	M 10	17	10
FHB II-A S M10 x 75/60	506886	506891	–	■	10	90	75	60	M 10	17	10
FHB II-A S M10 x 75/100	506887	506892	–	■	10	90	75	100	M 10	17	10
FHB II-A S M12 x 75/10	097257	097635	–	■	12	90	75	10	M 12	19	10
FHB II-A S M12 x 75/25	097268	097636	097706 1)	■	12	90	75	25	M 12	19	10
FHB II-A S M12 x 75/40	–	097637	–	■	12	90	75	40	M 12	19	10
FHB II-A S M12 x 75/60	097274	097638	–	■	12	90	75	60	M 12	19	10
FHB II-A S M12 x 75/100	097275	097639	–	■	12	90	75	100	M 12	19	10
FHB II-A S M12 x 75/165	097280	097640	–	■	12	90	75	165	M 12	19	10
FHB II-A S M16 x 95/30	097281	097641	097708 1)	■	16	110	95	30	M 16	24	10
FHB II-A S M16 x 95/60	097286	097642	–	■	16	110	95	60	M 16	24	10
FHB II-A S M16 x 95/100	097295	097643	–	■	16	110	95	100	M 16	24	10
FHB II-A S M16 x 95/165	097296	097644	–	■	16	110	95	165	M 16	24	10
FHB II-A S M20 x 170/50	506917	506919	–	■	25	190	170	50	M 20	30	4
FHB II-A S M24 x 170/50	097297	097645	–	■	25	190	170	50	M 24	36	4

1) Delivery time on request.

TECHNICAL DATA

Highbond anchor **FHB II-A L** (long version)

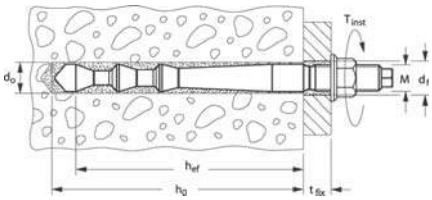


	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Approval	Drill hole diameter	Drill hole depth	Anchorage depth	Usable length	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_0 [mm]	h_{ef} [mm]	t_{fix} [mm]	M	⬡ SW [mm]	[pcs]
Item	gvz	A4	C								
FHB II-A L M8 x 60/10	097032	097298	097696 1)	■	10	75	60	10	M 8	13	10
FHB II-A L M8 x 60/30	097033	097299	–	■	10	75	60	30	M 8	13	10
FHB II-A L M8 x 60/50	097034	097440	–	■	10	75	60	50	M 8	13	10
FHB II-A L M10 x 95/10	096907	097616	–	■	12	110	95	10	M 10	17	10
FHB II-A L M10 x 95/20	096940	097617	097699 1)	■	12	110	95	20	M 10	17	10
FHB II-A L M10 x 95/40	–	097618	–	■	12	110	95	40	M 10	17	10
FHB II-A L M10 x 95/60	096941	097619	–	■	12	110	95	60	M 10	17	10
FHB II-A L M10 x 95/100	096942	097620	–	■	12	110	95	100	M 10	17	10
FHB II-A L M12 x 100/10	506893	506897	–	■	14	115	100	10	M 12	19	10
FHB II-A L M12 x 100/25	506894	506898	–	■	14	115	100	25	M 12	19	10
FHB II-A L M12 x 100/40	–	506899	–	■	14	115	100	40	M 12	19	10
FHB II-A L M12 x 100/50 GS A4	–	537065	–	■	14	115	100	50	M 12	19	10
FHB II-A L M12 x 100/60	506895	506901	–	■	14	115	100	60	M 12	19	10
FHB II-A L M12 x 100/100	506896	506902	–	■	14	115	100	100	M 12	19	10
FHB II-A L M12 x 120/10	096943	097621	–	■	14	135	120	10	M 12	19	10

1) Delivery time on request.

TECHNICAL DATA

Highbond anchor **FHB II-A L** (long version)



	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Approval	Drill hole diameter	Drill hole depth	Anchorage depth	Usable length	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_0 [mm]	h_{ef} [mm]	t_{fix} [mm]	M	○ SW [mm]	[pcs]
Item	gvz	A4	C								
FHB II-A L M12 x 120/25	**096944**	**097622**	**097700** 1)	■	14	135	120	25	M 12	19	10
FHB II-A L M12 x 120/40	–	**097623**	–	■	14	135	120	40	M 12	19	10
FHB II-A L M12 x 120/60	**097014**	**097624**	–	■	14	135	120	60	M 12	19	10
FHB II-A L M12 x 120/100	**097031**	**097625**	–	■	14	135	120	100	M 12	19	10
FHB II-A L M16 x 125/30	**506903**	**506906**	–	■	18	140	125	30	M 16	24	10
FHB II-A L M16 x 125/60	**506904**	**506909**	–	■	18	140	125	60	M 16	24	10
FHB II-A L M16 x 125/100	**506905**	**506910**	–	■	18	140	125	100	M 16	24	10
FHB II-A L M16 x 145/30	**506911**	**506914**	–	■	18	160	145	30	M 16	24	10
FHB II-A L M16 x 145/60	**506912**	**506915**	–	■	18	160	145	60	M 16	24	10
FHB II-A L M16 x 145/100	**506913**	**506916**	–	■	18	160	145	100	M 16	24	10
FHB II-A L M16 x 160/30	**097035**	**097626**	**097702** 1)	■	18	175	160	30	M 16	24	10
FHB II-A L M16 x 160/60	**097038**	**097627**	–	■	18	175	160	60	M 16	24	10
FHB II-A L M16 x 160/100	**097070**	**097628**	–	■	18	175	160	100	M 16	24	10
FHB II-A L M20 x 210/50	**097071**	**097629**	**097703** 1)	■	25	235	210	50	M 20	30	4
FHB II-A L M20 x 210/150	**052370**	–	–	■	25	235	210	150	M 20	30	8
FHB II-A L M24 x 210/50	**506920**	**506921**	–	■	25	235	210	50	M 24	36	4

1) Delivery time on request.

FILLING QUANTITIES

Type	Drill hole diameter [mm]	Min. drill hole depth [mm]	Mortar volume in scale units shown on the cartridge labels' corresponding scala	Anchor per cartridge FIS HB 345 S *)
FHB II-A S M10 x 60	10	75	3	56
FHB II-A S M10 x 75	10	90	4	42
FHB II-A S M12 x 75	12	90	4	42
FHB II-A S M16 x 95	16	110	8	21
FHB II-A S M20 x 170	25	190	26	6
FHB II-A S M24 x 170	25	190	26	6

*) max. number with one static mixer

FILLING QUANTITIES

Type	Drill hole diameter [mm]	Min. drill hole depth [mm]	Mortar volume in scale units shown on the cartridge labels' corresponding scala	Anchor per cartridge FIS HB 345 S *)
FHB II-A L M8 x 60	10	75	3	56
FHB II-A L M10 x 95	12	110	5	34
FHB II-A L M12 x 100	14	115	7	24
FHB II-A L M12 x 120	14	135	7	24
FHB II-A L M16 x 125	18	140	11	15
FHB II-A L M16 x 145	18	160	13	13
FHB II-A L M16 x 160	18	175	13	13
FHB II-A L M20 x 210	25	235	33	5
FHB II-A L M24 x 210	25	235	33	5

*) max. number with one static mixer

LOADS

Highbond anchor FHB II [1]

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 [2][3][4]									Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [5] [kN]	Permissible shear load V_{perm} [5] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s [mm]	Min. spacing s_{min} [6] [mm]	Min. edge distance c_{min} [6] [mm]
FHB II-A L M8 x 60	gvz	100	60	15	8,0[1]	7,8	150	163	180	40	40
	A4-70					8,7		183			
	C-70										
FHB II-A S M10 x 60	gvz	100	60	15	8,0[1]	11,3	150	245	180	40	40
	A4-70					13,8		306			
	C-70										
FHB II-A S M10 x 75	gvz	120	75	15	11,1	11,3	150	215	225	40	40
	A4-70					13,8		269			
FHB II-A L M10 x 95	gvz	140	95	20	15,9	11,9	238	197	285	40	40
	A4-70					13,3		224			
	C-70										
FHB II-A S M12 x 75	gvz	120	75	30	11,1	15,6	150	304	225	40	40
	A4-70					19,3		384			
	C-70										
FHB II-A L M12 x 100	gvz	140	100	40	17,1	17,3	190	296	300	50	50
	A4-70					19,3		334			
FHB II-A L M12 x 120	gvz	170	120	40	22,5	17,3	300	259	360	50	50
	A4-70					19,3		292			
	C-70										
FHB II-A S M16 x 95	gvz	150	95	50	15,9	29,0	170	506	285	50	50
	A4-70					31,7		559			
	C-70										
FHB II-A L M16 x 125	gvz	170	125	60	24,0	32,2	188	505	375	55	55
	A4-70					35,8		570			
FHB II-A L M16 x 145	gvz	190	145	60	29,9	32,2	250	464	435	60	60
	A4-70					35,8		525			
FHB II-A L M16 x 160	gvz	220	160	60	34,7	32,2	290	423	480	70	70
	A4-70					35,8		479			
	C-70										
FHB II-A S M20 x 170	gvz	240	170	100	38,0	45,9	255	571	510	80	80
	A4-70					55,9		719			
FHB II-A L M20 x 210	gvz	280	210	100	52,2	50,2	315	563	630	90	90
	A4-70					55,9		639			
	C-70										
FHB II-A S M24 x 170	gvz	240	170	100	38,0	65,3	255	857	510	80	80
	A4-70					71,1		946			
	C-70					76,0		1019			
FHB II-A L M24 x 210	gvz	280	210	100	52,2	72,5	315	863	630	90	90
	A4-70					80,6		974			

For the design the complete assessment ETA-05/0164 has to be considered. [7]

[1] Valid for injection mortar FIS HB. For using the glass capsule FHB II-P or FHB II-PF see ETA-05/0164.

[2] The partial safety factors for material resistance as regulated in the ETA-05/0164 as well as a partial safety factor for load actions of γ_L = 1.4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1.5 \cdot h_{ef}$. Accurate data see ETA-05/0164.

[3] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[4] Drill method Hammer drilling.

[5] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-05/0164.

[6] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[7] The given loads refer to the assessment ETA-05/0164, issue date 14/12/2017. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

LOADS

Highbond anchor FHB II [1)]

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 [2)3)4)]											
							Required edge distance (with one edge) for			Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Max. tension load c [mm]	Max. shear load c [mm]	Required spacing for Max. Load s [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
FHB II-A L M8 x 60	gvz	100	60	15	11,2[1)]	7,8	150	110	180	40	40
	A4-70					8,7		124			
	C-70										
FHB II-A S M10 x 60	gvz	100	60	15	11,2[1)]	11,3	150	166	180	40	40
	A4-70					13,8		209			
	C-70										
FHB II-A S M10 x 75	gvz	120	75	15	12,0	11,3	103	145	225	40	40
	A4-70					13,8		183			
FHB II-A L M10 x 95	gvz	140	95	20	16,4	11,9	139	131	285	40	40
	A4-70					13,3		150			
	C-70										
FHB II-A S M12 x 75	gvz	120	75	30	15,6	15,6	150	206	225	40	40
	A4-70					19,3		261			
	C-70										
FHB II-A L M12 x 100	gvz	140	100	40	23,7	17,3	187	198	300	50	50
	A4-70					19,3		225			
FHB II-A L M12 x 120	gvz	170	120	40	23,7	17,3	179	172	360	50	50
	A4-70					19,3		195			
	C-70										
FHB II-A S M16 x 95	gvz	150	95	50	22,3	29,0	170	343	285	50	50
	A4-70					35,8		435			
	C-70										
FHB II-A L M16 x 125	gvz	170	125	60	33,6	32,2	188	339	375	55	55
	A4-70					35,8		384			
FHB II-A L M16 x 145	gvz	190	145	60	42,0	32,2	250	310	435	60	60
	A4-70					35,8		352			
FHB II-A L M16 x 160	gvz	220	160	60	46,0	32,2	270	282	480	70	70
	A4-70					35,8		321			
	C-70										
FHB II-A S M20 x 170	gvz	240	170	100	53,3	45,9	255	380	510	80	80
	A4-70					55,9		481			
FHB II-A L M20 x 210	gvz	280	210	100	65,5	50,2	273	372	630	90	90
	A4-70					55,9		424			
	C-70										
FHB II-A S M24 x 170	gvz	240	170	100	53,3	65,3	255	576	510	80	80
	A4-70					71,1		637			
	C-70					80,6		735			
FHB II-A L M24 x 210	gvz	280	210	100	65,5	72,5	273	578	630	90	90
	A4-70					80,6		654			

For the design the complete assessment ETA-05/0164 has to be considered. [7)]

[1)] Valid for injection mortar FIS HB. For using the glass capsule FHB II-P or FHB II-PF see ETA-05/0164.

[2)] The partial safety factors for material resistance as regulated in the ETA-05/0164 as well as a partial safety factor for load actions of γ_L = 1.4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1.5 \cdot h_{ef}$. Accurate data see ETA-05/0164.

[3)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[4)] Drill method Hammer drilling.

[5)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-05/0164.

[6)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[7)] The given loads refer to the assessment ETA-05/0164, issue date 14/12/2017. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

The economical solution in cracked concrete

Bridge railings

Steel constructions

VERSIONS

- Stainless steel A4

BUILDING MATERIALS

Approved for:
- Concrete C20/25 to C50/60, cracked and non-cracked

Also suitable for:
- Concrete C12/15

CERTIFICATES

ETA-16/0637
ETAG 001-5
Option 1 for cracked concrete

ADVANTAGES

- The Highbond system FHB II Inject achieves high load values in cracked concrete.
- The combination of injection mortar FIS HB and anchor rod FHB II-AS Inject A4 (short version) or FHB II-AL Inject A4 (long version) is ideally suited for serial installation outdoors.
- The low drill hole depth minimizes the drilling effort, which saves time and ensures economical installation.
- When using hollow drills with extraction, no drill hole cleaning is required.

APPLICATIONS

- Bridge railings
- Façades
- Staircases
- Steel constructions
- Masts

FUNCTIONING

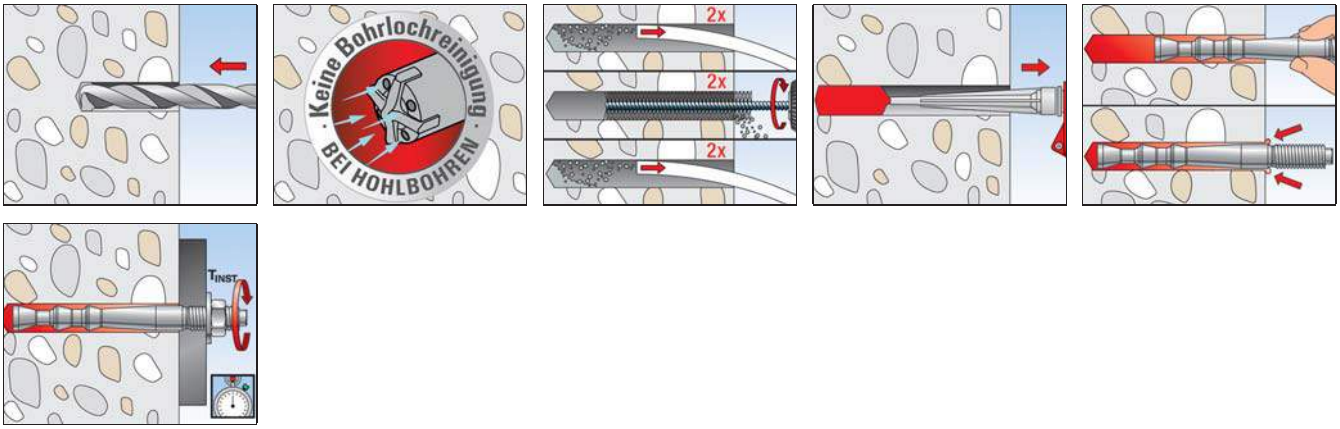
- The FHB II Inject is a bonded anchor with torque-controlled expansion for pre-positioned and push-trough installation.
- For FHB II-AL Inject, the annular gap must be filled with Highbond special mortar FIS HB in case of push-through installation.
- The anchor rod is set with the Highbond special motor FIS HB and is fully bonded in the drill hole.
- When tightening the hexagon nut, the anchor rod cones are pulled in the motar shell, which expands against the drill hole wall.

SEE ALSO

DISPENSER
Page 195

ACCESSORIES
Page 198

INSTALLATION IN CONCRETE WITH FIS HB



TECHNICAL DATA

Injection mortar **FIS HB 345 S**
+ static mixer **FIS MR Plus**

Injection mortar **FIS HB 150 C**

		Approval	Languages on the cartridge	Scale unit	Contents	Sales unit
Item	Art.-No.	ETA				[pcs]
FIS HB 345 S	**033211**	■	DE, GB, FR, ES, NL, CS	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS HB 150 C	**519665**	■	DE, FR, NL	70	1 cartridge 145 ml, 2 x FIS MR Plus	6
FIS MR Plus	**545853**	–	–	–	10 static mixer FIS MR Plus	10

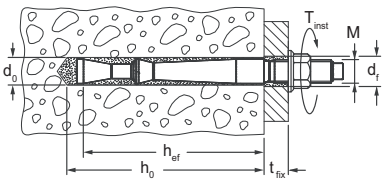
CURING TIME - FIS HB

Cartridge temperature FIS HB (minimum + 5°C)	Gelling time FIS HB	Temperature at anchoring base	Curing time FIS HB
		- 5°C - ± 0°C	360 min.
		± 0°C - + 5°C	180 min.
+ 5°C - +20°C	15 min.	+ 5°C - +20°C	90 min.
+20°C - +30°C	6 min.	+20°C - +30°C	35 min.
+30°C - +40°C	4 min.	+30°C - +40°C	20 min.
> +40°C	2 min.	> +40°C	12 min.

Please note: The curing times apply for dry anchoring bases, in damp anchoring bases they should be doubled. Remove water from drill hole.

TECHNICAL DATA

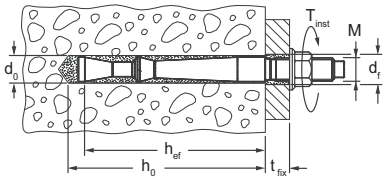
Highbond anchor **FHB II-A S Inject**
(short version)



	Stainless steel Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Drill hole depth h_0 [mm]	Anchorage depth h_{ef} [mm]	Total length l [mm]	Usable length t_{fix} [mm]	Width across nut ⬡ SW [mm]	Sales unit [pcs]
Item	A4								
FHB II-A S Inject M10 x 60/10	**539911**	■	10	66	60	90	10	17	10
FHB II-A S Inject M10 x 60/20	**539912**	■	10	66	60	100	20	17	10
FHB II-A S Inject M10 x 60/30	**539927**	■	10	66	60	110	30	17	10
FHB II-A S Inject M10 x 60/40	**539913**	■	10	66	60	120	40	17	10
FHB II-A S Inject M10 x 60/100	**539914**	■	10	66	60	180	100	17	10
FHB II-A S Inject M12 x 75/25	**539928**	■	12	81	75	123	25	19	10
FHB II-A S Inject M12 x 75/50	**539929**	■	12	81	75	148	50	19	10

TECHNICAL DATA

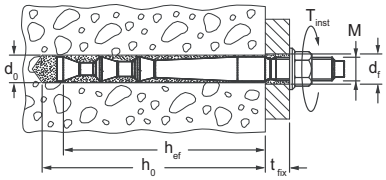
Highbond anchor **FHB II-A S Inject**
(short version)



	Stainless steel	Approval	Drill hole diameter	Drill hole depth	Anchorage depth	Total length	Usable length	Width across nut	Sales unit
	Art.-No.	ETA	d_0 [mm]	h_0 [mm]	h_{ef} [mm]	l [mm]	t_{fix} [mm]	⬡ SW [mm]	[pcs]
Item	**A4**								
FHB II-A S Inject M16 x 95/30	**539920**	■	16	101	95	150	30	24	10
FHB II-A S Inject M16 x 95/60	**539921**	■	16	101	95	180	60	24	10

TECHNICAL DATA

Highbond anchor **FHB II-A L Inject**
(long version)



	Stainless steel	Approval	Drill hole diameter	Drill hole depth	Anchorage depth	Total length	Usable length	Width across nut	Sales unit
	Art.-No.	ETA	d_0 [mm]	h_0 [mm]	h_{ef} [mm]	l [mm]	t_{fix} [mm]	⬡ SW [mm]	[pcs]
Item	**A4**								
FHB II-A L Inject M10 x 95/10	**539916**	■	12	101	95	125	10	17	10
FHB II-A L Inject M10 x 95/20	**539917**	■	12	101	95	135	20	17	10
FHB II-A L Inject M12 x 100/25	**539918**	■	14	106	100	148	25	19	10
FHB II-A L Inject M12 x 120/25	**539919**	■	14	126	120	160	25	19	10
FHB II-A L Inject M16 x 125/30	**539922**	■	18	131	125	180	30	24	10
FHB II-A L Inject M16 x 125/60	**539923**	■	18	131	125	210	60	24	10
FHB II-A L Inject M16 x 160/30	**539925**	■	18	166	160	215	30	24	10
FHB II-A L Inject M16 x 160/60	**539926**	■	18	166	160	245	60	24	10

FILLING QUANTITIES FHB II-A S INJECT

Type	Drill hole diameter [mm]	Min. drill hole depth [mm]	Mortar volume in scale units shown on the cartridge labels' corresponding scala	Anchor per cartridge FIS HB 345 S *)
FHB II-A S Inject M10 x 60	10	75	3	56
FHB II-A S Inject M12 x 75	12	90	4	42
FHB II-A S Inject M16 x 95	16	110	8	21

*) max. number with one static mixer

FILLING QUANTITIES FHB II-A L INJECT

Type	Drill hole diameter [mm]	Min. drill hole depth [mm]	Mortar volume in scale units shown on the cartridge labels' corresponding scala	Anchor per cartridge FIS HB 345 S *)
FHB II-A L Inject M10 x 95	12	110	5	34
FHB II-A L Inject M12 x 100	14	115	6	24
FHB II-A L Inject M12 x 120	14	135	7	24
FHB II-A L Inject M16 x 125	18	140	11	15
FHB II-A L Inject M16 x 160	18	175	13	13

*) max. number with one static mixer

LOADS

Highbond anchor FHB II Inject: Injection mortar FIS HB with Anchor rod FHB II-A Inject
stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 7)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [5)] [mm]	Min. edge distance c_{min} [5)] [mm]
FHB II-A S Inject M10 x 60	A4	100	60	15	8,0	13,8	90	310	180	40	40
FHB II-A L Inject M10 x 95	A4	140	95	20	15,9	13,3	145	225	285	40	40
FHB II-A S Inject M12 x 75	A4	120	75	30	11,1	19,3	115	385	225	40	40
FHB II-A L Inject M12 x 100	A4	140	100	40	17,1	19,3	150	335	300	50	50
FHB II-A L Inject M12 x 120	A4	170	120	40	22,5	19,3	180	295	360	50	50
FHB II-A S Inject M16 x 95	A4	150	95	50	15,9	31,7	145	560	285	50	50
FHB II-A L Inject M16 x 125	A4	170	125	60	24,0	35,8	190	570	375	55	55
FHB II-A L Inject M16 x 160	A4	220	160	60	34,7	35,8	240	480	480	70	70

For the design the complete assessment ETA-16/0637 has to be considered. [6)]

[1)] The partial safety factors for material resistance as regulated in the ETA-16/0637 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As a single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-16/0637.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling.

[4)] For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[6)] The given loads refer to the European Technical Assessment ETA-16/0637, issue date 14/12/2017. Design of the loads according to ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

[7)] A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0{,}3$ mm.

LOADS

Highbond anchor FHB II Inject: Injection mortar FIS HB with Anchor rod FHB II-A Inject
stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [5)] [mm]	Min. edge distance c_{min} [5)] [mm]
FHB II-A S Inject M10 x 60	A4	100	60	15	11,2	13,8	150	210	180	40	40
FHB II-A L Inject M10 x 95	A4	140	95	20	16,4	13,3	140	150	285	40	40
FHB II-A S Inject M12 x 75	A4	120	75	30	15,6	19,3	150	265	225	40	40
FHB II-A L Inject M12 x 100	A4	140	100	40	23,7	19,3	190	225	300	50	50
FHB II-A L Inject M12 x 120	A4	170	120	40	23,7	19,3	180	195	360	50	50
FHB II-A S Inject M16 x 95	A4	150	95	50	22,3	35,8	170	435	285	50	50
FHB II-A L Inject M16 x 125	A4	170	125	60	33,6	35,8	190	385	375	55	55
FHB II-A L Inject M16 x 160	A4	220	160	60	46,0	35,8	270	325	480	70	70

For the design the complete assessment ETA-16/0637 has to be considered. [6)]

[1)] The partial safety factors for material resistance as regulated in the ETA-16/0637 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As a single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-16/0637.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling.

[4)] For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[6)] The given loads refer to the European Technical Assessment ETA-16/0637, issue date 14/12/2017. Design of the loads according to ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

The concrete all-rounder

Bridges for traffic signs

Steel girders

BUILDING MATERIALS

Approved for anchorings in:
- Concrete C20/25 to C50/60, cracked and non-cracked

Also suitable for:
- Natural stone with dense structure

CERTIFICATES

ETA-12/0258
ETAG 001-5
Option 1 for cracked concrete
Seismic performance category C1, C2

ETA-13/0651
ETAG 001-5
Post-installed rebar connection (TR23)

Fire resistance classification R 120
Anchor types see test report

SEISMIC

ICC ES ESR-3572
See ICC-ES Evaluation Report at www.icc-es.org

ADVANTAGES

- The Superbond system is a combined capsule and injection system for cracked and non-cracked concrete. The injection mortar FIS SB and resin capsule RSB perform the same as each other at the same anchorage depth. This gives the installer maximum flexibility.
- Variable anchorage depths from 4 x d_s to 20 x d_s enable ideal adaptation to the load to be applied, and thus ensure an optimised installation time and use of materials.
- Maximum application temperatures of up to +150 °C open up new areas of use for bonded anchors.
- Superbond is even approved for installation at frosty temperatures of -30 °C.
- The approval-compliant use for seismic applications (performance category C1, C2) as well as in waterfilled and diamond drill holes ensures safety even in extreme conditions.

APPLICATIONS

- Heavy steel constructions
- Silo installations
- Tall shelving
- Sound barriers
- Guard rails
- Staircases
- Reinforcing steel (only FIS SB)
- Overhead installations
- Water-filled drill holes
- Diamond drilled holes

FUNCTIONING

- Superbond is a bonded anchor system based on a vinyl ester hybrid with silane technology.
- The threaded rod FIS A can only be set with injection mortar FIS SB (Standard and HIGH SPEED); the threaded rod RG M with oblique edge can be optionally set with injection mortar FIS SB (Standard and HIGH SPEED) or resin capsule RSB.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion through the injection cartridge in the static mixer or destruction of the capsule during the setting procedure.
- The mortar bonds the entire surface of the fastening element with the drill hole wall and seals the drill hole.

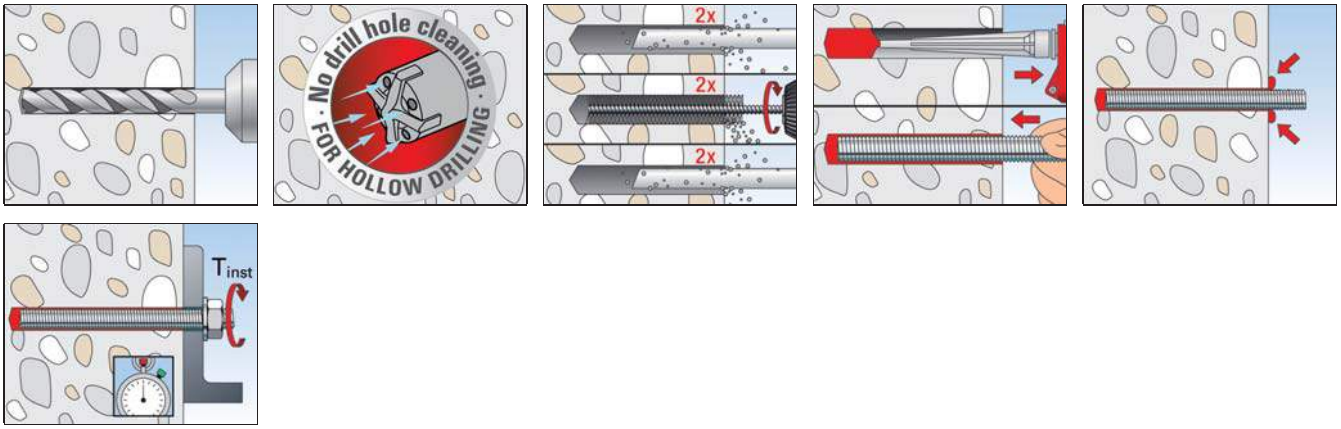
SEE ALSO

ANCHORS + SLEEVES Page 144

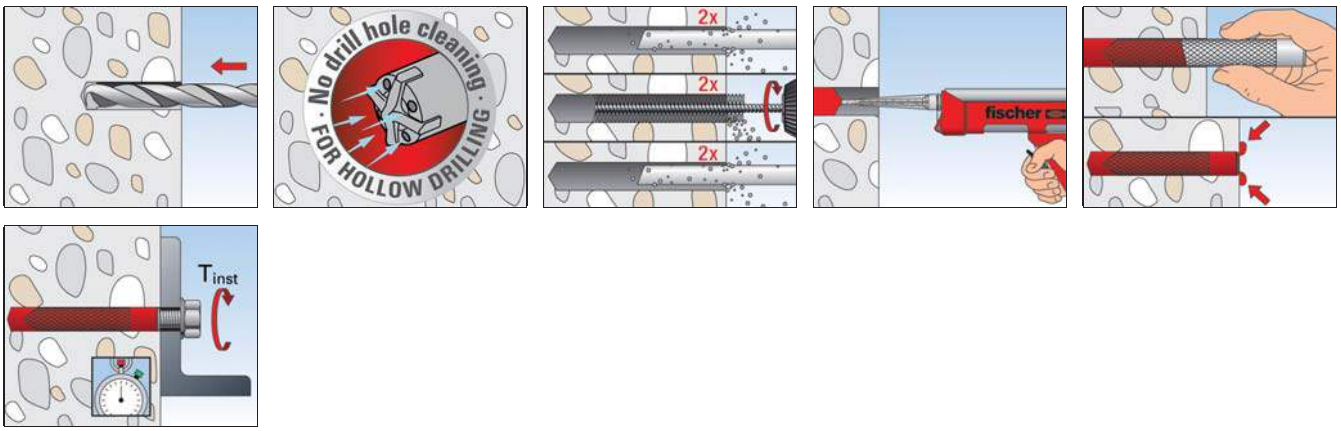
DISPENSER Page 195

ACCESSORIES Page 198

INSTALLATION IN CONCRETE WITH FIS SB AND FIS A / RG M



INSTALLATION IN CONCRETE WITH FIS SB AND RG M I



TECHNICAL DATA

Superbond mortar
FIS SB 390 S

Static mixer **FIS MR Plus**

		Approval		Languages on the cartridge	Scale unit	Contents	Sales unit
Item	Art.-No.	ETA	ICC				[pcs]
FIS SB 390 S	**519451**	■	▲	DE, FR, NL	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS SB 390 S	**520557**	■	▲	DE, SL, SR, BG	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS SB 390 S	**518831**	■	▲	EN, ES, PT	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS SB 390 S	**519450**	■	▲	IT, EN, DE	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS SB 390 S	**520559**	■	▲	DA, SV, NO, FI	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS SB 390 S	**520555**	■	▲	CS, SK, RO	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS SB 390 S	**520595**	■	▲	PL, RU, HU	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS SB 585 S	**519452**	■	▲	EN, ES, PT	270	1 cartridge 585 ml + 2 x FIS UMR	6
FIS SB 585 S	**520526**	■	▲	IT, EN, DE	270	1 cartridge 585 ml + 2 x FIS UMR	6
FIS SB HIGH SPEED 390 S	**523303**	■	–	PL, RUS, HU	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS MR Plus	**545853**	–	–	–	–	10 static mixer FIS MR Plus	10
FIS UMR	**520593**	–	–	–	–	10 static mixer FIS UMR for 585 ml and 1500 ml cartridges	10

FIS SB 390 S HWK big

FIS SB 390 S in bucket

		Approval		Languages on the cartridge	Contents	Sales unit
Item	Art.-No.	ETA	ICC			[pcs]
FIS SB 390 S HWK big	**540252**	■	▲	EN, ES, PT	20 cartridges 390 ml, 40 x FIS MR Plus	1
FIS SB 390 S HWK big	**520573**	■	▲	IT, EN, DE	20 cartridges 390 ml, 20 x FIS MR Plus	1
FIS SB 390 S in bucket	**540750**	■	▲	EN, ES, PT	18 cartridges 390 ml, 36 x FIS MR Plus	1

GELLING AND CURING TIME

Temperature at anchoring base	Gelling time		Curing time	
	FIS SB Standard	FIS SB HIGH SPEED	FIS SB Standard	FIS SB HIGH SPEED
> - 20°C – - 15°C	–	60 min.	–	24 hrs.
> - 15°C – - 10°C	60 min.	30 min.	36 hrs.	8 hrs.
> - 10°C – - 5°C	30 min.	15 min.	24 hrs.	180 min.
> - 5°C – ± 0°C	20 min.	10 min.	8 hrs.	120 min.
> ± 0°C – + 5°C	13 min.	5 min.	4 hrs.	60 min.
> + 5°C – +10°C	9 min.	3 min.	120 min.	45 min.
> + 10°C – +20°C	5 min.	2 min.	60 min.	30 min.
> + 20°C – +30°C	4 min.	1 min.	45 min.	15 min.
> + 30°C – +40°C	2 min.	–	30 min.	–

LOADS

Superbond-System: Injection mortar FIS SB with Threaded rod FIS A [1) 2)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [3) 4) 5) 6) 11)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [7)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [8)] [kN]	Permissible shear load V_{perm} [8)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [9)] [mm]	Min. edge distance c_{min} [9)] [mm]
FIS A M 8	5.8	100	60	10	4,3	5,1	90	105	180	40	40
		110	80		5,7		105	95	240		
		190	160		9,0		75	80	480		
	8.8	100	60		4,3	8,6	90	185	180		
		110	80		5,7		105	170	240		
		190	160		11,5			115	480		
	A4-70	100	60		4,3	6,0	90	125	180		
		110	80		5,7		105	115	240		
		190	160		9,9		85	90	480		
	C-70	100	60		4,3	7,4	90	160	180		
		110	80		5,7		105	145	240		
		190	160		11,5			105	480		

LOADS

Superbond-System: Injection mortar FIS SB with Threaded rod FIS A [1) 2)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [3) 4) 5) 6) 11)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [7)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [8)] [kN]	Permissible shear load V_{perm} [8)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [9)] [mm]	Min. edge distance c_{min} [9)] [mm]
FIS A M 10	5.8	100	60	20	5,8	8,6	90	185	180	45	45
		120	90		8,8		130	155	270		
		230	200		13,8		80	110	600		
	8.8	100	60		5,8	11,7	90	255	180		
		120	90		8,8	13,1	130	250	270		
		230	200		19,4			150	600		
	A4-70	100	60		5,8	9,2	90	195	180		
		120	90		8,8		130	165	270		
		230	200		15,7		95	115	600		
	C-70	100	60		5,8	11,4	90	250	180		
		120	90		8,8		130	215	270		
		230	200		19,4			135	600		
FIS A M 12	5.8	100	70	40	9,4	12,0	105	255	210	55	55
		140	110		14,8		155	195	330		
		270	240		20,5		75	135	720		
	8.8	100	70		9,4	18,8	105	420	210		
		140	110		14,8	19,4	155	340	330		
		270	240		32,3			200	720		
	A4-70	100	70		9,4	13,7	105	295	210		
		140	110		14,8		155	230	330		
		270	240		22,5		90	150	720		
	C-70	100	70		9,4	17,1	105	380	210		
		140	110		14,8		155	295	330		
		270	240		28,1		130	175	720		
FIS A M 16	5.8	120	80	60	12,3	22,3	120	445	240	65	65
		170	125		22,4		190	350	375		
		360	320		37,6		115	195	960		
	8.8	120	80		12,3	24,5	120	495	240		
		170	125		22,4	36,0	190	600	375		
		360	320		57,4		210	320	960		
	A4-70	120	80		12,3	24,5	120	495	240		
		170	125		22,4	25,2	190	400	375		
		360	320		42,0		135	215	960		
	C-70	120	80		12,3	24,5	120	495	240		
		170	125		22,4	31,4	190	515	375		
		360	320		52,4			270	960		
FIS A M 20	5.8	140	90	120	14,6	29,3	135	530	270	85	85
		220	170		38,0	34,9	255	455	510		
		450	400		58,6		140	260	1200		
	8.8	140	90		14,6	29,3	135	530	270		
		220	170		38,0	56,0	255	780	510		
		450	400		89,8		320	435	1200		
	A4-70	140	90		14,6	29,3	135	530	270		
		220	170		38,0	39,4	255	520	510		
		450	400		65,7		170	285	1200		
	C-70	140	90		14,6	29,3	135	530	270		
		220	170		38,0	49,1	255	675	510		
		450	400		81,9		265	370	1200		

LOADS

Superbond-System: Injection mortar FIS SB with Threaded rod FIS A [1) 2)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [3) 4) 5) 6) 11)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [7)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [8)] [kN]	Permissible shear load V_{perm} [8)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [9)] [mm]	Min. edge distance c_{min} [9)] [mm]
FIS A M 24	5.8	160	96	150	16,1	32,2	145	545	290	105	105
		270	210		52,2	50,9	315	590	630		
		540	480		84,3		160	330	1440		
	8.8	160	96		16,1	32,2	145	545	290		
		270	210		52,2	80,6	315	1005	630		
		540	480		129,3		450	570	1440		
	A4-70	160	96		16,1	32,2	145	545	290		
		270	210		52,2	56,8	315	670	630		
		540	480		94,3		230	360	1440		
	C-70	160	96		16,1	32,2	145	545	290		
		270	210		52,2	70,9	315	870	630		
		540	480		117,6		380	480	1440		
FIS A M 27	5.8	170	108	200	19,2	38,5	165	610	325	120	120
		310	250		67,8	65,7	375	695	750		
		600	540		109,5		240	390	1620		
	8.8	170	108		19,2	38,5	165	610	325		
		310	250		67,8	105,1	375	1200	750		
		600	540		152,7		495	700	1620		
	A4-70	170	108		19,2	38,5	165	610	325		
		310	250		67,8	73,7	375	795	750		
		600	540		123,0		325	445	1620		
	C-70	170	108		19,2	38,5	165	610	325		
		310	250		67,8	92,0	375	1030	750		
		600	540		152,7		495	595	1620		
FIS A M 30	5.8	190	120	300	22,5	45,1	180	665	360	140	140
		350	280		80,3	80,6	420	795	840		
		670	600		133,8		300	440	1800		
	8.8	190	120		22,5	45,1	180	665	360		
		350	280		80,3	128,6	420	1375	840		
		670	600		188,5		600	805	1800		
	A4-70	190	120		22,5	45,1	180	665	360		
		350	280		80,3	90,2	420	910	840		
		670	600		150,1		395	510	1800		
	C-70	190	120		22,5	45,1	180	665	360		
		350	280		80,3	112,6	420	1180	840		
		670	600		187,1		595	680	1800		

For the design the complete assessment ETA-12/0258 has to be considered. [10)]

[1)] Also valid for threaded rod RG M in the same property class.

[2)] Valid for injection mortar FIS SB. For using the glass capsule RSB see separate table resp. ETA-12/0258.

[2)] The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-12/0258.

[4)] The given loads are valid for injection mortar FIS SB for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-12/0258.

[5)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[6)] Drill method hammer drilling.

[7)] For the sizes M8 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

[8)] For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

[9)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[10)] The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

[11)] A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0{,}3$ mm.

LOADS

Superbond-System: Injection mortar FIS SB with Threaded rod FIS A [1) 2)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [3) 4) 5) 6)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [7)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [8)] [kN]	Permissible shear load V_{perm} [8)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [9)] [mm]	Min. edge distance c_{min} [9)] [mm]
FIS A M 8	5.8	100	60	10	8,6	5,1	90	70	180	40	40
		110	80		9,0		75		240		
		190	160				40	60	480		
	8.8	100	60		8,6	8,6	90	130	180		
		110	80		11,5		105	115	240		
		190	160		14,3		50	90	480		
	A4-70	100	60		8,6	6,0	90	85	180		
		110	80		9,9		85	75	240		
		190	160				40	70	480		
	C-70	100	60		8,6	7,4	90	110	180		
		110	80		11,5		105	100	240		
		190	160		12,4		40	80	480		
FIS A M 10	5.8	100	60	20	10,8	8,6	95	125	180	45	45
		120	90		13,8		110	105	270		
		230	200				45	85	600		
	8.8	100	60		10,8	13,1	95	200	180		
		120	90		16,2		145	170	270		
		230	200		22,4		60	115	600		
	A4-70	100	60		10,8	9,2	95	135	180		
		120	90		15,7		140	110	270		
		230	200				45	90	600		
	C-70	100	60		10,8	11,4	95	170	180		
		120	90		16,2		145	145	270		
		230	200		19,5		45	105	600		
FIS A M 12	5.8	100	70	40	14,1	12,0	145	175	210	55	55
		140	110		20,5		165	130	330		
		270	240				55	100	720		
	8.8	100	70		14,1	19,4	145	295	210		
		140	110		23,7		205	230	330		
		270	240		32,4		75	150	720		
	A4-70	100	70		14,1	13,7	145	200	210		
		140	110		22,5		190	155	330		
		270	240				55	115	720		
	C-70	100	70		14,1	17,1	145	260	210		
		140	110		23,7		205	200	330		
		270	240		28,1		55	135	720		
FIS A M 16	5.8	120	80	60	17,2	22,3	160	305	240	65	65
		170	125		33,6		285	235	375		
		360	320		37,6		65	150	960		
	8.8	120	80		17,2	34,4	160	495	240		
		170	125		33,6	36,0	285	405	375		
		360	320		60,0		120	220	960		
	A4-70	120	80		17,2	25,2	160	350	240		
		170	125		33,6		285	270	375		
		360	320		42,0		65	165	960		
	C-70	120	80		17,2	31,4	160	445	240		
		170	125		33,6		285	350	375		
		360	320		52,4		70	195	960		

LOADS

Superbond-System: Injection mortar FIS SB with Threaded rod FIS A [1) 2)]
zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [3) 4) 5) 6)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [7)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [8)] [kN]	Permissible shear load V_{perm} [8)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [9)] [mm]	Min. edge distance c_{min} [9)] [mm]
FIS A M 20	5.8	140	90	120	20,5	34,9	170	435	270	85	85
		220	170		53,3		385	300	510		
		450	400		58,6		85	195	1200		
	8.8	140	90		20,5	41,1	170	525	270		
		220	170		53,3	56,0	385		510		
		450	400		93,3		230	290	1200		
	A4-70	140	90		20,5	39,4	170	500	270		
		220	170		53,3		385	350	510		
		450	400		65,7		85	215	1200		
	C-70	140	90		20,5	41,1	170	525	270		
		220	170		53,3	49,1	385	455	510		
		450	400		81,9		135	260	1200		
FIS A M 24	5.8	160	96	150	22,6	45,2	170	540	290	105	105
		270	210		73,2	50,9	475	390	630		
		540	480		84,3		105	250	1440		
	8.8	160	96		22,6	45,2	170	540	290		
		270	210		73,2	80,6	475	675	630		
		540	480		134,3		360	365	1440		
	A4-70	160	96		22,6	45,2	170	540	290		
		270	210		73,2	56,8	475	445	630		
		540	480		94,3		105	270	1440		
	C-70	160	96		22,6	45,2	170	540	290		
		270	210		73,2	70,9	475	580	630		
		540	480		117,6		235	325	1440		
FIS A M 27	5.8	170	108	200	27,0	54,0	195	605	325	120	120
		310	250		95,1	65,7	565	460	750		
		600	540		109,5		120	295	1620		
	8.8	170	108		27,0	54,0	195	605	325		
		310	250		95,1	105,1	565	805	750		
		600	540		175,2		505	450	1620		
	A4-70	170	108		27,0	54,0	195	605	325		
		310	250		95,1	73,7	565	530	750		
		600	540		123,0		140	320	1620		
	C-70	170	108		27,0	54,0	195	605	325		
		310	250		95,1	92,0	565	690	750		
		600	540		153,3		355	385	1620		
FIS A M 30	5.8	190	120	300	31,6	63,2	210	660	360	140	140
		350	280		112,7	80,6	635	525	840		
		670	600		133,8		140	330	1800		
	8.8	190	120		31,6	63,2	210	660	360		
		350	280		112,7	128,6	635	920	840		
		670	600		213,8		610	515	1800		
	A4-70	190	120		31,6	63,2	210	660	360		
		350	280		112,7	90,2	635	605	840		
		670	600		150,1		195	365	1800		
	C-70	190	120		31,6	63,2	210	660	360		
		350	280		112,7	112,6	635	785	840		
		670	600		187,1		445	435	1800		

LOADS

Superbond-System: Injection mortar FIS SB with Threaded rod FIS A [1) 2)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [3) 4) 5) 6)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [7)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [8)] [kN]	Permissible shear load V_{perm} [8)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for Max. Load s_{cr} [mm]	Min. spacing s_{min} [9)] [mm]	Min. edge distance c_{min} [9)] [mm]
For the design the complete assessment ETA-12/0258 has to be considered. [10)]											

1) Also valid for threaded rod RG M in the same property class.

2) Valid for injection mortar FIS SB. For using the glass capsule RSB see separate table resp. ETA-12/0258.

2) The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of γL = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3·hef and an edge distance c ≥ 1,5·hef. Accurate data see ETA-12/0258.

4) The given loads are valid for injection mortar FIS SB for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-12/0258.

5) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

6) Drill method hammer drilling.

7) For the sizes M8 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

8) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

9) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

10) The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

LOADS

Superbond-System: Injection mortar FIS SB with Internal threaded anchor RG M I [1)]

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~ B25) [2) 3) 4) 5) 9)]										Minimum spacings while reducing the load	
Type	Screw steel property/ surface	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for Max. Load s_{cr} [mm]	Min. spacing s_{min} [7)] [mm]	Min. edge distance c_{min} [7)] [mm]
RG M8 I	5.8	120	90	10	8,1	5,3	135	85	270	55	55
	8.8					8,3		145			
	A4-70					5,9		95			
RG M10 I	5.8	130	90	20	10,8	8,3	135	135	270	65	65
	8.8					13,3		235			
	A4-70					9,3		155			
RG M12 I	5.8	170	125	40	16,8	12,1	190	165	375	75	75
	8.8					19,3		285			
	A4-70					13,5		185			
RG M16 I	5.8	210	160	80	26,3	22,4	240	275	480	95	95
	8.8					30,9		405			
	A4-70					25,1		315			
RG M20 I	5.8	270	200	120	41,9	39,4	300	435	600	125	125
	8.8					51,4		595			
	A4-70					39,4		430			

For the design the complete assessment ETA-12/0258 has to be considered. [8)]

1) Valid for injection mor tar FIS SB. F or using the glass capsule RSB see separate table resp. ETA-12/0258.

2) The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a par tial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3·h_{ef} and an edge distance c ≥ 1,5·h_{ef}. Accurate data see ETA-12/0258.

3) The given loads are valid for injection mortar FIS SB for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-12/0258.

4) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

5) Drill method hammer drilling.

6) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

7) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

8) The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

9) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at w_k ~ 0,3.

LOADS

Superbond-System: Injection mortar FIS SB with Internal threaded anchor RG M I [1)]
zinc plated steel / stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~ B25) [2) 3) 4) 5)]										Minimum spacings while reducing the load	
Type	Screw steel property/ surface	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [7)] [mm]	Min. edge distance c_{min} [7)] [mm]
RG M8 I	5.8	120	90	10	9,0	5,3	55	65	270	55	55
	8.8				13,8	8,3	110	95			
	A4-70				9,9	5,9	55	70			
RG M10 I	5.8	130	90	20	13,8	8,3	105	90	270	65	65
	8.8				20,5	13,3	190	155			
	A4-70				15,7	9,3	130	100			
RG M12 I	5.8	170	125	40	20,5	12,1	130	110	375	75	75
	8.8				32,4	19,3	265	190			
	A4-70				22,5	13,5	155	125			
RG M16 I	5.8	210	160	80	37,6	22,4	255	180	480	95	95
	8.8				48,7	30,9	365	265			
	A4-70				42,0	25,1	300	205			
RG M20 I	5.8	270	200	120	58,6	39,4	365	285	600	125	125
	8.8				68,0	51,4	445	395			
	A4-70				65,7	39,4	430	285			

For the design the complete assessment ETA-12/0258 has to be considered. [8)]

1) Valid for injection mor tar FIS SB. F or using the glass capsule RSB see separate table resp. ETA-12/0258.

2) The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a par tial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-12/0258.

3) The given loads are valid for injection mortar FIS SB for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-12/0258.

4) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

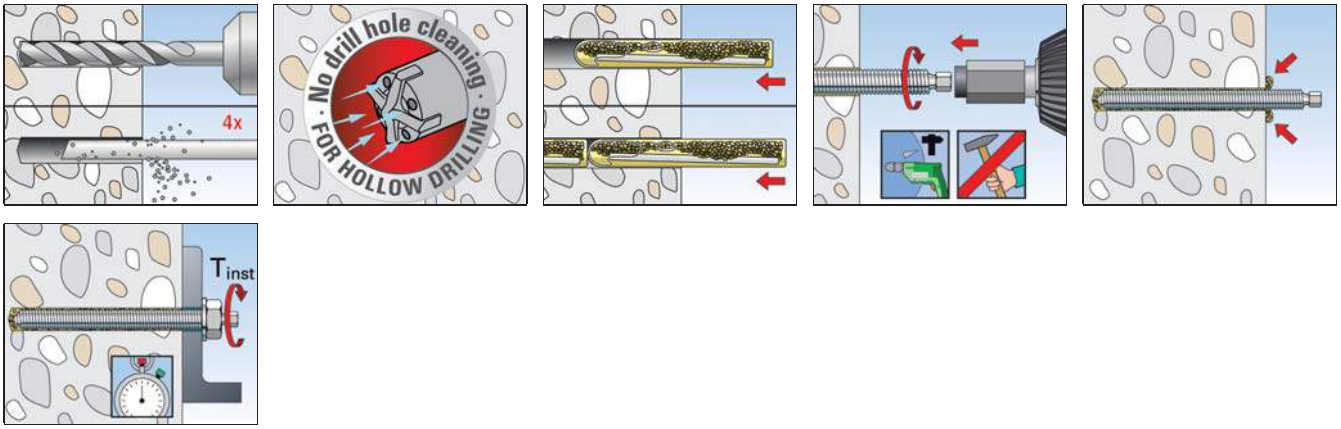
5) Drill method hammer drilling.

6) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

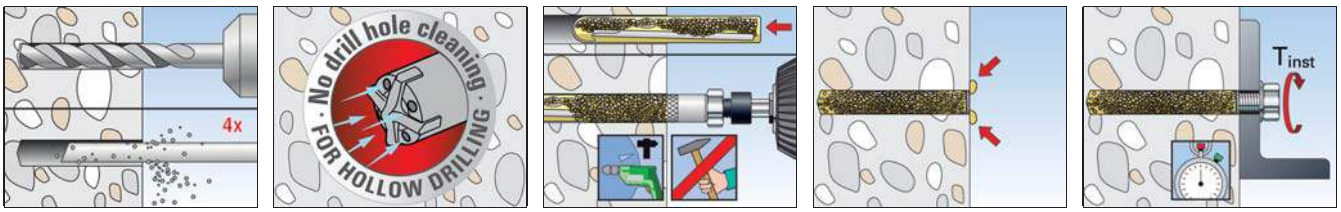
7) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

8) The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

INSTALLATION IN CONCRETE WITH CAPSULE RSB AND RG M

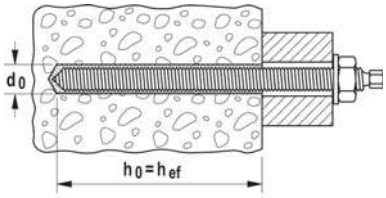


INSTALLATION IN CONCRETE WITH CAPSULE RSB AND RG M I



TECHNICAL DATA

Resin capsule **RSB**



	Art.-No.	Approval ETA	Approval ICC	Drill hole diameter d_0 [mm]	Drill hole depth h_0 [mm]	Anchorage depth h_{ef} [mm]	Match	Sales unit [pcs]
Item								
RSB 8	**518807**	■	▲	10	80	80	RG M 8	10
RSB 10 mini	**518820** 1)	■	▲	12	75 / 150	75 / 150	RG M 10	10
RSB 10	**518821** 2)	■	▲	12 / 14	90	90	RG M 10 / RG M 8 I	10
RSB 12 mini	**518822** 1)	■	▲	14	75 / 150	75 / 150	RG M 12	10
RSB 12	**518823** 2)	■	▲	14 / 18	110	110	RG M 12 / RG M 10 I	10
RSB 16 mini	**518824** 1)	■	▲	18	95 / 190	95 / 190	RG M 16	10
RSB 16	**518825** 2)	■	▲	18 / 20	125	125	RG M 16 / RG M 12 I	10
RSB 16 E	**518826**	■	–	24	160	160	RG M 16 I	10
RSB 20	**518827**	■	▲	25	170	170	RG M 20	10
RSB 20 E/24	**518828**	■	▲	25 / 28 / 32	210	210	RG M 20 / RG M 24 / RG M 20 I	5
RSB 30	**518829**	■	▲	35	280	280	RG M 30	5

1) use 2 x RSB mini in a row for larger anchoring depth

2) / second value "Drill hole diameter" in conjunction with Internal threaded anchor RG MI

CURING TIME

Temperature in anchoring base	Curing time RSB
- 30°C – - 20°C	120 hrs.
- 19°C – - 15°C	48 hrs.
- 14°C – - 10°C	30 hrs.
- 9°C – - 5°C	16 hrs.
- 4°C – ± 0°C	10 hrs.
+ 1°C – + 5°C	45 min.
+ 6°C – +10°C	30 min.
+ 11°C – +20°C	20 min.
+ 21°C – +30°C	5 min.
+ 31°C – +40°C	3 min.

LOADS

Superbond-System: Resin capsule RSB with Threaded rod RG M [1)]
zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~ B25) [2) 3) 4) 9)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [7)] [mm]	Min. edge distance c_{min} [7)] [mm]
RG M 8 [5)]	5.8	110	80	10	5,7	5,1	105	95	240	40	40
	8.8					8,6		170			
	A4-70					6,0		115			
	C-70					7,4		145			
RG M 10 [5)]	5.8	110	75	20	7,3	8,6	115	170	225	45	45
	8.8					13,1		280			
	A4-70					9,2		185			
	C-70					11,4		240			
	5.8	120	90		8,8	8,6	130	155	270		
	8.8					13,1		250			
	A4-70					9,2		165			
	C-70					11,4		215			
	5.8	180	150		13,8	8,6	120	115	450		
	8.8				14,6	13,1	130	185			
	A4-70					9,2		120			
RG M 12 [5)]	5.8	110	75	40	10,1	12,0	115	245	225	55	55
	8.8					19,4		420			
	A4-70					13,7		285			
	C-70					17,1		365			
	5.8	140	110		14,8	12,0	155	195	330		
	8.8					19,4		340			
	A4-70					13,7		230			
	C-70					17,1		295			
	5.8	180	150		20,2	12,0		160	450		
	8.8					19,4		280			
	A4-70					13,7		185			
RG M 16	5.8	140	95	60	15,9	22,3	145	410	285	65	65
	8.8					31,7		605			
	A4-70					25,2		470			
	C-70					31,4		600			
	5.8	170	125		22,4	22,3	190	350	375		
	8.8					36,0		600			
	A4-70					25,2		400			
	C-70					31,4		515			
	5.8	230	190		34,1	22,3	210	265	570		
	8.8					36,0		465			
	A4-70					25,2		305			

LOADS

Superbond-System: Resin capsule RSB with Threaded rod RG M [1)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~ B25) [2) 3) 4) 9)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [7)] [mm]	Min. edge distance c_{min} [7)] [mm]
RG M 20	5.8	220	170	120	38,0	34,9	255	450	510	85	85
	8.8					56,0		780			
	A4-70					39,4		520			
	5.8	260	210		47,1	34,9	280	395	630		
	8.8					56,0		685			
	A4-70					39,4		455			
RG M 24	5.8	270	210	150	52,2	50,9	315	590	630	105	105
	8.8					80,6		1005			
	A4-70					56,8		670			
RG M 30	5.8	350	280	300	80,3	80,6	420	795	840	140	140
	A4-70					90,2		910			

For the design the complete assessment ETA-12/0258 has to be considered. [8)]

[1)] Valid for glass capsule RSB. For using the injection mortar FIS SB see separate table resp. ETA-12/0258.

[2)] The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-12/0258.

[3)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[4)] Drill method hammer drilling. For further allowable drill methods and application conditions see ETA-12/0258.

[5)] Diamond drilling not permitted.

[6)] For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

[7)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[8)] The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

[9)] A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at w_k ~ 0,3 mm.

LOADS

Superbond-System: Resin capsule RSB with Threaded rod RG M [1)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~ B25) [2) 3) 4) 9)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
RG M 8	5.8	110	80	10	9,0	5,1	75	70	240	40	40
	8.8				11,5	8,6	105	115			
	A4-70				9,9	6,0	85	75			
	C-70				11,5	7,4	105	100			
RG M 10	5.8	110	75	20	13,5	8,6	130	115	225	45	45
	8.8					13,1		190			
	A4-70					9,2		125			
	C-70					11,4		160			
	5.8	120	90		13,8	8,6	110	105	270		
	8.8				16,2	13,1	145	170			
	A4-70				15,7	9,2	140	110			
	C-70				16,2	11,4	145	145			
	5.8	180	150		13,8	8,6	45	90	450		
	8.8				22,4	13,1	100	120			
	A4-70				15,7	9,2	55	95			

LOADS

Superbond-System: Resin capsule RSB with Threaded rod RG M [1)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~ B25) [2) 3) 4) 9)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
RG M 12	5.8	110	75	40	15,6	12,0	160	165	225	55	55
	8.8					19,4		285			
	A4-70					13,7		195			
	C-70					17,1		250			
	5.8	140	110		20,5	12,0	165	130	330		
	8.8				23,7	19,4	205	230			
	A4-70				22,5	13,7	190	155			
	C-70				23,7	17,1	205	200			
	5.8	180	150		20,5	12,0	75	110	450		
	8.8				32,3	19,4	220	190			
	A4-70				22,5	13,7	100	125			
RG M 16	5.8	140	95	60	22,3	22,3	205	275	285	65	65
	8.8					36,0		475			
	A4-70					25,2		315			
	C-70					31,4		405			
	5.8	170	125		33,6	22,3	285	235	375		
	8.8					36,0		405			
	A4-70					25,2		270			
	C-70					31,4		350			
	5.8	230	190		37,6	22,3	190	175	570		
	8.8				59,1	36,0	400	310			
	A4-70				42,0	25,2	235	200			
RG M 20	5.8	220	170	120	53,3	34,9	385	300	510	85	85
	8.8					56,0		525			
	A4-70					39,4		345			
	5.8	260	210		58,6	34,9	350	260	630		
	8.8				73,2	56,0	475	460			
	A4-70				65,7	39,4	415	300			
RG M 24	5.8	270	210	150	73,2	50,9	475	390	630	105	105
	8.8					80,6		675			
	A4-70					56,8		445			
RG M 30	5.8	350	280	300	112,7	80,6	635	525	840	140	140
	A4-70					90,2		605			

For the design the complete assessment ETA-12/0258 has to be considered. [7)]

[1)] Valid for glass capsule RSB. For using the injection mortar FIS SB see separate table resp. ETA-12/0258.

[2)] The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-12/0258.

[3)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[4)] Drill method hammer drilling. For further allowable drill methods and application conditions see ETA-12/0258.

[5)] For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

[6)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[7)] The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

LOADS

Superbond-System: Resin capsule RSB with Internal threaded anchor RG M I [1)]
zinc plated steel / stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~ B25) [2) 3) 4) 9)]										Minimum spacings while reducing the load	
Type	Screw steel property/ surface	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [7)] [mm]	Min. edge distance c_{min} [7)] [mm]
RG M8 I [5)]	5.8	120	90	10	8,1	5,3	135	85	270	55	55
	8.8					8,3		145			
	A4-70					5,9		95			
RG M10 I	5.8	130	90	20	10,8	8,3	135	135	270	65	65
	8.8					13,3		235			
	A4-70					9,3		155			
RG M12 I	5.8	170	125	40	16,8	12,1	190	165	375	75	75
	8.8					19,3		285			
	A4-70					13,5		185			
RG M16 I	5.8	210	160	80	26,3	22,4	240	275	480	95	95
	8.8					30,9		405			
	A4-70					25,1		315			
RG M20 I	5.8	270	200	120	41,9	39,4	300	435	600	125	125
	8.8					51,4		595			
	A4-70					39,4					

For the design the complete assessment ETA-12/0258 has to be considered. [7)]

[1)] Valid for glass capsule RSB. For using the injection mortar FIS SB see separate table resp. ETA-12/0258.

[2)] The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-12/0258.

[3)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[4)] Drill method hammer drilling. For further allowable drill methods and application conditions see ETA-12/0258.

[5)] Diamond drilling not permitted.

[6)] For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

[7)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[7)] The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

[9)] A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0{,}3$ mm.

LOADS

Superbond-System: Resin capsule RSB with Internal threaded anchor RG M I [1)]
zinc plated steel / stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~ B25) [2) 3) 4)]										Minimum spacings while reducing the load	
Type	Screw steel property/ surface	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
RG M8 I	5.8	120	90	10	9,0	5,3	55	65	270	55	55
	8.8				13,8	8,3	110	95			
	A4-70				9,9	5,9	55	70			
RG M10 I	5.8	130	90	20	13,8	8,3	105	90	270	65	65
	8.8				20,5	13,3	190	155			
	A4-70				15,7	9,3	130	100			
RG M12 I	5.8	170	125	40	20,5	12,1	130	110	375	75	75
	8.8				32,4	19,3	265	190			
	A4-70				22,5	13,5	155	125			
RG M16 I	5.8	210	160	80	37,6	22,4	255	180	480	95	95
	8.8				48,7	30,9	365	265			
	A4-70				42,0	25,1	300	205			
RG M20 I	5.8	270	200	120	58,6	39,4	365	285	600	125	125
	8.8				68,0	51,4	445	395			
	A4-70				65,7	39,4	430	285			

For the design the complete assessment ETA-12/0258 has to be considered. [7)]

[1)] Valid for glass capsule RSB. For using the injection mortar FIS SB see separate table resp. ETA-12/0258.

[2)] The partial safety factors for material resistance as regulated in the ETA-12/0258 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3·h_{ef} and an edge distance c ≥ 1,5·h_{ef}. Accurate data see ETA-12/0258.

[3)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[4)] Drill method hammer drilling. For further allowable drill methods and application conditions see ETA-12/0258.

[5)] For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

[6)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[7)] The given loads refer to the European Technical Assessment ETA-12/0258, issue date 19.05.2016. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

The bonded anchor for cracked concrete with threaded rod RG M without drill hole cleaning

Crash barriers

Collision protection

VERSIONS

- Zinc-plated steel
- Stainless steel
- Highly corrosion-resistant steel
- Hot-dip galvanised steel

CERTIFICATES

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

Also suitable for:

- Natural stone with dense structure

ADVANTAGES

- RM II is the first bonded anchor with threaded rod RG M for cracked and non-cracked concrete that does not require drill hole cleaning. This allows for a rapid working progress and an economic installation.
- Moreover, there is a reduced exposition to drill dust on the building site. This increases the safety for the user.
- The pre-portioned resin capsule is easy to install and especially suitable for individual applications and overhead installations.

APPLICATIONS

- Steel constructions
- Guard rails
- Staircases
- Column bases
- Machines
- Masts

Ideal for:

- Overhead installations
- Water-filled drill holes

FUNCTIONING

- The resin anchor RM II is suitable for pre-positioned installation when combined with the threaded rod RG M.
- The 2-component resin capsule RM II contains styrene-free vinyl ester resin and hardener.
- The threaded rod RG M is set using a hammer drill and the accompanying setting tool in rotating and hitting motions.
- During setting, the oblique edge of the RG M destroys the capsule, and mixes and activates the mortar.
- The mortar bonds the entire surface of the threaded rod with the drill hole wall and seals the drill hole.

SEE ALSO

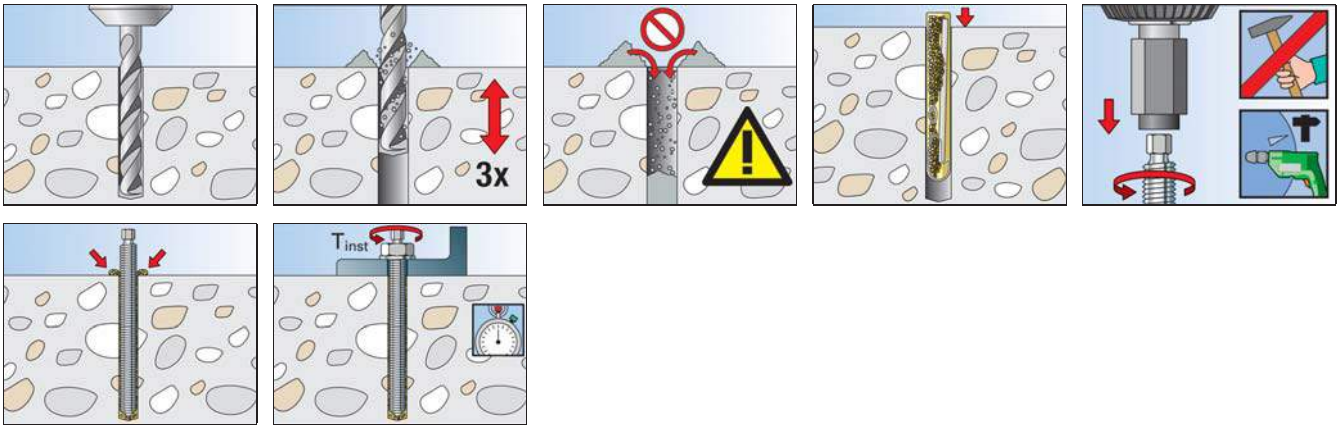
ANCHORS + SLEEVES
Page 144

DISPENSER
Page 195

ACCESSORIES
Page 198

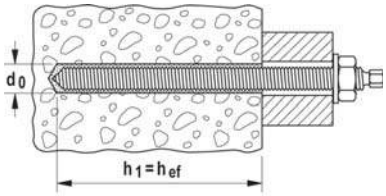
Resin anchor RM II

INSTALLATION IN CONCRETE WITH CAPSULE RM II AND RG M



TECHNICAL DATA

Resin capsule **RM II**



		Approval	Drill hole diameter	Min. drill hole depth	Effect. anchorage depth	Suitable for threaded rod	Sales unit
		ETA	d_0 [mm]	h_1 [mm]	h_{ef} [mm]		[pcs]
Item	**Art.-No.**						
RM II 8	**539796**	■	10	80	80	RG M 8	10
RM II 10	**539797**	■	12	90	90	RG M10	10
RM II 12	**539798**	■	14	110	110	RG M 12	10
RM II 14	**539799**	–	16	120	120	RG M 14	10
RM II 16	**539800**	■	18	125	125	RG M 16	10
RM II 20/22	**539802** 1)	■	25	170 / 190	170 / 190	RG M 20 / RG M 22	10
RM II 24	**539803**	■	28	210	210	RG M 24	5

1) RM II 20/22 in combination with RG M 22 and effect. anchorage depth of 190 mm is not part of the assessment.

CURING TIME

Temperature at anchoring base	Curing time
-15 °C - -11 °C	30 hrs.
- 10 °C - - 6 °C	16 hrs.
- 5 °C - - 1 °C	10 hrs.
+ 0 °C - + 4 °C	45 min.
+ 5 °C - + 9 °C	30 min.
+10 °C - +19 °C	20 min.
+20 °C - +29 °C	5 min.
+30 °C - +40 °C	3 min.

LOADS

Resin anchor RM II: Resin capsule RM II with Threaded rod RG M

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 4) 8)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
RG M 10	5.8	120	90	20	3,9	8,6	120	155	270	45	45
	8.8					9,4		175			
	A4-70					9,2		165			
	C-70					9,4		175			
RG M 12	5.8	140	110	40	5,8	12,0	145	195	330	55	55
	8.8					13,8		230			
	A4-70					13,7					
	C-70					13,8					
RG M 16	5.8	170	125	60	8,7	20,9	190	325	375	65	65
	8.8										
	A4-70										
	C-70										
RG M 20	5.8	220	170	120	14,8	34,9	240	450	510	85	85
	8.8					35,6		460			
	A4-70										
RG M 24	5.8	270	210	150	22,0	50,9	285	590	630	105	105
	8.8					52,8		615			
	A4-70										

For the design the complete assessment ETA-16/0340 has to be considered. [7)]

1) The partial safety factors for material resistance as regulated in the ETA-16/0340 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1.5 \cdot h_{ef}$. Accurate data see ETA-16/0340.

2) The given loads are valid for RM II for fixations in dry and humid concrete for temperatures in the substrate up to 72 °C (resp. short term up to 120 °C in accordance with ETA-16/0340.

3) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

4) Drill method hammer drilling. For further allowable application conditions see ETA-16/0340.

5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

6) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

7) The given loads refer to the European Technical Assessment ETA-16/0340, issue date 06.10.2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

8) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0,3$ mm.

LOADS

Resin anchor RM II: Resin capsule RM II with Threaded rod RG M

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3) 4)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
RG M 8	5.8	110	80	10	8,4	5,1	95	70	240	40	40
	8.8					8,6		115			
	A4-70					6,0		75			
	C-70					7,4		100			
RG M 10	5.8	120	90	20	11,8	8,6	120	105	270	45	45
	8.8					13,1		170			
	A4-70					9,2		110			
	C-70					11,4		145			
RG M 12	5.8	140	110	40	17,3	12,0	165	130	330	55	55
	8.8					19,4		230			
	A4-70					13,7		155			
	C-70					17,1		200			
RG M 16	5.8	170	125	60	26,2	22,3	260	235	375	65	65
	8.8					36,0		405			
	A4-70					25,2		270			
	C-70					31,4		350			
RG M 20	5.8	220	170	120	44,4	34,9	385	300	510	85	85
	8.8					56,0		525			
	A4-70					39,4		345			
RG M 24	5.8	270	210	150	61,0	50,9	475	390	630	105	105
	8.8					80,6		675			
	A4-70					56,8		445			

For the design the complete assessment ETA-16/0340 has to be considered. [7)]

1) The partial safety factors for material resistance as regulated in the ETA-16/0340 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1.5 \cdot h_{ef}$. Accurate data see ETA-16/0340.

2) The given loads are valid for RM II for fixations in dry and humid concrete for temperatures in the substrate up to 72 °C (resp. short term up to 120 °C in accordance with ETA-16/0340.

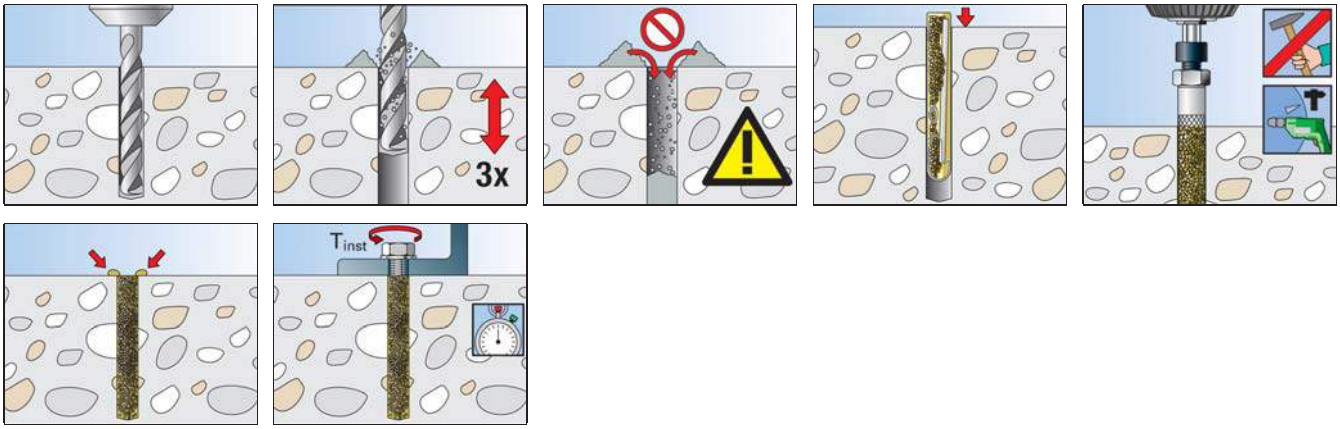
3) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

4) Drill method hammer drilling. For further allowable application conditions see ETA-16/0340.

5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

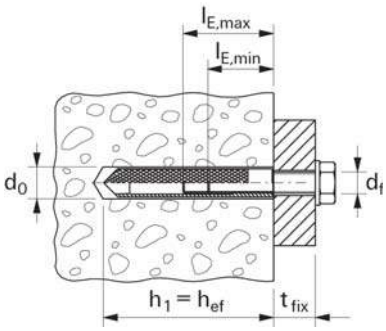
6) The given loads refer to the European Technical Assessment ETA-16/0340, issue date 06.10.2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

INSTALLATION IN CONCRETE WITH CAPSULE RM II AND RG M I



TECHNICAL DATA

Resin capsule **RM II**



		Approval	Drill diameter	Min. drill hole depth	Effect. anchorage depth	Suitable for internal-threaded anchor	Sales unit
		ETA	d_0 [mm]	h_1 [mm]	h_{ef} [mm]		[pcs]
Item	**Art.-No.**						
RM II 10	**539797**	■	14	90	90	RG M8 I	10
RM II 12	**539798**	■	18	90	90	RG M10 I	10
RM II 16	**539800**	■	20	125	125	RG M12 I	10
RM II 16 E	**539801**	■	24	160	160	RG M16 I	10
RM II 24	**539803**	■	32	200	200	RG M20 I	5

CURING TIME

Temperature at anchoring base	Curing time
-15 °C - -11 °C	30 hrs.
- 10 °C - - 6 °C	16 hrs.
- 5 °C - - 1 °C	10 hrs.
+ 0 °C - + 4 °C	45 min.
+ 5 °C - + 9 °C	30 min.
+10 °C - +19 °C	20 min.
+20 °C - +29 °C	5 min.
+30 °C - +40 °C	3 min.

LOADS

Resin anchor RM II: Resin capsule RM II with Internal threaded anchor RG M I

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 4) 7)]										Minimum spacings while reducing the load	
Type	Screw steel property/ surface	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [5)] [mm]	Min. edge distance c_{min} [5)] [mm]
RG M 8 I	5.8	120	90	10	4,7	5,3	135	85	270	55	55
	8.8					8,3		145			
	A4-70					5,9		95			
RG M 10 I	5.8	130	90	20	6,3	8,3	135	135	270	65	65
	8.8					13,3		235			
	A4-70					9,3		155			
RG M 12 I	5.8	170	125	40	9,8	12,1	190	165	375	75	75
	8.8					19,3		285			
	A4-70					13,5		185			
RG M 16 I	5.8	210	160	80	15,4	22,4	240	275	480	95	95
	8.8					30,9		405			
	A4-70					25,1		315			
RG M 20 I	5.8	270	200	120	24,4	35,4	300	385	600	125	125
	8.8					51,4		600			
	A4-70					39,4		435			

For the design the complete assessment ETA-16/0340 has to be considered. [6)]

1) The partial safety factors for material resistance as regulated in the ETA-16/0340 as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-16/0340.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling. For further allowable application conditions see ETA-16/0340.

4) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

5) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

6) The given loads refer to the European Technical Assessment ETA-16/0340, issue date 06.10.2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

7) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0,3$ mm.

LOADS

Resin anchor RM II: Resin capsule RM II with Internal threaded anchor RG M I

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Screw steel property/ surface	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [5)] [mm]	Min. edge distance c_{min} [5)] [mm]
RG M 8 I	5.8	120	90	10	9,0	5,3	85	65	270	55	55
	8.8				12,8	8,3	135	95			
	A4-70				9,9	5,9	95	70			
RG M 10 I	5.8	130	90	20	13,8	8,3	140	90	270	65	65
	8.8				17,1	13,3	190	155			
	A4-70				15,7	9,3	170	100			
RG M 12 I	5.8	170	125	40	20,5	12,1	180	110	375	75	75
	8.8				26,6	19,3	265	190			
	A4-70				22,5	13,5	210	125			
RG M 16 I	5.8	210	160	80	37,6	22,4	330	180	480	95	95
	8.8				40,6	30,9	365	265			
	A4-70					25,1		205			
RG M 20 I	5.8	270	200	120	56,7	35,4	445	250	600	125	125
	8.8					51,4		400			
	A4-70					39,4		285			

For the design the complete assessment ETA-16/0340 has to be considered. [6)]

1) The partial safety factors for material resistance as regulated in the ETA-16/0340 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-16/0340.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling. For further allowable application conditions see ETA-16/0340.

4) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

5) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

6) The given loads refer to the European Technical Assessment ETA-16/0340, issue date 06.10.2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

The powerful injection mortar for rebar connections and cracked concrete

Rail fastenings

Rebar connections

BUILDING MATERIALS

Approved for anchorings in:
- Concrete C20/25 to C50/60, cracked and non-cracked

Also suitable for:
- Natural stone with dense structure

CERTIFICATES

ETA-17/0979
EAD 330499-00-0601
Option 1 for cracked concrete
Seismic performance category C1, C2

ETA-17/1056
ETAG 001-5
Post-installed rebar connection (TR23)

ICC ES ESR-1990
See ICC-ES Evaluation Report at www.icc-es.org

Zulassung

Fire resistance classification R240
Anchor types see test report

SEISMIC C2

ADVANTAGES

- The optimised formulation of the epoxy resin mortar FIS EM Plus leads to improved load values in cracked and non-cracked concrete.
- The mortar can be used for rebar connections from diameter 8 to 40 mm.
- With the threaded rod FIS A, the loads to be applied can be designed variably by selecting the anchorage depth.
- Temporary and detachable fixing points are possible with the internal threaded anchor RG M I.
- For practical use on the building site, FIS EM Plus can be processed at low temperatures down to -5 °C.
- The mortar is approved for diamond-drilled and water-filled drill holes as well as seismic applications of performance categories C1, C2 and thus offers safety under extreme conditions.

APPLICATIONS

- Post-installed rebar connections
- Jointers for concrete layers
- Rim beam anchorings
- Seismic applications
- Anchorings in diamond-drilled or in waterfilled drill holes
- Heavy steel constructions
- Silo installations
- Tall shelving
- Sound barriers
- Temporary or removable fixings (with internal threaded anchor RG M I)

FUNCTIONING

- The epoxy mortar FIS EM Plus combined with the FIS A threaded rod, is suitable for pre-positioned and push-through installation and with the internal threaded anchor RG M I for pre-positioned installation.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion through the injection capsule in the static mixer.
- The mortar is injected bubble-free from the drill hole base.
- The mortar bonds the entire surface of the anchor with the drill hole wall and seals off the drill hole.
- The anchor is set manually by lightly rotating it until it reaches the drill hole base.
- During push-through installation, the annular gap between the threaded rod and attachment is filled with FIS EM Plus.

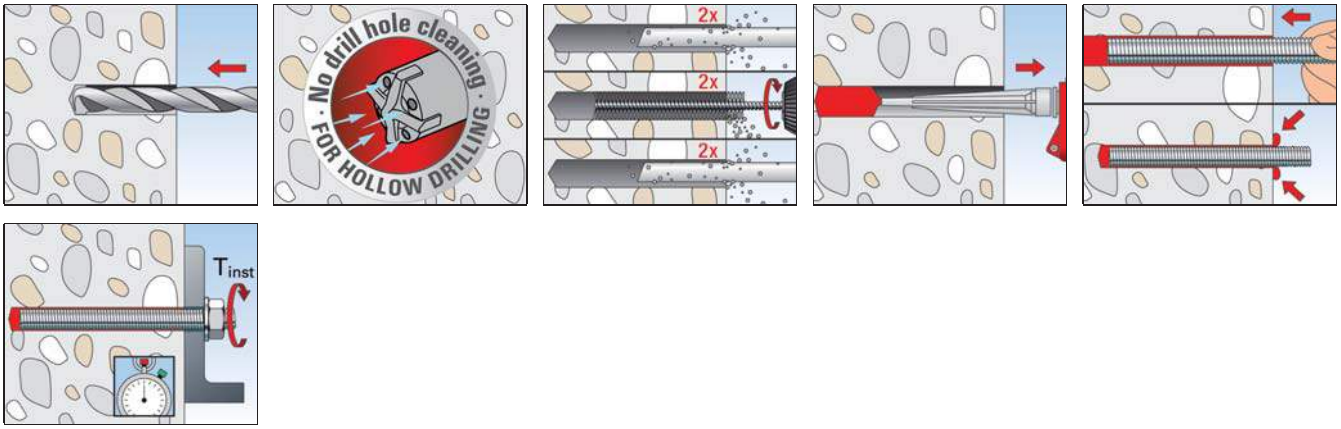
SEE ALSO

ANCHORS + SLEEVES
Page 144

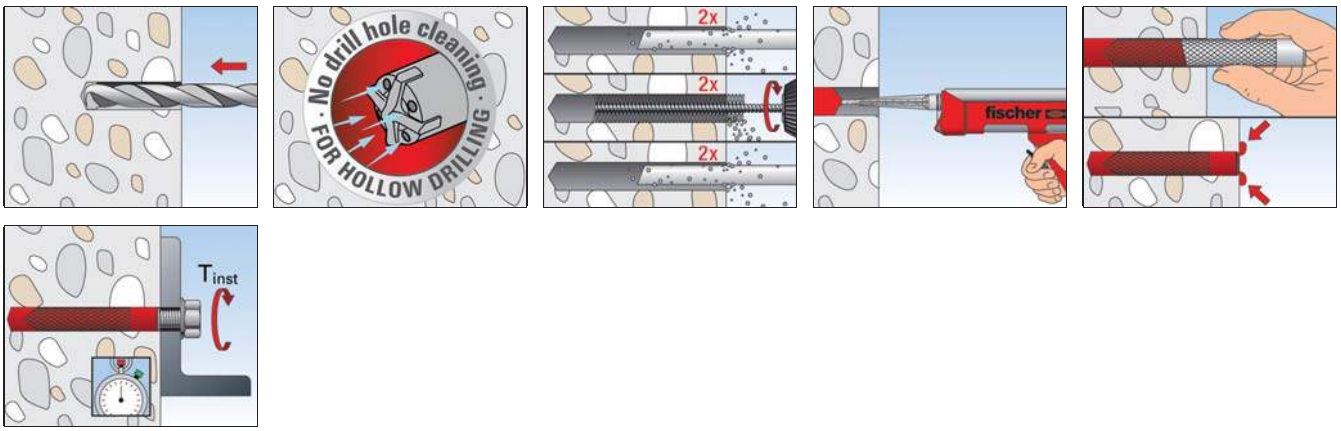
DISPENSER
Page 195

ACCESSORIES
Page 198

INSTALLATION IN CONCRETE WITH FIS EM PLUS AND FIS A / RG M



INSTALLATION IN CONCRETE WITH FIS EM PLUS AND RG M I



TECHNICAL DATA

Epoxy mortar
FIS EM Plus 390 S

Epoxy mortar
FIS EM Plus 585 S

Epoxy mortar
FIS EM Plus 1500 S

		Approval			Languages on the cartridge	Scale unit	Contents	Sales unit
Item	Art.-No.	DIBt	ETA	ICC				[pcs]
FIS EM Plus 390 S	**544154**	●	■	▲	DE, EN, FR, NL, ES, PT	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS EM Plus 390 S	**544155**	●	■	▲	EN, ZH, EL, KO, HU, PL	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS EM Plus 390 S	**544176**	●	■	▲	CS, SK, RO, AR, FR, EN	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS EM Plus 390 S	**544159**	●	■	▲	LT, LV, ET, UK, RU, KK	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS EM Plus 585 S	**544166**	●	■	▲	DE, EN, FR, NL, ES, PT	270	1 cartridge 585 ml + 2 x FIS UMR	6
FIS EM Plus 585 S	**544165**	●	■	▲	EN, ZH, RU, KO, CS, PL	270	1 cartridge 585 ml + 2 x FIS UMR	6
FIS EM Plus 585 S	**544175**	●	■	▲	EN, ZH, RU, KO, CS, PL	270	1 cartridge 585 ml, 1 x FIS UMR, 1 x extension tube Ø 9x250 mm	6
FIS EM Plus 1500 S	**544167**	●	■	▲	DE, IT, FR, NL, CS, SK	700	1 cartridge 1500 ml, 2 x FIS UMR	4
FIS EM Plus 1500 S	**544173**	●	■	▲	EN, ES, PT, ZH, RU, PL	700	1 cartridge 1500 ml, 2 x FIS UMR	4

Epoxy mortar FIS EM Plus

TECHNICAL DATA

Static mixer **FIS MR Plus**

Static mixer **FIS UMR**

					Contents	Sales unit
Item	**Art.-No.**					[pcs]
FIS MR Plus	**545853**				10 static mixer FIS MR Plus	10
FIS UMR	**520593**				10 static mixer FIS UMR for 585 ml and 1500 ml cartridges	10

FIS EM Plus 390 S HWK big

FIS EM Plus 390 S in bucket

		Approval			Languages on the cartridge	Contents	Sales unit
Item	**Art.-No.**	**DIBt**	**ETA**	**ICC**			[pcs]
FIS EM Plus 390 S HWK big	**544156**	●	■	▲	EN, ZH, EL, KO, HU, PL	20 cartridges 390 ml, 20 x FIS MR Plus	1
FIS EM Plus 390 S in bucket	**544172**	●	■	▲	DE, EN, FR, NL, ES, PT	20 cartridges 390 ml, 20 x FIS MR Plus	1

GELLING AND CURING TIME

Temperature at anchoring base	Gelling time	Curing time
- 5 °C to - 1 °C	180 min.	200 hrs.
0 °C to + 4 °C	150 min.	90 hrs.
+ 5 °C to + 9 °C	120 min.	40 hrs.
+ 10 °C to + 19 °C	30 min.	18 hrs.
+ 20 °C to + 29 °C	14 min.	10 hrs.
+ 30 °C to + 40 °C	7 min.	5 hrs.

The above times apply from the moment of contact between resin and hardener in the static mixer.
For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

LOADS

Injection system FIS EM Plus: Injection resin FIS EM Plus with Threaded rod FIS A[2)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength clas C20/25 (~B25) [1) 3) 4) 8)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
FIS A M 8	5.8	100	60	10	5,4	5,1	90	105	180	40	40
		110	80		7,2		120	95	240		
		190	160		9,0		65	80	480		
	8.8	100	60		5,4	8,6	90	185	180		
		110	80		7,2		120	170	240		
		190	160		13,8			115	480		
	A4-70	100	60		5,4	6,0	90	125	180		
		110	80		7,2		120	115	240		
		190	160		9,9		75	90	480		
	C-70	100	60		5,4	7,4	90	160	180		
		110	80		7,2		120	145	240		
		190	160		12,4		105	105	480		
FIS A M 10	5.8	100	60	20	6,7	8,6	90	185	180	45	45
		120	90		10,1		135	155	270		
		230	200		13,8		70	110	600		
	8.8	100	60		6,7	13,1	90	295	180		
		120	90		10,1		135	250	270		
		230	200		22,4		150	150	600		
	A4-70	100	60		6,7	9,2	90	195	180		
		120	90		10,1		135	165	270		
		230	200		15,7		90	115	600		
	C-70	100	60		6,7	11,4		250	180		
		120	90		10,1		135	215	270		
		230	200		19,5		125	135	600		
FIS A M 12	5.8	100	70	40	10,0	12,0	105	255	210	55	45
		140	110		17,8		165	195	330		
		270	240		20,5		60	135	720		
	8.8	100	70		10,0	19,4	105	435	210		
		140	110		17,8		165	340	330		
		270	240		32,4		145	200	720		
	A4-70	100	70		10,0	13,7	105	295	210		
		140	110		17,8		165	230	330		
		270	240		22,5		75	150	720		
	C-70	100	70		10,0	17,1	105	380	210		
		140	110		17,8		165	295	330		
		270	240		28,1		115	175	720		
FIS A M 16	5.8	120	80	60	12,3	22,3	120	445	240	65	50
		170	125		24,0		190	350	375		
		360	320		37,6		95	195	960		
	8.8	120	80		12,3	24,5	120	495	240		
		170	125		24,0	36,0	190	600	375		
		360	320		60,0		225	320	960		
	A4-70	120	80		12,3	24,5	120	495	240		
		170	125		24,0	25,2	190	400	375		
		360	320		42,0		120	215	960		
	C-70	120	80		12,3	24,5		495	240		
		170	125		24,0	31,4	190	515	375		
		360	320		52,4		175	270	960		

LOADS

Injection system FIS EM Plus: Injection resin FIS EM Plus with Threaded rod FIS A[2)]
zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength clas C20/25 (~B25) [1)3)4)8)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
FIS A M 20	5.8	140	90	120	14,6	29,3	135	530	270	85	55
		220	170		38,0	34,9	255	455	510		
		450	400		58,6		115	260	1200		
	8.8	140	90		14,6	29,3	135	530	270		
		220	170		38,0	56,0	255	780	510		
		450	400		93,3		340	435	1200		
	A4-70	140	90		14,6	29,3	135	530	270		
		220	170		38,0	39,4	255	520	510		
		450	400		65,7		145	285	1200		
	C-70	140	90		14,6	29,3	135	530	270		
		220	170		38,0	49,1	255	675	510		
		450	400		81,9		265	370	1200		
FIS A M 24	5.8	160	96	150	16,1	32,2	145	545	290	105	60
		270	210		52,2	50,9	315	590	630		
		540	480		84,3		160	330	1440		
	8.8	160	96		16,1	32,2	145	545	290		
		270	210		52,2	80,6	315	1005	630		
		540	480		134,3		475	570	1440		
	A4-70	160	96		16,1	32,2	145	545	290		
		270	210		52,2	56,8	315	670	630		
		540	480		94,3		230	360	1440		
	C-70	160	96		16,1	32,2	145	545	290		
		270	210		52,2	70,9	315	870	630		
		540	480		117,6		380	480	1440		
FIS A M 27	5.8	170	108	200	19,2	38,5	165	610	325	120	75
		310	250		67,8	65,7	375	695	750		
		600	540		109,5		240	390	1620		
	8.8	170	108		19,2	38,5	165	610	325		
		310	250		67,8	105,1	375	1200	750		
		600	540		175,2		615	700	1620		
	A4-70	170	108		19,2	38,5	165	610	325		
		310	250		67,8	73,7	375	795	750		
		600	540		123,0		325	445	1620		
	C-70	170	108		19,2	38,5	165	610	325		
		310	250		67,8	92,0	375	1030	750		
		600	540		153,3		500	595	1620		
FIS A M 30	5.8	190	120	300	22,5	45,1	180	665	360	140	80
		350	280		80,3	80,6	420	795	840		
		670	600		133,8		300	440	1800		
	8.8	190	120		22,5	45,1	180	665	360		
		350	280		80,3	128,6	420	1375	840		
		670	600		213,8		725	805	1800		
	A4-70	190	120		22,5	45,1	180	665	360		
		350	280		80,3	90,2	420	910	840		
		670	600		150,1		395	510	1800		
	C-70	190	120		22,5	45,1	180	665	360		
		350	280		80,3	112,6	420	1180	840		
		670	600		187,1		595	680	1800		

For the design the complete assessment ETA-17/0979 has to be considered. [7)]

[1)] The partial safety factors for material resistance as regulated in the ETA-17/0979 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As a single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-17/0979.

[2)] Also valid for threaded rod RG M in the same property class.

[3)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[4)] Drill method hammer drilling resp. hollow drilling. For further allowable drill methods and application conditions see ETA-17/0979.

LOADS

Injection system FIS EM Plus: Injection resin FIS EM Plus with Threaded rod FIS A[2)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength clas C20/25 (~B25) [1) 3) 4) 8)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
FIS A M 8	5.8	100	60	10	9,0	5,1	75	70	180	40	40
		110	80				55		240		
		190	160				40	60	480		
	8.8	100	60		11,2	8,6	100	130	180		
		110	80		13,8		130	115	240		
		190	160				40	90	480		
	A4-70	100	60		9,9	6,0	85	85	180		
		110	80				70	75	240		
		190	160				40	70	480		
	C-70	100	60		11,2	7,4	100	110	180		
		110	80		12,4		110	100	240		
		190	160				40	80	480		
FIS A M 10	5.8	100	60	20	11,2	8,6	100	125	180	45	45
		120	90		13,8		110	105	270		
		230	200				45	85	600		
	8.8	100	60		11,2	13,1	100	200	180		
		120	90		20,5		200	170	270		
		230	200		22,4		45	115	600		
	A4-70	100	60		11,2	9,2	100	135	180		
		120	90		15,7		140	110	270		
		230	200				45	90	600		
	C-70	100	60		11,2	11,4	100	170	180		
		120	90		19,5		190	145	270		
		230	200				45	105	600		
FIS A M 12	5.8	100	70	40	14,1	12,0	145	175	210	55	45
		140	110		20,5		165	130	330		
		270	240				45	100	720		
	8.8	100	70		14,1	19,4	145	295	210		
		140	110		27,7		250	230	330		
		270	240		32,4		45	150	720		
	A4-70	100	70		14,1	13,7	145	200	210		
		140	110		22,5		190	155	330		
		270	240				45	115	720		
	C-70	100	70		14,1	17,1	145	260	210		
		140	110		27,7		250	200	330		
		270	240		28,1		45	135	720		

[5)] For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

[6)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[7)] The given loads refer to the European Technical Assessment ETA-17/0979, issue date 06/04/2018. Design of the loads according to FprEN 1992-4:2017 and TR 055 (for static resp. quasi-static loads).

[8)] A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at w_k ~0,3mm.

LOADS

Injection system FIS EM Plus: Injection resin FIS EM Plus with Threaded rod FIS A[2)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 3) 4)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
FIS A M 8	5.8	100	60	10	9,0	5,1	75	70	180	40	40
		110	80				55		240		
		190	160				40	60	480		
	8.8	100	60		11,2	8,6	100	130	180		
		110	80		13,8		130	115	240		
		190	160				40	90	480		
	A4-70	100	60		9,9	6,0	85	85	180		
		110	80				70	75	240		
		190	160				40	70	480		
	C-70	100	60		11,2	7,4	100	110	180		
		110	80		12,4		110	100	240		
		190	160				40	80	480		
FIS A M 10	5.8	100	60	20	11,2	8,6	100	125	180	45	45
		120	90		13,8		110	105	270		
		230	200				45	85	600		
	8.8	100	60		11,2	13,1	100	200	180		
		120	90		20,5		200	170	270		
		230	200		22,4		45	115	600		
	A4-70	100	60		11,2	9,2	100	135	180		
		120	90		15,7		140	110	270		
		230	200				45	90	600		
	C-70	100	60		11,2	11,4	100	170	180		
		120	90		19,5		190	145	270		
		230	200				45	105	600		
FIS A M 12	5.8	100	70	40	14,1	12,0	145	175	210	55	45
		140	110		20,5		165	130	330		
		270	240				45	100	720		
	8.8	100	70		14,1	19,4	145	295	210		
		140	110		27,7		250	230	330		
		270	240		32,4		45	150	720		
	A4-70	100	70		14,1	13,7	145	200	210		
		140	110		22,5		190	155	330		
		270	240				45	115	720		
	C-70	100	70		14,1	17,1	145	260	210		
		140	110		27,7		250	200	330		
		270	240		28,1		45	135	720		

LOADS

Injection system FIS EM Plus: Injection resin FIS EM Plus with Threaded rod FIS A[2)]
zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1)3)4)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
FIS A M 16	5.8	120	80	60	17,2	22,3	160	305	240	65	50
		170	125		33,6		285	235	375		
		360	320		37,6		50	150	960		
	8.8	120	80		17,2	34,4	160	495	240		
		170	125		33,6	36,0	285	405	375		
		360	320		60,0		120	220	960		
	A4-70	120	80		17,2	25,2	160	350	240		
		170	125		33,6		285	270	375		
		360	320		42,0		50	165	960		
	C-70	120	80		17,2	31,4	160	445	240		
		170	125		33,6		285	350	375		
		360	320		52,4		50	195	960		
FIS A M 20	5.8	140	90	120	20,5	34,9	170	435	270	85	55
		220	170		53,3		385	300	510		
		450	400		58,6		55	195	1200		
	8.8	140	90		20,5	41,1	170	525	270		
		220	170		53,3	56,0	385		510		
		450	400		93,3		230	290	1200		
	A4-70	140	90		20,5	39,4	170	500	270		
		220	170		53,3		385	350	510		
		450	400		65,7		55	215	1200		
	C-70	140	90		20,5	41,1	170	525	270		
		220	170		53,3	49,1	385	455	510		
		450	400		81,9		135	260	1200		
FIS A M 24	5.8	160	96	150	22,6	45,2	170	540	290	105	60
		270	210		73,2	50,9	475	390	630		
		540	480		84,3		60	250	1440		
	8.8	160	96		22,6	45,2	170	540	290		
		270	210		73,2	80,6	475	675	630		
		540	480		134,3		360	365	1440		
	A4-70	160	96		22,6	45,2	170	540	290		
		270	210		73,2	56,8	475	445	630		
		540	480		94,3		60	270	1440		
	C-70	160	96		22,6	45,2	170	540	290		
		270	210		73,2	70,9	475	580	630		
		540	480		117,6		235	325	1440		
FIS A M 27	5.8	170	108	200	27,0	54,0	195	605	325	120	75
		310	250		95,1	65,7	565	460	750		
		600	540		109,5		75	295	1620		
	8.8	170	108		27,0	54,0	195	605	325		
		310	250		95,1	105,1	565	805	750		
		600	540		175,2		505	450	1620		
	A4-70	170	108		27,0	54,0	195	605	325		
		310	250		95,1	73,7	565	530	750		
		600	540		123,0		140	320	1620		
	C-70	170	108		27,0	54,0	195	605	325		
		310	250		95,1	92,0	565	690	750		
		600	540		153,3		355	385	1620		

LOADS

Injection system FIS EM Plus: Injection resin FIS EM Plus with Threaded rod FIS A[2)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 3) 4)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
FIS A M 30	5.8	190	120	300	31,6	63,2	210	660	360	140	80
		350	280		112,7	80,6	635	525	840		
		670	600		133,8		80	330	1800		
	8.8	190	120		31,6	63,2	210	660	360		
		350	280		112,7	128,6	635	920	840		
		670	600		213,8		610	515	1800		
	A4-70	190	120		31,6	63,2	210	660	360		
		350	280		112,7	90,2	635	605	840		
		670	600		150,1		195	365	1800		
	C-70	190	120		31,6	63,2	210	660	360		
		350	280		112,7	112,6	635	785	840		
		670	600		187,1		445	435	1800		

For the design the complete assessment ETA-17/0979 has to be considered. [7)]

1) The partial safety factors for material resistance as regulated in the ETA-17/0979 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As a single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-17/0979.

2) Also valid for threaded rod RG M in the same property class.

3) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

4) Drill method hammer drilling resp. hollow drilling. For further allowable drill methods and application conditions see ETA-17/0979.

5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

6) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

7) The given loads refer to the European Technical Assessment ETA-17/0979, issue date 06/04/2018. Design of the loads according to FprEN 1992-4:2017 and TR 055 (for static resp. quasi-static loads).

LOADS

Injection system FIS EM Plus: Injection resin FIS EM Plus with Internal threaded anchor RG M I

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~ B25) [1) 2) 3) 7)]										Minimum spacings while reducing the load	
Type	Screw steel property/ surface	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [5)] [mm]	Min. edge distance c_{min} [5)] [mm]
RG M8 I	5.8	120	90	10	9,0	5,3	100	85	270	55	55
	8.8				11,3	8,3	135	145			
	A4-70				9,9	5,9	115	95			
RG M10 I	5.8	130	90	20	12,9	8,3	135	135	270	65	65
	8.8					13,3		235			
	A4-70					9,3		155			
RG M12 I	5.8	170	125	40	20,2	12,1	190	165	375	75	75
	8.8					19,3		285			
	A4-70					13,5		185			
RG M16 I	5.8	210	160	80	34,7	22,4	240	275	480	95	95
	8.8					30,9		405			
	A4-70					25,1		315			
RG M20 I	5.8	270	200	120	48,5	35,4	300	380	600	125	125
	8.8					42,9		480			
	A4-70					39,4		430			

LOADS

Injection system FIS EM Plus: Injection resin FIS EM Plus with Internal threaded anchor RG M I
zinc plated steel / stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~ B25) [1) 2) 3) 7)]										Minimum spacings while reducing the load	
Type	Screw steel property/ surface	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [5)] [mm]	Min. edge distance c_{min} [5)] [mm]
RG M8 I	5.8	120	90	10	9,0	5,3	55	65	270	55	55
	8.8				13,8	8,3	110	95			
	A4-70				9,9	5,9	55	70			
RG M10 I	5.8	130	90	20	13,8	8,3	105	90	270	65	65
	8.8				20,5	13,3	190	155			
	A4-70				15,7	9,3	130	100			
RG M12 I	5.8	170	125	40	20,5	12,1	130	110	375	75	75
	8.8				32,4	19,3	265	190			
	A4-70				22,5	13,5	155	125			
RG M16 I	5.8	210	160	80	37,6	22,4	255	180	480	95	95
	8.8				48,7	30,9	365	265			
	A4-70				42,0	25,1	300	205			
RG M20 I	5.8	270	200	120	58,6	35,4	365	245	600	125	125
	8.8				68,0	42,9	445	315			
	A4-70				65,7	39,4	430	285			

For the design the complete assessment ETA-17/0979 has to be considered. [6)]

1) The partial safety factors for material resistance as regulated in the ETA-17/0979 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As a single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-17/0979.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling resp. hollow drilling. For further allowable drill methods and application conditions see ETA-17/0979.

4) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

5) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

6) The given loads refer to the European Technical Assessment ETA-17/0979, issue date 06/04/2018. Design of the loads according to FprEN 1992-4:2017 and TR 055 (for static resp. quasi-static loads).

7) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at w_k ~ 0,3 mm.

LOADS

Injection system FIS EM Plus: Injection resin FIS EM Plus with Internal threaded anchor RG M I
zinc plated steel / stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~ B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Screw steel property/ surface	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [5)] [mm]	Min. edge distance c_{min} [5)] [mm]
RG M8 I	5.8	120	90	10	9,0	5,3	55	65	270	55	55
	8.8				13,8	8,3	110	95			
	A4-70				9,9	5,9	55	70			
RG M10 I	5.8	130	90	20	13,8	8,3	105	90	270	65	65
	8.8				20,5	13,3	190	155			
	A4-70				15,7	9,3	130	100			
RG M12 I	5.8	170	125	40	20,5	12,1	130	110	375	75	75
	8.8				32,4	19,3	265	190			
	A4-70				22,5	13,5	155	125			
RG M16 I	5.8	210	160	80	37,6	22,4	255	180	480	95	95
	8.8				48,7	30,9	365	265			
	A4-70				42,0	25,1	300	205			
RG M20 I	5.8	270	200	120	58,6	35,4	365	245	600	125	125
	8.8				68,0	42,9	445	315			
	A4-70				65,7	39,4	430	285			

For the design the complete assessment ETA-17/0979 has to be considered. [6)]

1) The partial safety factors for material resistance as regulated in the ETA-17/0979 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As a single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-17/0979.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling resp. hollow drilling. For further allowable drill methods and application conditions see ETA-17/0979.

4) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

5) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

6) The given loads refer to the European Technical Assessment ETA-17/0979, issue date 06/04/2018. Design of the loads according to FprEN 1992-4:2017 and TR 055 (for static resp. quasi-static loads).

The basic epoxy mortar for applications in concrete

Crash barriers and sound insulation walls

Rebar connections

BUILDING MATERIALS

Approved for anchorings in:

- Concrete C20/25, cracked and non-cracked

CERTIFICATES

ETA-15/0440
ETAG 001-5
Option 1 for cracked concrete
Seismic performance category C1, C2

ETA-15/0771
ETAG 001-5
Post-installed rebar connection (TR23)

SEISMIC

Fire resistance classification
R 240
Anchor types see test report

ADVANTAGES

- FIS EB is approved for use in cracked concrete and for rebar applications and achieves a good performance in these applications which enables an economical use of injection mortar.
- Variable anchorage depths from 4xd to 20xd allow for ideal adaptation to the load to be applied.
- FIS EB can be used in various conditions (dry/wet concrete, flooded hole), thus working in almost all situations on the building site and making it a safe and reliable system.

APPLICATIONS

- Heavy steel constructions
- Consoles
- Silo installations
- Tall shelving
- Post-installed rebar connections

FUNCTIONING

- The epoxy mortar FIS EB combined with the threaded rod FIS A is suitable for pre-positioned and push-through installation.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion through the injection capsule in the static mixer.
- The mortar is injected bubble-free from the drill hole base.
- The mortar bonds the entire surface of the threaded rod with the drill hole wall and seals off the drill hole.
- The threaded rod is set manually by slightly rotating it until it reached the drill hole base.
- During push-through installation, the annular gap between the threaded rod and the attachment is filled with FIS EB.

SEE ALSO

ANCHORS + SLEEVES
Page 144

DISPENSER
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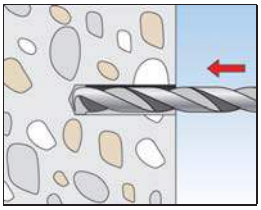
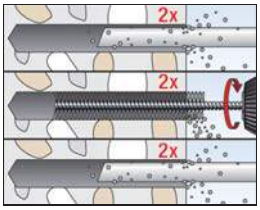
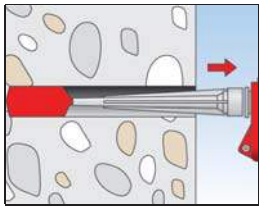
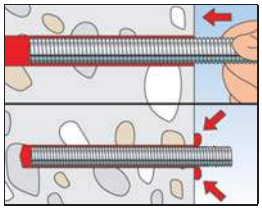
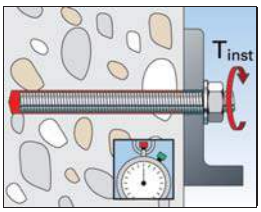
ACCESSORIES
Page 198

INSTALLATION IN CONCRETE WITH FIS EB AND FIS A / RG M





TECHNICAL DATA

Epoxy mortar **FIS EB**

Static mixer **FIS MR Plus**

		Approval	Languages on the cartridge	Scale unit	Contents	Sales unit
Item	**Art.-No.**	**ETA**				**[pcs]**
FIS EB 390 S	**534984**	■	EN, ES, PT	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS EB 390 S	**534985**	■	TR, RU, KO	180	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS EB 390 S in bucket	**543652**	■	EN, ES, PT	180	20 cartridges 390 ml, 20 x FIS MR Plus	1
FIS EB 390 S in bucket	**538547**	■	TR, RU, KO	180	20 cartridges 390 ml, 20 x FIS MR Plus	1
FIS EB 585 S	**534986**	■	EN, ES, PT, NL	270	1 cartridge 585 ml + 2 x FIS UMR	6
FIS MR Plus	**545853**	–	–	–	10 static mixer FIS MR Plus	10

LOADS

Injection system FIS EB: Injection mortar FIS EB with Threaded rod FIS A [1)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [2) 3) 4) 9)]										Minimum spacings while reducing the load	
Type	**Material fixing element**	**Min. member thickness** h_{min} [mm]	**Effective anchorage depth** h_{ef} [5)] [mm]	**Maximum torque moment** T_{max} [Nm]	**Permissible tensile load** N_{perm} [6)] [kN]	**Permissible shear load** V_{perm} [6)] [kN]	**Required edge distance (with one edge) for** Max. tension load c [mm]	Max. shear load c [mm]	**Required spacing for** Max. Load s_{cr} [mm]	**Min. spacing** s_{min} [7)] [mm]	**Min. edge distance** c_{min} [7)] [mm]
FIS A M8	5.8	100	60	10	3,6	5,1	90	105	180	40	40
		110	80		4,8		100	100	240		
		190	160		9,0		90	90	480		
	8.8	100	60		3,6	7,2		155	180		
		110	80		4,8	8,6	100	170	240		
		190	160		9,6			115	480		
	A4-70	100	60		3,6	6,0	90	125	180		
		110	80		4,8		100	115	240		
		190	160		9,6			90	480		
FIS A M10	5.8	100	60	20	4,5	8,6	90	185	180	45	45
		120	90		6,7		115	160	270		
		230	200		13,8		105	125	600		
	8.8	100	60		4,5	9,0	90	190	180		
		120	90		6,7	13,1	115	250	270		
		230	200		15,0			150	600		
	A4-70	100	60		4,5	9,0	90	190	180		
		120	90		6,7	9,2	115	165	270		
		230	200		15,0			115	600		

LOADS

Injection system FIS EB: Injection mortar FIS EB with Threaded rod FIS A [1)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [2) 3) 4) 9)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [5)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [7)] [mm]	Min. edge distance c_{min} [7)] [mm]
FIS A M12	5.8	100	70	40	6,3	12,0	105	255	210	55	55
		140	110		9,9		140	200	330		
		270	240		20,5		130	150	720		
	8.8	100	70		6,3	12,6	105	270	210		
		140	110		9,9	19,4	140	340	330		
		270	240		21,5			200	720		
	A4-70	100	70		6,3	12,6	105	270	210		
		140	110		9,9	13,7	140	230	330		
		270	240		21,5			150	720		
FIS A M14	5.8	110	75	50	7,9	15,7	115	325	225	60	60
		160	120		12,6	16,6	155	265	360		
		320	280		27,6		145	185	840		
	8.8	110	75		7,9	15,7	115	325	225		
		160	120		12,6	25,1	155	420	360		
		320	280		29,3	26,3		250	840		
	A4-70	110	75		7,9	15,7	115	325	225		
		160	120		12,6	18,3	155	295	360		
		320	280		29,3			175	840		
FIS A M16	5.8	120	80	60	7,7	15,3	120	295	240	65	65
		170	125		12,0	22,3	175	350	375		
		360	320		30,6			225	960		
	8.8	120	80		7,7	15,3	120	295	240		
		170	125		12,0	23,9	175	380	375		
		360	320		30,6	36,0		320	960		
	A4-70	120	80		7,7	15,3	120	295	240		
		170	125		12,0	23,9	175	380	375		
		360	320		30,6	25,2		215	960		
FIS A M20	5.8	140	90	120	10,8	21,5	135	375	270	85	85
		220	170		20,3	34,9	210	460	510		
		450	400		47,9			300	1200		
	8.8	140	90		10,8	21,5	135	375	270		
		220	170		20,3	40,7	210	540	510		
		450	400		47,9	56,0		435	1200		
	A4-70	140	90		10,8	21,5	135	375	270		
		220	170		20,3	39,4	210	520	510		
		450	400		47,9			285	1200		
FIS A M24	5.8	160	96	150	13,4	32,2	145	545	290	105	105
		270	210		31,4	50,9	250	600	630		
		540	480		71,8			395	1440		
	8.8	160	96		13,4	32,2	145	545	290		
		270	210		31,4	75,4	250	930	630		
		540	480		71,8	80,6		570	1440		
	A4-70	160	96		13,4	32,2	145	545	290		
		270	210		31,4	56,8	250	670	630		
		540	480		71,8			360	1440		

LOADS

Injection system FIS EB: Injection mortar FIS EB with Threaded rod FIS A [1)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [2) 3) 4) 9)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [5)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [7)] [mm]	Min. edge distance c_{min} [7)] [mm]
FIS A M27	5.8	170	108	200	16,0	38,5	165	610	325	120	120
		310	250		42,1	65,7	270	715	750		
		600	540		90,9			485	1620		
	8.8	170	108		16,0	38,5	165	610	325		
		310	250		42,1	101,0	270	1150	750		
		600	540		90,9	105,1		700	1620		
	A4-70	170	108		16,0	38,5	165	610	325		
		310	250		42,1	73,7	270	795	750		
		600	540		90,9			445	1620		
FIS A M30	5.8	190	120	300	18,8	45,1	180	665	360	140	140
		350	280		52,4	80,6	300	820	840		
		670	600		112,2		305	555	1800		
	8.8	190	120		18,8	45,1	180	665	360		
		350	280		52,4	125,7	300	1340	840		
		670	600		112,2	128,6	305	805	1800		
	A4-70	190	120		18,8	45,1	180	665	360		
		350	280		52,4	90,2	300	910	840		
		670	600		112,2		305	510	1800		

For the design the complete assessment ETA-15/0440 has to be considered. [8)]

[1)] Also valid for threaded rod RG M in the same property class.

[2)] The partial safety factors for material resistance as regulated in the ETA-15/0440 as well as a partial safety factor for load actions of γ_L = 1,4 bare considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1.5 \cdot h_{ef}$. Accurate data see ETA-15/0440.

[3)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[4)] Drill method hammer drilling. For further allowable drill methods and application conditions see ETA-15/0440.

[5)] For the sizes M8 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

[6)] For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

[7)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[8)] The given loads refer to the European Technical Assessment ETA-15/0440, issue date 06/07/2015. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

[9)] A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0,3$ mm.

LOADS

Injection system FIS EB: Injection mortar FIS EB with Threaded rod FIS A [1)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [2) 3) 4)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [5)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [7)] [mm]	Min. edge distance c_{min} [7)] [mm]
FIS A M8	5.8	100	60	10	7,9	5,1	90	70	180	40	40
		110	80		9,0		80		240		
		190	160				40		480		
	8.8	100	60		7,9	8,6	90	130	180		
		110	80		10,5		100	115	240		
		190	160		13,8		50	90	480		
	A4-70	100	60		7,9	6,0	90	85	180		
		110	80		9,9			75	240		
		190	160				40	70	480		
FIS A M10	5.8	100	60	20	9,0	8,6	90	125	180	45	45
		120	90		13,5		115	105	270		
		230	200		13,8		45	95	600		
	8.8	100	60		9,0	13,1	90	200	180		
		120	90		13,5		115	170	270		
		230	200		22,4		80	115	600		
	A4-70	100	60		9,0	9,2	90	135	180		
		120	90		13,5		115	110	270		
		230	200		15,7		45	90	600		
FIS A M12	5.8	100	70	40	12,6	12,0	125	175	210	55	55
		140	110		19,7		155	135	330		
		270	240		20,5		55	120	720		
	8.8	100	70		12,6	19,4	125	295	210		
		140	110		19,7		155	230	330		
		270	240		32,4		95	150	720		
	A4-70	100	70		12,6	13,7	125	200	210		
		140	110		19,7		155	155	330		
		270	240		22,5		55	115	720		
FIS A M14	5.8	110	75	50	14,1	16,6	135	235	225	60	60
		160	120		22,6		170	180	360		
		320	280		27,6		60	145	840		
	8.8	110	75		14,1	26,3	135	390	225		
		160	120		22,6		170	300	360		
		320	280		43,8		120	180	840		
	A4-70	110	75		14,1	18,3	135	260	225		
		160	120		22,6		170	195	360		
		320	280		30,9		65	135	840		
FIS A M16	5.8	120	80	60	17,2	22,3	160	305	240	65	65
		170	125		26,9		210	235	375		
		360	320		37,6		65	175	960		
	8.8	120	80		17,2	34,4	160	495	240		
		170	125		26,9	36,0	210	405	375		
		360	320		60,0		150	220	960		
	A4-70	120	80		17,2	25,2	160	350	240		
		170	125		26,9		210	270	375		
		360	320		42,0		80	165	960		

LOADS

Injection system FIS EB: Injection mortar FIS EB with Threaded rod FIS A [1)]

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [2) 3) 4)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [5)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [7)] [mm]	Min. edge distance c_{min} [7)] [mm]
FIS A M20	5.8	140	90	120	20,5	34,9	170	435	270	85	85
		220	170		40,7		265	305	510		
		450	400		58,6		95	230	1200		
	8.8	140	90		20,5	41,1	170	525	270		
		220	170		40,7	56,0	265		510		
		450	400		93,3		230	290	1200		
	A4-70	140	90		20,5	39,4	170	500	270		
		220	170		40,7		265	350	510		
		450	400		65,7		120	215	1200		
FIS A M24	5.8	160	96	150	18,8	45,2	170	540	290	105	105
		270	210		50,3	50,9	370	400	630		
		540	480		84,3		160	295	1440		
	8.8	160	96		18,8	45,2	170	540	290		
		270	210		50,3	80,6	370	675	630		
		540	480		114,9		385	365	1440		
	A4-70	160	96		18,8	45,2	170	540	290		
		270	210		50,3	56,8	370	445	630		
		540	480		94,3		205	270	1440		
FIS A M27	5.8	170	108	200	22,5	54,0	195	605	325	120	120
		310	250		63,1	65,7	415	475	750		
		600	540		109,5		200	345	1620		
	8.8	170	108		22,5	54,0	195	605	325		
		310	250		63,1	105,1	415	805	750		
		600	540		136,3		425	450	1620		
	A4-70	170	108		22,5	54,0	195	605	325		
		310	250		63,1	73,7	415	530	750		
		600	540		123,0		315	320	1620		
FIS A M30	5.8	190	120	300	26,3	63,2	210	660	360	140	140
		350	280		78,5	80,6	500	545	840		
		670	600		133,8		270	395	1800		
	8.8	190	120		26,3	63,2	210	660	360		
		350	280		78,5	128,6	500	920	840		
		670	600		168,3		540	515	1800		
	A4-70	190	120		26,3	63,2	210	660	360		
		350	280		78,5	90,2	500	605	840		
		670	600		150,1		400	365	1800		

For the design the complete assessment ETA-15/0440 has to be considered. [8)]

[1)] Also valid for threaded rod RG M in the same property class.

[2)] The partial safety factors for material resistance as regulated in the ETA-15/0440 as well as a partial safety factor for load actions of γ_L = 1,4 bare considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1.5 \cdot h_{ef}$. Accurate data see ETA-15/0440.

[3)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[4)] Drill method hammer drilling. For further allowable drill methods and application conditions see ETA-15/0440.

[5)] For the sizes M8 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

[6)] For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

[7)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[8)] The given loads refer to the European Technical Assessment ETA-15/0440, issue date 06/07/2015. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

The versatile injection mortar for anchorings in masonry and cracked concrete

Rescue ladders

Column bases

BUILDING MATERIALS

Approved for anchorings in:

- Concrete C20/25 to C50/60, cracked and non-cracked
- Hollow blocks made from lightweight concrete
- Hollow blocks made from concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Aerated concrete
- Solid brick

Approved for:

- Rebar connections
- Remedial wall tie VBS 8
- Weather facing reconstruction system FWS II
- Stand-off installation Thermax

CERTIFICATES

ETA-02/0024 ETAG 001-5 — Option 1 for cracked concrete — Seismic performance category C1, C2

ETA-08/0266 ETAG 001-5 — Post-installed rebar connection (TR23)

ETA-10/0383 ETAG 029 — Masonry — Use categories b, c or d and d/d or w/w

ICC ES ESR-2786 — See ICC-ES Evaluation Report at www.icc-es.org

Fire resistance classification R 120 — Anchor types see test report

SEISMIC

ADVANTAGES

- The FIS V injection mortar has numerous system approvals, such as in cracked and non-cracked concrete, masonry and for special applications. FIS V is thus the universal injection mortar family with guaranteed reliability for practically all areas of application.
- FIS VW HIGH SPEED has a significantly shorter curing time than FIS V, thus also ensuring swift work progress even at low temperatures.
- FIS VS LOW SPEED with extended gelling time prevents premature curing of the mortar at higher temperatures and is ideally suited to large drill hole depths.
- The extensive range of accessories is ideally suited to the FIS V injection mortar family, increases the great flexibility of the system and thus allows for a broad range of applications.

APPLICATIONS

Injection mortar for use with:

- Threaded rods FIS A, see page 146
- Internal threaded anchor RG MI, see page 159
- Rebar anchor FRA, see page 179
- Concrete steel bars, see page 185
- Injection anchor sleeves FIS H, see page 167
- Aerated concrete centring sleeve PBZ, see page PL
- Remedial wall tie VBS 8, see page 187
- Weather facing reconstruction system FWS II, see page 189
- Anchorings in waterfilled drill holes (only FIS V 410 C)

FUNCTIONING

- The FIS V is a 2-component injection mortar based on vinyl ester hybrid.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion through the static mixer.
- The injection cartridges are quick and easy to use with the fischer dispensers.
- Partially used cartridges can be reused, simply by changing the static mixer.

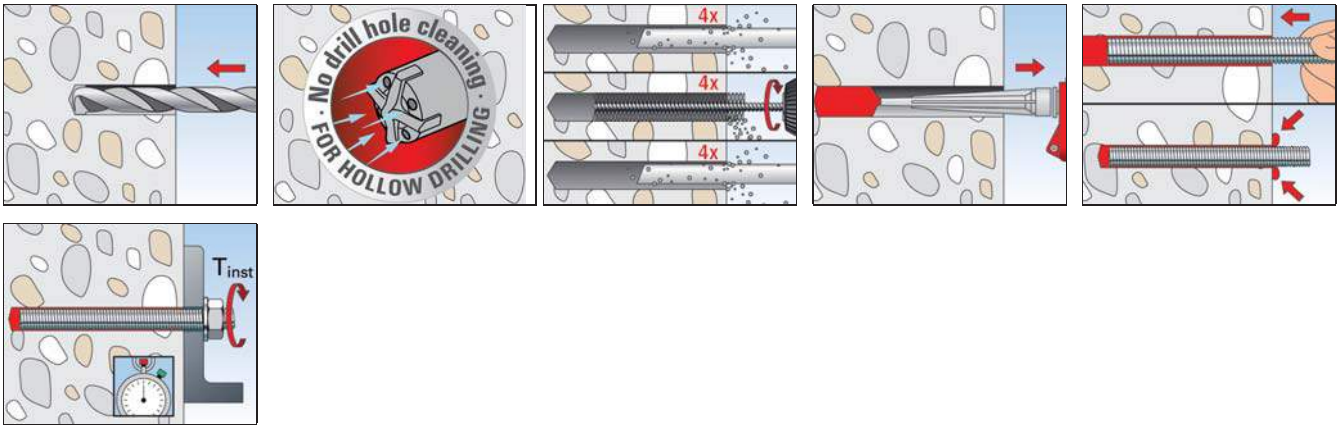
SEE ALSO

ANCHORS + SLEEVES
Page 144

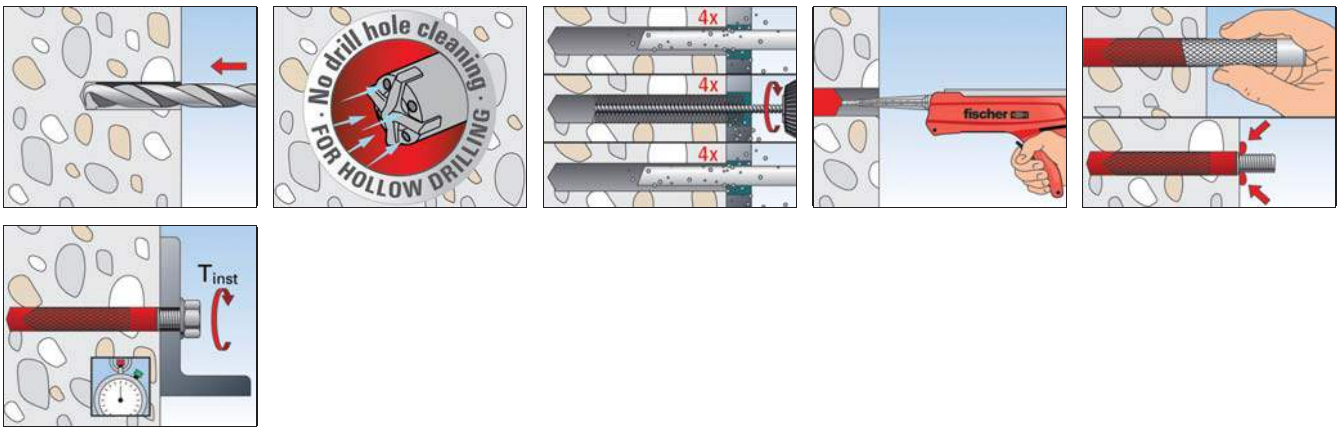
DISPENSER
Page 195

ACCESSORIES
Page 198

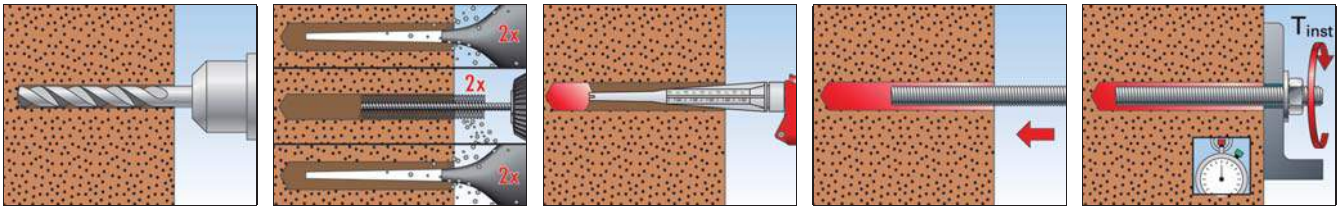
INSTALLATION IN CONCRETE WITH FIS V AND FIS A / RG M



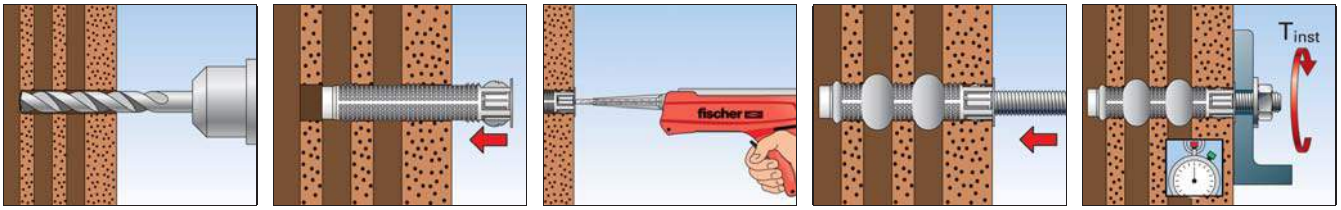
INSTALLATION IN CONCRETE WITH FIS V AND RG M I



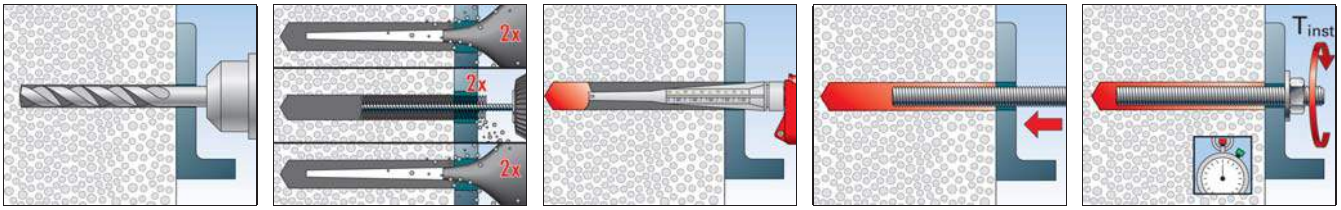
INSTALLATION IN SOLID BRICK WITH FIS V AND FIS A



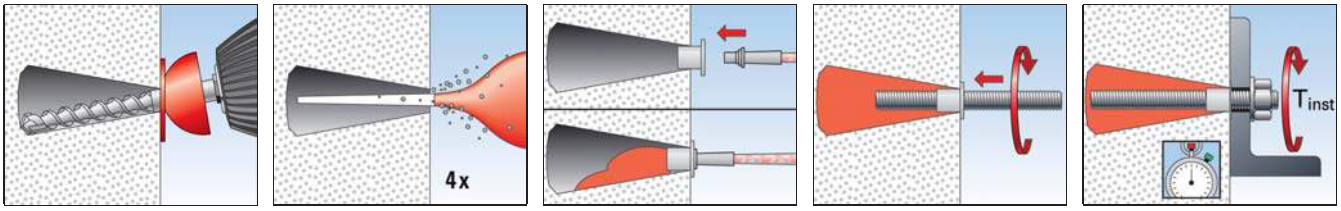
INSTALLATION IN HOLLOW BLOCKS WITH FIS V AND FIS HK + FIS A



INSTALLATION IN AERATED CONCRETE WITH FIS V AND FIS A / RG M



INSTALLATION IN UNDERCUT DRILL HOLE IN AERATED CONCRETE WITH FIS V AND FIS A / RG M



TECHNICAL DATA

Injection mortar **FIS V 300 T**

Injection mortar **FIS V 360 S**

Injection mortar **FIS V 410 C**

Static mixer **FIS MR Plus**

		Approval			Languages on the cartridge	Scale unit	Contents	Sales unit
Item	Art.-No.	DIBt	ETA	ICC				[pcs]
FIS V 300 T	**531573**	●	■	▲	USA, RA, BR, MEX	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS V 360 S	**094404**	●	■	▲	DE, FR, NL, TR, HU, AR	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS V 360 S	**094405**	●	■	▲	EN, IT, PT, ES, ZH, JA	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS V 360 S	**068435**	●	■	▲	DA, SV, NO, FI, PL, EL	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS V 360 S	**502283**	●	■	▲	LT, LV, ET, UK, RU, KK	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS V 360 S	**043994**	●	■	▲	CS, SK, PL, HU, RO, RU	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS V 410 C	**521431**	●	■	▲	IT, EN, DE	200	1 cartridge 410 ml, 2 x FIS MR Plus	16
FIS V 410 C	**534880**	●	■	▲	PL, LT, LV, ET, RU	200	1 cartridge 410 ml, 2 x FIS MR Plus	12
FIS V 410 C	**538131**	●	■	▲	USA, RA, BR, MEX	200	1 cartridge 410 ml, 2 x FIS MR Plus	12
FIS MR Plus	**545853**	–	–	–	–	–	10 static mixer FIS MR Plus	10

TECHNICAL DATA

Injection mortar **FIS VW 300 T**

Injection mortar **FIS VW 360 S**

Injection mortar **FIS VW 380 C**

Static mixer **FIS MR Plus**

		Approval		Languages on the cartridge	Scale unit	Contents	Sales unit
Item	Art.-No.	DIBt	ETA				[pcs]
FIS VW 300 T	**507793**	●	■	DE, EN, HR, SL, SR, BG	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS VW 300 T	**507795**	●	■	SV, DA, NO, CS, SK, PL, RU	150	1 cartridge 360 ml, 2 x FIS MR Plus	12
FIS VW 360 S	**090753**	●	■	DE, EN, FR, IT, NL, ES	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS VW 360 S	**043997**	●	■	CS, SK, PL, HU, RO, RU	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS VW 360 S	**502284**	●	■	RU, LT, LV, ET, UK, KK	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS VW 380 C	**519328**	●	■	CS, SK, PL	190	1 cartridge 380 ml, 2 x FIS MR Plus	12
FIS MR Plus	**545853**	–	–	–	–	10 static mixer FIS MR Plus	10

TECHNICAL DATA

Injection mortar **FIS VS 100 P**

Injection mortar **FIS VS 150 C**

Injection mortar **FIS VS 300 T**

Injection mortar **FIS VS 360 S**

Static mixer **FIS MR Plus**

		Approval			Languages on the cartridge	Scale unit	Contents	Sales unit
Item	Art.-No.	DIBt	ETA	ICC				[pcs]
FIS VS 100 P	**072525**	●	■	▲	DE, EN, FR, IT, NL, ES	50	1 cartridge 100 ml, 2 x FIS MR Plus	6
FIS VS 150 C	**045302**	●	■	▲	DE, EN, FR, IT, NL, ES	70	1 cartridge 145 ml, 1 x FIS MR Plus	6
FIS VS 150 C Set	**045303**	●	■	▲	DE, EN, FR, IT, NL, ES	70	Set for hollow bricks: 1 cartridge 145 ml, 2 x FIS MR Plus, 6 x FIS H 16 x 85 K	6
FIS VS 300 T	**093180**	●	■	▲	DE, EN, FR, NL, ES, PT	150	1 cartridge 300 ml, 1 x FIS MR Plus	12
FIS VS 300 T	**502285**	●	■	▲	RU, LT, LV, ET, UK, KK	150	1 cartridge 300 ml, 1 x FIS MR Plus	12
FIS VS 300 T	**044102**	●	■	▲	CS, SK, PL, HU, RO, RU, EL	150	1 cartridge 300 ml, 1 x FIS MR Plus	12
FIS VS 300 T	**093226**	●	■	▲	PL, CS, DA, NO, SV, FI	150	1 cartridge 300 ml, 1 x FIS MR Plus	12
FIS VS 360 S	**078664**	●	■	▲	EN, ZH, ES, PT, JA	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS MR Plus	**545853**	–	–	–	–	–	10 static mixer FIS MR Plus	10

FIS V 360 S HWK small

FIS V 360 S HWK big

FIS V 360 S HWK big with dispenser **FIS DM S**

		Approval			Languages on the cartridge	Contents	Sales unit
Item	Art.-No.	DIBt	ETA	ICC			[pcs]
FIS V 360 S HWK small	**092430**	●	■	▲	DE, FR, NL, TR, HU, AR	10 cartridges 360 ml, 20 x FIS MR Plus	1
FIS V 360 S HWK big	**091936**	●	■	▲	DE, FR, NL, TR, HU, AR	20 cartridges 360 ml, 40 x FIS MR Plus	1
FIS V 360 S HWK big	**096554**	●	■	▲	EN, IT, PT, ES, ZH, JA	20 cartridges 360 ml, 40 x FIS MR Plus	1
FIS V 360 S HWK big	**503027**	●	■	▲	CS, SK, PL, HU, RO, RU	12 cartridges 360 ml, 24 x FIS MR Plus, 1 x dispenser FIS DM S	1

FIS VS 300 T in bucket

FIS V 360 S in bucket

FIS V 410 in bucket

		Approval			Languages on the cartridge	Contents	Sales unit
Item	Art.-No.	DIBt	ETA	ICC			[pcs]
FIS VS 300 T in bucket	512062	●	■	▲	DE, EN, FR, NL, ES, PT	20 cartridges 300 ml, 20 x FIS MR Plus	1
FIS V 360 S in bucket	503025	●	■	▲	EN, IT, PT, ES, ZH, JA	10 cartridges 360 ml, 20 x FIS MR Plus	1
FIS V 410 in bucket	531504	●	■	▲	EN, TR, RU	16 cartridge 410 ml, 32 x FIS MR Plus	1

FIS VS 300 T in bucket

FIS VS 300 T HWK big

FIS VS 300 T HWK small

		Approval			Languages on the cartridge	Contents	Sales unit
Item	Art.-No.	DIBt	ETA	ICC			[pcs]
FIS VS 300 T in bucket	518539	●	■	▲	CS, SK, PL, HU, RO, EL	20 cartridges 300 ml, 20 x FIS MR Plus	1
FIS VS 300 T HWK big	517645	●	■	▲	DE, EN, FR, NL, ES, PT	20 cartridges 300 ml, 40 x FIS MR Plus	1
FIS VS 300 T HWK small	518832	●	■	▲	DE, EN, FR, NL, ES, PT	10 cartridges 300 ml, 20 x FIS MR Plus	1

CURING TIME FIS V

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		- 5°C - ± 0°C	24 hrs.
+ 0°C - + 5°C	13 min.	± 0°C - + 5°C	3 hrs.
+ 5°C - +10°C	9 min.	+ 5°C - +10°C	90 min.
+10°C - +20°C	5 min.	+10°C - +20°C	60 min.
+20°C - +30°C	4 min.	+20°C - +30°C	45 min.
+30°C - +40°C	2 min.	+30°C - +40°C	35 min.

The above times apply from the moment of contact between resin and hardener in the static mixer.
For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

CURING TIME FIS VW HIGH SPEED

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		-15°C - -10°C [1]	12 hrs.
		-10°C - - 5°C [1]	8 hrs.
- 5°C - ± 0°C [1]	5 min.	- 5°C - ± 0°C	3 hrs.
0°C - + 5°C	5 min.	± 0°C - + 5°C	90 min.
+ 5°C - +10°C	3 min.	+ 5°C - +10°C	45 min.
+10°C - +20°C	1 min.	+10°C - +20°C	30 min.

[1] Without approval.
The above times apply from the moment of contact between resin and hardener in the static mixer.
For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

CURING TIME FIS VS LOW SPEED

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		± 0°C - + 5°C	6 hrs.
+ 5°C - +10°C	20 min.	+ 5°C - +10°C	3 hrs.
+10°C - +20°C	10 min.	+10°C - +20°C	2 hrs.
+20°C - +30°C	6 min.	+20°C - +30°C	60 min.
+30°C - +40°C	4 min.	+30°C - +40°C	30 min.

The above times apply from the moment of contact between resin and hardener in the static mixer.
For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

LOADS

Injection system FIS V: Injection mortar FIS V with Threaded rod FIS A [1]
zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [2)3)4)5)11)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [6)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [7)] [kN]	Permissible shear load V_{perm} [7)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [8)9)] [mm]	Min. edge distance c_{min} [8)9)] [mm]
FIS A M 10	5.8	100	60	20	5,4	8,6	90	185	180	45	45
		120	90		8,1		125	155	270		
		230	200		13,8		85	110	600		
	8.8	100	60		5,4	10,8	90	235	180		
		120	90		8,1	13,3	125	255	270		
		230	200		18,0			150	600		
	A4-70	100	60		5,4	9,3	90	200	180		
		120	90		8,1		125	170	270		
		230	200		15,5		100	115	600		
	C-70	100	60		5,4	10,8	90	235	180		
		120	90		8,1	11,6	125	220	270		
		230	200		18,0			140	600		
FIS A M 12	5.8	100	70	40	7,5	12,0	105	255	210	55	55
		140	110		11,8		145	195	330		
		270	240		20,5		110	135	720		
	8.8	100	70		7,5	15,1	105	330	210		
		140	110		11,8	19,3	145	340	330		
		270	240		25,9			200	720		
	A4-70	100	70		7,5	13,5	105	290	210		
		140	110		11,8		145	225	330		
		270	240		22,5		125	145	720		
	C-70	100	70		7,5	15,1	105	330	210		
		140	110		11,8	16,9	145	290	330		
		270	240		25,9			175	720		

LOADS

Injection system FIS V: Injection mortar FIS V with Threaded rod FIS A [1)]

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [2) 3) 4) 5) 11)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [6)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [7)] [kN]	Permissible shear load V_{perm} [7)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [8) 9)] [mm]	Min. edge distance c_{min} [8) 9)] [mm]
FIS A M 16	5.8	120	80	60	11,5	22,3	120	445	240	65	65
		170	125		18,0		185	350	375		
		360	320		37,6		145	195	960		
	8.8	120	80		11,5	23,0	120	460	240		
		170	125		18,0	35,9	185	600	375		
		360	320		46,0			320	960		
	A4-70	120	80		11,5	23,0	120	460	240		
		170	125		18,0	25,2	185	400	375		
		360	320		42,0		165	215	960		
	C-70	120	80		11,5	23,0	120	460	240		
		170	125		18,0	31,4	185	515	375		
		360	320		46,0			270	960		
FIS A M 20	5.8	140	90	120	14,6	29,3	135	530	270	85	85
		220	170		28,0	34,9	225	455	510		
		450	400		58,6		195	260	1200		
	8.8	140	90		14,6	29,3	135	530	270		
		220	170		28,0	56,0	225	780	510		
		450	400		65,8			435	1200		
	A4-70	140	90		14,6	29,3	135	530	270		
		220	170		28,0	39,3	225	520	510		
		450	400		65,5			285	1200		
	C-70	140	90		14,6	29,3	135	530	270		
		220	170		28,0	49,0	225	670	510		
		450	400		65,8			370	1200		
FIS A M 24	5.8	160	96	150	15,5	31,0	145	520	290	105	105
		270	210		33,9	50,9	265	590	630		
		540	480		77,6			330	1440		
	8.8	160	96		15,5	31,0	145	520	290		
		270	210		33,9	67,9	265	825	630		
		540	480		77,6	80,7		570	1440		
	A4-70	160	96		15,5	31,0	145	520	290		
		270	210		33,9	56,6	265	670	630		
		540	480		77,6			360	1440		
	C-70	160	96		15,5	31,0	145	520	290		
		270	210		33,9	67,9	265	825	630		
		540	480		77,6	70,6		480	1440		
FIS A M 27	5.8	170	108	200	17,4	34,9	165	545	325	125	125
		310	250		40,4	65,7	290	695	750		
		600	540		87,2			390	1620		
	8.8	170	108		17,4	34,9	165	545	325		
		310	250		40,4	80,8	290	885	750		
		600	540		87,2	104,9		700	1620		
	A4-70	170	108		17,4	34,9	165	545	325		
		310	250		40,4	73,6	290	795	750		
		600	540		87,2			440	1620		
	C-70	170	108		17,4	34,9	165	545	325		
		310	250		40,4	80,8	290	885	750		
		600	540		87,2	91,8		590	1620		

LOADS

Injection system FIS V: Injection mortar FIS V with Threaded rod FIS A [1)]

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [2) 3) 4) 5) 11)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [6)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [7)] [kN]	Permissible shear load V_{perm} [7)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [8) 9)] [mm]	Min. edge distance c_{min} [8) 9)] [mm]
FIS A M 30	5.8	190	120	300	21,5	43,1	180	630	360	140	140
		350	280		50,3	80,6	320	795	840		
		670	600		107,7			440	1800		
	8.8	190	120		21,5	43,1	180	630	360		
		350	280		50,3	100,5	320	1035	840		
		670	600		107,7	128,2		805	1800		
	A4-70	190	120		21,5	43,1	180	630	360		
		350	280		50,3	89,9	320	905	840		
		670	600		107,7			505	1800		
	C-70	190	120		21,5	43,1	180	630	360		
		350	280		50,3	100,5	320	1035	840		
		670	600		107,7	112,2		675	1800		

For the design the complete assessment ETA-02/0024 has to be considered. [10)]

[1)] Also valid for threaded rod RG M in the same property class.

[2)] The partial safety factors for material resistance as regulated in the ETA-02/0024 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-02/0024.

[3)] The given loads are valid for injection mortar FIS V for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-02/0024.

[4)] For higher concrete strength classes up t o C50/60 higher per missible loads may be possible.

[5)] Drill method hammer drilling. For further allowable application conditions see ETA-02/0024.

[6)] For the sizes M10 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

[7)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-02/0024.

[8)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[9)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-02/0024.

[10)] The given loads refer to the European Technical Assessment ETA-02/0024, issue date 13/02/2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

[11)] A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0{,}3$ mm.

LOADS

Injection system FIS V: Injection mortar FIS V with Threaded rod FIS A [1)]

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [2) 3) 4) 5)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [6)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [7)] [kN]	Permissible shear load V_{perm} [7)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [8) 9)] [mm]	Min. edge distance c_{min} [8) 9)] [mm]
FIS A M 6	5.8	100	50	5	4,0	2,9	65	50	150	40	40
			60		4,8				180		
		110	72				50	45	220		
	8.8	100	50		4,0	4,6	65	70	150		
			60		4,8			65	180		
		110	72		5,8				220		
	A4-70	100	50		4,0	3,2		55	150		
			60		4,8			50	180		
		110	72		5,4		60		220		
FIS A M 8	5.8	100	60	10	7,9	5,1	90	70	180	40	40
		110	80		9,0		80		240		
		190	160				40	60	480		
	8.8	100	60		7,9	8,4	90	125	180		
		110	80		10,5		100	115	240		
		190	160		13,9		55	90	480		
	A4-70	100	60		7,9	5,9	90	85	180		
		110	80		9,8			75	240		
		190	160				40	70	480		
	C-70	100	60		7,9	7,3	90	105	180		
		110	80		10,5		100	95	240		
		190	160		12,2		40	80	480		
FIS A M 10	5.8	100	60	20	9,9	8,6	90	125	180	45	45
		120	90		13,8		115	105	270		
		230	200				45	85	600		
	8.8	100	60		9,9	13,3	90	200	180		
		120	90		14,8		125	170	270		
		230	200		22,1		70	115	600		
	A4-70	100	60		9,9	9,3	90	135	180		
		120	90		14,8		125	115	270		
		230	200		15,5		45	90	600		
	C-70	100	60		9,9	11,6	90	175	180		
		120	90		14,8		125	150	270		
		230	200		19,3		55	105	600		
FIS A M 12	5.8	100	70	40	13,8	12,0	140	175	210	55	55
		140	110		20,5		165	130	330		
		270	240				55	100	720		
	8.8	100	70		13,8	19,3	140	295	210		
		140	110		21,7		180	230	330		
		270	240		32,1		85	150	720		
	A4-70	100	70		13,8	13,5	140	200	210		
		140	110		21,7		180	150	330		
		270	240		22,5		55	110	720		
	C-70	100	70		13,8	16,9	140	255	210		
		140	110		21,7		180	195	330		
		270	240		28,1		65	135	720		

LOADS

Injection system FIS V: Injection mortar FIS V with Threaded rod FIS A [1]
zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [2][3][4][5]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [6] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [7] [kN]	Permissible shear load V_{perm} [7] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [8][9] [mm]	Min. edge distance c_{min} [8][9] [mm]
FIS A M 16	5.8	120	80	60	17,2	22,3	160	305	240	65	65
		170	125		29,9		245	235	375		
		360	320		37,6		65	150	960		
	8.8	120	80		17,2	34,4	160	495	240		
		170	125		29,9	35,9	245	405	375		
		360	320		59,8		135	220	960		
	A4-70	120	80		17,2	25,2	160	350	240		
		170	125		29,9		245	270	375		
		360	320		42,0		70	165	960		
	C-70	120	80		17,2	31,4	160	445	240		
		170	125		29,9		245	350	375		
		360	320		52,3		105	195	960		
FIS A M 20	5.8	140	90	120	20,5	34,9	170	435	270	85	85
		220	170		48,3		340	300	510		
		450	400		58,6		85	195	1200		
	8.8	140	90		20,5	41,1	170	525	270		
		220	170		48,3	56,0	340		510		
		450	400		93,3		230	290	1200		
	A4-70	140	90		20,5	39,3	170	500	270		
		220	170		48,3		340	345	510		
		450	400		65,5		95	215	1200		
	C-70	140	90		20,5	41,1	170	525	270		
		220	170		48,3	49,0	340	450	510		
		450	400		81,7		140	260	1200		
FIS A M 24	5.8	160	96	150	22,6	45,2	170	540	290	105	105
		270	210		67,9	50,9	435	390	630		
		540	480		84,3		105	250	1440		
	8.8	160	96		22,6	45,2	170	540	290		
		270	210		67,9	80,7	435	675	630		
		540	480		134,5		360	365	1440		
	A4-70	160	96		22,6	45,2	170	540	290		
		270	210		67,9	56,6	435	445	630		
		540	480		94,4		120	270	1440		
	C-70	160	96		22,6	45,2	170	540	290		
		270	210		67,9	70,6	435	580	630		
		540	480		117,7		235	325	1440		
FIS A M 27	5.8	170	108	200	27,0	54,0	195	605	325	125	125
		310	250		85,8	65,7	495	460	750		
		600	540		109,5		125	295	1620		
	8.8	170	108		27,0	54,0	195	605	325		
		310	250		85,8	104,9	495	805	750		
		600	540		174,9		500	450	1620		
	A4-70	170	108		27,0	54,0	195	605	325		
		310	250		85,8	73,6	495	530	750		
		600	540		122,7		155	320	1620		
	C-70	170	108		27,0	54,0	195	605	325		
		310	250		85,8	91,8	495	690	750		
		600	540		153,0		355	385	1620		

LOADS

Injection system FIS V: Injection mortar FIS V with Threaded rod FIS A [1)]

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [2) 3) 4) 5)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [6)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [7)] [kN]	Permissible shear load V_{perm} [7)] [kN]	Required edge distance (with one edge) for Max. tension load c [mm]	Required edge distance (with one edge) for Max. shear load c [mm]	Required spacing for Max. Load s_{cr} [mm]	Min. spacing s_{min} [8) 9)] [mm]	Min. edge distance c_{min} [8) 9)] [mm]
FIS A M 30	5.8	190	120	300	31,6	63,2	210	660	360	140	140
		350	280		106,8	80,6	595	525	840		
		670	600		133,8		140	330	1800		
	8.8	190	120		31,6	63,2	210	660	360		
		350	280		106,8	128,2	595	920	840		
		670	600		213,7		610	515	1800		
	A4-70	190	120		31,6	63,2	210	660	360		
		350	280		106,8	89,9	595	600	840		
		670	600		150,0		195	365	1800		
	C-70	190	120		31,6	63,2	210	660	360		
		350	280		106,8	112,2	595	785	840		
		670	600		187,0		445	435	1800		

For the design the complete assessment ETA-02/0024 has to be considered. [10)]

[1)] Also valid for threaded rod RG M in the same property class.

[2)] The partial safety factors for material resistance as regulated in the ETA-02/0024 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-02/0024.

[3)] The given loads are valid for injection mortar FIS V for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-02/0024.

[4)] For higher concrete strength classes up t o C50/60 higher per missible loads may be possible.

[5)] Drill method hammer drilling. For further allowable application conditions see ETA-02/0024.

[6)] For the sizes M6 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

[7)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-02/0024.

[8)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[9)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-02/0024.

[10)] The given loads refer to the European Technical Assessment ETA-02/0024, issue date 13/02/2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

LOADS

Injection system FIS V: Injection mortar FIS V with Internal threaded anchor RG M I

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [5) 6)] [mm]	Min. edge distance c_{min} [5) 6)] [mm]
RG M 8 I	5.8	120	90	10	9,0	5,3	70	65	270	55	55
	8.8				13,8	8,3	130	95			
	A4-70				9,9	5,9	80	70			
RG M 10 I	5.8	130	90	20	13,8	8,3	105	90	270	65	65
	8.8				19,0	13,3	175	155			
	A4-70				15,7	9,3	130	100			
RG M 12 I	5.8	170	125	40	20,5	12,1	155	110	375	75	75
	8.8				23,8	19,3	190	190			
	A4-70				22,5	13,5	175	125			
RG M 16 I	5.8	210	160	80	35,7	22,4	240	180	480	95	95
	8.8					35,8		320			
	A4-70					25,1		205			
RG M 20 I	5.8	270	200	120	54,8	35,4	335	245	600	125	125
	8.8					42,9		315			
	A4-70					39,4		285			

For the design the complete assessment ETA-02/0024 has to be considered. [7)]

[1)] The partial safety factors for material resistance as regulated in the ETA-02/0024 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-02/0024.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling. For further allowable application conditions see ETA-02/0024.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-02/0024.

[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[6)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-02/0024.

[7)] The given loads refer to the European Technical Assessment ETA-02/0024, issue date 13/02/2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

LOADS

Injection system FIS V with threaded rod FIS A [4]

Highest permissible loads[1) 5)] for a single anchor in solid brick masonry (without injection anchor sleeve) for pre-positioned or push-through installation.

For the design the complete assessment ETA-10/0383 has to be considered.

Type	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick-dimensions [6)] (L x W x H) [mm]	Min. effective-anchorage depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characte-ristic spacing parallel to bed joint $s_{cr\,\parallel}$ [mm]	Characte-ristic spacing perpendicu-lar to bed joint $s_{cr\perp}$ [mm]	Min. spacing [2)] $s_{min\,\parallel}$ / $s_{min\perp}$ [mm]	Characte-ristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Solid brick Mz, NF acc. to EN 771-1												
M6	≥ 10	≥ 1,8	240x115x71 (NF)	50	115	4	1,14	0,71	240	75	240 / 75	100
M8				50		10	1,14	0,71				100
M10				50		10	1,00	1,14				100
M10				80		10	1,43	1,14				100
M10				200		10	3,42	2,43				150
M12				50		10	0,86	1,14				100
M12				80		10	1,57	1,14				100
M12				200		10	2,29	3,29				150
M6	≥ 20			50		4	1,57	1,14				100
M8				50		10	1,57	1,14				100
M10				50		10	1,43	1,71				100
M10				80		10	2,00	1,71				100
M10				200		10	3,42	3,43				150
M12				50		10	1,29	1,57				100
M12				80		10	2,29	1,57				100
M12				200		10	3,29	3,43				150
Solid brick Mz, 2DF acc. to EN 771-1												
M6	≥ 10	≥ 1,8	240x115x113 (2DF)	50	115	4	0,86	0,71	240	115	120 / 115	60
M8				50		10	0,86	0,86				
M10				100		10	1,29	1,00				
M12				100		10	1,57	1,00				
M16				100		10	1,57	0,86				
M6	≥ 16			50		4	1,29	1,14				
M8				50		10	1,29	1,43				
M10				100		10	2,14	1,57				
M12				100		10	2,29	1,57				
M16				100		10	2,29	1,43				
Solid sand-lime brick KS acc. to EN 771												
M6	≥ 10	≥ 2,0	250x240x240	50	240	4	1,43	0,71	250	240	80 / 80	60
M8						10	2,00	1,29				
M10						10	2,00	1,29				
M12						10	2,00	1,29				
M16						10	1,57	1,29				
M6	≥ 20					4	2,14	1,14				
M8						10	2,57	1,86				
M10						10	2,57	1,86				
M12						10	2,57	1,86				
M16						10	2,14	1,86				
M6	≥ 28					4	2,43	1,43				
M8						10	2,57	2,57				
M10						10	2,57	2,57				
M12						10	2,57	2,57				
M16						10	2,57	2,57				

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

5) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

6) Hole patterns see assessment.

LOADS

Injection system FIS V with threaded rod FIS A[5] and anchor sleeve FIS H..K

Highest permissible loads[1] [6] for a single anchor in solid brick masonry (with injection anchor sleeve) for pre-positioned installation.
For the design the complete assessment ETA-10/0383 has to be considered.

Type of anchor sleeve with threaded rod	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions [6] (L x W x H) [mm]	Min. effective anchorage depth[4] h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3] N_{perm} [kN]	Permissible shear load[3] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing [2] $s_{min\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2] $c_{cr} = c_{min}$ [mm]
Solid brick Mz, 2DF acc. to EN 771-1												
16x85 M8	≥ 10	≥ 1,8	240x115x113 (2DF)	85	115	10	0,86	0,86	240	115	120 / 115	60
16x85 M10							0,86	1,00				
16x85 M8	≥ 16						1,29	1,43				
16x85 M10							1,29	1,57				
Solid sand-lime brick KS acc. to EN 771												
16x85 M8/M10	≥ 10	≥ 2,0	250x240x240	85	240	10	2,29	1,29	250	240	80 / 80	60
16x85 M8/M10	≥ 20						2,57	1,86				
16x85 M8/M10	≥ 28						2,57	2,57				
Lightweight concrete block Vbl acc. to EN 771-3												
12x85 M6	≥ 4	≥ 1,6	250x240x239	85	240	4	1,00	0,57	250	250	250 / 250	130
12x50 M8				50			0,57	0,86				
12x85 M8				85			1,00	0,86				
16x85 M10				85			1,14	1,00				
20x85 M12				85			1,43	1,29				
12x85 M6	≥ 6			85			1,43	0,86				
12x50 M8				50			0,86	1,29				
12x85 M8				85			1,43	1,29				
16x85 M8 / M10				85			1,86	1,57				
20x85 M12 / M16				85			2,14	1,86				
12x85 M6	≥ 8			85			2,00	1,14				
12x50 M8				50			1,14	1,71				
12x85 M8				85			2,00	1,71				
16x85 M8 / M10				85			2,43	2,00				
20x85 M12 / M16				85			2,57	2,43				

[1] The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

[2] Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

[3] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

[4] The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

[5] Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

[6] The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

[7] Hole patterns see assessment.

LOADS

Injection system FIS V with threaded rod FIS A[5] and anchor sleeve FIS H..K

Highest permissible loads[1) 6)] for a single anchor in perforated brick masonry (with injection anchor sleeve) for pre-positioned installation. For the design the complete assessment ETA-10/0383 has to be considered.

Type of anchor sleeve with threaded rod	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick-dimensions [7)] (L x W x H) [mm]	Min. effective anchorage depth[4)] h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing [2)] $s_{min\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Vertically perforated brick Hlz, shape B acc. to EN 771-1												
12x50 M6/M8	≥ 4	≥ 1,0	500x175x237 or 370x240x237	50	175	2,0	0,11	0,14	500 resp. 370	240	100 / 100	100
16x85 M8/M10	≥ 4			85			0,26	0,14				
20x130 M12/M16	≥ 4			130			0,34	0,17				
12x50 M6/M8	≥ 8			50			0,21	0,26				
16x85 M8/M10	≥ 8			85			0,57	0,26				
20x130 M12/M16	≥ 8			130			0,71	0,34				
12x50 M6/M8	≥ 12			50			0,34	0,43				
16x85 M8/M10	≥ 12			85			0,86	0,43				
20x130 M12/M16	≥ 12			130			1,14	0,57				
Vertically perforated brick Hlz, acc. to EN 771-1												
12x50 M6	≥ 6	≥ 1,4	240x115x113 (2DF)	50	115	2,0	0,21	0,34	240	115	240 / 115	80
12x85 M8	≥ 6			85			0,34	0,57				
16x85 M8/M10	≥ 6			85			0,21	0,43				
20x85 M12/M16	≥ 6			85			0,26	0,71				
12x50 M6	≥ 16			50			0,57	0,86				
12x85 M8	≥ 16			85			0,86	1,57				
16x85 M8/M10	≥ 16			85			0,57	1,00				
20x85 M12/M16	≥ 16			85			0,71	1,57				
12x50 M6	≥ 28			50			1,00	1,43				
12x85 M8	≥ 28			85			1,57	1,57				
16x85 M8/M10	≥ 28			85			1,00	1,57				
20x85 M12/M16	≥ 28			85			1,29	1,57				
Perforated sand-lime brick KSL acc. to EN 771-2												
12x50 M6/M8	≥ 12	≥ 1,4	240x175x113	50	175	2,0	0,71	0,71	240	115	100 / 115	60
16x85 M8/M10	≥ 12			85			0,86	1,29				80
20x85 M12	≥ 12			85			1,00	1,29				
12x50 M6/M8	≥ 20			50			1,29	1,14				60
16x85 M8/M10	≥ 20			85			1,43	2,14				80
20x85 M12	≥ 20			85			1,71	2,14				
Lightweight concrete hollow block Hbl acc. to EN 771-3												
12x50 M6/M8	≥ 2	≥ 1,0	362x240x240	50	240	2,0	0,34	0,26	362	240	100 / 240	60
16x85 M8/M10	≥ 2			85			0,43	0,26				
20x200 M12/M16	≥ 2			180			0,71	0,26				
12x50 M6/M8	≥ 4			50			0,71	0,57				
16x85 M8/M10	≥ 4			85			0,86	0,57				
20x200 M12/M16	≥ 4			180			1,57	0,57				

1) The required partial safety factors for material resistance as well as a par tial safety factor for load actions of γ_L = 1,4 are considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

5) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

6) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

7) Hole patterns see assessment.

LOADS

Injection system FIS V with threaded rod FIS A[4]

Highest permissible loads[1) 5)] for a single anchor in aerated concrete.

For the design the complete assessment ETA-10/0383 has to be considered.

Type threaded rod	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions (L x W x H) [mm]	Min. effective-anchorage depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3] N_{perm} [kN]	Permissible shear load[3] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\,\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing[2] $s_{min\,\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2] $c_{cr} = c_{min}$ [mm]
Aerated concrete acc. to EN 771-4												
M8[6]	≥ 2	≥ 0,35	-	100	130	1	0,54	0,43	250	250	250	100
M10[6]						2	0,54	0,43				
M12[6]						2	0,71	0,54				
M16[6]						2	0,71	0,43				
M8[6]	≥ 4	≥ 0,50				1	0,71	0,89				
M10[6]						2	1,07	0,71				
M12[6]						2	0,89	0,89				
M16[6]						2	0,71	0,71				
M8[6]	≥ 6	≥ 0,65				1	1,25	1,07				
M10[6]						2	1,79	1,07				
M12[6]						2	1,79	1,25				
M16[6]						2	1,07	1,61				
M8, M10, M12[7]	≥ 2	≥ 0,35		75	105	2	0,71	0,89	240	240	240	120
M8, M10, M12[7]	≥ 4	≥ 0,50					1,07	1,61				
M8, M10, M12[7]	≥ 6	≥ 0,65					1,43	2,14				
M8, M10, M12[7]	≥ 2	≥ 0,35		95	125		0,89	0,89	300	250	300 / 250	150
M8, M10, M12[7]	≥ 4	≥ 0,50					1,25	1,61				
M8, M10, M12[7]	≥ 6	≥ 0,65					1,61	2,14				

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

5) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

6) Cylindrical drill hole. Pre-positioned and push-through installation possible.

7) Drill hole to be made with cone drill bit PBB. Pre-positioned installation only.

The solid injection mortar for standard applications in cracked concrete and masonry

High-bay warehouses

Air conditioning units

BUILDING MATERIALS

Approved for anchorings in:
- Concrete C20/25 to C50/60, cracked
- Hollow blocks made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Solid brick
- Rebar connections
- Aerated concrete

Also suitable for:
- Concrete C12/15
- Hollow blocks made from concrete

CERTIFICATES

ETA-10/0352
ETAG 001-5
Option 1 for cracked concrete

ETA-15/0263
ETAG 029
Masonry
Use categories b, c or d and d/d or w/w

ETA-15/0539
ETAG 001-5
Post-installed rebar connection (TR23)

Fire resistance classification
R 120
Anchor types see test report

ADVANTAGES

- The FIS VL is approved for use in cracked concrete and masonry, and achieves a high load-bearing capacity in these conditions.
- The injection mortar, based on vinylester resin, allows for anchorings in water-filled drill holes (410 ml cartridges only), thus allowing for rapid progress.
- The temperature resistance of the FIS VL injection mortar of -40 °C to +120 °C allows for a solid load level even when subjected to high temperature demands, thus providing great flexibility.
- FIS VL HIGH SPEED has a significantly shorter curing time than FIS VL, thus also ensuring swift work progress even at low temperatures.

APPLICATIONS

Injection mortar for use with:
- Threaded rods FIS A, see page 146
- Internal threaded anchor RG MI, see page 159
- Injection anchor sleeves FIS H, see page 167

FUNCTIONING

- The FIS VL is a 2-component injection mortar based on vinylester.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion through the static mixer.
- The 410 ml coaxial cartridge can be easily used with the fischer FIS AC dispenser.
- Partially used cartridges can be reused, simply by changing the static mixer.
- Related accessories for use in concrete and masonry can be found on page PL.

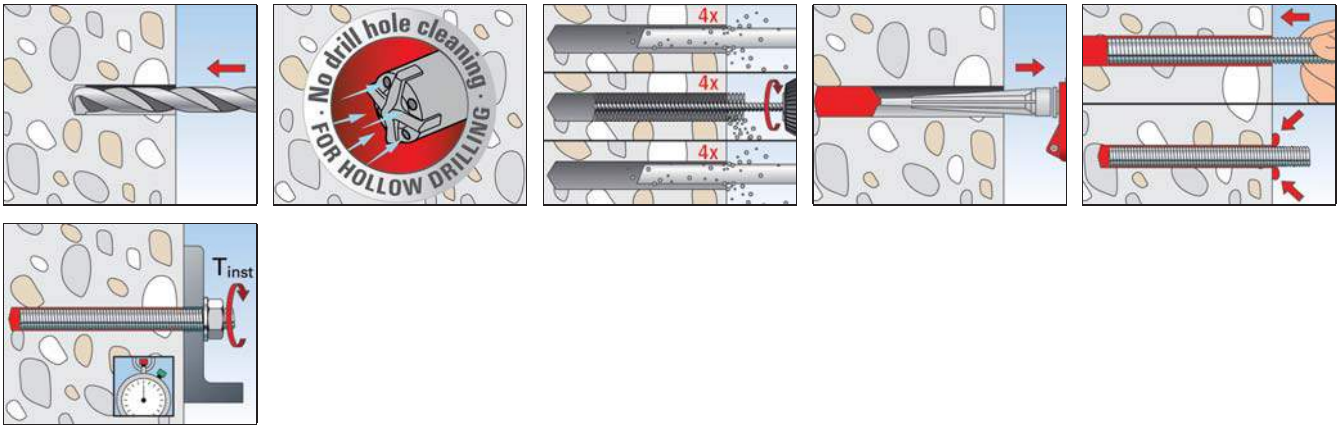
SEE ALSO

ANCHORS + SLEEVES
Page 144

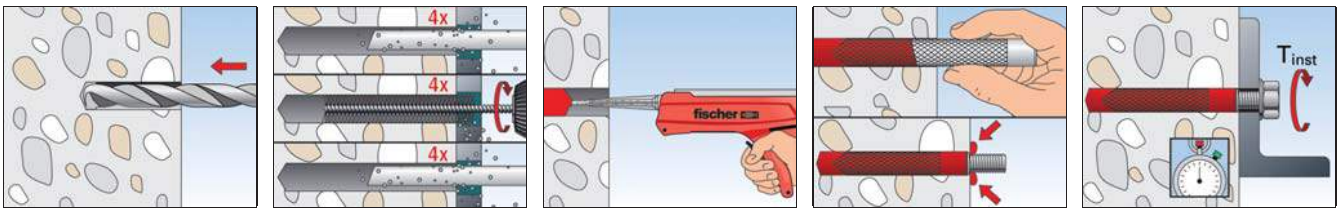
DISPENSER
Page 195

ACCESSORIES
Page 198

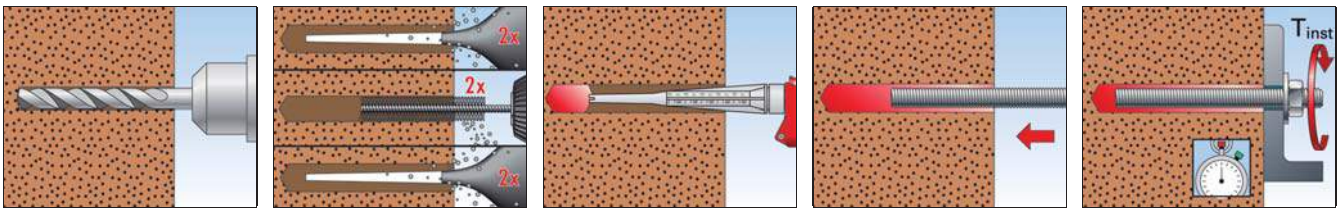
INSTALLATION IN CONCRETE WITH FIS VL AND FIS A / RG M



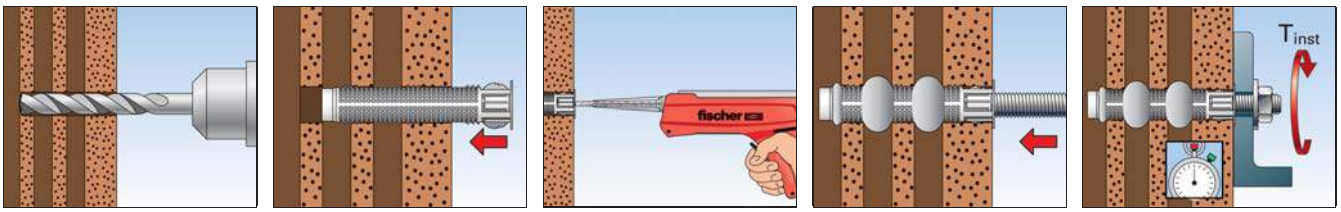
INSTALLATION IN CONCRETE WITH FIS VL AND RG M I



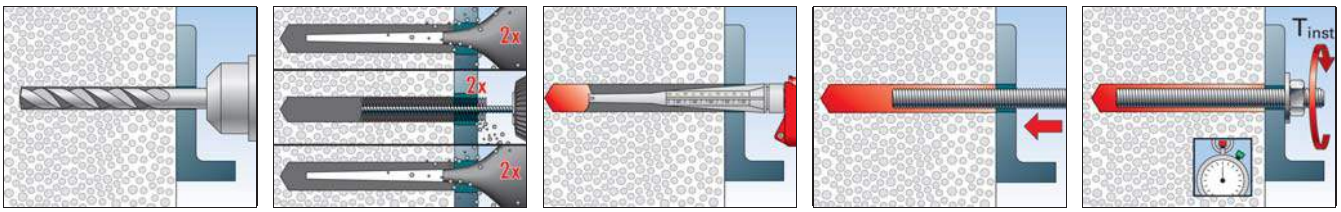
INSTALLATION IN SOLID BRICK WITH FIS VL AND FIS A / RG M



INSTALLATION IN HOLLOW BLOCKS WITH FIS VL AND FIS HK + FIS A / RG M



INSTALLATION IN AERATED CONCRETE WITH FIS V AND FIS A / RG M



TECHNICAL DATA

FIS VL 300 T

FIS VL 410 C

FIS VL 410 C in bucket

Static mixer **FIS MR Plus**

		Approval	Languages on the cartridge	Scale unit	Contents	Sales unit
Item	**Art.-No.**	**ETA**				**[pcs]**
FIS VL 300 T with clip	**537149**	■	PT, ES, EN	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS VL 300 T with clip	**538583**	■	CS, SK	150	1 cartridge 300 ml, 2 x FIS MR Plus	10
FIS VL 300 T HIGH SPEED with clip	**538585**	■	CS, SK	150	1 cartridge 380 ml, 2 x FIS MR Plus	10
FIS VL 300 T	**539461**	■	EN, FR, ES, PT, RO, AR	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS VL 300 T in bucket	**539462**	■	EN, FR, ES, PT, RO, AR	150	20 cartridges 300 ml, 40 x FIS MR Plus	1
FIS VL 300 T HWK big	**538589**	■	CS, SK	150	20 cartridges 300 ml, 40 x FIS MR Plus	1
FIS VL 410 C	**539463**	■	EN, FR, ES, PT, RO, AR	200	1 cartridge 410 ml, 2 x FIS MR Plus	12
FIS VL 410 C	**538584**	■	CS, SK	200	1 cartridge 410 ml, 2 x FIS MR Plus	12
FIS VL 410 C HIGH SPEED	**538586**	■	CS, SK	200	1 cartridges 410 ml, 1 x FIS MR Plus	12
FIS VL 410 C in bucket	**538549**	■	DE, FR, NL, EN, TR	200	16 cartridges 410 ml, 32 x FIS MR Plus	1
FIS VL 410 C in bucket	**539464**	■	EN, FR, ES, PT, RO, AR	200	16 cartridges 410 ml, 32 x FIS MR Plus	1
FIS VL 410 C HWK big	**538590**	■	CS, SK	200	16 cartridges 410 ml, 32 x FIS MR Plus	1
FIS MR Plus	**545853**	–	–	–	10 static mixer FIS MR Plus	10

CURING TIME FIS VL

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		- 5°C - ± 0°C	24 hrs.
+ 0°C - + 5°C	13 min.	± 0°C - + 5°C	3 hrs.
+ 5°C - +10°C	9 min.	+ 5°C - +10°C	90 min.
+10°C - +20°C	5 min.	+10°C - +20°C	60 min.
+20°C - +30°C	4 min.	+20°C - +30°C	45 min.
+30°C - +40°C	2 min.	+30°C - +40°C	35 min.

The above times apply from the moment of contact between resin and hardener in the static mixer.
For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

CURING TIME FIS VL HIGH SPEED

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		-15°C - -10°C [1]	12 hrs.
		-10°C - - 5°C [1]	8 hrs.
- 5°C - ± 0°C [1]	5 min.	- 5°C - ± 0°C	3 hrs.
0°C - + 5°C	5 min.	± 0°C - + 5°C	90 min.
+ 5°C - +10°C	3 min.	+ 5°C - +10°C	45 min.
+10°C - +20°C	1 min.	+10°C - +20°C	30 min.

[1] Without approval.
The above times apply from the moment of contact between resin and hardener in the static mixer.
For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

LOADS

Injection system FIS VL: Injection mortar FIS VL with Threaded rod FIS A [1)]

zinc plated steel / stainless steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [2) 3) 4) 5) 11)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [6)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [7)] [kN]	Permissible shear load V_{perm} [7)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [8) 9)] [mm]	Min. edge distance c_{min} [8) 9)] [mm]
M10	5.8	100	60	20	4,5	8,6	90	185	180	45	45
		120	90		6,7		125	160	270		
		230	200		13,8		110	125	600		
	8.8	100	60		4,5	10,8	90	235	180		
		120	90		6,7	13,3	125	260	270		
		230	200		15,0			180	600		
	A4-70	100	60		4,5	9,3	90	200	180		
		120	90		6,7		125	175	270		
		230	200		15,0			130	600		
M12	5.8	100	70	40	6,3	12,0	105	255	210	55	55
		140	110		9,9		145	200	330		
		270	240		20,5		140	150	720		
	8.8	100	70		6,3	15,1	105	330	210		
		140	110		9,9	19,3	145	345	330		
		270	240		21,5			235	720		
	A4-70	100	70		6,3	13,5	105	290	210		
		140	110		9,9		145	230	330		
		270	240		21,5			165	720		
M16	5.8	120	80	60	9,6	22,3	120	445	240	65	65
		170	125		15,0		185	350	375		
		360	320		37,6			225	960		
	8.8	120	80		9,6	23,0	120	460	240		
		170	125		15,0	35,9	185	600	375		
		360	320		38,3			380	960		
	A4-70	120	80		9,6	23,0	120	460	240		
		170	125		15,0	25,2	185	400	375		
		360	320		38,3			250	960		
M20	5.8	140	90	120	12,2	29,3	135	530	270	85	85
		220	170		23,3	34,9	225	460	510		
		450	400		54,9			300	1200		
	8.8	140	90		12,2	29,3	135	530	270		
		220	170		23,3	56,0	225	785	510		
		450	400		54,9			520	1200		
	A4-70	140	90		12,2	29,3	135	530	270		
		220	170		23,3	39,3	225	525	510		
		450	400		54,9			345	1200		

For the design the complete assessment ETA-10/0352 has to be considered. [10)]

[1)] Also valid for threaded rod RG M in the same property class.

[2)] The partial safety factors for material resistance as regulated in the ETA-10/0352 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-10/0352.

[3)] The given loads are valid for injection mortar FIS VL for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. F or drill hole cleaning see ETA-10/0352.

[4)] For higher concrete strength classes up t o C50/60 higher per missible loads may be possible.

[5)] Drill method hammer drilling. For further allowable application conditions see ETA-10/0352.

[6)] For the sizes M10 - M20 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

[7)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-10/0352.

[8)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[9)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-10/0352.

[10)] The given loads refer to the European Technical Assessment ETA-10/0352, issue date 10/08/2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

[11)] A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0{,}3$ mm.

LOADS

Injection system FIS VL: Injection mortar FIS VL with Threaded rod FIS A [1)]

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [2) 3) 4) 5)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [6)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [8) 9)] [mm]	Min. edge distance c_{min} [8) 9)] [mm]
M6	5.8	100	50	5	3,4	2,9	65	50	150	40	40
			60		4,0				180		
		110	72		4,8				220		
	8.8	100	50		3,4	4,6		70	150		
			60		4,0				180		
		110	72		4,8				220		
	A4-70	100	50		3,4	3,2		55	150		
			60		4,0				180		
		110	72		4,8				220		
M8	5.8	100	60	10	6,6	5,1	90	70	180	40	40
		110	80		8,8		100		240		
		190	160		9,0		40		480		
	8.8	100	60		6,6	8,4	90	125	180		
		110	80		8,8		100	115	240		
		190	160		13,9		75	100	480		
	A4-70	100	60		6,6	5,9	90	85	180		
		110	80		8,8		100	80	240		
		190	160		9,8		40	75	480		
M10	5.8	100	60	20	8,2	8,6	90	125	180	45	45
		120	90		12,3		125	105	270		
		230	200		13,8		45	95	600		
	8.8	100	60		8,2	13,3	90	200	180		
		120	90		12,3		125	175	270		
		230	200		22,1		90	130	600		
	A4-70	100	60		8,2	9,3		135	180		
		120	90		12,3		125	115	270		
		230	200		15,5		50	100	600		
M12	5.8	100	70	40	11,5	12,0	140	175	210	55	55
		140	110		18,1		180	135	330		
		270	240		20,5		55	120	720		
	8.8	100	70		11,5	19,3	140	295	210		
		140	110		18,1		180	235	330		
		270	240		32,1		110	170	720		
	A4-70	100	70		11,5	13,5	140	200	210		
		140	110		18,1		180	155	330		
		270	240		22,5		60	130	720		
M16	5.8	120	80	60	14,3	22,3	160	305	240	65	65
		170	125		24,9		245	235	375		
		360	320		37,6		80	175	960		
	8.8	120	80		14,3	34,4	160	495	240		
		170	125		24,9	35,9	245	405	375		
		360	320		59,8		230	255	960		
	A4-70	120	80		14,3	25,2	160	350	240		
		170	125		24,9		245	270	375		
		360	320		42,0		100	190	960		

LOADS

Injection system FIS VL: Injection mortar FIS VL with Threaded rod FIS A [1)]

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [2) 3) 4) 5)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [6)] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [8) 9)] [mm]	Min. edge distance c_{min} [8) 9)] [mm]
M20	5.8	140	90	120	17,1	34,9	170	435	270	85	85
		220	170		40,3		340	305	510		
		450	400		58,6		110	230	1200		
	8.8	140	90		17,1	41,1	170	525	270		
		220	170		40,3	56,0	340	530	510		
		450	400		93,3		375	350	1200		
	A4-70	140	90		17,1	39,3	170	500	270		
		220	170		40,3		340	350	510		
		450	400		65,5		135	255	1200		
M24	5.8	160	96	150	18,8	45,2	170	540	290	105	105
		270	210		56,5	50,9	435	400	630		
		540	480		84,3		140	295	1440		
	8.8	160	96		18,8	45,2	170	540	290		
		270	210		56,5	80,7	435	685	630		
		540	480		129,3		505	455	1440		
	A4-70	160	96		18,8	45,2	170	540	290		
		270	210		56,5	56,6	435	455	630		
		540	480		94,4		205	320	1440		
M27	5.8	170	108	200	22,5	54,0	195	605	325	125	125
		310	250		71,5	65,7	495	475	750		
		600	540		109,5		200	345	1620		
	8.8	170	108		22,5	54,0	195	605	325		
		310	250		71,5	104,9	495	825	750		
		600	540		154,5		570	560	1620		
	A4-70	170	108		22,5	54,0	195	605	325		
		310	250		71,5	73,6	495	545	750		
		600	540		122,7		315	380	1620		
M30	5.8	190	120	300	26,3	63,2	210	660	360	140	140
		350	280		89,0	80,6	595	545	840		
		670	600		133,8		270	395	1800		
	8.8	190	120		26,3	63,2	210	660	360		
		350	280		89,0	128,2	595	940	840		
		670	600		190,7		700	645	1800		
	A4-70	190	120		26,3	63,2	210	660	360		
		350	280		89,0	89,9	595	620	840		
		670	600		150,0		400	430	1800		

For the design the complete assessment ETA-10/0352 has to be considered. [10)]

[1)] Also valid for threaded rod RG M in the same property class.

[2)] The partial safety factors for material resistance as regulated in the ETA-10/0352 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1.5 \cdot h_{ef}$. Accurate data see ETA-10/0352.

[3)] The given loads are valid for injection mortar FIS VL for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-10/0352.

[4)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[5)] Drill method hammer drilling. For further allowable application conditions see ETA-10/0352.

[6)] For the sizes M6 - M30 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

[7)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-10/0352.

[8)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[9)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-10/0352.

[10)] The given loads refer to the European Technical Assessment ETA-10/0352, issue date 10/08/2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

LOADS

Injection system FIS VL: Injection mortar FIS VL with Internal threaded anchor RG M I
zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [5) 6)] [mm]	Min. edge distance c_{min} [5) 6)] [mm]
RG M8 I	5.8	120	90	10	9,0	5,3	95	65	270	55	55
	8.8				11,9	8,3	135	95			
	A4-70				9,9	5,9	110	70			
RG M10 I	5.8	130	90	20	13,8	8,3	140	90	270	65	65
	8.8				15,9	13,3	170	155			
	A4-70				15,7	9,3		100			
RG M 12 I	5.8	170	125	40	19,8	12,1	190	110	375	75	75
	8.8					19,3		190			
	A4-70					13,5		125			
RG M 16 I	5.8	210	160	80	29,8	22,4	240	180	480	95	95
	8.8					35,8		320			
	A4-70					25,1		205			
RG M 20 I	5.8	270	200	120	45,6	35,4	330	245	600	125	125
	8.8					42,9		315			
	A4-70					39,4		280			

For the design the complete assessment ETA-10/0352 has to be considered. [7)]

[1)] The partial safety factors for material resistance as regulated in the ETA-10/0352 as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1.5 \cdot h_{ef}$. Accurate data see ETA-10/0352.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling. For further allowable application conditions see ETA-10/0352.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-10/0352.

[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[6)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-10/0352.

[7)] The given loads refer to the European Technical Assessment ETA-10/0352, issue date 10/08/2017. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

LOADS

Injection system FIS VL with threaded rod FIS A [4)]
Highest permissible loads [1) 5)] for a single anchor in solid brick masonry (without injection anchor sleeve) for pre-positioned or push-through installation.
For the design the complete assessment ETA-15/0263 has to be considered.

Type	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions [6)] (L x W x H) [mm]	Min. effective-anchorage depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load [3)] N_{perm} [kN]	Permissible shear load [3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing [2)] $s_{min\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance [2)] $c_{cr} = c_{min}$ [mm]
Solid brick Mz, NF acc. to EN 771-1												
M8	≥10	≥1,8	240x115x71	50	115	10	1,14	0,71	150	75	150 / 75	100
M10				50			1,00	1,14	150		150 / 75	100
M10				80			1,43	1,14	240		240 / 75	100
M10				200			2,43	3,40	240		240 / 75	150
M12				50			0,86	1,14	150		150 / 75	100
M12				80			1,51	1,14	240		240 / 75	100
M12				200			3,20	2,43	240		240 / 75	150
M8	≥20			50			1,57	1,14	150		150 / 75	100
M10				50			1,43	1,71	150		150 / 75	100
M10				80			2,00	1,71	240		240 / 75	100
M10				200			2,43	2,43	240		240 / 75	150
M12				50			1,29	1,57	150		150 / 75	100
M12				80			2,29	1,57	240		240 / 75	100
M12				200			2,43	2,43	240		240 / 75	150

LOADS

Injection system FIS VL with threaded rod FIS A[4]

Highest permissible loads [1) 5)] for a single anchor in solid brick masonry (without injection anchor sleeve) for pre-positioned or push-through installation.

For the design the complete assessment ETA-15/0263 has to be considered.

Type	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions [6)] (L x W x H) [mm]	Min. effective-anchorage depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load [3)] N_{perm} [kN]	Permissible shear load [3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing [2)] $s_{min\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance [2)] $c_{cr} = c_{min}$ [mm]
Solid sand-lime brick KS acc. to EN 771												
M8	≥10	≥1,8	240x115x71	50	115	10	0,71	1,14	240	75	240 / 75	100
M10				50			0,71	1,14				100
M10				80			0,71	1,14				100
M10				200			2,43	1,14				150
M12				50			0,71	1,43				100
M12				80			0,71	1,43				100
M12				200			2,43	1,43				150
M8	≥20			50			1,00	1,57				100
M10				50			1,00	1,57				100
M10				80			1,00	1,57				100
M10				200			2,43	1,57				150
M12				50			1,00	2,00				100
M12				80			1,00	2,00				100
M12				200			2,43	2,00				150

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

5) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

6) Hole patterns see assessment.

LOADS

Injection system FIS VL with threaded rod FIS A[5)] **and anchor sleeve FIS H..K**

Highest permissible loads [1) 6)] for a single anchor in solid brick masonry (with injection anchor sleeve) for pre-positioned installation.

For the design the complete assessment ETA-15/0263 has to be considered.

Type of anchor sleeve with threaded rod	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions [6)] (L x W x H) [mm]	Min. effective anchorage depth [4)] h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load [3)] N_{perm} [kN]	Permissible shear load [3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing [2)] $s_{min\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance [2)] $c_{cr} = c_{min}$ [mm]
Solid sand-lime brick KS acc. to EN 771												
12x85 M8	≥ 10	≥ 1,8	240x115x113	85	115	2	1,71	0,86	240	115	240 / 115	100
16x85 M10							1,00	1,00				
20x85 M12							2,43	1,00				
12x85 M8	≥ 20			85	115		2,43	1,29				
16x85 M10							1,57	1,57				
20x85 M12							2,43	1,57				

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

5) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

6) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

7) Hole patterns see assessment.

LOADS

Injection system FIS VL with threaded rod FIS A[5] and anchor sleeve FIS H...K

Highest permissible loads[1) 6)] for a single anchor in perforated brick masonry (with injection anchor sleeve) for pre-positioned installation.
For the design the complete assessment ETA-15/0263 has to be considered.

Type of anchor sleeve with threaded rod	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick-dimensions [7)] (L x W x H) [mm]	Min. effective anchorage depth[4)] h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\,\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing [2)] $s_{min\,\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Vertically perforated brick Hlz, acc. to EN 771-1												
12x85 M8	≥ 10	≥ 0,9	240x175x113	85	175	2,0	1,14	1,14	240	115	240 / 115	100
16x85 M10							1,00	1,57				
20x85 M12							1,43	1,71				
Perforated sand-lime brick KSL acc. to EN 771-2												
12x85 M8	≥ 12	≥ 1,4	240x175x113	85	175	2,0	0,71	0,71	240	115	100 / 115	100
16x85 M8/M10							0,86	1,29				
20x85 M12							1,00	1,29				
12x85 M8	≥ 20						1,29	1,29				
16x85 M8/M10							1,43	2,14				
20x85 M12							1,71	2,14				
Lightweight concrete hollow block Hbl acc. to EN 771-3												
12x85 M8	≥ 4	≥ 1,0	362x240x240	85	240	2,0	0,86	0,57	365	240	365 / 240	80
16x85 M10												
20x85 M12												

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

5) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

6) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

7) Hole patterns see assessment.

LOADS

Injection system FIS VL with threaded rod FIS A[4]

Highest permissible loads[1) 5)] for a single anchor in aerated concrete.
For the design the complete assessment ETA-15/0263 has to be considered.

Type threaded rod	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions (L x W x H) [mm]	Min. effective-anchorage depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\,\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing [2)] $s_{min\,\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Aerated concrete acc. to EN 771-4												
M8	≥ 2	≥ 0,35	-	100	130	1	0,54	0,43	250	250	250	100
M10						2	0,54	0,43				
M12						2	0,54	0,54				
M8	≥ 4	≥ 0,50				1	0,71	0,89				
M10						2	0,89	0,71				
M12						2	0,89	0,89				
M8	≥ 6	≥ 0,65				1	1,25	1,07				
M10						2	1,79	1,07				
M12						2	1,79	1,25				

1) The required partial safety factors for material resistance as well as a par tial safety factor for load actions of γ_L = 1,4 are considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

5) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

The first approved injection mortar made with renewable raw materials

Building renovation

Staircase

BUILDING MATERIALS

Approved for anchorings in:

- Concrete C20/25 to C50/60, non-cracked
- Solid brick
- Vertically perforated brick
- Solid sand-lime brick
- Perforated sand-lime brick
- Aerated concrete

CERTIFICATES

ETA-14/0408
ETAG 001
Option 7 for non-cracked concrete

ETA-14/0471
ETAG 029
Masonry
Use categories b, c, d and w/w

Fire resistance classification R 120
Anchor types see test report

THIRD-PARTY VERIFIED EPD
ISO 14025 and EN 15804

BIOBASED 50 - 85%
DIN Geprüft
8C048

ÉMISSIONS DANS L'AIR INTÉRIEUR*
A+
A+ A B C

* Information sur le niveau d'émission de substances volatiles dans l'air intérieur, présentant un risque de toxicité par inhalation, sur une échelle de classe allant de A+ (très faibles émissions) à C (fortes émissions).

NSF
Certified to NSF/ANSI 61

ADVANTAGES

- The worldwide first injection mortar with renewable raw materials. The share of renewable raw materials is certified by DIN CERTCO / TÜV Rheinland.
- Because of the European Technical Assessment it is possible to use the injection system in the area of public buildings.
- The low content of volatile organic compounds (VOC) has a positive effect for the evaluation of fixings in „Green Building"-projects.
- Biobased raw materials increase the residential and workplace quality and preserve valuable resources for future generations.
- The injection system is not mandatory for indication and thus reduces risks for installers and the environment.
- FIS GREEN is suitable for the use with the complete fischer injection accessories.

APPLICATIONS

Injection mortar for use with:

- Threaded rods FIS A, see page 144
- Internal threaded anchor RG MI, see page 159
- Rebar anchor FRA, see page 179
- Concrete steel bars, see page 185
- Injection anchor sleeves FIS H, see page 167
- NSF certificate verifies its suitability for applications in drinking water

FUNCTIONING

- FIS GREEN is a 2-component injection mortar.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion trough the static mixer.
- The injection cartridges are quick and easy to use with the fischer dispensers.
- Partially used cartridges can be reused by changing the static mixer.
- Related accessories for the various applications can be found on pages „non-cracked concrete" and „masonry".

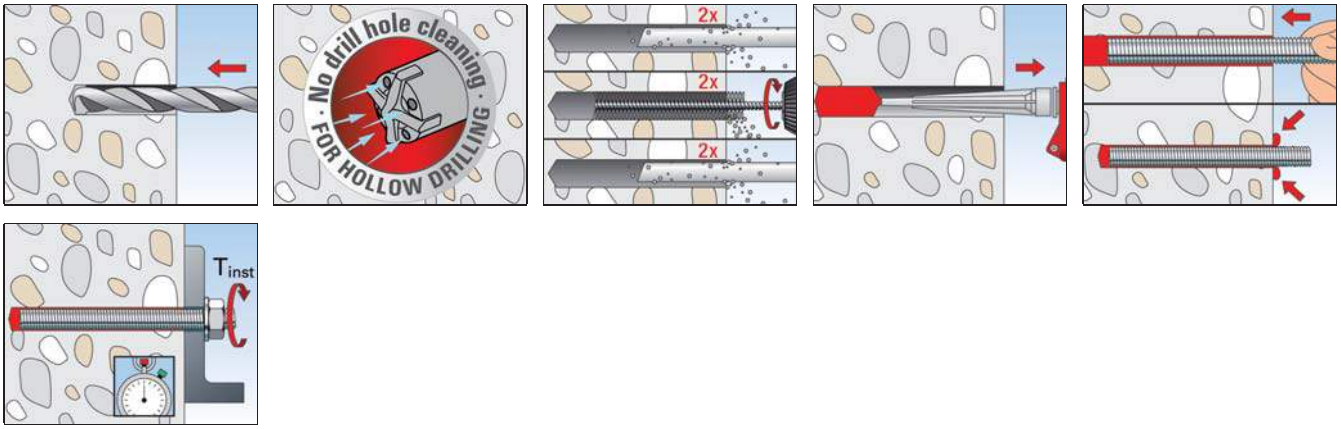
SEE ALSO

ANCHORS + SLEEVES
Page 144

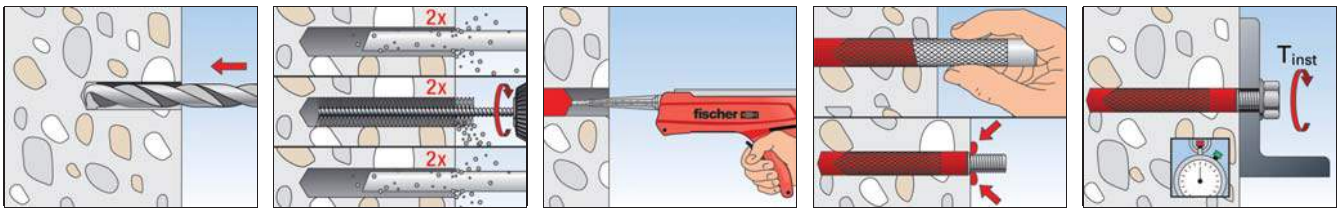
DISPENSER
Page 195

ACCESSORIES
Page 198

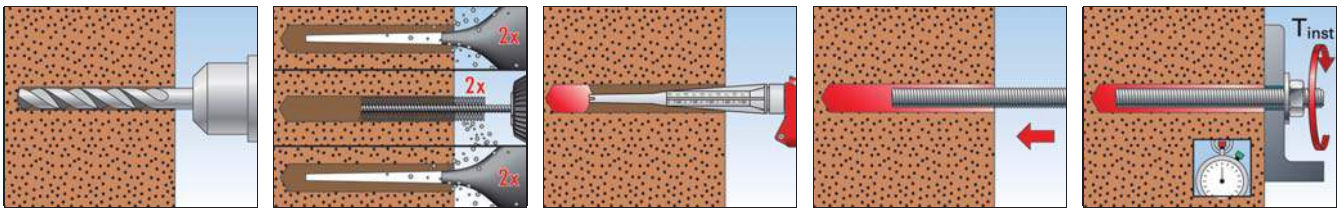
INSTALLATION IN CONCRETE WITH FIS GREEN AND FIS A / RG M



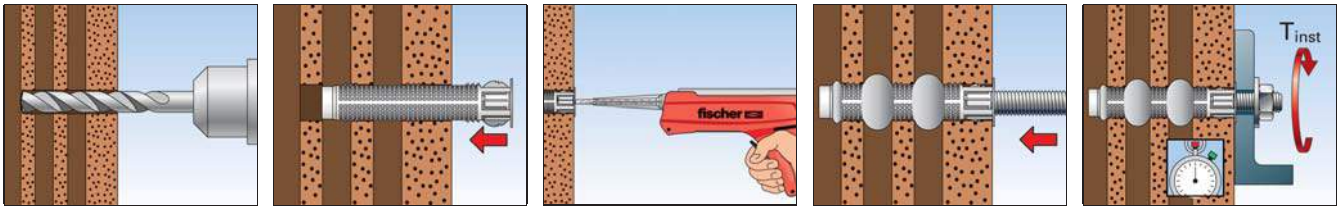
INSTALLATION IN CONCRETE WITH FIS GREEN AND RG M I



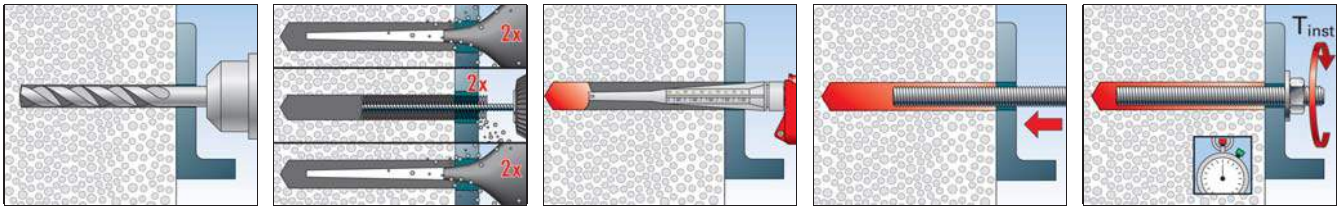
INSTALLATION IN SOLID BRICK WITH FIS GREEN AND FIS A / RG M



INSTALLATION IN HOLLOW BRICKS WITH FIS GREEN AND FIS HK + FIS A / RG M



INSTALLATION IN AERATED CONCRETE WITH FIS GREEN AND FIS A / RG M



TECHNICAL DATA

FIS GREEN 300 T

Static mixer **FIS MR Plus**

		Approval	Languages on the cartridge	Scale unit	Contents	Sales unit
Item	**Art.-No.**	**ETA**				**[pcs]**
FIS GREEN 300 T	**522223**	■	DE	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS GREEN 300 T K	**523244**	■	DE	150	1 Cartidge 300 ml, 2 x Static mixer (incl. clip with europerforation)	4
FIS GREEN 300 T	**522989**	■	FR	150	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	4
FIS GREEN 300 T	**523245**	■	IT	150	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	12
FIS GREEN 300 T	**538219**	■	CS, SK	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS GREEN 300 T	**532972**	■	DA, SV, NO, FI	150	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	12
FIS MR Plus	**545853**	–	–	–	10 static mixer FIS MR Plus	10

LOADS

Injection system FIS GREEN: Injection mortar FIS GREEN with Threaded rod FIS A [1)]

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [2)3)4)5)]										Minimum spacings while reducing the load	
Type	**Material fixing element**	**Min. member thickness** h_{min} [mm]	**Effective anchorage depth** h_{ef} [6)] [mm]	**Maximum torque moment** T_{max} [Nm]	**Permissible tensile load** N_{perm} [7)] [kN]	**Permissible shear load** V_{perm} [7)] [kN]	**Required edge distance (with one edge) for** Max. tension load c [mm]	Max. shear load c [mm]	**Required spacing for** Max. Load s_{cr} [mm]	**Min. spacing** s_{min} [8)9)] [mm]	**Min. edge distance** c_{min} [8)9)] [mm]
M8	5.8	100	60	10	5,7	5,1	90	70	180	40	40
		110	80		7,6				240		
		190	160		9,0		40	60	480		
	8.8	100	60		5,7	8,6	90	130	180		
		110	80		7,6			115	240		
		190	160		14,3		85	90	480		
	A4-70	100	60		5,7	6,0	90	85	180		
		110	80		7,6			75	240		
		190	160		9,9		50	70	480		
	C-70	100	60		5,7	7,4	90	110	180		
		110	80		7,6			100	240		
		190	160		12,4		70	80	480		
M10	5.8	100	60	20	6,7	8,6	90	125	180	45	45
		120	90		10,1		110	105	270		
		230	200		13,8		55	85	600		
	8.8	100	60		6,7	13,1	90	200	180		
		120	90		10,1		110	170	270		
		230	200		22,4			115	600		
	A4-70	100	60		6,7	9,2	90	135	180		
		120	90		10,1		110	110	270		
		230	200		15,7		65	90	600		
	C-70	100	60		6,7	11,4	90	170	180		
		120	90		10,1		110	145	270		
		230	200		19,5		95	105	600		

LOADS

Injection system FIS GREEN: Injection mortar FIS GREEN with Threaded rod FIS A [1]

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [2] [3] [4] [5]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [6] [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [7] [kN]	Permissible shear load V_{perm} [7] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [8] [9] [mm]	Min. edge distance c_{min} [8] [9] [mm]
M12	5.8	100	70	40	8,9	12,0	105	175	210	55	55
		140	110		14,0		130	130	330		
		270	240		20,5		70	100	720		
	8.8	100	70		8,9	19,4	105	295	210		
		140	110		14,0		130	230	330		
		270	240		30,5			150	720		
	A4-70	100	70		8,9	13,7	105	200	210		
		140	110		14,0		130	155	330		
		270	240		22,5		85	115	720		
	C-70	100	70		8,9	17,1	105	260	210		
		140	110		14,0		130	200	330		
		270	240		28,1		115	135	720		
M16	5.8	120	80	60	12,0	22,3	125	305	240	65	65
		170	125		18,7		160	235	375		
		360	320		37,6		115	150	960		
	8.8	120	80		12,0	28,7	125	405	240		
		170	125		18,7	36,0	160		375		
		360	320		47,9			220	960		
	A4-70	120	80		12,0	25,2	125	350	240		
		170	125		18,7		160	270	375		
		360	320		42,0		135	165	960		
	C-70	120	80		12,0	28,7	125	405	240		
		170	125		18,7	31,4	160	350	375		
		360	320		47,9			195	960		
M20	5.8	140	90	120	14,6	34,9	135	435	270	85	85
		220	170		27,6		190	300	510		
		450	400		58,6		165	195	1200		
	8.8	140	90		14,6	35,0	135	440	270		
		220	170		27,6	56,0	190	525	510		
		450	400		64,8			290	1200		
	A4-70	140	90		14,6	35,0	135	440	270		
		220	170		27,6	39,4	190	350	510		
		450	400		64,8			215	1200		
	C-70	140	90		14,6	35,0	135	440	270		
		220	170		27,6	49,1	190	455	510		
		450	400		64,8			260	1200		

For the design the complete assessment ETA-14/0408 has to be considered. [10]

[1] Also valid for threaded rod RG M in the same property class.

[2] The partial safety factors for material resistance as regulated in the ETA-14/0408 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-14/0408.

[3] The given loads are valid for injection mortar FIS GREEN for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-14/0408.

[4] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[5] Drill method hammer drilling.

[6] For the sizes M8 - M20 the min. anchorage depth and the max. anchorage depth are given. The anchorage depth can be chosen freely between these borders.

[7] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-14/0408.

[8] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[9] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-14/0408.

[10] The given loads refer to the European Technical Assessment ETA-14/0408, issue date 19/12/2014. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

LOADS

Injection system FIS GREEN: Injection resin FIS GREEN with Internal threaded anchor RGMI

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~ B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Screw steel property/ surface	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [5)] [mm]	Min. edge distance c_{min} [5)] [mm]
RG M8 I	5.8	120	90	10	9,0	5,3	95	65	270	55	55
	8.8				11,9	8,3	135	95			
	A4-70				9,9	5,9	110	70			
RG M10 I	5.8	130	90	20	13,8	8,3	145	90	270	65	65
	8.8				13,9	13,3		155			
	A4-70					9,3		100			
RG M12 I	5.8	170	125	40	20,2	12,1	190	110	375	75	75
	8.8					19,3		190			
	A4-70					13,5		125			
RG M16 I	5.8	210	160	80	27,8	22,4	240	180	480	95	95
	8.8					30,9		265			
	A4-70					25,1		205			

For the design the complete assessment ETA-14/0408 has to be considered. [6)]

[1)] The partial safety factors for material resistance as regulated in the ETA-14/0408 as well as a partial safety factor for load actions of γ_L = 1.4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3-h_{ef} and an edge distance c ≥ 1.5-h_{ef}. Accurate data see ETA-14/0408.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling. For further allowable application conditions see ETA-14/0408.

[4)] For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[8)] The given loads refer to the European Technical Assessment ETA-14/0408, issue date 19/12/2014. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

LOADS

Injection system FIS GREEN with threaded rod FIS A[4)]

Highest permissible loads[1) 5)] for a single anchor in solid brick masonry (without injection anchor sleeve) for pre-positioned or push-through installation.

For the design the complete assessment ETA-14/0471 has to be considered.

Type	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions [6)] (L x W x H) [mm]	Min. effective anchorage depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\,\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing [2)] $s_{min\,\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Solid brick Mz, NF acc. to EN 771-1												
M8	≥10	≥1,8	240x115x71 (NF)	50	80	10	0,71	0,71	150	150	150	100
M10				50	80		0,86	1,14	150	150	150	100
M10				80	110		1,29	1,14	240	240	240	100
M10				200	230		3,14	2,43	300	300	300	150
M12				50	80		0,86	1,14	150	150	150	100
M12				80	110		1,43	1,14	240	240	240	100
M12				200	230		2,00	3,29	300	300	300	150
M8	≥20			50	80		0,71	1,14	150	150	150	100
M10				50	80		1,29	1,71	150	150	150	100
M10				80	110		1,71	1,71	240	240	240	100
M10				200	230		3,43	3,43	300	300	300	150
M12				50	80		1,14	1,57	150	150	150	100
M12				80	110		2,00	1,57	240	240	240	100
M12				200	230		2,86	3,43	300	300	300	150

LOADS

Injection system FIS GREEN with threaded rod FIS A[4]

Highest permissible loads[1) 5)] for a single anchor in solid brick masonry (without injection anchor sleeve) for pre-positioned or push-through installation.

For the design the complete assessment ETA-14/0471 has to be considered.

Type	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions [6)] (L x W x H) [mm]	Min. effective anchorage depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing [2)] $s_{min\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Solid sand-lime brick KS acc. to EN 771												
M8	≥10	≥1,8	240x115x71 (NF)	50	80	10	0,71	1,14	150	150	150	100
M10				50	80		0,71	1,14	150	150	150	100
M10				80	110		0,86	1,14	240	240	240	100
M10				200	230		2,57	1,14	300	300	300	150
M12				50	80		0,57	1,43	150	150	150	100
M12				80	110		0,86	1,43	240	240	240	100
M12				200	230		2,57	1,43	300	300	300	150
M8	≥20			50	80		0,71	1,57	150	150	150	100
M10				50	80		0,86	1,57	150	150	150	100
M10				80	110		1,14	1,57	240	240	240	100
M10				200	230		3,43	1,57	300	300	300	150
M12				50	80		0,86	2,00	150	150	150	100
M12				80	110		1,29	2,00	240	240	240	100
M12				200	230		3,43	2,00	300	300	300	150

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

5) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

6) Hole patterns see assessment.

LOADS

Injection system FIS GREEN with threaded rod FIS A[5)] **and anchor sleeve FIS H..K**

Highest permissible loads[1) 6)] for a single anchor in solid brick masonry (with injection anchor sleeve) for pre-positioned installation.

For the design the complete assessment ETA-14/0471 has to be considered.

Type of anchor sleeve with threaded rod	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions [6)] (L x W x H) [mm]	Min. effective anchorage depth[4)] h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing [2)] $s_{min\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Solid sand-lime brick KS acc. to EN 771												
12x85 M8	≥ 10	≥ 1,8	240x115x113	85	115	2	0,86	0,86	255	255	255	100
16x85 M10						4	0,57	1,00				
20x85 M12						4	1,57	1,00				
12x85 M8	≥ 20			85	115	2	1,29	1,29				
16x85 M10						4	0,86	1,57				
20x85 M12						4	2,29	1,57				

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

5) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

6) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

7) Hole patterns see assessment.

LOADS

Injection system FIS GREEN with threaded rod FIS A[5] and anchor sleeve FIS H..K

Highest permissible loads[1] [6] for a single anchor in perforated brick masonry (with injection anchor sleeve) for pre-positioned installation.
For the design the complete assessment ETA-14/0471 has to be considered.

Type of anchor sleeve with threaded rod	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick-dimensions[7] (L x W x H) [mm]	Min. effevtive-anchorage depth[4] h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3] N_{perm} [kN]	Permissible shear load[3] V_{perm} [kN]	Characteristic spacing parallel to bed joint s_{cr} ∥ [mm]	Characteristic spacing perpendicular to bed joint s_{cr}⊥ [mm]	Min. spacing[2] s_{min} ∥ / s_{min}⊥ [mm]	Characteristic resp. min. edge distance[2] $c_{cr} = c_{min}$ [mm]
Vertically perforated brick Hlz, acc. to EN 771-1												
12x85 M6/M8	≥ 8	≥ 1,4	230x108x55	85	115	2,0	0,57	0,71	230	55	230 / 55	100
16x85 M8/M10												
20x85 M12/M16												
12x85 M6/M8	≥ 10	≥ 0,9	240x175x113	85	175	2,0	0,57	1,14	240	115	240 / 115	120
16x85 M8/M10							0,57	1,57				
20x85 M12/M16							0,71	1,71				
Perforated sand-lime brick KSL acc. to EN 771-2												
12x85 M6/M8	≥ 12	≥ 1,4	240x175x113	85	175	2,0	0,34	0,71	240	115	240 / 115	100
16x85 M8/M10							0,57	1,57				
20x85 M12/M16							0,57	1,29				
12x85 M6/M8	≥ 20						0,57	1,29				
16x85 M8/M10							1,00	2,29				
20x85 M12/M16							1,00	2,14				

[1] The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

[2] Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

[3] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

[4] The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

[5] Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

[6] The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

[7] Hole patterns see assessment.

LOADS

Injection system FIS GREEN with threaded rod FIS A[4]

Highest permissible loads[1] [5] for a single anchor in aerated concrete.
For the design the complete assessment ETA-14/0471 has to be considered.

Type threaded rod	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions (L x W x H) [mm]	Min. effective-anchorage depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3] N_{perm} [kN]	Permissible shear load[3] V_{perm} [kN]	Characteristic spacing parallel to bed joint s_{cr} ∥ [mm]	Characteristic spacing perpendicular to bed joint s_{cr}⊥ [mm]	Min. spacing[2] s_{min} ∥ / s_{min}⊥ [mm]	Characteristic resp. min. edge distance[2] $c_{cr} = c_{min}$ [mm]
Aerated concrete acc. to EN 771-4												
M8	≥ 2	≥ 0,35	-	100	130	1	0,71	0,32	240	115	240 / 115	80
M10						2	0,71	0,32				
M12						2	0,89	0,32				
M16						2	0,89	0,43				
M8	≥ 4	≥ 0,50				1	0,89	0,54				
M10						2	1,07	0,54				
M12						2	1,07	0,54				
M16						2	1,07	0,54				
M8	≥ 6	≥ 0,65				1	1,25	0,89				
M10						2	1,43	0,89				
M12						2	1,43	0,89				
M16						2	1,43	0,71				

[1] The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

[2] Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

[3] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

[4] Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

[5] The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

The approved injection mortar for anchorings in masonry and non-cracked concrete

Cable duct

Air conditioning units

BUILDING MATERIALS

- Concrete C20/25 to C50/60, non-cracked
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Perforated blocks made from light-weight concrete
- Solid brick
- Aerated concrete

Also suitable for:

- Solid brick made from lightweight concrete

ASSESSMENT/APPROVAL

ETA-11/0419
ETAG 029
Masonry
Use categories b, c, d and d/d, w/w

ETA-18/0383
EAD 330499-00-0601
Option 7 for non-cracked concrete

ADVANTAGES

- With FIS P Plus, anchorings in masonry and non-cracked concrete for which approval is relevant can be realised in a particularly economical manner.
- FIS P Plus 300 T can be used with stable, standard silicone injection dispensers. No special equipment is required. As a result, procurement costs can be reduced on the basis of polyester resin.

APPLICATIONS

Injection mortar for use in masonry and non-cracked concrete with:

- Threaded rods FIS A, see pages 146
- Injection anchor sleeves FIS H K, see page 167
- Injection push-through anchor sleeve FIS H K, see page 164

FUNCTIONING

- FIS P Plus is a 2-component injection mortar based on polyester resin.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion through the static mixer.
- Partially used cartridges can be reused, simply by changing the static mixer.
- Related accessories for use in masonry and non-cracked concrete can be found on page PL.

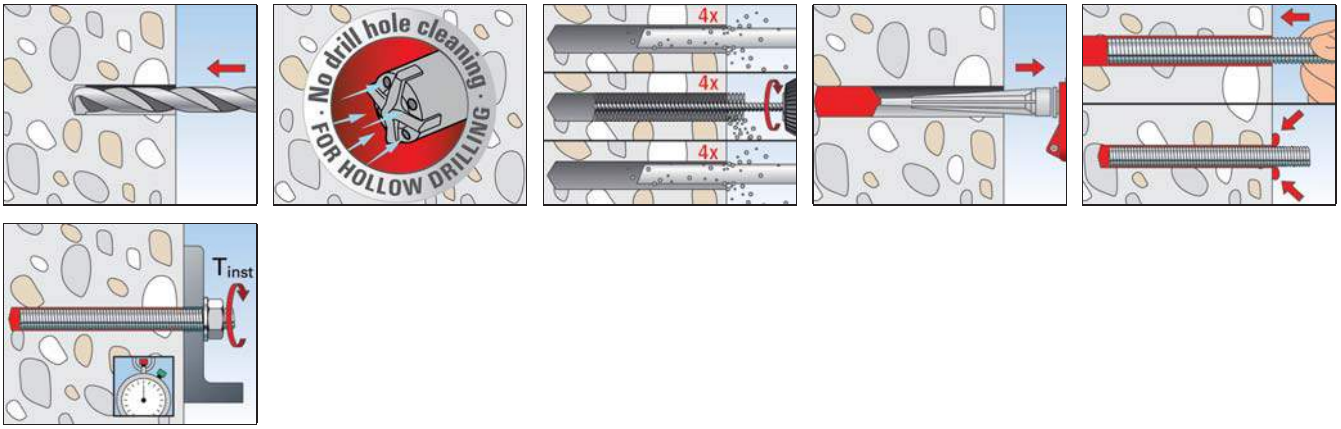
SEE ALSO

ANCHORS + SLEEVES
Page 144

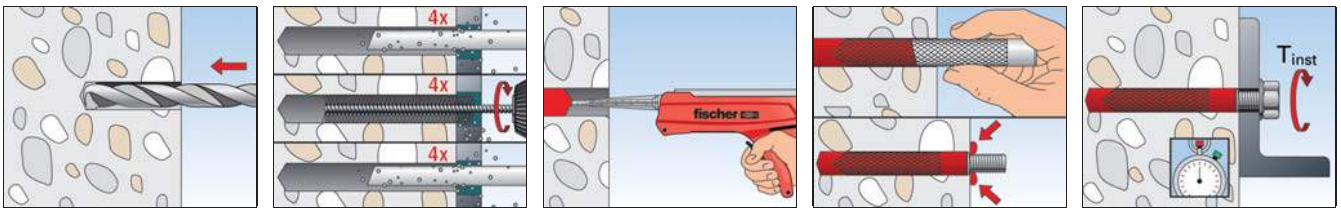
DISPENSER
Page 195

ACCESSORIES
Page 198

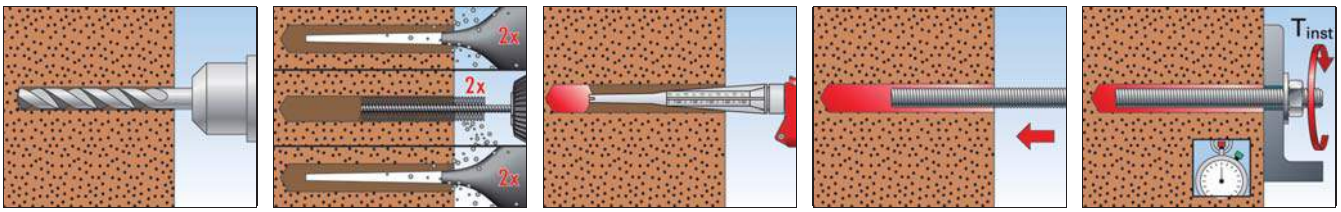
INSTALLATION IN CONCRETE WITH FIS P PLUS AND FIS A / RG M



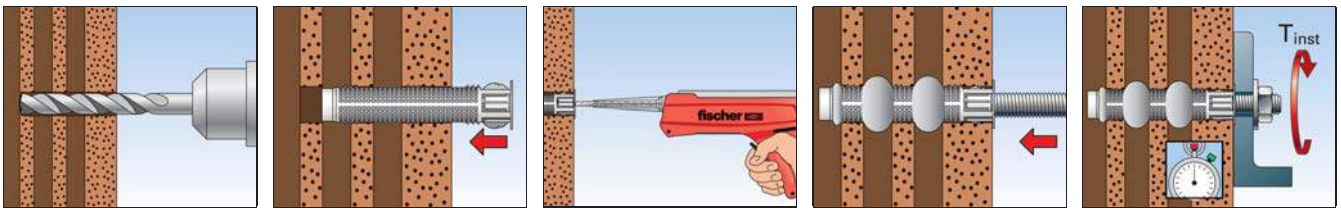
INSTALLATION IN CONCRETE WITH FIS P PLUS AND RG M I



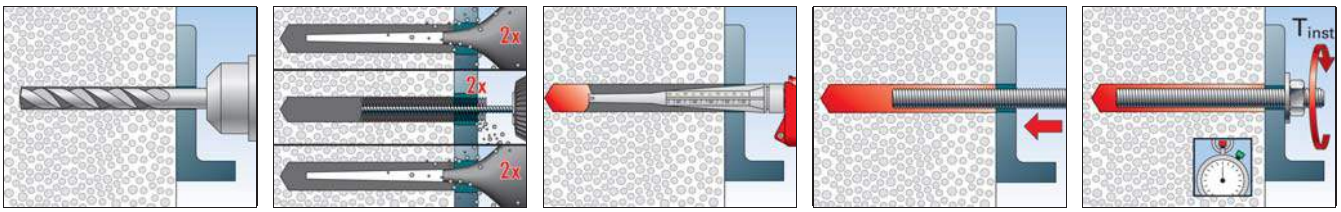
INSTALLATION IN SOLID BRICK WITH FIS P PLUS AND FIS A / RG M



INSTALLATION IN HOLLOW BRICKS WITH FIS P PLUS AND FIS HK + FIS A / RG M



INSTALLATION IN AERATED CONCRETE WITH FIS P PLUS AND FIS A / RG M



TECHNICAL DATA

FIS P Plus 300 T

FIS P Plus 380 C

Static mixer **FIS MR Plus**

		Approval	Languages on the cartridge	Scale unit	Contents	Sales unit
Item	**Art.-No.**	**ETA**				**[pcs]**
FIS P Plus 300 T	**523226**	■	EN, ES, PT	150	1 cartridge 300 ml, 1 x FIS MR Plus	12
FIS P Plus 300 T	**537551**	■	CS, SK, EL	150	1 cartridge 300 ml, 2 x FIS MR Plus	10
FIS P Plus 300 T	**522430**	■	DE, FR, NL	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS P Plus 300 T DIY	**510637**	■	ES, PT	150	1 cartridge 300 ml, 2 x FIS MR Plus	10
FIS P Plus 380 C	**522178**	■	EN, ES, PT	190	1 cartridge 380 ml, 2 x FIS MR Plus	12
FIS MR Plus	**545853**	–	–	–	10 static mixer FIS MR Plus	10

CURING TIME

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		- 5 °C - 0 °C	24 hrs.
		+ 1 °C - + 5 °C	3 hrs.
+ 5 °C - +10 °C	9 min.	+ 6 °C - +10 °C	90 min.
+10 °C - +20 °C	5 min.	+11 °C - +20 °C	60 min.
+20 °C - +30 °C	4 min.	+21 °C - +30 °C	45 min.
+30 °C - +40 °C	2 min.	+31 °C - +40 °C	35 min.

The above times apply from the moment of contact between resin and hardener in the static mixer.
For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

LOADS

Injection system FIS P Plus: Injection resin with Threaded rod FIS A

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70 [2)]

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 3) 4) 5)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [7)] [mm]	Min. edge distance c_{min} [7)] [mm]
FIS A M 8	5.8	100	60	10	4,7	5,1	75	70	180	40	40
		110	80		6,2				240		
		190	160		9,0		50	65	480		
	8.8	100	60		4,7	8,6	75	130	180		
		110	80		6,2			115	240		
		190	160		12,4			95	480		
	A4-70	100	60		4,7	6,0		85	180		
		110	80		6,2			75	240		
		190	160		9,9		55		480		
	C-70	100	60		4,7	7,4	75	110	180		
		110	80		6,2			100	240		
		190	160		12,4			85	480		
FIS A M 10	5.8	100	60	20	5,8	8,6	90	125	180	45	45
		120	90		8,8		95	105	270		
		230	200		13,8		60	90	600		
	8.8	100	60		5,8	11,7	90	175	180		
		120	90		8,8	13,1	95	170	270		
		230	200		19,4			125	600		
	A4-70	100	60		5,8	9,2	90	135	180		
		120	90		8,8		95	110	270		
		230	200		15,7		70	95	600		
	C-70	100	60		5,8	11,4	90	170	180		
		120	90		8,8		95	145	270		
		230	200		19,4			115	600		
FIS A M 12	5.8	100	70	40	8,2	12,0	105	175	210	55	55
		140	110		12,8		115	130	330		
		270	240		20,5		75	110	720		
	8.8	100	70		8,2	16,3	105	245	210		
		140	110		12,8	19,4	115	230	330		
		270	240		28,0			160	720		
	A4-70	100	70		8,2	13,7	105	200	210		
		140	110		12,8		115	155	330		
		270	240		22,5		85	125	720		
	C-70	100	70		8,2	16,3	105	245	210		
		140	110		12,8	17,1	115	200	330		
		270	240		28,0			145	720		
FIS A M 16	5.8	120	80	60	12,4	22,3	120	305	240	65	65
		170	125		19,4		150	235	375		
		360	320		37,6		105	165	960		
	8.8	120	80		12,4	24,9	120	345	240		
		170	125		19,4	36,0	150	405	375		
		360	320		49,8			235	960		
	A4-70	120	80		12,4	24,9	120	345	240		
		170	125		19,4	25,2	150	270	375		
		360	320		42,0		120	180	960		
	C-70	120	80		12,4	24,9		345	240		
		170	125		19,4	31,4	150	350	375		
		360	320		49,8			215	960		

LOADS

Injection system FIS P Plus: Injection resin with Threaded rod FIS A

zinc plated steel 5.8 / zinc plated steel 8.8 / stainless steel A4-70 / high corrosion resistant steel C-70 [2]

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1] [3] [4] [5]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Permissible tensile load N_{perm} [6] [kN]	Permissible shear load V_{perm} [6] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [7] [mm]	Min. edge distance c_{min} [7] [mm]
FIS A M 20	5.8	140	90	120	16,2	32,3	135	400	270	85	85
		220	170		30,5	34,9	180	300	510		
		450	400		58,6		140	215	1200		
	8.8	140	90		16,2	32,3	135	400	270		
		220	170		30,5	56,0	180	525	510		
		450	400		71,8			320	1200		
	A4-70	140	90		16,2	32,3	135	400	270		
		220	170		30,5	39,4	180	350	510		
		450	400		65,7		160	240	1200		
	C-70	140	90		16,2	32,3	135	400	270		
		220	170		30,5	49,1	180	455	510		
		450	400		71,8			285	1200		
FIS A M 24	5.8	160	96	150	20,7	41,4	150	490	290	105	105
		270	210		45,2	50,9	225	390	630		
		540	480		84,3		165	275	1440		
	8.8	160	96		20,7	41,4	150	490	290		
		270	210		45,2	80,6	225	675	630		
		540	480		103,4		215	420	1440		
	A4-70	160	96		20,7	41,4	150	490	290		
		270	210		45,2	56,8	225	445	630		
		540	480		94,3		195	300	1440		
	C-70	160	96		20,7	41,4	150	490	290		
		270	210		45,2	70,9	225	580	630		
		540	480		103,4		215	355	1440		

For the design the complete assessment ETA-18/0383 has to be considered. [8]

[1] The partial safety factors for material resistance as regulated in the ETA-18/0383 as well as a partial safety factor for load actions of $\gamma_L = 1.4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1.5 \cdot h_{ef}$. Accurate data see ETA-18/0383

[2] Also valid for threaded rod RGM in the same property class.

[3] The given loads are valid for injection mortar for fixations in dry and humid concrete for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C. For drill hole cleaning see ETA-18/0383.

[4] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[5] Drill method hammer drilling. For further allowable application conditions see ETA-18/0383.

[6] For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

[7] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[8] The given loads refer to the European Technical Assessment ETA-18/0383, issue date 06/09/2018. Design of the loads according ETAG 001, Technical Report TR 029 (for static resp. quasi-static loads).

LOADS

Injection system FIS P Plus with threaded rod FIS A[4]

Highest permissible loads[1) 5)] for a single anchor in solid brick masonry (without injection anchor sleeve) for pre-positioned or push-through installation.

For the design the complete assessment ETA-11/0419 has to be considered.

Type	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions[6)] (L x W x H) [mm]	Min. effective-anchorage depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\,\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing[2)] $s_{min\,\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Solid brick Mz, NF acc. to EN 771-1												
M8	≥10	≥1,8	240x115x71	50	115	10	1,14	0,71	150	75	150 / 75	100
M10				50			1,00	1,14	150		150 / 75	100
M10				80			1,43	1,14	240		240 / 75	100
M10				200			2,43	3,40	240		240 / 75	150
M12				50			0,86	1,14	150		150 / 75	100
M12				80			1,51	1,14	240		240 / 75	100
M12				200			3,20	2,43	240		240 / 75	150
M8	≥20			50			1,57	1,14	150		150 / 75	100
M10				50			1,43	1,71	150		150 / 75	100
M10				80			2,00	1,71	240		240 / 75	100
M10				200			2,43	2,43	240		240 / 75	150
M12				50			1,29	1,57	150		150 / 75	100
M12				80			2,29	1,57	240		240 / 75	100
M12				200			2,43	2,43	240		240 / 75	150
Solid sand-lime brick KS acc. to EN 771												
M8	≥10	≥1,8	240x115x71	50	115	10	0,71	1,14	240	75	240 / 75	100
M10				50			0,71	1,14				100
M10				80			0,71	1,14				100
M10				200			2,43	1,14				150
M12				50			0,71	1,43				100
M12				80			0,71	1,43				100
M12				200			2,43	1,43				150
M8	≥20			50			1,00	1,57				100
M10				50			1,00	1,57				100
M10				80			1,00	1,57				100
M10				200			2,43	1,57				150
M12				50			1,00	2,00				100
M12				80			1,00	2,00				100
M12				200			2,43	2,00				150

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 ae considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

5) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

6) Hole patterns see assessment.

LOADS

Injection system FIS P Plus with threaded rod FIS A[5] and anchor sleeve FIS H...K

Highest permissible loads[1) 6)] for a single anchor in perforated brick masonry (with injection anchor sleeve) for pre-positioned installation.
For the design the complete assessment ETA-11/0419 has to be considered.

Type of anchor sleeve with threaded rod	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick-dimensions [7)] (L x W x H) [mm]	Min. effective anchorage depth[4)] h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing [2)] $s_{min\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Vertically perforated brick Hlz, acc. to EN 771-1												
12x85 M8	≥ 10	≥ 0,9	240x175x113	85	175	2,0	1,14	1,14	240	115	240 / 115	100
16x85 M10							1,00	1,57				
20x85 M12							1,43	1,71				
Perforated sand-lime brick KSL acc. to EN 771-2												
12x85 M8	≥ 12	≥ 1,4	240x175x113	85	175	2,0	0,71	0,71	240	115	100 / 115	100
16x85 M8/M10							0,86	1,29				
20x85 M12							1,00	1,29				
12x85 M8	≥ 20						1,29	1,29				
16x85 M8/M10							1,43	2,14				
20x85 M12							1,71	2,14				
Lightweight concrete hollow block Hbl acc. to EN 771-3												
12x85 M8	≥ 4	≥ 1,0	362x240x240	85	240	2,0	0,86	0,57	365	240	365 / 240	80
16x85 M10												
20x85 M12												

1) The required partial safety factors for material resistance as well as a par tial safety factor for load actions of γ_L = 1,4 are considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) The maximum anchorage depth is corresponding with the relevant anchor sleeves FIS H..K (see technical data).

5) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

6) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

7) Hole patterns see assessment.

LOADS

Injection system FIS P Plus with threaded rod FIS A[4)]

Highest permissible loads[1) 5)] for a single anchor in aerated concrete.
For the design the complete assessment ETA-11/0419 has to be considered.

Type threaded rod	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick dimensions (L x W x H) [mm]	Min. effective-anchorage depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing [2)] $s_{min\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Aerated concrete acc. to EN 771-4												
M8	≥ 2	≥ 0,35	-	100	130	1	0,54	0,43	250	250	250	100
M10						2	0,54	0,43				
M12						2	0,54	0,54				
M8	≥ 4	≥ 0,50				1	0,71	0,89				
M10						2	0,89	0,71				
M12						2	0,89	0,89				
M8	≥ 6	≥ 0,65				1	1,25	1,07				
M10						2	1,79	1,07				
M12						2	1,79	1,25				

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

5) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

The reliable injection mortar for anchorings in masonry

Gates

Wall consoles

BUILDING MATERIALS

- Vertically perforated brick
- Hollow block
- Perforated sand-lime brick
- Solid sand-lime brick
- Aerated concrete
- Solid brick made from lightweight concrete
- Solid brick

ADVANTAGES

- The FIS P is the economical solution for anchorings in masonry that do not require approvals.
- The FIS P 300 T can be used with stable, standard silicone injection dispensers. No special equipment is required. This helps to reduce procurement costs.

APPLICATIONS

Injection mortar for use in masonry and aerated concrete with:

- Threaded rods FIS A, see page 144
- Internal threaded anchor FIS E, see page 161
- Injection anchor sleeves FIS H, see page 167
- Aerated concrete centring sleeve PBZ, see page 199

FUNCTIONING

- The FIS P is a 2-component injection mortar based on polyester resin.
- Resin and hardener are stored in two separate chambers and are not mixed and activated until extrusion through the static mixer.
- Partially used cartridges can be reused, simply by changing the static mixer.
- Related accessories for use in masonry and aerated concrete can be found on page 167 or page 198.

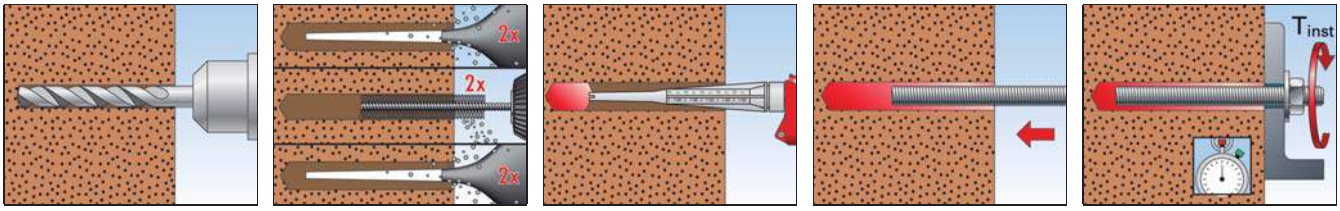
SEE ALSO

ANCHORS + SLEEVES
Page 144

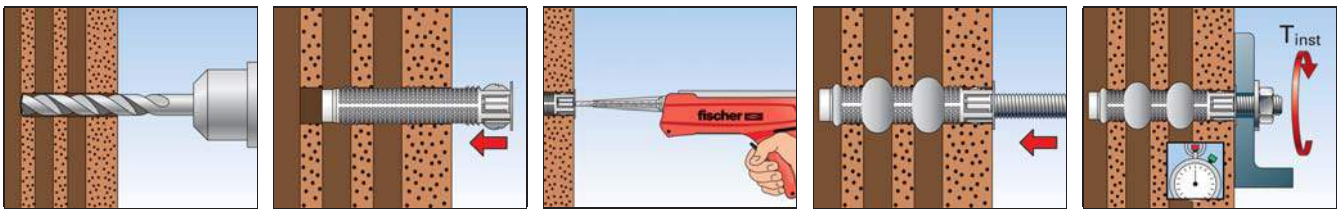
DISPENSER
Page 195

ACCESSORIES
Page 198

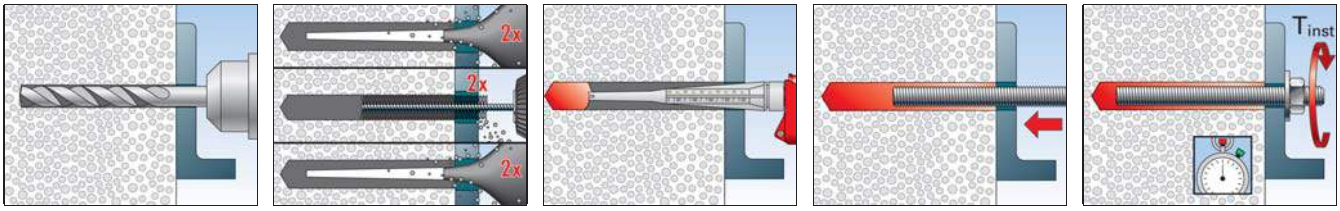
INSTALLATION IN SOLID BRICK WITH FIS P AND FIS A / RG M



INSTALLATION IN HOLLOW BLOCKS WITH FIS P AND FIS HK + FIS A / RG M



INSTALLATION IN AERATED CONCRETE WITH FIS P AND FIS A / RG M



TECHNICAL DATA

FIS P 300 TB

FIS P 300 T

FIS P 360 S

FIS P 380 C

FIS P 410 C

Static mixer **FIS MR Plus**

		Languages on the cartridge	Scale unit	Contents	Sales unit
Item	**Art.-No.**				**[pcs]**
FIS P 300 TB	**044725**	DE, EN, NL, ES, ZH, PT	150	1 cartridge 300 ml, 2 x FIS MR Plus	6
FIS P 300 T	**093175**	DE, EN, NL, ES, ZH, PT	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS P 300 T	**093178**	PL, SL, HU, HR, RO	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS P 300 T	**502287**	LT, LV, ET, UK, RU, KK	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS P 300 T	**051061**	CS, SK, EL	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS P 300 T	**535861**	USA, RA, BR, MEX	150	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS P 300 T with Clip	**537150**	USA, RA, BR, MEX	150	1 cartridge 300 ml, 2 x FIS MR Plus	10
FIS P 360 S	**056691**	DE, FR, NL, CS, TR, PL	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS P 360 S	**056708**	GB, I, E, P, F, UAE	180	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS P 360 S	**531547**	USA, RA, BR, MEX	180	1 cartridge 360 ml, 2 x FIS MR Plus	12
FIS P 380 C	**059234**	EN, IT, PT, ES, ZH, JA	190	1 cartridge 380 ml, 2 x FIS MR Plus	12
FIS P 410 C	**538134**	USA, RA, BR, MEX	205	1 cartridge 410 ml, 2 x FIS MR Plus	12
FIS MR Plus	**545853**	–	–	10 static mixer FIS MR Plus	10

FIS P 300 T HWK small

FIS P 300 T in bucket

FIS P 380 C in bucket

		Languages on the cartridge	Contents	Sales unit
Item	**Art.-No.**			**[pcs]**
FIS P 300 T HWK small	**040040**	DE, EN, NL, ES, ZH, PT	12 cartridges, 24 x FIS MR Plus	1
FIS P 300 T in bucket	**511341**	DE, EN, NL, ES, ZH, PT	20 cartridges, 20 x FIS MR Plus	1
FIS P 380 C in bucket	**511340**	EN, IT, PT, ES, ZH, JA	16 cartridges, 16 x FIS MR Plus	1

CURING TIME FIS P 300 T

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		± 0 °C – + 5 °C	6 hrs.
+ 5 °C – +10 °C	15 min.	+ 5 °C – +10 °C	3 hrs.
+10 °C – +20 °C	8 min.	+10 °C – +20 °C	2 hrs.
+20 °C – +30 °C	5 min.	+20 °C – +30 °C	60 min.
+30 °C – +40 °C	3 min.	+30 °C – +40 °C	30 min.

The above times apply from the moment of contact between resin and hardener in the static mixer.
For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

CURING TIME FIS P 360 S

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		– 5 °C	480 min.
		± 0 °C	240 min.
+ 5 °C	14 min.	+ 5 °C	120 min.
+20 °C	5 min.	+20 °C	60 min.
+30 °C	3 min.	+30 °C	30 min.
+40 °C	2 min.	+40 °C	20 min.

Please note: The curing times apply for dry anchoring basees, in damp anchoring bases they should be doubled.

CURING TIME FIS P 380 C / FIS P 410 C

Cartridge temperature (mortar)	Gelling time	Temperature at anchoring base	Curing time
		– 5 °C – ± 0 °C	6 hrs.
		± 0 °C – + 5 °C	3 hrs.
+ 5 °C – +20 °C	5 min.	+ 5 °C – +20 °C	90 min.
+20 °C – +30 °C	4 min.	+20 °C – +30 °C	45 min.
+30 °C – +40 °C	2 min.	+30 °C – +40 °C	30 min.

The above times apply from the moment of contact between resin and hardener in the static mixer.
For installation, the cartridge temperature must be at least +5 °C. For longer installation times, i.e. when interruptions occur in work, the mixer should be replaced.

Anchors and Mortars

Mortar Cartridges

	Positioning	Threaded Rod FIS A	Threaded Rod RG M	Internal Threaded Anchor RG M I	Internal Threaded Socket FIS E	Highbond Anchor FHB II-A L / FHB II-AS	Highbond Anchor FHB II-A L Inject / FHB II-A S Inject	FHB dyn	FDA	UMV-A dyn	Rebar	Page
Highbond-System FHB II	Best performance in concrete					■	■	■	■			52
Superbond-System FSB	Concrete all-rounder	■	■	■							■	64
Epoxy mortar FIS EM Plus	Powerful rebar connections + cracked concrete	■	■	■							■	86
Epoxy mortar FIS EB	Basic Epoxy mortar for concrete	■	■								■	95
Injection mortar FIS V	Versatile mortar for masonry und cracked concrete	■	■	■	■						■	101
Injection mortar FIS VL	Solid mortar for standard ancho-rings in masonry and cracked concrete	■	■	■	■						■	117
Injection mortar FIS GREEN	First approved mortar made with renewable raw materials	■	■	■	■							126
Injection mortar FIS P Plus	Approved for Masonry	■	■		■							133
Injection mortar FIS P	Reliable in masonry	(■)	(■)		(■)							140

■ = approved · (■) = recommendation

Anchors and Mortars

	Positioning	Threaded Rod FIS A	Threaded Rod RG M	Internal Threaded Anchor RG M I	Internal Threaded Socket FIS E	Highbond Anchor FHB II-A L / FHB II-AS	Highbond Anchor FHB II-A L Inject / FHB II-A S Inject	FHB dyn	FDA	UMV-A dyn	Rebar	Page
Mortar Capsules												
Resin capsules FHB II-P, FHB II-PF High Speed	Best performance in concrete					■						53
Resin capsules RSB	Concrete all-rounder		■	■								73
Resin capsules RM II	Bonded anchor for cracked concrete without drill hole cleaning		■	■								80
UMV-P	Capsule system for dynamic loads									■		176

Threaded rod FIS A

Bridges for traffic signs

Steel constructions

ADVANTAGES

- The system of anchor rod FIS A and an injection mortar for cracked concrete (M10 to M30) and non-cracked concrete (M6 to M30) can be individually selected based on requirements, thus allowing for a wide range of applications.
- Variable anchorage depths allow for ideal adaptation to the load to be applied, and ensure an optimised installation time and use of materials.
- Push-through installation is possible without any special parts through filling the annular gap with injection mortar.
- The wide range of approved steel types allows for use in all corrosion resistance classes and offers maximum application safety.

VERSIONS

- Zinc-plated steel
- Stainless steel

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

Also suitable for:

- Concrete C12/15

FUNCTIONING

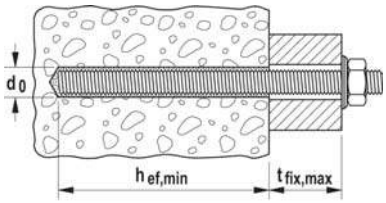
- The system of threaded rod FIS A and an injection mortar for cracked concrete (M10 to M30) and non-cracked concrete (M6 to M30) can be individually selected based on requirements, thus allowing for a wide range of applications.
- The mortar is extruded bubble free from the drill hole base.
- The mortar bonds the entire surface of the threaded rod with the drill hole wall and seals the drill hole.
- The threaded rod is set manually, by lightly rotating it until it reaches the drill hole base.

Item	zinc plated, steel grade 5.8 gvz Art.-No.	zinc plated, steel grade 8.8 gvz Art.-No.	stainless steel A4 Art.-No.	FIS SB	FIS EM Plus	FIS EB	FIS V		FIS VL		FIS GREEN		FIS P Plus		FIS P
				Concrete	Concrete	Concrete	Concrete	Masonry	Concrete	Masonry	Concrete	Masonry	Concrete	Masonry	Masonry
FIS A M 6 x 70	046204						■	■	■			■			(■)
FIS A M 6 x 75	090243		090437				■	■	■			■			(■)
FIS A M 6 x 85	090272						■	■	■			■			(■)
FIS A M 6 x 110	090273		090439				■	■	■			■			(■)
FIS A M 8 x 90	090274	519390	090440	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 8 x 110	090275	519391	090441	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 8 x 130	090276	519392	090442	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 8 x 175	090277	519393	090443	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 8 x 1000	509214 [1]	–	509230 [1]	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 10 x 110	090278	–	090444	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 10 x 130	090279	–	090447	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 10 x 130	–	524170	–	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 10 x 150	090281	517935	090448	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 10 x 170	044969	519395	044973	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 10 x 190	–	517936	–	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 10 x 200	090282	519396	090449	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 10 x 1000	509215 [1]	509223 [1]	509231 [1]	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 12 x 120	044971	519397	044974	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 12 x 140	090283	519398	090450	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 12 x 160	090284	517937	090451	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 12 x 180	090285	519399	090452	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 12 x 200	–	517938	519421	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 12 x 210	090286	–	090453	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 12 x 260	090287	–	090454	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 12 x 1000	509216 [1]	509224 [1]	509232 [1]	■	■	■	■	■	■	■	■	■	■	■	(■)
FIS A M 16 x 130	044972	519400	044975	■	■	■	■	■	■		■	■	■		
FIS A M 16 x 175	090288	519401	090455	■	■	■	■	■	■		■	■	■		
FIS A M 16 x 200	090289	517939	090456	■	■	■	■	■	■		■	■	■		
FIS A M 16 x 250	090290	517940	090457	■	■	■	■	■	■		■	■	■		
FIS A M 16 x 300	090291	519402	090458	■	■	■	■	■	■		■	■	■		
FIS A M 16 x 1000	509217 [1]	509225 [1]	509233 [1]	■	■	■	■	■	■		■	■	■		
FIS A M 20 x 245	090292	519404	090459	■	■	■	■		■		■		■		
FIS A M 20 x 290	090293	519406	090460	■	■	■	■		■		■		■		
FIS A M 20 x 1000	–	519410 [1]	519427 [1]	■	■	■	■		■		■		■		
FIS A M 24 x 290	090294	–	090461	■	■	■	■		■				■		
FIS A M 24 x 380	090295	–	090462	■	■	■	■		■				■		
FIS A M 24 x 1000	533881	–	–	■	■	■	■		■				■		
FIS A M 30 x 430	090297	–	090464	■	■	■	■		■						

■ = approved · (■) = recommendation

TECHNICAL DATA IN CONCRETE

Threaded rod **FIS A**



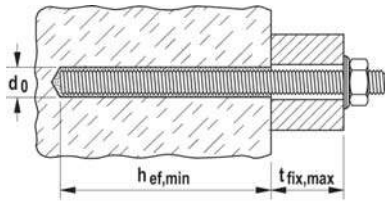
	Zinc plated, steel grade 5.8 Art.-No.	Zinc plated, steel grade 8.8 Art.-No.	Stainless steel Art.-No.	Approval ETA	Approval ICC	Drill hole diameter d_0 [mm]	Min. / max. anchorage depth [mm]	Min. / max. usable length [mm]	Min. / max. filling quantity [scale units]	Sales unit [pcs]
Item	gvz	gvz	A4							
FIS A M 6 x 70	046204	–	–	■	–	8	50 / 61	1 / 12	2	10
FIS A M 6 x 75	090243	–	090437	■	–	8	50 / 66	1 / 17	2	20
FIS A M 6 x 85	090272	–	–	■	–	8	50 / 72	5 / 27	2	20
FIS A M 6 x 110	090273	–	090439	■	–	8	50 / 72	30 / 52	2	20
FIS A M 8 x 90	090274	519390	090440	■	▲	10	60 / 78	1 / 19	2 / 3	10
FIS A M 8 x 110	090275	519391	090441	■	▲	10	60 / 98	1 / 39	2 / 3	10
FIS A M 8 x 130	090276	519392	090442	■	▲	10	60 / 118	1 / 59	2 / 4	10
FIS A M 8 x 175	090277	519393	090443	■	▲	10	60 / 160	4 / 104	2 / 5	10
FIS A M 8 x 1000	509214 1)	–	509230 1)	■	▲	10	60 / 160	–	2 / 5	10
FIS A M 8 x 1000	–	509222 1)	–	■	–	10	60 / 160	–	2 / 5	10
FIS A M 10 x 110	090278	–	090444	■	▲	12	60 / 96	1 / 37	3 / 4	10
FIS A M 10 x 130	090279	524170	090447	■	▲	12	60 / 116	1 / 57	3 / 5	10
FIS A M 10 x 150	090281	517935	090448	■	▲	12	60 / 136	1 / 77	3 / 5	10
FIS A M 10 x 170	044969	519395	044973	■	▲	12	60 / 156	1 / 97	3 / 6	10
FIS A M 10 x 190	–	517936	–	■	▲	12	60 / 176	1 / 117	3 / 7	10
FIS A M 10 x 200	090282	519396	090449	■	▲	12	60 / 186	1 / 127	3 / 7	10
FIS A M 10 x 1000	509215 1)	509223 1)	509231 1)	■	▲	12	60 / 200	–	3 / 7	10
FIS A M 12 x 120	044971	519397	044974	■	▲	14	70 / 103	1 / 34	3 / 5	10
FIS A M 12 x 140	090283	519398	090450	■	▲	14	70 / 123	1 / 54	3 / 6	10
FIS A M 12 x 160	090284	517937	090451	■	▲	14	70 / 143	1 / 74	3 / 7	10
FIS A M 12 x 180	090285	519399	090452	■	▲	14	70 / 163	1 / 94	3 / 7	10
FIS A M 12 x 200	–	517938	–	■	▲	14	70 / 183	1 / 114	3 / 8	10
FIS A M 12 x 210	090286	–	090453	■	▲	14	70 / 193	1 / 124	3 / 9	10
FIS A M 12 x 260	090287	–	090454	■	▲	14	70 / 240	4 / 174	3 / 10	10
FIS A M 12 x 1000	509216 1)	509224 1)	509232 1)	■	▲	14	70 / 240	–	3 / 10	10
FIS A M 16 x 130	044972	519400	044975	■	▲	18	80 / 109	1 / 30	5 / 7	10
FIS A M 16 x 175	090288	519401	090455	■	▲	18	80 / 154	1 / 75	5 / 10	10
FIS A M 16 x 200	090289	517939	090456	■	▲	18	80 / 179	1 / 100	5 / 11	10
FIS A M 16 x 250	090290	517940	090457	■	▲	18	80 / 229	1 / 150	5 / 14	10
FIS A M 16 x 300	090291	519402	090458	■	▲	18	80 / 279	1 / 200	5 / 17	10
FIS A M 16 x 1000	509217 1)	509225 1)	509233 1)	■	▲	18	80 / 320	–	5 / 19	10
FIS A M 20 x 245	090292	519404	090459	■	▲	24	90 / 220	1 / 131	11/28	10
FIS A M 20 x 290	090293	519406	090460	■	▲	24	90 / 265	1 / 176	11/32	10
FIS A M 20 x 1000	–	519410 1)	519427 1)	■	▲	24	90 / 400	–	11/48	10
FIS A M 24 x 290	090294	–	090461	■	▲	28	96 / 260	1 / 165	15/69	5
FIS A M 24 x 380	090295	–	090462	■	▲	28	96 / 350	1 / 255	15/52	5
FIS A M 24 x 1000	533881	–	–	■	▲	28	96 / 480	–	15/69	10
FIS A M 30 x 430	090297	–	090464	■	▲	35	120 / 394	1 / 275	28/88	5

1) Order washer and nut separately.

FIS A M 6 x ... : ETA-Approval in combination with FIS V, FIS VW, FIS VS

TECHNICAL DATA IN SOLID BRICK MASONRY

Threaded rod **FIS A**

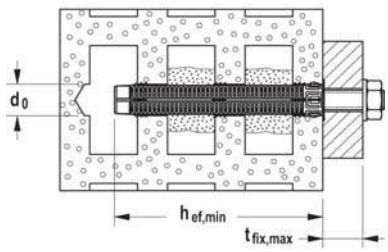


	Zinc plated, steel grade 5.8 Art.-No.	Zinc plated, steel grade 8.8 Art.-No.	Stainless steel Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Min. effective anchorage depth acc. ETA [mm]	Max. effective length acc. ETA [mm]	Fill quantity for effect. anchoring depth [scale units]	Sales unit [pcs]
Item	gvz	gvz	A4						
FIS A M 6 x 70	046204	–	–	■	8	50	11	2	10
FIS A M 6 x 75	090243	–	090437	■	8	50	17	2	20
FIS A M 6 x 85	090272	–	–	■	8	50	27	2	20
FIS A M 6 x 110	090273	–	090439	■	8	50	50	2	20
FIS A M 8 x 90	090274	519390	090440	■	10	50	29	2	10
FIS A M 8 x 110	090275	519391	090441	■	10	50	46	2	10
FIS A M 8 x 130	090276	519392	090442	■	10	50	66	2	10
FIS A M 8 x 175	090277	519393	090443	■	10	50	111	2	10
FIS A M 10 x 110	090278	–	090444	■	12	50	30	3	10
FIS A M 10 x 130	090279	524170	090447	■	12	50	50	3	10
FIS A M 10 x 150	090281	517935	090448	■	12	50	70	3	10
FIS A M 10 x 170	044969	519395	044973	■	12	50	90	3	10
FIS A M 10 x 190	–	517936	–	■	12	50	110	3	10
FIS A M 10 x 200	090282	519396	090449	■	12	50	120	3	10
FIS A M 12 x 120	044971	519397	044974	■	14	50	39	3	10
FIS A M 12 x 140	090283	519398	090450	■	14	50	59	3	10
FIS A M 12 x 160	090284	517937	090451	■	14	50	79	3	10
FIS A M 12 x 180	090285	519399	090452	■	14	50	99	3	10
FIS A M 12 x 200	–	517938	–	■	14	50	119	3	10
FIS A M 12 x 210	090286	–	090453	■	14	50	129	3	10
FIS A M 12 x 260	090287	–	090454	■	14	50	179	3	10
FIS A M 16 x 130	044972	519400	044975	■	18	50	20	6	10
FIS A M 16 x 175	090288	519401	090455	■	18	50	65	6	10
FIS A M 16 x 200	090289	517939	090456	■	18	50	90	6	10
FIS A M 16 x 250	090290	517940	090457	■	18	50	140	6	10
FIS A M 16 x 300	090291	519402	090458	■	18	50	190	6	10

FIS A M 6 x ... : ETA-Approval in combination with FIS V, FIS VW, FIS VS

TECHNICAL DATA IN PERFORATED BRICK MASONRY

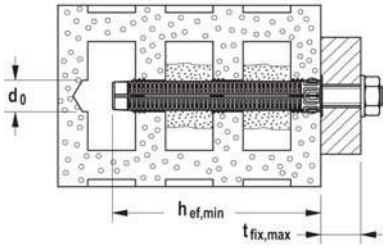
Threaded rod **FIS A**



	Zinc plated, steel grade 5.8 Art.-No.	Zinc plated, steel grade 8.8 Art.-No.	Stainless steel Art.-No.	Approval ETA	Drill hole diameter in perforated brick masonry d_0 [mm]	Min. anchorage depth in perforated brick masonry $h_{ef,\,min}$ [mm]	Max. useful length in perforated brick masonry $t_{fix,\,max}$ [mm]	Suitable injection anchor sleeve	Sales unit [pcs]
Item	gvz	gvz	A4						
FIS A M 6 x 70	046204	–	–	■	12	50	11	FIS H 12 x 50 K	10
FIS A M 6 x 75	090243	–	090437	■	12	50	16	FIS H 12 x 50 K	20
FIS A M 6 x 85	090272	–	–	■	12	50	26	FIS H 12 x 50 K	20

TECHNICAL DATA IN PERFORATED BRICK MASONRY

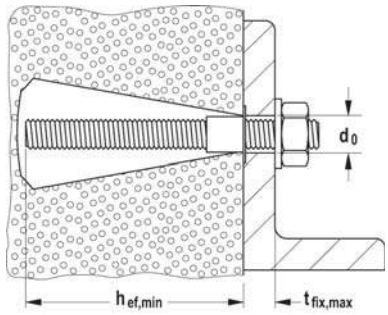
Threaded rod **FIS A**



	Zinc plated, steel grade 5.8 Art.-No.	Zinc plated, steel grade 8.8 Art.-No.	Stainless steel Art.-No.	Approval ETA	Drill hole diameter in perforated brick masonry d_0 [mm]	Min. anchorage depth in perforated brick masonry $h_{ef,min}$ [mm]	Max. useful length in perforated brick masonry $t_{fix,max}$ [mm]	Suitable injection anchor sleeve	Sales unit [pcs]
Item	gvz	gvz	A4						
FIS A M 6 x 110	**090273**	–	**090439**	■	12	50 85	52 17	FIS H 12 x 50 K FIS H 12 x 85 K	20
FIS A M 8 x 90	**090274**	**519390**	**090440**	■	12	50	29	FIS H 12 x 50 K	10
FIS A M 8 x 110	**090275**	**519391**	**090441**	■	12 12 16	50 85 85	49 14 14	FIS H 12 x 50 K FIS H 12 x 85 K FIS H 16 x 85 K	10
FIS A M 8 x 130	**090276**	**519392**	**090442**	■	12/16	50 85 85	69 34 34	FIS H 12 x 50 K FIS H 12 x 85 K FIS H 16 x 85 K	10
FIS A M 8 x 175	**090277**	**519393**	**090443**	■	12 12 16	50 85 85 130	114 79 79 34	FIS H 12 x 50 K FIS H 12 x 85 K FIS H 16 x 85 K FIS H 16 x 130 K	10
FIS A M 10 x 110	**090278**	–	**090444**	■	16	85	12	FIS H 16 x 85 K	10
FIS A M 10 x 130	**090279**	**524170**	**090447**	■	16	85	32	FIS H 16 x 85 K	10
FIS A M 10 x 150	**090281**	**517935**	**090448**	■	16	85 130	52 7	FIS H 16 x 85 K FIS H 16 x 130 K	10
FIS A M 10 x 170	**044969**	**519395**	**044973**	■	16	85 130	72 27	FIS H 16 x 85 K FIS H 16 x 130 K	10
FIS A M 10 x 190	–	**517936**	–	■	16	85 130	92 47	FIS H 16 x 85 K FIS H 16 x 130 K	10
FIS A M 10 x 200	**090282**	**519396**	**090449**	■	16	85 130	102 57	FIS H 16 x 85 K FIS H 16 x 130 K	10
FIS A M 12 x 120	**044971**	**519397**	**044974**	■	20	85	19	FIS H 20 x 85 K	10
FIS A M 12 x 140	**090283**	**519398**	**090450**	■	20	85	39	FIS H 20 x 85 K	10
FIS A M 12 x 160	**090284**	**517937**	**090451**	■	20	85 130	59 14	FIS H 20 x 85 K FIS H 20 x 130 K	10
FIS A M 12 x 180	**090285**	**519399**	**090452**	■	20	85 130	79 34	FIS H 20 x 85 K FIS H 20 x 130 K	10
FIS A M 12 x 200	–	**517938**	–	■	20	85 130	99 54	FIS H 20 x 85 K FIS H 20 x 130 K	10
FIS A M 12 x 210	**090286**	–	**090453**	■	20	85 130	109 64	FIS H 20 x 85 K FIS H 20 x 130 K	10
FIS A M 12 x 260	**090287**	–	**090454**	■	20	85 130 200	169 114 44	FIS H 20 x 85 K FIS H 20 x 130 K FIS H 20 x 200 K	10
FIS A M 16 x 130	**044972**	**519400**	**044975**	■	20	85	25	FIS H 20 x 85 K	10
FIS A M 16 x 175	**090288**	**519401**	**090455**	■	20	85 130	70 25	FIS H 20 x 85 K FIS H 20 x 130 K	10
FIS A M 16 x 200	**090289**	**517939**	**090456**	■	20	85 130	95 50	FIS H 20 x 85 K FIS H 20 x 130 K	10
FIS A M 16 x 250	**090290**	**517940**	**090457**	■	20	85 130 200	145 100 30	FIS H 20 x 85 K FIS H 20 x 130 K FIS H 20 x 200 K	10
FIS A M 16 x 300	**090291**	**519402**	**090458**	■	20	85 130 200	195 150 80	FIS H 20 x 85 K FIS H 20 x 130 K FIS H 20 x 200 K	10

TECHNICAL DATA IN UNDERCUT DRILL HOLE IN AERATED CONCRETE

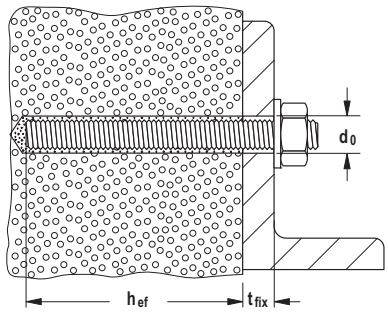
Threaded rod **FIS A**



	Zinc plated, steel grade 5.8	Zinc plated, steel grade 8.8	Stainless steel	Approval	Drill hole diameter in aerated concrete in undercut drill hole	Min. / max. anchorage depth in aerated concrete in undercut drill hole	Min. / max. usable length in aerated concrete	Filling quantity for min. / max. anchorage depth in aerated concrete	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	[mm]	h_{ef} [mm]	t_{fix} [mm]	[scale units]	[pcs]
Item	**gvz**	**gvz**	**A4**						
FIS A M 8 x 90	**090274**	**519390**	**090440**	■	14	75 / 95	4 / -	15 / 20	10
FIS A M 8 x 110	**090275**	**519391**	**090441**	■	14	75 / 95	24 / 4	15 / 20	10
FIS A M 8 x 130	**090276**	**519392**	**090442**	■	14	75 / 95	44 / 24	15 / 20	10
FIS A M 8 x 175	**090277**	**519393**	**090443**	■	14	75 / 95	89 / 69	15 / 20	10
FIS A M 10 x 110	**090278**	–	**090444**	■	14	75 / 95	22 / 2	15 / 20	10
FIS A M 10 x 130	**090279**	**524170**	**090447**	■	14	75 / 95	42 / 22	15 / 20	10
FIS A M 10 x 150	**090281**	**517935**	**090448**	■	14	75 / 95	62 / 42	15 / 20	10
FIS A M 10 x 170	**044969**	**519395**	**044973**	■	14	75 / 95	82 / 62	15 / 20	10
FIS A M 10 x 190	–	**517936**	–	■	14	75 / 95	102 / 82	15 / 20	10
FIS A M 10 x 200	**090282**	**519396**	**090449**	■	14	75 / 95	112 / 92	15 / 20	10
FIS A M 12 x 120	**044971**	**519397**	**044974**	■	14	75 / 95	29 / 9	15 / 20	10
FIS A M 12 x 140	**090283**	**519398**	**090450**	■	14	75 / 95	49 / 29	15 / 20	10
FIS A M 12 x 160	**090284**	**517937**	**090451**	■	14	75 / 95	69 / 49	15 / 20	10
FIS A M 12 x 180	**090285**	**519399**	**090452**	■	14	75 / 95	89 / 69	15 / 20	10
FIS A M 12 x 200	–	**517938**	–	■	14	75 / 95	109 / 89	15 / 20	10
FIS A M 12 x 210	**090286**	–	**090453**	■	14	75 / 95	119 / 99	15 / 20	10
FIS A M 12 x 260	**090287**	–	**090454**	■	14	75 / 95	169 / 149	15 / 20	10

TECHNICAL DATA IN AERATED CONCRETE

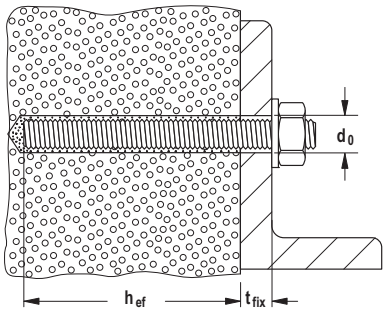
Threaded rod **FIS A**



	Zinc plated, steel grade 5.8	Zinc plated, steel grade 8.8	Stainless steel	Approval	Drill hole diameter in aerated concrete in cylindrical drill hole	Anchorage depth in aerated concrete in cylindrical drill hole	Usable length	Fill quantity for effect. anchorage depth in aerated concrete	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_{ef} [mm]	t_{fix} [mm]	[scale units]	[pcs]
Item	**gvz**	**gvz**	**A4**						
FIS A M 8 x 90	–	–	**090440**	■	10	100	–	–	10
FIS A M 8 x 110	**090275**	**519391**	**090441**	■	10	100	2	–	10
FIS A M 8 x 130	**090276**	**519392**	**090442**	■	10	100	19	3	10
FIS A M 8 x 175	**090277**	**519393**	**090443**	■	10	100	64	3	10
FIS A M 10 x 110	**090278**	–	**090444**	■	12	100	–	–	10
FIS A M 10 x 130	**090279**	**524170**	**090447**	■	12	100	17	6	10
FIS A M 10 x 150	**090281**	**517935**	**090448**	■	12	100	37	4	10

TECHNICAL DATA IN AERATED CONCRETE

Threaded rod **FIS A**



	Zinc plated, steel grade 5.8 Art.-No.	Zinc plated, steel grade 8.8 Art.-No.	Stainless steel Art.-No.	Approval ETA	Drill hole diameter in aerated concrete in cylindrical drill hole d_0 [mm]	Anchorage depth in aerated concrete in cylindrical drill hole h_{ef} [mm]	Usable length t_{fix} [mm]	Fill quantity for effect. anchorage depth in aerated concrete [scale units]	Sales unit [pcs]
Item	gvz	gvz	A4						
FIS A M 10 x 170	**044969**	**519395**	**044973**	■	12	100	57	4	10
FIS A M 10 x 190	–	**517936**	–	■	12	100	77	4	10
FIS A M 10 x 200	**090282**	**519396**	**090449**	■	12	100	87	4	10
FIS A M 12 x 120	**044971**	**519397**	**044974**	■	14	100	4	5	10
FIS A M 12 x 140	**090283**	**519398**	**090450**	■	14	100	24	5	10
FIS A M 12 x 160	**090284**	**517937**	**090451**	■	14	100	44	5	10
FIS A M 12 x 180	**090285**	**519399**	**090452**	■	14	100	64	5	10
FIS A M 12 x 200	–	**517938**	–	■	14	100	84	5	10
FIS A M 12 x 210	**090286**	–	**090453**	■	14	100	94	5	10
FIS A M 12 x 260	**090287**	–	**090454**	■	14	100	144	5	10
FIS A M 16 x 130	**044972**	**519400**	**044975**	■	18	100	10	6	10
FIS A M 16 x 175	**090288**	**519401**	**090455**	■	18	100	55	6	10
FIS A M 16 x 200	**090289**	**517939**	**090456**	■	18	100	80	6	10
FIS A M 16 x 250	**090290**	**517940**	**090457**	■	18	100	130	6	10
FIS A M 16 x 300	**090291**	**519402**	**090458**	■	18	100	180	6	10

TECHNICAL DATA

Hexagonal nut and washer

	Zinc plated, steel grade 8.8 Art.-No.	Stainless steel Art.-No.	Width across nut ⬡ SW [mm]	Washer (outer diameter x thickness) [mm]	Match	Sales unit [pcs]
Item	gvz	A4				
Nut & washer M8	**510509**	–	13	16 x 1,6	FIS A M8	50
Nut & washer M10	**510510**	–	17	20 x 2	FIS A M10	50
Nut & washer M12	**510511**	–	19	24 x 2,5	FIS A M12	25
Nut & washer M16	**510512**	–	24	30 x 3	FIS A M16	20
Nut & washer M8	–	**510513**	13	16 x 1,6	FIS A M8 A4	50
Nut & washer M10	–	**510514**	17	20 x 2	FIS A M10 A4	50
Nut & washer M12	–	**510515**	19	24 x 2,5	FIS A M12 A4	25
Nut & washer M16	–	**510516**	24	30 x 3	FIS A M16 A4	20
Nut & washer M20	–	**519738**	30	37 x 3	FIS A M20 A4	10
Nut & washer M20	**519737**	–	30	37 x 3	FIS A M 20	10

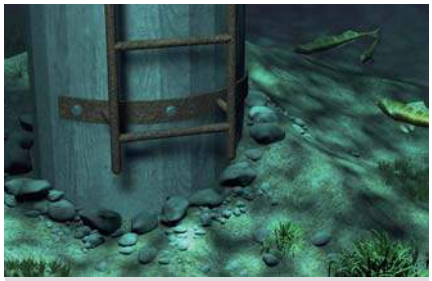
TECHNICAL DATA

Filling Sets for subsequent filling of the annular gap

Item	Art.-No.	For use with injection mortar	Match	Sales unit [pcs]
Filling Set M12	**537218**	FIS SB, FIS EM Plus, FIS V	FIS A M12	10
Filling Set M16	**537219**	FIS SB, FIS EM Plus, FIS V	FIS A M16	10
Filling Set M20	**537220**	FIS SB, FIS EM Plus, FIS V	FIS A M 20	10

Threaded rod RG M

Steel constructions



Underwater applications

ADVANTAGES

- The wide range of the RG M from M8 to M30 opens up a wide range of applications and therefore offers great flexibility.
- The wide range of approved steel types for RG M allows for use in all corrosion resistance classes and offers the best possible application safety.
- Please refer to the approvals for the resin capsules and mortar used.

VERSIONS

- Zinc-plated steel
- Stainless steel

BUILDING MATERIALS

Approved for anchorings in:

- Concrete C20/25 to C50/60, cracked and non-cracked

Also suitable for:

- Natural stone with dense structure

FUNCTIONING

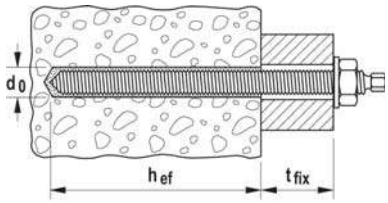
- Due to its oblique edge, the threaded rod RG M is particularly suitable for use in conjunction with resin capsules.
- The threaded rod RG M is set using a hammer drill and the accompanying setting tool in rotating and hitting motions.
- During setting, the oblique edge of the RG M destroys the capsule, and mixes and activates the mortar.
- Use with injection mortar is also possible. Here, the threaded rod is manually inserted into the drill hole with a light rotating movement until it reaches the base of the hole.

Item	zinc plated, steel grade 5.8 gvz Art.-No.	zinc plated, steel grade 8.8 gvz Art.-No.	stainless steel A4 Art.-No.	hot-dip galva-nised steel hdg Art.-No.	highly corro-sion resistant steel C Art.-No.	FIS SB Concrete	FIS EM Plus Concrete	FIS EB Concrete	FIS V Concrete	FIS V Masonry	FIS VL Concrete	FIS VL Masonry	FIS GREEN Concrete	FIS GREEN Masonry	FIS P Plus Concrete	FIS P Plus Masonry	FIS P Masonry	RSB Concrete	RM II Concrete
RG M 8 x 110	050256	–	050263			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■
RG M 8 x 150	095698	519443	050293			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■
RG M 10 x 110	535007	–	535009			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■
RG M 10 x 130	050257	–	050264		096217[1]	■	■	■	■	■	■	■	■	■	■	■	(■)	■	■
RG M 10 x 165	050280	–	050294			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■
RG M 10 x 190	050281	–	050296			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■
RG M 10 x 220	–	519444	–			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■
RG M 10 x 250	095703	–	095701			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■
RG M 10 x 350	095718	–	095709			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■
RG M 12 x 120	535010	–	535011			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■
RG M 12 x 160	050258	–	050265	512247	096218[1]	■	■	■	■	■	■	■	■	■	■	■	(■)	■	■
RG M 12 x 180	512248	–	512249			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■
RG M 12 x 200	–	–	050576			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■
RG M 12 x 220	050283	519445	050297			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■
RG M 12 x 250	050284	–	095702			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■
RG M 12 x 300	050285	–	095705			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■
RG M 12 x 380	095720[2]	–	095710[1]			■	■	■	■	■	■	■	■	■	■	■	(■)	■	■
RG M 16 x 165	050287	–	095704	537062		■	■	■	■	■	■		■	■	■			■	■
RG M 16 x 140	542407	–	–			■	■	■	■	■	■		■	■	■			■	■
RG M 16 x 190	050259	–	050266	512250	096219[1]	■	■	■	■	■	■		■	■	■			■	■
RG M 16 x 250	050288	–	050298			■	■	■	■	■	■		■	■	■			■	■
RG M 16 x 270	–	519446	–			■	■	■	■	■	■		■	■	■			■	■
RG M 16 x 300	050289	–	050299			■	■	■	■	■	■		■	■	■			■	■
RG M 16 x 380	095722[2]	–	095712[1]			■	■	■	■	■	■		■	■	■			■	■
RG M 16 x 500	095723[2]	–	095713[1]			■	■	■	■	■	■		■	■	■			■	■
RG M 20 x 220	512251	–	–			■	■	■	■		■		■		■			■	■
RG M 20 x 260	050260	–	050267			■	■	■	■		■		■		■			■	■
RG M 20 x 290	–	519447	–			■	■	■	■		■		■		■			■	■
RG M 20 x 350	095707	–	095706			■	■	■	■		■		■		■			■	■
RG M 20 x 500	095725[1]	–	–			■	■	■	■		■		■		■			■	■
RG M 24 x 295	–	519448[1]	–			■	■	■	■		■				■			■	■
RG M 24 x 300	050261[1]	–	050268[1]			■	■	■	■		■				■			■	■
RG M 24 x 400	095727[1]	–	095715[1]			■	■	■	■		■				■			■	■
RG M 24 x 600	095728	–	–			■	■	■	■		■				■			■	■
RG M 30 x 380	050262[1]	–	090726[1]			■	■	■	■		■							■	
RG M 30 x 500	095730[1]	–	–			■	■	■	■		■							■	

■ = approved
(■) = recommendation

TECHNICAL DATA IN CONCRETE

Threaded rod **RG M**



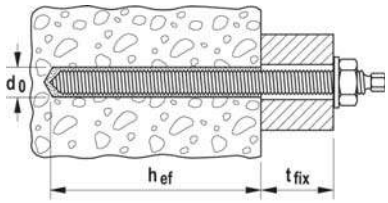
	Zinc plated, steel grade 5.8 Art.-No.	Zinc plated, steel grade 8.8 Art.-No.	Stainless steel Art.-No.	Approval ETA	Approval ICC	Drill hole diameter d_0 [mm]	Anchorage depth (short/standard/large) h_{ef} [mm]	Usable length (short/standard/large) t_{fix} [mm]	Fits capsule RSB	Sales unit [pcs]
Item	gvz	gvz	A4							
RG M 8 x 110	050256	–	050263	■	–	10	- / 80 / -	- / 14 / -	1 x RSB 8	10
RG M 8 x 150	095698	–	050293	■	–	10	- / 80 / -	- / 54 / -	1 x RSB 8	10
RG M 8 x 150	–	519443	–	–	–	10	- / 80 / -	- / 54 / -	1 x RSB 8	10
RG M 10 x 110	535007	–	535009	–	–	12	75 / - / -	15 / - / -	1 x RSB 10 Mini	10
RG M 10 x 130	050257	–	050264	■	–	12	75 / 90 / -	35 / 20 / -	1 x RSB 10 mini 1 x RSB 10	10
RG M 10 x 165	050280	–	050294	■	–	12	75 / 90 / -	70 / 55 / -	1 x RSB 10 mini 1 x RSB 10	10
RG M 10 x 190	050281	–	050296	■	–	12	75 / 90 / 150	95 / 80 / 20	1 x RSB 10 mini 1 x RSB 10 2 x RSB 10 mini	10
RG M 10 x 220	–	519444	–	–	–	12	75 / 90 / 150	125 / 110 / 50	1 x RSB 10 mini 1 x RSB 10 2 x RSB 10 mini	10
RG M 10 x 250	095703	–	095701	■	–	12	75 / 90 / 150	155 / 140 / 80	1 x RSB 10 mini 1 x RSB 10 2 x RSB 10 mini	10
RG M 10 x 350	–	–	095709	–	–	12	75 / 90 / 150	255 / 240 / 180	1 x RSB 10 mini 1 x RSB 10 2 x RSB 10 mini	10
RG M 10 x 350	095718	–	–	■	–	12	75 / 90 / 150	255 / 240 / 180	1 x RSB 10 mini 1 x RSB 10 2 x RSB 10 mini	10
RG M 12 x 120	535010	–	535011	■	–	14	75 / - / -	21 / - / -	1 x RSB 12 mini	10
RG M 12 x 160	050258	–	050265	■	–	14	75 / 110 / -	61 / 26 / -	1 x RSB 12 mini 1 x RSB 12	10
RG M 12 x 180	512248	–	512249	■	–	14	75 / 110 / 150	81 / 46 / 6	1 x RSB 12 mini 1 x RSB 12 2 x RSB 12 mini	10
RG M 12 x 200	–	–	050576	■	–	14	75 / 110 / 150	101 / 66 / 26	1 x RSB 12 mini 1 x RSB 12 2 x RSB 12 mini	10
RG M 12 x 220	–	519445	–	–	–	14	75 / 110 / 150	121 / 86 / 46	1 x RSB 12 mini 1 x RSB 12 2 x RSB 12 mini	10
RG M 12 x 220	050283	–	050297	■	–	14	75 / 110 / 150	121 / 86 / 46	1 x RSB 12 mini 1 x RSB 12 2 x RSB 12 mini	10
RG M 12 x 250	050284	–	095702	■	–	14	75 / 110 / 150	151 / 116 / 76	1 x RSB 12 mini 1 x RSB 12 2 x RSB 12 mini	10
RG M 12 x 300	050285	–	095705	■	–	14	75 / 110 / 150	201 / 166 / 126	1 x RSB 12 mini 1 x RSB 12 2 x RSB 12 mini	10
RG M 12 x 380	095720 2)	–	095710 1)	■	–	14	75 / 110 / 150	281 / 246 / 206	1 x RSB 12 mini 1 x RSB 12 2 x RSB 12 mini	10

1) Straight cut, additional setting tool required

2) Straight cut, setting tool is enclosed.

TECHNICAL DATA IN CONCRETE

Threaded rod **RG M**



	Zinc plated, steel grade 5.8	Zinc plated, steel grade 8.8	Stainless steel	Approval		Drill hole diameter	Anchorage depth (short/standard/ large)	Usable length (short/standard/ large)	Fits capsule RSB	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	ICC	d_0 [mm]	h_{ef} [mm]	t_{fix} [mm]		[pcs]
Item	gvz	gvz	A4							
RG M 16 x 165	**050287**	–	**095704**	■	–	18	95 / 125 / -	38 / 8 / -	1 x RSB 16 mini 1 x RSB 16	10
RG M 16 x 140	**542407**	–	–	■	–	18	95 / - / -	13 / - / -	1 x RSB 16 mini 1 x RSB 16	10
RG M 16 x 190	–	–	**050266**	–	–	18	95 / 125 / -	63 / 33 / -	1 x RSB 16 mini 1 x RSB 16	10
RG M 16 x 190	**050259**	–	–	■	–	18	95 / 125 / -	63 / 33 / -	1 x RSB 16 mini 1 x RSB 16	10
RG M 16 x 250	**050288**	–	**050298**	■	–	18	95 / 125 / 190	123 / 93 / 28	1 x RSB 16 mini 1 x RSB 16 2 x RSB 16 mini	10
RG M 16 x 270	–	**519446**	–	–	–	18	95 / 125 / 190	143 / 113 / 48	1 x RSB 16 mini 1 x RSB 16 2 x RSB 16 mini	10
RG M 16 x 300	**050289**	–	**050299**	■	–	18	95 / 125 / 190	173 / 143 / 78	1 x RSB 16 mini 1 x RSB 16 2 x RSB 16 mini	10
RG M 16 x 380	**095722** 2)	–	**095712** 1)	■	–	18	95 / 125 / 190	253 / 223 / 158	1 x RSB 16 mini 1 x RSB 16 2 x RSB 16 mini	10
RG M 16 x 500	**095723** 2)	–	**095713** 1)	■	–	18	95 / 125 / 190	373 / 343 / 278	1 x RSB 16 mini 1 x RSB 16 2 x RSB 16 mini	10
RG M 20 x 220	**512251**	–	–	■	–	25	- / 170 / -	- / 14 / -	1 x RSB 20	10
RG M 20 x 260	**050260**	–	**050267**	■	–	25	- / 170 / 210	- / 54 / 14	1 x RSB 20 1 x RSB 20 E / 24	10
RG M 20 x 290	–	**519447**	–	–	–	25	- / 170 / 210	- / 84 / 44	1 x RSB 20 1 x RSB 20 E / 24	10
RG M 20 x 350	**095707**	–	–	■	–	25	- / 170 / 210	- / 144 / 104	1 x RSB 20 1 x RSB 20 E / 24	10
RG M 20 x 350	–	–	**095706**	–	–	25	- / 170 / 210	- / 144 / 104	1 x RSB 20 1 x RSB 20 E / 24	10
RG M 20 x 500	**095725** 1)	–	–	■	–	25	- / 170 / 210	- / 294 / 254	1 x RSB 20 1 x RSB 20 E / 24	10
RG M 24 x 295	–	**519448** 1)	–	–	–	28	- / 210 / -	- / 56 / -	1 x RSB 20 E / 24	10
RG M 24 x 300	**050261** 1)	–	**050268** 1)	■	–	28	- / 210 / -	- / 61 / -	1 x RSB 20 E / 24	10
RG M 24 x 400	**095727** 1)	–	**095715** 1)	■	–	28	- / 210 / -	- / 161 / -	1 x RSB 20 E / 24	10
RG M 24 x 600	**095728** 1)	–	–	■	–	28	- / 210 / -	- / 361 / -	1 x RSB 20 E / 24	5
RG M 30 x 380	**050262** 1)	–	**090726** 1)	■	–	35	- / 280 / -	- / 65 / -	1 x RSB 30	5
RG M 30 x 500	**095730** 1)	–	–	■	–	35	- / 280 / -	- / 185 / -	1 x RSB 30	5

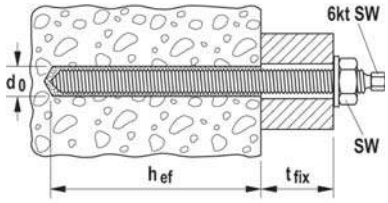
1) Straight cut, additional setting tool required

2) Straight cut, setting tool is enclosed.

Threaded rod RG M

TECHNICAL DATA IN CONCRETE

Threaded rod **RG M**



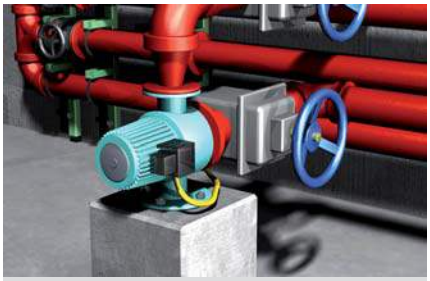
	Highly corrosion resistant steel	Hot-dip galvanised steel	Approval	Drill hole diameter	Effect. anchorage depth	Max. fixture thickness	Hexagon drive	Hexagon nut	Fits capsule RSB	Sales unit
	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_{ef} [mm]	t_{fix} [mm]	6kt SW [mm]	⬡ SW [mm]		[pcs]
Item	C	hdg								
RG M 10 x 130	096217	–	■	12	90	20	7	17	1 x RSB 10 mini 1 x RSB 10	10
RG M 12 x 160	096218	512247	■	14	110	25	8	19	1 x RSB 12 mini 1 x RSB 12	10
RG M 16 x 165	–	537062	■	18	125	8	12	24	1 x RSB 16 mini 1 x RSB 16	10
RG M 16 x 190	096219	512250	■	18	125	35	12	24	1 x RSB 16 mini 1 x RSB 16	10

TECHNICAL DATA

Filling Sets for subsequent filling of the annular gap

Item	Art.-No.	For use with injection mortar	Match	Sales unit [pcs]
Filling Set M12	**537218**	FIS SB, FIS EM Plus, FIS V	FIS A M12	10
Filling Set M16	**537219**	FIS SB, FIS EM Plus, FIS V	FIS A M16	10
Filling Set M20	**537220**	FIS SB, FIS EM Plus, FIS V	FIS A M 20	10

Column bases



Pumps

ADVANTAGES

- The system internal threaded anchor RG M I and an injection mortar for concrete can be individually selected based on requirements, thus allowing for a wide range of applications.
- The internal threaded anchor RG MI allows for surface flush removal and reuse of the fixing point, and therefore offers the best possible flexibility.
- The metric internal thread allows for the use of standard screws or threaded rods for the ideal adaptation to suit the intended use.

VERSIONS

- Zinc-plated steel
- Stainless steel

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, non-cracked

Also suitable for:

- Concrete C12/15, non-cracked

FUNCTIONING

- The injection system is suitable for pre-positioned installation when combined with the internal threaded anchor RG MI.
- The mortar is extruded bubble free from the drill hole base.
- The mortar bonds the entire surface of the internal threaded anchor with the drill hole wall and seals the drill hole.
- The internal threaded anchor is set manually, by lightly rotating it until it reaches the drill hole base.

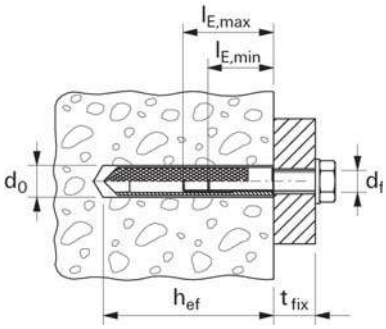
Item	zinc plated, steel grade 5.8 gvz Art.-No.	stainless steel A4 Art.-No.	 FIS SB Concrete	 FIS EM Plus Concrete	 FIS V Concrete	 FIS VL Concrete	 FIS GREEN Concrete	 RSB Concrete	 RM II Concrete
RG 8 x 75 M 5 I	48221								
RG 10 x 75 M 6 I	48222								
RG 12 x 90 M8 I	50552	50565	■	■	■	■	■	■	■
RG 16 x 90 M10 I	50553	50566	■	■	■	■	■	■	■
RG 18 x 125 M12 I	50562	50567	■	■	■	■	■	■	■
RG 22 x 160 M16 I	50563	50568	■	■	■	■	■	■	■
RG 28 x 200 M20 I	50564	50569	■	■	■	■		■	■

■ = approved

Internal-threaded anchor RG M I

TECHNICAL DATA IN CONCRETE

Internal threaded anchor **RG M I**



	Zinc-plated steel Art.-No.	Stainless steel Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Effect. anchorage depth h_{ef} [mm]	Min. bolt penetration $l_{E,min}$ [mm]	Max. bolt penetration $l_{E,max}$ [mm]	Fits capsules	Sales unit [pcs]
Item	**gvz**	**A4**							
RG 8 x 75 M 5 I	**048221** 1)	–	–	10	75	8	14	539796 RM II 8	10
RG 10 x 75 M 6 I	**048222** 1)	–	–	12	75	10	16	539797 RM II 10	10
RG 12 x 90 M8 I	**050552** 1)	**050565** 1)	–	14	90	8	18	539797 RM II 10	10
RG 16 x 90 M10 I	**050553** 1)	**050566** 1)	–	18	90	10	23	539798 RM II 12	10
RG 18 x 125 M12 I	**050562** 1)	**050567** 1)	–	20	125	12	26	539800 RM II 16	10
RG 22 x 160 M16 I	**050563** 1)	**050568** 1)	–	24	160	16	35	539801 RM II 16 E	5
RG 28 x 200 M20 I	**050564** 1)	**050569** 1)	–	32	200	20	45	539803 RM II 24	5

1) Setting tool is included in each package.

French balconies

Satellite dishes

ADVANTAGES

- The fixing system threaded rod FIS A and an injection mortar can be individually selected based on requirements, thus allowing for a wide range of applications.
- The wide range of approved threaded rods FIS A from M6 to M16 allows for various applications.
- The internal threaded anchor FIS E allows for surface flush removal and reuse of the fixing point, and therefore offers the best possible flexibility.

VERSIONS

- Zinc-plated steel
- Stainless steel

BUILDING MATERIALS

Approved for:

- Solid sand-lime brick
- Solid brick

Also suitable for:

- Solid and lightweight concrete blocks
- Solid pumice and other solid building materials

FUNCTIONING

- FIS E is suitable for pre-positioned installation, whilst FIS A is suitable for pre-positioned and push-through installation.
- The mortar bonds the entire surface of the anchor with the drill hole wall and seals the drill hole.
- The anchor is set manually, by lightly rotating it until it reaches the drill hole base.
- In general, it is also possible to use the FIS H K anchor sleeves in solid brick masonry, and this provides additional safety when the base material is unknown. Technical data see page 168.

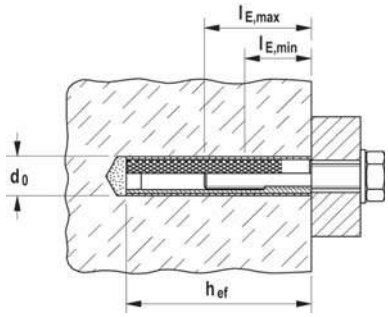
Item	zinc plated, steel grade 5.8 gvz Art.-No.	FIS V	FIS VL	FIS P Plus	FIS GREEN
FIS E 11 x 85 M6	43631	■	■	■	■
FIS E 11 x 85 M8	43632	■	■	■	■
FIS E 15 x 85 M10	43633	■	■	■	■
FIS E 15 x 85 M12	43634	■	■	■	■

■ = approved

Internal threaded sockets FIS E

TECHNICAL DATA IN SOLID BRICK MASONRY

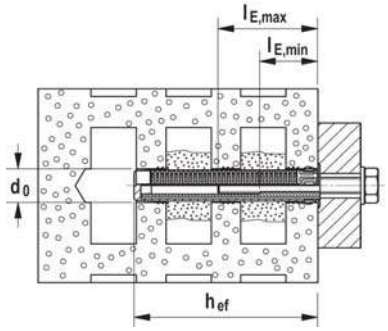
Internal threaded sockets **FIS E**



	Zinc-plated steel	Approval	Drill hole diameter	Effect. anchorage depth	Min. bolt penetration	Max. bolt penetration	Fill quantity for effect. anchorage depth in solid brick masonry		Sales unit
	Art.-No.	ETA	d_0 [mm]	h_{ef} [mm]	$l_{E,min}$ [mm]	$l_{E,max}$ [mm]	[scale units]		[pcs]
Item	**gvz**								
FIS E 11 x 85 M6	**043631**	■	14	85	6	60	4		10
FIS E 11 x 85 M8	**043632**	■	14	85	8	60	4		10
FIS E 15 x 85 M10	**043633**	■	18	85	10	60	5		10
FIS E 15 x 85 M12	**043634**	■	18	85	12	60	5		10

TECHNICAL DATA IN PERFORATED BRICK MASONRY

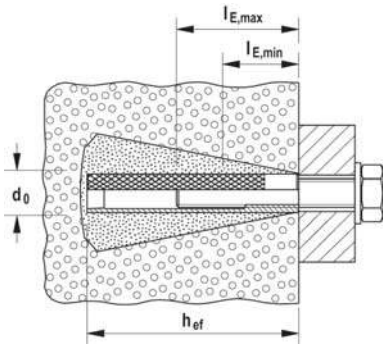
Internal threaded sockets **FIS E**



	Zinc-plated steel	Approval	Drill hole diameter in perforated brick masonry	Effect. anchorage depth	Min. bolt penetration	Max. bolt penetration	Suitable injection anchor sleeve		Sales unit
	Art.-No.	ETA	d_0 [mm]	h_{ef} [mm]	$l_{E,min}$ [mm]	$l_{E,max}$ [mm]			[pcs]
Item	**gvz**								
FIS E 11 x 85 M6	**043631**	■	16 20	85	6	60	FIS H 16 x 85 K FIS H 20 x 85 K		10
FIS E 11 x 85 M8	**043632**	■	16 20	85	8	60	FIS H 16 x 85 K FIS H 20 x 85 K		10
FIS E 15 x 85 M10	**043633**	■	20	85	10	60	FIS H 20 x 85 K		10
FIS E 15 x 85 M12	**043634**	■	20	85	12	60	FIS H 20 x 85 K		10

TECHNICAL DATA IN UNDERCUT DRILL HOLE IN AERATED CONCRETE

Internal threaded sockets **FIS E**

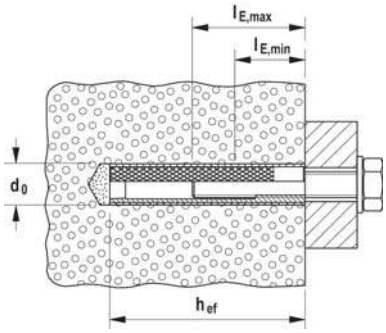


	Zinc-plated steel Art.-No.	Approval ETA	Drill hole diameter in undercut drill hole [mm]	Min. anchorage depth in undercut drill hole [mm]	Min. bolt penetration $l_{E,min}$ [mm]	Max. bolt penetration $l_{E,max}$ [mm]	Fill quantity for effect. anchorage depth in aerated concrete [scale units]	Sales unit [pcs]
Item	**gvz**							
FIS E 11 x 85 M6	**043631**	■	14	85	6	60	20	10
FIS E 11 x 85 M8	**043632**	■	14	85	8	60	20	10

The ETA also allows that the internal threaded sockets FIS E M6 - M12 can be anchored in cylindric drilled holes.

TECHNICAL DATA IN CYLINDRICAL DRILL HOLE IN AERATED CONCRETE

Internal threaded sockets **FIS E**

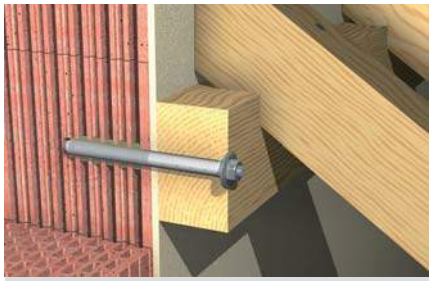


	Zinc-plated steel Art.-No.	Approval ETA	Drill hole diameter in cylindrical drill hole [mm]	Min. anchorage depth in cylindrical drill hole h_{ef} [mm]	Min. bolt penetration $l_{E,min}$ [mm]	Max. bolt penetration $l_{E,max}$ [mm]	Fill quantity for effect. anchorage depth in aerated concrete [scale units]	Sales unit [pcs]
Item	**gvz**							
FIS E 11 x 85 M6	**043631**	■	14	85	6	60	20	10
FIS E 11 x 85 M8	**043632**	■	14	85	8	60	20	10
FIS E 15 x 85 M10	**043633**	■	18	85	10	60	–	10
FIS E 15 x 85 M12	**043634**	■	18	85	12	60	–	10

The ETA also allows that the internal threaded sockets FIS E M6 - M12 can be anchored in cylindric drilled holes.

Simple push-through installation in masonry

Car ports



Detail: Wood constructions in push-through installation

VERSIONS

- Zinc-plated steel
- Stainless steel

BUILDING MATERIALS

Approved for:

- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Hollow blocks made from concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Solid brick

Also suitable for:

- Hollow pumice slabs
- Slabs made of hollow brick and other perforated brick
- Solid pumice and other solid building materials

CERTIFICATES

ADVANTAGES

- The direct installation through the fixture reduces preliminary work wherever there are several fixing points for each fixture, and guarantees a significantly simpler installation process.
- The design of the push-through anchor sleeve FIS H K allows for a range of usable lengths with just one product, thus providing maximum flexibility and cost-effectiveness.
- The movable edge, in combination with the scale, makes it easier to adapt the anchor sleeve to suit the desired usable length.
- The grating structure of the push-through anchor sleeve is adapted for the injection mortars FIS V, FIS VW HIGH SPEED, FIS VS LOW SPEED, FIS GREEN and FIS P Plus, and ensures sparing mortar use with the best interlock.

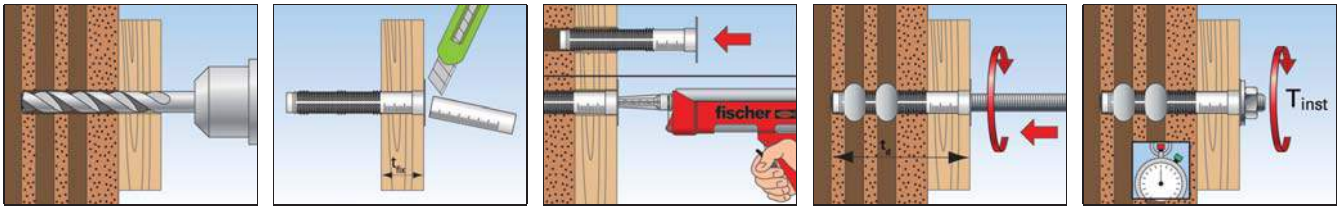
APPLICATIONS

- Timber constructions
- Awnings
- Canopies
- Car ports
- Gates

FUNCTIONING

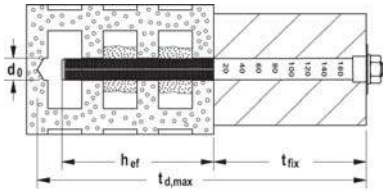
- The system can be used with any of the following injection mortars: FIS V or FIS GREEN. FIS P can be used but does not have approvals.
- The injection system is suitable for push-through installation when combined with the push-through anchor sleeve FIS H K.
- The push-through anchor sleeve is adapted to suit the fixture thickness using the scale and the movable edge, and cut as required.
- The anchor sleeve is placed in the drill hole, and filled with injection mortar from the anchor sleeve base. It should be ensured that the anchor sleeve is completely filled, including in the fixture region.
- Turning in the anchor causes the mortar to be pushed through the anchor sleeve's grating structure, so that it fits the base material perfectly. The load is borne by the interlock.

INSTALLATION WITH FIS V AND FIS HK



TECHNICAL DATA

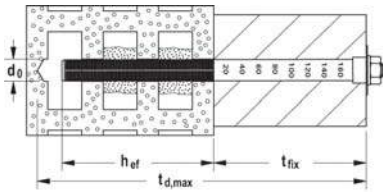
Injection push-through anchor sleeve **FIS HK**



	Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Max. drill hole depth [mm]	Effect. anchorage depth h_{ef} [mm]	Max. fixture thickness t_{fix} [mm]	Match	Fill quantity [scale units]	Sales unit [pcs]
Item									
FIS H 18 x 130/200 K	**045707**	■	18	340	130	200	M10 - M12	35	10
FIS H 22 x 130/200 K	**045708**	■	22	340	130	200	M 16	45	10

TECHNICAL DATA

FIS Set 18 x 130/200 M12/200



	Zinc-plated steel Art.-No.	Stainless steel Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Max. drill hole depth [mm]	Effect. anchorage depth h_{ef} [mm]	Max. fixture thickness t_{fix} [mm]	Fill quantity [scale units]	Sales unit [pcs]
Item	gvz	A4							
FIS Set 18 x 130/200 M12/200	**047443**	**047452**	■	18	340	130	200	35	5

LOADS

Injection system FIS V with threaded rod FIS A[5] and push-through anchor sleeve FIS H..K

Highest permissible loads[1) 6)] for a single anchor in perforated brick masonry (with push-through anchor sleeve) for push-through installation.

For the design the complete assessment ETA-10/0383 has to be considered.

Type of anchor sleeve with threaded rod	Compressive-brick-strength f_b [N/mm²]	Brick raw density ρ [kg/dm³]	Minimum brick-dimensions[7)] (L x W x H) [mm]	Min. effevtive-anchorage depth[4)] h_{ef} [mm]	Min. member thickness h_{min} [mm]	Maximum torque $T_{inst,max}$ [Nm]	Permissible tensile load[3)] N_{perm} [kN]	Permissible shear load[3)] V_{perm} [kN]	Characteristic spacing parallel to bed joint $s_{cr\,\parallel}$ [mm]	Characteristic spacing perpendicular to bed joint $s_{cr\perp}$ [mm]	Min. spacing[2)] $s_{min\,\parallel}$ / $s_{min\perp}$ [mm]	Characteristic resp. min. edge distance[2)] $c_{cr} = c_{min}$ [mm]
Vertically perforated brick Hlz, shape B acc. to EN 771-1												
18x130/200 M10/M12	≥ 4	≥ 0,7	500x200x300	130	200	2	0,34	0,17	500	300	100 / 300	80
22x130/200 M16	≥ 4						0,43	0,17				
18x130/200 M10/M12	≥ 6						0,57	0,26				
22x130/200 M16	≥ 6						0,71	0,26				
18x130/200 M10/M12	≥ 8						0,71	0,34				
22x130/200 M16	≥ 8						0,86	0,34				
18x130/200 M10/M12	≥ 10						0,86	0,43				
22x130/200 M16	≥ 10						1,14	0,43				
Perforated sand-lime brick KSL acc. to EN 771-2												
18x130/200 M10/M12	≥ 8	≥ 1,4	240x175x113	130	175	2	0,71	0,86	240	115	100 / 115	80
22x130/200 M16	≥ 8						0,71	0,71				
18x130/200 M10/M12	≥ 12						1,00	1,29				
22x130/200 M16	≥ 12						1,00	1,14				
18x130/200 M10/M12	≥ 16						1,29	1,71				
22x130/200 M16	≥ 16						1,29	1,57				
18x130/200 M10/M12	≥ 20						1,71	1,71				
22x130/200 M16	≥ 20						1,71	1,71				
Lightweight concrete hollow block Hbl acc. to EN 771-3												
18x130/200 M10/M12 and 22x130/200 M16	≥ 2	≥ 1,0	362x240x240	130	240	2	0,43	0,26	365	240	100 / 240	60
	≥ 4						0,86	0,57				

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

2) Minimum feasible spacings resp. edge distance. Details as well as to the distances to joints see assessment.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

4) The maximum anchorage depth is corresponding with the relevant push-through anchor sleeves FIS H18.. K and FIS H22.. K (see technical data).

5) Zinc-plated, stainless steel A4 and high corrosion-resistant steel C.

6) The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

7) Hole patterns see assessment.

FIS H K

ADVANTAGES

- The grating structure of the FIS H K anchor sleeve is adapted for the injection mortars FIS V, FIS GREEN and FIS P Plus, and ensures sparing mortar use with the best interlock.
- The centring blades perfectly align the anchor in the anchor sleeve, and allow for use with various threaded rod diameters.
- The barbed hooks secure the anchor sleeve in the drill hole and allow for a trouble-free overhead installation.
- The geometry of the anchor sleeves allows for the bridging of non-bearing layers for a simple and convenient installation.

FUNCTIONING

- The system can be used with any of the following injection mortars: FIS V, FIS VW HIGH SPEED, FIS VS LOW SPEED, FIS GREEN or FIS P Plus. FIS P can be used but does not have approvals.
- The system is suitable for pre-positioned installation when combined with injection anchor sleeves and threaded rods FIS A or internal threaded anchors FIS E.
- The anchor sleeve is placed in the drill hole, and filled with injection mortar from the anchor sleeve base.
- Turning in the anchor causes the mortar to be pushed through the anchor sleeve's grating structure, so that it fits the base material perfectly. The load is borne by the interlock.

FIS H L

ADVANTAGES

- The metal anchor sleeve can be cut to the required length and thus allows for a range of usable lengths with just one produce, providing flexibility and cost-effectiveness.
- The grating structure of the anchor sleeve allows for uniform distribution of mortar in the drill hole and thus for secure hold.

FUNCTIONING

- The anchor sleeve is at first cut to the required length.
- The anchor sleeve is placed in the drill hole, and filled with injection mortar from the anchor sleeve base.
- Turning in the anchor causes the mortar to be pushed through the anchor sleeve's grating structure, so that it fits the base material perfectly.
- The load is borne by the interlock.

FIS H N

ADVANTAGE

- The net structure of the anchor sleeve allows for uniform distribution of mortar in the drill hole and thus for secure hold.

FUNCTIONING

- The anchor sleeve is placed in the drill hole, and filled with injection mortar from the anchor sleeve base.
- Turning in the anchor causes the mortar to be pushed through the anchor sleeve's grating structure, so that it fits the base material perfectly.
- The load is borne by the interlock.

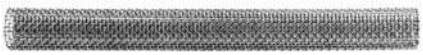
Injection anchor sleeves

TECHNICAL DATA

Injection anchor sleeve **FIS H K**

Item	Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Drill hole depth acc. ETA [mm]	Effect. anchorage depth h_{ef} [mm]	Match	Fill quantity per sleeve [scale units]	Sales unit [pcs]
FIS H 12 x 50 K	**041900**	■	12	55	50	FIS A M6-M8	5	50
FIS H 12 x 85 K	**041901**	■	12	90	85	FIS A M6-M8	10	50
FIS H 16 x 85 K	**041902**	■	16	90	85	FIS A M8-M10, FIS E M6-M8	12	50
FIS H 16 x 130 K	**041903**	■	16	135	110	FIS A M8-M10	15	20
FIS H 20 x 85 K	**041904**	■	20	90	85	FIS A M12-M16, FIS E M10-M12	15	20
FIS H 20 x 130 K	**046703**	■	20	135	110	FIS A M12-M16	25	20
FIS H 20 x 200 K	**046704**	■	20	205	180	FIS A M12-M16	40	20

TECHNICAL DATA

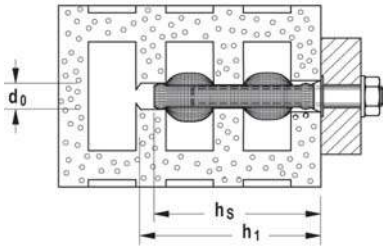


Injection anchor sleeve, 1 m length **FIS H L**

Item	Art.-No.	Drill hole diameter d_0 [mm]	Total length l [mm]	Match	Fill quantity per 10 cm	Sales unit [pcs]
FIS H 12 x 1000 L	**050598**	12	1000	Ø6 / M 6 - Ø8 / M 8	12	10
FIS H 16 x 1000 L	**050599**	16	1000	Ø10/M10 / Ø12/M12	14	10
FIS H 22 x 1000 L	**045301**	22	1000	Ø12/M12 - Ø16/M16	20	6
FIS H 30 x 1000 L	**000645**	30	1000	Ø16/M16 - Ø22/M22	26	4

TECHNICAL DATA

Injection anchor sleeve with net **FIS H N**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Min. anchorage depth anchor h_v [mm]	Fill quantity per sleeve [scale units]	Match	Sales unit [pcs]
FIS H 16 x 85 N	**050470**	16	95	90	15	Ø8/M8	20
FIS H 18 x 85 N	**050472**	18	95	90	17	Ø10/M10	20
FIS H 20 x 85 N	**050474**	20	95	90	18	Ø12/M12	20

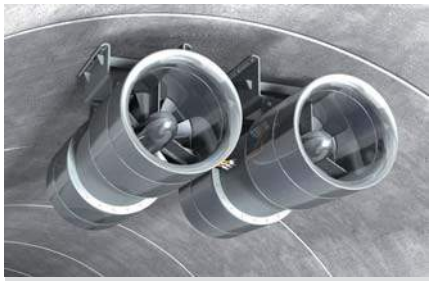
Special Applications

Item		FIS HB	FIS SB	FIS EM Plus	FIS EB	FIS V	FIS VL	UMV-P	Page
Highbond anchor dynamic FHB dyn	Performance class amongst dynamic anchors	■							170
Dynamic-anchor FDA	Dynamic push-through anchor for an economical serial installation at medium load level	■							174
UMV multicone dynamic bonded anchor	The capsule system for the anchoring of dynamic loads							■	176
Rebar Connections	Professional rebar connections	■	■	■	■	■	■		179
Concrete- Concrete Shear Connector FCC	Approved system for building renovation	■	■	■		■			185
Remedial Wall Tie VBS 8	Facade repair for two-leaf cavity walls					■			187
Weather Facing Reconstruction System FWS II	Economical repair of triple-skin outer wall panels					■			189

■ = approved
(■) = recommendation

The performance class amongst dynamic anchors

Production robots



Tunnel ventilators

VERSIONS

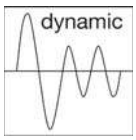
- Zinc-plated steel
- Highly corrosion-resistant steel

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

CERTIFICATES



ADVANTAGES

- During the setting process, the injection mortar FIS HB fills the annular gap in the fixture, and ensures optimum load distribution. This allows for the absorption of dynamic alternating loads.
- The cone shape of the FHB-A dyn anchor rod ensures a controlled expansion under dynamic stress, thus allowing for use in cracked concrete.
- The anchor rod FHB-A dyn is also available made from highly corrosion-resistant steel. This makes it suitable for use in aggressive atmospheres, for example in tunnels.
- The Highbond anchor dynamic system can achieve even greater shear loads thanks to the additional sleeve of the anchor rod FHB-A dyn V, and therefore provides an increased level of safety.

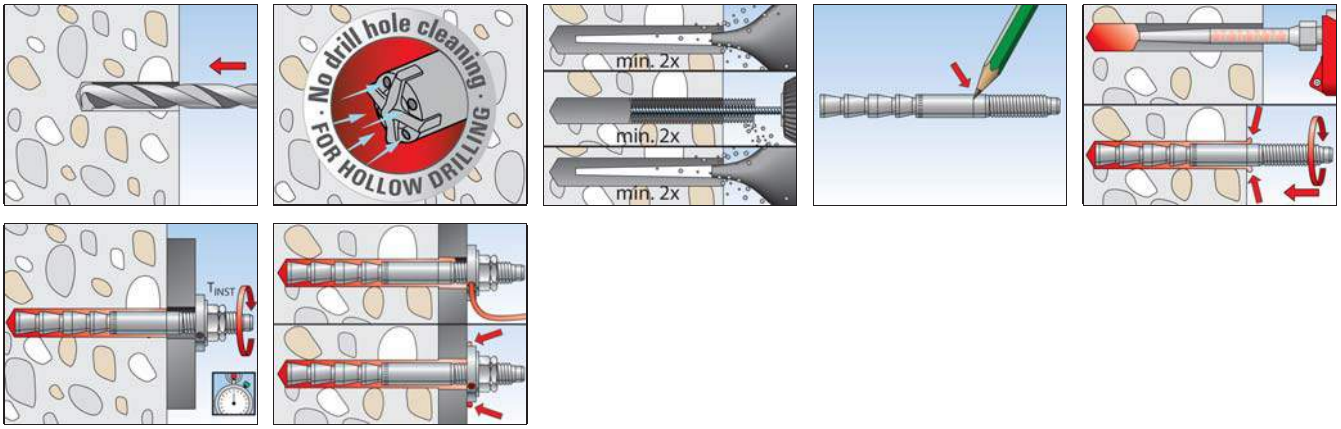
APPLICATIONS

- Jib cranes
- Gantry and overhead cranes
- Guide rails for elevators
- Tunnel ventilators (jet fans)
- Gantries in road construction
- Antennas and transmitter masts
- Industrial robots

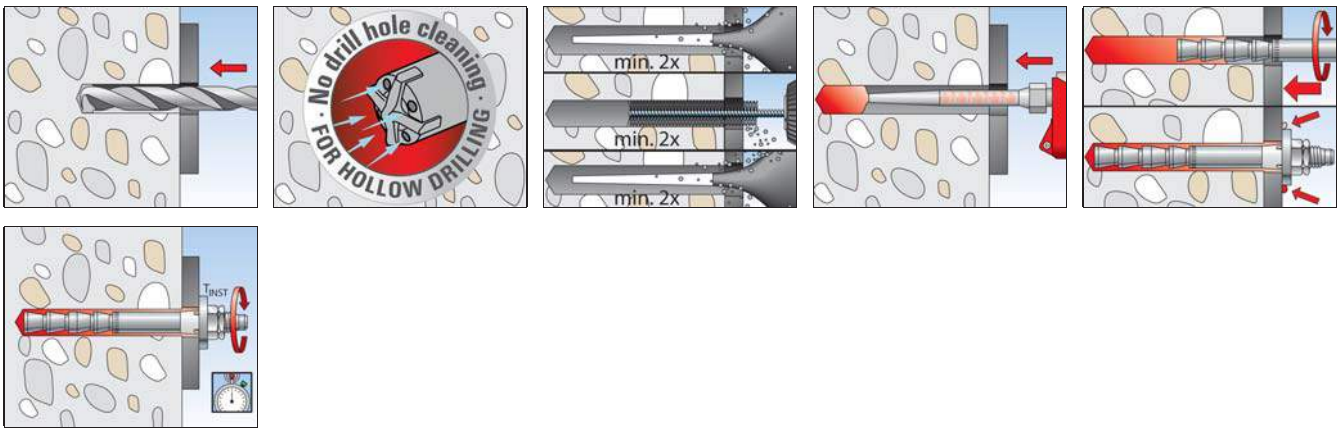
FUNCTIONING

- The injection system suitable for tensile zones consists of the Highbond dynamic anchor rod FHB-A dyn and the injection mortar FIS HB.
- FHB dyn is approved for pre-positioned and push-through installation.
- Extruding the mortar causes the two components to be mixed and activated in the static mixer.
- The mortar bonds the entire surface of the anchor rod with the drill hole wall and seals the drill hole.
- The centring sleeve centres the anchor in the fixture, thus ensuring a safe load application.
- The lock nut prevents the nut from becoming loose.

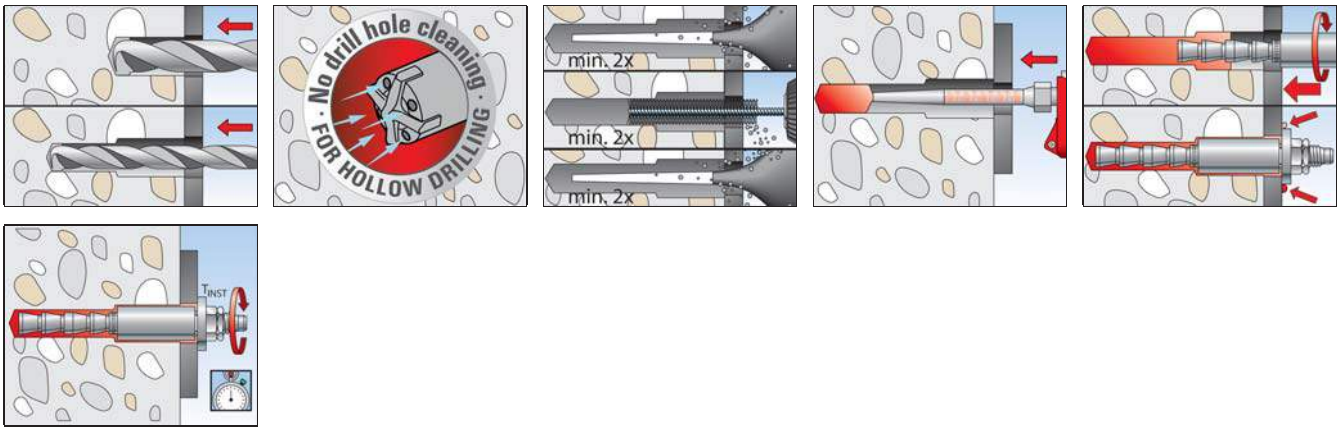
PRE-POSITIONED INSTALLATION IN CONCRETE WITH FIS HB AND FHB DYN



PUSH-THROUGH INSTALLATION IN CONCRETE WITH FIS HB AND FHB DYN

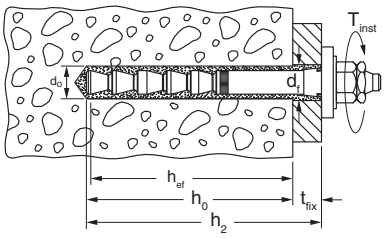


PUSH-THROUGH INSTALLATION IN CONCRETE WITH FIS HB AND FHB DYN V



TECHNICAL DATA

Highbond anchor dynamic **FHB-A dyn**

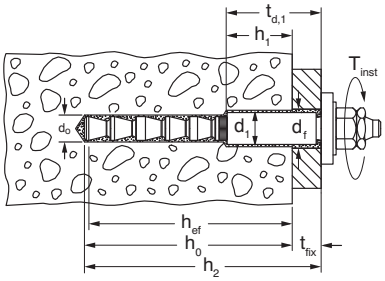


	Zinc-plated steel	Highly corrosion resistant steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchorage depth	Min. - max. usable length	Drill hole diameter in fixture	Width across nut	Sales unit
	Art.-No.	Art.-No.	DIBt	d_0 [mm]	h_2 [mm]	h_{ef} [mm]	t_{fix} [mm]	d_f [Ø mm]	⬡ SW [mm]	[pcs]
Item	**gvz**	**C**								
FHB-A dyn 12 x 100/25	**092018**	**531384** 1)	●	14	130	100	8 - 25	15	19	10
FHB-A dyn 12 x 100/50	**092019**	–	●	14	155	100	8 - 50	15	19	10
FHB-A dyn 16 x 125/25	**092020**	–	●	18	155	125	10 - 25	19	24	10
FHB-A dyn 16 x 125/50	**092036**	**093445** 1)	●	18	180	125	10 - 50	19	24	10
FHB-A dyn 20 x 170/50	**092037**	–	●	24	225	170	12 - 50	25	30	10
FHB-A dyn 24 x 220/50	**092038**	–	●	28	275	220	14 - 50	29	36	5

1) Prices and delivery time on requst.

TECHNICAL DATA

Highbond anchor dynamic **FHB-A dyn V**



	Zinc-plated steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchorage depth	Min. - max. usable length	Drill hole diameter in fixture	Width across nut	Sales unit
	Art.-No.	DIBt	d_0 [mm]	h_2 [mm]	h_{ef} [mm]	t_{fix} [mm]	d_f [Ø mm]	⬡ SW [mm]	[pcs]
Item	**gvz**								
FHB-A dyn 12 x 100/50 V	**092039** 1)	●	14	160	105	8 - 50	21	19	10
FHB-A dyn 16 x 125/50 V	**092040** 2)	●	18	185	130	10 - 50	29	24	10

1) Stepped hole: 1st drill hole with Ø 20 mm and depth 85 mm. 2nd drill hole with Ø 14 mm and depth 160 mm.

2) Stepped hole: 1st drill hole with Ø 28 mm and depth 100 mm. 2nd drill hole with Ø 18 mm and depth 185 mm.

TECHNICAL DATA

Injection mortar FIS HB 345 S

Injection mortar FIS HB 150 C

Static mixer **FIS MR Plus**

		Approval	Languages on the cartridge	Contents	Sales unit
Item		DIBt			[pcs]
FIS HB 345 S	**033211**	●	DE, GB, FR, ES, NL, CS	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS HB 150 C	**519665**	●	DE, FR, NL	1 cartridge 145 ml, 2 x FIS MR Plus	6
FIS MR Plus	**545853**	–	–	10 static mixer FIS MR Plus	10

CURING TIME - FIS HB

Cartridge temperature FIS HB (minimum + 5°C)	Gelling time FIS HB	Temperature at anchoring base	Curing time FIS HB
		- 5°C - ± 0°C	360 min.
		± 0°C - + 5°C	180 min.
+ 5°C - +20°C	15 min.	+ 5°C - +20°C	90 min.
+20°C - +30°C	6 min.	+20°C - +30°C	35 min.
+30°C - +40°C	4 min.	+30°C - +40°C	20 min.
> +40°C	2 min.	> +40°C	12 min.

Please note: The curing times apply for dry anchoring bases, in damp anchoring bases they should be doubled. Remove water from drill hole.

FILLING QUANTITIES

Type	Mortar volume in scale units shown on the cartridge labels' corresponding scale	Anchors per cartridge FIS HB 345 S *)
FHB-A dyn 12 x 100 / 25	7	24
FHB-A dyn 12 x 100 / 50	8	21
FHB-A dyn 16 x 125 / 25	9	18
FHB-A dyn 16 x 125 / 50	10	17
FHB-A dyn 20 x 170 / 50	23	7
FHB-A dyn 24 x 220 / 50	38	4
FHB-A dyn 12 x 100 / 50 V	12	14
FHB-A dyn 16 x 125 / 50 V	20	8

*) max. number with one static mixer

LOADS

Highbond anchor dynamic FHB dyn

zinc-plated steel / high corrosion-resistant steel C

Design values for cyclic fatigue loading[1] of a single anchor in cracked or non-cracked normal concrete of strength class C20/25 [3]										Minimum spacings while reducing the load	
Type	Material fixing element	Effective anchorage depth h_{ef} [mm]	Minimum member thickness h_{min} [5] [mm]	Installation torque T_{inst} [Nm]	Design value of tensile load $\Delta N_{Ed,max}$ [2] [kN]	Design value of shear load $\Delta V_{Ed,max}$ [2] [9] [kN]	Required edge distance (with one edge) for: Max. tension load ΔN_{Ed} c [6] [8] [mm]	Max. shear load ΔV_{Ed} c [8] [mm]	Required spacing for Max. Load s_{cr} [6] [mm]	Min. spacing s_{min} [5] [mm]	Min. edge distance c_{min} [5] [mm]
FHB dyn 12 x 100	gvz	100	130	40	14,1	6,7	200	200	300	100	200 [4] [7]
			200				120	100			100 [4]
	C / 1.4529		130		11,3	4,4	200	200			200 [4] [7]
			200				100	100			100 [4] [7]
FHB dyn 12 x 100 V	gvz	105	130	40	14,1	9,6	200	200	315	100	200 [4] [7]
			200				105	130			100
FHB dyn 16 x 125	gvz	125	160	60	23,0	11,9	200	200	375	100	200 [4] [7]
			250				185	145			100
	C / 1.4529		160		15,6	11,9	200	200			200 [4] [7]
			250				100	145			100 [7]
FHB dyn 16 x 125 V	gvz	130	160	60	23,0	17,0	200	260	375	100	200 [7]
			250				170	200			100
FHB dyn 20 x 170	gvz	170	220	100	28,4	17,0	175	190	510	80	80
FHB dyn 24 x 220	gvz	220	440	120	28,9	22,2	180	200	660	180	180 [7]

For the design the complete approval Z-21.3-1748 has to be considered.

1) The design values of the cyclic fatigue loading apply for ≥ 5 x 10^6 load cycles in accordance with design method I - for unknown static lower load. If the static lower load is known and / or for lower number of load cycles higher load values are possible. The partial safety factors as regulated in the approval are considered. As a single anchor counts e.g. an anchor with a spacing s ≥ 3 x h_{ef} . The given load values apply for anchorages in dry and wet concrete and temperatures in the base material up to +50 °C (resp. short-term up to +80 °C) and drill hole cleaning in accor dance with the approval.

2) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) a detailed anchor design is required.

3) For higher concrete strength classes up to C50/60 higher permissible loads may be possible. - see approval. The concrete is assumed to be standard-reinforced.

4) Without reduction of the shear load.

5) Intermediate values for h_{min} may be applied in accor dance with table 5 resp. 7 of t he approval Z-21.3-1748 considering the influence on s_{min} and c_{min}.

6) A splitting reinforcement, which limits the crack width to ~ 0,3 mm considering the splitting forces, is assumed to be available. For an actual edge distance, which is smaller than the characteristic edge distance $c_{cr,N}$ a longitudinal reinforcement of at least diameter 6 mm in the area of the anchorage depth of the anchor must be avialable.

7) Without reduction of the shear load.

8) Values apply for predominantly non-static (dynamic) actions. For predominantly static actions differing values can be decisive.

9) Valid for pulsating loads. For alternating loads see approval.

The dynamic push-through anchor for an economical serial installation at medium load level

Platform lifts

VERSIONS

- Zinc-plated steel

BUILDING MATERIALS

- Concrete C20/25 to C50/60, cracked and non-cracked

CERTIFICATES

Zulassung

dynamic

ADVANTAGES

- Medium load level for a variety of applications.
- Pre-assembled anchor rod for fast installation.
- Approved safety by DIBt-Approval for endless numbers of load cycles.
- Easy push-through installation leads to cost effectiveness – especially for serial installations.
- Tight assortment with the size.
- Less spacings and edge distances.
- Drill holes are sealed.

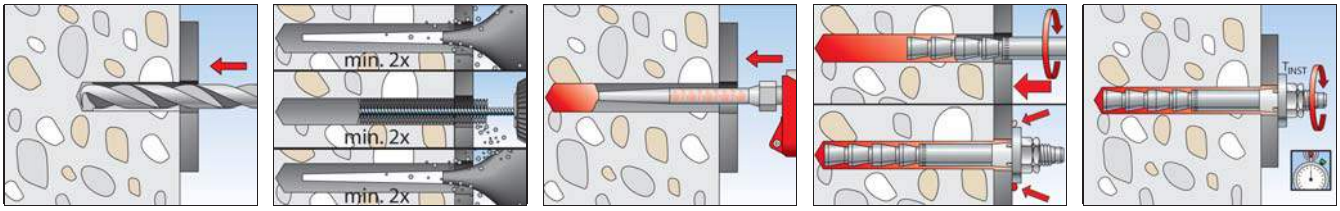
APPLICATIONS

- hydraulic ramps
- Conveyor belts
- Industrial robots
- cooperation robots and -parts
- Guide rails for elevators

FUNCTIONING

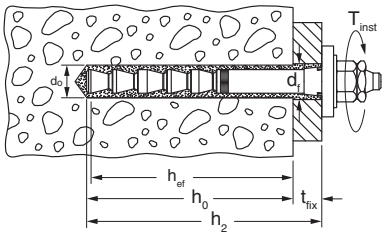
- The injection system suitable for tensile zones consists of the fischer dynamic anchor rod FDA-A dyn and the injection mortar FIS HB.
- FDA is approved push-through installation.
- Extruding the mortar causes the two components to be mixed and activated in the static mixer.
- The mortar bonds the entire surface of the anchor rod with the drill hole wall and seals the drill hole.
- The centring sleeve centres the anchor in the fixture, thus ensuring a safe load application.
- During the setting process, the injection mortar FIS HB fills the annular gap in the fixture, and ensures optimum load distribution. This allows for the absorption of dynamic alternating loads.

INSTALLATION IN CONCRETE WITH FIS HB AND FDA



TECHNICAL DATA

Dynamic-Anchor **FDA**



	Zinc-plated steel	Approval	Drill hole diameter	Drill hole diameter in fixture	Anchorage depth	Min. - max. usable length	Min. drill hole depth for through fixings	Width across nut	Sales unit
	Art.-No.	DIBt	d_0 [mm]	d_f [Ø mm]	h_{ef} [mm]	t_{fix} [mm]	h_2 [mm]	⬡ SW [mm]	[pcs]
Item	**gvz**								
FDA-A 12 x 100/25 gvz	**536943**	●	14	15	100	12 - 25	130	19	10
FDA-A 12 x 100/50 gvz	**536944**	●	14	15	100	12 - 50	155	19	10
FDA-A 16 x 125/25 gvz	**536945**	●	18	19	125	16 - 25	155	24	10
FDA-A 16 x 125/50 gvz	**536946**	●	18	19	125	16 - 50	180	24	10

LOADS

Dynamic-Anchor FDA

zinc-plated steel

Design values for cyclic fatigue loading[1] of a single anchor in cracked or non-cracked normal concrete of strength class C20/25[3]										Minimum spacings while reducing the load	
Type	Material fixing element	Effective anchorage depth h_{ef} [mm]	Minimum member thickness h_{min}[5] [mm]	Installation torque T_{inst} [Nm]	Design value of tensile load $\Delta N_{Ed,max}$[2] [kN]	Design value of shear load $\Delta V_{Ed,max}$[2] [8] [kN]	Required edge distance (with one edge) for: Max. tension load ΔN_{Ed} c[6] [7] [mm]	Max. shear load ΔV_{Ed} c[7] [mm]	Required spacing for Max. Load s_{cr}[6] [mm]	Min. spacing s_{min}[5] [mm]	Min. edge distance c_{min}[5] [mm]
FDA 12 x 100	gvz	100	130	40	11,3	5,1	200	200	300	100	200[4]
			200				100	100			100[4]
FDA 16 x 125	gvz	125	160	60	18,8	9,1	200	200	375	100	200[4]
			250				140	115			100

For the design the complete approval Z-21.3-2058 has to be considered.

1) The design values of the cyclic fatigue loading apply for ≥ 5 x 10^6 load cycles in accordance with design method I - for unknown static lower load. If the static lower load is known and / or for lower number of load cycles higher load values are possible. The partial safety factors as regulated in the approval are considered. As a single anchor counts e.g. an anchor with a spacing s ≥ 3 x h_{ef} . The given load values apply for anchorages in dry and wet concrete and temperatures in the base material up to +50 °C (resp. short-term up to +80 °C) and drill hole cleaning in accordance with the approval.

2) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) a detailed anchor design is required.

3) For higher concrete strength classes up to C50/60 higher permissible loads may be possible. - see approval. The concrete is assumed to be standard-reinforced.

4) Without reduction of the shear load.

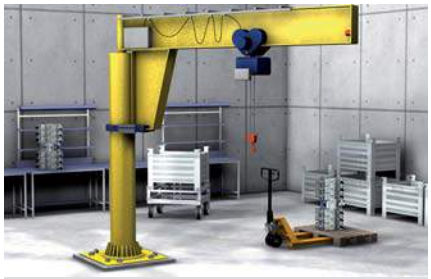
5) Intermediate values for h_{min} may be applied in accordance with table 5 of the approval Z-21.3-2058 considering the influence on s_{min} and c_{min}.

6) A splitting reinforcement, which limits the crack width to ~ 0,3 mm considering the splitting foreces, is assumed to be available. For an actual edge distance, which is smaller than the characteristic edge distance $c_{cr,N}$, a longitudinal reinforcement of at least diameter 6 mm in the area of the anchorage depth of the anchor must be avialable.

7) Values apply for predominantly non-static (dynamic) actions. For predominantly static actions differing values can be decisive.

8) Valid for pulsating loads. For alternating loads see approval.

The capsule system for the anchoring of dynamic loads



Slewing cranes

Guide rails for elevators

VERSIONS

- Zinc-plated steel

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

CERTIFICATES

Zulassung

dynamic

ADVANTAGES

- The bushing fills the annular gap in the fixture and, in combination with the anchor rod UMV-A dyn, ensures an even load distribution. This allows for the bearing of dynamic alternating loads.
- The cone shape of the UMV-A dyn anchor rod ensures a controlled expansion under dynamic stress, thus allowing for use in cracked concrete.
- The pre-portioned resin capsule ensures a quick and easy installation on the construction site, and helps to avoid errors.
- The glass particles of the capsule body rough up the drill hole wall during the setting process, and improve the bond between the anchor rod and concrete.

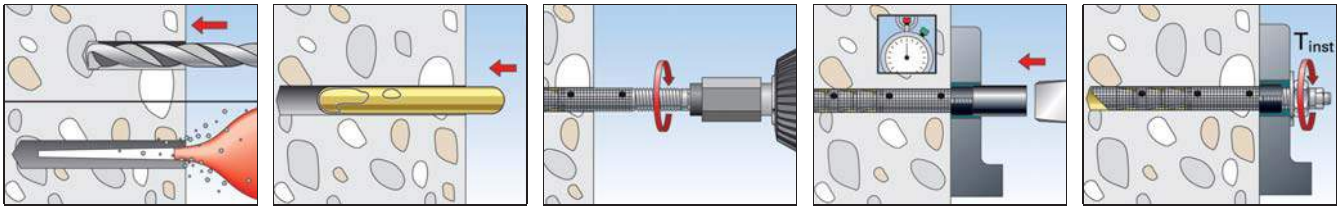
APPLICATIONS

- Jib cranes
- Gantry and overhead cranes
- Guide rails for elevators
- Antennas and transmitter masts
- Industrial robots

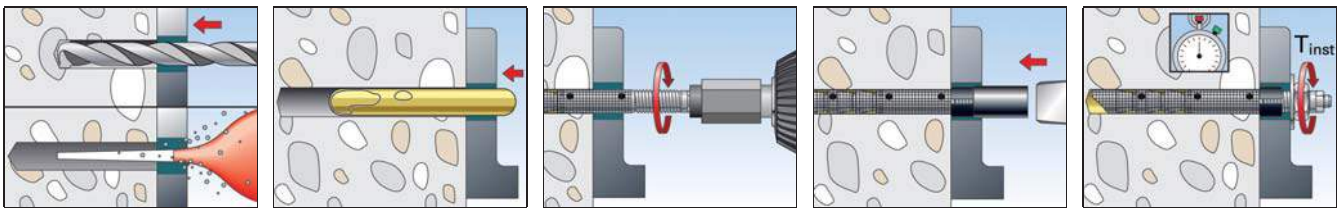
FUNCTIONING

- The bonded anchor suitable for tensile zones consists of the UMV multicone dynamic anchor rod and the UMV multicone resin capsule.
- UMV multicone dynamic is suitable for pre-positioned and push-through installation.
- During setting (rotating/hitting), the tip of the anchor rod destroys the capsule in the drill hole, and mixes and activates the mortar.
- The mortar bonds the entire surface of the anchor rod with the drill hole wall and seals the drill hole.
- Once the fixture has been positioned, the installation sleeve is used to drive the bushing over the anchor rod.

PRE-POSITIONED INSTALLATION IN CONCRETE WITH CAPSULE UMV-P AND UMV-A DYN

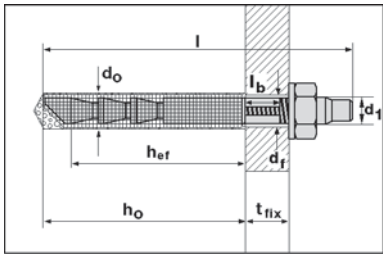


PUSH-THROUGH INSTALLATION IN CONCRETE WITH CAPSULE UMV-P AND UMV-A DYN



TECHNICAL DATA

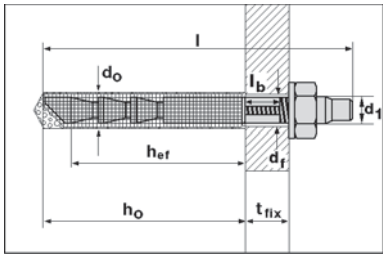
UMV multicone chemical anchor capsule



Item	Art.-No.	Approval DIBt	Drill diameter [mm]	Drill hole depth [mm]	Sales unit [pcs]
UMV-P 12 x 100	**007947**	●	15	115	10
UMV-P 16 x 125	**007948**	●	18	140	10
UMV-P 20 x 170	**007949**	●	25	190	10
UMV-P 24 x 220	**007973**	●	28	245	5

TECHNICAL DATA

UMV multicone dynamic anchor rod



Item	Zinc-plated steel Art.-No. gvz	Approval DIBt	Drill hole diameter d_0 [mm]	Total length l [mm]	Min. fixing thickness t_{fix} [mm]	Max. fixing thickness t_{fix} [mm]	Through hole d_f [mm]	Clamping bush height l_b [mm]	Qty. per pack threaded rod [pcs]	Qty. per pack clamping chuck [pcs]
UMV-A dyn 12 x 100/10	**007943**	●	15	145	5	10	16	5	10	10
UMV-A dyn 12 x 100/15	**007988**	●	15	150	8	15	16	8	10	10
UMV-A dyn 12 x 100/25	**008004**	●	15	160	15	25	16	15	10	10
UMV-A dyn 12 x 100/50	**008005**	●	15	185	25	50	16	15	10	10
UMV-A dyn 16 x 125/30	**008006**	●	18	200	15	30	19	15	10	10
UMV-A dyn 16 x 125/60	**008007**	●	18	230	30	60	19	15	10	10
UMV-A dyn 20 x 170/40	**008008** 1)	●	25	255	20	40	26	20	10	10
UMV-A dyn 24 x 220/50	**008009** 1)	●	28	325	25	50	29	25	5	5

1) Without external hexagon. Please use a separate setting tool.

LOADS

UMV multicone dynamic bonded anchor

zinc-plated steel

Design values for cyclic fatigue loading[1] of a single anchor in cracked or non-cracked normal concrete of strength class C20/25[3]										Minimum spacings while reducing the load	
Type	Material fixing element	Effective anchorage depth h_{ef} [mm]	Minimum member thickness h_{min} [mm]	Installation torque T_{inst} [Nm]	Design value of tensile load $\Delta N_{Ed,max}$[2] [kN]	Design value of shear load $\Delta V_{Ed,max}$[2] [6] [kN]	Required edge distance (with one edge) for Max. tension load ΔN_{Ed} c[5] [mm]	Max. shear load ΔV_{Ed} c[5] [mm]	Required spacing for Max. Load s_{cr} [mm]	Min. spacing s_{min} [mm]	Min. edge distance c_{min} [mm]
UMV dyn 100 M12	gvz	100	200	40	12,2	5,6	125	100	300	100	100[4]
UMV dyn 125 M16	gvz	125	250	60	14,8	6,7	130	130	375	130	130[7]
UMV dyn 170 M20	gvz	170	340	100	31,4	16,3	255	170	510	170	170[4]
UMV dyn 220 M24	gvz	220	440	120	38,5	16,3	260	220	660	220	220[4]

For the design the complete approval Z-21.3-1662 has to be considered.

1) The design values of the cyclic fatigue loading apply for ≥ 5 x 10^6 load cycles in accordance with design method I - for unknown static lower load. If the static lower load is known and / or for lower number of load cycles higher load values are possible. The partial safety factors as regulated in the approval are considered. As a single anchor counts e.g. an anchor with a spacing s ≥ 3 x h_{ef} . The given load values apply for anchorages in dry and wet concrete and temperatures in the base material up to +50 °C (resp. short-term up to +80 °C) and drill hole cleaning in accordance with the approval.

2) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) a detailed anchor design is required.

3) For higher concrete strength classes up to C50/60 higher permissible loads may be possible. - see approval. The concrete is assumed to be standard-reinforced.

4) Without reduction of the shear load.

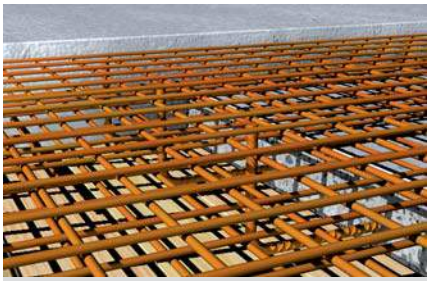
5) Values apply for predominantly non-static (dynamic) actions. For predominantly static actions differing values can be decisive.

6) Valid for pulsating loads. For alternating loads see approval.

7) Without reduction of the tensile and the shear load.

Professional rebar connections

Rebar connections



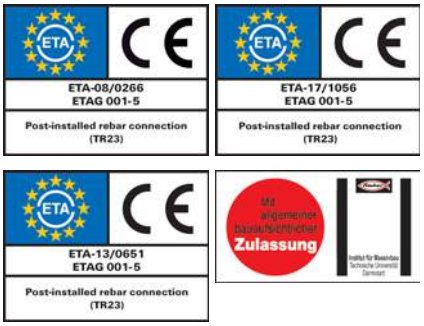
Rebar connections

BUILDING MATERIALS

Approved for:

- Concrete C12/15 to C50/60, cracked and non-cracked

CERTIFICATES



ADVANTAGES

- The injection mortars FIS V and FIS VS LOW SPEED allow for rebar connections from Ø8 to 28 mm, whilst injection mortar FIS EM Plus allows for rebar connections up to Ø40 mm to be carried out. This offers maximum flexibility.
- The injection mortar FIS SB allows the user for realizing rebar connections from Ø 8 to 32 mm in combination with a simple and thus user-friendly cleaning of the drill hole.
- FIS EM Plus also allows for the execution of rebar connections in diamond-drilled holes.
- The FRA with connecting thread in stainless steel A4 fully utilises the load-bearing capacity of the concrete. This means that extremely high tensile loads can be introduced into the base material.
- Accessories in line with building site requirements, such as injection adapters and extension tubes, ensure rapid progress.
- The FIS rebar case contains all of the individual components required, thus ensuring a convenient installation.

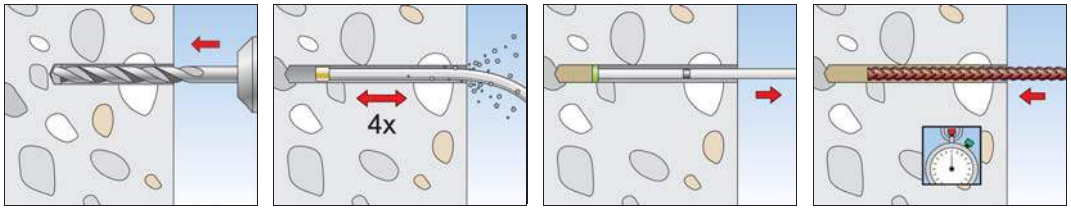
APPLICATIONS

- Post-installed concrete steel bars, e.g. for overlap connections, end anchorings, starter bars, crack stitching etc.
- Rebar anchor FRA
- Concrete-Concrete Shear Connector FCC

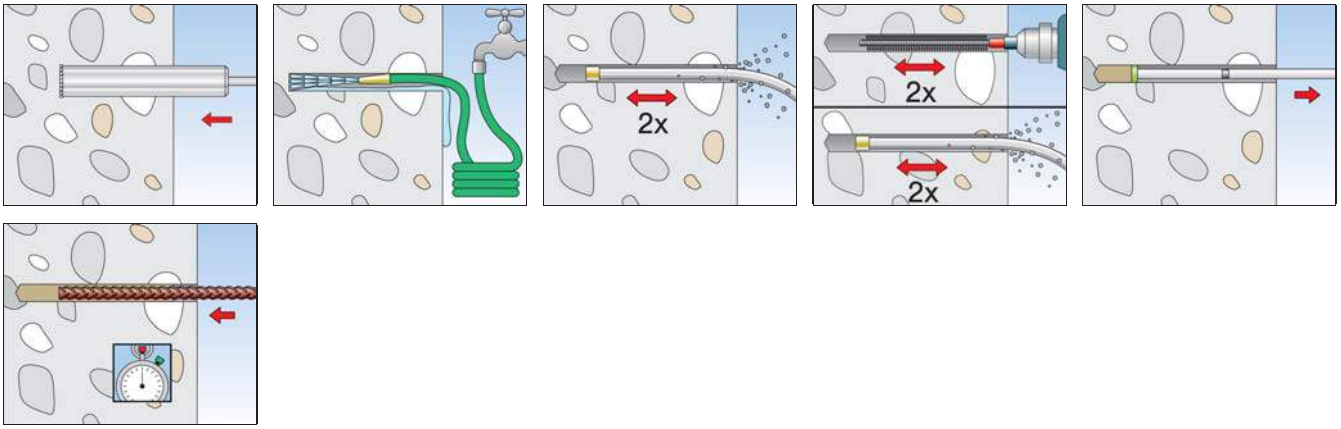
FUNCTIONING

- Anchoring as with cast-in reinforcement bars in line with Eurocode 2 and DIN 1045-1.
- The mortar is extruded bubble free into the drill hole using the injection adapter. The geometry causes a build-up of pressure in the drill hole, which pushes the injection adapter and extension tube automatically out of the drill hole.
- The mortar bonds the entire surface of the reinforcement bar with the drill hole wall.
- A special certification is necessary for installation according to approval in Germany. The fischer Academy offers the relevant training courses.

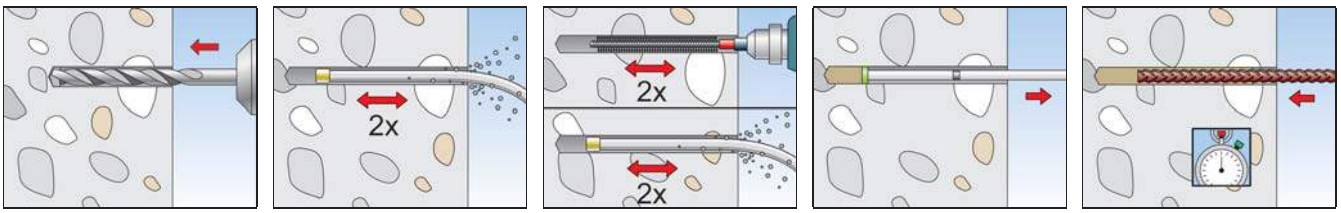
INSTALLATION IN CONCRETE WITH FIS EM PLUS AND HAMMER DRILLED HOLES



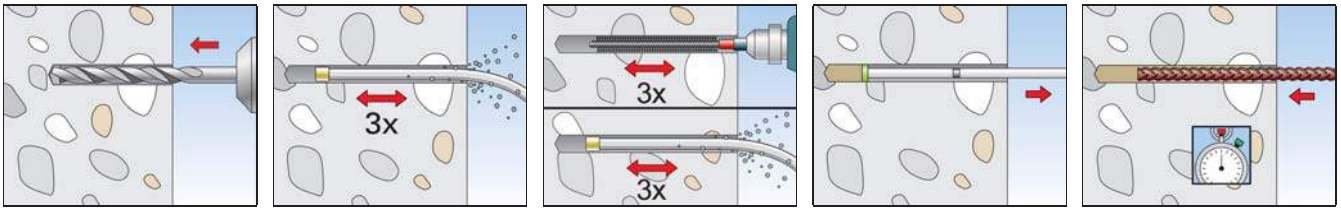
INSTALLATION IN CONCRETE WITH FIS EM PLUS IN DIAMOND DRILLED HOLES



INSTALLATION IN CONCRETE WITH FIS SB IN HAMMER DRILLED HOLES

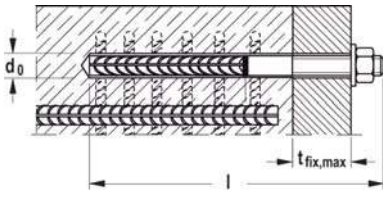


INSTALLATION IN CONCRETE WITH FIS V AND FIS VS LOW SPEED IN HAMMER DRILLED HOLES



TECHNICAL DATA

Rebar anchor **FRA**



	Combination of materials	Approval		Total length	Max. fixing thickness	Drill hole	Fill quantity	Sales unit		
	Art.-No.	DIBt	ETA	l [mm]	t_{fix} [mm]	d_0 [Ø mm]	[scale units]	[pcs]		
Item										
FRA 12/900 M12-60	**505529**	●	■	975	60	16	50	8		
FRA 16/1100 M16-60	**505533**	●	■	1180	60	20	81	8		
FRA 20/1400 M20-60	**505534**	●	■	1485	60	25	160	4		

Reinforcement bar welded with threaded part made of stainless steel A4.

TECHNICAL DATA

FIS-Rebar Case for reinforcement connection

		Approval		Contents	Sales unit
Item	Art.-No.	DIBt	ETA		[pcs]
FIS-Rebar case D	**505941**	●	■	8 x Cleaning brush BSB, 5 x Extensions for cleaning brushes à 40 cm, 1 x SDS Chuck with internal thread M 8, 24 x Injection adapter, 1 x Cleaning hose complete, 1 x Brush control template, 8 x Cleaning nozzle, 1 x Marker tape, 1 x Digital thermometer, 1 x Protective goggles, 1 x Installation instructions (german), 10 x Installation report, 2 x Flat spanner SW 7 and the relevant approvals	1
FIS-Rebar case Int	**505942**	●	■	8 x Cleaning brush BSB, 5 x Extensions for cleaning brushes à 40 cm, 1 x SDS Chuck with internal thread M 8, 24 x Injection adapter, 1 x Cleaning hose complete, 1 x Brush control template, 8 x Cleaning nozzle, 1 x Marker tape, 1 x Digital thermometer, 1 x Protective goggles, 1 x Installation instructions (german, english, french, italian, spanish), 10 x Installation report, 2 x Flat spanner SW 7 and the relevant approvals	1

ACCESSORIES

Cleaning brush with thread M 8

Item	Art.-No.		Colour	Length [mm]	Sales unit [pcs]
BSB for drill-Ø 12 mm	**001490**		white	180	1
BSB for drill-Ø 14 mm	**001491**		blue	180	1
BSB for drill-Ø 16 mm	**001492**		red	180	1
BSB for drill-Ø 18 mm	**001493**		yellow	180	1
BSB for drill-Ø 20 mm	**001494**		green	180	1
BSB for drill-Ø 25 mm	**001495**		black	180	1
BSB for drill-Ø 30 mm	**090063**		grey	180	1
BSB for drill-Ø 35 mm	**090071**		brown	180	1
BSB for drill-Ø 40 mm	**505061**		-	180	1
BSB for drill-Ø 45 mm	**506254**		-	180	1
BSB for drill-Ø 55 mm	**505062**		-	180	1
FIS brush extension	**508791**		-	420	1
SDS Chuck	**530332**		-	-	1

ACCESSORIES

Injection adapter for drill Ø 12 - 25 mm

Injection adapter for drill Ø 30 - 55 mm

Extension tube

Item	Art.-No.		Colour	Length [mm]	Sales unit [pcs]
Injection-adapter (Ø 9) for drill-Ø 12 mm	**001497**		ecru	-	10
Injection-adapter (Ø 9 for drill-Ø 14 mm	**001498**		blue	-	10
Injection-adapter (Ø 9) for drill-Ø 16 mm	**001499**		red	-	10
Injection-adapter (Ø 9) for drill-Ø 18 mm	**001483**		yellow	-	10
Injection-adapter (Ø 9 for drill-Ø 20 mm	**001506**		green	-	10
Injection-adapter (Ø 15) for drill-Ø 20 mm	**001508**		green	-	10

1) Delivery time on request.

ACCESSORIES

Injection adapter
for drill Ø 12 - 25 mm

Injection adapter
for drill Ø 30 - 55 mm

Extension tube

Item	Art.-No.		Colour	Length [mm]	Sales unit [pcs]
Injection-adapter (Ø 9) for drill-Ø 25 mm	**001507**		black	-	10
Injection-adapter (Ø 15) for drill-Ø 25 mm	**001509**		black	-	10
Injection-adapter (Ø 9) for drill-Ø 30 mm	**090689**		grey	-	10
Injection-adapter (Ø 15) for drill-Ø 30 mm	**090700**		grey	-	10
Injection-adapter (Ø 9) for drill-Ø 35 mm	**090699**		brown	-	10
Injection-adapter (Ø 15) for drill-Ø 35 mm	**090701**		brown	-	10
Injection-adapter (Ø 9) for drill-Ø 40 mm	**505077**		red	-	10
Injection-adapter (Ø 15) for drill-Ø 40 mm	**505079**		red	-	10
Injection-adapter (Ø 9) for drill-Ø 45 mm	**508909** 1)		yellow	-	10
Injection-adapter (Ø 15) for drill-Ø 45 mm	**508910** 1)		yellow	-	10
Injection-adapter (Ø 9) for drill-Ø 55 mm	**505078**		ecru	-	10
Injection-adapter (Ø 15) for drill-Ø 55 mm	**505080**		ecru	-	10
FIS Extension tube	**048983**		-	1000	10
FIS EXT Ø 15	**530800**		transparent	10000	1

1) Delivery time on request.

ACCESSORIES

Drilling aid

Item	Art.-No.				Sales unit [pcs]
Drilling aid 3pcs.	**090819**				1

ACCESSORIES

SDS-max scrabbeling tool to
roughen the connection surface

Item	Art.-No.		Match	Dimensions [mm]	Sales unit [pcs]
Stocker	**001253**		Chuck type SDS max	45 x 240	1

ACCESSORIES

Compressed air nozzle

Item	Art.-No.		Match		Sales unit [pcs]
Compressed air nozzle D12-D15	**511956**		Drill diameter Ø 12 - 15 mm		2
Compressed air nozzle D16-D19	**511957**		Drill diameter Ø 16 - 19 mm		2
Compressed air nozzle D20-D25	**511958**		Drill diameter Ø 20 - 25 mm		2
Compressed air nozzle D30-D35	**511959**		Drill diameter Ø 30 - 35 mm		2
Compressed air nozzle D40-D55	**511960**		Drill diameter Ø 40 - 45 mm		2

LOADS

Injection systems FIS EM Plus, FIS RC, FIS SB, FIS V and FIS VS LOW SPEED with reinforcing steel B500B[5] in accordance with rebar theory

Design resistances and permissible loads[1][6] of single, post-installed rebars in cracked or non-cracked normal concrete of the strength class C20/25[2]						
Reinforcing steel B500B f_{yk} / f_{uk} = 500 / 540 N/mm²	Basic value for the anchorage length for FIS EM Plus $l_{b,rqd}$[4] [mm]	Basic value for the anchorage length for FIS SB $l_{b,rqd}$[4] [mm]	Basic value for the anchorage length for FIS V FIS VS LOW SPEED $l_{b,rqd}$[4] [Nm]	Maximum anchorage depth $l_{v,max}$ [mm]	Maximum design resistance for axial tensile load $N_{Rd,s}$[3] [kN]	Maximum permissible tensile load $N_{perm,s}$[3] [kN]
Ø 8 mm	378	378	378	1800 (3000)[8]	21,9	15,6
Ø 10 mm	473	473	473	1800 (3000)[8]	34,1	24,4
Ø 12 mm	567	567	567	1800 (3000)[8]	49,2	35,1
Ø 14 mm	662	662	662	1800 (3000)[8]	66,9	47,8
Ø 16 mm	756	756	756	1800 (3000)[8]	87,4	62,4
Ø 20 mm	945	945	945	1800 (3000)[8]	136,6	97,6
Ø 22 mm[7]	1040	–	–	2000	165,3	118,1
Ø 24 mm[7]	1134	–	–	2000	196,7	140,5
Ø 25 mm	1181	1181	1181	2000 (3000)[8]	213,4	152,4
Ø 26 mm[7]	1229	–	–	2000	230,8	164,9
Ø 28 mm	1323	1323	1323	2000 (3000)[8]	267,7	191,2
Ø 30 mm[7]	1418	–	–	2000	307,3	219,5
Ø 32 mm[9]	1512	1512	–	2000 (3000)[8]	349,7	249,8
Ø 34 mm[7]	1607	–	–	2000	394,7	282,0
Ø 36 mm[7]	1701	–	–	2000	442,6	316,1
Ø 40 mm[7]	1890	–	–	2000	546,4	390,3

For planning and design the complete European Technical Assessments ETA-17/1056 (FIS EM Plus), ETA-13/0651 (FIS SB) or resp. ETA-08/0266 (FIS V and FIS VS LOW SPEED) have to be considered. For determination of the installation parameters (minimum concrete cover, distances, etc.) as well as required transverse reinforcement see EN 1992-1-1 and general installation rules of the assessments.

1) The partial safety factors for resistance taken from the European standard EN 1992-1-1 as well as a partial safety factor for action of γ_F = 1,4 are considered.

2) The ETAs for FIS EM Plus, FIS SB, FIS V and FIS VS LOW SPEED permit post-installed rebar connections in concrete C12/15 up to C50/60. The above mentioned basic value for anchorage length changes depending on the relevant concrete strength class.

3) For utilisation of the full steel capacity.

4) Basic value of the anchorage length in accordance with EN 1992-1-1, section 8.4.3 for concrete strength class C20/25 and good bond conditions.

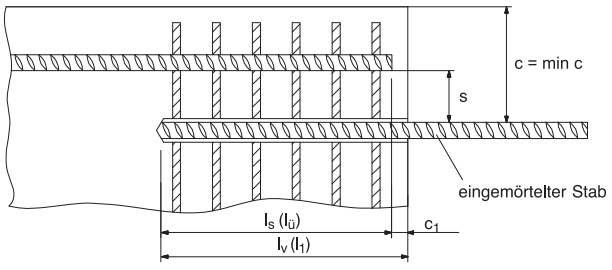
5) Reinforcing steel with characteristic yield strength f_{yk} = 400 - 600 N/mm² in accordance with EN 1992-1-1 Annex C, Table C.1 and C.2N is approved. The above mentioned basic value for the anchorage length as well as maximum steel resitance (see foot not 3) will change accordingly.

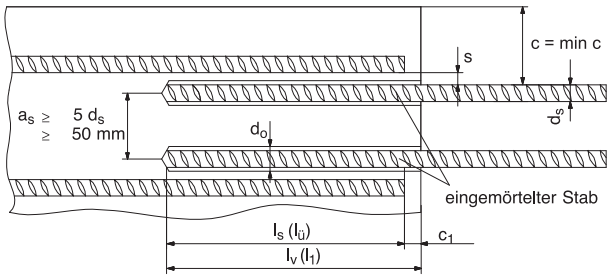
6) With FIS EM Plus, FIS SB, FIS V or FIS VS LOW SPEED post-installed rebars are approved in dry or wet concrete with temperatures up to +50 °C (resp. short term up to +80 °C) and drill hole cleaning in accordance with ETA.

7) Only FIS EM Plus.

8) Values in brackets apply for FIS SB.

9) Only FIS EM Plus or FIS SB.





LOADS

Design resistances and permissible loads[1) 5)] of single, post-installed Rebar anchor in cracked or non-cracked normal concrete of the strength class C20/25[2)]

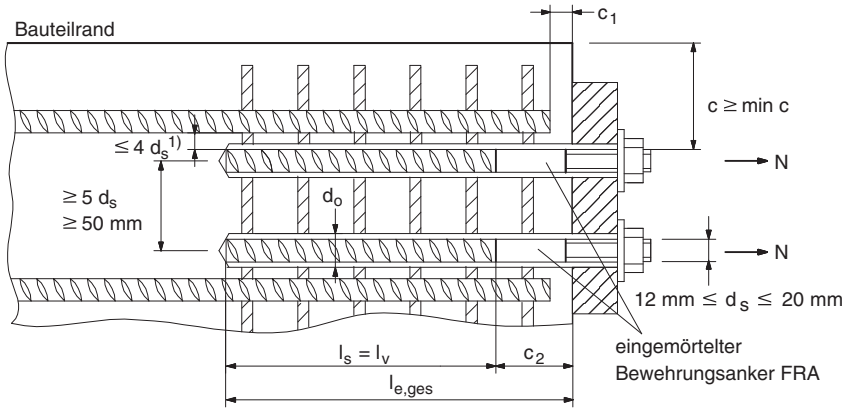
Design resistances and permissible loads[1) 5)] of single, post-installed Rebar anchor in cracked or non-cracked normal concrete of the strength class C20/25[2)]						
Type	**Basic value for the anchorage length** $l_{b,rqd}$[4)] [mm]	**Maximum anchorage depth** $l_{v,max}$ [mm]	**Maximum embedment depth** $l_{e,ges,max}$ [mm]	**Maximum torque moment** T_{inst} [Nm]	**Maximum design resistance for axial tensile load** $N_{Rd,s}$[3)] [kN]	**Maximum permissible tensile load** $N_{perm,s}$[3)] [kN]
FRA 12/900 M12	567	800	900	≤ 50	49,2	35,1
FRA 16/1100 M16	756	1000	1100	≤ 100	87,4	62,4
FRA 20/1400 M20	945	1300	1400	≤ 150	136,6	97,6

For planning and design the complete European Technical Assessments ETA-17/1056 (FIS EM Plus), ETA-13/0651 (FIS SB) or resp. ETA-08/0266 (FIS V and FIS VS LOW SPEED) have to be considered. For determination of the installation parameters (minimum concrete cover distances, etc.) as well as required transverse reinforcement see EN 1992-1-1 and general installation rules of the assessments.

1) The partial safety factors for resistance taken from the European standard EN 1992-1-1 as well as a partial safety factor for action of γ_F = 1,4 are considered.
2) The ETAs for FIS EM Plus, FIS SB, FIS V and FIS VS LOW SPEED permit post-installed rebar connections in concrete C12/15 up to C50/60. The above mentioned basic value for anchorage length changes depending on the relevant concrete strength class.
3) For utilisation of the full steel capacity.
4) Basic value of the anchorage length in accordance with EN 1992-1-1, section 8.4.3 for concrete strength class C20/25 and good bond conditions.
5) With FIS EM Plus, FIS SB, FIS V or FIS VS LOW SPEED post-installed Rebar anchors are approved in dry or wet concrete with temperatures up to +50 °C (resp. short term up to +80 °C) and drill hole cleaning in accordance with ETA.

General rules of consstructions

- The Rebar anchor FRA is permitted to transfer tension loads in direction of the axis of the rebar only.
- l_v and l_s according to approval.
- According to approval it has to be proved that sufficient transverse reinforcement is available.



c	Concrete cover of the post-installed rebar anchor
c_1	Concrete cover of the front side of the existing rebar
c_2	Concrete cover above the welding
min c	Minimum concrete cover acc. to approval
d_s	Diameter of the post-installed rebar anchor
l_s	Lap length
l_v	Effective anchorage depth of the rebar anchor
$l_{e,ges}$	Embedment depth of the rebar anchor
d_0	Nominal drill diameter

1) If the clear distance of the lapped bars is larger than 4 x d_s, EC2 has to be applied.

The approved system for building renovation

Upgrade of bridges

Reinforcement of ceilings

VERSIONS

- Zinc-plated concrete steel bar B500B

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked
- Fixing in old concrete B 25 to B 55

CERTIFICATES

ADVANTAGES

- Due to its geometry and ease of installation, FCC is the rapid and economic alternative compared to the conventional installation method with bent iron.
- Dimensioning of the anchorage is possible thanks to the building approval. Thus, the system offers maximum security.
- Variable anchoring depths allow for ideal adaptation to the load to be applied, and ensure an optimised installation time and use of materials.
- Depending on site conditions, the FCC can be anchored, in compliance with the approval, with the injection mortars FIS SB or FIS EM Plus.
- In conjunction with FIS EM Plus, FCC is also approved for use in diamond-drilled drill holes.

APPLICATIONS

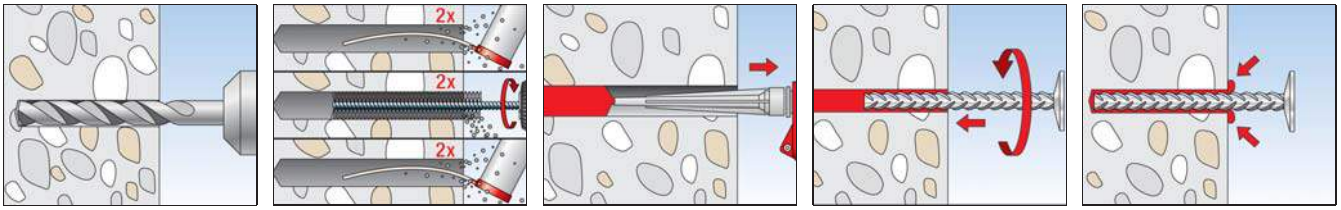
- Bridge repairs
- Increasing load capacity of bridges
- Increasing loads of ceilings during conversion, for example
- Reinforcement of foundations, piers, columns and walls
- Renovation of car park ceilings following corrosion damage

FUNCTIONING

- The system consists of injection mortar (FIS SB or FIS EM Plus) and the concrete-concrete shear connector FCC.
- The mortar is injected bubble-free from the drill hole base.
- The mortar adheres the drill hole wall to the shear connector FCC.
- The shear connector is set manually, by lightly rotating it until it reaches the drill hole base.
- The tensile and shear forces arising in the joints between the old and new concrete are absorbed by the FCC-H and safely redirected.

Concrete-Concrete Shear Connector FCC

INSTALLATION IN CONCRETE WITH FIS SB OR FIS EM PLUS AND FCC-H



TECHNICAL DATA

Concrete-Concrete Shear Connector **FCC-H**

	Art.-No.	Approval DIBt	Drill hole diameter d_0 [mm]	Rebar diameter [mm]	Anchor length [mm]	Min. / standard anchorage depth [mm]	Min. / standard fill quantity e.g. FIS SB [scale units]	Sales unit [pcs]
Item								
FCC-H 10 x 180	**520081**	●	12	10	180	60/120	2/4	100
FCC-H 12 x 230	**520082** 1)	●	14	12	230	70/155	3/7	100
FCC-H 14 x 290	**520083** 1)	●	18	14	290	75/195	6/14	50
FCC-H 16 x 360	**520085** 1)	●	20	16	360	80/240	7/20	25

1) Delivery time on request.

The professional façade repair for two-leaf cavity walls

Repairing outer leafs

Detail: Repairing outer leafs

VERSIONS

- Stainless steel

BUILDING MATERIALS

- Facing masonry with and without an air layer

CERTIFICATES

ADVANTAGES

- The expansion-force-free fixing prevents splitting and cracks. This means that VBS 8 can be used even in old and sensitive masonry.
- The drill bit diameter of just 8 mm means that a minimal amount of mortar is required for each fixing point. Thus VBS 8 is particularly economical.
- The installation is approved anywhere along the entire bed joint, thus ensuring a high level of installation safety.
- The grey colour of the injection mortar is similar to the colour of the bed joint. This means that the fixing is almost invisible to the eye.

APPLICATIONS

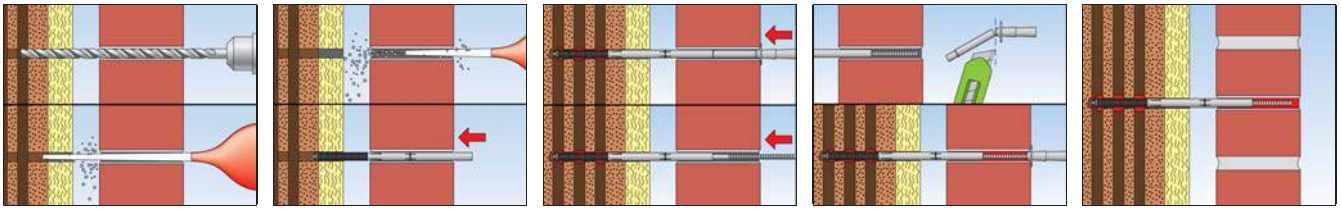
- Post-installation needling of two-skin cavity walls

FUNCTIONING

- The remedial wall tie VBS 8 comprises a perforated plastic sleeve and a profiled A4 stainless steel tie Ø 4 mm.
- VBS 8 is used together with the injection mortar FIS V.
- The anchor is inserted in the bed joint of the outer leaf using push-through installation.

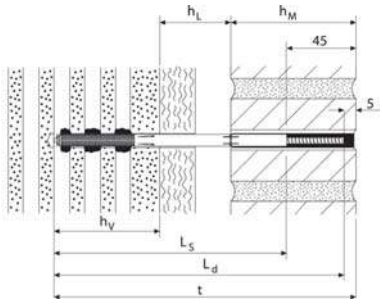
Remedial wall tie VBS 8

INSTALLATION IN FACING MASONRY WITH FIS V AND VBS 8



TECHNICAL DATA

Remedial wall tie **VBS 8**



	Stainless steel	Approval	Cavity or insulation	Drill hole diameter	Outer leaf	Depth = embedment depth	Fixing length	Anchorage depth	Fill quantity FIS V bearing wall	Sales unit
	Art.-No.	DIBt	[mm]	d_0 [mm]	[mm]	$h_0 = h_s$ [mm]	l [mm]	h_{ef} [mm]	[scale units]	[pcs]
Item	**A4**									
VBS 8/20	**078763** 1)2)	●	0 - 20	8	≥ 90	195	188	>60	4	100
VBS 8/50	**078799** 1)2)	●	20 - 50	8	≥ 90	225	218	>60	4	100
VBS 8/80	**078800** 1)2)	●	50 - 80	8	≥ 90	255	248	>60	4	100
VBS 8/120	**078801** 1)2)	●	80 - 120	8	≥ 90	295	288	>60	6	100
VBS 8/150	**078802** 1)2)	●	120 - 150	8	≥ 90	325	318	>60	6	100

1) Product consisting of perforated plastic sleeve, profiled wire A4 and injection nozzle.

2) For the closing of the curtain walling about 2-3 additional scale units of mortar FISV are required.

ACCESSORIES

Compressed-air cleaning tool

Hammer drill SDS-Plus Pointer, DIN 8039

Item	Art.-No.	Technical details	Sales unit [pcs]
VBS 8 cleaning set	**090241**	content: cleaning brush and extension tube for blow-out pump	1
Compressed-air cleaning tool	**093286**	for professional cleaning of the drill hole	1
SDS-Plus Pointer 8,0 / 460 mm	**074330**	Hammer drill with self-centring drill bit and relief-ground drill grooving	1

The economical solution for the repair of triple-skin outer wall panels

Repairing weather shells

Detail: Repairing weather shells

VERSIONS

- Stainless steel

BUILDING MATERIALS

- Triple-skin outer wall panels made of concrete ≥ C12/15

CERTIFICATES

Zulassung

ADVANTAGES

- The FWS II achieves a high shear load-bearing capacity due to its large anchor diameter. This reduces the number of reconstruction anchors needed for each plate to a minimum, thus saving costs.
- The drill hole can be drilled in one step using standard diamond drill bits. This ensures quick progress is made.
- Installation is already approved from a sub-base thickness ≥ 80 mm.
- Approval with a new measuring strategy allows a safer and economically static calculation while making it possible to document loads from temperature changes.

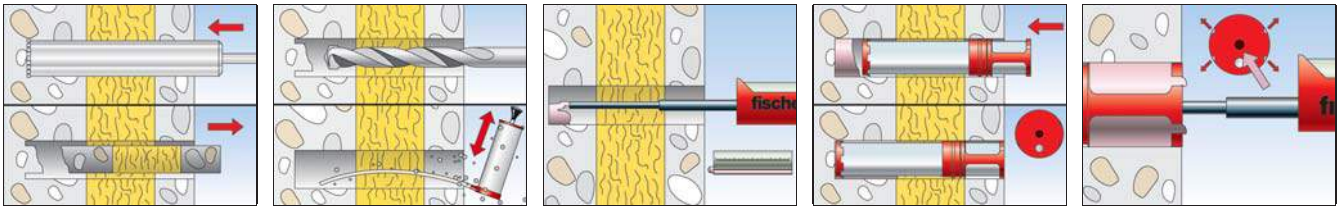
APPLICATIONS

- For post-installation securing of triple-skin outer wall panels
- Strengthening outer wall panels for additional exterior insulation

FUNCTIONING

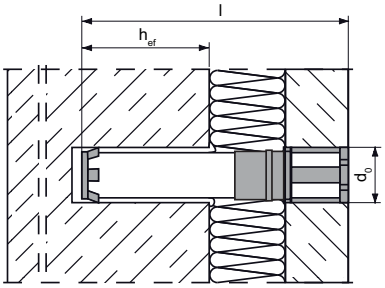
- The FWS II weather facing reconstruction anchors can be bedded in mortar into the load-bearing skin and weather shell with the FIS V, FIS VW or FIS VS injection mortar.
- The red plastic coating protects the insulation from being penetrated with mortar.
- You can see the correct anchor filling with the weather shell through the inspection openings on the head of the anchor.

INSTALLATION IN TRIPLE-SKIN OUTER WALL PANELS WITH FIS V AND FWS II-A



TECHNICAL DATA

Weather facing reconstruction system
FWS II - A



	Art.-No.	Approval DIBt	Total length l [mm]	Nom. drill diameter d_0 [mm]	Effect. anchorage depth in the load-bearing skin h_{ef} [mm]	Anchors per cartridge FIS V / FIS VS / FIS VW 360 ml	Sales unit [pcs]
Item							
FWS II - A 180	**532883**	●	180	40 - 41	70	5	5
FWS II - A 205	**532884**	●	205	40 - 41	70	5	5
FWS II - A 230	**532885**	●	230	40 - 41	70	5	5

TECHNICAL DATA

Injection mortar **FIS V 360 S**

		Approval		Languages on the cartridge	Scale unit	Contents	Sales unit
Item	**Art.-No.**	**DIBt**	**ETA**				**[pcs]**
FIS V 360 S	**094404**	●	■	DE, FR, NL, TR, HU, AR	180	1 cartridge 360 ml, 2 x FIS MR Plus	6

LOADS

Weather facing reconstruction system FWS II

Highest permissible shear loads[1) 5)] for a single anchor in a load-bearing skin made of concrete ≥ C12/15.
For the design the complete approval Z-21.8-2029 has to be considered.

						Cracked or non-cracked concrete	
Type	**Effective anchorage depth in the load bearing skin h_{ef} ≥ [mm]**	**Thickness of load-bearing layer h_T ≥ [mm]**	**Thickness of thermal insolution[2)] h_D ≤ [mm]**	**Thickness of outer leaf h_w ≥ [mm]**	**Permissible bending moment M_{perm} [Nm]**	**Permissible shear load[4)] V_{perm} [kN]**	**Minimum edge distance[3)] $c_{min}(c_W, c_T)$ [mm]**
FWS II - A 180	70	80	70	40	1310	11,5	150
FWS II - A 205	70	80	95	40	1310	9,5	150
FWS II - A 230	70	80	120	40	1310	8,1	150

[1)] Required safety factors are considered. The given loads are valid under the pre-condition that an additional thermal insulation will be applied on the weather facing.

[2)] For bigger insulation thicknesses special lengths are possible.

[3)] For exact arrangement of the bolts as well as for eventually needed additional proofs see approval.

[4)] The determination of the permissible shear load for special lengths is done according Annex 3 and 4 of the approval.

[5)] The given loads are valid for fixations in dry and humid concrete for temperatures in the substrate up to +50 °C (resp. short term up to 80 °C) and drillhole cleaning according to approval.

The epoxy resin for repair work

Filling cracks

Reconstructing corners and edges

BUILDING MATERIALS

Suitable for:

- Concrete

ADVANTAGES

- The FCS based on epoxy resin has a high bond strength and a low shrinkage value. This guarantees a high performance and opens up a wide range of applications.
- The two product variants, FCS Liquid (low viscosity = liquid) and FCS (high viscosity = paste-like), allow for use both in horizontal situations and on walls and ceilings. Therefore, there is always the right product for every occasion.

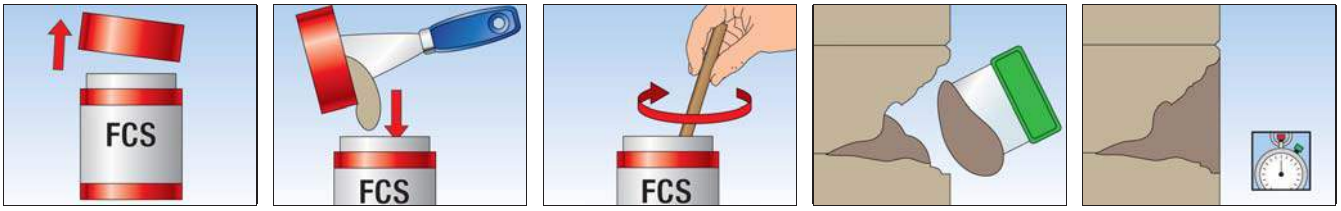
APPLICATIONS

- Filling holes and cracks in concrete and similar surfaces
- Reconstructing chipped corners and edges

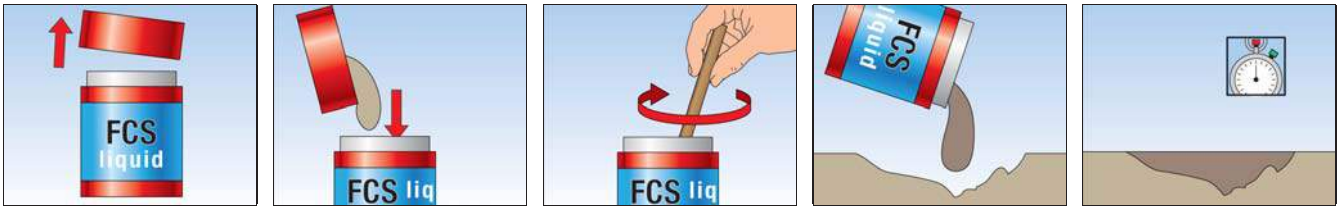
FUNCTIONING

- The resin and hardener are stored in two separate containers.
- The hardener is added to the resin and mixed thoroughly until the material is the same colour throughout.
- Note: The quality of the mixing of components and the proper filling of the holes (without air pockets) has an effect on the load-bearing capacity of the system!
- FCS Liquid can be poured into holes or cracks, or applied using a brush.
- FCS can be applied with a palette knife.
- Once mixed, the material can be used until the maximum open time is reached.

INSTALLATION FCS



INSTALLATION FCS LIQUID



TECHNICAL DATA

fischer Can System **FCS**

fischer Can System **FCS liquid**

Item		Languages on the can	Sales unit [pcs]
FCS - fischer Can System	**043676**	EN, ES, PT	12
FCS Liquid - fischer Can System	**043917**	EN, ES, PT	12

CURING TIME

Temperature	Gelling time	Curing time
+ 5°C	70 min.	60 hrs.
+10°C	60 min.	30 hrs.
+20°C	45 min.	24 hrs.
+30°C	30 min.	20 hrs.
+40°C	15 min.	16 hrs.

The gelling time starts when the components get in contact. Stir the components thoroughly until the colour of the mortar is evenly. This is essential to achieve the full performance of the mortar.

Liquid plugs and repair compounds for serious cases

Repairing damaged drill holes

Repairing damaged hinges

BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete
- Wooden materials
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Panel building materials
- Aerated concrete
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

ADVANTAGES

- The Fill & Fix injection fixing works whatever the drill hole size and building material. As a result, a number of applications can be completed with just one product.
- Wood screws can be screwed directly into the hardened injection fixing. This allows for a fast and simple installation.
- Due to the special formulation, the screw can be screwed into the injection fixing and removed. Thus, components can be reattached to the same point.
- Fill & Fix can be sanded and painted, and is suitable for filling drill holes that are no longer needed prior to painting.

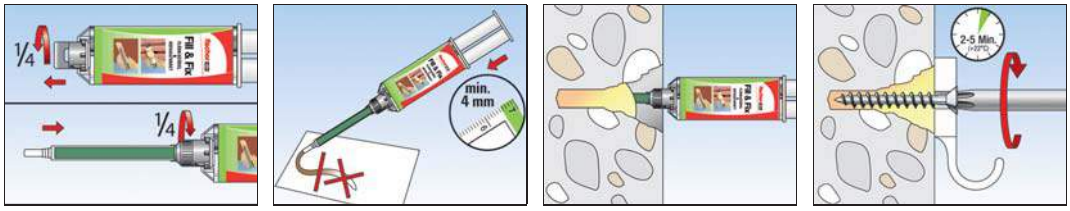
APPLICATIONS

- Repairing cracked or over-sized drill holes
- Repairing broken furniture hinges etc.
- Fixing lightweight objects in difficult or damaged building materials (old buildings)
- Fixing lightweight objects in internal and UV-protected external areas

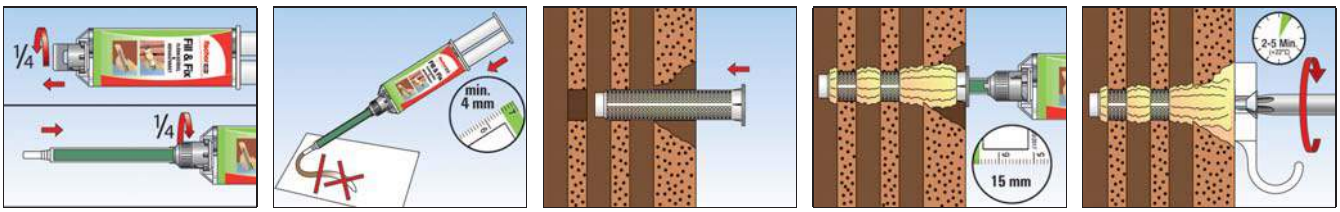
FUNCTIONING

- Fill & Fix is a 2-component, solvent-free injection compound based on polyurethane. It is applied into the drill hole, where it foams lightly and sets quickly.
- The increase in volume during the setting process guarantees a secure hold, even in dilapidated or difficult building materials.
- After approx. 2 minutes, screws, hooks, eye screws etc. with a diameter of up to 6 mm that are normally used in wood can be screwed into and removed from the set material without pre-drilling.
- Use the perforated sleeves (included) for hollow and board building materials.

INSTALLATION IN SOLID BUILDING MATERIALS



INSTALLATION IN HOLLOW AND PANEL BUILDING MATERIALS



TECHNICAL DATA

Fill & Fix Injection fixing

Item	Art.-No.	Contents	Languages on the cartridge	Sales unit [pcs]
Fill & Fix K (D)	**051097**	1 cartridge 25 ml, 2 static mixer, 4 anchor sleeves, 2 extension tubes	DE	4
Fill & Fix K (D/F)	**503227**	1 cartridge 25 ml, 2 static mixer, 4 anchor sleeves, 2 extension tubes	D, F	8
Fill & Fix K (F)	**513500**	1 cartridge 25 ml, 2 static mixer, 4 anchor sleeves, 2 extension tubes	F	8
Fill & Fix K (I)	**051098**	1 cartridge 25 ml, 2 static mixer, 4 anchor sleeves, 2 extension tubes	I	8
Fill & Fix K (S/DK)	**505083**	1 cartridge 25 ml, 2 static mixer, 4 anchor sleeves, 2 extension tubes	S, DK	8
Fill & Fix K (GR)	**505084**	1 cartridge 25 ml, 2 static mixer, 4 anchor sleeves, 2 extension tubes	GR	8
Fill & Fix Static mixer	**502735**	6 static mixer	-	1

LOADS

Fill & Fix

Highest recommended loads[1] for a single anchor.

The given loads are valid for chipboard screws with the specified diameters.

Type			Fill & Fix		
Diameter of chipboard screw	Ø	[mm]	4,0	5,0	6,0
Nominal drill diameter	d_0	[mm]	10	10	10
Anchorage depth	$h_{ef} \geq$	[mm]	45	45	45
Drill hole depth	$h_1 \geq$	[mm]	50	50	50
Anchorage in solid substrates					
Recommended load[2] in concrete	≥ C12/15	[kN]	0,50	0,60	0,70
Recommended load[2] in sand-lime bricks	≥ KS 20 a. ≥ NF	[kN]	0,50	0,60	0,70
Anchorage in perforated bricks/hollow blocks using the perforated sleeve					
Recommended load[2] in vertically perforated bricks	≥ HLz 12, ρ ≥ 0,9 kg/dm3 a. ≥ 16DF	[kN]	0,20	0,25	0,30
Recommended load[2] in per forated sand-lime bricks	≥ KSL 12, ρ ≥ 1,4 kg/dm3 a. ≥ 5DF	[kN]	0,20	0,25	0,30
Recommended load[2] in lightweight concrete hollow blocks		[kN]	0,20	0,25	0,30
Anchorage in aerated concrete					
Recommended load[2] in aerated concrete	≥ PP2	[kN]	0,10	0,15	0,20
Anchorage in board materials using the perforated sleeve					
Recommended load[2] in gypsum plasterboard	12,5 mm	[kN]	0,12	0,12	0,12
Recommended load[2] in gypsum plasterboard	25 mm (= 2 × 12,5 mm)	[kN]	0,20	0,20	0,20
Recommended load[2] in gypsum fibreboard	12,5 mm	[kN]	0,21	0,21	0,21

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

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Dispensers and Mortars

	FIS ... 150 T	FIS ... 300 T	FIS ... 345 S	FIS ... 360 S	FIS ... 380/410 C	FIS ... 390 S	FIS ... 585 S	FIS ... 1500 S	Page
Dispensers / Mortars									
FIS DMS (511118)	■	■	■	■		■			196
FIS AM (58000)	■	■	■	■		■			196
KP M1 (53115)	■	■							196
KP M2 (53117)	■	■							196
FIS AC (96497)					■				196
FIS DMS-L (510992)							■		196
FIS DCD S (543629)		■	■	■		■			197
FIS AP (58027	■	■	■	■		■			197
FIS DP-S L (511125)							■		197
FIS DP-S XL (512401)								■	197

FIS DMS (511118)

APPLICATIONS

- Shuttle cartridges with 345, 360 and 390 ml content
- Cartridges with 150 ml content
- Multibond cartridges with 300 ml content
- Standard silicone cartridges

ADVANTAGES

- The 3-fold push rod distributes the extrusion forces equal over the cartridge and prevents the cartridge from tearing up.
- The robust glass fiber reinforced plastic housing increases the breaking strength of the dispenser and offers a long service life.
- The ergonomic design of the FIS DM S ensures a good balance and allows fatigue-free working.

FIS AM (58000)

APPLICATIONS

- Shuttle cartridges with 345, 360 and 390 ml content
- Cartridges with 150 ml content
- Multibond cartridges with 300 ml content
- Standard silicone cartridges

ADVANTAGES

- The robust design can withstand the high requirements of the job site and thus offers a long life.
- The infinitely variable feed allows the exact dosing and thus ensures easy handling.

KP M1 (53115)

APPLICATIONS

- Cartridges with 150 ml content
- Multibond cartridges with 300 ml content
- Standard silicone cartridges

ADVANTAGES

- The handy, robust solid metal construction for standard cartridges up to 310 ml bears up against requirements on the construction site and, as such, is also suitable for professional use.
- The continuous in-feed allows for a precise dosage, making it easy to use.
- The slim shape of the device allows for an exact application, even in difficult to reach spots, thus offering a high level of flexibility

KP M2 (53117)

APPLICATIONS

- Cartridges with 150 ml content
- Multibond cartridges with 300 ml content
- Standard silicone cartridges

ADVANTAGES

- The 18:1 transmission ratio enables the fast, low-energy application of even highly viscous materials, thus ensuring stress-free work.
- The robust design with the special, hardened drive block meets the tough requirements of a construction site and thus offers a long lifespan.
- The freely accessible cartridge makes it possible to perfectly align the extrusion nozzle, guaranteeing application-orientated work.

FIS AC (96497)

APPLICATIONS

- Coaxial cartridges with 380 and 410 ml content

ADVANTAGES

- The robust design can withstand the high requirements of the job site and thus offers a long life.
- The infinitely variable feed allows the exact dosing and thus ensures easy handling.

FIS DMS-L (510992)

APPLICATIONS

- Cartridges with 585 ml content

ADVANTAGES

- The patented parallel lever of the FIS DM S-L allows a large and even force transmission and ensures fatigue-free working.
- The dropout protection on the cartridge holder provides a secure hold of the cartridge in the dispenser.

FIS DCD S (543629)

APPLICATIONS

- Shuttle cartridges with 345, 360 and 390 ml content
- Multibond cartridges with 300 ml content

ADVANTAGES

- The FIS DCD S has a dosing function which is controlled by a setting wheel. This allows for optimal adaptation to the processing conditions and ensures fast work progress.
- The robust battery dispenser is very light, fits comfortably in the hand and allows fatigue-free working.

FIS AP (58027)

APPLICATIONS

- Shuttle cartridges with 345, 360 and 390 ml content
- Cartridges with 150 ml content
- Multibond cartridges with 300 ml content
- Standard silicone cartridges

ADVANTAGES

- The fast venting minimises cartridge after-run, which facilitates clean work at the site.
- The reducing valve in the handle enables the optimum adjustment of the volume flow in line with the processing conditions.
- Due to the ergonomically formed handle, the dispensers fit nicely in your hand and make work less tiring.

FIS DP-S L (511125)

APPLICATIONS

- Cartridges with 585 ml content

ADVANTAGES

- The fast venting minimises cartridge after-run, which facilitates clean work at the site.
- The reducing valve in the handle enables the optimum adjustment of the volume flow in line with the processing conditions.
- Due to the ergonomically formed handle, the dispensers fit nicely in your hand and make work less tiring.

FIS DP-S XL (512401)

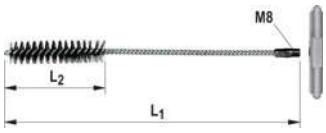
APPLICATIONS

- Cartridges with 1500 ml content

ADVANTAGES

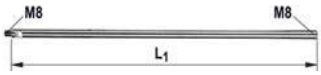
- The fast venting minimises cartridge after-run, which facilitates clean work at the site.
- The reducing valve in the handle enables the optimum adjustment of the volume flow in line with the processing conditions.
- Due to the ergonomically formed handle, the dispensers fit nicely in your hand.
- In addition the dispencer has a carrying strap around which make work less tiring.

ACCESSORIES DRILL HOLE CLEANING



Cleaning brush **BS**

SDS-Adapter M8



Brush extension

Item	Art.-No.	Length L1 [mm]	Length L2 [mm]	Brush diameter [mm]	For drill diameter [mm]	Sales unit [pcs]
BS ø 8	**078177**	120	50	9	8	1
BS ø 10	**078178**	120	50	11	10	1
BS ø 12	**078179**	150	80	13	12	1
BS ø 14	**078180**	250	80	16	14	1
BS ø 16/18	**078181**	250	80	20	16/18	1
BS ø 20/22	**052277**	180	80	25	20/22	1
BS ø 24	**078182**	300	100	26	24	1
BS ø 25	**097806**	300	100	27	25	1
FIS brush extension	**508791**	410	-	-	-	1
Compressed air nozzle D16-D19	**511957**	-	-	-	-	2
Compressed air nozzle D20-D25	**511958** 1)	-	-	-	-	2

1) Delivery time on request.

Compressed-air cleaning tool

Blow-out pump **AB G**

Centring wedge

Item	Art.-No.	Contents	Total length [mm]
Compressed-air cleaning tool	**093286**	–	–
Blow-out pump AB G	**089300**	–	370
Centring wedge	**093076**	10 wedges for overhead installation, from M16	–

ACCESSORIES

Machine setting tool **RA-SDS**

Adapter **SDS max 1/2" VK**

Adapter **SDS max 3/4" VK**

Adapter **SDS plus 1/2" VK**

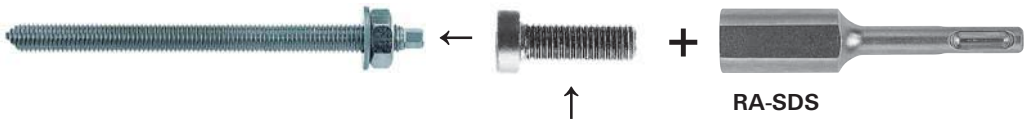
Adapter **SK SW 8 1/2" VK**

Item	Art.-No.	Match	Sales unit [pcs]
RA-SDS	**062420**	Adapter suitable fits set screw	1
SK SW 8 1/2	**001536**	Adapter suitable fits threaded rods M8 - M22	1
SDS plus 1/2	**001537**	Adapter suitable fits threaded rods M8 - M16	1
SDS max 1/2	**001538**	Adapter suitable fits threaded rods M16 - M20	1
SDS max 3/4	**001539**	Adapter suitable fits threaded rods M20 - M30	1

SETTING TOOLS

Setting tool with SDS adapter

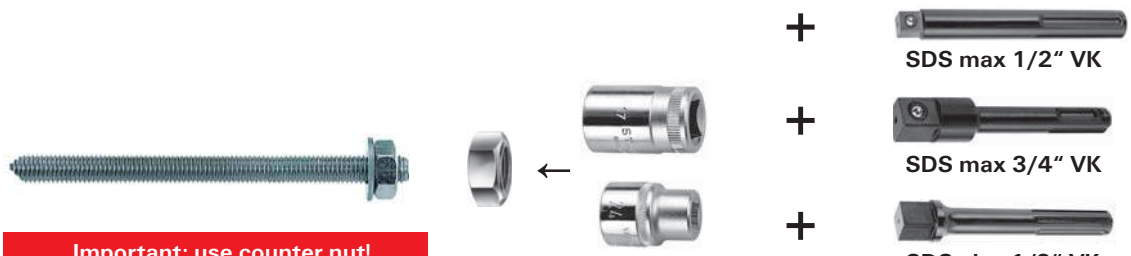
For simple installation of bonded anchors for example Resin anchor RM II, Highbond anchor FHB II, Superbond resin capsule RSB.



included with each package

Adapter for installing threaded rods

Threaded rods without external hex-drive (special lengths).



Important: use counter nut!

ACCESSORIES

Cone drill **PBB**

Centring sleeve **PBZ**

Item	Art.-No.	Approval	Match	Contents	Sales unit [pcs]
Cone drill PBB	**090634**	■	M8 - M12; FIS E	1x cone drill PBB	1
Centring sleeve PBZ	**090671**	■	M8 - M12; FIS E	10x centring sleeve PBZ, 5x injection adapter	10

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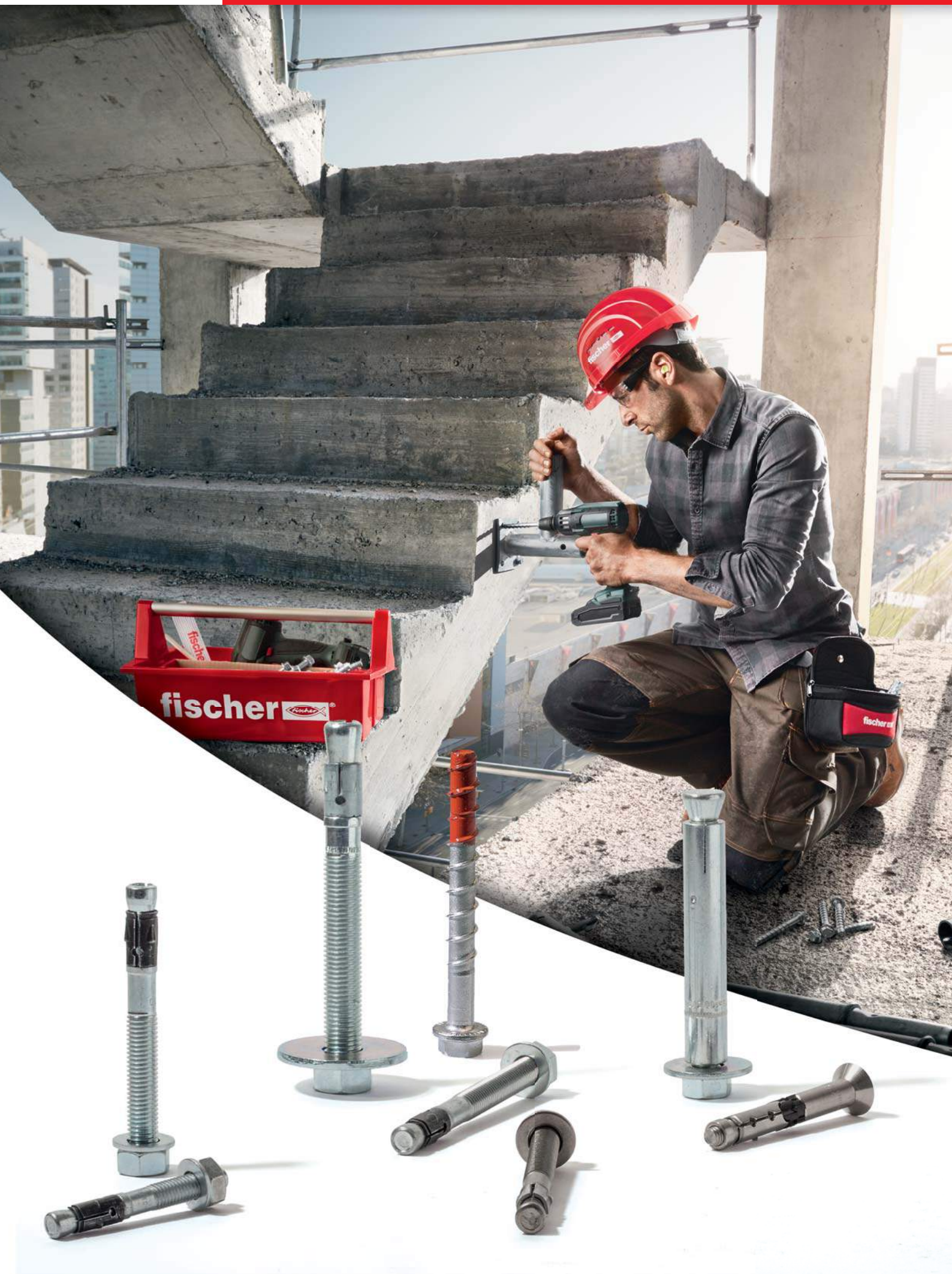

4 High performance steel anchors

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For highest demands. Powerful and flexible.

Balcony railings

Steel girders

VERSIONS

- Zinc-plated steel
- Stainless steel
- Highly corrosion-resistant steel

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

Also suitable for:

- Concrete C12/15
- Concrete C80/95
- Natural stone with dense structure

CERTIFICATES

ETA-05/0069
EAD 330232-00-0601
Option 1 for cracked concrete
Seismic performance category C1, C2

FM APPROVED from M10

ICC ES ESR-2948 — See ICC-ES Evaluation Report at www.icc-es.org

Fire resistance classification R 120 — Anchor types see test report

EDELSTAHL Rostfrei — INOX STAINLESS STEEL

M8 - M20

ZTV — 1200 °C — anchor types see test report (only FAZ II C)

SEISMIC

ADVANTAGES

- According to the new assessment (ETA) the tensile load capacities are decisively increased. This requires less anchors.
- The variable anchorage depths for the sizes M8 to M16 allow for the first time a millimeter-accurate adjustment to the loads.
- The design with cap nut offers a visually attractive anchoring and protects against injuries due to the round head shape.
- The first bolt anchor M6 with ETA Assessment for Option 1, for secure and approved anchorage.
- The international approvals guarantees maximum safety and the best performance.
- Approved for diamond-drilled holes.

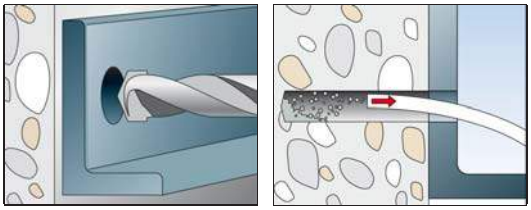
APPLICATIONS

- Steel constructions
- Guard rails
- Consoles
- Ladders
- Cable trays
- Machines
- Staircases
- Gates
- Façades
- Timber constructions

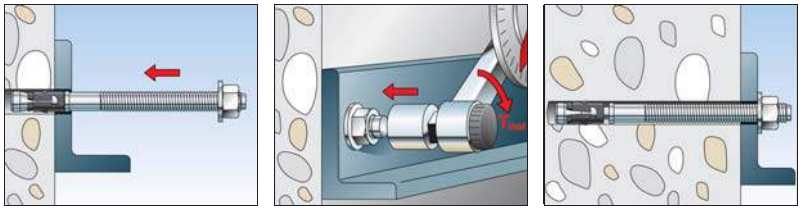
FUNCTIONING

- The FAZ II is suitable for pre-positioned and push-through installation and is also ideal for stand-off installation thanks to the long thread.
- When applying the torque, the cone bolt is pulled into the expansion sleeve and expand it against the drill hole wall.
- The anchor is set in line with the approval once the preset installation torque is achieved.
- In the case of series installation, we recommend using the FABS anchor bolt setting tool.

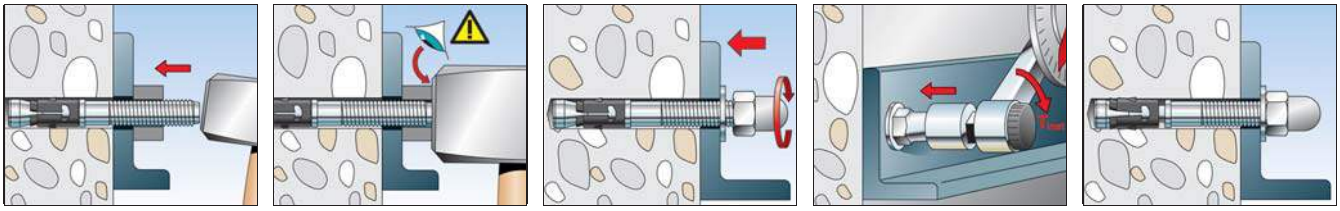
DRILL HOLE PREPARATION



PUSH-THROUGH INSTALLATION WITH HEXAGON NUT

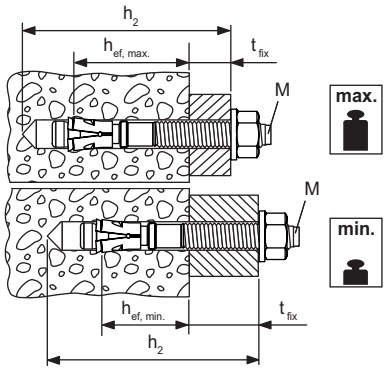


PUSH-THROUGH INSTALLATION OF THE CUP NUT VERSION WITH SETTING GAUGE



TECHNICAL DATA

Bolt anchor **FAZ II**



	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Approval		Seismic-Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. usable length hef,max./ hef,min.	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	ICC		d_0	h_2	l	t_{fix}	Ø x length	⬡ SW	
Item	gvz	A4	C				[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[pcs]
FAZ II 6/10	**542621**	**542623**	–	■	–	–	6	60	65	10/-	M 6 x 25	10	50
FAZ II 6/20	**542622**	**542624**	–	■	–	–	6	70	75	20/-	M 6 x 35	10	50
FAZ II 8/10	**094871** 1)	**501396** 1)	–	■	▲	C1	8	65	75	10/20	M 8 x 38	13	50
FAZ II 8/10	–	–	**501428** 1)	■	▲	C1	8	65	75	10/20	M 8 x 38	13	10
FAZ II 8/30	**094877** 1)	**501399** 1)	–	■	▲	C1	8	85	95	30/40	M 8 x 58	13	50
FAZ II 8/30	–	–	**501429** 1)	■	▲	C1	8	85	95	30/40	M 8 x 58	13	10
FAZ II 8/50	**094878** 1)	**501401**	–	■	▲	C1	8	105	115	50/60	M 8 x 78	13	50
FAZ II 8/100	**094879** 1)	–	–	■	▲	C1	8	155	165	100/110	M 8 x 128	13	25
FAZ II 8/160	**503251** 1)	–	–	■	▲	C1	8	215	225	160/170	M 8 x 100	13	20
FAZ II 10/10	**094981**	**501403**	–	■	▲	C1 / C2	10	85	95	10/30	M 10 x 53	17	50
FAZ II 10/10	–	–	**501430**	■	▲	C1	10	85	95	10/30	M 10 x 53	17	10
FAZ II 10/20	**094982**	–	–	■	▲	C1 / C2	10	95	105	20/40	M 10 x 63	17	25
FAZ II 10/20	–	**501406**	–	■	▲	C1 / C2	10	95	105	20/40	M 10 x 63	17	50
FAZ II 10/30	**094983**	–	–	■	▲	C1 / C2	10	105	115	30/50	M 10 x 73	17	25
FAZ II 10/30	–	**501407**	–	■	▲	C1 / C2	10	105	115	30/50	M 10 x 73	17	50
FAZ II 10/30	–	–	**503185**	■	▲	C1	10	105	115	30/50	M 10 x 73	17	10
FAZ II 10/50	**094984**	**501409**	–	■	▲	C1 / C2	10	125	135	50/70	M 10 x 93	17	20
FAZ II 10/70	–	**501410**	–	■	▲	C1 / C2	10	145	155	70/90	M 10 x 113	17	20
FAZ II 10/80	**094985**	–	–	■	▲	C1 / C2	10	155	165	80/100	M 10 x 123	17	20
FAZ II 10/100	–	**501411**	–	■	▲	C1 / C2	10	175	185	100/120	M 10 x 100	17	20
FAZ II 10/100	**094986**	–	–	■	▲	C1 / C2	10	175	185	100/120	M 10 x 143	17	20
FAZ II 10/160	–	**501412**	–	■	▲	–	10	235	245	160/180	M 10 x 100	17	20
FAZ II 10/160	**503252**	–	–	■	▲	–	10	235	245	160/180	M 10 x 193	17	20
FAZ II 12/10	**095419**	**501413**	–	■	▲	C1 / C2	12	100	110	10/30	M 12 x 61	19	20

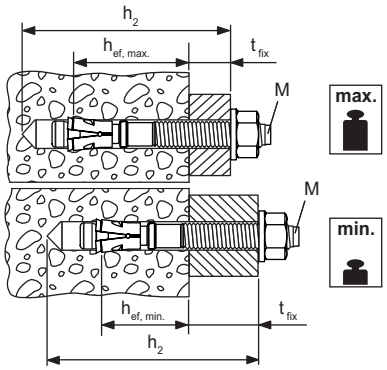
1) With minimum embedment depth only for statically interdeterminate systems

Approval Seismic C1/C2 only with maximum embedment depth

Bolt anchor FAZ II

TECHNICAL DATA

Bolt anchor **FAZ II**



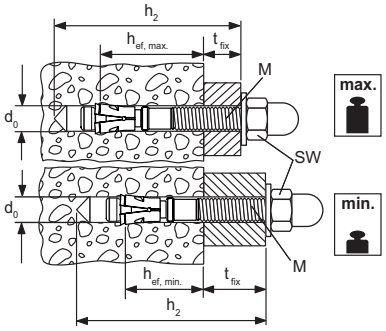
	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Approval		Seismic-Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. usable length hef,max./ hef,min.	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	ICC		d_0 [mm]	h_2 [mm]	l [mm]	t_{fix} [mm]	Ø x length [mm]	⬡ SW [mm]	[pcs]
Item	gvz	A4	C										
FAZ II 12/10	–	–	503186	■	▲	C1	12	100	110	10/30	M 12 x 61	19	10
FAZ II 12/20	095420	501415	–	■	▲	C1 / C2	12	110	120	20/40	M 12 x 71	19	20
FAZ II 12/30	095421	501416	–	■	▲	C1 / C2	12	120	130	30/50	M 12 x 81	19	20
FAZ II 12/30	–	–	501431	■	▲	C1	12	120	130	30/50	M 12 x 81	19	10
FAZ II 12/50	095446	501419	–	■	▲	C1 / C2	12	140	150	50/70	M 12 x 101	19	20
FAZ II 12/60	–	501420	–	■	▲	C1 / C2	12	150	160	60/80	M 12 x 111	19	20
FAZ II 12/80	095454	–	–	■	▲	C1 / C2	12	170	180	80/100	M 12 x 131	19	20
FAZ II 12/100	095470	501421	–	■	▲	C1 / C2	12	190	200	100/120	M 12 x 151	19	20
FAZ II 12/160	503253	–	–	■	▲	–	12	250	260	160/180	M 12 x 186	19	10
FAZ II 12/160	–	503180	–	■	▲	–	12	250	260	160/180	M 12 x 100	19	20
FAZ II 12/200	095605	–	–	■	▲	–	12	290	300	200/220	M 12 x 186	19	10
FAZ II 16/5	522124	–	–	■	▲	C1 / C2	16	115	128	5/25	M 16 x 64	24	10
FAZ II 16/5	–	522125	–	■	▲	C1 / C2	16	115	128	5/25	M 16 x 64	24	20
FAZ II 16/25	–	501423	–	■	▲	C1 / C2	16	135	148	25/45	M 16 x 84	24	20
FAZ II 16/25	–	–	501432	■	▲	C1	16	135	148	25/45	M 16 x 84	24	10
FAZ II 16/25	095836	–	–	■	▲	C1 / C2	16	135	148	25/45	M 16 x 84	24	10
FAZ II 16/50	095864	–	–	■	▲	C1 / C2	16	160	173	50/70	M 16 x 109	24	10
FAZ II 16/50	–	–	503187	■	▲	C1	16	160	173	50/70	M 16 x 109	24	10
FAZ II 16/50	–	501424	–	■	▲	C1 / C2	16	160	173	50/70	M 16 x 109	24	20
FAZ II 16/100	095865	501425	–	■	▲	C1 / C2	16	210	223	100/120	M 16 x 159	24	10
FAZ II 16/160	503254	–	–	■	▲	C1 / C2	16	270	283	160/180	M 16 x 189	24	10
FAZ II 16/200	095967	–	–	■	▲	–	16	310	323	200/220	M 16 x 189	24	10
FAZ II 16/250	095968	–	–	■	▲	–	16	360	373	250/270	M 16 x 100	24	10
FAZ II 16/300	096188	–	–	■	▲	–	16	410	423	300/320	M 16 x 100	24	10
FAZ II 20/30	046632	–	–	■	▲	C1 / C2	20	155	172	30/-	M 20 x 54	30	5
FAZ II 20/30	–	501426	–	■	▲	C1 / C2	20	155	172	30/-	M 20 x 54	30	4
FAZ II 20/60	046633	–	–	■	▲	C1 / C2	20	185	202	60/-	M 20 x 84	30	5
FAZ II 20/60	–	503183	–	■	▲	C1 / C2	20	185	202	60/-	M 20 x 84	30	4
FAZ II 20/160	503255	–	–	■	▲	C1 / C2	20	285	302	160/-	M 20 x 100	30	5
FAZ II 24/30	046635	–	–	■	▲	C1	24	185	205	30/-	M 24 x 58	36	5
FAZ II 24/30	–	501427	–	■	▲	C1	24	185	205	30/-	M 24 x 58	36	4
FAZ II 24/60	046636	–	–	■	▲	C1	24	215	235	60/-	M 24 x 88	36	5
FAZ II 24/60	–	503184	–	■	▲	C1	24	215	235	60/-	M 24 x 88	36	4

1) With minimum embedment depth only for statically interdeterminate systems

Approval Seismic C1/C2 only with maximum embedment depth

TECHNICAL DATA

Bolt anchor **FAZ II H**

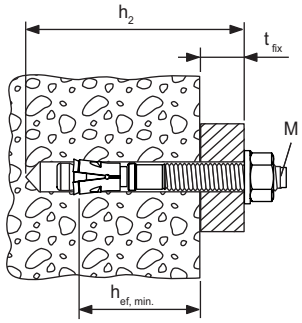


	Zinc-plated steel	Stainless steel	Approval		Seismic-Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. usable length hef,max./ hef,min.	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	ETA	ICC		d_0 [mm]	h_2 [mm]	l [mm]	t_{fix} [mm]	Ø x length [mm]	⬡ SW [mm]	[pcs]
Item	**gvz**	**A4**										
FAZ II 10/10 H	**543392**	**543396**	■	–	C1 / C2	10	87	95	10/30	M 10 x 53	17	20
FAZ II 10/20 H	**543393**	**543397**	■	–	C1 / C2	10	97	105	20/40	M 10 x 63	17	20
FAZ II 12/10 H	**543394**	**543398**	■	–	C1 / C2	12	99	109	10/30	M 12 x 61	19	20
FAZ II 12/20 H	**543395**	**543399**	■	–	C1 / C2	12	109	119	20/40	M 12 x 71	19	20

Approval Seismic C1/C2 only with maximum embedment depth

TECHNICAL DATA

Bolt anchor **FAZ II K**

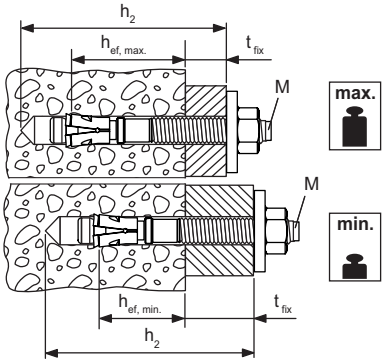


	Zinc-plated steel	Stainless steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Usable length (hef min.)	Thread	Washer (outer diameter x thickness)	Sales unit
	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_2 [mm]	l [mm]	t_{fix} [mm]	Ø x length [mm]	[mm]	[pcs]
Item	**gvz**	**A4**								
FAZ II 8/5 K	**538989**	**538990**	■	8	45	60	5	M 8 x 23	16 x 1,6	50
FAZ II 10/10 K	**522108**	**522116**	■	10	65	75	10	M 10 x 33	20 x 2	50
FAZ II 10/20 K	**522110**	–	■	10	75	85	20	M 10 x 43	20 x 2	25
FAZ II 10/20 K	–	**522117**	■	10	75	85	20	M 10 x 43	20 x 2	50
FAZ II 12/10 K	**522118**	**522122**	■	12	80	90	10	M 12 x 41	24 x 2,5	20
FAZ II 12/20 K	**522119**	**522123**	■	12	90	100	20	M 12 x 51	24 x 2,5	20
FAZ II 10/10 K GS	**522115**	–	■	10	65	75	10	M 10 x 33	25 x 3	50
FAZ II 12/10 K GS	**522121**	–	■	12	80	90	10	M 12 x 41	30 x 3	20

TECHNICAL DATA

Bolt anchor **FAZ II GS** (with large washer)

Bolt anchor **FAZ II HBS** (washer compliant to wood construction standard DIN 1052)



	Steel, zinc-plated, with large washer	Stainless steel, with large washer	Approval	Seismic-Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. usable length hef,max./ hef,min.	Thread	Width across nut	Washer (outer diameter x thickness)	Sales unit
	Art.-No.	Art.-No.	ETA		d_0 [mm]	h_2 [mm]	l [mm]	t_{fix} [mm]	Ø x length [mm]	⬡ SW [mm]	[mm]	[mm]
Item	gvz	A4										
FAZ II 8/10 GS	**094872**	**501398**	■	C1	8	65	75	10/20	M 8 x 38	13	22 x 2,5	50
FAZ II 8/30 GS	**096189**	**501400**	■	C1	8	85	95	30/40	M 8 x 58	13	22 x 2,5	50
FAZ II 10/10 GS	**096291**	**501405**	■	C1 / C2	10	85	95	10/30	M 10 x 53	17	25 x 3	50
FAZ II 10/30 GS	**096297**	–	■	C1 / C2	10	105	115	30/50	M 10 x 73	17	25 x 3	25
FAZ II 10/30 GS	–	**501408**	■	C1 / C2	10	105	115	30/50	M 10 x 73	17	25 x 3	50
FAZ II 12/10 GS	**096303**	**501414**	■	C1 / C2	12	100	110	10/30	M 12 x 61	19	30 x 3	20
FAZ II 12/20 GS	**502530**	–	■	C1 / C2	12	110	120	20/40	M 12 x 71	19	30 x 3	20
FAZ II 12/30 GS	**096340**	**501418**	■	C1 / C2	12	120	130	30/50	M 12 x 81	19	30 x 3	20
FAZ II 12/50 GS	**502531**	–	■	C1 / C2	12	140	150	50/70	M 12 x 101	19	30 x 3	20
FAZ II 12/80 GS	**538430**	–	■	C1 / C2	12	170	180	80/100	M 12 x 131	19	44 x 4	20
FAZ II 12/100 GS	**502532**	–	■	C1 / C2	12	190	200	100/120	M 12 x 151	19	30 x 3	20
FAZ II 12/100 GS	**538702**	–	■	C1 / C2	12	190	200	100/120	M 12 x 151	19	44 x 4	20
FAZ II 12/120 GS	**096367**	–	■	C1 / C2	12	210	220	120/140	M 12 x 171	19	30 x 3	20
FAZ II 12/120 GS	**538703**	–	■	C1 / C2	12	210	220	120/140	M 12 x 171	19	44 x 4	20
FAZ II 12/140 GS	**538433**	–	■	C1 / C2	12	230	240	140/160	M 12 x 186	19	44 x 4	20
FAZ II 12/160 GS	**538431**	–	■	C1 / C2	12	250	260	160/180	M 12 x 186	19	44 x 4	20
FAZ II 12/160 GS	–	**503181**	■	–	12	250	260	160/180	M 12 x 186	19	44 x 4	20
FAZ II 12/180 GS	**538434**	–	■	C1 / C2	12	270	280	180/200	M 12 x 186	19	44 x 4	20
FAZ II 12/200 GS	**538432**	–	■	C1 / C2	12	290	300	200/220	M 12 x 186	19	44 x 4	20
FAZ II 16/160 GS	**503261**	–	■	C1 / C2	16	270	283	160/180	M 16 x 189	24	56 x 5	10
FAZ II 16/160 GS	–	**503182**	■	C1 / C2	16	270	283	160/180	M 16 x 100	24	56 x 5	4
FAZ II 16/200 GS	**096370**	–	■	–	16	310	323	200/220	M 16 x 189	24	56 x 5	10
FAZ II 12/100 HBS	**522951**	–	■	C1 / C2	12	190	205	100/120	M 12 x 151	19	58 x 6	20
FAZ II 12/120 HBS	**522952**	–	■	C1 / C2	12	210	225	120/140	M 12 x 171	19	58 x 6	20
FAZ II 16/160 HBS	**522953**	–	■	C1 / C2	16	270	278	160/180	M 16 x 189	24	68 x 6	10
FAZ II 16/200 HBS	**522954**	–	■	–	16	310	328	200/220	M 16 x 189	24	68 x 6	10

ACCESSORIES

fischer Anchor bolt setting tool **FABS**

Item	Art.-No.	Matching anchor type	Sales unit [pcs]
FABS	**077937**	FAZ II, FBZ, FBN II for diameter from M8 - M12	1

LOADS

Bolt anchor FAZ II, FAZ II K and FAZ II GS (HBS)

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 9)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [4)] [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s [mm]	Min. spacing s_{min} [7)] [mm]	Min. edge distance c_{min} [7)] [mm]
FAZ II 6	gvz	80	40	8	0,7	3,4	45	80	120	35	45
	A4					5,0		125			
	C										
FAZ II 8	gvz	80	35[5)]	20	2,6	7,8	40	200	105	35	40
		90	45		3,8		45	185	135		
	A4	80	35[5)]		2,6	8,9	40	235	105		
		90	45		3,8	9,6	45		135		
	C	80	35[5)]		2,6	8,9	40		105		
		90	45		3,8	9,6	45		135		
FAZ II 10	gvz	90	40	45	4,3	11,3	60	275	120	40	45
		110	60		6,2	12,2	65	255	180		
	A4	90	40		4,3	11,3	60	275	120		
		110	60		6,2	15,1	65	325	180		
	C	90	40		4,3	11,3	60	275	120		
		110	60		6,2	15,1	65	325	180		
FAZ II 12	gvz	100	50	60	6,1	17,5	75	400	150	50	55
		120	70		9,5		100	350	210		
	A4	100	50		6,1	18,8	75	435	150		
		120	70		9,5	21,9	100	450	210		
	C	100	50		6,1	18,8	75	435	150		
		120	70		9,5	21,9	100	450	210		
FAZ II 16	gvz	140	65	110	9,0	28,7	100	545	195	65	65
			85		13,4	31,4	130	585	255		
	A4		65		9,0	28,7	100	545	195		
			85		13,4	39,9	130	760	255		
	C		65		9,0	28,7	100	545	195		
			85		13,4	39,9	130	760	255		
FAZ II 20	gvz	170	100	200	17,1	44,6	150	745	300	95	85
	A4										
	C										
FAZ II 24	gvz	210	125	270	24,0	57,5	170	840	375	100	100
	A4										
	C										

For the design the complete assessment ETA-05/0069, issue date 03.07.2017 has to be considered.[8)]

[1)] The partial safety factors for material resistance as regulated in the ETA as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered. As an single anchor under tension load and shear load without edge influence counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1.5 \cdot h_{ef}$. Concerning shear loads under edge influence and accurate data see ETA.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling, hollow drilling resp. Diamond drilling.

[4)] Eff. anchorage depth: min. anchorage depth, max. anchorage depth.

[5)] The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

[6)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA.

[7)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[8)] The given loads refer to the European Technical Assessment ETA-05/0069, issue date 03.07.2017. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

[9)] A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0.3$mm.

LOADS

Bolt anchor FAZ II, FAZ II K and FAZ II GS (HBS)

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [4)] [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [6)] [kN]	Permissible shear load V_{perm} [6)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s [mm]	Min. spacing s_{min} [7)] [mm]	Min. edge distance c_{min} [7)] [mm]
FAZ II 6	gvz	80	40	8	3,6	3,4	45	55	120	35	45
	A4				5,0	5,0	50	85			
	C										
FAZ II 8	gvz	80	35[5)]	20	5,0	7,8	85	140	105	40	40
		90	45		6,7		80	125	135		
	A4	80	35[5)]		5,0	9,6	85	175	105		
		90	45		6,7		80	160	135		
	C	80	35[5)]		5,0		85	175	105		
		90	45		6,7		80	160	135		
FAZ II 10	gvz	90	40	45	6,1	12,2	80	205	120	40	45
		110	60		9,5		75	175	180		
	A4	90	40		6,1	15,1	80	260	120		
		110	60		9,5		75	220	180		
	C	90	40		6,1		80	260	120		
		110	60		9,5		75	220	180		
FAZ II 12	gvz	100	50	60	8,5	17,5	100	275	150	50	55
		120	70		10,5		80	240	210		
	A4	100	50		8,5	21,9	100	350	150		
		120	70		10,5		80	305	210		
	C	100	50		8,5		100	350	150		
		120	70		10,5		80	305	210		
FAZ II 16	gvz	140	65	110	12,6	31,4	130	410	195	65	65
			85		18,8		170	400	255		
	A4		65		12,6	39,9	130	535	195		
			85		18,8		170	520	255		
	C		65		12,6		130	535	195		
			85		18,8		170	520	255		
FAZ II 20	gvz	170	100	200	24,0	46,5	230	530	300	95	95
	A4					60,7		515			
	C										
FAZ II 24	gvz	210	125	270	33,6	62,9	265	630	375	100	135
	A4					80,7		835			
	C										

For the design the complete assessment ETA-05/0069, issue date 03.07.2017 has to be considered.[8)]

[1)] The partial safety factors for material resistance as regulated in the ETA as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor under tension load and shear load without edge influence counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1.5 \cdot h_{ef}$. Concerning shear loads under edge influence and accurate data see ETA.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling, hollow drilling resp. Diamond drilling.

[4)] Eff. anchorage depth: min. anchorage depth, max. anchorage depth.

[5)] The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

[6)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA.

[7)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[8)] The given loads refer to the European Technical Assessment ETA-05/0069, issue date 03.07.2017. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

Strong, secure and aesthetic anchoring

Steel girders

Banisters

VERSIONS

- Zinc-plated steel
- Stainless steel

BUILDING MATERIALS

- Concrete C20/25, cracked and non-cracked

CERTIFICATES

ETA-07/0025
ETAG 001-2
Option 1 for cracked concrete
Seismic performance category C1, C2

FM APPROVED from M10

Fire resistance classification R 120
Anchor types see test report

ICC ES ESR-2691
See ICC-ES Evaluation Report at www.icc-es.org

EDELSTAHL Rostfrei INOX STAINLESS STEEL

M8 - M20

SEISMIC

ADVANTAGES

- The international approvals guarantee maximum safety and the best performance. These approvals even cover use in earthquake zones (seismic C1 and C2).
- The anchor is designed with different head styles for fixing points with aesthetic design.
- The design between the bolt and the sleeve ensures high shear load-bearing capacity. Thus, fewer fixing points are required.
- The optimised geometry minimises the energy required for installation and thus allows for fast installation.
- The use of hollow drills is included in the approval.

APPLICATIONS

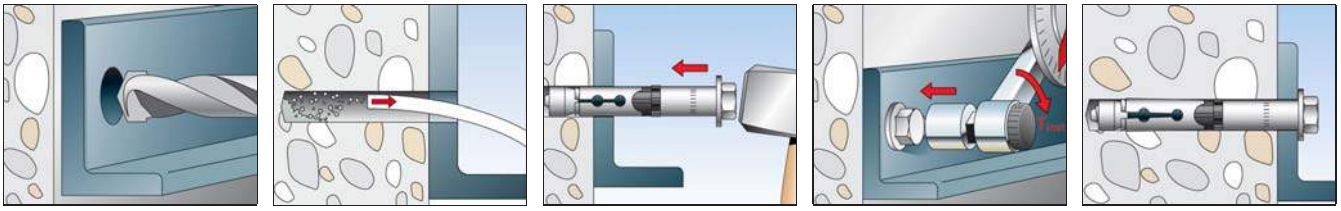
- Guard rails
- Staircases
- Consoles
- Steel constructions
- Ladders
- Cable trays
- Machines
- Gates
- Façades
- Gratings

FUNCTIONING

- The FH II is suitable for push-through installation.
- When the torque is applied, the cone is pulled into the expansion sleeve which is forced against the drill hole wall.
- The black plastic ring prevents rotation when tightening the anchor and acts as a crumple zone to take the torque slippage, so that the fixture of pulled onto the substrate.
- Alternative head designs for flexible design solutions:
  Hexagon head (type S), countersunk head (type SK), bolt version with nut and washer (type B) and cap nut (type H).

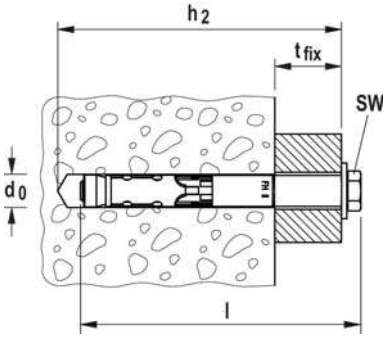
High performance anchor FH II

INSTALLATION



TECHNICAL DATA

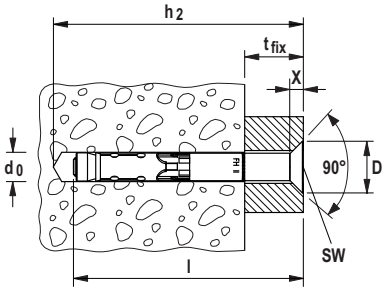
High performance anchor **FH II-S** with hexagonal head



	Zinc-plated steel	Stainless steel	Approval		Seismic-Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	ETA	ICC		d_0 [mm]	h_2 [mm]	l [mm]	t_{fix} [mm]	M	⬡ SW [mm]	[pcs]
Item	gvz	A4										
FH II 10/10 S	503133	–	■	–	–	10	65	70	10	M 6	10	50
FH II 10/10 S	–	510923	■	–	–	10	65	69	10	M 6	10	50
FH II 10/25 S	503134	–	■	–	–	10	80	85	25	M 6	10	50
FH II 10/25 S	–	510924	■	–	–	10	80	84	25	M 6	10	50
FH II 10/50 S	503135	–	■	–	–	10	105	110	50	M 6	10	50
FH II 12/10 S	044884	–	■	▲	C1 / C2	12	90	90	10	M 8	13	50
FH II 12/10 S	–	510925	■	–	C1 / C2	12	90	90	10	M 8	13	50
FH II 12/25 S	044885	–	■	▲	C1 / C2	12	105	105	25	M 8	13	50
FH II 12/25 S	–	510926	■	–	C1 / C2	12	105	105	25	M 8	13	20
FH II 12/50 S	044886	–	■	▲	C1 / C2	12	130	130	50	M 8	13	25
FH II 15/10 S	044887	–	■	▲	C1 / C2	15	100	106	10	M 10	17	25
FH II 15/10 S	–	510927	■	–	C1 / C2	15	100	107	10	M 10	17	50
FH II 15/25 S	044888	–	■	▲	C1 / C2	15	115	121	25	M 10	17	25
FH II 15/25 S	–	510928	■	–	C1 / C2	15	115	122	25	M 10	17	20
FH II 15/50 S	044889	–	■	▲	C1 / C2	15	140	146	50	M 10	17	25
FH II 18/10 S	046847	–	■	▲	C1 / C2	18	115	118	10	M 12	19	20
FH II 18/25 S	044894	–	■	▲	C1 / C2	18	130	132	25	M 12	19	20
FH II 18/25 S	–	510929	■	–	C1 / C2	18	130	133	25	M 12	19	10
FH II 18/50 S	044896	–	■	▲	C1 / C2	18	155	157	50	M 12	19	20
FH II 24/25 S	044898	–	■	▲	C1 / C2	24	150	160	25	M 16	24	10
FH II 24/25 S	–	502711	■	–	C1 / C2	24	150	160	25	M 16	24	8
FH II 24/50 S	044900	–	■	▲	C1 / C2	24	175	185	50	M 16	24	10
FH II 28/30 S	044901	–	■	▲	C1 / C2	28	185	192	30	M 20	30	4
FH II 28/60 S	044902	–	■	▲	C1 / C2	28	215	222	60	M 20	30	4
FH II 32/30 S	044903	–	■	▲	C1 / C2	32	210	215	30	M 24	36	4
FH II 32/60 S	044904	–	■	▲	C1 / C2	32	240	245	60	M 24	36	4

TECHNICAL DATA

High performance anchor **FH II-SK** with countersunk head

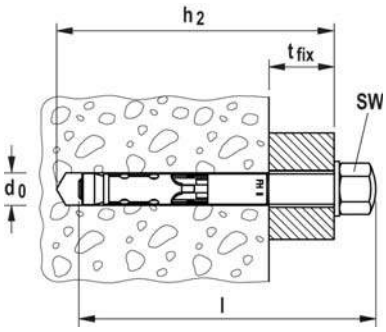


	X [mm]	ØD [mm]
FH II 10/... SK	5,0	19,5
FH II 12/... SK	5,8	22
FH II 15/... SK	5,8	25
FH II 18/... SK	8,0	32

	Zinc-plated steel	Stainless steel	Approval		Seismic-Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Thread	Width across nut (hexagon socket)	Sales unit
	Art.-No.	Art.-No.	ETA	ICC		d_0 [mm]	h_2 [mm]	l [mm]	t_{fix} [mm]	M	⬡ SW [mm]	[pcs]
Item	gvz	A4										
FH II 10/15 SK	503136	–	■	–	–	10	70	65	15	M 6	4	50
FH II 10/25 SK	503137	–	■	–	–	10	80	75	25	M 6	4	50
FH II 10/50 SK	503138	–	■	–	–	10	105	100	50	M 6	4	50
FH II 12/15 SK	–	510931	■	–	–	12	95	90	15	M 8	5	25
FH II 12/15 SK	044917	–	■	–	C1 / C2	12	95	90	15	M 8	5	25
FH II 12/25 SK	044918	–	■	–	C1 / C2	12	105	100	25	M 8	5	25
FH II 12/30 SK	–	510932	■	–	C1 / C2	12	110	105	30	M 8	5	25
FH II 12/50 SK	044919	510933	■	–	C1 / C2	12	130	125	50	M 8	5	25
FH II 15/15 SK	044920	510934	■	▲	C1 / C2	15	105	100	15	M 10	6	25
FH II 15/25 SK	044921	–	■	▲	C1 / C2	15	115	110	25	M 10	6	25
FH II 15/50 SK	044922	–	■	▲	C1 / C2	15	140	135	50	M 10	6	25
FH II 18/15 SK	044923	–	■	▲	C1 / C2	18	120	115	15	M 12	8	20
FH II 18/25 SK	044924	–	■	▲	C1 / C2	18	130	125	25	M 12	8	20
FH II 18/30 SK	–	510935	■	–	C1 / C2	18	135	130	30	M 12	8	20
FH II 18/50 SK	044925	–	■	▲	C1 / C2	18	155	150	50	M 12	8	20

TECHNICAL DATA

High performance anchor **FH II-H** with cap nut

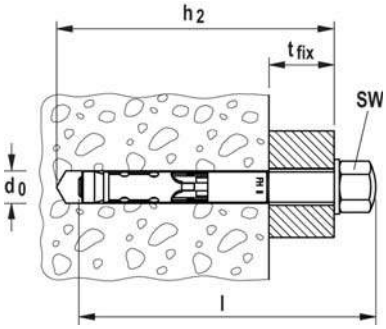


	Zinc-plated steel	Approval		Seismic-Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Thread	Width across nut	Sales unit
	Art.-No.	ETA	ICC		d_0 [mm]	h_2 [mm]	l [mm]	t_{fix} [mm]	M	⬡ SW [mm]	[pcs]
Item	gvz										
FH II 10/10 H	503139	■	–	–	10	65	75	10	M 6	13	50
FH II 10/25 H	503140	■	–	–	10	80	90	25	M 6	13	50
FH II 10/50 H	503141	■	–	–	10	105	115	50	M 6	13	50
FH II 12/10 H	044905	■	–	C1 / C2	12	90	100	10	M 8	17	50
FH II 12/25 H	044906	■	–	C1 / C2	12	105	115	25	M 8	17	50
FH II 12/50 H	044907	■	–	C1 / C2	12	130	140	50	M 8	17	25
FH II 15/10 H	044908	■	▲	C1 / C2	15	100	115	10	M 10	17	25

High performance anchor FH II

TECHNICAL DATA

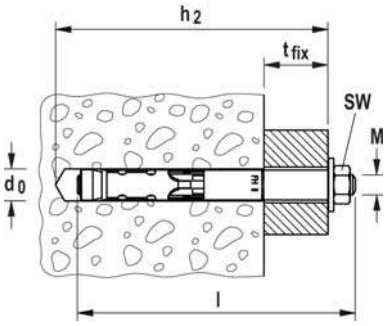
High performance anchor **FH II-H** with cap nut



	Zinc-plated steel	Approval		Seismic-Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Thread	Width across nut	Sales unit
	Art.-No.	ETA	ICC		d_0 [mm]	h_2 [mm]	l [mm]	t_{fix} [mm]	M	⬡ SW [mm]	[pcs]
Item	gvz										
FH II 15/25 H	**044909**	■	▲	C1 / C2	15	115	130	25	M 10	17	25
FH II 15/50 H	**044910**	■	▲	C1 / C2	15	140	155	50	M 10	17	25
FH II 18/25 H	**044915**	■	▲	C1 / C2	18	130	145	25	M 12	19	20
FH II 18/50 H	**044916**	■	▲	C1 / C2	18	155	170	50	M 12	19	20

TECHNICAL DATA

High performance anchor **FH II-B** with hexagon nut and threaded bolt



	Zinc-plated steel	Approval		Seismic-Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Thread	Width across nut	Sales unit
	Art.-No.	ETA	ICC		d_0 [mm]	h_2 [mm]	l [mm]	t_{fix} [mm]	M	⬡ SW [mm]	[pcs]
Item	gvz										
FH II 10/10 B	**503142**	■	–	–	10	65	70	10	M 6	10	50
FH II 10/25 B	**503143**	■	–	–	10	80	85	25	M 6	10	50
FH II 10/50 B	**503144**	■	–	–	10	105	110	50	M 6	10	50
FH II 12/10 B	**048773**	■	▲	C1 / C2	12	90	95	10	M 8	13	50
FH II 12/100 B	**046832**	■	▲	C1 / C2	12	180	185	100	M 8	13	25
FH II 12/25 B	**048774**	■	▲	C1 / C2	12	105	110	25	M 8	13	50
FH II 12/50 B	**048775**	■	▲	C1 / C2	12	130	135	50	M 8	13	25
FH II 15/10 B	**048776**	■	▲	C1 / C2	15	100	110	10	M 10	17	25
FH II 15/100 B	**046835**	■	▲	C1 / C2	15	190	200	100	M 10	17	20
FH II 15/25 B	**048777**	■	▲	C1 / C2	15	115	125	25	M 10	17	25
FH II 15/50 B	**048778**	■	▲	C1 / C2	15	140	150	50	M 10	17	25
FH II 18/100 B	**046841**	■	▲	C1 / C2	18	205	215	100	M 12	19	10
FH II 18/25 B	**048779**	■	▲	C1 / C2	18	130	140	25	M 12	19	20
FH II 18/50 B	**048780**	■	▲	C1 / C2	18	155	165	50	M 12	19	20
FH II 24/100 B	**046842**	■	▲	C1 / C2	24	225	242	100	M 16	24	5
FH II 24/25 B	**048886**	■	▲	C1 / C2	24	150	167	25	M 16	24	10
FH II 24/50 B	**048887**	■	▲	C1 / C2	24	175	192	50	M 16	24	10
FH II 28/30 B	**047547**	■	▲	C1 / C2	28	185	199	30	M 20	30	4
FH II 28/60 B	**047548**	■	▲	C1 / C2	28	215	229	60	M 20	30	4
FH II 32/30 B	**047549**	■	▲	C1 / C2	32	210	231	30	M 24	36	4
FH II 32/60 B	**047550**	■	▲	C1 / C2	32	240	261	60	M 24	36	4

LOADS

High performance anchor FH II-S

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 8)]										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
FH II 10 S	gvz	80	40	10	3,6	4,3	50	105	120	40	40
	A4			15							
FH II 12 S	gvz	120	60	22,5	5,7	15,9	60	320	180	50	50
	A4			25							
FH II 15 S	gvz	140	70	40	7,6	20,1	75	365	210	60	60
	A4										
FH II 18 S	gvz	160	80	80	11,9	24,5	120	410	240	70	70
	A4			100							
FH II 24 S	gvz	200	100	160	17,1	34,3	150	495	300	80	80
	A4										
FH II 28 S [4)]	gvz	250	125	180	24,0	47,9	190	610	375	100	100
FH II 32 S [4)]	gvz	300	150	200	31,5	63,0	225	720	450	120	120

For the design the complete assessment ETA-07/0025 has to be considered.[7)]

1) The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-07/0025.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling resp. hollow drilling.

4) Drill method hollow drilling is not permitted for this size.

5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

6) Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0025.

7) The given loads refer to the European Technical Assessment ETA-07/0025, issue date 28.08.2018. Design of the loads according to FprEN 1992-4:2016 and EOTA Technical Report TR 055 (for static resp. quasi-static loads).

8) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0.3$mm.

LOADS

High performance anchor FH II-SK

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 8)]										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
FH II 10 SK [4)]	gvz	80	40	10	3,6	4,3	50	105	120	40	40
FH II 12 SK	gvz	120	60	22,5	5,7	15,9	60	320	180	50	50
	A4										
FH II 15 SK	gvz	140	70	40	7,6	20,1	75	365	210	60	60
	A4										
FH II 18 SK	gvz	160	80	80	11,9	24,5	120	410	240	70	70
	A4			100							

For the design the complete assessment ETA-07/0025 has to be considered.[7)]

1) The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-07/0025.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling resp. hollow drilling.

4) Drill method hollow drilling is not permitted for this size.

5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

6) Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0025.

7) The given loads refer to the European Technical Assessment ETA-07/0025, issue date 28.08.2018. Design of the loads according to FprEN 1992-4:2016 and EOTA Technical Report TR 055 (for static resp. quasi-static loads).

8) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0.3$mm.

LOADS

High performance anchor FH II-H

zinc plated steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 7)]										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [5)] [mm]	Min. edge distance c_{min} [5)] [mm]
FH II 10 H	gvz	80	40	10	3,6	4,3	50	105	120	40	40
FH II 12 H	gvz	120	60	22,5	5,7	15,5	60	315	180	50	50
FH II 15 H	gvz	140	70	40	7,6	20,1	75	365	210	60	60
FH II 18 H	gvz	160	80	80	11,9	24,5	120	410	240	70	70

For the design the complete assessment ETA-07/0025 has to be considered.[6)]

1) The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-07/0025.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling resp. hollow drilling.

4) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

5) Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0025.

6) The given loads refer to the European Technical Assessment ETA-07/0025, issue date 28.08.2018. Design of the loads according to FprEN 1992-4:2016 and EOTA Technical Report TR 055 (for static resp. quasi-static loads).

7) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0.3$mm.

LOADS

High performance anchor FH II-B

zinc plated steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 8)]										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
FH II 10 B	gvz	80	40	10	3,6	4,3	50	105	120	40	40
FH II 12 B	gvz	120	60	17,5	5,7	15,5	60	315	180	50	50
FH II 15 B	gvz	140	70	38	7,6	20,1	75	365	210	60	60
FH II 18 B	gvz	160	80	80	11,9	24,5	120	410	240	70	70
FH II 24 B	gvz	200	100	120	17,1	34,3	150	495	300	80	80
FH II 28 B [4)]	gvz	250	125	180	24,0	47,9	190	610	375	100	100
FH II 32 B [4)]	gvz	300	150	200	31,5	63,0	225	720	450	120	120

For the design the complete assessment ETA-07/0025 has to be considered.[7)]

1) The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-07/0025.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling resp. hollow drilling.

4) Drill method hollow drilling is not permitted for this size.

5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

6) Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0025.

7) The given loads refer to the European Technical Assessment ETA-07/0025, issue date 28.08.2018. Design of the loads according to FprEN 1992-4:2016 and EOTA Technical Report TR 055 (for static resp. quasi-static loads).

8) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0.3$mm.

LOADS

High performance anchor FH II-S

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
FH II 10 S	gvz	80	40	10	6,1	6,1	95	100	120	40	40
	A4			15							
FH II 12 S	gvz	120	60	22,5	11,2	18,9	150	265	180	60	60
	A4			25	9,5	17,7	125	245			
FH II 15 S	gvz	140	70	40	14,1	28,2	160	365	210	70	70
	A4										
FH II 18 S	gvz	160	80	80	17,2	34,4	170	405	240	80	80
	A4			100							
FH II 24 S	gvz	200	100	160	24,0	48,1	190	495	300	100	100
	A4										
FH II 28 S [4)]	gvz	250	125	180	33,6	67,2	240	605	375	120	120
FH II 32 S [4)]	gvz	300	150	200	44,2	88,4	285	715	450	160	180

For the design the complete assessment ETA-07/0025 has to be considered.[7)]

1) The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-07/0025.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling resp. hollow drilling.

4) Drill method hollow drilling is not permitted for this size.

5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

6) Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0025.

7) The given loads refer to the European Technical Assessment ETA-07/0025, issue date 28.08.2018. Design of the loads according to FprEN 1992-4:2016 and EOTA Technical Report TR 055 (for static resp. quasi-static loads).

LOADS

High performance anchor FH II-SK

zinc plated steel / stainless steel A4

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
FH II 10 SK [4)]	gvz	80	40	10	6,1	6,1	95	100	120	40	40
FH II 12 SK	gvz	120	60	22,5	11,2	18,9	150	265	180	60	60
	A4										
FH II 15 SK	gvz	140	70	40	14,1	28,2	160	365	210	70	70
	A4										
FH II 18 SK	gvz	160	80	80	17,2	34,4	170	405	240	80	80
	A4			100							

For the design the complete assessment ETA-07/0025 has to be considered.[7)]

1) The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-07/0025.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling resp. hollow drilling.

4) Drill method hollow drilling is not permitted for this size.

5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

6) Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0025.

7) The given loads refer to the European Technical Assessment ETA-07/0025, issue date 28.08.2018. Design of the loads according to FprEN 1992-4:2016 and EOTA Technical Report TR 055 (for static resp. quasi-static loads).

LOADS

High performance anchor FH II-H

zinc plated steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [5)] [mm]	Min. edge distance c_{min} [5)] [mm]
FH II 10 H	gvz	80	40	10	6,1	6,1	95	100	120	40	40
FH II 12 H	gvz	120	60	22,5	11,2	15,5	150	215	180	60	60
FH II 15 H	gvz	140	70	40	14,1	24,5	160	310	210	70	70
FH II 18 H	gvz	160	80	80	17,2	34,4	170	405	240	80	80

For the design the complete assessment ETA-07/0025 has to be considered.[6)]

1) The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-07/0025.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling resp. hollow drilling.

4) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

5) Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0025.

6) The given loads refer to the European Technical Assessment ETA-07/0025, issue date 28.08.2018. Design of the loads according to FprEN 1992-4:2016 and EOTA Technical Report TR 055 (for static resp. quasi-static loads).

LOADS

High performance anchor FH II-B

zinc plated steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
FH II 10 B	gvz	80	40	10	6,1	6,1	95	100	120	40	40
FH II 12 B	gvz	120	60	17,5	11,2	15,5	150	215	180	60	60
FH II 15 B	gvz	140	70	38	14,1	24,5	160	310	210	70	70
FH II 18 B	gvz	160	80	80	17,2	34,4	170	405	240	80	80
FH II 24 B	gvz	200	100	120	24,0	48,1	190	495	300	100	100
FH II 28 B [4)]	gvz	250	125	180	33,6	67,2	240	605	375	120	120
FH II 32 B [4)]	gvz	300	150	200	44,2	88,4	285	715	450	160	180

For the design the complete assessment ETA-07/0025 has to be considered.[7)]

1) The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-07/0025.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling resp. hollow drilling.

4) Drill method hollow drilling is not permitted for this size.

5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

6) Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0025.

7) The given loads refer to the European Technical Assessment ETA-07/0025, issue date 28.08.2018. Design of the loads according to FprEN 1992-4:2016 and EOTA Technical Report TR 055 (for static resp. quasi-static loads).

Strong, secure and aesthetic with internal thread for the removal option of the attachment

Stadium seating

Air conditioning units

VERSIONS

- Zinc-plated steel
- Stainless steel

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

CERTIFICATES

ADVANTAGES

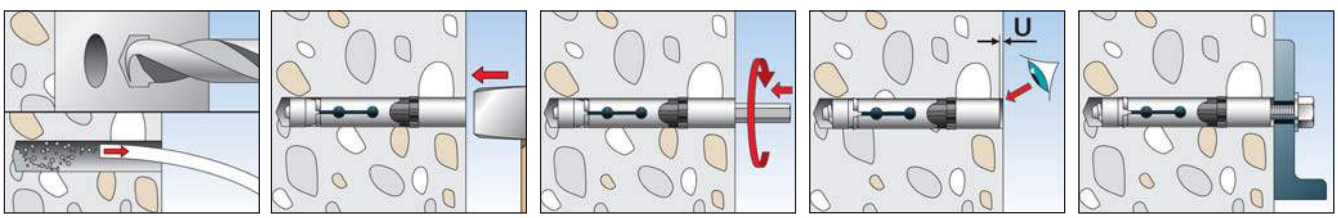
- The international approvals guarantee maximum safety and the best performance. The European Technical Assessment even cover use in earthquake zones (seismic C1 and C2).
- The internal threaded anchor allows the removal of the attachment and the fixing point can be reused.
- The design between the bolt and the sleeve ensures high shear load-bearing capacity. Thus, fewer fixing points are required.
- The optimised geometry intelligently reduces the energy required for assembly.
- The approval regulates the use of hollow drills.

APPLICATIONS

- Steel constructions
- Guard rails
- Consoles
- Ladders
- Cable trays
- Machines
- Staircases
- Pipeline routes
- Ventilation systems
- Sprinkler systems

FUNCTIONING

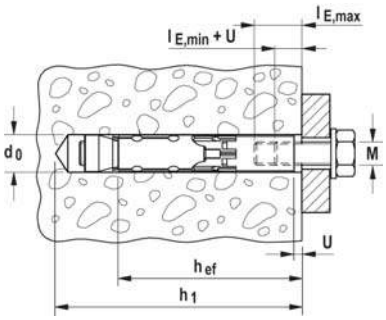
- The FH II-I is suitable for pre-positioned installation.
- When a hexagon wrench is used for installation, the internal thread bolt starts to rotate. This pulls the cone into the expansion sleeve and expands it against the drill-hole wall. At the same time, the anchor is tightened through compression of the black plastic ring. A gap U to the concrete surface is created (see image 4).
- The anchor is set according to the approval when the gap U is 3-5 mm. Alternatively, an installation torque of T_{inst} can also be applied.



High performance anchor FH II-I

TECHNICAL DATA

High performance anchor **FH II-I**



	Zinc plated, steel grade 8.8	Stainless steel	Approval	Drill hole diameter	Min. drill hole depth for pre-positioned installation	Anchor length	Thread	Min. bolt penetration	Max. bolt penetration	Sales unit
	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_1 [mm]	l [mm]	M	$l_{E,min}$ [mm]	$l_{E,max}$ [mm]	[pcs]
Item	**gvz**	**A4**								
FH II 12/M6 I	**520358**	**520360**	■	12	85	77.5	M 6	11 + U	25	25
FH II 12/M8 I	**520359**	**520361**	■	12	85	77.5	M 8	13 + U	25	25
FH II 15/M10 I	**519014**	**519018**	■	15	95	90	M 10	10 + U	25	25
FH II 15/M12 I	**519015**	**519019**	■	15	95	90	M 12	12 + U	25	20

ACCESSORIES

Setting tool **FH II-I**

Item	Art.-No.	Matching anchor type	Sales unit [pcs]
Setting tool FH II-I M6-M10	**532780**	FH II 12/M6 I, FH II 15/M 10 I	10
Setting tool FH II-I M8-M12	**532781**	FH II 12/M8 I, FH II 15/M 12 I	10

LOADS

High performance anchor with internal thread FH II-I

zinc plated steel / stainless steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [1)2)3)6)]										Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s [mm]	Min. spacing s_{min} [mm]	Min. edge distance c_{min} [mm]
FH II 12/M 6 I	5.8	130	60	15	4,3	2,9	55	55	180	50	50
	8.8					4,6		80			
	A4-70					3,2		60			
FH II 12/M 8 I	5.8	130	60	15	4,3	5,1	55	90	180	50	50
	8.8					8,0		145			
	A4-70					6,0		105			
FH II 15/M 10 I	5.8	150	70	25	5,7	8,6	65	135	210	60	60
	8.8					13,1		220			
	A4-70					9,2		145			
FH II 15/M 12 I	5.8	150	70	25	5,7	12,0	65	200	210	60	60
	8.8					13,7		230			
	A4-70										

For the design the complete assessment ETA-07/0025 has to be considered.[5)]

[1)] The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of γ_F = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-07/0025..

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method Hammer drilling resp. hollow drilling.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-07/0025.

[5)] The given loads refer to the European Technical Assessment ETA-07/0025, issue date 09/12/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

[6)] A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0.3$mm begrenzt.

LOADS

High performance anchor with internal thread FH II-I

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]									Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s [mm]	Min. spacing s_{min} [mm]	Min. edge distance c_{min} [mm]
FH II 12/M 6 I	5.8	130	60	15	4,8	2,9	60	60	180	60	60
	8.8				7,6	4,6	85				
	A4-70				5,3	3,2	60				
FH II 12/M 8 I	5.8	130	60	15	9,0	5,1	115	65	180	60	60
	8.8				9,5	8,0	125	100			
	A4-70					6,0		75			
FH II 15/M 10 I	5.8	150	70	25	13,8	8,6	160	95	210	70	70
	8.8				14,1	13,1		150			
	A4-70					9,2		100			
FH II 15/M 12 I	5.8	150	70	25	14,1	12,0	160	135	210	70	70
	8.8					13,7		155			
	A4-70										

For the design the complete assessment ETA-07/0025 has to be considered.[5)]

[1)] The partial safety factors for material resistance as regulated in the ETA-07/0025 as well as a partial safety factor for load actions of γ_F = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-07/0025..

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method Hammer drilling resp. hollow drilling.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-07/0025.

[5)] The given loads refer to the European Technical Assessment ETA-07/0025, issue date 09/12/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

The fixing system with the highest safety in cracked concrete

Steel girders

Installations in tunnels

VERSIONS

- Zinc-plated steel
- Stainless steel

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

CERTIFICATES

ETA-98/004
ETAG 001-3
Option 1 for cracked concrete
Seismic performance category C1

Fire resistance classification R 120
Anchor types see test report

EDELSTAHL Rost frei
INOX STAINLESS STEEL

from M8

SEISMIC

ADVANTAGES

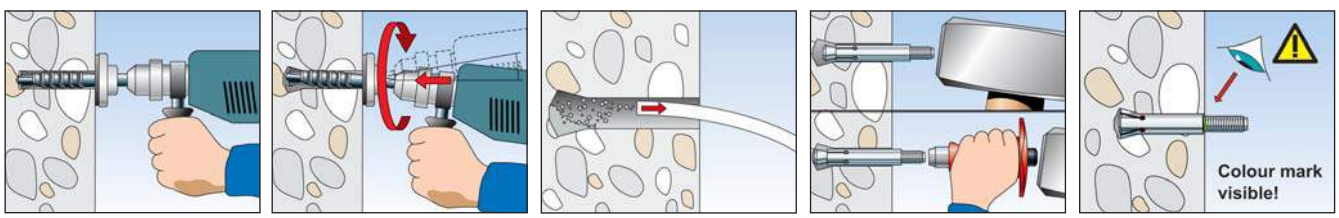
- The special ZYKON undercut technology allows for a positive fit connection and ensures maximum safety, even in large cracks.
- The almost expansion-free installation of the anchor allows small edge distances and axial spacing, and thereby enables flexible use.
- The FZUB special drill allows for a fast installation by creating the undercut without having to change tools.
- The drill hole geometry allows for a very low setting energy, thus reducing the energy required for installation.
- The ideal interaction of threaded bolts and sleeve with FZA-D allows for a high shear load and therefore fewer fixing points.

APPLICATIONS

- Steelwork constructions
- Guard rails
- Consoles
- Step irons (FZA-ST)
- Ladders
- Cable trays
- Machines
- Staircases
- Gates
- Façades

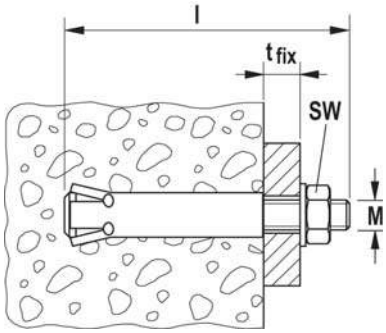
FUNCTIONING

- The FZA and FZA-I is suitable for pre-positioned installation, whereas the FZA-D is suitable for push-through installation.
- The undercut drill hole is created using the special FZUB drill.
- Once the anchor has been placed in the drill hole, the expansion sleeve is driven over the cone using the FZE Plus setting tool, and the undercut drill hole is filled with a positive fit.



TECHNICAL DATA

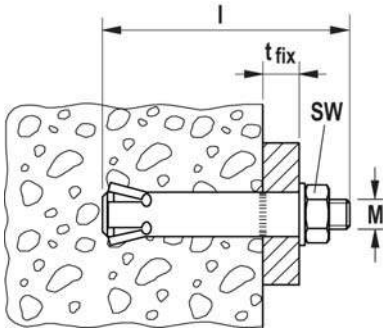
ZYKON Bolt anchor **FZA**



	Zinc-plated steel	Stainless steel	Approval	Seismic-Approval	Required drill bit FZUB	Required setting tool FZE plus	Bolt length	Max. fixture thickness	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	ETA				l [mm]	t_{fix} [mm]	M	○ SW [mm]	[pcs]
Item	gvz	A4									
FZA 10 x 40 M6/10	**060712**	**060772**	■	–	10 x 40	FZE 10 plus	60	10	M 6	10	25
FZA 12 x 40 M 8/15	**060715**	**060775**	■	–	12 x 40	FZE 12 plus	69	15	M 8	13	25
FZA 12 x 50 M 8/15	**060716**	**060776**	■	–	12 x 50	FZE 12 plus	79	15	M 8	13	20
FZA 12 x 50 M 8/50	**–**	**060774**	■	–	12 x 50	FZE 12 plus	114	50	M 8	13	20
FZA 14 x 40 M10/25	**060718**	**–**	■	C1	14 x 40	FZE 14 plus	79	25	M 10	17	25
FZA 14 x 40 M10/25	**–**	**060778**	■	C1	14 x 40	FZE 14 plus	79	25	M 10	17	20
FZA 14 x 60 M10/25	**060719**	**060779**	■	C1	14 x 60	FZE 14 plus	102	25	M 10	17	10
FZA 14 x 60 M10/50	**–**	**060766**	■	C1	14 x 60	FZE 14 plus	126	50	M 10	17	10
FZA 18 x 80 M12/25	**060721**	**060781**	■	C1	18 x 80	FZE 18 plus	126	25	M 12	19	10
FZA 18 x 80 M12/55	**–**	**060767**	■	C1	18 x 80	FZE 18 plus	156	55	M 12	19	10
FZA 22 x 100 M16/60	**060724**	**060782**	■	C1	22 x 100	FZE 22 plus	184	60	M 16	24	10
FZA 22 x 125 M16/60	**060725**	**060768**	■	C1	22 x 125	FZE 22 plus	209	60	M 16	24	6

TECHNICAL DATA

ZYKON Through anchor **FZA-D**

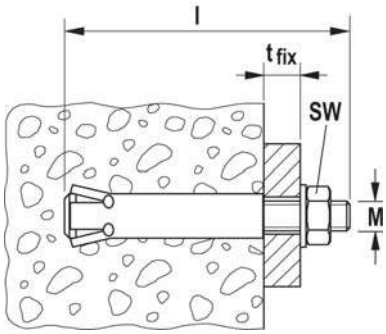


	Zinc-plated steel	Stainless steel	Approval	Seismic-Approval	Required drill bit FZUB	Required setting tool FZE plus	Bolt length	Max. fixture thickness	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	ETA				l [mm]	t_{fix} [mm]	M	○ SW [mm]	[pcs]
Item	gvz	A4									
FZA 12 x 50 M 8 D/10	**060652**	**060664**	■	–	12 x 50	FZE 12 plus	69	10	M 8	13	25
FZA 12 x 60 M 8 D/10	**060653**	**060665**	■	–	12 x 60	FZE 12 plus	79	10	M 8	13	25
FZA 12 x 80 M 8 D/30	**060654**	**060666**	■	–	12 x 80	FZE 12 plus	99	30	M 8	13	25
FZA 14 x 80 M10 D/20	**060657**	**060669**	■	C1	14 x 80	FZE 14 plus	102	20	M 10	17	10
FZA 14 x 100 M 8 D/30	**060658**	**060670**	■	C1	14 x 100	FZE 14 plus	126	40	M 10	17	10
FZA 18 x 100 M12 D/20	**060684**	**060672**	■	C1	18 x 100	FZE 18 plus	126	20	M 12	19	10
FZA 18 x 130 M12 D/50	**060685**	**060673**	■	C1	18 x 130	FZE 18 plus	156	50	M 12	19	10
FZA 22 x 125 M16 D/25	**060663**	**060675**	■	C1	22 x 125	FZE 22 plus	156	25	M 16	24	10

ZYKON undercut anchor FZA

TECHNICAL DATA

Zykon anchor for fixing step irons
FZA ST A4

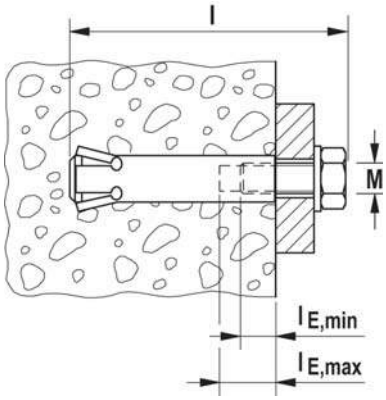


	Stainless steel Art.-No.		Required drill bit FZUB	Required setting tool FZE plus	Max. fixture thickness t_{fix} [mm]	Thread M	Width across nut ⬡ SW [mm]	Sales unit [pcs]	
Item	**A4**								
FZA 14 x 40 ST A4	**060686** 1)		14 x 40	FZE 14 plus	30	M 10	16	20	
FZA 14 x 60 ST A4	**060687** 1)		14 x 60	FZE 14 plus	30	M 10	16	20	

1) According to DIN 1211GS/1212GS.

TECHNICAL DATA

ZYKON Internally-threaded anchor **FZA-I**



	Zinc-plated steel Art.-No.	Stainless steel Art.-No.	Approval ETA	Required drill bit FZUB	Required setting tool FZE plus	Internal thread A1	Min. bolt penetration $l_{E,min}$ [mm]	Max. bolt penetration $l_{E,max}$ [mm]	Sales unit [pcs]
Item	**gvz**	**A4**							
FZA 12 x 40 M6 I	**060758**	**060783**	■	12 x 40	FZE 12 plus	M 6	10	15	25
FZA 12 x 50 M6 I	**–**	**060784**	■	12 x 50	FZE 12 plus	M 6	10	15	25
FZA 14 x 60 M8 I	**060760**	**060786**	■	14 x 60	FZE 14 plus	M 8	11	17	20
FZA 18 x 80 M10 I	**060761**	**060787**	■	18 x 80	FZE 18 plus	M 10	13	21	10
FZA 22 x 100 M12 I	**060763**	**060788**	■	22 x 100	FZE 22 plus	M 12	15	25	10
FZA 22 x 125 M12 I	**060769**	**060770**	■	22 x 125	FZE 22 plus	M 12	15	25	10

ACCESSORIES

Drill bit **FZUB**

Item	Art.-No.	Fits anchor			Sales unit
		bolt anchor	push-through anchor	internal thread anchor	[pcs]
FZUB 10 x 40	**060622**	FZA 10 x 40 M6	-	-	1
FZUB 12 x 40	**060623**	FZA 12 x 40 M8	-	FZA 12 x 40 M6 I	1
FZUB 12 x 50	**060627**	FZA 12 x 50 M8	FZA 12 x 50 M8 D/10	FZA 12 x 50 M6 I	1
FZUB 12 x 60	**060625**	-	FZA 12 x 60 M8 D/10	-	1
FZUB 12 x 80	**060626**	-	FZA 12 x 80 M8 D/30	-	1
FZUB 14 x 40	**060624**	FZA 14 x 40 M10	-	-	1
FZUB 14 x 60	**060628**	FZA 14 x 60 M10	-	FZA 14 x 60 M8 I	1
FZUB 14 x 80	**060629**	-	FZA 14 x 80 M10 D/20	-	1
FZUB 14 x 100	**060630**	-	FZA 14 x 100 M10 D/40	-	1
FZUB 18 x 80	**060634**	FZA 18 x 80 M12	-	FZA 18 x 80 M10I	1
FZUB 18 x 100	**060632**	-	FZA 18 x 100 M12 D/20	-	1
FZUB 18 x 130	**060633**	-	FZA 18 x 130 M12 D/50	-	1
FZUB 22 x 100	**060636**	FZA 22 x 100 M16	-	FZA 22 x 100 M12 I	1
FZUB 22 x 125	**060638**	FZA 22 x 125 M16	FZA 22 x 125 M16 D/25	FZA 22 x 125 M12 I	1

ACCESSORIES

Setting tool **FZE plus**

Item	Art.-No.	Fits anchor			Sales unit
		bolt anchor	push-through anchor	internal thread anchor	[pcs]
FZE 10 plus	**044637** 1)	FZA 10 x ... M6	-	-	1
FZE 12 plus	**044638**	FZA 12 x ... M8	FZA 12 x ... M8 D	FZA 12 x ... M6 I	1
FZE 14 plus	**044639**	FZA 14 x ... M10	FZA 14 x ... M10 D	FZA 14 x ... M8 I	1
FZE 18 plus	**044640**	FZA 18 x ... M12	FZA 18 x ... M12 D	FZA 18 x ... M10 I	1
FZE 22 plus	**044641**	FZA 22 x ... M16	FZA 22 x ... M16 D	FZA 22 x ... M12 I	1

1) Without centring pin.

LOADS

ZYKON Bolt anchor FZA

zinc plated steel / stainless steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 8)]										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s [mm]	Min. spacing s_{min} [5) 6)] [mm]	Min. edge distance c_{min} [5) 6)] [mm]
FZA 10 x 40 M6	gvz	100	40	8,5	2,4	4,6	35	95	120	40	35
	A4					3,2		65			
FZA 12 x 40 M8	gvz	100	40	20	2,4	5,6	40	120	120	40	40
	A4										
FZA 12 x 50 M8	gvz	110	50	20	4,3	7,9	45	160	150	50	45
	A4					5,9		115			
FZA 14 x 40 M10	gvz	100	40	40	2,4	5,6	70	115	120	70	70
	A4										
FZA 14 x 60 M10	gvz	130	60	40	5,7	13,3	60	245	180	60	55
	A4					9,3		165			
FZA 18 x 80 M12	gvz	160	80	60	9,5	19,3	85	315	240	80	70
	A4					13,5		210			
FZA 22 x 100 M16	gvz	200	100	100	17,1	34,3	150	500	300	100	100
	A4					25,2		355			
FZA 22 x 125 M16	gvz	250	125	100	19,0	35,9	140	450	375	125	125
	A4					25,2		300			

For the design the complete assessment ETA-98/0004 has to be considered.[7)]

[1)] The partial safety factors for material resistance as regulated in the ETA-98/0004 as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-98/0004.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-98/0004.

[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[6)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-98/0004.

[7)] The given loads refer to the European Technical Assessment ETA-98/0004, issue date 12/09/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

LOADS

ZYKON-Bolt anchor FZA

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s [mm]	Min. spacing s_{min} [5) 6)] [mm]	Min. edge distance c_{min} [5) 6)] [mm]
FZA 10 x 40 M6	gvz	100	40	8,5	3,6	4,6	40	65	120	40	35
	A4					3,2		50			
FZA 12 x 40 M8	gvz	100	40	20	3,6	7,9	40	120	120	40	40
	A4					5,9		85			
FZA 12 x 50 M8	gvz	110	50	20	5,7	8,4	45	115	150	50	45
	A4					5,9		75			
FZA 14 x 40 M10	gvz	100	40	40	3,6	7,9	70	115	120	70	70
	A4										
FZA 14 x 60 M10	gvz	130	60	40	9,5	13,3	75	170	180	60	55
	A4					9,3		110			
FZA 18 x 80 M12	gvz	160	80	60	14,3	19,3	95	210	240	80	70
	A4					13,5		140			
FZA 22 x 100 M16	gvz	200	100	100	19,0	35,9	110	355	300	100	100
	A4					25,2		235			
FZA 22 x 125 M16	gvz	250	125	100	19,0	35,9	125	300	375	125	125
	A4					25,2		195			

For the design the complete assessment ETA-98/0004 has to be considered.[7)]

[1)] The partial safety factors for material resistance as regulated in the ETA-98/0004 as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-98/0004.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-98/0004.

[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[6)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-98/0004.

[7)] The given loads refer to the European Technical Assessment ETA-98/0004, issue date 12/09/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

LOADS

ZYKON Through anchor FZA-D

zinc plated steel / stainless steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 8)]										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s [mm]	Min. spacing s_{min} [5) 6)] [mm]	Min. edge distance c_{min} [5) 6)] [mm]
FZA 12 x 50 M8 D	gvz	100	40	20	2,4	5,6	35	120	120	40	35
	A4										
FZA 12 x 60 M8 D	gvz	110	50	20	4,3	7,9	45	160	150	50	45
	A4					5,9		115			
FZA 14 x 80 M10 D	gvz	130	60	40	5,7	13,3	60	245	180	60	55
	A4					9,3		165			
FZA 18 x 100 M12 D	gvz	160	80	60	9,5	19,3	85	315	240	80	70
	A4					13,5		210			
FZA 22 x 125 M16 D	gvz	200	100	100	17,1	34,3	150	500	300	100	100
	A4					25,2		355			

For the design the complete assessment ETA-98/0004 has to be considered.[7)]

[1)] The partial safety factors for material resistance as regulated in the ETA-98/0004 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-98/0004.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-98/0004.

[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[6)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-98/0004.

[7)] The given loads refer to the European Technical Assessment ETA-98/0004, issue date 12/09/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

[8)] A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0{,}3$mm.

LOADS

ZYKON Through anchor FZA-D

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s [mm]	Min. spacing s_{min} [5) 6)] [mm]	Min. edge distance c_{min} [5) 6)] [mm]
FZA 12 x 50 M8 D	gvz	100	40	20	3,6	7,9	40	120	120	40	35
	A4					5,9		85			
FZA 12 x 60 M8 D	gvz	110	50	20	5,7	8,4	45	115	150	50	45
	A4					5,9		75			
FZA 14 x 80 M10 D	gvz	130	60	40	9,5	13,3	75	170	180	60	55
	A4					9,3		110			
FZA 18 x 100 M12 D	gvz	160	80	60	14,3	19,3	95	210	240	80	70
	A4					13,5		140			
FZA 22 x 125 M16 D	gvz	200	100	100	19,0	35,9	110	355	300	100	100
	A4					25,2		235			

For the design the complete assessment ETA-98/0004 has to be considered.[7)]

[1)] The partial safety factors for material resistance as regulated in the ETA-98/0004 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-98/0004.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-98/0004.

[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[6)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-98/0004.

[7)] The given loads refer to the European Technical Assessment ETA-98/0004, issue date 12/09/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

LOADS

ZYKON-Internally-threaded anchor FZA-I

zinc plated steel / stainless steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 8)]										Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s [mm]	Min. spacing s_{min} [5) 6)] [mm]	Min. edge distance c_{min} [5) 6)] [mm]
FZA 12 x 40 M6 I	8.8	100	40	8,5	2,4	4,1	35	85	120	40	35
	A4-70					3,2		65			
FZA 12 x 50 M6 I	A4-70	110	50	8,5	4,3	3,2	45	65	150	50	45
FZA 14 x 60 M8 I	8.8	130	60	15	5,7	5,4	60	90	180	60	55
	A4-70					4,3		75			
FZA 18 x 80 M10 I	8.8	160	80	30	9,5	5,6	85	85	240	80	70
	A4-70				9,0	5,4	80	80			
FZA 22 x 100 M12 I	8.8	200	100	60	17,1	13,2	150	165	300	100	100
	A4-70					12,7		155			
FZA 22 x 125 M12 I	8.8	250	125	60	19,0	13,2	140	150	375	125	125
	A4-70					12,7		145			

For the design the complete assessment ETA-98/0004 has to be considered.[7)]

[1)] The partial safety factors for material resistance as regulated in the ETA-98/0004 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-98/0004.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-98/0004.

[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[6)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-98/0004.

[7)] The given loads refer to the European Technical Assessment ETA-98/0004, issue date 12/09/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

[8)] A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at w_k ~ 0,3mm.

LOADS

ZYKON-Internally-threaded anchor FZA-I

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s [mm]	Min. spacing s_{min} [5) 6)] [mm]	Min. edge distance c_{min} [5) 6)] [mm]
FZA 12 x 40 M6 I	8.8	100	40	8,5	3,6	4,1	40	60	120	40	35
	A4-70					3,2		50			
FZA 12 x 50 M6 I	A4-70	110	50	8,5	5,4	3,2	45	50	150	50	45
FZA 14 x 60 M8 I	8.8	130	60	15	9,3	5,4	75	70	180	60	55
	A4-70				7,1	4,3	55	60			
FZA 18 x 80 M10 I	8.8	160	80	30	9,6	5,6	70	70	240	80	70
	A4-70				9,0	5,4					
FZA 22 x 100 M12 I	8.8	200	100	60	19,0	13,2	110	120	300	100	100
	A4-70					12,7		115			
FZA 22 x 125 M12 I	8.8	250	125	60	19,0	13,2	125	125	375	125	125
	A4-70					12,7					

For the design the complete assessment ETA-98/0004 has to be considered.[7)]

[1)] The partial safety factors for material resistance as regulated in the ETA-98/0004 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-98/0004.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-98/0004.

[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[6)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-98/0004.

[7)] The given loads refer to the European Technical Assessment ETA-98/0004, issue date 12/09/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

The internally threaded anchor with low anchoring depth for individual fixings in cracked concrete

Emergency exit signs in tunnels

Air conditioning units

VERSIONS

- Zinc-plated steel
- Stainless steel
- Highly corrosion-resistant steel

BUILDING MATERIALS

Approved for:
- Concrete C20/25 to C50/60, cracked and non-cracked

Also suitable for:
- Concrete C12/15
- Natural stone with dense structure

CERTIFICATES

ETA-06/0271
ETAG 001-3
Option 1 for cracked concrete

Fire resistance classification R 120
Anchor types see test report

FM APPROVED from M10

EDELSTAHL Rostfrei INOX STAINLESS STEEL

M8 - M20

ADVANTAGES

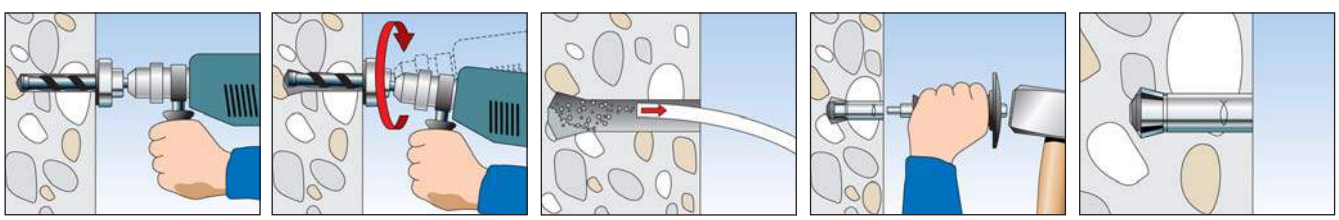
- Hammerset anchor with Zykon undercut technology for individual fixings in cracked and non-cracked concrete.
- The combination of hammerset and ZYKON undercut anchor allows for individual fixings in cracked concrete.
- The special ZYKON undercut technology reduces the energy required for installation.
- The FZUB special drill allows for a fast installation by creating the undercut without having to change tools.
- The embossing that is applied when expanding the anchor secures the simple control of the anchoring.
- The almost expansion-free installation of the anchor allows small edge distances and axial spacing, thereby enabling flexible use.

APPLICATIONS

- Pipelines
- Ventilation systems
- Sprinkler systems
- Cable trays
- Suspended ceilings

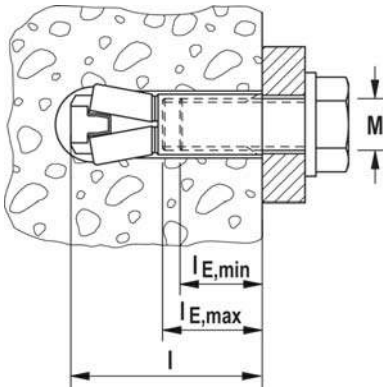
FUNCTIONING

- The FZEA II is suitable for pre-positioned installation.
- The undercut drill hole is created using the special FZUB drill.
- Once the anchor has been placed in the drill hole, the expansion sleeve is expanded by the driving in of the internal expansion pin with the FZED Plus setting tool, and the undercut drill hole is filled with a positive fit.



TECHNICAL DATA

Zykon-Hammerset anchor **FZEA II**



	Zinc-plated steel Art.-No.	Stainless steel Art.-No.	Highly corrosion resistant steel Art.-No.	Approval ETA	Required drill bit FZUB	Required setting tool FZED plus	Length l [mm]	Internal thread A1	Max. bolt penetration $l_{E,max}$ [mm]	Min. bolt penetration $l_{E,min}$ [mm]	Sales unit [pcs]
Item	**gvz**	**A4**	**C**								
FZEA II 10 x 40 M 8	**047303**	**047306**	**047309** 1)	■	10 x 40	FZED 10 plus	43	M 8	17	11	100
FZEA II 12 x 40 M10	**047304**	**047307**	**047310** 1)	■	12 x 40	FZED 12 plus	43	M 10	19	13	100
FZEA II 14 x 40 M12	**047305**	**047308**	–	■	14 x 40	FZED 14 plus	43	M 12	21	15	50

1) Delivery on request.

ACCESSORIES

Drill bit **FZUB**

Item	Art.-No.	Matching anchor type			Sales unit [pcs]
FZUB 10 x 40	**060622**	FZEA II 10 x 40, FZA 10 x 40 M6			1
FZUB 12 x 40	**060623**	FZEA II 12 x 40, FZA 12 x 40 M8			1
FZUB 14 x 40	**060624**	FZEA II 14 x 40, FZA 14 x 40			1

ACCESSORIES

Setting tool **FZED plus**

Item	Art.-No.	Matching anchor type			Sales unit [pcs]
FZED 10 plus	**044642**	FZEA II 10 x 40 M8			1
FZED 12 plus	**044643**	FZEA II 12 x 40 M10			1
FZED 14 plus	**044644**	FZEA II 14 x 40 M12			1

LOADS

ZYKON Hammerset Anchor FZEA II

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 8)]										Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum installation torque T_{max} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s [mm]	Min. spacing s_{min} [5) 6)] [mm]	Min. edge distance c_{min} [5) 6)] [mm]
FZEA II 10 x 40 M8	5.6	80	40	10	1,6	3,7	40	85	120	40	40
	5.8					4,7		115			
	8.8										
	A4-70			15		5,6		135			
	C-70										
FZEA II 12 x 40 M10	5.6	80	40	15	3,0	5,6	65	135	120	45	45
	5.8										
	8.8										
	A4-70			20							
	C-70										
FZEA II 14 x 40 M12	5.6	80	40	20	3,6	5,6	85	130	120	50	50
	5.8										
	8.8										
	A4-70			40							
	C-70										

For the design the complete assessment ETA-06/0271 has to be considered.[7)]

[1)] The partial safety factors for material resistance as regulated in the ETA-06/0271 as well as a partial safety factor for load actions of $\gamma_F = 1,4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-06/0271.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-06/0271.

[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[6)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-06/0271.

[7)] The given loads refer to the European Technical Assessment ETA-06/0271, issue date 30/11/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

[8)] A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0,3$mm.

LOADS

ZYKON Hammerset Anchor FZEA II

zinc plated steel / stainless steel / high corrosion resistant steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum installation torque T_{max} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s [mm]	Min. spacing s_{min} [5) 6)] [mm]	Min. edge distance c_{min} [5) 6)] [mm]
FZEA II 10 x 40 M8	5.6	80	40	10	3,6	3,7	55	60	120	40	40
	5.8					4,7		75			
	8.8										
	A4-70			15		5,7		95			
	C-70										
FZEA II 12 x 40 M10	5.6	80	40	15	3,6	6,1	55	100	120	45	45
	5.8					7,8		130			
	8.8										
	A4-70			20		7,9		135			
	C-70										
FZEA II 14 x 40 M12	5.6	80	40	20	3,6	7,9	55	130	120	50	50
	5.8										
	8.8										
	A4-70			40							
	C-70										

For the design the complete assessment ETA-06/0271 has to be considered.[7)]

[1)] The partial safety factors for material resistance as regulated in the ETA-06/0271 as well as a partial safety factor for load actions of γ_F = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-06/0271.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-06/0271.

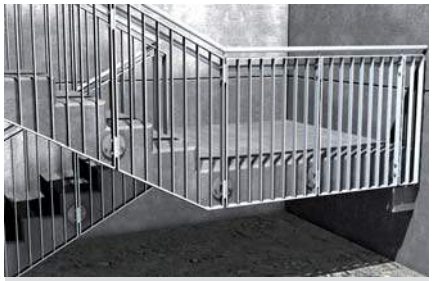
[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[6)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-06/0271.

[7)] The given loads refer to the European Technical Assessment ETA-06/0271, issue date 30/11/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

The high-performance concrete screw for absolute installation ease

Inclined supports



Banisters

VERSIONS

- Zinc-plated steel
- Stainless steel A4

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked

Also suitable for:

- Concrete C12/15
- Solid building materials
- Masonry with a dense structure

CERTIFICATES

ETA-15/0352
EAD 330011-00-0601
Option 1 for cracked concrete
seismic performance category C1, C2

ETA-17/0740
EAD 330232-00-0601
Option 1 for cracked concrete
Seismic performance category C1, C2

Zulassung

Fire resistance classification
R 120
Anchor types see test report

SEISMIC

EDELSTAHL Rostfrei
INOX STAINLESS STEEL

ADVANTAGES

- With up to 3 embedment depths, the ULTRACUT FBS II allows for the same screw to be used for different component thicknesses.
- Unique saw-tooth geometry cuts quickly into the concrete - also in multiple use and reinforced concrete.
- The short ULTRACUT FBS II, with a reduced embedment depth, allows for a short drill hole depth and fast installation which makes it an efficient choice for many applications.
- The performance categories seismic C1 and C2 ensure that the strictest of safety standards and earthquake specifications can be fulfilled.
- For the zinc-plated steel version the checking gauge allows for reuse covered by the approval.
- The specially hardened red tip of the stainless steel A4 version provides faster and more secure installation.
- The stainless steel concrete screw guarantees a high level of corrosion resistance especially for wet conditions and in outdoor areas.

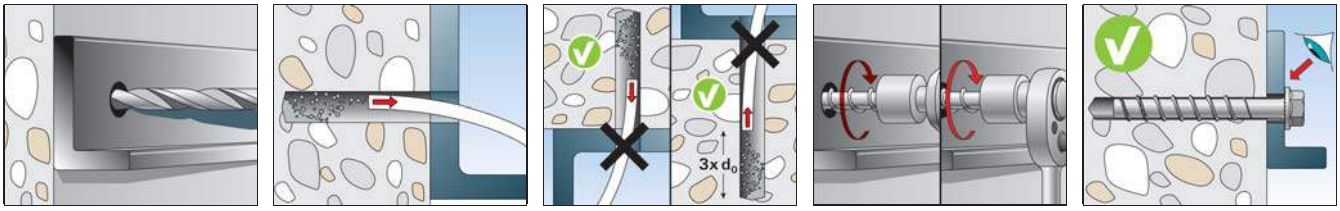
APPLICATIONS

- Guard rails
- Consoles/Base plates
- Metal profiles
- Steel constructions
- Façades
- Protection barriers
- Results/beam anchors
- Shuttering props (only FBS II zinc-plated steeel)
- Temporary anchoring, e.g. of building site equipment (only FBS II zinc-plated steeel)

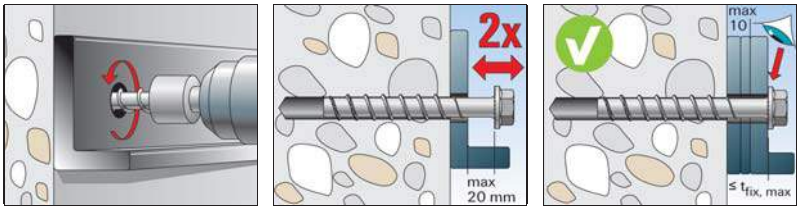
FUNCTIONING

- The ULTRACUT FBS II is recommended for the push-through installation.
- Drill holes do not need to be cleaned during vertical installation (ceiling and floor). For floor fixings the hole must be drilled 3x drill hole diameter deeper.
- The approved adjustment for the concrete screws allows the screw to be unscrewed twice for a total length of 20 mm, to place maximum 10 mm packing below the base plates or to align the attached part, and then to tighten the screw again.
- We recommend using a tangential impact screwdriver with a suitable impact screwdriver socket or an internal torx drive.
- The screw is installed correctly when the screw head sits flush on the fixture (visual setting control).

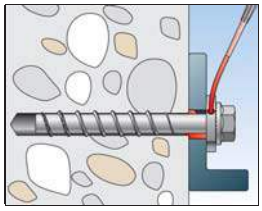
INSTALLATION



FIXTURE ADJUSTMENT

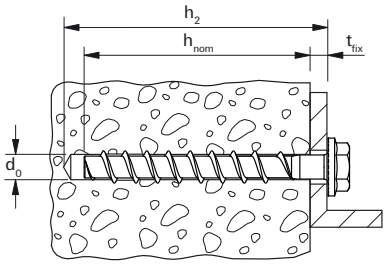


ADDITIONAL FOR SEISMIC



TECHNICAL DATA

ULTRACUT FBS II US - hexagon head with integral washer

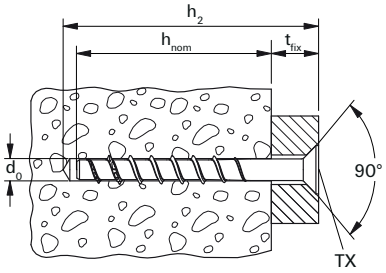


Item	Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Min. drill hole depth for through fixings h_2 [mm]	Screw $d_a \times l_s$ [mm]	Screw-in depth with fixture thickness h_{nom1} / t_{fix} [mm]	Screw-in depth with fixture thickness h_{nom2} / t_{fix} [mm]	Screw-in depth with fixture thickness h_{nom3} / t_{fix} [mm]	Drive	Sales unit [pcs]
	gvz									
ULTRACUT FBS II 8x55 5/- US TX	**536851**	■	8	65	10 x 55	50 / 5	- / -	- / -	TX40/SW13	50
ULTRACUT FBS II 8x70 20/5 US TX	**536852**	■	8	80	10 x 70	50 / 20	- / -	65 / 5	TX40/SW13	50
ULTRACUT FBS II 8x80 30/15 US TX	**536853**	■	8	90	10 x 80	50 / 30	- / -	65 / 15	TX40/SW13	50
ULTRACUT FBS II 8x90 40/25 US TX	**536854**	■	8	100	10 x 90	50 / 40	- / -	65 / 25	TX40/SW13	50
ULTRACUT FBS II 8x100 50/35 US TX	**536855**	■	8	110	10 x 100	50 / 50	- / -	65 / 35	TX40/SW13	50
ULTRACUT FBS II 8x110 60/45 US TX	**536856**	■	8	120	10 x 110	50 / 60	- / -	65 / 45	TX40/SW13	50
ULTRACUT FBS II 8x130 80/65 US TX	**536857**	■	8	140	10 x 130	50 / 80	- / -	65 / 65	TX40/SW13	50
ULTRACUT FBS II 10x60 5/-/- US	**536858**	■	10	70	12 x 60	55 / 5	- / -	- / -	SW 15	50
ULTRACUT FBS II 10x70 15/5/- US	**536859**	■	10	80	12 x 70	55 / 15	65 / 5	- / -	SW 15	50
ULTRACUT FBS II 10x80 25/15/- US	**536860**	■	10	90	12 x 80	55 / 25	65 / 15	- / -	SW 15	50
ULTRACUT FBS II 10x90 35/25/5 US	**536861**	■	10	100	12 x 90	55 / 35	65 / 25	85 / 5	SW 15	50
ULTRACUT FBS II 10x100 45/35/15 US	**536862**	■	10	110	12 x 100	55 / 45	65 / 35	85 / 15	SW 15	50
ULTRACUT FBS II 10x120 65/55/35 US	**536863**	■	10	130	12 x 120	55 / 65	65 / 55	85 / 35	SW 15	50
ULTRACUT FBS II 10x140 85/75/55 US	**536864**	■	10	150	12 x 140	55 / 85	65 / 75	85 / 55	SW 15	50
ULTRACUT FBS II 10x160 105/95/75 US	**536865**	■	10	170	12 x 160	55 / 105	65 / 95	85 / 75	SW 15	50
ULTRACUT FBS II 10x200 145/135/115 US	**536866**	■	10	210	12 x 200	55 / 145	65 / 135	85 / 115	SW 15	20
ULTRACUT FBS II 10x230 175/165/145 US	**536867**	■	10	240	12 x 230	55 / 175	65 / 165	85 / 145	SW 15	20
ULTRACUT FBS II 10x260 205/195/175 US	**536868**	■	10	270	12 x 260	55 / 205	65 / 195	85 / 175	SW 15	20
ULTRACUT FBS II 12x70 10/-/- US	**536869**	■	12	80	14 x 70	60 / 10	- / -	- / -	SW 17	20
ULTRACUT FBS II 12x85 25/10/- US	**536870**	■	12	95	14 x 85	60 / 25	75 / 10	- / -	SW 17	20
ULTRACUT FBS II 12x110 50/35/10 US	**536871**	■	12	120	14 x 110	60 / 50	75 / 35	100 / 10	SW 17	20
ULTRACUT FBS II 12x130 70/55/30 US	**536872**	■	12	140	14 x 130	60 / 70	75 / 55	100 / 30	SW 17	20
ULTRACUT FBS II 12x150 90/75/50 US	**536873**	■	12	160	14 x 150	60 / 90	75 / 75	100 / 50	SW 17	20
ULTRACUT FBS II 14x75 10/-/- US	**536874**	■	14	90	16 x 75	65 / 10	- / -	- / -	SW 21	20
ULTRACUT FBS II 14x95 30/10/- US	**536875**	■	14	110	16 x 95	65 / 30	85 / 10	- / -	SW 21	20
ULTRACUT FBS II 14x100 35/15/- US	**536876**	■	14	115	16 x 100	65 / 35	85 / 15	- / -	SW 21	20
ULTRACUT FBS II 14x125 60/40/10 US	**536877**	■	14	140	16 x 125	65 / 60	85 / 40	115 / 10	SW 21	10
ULTRACUT FBS II 14x150 85/65/35 US	**536878**	■	14	165	16 x 150	65 / 85	85 / 65	115 / 35	SW 21	10

Concrete screw ULTRACUT FBS II 8-14

TECHNICAL DATA

ULTRACUT FBS II SK - countersunk head

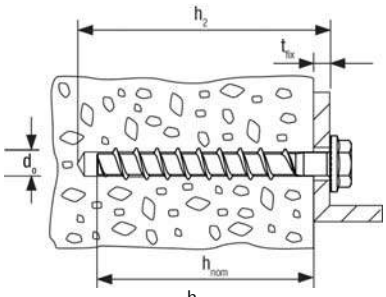


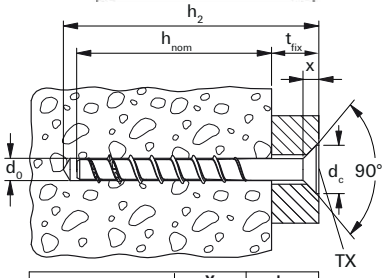
	Art.-No.	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Screw	Screw-in depth with fixture thickness	Screw-in depth with fixture thickness	Screw-in depth with fixture thickness	Drive	Sales unit
		ETA	d_0	h_2	$d_a \times l_s$	h_{nom1} / t_{fix}	h_{nom2} / t_{fix}	h_{nom3} / t_{fix}		
Item	**gvz**		**[mm]**	**[mm]**	**[mm]**	**[mm]**	**[mm]**	**[mm]**		**[pcs]**
ULTRACUT FBS II 8x60 10/- SK	**536880**	■	8	70	10 x 60	50 / 10	- / -	- / -	TX40	50
ULTRACUT FBS II 8x80 30/15 SK	**536881**	■	8	90	10 x 80	50 / 30	- / -	65 / 15	TX40	50
ULTRACUT FBS II 8x90 40/25 SK	**536882**	■	8	100	10 x 90	50 / 40	- / -	65 / 25	TX40	50
ULTRACUT FBS II 10x65 10/-/- SK	**536884**	■	10	75	12 x 65	55 / 10	- / -	- / -	TX50	50
ULTRACUT FBS II 10x80 25/15/- SK	**536885**	■	10	90	12 x 80	55 / 25	65 / 15	- / -	TX50	50
ULTRACUT FBS II 10x95 40/30/10 SK	**536886**	■	10	105	12 x 95	55 / 40	65 / 30	85 / 10	TX50	50
ULTRACUT FBS II 10x100 45/35/15 SK	**536887**	■	10	110	12 x 100	55 / 45	65 / 35	85 / 15	TX50	50
ULTRACUT FBS II 10x120 65/55/35 SK	**536888**	■	10	130	12 x 120	55 / 65	65 / 55	85 / 35	TX50	50

TECHNICAL DATA

ULTRACUT FBS II US A4 - hexagon head with molded washer, stainless steel A4

ULTRACUT FBS II SK A4 - countersunk head, stainless steel A4





	X [mm]	dc [mm]
FBS II 8	7	23
FBS II 10	7	25

Item	Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Min. drill hole depth for through fixings h_2 [mm]	Screw length l_s [mm]	Screw-in depth with fixture thickness h_{nom1} / t_{fix} [mm]	Screw-in depth with fixture thickness h_{nom3} / t_{fix} [mm]	Screw-in depth with fixture thickness h_{nom2} / t_{fix} [mm]	Drive	Sales unit [pcs]
	A4									
FBS II 8 x 60 10/- US A4	543565	■	8	70	60	50 / 10	- / -	- / -	SW 13	50
FBS II 8 x 70 5/- US A4	543566	■	8	80	70	50 / 20	65 / 5	- / -	SW 13	50
FBS II 8 x 80 15/- US A4	543567	■	8	90	80	50 / 30	65 / 15	- / -	SW 13	50
FBS II 8 x 90 25/- US A4	543568	■	8	100	90	50 / 40	65 / 25	- / -	SW 13	50
FBS II 10 x 60 5/-/- US A4	543569	■	10	70	60	55 / 5	- / -	- / -	SW 15	50
FBS II 10 x 70 15/5/- US A4	543570	■	10	80	70	55 / 15	- / -	65 / 5	SW 15	50
FBS II 10 x 80 25/15/- US A4	543571	■	10	90	80	55 / 25	- / -	65 / 15	SW 15	50
FBS II 10 x 90 5/- US A4	543572	■	10	100	90	55 / 35	85 / 5	65 / 25	SW 15	50
FBS II 10 x 100 15/- US A4	543573	■	10	110	100	55 / 45	85 / 15	65 / 35	SW 15	50
FBS II 10 x 120 35/- US A4	543574	■	10	130	120	55 / 65	85 / 35	65 / 55	SW 15	50
FBS II 12 x 70 10/-/- US A4	543575	■	12	80	70	60 / 10	- / -	- / -	SW 17	20
FBS II 12 x 85 25/10/- US A4	543576	■	12	95	85	60 / 25	- / -	75 / 10	SW 17	20
FBS II 12 x 110 10/- US A4	543577	■	12	120	110	60 / 50	100 / 10	75 / 35	SW 17	50
FBS II 12 x 130 30/- US A4	543578	■	12	140	130	60 / 70	100 / 30	75 / 55	SW 17	20
FBS II 8 x 60 10/- SK A4	543579	■	8	70	60	50 / 10	- / -	- / -	TX40	50
FBS II 8 x 80 15/- SK A4	543580	■	8	90	80	50 / 30	65 / 15	- / -	TX40	50
FBS II 8 x 90 25/- SK A4	543581	■	8	100	90	50 / 40	65 / 25	- / -	TX40	50
FBS II 10 x 65 10/-/- SK A4	543582	■	10	75	65	55 / 10	- / -	- / -	TX50	50
FBS II 10 x 80 25/15/- SK A4	543583	■	10	90	80	55 / 25	- / -	65 / 15	TX50	50
FBS II 10 x 95 10/- SK A4	543584	■	10	105	95	55 / 40	85 / 10	65 / 30	TX50	50
FBS II 10 x 100 15/- SK A4	543585	■	10	110	100	55 / 45	85 / 15	65 / 35	TX50	50
FBS II 10 x 120 35/- SK A4	543586	■	10	130	120	55 / 65	85 / 35	65 / 55	TX50	50

ACCESSORIES

Checking gauge **FUP**

Nut SW

Nut TX

FMB T40 Maxx Bit

Profi-bit **FPB T50 5/16"**

Item	Art.-No.	Internal diameter D [mm]	Drive	Match	Sales unit [pcs]
Checking gauge FUP 8	**537200**	9,9	–	FBS II 8	1
Checking gauge FUP 10	**537201**	12,0	–	FBS II 10	1
Checking gauge FUP 12	**537202**	13,0	–	FBS II 12	1
Checking gauge FUP 14	**537203**	15,0	–	FBS II 14	1
Nut SW13	**538578**	–	1/2" / SW13	FBS II 8	1
Nut SW15	**538579**	–	1/2" / SW15	FBS II 10	1
Nut SW17	**538580**	–	1/2" / SW17	FBS II 12	1
Nut SW21	**538581**	–	1/2" / SW21	FBS II 14	1
Nut TX40	**538575** 1)	–	1/2" - 1/4"	FBS II 8 / FBS II 8 SK	1
Nut TX50	**538576** 2)	–	1/2" - 5/16"	FBS II 10 / FBS II 10 SK	1
FMB T40 Maxx Bit W 5	**533159**	–	TX40	FBS II 8 / FBS II 8 SK	10
FPB Profi-Bit T50 5/16"	**538574**	–	TX50	FBS II 10 SK	1

1) Suitable for FMB T40 Maxx Bit

2) Suitable for FPB Profi-Bit T50 5/16"

ACCESSORIES

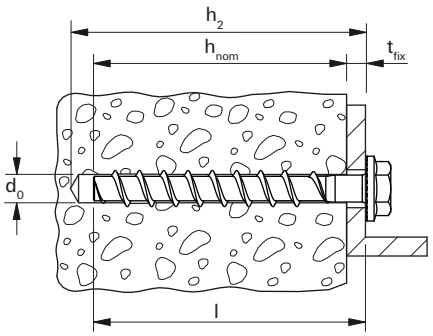
Filling washer **FFD**

Washer **U**

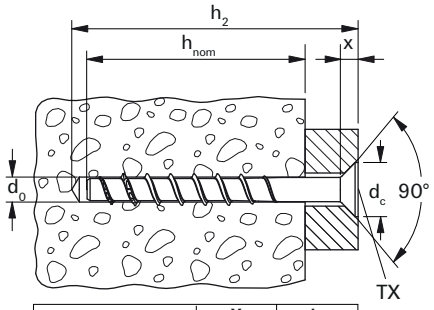
Item	Art.-No.	Internal diameter D [mm]	External-Ø d [mm]	Match	Sales unit [pcs]
FFD 22 x 9 x 6	**547515**	9,0	22	FBS II 6	4
FFD 26 x 12 x 6	**538458**	12,0	26	FBS II 8	4
FFD 30 x 14 x 6	**538459**	14,2	30	FBS II 10 / FBS II 12	4
FFD 38 x 19 x 7	**538460**	19.2	38	FBS II 14	4
FFD 30x14x6 A4	**541987**	14,0	30	FBS II 10 A4 / FBS II 12 A4	4
Washer for FBS 10	**520471**	13,5	44	FBS II 10	50

INSTALLATION DATA - CONCRETE C20/25 - C50/60

Type US



Type SK



	X [mm]	dc [mm]
ULTRACUT FBS II 8	**6**	**20**
ULTRACUT FBS II 10	**7**	**23**

Concrete screw ULTRACUT FBS II 8-14			**8**	**10**	**12**	**14**
Drill hole diameter	d0	[mm]	8	10	12	14
Nominal screw-in depth	hnom1	[mm]	50	55	60	65
	hnom2	[mm]	-	65	75	85
	hnom3	[mm]	65	85	100	115
Drill hole depth (push-through installation)	h2 ≥	[mm]	l + 10	l + 10	l + 10	l + 15
Clearance hole diameter	df		10,6 - 12	12,8 - 14	14,8 - 16	16,9 - 18
Max. torque for installation with impact screw driver in concrete	Timp, max		600	650	650	650
Width across flat	SW		13	15	17	21
Drive	Torx		T40 (SK a. US)	T50 (SK)	-	-

INSTALLATION DATA - MASONRY

Concrete screw ULTRACUT FBS II 8-14					
Building material	Compressive strength class [N/mm²]	Size	[mm]	8	10
		hnom	[mm]	65	85
Solid clay brick (EN771-1)	≥ 12	Tinst	[Nm]	10	10
Solid sand-lime brick (EN771-2)	≥ 12	Tinst	[Nm]	15	15
Aerated concrete (EN771-4)	≥ 6	Tinst	[Nm]	5	5

INSTALLATION OF CONCRETE SCREWS (USE A CORDLESS OR CABLED IMPACT WRENCH)

Concrete screw ULTRACUT FBS II 8-14	**Maximum torque gvz [Nm]**	**Maximum torque A4 [Nm]**
FBS II 8	600	450
FBS II 10	650	450
FBS II 12	650	650
FBS II 14	650	-

*) The values apply to concrete strength of approx. 40N/mm², for other concrete strength classes the values may differ.
The conversion of nominal output into effective tightening torque varies from machine to machine - always therefore use torque control.

LOADS

Concrete srew ULTRACUT FBS II

zinc plated steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 10)]											Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness h_{min} [mm]	Screw-in depth h_{nom} [mm]	Maximum installation torque T_{max} [Nm]	Installation torque $T_{imp,max}$ [6)] [Nm]	Permissible tensile load N_{perm} [7)] [kN]	Permissible shear load V_{perm} [7)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [8)] [mm]	Min. edge distance c_{min} [8)] [mm]
FBS II 6x40 [5)]	gvz	80	40	10	450	1,2	4,3	35	110	100	35	35
FBS II 6x45 [5)]	gvz	90	45	10	450	1,7	4,3	35	105	110	35	35
FBS II 6x50 [5)]	gvz	90	50	10	450	1,9	4,3	35	100	120	35	35
FBS II 6x55 [5)]	gvz	100	55	10	450	2,4	6,3	35	145	135	35	35
FBS II 8x50	gvz	100	50	0	600	2,9	4,3	35	90	120	35	35
FBS II 8x65	gvz	120	65	0	600	5,7	9,0	70	180	160	35	35
FBS II 10x55	gvz	100	55	0	650	4,3	4,8	55	100	130	40	40
FBS II 10x65	gvz	120	65	0	650	5,7	12,5	70	250	155	40	40
FBS II 10x85	gvz	140	85	0	650	9,6	16,6	105	305	205	40	40
FBS II 12x60	gvz	110	60	0	650	5,5	11,0	70	230	145	50	50
FBS II 12x75	gvz	130	75	0	650	8,0	15,2	90	290	180	50	50
FBS II 12x100	gvz	150	100	0	650	12,5	20,3	125	355	245	50	50
FBS II 14x65	gvz	120	65	0	650	6,1	12,1	75	235	150	60	60
FBS II 14x85	gvz	140	85	0	650	9,4	18,8	100	340	205	60	60
FBS II 14x115	gvz	180	115	0	650	15,4	29,4	140	465	280	60	60

For the design the complete assessment ETA-15/0352 has to be considered.[9)]

[1)] The partial safety factors for material resistance as regulated in the ETA-15/0352 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-15/0352.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling resp. hollow drilling. For further allowable drill methods see ETA-15/0352.

[4)] The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

[5)] Diamond drilling not permitted.

[6)] Maximum allowable torque for installation with any tangential impact screw driver.

[7)] For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

[8)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[9)] The given loads refer to the European Technical Assessment ETA-15/0352, issue date 30/10/2018. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

[10)] A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0{,}3$ mm.

LOADS

Concrete srew ULTRACUT FBS II

zinc plated steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]											Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness h_{min} [mm]	Screw-in depth h_{nom} [mm]	Maximum installation torque T_{max} [Nm]	Installation torque $T_{imp,max}$ [6)] [Nm]	Permissible tensile load N_{perm} [7)] [kN]	Permissible shear load V_{perm} [7)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [8)] [mm]	Min. edge distance c_{min} [8)] [mm]
FBS II 6x40 [5)]	gvz	80	40	10	450	3,8	4,3	40	75	100	35	35
FBS II 6x45 [5)]	gvz	90	45	10	450	4,8	4,3	50	70	110	35	35
FBS II 6x50 [5)]	gvz	90	50	10	450	5,7	4,3	55	70	120	35	35
FBS II 6x55 [5)]	gvz	100	55	10	450	6,4	6,3	60	100	135	35	35
FBS II 8x50	gvz	100	50	0	600	6,1	6,1	60	90	120	35	35
FBS II 8x65	gvz	120	65	0	600	9,0	9,0	80	125	160	35	35
FBS II 10x55	gvz	100	55	0	650	6,8	6,8	65	100	130	40	40
FBS II 10x65	gvz	120	65	0	650	8,8	14,0	80	195	155	40	40
FBS II 10x85	gvz	140	85	0	650	13,5	16,6	105	210	205	40	40
FBS II 12x60	gvz	110	60	0	650	7,7	15,2	70	220	145	50	50
FBS II 12x75	gvz	130	75	0	650	11,2	15,2	90	195	180	50	50
FBS II 12x100	gvz	150	100	0	650	17,5	20,3	125	240	245	50	50

LOADS

Concrete srew ULTRACUT FBS II

zinc plated steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]											Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Screw-in depth	Maximum installation torque	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
								Max. tension load	Max. shear load	Max. Load		
		h_{min}	h_{nom}	T_{max}	$T_{imp,max}$ [6)]	N_{perm} [7)]	V_{perm} [7)]	c	c	s_{cr}	s_{min} [8)]	c_{min} [8)]
		[mm]	[mm]	[Nm]	[Nm]	[kN]	[kN]	[mm]	[mm]	[mm]	[mm]	[mm]
FBS II 14x65	gvz	120	65	0	650	8,5	17,0	75	235	150	60	60
FBS II 14x85	gvz	140	85	0	650	13,2	22,1	100	275	205	60	60
FBS II 14x115	gvz	180	115	0	650	21,6	29,4	140	315	280	60	60

For the design the complete assessment ETA-15/0352 has to be considered.[9)]

1) The partial safety factors for material resistance as regulated in the ETA-15/0352 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-15/0352.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling resp. hollow drilling. For further allowable drill methods see ETA-15/0352.

4) The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

5) Diamond drilling not permitted.

6) Maximum allowable torque for installation with any tangential impact screw driver.

7) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

8) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

9) The given loads refer to the European Technical Assessment ETA-15/0352, issue date 30/10/2018. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

LOADS

Concrete screw with hexagon head and washer ULTRACUT FBS II A4 US

stainless steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 8)]										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Screw-in depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load	Max. shear load	Max. Load		
		h_{min}	h_{nom}	$T_{imp,max}$ [4)]	N_{perm} [5)]	V_{perm} [5)]	c	c	s_{cr}	s_{min} [6)]	c_{min} [6)]
		[mm]	[mm]	[Nm]	[kN]	[kN]	[mm]	[mm]	[mm]	[mm]	[mm]
FBS II 8x50	A4	100	50	450	1,9	4,3	35	90	120	35	35
FBS II 8x65	A4	120	65	450	4,3	6,4	45	125	160	35	35
FBS II 10x55	A4	100	55	450	2,1	4,8	40	100	130	40	40
FBS II 10x65	A4	120	65	450	2,9	6,2	40	115	155	40	40
FBS II 10x85	A4	140	85	450	7,6	19,2	75	360	205	40	40
FBS II 12x60	A4	110	60	650	2,1	5,5	50	105	145	50	50
FBS II 12x75	A4	130	75	650	5,2	15,9	50	305	180	50	50
FBS II 12x100	A4	150	100	650	12,5	25,0	125	445	245	50	50

For the design the complete assessment ETA-17/0740 has to be considered. [7)]

1) The partial safety factors for material resistance as regulated in the ETA-17/0740 as well as a partial safety factor for load actions of γ_F = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-17/0740.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method Hammer drilling resp. hollow drilling. For further allowable drill methods see ETA-17/0740.

4) Maximum allowable torque for installation with any tangential impact screw driver.

5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

6) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

7) The given loads refer to the European Technical Assessment ETA-17/0740, issue date 23/10/2018. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

8) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0,3$ mm.

LOADS

Concrete screw with hexagon head and washer ULTRACUT FBS II A4 US

stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness h_{min} [mm]	Screw-in depth h_{nom} [mm]	Installation torque $T_{imp,max}$ [4)] [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
FBS II 8x50	A4	100	50	450	3,3	6,1	35	90	120	35	35
FBS II 8x65	A4	120	65	450	6,7	9,0	55	120	160	35	35
FBS II 10x55	A4	100	55	450	4,0	6,8	40	100	130	40	40
FBS II 10x65	A4	120	65	450	6,7	8,8	55	115	155	40	40
FBS II 10x85	A4	140	85	450	13,5	20,9	105	270	205	40	40
FBS II 12x60	A4	110	60	650	4,8	7,7	50	105	145	50	50
FBS II 12x75	A4	130	75	650	5,7	22,4	50	300	180	50	50
FBS II 12x100	A4	150	100	650	17,5	26,2	125	320	245	50	50

For the design the complete assessment ETA-17/0740 has to be considered. [7)]

1) The partial safety factors for material resistance as regulated in the ETA-17/0740 as well as a partial safety factor for load actions of γ_F = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-17/0740.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method Hammer drilling resp. hollow drilling. For further allowable drill methods see ETA-17/0740.

4) Maximum allowable torque for installation with any tangential impact screw driver.

5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

6) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

7) The given loads refer to the European Technical Assessment ETA-17/0740, issue date 23/10/2018. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

LOADS

Concrete screw with countersunk head ULTRACUT FBS II A4 SK

stainless steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 8)]										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness h_{min} [mm]	Screw-in depth h_{nom} [mm]	Installation torque $T_{imp,max}$ [4)] [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Max. shear load c [mm]	Required spacing for: Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
FBS II 8x50	A4	100	50	450	1,9	4,3	35	90	120	35	35
FBS II 8x65	A4	120	65	450	4,3	6,4	45	125	160	35	35
FBS II 10x55	A4	100	55	450	2,1	4,8	40	100	130	40	40
FBS II 10x65	A4	120	65	450	2,9	6,2	40	115	155	40	40
FBS II 10x85	A4	140	85	450	7,6	19,2	75	360	205	40	40

For the design the complete assessment ETA-17/0740 has to be considered. [7)]

1) The partial safety factors for material resistance as regulated in the ETA-17/0740 as well as a partial safety factor for load actions of γ_F = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-17/0740.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling. For further allowable drill methods see ETA-17/0740.

4) Maximum allowable torque for installation with any tangential impact screw driver.

5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

6) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

7) The given loads refer to the European Technical Assessment ETA-17/0740, issue date 23/10/2018. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

8) A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0,3$ mm.

LOADS

Concrete screw with countersunk head ULTRACUT FBS II A4 SK

stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness h_{min} [mm]	Screw-in depth h_{nom} [mm]	Installation torque $T_{imp,max}$ [4)] [Nm]	Permissible tensile load N_{perm} [5)] [kN]	Permissible shear load V_{perm} [5)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Max. shear load c [mm]	Required spacing for Max. Load s_{cr} [mm]	Min. spacing s_{min} [6)] [mm]	Min. edge distance c_{min} [6)] [mm]
FBS II 8x50	A4	100	50	450	3,3	6,1	35	90	120	35	35
FBS II 8x65	A4	120	65	450	6,7	9,0	55	120	160	35	35
FBS II 10x55	A4	100	55	450	4,0	6,8	40	100	130	40	40
FBS II 10x65	A4	120	65	450	6,7	8,8	55	115	155	40	40
FBS II 10x85	A4	140	85	450	13,5	20,9	105	270	205	40	40

For the design the complete assessment ETA-17/0740 has to be considered. [7)]

1) The partial safety factors for material resistance as regulated in the ETA-17/0740 as well as a partial safety factor for load actions of γ_F = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-17/0740.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling. For further allowable drill methods see ETA-17/0740.

4) Maximum allowable torque for installation with any tangential impact screw driver.

5) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

6) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

7) The given loads refer to the European Technical Assessment ETA-17/0740, issue date 23/10/2018. Design of the loads according TR055/ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

LOADS

Concrete srew ULTRACUT FBS II

Highest recommended loads [1) 3)] for a single anchor, resp. a fixing point [4) 5) 6)] in solid brick masonry.

Base material	Compressive strength [N/mm²]	Type		ULTRACUT	
		Size		FBS II 8	FBS II 10
		Anchoring depth hnom	[mm]	65	85
Solid clay brick [9)] (EN771-1) ≥ 240x113x115 mm	≥ 12	F_{rec} [2)3)]	[kN]	1,1	1,4
	≥ 20	F_{rec} [2)3)7)]	[kN]	1,6	1,6
Solid sand-lime brick [9)] (EN771-2) ≥ 240x71x115 mm	≥ 12	F_{rec} [2)3)7)]	[kN]	1,2	1,2
	≥ 20	F_{rec} [2)3)7)]	[kN]	1,2	1,2
Aerated concrete (EN771-4) ≥ 499x249x120 mm	≥ 6	F_{rec} [2)3)]	[kN]	0,7	0,9
Minimum spacing within anchor groups of 2 or 4 anchors		smin	[mm]	80	
Minimum spacing between single anchors, resp. anchor groups		smin	[mm]	80	
Minimum distance to the horizontal joint		$c_{min,v}$ [8)]	[mm]	20	
Minimum distance to the vertical joint		$c_{min,h}$ [8)]	[mm]	40	
Minimum distance to the free edge		$c_{min,free\ edge}$ [8)]	[mm]	200	
Tightening torque [10)]	Solid clay brick [9)]	$T_{tighten}$	[Nm]	10	
	Solid sandlime brick [9)]			15	
	Aerated concrete			5	

1) An appropriate safety factor is considered.

2) The given loads apply to the given brick measures for masonry with superimposed load. Bigger brick sizes are minimum equal in case of the loads.

3) The loads only apply to multiple fixings of non-load-bearing systems and are valid for tensile load, shear load and oblique load under any angle.

4) On-site screw testing is recommended to validate technical data. If the joints are not visible 100% anchor testing is recommended due to the screws are only working in the bricks and not in the mortar joints.

5) A fixing point can be a single anchor, 2 anchors or 4 anchors with a minimum spacing $s_{min.}$ Anchor groups of 4 anchors are arranged in rectangular disposition.

6) The fixing points have to be arranged in this way that there will be always maximum one fixing point arranged in one brick.

7) Brick pull-out is decisive.

8) The values $c_{min,v}$ and $c_{min,h}$ are only valid if the mortar joints are filled proper. Otherwise the joints has to be considered as free edges and $c_{min,free}$ is decisive. Minimum mortar strenght is M2.5

9) The values are valid for unperforated solid bricks.

10) The screw is screwed in with a cordless screwdriver, an impact screwdriver or by hand. The screwing process must be finished immediately when the screw head is in contact with the assembled object. The specified tightening torque must then be applied with a torque wrench.

The high-performance concrete screw for absolute installation ease

Light, suspended pipelines

Suspended air-conditioners

VERSIONS

- Zinc-plated steel

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, cracked and non-cracked
- Prestressed hollow concrete ceilings C30/37 to C50/60 for the multiple use of non-load bearing systems

Also suitable for:

- Concrete C12/15
- Solid building materials
- Masonry with dense structure

CERTIFICATES

ETA-15/0352
EAD 330232-00-0601
Option 1 for cracked concrete
seismic performance category C1

ETA-18/0242
EAD 330747-00-0601
Multiple use for non-structural applications in concrete

Fire resistance classification
R 120
Anchor types see test report

SEISMIC

ADVANTAGES

- The first concrete screw with diameter 6 with variable embedment depth offers a flexible adaption of the embedment depth to the loads.
- The ETA assessment option 1 includes the use in cracked and non-cracked concrete for highest safety requirements.
- The first 6 mm diameter concrete screw with an ETA assessment for the C1 seismic performance category for additional safety standards.
- Different head designs offer a maximum of flexibility and a perfect adaptation to the application.
- The ULTRACUT FBS II 6 is approved for multiple use of non-load bearing systems and thereby ideal for the installation of pipe routes, cable trays and prestressed hollow concrete ceilings.

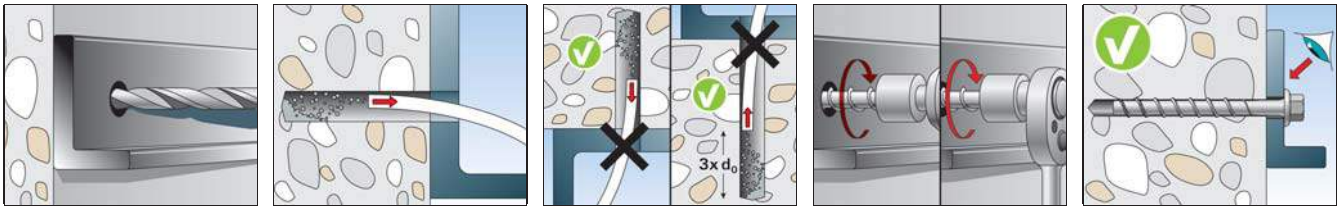
APPLICATIONS

- Pipeline routes
- Suspension for individual pipes
- Suspended mounting rails
- Prestressed concrete hollow core ceilings
- Cable trays
- Ventilation ducts
- Perforated tapes
- Air conditioning units

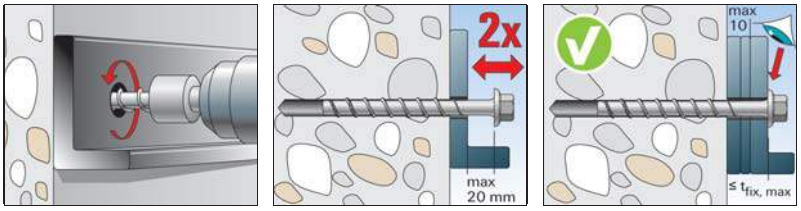
FUNCTIONING

- The ULTRACUT FBS II is recommended for the push-through / pre-positioned installation.
- Drill holes do not need to be cleaned during vertical installation (ceiling and floor). For floor fixings the hole must be drilled 3x drill hole diameter deeper.
- The approved adjustment for the concrete screws allows the screw to be unscrewed twice for a total length of 20 mm, to place maximum 10 mm packing below the base plates or to align the attached part, and then to tighten the screw again.
- We recommend using a tangential impact screwdriver with a suitable impact screwdriver socket or an internal torx drive.
- The screw is installed correctly when the screw head sits flush on the fixture (visual setting control).

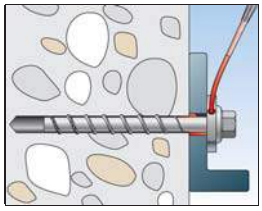
INSTALLATION



FIXTURE ADJUSTMENT



ADDITIONAL FOR SEISMIC

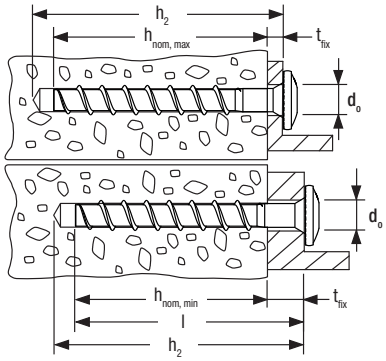


TECHNICAL DATA

ULTRACUT FBS II 6 P - panhead

ULTRACUT FBS II 6 SK - panhead

ULTRACUT FBS II 6 US - hexagon head with molded washer

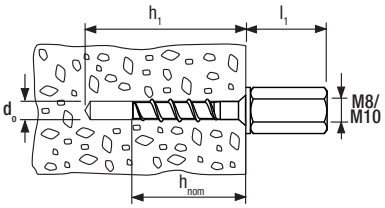


	Art.-No.	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Screw length	Head-Ø	Screw-in depth	Usable length	Drive	Sales unit
			d_0	h_2	l_s	d_K	$h_{nom,min}$ - $h_{nom,max}$	$t_{fix,min}$ - $t_{fix,max}$		
Item	gvz	ETA	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		[pcs]
FBS II 6 x 30/5 P	**546377**	■	6	40	30	14.4	25	Screw length - h_{nom}	T30	100
FBS II 6 x 40/5 P	**546378**	■	6	50	40	14.4	25 - 35	Screw length - h_{nom}	T30	100
FBS II 6 x 40/5 LP	**546379**	■	6	50	40	17.5	25 - 35	Screw length - h_{nom}	T30	100
FBS II 6 x 60/5 P	**546380**	■	6	70	60	14.4	25 - 55	Screw length - h_{nom}	T30	100
FBS II 6 x 80/25 P	**546381**	■	6	90	80	14.4	25 - 55	Screw length - h_{nom}	T30	100
FBS II 6 x 30/5 SK	**546382**	■	6	40	30	13.5	25	Screw length - h_{nom}	T30	100
FBS II 6 x 40/5 SK	**546383**	■	6	50	40	13.5	25 - 35	Screw length - h_{nom}	T30	100
FBS II 6 x 60/5 SK	**546384**	■	6	70	60	13.5	25 - 55	Screw length - h_{nom}	T30	100
FBS II 6 x 80/25 SK	**546385**	■	6	90	80	13.5	25 - 55	Screw length - h_{nom}	T30	100
FBS II 6 x 100/45 SK	**546386**	■	6	110	100	13.5	25 - 55	Screw length - h_{nom}	T30	100
FBS II 6 x 120/65 SK	**546387**	■	6	130	120	13.5	25 - 55	Screw length - h_{nom}	T30	100
FBS II 6 x 140/85 SK	**546388**	■	6	150	140	13.5	25 - 55	Screw length - h_{nom}	T30	100
FBS II 6 x 160/105 SK	**546389**	■	6	170	160	13.5	25 - 55	Screw length - h_{nom}	T30	100
FBS II 6 x 40/5 US	**546390**	■	6	50	40	17	25 - 35	Screw length - h_{nom}	SW 10	100
FBS II 6 x 60/5 US	**546391**	■	6	70	60	17	25 - 55	Screw length - h_{nom}	SW 10	100
FBS II 6 x 80/25 US	**546392**	■	6	90	80	17	25 - 55	Screw length - h_{nom}	SW 10	100
FBS II 6 x 100/45 US	**546393**	■	6	110	100	17	25 - 55	Screw length - h_{nom}	SW 10	100
FBS II 6 x 120/65 US	**546394**	■	6	130	120	17	25 - 55	Screw length - h_{nom}	SW 10	100

Concrete screw ULTRACUT FBS II 6

TECHNICAL DATA

ULTRACUT FBS II M8/M10
- outside diamater



ULTRACUT FBS II M8/M10 I
- internal thread M8/M10

	Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Min. drill hole depth for pre-positioned installation h_1 [mm]	Projection length l_1 [mm]	Screw-in depth h_{nom} [mm]	Drive	Sales unit [pcs]	
Item	**gvz**								
FBS II 6 x 25 M8/19	**546395**	■	6	35	4	25	SW 10	100	
FBS II 6 x 35 M8/19	**546396**	■	6	65	4	35	SW 10	100	
FBS II 6 x 55 M8/19	**546397**	■	6	45	37	55	SW 10	100	
FBS II 6 x 35 M10/21	**546398**	■	6	45	4	35	SW 13	100	
FBS II 6 x 55 M10/21	**546399**	■	6	65	5	55	SW 13	100	
FBS II 6 x 35 M8/M10 I	**546400**	■	6	45	5	35	SW 13	100	
FBS II 6 x 55 M8/M10 I	**546401**	■	6	65	37	55	SW 13	100	

LOADS

Concrete screw ULTRACUT FBS II 6
zinc plated steel

Permissible loads of a single anchor in cracked normal concrete (concrete tension zone) of strength class C20/25 (~B25) [1) 2) 3) 10)]											Minimum spacings while reducing the load	
Type	**Material fixing element**	**Minimum member thickness h_{min} [mm]**	**Screw-in depth h_{nom} [mm]**	**Maximum installation torque T_{max} [Nm]**	**Installation torque $T_{imp,max}$ [6)] [Nm]**	**Permissible tensile load N_{perm} [7)] [kN]**	**Permissible shear load V_{perm} [7)] [kN]**	**Required edge distance (with one edge) for** Max. tension load c [mm]	Max. shear load c [mm]	**Required spacing for** Max. Load s_{cr} [mm]	**Min. spacing s_{min} [8)] [mm]**	**Min. edge distance c_{min} [8)] [mm]**
FBS II 6x40 [5)]	gvz	80	40	10	450	1,2	4,3	35	110	100	35	35
FBS II 6x45 [5)]	gvz	90	45	10	450	1,7	4,3	35	105	110	35	35
FBS II 6x50 [5)]	gvz	90	50	10	450	1,9	4,3	35	100	120	35	35
FBS II 6x55 [5)]	gvz	100	55	10	450	2,4	6,3	35	145	135	35	35

For the design the complete assessment ETA-15/0352 has to be considered.[9)]

[1)] The partial safety factors for material resistance as regulated in the ETA-15/0352 as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1,5 \cdot h_{ef}$. Accurate data see ETA-15/0352.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling resp. hollow drilling. For further allowable drill methods see ETA-15/0352.

[4)] The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

[5)] Diamond drilling not permitted.

[6)] Maximum allowable torque for installation with any tangential impact screw driver.

[7)] For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

[8)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[9)] The given loads refer to the European Technical Assessment ETA-15/0352, issue date 30/10/2018. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

[10)] A reinforcement in the concrete to prevent splitting is required. The width of the cracks has to be limited under consideration of the splitting forces at $w_k \sim 0,3$ mm.

LOADS

Concrete screw ULTRACUT FBS II 6

zinc plated steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]											Minimum spacings while reducing the load	
Type	Material fixing element	Minimum member thickness	Screw-in depth	Maximum installation torque	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
								Max. tension load	Max. shear load	Max. Load		
		h_{min}	h_{nom}	T_{max}	$T_{imp,max}$ [6)]	N_{perm} [7)]	V_{perm} [7)]	c	c	s_{cr}	s_{min} [8)]	c_{min} [8)]
		[mm]	[mm]	[Nm]	[Nm]	[kN]	[kN]	[mm]	[mm]	[mm]	[mm]	[mm]
FBS II 6x40 [5)]	gvz	80	40	10	450	3,8	4,3	40	75	100	35	35
FBS II 6x45 [5)]	gvz	90	45	10	450	4,8	4,3	50	70	110	35	35
FBS II 6x50 [5)]	gvz	90	50	10	450	5,7	4,3	55	70	120	35	35
FBS II 6x55 [5)]	gvz	100	55	10	450	6,4	6,3	60	100	135	35	35

For the design the complete assessment ETA-15/0352 has to be considered.[9)]

1) The partial safety factors for material resistance as regulated in the ETA-15/0352 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-15/0352.

2) For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

3) Drill method hammer drilling resp. hollow drilling. For further allowable drill methods see ETA-15/0352.

4) The anchorage depths smaller than 40 mm are only allowed for single anchors as part of a multiple fixing of non-structural systems.

5) Diamond drilling not permitted.

6) Maximum allowable torque for installation with any tangential impact screw driver.

7) For combinations of tensile loads and shear loads or for shear loads with lever arm (bending moments) as well as reduced edge distances or spacings (anchor groups) we recommend to use our anchor design software C-FIX.

8) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

9) The given loads refer to the European Technical Assessment ETA-15/0352, issue date 30/10/2018. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

LOADS

Concrete screw ULTRACUT FBS II 6 zinc plated

Highest permissible loads for a single anchor[1)] for multiple use for non-structural applications in cracked concrete C20/25 to C50/60.

Type	Material fixing element	Screw-in depth	Min. member thickness	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load	Max. shear load			
		h_{nom}	h_{min}	$T_{inst,\,max}$	N_{perm} [3)]	V_{perm} [3)]	c	c	s	s_{min} [2)]	c_{min} [2)]
		[mm]	[mm]	[Nm]	[kN]	[kN]	[mm]	[mm]	[mm]	[mm]	[mm]
FBS II 6	**gvz**	25	80	≤ 5	0.7	1.8	35	50	60	35	35
FBS II 6	**gvz**	30	80	≤ 5	1.2	2.3	35	55	70	35	35
FBS II 6	**gvz**	35	80	≤ 5	1.7	4.3	35	100	100	35	35
FBS II 6	**gvz**	40	80	≤ 10	2.4	4.3	35	105	110	35	35
FBS II 6	**gvz**	45	90	≤ 10	2.9	4.3	40	110	115	35	35
FBS II 6	**gvz**	50	90	≤ 10	3.6	4.3	50	115	120	35	35
FBS II 6	**gvz**	55	100	≤ 10	4.0	6.3	50	145	135	35	35

For the design the complete assessment ETA-18/0242, issued 30.10.2018 has to be considered.

1) The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \times h_{ef}$ and an edge distance $c \geq 1{,}5 \times h_{ef}$. Accurate data see assessment.

2) Minimum possible axial spacings resp. edge distance while reducing the permissible load.

3) For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

LOADS

Concrete screw ULTRACUT FBS II 6 zinc plated

Highest permissible loads for a single anchor[1] for multiple use for non-structural applications in non-cracked concrete C20/25 to C50/60.

Type	Material fixing element	Screw-in depth h_{nom} [mm]	Min. member thickness h_{min} [mm]	Installation torque $T_{inst, max}$ [Nm]	Permissible tensile load N_{perm} [3] [kN]	Permissible shear load V_{perm} [3] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for s [mm]	Min. spacing s_{min} [2] [mm]	Min. edge distance c_{min} [2] [mm]
FBS II 6	**gvz**	25	80	≤ 5	1.4	2.3	35	45	60	35	35
FBS II 6	**gvz**	30	80	≤ 5	2.4	2.3	35	45	70	35	35
FBS II 6	**gvz**	35	80	≤ 5	3.1	4.3	40	70	100	35	35
FBS II 6	**gvz**	40	80	≤ 10	3.8	4.3	55	70	110	35	35
FBS II 6	**gvz**	45	90	≤ 10	4.8	4.3	65	75	115	35	35
FBS II 6	**gvz**	50	90	≤ 10	5.7	4.3	75	75	120	35	35
FBS II 6	**gvz**	55	100	≤ 10	6.4	6.3	80	100	135	35	35

For the design the complete assessment ETA-18/0242, issued 30.10.2018 has to be considered.

[1] The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3 x h_{ef} and an edge distance c ≥ 1,5 x h_{ef}. Accurate data see assessment.

[2] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[3] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see assessment.

LOADS

Concrete screw ULTRACUT FBS II 6 zinc plated

Highest permissible loads[1] for a single anchor for multiple use for non-structural applications in pre-stressed hollow core slabs[4]

Type			FBS II 6						
Nominal embedment depth		h_{nom}	25	30	35	40	45	50	55
Permissible load in the respective bottom flange thickness F_{rec} [3]									
≥ 25 mm		[kN]	0,23	0,47	0,47	0,47	0,47	0,47	0,47
≥ 30 mm		[kN]	1,64	1,64	1,64	1,64	1,64	1,64	1,64
≥ 35 mm		[kN]	1,64	1,88	2,11	2,35	2,58	2,82	3,05
≥ 40 mm		[kN]	1,64	2,35	2,58	2,82	3,29	3,52	3,76
≥ 50 mm		[kN]	1,64	2,58	3,29	3,76	4,46	5,16	5,63
Installation torque	$T_{inst, max}$	[Nm]	5	5	10	10	10	10	10
Min. spacing	s1, s2[2]	[mm]	100	100	100	100	100	100	100
Min. edge distance	c1, c2[2]	[mm]	100	100	100	100	100	100	100

For the design the complete assessment ETA-18/0242, issued 30.10.2018 has to be considered.

[1] The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

[2] Minimum possible axial spacings resp. edge distance. For further measures see assessment.

[3] Valid for tensile load, shear load and oblique load under any angle.

[4] Concrete strength class C30/37 up to C50/60.

The internally threaded anchor with rim for simple hammerset installation

Sprinklers

Pipelines

VERSIONS

- Zinc-plated steel
- Stainless steel

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, cracked, for the multiple fixings of non-load-bearing systems
- Concrete C20/25 to C50/60, non-cracked

Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

CERTIFICATES

ETA-07/0135 ETAG 001-4 Option 7 for non-cracked concrete

ETA-07/0142 ETAG 001-6 Multiple use for non-structural applications in concrete

Fire resistance classification R 120 Anchor types see test report

FM APPROVED from M10

EDELSTAHL Rost frei INOX STAINLESS STEEL

from M8

ADVANTAGES

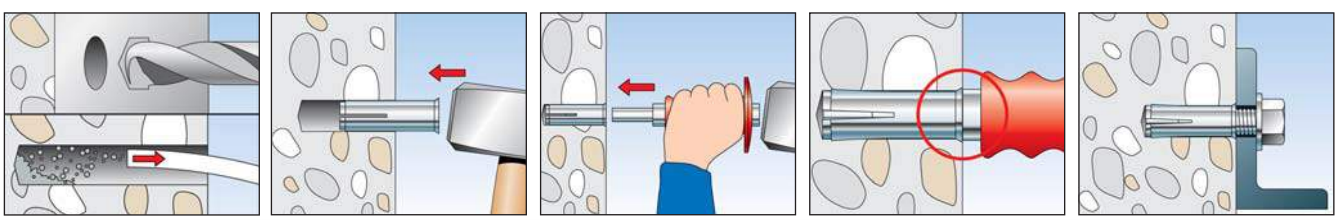
- The embossed rim prevents the anchor sleeve from slipping, thus ensuring a trouble-free hammerset installation.
- The metric internal thread means that it is possible to use standard screws or threaded rods for the ideal adaptation to suit the intended use.
- The EMS machine setting tool allows for effortless installation, particularly in the case of series installations.
- The embossing that is applied when expanding with the EHS Plus setting tool offers a simple control of the anchoring and provides increased safety.
- Fixing point at h_{ef} 25 mm prevents anchor of falling out of the drill hole before being expanded.
- The black fixing point prevents the anchor from falling out of the drill hole during overhead installation.

APPLICATIONS

- Pipelines and ventilation ducts
- Sprinkler systems
- Cable conduits and wires
- Gratings
- Steel constructions
- Machines
- Consoles
- Shuttering props
- Diamond or core drilling devices (EA II M12 D)

FUNCTIONING

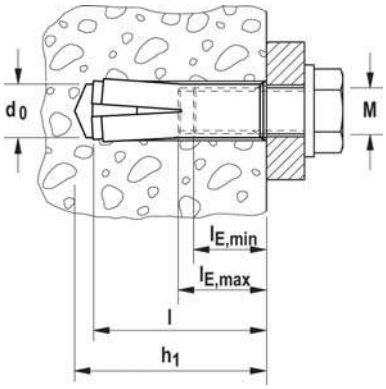
- The EA II is suitable for pre-positioned installation.
- Position the hammerset anchor in the drill hole and drive in flush to the surface of the anchor base using the hammer.
- The sleeve is then expanded by driving in the internal bolt with the EHS Plus setting tool (alternative: EMS machine setting tool), and expanded against the drill hole wall.
- The setting tools must sit on the rim of the anchor to ensure correct expansion.
- Use the special EA II M12 x 50 D / EA M 12 x 50 N D with thicker sleeve for fixing diamond and core drilling devices.



TECHNICAL DATA

Hammerset anchor **EA II**, with reduced anchorage depth $\mathbf{h_{ef}}$ **25 mm**.

Hammerset anchor **EA II**. Not suitable for diamond drilling appliances and diamond saws.



	Zinc-plated steel	Stainless steel	Approval	Drill hole diameter	Min. drill hole depth for pre-positioned installation	Anchor length	Internal thread	Min. bolt penetration	Max. bolt penetration	Sales unit
	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_1 [mm]	l [mm]	M	$l_{E,min}$ [mm]	$l_{E,max}$ [mm]	[pcs]
Item	**gvz**	**A4**								
EA II M 6 x 25	**532230**	–	■	8	27	25	M 6	6	14	100
EA II M 6 x 30	**048264**	**048410**	■	8	32	30	M 6	6	14	100
EA II M 8 x 25	**532231**	–	■	10	27	25	M 8	8	14	100
EA II M 8 x 30	**048284**	**048411**	■	10	33	30	M 8	8	14	100
EA II M 8 x 40	**048323**	**048412**	■	10	43	40	M 8	8	14	50
EA II M 10 x 25	**532232**	–	■	12	27	25	M 10	10	14	50
EA II M 10 x 30	**048332**	–	■	12	33	30	M 10	10	14	50
EA II M 10 x 40	**048339**	**048414**	■	12	43	40	M 10	10	17	50
EA II M 12 x 25	**532233**	–	■	15	27	25	M 12	12	14	25
EA II M 12 x 50	**048406**	**048415**	■	15	54	50	M 12	12	22	25
EA II M 16 x 65	**048408**	**048416**	■	20	70	65	M 16	16	28	20
EA II M 20 x 80	**048409**	**048417**	■	25	85	80	M 20	20	34	10

Associated setting tool for manual installation (EHS Plus), for installation with hammer drill (EMS)

TECHNICAL DATA

Hammerset anchor **EA II M 12 x 50 D. Suitable for diamond drilling appliances and diamond saws.**

Hammerset anchor **EA M 12 x 50 N D. Suitable for diamond drilling machines and diamond saws.**

	Zinc-plated steel	Approval	Drill hole diameter	Min. drill hole depth	Anchor length	Internal thread	Min. bolt pene-tration	Max. bolt pene-tration	Sales unit
	Art.-No.	ETA	d_0 [mm]	h_1 [mm]	l [mm]	M	$l_{E,min}$ [mm]	$l_{E,max}$ [mm]	[pcs]
Item	**gvz**								
EA II M 12 x 50 D	**048407**	■	16	54	50	M 12	12	22	25
EA M 12 x 50 N D	**500872**	–	16	54	50	M 12	12	22	50

Associated setting tool for manual installation (EHS Plus), for installation with hammer drill (EMS)

ACCESSORIES

Stop drill **EBB**

Item	Art.-No.	Tool holder	Drill hole diameter [mm]	Drill hole depth [mm]	Match	Sales unit [pcs]
EBB 8 x 25	**532607**	SDS plus	8	27	EA II M 6 x 25	1
EBB 10 x 25	**532608**	SDS plus	10	27	EA II M 8 x 25	1
EBB 12 x 25	**532609**	SDS plus	12	27	EA II M 10 x 25	1
EBB 15 x 25	**532610**	SDS plus	15	27	EA II M 12 x 25	1

ACCESSORIES

Machine setting tool **EMS**

Item	Art.-No.	Tool holder	Match	Sales unit [pcs]
EMS M 6 x 25/30	**048065**	SDS plus	EA II M 6 x 25, EA II M 6 x 30	1
EMS M 8 x 25/30	**048066**	SDS plus	EA II M 8 x 25, EA II M 8 x 30	1
EMS M 8 x 40	**048067**	SDS plus	EA II M 8 x 40	1
EMS M 10 x 25/30	**048068** 1)	SDS plus	EA II M 10 x 25, EA II M 10 x 30	1
EMS M 10 x 40	**048070**	SDS plus	EA II M 10 x 40	1
EMS M 12 x 50	**048071**	SDS plus	EA II M 12 x 50 D, EA II M 12 x 50, EA M 12 x 50 N D	1
EMS M 16 x 65	**048072** 1)	SDS max	EA II M 16 x 65	1
EMS M 20 x 80	**048073** 1)	SDS max	EA II M 20 x 80	1

1) Delivery time on request.

ACCESSORIES

Setting tool **EHS Plus** with hand impact protection for your safety and embossing tool.

Setting tool **EA-ST**

Item	Art.-No.	Match	Sales unit [pcs]
EHS M 6 x 25/30 Plus	**044630**	EA II M 6 x 25, EA II M 6 x 30	1
EHS M 8 x 25/30 Plus	**044631**	EA II M 8 x 25, EA II M 8 x 30	1
EHS M 8 x 40 Plus	**044632**	EA II M 8 x 40	1
EHS M 10 x 25/30 Plus	**048487**	EA II M 10 x 25, EA II M 10 x 30	1
EHS M 12 x 25 Plus	**532568**	EA II M 12 x 25	1
EHS M 10 x 40 Plus	**044633**	EA II M 10 x 40	1
EHS M 12 x 50 Plus	**044634**	EA II M 12 x 50, EA II M 12 x 50 D	1
EHS M 16 x 65 Plus	**044635**	EA II M 16 x 65	1
EHS M 20 x 80 Plus	**044636**	EA II M 20 x 80	1
EA-ST 12	**504585**	EA M 12 x 50 N D	1

LOADS

Hammerset anchor EA II

zinc plated steel / stainless steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Minimum member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum installation torque T_{max} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s [mm]	Min. spacing s_{min} [5) 6)] [mm]	Min. edge distance c_{min} [5) 6)] [mm]
EA II M6 x 30[8)]	5.8	80	30	4	3,9	2,9	150	150	90	70	150
	8.8					3,9					
	A4-70					3,2					
EA II M8 x 30[8)]	5.8	80	30	8	3,9	4,9	150	150	90	110	150
	8.8										
	A4-70					5,6					
EA II M8 x 40	5.8	80	40	8	6,1	4,9	150	150	120	200	150
	8.8										
	A4-70					5,6					
EA II M10 x 40	5.8	100	40	15	6,1	6,2	180	180	120	150	180
	8.8										
	A4-70					7,1					
EA II M12	5.8	100	50	35	8,5	11,3	200	200	150	200	200
	8.8										
	A4-70					12,9					
EA II M16	5.8	160	65	60	12,6	18,3	240	240	195	180	240
	8.8										
	A4-70					21,1					
EA II M20	5.8	200	80	120	17,2	29,1	280	285	240	190	280
	8.8										
	A4-70					33,7		340			

For the design the complete assessment ETA-07/0135 has to be considered. [7)]

[1)] The partial safety factors for material resistance as regulated in the ETA-07/0135 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3-hef and an edge distance c ≥ 1.5-hef. Accurate data see ETA-07/0135.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-07/0135.

[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[6)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0135.

[7)] The given loads refer to the European Technical Assessment ETA-07/0135, issue date 09/12/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

[8)] Only approved for statically intederminate systems.

LOADS

Hammerset anchor EA II galvanised / corrosion resistant steel A4

Highest permissible loads for a single anchor[1)6)] for multiple use for non-structural applications in cracked and non-cracked concrete C20/25 up to C50/60[5)].

Type	Effective anchorage depth h_{ef} [mm]	Min. member thickness h_{min}[4)] [mm]	Maximum torque moment $T_{inst, max}$ [Nm]	Permissible load F_{perm}[3)] [kN]	Required spacing for Max. Load s [mm]	Min. spacing s_{min}[2)] [mm]	Min. edge distance c_{min}[2)] [mm]
EA II M6 x 25	25	80	4,0	1,0	75	30	60
EA II M6 x 30	30	80	4,0	1,2	90	65	115
EA II M8 x 25	25	80	8,0	1,4	75	50	100
EA II M8 x 30	30	80	8,0	2,0	90	70	115
EA II M8 x 40	40	80	8,0	2,0	120	70	115
EA II M10 x 25	25	80	15,0	1,9	75	60	100
EA II M10 x 30	30	80	15,0	2,0	90	85	140
EA II M10 x 40	40	80	15,0	3,0	200	95	150
EA II M12 x 25	25	80	35,0	1,9	75	100	110
EA II M12 x 50	50	100	35,0	4,3	300	145	200

For the design the complete approval ETA-07/0142 has to be considered.

[1)] The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

[2)] Minimum possible axial spacings resp. edge distances while increasing the member thickness. The combination of minimum axial spacing and minimum edge distance with the minimum member thickness is not possible. Exact data see approval.

[3)] Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads as well as bending moments see approval.

[4)] Minimum possible member thickness while increasing the axial spacings and edge distances. The combination of minimum axial spacing and minimum edge distance with the minimum member thickness is not possible. Exact data see approval.

[5)] Further data for concrete C12/15 see approval.

[6)] Screw property class 4.6 and A4-50.

LOADS

Hammerset anchor EA II (screw property class 4.6 and A4-50)

Highest permissible loads[1)] for a single anchor for multiple use for non-structural applications in pre-stressed hollow core slabs[4)]

Type	Bottom flange thickness [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment $T_{inst,max}$ [Nm]	Permissible load F_{perm}[3)] [kN]	Min. spacing s_{min}[2)] [mm]	Min. edge distance c_{min}[2)] [mm]
EA II M6 x 25	≥ 35[5)]	25	4,0	1,0	200	150
EA II M8 x 25			8,0	1,4		
EA II M10 x 25			15,0	1,9		
EA II M12 x 25			35,0	1,9		

For the design the complete approval ETA-07/0142 has to be considered.

[1)] The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

[2)] Minimum possible axial spacings resp. edge distance. For further measures see approval.

[3)] Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads as well as bending moments see approval.

[4)] Concrete strength class C30/37 up to C50/60.

[5)] The anchor may be used in a flange thickness d_b = 30 mm with the same characteristic resistance, but the drill hole must not cut a cavity.

The cost-efficient hammerset anchor for an easy installation

Pipelines

Height adjustable pipe installation

VERSIONS

- Zinc-plated steel

BUILDING MATERIALS

- Concrete C12/15 to C50/60, non-cracked

ADVANTAGES

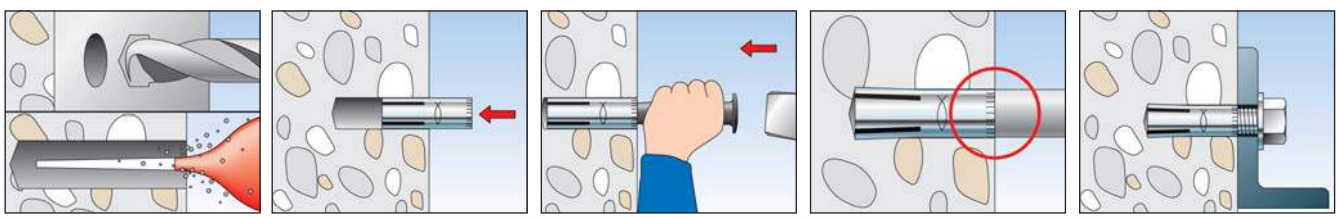
- The hammerset anchor with internal thread is suitable for pre-positioned installation.
- The EA-N fits for all standard screws with metric/inch – thread.
- The available internal thread diameter from 6 mm to 20 mm provides flexibility in the application.

APPLICATIONS

- Pipeline routes
- Cable trays
- Consoles

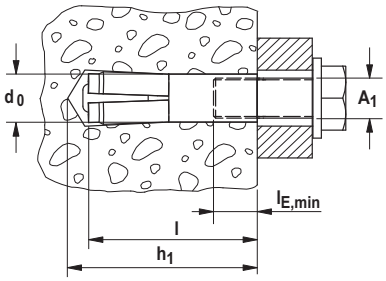
FUNCTIONING

- Put the hammerset anchor in the drill hole and get it flush to the surface by hammering in.
- With the hammerset tool EA-ST the capsule will spread due to hammering in the internal bolt and tensed up against the drill hole wall.
- The hammerset tools must be set up on the edge of the anchor for a correct expansion.



TECHNICAL DATA

Hammerset anchor **EA-N Metric**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth for pre-positioned installation h_1 [mm]	Anchor length l [mm]	Internal thread A1	Min. bolt penetration $l_{E,min}$ [mm]	Sales unit [pcs]
EA M 6 x 25 N gvz	**090159**	8	25	25	M 6	6	100
EA M 8 x 30 N gvz	**090160**	10	30	30	M 8	8	100
EA M10x40 N gvz	**090161**	12	40	40	M 10	10	50
EA M 12 x 50 N gvz	**090162**	15	50	50	M 12	12	50
EA M 16 x 65 N gvz	**090163**	20	65	65	M 16	16	25
EA M 20 x 80 N gvz	**090164**	25	80	80	M 20	20	25
EA M 12 x 50 N D gvz	**500872**	16	50	50	M 12	12	50

Hammerset anchor **EA-N Inch-metric**

Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth for pre-positioned installation h_1 [mm]	Anchor length l [mm]	Internal thread A1	Min. bolt penetration $l_{E,min}$ [mm]	Sales unit [pcs]
EA IM 1/4 x 25 N gvz	**048103**	8	25	25	1/4"	6	100
EA IM 5/16 x 30 N gvz	**048104**	10	30	30	5/16"	8	100
EA IM 3/8 x 40 N gvz	**048105**	12	40	40	3/8"	10	50
EA IM 1/2 x 50 N gvz	**048106**	16	50	50	1/2"	12	50
EA IM 5/8 x 65 N gvz	**048107**	20	65	65	5/8"	16	25
EA IM 3/4 x 80 N gvz	**048108**	25	80	70	3/4"	20	25

Hammerset anchor **EA-N Inch**

Item	Art.-No.	Drill diameter d_0 [Inch]	Min. drill hole depth for pre-positioned installation h_1 [Inch]	Total length l [Inch]	Internal thread A1 [Inch]	Min. bolt penetration $l_{E,min}$ [Inch]	Sales unit [pcs]
EA I 1/4 x 1" N gvz	**049185**	3/8	1	1	1/4	1/4	100
EA I 5/16 x 1 3/16" N gvz	**049194**	3/8	1 1/4	1 1/4	5/16	5/16	100
EA I 3/8 x 1 9/16" N gvz	**049195**	1/2	1 9/16	1 5/8	3/8	3/8	50
EA I 1/2 x 2" N gvz	**049197**	5/8	2	2	1/2	1/2	50
EA I 5/8 x 2 1/2" N gvz	**049198**	3/4	2 3/8	2 1/2	5/8	5/8	20

ACCESSORIES

Setting tool **EA-ST**

Item		Match	Sales unit [pcs]
EA-ST 6	**504573**	EA N M6	1
EA-ST 8	**504576**	EA N M8	1
EA-ST 10	**504584**	EA N M10	1
EA-ST 12	**504585**	EA N M12	1
EA-ST 16	**504586**	EA N M16	1
EA-ST 20	**504587**	EA N M20	1

LOADS

Hammerset anchor EA-N
zinc plated steel

Recommended loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 [1]						Minimum spacings while reducing the load	
Type	Screw material	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Recommended Tensile load N_{rec} [kN]	Min. spacing s_{min} [2] [mm]	Min. edge distance c_{min} [2] [mm]
EA M6x25 N[3]	≥ 4.6	100	25	4	2,0	65	115
EA M8x30 N[3]	≥ 4.6	100	30	8	2,5	95	140
EA M10x40 N	≥ 4.6	100	40	15	4,5	150	180
EA M12x50 N	≥ 4.6	120	50	35	6,0	145	200
EA M12x50 N D	≥ 4.6	120	50	35	6,0	145	200
EA M16x65 N	≥ 4.6	160	65	60	11,5	180	240
EA M20x80 N	≥ 4.6	200	80	120	16,0	190	280

[1] Required safety factors are considered.

[2] Minimum possible axial spacings resp. edge distance while reducing the recommended load.

[3] Only suitable for statically intederminate systems.

LOADS

Hammerset anchor EA-N Inch Metric
zinc plated steel

Recommended loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 [1]						Minimum spacings while reducing the load	
Type	Screw material	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Maximum torque moment T_{max} [Nm]	Recommended Tensile load N_{rec} [kN]	Min. spacing s_{min} [2] [mm]	Min. edge distance c_{min} [2] [mm]
EA IM 1/4x25 N[3]	≥ 4.6	100	25	4	3,0	65	115
EA IM 5/16x30 N[3]	≥ 4.6	100	30	8	4,0	95	140
EA IM 3/8x40 N	≥ 4.6	100	40	15	6,0	150	180
EA IM 1/2x50 N	≥ 4.6	120	50	35	7,0	145	200
EA IM 5/8x65 N	≥ 4.6	160	65	60	12,0	180	240
EA IM 3/4x80 N	≥ 4.6	200	80	120	18,0	190	280

[1] Required safety factors are considered.

[2] Minimum possible axial spacings resp. edge distance while reducing the recommended load.

[3] Only suitable for statically intederminate systems.

LOADS

Hammerset anchor EA-N Inch

zinc plated steel

Recommended loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength 3500 psi [1]						Minimum spacings while reducing the load	
Type	Screw material	Min. member thickness h_{min} [in.]	Effective anchorage depth h_{ef} [in.]	Maximum torque moment T_{max} [ft-lb]	Recommended Tensile load N_{rec} [lb]	Min. spacing s_{min} [2] [in.]	Min. edge distance c_{min} [2] [in.]
EA I 1/4x1 N [3]	≥ ISO 898-1 Klasse 4.6	4	1	3	560	2 9/16	4 1/2
EA I 5/16x1 3/16 N [3]	≥ ISO 898-1 Klasse 4.6	4	1 3/16	6	900	3 3/4	5 1/2
EA I 3/8x1 9/16 N	≥ ISO 898-1 Klasse 4.6	4	1 9/16	11	1120	5 5/16	7 1/8
EA I 1/2x2 N	≥ ISO 898-1 Klasse 4.6	4 3/4	2	26	1240	5 11/16	7 7/8
EA I 5/8x2 1/2 N	≥ ISO 898-1 Klasse 4.6	6 3/8	2 1/2	44	2020	7 1/8	9 1/2

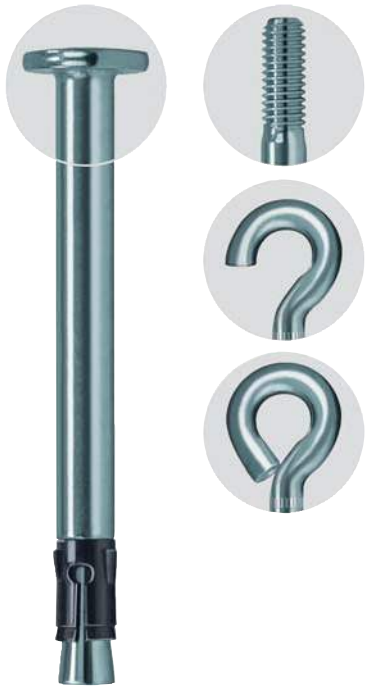
[1] Required safety factors are considered.

[2] Minimum possible axial spacings resp. edge distance while reducing the recommended load.

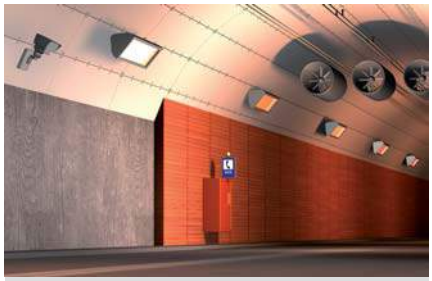
[3] Only suitable for statically intederminate systems.

Nail anchor FNA II

The installation-friendly hammerset anchor for multiple fixings



Suspended ceilings



Fire protection boards

VERSIONS

- Zinc-plated steel
- Stainless steel
- Highly corrosion-resistant steel

BUILDING MATERIALS

Approved for:

- Concrete C12/15 to C50/60, cracked, for multiple fixings of non-structural applications

Also suitable for:

- Solid sand-lime brick
- Natural stone with dense structure
- Prestressed hollow-core concrete slabs

CERTIFICATES

ETA-06/0175
ETAG 001-6
Multiple use for non-structural applications in concrete

Fire resistance classification R 120
Anchor types see test report

RWS 1350 °C
Anchor types see test report

ZTV 1200 °C
anchor types see test report

EDELSTAHL Rostfrei
INOX STAINLESS STEEL

from M8

ADVANTAGES

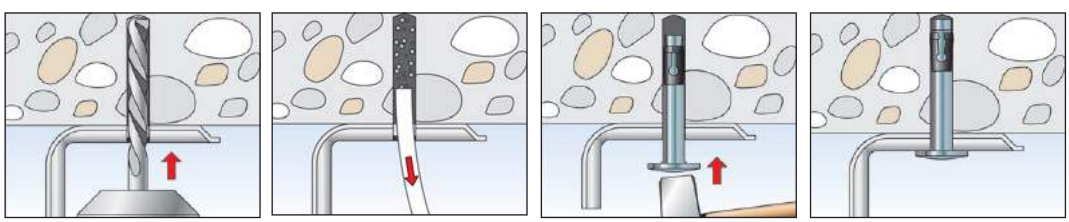
- The special active principle allows for a simple hammerset installation and, therefore, a short processing time.
- The extremely short anchor depth prevents reinforcement hits, and creates the conditions for a trouble-free installation.
- The optimised expansion clip ensures hold when placing in the drill hole, and prevents it falling out during overhead installations.
- The massive shaft cross-section guarantees a high load-bearing capacity, thus offering an extremely high level of safety.
- A range of head shapes allows for the fixing of wide-ranging fixtures, and for the ideal adaptation to suit the intended use.

APPLICATIONS

- Fire protection plates
- Fire protection boards
- Ventilation systems
- Wire and nonious hangers
- Mounting rails
- Metal clamps
- Substructures made of wood and metal

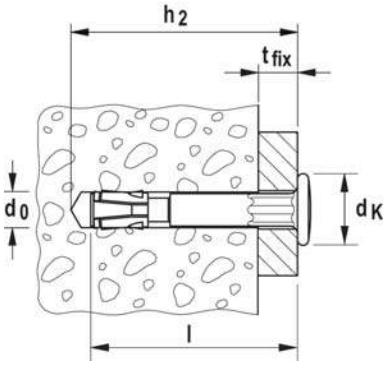
FUNCTIONING

- The FNA II with nail head is suitable for push-through installation. The FNA II M6 is suitable for pre-positioned and push-through installation. The FNA II OE and H are suitable for pre-positioned installation.
- The installed FNA II nail anchor expands automatically under load. The cone is pulled into the expansion clip and expands it against the drill hole wall.
- Available setting tools:
  FNA S-SBO to slip onto the drill,
  FNA S-SDS for series installation with a drilling hammer,
  FNA S-H for the manual installation of mounting rails.



TECHNICAL DATA

Nail anchor **FNA II** with nail head



	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Head-Ø	Sales unit	
	Art.-No.	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_2 [mm]	l [mm]	t_{fix} [mm]	d_K [mm]	[pcs]	
Item	**gvz**	**A4**	**C**								
FNA II 6 x 25/5	**044121** 1)	–	–	■	6	40	35	5	13.0	100	
FNA II 6 x 30/5	**044115** 1)	**044122**	–	■	6	45	40	5	13.0	100	
FNA II 6 x 30/5	–	–	**044124**	■	6	45	40	5	13.0	25	
FNA II 6 x 30/30	**044116**	**044123**	–	■	6	70	65	30	13.0	50	
FNA II 6 x 30/30	–	–	**044125**	■	6	70	65	30	13.0	25	
FNA II 6 x 30/50	**044117**	**046024**	**500569**	■	6	90	85	50	13.0	50	
FNA II 6 x 30/75	**044118**	–	**500573** 2)	■	6	115	110	75	13.0	50	
FNA II 6 x 30/100	**044119**	–	**500574** 3)	■	6	140	135	100	13.0	50	
FNA II 6 x 30/120	**044120**	–	**500575** 3)	■	6	160	155	120	13.0	50	

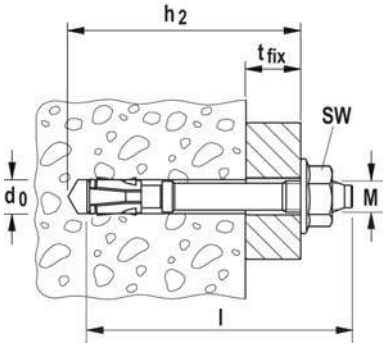
1) with hexagon below the nail head for anti-rotation lock of hole and wire hangers (for example) and centring for optional setting tool FNA-S

2) On request.

3) Delivery time on request.

TECHNICAL DATA

Nail anchor **FNA II M6** with thread and flange nut



	Zinc-plated steel	Stainless steel	Highly corrosion resistant steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_2 [mm]	l [mm]	t_{fix} [mm]	M	⬡ SW [mm]	[pcs]
Item	**gvz**	**A4**	**C**								
FNA II 6 x 25 M6/5	**044111**	–	–	■	6	40	45	5	M 6	10	100
FNA II 6 x 30 M6/5	**044109**	–	–	■	6	45	50	5	M 6	10	100
FNA II 6 x 30 M6/5	–	**044112** 2)	–	■	6	45	50	5	M 6	10	50
FNA II 6 x 30 M6/5	–	–	**044113** 2)	■	6	45	50	5	M 6	10	25
FNA II 6 x 30 M6 x 41	**044110** 1)	–	–	■	6	40	41	–	M 6	10	100
FNA II 6 x 30 M6/10	**046022**	–	–	■	6	45	55	10	M 6	10	100
FNA II 6 x 30 M8/5	**044114**	–	–	■	6	45	51	5	M 8	13	50

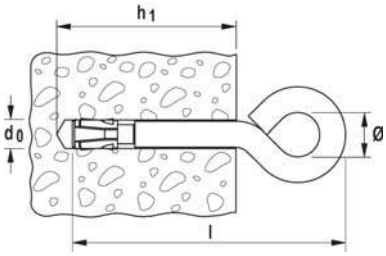
1) without nut; e.g. for fixing of pipe clamps

2) with nut and washer (no flange nut)

TECHNICAL DATA

Nail anchor **FNA II-H** with hook

Nail anchor **FNA II-OE** with eye



	Zinc-plated steel	Approval	Drill hole diameter	Anchor length	Min. drill hole depth	Inner diameter of the hook/eye	Sales unit		
	Art.-No.	ETA	d_0 [mm]	l [mm]	h_1 [mm]	[Ø mm]	[pcs]		
Item	**gvz**								
FNA II 6 x 25 H	**044126**	–	6	54	35	10	50		
FNA II 6 x 25 OE	**044127**	■	6	54	35	10	50		

TECHNICAL DATA

Machine setting tool **FNA S-SDS**

Machine setting tool **FNA S-SBO** for mounting on the drill bit (drill-Ø 6mm)

Hand tool **FNA S-H**

Item	Art.-No.			Sales unit [pcs]
FNA S-SDS	**061547**	for all FNA II with nail head	The ideal setting tool for the serial installation with SDS-plus adapter for driving in FNA II with nail head using a hammer drill.	1
FNA S-SBO	**061548**	for all FNA II with nail head	For a power saving and fast installation to be placed on the drill.	1
FNA S-H	**095990**	for FNA II with metric thread M6	E.g. for the fixing of installation of mounting rails. Chuck with outer diameter of 15mm for the installation of FNA II M6 by hand.	1

LOADS

Nail anchor FNA II

zinc plated steel / stainless steel / high corrosion resistant steel

Highest permissible loads[1] for a single fixing point[6] as part of a multiple fixing of non-structural systems[4] in concrete C20/25 up to C50/60[3].								Minimum spacings while reducing the load	
Type	Material fixing element	Effective anchorage depth h_{ef} [mm]	Minimum member thickness h_{min} [mm]	Maximum torque moment T_{inst} [Nm]	Permissible load F_{perm} [2] [kN]	Required edge distance for Max. Load c [mm]	Required spacing for Max. Load s [mm]	Min. spacing s_{min} [5] [mm]	Min. edge distance c_{min} [5] [mm]
FNA II 6 x 25	gvz	25	80	-	1,4	100 for s ≥ 200	100 for c ≥ 200	40	40
FNA II 6 x 30	gvz	30		-	2,4				
	A 4								
	C								
FNA II 6 x 25 M6	gvz	25		4	1,4				
FNA II 6 x 30 M6	gvz	30		4	2,4				
	A 4								
	C								
FNA II 6 x 30 M8	gvz	30		4	2,4				
FNA II 6 x 25 OE	gvz	25		-	0,7				

For the design the complete approval ETA - 06/0175 has to be considered.

[1] The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

[2] Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.

[3] For concrete compressive strength C12/15 see approval.

[4] Multiple use is defined acc ETAG 001 Part 6 with min. 3 fixing points with min. one anchor per fixing point and a permissible load of 1.4 kN or min. 4 fixing points with min. one anchor an a permissible load of 2.1 kN.

[5] Minimum possible axial spacings resp. edge distances. Smaller permissible loads acc. approval are required.

[6] A fixing point is defined as a single anchor or a group of 2 or 4 anchor.

The easy-to-assemble fixing solution for removable fire protection panel

Fire protection boards

Fire protection boards

VERSIONS

- Stainless steel
- Highly corrosion-resistant steel

BUILDING MATERIALS

- Concrete C12/15 to C50/60, cracked and non-cracked, for multiple fixings of non-structural applications

CERTIFICATES

ETA-06/0175
ETAG 001-6
Multiple use for non-structural applications in concrete

Fire resistance classification R 120
Anchor types see test report

RWS 1350 °C
Anchor types see test report

ZTV 1200 °C
anchor types see test report

EDELSTAHL Rost frei
INOX STAINLESS STEEL

from M8

ADVANTAGES

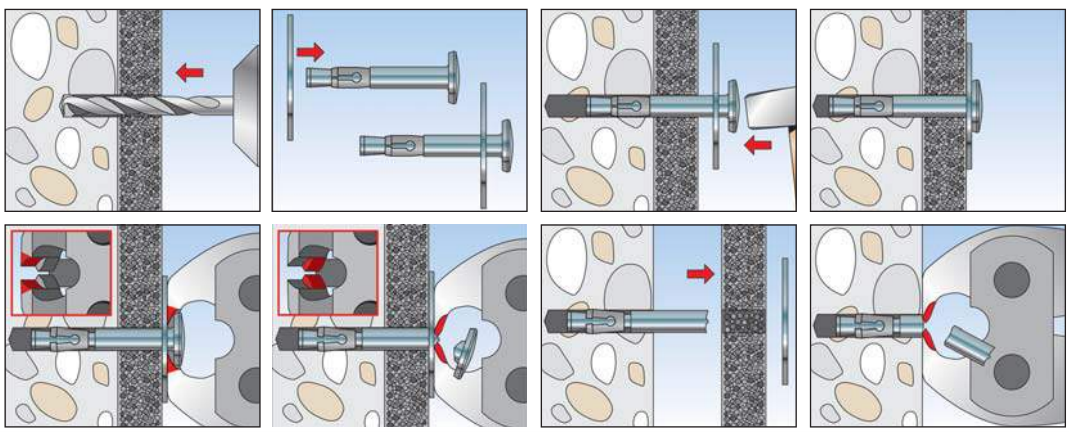
- Easy removal of fire protection panel without damage.
- Reusability of removed fire protection panel.
- Secure fixing, particularly when exposed to vibration, wind and pushing/pulling effects.
- Easy-to-assemble solution.
- Low anchoring depth (30 mm).
- Convenient assembly without torque-controlled setting tool.
- Approved system which has proven itself one million times over.
- Large range of anchor lengths possible.

APPLICATIONS

- Fixing of fire protection panel in tunnel construction.
- For fixing of one and more layers of fire protection panel of all manufacturers e.g. Aestuver and Promat.

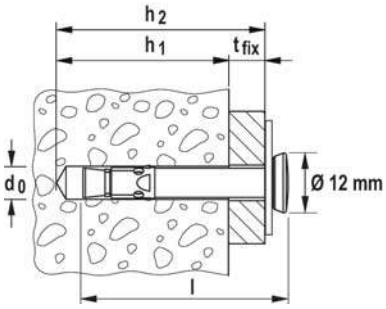
FUNCTIONING

- Nail anchor with low anchoring depth.
- The washer increases the pull through forces significantly and provides the damage of the panel during dismantling.
- Mounting: Drill, hammer in, and you're done!
- Easy pinching off of nail head thanks to special 2-stage pliers.
- For a fast assembly process, we recommend the fischer compressed air setting device (item no. 093731).



TECHNICAL DATA

Nail anchor **FNA II RB**



	Stainless steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Min. drill hole depth for pre-positioned installation	Anchorage depth	Anchor length	Max. usable length	Sales unit
	Art.-No.	ETA	d_0 [mm]	h_2 [mm]	h_1 [mm]	h_{ef} [mm]	l [mm]	t_{fix} [mm]	[pcs]
Item	A4								
FNA II 6 x30/30 RB	530674 1)	■	6	66	36	30	68	30	50
FNA II 6 x30/30 RB	530798 1)	■	6	66	36	30	68	30	200

1) delivery on request

TECHNICAL DATA

Washer 30/1,5/7,5

	Stainless steel	Highly corrosion resistant steel	Internal diameter	External-Ø	Thickness	Sales unit
			D [mm]	d [mm]	S [mm]	[pcs]
Item	A4	C				
Washer 30/1,5/7,5	531161	531162	7,5	30	1.5	100

ACCESSORIES

FNA RB Z - 2-stage plier

Item	Art.-No.		Adapted for		Sales unit [pcs]
FNA RB Z	**531142**		Plier for removal of FNA II RB		1

Nail anchor FNA II RB

ACCESSORIES

Air compressed setting tool

Item	Art.-No.		Match	Required for	Sales unit [pcs]
Air compressed setting tool	**093731**		for FNA II + FNA II RB	-	1
Drop in element	**093729**		-	Air compressed setting tool Art No. 93731	1
Stop ring	**093730**		-	Air compressed setting tool Art No. 93731	1
Fitting	**093732**		-	Air compressed setting tool Art No. 93731	1

LOADS

Nail anchor FNA II RB

stainless steel / high corrosion resistant steel

Highest permissible loads[1] for a single fixing point[6] as part of a multiple fixing of non-structural systems[4] in concrete C20/25 up to C50/60[3].								Minimum spacings while reducing the load	
Type	Material fixing element	Effective anchorage depth h_{ef} [mm]	Minimum member thickness h_{min} [mm]	Maximum torque moment T_{inst} [Nm]	Permissible load F_{perm} [2] [kN]	Required edge distance for Max. Load c [mm]	Required spacing for Max. Load s [mm]	Min. spacing s_{min} [5] [mm]	Min. edge distance c_{min} [5] [mm]
FNA II 6 x 30 RB	A4 / C	30	80	-	2,4	100 for s ≥ 200	100 for c ≥ 200	40	40

For the design the complete approval ETA - 06/0175 has to be considered.

[1] The partial safety factors for material resistance as regulated in the approval as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

[2] Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.

[3] For concrete compressive strength C12/15 see approval.

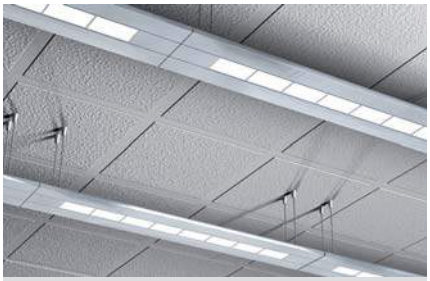
[4] Multiple use is defined acc ETAG 001 Part 6 with min. 3 fixing points with min. one anchor per fixing point and a permissible load of 1.4 kN or min. 4 fixing points with min. one anchor an a permissible load of 2.1 kN.

[5] Minimum possible axial spacings resp. edge distances. Smaller permissible loads acc. approval are required.

[6] A fixing point is defined as a single anchor or a group of 2 or 4 anchor.

The installation-friendly push-through anchor for multiple fixings

Suspended ceilings with Nonius hangers



Suspended ceilings

VERSIONS

- Zinc-plated steel

CERTIFICATES

ETA-17/0736
ETAG 001-6
Multiple use for non-structural applications in concrete

Fire resistance classification
R 120
Anchor types see test report

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, cracked, for the multiple fixings of non-load-bearing systems

Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

ADVANTAGES

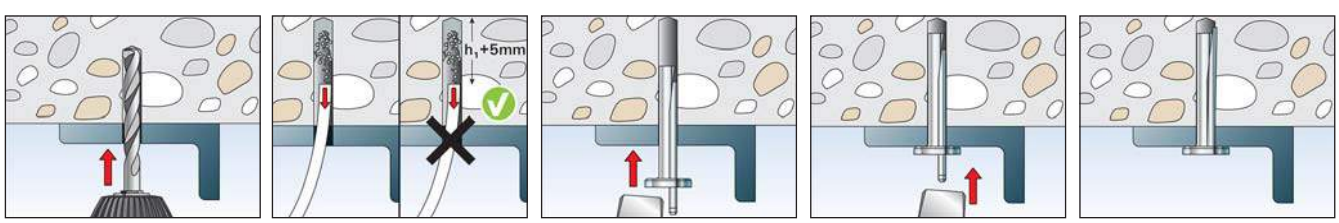
- The simple active principle allows for cost-efficient hammerset installation.
- The new short version FDN II K with reduced anchorage depth ist faster to install and reduces reinforcement hits.
- The flush-sunk expansion nail signifies the complete expansion of the anchor, and thereby ensures minimum movement when under load.
- The fischer FDN II can be installed without cleaning of the drill hole.
- The head embossing offers a simple control of the anchoring, and thus saves time.

APPLICATIONS

- Wire and Nonius hangers
- Ventilation systems
- Slats
- Metal profiles
- Perforated tapes
- Sub-structures made of metal

FUNCTIONING

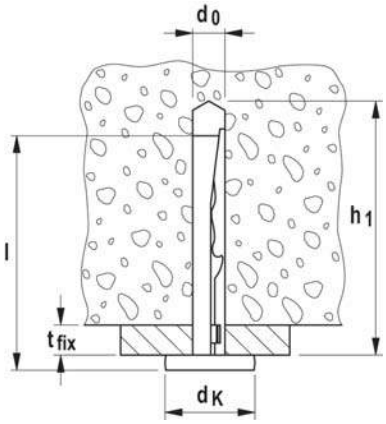
- The FDN II is suitable for push-through installation.
- The FDN II ceiling nail is driven into the drill hole with a hammer until it is firmly in position. Do not hit the expansion wedge at this stage.
- Then, drive the expansion wedge in flush to the nail head. This causes the FDN II to expand against the drill hole wall.



Ceiling nail FDN II

TECHNICAL DATA

Ceiling nail **FDN II**



	Art.-No.	Approval ETA	Drill diameter d_0 [mm]	Anchor length l [mm]	Max. usable length t_{fix} [mm]	Min. drill hole depth without cleaning h_1 [mm]	Min. drill hole depth with cleaning h_1 [mm]	Head-Ø d_K [mm]	Sales unit [pcs]
FDN II 6/5	**545636**	■	6	40	5	47	42	15	100
FDN II 6/35	**545637**	■	6	70	35	77	72	15	100
FDN II 6/5 K	**545638**	■	6	33	5	40	35	15	100
FDN II 6/35 K	**545639**	■	6	64	35	70	65	15	100

LOADS

Ceiling nail FDN II

zinc-plated steel

Permissible loads[1] for a single fixing point[5] as part of a multiple fixing[4] in cracked and non-cracked normal concrete of strength classes C20/25 up to C50/60[3]

Type	Effective anchorage depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Permissible load F_{perm} [2] [kN]	Required edge distance for maximum load c [mm]	Required spacing for maximum load s [mm]	Min. spacing s_{min} [mm]	Min. edge distance c_{min} [mm]
FDN II 6/5 K	25	80	1,2	70	60	60	70
FDN II 6/35 K	25	80	1,2	70	60	60	70
FDN II 6/5	32	80	1,7	60	50	50	60
FDN II 6/35	32	80	1,7	60	50	50	60

For the design the complete European Technical Assessment ETA-17/0736 has to be considered.

[1] The partial safety factors for material resistance as regulated in the assessment as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

[2] Valid for tensile load, shear load and oblique load under any angle. For shear load with lever arm (bending) see assessment.

[3] For concrete strength class C12/15 see assessment.

[4] A multiple fixing in accordance with ETAG 001 Part 6 is defined by at least 3 fixing points with at least one anchor each and a permissible load per fixing point of 1,4 kN or by at least 4 fixing points with at least one anchor each and a permissible load per fixing point of 2,1 kN.

[5] A fixing point is defined as a single anchor or a group of 2 or 4 anchors.

The cost-efficient push-through anchor for multiple fixings

Drywall profiles

Suspended ceilings with Nonius hangers

VERSIONS

- Zinc-plated steel

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, cracked, for the multiple fixings of non-load-bearing systems

Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

CERTIFICATES

ETA-17/0737
ETAG 001-6
Multiple use for non-structural applications in concrete

Fire resistance classification
R 120
Anchor types see test report

ADVANTAGES

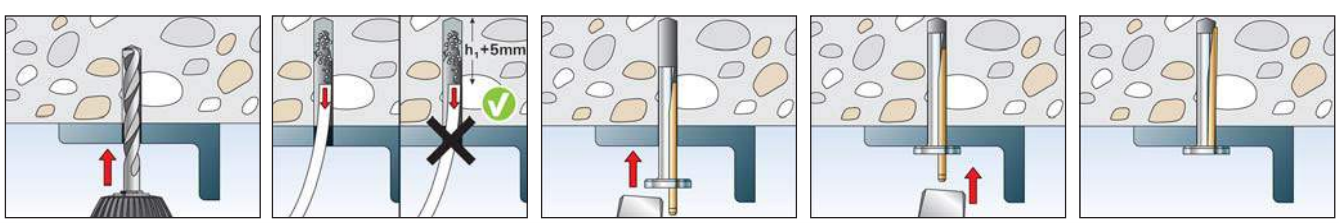
- The simple active principle allows for fast hammerset installation.
- The efficient anchor offers the perfect price-performance ratio for an economical installation.
- The flush-sunk expansion nail signifies the complete expansion of the anchor, and thereby ensures minimum movement when under load.
- The head embossing offers a simple control of the anchoring, and thus saves time.

APPLICATIONS

- Drywall profiles
- Wire and Nonius hangers
- Ventilation systems
- Slats
- Metal profiles
- Perforated tapes
- Sub-structures made of metal

FUNCTIONING

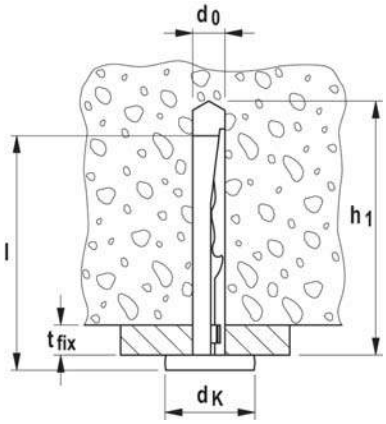
- The FDZ is suitable for push-through installation.
- The FDZ ceiling nail is driven into the drill hole with a hammer until it is firmly in position. Do not hit the expansion wedge at this stage.
- Then, drive the expansion wedge in flush to the nail head. This causes the FDZ to expand against the drill hole wall.



Ceiling nail FDZ

TECHNICAL DATA

Ceiling nail **FDZ**



	Art.-No.	Approval ETA	Drill diameter d_0 [mm]	Anchor length l [mm]	Max. usable length t_{fix} [mm]	Min. drill hole depth without cleaning h_1 [mm]	Min. drill hole depth with cleaning h_1 [mm]	Head-Ø d_K [mm]	Sales unit [pcs]
FDZ 6/5	**544103**	■	6	40	5	47	42	15	200
FDZ 6/35	**544104**	■	6	70	35	77	72	15	200

LOADS

Ceiling nail FDZ
zinc-plated steel

Permissible loads[1] for a single fixing point[5] as part of a multiple fixing[4] in cracked and non-cracked normal concrete of strength classes C20/25 up to C50/60[3]

Type	Effective anchorage depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Permissible load F_{perm} [2] [kN]	Required edge distance for maximum load c [mm]	Required spacing for maximum load s [mm]	Min. spacing s_{min} [mm]	Min. edge distance c_{min} [mm]
FDZ 6/5	32	80	1,0	60	50	50	60
FDZ 6/35	32	80	1,0	60	50	50	60

For the design the complete European Technical Assessment ETA-17/0737 has to be considered.

[1] The partial safety factors for material resistance as regulated in the assessment as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

[2] Valid for tensile load, shear load and oblique load under any angle. For shear load with lever arm (bending) see assessment.

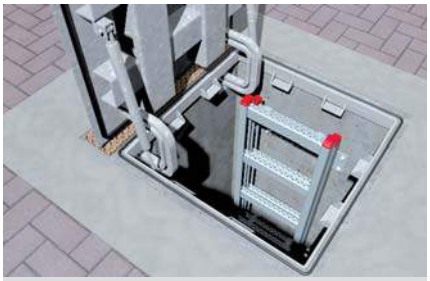
[3] For concrete strength class C12/15 see assessment.

[4] A multiple fixing in accordance with ETAG 001 Part 6 is defined by at least 3 fixing points with at least one anchor each and a permissible load per fixing point of 1,4 kN or by at least 4 fixing points with at least one anchor each and a permissible load per fixing point of 2,1 kN.

[5] A fixing point is defined as a single anchor or a group of 2 or 4 anchors.

The cost-efficient fixing for flexible use in non-cracked concrete

Column bases



Stormwater overflow tank manholes

VERSIONS

- Zinc-plated steel
- Stainless steel
- Hot-dip galvanised steel (with variable working life for outdoor areas)

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, non-cracked

Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

CERTIFICATES

ETA-07/0211
EAD 330232-00-0601
Option 7 for non-cracked concrete

ETA-18/0101
EAD 331612-00-0601
Option 7 for non-cracked concrete
With variable working life

EDELSTAHL Rostfrei
INOX
STAINLESS STEEL

ADVANTAGES

- The standard anchorage depth achieves the maximum load-bearing capacities.
- The reduced anchorage depth reduces the drill hole depth. This minimises the amount of time needed for installation whilst increasing flexibility.
- Additional short version „K" with short anchoring depth.
- The long thread balances component tolerances and allows for stand-off installations, thus increasing flexibility.
- Few hammer blows and the minimal torque slippage allow for a noticeably simpler installation.
- The drive-in pin protects the thread from damage, and thus ensures a faster installation and dismantling of the attachment.
- The larger washer included with the FBN II GS creates a larger supporting surface and, as such, allows for the fixing of wood constructions.
- When using hollow drills with suction is no drill hole cleaning required.
- New ETA assessment for hot-dip galvanised version for variable working life in outdoor areas.

APPLICATIONS

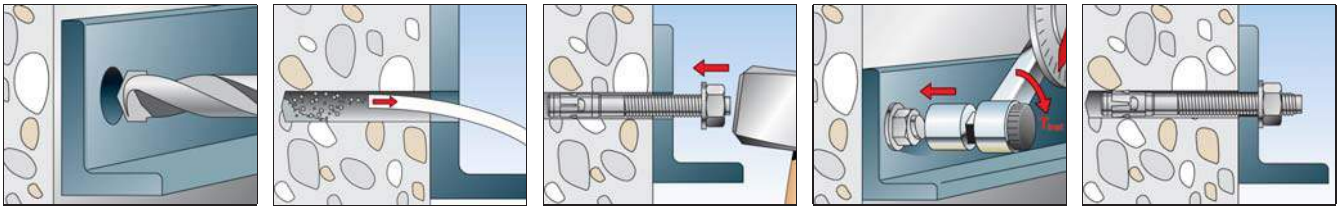
- Steel constructions
- Guard rails
- Consoles
- Ladders
- Cable trays
- Machines
- Staircases
- Gates
- Façades

FUNCTIONING

- The FBN II is suitable for pre-positioned and push-through installation; also suitable for stand-off installation under certain conditions.
- Prior to installation, place the hexagon nut in the optimal position (the drive-in pin projects by approx. 3 mm out of the hexagon nut).
- When applying the torque, the cone bolt is pulled into the expansion clip and expands it against the drill hole wall.
- The head embossing offers a simple control of the anchoring.
- In the case of series installation, we recommend using the FABS bolt anchor setting tool.

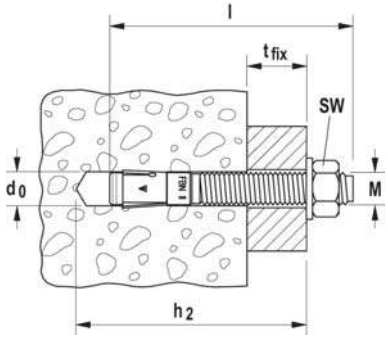
Bolt anchor FBN II

INSTALLATION



TECHNICAL DATA

Bolt anchor **FBN II**



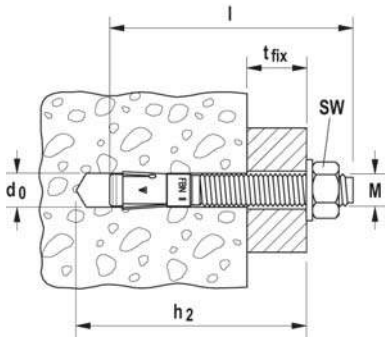
	Zinc-plated steel	Stainless steel	Hot-dip galvanised steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. usable length hef,max./ hef,min.	Thread	Width across nut	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_2 [mm]	l [mm]	t_{fix} [mm]	Ø x length [mm]	⬡ SW [mm]	[pcs]
Item	gvz	A4	hdg								
FBN II 6/5	**505526** 1)2)	–	–	■	6	45	50	5/-	M 6 x 12	10	100
FBN II 6/10	**505527** 1)2)	**505532** 1)2)	–	■	6	50	55	10/-	M 6 x 17	10	100
FBN II 6/30	**505528** 1)2)	**505535** 1)2)	–	■	6	70	75	30/-	M 6 x 35	10	100
FBN II 8/5	**040662**	–	–	■	8	61	66	5/15	M 8 x 34	13	50
FBN II 8/10	**040664**	**507555**	**507575**	■	8	66	71	10/20	M 8 x 39	13	50
FBN II 8/20	**040669**	–	–	■	8	76	81	20/30	M 8 x 49	13	50
FBN II 8/30	**040700**	**507556**	**507576**	■	8	86	91	30/40	M 8 x 59	13	50
FBN II 8/50	**040771**	**507557**	**507577**	■	8	106	111	50/60	M 8 x 79	13	50
FBN II 8/70	**040777**	–	**507578**	■	8	126	131	70/80	M 8 x 99	13	20
FBN II 8/100	**040783**	–	–	■	8	156	161	100/110	M 8 x 129	13	20
FBN II 10/10	**040827**	**507558**	**507579**	■	10	78	86	10/20	M 10 x 46	17	50
FBN II 10/20	**040851**	**507559**	–	■	10	88	96	20/30	M 10 x 56	17	50
FBN II 10/30	**040854**	–	–	■	10	98	106	30/40	M 10 x 66	17	–
FBN II 10/30	–	**507560**	**507580**	■	10	98	106	30/40	M 10 x 66	17	50
FBN II 10/50	**040855**	**507561**	**507582**	■	10	118	126	50/60	M 10 x 86	17	20
FBN II 10/70	**040931**	–	–	■	10	138	146	70/80	M 10 x 106	17	20
FBN II 10/100	**040943**	**507562**	**507583**	■	10	168	176	100/110	M 10 x 136	17	20
FBN II 10/140	**040944**	–	–	■	10	208	216	140/150	M 10 x 176	17	20
FBN II 10/160	**040945**	–	–	■	10	228	236	160/170	M 10 x 196	17	20
FBN II 12/10	**040950**	**507563**	**507589**	■	12	95	106	10/25	M 12 x 59	19	20
FBN II 12/20	**044558**	**507564**	–	■	12	105	116	20/35	M 12 x 69	19	20
FBN II 12/30	**045263**	**507565**	**507591**	■	12	115	126	30/45	M 12 x 79	19	20
FBN II 12/50	**045264**	**507566**	**507592**	■	12	135	146	50/65	M 12 x 99	19	20
FBN II 12/80	**045265**	–	–	■	12	165	176	80/95	M 12 x 129	19	20
FBN II 12/100	**045266**	**507567**	**507596**	■	12	185	196	100/115	M 12 x 149	19	20
FBN II 12/120	**045267**	–	–	■	12	205	216	120/135	M 12 x 169	19	20
FBN II 12/140	**045268**	–	–	■	12	225	236	140/155	M 12 x 189	19	20
FBN II 12/160	**045269**	–	–	■	12	245	256	160/175	M 12 x 189	19	20
FBN II 16/10	–	**507568**	–	■	16	114	130	10/25	M 16 x 74	24	10
FBN II 16/25	**045564**	**507569**	**507598**	■	16	129	145	25/40	M 16 x 89	24	10
FBN II 16/50	**045565**	**507570**	**507553**	■	16	154	170	50/65	M 16 x 105	24	10
FBN II 16/80	**045566**	–	–	■	16	184	200	80/95	M 16 x 144	24	10
FBN II 16/100	**045567**	–	**507554**	■	16	204	220	100/115	M 16 x 164	24	10
FBN II 16/140	**045568**	–	–	■	16	244	260	140/155	M 16 x 184	24	10

1) Use restricted to anchoring of structural components which are statically indeterminate.

2) Nut and washer not pre-assembled/supplied loose.

TECHNICAL DATA

Bolt anchor **FBN II**



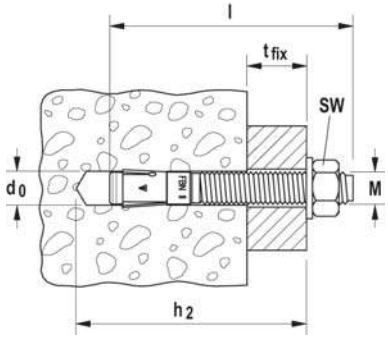
	Zinc-plated steel Art.-No.	Stainless steel Art.-No.	Hot-dip galvanised steel Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Min. drill hole depth for through fixings h_2 [mm]	Anchor length l [mm]	Max. usable length hef,max./ hef,min. t_{fix} [mm]	Thread Ø x length [mm]	Width across nut ⬡ SW [mm]	Sales unit [pcs]
Item	**gvz**	**A4**	**hdg**								
FBN II 16/160	**045569**	–	–	■	16	264	280	160/175	M 16 x 184	24	10
FBN II 16/200	**045570**	–	–	■	16	304	320	200/215	M 16 x 184	24	10
FBN II 20/30	**045573**	**507571**	**508015**	■	20	165	187	30/55	M 20 x 90	30	10
FBN II 20/60	**045574**	**507572**	–	■	20	195	217	60/85	M 20 x 90	30	10
FBN II 20/80	**045575**	–	–	■	20	215	237	80/105	M 20 x 90	30	10
FBN II 20/120	**045576**	–	–	■	20	255	277	120/145	M 20 x 90	30	10

1) Use restricted to anchoring of structural components which are statically indeterminate.

2) Nut and washer not pre-assembled/supplied loose.

TECHNICAL DATA

Bolt anchor **FBN II K**

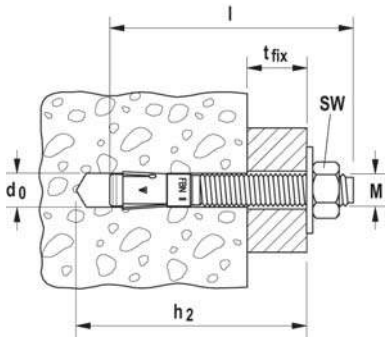


	Zinc-plated steel, short version Art.-No.	Stainless steel, short version Art.-No.	Hot-dip galvanised steel, short version Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Min. drill hole depth for through fixings h_2 [mm]	Anchor length l [mm]	Max. usable length hef,max./ hef,min. t_{fix} [mm]	Thread Ø x length [mm]	Width across nut ⬡ SW [mm]	Sales unit [pcs]
Item	**gvz**	**A4**	**hdg**								
FBN II 8/5 K	**040806**	**508007**	**508012**	■	8	51	56	-/5	M 8 x 24	13	50
FBN II 8/10 K	**040807**	–	–	■	8	56	61	-/10	M 8 x 29	13	50
FBN II 10/5 K	**040946**	**508010**	**508013**	■	10	63	71	-/5	M 10 x 31	17	50
FBN II 10/10 K	**040947**	–	–	■	10	68	76	-/10	M 10 x 36	17	50
FBN II 12/5 K	**045272**	**508011**	**508014**	■	12	75	86	-/5	M 12 x 39	19	20
FBN II 12/10 K	**045273**	–	–	■	12	80	91	-/10	M 12 x 44	19	20
FBN II 12/30 K	**045274**	–	–	■	12	100	111	-/30	M 12 x 64	19	20
FBN II 16/15 K	**045571**	**508745**	**507597**	■	16	104	120	-/15	M 16 x 64	24	10
FBN II 16/25 K	**045572**	–	–	■	16	114	130	-/25	M 16 x 74	24	10
FBN II 20/10 K	**045577**	–	–	■	20	120	142	-/10	M 20 x 50	30	10

Bolt anchor FBN II

TECHNICAL DATA

Bolt anchor **FBN II-GS** with large washer



	Steel, zinc-plated, with large washer	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. usable length hef,max./ hef,min.	Thread	Width across nut	Washer (outer diameter x thickness)	Sales unit
	Art.-No.	ETA	d_0 [mm]	h_2 [mm]	l [mm]	t_{fix} [mm]	Ø x length [mm]	⬡ SW [mm]	[mm]	[pcs]
Item	**gvz**									
FBN II 12/80 GS	**045578**	■	12	165	176	80/95	M 12 x 129	19	44 x 4	20
FBN II 12/100 GS	**045579**	■	12	185	196	100/115	M 12 x 149	19	44 x 4	20
FBN II 12/120 GS	**045580**	■	12	205	216	120/135	M 12 x 169	19	44 x 4	20
FBN II 12/140 GS	**045581**	■	12	225	236	140/155	M 12 x 189	19	44 x 4	10
FBN II 12/160 GS	**045583**	■	12	245	256	160/175	M 12 x 189	19	44 x 4	10
FBN II 12/180 GS	**045584**	■	12	265	276	180/195	M 12 x 189	19	44 x 4	10
FBN II 12/200 GS	**045585**	■	12	285	296	200/215	M 12 x 189	19	44 x 4	10
FBN II 12/250 GS	**045586**	■	12	335	346	250/265	M 12 x 100	19	44 x 4	10
FBN II 16/100 GS	**045588**	■	16	204	220	100/115	M 16 x 164	24	56 x 5	10
FBN II 16/140 GS	**045590**	■	16	244	260	140/155	M 16 x 184	24	56 x 5	10
FBN II 16/160 GS	**045591**	■	16	264	280	160/175	M 16 x 184	24	56 x 5	10
FBN II 16/200 GS	**045593**	■	16	304	320	200/215	M 16 x 100	24	56 x 5	10

ACCESSORIES

fischer Anchor bolt setting tool **FABS**

Item	Art.-No.	Matching anchor type	Sales unit [pcs]
FABS	**077937**	FAZ II, FBN II, EXA for diameter from M6 - M12	1

LOADS

Bolt anchor FBN II

zinc plated steel / stainless steel / hot dip galvanised steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s [mm]	Min. spacing s_{min} [5) 6)] [mm]	Min. edge distance c_{min} [5) 6)] [mm]
FBN II 6	gvz	100	30[8)]	4	2,9	3,4	100	60	90	40	40
	A4			4	2,9	3		55			
FBN II 8	gvz	100	30[8)]	15	2,9	7,1	65	115	90	40	40
	A4			10	2,9	7,1		115		50	45
	gvz	100	40	15	6,1	7,6	95	120	120	40	40
	A4			10		7,3		115			45
	hdg			15		7,6		120			40
FBN II 10	gvz	100	40	30	6,1	12,0	100	190	120	50	80
	A4			20		11,6		185			
	gvz	100	50	30	8,5	12,0	100	185	150	50	50
	A4			20		11,6		180		70	55
	hdg			30		12,0		185		50	50
FBN II 12	gvz	100	50	50	8,5	17,9	145	280	150	70	100
	A4			35		15,7		245			
	gvz	120	65	50	12,6	17,9	145	245	195	70	70
	A4			35		15,7		215			
	hdg			40		17,9		245			
FBN II 16	gvz	120	65	100	12,6	29,0	175	410	195	90	120
	A4			80							
	gvz	160	80	100	17,2	31,5	175	375	240	90	90
	A4			80		29,1		340		120	80
	hdg			70		31,5		375		90	90
FBN II 20	gvz	160	80	200	17,2	38,3	185	455	240	120	120
	A4			150		39,6		470		140	
	gvz	200	105	200	25,9	38,3	185	385	315	120	120
	A4			150		49,1		510			
	hdg			200		38,3		385			

For the design the complete assessment ETA-07/0211 has to be considered. [7)]

[1)] The partial safety factors for material resistance as regulated in the ETA-07/0211 as well as a partial safety factor for load actions of γ_L = 1,4 are considered. As an single anchor counts e.g. an anchor with a spacing $s \geq 3 \cdot h_{ef}$ and an edge distance $c \geq 1{,}5 \cdot h_{ef}$. Accurate data see ETA-07/0211.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method Hammer drilling resp. hollow drilling.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-07/0211.

[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

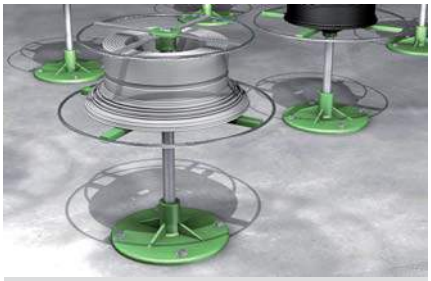
[6)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-07/0211.

[7)] The given loads refer to the European Technical Assessment ETA-07/0211, issue date 19/05/2016. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

[8)] Anchoring depth smaller than 40 mm are only approved for statically intederminate systems.

The installation-friendly internally threaded anchor for fixings in non-cracked concrete

Fall protection devices



Plant construction

VERSIONS

- Zinc-plated steel

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, non-cracked

Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

CERTIFICATES

ETA-04/0003
ETAG 001-2
Option 7 for non-cracked concrete

ADVANTAGES

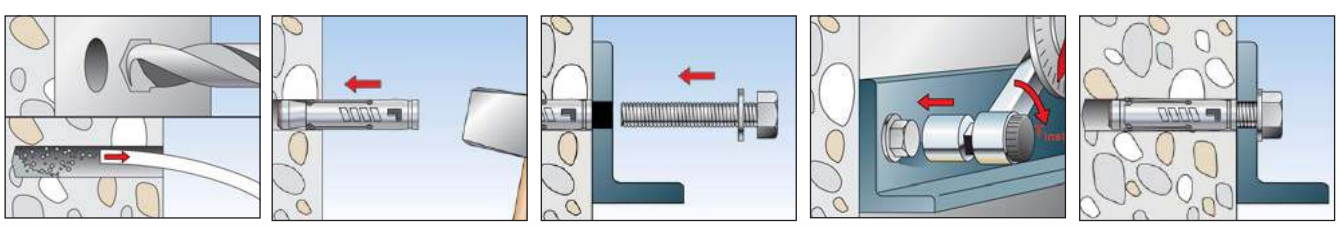
- The optimised geometry minimises setting energy and allows for use in extremely narrow spaces. This allows for user-friendly installation.
- The three-part expansion sleeve creates even load distribution, thus allowing small edge and axial spacing. Thus the TA M is extremely flexible.
- The metric internal thread allows to use standard screws or threaded rods for the ideal adaptation to suit the intended use.
- The red plastic cap protects against soiling and thus ensures free-running of the thread.

APPLICATIONS

- Steel constructions
- Handrails
- Consoles
- Ladders
- Cable trays
- Machines
- Staircases
- Gates
- Façades
- Stand-off installations

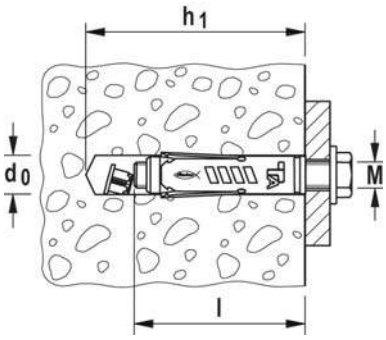
FUNCTIONING

- The TAM is suitable for pre-positioned installation.
- When applying the torque, the cone is pulled into the expansion sleeve and expands it against the drill hole wall.
- For correct installation, it must be ensured that the pre-positioned anchor TA M can be supported on the attachment, or that the threaded rod is countered.
- Determining the screw length l_s:
  Screw length l_s =
  Length of fixing
  + Thickness of fixture t_{fix}
  + Thickness of washer.



TECHNICAL DATA

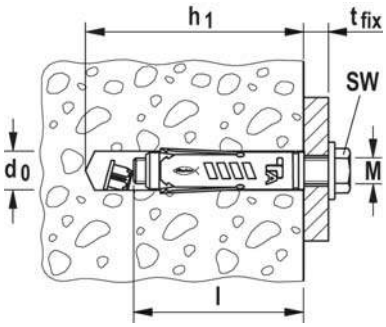
Heavy-duty anchor **TA M**



	Zinc-plated steel	Approval	Drill hole diameter	Min. drill hole depth	Anchor length	Thread	Sales unit		
		ETA	d_0 [mm]	h_1 [mm]	l [mm]	M	[pcs]		
Item	**gvz**								
TA M6	**090245**	■	10	65	49	M 6	50		
TA M8	**090246**	■	12	70	56	M 8	50		
TA M10	**090247**	■	15	90	69	M 10	25		
TA M12	**090248**	■	18	105	86	M 12	25		

TECHNICAL DATA

Heavy-duty anchor **TA M-S** with screw



	Zinc-plated steel	Approval	Drill hole diameter	Min. drill hole depth	Anchor length	Max. fixture thickness	Screw	Width across nut	Sales unit
		ETA	d_0 [mm]	h_1 [mm]	l [mm]	t_{fix} [mm]	Ø x length	⬡ SW [mm]	[pcs]
Item	**gvz**								
TA M6 S/10	**090249**	■	10	65	49	10	M 6 x 60	10	50
TA M8 S/10	**090250**	■	12	70	56	10	M 8 x 65	13	50
TA M10 S/20	**090251**	■	15	90	69	20	M 10 x 90	17	25
TA M12 S/25	**090252**	■	18	105	86	25	M 12 x 110	19	20

LOADS

Heavy-duty anchor TA M

zinc plated steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Screw material resp. screw surface	Min. member thickness h_{min} [mm]	Effective anchorage depth h_{ef} [mm]	Installation torque T_{inst} [Nm]	Permissible tensile load N_{perm} [4)] [kN]	Permissible shear load V_{perm} [4)] [kN]	Required edge distance (with one edge) for: Max. tension load c [mm]	Required edge distance (with one edge) for: Max. shear load c [mm]	Required spacing for: Max. Load s [mm]	Min. spacing s_{min} [5) 6)] [mm]	Min. edge distance c_{min} [5) 6)] [mm]
TA M6	8.8	100	40	10	3,6	3,3	50	55	120	80	50
TA M8	8.8	100	45	20	5,7	6,7	65	95	135	90	60
TA M10	8.8	110	55	40	9,5	11,0	160	150	165	110	70
TA M12	8.8	140	70	75	11,9	17,0	170	200	210	160	120

For the design the complete assessment ETA-04/0003 has to be considered. [7)]

[1)] The partial safety factors for material resistance as regulated in the ETA-04/0003 as well as a partial safety factor for load actions of γ_L = 1.4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3-h_{ef} and an edge distance c ≥ 1.5-h_{ef}. Accurate data see ETA-04/0003.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-04/0003.

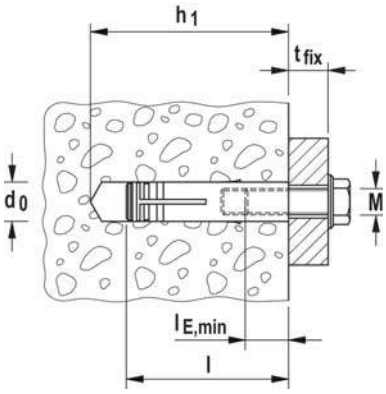
[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[6)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-04/0003.

[7)] The given loads refer to the European Technical Approval ETA-04/0003, issue date 11/06/2013. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

TECHNICAL DATA

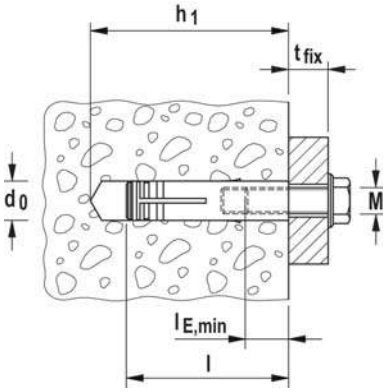
Heavy-duty anchor **SL M**



	Zinc-plated steel Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Anchor length l [mm]	Internal thread A1	Min. bolt penetration $l_{E,min}$ [mm]	Sales unit [pcs]	
Item	**gvz**							
SL M 16	**050556**	24	110	90	M 16	90	10	
SL M 20	**050557**	30	130	110	M 20	110	5	
SL M 24	**050558**	35	150	125	M 24	125	5	

TECHNICAL DATA

Heavy-duty anchor **SLM-N A4**



	Stainless steel Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Anchor length l [mm]	Internal thread A1	Min. bolt penetration $l_{E,min}$ [mm]	Sales unit [pcs]	
Item	**A4**							
SL M 8 N A4	**050526**	12	60	54	M 8	52	25	
SL M 10 N A4	**050527**	16	70	62	M 10	62	20	

LOADS

Heavy-duty anchor SL M

zinc plated steel / stainless steel

Recommended loads[1) 3)] of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25.

Type	Effective anchorage-depth h_{ef} [mm]	Min. member thickness h_{min} [mm]	Torque-moment T_{inst} [Nm]	Recommended load F_{rec} [2)] [kN]	Char. spacing $s_{cr,N}$ [mm]	Char. edge distance $c_{cr,N}$ [mm]	Min. spacing s_{min} [4)] [mm]	Min. edge distance c_{min} [4)] [mm]
SL M 8 N A4	45	100	25	3,5	135	68	50	90
SL M 10 N A4	50	100	50	5,0	150	75	50	100
SL M 16 gvz	62	130	100	8,0	186	93	60	120
SL M 20 gvz	77	150	150	11,0	231	116	80	160
SL M 24 gvz	90	200	200	13,9	270	135	90	180

[1)] Required safety factors are considered.

[2)] Valid for tensile load, shear load and oblique load under any angle.

[3)] Valid for screws with grade 8.8 and A4-70

[4)] Minimum possible axial spacings resp. edge distance while reducing the recommended load.

The installation-friendly push-through anchor for fixings in non-cracked concrete

Collision protection

Benches

VERSIONS

- Zinc-plated steel

BUILDING MATERIALS

Approved for:

- Concrete C20/25 to C50/60, non-cracked

Also suitable for:

- Concrete C12/15
- Natural stone with dense structure

CERTIFICATES

ETA-04/0003
ETAG 001-2
Option 7 for non-cracked concrete

ADVANTAGES

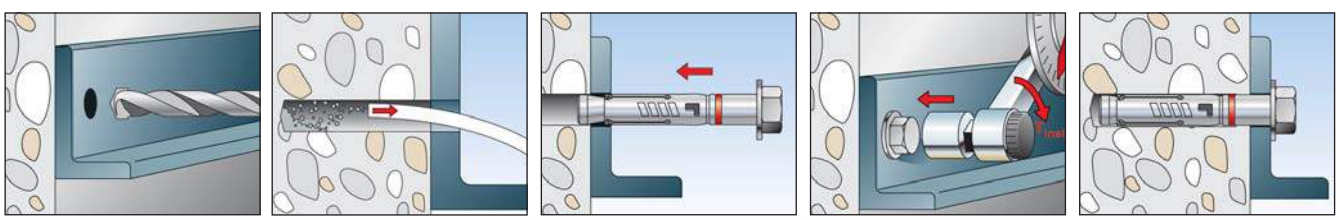
- The optimised geometry minimises setting energy and allows for use in extremely narrow spaces. This allows for user-friendly installation.
- The three-part expansion sleeve creates even load distribution, thus allowing small edge and axial spacing. Thus the TA M-T is extremely flexible.
- The TA M-BP version with twist-off head hinders the dismantling of the fixture for use as a theft-deterrent and break-in protection.
- The detachable screw connection allows for surface flush removal.

APPLICATIONS

- Steel constructions
- Handrails
- Consoles
- Ladders
- Cable trays
- Machines
- Staircases
- Gates
- Façades

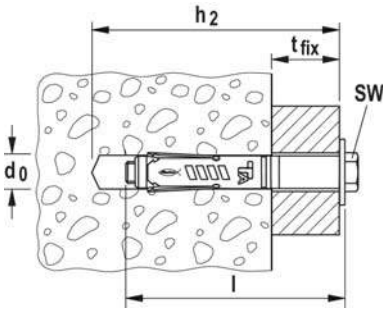
FUNCTIONING

- The TA M-T is suitable for push-through installation.
- When applying the torque, the cone is pulled into the expansion sleeve and expands it against the drill hole wall.
- The hexagonal head of the TA M-BP is tightened until it breaks off.



TECHNICAL DATA

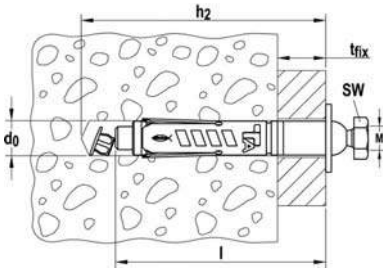
Heavy-duty anchor **TA M-T**,
for push-through installation



	Zinc-plated steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Thread	Width across nut	Sales unit
	Art.-No.	ETA	d_0 [mm]	h_2 [mm]	l [mm]	t_{fix} [mm]	M	⬡ SW [mm]	[pcs]
Item	**gvz**								
TA M8 T/25 S	**090268**	■	12	95	84	25	M 8	13	50
TA M10 T/25 S	**090269**	■	15	110	100	25	M 10	17	25
TA M12 T/25 S	**090270**	■	18	120	114	25	M 12	19	20

TECHNICAL DATA

Heavy-duty anchor **TA M-T BP**,
with twist-off head



	Zinc-plated steel	Drill hole diameter	Min. drill hole depth for through fixings	Anchor length	Max. fixture thickness	Thread	Width across nut	Sales unit
	Art.-No.	d_0 [mm]	h_2 [mm]	l [mm]	t_{fix} [mm]	M	⬡ SW [mm]	[pcs]
Item	**gvz**							
TA M8 BP	**090265**	12	95	84	25	M 8	13	50

LOADS

Heavy-duty anchor TA M-T

zinc plated steel

Permissible loads of a single anchor in non-cracked normal concrete (concrete compression zone) of strength class C20/25 (~B25) [1) 2) 3)]										Minimum spacings while reducing the load	
Type	Material fixing element	Min. member thickness	Effective anchorage depth	Installation torque	Permissible tensile load	Permissible shear load	Required edge distance (with one edge) for		Required spacing for	Min. spacing	Min. edge distance
							Max. tension load	Max. shear load	Max. Load		
		h_{min} [mm]	h_{ef} [mm]	T_{inst} [Nm]	N_{perm} [4)] [kN]	V_{perm} [4)] [kN]	c [mm]	c [mm]	s [mm]	s_{min} [5) 6)] [mm]	c_{min} [5) 6)] [mm]
TA M8 T	gvz	100	45	20	5,7	6,7	65	95	135	90	60
TA M10 T	gvz	110	55	40	9,5	11,0	160	150	165	110	70
TA M12 T	gvz	140	70	75	11,9	17,0	170	200	210	160	120

For the design the complete assessment ETA-04/0003 has to be considered. [7)]

[1)] The partial safety factors for material resistance as regulated in the ETA-04/0003 as well as a partial safety factor for load actions of γ_L = 1.4 are considered. As an single anchor counts e.g. an anchor with a spacing s ≥ 3-h_{ef} and an edge distance c ≥ 1.5-h_{ef}. Accurate data see ETA-04/0003.

[2)] For higher concrete strength classes up to C50/60 higher permissible loads may be possible.

[3)] Drill method hammer drilling.

[4)] For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see ETA-04/0003.

[5)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

[6)] Minimum possible spacing resp. edge distance while reducing the permissible load for the required minimum member thickness. The combination of minimum edge distance and minimum spacing is not possible. One of both values has to be increased acc. ETA-04/0003.

[7)] The given loads refer to the European Technical Approval ETA-04/0003, issue date 11/06/2013. Design of the loads according ETAG 001, Annex C, Method A (for static resp. quasi-static loads).

The push-through anchor for structural fixings in non-cracked concrete

Bicycle racks

Waste bins

VERSIONS

- Zinc-plated steel

BUILDING MATERIALS

Suitable for:

- Concrete C12/15 to C20/25, non-cracked
- Natural stone with dense structure

ADVANTAGES

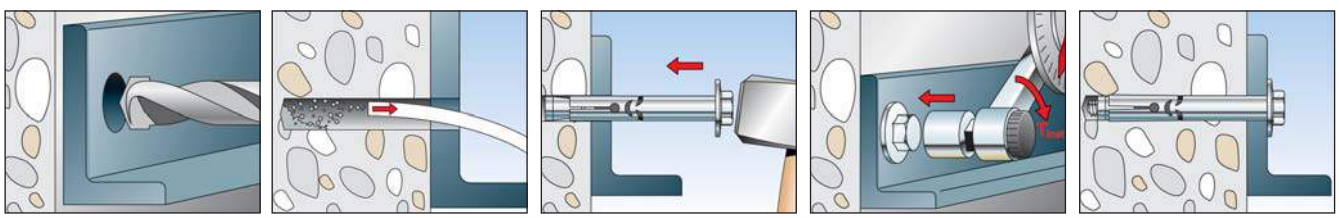
- The optimised geometry minimises setting energy and enables the use in extremely narrow spaces. This allows for user-friendly installation.
- The anchor design makes it possible to use different head shapes for flexible design solutions: Hexagon head (type S), bolt version with nut and washer (type B).
- The detachable screw connection allows for surface flush removal.

APPLICATIONS

- Handrails
- Consoles
- Ladders
- Cable trays
- Gates
- Façades
- Temporary or structural fixings

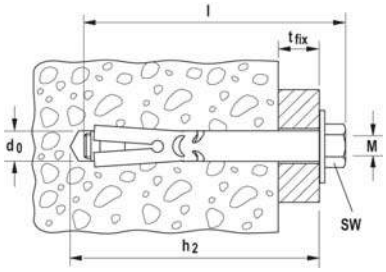
FUNCTIONING

- The FSA is suitable for push-through installation.
- When applying the torque, the cone is pulled into the expansion sleeve and expands it against the drill hole wall.
- The half-moon shaped recesses act as a crumple zone to take the torque slippage, so that the attachment is pulled onto the anchor base.



TECHNICAL DATA

Sleeve anchor **FSA-S**



	Zinc-plated steel Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth for through fixings h_2 [mm]	Max. fixture thickness t_{fix} [mm]	Anchor length l [mm]	Thread M	Width across nut ⬡ SW [mm]	Sales unit [pcs]
Item	**gvz**							
FSA 8/15 S	**068520**	8	65	15	64	M 6	10	50
FSA 8/40 S	**068521**	8	90	40	89	M 6	10	50
FSA 8/65 S	**068522**	8	115	65	114	M 6	10	50
FSA 10/10 S	**068523**	10	65	10	65	M 8	13	20
FSA 10/35 S	**068524**	10	90	35	90	M 8	13	20
FSA 10/60 S	**068525**	10	115	60	115	M 8	13	20
FSA 12/10 S	**068526**	12	75	10	76	M 10	17	20
FSA 12/25 S	**068527**	12	90	25	91	M 10	17	20
FSA 12/50 S	**068528**	12	115	50	116	M 10	17	20

TECHNICAL DATA

Sleeve anchor **FSA-B**

	Zinc-plated steel Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth for through fixings h_2 [mm]	Max. fixture thickness t_{fix} [mm]	Anchor length l [mm]	Thread M	Width across nut ⬡ SW [mm]	Sales unit [pcs]
Item	**gvz**							
FSA 8/15 B	**068500**	8	65	15	65	M 6	10	50
FSA 8/40 B	**068501**	8	90	40	90	M 6	10	50
FSA 8/65 B	**068502**	8	115	65	115	M 6	10	50
FSA 10/10 B	**068503**	10	65	10	69	M 8	13	20
FSA 10/35 B	**068504**	10	90	35	94	M 8	13	20
FSA 10/60 B	**068505**	10	115	60	119	M 8	13	20
FSA 12/10 B	**068506**	12	75	10	81	M 10	17	20
FSA 12/25 B	**068507**	12	90	25	96	M 10	17	20
FSA 12/50 B	**068508**	12	115	50	121	M 10	17	20
FSA 12/75 B	**068509**	12	140	75	146	M 10	17	20

LOADS

Sleeve anchor FSA zinc plated steel

Recommended loads[1] of a single anchor in non-craked normal concrete (concrete compression zone) of strength class C20/25.

Type	Effective anchorage-depth h_{ef} [mm]	Minimum member thickness h_{min} [mm]	Torque-moment T_{inst} [Nm]	Recommended Tensile load N_{rec} [2] [kN]	Recommended shear load V_{rec} [2] [kN]	Char. spacing $s_{cr,N}$ [mm]	Char. edge distance $c_{cr,N}$ [mm]	Min. spacing s_{min} [3] [mm]	Min. edge distance c_{min} [3] [mm]
FSA 8	35	70	8	2,0	3,4	105	53	70	50
FSA 10	40	80	25	3,5	6,3	120	60	80	60[4]
FSA 12	50	100	40	5,0	9,9	150	75	100	75[4]

[1] Required safety factors are considered.

[2] For combination of tensile and shear loads a detailled anchor design is necessary.

[3] Minimum possible axial spacings resp. edge distance while reducing the recommended load.

[4] No reduction of the recommended tensile load.

The reusable fixing system for diamond drills and saws

Diamond drills

Detail: Diamond drills

VERSIONS

- Zinc-plated steel

BUILDING MATERIALS

Suitable for:

- Concrete C12/15 to C50/60, non-cracked
- Natural stone with dense structure

ADVANTAGES

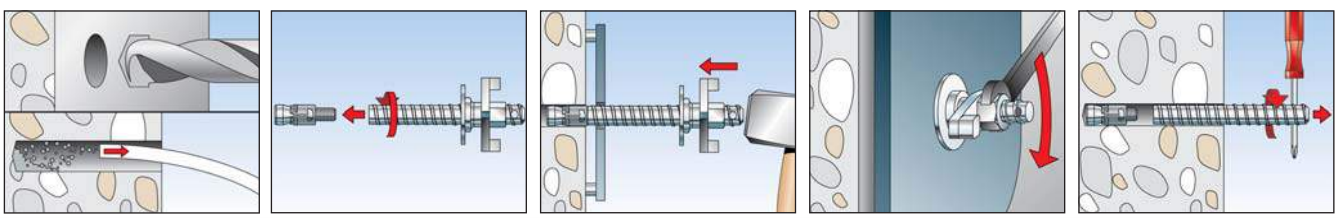
- The detachable screw connection between the expansion element and spindle enables simple dismantling and ensures that the spindle bolt can be reused.
- The robust, reusable spindle bolt guarantees a long life span.
- The active principle of the anchor bolt enables an active controlled expansion, thus offering a high level of safety.
- The large steel cross-section provides high shear load-bearing capability and, as such, high security for the jerky stoppage of the drill bit.

APPLICATIONS

- Diamond and core drilling devices
- Diamond saws

FUNCTIONING

- The FDBB is suitable for pre-positioned and push-through installation.
- An expansion element must be added to the spindle bolt before installation.
- Use a hammer to drive the FDBB through the base plate of the drilling device into the drill hole.
- When the nut is tightened, the cone bolt is pulled into the expansion clip and expands it against the drill hole wall.
- The expansion element remains in the drill hole when dismantling the spindle bolt. The spindle bolt is once again completed with an expansion element and can be reused.

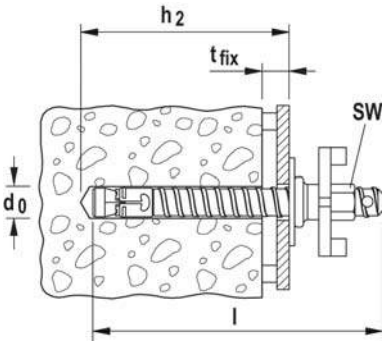


Fixing set for diamond drills FDBB

TECHNICAL DATA

Fixing set for diamond drills **FDBB**

Expansion element **FDBB SE**



	Art.-No.	Drill hole diameter d_0 [mm]	Usable length t_{fix} [mm]	Min. drill hole depth for through fixings h_2 [mm]	Width across nut ⬡ SW [mm]	Length l [mm]	Contents	Sales unit [pcs]
Item	**gvz**							
FDBB 16/50 Set	**090680**	16	50	135	27	200	1 expansion element 16 SE, 1 spindle bolt 16/50/160, 1 washer, 1 nut	1
FDBB 16 SE	**090681**	16	–	–	–	–	Expansion element	25

LOADS

Fixing set for Diamond Drills FDBB

Highest recommended loads[1] for a single anchor in non-cracked concrete.

		C20/25		C12/15	
Type	**Recommended bending moment M_{rec} [Nm]**	**Recommended Tensile load N_{rec} [kN]**	**Recommended shear load V_{rec}[2] [kN]**	**Recommended Tensile load N_{rec} [kN]**	**Recommended shear load V_{rec}[2] [kN]**
FDBB	98	12,0	13,3	9,0	13,3

[1] Required safety factors are considered.

[2] Steel failure value.

The fixing with simple hammerset installation in non-cracked concrete

Radiators

VERSIONS

- Zinc-plated steel

BUILDING MATERIALS

Suitable for:

- Concrete C12/15 to C50/60, non-cracked
- Natural stone with dense structure

ADVANTAGES

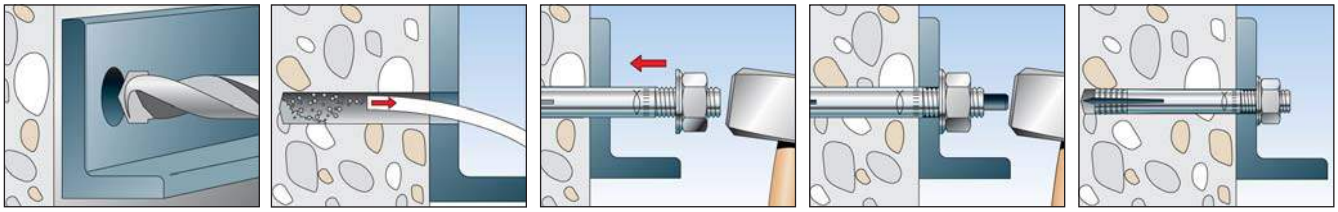
- The special construction of the anchor sleeve enables it to be set into the drill hole with a low number of hammer blows. This enables easy installation.
- The flush-sunk expansion pin signifies the complete expansion of the anchor, and thereby ensures minimum movement when under load.
- The special geometry of the expansion pin reduces the setting energy, thereby enabling a fast and energy-saving installation.

APPLICATIONS

- Non-approval-relevant fixings only
- Handrails
- Gratings
- Garden gates

FUNCTIONING

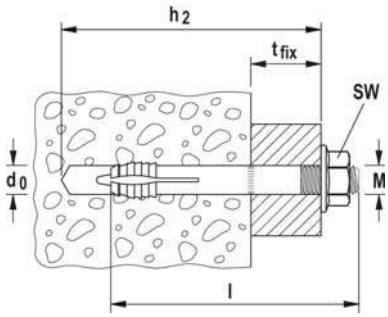
- The MR is suitable for pre-positioned and push-through installation.
- The anchor sleeve is driven into the drill hole with a hammer, without the need for an expansion pin.
- Then the expansion pin is driven in with a hammer, and the wall screw expands against the drill hole wall.



Wall screw MR

TECHNICAL DATA

Wall screw **MR**



	Zinc-plated steel Art.-No.	Drill hole diameter d_0 [mm]	Anchor length l [mm]	Min. drill hole depth for through fixings h_2 [mm]	Thread M	Width across nut ○ SW [mm]	Max. fixture thickness t_{fix} [mm]	Sales unit [pcs]
Item	**gvz**							
MR 8	**050583**	8	70	70	M 8	13	22	25
MR 10	**050584**	10	85	85	M 10	15	24	20
MR 12	**050585**	12	100	100	M 12	18	27	10

The installation-friendly internally threaded anchor for fixings in pre-stressed hollow-core concrete slabs

Air conditioning units in pre-stressed hollow-core concrete slabs

Cable trays in pre-stressed hollow-core concrete

VERSIONS

- Zinc-plated steel
- Stainless steel

BUILDING MATERIALS

Approved for:

- Pre-stressed hollow-core concrete slabs ≥ C45/55

CERTIFICATES

Zulassung

Fire resistance classification R 120 Anchor types see test report

EDELSTAHL Rost frei INOX STAINLESS STEEL

from M8

ADVANTAGES

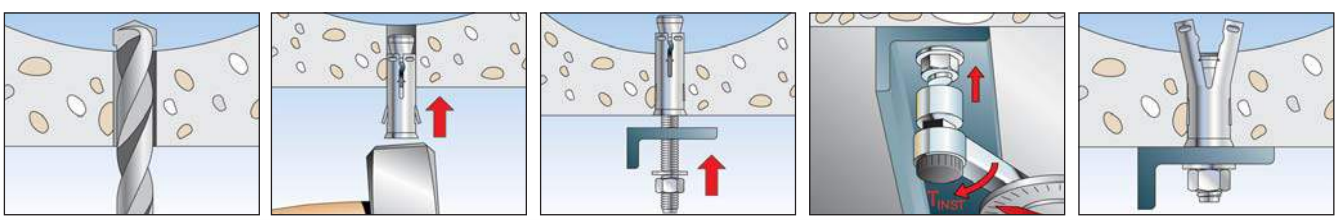
- The active principle of the anchor means that the FHY can be used in cavities or in solid materials up to 5 cm from the tensioning wire. This ensures the highest flexibility and user-friendly installation.
- The embossed edge prevents the anchor sleeve from slipping in the cavity, thus allowing for trouble-free installation.
- The optimised geometry minimises setting energy and allows for use in extremely narrow spaces. This allows for user-friendly installation.
- The metric internal thread means that it is possible to use standard screws or threaded rods for the ideal adaptation to suit the intended use.

APPLICATIONS

- Pipelines
- Cable trays
- Ventilation systems
- Sprinkler systems
- Suspended ceilings
- Consoles
- Steel constructions
- Timber constructions

FUNCTIONING

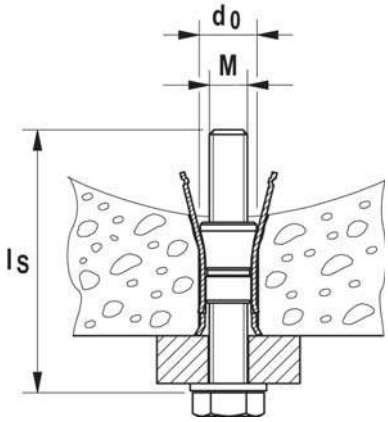
- The FHY is suitable for pre-positioned installation.
- Position the FHY hollow-ceiling anchor in the drill hole and drive in flush to the surface of the anchor base using the hammer.
- The FHY pre-positioned anchor must be able to be supported on the attachment for expansion.
- When applying the torque, the cone is pulled into the expansion sleeve and expands it into the cavity or expands it in the solid material against the drill hole wall.
- Screw length ls =
  Minimum screw-in depth e_2
  + Thickness of fixture t_{fix}
  + Thickness of washer
  (with threaded rod: + height of nut)



Hollow-ceiling anchor FHY

TECHNICAL DATA

Hollow-ceiling anchor **FHY**



	Zinc-plated steel	Stainless steel	Approval	Drill hole diameter	Anchor length	Thread	Min. drill hole depth	Min. bolt penetration	Sales unit
	Art.-No.	Art.-No.	DIBt	d_0 [mm]	l [mm]	M	h_1 [mm]	$l_{E,min}$ [mm]	[pcs]
Item	**gvz**	**A4**							
FHY M 6	**030138**	–	●	10	37	M 6	50	37	50
FHY M 6	–	**030139**	–	10	37	M 6	50	37	50
FHY M 8	**030146**	–	●	12	43	M 8	60	43	25
FHY M 8	–	**030147**	–	12	43	M 8	60	43	25
FHY M10	**030148**	–	●	16	52	M 10	65	52	20
FHY M10	–	**030151**	–	16	52	M 10	65	52	20
FHY M12	**545512**	–	–	18	52	M 12	65	52	25

LOADS

Hollow-ceiling anchor FHY zinc plated steel

Highest permissible loads[1)3)] for a single anchor in pre-stressed hollow-core concrete slabs of strength class ≥ C45/55.

Type	Bottom flange thickness d_u [mm]	Installation torque T_{inst} [Nm]	Permissible load F_{perm}[2)] [kN]	Required edge distance (with one edge) for max. load [mm]	Min. spacing s_{min}[4)] [mm]	Min. edge distance c_{min}[4)] [mm]
FHY M6	25 - 29	10	0,7	150	70	100
	30 - 39		0,9		80	
	≥40		2,0		100	
FHY M8	25 - 29	10	0,7		70	
	30 - 39		0,9		80	
	≥40		2,0		100	
FHY M10	30 - 39	20	1,2		80	
	≥40		3,0		100	

For the design the complete approval Z-21.1-1711 has to be considered.

[1)] The required safety factors as regulated in the approval are considered.

[2)] Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads, bending moments as well as reduced edge distances or spacings (anchor groups) see approval.

[3)] For screw strength class 4.6.

[4)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

LOADS

Hollow-ceiling anchor FHY stainless steel A4

Highest recommended loads [1) 3)] for a single anchor in pre-stressed hollow-core concrete slabs of strength class ≥ C45/55

Type	Bottom flange thickness d_u [mm]	Installation torque T_{inst} [Nm]	Recommended load F_{rec} [2)] [kN]	Required edge distance (with one edge) for Max. load [mm]	Min. spacing s_{min} [4)] [mm]	Min. edge distance c_{min} [4)] [mm]
FHY M6 A4	25 - 29	10	0,7	150	70	100
	30 - 39		0,9		80	
	≥40		2,0		100	
FHY M8 A4	25 - 29	10	0,7		70	
	30 - 39		0,9		80	
	≥40		2,0		100	
FHY M10 A4	30 - 39	20	1,2		80	
	≥40		3,0		100	

[1)] Required safety factors are considered.

[2)] Valid for tensile load, shear load and oblique load under any angle.

[3)] For screw strength class A4-70.

[4)] Minimum possible axial spacings resp. edge distance while reducing the permissible load.

The strong internally threaded anchor with unique 4-way expansion for fixings in aerated concrete

Rail fixing

Air conditioning units

VERSIONS

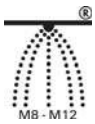
- Zinc-plated steel

BUILDING MATERIALS

Approved for:

- Aerated concrete with compressive strength 2 to 7 N/mm²
- Aerated concrete wall or ceiling boards with compressive strength 3.3 to 4.4 N/mm²
- Planked aerated concrete masonry, e.g. plastered, tiled, papered etc.

CERTIFICATES



ADVANTAGES

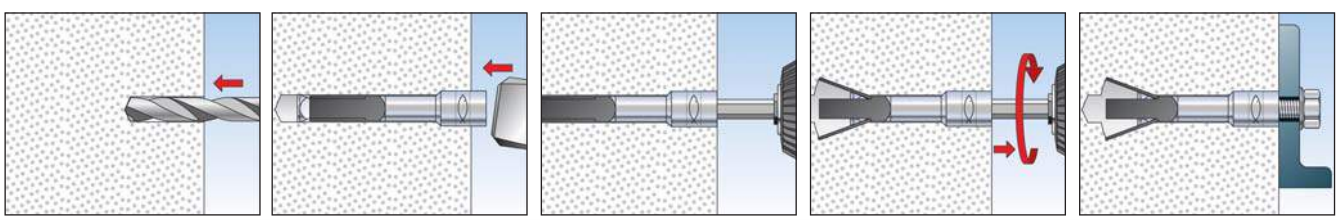
- The FPX-I enables easy tightening via the hexagon wrench using a cordless screwdriver or ratchet and therefore offers top installation comfort.
- The deformation-controlled expansion of the anchor with the hexagon wrench ensures safe, even and gentle installation.
- The unique 4-way expansion of the FPX-I with a square expansion sleeve prevents the rotation of the anchor in the drill hole and ensures high tension and shear loads, which means fewer fixing points.
- The releasing of the hexagonal wrench guarantees an automatical setting control for each installation process.
- The first steel anchor with an ETA-Approval and fire protection certificate for fixings in aerated concrete enables use for safety-relevant fixings, too.

APPLICATIONS

- Suspended ceilings
- Cable trays
- Pipelines
- Ventilation ducts
- Guard rails/hand rails
- TV consoles
- Kitchen cupboards
- Stand-off installations

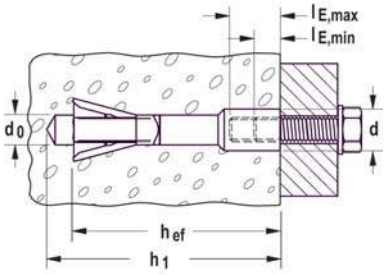
FUNCTIONING

- The FPX-I with internal thread is suitable for pre-positioned installation.
- Pre-drilling enables easy hammering in, even in high-strength aerated concrete. There is no need to clean the drill hole.
- When the anchor is tightened with the hexagon wrench, the internal thread sleeve starts to rotate and the cone is pulled into the square expansion sleeve. The aerated concrete is compressed on the four sides and generates an undercut in the drill hole.
- When reached the optimum expansion, the hexagon wrench is released automatically from the anchor.



TECHNICAL DATA

Aircrete anchor **FPX-I**



	Art.-No.	Approval ETA	Drill diameter d_0 [mm]	Min. drill hole depth for pre-positioned installation h_1 [mm]	Anchor length l [mm]	Effect. anchorage depth h_{ef} [mm]	Min. bolt penetration $l_{E,min}$ [mm]	Max. bolt penetration $l_{E,max}$ [mm]	Sales unit [pcs]
Item	**gvz**								
FPX M6-I	**519021**	■	10	95	75	70	10	15	25
FPX M8-I	**519022**	■	10	95	75	70	8	15	25
FPX M10-I	**519023**	■	10	95	75	70	10	15	25
FPX M12-I	**519024**	■	10	95	75	70	12	15	25

ACCESSORIES

Setting tool **FPX M6 I**

Setting tool **FPX M8-M12 I**

Item	Art.-No.	Matching anchor type	Sales unit [pcs]
Setting tool FPX M6 I	**522517**	FPX M6-I	10
Setting tool FPX M8-M12 I	**522518**	FPX M8-I - FPX M12-I	10

LOADS

AAC anchor FPX-I

Highest permissible loads[1)5)] and required component dimensions in aerated concrete masonry.

Type			FPX-I M6 , M8 , M10 , M12	
Permissible load[1)5)] per anchor F_{perm}				
Effective anchoring depth	hef	[mm]	70	
$f_{ck} \geq 1,6$ N /mm² / ρm ≥ 0,25 kg/dm³		[kN]	0,32	
$f_{ck} \geq 2,0$ N /mm² / ρm ≥ 0,35 kg/dm³		[kN]	0,43	
$f_{ck} \geq 4,0$ N /mm² / ρm ≥ 0,50 kg/dm³		[kN]	0,89	
$f_{ck} \geq 6,0$ N /mm² / ρm ≥ 0,65 kg/dm³		[kN]	1,43	
Component dimensions				
Minimum member thickness with drill hole cleaning	h_{min}	[mm]	100	
Minimum member thickness without drill hole cleaning	h_{min}	[mm]	120	
Single anchor				
Min. spacing between single anchors	a	[mm]	375	
Min. edge distance	c1	[mm]	125	
Min. distance to joints	c_F[4)]	[mm]	75[2)] / 125	
Min. edge distance orthogonal to c_1	c2	[mm]	190	
Anchor groups[3)] with 2 or 4 Ancors				
Actions			shear + oblique tension	only axial tension
Min. spacing	s_{min}	[mm]	100	100
Min. edge distance	c1	[mm]	250	125
Min. spacing between single anchors	a	[mm]	750	375
Min. edge distance orthogonal to c_1	c2	[mm]	375	190

For the design the complete approval ETA - 12/0456 has to be considered.

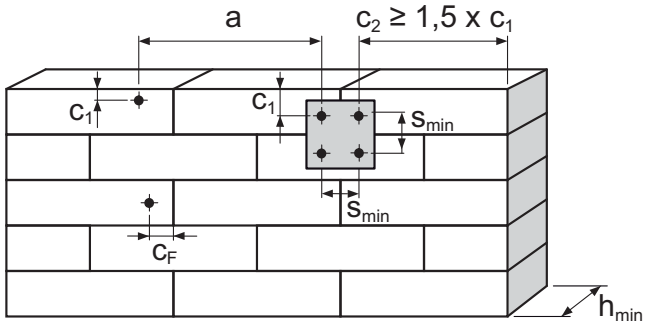
[1)] The required partial safety factors for material resistance as well as a partial safety factor for load actions of $\gamma_L = 1,4$ are considered.

[2)] c_F for tensile load and/or shear load parallel to the joint which is not filled with mortar with width ≤ 2 mm.

[3)] $F_{perm,Group} = 2 \times F_{perm,single\ anchor}$ valid in case of anchor groups with 2 or 4 anchors.

[4)] In case of non visible joints F_{perm} has to be divided in half.

[5)] Grade of the screw, resp. threaded rod ≥ 4.8.



LOADS

AAC anchor FPX-I

Highest permissible loads[1)4)] and required component dimensions in cracked and non-cracked aerated concrete wall and slab plates.

Type			FPX-I M6 , M8 , M10 , M12	
Permissible load[1)4)] per anchor F_{perm}				
Effective anchoring depth	hef	[mm]	70	
Tensile area of the AAC plate				
$f_{ck} \geq 3{,}3$ N /mm² / $\rho_m \geq 0{,}50$ kg/dm³		[kN]	0,62	
$f_{ck} \geq 4{,}4$ N /mm² / $\rho_m \geq 0{,}55$ kg/dm³		[kN]	0,83	
Compression area of the AAC plate				
$f_{ck} \geq 3{,}3$ N /mm² / $\rho_m \geq 0{,}50$ kg/dm³		[kN]	0,83	
$f_{ck} \geq 4{,}4$ N /mm² / $\rho_m \geq 0{,}55$ kg/dm³		[kN]	1,24	
Component dimensions				
Minimum member thickness with drill hole cleaning	hmin	[mm]	100	
Minimum member thickness without drill hole cleaning	hmin	[mm]	120	
Single anchor				
Min. spacing between single anchors	a	[mm]	600	
Min. edge distance	c1	[mm]	125 / 300[3)]	
Min. edge distance orthogonal to c_1	c2	[mm]	190	
Anchor groups[2)] with 2 or 4 anchors				
Actions			shear + oblique tension	only axial tension
Min. spacing	smin	[mm]	100	100
Min. edge distance	c1	[mm]	250	125 / 150[3)]
Min. spacing between single anchors	a	[mm]	750	600
Min. edge distance orthogonal to c_1	c2	[mm]	375	190

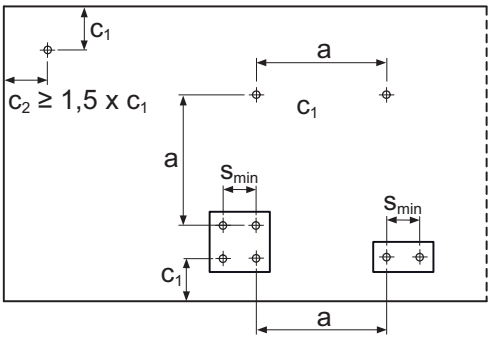
For the design the complete approval ETA - 12/0456 has to be considered.

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of $\gamma_L = 1{,}4$ are considered.

2) $F_{perm,Group} = 2 \times F_{perm,single\ anchor}$ valid in case of anchor groups with 2 or 4 anchors.

3) In case of reinforced plates with a width ≤ 700 mm.

4) Grade of the screw, resp. threaded rod ≥ 4.8.



fischer
innovative solutions

5 Frame fixings / Stand-off installation

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The versatile with multiple anchorage depth

Timber substructures

Wall consoles

VERSIONS

- Zinc-plated steel
- Stainless steel

BUILDING MATERIALS

Approved for:

- Vertically perforated brick
- Aerated concrete
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Thermal insulation blocks
- Solid block made from lightweight and normal weight concrete
- Solid brick
- Solid sand-lime brick
- Concrete ≧ C12/15

Also suitable for:

- Natural stone with dense structure
- Solid panel made from gypsum

CERTIFICATES

ETA-07/0121
ETAG 020 a, b, c, d
Multiple use in concrete and masonry for non-structural applications

Zulassung

Fire resistance classification R 90
for facade systems in concrete

EDELSTAHL Rostfrei
INOX STAINLESS STEEL

fischer NYLON QUALITY
HIGH-QUALITY NYLON

ADVANTAGES

- The long expansion element with multiple anchorage depths of 50, 70 or 90 mm for SXRL 8 and SXRL 10 and 70 or 90 mm for SXRL 14 makes the SXRL a versatile applicable product.
- Through the special geometry of the plug, the loads are evenly distributed in the drill hole.
- When the plug is to be set below the plaster, the longer ribs prevent plug rotation during installation.
- The approval for single-point fixing in cracked concrete makes the SXRL the designated specialist in concrete particularly for tasks such as the installation of awning roofs and outdoor railings compared to steel anchors.
- SXRL 14 is approved for the application under compression load and is thus for example useable for facade substructures that are mounted at a distance without wall brackets.
- Complete range available with diameters of 8, 10 and 14 mm and usable lengths up to 290 mm.

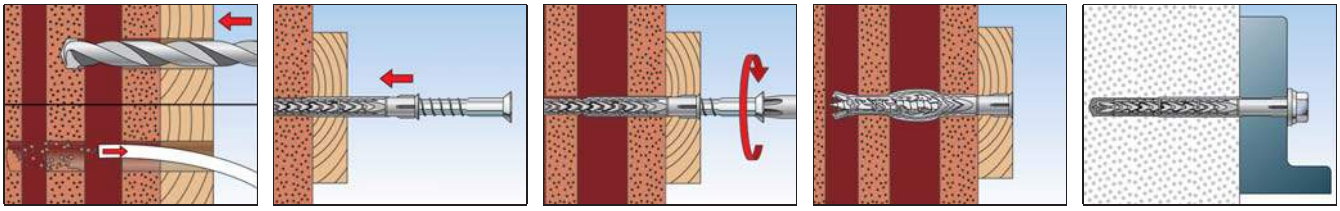
APPLICATIONS

- Façade, ceiling and roof substructures made of wood and metal
- Facade substructures under compression load (e.g. distance installation without a wall bracket)
- Windows
- Gates and doors
- Wardrobes
- Kitchen hanging cabinets
- Squared timbers
- Beams
- TV consoles
- Wall covering
- Metal brackets
- Metal supports
- Cable ducts
- Cable trays

FUNCTIONING

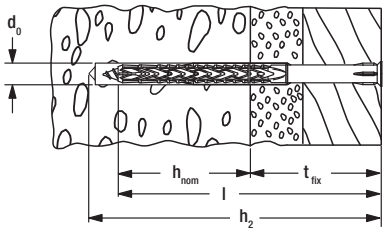
- In hollow building materials, the two expansion zones ensure that the introduction of force is gentle on the substrate. The porous block fillets are not crushed by the second expansion zone and therefore serve to transmit the force
- In aircrete and solid building material, the two expansion zones combine to form one long expansion element, thus providing for a uniform and flat distribution of the load into substrate.
- SXRL-T with countersunk head screw is recommended for the installation of timber constructions; in the case of metal constructions, use SXRL-FUS with a wide sleeve rim and a moulded washer on the screw, which also features an integrated hexagon socket.

INSTALLATION



TECHNICAL DATA

SXRL-T - with fischer countersunk head safety screw



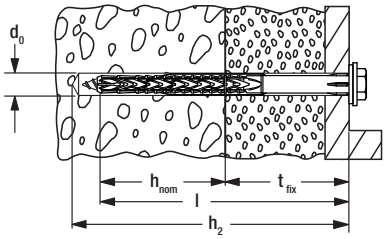
	Zinc-plated steel	Stainless steel	Approval		Drill diameter	Min. drill hole depth for through fixings	Usable length at anchorage depth 50mm	Usable length at anchorage depth 70mm	Usable length at anchorage depth 90mm	Anchor length	Drive	Sales unit
	Art.-No.	Art.-No.	ETA	DIBt	d_0 [mm]	h_2 [mm]	t_{fix} [mm]	t_{fix} [mm]	t_{fix} [mm]	l [mm]		[pcs]
Item	gvz	A4										
SXRL 8 x 60 T	540113	540119	■	–	8	70	10	–	–	60	T30	50
SXRL 8 x 80 T	540114	540121	■	–	8	90	30	10	–	80	T30	50
SXRL 8 x 100 T	540115	540123	■	–	8	110	50	30	10	100	T30	50
SXRL 8 x 120 T	540116	540124	■	–	8	130	70	50	30	120	T30	50
SXRL 8 x 140 T	540117	540125	■	–	8	150	90	70	50	140	T30	50
SXRL 8 x 160 T	540118	540126	■	–	8	170	110	90	70	160	T30	50
SXRL 10 x 60 T	546477	546505	■	●	10	70	10	–	–	60	T40	50
SXRL 10 x 80 T	522698	522709	■	●	10	90	30	10	–	80	T40	50
SXRL 10 x 100 T	522699	522710	■	●	10	110	50	30	10	100	T40	50
SXRL 10 x 120 T	522700	522711	■	●	10	130	70	50	30	120	T40	50
SXRL 10 x 140 T	522701	522712	■	●	10	150	90	70	50	140	T40	50
SXRL 10 x 160 T	522703	522713	■	●	10	170	110	90	70	160	T40	50
SXRL 10 x 180 T	522704	522714	■	●	10	190	130	110	90	180	T40	50
SXRL 10 x 200 T	522705	522715	■	●	10	210	150	130	110	200	T40	50
SXRL 10 x 230 T	522706	522716	■	●	10	240	180	160	140	230	T40	50
SXRL 10 x 260 T	522707 1)	522717 1)	■	●	10	270	210	190	170	260	T40	50
SXRL 10 x 290 T	522708 1)	522718 1)	■	●	10	300	240	220	200	290	T40	50
SXRL 14 x 80 T	530920	530932	■	●	14	95	–	10	–	80	T50	50
SXRL 14 x 100 T	530921	530933	■	●	14	115	–	30	10	100	T50	50
SXRL 14 x 120 T	530922	530934	■	●	14	135	–	50	30	120	T50	50
SXRL 14 x 140 T	530923	530935	■	●	14	155	–	70	50	140	T50	50
SXRL 14 x 160 T	530924	530936	■	●	14	175	–	90	70	160	T50	50
SXRL 14 x 180 T	530925	530937	■	●	14	195	–	110	90	180	T50	50
SXRL 14 x 200 T	530926	530938	■	●	14	215	–	130	110	200	T50	50
SXRL 14 x 230 T	530927	530939	■	●	14	245	–	160	140	230	T50	50
SXRL 14 x 260 T	530928	530940	■	●	14	275	–	190	170	260	T50	50
SXRL 14 x 300 T	530929 1)	530941 1)	■	●	14	315	–	230	210	300	T50	20
SXRL 14 x 330 T	530930 1)	530942 1)	■	●	14	345	–	260	240	330	T50	20
SXRL 14 x 360 T	530931 1)	530943 1)	■	●	14	375	–	290	270	360	T50	20

1) not pre-assembled

Frame fixing SXRL

TECHNICAL DATA

SXRL-FUS - with fischer hexagon head safety screw, moulded washer and integrated bit recess

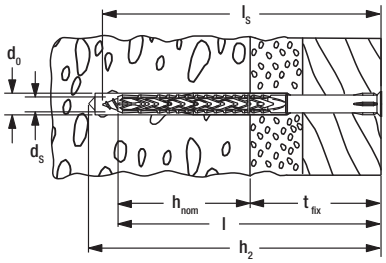


	Zinc-plated steel	Stainless steel	Approval		Drill diameter	Min. drill hole depth for through fixings	Usable length at anchorage depth 50mm	Usable length at anchorage depth 70mm	Usable length at anchorage depth 90mm	Anchor length	Drive	Sales unit
	Art.-No.	Art.-No.	ETA	DIBt	d_0 [mm]	h_2 [mm]	t_{fix} [mm]	t_{fix} [mm]	t_{fix} [mm]	l [mm]		[pcs]
Item	gvz	A4										
SXRL 8 x 60 FUS	540127	540135	■	–	8	70	10	–	–	60	T30/SW10	50
SXRL 8 x 80 FUS	540129	540136	■	–	8	90	30	10	–	80	T30/SW10	50
SXRL 8 x 100 FUS	540130	540137	■	–	8	110	50	30	10	100	T30/SW10	50
SXRL 8 x 120 FUS	540131	–	■	–	8	130	70	50	30	120	T30/SW10	50
SXRL 8 x 140 FUS	540133	–	■	–	8	150	90	70	50	140	T30/SW10	50
SXRL 8 x 160 FUS	540134	–	■	–	8	170	110	90	70	160	T30/SW10	50
SXRL 10 x 60 FUS	546506	546507	■	●	10	70	10	–	–	60	T40/SW13	50
SXRL 10 x 80 FUS	522719	522730	■	●	10	90	30	10	–	80	T40/SW13	50
SXRL 10 x 100 FUS	522720	522731	■	●	10	110	50	30	10	100	T40/SW13	50
SXRL 10 x 120 FUS	522721	522732	■	●	10	130	70	50	30	120	T40/SW13	50
SXRL 10 x 140 FUS	522723	522733	■	●	10	150	90	70	50	140	T40/SW13	50
SXRL 10 x 160 FUS	522724	522734	■	●	10	170	110	90	70	160	T40/SW13	50
SXRL 10 x 180 FUS	522725	522735	■	●	10	190	130	110	90	180	T40/SW13	50
SXRL 10 x 200 FUS	522726	522736	■	●	10	210	150	130	110	200	T40/SW13	50
SXRL 10 x 230 FUS	522727	522737	■	●	10	240	180	160	140	230	T40/SW13	50
SXRL 10 x 260 FUS	522728 1)	522738 1)	■	●	10	270	210	190	170	260	T40/SW13	50
SXRL 10 x 290 FUS	522729 1)	522739 1)	■	●	10	300	240	220	200	290	T40/SW13	50
SXRL 14 x 80 FUS	530946	530955	■	●	14	95	–	10	–	80	T50/SW17	50
SXRL 14 x 100 FUS	530947	530956	■	●	14	115	–	30	10	100	T50/SW17	50
SXRL 14 x 120 FUS	530948	530957	■	●	14	135	–	50	30	120	T50/SW17	50
SXRL 14 x 140 FUS	530949	530958	■	●	14	155	–	70	50	140	T50/SW17	50
SXRL 14 x 160 FUS	530950	530959	■	●	14	175	–	90	70	160	T50/SW17	50
SXRL 14 x 180 FUS	530951	530960	■	●	14	195	–	110	90	180	T50/SW17	50
SXRL 14 x 200 FUS	530952	530961	■	●	14	215	–	130	110	200	T50/SW17	50
SXRL 14 x 230 FUS	530953	530962	■	●	14	245	–	160	140	230	T50/SW17	50
SXRL 14 x 260 FUS	530954	530963	■	●	14	275	–	190	170	260	T50/SW17	50

1) not pre-assembled

ACCESSORIES

SXRL - without screw



Item	Art.-No.	Drill diameter d_0 [mm]	Min. drill hole depth for through fixings h_2 [mm]	Usable length at anchorage depth 50mm t_{fix} [mm]	Usable length at anchorage depth 70mm t_{fix} [mm]	Usable length at anchorage depth 90mm t_{fix} [mm]	Anchor length l [mm]	Screw diameter d_s [mm]	Min. screw length l_s [mm]	Sales unit [pcs]
SXRL 8 x 60	540879	8	70	10	–	–	60	5,5 - 6,0	65	100
SXRL 8 x 80	540880	8	90	30	10	–	80	5,5 - 6,0	85	100
SXRL 8 x 100	540881	8	110	50	30	10	100	5,5 - 6,0	105	100
SXRL 8 x 120	540882	8	130	70	50	30	120	5,5 - 6,0	125	100

ACCESSORIES

Cover cap **ADT**

Item	Art.-No.	Colour	Cap [Ø mm]	Match	Sales unit [pcs]
ADT 15 W	**060326**	white	15	Safety screw with integrated bit recess T40	100
ADT 15 DB	**060329**	dark brown	15	Safety screw with integrated bit recess T40	100
ADT 18 W	**060334**	white	18	Safety screw with integrated bit recess T40	100
ADT 18 DB	**060337**	dark brown	18	Safety screw with integrated bit recess T40	100

ACCESSORIES

Washer **U**

Item	Art.-No.	External-Ø d [mm]	Hole-Ø D [mm]	Thickness S [mm]	Matching anchor type	Sales unit [pcs]
U 11,5 x 21 x 1,5 DIN 522 A2	**010026**	21	11.5	1.5	SXR 10, SXRL 10, FUR 10	500

LOADS

Frame fixing SXRL[3)]

Highest recommended loads[1)] for a single anchor as part of a multiple fixing of non-structural systems.
The given loads are valid for wood screws with the specified diameter.

Type			SXRL 8		
Anchorage depth	h_{nom}	[mm]	50	70	90
Screw diameter	Ø	[mm]	6,0	6,0	6,0
Min. edge distance concrete	a_r	[mm]	60	80	100
Recommended loads in the respective base material F_{rec}[2)]					
Concrete	≥ C20/25	[kN]	0,60	1,00	1,00
Solid brick	≥ Mz 12	[kN]	0,45	0,60	0,60
Solid sand-lime brick	≥ KS 12	[kN]	0,40	0,50	0,50
Vertically perforated brick	≥ Hlz 12 (ρ ≥ 1,0 kg/dm³)	[kN]	0,15	0,15	0,15
Perforated sand-lime brick	≥ KSL 12	[kN]	0,10	0,40	0,40
Aerated concrete	AAC 2	[kN]	-	0,10	0,10
Aerated concrete	AAC 4	[kN]	-	0,15	0,20

[1)] Required safety factors are considered.

[2)] Valid for tensile load, shear load and oblique load under any angle.

[3)] Valid for zinc coated screws and for screws made of stainless steel. For exterior use of the zinc coated screws measures against incoming humidity have to be taken.

LOADS

Frame fixing SXRL[4)]

Highest permissible loads[1)2)] of a single anchor as part of a multiple fixing of non-structural systems.
For the design the complete assessment ETA-07/0121 has to be considered.

Product			SXRL							
Anchor diameter		[mm]	Ø 8			Ø 10			Ø 14	
Anchorage depth	h_{nom}	[mm]	50	70	90	50	70	90	70	90
Anchorage in concrete ≥ C12/15										
Permissible tensile load		[kN]	1,59	1,98		1,98	2,58		3,37	
Permissible shear load	Zinc-plated steel	[kN]	4,23			5,98			12,40	
	Stainless steel A4	[kN]	3,93			5,98			11,63	
Minimum member thickness	h_{min}	[mm]	80	100	120	100		120	110	130
Characteristic edge distance	$c_{cr,N}$	[mm]	85			140			140	
Characteristic spacing	a resp. $s_{cr,N}$	[mm]	90	105		120			135	
Minimum spacing	s_{min}	[mm]	85			70			85	
with an edge distance	c ≥	[mm]	85			140			140	
Minimum edge distance	c_{min}	[mm]	85			70			85	
with a spacing	s ≥	[mm]	85			175			175	
Anchorage in narrow concrete members (h ≥ 40 mm) made of concrete ≥ C12/15, e.g. weather shells of triple-skin outer wall panels										
Permissible tensile load		[kN]	-			0,99	-		-	
Permissible shear load		[kN]	-			5,98	-		-	
Anchorage in pre-stressed hollow-core concrete slabs (mirror thickness d_b ≥ 30 mm) made of concrete ≥ C45/55										
Permissible tensile load		[kN]	-			1,39	-		-	
Permissible shear load		[kN]	-			5,98	-		-	
Anchorage in masonry										
Permisible load[3)] in solid brick	≥ Mz 12 a. ≥ NF	[kN]	0,57	0,71		0,57	1,14	-	0,86	
	≥ Mz 20 a. ≥ NF	[kN]	0,86	1,14		1,00	1,14	-	1,14	
Permissible load[3)] in solid sand-lime brick	≥ KS 10 a. ≥ NF	[kN]	0,57			0,57	0,71	-	0,86	
	≥ KS 20 a. ≥ NF	[kN]	0,71	0,86		1,00		-	1,29	
Permissible load[3)] in lightweight concrete block	≥ V 2; ρ ≥ 1,2 kg/dm³	[kN]	0,11	0,26		0,11		-	0,26	
	≥ V 6; ρ ≥ 1,6 kg/dm³	[kN]	0,34	0,57		0,57	1,29	-	0,57	
Permissible load[3)5)] in vertically perforated brick (e.g. Poroton)	≥ HLz 10; ρ ≥1,0 kg/dm³	[kN]	0,17			-	0,21	-	0,57	0,71
Permissible load[3)] in perforated sand-lime brick	≥ KSL 6	[kN]	-			-	0,21	-	0,26	0,34
	≥ KSL 12	[kN]	0,34	0,43		-	0,71	-	0,43	0,71
Permissible load in[3)5)] hollow lightweight concrete blocks	≥ HBL 2	[kN]	0,43	0,57	0,43	0,57	0,71	-	0,34	0,21
	≥ HBL 6	[kN]	0,43	0,71	0,43	0,71	0,43	-	0,57	-
Permissible load[3)5)] in ceilings made of vertically perforated bricks	f_b ≥ 10 N/mm²; ρ ≥ 0,7 kg/dm³	[kN]	-			-	0,57	-	-	
Minimum member thickness	h_{min}	[mm]	115			110			115	
Minimum spacing (single anchor)	a_{min}	[mm]	250			250			250	
Minimum spacing (anchor group)	s_{min}	[mm]	100			100			100	
Minimum edge distance (anchor group)	c_{min}	[mm]	100			100			100	
Anchorage in aerated concrete										
Permissible load[3)] in aerated concrete	2 N/mm²	[kN]	-	0,14	0,21	-	0,18	0,21	0,32	0,43
	4 N/mm²	[kN]	-	0,32	0,43	-	0,43	0,54	0,89	1,07
	6 N/mm²	[kN]	-	0,54	0,71	-	0,71	0,89	1,43	1,79
Minimum member thickness	h_{min}	[mm]	-	175		-	100	120	175[6)]/300[7)]	
Minimum spacing (single anchor)	a_{min}	[mm]	-	250		-	250		250	
Minimum spacing (anchor group)	s_{min}	[mm]	-	80[6)]/ 110[8)]		-	100[6)]/ 120[8)]		80	100[6)]/125[7)]
Minimum edge distance (anchor group)	c_{min}	[mm]	-	90[6)]/110[8)]		-	120		120	120[6)]/150[7)]

[1)] The required partial safety factors for material resistance as well as a partial safety factor for load actions γ_L = 1,4 are considered.
As a single anchor counts e.g. an anchor with a minimum spacing a according to table B4.1 resp. table B4.2 of the assessment.

[2)] Valid for temperatures in the substrate up to +50 °C (resp. short term up to +80 °C). For long term temperatures up to +30 °C higher permissible loads may be possible.

[3)] Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads and bending moments see assessment.

[4)] Valid for zinc coated screws and for screws made of stainless steel. For exterior use of the zinc coated screws measures against incoming humidity according to assessment have to be taken.

[5)] Rotary drilling.

[6)] Only valid for AAC with compression strength ≥ 2 to < 4 N/mm².

[7)] Only valid for AAC with compression strength ≥ 4 N/mm².

[8)] Only valid for AAC with compression strength ≥ 6 N/mm².

LOADS

Frame fixing SXRL[3)]

Highest permissible compression loads[1)2)] of a single anchor as part of a multiple fixing of non-structural systems.
For the design the complete approval Z-21.2-2037 has to be considered.

Product			SXRL	
Anchor diameter		[mm]	Ø 14	
Anchorage depth	h_{nom}	[mm]	70	90
Anchorage in concrete ≥ C12/15				
Permissible compression load		[kN]	3,37	
Minimum member thickness	h_{min}	[mm]	110	130
Characteristic edge distance	$c_{cr,N}$	[mm]	140	
Characteristic spacing	a resp. $s_{cr,N}$	[mm]	135	
Minimum spacing with an edge distance	s_{min}	[mm]	85	
	c ≥	[mm]	140	
Minimum edge distance with a spacing	c_{min}	[mm]	85	
	s ≥	[mm]	175	
Anchorage in masonry				
Permissible compression load in solid brick	≥ Mz 12 a. ≥ NF	[kN]	0,86	
	≥ Mz 20 a. ≥ NF	[kN]	1,14	
Permissible compression load in solid sand-lime brick	≥ KS 10 a. ≥ NF	[kN]	0,86	
	≥ KS 20 a. ≥ NF	[kN]	1,29	
Permissible compression load in lightweight concrete block	≥ V 2; ρ ≥ 1,2 kg/dm³	[kN]	0,26	0,34
	≥ V 6; ρ ≥ 1,6 kg/dm³	[kN]	0,57	
Permissible compression load[4)] in vertically perforated brick (e.g. Poroton)	≥ HLz 10; ρ ≥1,0 kg/dm³	[kN]	0,34	0,57
Permissible compression load in perforated sand-lime brick	≥ KSL 6	[kN]	0,21	0,34
	≥ KSL 12	[kN]	0,43	0,71
Permissible compression load[4)] in hollow lightweight concrete blocks	≥ HBL 2	[kN]	0,26	-
Minimum member thickness	h_{min}	[mm]	115	
Minimum spacing (single anchor)	a_{min}	[mm]	250	
Minimum spacing (anchor group)	s_{min}	[mm]	100	
Minimum edge distance (anchor group)	c_{min}	[mm]	100	
Anchorage in aerated concrete				
Permissible compression load in aerated concrete	2 N/mm²	[kN]	0,32	
	4 N/mm²	[kN]	0,89	1,07
	6 N/mm²	[kN]	1,43	1,79
Minimum member thickness	h_{min}	[mm]	175[5)]/300[6)]	
Minimum spacing (single anchor)	a_{min}	[mm]	250	
Minimum spacing (anchor group)	s_{min}	[mm]	80	100[5)]/125[6)]
Minimum edge distance (anchor group)	c_{min}	[mm]	120	120[5)]/150[6)]

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions γ_L = 1,4 are considered.
As a single anchor counts e.g. an anchor with a minimum spacing a according to tables B3.1, B4.1 resp. B4.2 of the ETA-07/0121.

2) Valid for temperatures in the substrate up to +50 °C (resp. short term up to +80 °C). For long term temperatures up to +30 °C higher permissible loads may be possible.

3) Valid for zinc coated screws and for screws made of stainless steel. For exterior use of the zinc coated screws measures against incoming humidity according to assessment have to be taken.

4) Rotary drilling.

5) Only valid for AAC with compression strength ≥ 2 to < 4 N/mm².

6) Only valid for AAC with compression strength ≥ 4 N/mm².

The efficient with short expansion element

Façade substructures

Façade substructures

VERSIONS

- Zinc-plated steel
- Stainless steel
- Hot-dip galvanised steel

BUILDING MATERIALS

Approved for:

- Concrete ≥ C12/15
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Aerated concrete
- Solid block made from lightweight and normal weight concrete
- Solid brick
- Thermal insulation blocks

Also suitable for:

- Natural stone with dense structure
- Solid panel made from gypsum

CERTIFICATES

ETA-07/0121
ETAG 020 a, b, c, d
Multiple use in concrete and masonry for non-structural applications

Fire resistance classification R 90 for facade systems in concrete

EDELSTAHL Rostfrei INOX STAINLESS STEEL

ADVANTAGES

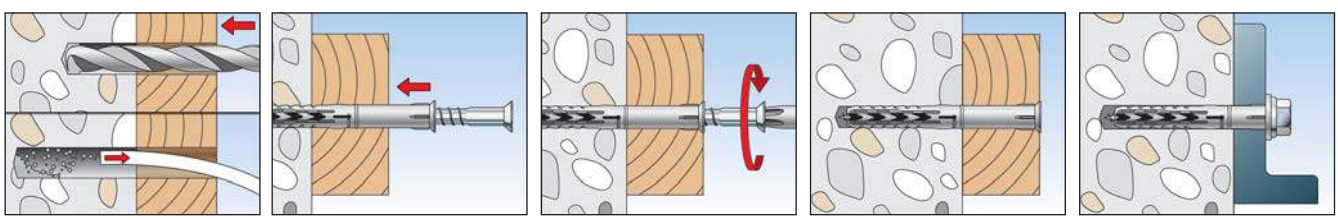
- The special functioning allows for use in solid and hollow building materials with an anchorage depth of just 50 mm, ensuring an economical fixing.
- The ETA assessment covers use in a range of solid and hollow building materials, and guarantees a secure fixing.
- The specially developed combination of plugs and screws ensures the very best handling. The plug has a noticeable hold, making installation more convenient.
- The extensive range with diameters of 6, 8 and 10 mm, usable lengths up to 210 mm.

APPLICATIONS

- Façade, ceiling and roof substructures made of wood and metal
- Windows
- Gates and doors
- Wardrobes
- Kitchen hanging cabinets
- Squared timbers
- Beams
- TV consoles
- Wall covering
- Metal brackets
- Metal supports
- Cable ducts
- Cable trays

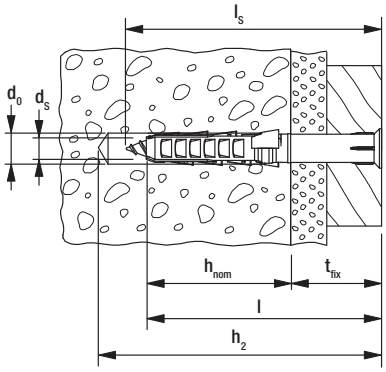
FUNCTIONING

- The SXR is suitable for push-through installation.
- The SXR expands in solid building materials. In hollow building materials the loads are transmitted to the substrate webs.
- With vertically perforated bricks, only use rotary drilling (no impact drilling).
- SXR-T with countersunk head screw is recommended for the installation of timber constructions; in the case of metal constructions, use SXR-FUS with a wide sleeve rim and a moulded washer on the screw, which also features an integrated hexagon socket.



TECHNICAL DATA

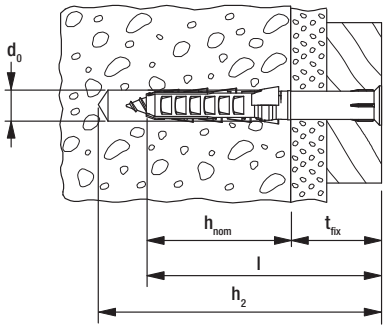
SXR - without screw



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth for through fixings h_2 [mm]	Min. anchorage depth h_{nom} [mm]	Anchor length l [mm]	Screw diameter d_s [mm]	Min. screw length l_s [mm]	Max. fixture thickness t_{fix} [mm]	Sales unit [pcs]
SXR 6 x 35	**503228**	6	45	30	35	4,5	40	5	100
SXR 6 x 50	**503229**	6	60	30	50	4,5	55	20	100
SXR 6 x 60	**503230**	6	70	30	60	4,5	65	30	100
SXR 8 x 60	**506194**	8	70	50	60	5,5 - 6,0	65	10	100
SXR 8 x 80	**506196**	8	90	50	80	5,5 - 6,0	85	30	100
SXR 8 x 100	**506198**	8	110	50	100	5,5 - 6,0	125	50	100
SXR 8 x 120	**506199**	8	130	50	120	5,5 - 6,0	105	70	100

TECHNICAL DATA

SXR-Z - with zinc-plated countersunk head screw with cross drive PZ

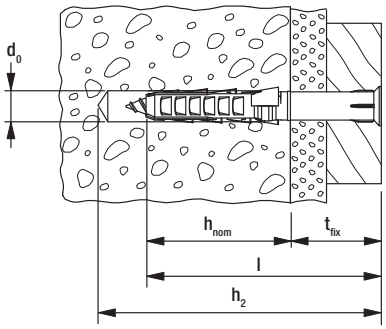


Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth for through fixings h_2 [mm]	Min. anchorage depth h_{nom} [mm]	Anchor length l [mm]	Max. fixture thickness t_{fix} [mm]	Drive	Sales unit [pcs]
SXR 6 x 60 Z	**503233** 1)	6	70	30	60	30	PZ2	50

1) not pre-assembled

TECHNICAL DATA

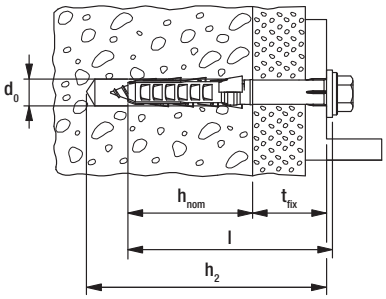
SXR-T - with fischer countersunk head safety screw



	Zinc-plated steel	Stainless steel	Hot-dip galvanised steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Min. anchorage depth	Anchor length	Max. fixture thickness	Drive	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_2 [mm]	h_{nom} [mm]	l [mm]	t_{fix} [mm]		[pcs]
Item	gvz	A4	hdg								
SXR 8 x 60 T	502999	–	–	■	8	70	50	60	10	T30	50
SXR 8 x 80 T	503000	–	–	■	8	90	50	80	30	T30	50
SXR 8 x 100 T	503001	–	–	■	8	110	50	100	50	T30	50
SXR 8 x 120 T	503002	–	–	■	8	130	50	120	70	T30	50
SXR 10 x 80 T	046263	046272	–	■	10	90	50	80	30	T40	50
SXR 10 x 100 T	046264	046274	–	■	10	110	50	100	50	T40	50
SXR 10 x 100 T	–	–	509534	–	10	110	50	100	50	T40	50
SXR 10 x 120 T	046265	046278	–	■	10	130	50	120	70	T40	50
SXR 10 x 120 T	–	–	509535	–	10	130	50	120	70	T40	50
SXR 10 x 140 T	046266	046279	–	■	10	150	50	140	90	T40	50
SXR 10 x 140 T	–	–	509536	–	10	150	50	140	90	T40	50
SXR 10 x 160 T	046267	046283	–	■	10	170	50	160	110	T40	50
SXR 10 x 180 T	046268	046285	–	■	10	190	50	180	130	T40	50
SXR 10 x 200 T	046269	046286	–	■	10	210	50	200	150	T40	50
SXR 10 x 230 T	046270	046287	–	■	10	240	50	230	180	T40	50
SXR 10 x 260 T	046271	046288	–	■	10	270	50	260	210	T40	50

TECHNICAL DATA

SXR-FUS - with fischer hexagon head safety screw, moulded washer and integrated T40 bit recess

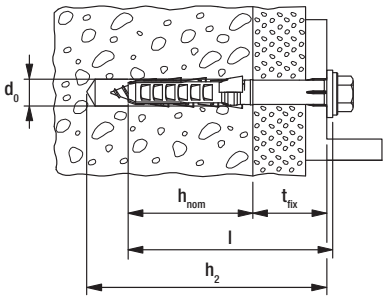


	Zinc-plated steel	Stainless steel	Hot-dip galvanised steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Min. anchorage depth	Anchor length	Max. fixture thickness	Drive	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_2 [mm]	h_{nom} [mm]	l [mm]	t_{fix} [mm]		[pcs]
Item	gvz	A4	hdg								
SXR 10 x 52 FUS	502456 1)	–	–	■	10	62	50	52	2	T40/SW13	50
SXR 10 x 60 FUS	046329	046339	–	■	10	70	50	60	10	T40/SW13	50
SXR 10 x 60 FUS	–	–	509537	–	10	70	50	60	10	T40/SW13	50
SXR 10 x 80 FUS	046330	046340	–	■	10	90	50	80	30	T40/SW13	50
SXR 10 x 80 FUS	–	–	509538	–	10	90	50	80	30	T40/SW13	50
SXR 10 x 100 FUS	046331	046342	–	■	10	110	50	100	50	T40/SW13	50
SXR 10 x 100 FUS	–	–	509539	–	10	110	50	100	50	T40/SW13	50
SXR 10 x 120 FUS	046332	046343	–	■	10	130	50	120	70	T40/SW13	50
SXR 10 x 140 FUS	046333	046344	–	■	10	150	50	140	90	T40/SW13	50
SXR 10 x 140 FUS	–	–	509540	–	10	150	50	140	90	T40/SW13	50

1) not pre-assembled

TECHNICAL DATA

SXR-FUS - with fischer hexagon head safety screw, moulded washer and integrated T40 bit recess



	Zinc-plated steel	Stainless steel	Hot-dip galvanised steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Min. anchorage depth	Anchor length	Max. fixture thickness	Drive	Sales unit
	Art.-No.	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_2 [mm]	h_{nom} [mm]	l [mm]	t_{fix} [mm]		[pcs]
Item	gvz	A4	hdg								
SXR 10 x 160 FUS	**046334**	**046345**	–	■	10	170	50	160	110	T40/SW13	50
SXR 10 x 180 FUS	**046335**	**046361**	–	■	10	190	50	180	130	T40/SW13	50
SXR 10 x 200 FUS	**046336**	**046362**	–	■	10	210	50	200	150	T40/SW13	50
SXR 10 x 230 FUS	**046337**	**046363**	–	■	10	240	50	230	180	T40/SW13	50
SXR 10 x 260 FUS	**046338**	**046364**	–	■	10	270	50	260	210	T40/SW13	50

1) not pre-assembled

ACCESSORIES

Cover cap **ADT**

Item	Art.-No.	Colour	Cap [Ø mm]	Match	Sales unit [pcs]
ADT 15 W	**060326**	white	15	Safety screw with integrated bit recess T40	100
ADT 15 DB	**060329**	dark brown	15	Safety screw with integrated bit recess T40	100
ADT 18 W	**060334**	white	18	Safety screw with integrated bit recess T40	100
ADT 18 DB	**060337**	dark brown	18	Safety screw with integrated bit recess T40	100

ACCESSORIES

Washer **U**

Item	Art.-No.	External-Ø d [mm]	Hole-Ø D [mm]	Thickness S [mm]	Matching anchor type	Sales unit [pcs]
U 11,5 x 21 x 1,5 DIN 522 A2	**010026**	21	11.5	1.5	SXR 10, SXRL 10, FUR 10	500

ACCESSORIES

Aircrete hole punch **GBS**

Item	Art.-No.	Drill hole d_0 [Ø mm]	Min. drill hole depth for through fixings h_2 [mm]	Match	Sales unit [pcs]
GBS 10 x 80	**050590** 1)	9	85	SXR 10 x 52, SXR 10 x 60, SXR 10 x 80	1
GBS 10 x 100	**050591** 1)	9	105	SXR 10 x 100	1
GBS 10 x 135	**050593** 1)	9	140	SXR 10 x 120	1
GBS 10 x 160	**050594** 1)	9	165	SXR 10 x 140, SXR 10 x 160	1
GBS 10 x 185	**050595** 1)	9	190	SXR 10 x 180	1
GBS 10 x 230	**050596** 1)	9	235	SXR 10 x 200, SXR 10 x 230	1

1) According to the ETA, the aircrete hole punch GBS must be used for drill-hole production in aerated concrete PB < 4N/mm².

LOADS

Frame fixing SXR[4)]

Highest permissible loads[1)2)] of a single anchor as part of a multiple fixing of non-structural systems.
For the design the complete assessment ETA-07/0121 has to be considered.

Product			SXR	
Anchor diameter		[mm]	Ø 8	Ø 10
Anchorage depth	h_{nom}	[mm]	50	50
Anchorage in concrete ≥ C12/15				
Permissible tensile load		[kN]	0,99	1,79
Permissible shear load	Zinc-plated steel	[kN]	4,23	5,98
	Stainless steel A4	[kN]	3,93	5,98
Minimum member thickness	h_{min}	[mm]	100	100
Characteristic edge distance	$c_{cr,N}$	[mm]	70	140
Characteristic spacing	a resp. $s_{cr,N}$	[mm]	70	100
Minimum spacing	s_{min}	[mm]	70	70
with an edge distance	c ≥	[mm]	70	210
Minimum edge distance	c_{min}	[mm]	70	85
with a spacing	s ≥	[mm]	70	100
Anchorage in narrow concrete members (h ≥ 40 mm) made of concrete ≥ C12/15, e.g. weather shells of triple-skin outer wall panels				
Permissible tensile load		[kN]	-	1,19
Permissible shear load		[kN]	-	5,98
Anchorage in masonry				
Permisible load[3)] in solid brick	≥ Mz 12 a. ≥ NF	[kN]	0,57	0,57
	≥ Mz 20 a. ≥ NF	[kN]	0,71	0,86
Permissible load[3)] in solid sand-lime brick	≥ KS 10 a. ≥ NF	[kN]	0,57	0,57
	≥ KS 20 a. ≥ NF	[kN]	0,71	0,71
Permissible load[3)] in lightweight concrete block	≥ V 2; ρ ≥ 1,2 kg/dm³	[kN]	0,26	0,21
	≥ V 6; ρ ≥ 1,6 kg/dm³	[kN]	0,26	0,71
Permissible load[3)5)] in vertically perforated brick (e.g. Poroton)	≥ HLz 10; ρ ≥1,0 kg/dm³	[kN]	0,17	0,26
Permissible load[3)] in perforated sand-lime brick	≥ KSL 6	[kN]	0,26	0,43
	≥ KSL 12	[kN]	0,57	0,57
Permissible load[3)5)] in hollow lightweight concrete blocks	≥ HBL 2	[kN]	-	0,43
	≥ HBL 6	[kN]	0,43	0,57
Minimum member thickness	h_{min}	[mm]	100	100
Minimum spacing (single anchor)	a_{min}	[mm]	250	250
Minimum spacing (anchor group)	s_{min}	[mm]	100	100
Minimum edge distance (anchor group)	c_{min}	[mm]	100	100
Anchorage in aerated concrete				
Permissible load[3)] in aerated concrete	2 N/mm²	[kN]	-	0,14[6)]
	4 N/mm²	[kN]	-	0,27
	6 N/mm²	[kN]	-	0,27
Minimum member thickness	h_{min}	[mm]	-	100
Minimum spacing (single anchor)	a_{min}	[mm]	-	250
Minimum spacing (anchor group)	s_{min}	[mm]	-	400
Minimum edge distance (anchor group)	c_{min}	[mm]	-	100

[1)] The required partial safety factors for material resistance as well as a partial safety factor for load actions γ_L = 1,4 are considered.
As a single anchor counts e.g. an anchor with a minimum spacing a according to table B4.1 resp. table B4.2 of the assessment.

[2)] Valid for temperatures in the substrate up to +50 °C (resp. short term up to +80 °C). For long term temperatures up to +30 °C higher permissible loads may be possible.

[3)] Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads and bending moments see assessment.

[4)] Valid for zinc coated screws and for screws made of stainless steel. For exterior use of the zinc coated screws measures against incoming humidity according to assessment have to be taken.

[5)] Rotary drilling.

[6)] Drill holes to be made with aerated concrete hole punch.

LOADS

Frame fixing SXR[3]

Highest recommended loads[1] for a single anchor as part of a multiple fixing of non-structural systems.
The given loads are valid for wood screws with the specified diameter.

Type			SXR 6	SXR 8
Anchorage depth	h_{nom}	[mm]	30	50
Screw diameter	Ø	[mm]	4,5	6,0
Min. edge distance concrete	a_r	[mm]	50	60
Recommended loads in the respective base material F_{rec}[2]				
Concrete	≥ C20/25	[kN]	0,25	0,40
Solid brick	≥ Mz 12	[kN]	0,20	0,30
Solid sand-lime brick	≥ KS 12	[kN]	0,20	0,30
Vertically perforated brick	≥ Hlz 12 (ρ ≥ 1,0 kg/dm³)	[kN]	0,10	0,10
Perforated sand-lime brick	≥ KSL 12	[kN]	0,20	0,30

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

[3] Valid for zinc coated screws and for screws made of stainless steel. For exterior use of the zinc coated screws measures against incoming humidity have to be taken.

The lamella plug with gentle power transfer

Façade substructures

Timber substructures

VERSIONS

- Zinc-plated steel
- Stainless steel

BUILDING MATERIALS

Approved for:

- Concrete ≧ C12/15
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Solid brick made from lightweight concrete
- Solid brick

Also suitable for:

- Natural stone with dense structure
- Solid panel made from gypsum
- Hollow blocks made from lightweight concrete
- Three-layer composite exterior wall panels
- Lightweight aggregate concrete

CERTIFICATES

ETA-13/0235
ETAG 020 a, b, c
Multiple fixings for non-structural applications in concrete and masonry

Fire resistance classification R 90
for facade systems in concrete

fischer NYLON QUALITY

EDELSTAHL Rost frei
INOX STAINLESS STEEL

ADVANTAGES

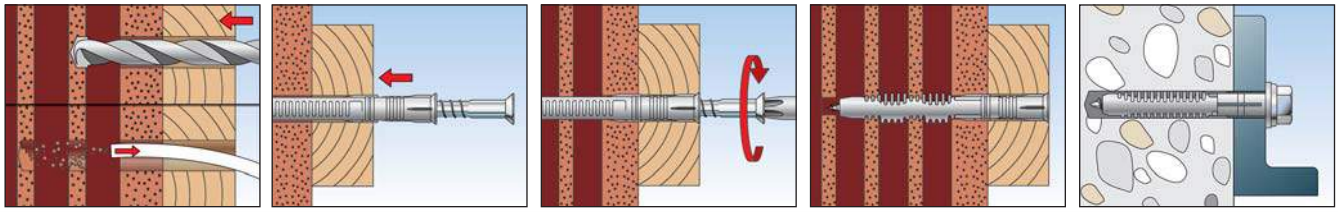
- The operating principle with an anchorage depth of 70 mm and proven asymmetrical teeth, makes it an assembly-friendly anchor even in an unknown base material.
- The slim geometry guarantees a simple installation, even in cases involving thick wooden fixtures and narrow drill holes.
- Range available with diameters of 8 and 10 mm and usable lengths up to 160 mm.

APPLICATIONS

- Façade, ceiling and roof substructures made of wood and metal
- Windows
- Gates and doors
- Squared timbers
- Beams
- Wall covering

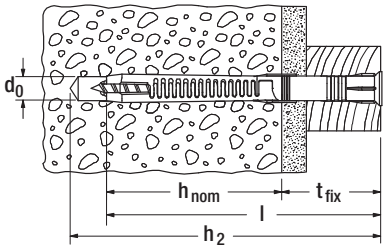
FUNCTIONING

- The FUR is suitable for push-through installation.
- Screwing in the screw causes the individual teeth to expand. In solid materials, the teeth create even expansion forces. In hollow materials, the teeth expand through the solid part of the block and form an undercut in the cavity.
- With vertically perforated bricks, only use rotary drilling (no impact drilling).
- FUR-T with countersunk head screw is recommended for the installation of timber constructions; in the case of metal constructions, use FUR-FUS with a wide sleeve rim and a moulded washer on the screw.



TECHNICAL DATA

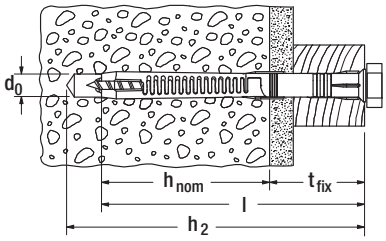
FUR-T - with fischer countersunk head safety screw



	Zinc-plated steel	Stainless steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Min. anchorage depth	Anchor length	Max. fixture thickness	Drive	Sales unit
	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_2 [mm]	h_{nom} [mm]	l [mm]	t_{fix} [mm]		[pcs]
Item	gvz	A4								
FUR 8 x 80 T	070110	070120	–	8	90	70	80	10	T30	50
FUR 8 x 100 T	070111	070121	–	8	110	70	100	30	T30	50
FUR 8 x 120 T	070112	070122	–	8	130	70	120	50	T30	50
FUR 10 x 80 T	088756	088784	■	10	90	70	80	10	T40	50
FUR 10 x 100 T	088757	088785	■	10	110	70	100	30	T40	50
FUR 10 x 115 T	088760	088791	■	10	125	70	115	45	T40	50
FUR 10 x 135 T	088758	088786	■	10	145	70	135	65	T40	50
FUR 10 x 160 T	088759	088787	■	10	170	70	160	90	T40	50
FUR 10 x 185 T	088761	088788	■	10	195	70	185	115	T40	50
FUR 10 x 200 T	088764	088789	■	10	210	70	200	130	T40	50
FUR 10 x 230 T	088762	088790	■	10	240	70	230	160	T40	50

TECHNICAL DATA

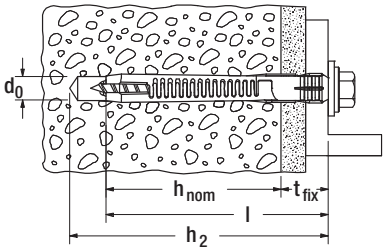
FUR-SS - with fischer hexagon head safety screw



	Zinc-plated steel	Stainless steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Min. anchorage depth	Anchor length	Max. fixture thickness	Drive	Sales unit
	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_2 [mm]	h_{nom} [mm]	l [mm]	t_{fix} [mm]		[pcs]
Item	gvz	A4								
FUR 8 x 80 SS	070130	070140	–	8	90	70	80	10	SW 10	50
FUR 8 x 100 SS	070131	070141	–	8	110	70	100	30	SW 10	50
FUR 8 x 120 SS	070132	–	–	8	130	70	120	50	SW 10	50
FUR 10 x 80 SS	088776	088792	■	10	90	70	80	10	SW 13	50
FUR 10 x 100 SS	088777	088793	■	10	110	70	100	30	SW 13	50
FUR 10 x 115 SS	088783	088799	■	10	125	70	115	45	SW 13	50
FUR 10 x 135 SS	088778	088794	■	10	145	70	135	65	SW 13	50
FUR 10 x 160 SS	088779	088795	■	10	170	70	160	90	SW 13	50
FUR 10 x 185 SS	088780	088796	■	10	195	70	185	115	SW 13	50
FUR 10 x 200 SS	088781	088797	■	10	210	70	200	130	SW 13	50
FUR 10 x 230 SS	088782	088798	■	10	240	70	230	160	SW 13	50

TECHNICAL DATA

FUR-FUS - with fischer hexagon head safety screw, moulded washer and integrated bit recess



	Zinc-plated steel	Stainless steel	Approval	Drill hole diameter	Min. drill hole depth for through fixings	Min. ancho-rage depth	Anchor length	Max. fixture thickness	Drive	Sales unit
	Art.-No.	Art.-No.	ETA	d_0 [mm]	h_2 [mm]	h_{nom} [mm]	l [mm]	t_{fix} [mm]		[pcs]
Item	**gvz**	**A4**								
FUR 10 x 80 FUS	**093527** 1)	**093528** 1)	■	10	90	70	80	10	T40/SW13	50
FUR 10 x 100 FUS	**097797** 1)	—	■	10	110	70	100	30	T40/SW13	50

1) Collar: Ø 18 x 2 mm.

ACCESSORIES

Cover cap **ADT**

Item	Art.-No.	Colour	Cap [Ø mm]	Match	Sales unit [pcs]
ADT 15 W	**060326**	white	15	Safety screw with integrated bit recess T40	100
ADT 15 DB	**060329**	dark brown	15	Safety screw with integrated bit recess T40	100
ADT 18 W	**060334**	white	18	Safety screw with integrated bit recess T40	100
ADT 18 DB	**060337**	dark brown	18	Safety screw with integrated bit recess T40	100

ACCESSORIES

Washer **U**

Item	Art.-No.	External-Ø d [mm]	Hole-Ø D [mm]	Thickness S [mm]	Matching anchor type	Sales unit [pcs]
U 11,5 x 21 x 1,5 DIN 522 A2	**010026**	21	11.5	1.5	SXR 10, SXRL 10, FUR 10	500

LOADS

Frame fixing FUR 10[4)]

Highest permissible loads[1)2)] of a single anchor as part of a multiple fixing of non-structural systems.
For the design the complete approval ETA-13/0235 has to be considered.

Product			FUR 10
Anchorage depth	h_{nom}	[mm]	70
Anchorage in concrete ≥ C12/15			
Permissible tensile load		[kN]	1,79
Permissible shear load	Zinc-plated steel	[kN]	5,37
	Stainless steel A4	[kN]	4,98
Minimum member thickness	h_{min}	[mm]	110
Characteristic edge distance	$c_{cr,N}$	[mm]	140
Characteristic spacing	a resp. $s_{cr,N}$	[mm]	90
Minimum spacing	s_{min}	[mm]	70
with an edge distance	c ≥	[mm]	140
Minimum edge distance	c_{min}	[mm]	70
with a spacing	s ≥	[mm]	210
Anchorage in masonry			
Permisible load[3)] in solid brick	≥ Mz 12 a. ≥ NF	[kN]	0,86
	≥ Mz 20 a. ≥ NF	[kN]	0,86
Permissible load[3)] in solid sand-lime brick	≥ KS 10 a. ≥ NF	[kN]	0,57
	≥ KS 20 a. ≥ NF	[kN]	0,71
Permissible load[3)] in lightweight concrete block	≥ V 6; $\rho \geq 1{,}6$ kg/dm³	[kN]	0,57
Permissible load[3)5)] in vertically perforated brick (e.g. Poroton)	≥ HLz 10; $\rho \geq 1{,}0$ kg/dm³	[kN]	0,37
Permissible load[3)] in perforated sand-lime brick	≥ KSL 12	[kN]	0,57
Minimum member thickness	h_{min}	[mm]	110
Minimum spacing (single anchor)	a_{min}	[mm]	250
Minimum spacing (anchor group)	s_{min}	[mm]	100
Minimum edge distance (anchor group)	c_{min}	[mm]	100

[1)] The required partial safety factors for material resistance as well as a partial safety factor for load actions $\gamma_F = 1{,}4$ are considered.
As a single anchor counts e.g. an anchor with a minimum spacing a according to table 8 resp. table 10 of the approval.

[2)] Valid for temperatures in the substrate up to +50 °C (resp. short term up to +80 °C).

[3)] Valid for tensile load, shear load and oblique load under any angle. For combinations of tensile loads, shear loads and bending moments see approval.

[4)] Valid for zinc coated screws and for screws made of stainless steel. For exterior use of the zinc coated screws measures against incoming humidity according to approval have to be taken.

[5)] Rotary drilling.

LOADS

Frame fixing FUR 8 [3)]

Highest recommended loads[1)] for a single anchor for multiple fixings of non-structural systems.
The given loads are valid for fischer safety screws included in delivery.

Type			FUR 8
Anchorage depth	h_{nom}	[mm]	70
Diameter of the safety screw	Ø	[mm]	6,0
Min. edge distance concrete	a_r	[mm]	50
Recommended loads in the respective base material F_{rec}[2)]			
Concrete	≥ C12/15	[kN]	1,0
Solid brick	≥ Mz 12	[kN]	0,60
Solid sand-lime brick	≥ KS 12	[kN]	0,60

[1)] Required safety factors are considered.

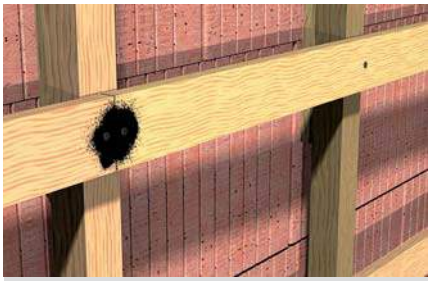
[2)] Valid for tensile load, shear load and oblique load under any angle.

[3)] Valid for zinc coated screws and for screws made of stainless steel. For exterior use of the zinc coated screws measures against incoming humidity have to be taken.

Anti-corrosion spray FTC-CP

The elastic protective coating for use with frame fixings

Sealing of the screw heads



Sealing of the screw heads

BUILDING MATERIALS

- Zinc-plated frame fixings
- Corrosive metals

ADVANTAGES

- FTC-CP professionally prevents the penetration of moisture into the anchor shaft and securely protects the connection from corrosion - as required in the ETA assessments.
- Once dry, the optimised formulation provides a long-lasting, elastic protective coating with a secure hold and a high abrasion resistance.
- The thixotropic anti-corrosion agent is also ideally suited to other corrosion protection applications and thus offers a wide range of uses.

APPLICATIONS

- Façade anchorings in line with the assessments for frame fixings, e.g. SXR, SXRL and FUR
- For all substructures, e.g. made from wood, aluminium, metal.

FUNCTIONING

- Thixotropic, bitumen-based anti-corrosion agent.
- Good stability under load; non-drip, no spray mist.
- Shake canister for at least 2 minutes from the time the mixing balls can be heard.
- Spray as evenly as possible from a distance of 15 to 20 cm.
- Ideal processing temperature +16 °C to +25 °C.
- Quick-drying (dried through after 3-4 hours at 600 mµ and 20 °C).
- Temperature-resistant from -25 °C to 80 °C.
- Salt and water-resistant, and resistant to abrasion.
- With one can about 300 screw heads can be coated.

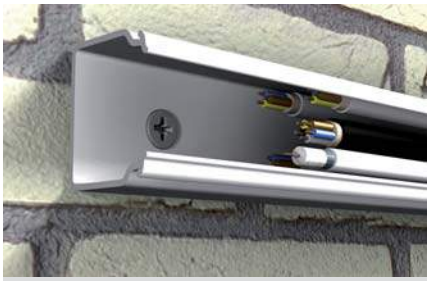
TECHNICAL DATA

Anti-corrosion spray **FTC-CP**

Item	Art.-No.	Colour	Content per can [ml]	Sales unit [pcs]
FTC-CP	**511440**	black	500	12

The hammer-in plug for a simple, fast and economical installation

Timber substructures



Cable ducts

VERSIONS

- Zinc-plated steel
- Stainless steel

CHARACTERISTICS

BUILDING MATERIALS

- Concrete
- Solid sand-lime brick
- Building brick
- Natural stone
- Solid brick made from lightweight concrete
- Aerated concrete
- Solid panel made from gypsum
- Vertically perforated brick
- Perforated sand-lime brick
- Hollow blocks made from lightweight concrete

ADVANTAGES

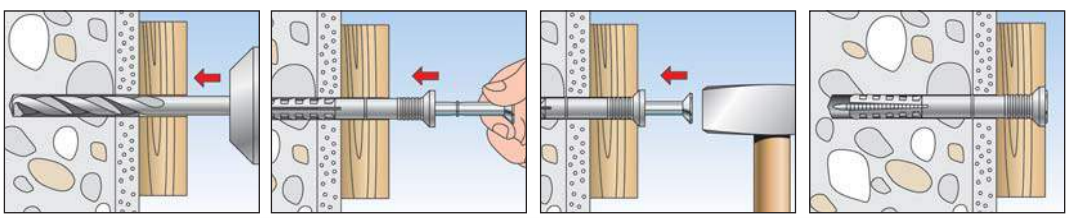
- The rapid hammerset installation reduces the amount of time required and allows for an economic series installation.
- The integrated hammer-in stop prevents the plug from expanding prematurely (jamming), thus enabling a problem-free installation.
- Together with the cross-slot recess, the thread of the nail screw allows the screw to be removed, thus allowing for subsequent dismantling.
- The wide range of diameters, usage lengths and head shapes provides the correct plug for every fixing.

APPLICATIONS

- Substructures made of wood and metal
- Wall connection or plaster profiles
- Slides
- Sheets
- Cable and pipe clips
- Perforated tapes

FUNCTIONING

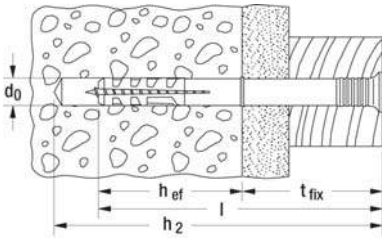
- The Hammerfix N is suitable for push-through installation.
- When hammered in, the nail screw causes the plug to expand in two directions, thus providing a secure anchoring in the building material.
- Countersunk head plugs are recommended for the installation of timber constructions; in the case of metal constructions, use flat-head plugs, and use pan-head plugs for long holes.



TECHNICAL DATA

Hammerfix **N-S** with nail

Hammerfix **N-S A2** with stainless steel A2 nail



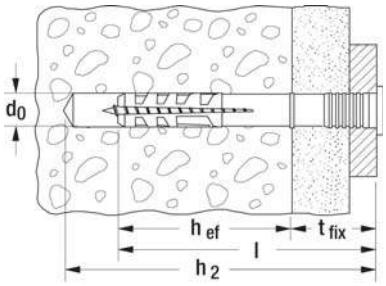
	Zinc-plated steel	Stainless steel A2	Drill hole diameter	Effect. ancho-rage depth	Anchor length	Min. drill hole depth for through fixings	Max. fixture thickness	Drive	Sales unit
	Art.-No.	Art.-No.	d_0 [mm]	h_{ef} [mm]	l [mm]	h_2 [mm]	t_{fix} [mm]		[pcs]
Item	**gvz**	**A2**							
N 5 x 30/5 S (100)	**050395** 2)	**050370**	5	25	30	45	5	PZ2	100
N 5 x 40/15 S (100)	**050351**	—	5	25	40	55	15	PZ2	100
N 5 x 50/25 S (100)	**050352**	—	5	25	50	65	25	PZ2	100
N 6 x 40/10 S (50)	**050354**	**050372**	6	30	40	55	10	PZ2	50
N 6 x 40/10 S (100)	**048788**	—	6	30	40	55	10	PZ2	100
N 6 x 40/10 S (200)	**513834** 2)	—	6	30	40	55	10	PZ2	200
N 6 x 60/30 S (50)	**050355**	**050373**	6	30	60	75	30	PZ2	50
N 6 x 60/30 S (100)	**048789**	—	6	30	60	75	30	PZ2	100
N 6 x 60/30 S (200)	**513835** 2)	—	6	30	60	75	30	PZ2	200
N 6 x 80/50 S (50)	**050353**	—	6	30	80	95	50	PZ2	50
N 6 x 80/50 S (100)	**048790**	—	6	30	80	95	50	PZ2	100
N 6 x 80/50 S (200)	**513836** 2)	—	6	30	80	95	50	PZ2	200
N 8 x 60/20 S (50)	**050356**	**050374**	8	40	60	75	20	PZ3	50
N 8 x 60/20 S (100)	**048791**	—	8	40	60	75	20	PZ3	100
N 8 x 80/40 S (50)	**050358**	**050375**	8	40	80	95	40	PZ3	50
N 8 x 80/40 S (100)	**048792**	—	8	40	80	95	40	PZ3	100
N 8 x 100/60 S (50)	**050357**	**050376**	8	40	100	115	60	PZ3	50
N 8 x 100/60 S (100)	**048793**	—	8	40	100	115	60	PZ3	100
N 8 x 120/80 S (50)	**050359**	—	8	40	120	135	80	PZ3	50
N 8 x 120/80 S (100)	**048794**	—	8	40	120	135	80	PZ3	100
N 10 x 100/50 S (50)	**050346** 1)	—	10	50	100	115	50	PZ3	50
N 10 x 135/85 S (50)	**050347** 1)	—	10	50	135	150	85	PZ3	50
N 10 x 160/110 S (50)	**050348** 1)	—	10	50	160	175	110	PZ3	50
N 10 x 230/180 S (50)	**050335** 1)	—	10	50	230	245	180	PZ3	50

1) not pre-assembled

2) also specially suitable for fischer pipe clips FC, see chapter electrical fixings.

TECHNICAL DATA

Hammerfix **N-F** with cylindrical head and nail

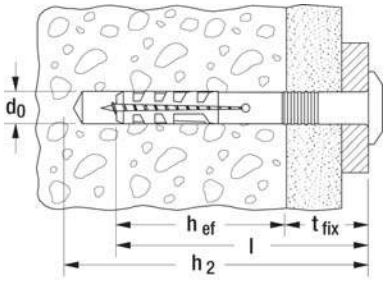


Item	Art.-No.	Drill hole diameter d_0 [mm]	Effect. anchorage depth h_{ef} [mm]	Anchor length l [mm]	Min. drill hole depth for through fixings h_2 [mm]	Max. fixture thickness t_{fix} [mm]	Drive	Sales unit [pcs]
N 5 x 25/1 F (100)	**514872**	5	25	25	40	1	PZ2	100
N 5 x 25/1 F (200)	**514873**	5	25	25	40	1	PZ2	200
N 5 x 30/5 F (100)	**513736**	5	25	30	45	5	PZ2	100
N 5 x 30/5 F (200)	**513739**	5	25	30	45	5	PZ2	200
N 5 x 40/15 F (100)	**513737**	5	25	40	55	15	PZ2	100
N 5 x 40/15 F (200)	**513740**	5	25	40	55	15	PZ2	200
N 5 x 50/25 F (100)	**513738**	5	25	50	65	25	PZ2	100
N 5 x 50/25 F (200)	**513741**	5	25	50	65	25	PZ2	200
N 6 x 35/5 F (100)	**522948**	6	30	35	40	5	PZ2	100
N 6 x 40/10 F (50)	**513837**	6	30	40	55	10	PZ2	50
N 6 x 40/10 F (100)	**513840**	6	30	40	55	10	PZ2	100
N 6 x 40/10 F (200)	**513843**	6	30	40	55	10	PZ2	200
N 6 x 60/30 F (50)	**513838**	6	30	60	75	30	PZ3	50
N 6 x 60/30 F (100)	**513841**	6	30	60	75	30	PZ2	100
N 6 x 60/30 F (200)	**513844**	6	30	60	75	30	PZ2	200
N 6 x 80/50 F (50)	**513839**	6	30	80	95	50	PZ3	50
N 6 x 80/50 F (100)	**513842**	6	30	80	95	50	PZ2	100
N 6 x 80/50 F (200)	**513845**	6	30	80	95	50	PZ2	200
N 8 x 60/20 F (50)	**513697**	8	40	60	75	20	PZ3	50
N 8 x 60/20 F (100)	**513701**	8	40	60	75	20	PZ3	100
N 8 x 80/40 F (50)	**513698**	8	40	80	95	40	PZ3	50
N 8 x 80/40 F (100)	**513702**	8	40	80	95	40	PZ3	100
N 8 x 100/60 F (50)	**513699**	8	40	100	115	60	PZ3	50
N 8 x 100/60 F (100)	**513703**	8	40	100	115	60	PZ3	100
N 8 x 120/80 F (50)	**513700**	8	40	120	135	80	PZ3	50
N 8 x 120/80 F (100)	**513704**	8	40	120	135	80	PZ3	100

TECHNICAL DATA

Hammerfix **N-P** with flat edge and nail

Hammerfix **N-P A2** with flat edge and stainless steel A2 nail



Item	Zinc-plated steel Art.-No.	Stainless steel A2 Art.-No.	Drill hole diameter d_0 [mm]	Effect. anchorage depth h_{ef} [mm]	Anchor length l [mm]	Min. drill hole depth for through fixings h_2 [mm]	Max. fixture thickness t_{fix} [mm]	Drive	Sales unit [pcs]
	gvz	A2							
N 5 x 30/5 P (100)	**050338**	–	5	25	30	45	5	PZ2	100
N 6 x 30/1 P (100)	**514869**	–	6	30	30	45	1	PZ2	100
N 6 x 40/7 P (50)	**050339**	**050369**	6	30	40	55	7	PZ2	50
N 6 x 40/7 P (100)	**048795**	**092520**	6	30	40	55	7	PZ2	100
N 6 x 40/7 P (200)	**514871**	–	6	30	40	55	7	PZ2	200
N 8 x 40/1 P (50)	**015903**	–	8	40	40	55	1	PZ3	50
N 8 x 40/1 P (100)	**514870**	–	8	40	40	55	1	PZ3	100

TECHNICAL DATA

Hammerfix **N-P K** with flat edge and plastic nail

Hammerfix **N-S D A2** with isolating washer and nail

N-S M with nail and connection thread M 6

Item	Art.-No.	Drill hole diameter d_0 [mm]	Effect. anchorage depth h_{ef} [mm]	Anchor length l [mm]	Max. fixture thickness t_{fix} [mm]	Min. drill hole depth for through fixings h_2 [mm]	Washer [Ø mm]	Drive	Sales unit [pcs]
N 6 x 40/7 P K (50)	**050342**	6	30	40	7	55	–	–	50
N 6 x 40/10 S M6 (50)	**050398**	6	30	40	10	55	–	–	50
N 6 x 40/10 S D A2 (50)	**050367**	6	30	40	10	55	19	PZ2	50
N 6 x 60/30 S D A2 (50)	**050368**	6	30	60	30	75	19	PZ2	50

LOADS

Hammerfix N

Highest recommended loads[1] for a single anchor

The given loads are valid for screw nails with the specified diameter.

Type			N5	N6[3]	N8	N10
Screw nail diameter	Ø	[mm]	3,5	4	5	7
Recommended loads in the respective base material F_{rec}[2]						
Concrete	≥ C20/25	[kN]	0,20	0,25	0,27	0,33
Solid brick	≥ Mz 12	[kN]	0,14	0,18	0,24	0,30
Solid sand-lime brick	≥ KS 12	[kN]	0,18	0,22	0,24	0,33
Solid brick of lightweight aggregate concrete	≥ V 4	[kN]	0,05	0,12	0,15	0,16
Aerated concrete	≥ PB 2	[kN]	0,03	0,04	0,05	0,10
Aerated concrete	≥ PB 4	[kN]	0,07	0,10	0,13	0,16

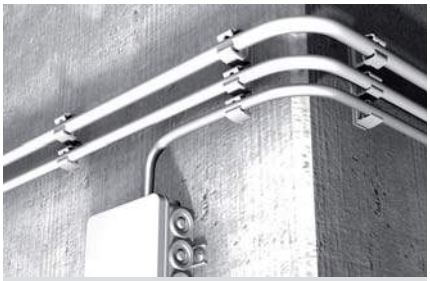
[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

[3] The values have to be reduced by 50% for N 6 x 40/7 P K.

The hammer-in plug for simple, fast and economic installation

Timber substructures



Cable fixing

BUILDING MATERIALS

- Concrete
- Solid sand-lime brick
- Building brick
- Natural stone
- Solid brick made from lightweight concrete
- Aerated concrete
- Solid panel made from gypsum
- Vertically perforated brick
- Perforated sand-lime brick
- Hollow blocks made from lightweight concrete

CHARACTERISTICS

BIOBASED 50 - 85%
DIN Geprüft
8C029

ADVANTAGES

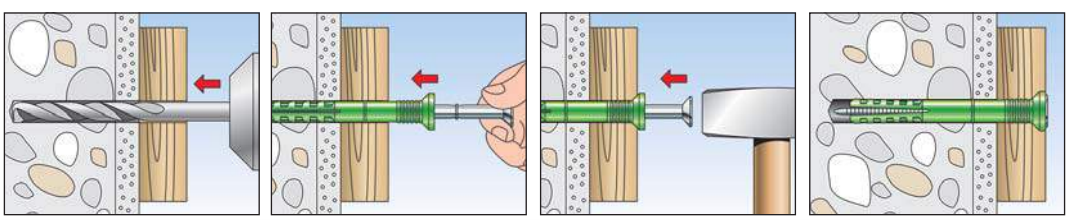
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular hammerfix N plugs.
- The rapid push-through and hammer-set installation reduces the amount of work required and allows for economic series installation.
- The integrated hammer-in stop prevents the plug from expanding prematurely, thus enabling problem-free installation.
- Together with the cross-slot recess, the thread of the nail screw allows the screw to be removed, thus allowing for subsequent dismantling.

APPLICATIONS

- Substructures made of wood and metal
- Wall connection or plaster profiles
- Slides
- Sheets
- Cable and pipe clips
- Perforated tapes

FUNCTIONING

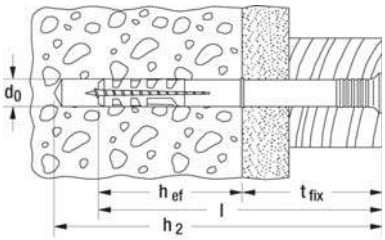
- The hammerfix N GREEN is suitable for push-through installation.
- The easiest installation: drill, knock in and you're done.
- When being hammered in, the nail screw causes the plug to expand in two directions, thus providing a secure anchoring in the building material.



Hammerfix N GREEN

TECHNICAL DATA

Hammerfix **N GREEN S** with countersunk head and zinc-plated nail



Item	Art.-No.	Drill hole diameter d_0 [mm]	Effect. anchorage depth h_{ef} [mm]	Anchor length l [mm]	Min. drill hole depth for through fixings h_2 [mm]	Max. fixture thickness t_{fix} [mm]	Drive	Sales unit [pcs]
N GREEN 6 x 40/10 S	**524845**	6	30	40	55	10	PZ2	45
N GREEN 6 x 60/30 S	**524847**	6	30	60	75	30	PZ2	45
N GREEN 6 x 80/50 S	**524848**	6	30	80	95	50	PZ2	45
N GREEN 8 x 80/40 S	**524849**	8	40	80	95	40	PZ3	45
N GREEN 8 x 100/60 S	**524850**	8	40	100	115	60	PZ3	45

LOADS

Hammerfix N GREEN S

Highest recommended loads[1] for a single anchor.
The given loads are valid for screw nails with the specified diameter.

Type			N GREEN 6	N GREEN 8
Screw nail diameter	Ø	[mm]	4	5
Recommended loads in the respective base material F_{rec}[2]				
Concrete	≥ C20/25	[kN]	0,25	0,27
Solid brick	≥ Mz 12	[kN]	0,18	0,24
Solid sand-lime brick	≥ KS 12	[kN]	0,22	0,24
Solid brick of lightweight aggregate concrete	≥ V 4	[kN]	0,12	0,15
Aerated concrete	≥ AAC 2	[kN]	0,04	0,05
Aerated concrete	≥ AAC 4	[kN]	0,10	0,13

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

The user-friendly spring sleeve for light fixings in solid building materials

Timber substructures

BUILDING MATERIALS

- Concrete
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

ADVANTAGES

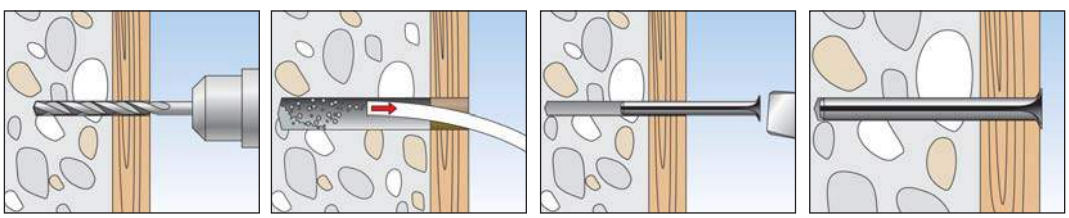
- No plugs or screws are required for the one-piece nail sleeve. This guarantees a simple and easy installation.
- The geometry of the nail sleeve makes it easy to push it into the drill hole. This saves time and money.

APPLICATIONS

- Squared timbers
- Substructures made of wood and metal
- Metal profiles

FUNCTIONING

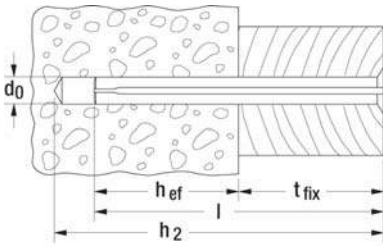
- The FNH nail sleeve is suitable for push-through installation.
- The nail sleeve is hammered in and expands its entire length in the hole.
- FNH is suitable for interior applications and for temporary external fixings.



Nail sleeve FNH

TECHNICAL DATA

Nail sleeve **FNH**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Effect. anchorage depth h_{ef} [mm]	Anchor length l [mm]	Max. fixture thickness t_{fix} [mm]	Min. drill hole depth for through fixings h_2 [mm]	Sales unit [pcs]
FNH 5/50	**541893**	5	20	50	30	60	100
FNH 6/30	**541894**	6	30	30	–	40	100
FNH 6/40	**541895**	6	30	40	10	50	100
FNH 6/50	**541896**	6	30	50	20	60	100
FNH 6/60	**541897**	6	30	60	30	70	100
FNH 6/80	**541898**	6	30	80	50	90	100
FNH 8/70	**541899**	8	40	70	30	80	100
FNH 8/90	**541905**	8	40	90	50	100	50
FNH 8/110	**541906**	8	40	110	70	120	50
FNH 8/130	**541907**	8	40	130	90	140	50
FNH 8/150	**541908**	8	40	150	110	160	50
FNH 8/180	**541909**	8	40	180	140	190	50

LOADS

Nail sleeve FNH

Highest recommended loads[1)] of a single anchor as part of a multiple fixing of non-structural systems.

Type		FNH 5	FNH 6	FNH 8
Minimum member thickness	[mm]	50	60	70
Anchorage in concrete ≥ C20/25				
Recommended tensile load	[kN]	0,10	0,50	0,70
Recommended shear load	[kN]	0,40	1,40	2,00

[1)] Required safety factors are considered.

The nylon fixing for stress-free stand-off installation of window and door frames

Window frames

BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Aerated concrete
- Solid brick made from lightweight concrete
- Solid brick

CERTIFICATES

ADVANTAGES

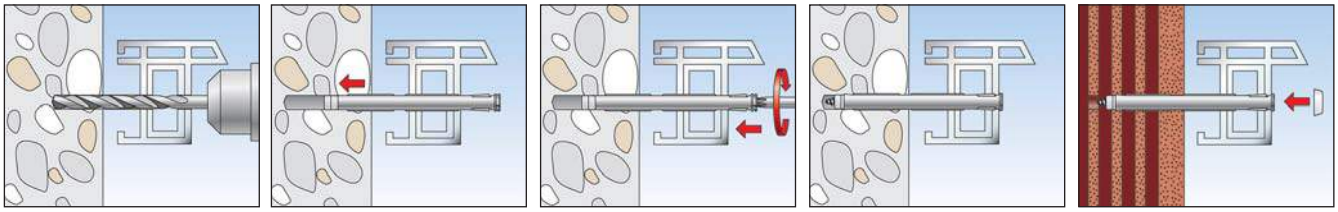
- The operating principle of the plug prevents the frame from being pulled against the substrate, and ensures a stress-free and long-lasting fixing of the frame.
- The special plug geometry anchors the metal and plastic profiles against compressive and tensile loads, and allows for a secure hold of the window frame.
- The cover cap (available separately) can be used to discreetly cover the screw head.

APPLICATIONS

- Window frames
- Door frames

FUNCTIONING

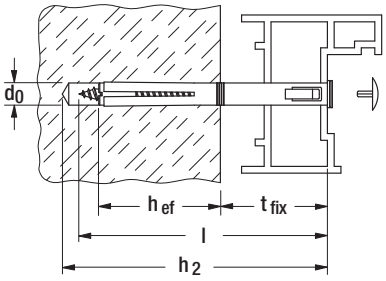
- The F-S is suitable for push-through installation.
- By tightening the screw, the glass-fibre-reinforced plastic cone is drawn into the sleeve, whereby it is expanded and wedged inside the drill hole. The window frames are thus fixed in a stress-free manner.
- The maximum installation torque is 3 Nm for F8S and 6 Nm for F10S.



Window frame fixing F-S

TECHNICAL DATA

F-S - with zinc-plated countersunk screw and cross drive Z3



Item	Art.-No.	Drill hole diameter d_0 [mm]	Effect. anchorage depth h_{ef} [mm]	Anchor length l [mm]	Max. fixture thickness t_{fix} [mm]	Min. drill hole depth for through fixings h_2 [mm]	Max. installation torque T_{inst} [Nm]	Sales unit [pcs]
F 8 S 100	**088635**	8	40	100	50	115	3	50
F 8 S 120	**088636**	8	40	120	70	135	3	50
F 8 S 140	**088637**	8	40	140	90	155	3	50
F 10 S 75	**088625**	10	50	75	15	90	6	50
F 10 S 100	**088626**	10	50	100	40	115	6	50
F 10 S 120	**088627**	10	50	120	60	135	6	50
F 10 S 140	**088628**	10	50	140	80	155	6	50
F 10 S 165	**088629**	10	50	165	105	180	6	50

ACCESSORIES

Cover cap for **F-S** - with countersunk screw and cross drive Z3

Item	Art.-No.	Diameter [mm]	Colour	Sales unit [pcs]
ADF 12W	**060275**	12	white	100

LOADS

Window frame fixing F-S

Highest recommended loads[1] for a single anchor as part of a multiple fixing of non-structural systems.

Type			F 8 S	F 10 S
Recommended loads in the respective base material F_{rec}[2]				
Concrete	≥ C20/25	[kN]	0,78	1,48
Solid brick	≥ Mz 12	[kN]	0,90	1,25
Solid sand-lime brick	≥ KS 12	[kN]	0,90	1,25
Solid brick of lightweight aggregate concrete	≥ V 2	[kN]	0,25	-
Perforated sand-lime brick	≥ KSL 6	[kN]	0,25	-

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

The fixing for stress-free installation of window and door frames with fire classification

Fire protection doors

BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Aerated concrete
- Solid brick made from lightweight concrete
- Solid brick

CERTIFICATES

ADVANTAGES

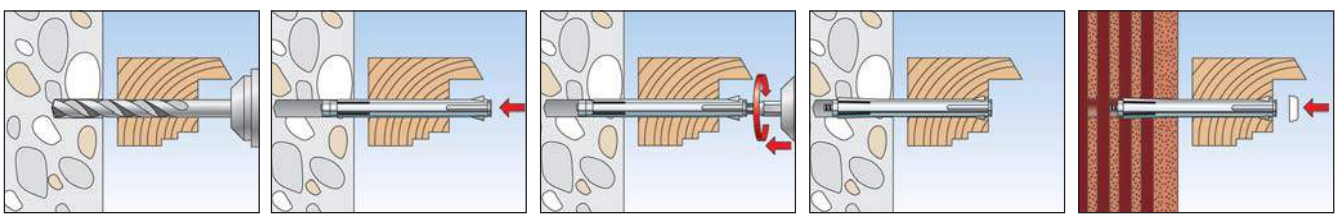
- The F-M metal frame plug achieves fire resistance F 120. This allows for use in areas where fire resistance is relevant.
- The operating principle prevents the window frame from being pulled against the substrate, and ensures a stress-free and long-lasting fixing of the frame.
- The special plug geometry anchors the metal and plastic profiles against compressive and tensile loads, and allows for a secure hold of the window frame.
- The cover caps (available separately) can be used to discreetly cover the screw heads.

APPLICATIONS

- Window frames
- Door frames
- Squared timbers

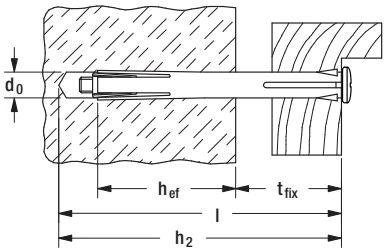
FUNCTIONING

- The F-M is suitable for push-through installation.
- By tightening the screw, the cone is drawn into the sleeve and the fixing is expanded which wedges it inside the drill hole. The window frames are thus fixed in a stress-free manner.
- The maximum installation torque is 5 Nm.



TECHNICAL DATA

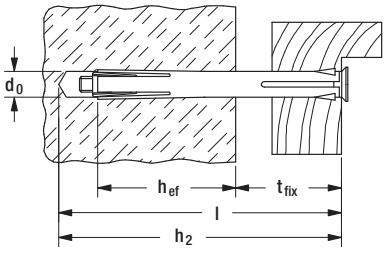
F 8 M - with zinc-plated raised countersunk screw and cross drive PZ2



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth for through fixings h_2 [mm]	Effect. anchorage depth h_{ef} [mm]	Anchor length l [mm]	Max. fixture thickness t_{fix} [mm]	Drive	Sales unit [pcs]
F 8 M 72	**088660**	8	90	30	72	42	PZ2	100
F 8 M 92	**088662**	8	110	30	92	62	PZ2	100
F 8 M 112	**088664**	8	130	30	112	82	PZ2	100
F 8 M 132	**088666**	8	150	30	132	102	PZ2	100

TECHNICAL DATA

F 10 M - with zinc-plated countersunk head screw and cross drive PZ3



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth for through fixings h_2 [mm]	Effect. anchorage depth h_{ef} [mm]	Anchor length l [mm]	Max. fixture thickness t_{fix} [mm]	Drive	Sales unit [pcs]
F 10 M 72	**088670**	10	90	30	72	42	PZ3	100
F 10 M 92	**088672**	10	110	30	92	62	PZ3	100
F 10 M 112	**088674**	10	130	30	112	82	PZ3	100
F 10 M 132	**088676**	10	150	30	132	102	PZ3	100
F 10 M 152	**088678**	10	170	30	152	122	PZ3	100
F 10 M 182	**088680**	10	200	30	182	152	PZ3	50
F 10 M 202	**061064**	10	220	30	202	172	PZ3	50

ACCESSORIES

Cover cap **ADM 10 W**

Item	Art.-No.	Colour	Cap height [mm]	Cap [Ø mm]	Match	Sales unit [pcs]
ADM 10 W	**088688**	white	4	16,5	F 10 M	100
ASM 10 W	**060320**	white	3	15	F 10 M	100

LOADS

Metal frame fixing F-M

Highest recommended loads[1] for a single anchor as part of a multiple fixing of non-structural systems.

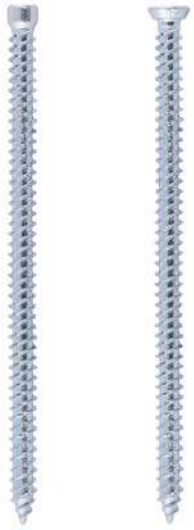
Type			F 8 M	F 10 M
Recommended loads in the respective base material F_{rec}[2]				
Concrete	≥ C20/25	[kN]	1,00	1,40
Solid brick	≥ Mz 12	[kN]	0,30	1,30
Solid sand-lime brick	≥ KS 12	[kN]	0,70	1,30
Solid brick of lightweight aggregate concrete	≥ V 2	[kN]	-	0,50
Perforated sand-lime brick	≥ KSL 12	[kN]	0,25	0,60

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

Window frame screws FFSZ and FFS

The economical special screw for window installation



Window frames

BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Solid brick made from lightweight concrete
- Solid brick
- Aerated concrete

CERTIFICATES

Test Report No.:
14-000559-PR02

ADVANTAGES

- Screw installation without plug for economical processing.
- The small drill bit diameter of 6 mm allows for efficient series installation.
- The continuous thread ensures a stress-free fixing of the frame in the substrate.
- The high-low-thread at the screw tip as well as several cutting notches reduce the amount of force required for screwing in the screws. The installation process can be completed without excessive effort.
- With two head types applicable for all common frame materials.
- According to the ift Rosenheim suitable for the fixation of a plastic window in brick masonry.

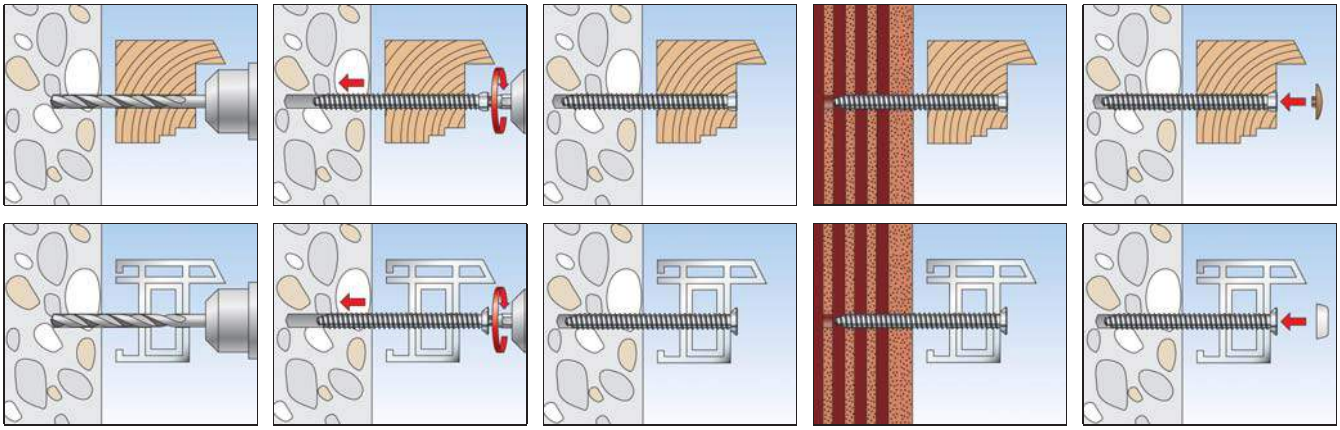
APPLICATIONS

- Window frames made of wood, plastic and aluminium
- Door frames
- Squared timbers

FUNCTIONING

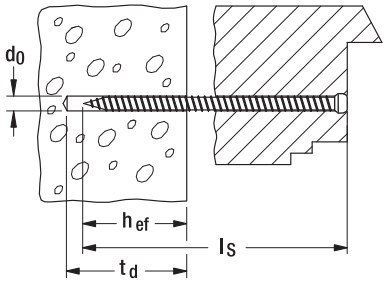
- Note the drill hole and screw-in depths for the different building materials listed in the table.
- Cylinder head screws are recommended for recessed installation in wooden profiles.
- Flat head screws are recommended for installation in plastic and aluminium profiles.

INSTALLATION



TECHNICAL DATA

Window frame screw with cylinder head
FFSZ



Anchorage depth h_{ef}
$h_{ef} \geq 30$ mm in concrete
$h_{ef} \geq 40$ mm in solid brick
$h_{ef} \geq 60$ mm in perforated brick / aerated concrete

t_d : drill hole depth $\geq h_{ef} +$ **10 mm**

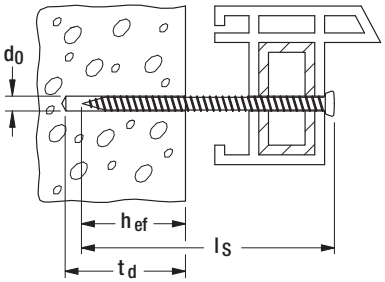
Item	Art.-No.	Drill hole diameter d_0 [mm]	Screw length l_s [mm]	Drive	Head [Ø mm]	Sales unit [pcs]
FFSZ 7,5 x 52 T30	**532906**	6	52	T30	8	100
FFSZ 7,5 x 62 T30	**532907**	6	62	T30	8	100
FFSZ 7,5 x 72 T30	**532908**	6	72	T30	8	100
FFSZ 7,5 x 82 T30	**532909**	6	82	T30	8	100
FFSZ 7,5 x 92 T30	**532910**	6	92	T30	8	100
FFSZ 7,5 x 102 T30	**532911**	6	102	T30	8	100
FFSZ 7,5 x 112 T30	**532912**	6	112	T30	8	100
FFSZ 7,5 x 122 T30	**532913**	6	122	T30	8	100
FFSZ 7,5 x 132 T30	**532914**	6	132	T30	8	100
FFSZ 7,5 x 152 T30	**532915**	6	152	T30	8	100
FFSZ 7,5 x 182 T30	**532916**	6	182	T30	8	100
FFSZ 7,5 x 202 T30	**532917**	6	202	T30	8	100
FFSZ 7,5 x 212 T30	**532919**	6	212	T30	8	100
FFSZ 7,5 x 252 T30	**532920**	6	252	T30	8	100
FFSZ 7,5 x 302 T30	**532921**	6	302	T30	8	100

No pre-drilling in aerated concrete.

Window frame screws FFSZ and FFS

TECHNICAL DATA

Window frame screw with flat head **FFS**



Anchorage depth h_{ef}
$h_{ef} \geq$ 30 mm in concrete
$h_{ef} \geq$ 40 mm in solid brick
$h_{ef} \geq$ 60 mm in perforated brick / aerated concrete

t_d : drill hole depth $\geq h_{ef}$ + **10 mm**

Item	Art.-No.	Drill hole diameter d_0 [mm]	Screw length l_s [mm]	Drive	Head [Ø mm]	Sales unit [pcs]
FFS 7,5 x 42 T30	**532922**	6	42	T30	11,5	100
FFS 7,5 x 52 T30	**532923**	6	52	T30	11,5	100
FFS 7,5 x 62 T30	**532925**	6	62	T30	11,5	100
FFS 7,5 x 72 T30	**532927**	6	72	T30	11,5	100
FFS 7,5 x 82 T30	**532928**	6	82	T30	11,5	100
FFS 7,5 x 92 T30	**532930**	6	92	T30	11,5	100
FFS 7,5 x 102 T30	**532931**	6	102	T30	11,5	100
FFS 7,5 x 112 T30	**532932**	6	112	T30	11,5	100
FFS 7,5 x 122 T30	**532934**	6	122	T30	11,5	100
FFS 7,5 x 132 T30	**532935**	6	132	T30	11,5	100
FFS 7,5 x 152 T30	**532941**	6	152	T30	11,5	100
FFS 7,5 x 182 T30	**532942**	6	182	T30	11,5	100
FFS 7,5 x 202 T30	**532943**	6	202	T30	11,5	100
FFS 7,5 x 212 T30	**532944**	6	212	T30	11,5	100
FFS 7,5 x 252 T30	**532945**	6	252	T30	11,5	100
FFS 7,5 x 302 T30	**532946**	6	302	T30	11,5	100

No pre-drilling in aerated concrete.

ACCESSORIES

Cover cap **FFSZ-A**

Item	Art.-No.	Colour	Cap [Ø mm]	Cap height [mm]	Match	Sales unit [pcs]
FFSZ-A W	**538708**	white	14	2,2	FFSZ - cylinder head	100
FFSZ-A BR	**538709**	brown	14	2,2	FFSZ - cylinder head	100

ACCESSORIES

Cover cap **FFS-A**

Item	Art.-No.	Colour	Cap [Ø mm]	Cap height [mm]	Match	Sales unit [pcs]
FFS-A W	**061560**	white	15	4,8	FFS - flat head	100
FFS-A BR	**061561**	brown	15	4,8	FFS - flat head	100

LOADS

Window frame screws FFSZ and FFS

Highest recommended loads[1] of a single screw.

Type			FFSZ			FFS		
Screw diameter	Ø	[mm]	7,5			7,5		
Anchorage depth	$h_{ef} \geq$	[mm]	30	40	60	30	40	60
Anchorage in concrete ≥ C20/25								
Recommended tensile load		[kN]	1,00	-		1,00	-	
Recommended shear load		[kN]	0,70	-		0,70	-	
Min. edge distance[5]	c_{min}	[mm]	30	-		30	-	
Anchorage in masonry								
Recommended tensile load in solid brick	≥ Mz 12	[kN]	-	0,40[3]	0,80	-	0,40[3]	0,80
Recommended shear load in solid brick	≥ Mz 12	[kN]	-	0,30[3]	0,70	-	0,30[3]	0,70
Recommended tensile load in solid sand-lime brick	≥ KS 12	[kN]	-	1,00	-	-	1,00	-
Recommended shear load in solid sand-lime brick	≥ KS 12	[kN]	-	0,60	-	-	0,60	-
Recommenced tensile load in vertically perforated brick	≥ HLz 12	[kN]	-		0,25[3]	-		0,25[3]
Recommenced shear load in vertically perforated brick	≥ HLz 12	[kN]	-		0,40[3]	-		0,40[3]
Min. edge distance[5]	c_{min}	[mm]	-	40		-	40	
Anchorage in aerated concrete								
Recommended load[2] in aerated concrete	≥ AAC 2	[kN]	-		0,10[4]	-		0,10[4]
	≥ AAC 4	[kN]	-		0,25[4]	-		0,25[4]
Min. edge distance[5]	c_{min}	[mm]	-		40	-		40

[1] Required safety factors are considered. As a single screw counts e.g. a screw with a spacing $s \geq 3 \times h_{ef}$ and an edge distance $c \geq 1,5 \times h_{ef}$.

[2] Valid for tensile load, shear load and oblique load under any angle.

[3] Rotary drilling.

[4] Without pre-drilling.

[5] Minimal possible edge distance while reducing the recommended loads.

The stainless steel A4 joint for two-shell masonry

Facing masonry

BUILDING MATERIALS

- All concrete and masonry materials in conjunction with the appropriate frame fixing

ADVANTAGES

- The VB securely connects the facing masonry with the load-bearing layer.
- The high quality A4 stainless steel connecting wire guarantees a long-lasting fixing.
- The VB is flexible and can be mounted on any point of the external wall.

APPLICATIONS

- Two-shell external walls (facings)
- Closers and economy facings

FUNCTIONING

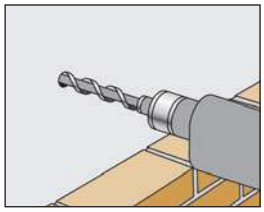
- The frame fixings SXR 10, SXRL 10 and FUR 10 are suitable for the anchoring of wall ties in concrete and masonry.

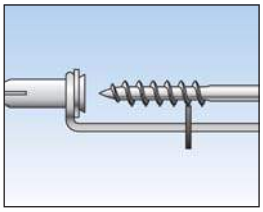
TECHNICAL DATA

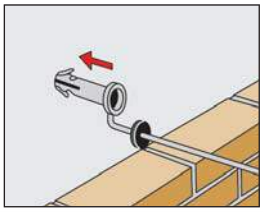
Cladding tie **VB**

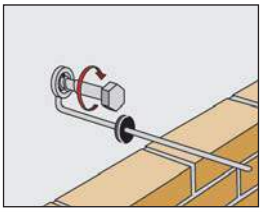
Item	Art.-No.	Contents	Sales unit [pcs]
VB	**050495** 1)	1 wire anchor stainless steel A4, 1 washer stainless steel A4, 1 drip ring	50

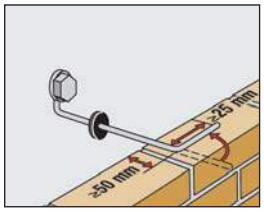
1) Wire: angled 265 mm.











The fixing for infinite adjustment of timber constructions in all standard solid building materials

Stand-off installations

BUILDING MATERIALS

- Concrete
- Wood
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

CERTIFICATES

ADVANTAGES

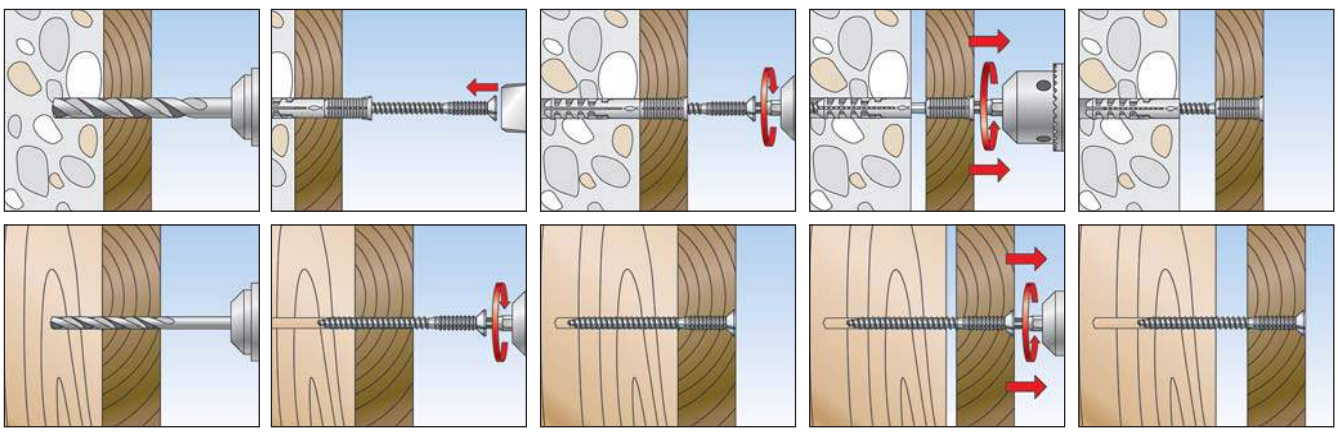
- The combination of adjustment plug and spacing screw allows for universal usage in wooden and solid building materials.
- The special operating principle of the adjustable fixing S10J and the spacing screw allows for infinite adjustment. This saves on the use of wedges and blocks when fixing the fixture.

APPLICATIONS

- Substructures made of wooden battens of 20-25 mm thickness.

FUNCTIONING

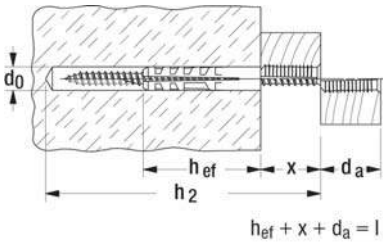
- The S10J is suitable for push-through installation.
- Once the screw has been screwed in, the fixture distance can be infinitely adjusted by modifying the rotation direction.
- For the fixing of wood on wood, e.g. in the roof truss, only use adjustment screw JS.



Adjustable fixing S10J

TECHNICAL DATA

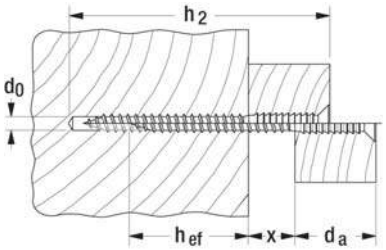
Adjustable fixing **S 10 J 75 S**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth for through fixings h_2 [mm]	Effect. anchorage depth h_{ef} [mm]	Anchor length l [mm]	Max. timber thickness d_a [mm]	Max. adjustment travel x [mm]	Sales unit [pcs]
S 10 J 75 S	**080710**	10	115	50	75	25	30	50

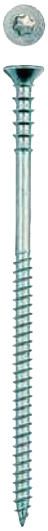
TECHNICAL DATA

Adjustable screw **JS**

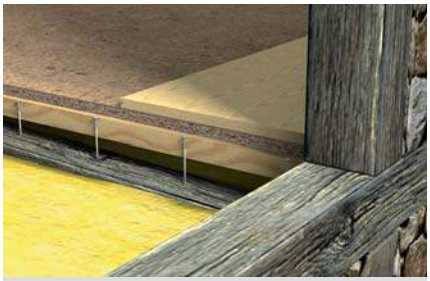


Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth for through fixings h_2 [mm]	Effect. anchorage depth h_{ef} [mm]	Max. timber thickness d_a [mm]	Max. adjustment travel x [mm]	Sales unit [pcs]
JS 6 x 110	**080700**	5	50 - 110	30	25	55	50

The adjustable screw for fast and infinitely adjustable installation of timber constructions



Stand-off installations



Stand-off installations

BUILDING MATERIALS

- Wood and wooden materials or wooden panels

ADVANTAGES

- The special operating principle of the adjustable screw JUSS allows for infinite adjustment. This saves on the use of wedges and blocks when fixing the fixture.
- The self-drilling thread cuts directly into the wood. Therefore pre-drilling is not required. For the installation in hardwood pre-drilling is recommended.

APPLICATIONS

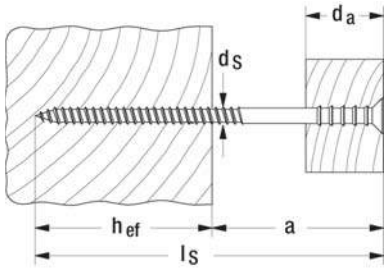
- Substructures made of wooden battens of 20-25 mm thickness.

FUNCTIONING

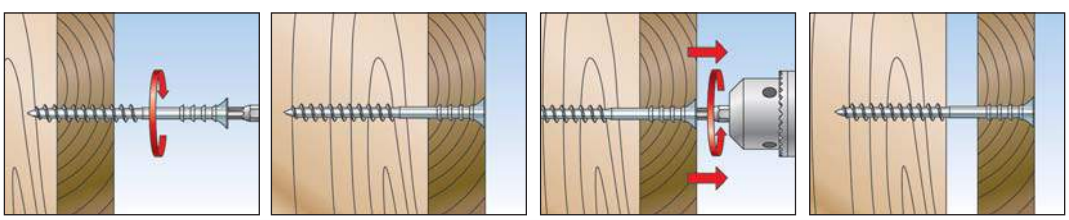
- The JUSS is suitable for push-through installation.
- Once the screw has been screwed in, the parallel thread below the screw head causes the fixture to initially pull against the substrate. The fixture distance can then be infinitely adjusted by modifying the rotation direction.

TECHNICAL DATA

Adjustable screw **JUSS**



Item	Art.-No.	Effect. anchorage depth h_{ef} [mm]	Max. distance a [mm]	Screw $d_S \times l_S$ [mm]	Max. timber thickness d_a [mm]	Drive	Sales unit [pcs]
JUSS 6 x 60	**059040**	30	30	6 x 60	20	T25	100
JUSS 6 x 70	**059041**	30	40	6 x 70	25	T25	100
JUSS 6 x 80	**059042**	30	50	6 x 80	25	T25	100
JUSS 6 x 90	**059043**	30	60	6 x 90	25	T25	100
JUSS 6 x 100	**059044**	30	70	6 x 100	25	T25	100
JUSS 6 x 110	**059045**	30	80	6 x 110	25	T25	100
JUSS 6 x 120	**059046**	30	90	6 x 120	25	T25	100
JUSS 6 x 145	**059047**	30	115	6 x 145	25	T25	100



The spacing screw for flexible positioning and alignment of wooden fixtures

Stand-off installations

Stand-off installations

BUILDING MATERIALS

- Without plug: suitable for wooden materials and wooden panels
- With SX or UX plugs: all concrete and masonry materials

ADVANTAGES

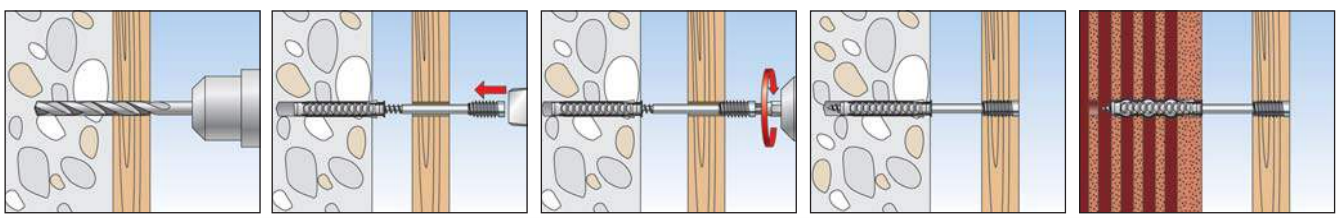
- The coordinated threads with the same pitch allow for the pin-point positioning and alignment of the fixture, which can even be mounted at an angle to the screw. This allows for an exact and flexible fixing.
- During the installation, the fixture is not pulled onto the substrate, instead it is brought directly to the desired distance and position. This allows for a simple and exact installation.
- When combined with SX 8 and UX 8 plugs, it can be used in almost all wall materials, guaranteeing a secure fixing.

APPLICATIONS

- Window frames
- Door frames
- Squared timbers
- Claddings
- Substructures made of wood

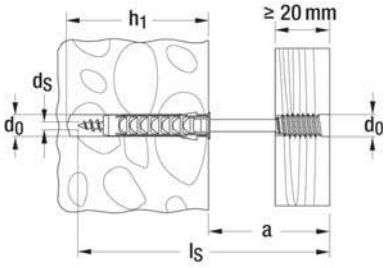
FUNCTIONING

- The ASL is suitable for push-through installation.
- Pre-drill the fixture at the desired angle in order to achieve the correct positioning and alignment.
- When screwing in the screw, the external thread cuts into the pre-drilled fixture, and fixes it into the stipulated position.
- The angled position of the screws (15° - 30°) allows high shear loads to be supported.



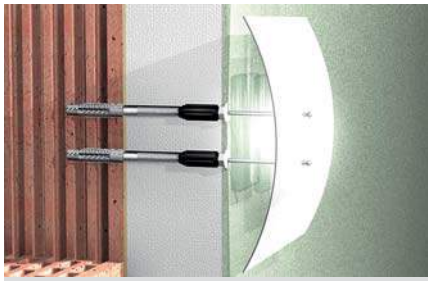
TECHNICAL DATA

Spacing screw **ASL**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Max. distance a [mm]	Screw $d_S \times l_S$ [mm]	Drive	Sales unit [pcs]
ASL 4,5 x 60	**059050**	6	40	25	4,5 x 60	T25	100
ASL 4,5 x 70	**059051**	6	40	35	4,5 x 70	T25	100
ASL 4,5 x 80	**059052**	6	40	45	4,5 x 80	T25	100
ASL 4,5 x 100	**059054**	6	40	65	4,5 x 100	T25	100
ASL 6 x 80	**059061**	8	55	35	6 x 80	T25	100
ASL 6 x 100	**059062**	8	55	55	6 x 100	T25	100
ASL 6 x 120	**059063**	8	55	75	6 x 120	T25	100
ASL 6 x 150	**059064**	8	55	105	6 x 150	T25	50

The thermally separated stand-off installation in external thermal insulation composite systems (ETICS)



External lighting

Down pipes

BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Building brick
- Aerated concrete
- Wood

ADVANTAGES

- The stand-off installation allows for the fixture to be adjusted to the exact position required, whereby pressure marks and damage to the ETICS are avoided.
- The plastic cone creates a thermal barrier between the fixture and the inner fixture, and offers an energy-optimised fixing.
- The glass-fibre-reinforced plastic cone cuts its own way through the ETICS with a positive fit, and allows for a simple and fast installation without the need for any special tools.
- Combining Thermax 8 and 10 with the universal plug UX provides a secure anchoring in the substrate.
- Without UX plug direct mounting in wood substrate is possible after pre-drilling.

APPLICATIONS

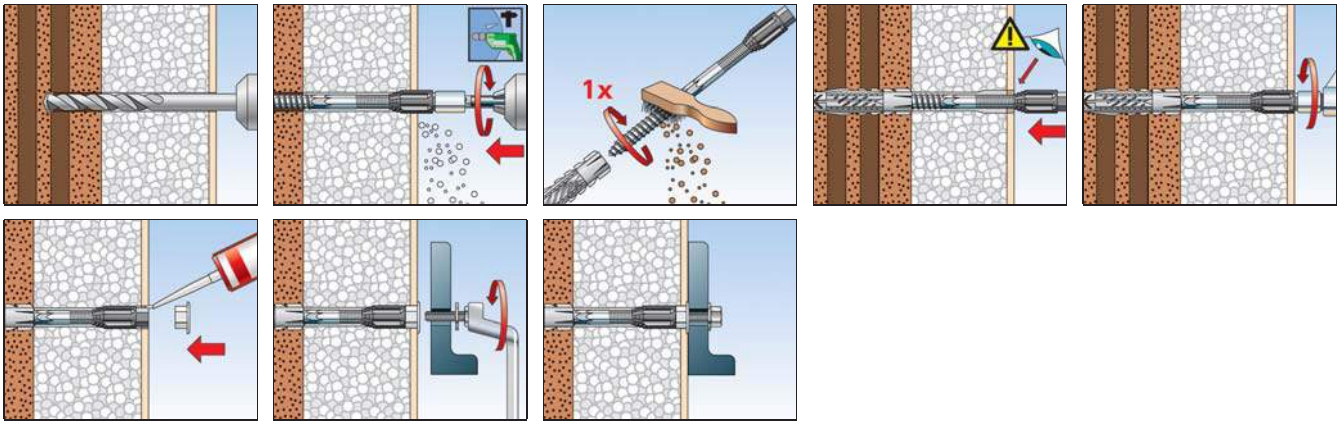
For the thermally separated fixing of:

- Signs
- Lighting
- Letter boxes
- Motion detectors
- Downpipes
- Lightning rods
- Blind guide rails

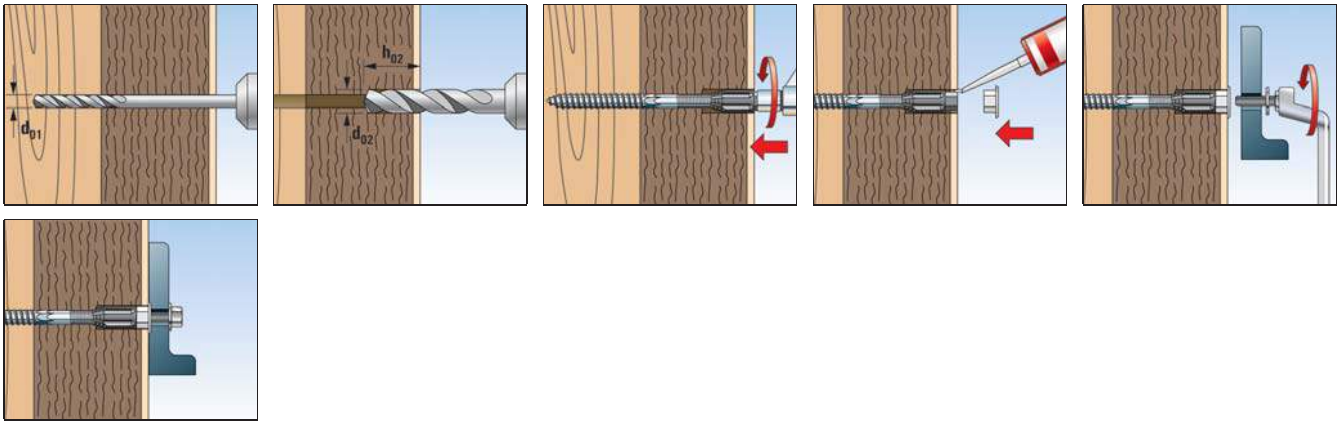
FUNCTIONING

- The Thermax 8 and 10 systems are suitable for pre-positioned installation.
- The self-tapping, glass-fibre-reinforced cone cuts its own way through the plaster into the insulation during installation.
- The anti-cold cone uses a thermal barrier to minimise heat losses.
- Installation without any special tools.
- For use in wood without plug, the wood (footnote below load table) as well as the plaster has to be pre-drilled:
  Thermax 8:
  d_{02} = 14 mm, h_{02} = 50 mm;
  Thermax 10:
  d_{02} = 18 mm, h_{02} = 50 mm
- The extensive range features fitting options with metric screws (M6/8/10), sheet screws (6.3 mm), chipboard screws (6.0 mm) or chipboard screws (4.5 - 5.5 mm) when using an SX 5 expansion plug.

INSTALLATION - MASONRY

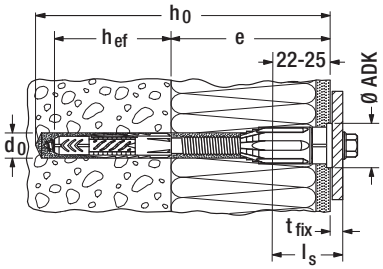


INSTALLATION - WOOD SUBSTRATE



TECHNICAL DATA

Thermax 8 and 10



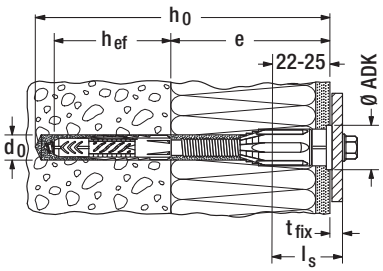
Item	Art.-No.	Drill hole diameter d_0 [mm]	Drill hole depth h_0 [mm]	Usable length e [mm]	Anchorage depth h_{ef} [mm]	Cover cap-Ø ADK [mm]	Width across nut ⬡ SW [mm]	Chipboard / metric / sheet metal screw	Sales unit [pcs]
Thermax 8/60 M6	**045685** 1) 2)	10	120	45 - 60	60	18	10	4,5 - 6,0 / M6 / 6,3	20
Thermax 8/80 M6	**045686** 1) 2)	10	140	60 - 80	60	18	10	4,5 - 6,0 / M6 / 6,3	20
Thermax 8/100 M6	**045687** 1) 2)	10	160	80 - 100	60	18	10	4,5 - 6,0 / M6 / 6,3	20
Thermax 8/120 M6	**045688** 1) 2)	10	180	100 - 120	60	18	10	4,5 - 6,0 / M6 / 6,3	20
Thermax 8/140 M6	**045689** 1) 2)	10	200	120 - 140	60	18	10	4,5 - 6,0 / M6 / 6,3	20
Thermax 8/160 M6	**045690** 1) 2)	10	220	140 - 160	60	18	10	4,5 - 6,0 / M6 / 6,3	20
Thermax 8/180 M6	**045691** 1) 2)	10	240	160 - 180	60	18	10	4,5 - 6,0 / M6 / 6,3	20
Thermax 10/100 M6	**045692** 1) 2)	12	160	80 - 100	70	22	13	4,5 - 6,0 / M6 / 6,3	20
Thermax 10/120 M6	**045693** 1) 2)	12	180	100 - 120	70	22	13	4,5 - 6,0 / M6 / 6,3	20
Thermax 10/140 M6	**045694** 1) 2)	12	200	120 - 140	70	22	13	4,5 - 6,0 / M6 / 6,3	20
Thermax 10/160 M6	**045695** 1) 2)	12	220	140 - 160	70	22	13	4,5 - 6,0 / M6 / 6,3	20
Thermax 10/180 M6	**045696** 1) 2)	12	240	160 - 180	70	22	13	4,5 - 6,0 / M6 / 6,3	20
Thermax 10/200 M6	**512605** 1) 2)	12	260	180 - 200	70	22	13	4,5 - 6,0 / M6 / 6,3	20

1) including SX 5

2) Min. screw length l_s = 22mm + thickness of mounting member e; for use in wood without universal plug UX, consider drill hole diameter in footnote under load table.

TECHNICAL DATA

Thermax 8 and 10



Item	Art.-No.	Drill hole diameter d_0 [mm]	Drill hole depth h_0 [mm]	Usable length e [mm]	Anchorage depth h_{ef} [mm]	Cover cap-Ø ADK [mm]	Width across nut ⬡ SW [mm]	Chipboard / metric / sheet metal screw	Sales unit [pcs]
Thermax 10/220 M6	**514250** 1) 2)	12	280	200 - 220	70	22	13	4,5 - 6,0 / M6 / 6,3	20
Thermax 10/240 M6	**514251** 1) 2)	12	300	220 - 240	70	22	13	4,5 - 6,0 / M6 / 6,3	20
Thermax 10/100 M8	**045697** 2)	12	160	80 - 100	70	22	13	M8	20
Thermax 10/120 M8	**045698** 2)	12	180	100 - 120	70	22	13	M8	20
Thermax 10/140 M8	**045699** 2)	12	200	120 - 140	70	22	13	M8	20
Thermax 10/160 M8	**045700** 2)	12	220	140 - 160	70	22	13	M8	20
Thermax 10/180 M8	**514252** 2)	12	240	160 - 180	70	22	13	M8	20
Thermax 10/200 M8	**514253** 2)	12	260	180 - 200	70	22	13	M8	20
Thermax 10/220 M8	**514254** 2)	12	280	200 - 220	70	22	13	M8	20
Thermax 10/240 M8	**514255** 2)	12	300	220 - 240	70	22	13	M8	20
Thermax 10/100 M10	**045702** 2)	12	160	80 - 100	70	22	13	M10	20
Thermax 10/120 M10	**045703** 2)	12	180	100 - 120	70	22	13	M10	20
Thermax 10/140 M10	**045704** 2)	12	200	120 - 140	70	22	13	M10	20
Thermax 10/160 M10	**045705** 2)	12	220	140 - 160	70	22	13	M10	20
Thermax 10/180 M10	**514256** 2)	12	240	160 - 180	70	22	13	M10	20
Thermax 10/200 M10	**514257** 2)	12	260	180 - 200	70	22	13	M10	20
Thermax 10/220 M10	**514258** 2)	12	280	200 - 220	70	22	13	M10	20
Thermax 10/240 M10	**514259** 2)	12	300	220 - 240	70	22	13	M10	20

1) including SX 5

2) Min. screw length l_s = 22mm + thickness of mounting member e; for use in wood without universal plug UX, consider drill hole diameter in footnote under load table.

LOADS

Stand-off installation Thermax 8 and 10

Highest recommended loads[1)] of a single anchor in concrete and masonry.

Type			Thermax 8	Thermax 10
Supplied type of plug for the anchorage in the base material			**UX 10 x 60**	**UX 12 x 70**
Recommended tensile loads in the respective base material N_{rec} 2)				
Concrete[3) 4)]	≥ C20/25	[kN]	1,00	1,00
Solid brick[3) 4)]	≥ Mz 12	[kN]	0,50	0,70
Perforated sand-lime brick[3) 4)]	≥ KSL 12	[kN]	0,60	0,80
Vertically perforated brick[4)]	≥ Hlz 12	[kN]	0,20	0,30
Aerated concrete[3) 4)]	≥ PB 4	[kN]	0,40	0,60
Recommended shear load V_{rec}, valid für all above mentioned base materials for the stated insulation thickness				
External Thermal Insulation Composite System[5)]	≤ 240 mm	[kN]	0,15	0,20

1) Required safety factors are considered.

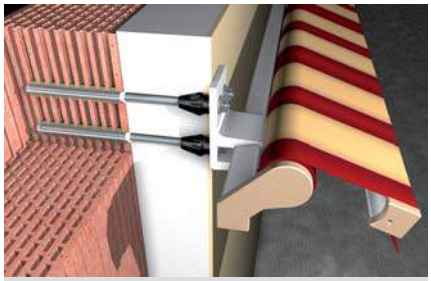
2) The drilling method is to be adapted to the building material used. As different joint qualities are possible, the given values only apply for installation in the brick.

3) The given recommended tensile loads apply for fastenings with metric screws. When using chipboard screws with diameter 6,0 mm they have to be reduced to 0,35 kN.

4) The given recommended tensile loads apply for fastenings with metric screws. When using a SX 5-plug chipboard screws with diameter 4,5 - 5,5 mm they have to be reduced to 0,1 kN.

5) Values are valid for an ETICS made from PS- respectively PU-rigid foam panels. Thickness of rendering minimum 6 mm.

The approved stand-off installation with thermal barrier in external thermal insulation composite systems (ETICS)



Awnings

Satellite dishes and air conditioning units

VERSIONS

- Zinc-plated steel
- Stainless steel

BUILDING MATERIALS

Approved for:

- Concrete, cracked and non-cracked
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Solid brick
- Aerated concrete

CERTIFICATES

Zulassung

ADVANTAGES

- When combined with the injection mortars FIS EM Plus, FIS V, FIS SB and FIS GREEN, the stand-off installation is approved for high loads in a range of materials. This allows for a secure fixing.
- Usable lengths of 62 to 290 mm can be covered with just one Thermax.
- The plastic cone creates a thermal barrier between the fixture and the inner fixture, and offers an energy-optimised fixing.
- The glass-fibre-reinforced plastic cone cuts its own way through the ETICS with a positive fit, and allows for a simple, fast and adjustable installation without the need for any special tools.

APPLICATIONS

For the thermally separated fixing of:

- Awnings
- Canopies
- French balcony railings
- Air conditioning units
- Satellite dishes

FUNCTIONING

- The Thermax 12 and 16 systems are suitable for pre-positioned installation.
- The self-tapping, glass-fibre-reinforced cone cuts its own way through the plaster into the insulation during installation.
- The anti-cold cone uses a thermal barrier to minimise heat losses.
- In the case of resistant plaster (e.g. thick cement plaster), it is recommended that the Thermax cutting blade included is used for grinding out the plaster.
- The sealing of the annular gap with sealing adhesive KD or construction sealant Premium DKM seals the facade at plaster level.

SEE ALSO

FIS EM PLUS mortar Page 86

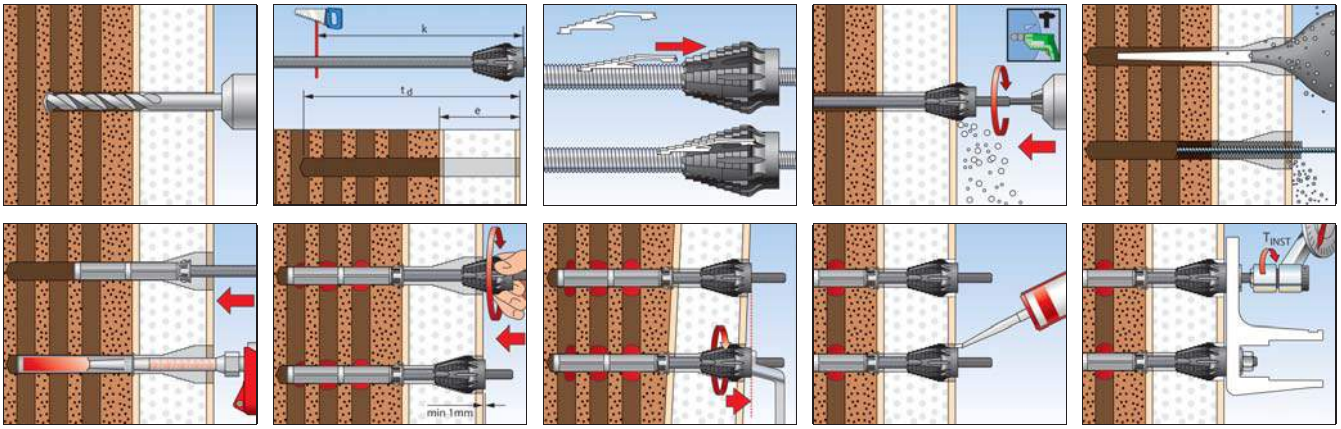
FIS V mortar Page 101

FIS SB mortar Page 64

FIS GREEN mortar Page 126

Stand-off installation Thermax 12 / 16

INSTALLATION



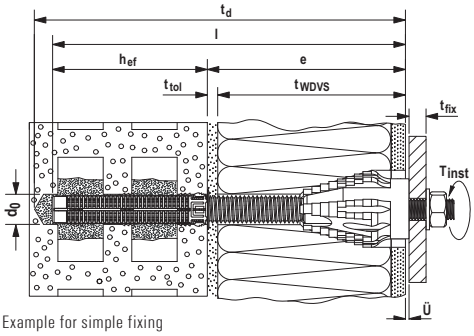
TECHNICAL DATA

Thermax 12/110 M12

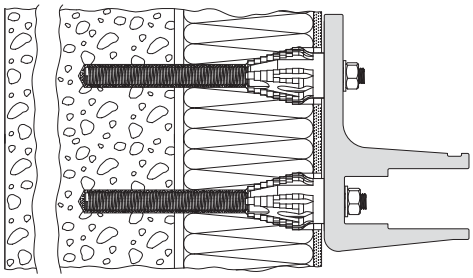
Thermax 16/170 M12

	Zinc-plated steel Art.-No.	Stainless steel Art.-No.	Approval DIBt	Contents	Sales unit [pcs]
Item	gvz	A4			
Thermax 12/110 M12	**051291**	–	●	20 Thermax M12, 20 perforated sleeves 20 x 130, 5 bits, 5 cutting blades, 5 user manuals	20
Thermax 12/110 M12	–	**051537**	●	10 Thermax M12 A4, 10 perforated sleeves 20 x 130, 3 bits, 3 cutting blades, 3 user manuals	10
Thermax 12/110 M12 B	**051290**	–	●	2 Thermax M12, 2 perforated sleeves 20 x 130, 1 bit, 1 cutting blade, 1 user manual	1
Thermax 16/170 M12	**051293**	–	●	20 Thermax M16, 20 perforated sleeves 20 x 200, 5 bits, 5 cutting blades, 5 applicator tip extension hoses, 5 user manuals	20
Thermax 16/170 M12	–	**051543**	●	10 Thermax M16 A4, 10 perforated sleeves 20 x 200, 3 bits, 3 cutting blades, 3 applicator tip extension hoses, 3 user manuals	10
Thermax 16/170 M12 B	**051292**	–	●	2 Thermax M16, 2 perforated sleeves 20 x 200, 1 bit, 1 cutting blade, 1 applicator tip extension hose, 1 user manual	1

INSTALLATION DATA



Example for simple fixing



Example for multiple fixing

Type	Length of Thermax incl. anti-cold cone l [mm]	Threaded rod in building material	Building material + insulation: Building material	Suitable injection anchor sleeve	Drill hole diameter d_0 [mm]	Min. ancho-rage depth h_{ef} [mm]	Drill hole depth t_d [mm]	Thickness of non-bearing layer e [mm]	Fixture: Max. fixture thick-ness t_{fix} [mm]	Con-nection thread [mm]	Max. instal-lation torque T_{inst} [Nm]	Required resin quantity [Scale unit]
Thermax M12	240	M12	Concrete		14	70	h_{ef} + e	62 - 170	16 [1]	M12	20	5
			Solid brick		14	80	h_{ef} + e	62 - 160				6
			Perforated brick	FIS H 20x130 K	20	130	h_{ef} + e + 10 mm	62 - 110				26
			Aerated concrete		14	100	h_{ef} + e	62 - 140				8
Thermax M16	370	M16	Concrete		18	80	h_{ef} + e	62 - 290	16 [1]	M12	20	7
			Solid brick		18	80	h_{ef} + e	62 - 290				7
			Perforated brick	FIS H 20x200 K	20	200	h_{ef} + e + 10 mm	62 - 170				40
			Aerated concrete		18	100	h_{ef} + e	62 - 270				9

1) The setscrews may be replaced by a setscrew / fixing screw up to a length 200 mm.

TECHNICAL DATA

Epoxy mortar
FIS EM Plus 390 S

Superbond mortar
FIS SB 390 S

Injection mortar
FIS V 360 S

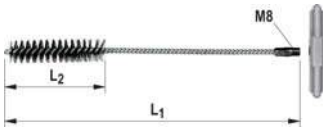
All-round adhesive gluing and sealing **KD-290**

Injection mortar
FIS GREEN 300 T

Construction sealant Premium
DKM WHITE 290ML

Item	Art.-No.	Approval: DIBt	Approval: ETA	Languages on the cartridge	Contents	Sales unit [pcs]
FIS EM Plus 390 S	**544154**	●	■	DE, EN, FR, NL, ES, PT	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS EM Plus 390 S	**544155**	●	■	EN, ZH, EL, KO, HU, PL	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS V 360 S	**094404**	●	■	DE, FR, NL, TR, HU, AR	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS V 360 S	**094405**	●	■	EN, IT, PT, ES, ZH, JA	1 cartridge 360 ml, 2 x FIS MR Plus	6
FIS SB 390 S	**519451**	●	■	DE, FR, NL	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS SB 390 S	**518831**	●	■	EN, ES, PT	1 cartridge 390 ml, 2 x FIS MR Plus	6
FIS GREEN 300 T	**522989**	–	■	FR	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	4
FIS GREEN 300 T	**523245**	–	■	IT	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	12
FIS GREEN 300 T	**538219**	–	■	CS, SK	1 cartridge 300 ml, 2 x FIS MR Plus	12
FIS GREEN 300 T	**532972**	–	■	DA, SV, NO, FI	1 cartridge 300 ml, 2 x FIS MR Plus with transparent Clip	12
KD WHITE 290ML	**059389**	–	–	DE, EN	1 cartridge 290 ml	12
DKM-290ML	**517598**	–	–	DE, EN	1 cartridge 290 ml	12

ACCESSORIES DRILL HOLE CLEANING



Cleaning brush **BS**

Item	Art.-No.	Length L_1 [mm]	Length L_2 [mm]	Brush diameter [mm]	For drill diameter [mm]	Sales unit [pcs]
BS ø 14	**078180**	250	80	16	14	1
BS ø 16/18	**078181**	250	80	20	16/18	1
BS ø 20/22	**052277**	180	80	25	20/22	1

ACCESSORIES DRILL HOLE CLEANING

Blow-out pump **AB G**

Item	Art.-No.		Sales unit [pcs]
Blow-out pump ABG	**089300**		1

LOADS

Stand-off installation Thermax 12 and 16 with load-bearing anchor rod made of zinc-plated steel 8.8 and a displacement of 1 mm

The below load table is valid for short-term loading (e.g. wind load). If the sealing of the annular gap between Thermax and plaster is assured by fischer all-round sealing KD, the Thermax version with an anchor rod on base substrate side made of zinc-plated steel may be used.

Highest permissible loads[1) 5) 7)] of a Thermax within an anchor group[2)] in concrete with the injection mortars FIS V or FIS SB and in masonry with the injection mortar FIS V.

Type	Minimum effective anchorage depth h_{ef} [4)8)] [mm]	Permissible tensile load N_{perm} [3)] [kN]	Permissible shear load at e = 62 mm V_{perm} [3)] [kN]	Permissible shear load at e = 100 mm V_{perm} [3)] [kN]	Permissible shear load at e = 120 mm V_{perm} [3)] [kN]	Permissible shear load at e = 140 mm V_{perm} [3)] [kN]	Permissible shear load at e = 160 mm V_{perm} [3)] [kN]	Permissible shear load at e = 180 mm V_{perm} [3)] [kN]	Permissible shear load at e = 200 mm V_{perm} [3)] [kN]	Permissible shear load at e = 250 mm V_{perm} [3)] [kN]	Permissible shear load at e = 300 mm V_{perm} [3)] [kN]	Minimum member thickness h_{min} [mm]	Minimum spacing s_{min} ∥ / s_{min} ⊥ [9)] [mm]	Minimum edge distance c_{min} [mm]
Concrete, cracked and non-cracked, strength class ≥ C20/25														
Thermax 12[8)]	70	3,40[6)]	1,07	0,69	0,58	0,42	0,32	0,24	0,18	0,08	0,04	100	55	55
Thermax 16[8)]	80	3,40[6)]	1,51	0,98	0,83	0,71	0,63	0,48	0,34	0,16	0,08	116	65	65
Solid brick, Mz, EN 771-1; f_b ≥ 12 N/mm²; ρ ≥ 1,8 kg/dm³; LxWxH ≥ 240x115x71 mm, NF														
Thermax 12[8)]	200	2,71	0,85	0,55	0,47	0,40	0,32	0,24	0,18	0,08	0,04	240	80/80	60
Thermax 16[8)]	200	2,71	1,29	0,98	0,83	0,71	0,63	0,48	0,34	0,16	0,08	240	80/80	60
Solid sand-lime brick, KS, EN 771; f_b ≥ 20 N/mm²; ρ ≥ 2,0 kg/dm³; LxWxH ≥ 250x240x240 mm, 8DF														
Thermax 12[8)]	50	2,86	0,85	0,55	0,47	0,40	0,32	0,24	0,18	0,08	0,04	240	80/80	60
Thermax 16[8)]	50	2,14	1,51	0,98	0,83	0,71	0,63	0,48	0,34	0,16	0,08	240	80/80	60
Vertically perforated brick type B, HLz, EN 771-1; f_b ≥ 12 N/mm²; ρ ≥ 1,0 kg/dm³; LxWxH = 370x240x237 mm resp. 500x175x237 mm														
Thermax 12[4)]	110	1,14	0,57	0,55	0,47	0,40	0,32	0,24	0,18	0,08	0,04	175	100/100	100
Thermax 16[4)]	110	1,14	0,57	0,57	0,57	0,57	0,57	0,48	0,34	0,16	0,08	175	100/100	100
Perforated sand-lime brick, KSL, EN 771-2; f_b ≥ 12 N/mm²; ρ ≥ 1,4 kg/dm³; LxWxH = 240x175x113 mm, 3DF														
Thermax 12[4)]	85	1,00	0,85	0,55	0,47	0,40	0,32	0,24	0,18	0,08	0,04	175	100/115	80
Thermax 16[4)]	85	1,00	1,14	0,98	0,83	0,71	0,63	0,48	0,34	0,16	0,08	175	100/115	80
Hollow block made of light weight concrete, Hbl, EN 771-3; f_b ≥ 2 N/mm²; ρ ≥ 1,0 kg/dm³; LxWxH = 362x240x240 mm														
Thermax 12[4)]	110	0,43	0,26	0,26	0,26	0,26	0,26	0,24	0,18	0,08	0,04	240	100/240	60
Thermax 16[4)]	180	0,71	0,26	0,26	0,26	0,26	0,26	0,26	0,26	0,16	0,08	240	100/240	60
Aerated concrete (cylindrical drill hole), EN 771-4; f_b ≥ 2 N/mm²; ρ ≥ 0,35 kg/dm³; LxWxH ≥ 599x240x249 mm														
Thermax 12[8)]	200	1,43	0,43	0,43	0,43	0,40	0,32	0,24	0,18	0,08	0,04	240	80/80	100
Thermax 16[8)]	200	1,43	0,43	0,43	0,43	0,43	0,43	0,43	0,34	0,16	0,08	240	80/80	100

For the design the complete approval Z-21.8-1837 as well as the European Technical Assessments ETA-10/0383, ETA-02/0024 or ETA-12/0258 have to be considered.

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

2) Set-up of one or more Thermax in a row in direction of shear, for which the clamping of the attachment prevents a torsion on attachment side due to a sufficient stiffness of the attachment or connecting construction. For a clamping on base substrate side only, see approval.

3) For combinations of tensile and shear loads as well as reduced edge distances or spacings (anchor groups) see approval. The values for tensile loads in masonry are valid only, if the joints of the masonry is completely filled with masonry mortar. If the joints are not filled with masonry mortar are not filled with masonry mortar and the edge distance towards the joints is less than c_{min}, the loads have to be reduced by the factor a_j = 0,75. The values for shear loads are valid only, if the joints are filled with masonry mortar. For not completely filled joints they have to be handled like a free edge and a minimum edge distance c_{min} of the anchors to the joints has to be observed. For compression loads and perforated bricks or hollow blocks see approval. Calculative assumed thickness of the attachment t_{fix} = 6 mm.

4) In vertically perforated bricks HLz, perforated sand-lime bricks KSL as well as hollow blocks made of light weight concrete Hbl the Thermax 12 (standard version) can bridge non-load bearing layers up to 110 mm and the Thermax 16 can bridge them up to 170 mm. Larger usable lengths up to 300 mm are possible, if other perforated sleeves and where required longer anchor rods are used and again the anchorage depth gets reduced - see approval.

5) The stated permissible loads are valid for anchorages in dry base substrates - use category d/d - and for temperatures up to +50 °C (resp. short-term up to +80 °C) in the area of the injection mortar and during drill hole cleaning in accordance with the approval. The load values apply to anchor rods on base substrate side made of zinc-plated steel grade 8.8 - for other steel grades or stainless steel see approval.

6) Complies with the permissible tensile load of the Thermax Cone.

7) Intermediate values of the shear load may be linearly interpolated in dependence of "e", if nothing else is mentioned in the approval.

8) In solid bricks Mz and solid sand-lime bricks KS the Thermax 12 (standard version) can bridge non-load bearing layers up to 190 mm (140 mm in aerated concrete) and the Thermax 16 can bridge them up to 300 mm (270 mm in aerated concrete) - but in solid brick Mz and aerated concrete the above load values have to be reduced. In concrete the Thermax 12 (standard version) can bridge non-loadbearing layers up to 170 mm and the Thermax 16 can bridge them up to 290 mm. Larger usable lengths up to 300 mm are possible, if longer anchor rods are used and again in solid bricks Mz if the anchorage depth (compared to above values) gets reduced where required - see approval.

9) Minimum spacings for at the same time reduced permissible loads, where required.

LOADS

Stand-off installation Thermax 12 and 16 with load-bearing anchor rod made of stainless steel A4-70 and a displacement of 3 mm

The below load table is valid for short-term loading (e.g. wind load). Measures for sealing see approval, section 3.2.4.
Highest permissible loads[1) 5) 7)] of a Thermax within an anchor group[2)] in concrete with the injection mortars FIS V or FIS SB and in masonry with the injection mortar FIS V.

Type	Minimum effective anchorage depth h_{ef} [4)8)] [mm]	Permissible tensile load N_{perm} [3)] [kN]	Permissible shear load at e = 62 mm V_{perm} [3)] [kN]	Permissible shear load at e = 100 mm V_{perm} [3)] [kN]	Permissible shear load at e = 120 mm V_{perm} [3)] [kN]	Permissible shear load at e = 140 mm V_{perm} [3)] [kN]	Permissible shear load at e = 160 mm V_{perm} [3)] [kN]	Permissible shear load at e = 180 mm V_{perm} [3)] [kN]	Permissible shear load at e = 200 mm V_{perm} [3)] [kN]	Permissible shear load at e = 250 mm V_{perm} [3)] [kN]	Permissible shear load at e = 300 mm V_{perm} [3)] [kN]	Minimum member thickness h_{min} [mm]	Minimum spacing $s_{min} \parallel$ / $s_{min} \perp$ [9)] [mm]	Minimum edge distance c_{min} [mm]
Concrete, cracked and non-cracked, strength class ≥ C20/25														
Thermax 12[8)]	70	3,40[6)]	1,07	0,69	0,58	0,50	0,44	0,39	0,35	0,24	0,12	100	55	55
Thermax 16[8)]	80	3,40[6)]	1,51	0,98	0,83	0,71	0,63	0,56	0,51	0,41	0,24	116	65	65
Solid brick, Mz, EN 771-1; f_b ≥ 12 N/mm²; ρ ≥ 1,8 kg/dm³; LxWxH ≥ 240x115x71 mm, NF														
Thermax 12[8)]	200	2,71	0,59	0,39	0,33	0,28	0,25	0,22	0,20	0,16	0,12	240	80/80	60
Thermax 16[8)]	200	2,71	1,29	0,96	0,81	0,70	0,62	0,56	0,50	0,41	0,24	240	80/80	60
Solid sand-lime brick, KS, EN 771; f_b ≥ 20 N/mm²; ρ ≥ 2,0 kg/dm³; LxWxH ≥ 250x240x240 mm, 8DF														
Thermax 12[8)]	50	2,86	0,59	0,39	0,33	0,28	0,25	0,22	0,20	0,16	0,12	240	80/80	60
Thermax 16[8)]	50	2,14	1,46	0,96	0,81	0,70	0,62	0,56	0,50	0,41	0,24	240	80/80	60
Vertically perforated brick type B, HLz, EN 771-1; f_b ≥ 12 N/mm²; ρ ≥ 1,0 kg/dm³; LxWxH = 370x240x237 mm resp. 500x175x237 mm														
Thermax 12[4)]	110	1,14	0,57	0,39	0,33	0,28	0,25	0,22	0,20	0,16	0,12	175	100/100	100
Thermax 16[4)]	110	1,14	0,57	0,57	0,57	0,57	0,57	0,56	0,50	0,41	0,24	175	100/100	100
Perforated sand-lime brick, KSL, EN 771-2; f_b ≥ 12 N/mm²; ρ ≥ 1,4 kg/dm³; LxWxH = 240x175x113 mm, 3DF														
Thermax 12[4)]	85	1,00	0,59	0,39	0,33	0,28	0,25	0,22	0,20	0,16	0,12	175	100/115	80
Thermax 16[4)]	85	1,00	1,14	0,96	0,81	0,70	0,62	0,56	0,50	0,41	0,24	175	100/115	80
Hollow block made of light weight concrete, Hbl, EN 771-3; f_b ≥ 2 N/mm²; ρ ≥ 1,0 kg/dm³; LxWxH = 362x240x240 mm														
Thermax 12[4)]	110	0,43	0,26	0,26	0,26	0,26	0,25	0,22	0,20	0,16	0,12	240	100/240	60
Thermax 16[4)]	180	0,71	0,26	0,26	0,26	0,26	0,26	0,26	0,26	0,26	0,24	240	100/240	60
Aerated concrete (cylindrical drill hole), EN 771-4; f_b ≥ 2 N/mm²; ρ ≥ 0,35 kg/dm³; LxWxH ≥ 599x240x249 mm														
Thermax 12[8)]	200	1,43	0,43	0,39	0,33	0,28	0,25	0,22	0,20	0,16	0,12	240	80/80	100
Thermax 16[8)]	200	1,43	0,43	0,43	0,43	0,43	0,43	0,43	0,43	0,41	0,24	240	80/80	100

For the design the complete approval Z-21.8-1837 as well as the European Technical Assessments ETA-10/0383, ETA-02/0024 or ETA-12/0258 have to be considered.

1) The required partial safety factors for material resistance as well as a partial safety factor for load actions of γ_L = 1,4 are considered.

2) Set-up of one or more Thermax in a row in direction of shear, for which the clamping of the attachment prevents a torsion on attachment side due to a sufficient stiffness of the attachment or connecting construction. For a clamping on base substrate side only, see approval.

3) For combinations of tensile and shear loads as well as reduced edge distances or spacings (anchor groups) see approval. The values for tensile loads in masonry are valid only, if the joints of the masonry is completely filled with masonry mortar. If the joints are not filled with masonry mortar are not filled with masonry mortar and the edge distance towards the joints is less than c_{min}, the loads have to be reduced by the factor a_j = 0,75. The values for shear loads are valid only, if the joints are filled with masonry mortar. For not completely filled joints they have to be handled like a free edge and a minimum edge distance c_{min} of the anchors to the joints has to be observed. For compression loads and perforated bricks or hollow blocks see approval. Calculative assumed thickness of the attachment t_{fix} = 6 mm.

4) In vertically perforated bricks HLz, perforated sand-lime bricks KSL as well as hollow blocks made of light weight concrete Hbl the Thermax 12 (standard version) can bridge non-load bearing layers up to 110 mm and the Thermax 16 can bridge them up to 170 mm. Larger usable lengths up to 300 mm are possible, if other perforated sleeves and where required longer anchor rods are used and again the anchorage depth gets reduced - see approval.

5) The stated permissible loads are valid for anchorages in dry base substrates - use category d/d - and for temperatures up to +50 °C (resp. short-term up to +80 °C) in the area of the injection mortar and during drill hole cleaning in accordance with the approval. The load values apply to anchor rods on base substrate side made of stainless steel of the grade A4-70.

6) Complies with the permissible tensile load of the Thermax Cone.

7) Intermediate values of the shear load may be linearly interpolated in dependence of "e", if nothing else is mentioned in the approval.

8) In solid bricks Mz and solid sand-lime bricks KS the Thermax 12 (standard version) can bridge non-load bearing layers up to 190 mm (140 mm in aerated concrete) and the Thermax 16 can bridge them up to 300 mm (270 mm in aerated concrete) - but in solid brick Mz and aerated concrete the above load values have to be reduced. In concrete the Thermax 12 (standard version) can bridge non-loadbearing layers up to 170 mm and the Thermax 16 can bridge them up to 290 mm. Larger usable lengths up to 300 mm are possible, if longer anchor rods are used and again in solid bricks Mz if the anchorage depth (compared to above values) gets reduced where required - see approval.

9) Minimum spacings for at the same time reduced permissible loads, where required.

The quick façade repair for two-leaf cavity walls

Facing masonry

Repairing outer leafs

VERSIONS

- Zinc-plated steel
- Stainless steel

BUILDING MATERIALS

- Facing masonry with and without an air layer

CERTIFICATES

Zulassung

ADVANTAGES

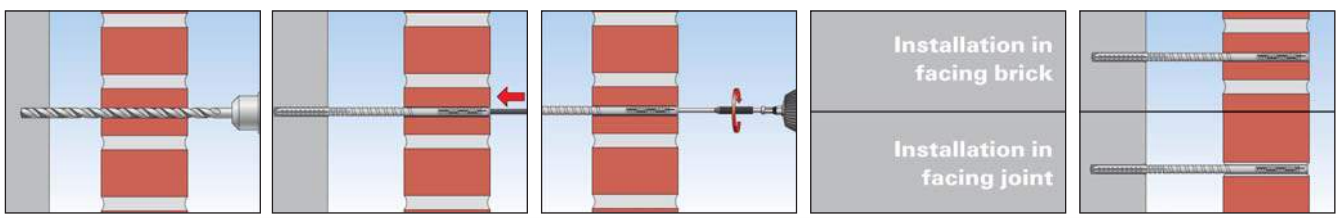
- The approved fixing in stone and in joints from at least 50 mm facing masonry provides a high degree of flexibility and security.
- Use in joints and with a low anchorage depth of just 50 mm allows for a quick and economical installation.
- The small anchor rim and screw head allow for a surface-flush or deep-set installation.
- The drill hole can be retrospectively sealed so that it is no longer visible in the façade.
- A drip coil prevents condensate running into the load-bearing layer, thus preventing frost and corrosive damage.

APPLICATIONS

- VBS-M is especially suitable for applications where external thermal insulation composite systems (ETICS) have been previously installed.
- Retrorespective repair of facing masonry.

FUNCTIONING

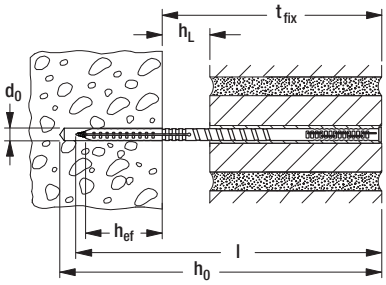
- The remedial wall tie VBS-M is set in the load-bearing layer and into facing masonry using push-through installation.
- In accordance with the approval, no drill hole cleaning is required.
- The two expansion zones in the load-bearing layer and in the facing masonry ensure a secure fixation.
- The plug doesn't fix into the facing masonry until the head grips into the load-bearing layer. This ensures the very best installation safety.



Remedial wall tie mechanical VBS-M

TECHNICAL DATA

Remedial wall tie **VBS-M**



	Zinc-plated steel	Stainless steel	Max. shell distance at 115 mm facing masonry, flush installation	Max. shell distance at 115 mm facing masonry, 20 mm sunk installation	Facing masonry + cavity	Drill diameter	Drill hole depth	Effect. anchorage depth	Anchor length	Sales unit
	Art.-No.	Art.-No.	[mm]	[mm]	t_{fix} [mm]	d_0 [mm]	h_0 [mm]	h_{ef} [mm]	l [mm]	[pcs]
Item	**gvz**	**A4**								
VBS-M 8 x 120	**514243**	**514236**	20*	–	70	8	140	>50	120	100
VBS-M 8 x 185	**514244**	**514237**	20	40	135	8	205	>50	185	100
VBS-M 8 x 205	**514245**	**514238**	40	60	155	8	225	>50	205	100
VBS-M 8 x 225	**514246**	**514239**	60	80	175	8	245	>50	225	100
VBS-M 8 x 245	**514247**	**514240**	80	100	195	8	265	>50	245	100
VBS-M 8 x 265	**514248**	**514241**	100	120	215	8	285	>50	265	100
VBS-M 8 x 285	**514249**	**514242**	120	140	235	8	305	>50	285	100

* Max. 20 mm mortar layer in the case of 50 mm thick economy facing.

The drill hole depth is to be adapted accordingly in the case of sunk installation of the anchor.

ACCESSORIES / DRILLS

SDS Plus IV 8/100/400

SDS Plus II Pointer 8/400/460

Masonry drill bit 8/100/400

Item	Art.-No.	Description	Sales unit [pcs]
SDS Plus IV 8/100/400	**517689**	fischer Quattric drill bit with SDS fixture and short flute for drilling in concrete	1
Masonry drill bit 8/100/400	**517690**	fischer masonry drill bit with SDS fixture and short flute, ground sharp, for rotary drilling in perforated brick and in the bed joint	1
SDS Plus II 8/400/460	**531785**	fischer hammer drill bit for drilling in concrete and in the facing brick	1

ACCESSORIES / BITS

FPB TX 25/5 long

FPB T 25 PROFI

Item	Art.-No.	Description	Sales unit [pcs]
FPB TX 25/5 long	**517693**	fischer Profi-Bit long, which can be extended to 50 mm bit, allows for deep setting in stone and in the bed joint	12
FPB T 25 PROFI Bit W 10	**533115**	fischer Profi-Bit	10

fischer
innovative solutions

6 General fixings

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Universal plug UX		351
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The duo of power and intelligence

Wall cabinets

TV-brackets

BUILDING MATERIALS

- Concrete
- Solid brick
- Solid sand-lime brick
- Aerated concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Plasterboard
- Gypsum plasterboard and gypsum fibreboards
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete or similar
- Natural stone
- Chipboard
- Solid panel made from gypsum
- Solid brick made from lightweight concrete

CERTIFICATES

2K TECHNOLOGY

DUOline

ADVANTAGES

- Two component materials for top load values and intelligent functioning (expansion, folding, knotting), depending on building material - solid, perforated or pannel material.
- Great feeback (feel-good-factor) of the plug. You can feel exactly when the plug is installed perfectly.
- The narrow plug rim prevents slipping into the drill hole.
- The serrated anti-rotation feature interlock in the building material and prevents rotation in the drill hole during installation.
- The greater anchorage depth of the DUOPOWER 6 x 50, 8 x 65 and 10 x 80 means that the plug is especially suited to fixings in hollow building materials, aerated concrete and to bridge plaster.

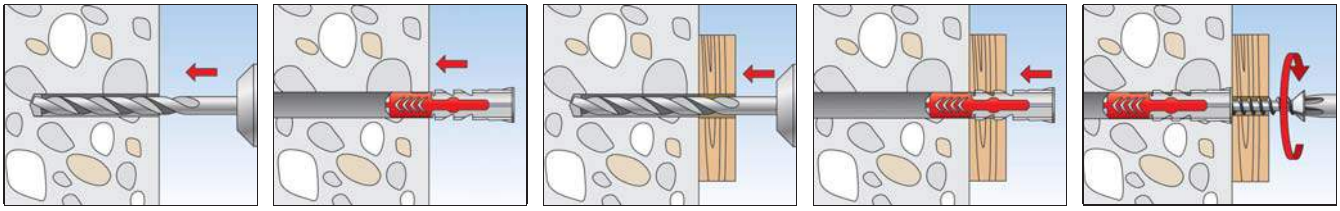
APPLICATIONS

- TV consoles
- Lighting
- Shelves
- Mirror cabinets
- Letter boxes
- Pictures
- Fixing blinds
- Curtain rails
- Wash basin fixings
- Plumbing and heating fixings
- Bath and toilet installations
- Wall cabinets
- Range hood

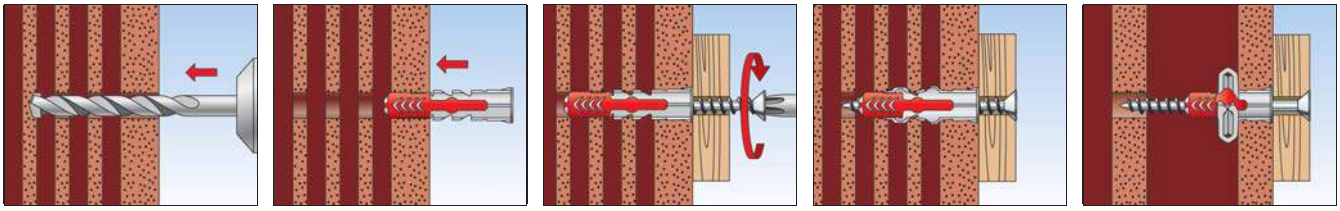
FUNCTIONING

- The grey component made from high quality nylon automatically activates for the optimum product function (expansion, folding, knotting) for the best hold.
- The red expansion wings support the safe expansion and offer additional safety for the grey component.
- The smooth-running opening allows the simple positioning of the screw and the secure guiding and fixing in the screw channel.
- The required screw length is given by the plug length + fixture thickness + the screw diameter.
- Suitable for wood and chipboard screws, as well as stud screws.
- In the case of fixing boards, the threadless part of the screw must not be longer than the fixture.

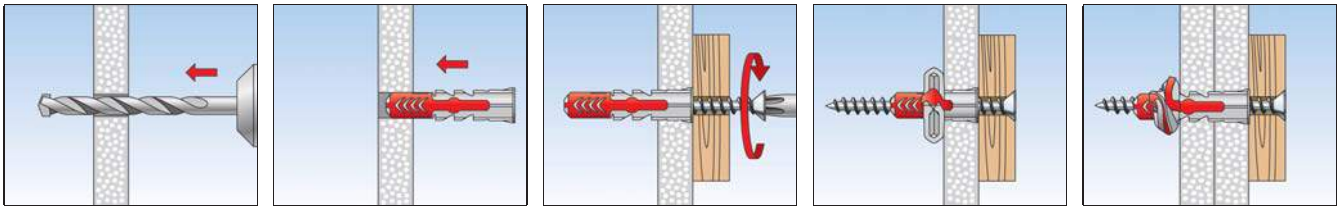
INSTALLATION IN SOLID BUILDING MATERIALS



INSTALLATION IN HOLLOW BUILDING MATERIALS



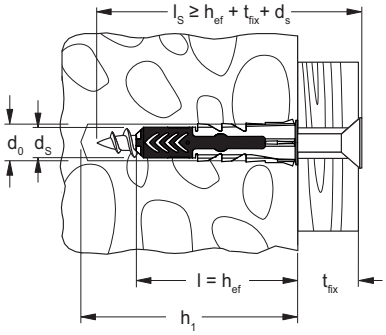
INSTALLATION IN PANEL BUILDING MATERIALS



TECHNICAL DATA

DUOPOWER

DUOPOWER with greater anchorage depth

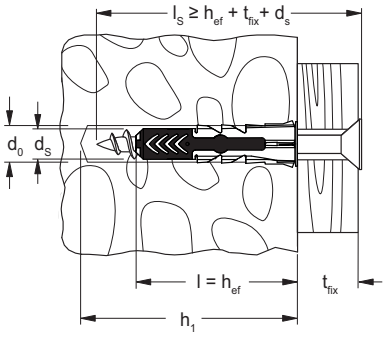


Item	Art.-No. without screw	Art.-No. with screw	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Min. panel thickness d_p [mm]	Min. bolt penetration $l_{E,min}$ [mm]	Anchor length l [mm]	Wood and chipboard screws d_S / d_S x l_S [mm]	Drive	Max. fixture thickness t_{fix} [mm]	Sales unit [pcs]
DUOPOWER 5 x 25	**555005**	–	5	35	12,5	29	25	3 - 4	–	–	100
DUOPOWER 6 x 30	**555006**	–	6	40	12,5	35	30	4 - 5	–	–	100
DUOPOWER 6 x 50	**538240**	–	6	60	12,5	55	50	4 - 5	–	–	100
DUOPOWER 8 x 40	**555008**	–	8	50	12,5	46	40	4,5 - 6	–	–	100
DUOPOWER 8 x 65	**538241**	–	8	75	2 x 12,5	71	65	4,5 - 6	–	–	50
DUOPOWER 10 x 50	**555010**	–	10	70	12,5	58	50	6 - 8	–	–	50
DUOPOWER 10 x 80	**538242**	–	10	100	–	88	80	6 - 8	–	–	25
DUOPOWER 12 x 60	**538243**	–	12	80	–	70	60	8 - 10	–	–	25
DUOPOWER 14 x 70	**538244**	–	14	90	–	82	70	10 - 12	–	–	20
DUOPOWER 5 x 25 S	–	**555105**	5	40	12,5	29	25	4 x 35	PZ2	6	50
DUOPOWER 6 x 30 S	–	**555106**	6	45	12,5	35	30	4,5 x 40	PZ2	5	50
DUOPOWER 6 x 50 S	–	**538245**	6	75	12,5	55	50	4,5 x 70	PZ2	15	50
DUOPOWER 8 x 40 S	–	**555108**	8	65	12,5	45	40	5 x 60	PZ2	15	50
DUOPOWER 8 x 65 S	–	**538246**	8	85	2 x 12,5	70	65	5 x 80	PZ2	10	25
DUOPOWER 10 x 50 S	–	**555110**	10	74	12,5	57	50	7 x 69	SW 13 / TX 40	13	25
DUOPOWER 10 x 80 S	–	**538247**	10	112	–	87	80	7 x 107	SW 13	20	10

TECHNICAL DATA

DUOPOWER

DUOPOWER with greater anchorage depth



Item	Art.-No. without screw	Art.-No. with screw	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Min. panel thickness d_p [mm]	Min. bolt penetration $l_{E,min}$ [mm]	Anchor length l [mm]	Wood and chipboard screws $d_S / d_S \times l_S$ [mm]	Drive	Max. fixture thickness t_{fix} [mm]	Sales unit [pcs]
DUOPOWER 12 x 60 S	–	**538248**	12	85	–	68	60	8 x 80	SW 13	12	10
DUOPOWER 14 x 70 S	–	**538249**	14	100	–	80	70	10 x 95	SW 17	15	8

LOADS

DUOPOWER

Highest recommended loads[1] for a single anchor.
The given loads are valid for wood screws with the specified diameter.

Type			DUOPOWER								
			5 x 25	6 x 30	6 x 50	8 x 40	8 x 65	10 x 50	10 x 80	12 x 60	14 x 70
Wood screw diameter	Ø	[mm]	4	5	5	6	6	8	8	10	12
Min. edge distance concrete	c_{min}	[mm]	30	35	35	50	50	65	65	80	100
Recommended loads in the respective base material F_{rec}[2]											
Concrete	≥ C20/25	[kN]	0,40	0,95	1,65	1,10	2,30	2,15	4,20	3,30	5,30
Solid brick	≥ Mz 12	[kN]	0,30	0,50	0,55	0,62	0,69	1,20	1,45	1,30	1,35
Solid sand-lime brick	≥ KS 12	[kN]	0,50	1,00	1,60	1,25	2,25	2,20	3,85	2,80	4,50
Aerated concrete	≥ PB 2, PP 2 (G 2)	[kN]	0,05	0,10	0,15	0,10	0,16	0,20	0,30	0,24	0,35
Aerated concrete	≥ PB 4, PP 4 (G 4)	[kN]	0,25	0,38	0,55	0,42	0,60	0,60	1,10	1,00	1,45
Vertically perforated brick	≥ Hlz 12 ($\rho \geq 0,9$ kg/dm³)	[kN]	0,13	0,15	0,17	0,25	0,40	0,25	0,40	0,35	0,40
Perforated sand-lime brick	≥ KSL 12 ($\rho \geq 1,6$ kg/dm³)	[kN]	0,40	0,60	0,60	0,70	1,00	0,70	2,00	0,75	1,50
Gypsum block	($\rho \geq 0,9$ kg/dm³)	[kN]	0,10	0,18	0,37	0,25	0,50	0,35	0,65	0,50	0,50
Gypsum fibreboard	12,5 mm	[kN]	0,24	0,33	0,35	0,35	-	0,50	-	-	-
Gypsum plasterboard	12,5 mm	[kN]	0,12	0,15	0,15	0,15	-	0,15	-	-	-
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,13	0,15	0,24	0,20	0,32	0,30	-	-	-
Mattone Forato Typ F8		[kN]	0,30	0,30	-	0,25	-	0,25	-	-	-
Tramezza Doppio UNI 19		[kN]	0,15	0,15	0,23	0,15	0,30	0,20	0,52	0,35	0,35
Sepa Parpaing		[kN]	0,30	0,45	0,25[3]	0,45	0,45[3]	0,45	0,45[3]	0,60[3]	0,60[3]

[1] Required safety factors are considered.

[2] The load data are valid for tension, shear and combined tension and shear load.

[3] Load determination on plastered wall.

The nylon plug for all building materials

Mirror fixings

Pictures

BUILDING MATERIALS

- Concrete
- Gypsum plasterboard and gypsum fibreboards
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone
- Aerated concrete
- Chipboard
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

CERTIFICATES

ADVANTAGES

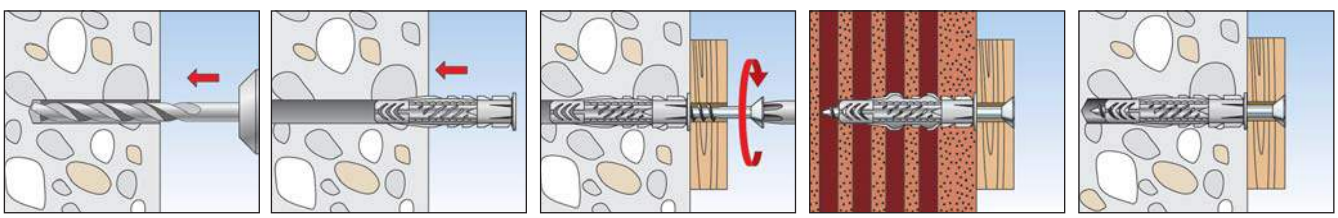
- The universal operating principle (knotting or expanding) allows for use in all solid, hollow and board building materials. Thus the UX is the correct choice for unknown base materials.
- The UX's angled connection ridges allow for optimum screw guidance. Serrated anti-rotation locks prevent rotation in the drill hole. This guarantees the greatest possible installation safety.
- Fixing sets with screws, eye screws and hooks provide the right solution for all applications.

APPLICATIONS

- Pictures
- Lighting
- Skirting
- Light cabinets
- Towel rails
- Mirror cabinets
- Curtain rails
- Wash basin fixings
- TV consoles
- Plumbing and heating fixings

FUNCTIONING

- The UX with rim is suitable for pre-positioned installation; the UX without rim is suitable for push-through installation.
- Turning in the screw causes the UX to expand in the solid building material and to knot within the cavity.
- The required screw length is given by the plug length + fixture thickness + 1 x screw diameter.
- Suitable for wood and chipboard screws, as well as stud screws.
- In the case of board building materials, the threadless part of the screw must not be longer than the fixture, and the UX with rim is to be used.
- The edge distance must be at least one plug length.



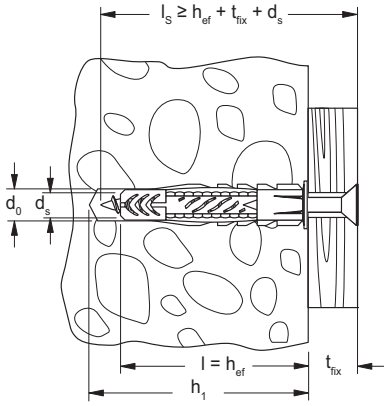
Universal plug UX

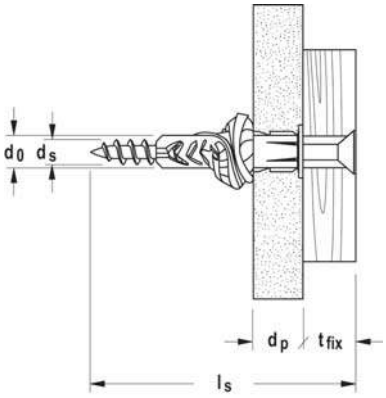
TECHNICAL DATA

UX - without rim

UX - with collar

UX R S - with rim and screw





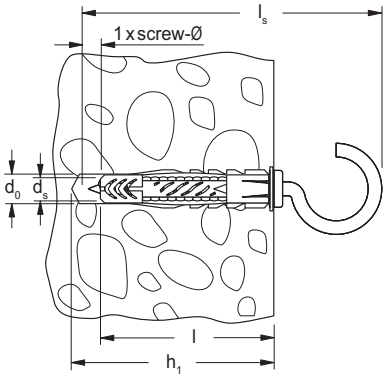
	Without rim	With rim	With rim and screw	Drill hole diameter	Min. drill hole depth	Min. panel thickness	Anchor length	Wood and chip-board screws	Max. fixture thickness	Sales unit
	Art.-No.	Art.-No.	Art.-No.	d_0 [mm]	h_1 [mm]	d_p [mm]	l [mm]	d_S / d_S x l_S [mm]	t_{fix} [mm]	[pcs]
Item	**UX**	**UX R**	**UX R S**							
UX 5 x 30	**094721**	**094722**	–	5	40	9,5	30	3 - 4	–	100
UX 6 x 35	**062754**	**062756**	–	6	45	9,5	35	4 - 5	–	100
UX 6 x 35	–	–	**094758**	6	65	9,5	35	4,5 x 60	20	25
UX 6 x 50	**072094**	**072095**	–	6	60	9,5	50	4 - 5	–	100
UX 6 x 50	–	–	**094759**	6	80	9,5	50	4,5 x 75	20	25
UX 8 x 40	–	**505483**	–	8	50	9,5	40	4,5 - 6	–	100
UX 8 x 50	**077869**	**077870**	–	8	60	9,5	50	4,5 - 6	–	100
UX 8 x 50	–	–	**094762**	8	75	9,5	50	5 x 70	15	25
UX 8 x 50	–	–	**094760**	8	85	9,5	50	5 x 80	25	25
UX 10 x 60	**077871**	**077872**	–	10	75	12,5	60	6 - 8	–	50
UX 10 x 60	**094761** 1)	–	–	10	90	12,5	60	6 x 85	20	10
UX 12 x 70	**062758**	–	–	12	85	–	70	8 - 10	–	25
UX 14 x 75	**062757**	–	–	14	95	–	75	10 - 12	–	20

1) with screw

TECHNICAL DATA

UX RH - with rim and round hook

UX WH - with rim and angle hook



UX RH N - with rim and round hook (white coated)

UX WH N - with rim and angle hook (white coated)

UX OH N - with rim and eyebolt (white coated)

	With rim and round hook	With round hook (white coated)	With rim and angle hook	With angle hook (white coated)	With eyebolt (white coated)	Drill hole diameter	Min. drill hole depth	Min. panel thickness	Anchor length	Screw dimension	Sales unit
	Art.-No.	Art.-No.	Art.-No.	Art.-No.	Art.-No.	d_0	h_1	d_p	l	$d_S \times l_S$	
Item	RH	RH N	WH	WH N	OH N	[mm]	[mm]	[mm]	[mm]	[Ø mm]	[pcs]
UX 6 x 35	**094407**	–	–	–	–	6	45	9,5	35	4,5 x 67	25
UX 6 x 35	–	–	**094408**	–	–	6	45	9,5	35	4,5 x 51	25
UX 8 x 50	**094409**	**094412**	–	–	**094414**	8	60	9,5	50	5,5 x 87	25
UX 8 x 50	–	–	**094410**	**094413**	–	8	60	9,5	50	5,5 x 70	25

TECHNICAL DATA

UX in bucket

Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Min. panel thickness d_p [mm]	Fixing length l [mm]	Wood and chipboard screws $d_S / d_S \times l_S$ [mm]	Sales unit [pcs]
UX 6 x 35 R in bucket	**508027**	6	45	9,5	35	4 - 5	2500
UX 8 x 50 R in bucket	**508028**	8	60	9,5	50	4,5 - 6	1000
UX 10 x 60 R in bucket	**508029**	10	75	12,5	60	6 - 8	600

Universal plug UX

TECHNICAL DATA

Assortment box UX / SX **Box UX / SX-S** **Meister-Box**

Item	Art.-No.	Contents	Sales unit [pcs]
Box UX 6/8/10	**093182**	100 plugs UX 6 x 35, 70 plugs UX 8 x 50, 20 plugs UX 10 x 60	1
Box UX-R 6/8/10	**093819**	100 plugs UX 6 x 35 R, 70 plugs UX 8 x 50 R, 20 plugs UX 10 x 60 R	1
Box UX / SX-S	**093181**	50 plugs UX 6 x 35, 50 screws 4,5 x 50, 50 plugs SX 6 x 30, 50 screws 4,5 x 45, 25 plugs UX 8 x 50, 25 screws 5 x 65, 25 plugs SX 8 x 40, 25 screws 5 x 50	1
Assortment box UX / SX	**040991**	60 plugs SX 6 x 30, 50 plugs SX 8 x 40, 20 plugs SX 10 x 50, 60 plugs UX 5 x 30 R, 40 plugs UX 6 x 50 R, 50 plugs UX 8 x 50 R, 10 plugs UX 10 x 60 R	1
Profi-Box UX + screws + hooks	**518526**	International version: 50 Universal plugs UX 6 x 35 R, 25 Universal plugs UX 8 x 50 R, 20 Chipboard screws 4,5 x 60, 15 Chipboard screws 5 x 70, 4 Angle hooks 5,5, x 70, 4 Round hooks 5,5 x 80	1
Profi-Box UX / UX-R	**518527**	International version: 25 Universal plugs UX 6 x 35, 25 Universal plugs UX 6 x 35 R, 25 Universal plugs UX 8 x 50, 25 Universal plugs UX 8 x 50 R, 10 Universal plugs UX 10 x 60	1
Meister-Box UX + screws + hooks	**513894**	German version: 50 Universal plugs UX 6 x 35 R, 25 Universal plugs UX 8 x 50 R, 20 Chipboard screws 4,5 x 60, 15 Chipboard screws 5 x 70, 4 Angle hooks 5,5, x 70, 4 Round hooks 5,5 x 80	1
Meister-Box UX / UX-R	**513893**	German version: 25 Universal plugs UX 6 x 35, 25 Universal plugs UX 6 x 35 R, 25 Universal plugs UX 8 x 50, 25 Universal plugs UX 8 x 50 R, 10 Universal plugs UX 10 x 60	1

LOADS

Universal plug UX

Highest recommended tensile loads[1] for a single anchor.
The given loads are valid for wood screws with the specified diameter.

Type			UX 5 x 30	UX 6 x 35	UX 6 x 50	UX 8 x 40 UX 8 x 50	UX 10 x 60	UX 12 x 70	UX 14 x 75
Wood screw diameter	Ø	[mm]	4	5	5	6	8	10	12
Recommended loads in the respective base material F_{rec}[2]									
Concrete	≥ C20/25	[kN]	0,30	0,40	0,60	0,60	1,00	1,50	1,80
Solid brick	≥ Mz 12	[kN]	0,20	0,20	0,30	0,30	0,50	0,70	0,80
Perforated sand-lime brick	≥ KSL 12	[kN]	0,30	0,40	0,40	0,50	0,60	0,80	0,80
Vertically perforated brick	≥ Hlz 12	[kN]	0,20	0,20	0,20	0,20	0,20	0,30	0,40
Aerated concrete	≥ AAC 4	[kN]	0,15	0,20	0,20	0,30	0,40	0,60	0,70
Gypsum plasterboard	12,5 mm	[kN]	0,10	0,10	0,10	0,10	0,10	-	-
Gypsum plasterboard	25 mm	[kN]	0,10	0,15	0,15	0,15	0,15	-	-
Gypsum fibreboard	(Fermacell)	[kN]	0,20	0,20	0,20	0,20	0,25	-	-
Gypsum block	$\rho \geq 0,9$ kg/dm³	[kN]	-	-	-	0,15	0,35	0,45	0,50

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

LOADS

Universal plug UX with hook screws respective eye screws

Highest recommended tensile loads[1] for a single anchor.
The given loads are valid for the included hook screws respective eye screws.

Type			UX 6 x 35 RH	UX 6 x 35 WH	UX 8 x 50 RH	UX 8 x 50 WH	UX 8 x 50 OE
Recommended loads in the respective base material F_{rec}[2]							
Concrete	≥ C20/25	[kN]	0,25	0,30	0,40	0,45	0,40
Vertically perforated brick	≥ Hlz 12	[kN]	0,20	0,20	0,20	0,20	0,20
Gypsum plasterboard	12,5 mm	[kN]	0,05	0,05	0,05	0,05	0,05

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

Universal plug UX GREEN

The nylon plug for all building materials

Curtain rails

Shelves

BUILDING MATERIALS

- Concrete
- Gypsum plasterboard and gypsum fibreboards
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone
- Aerated concrete
- Chipboard
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

CERTIFICATES

BIOBASED 50 - 85% DIN Geprüft 8C029

ADVANTAGES

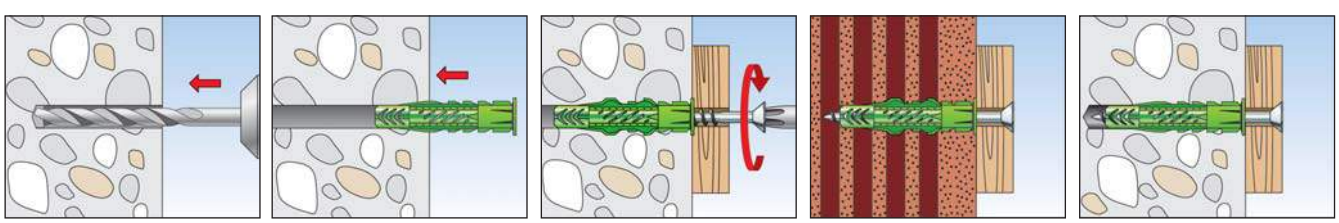
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular UX plugs.
- The universal operating principle (knotting or expanding) allows for use in all solid, hollow and board building materials. Thus the UX GREEN is the correct choice for unknown base materials.
- Plug collar for anti-slip safety and saw tooth sides as turning lock ensure the highest installation safety.

APPLICATIONS

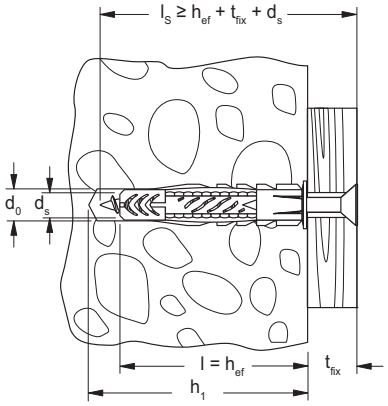
- Pictures
- Lighting
- Skirting
- Light cabinets
- Towel rails
- Mirror cabinets
- Curtain rails
- Wash basin fixings
- TV consoles
- Plumbing and heating fixings

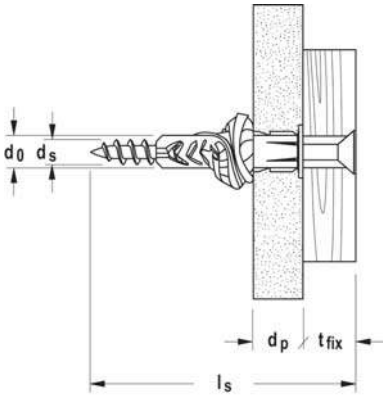
FUNCTIONING

- The Universal plug UX with rim is suitable for pre-positioned installation; the UX without rim is suitable for push-through installation.
- When screwing in the screw, the UX GREEN expands in solid building materials and knots itself into cavities.
- Suitable for wood and chipboard screws, as well as stud screws.
- The required screw length is given by: the plug length + fixture thickness + 1 x screw diameter.
- In the case of board building materials, the threadless part of the screw must not be longer than the fixture.
- The edge distance must be at least one plug length.



TECHNICAL DATA





Universal plug **UX GREEN R** - with rim

	With rim	Without rim	Drill hole diameter	Min. drill hole depth	Min. panel thickness	Anchor length	Wood and chip-board screws	Sales unit
	Art.-No.	Art.-No.	d_0 [mm]	h_1 [mm]	d_p [mm]	l [mm]	d_s / d_s x l_s [mm]	[pcs]
Item	**UX R**	**UX**						
UX GREEN 6 x 35	**518885**	–	6	45	9,5	35	4 - 5	40
UX GREEN 6 x 50	**524855**	–	6	60	9,5	50	4 - 5	40
UX GREEN 8 x 50	**518886**	–	8	60	9,5	50	4,5 - 6	40
UX GREEN 10 x 60	**518887**	–	10	75	12,5	60	6 - 8	20
UX GREEN 12 x 70	–	**524858**	12	85	–	70	8 - 10	18

LOADS

Universal plug UX GREEN

Highest recommended loads[1] for a single anchor.

The given loads are valid for wood screws with the specified diameter.

Type			UX GREEN 6 x 35	UX GREEN 6 x 50	UX GREEN 8 x 50	UX GREEN 10 x 60	UX GREEN 12 x 70
Screw diameter	Ø	[mm]	5	5	6	8	10
Recommended loads in the respective base material F_{rec}[2]							
Concrete	≥ C20/25	[kN]	0,40	0,60	0,60	1,00	1,50
Solid brick	≥ Mz 12	[kN]	0,20	0,30	0,30	0,50	0,70
Perforated sand-lime brick	≥ KSL 12	[kN]	0,40	0,40	0,50	0,60	0,80
Vertically perforated brick	≥ Hlz 12	[kN]	0,20	0,20	0,20	0,20	0,30
Aerated concrete	≥ AAC 4	[kN]	0,20	0,20	0,30	0,40	0,60
Gypsum plasterboard	12,5 mm	[kN]	0,10	0,10	0,10	0,10	-
Gypsum plasterboard	25 mm	[kN]	0,15	0,15	0,15	0,15	-
Gypsum fibreboard	(Fermacell)	[kN]	0,20	0,20	0,20	0,25	-
Gypsum block	$\rho \geq 0,9$ kg/dm³	[kN]	-	-	0,15	0,35	0,45

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

The powerful nylon plug with 4-way expansion

Wall consoles

Curtain rails

BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

CERTIFICATES

ADVANTAGES

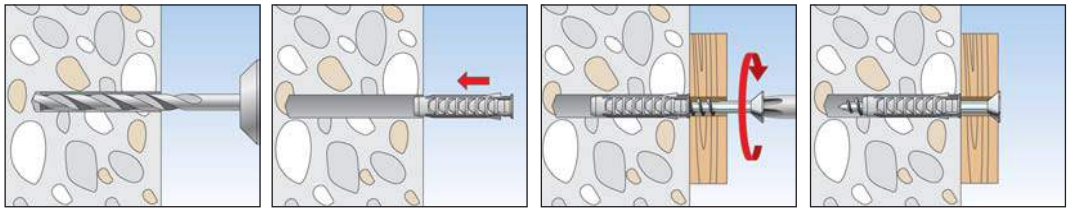
- The 4-way expansion provides the optimum force distribution in the material, and offers high load-bearing capacities in solid and hollow building materials.
- The expansion-free plug neck prevents the creation of expansion forces on the material surface whilst screwing in the screw. This helps to prevent damage to tiles and plaster.
- The pronounced rim prevents the plug from slipping into the drill hole, thus allowing for a simple installation.
- The greater anchorage depth of the SX 6x50, 8x65 and 10x80 means that the plug is especially suited to fixings in hollow building materials, aerated concrete and to bridge plaster.

APPLICATIONS

- Lighting
- Wardrobes
- Motion detectors
- Skirting
- Light shelves
- Mirror cabinets
- Letter boxes
- TV consoles
- Trellis
- Folding shutters
- Bath and toilet installations

PLFUNCTIONING

- The SX is suitable for pre-positioned and push-through installation.
- When turning in the screw, the SX expands in four directions, thus providing a secure anchoring in the building material.
- The required screw length is given by: Plug length + fixture thickness + 1 x screw diameter.
- Suitable for wood, chipboard and spacing screws (fischer ASL, see page 332).

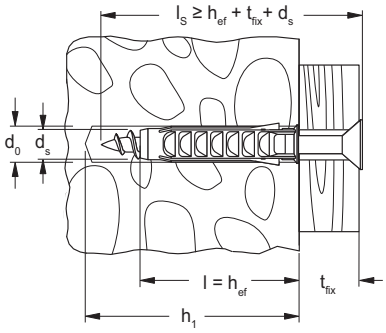


TECHNICAL DATA

Plug **SX** with rim

Plug **SX** - with greater anchorage depth, without rim

Plug **SX** with rim and screw



	With rim	With greater anchorage depth, without rim	With rim and screw	Drill hole diameter	Min. drill hole depth	Anchor length	Wood and chip-board screws	Max. fixture thickness	Sales unit
	Art.-No.	Art.-No.	Art.-No.	d_0	h_1	l	d_S / d_S x l_S	t_{fix}	
Item	SX	SX	SX-S	[mm]	[mm]	[mm]	[mm]	[mm]	[pcs]
SX 4 x 20	**070004**	–	–	4	25	20	2 - 3	–	200
SX 5 x 25	**070005**	–	–	5	35	25	3 - 4	–	100
SX 6 x 30	**070006**	–	–	6	40	30	4 - 5	–	100
SX 6 x 30	–	–	**070021**	6	45	30	4,5 x 40	5	50
SX 6 x 50	**078185**	**024827**	–	6	60	50	4 - 5	–	100
SX 8 x 40	**070008**	–	–	8	50	40	4,5 - 6	–	100
SX 8 x 40	–	–	**070022**	8	65	40	5 x 60	15	50
SX 8 x 65	–	**024828**	–	8	75	65	4,5 - 6	–	50
SX 10 x 50	**070010**	–	–	10	70	50	6 - 8	–	50
SX 10 x 80	–	**024829**	–	10	95	80	6 - 8	–	25
SX 12 x 60	**070012**	–	–	12	80	60	8 - 10	–	25
SX 14 x 70	**070014**	–	–	14	90	70	10 - 12	–	20
SX 16 x 80	**070016**	–	–	16	100	80	12 (1/2")	–	10

TECHNICAL DATA

SX in bucket

Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Anchor length l [mm]	Max. fixture thick-ness t_{fix} [mm]	Wood and chipboard screws d_S [mm]	Sales unit [pcs]
SX 6 in bucket	**507900**	6	40	30	–	4 - 5	3200
SX 8 in bucket	**507904**	8	50	40	–	4,5 - 6	1200
SX 10 in bucket	**507909**	10	70	50	–	6 - 8	720
SX 12 in bucket	**523269**	12	80	60	–	8 - 10	350

Expansion plug SX

TECHNICAL DATA

Box SX 5/6/8

Profi-Box

Box UX / SX-S

Assortment box UX / SX

Item	Art.-No.	Contents	Sales unit [pcs]
Box SX 5/6/8	**030191**	100 plugs SX 5 x 25, 100 plugs SX 6 x 30, 100 plugs SX 8 x 40	1
Box UX / SX-S	**093181**	50 plugs UX 6 x 35, 50 screws 4,5 x 50, 50 plugs SX 6 x 30, 50 screws 4,5 x 45, 25 plugs UX 8 x 50, 25 screws 5 x 65, 25 plugs SX 8 x 40, 25 screws 5 x 50	1
Assortment box UX / SX	**040991**	60 plugs SX 6 x 30, 50 plugs SX 8 x 40, 20 plugs SX 10 x 50, 60 plugs UX 5 x 30 R, 40 plugs UX 6 x 50 R, 50 plugs UX 8 x 50 R, 10 plugs UX 10 x 60 R	1
Profi-Box SX	**518524**	International version: 60 Expension plugs SX 6 x 30, 60 Expansion plugs SX 8 x 40, 12 Expansion plugs SX 10 x 50	1
Profi-Box SX + screws	**518525**	International version: 50 Expansion plugs SX 6 x 30, 30 Expansion plugs SX 8 x 40, 50 Chipboard screws 4,5 x 40, 30 Chipboard screws 5 x 60	1
Meister-Box SX-plug	**041648**	German version: 60 plugs SX 6 x 30, 60 plugs SX 8 x 40, 12 plugs SX 10 x 50	1
Meister-Box SX + screws	**513777**	German version: 50 Expansion plugs SX 6 x 30, 30 Expansion plugs SX 8 x 40, 50 Chipboard screws 4,5 x 40, 30 Chipboard screws 5 x 60	1

LOADS

Expansion plug SX

Highest recommended loads[1] for a single anchor.
The given loads are valid for wood screws with the specified diameter.

Type			SX 4 x 20	SX 5 x 25	SX 6 x 30 SX 6 x 50	SX 8 x 40 SX 8 x 65	SX 10 x 50	SX 10 x 80	SX 12 x 60	SX 14 x 70	SX 16 x 80
Wood screw diameter	Ø	[mm]	3	4	5	6	8	8	10	12	12
Min. edge distance concrete	c_{min}	[mm]	20	25	35	40	50	50	65	100	120
Recommended loads in the respective base material F_{rec}[2]											
Concrete	≥ C20/25	[kN]	0,16	0,30	0,65	0,70	1,20	1,20	1,70	2,00	2,60
Solid brick	≥ Mz 12	[kN]	0,11	0,25	0,30	0,60	0,65	1,20	0,70	0,80	0,90
Solid sand-lime brick	≥ KS 12	[kN]	0,17	0,30	0,50	0,60	1,20	1,20	1,70	2,00	2,60
Aerated concrete	≥ AAC 2	[kN]	0,03	0,03	0,03	0,04	0,09	0,20	0,14	0,30	0,40
Aerated concrete	≥ AAC 4	[kN]	0,07	0,09	0,09	0,14	0,30	0,60	0,45	0,50	0,60
Vertically perforated brick	≥ Hlz 12 (ρ ≥ 1.0 kg/dm³)	[kN]	0,13	0,07	0,07	0,17	0,17	0,50	0,26	0,40	0,60
Perforated sand-lime brick	≥ KSL 12	[kN]	0,15	0,17	0,30	0,35	0,30	0,80	0,35	0,30	0,40
Gypsum block		[kN]	-	-	-	0,26	0,37	-	1,00	1,00	-

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

The powerful nylon plug with 4-way expansion

Mirror fixings

Wall consoles

BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

CERTIFICATES

BIOBASED 50 - 85% DIN Geprüft 8C029

ADVANTAGES

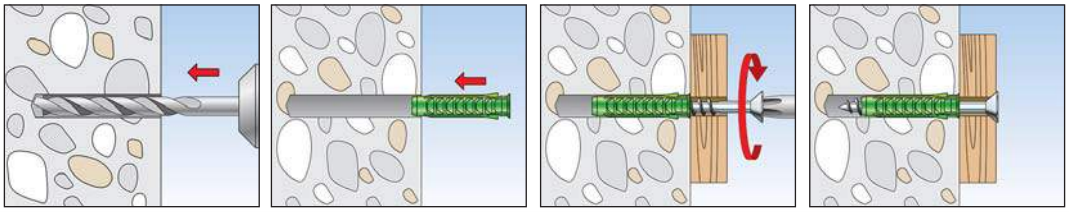
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular SX plugs.
- The powerful 4-way expansion provides optimum force transmission in the building material, thus enabling high load values and security.
- The anti-rotation lock prevents the plug from spinning in the drill hole.
- The expansion-free plug neck prevents the creation of expansion forces on the material whilst screwing in the screw. This helps to prevent damage to tiles and plaster.
- Fast and easy push-through installation reduces installation time.

APPLICATIONS

- Lighting
- Wardrobes
- Motion detectors
- Skirting
- Light shelves
- Mirror cabinets
- Letter boxes
- TV consoles
- Trellis
- Folding shutters
- Bath and toilet installations

FUNCTIONING

- The SX GREEN is suitable for pre-positioned and push-through installation.
- When screwing in the screw, the SX GREEN expands in four directions, thus providing a secure anchoring in the building material.
- The required screw length is given by the plug length + fixture thickness + 1 x screw diameter.
- Suitable for wood, chipboard and spacing screws.



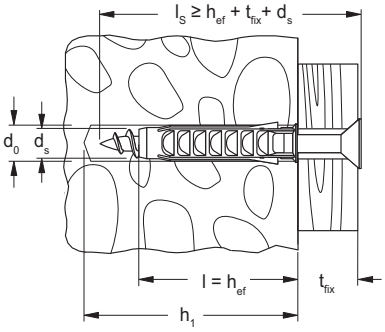
Expansion plug SX GREEN

TECHNICAL DATA

Plug **SX GREEN** - with rim

Plug **SX GREEN** - with greater anchorage depth, without rim

Plug **SX GREEN S** - with rim and screw



	With rim	Without rim and large anchorage depth	With rim and screw	Drill hole diameter	Min. drill hole depth	Anchor length	Max. fixture thickness	Wood and chip-board screws	Sales unit
	Art.-No.	Art.-No.	Art.-No.	d_0 [mm]	h_1 [mm]	l [mm]	t_{fix} [mm]	d_S / d_S x l_S [mm]	[pcs]
Item	**SX**	**SX**	**SX-S**						
SX GREEN 5 x 25	**524859**	–	–	5	35	25	–	3 - 4	90
SX GREEN 6 x 30	**524860**	–	–	6	40	30	–	4 - 5	90
SX GREEN 6 x 30	–	–	**524866**	6	40	30	5	4,5 x 40	45
SX GREEN 6 x 50	–	**524861**	–	6	60	50	–	4 - 5	90
SX GREEN 8 x 40	**524862**	–	–	8	50	40	–	4,5 - 6	90
SX GREEN 8 x 40	–	–	**524867**	8	60	40	15	5 x 60	45
SX GREEN 8 x 65	–	**524863**	–	8	75	65	–	4,5 - 6	45
SX GREEN 10 x 50	**524864**	–	–	10	70	50	–	6 - 8	45
SX GREEN 12 x 60	**524865**	–	–	12	80	60	–	8 - 10	20

LOADS

Expansion plug SX GREEN

Highest recommended loads[1] for a single anchor.
The given loads are valid for wood screws with the specified diameter.

Type			SX GREEN 5 x 25	SX GREEN 6 x 30 SX GREEN 6 x 50	SX GREEN 8 x 40 SX GREEN 8 x 65	SX GREEN 10 x 50	SX GREEN 12 x 60
Wood screw diameter	Ø	[mm]	4	5	6	8	10
Min. edge distance concrete	c_{min}	[mm]	25	35	40	50	65
Recommended loads in the respective base material F_{rec}[2]							
Concrete	≥ C20/25	[kN]	0,30	0,65	0,70	1,20	1,70
Solid brick	≥ Mz 12	[kN]	0,25	0,30	0,60	0,65	0,70
Solid sand-lime brick	≥ KS 12	[kN]	0,30	0,50	0,60	1,20	1,70
Aerated concrete	≥ AAC 2	[kN]	0,03	0,03	0,04	0,09	0,14
Aerated concrete	≥ AAC 4	[kN]	0,09	0,09	0,14	0,30	0,45
Vertically perforated brick	≥ Hlz 12 ($\rho \geq 1.0$ kg/dm³)	[kN]	0,07	0,07	0,17	0,17	0,26
Perforated sand-lime brick	≥ KSL 12	[kN]	0,17	0,30	0,35	0,30	0,35
Gypsum block		[kN]	-	-	0,26	0,37	1,00

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

The installation-friendly nylon plug with 2-way expansion

Small shelves

Signs

BUILDING MATERIALS

- Concrete
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick made from lightweight concrete
- Solid brick

CERTIFICATES

ADVANTAGES

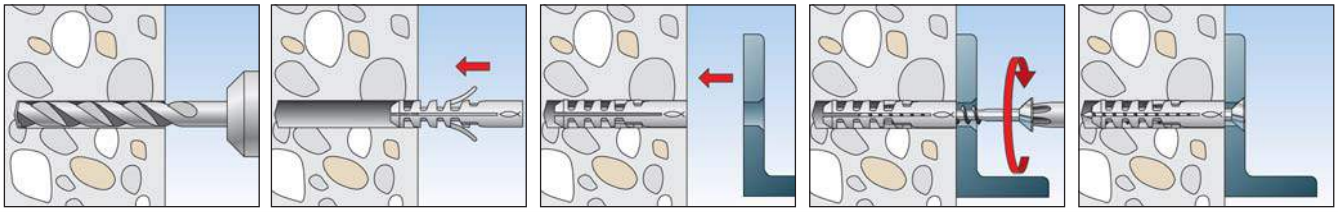
- The rimless plug sleeve allows for the plug to be set as deep as required below the plaster to the bearing substrate to achieve the maximum load-bearing capacity.
- As the plug only expands in two directions, it is possible to direct the expansion forces so that they run parallel to the edge of the building material by turning the plug. This allows for smaller edge distances.
- The slimline plug geometry makes it easy to push the plug into the drill hole. For a fast and simple installation.
- The anti-rotation lock prevents the plug rotating in the drill hole, thus guaranteeing a high level of installation safety.

APPLICATIONS

- Pictures
- Lighting
- Skirting
- Light shelves
- Mirror cabinets
- Letter boxes
- Motion detectors
- Information boards
- Curtain rails
- Electrical installations

FUNCTIONING

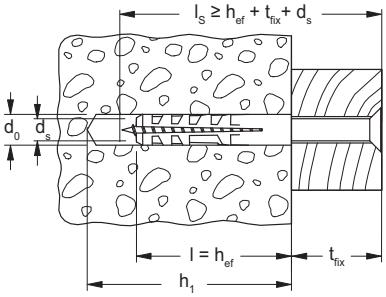
- The expansion plug S is suitable for pre-positioned and push-through installation.
- When turning in the screw, the expansion plug S expands in two directions, thus providing a secure anchoring in the building material.
- The required screw length is given by the plug length + plaster and/or insulation material thickness + fixture thickness + 1 x screw diameter.
- Suitable for wood and chipboard screws.
- The edge distance must be at least one plug length.
- For installations close to the edge, turn the plug so that the expansion force acts parallel to the edge.



Expansion plug S

TECHNICAL DATA

Expansion plug **S**



Item	Art.-No. Standard	Art.-No. Doublepack	Drill hole diameter d_0 [mm]	Anchor length l [mm]	Min. drill hole depth h_1 [mm]	Wood and chip-board screws d_S [mm]	Sales unit [pcs]		
S 4	**050104**	–	4	20	25	2 - 3	200		
S 5	**050105**	–	5	25	35	3 - 4	100		
S 5	–	**050124**	5	25	35	3 - 4	200		
S 6	**050106**	–	6	30	40	4 - 5	100		
S 6	–	**050125**	6	30	40	4 - 5	200		
S 8	**050108**	–	8	40	55	4,5 - 6	100		
S 8	–	**050126**	8	40	55	4,5 - 6	200		
S 10	**050110**	–	10	50	70	6 - 8	50		
S 10	–	**050127**	10	50	70	6 - 8	100		
S 12	**050112**	–	12	60	80	8 - 10	25		
S 14	**050114**	–	14	75	90	10 - 12	20		
S 16	**050116**	–	16	80	100	12 (1/2")	10		
S 20	**050120**	–	20	90	120	16	5		

TECHNICAL DATA

S in bucket

Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Anchor length l [mm]	Wood and chipboard screws d_S [mm]	Sales unit [pcs]	
S 6 in bucket	**508024**	6	40	30	4 - 5	3200	
S 8 in bucket	**508025**	8	55	40	4,5 - 6	1400	

TECHNICAL DATA

Stacking box ST

fischerbox

Item	Art.-No.	Contents	Sales unit [pcs]
ST 1 S8 S	**060510**	34 plugs S 8, 34 countersunk wood screws SH 5 x 60	1
ST 1 S6 S	**060509**	50 plugs S 6, 50 countersunk wood screws SH 4,5 x 45	1
ST 1 S6/8	**060499**	50 plugs S 6, 30 plugs S 8	1
Box S 5.6.8	**060513**	100 plugs S 5, 100 plugs S 6, 100 plugs S8	1
Box S 6.8.10	**060515**	100 plugs S 6, 100 plugs S 8, 25 plugs S 10	1
Box empty	**060500**	–	1

LOADS

Expansion plug S

Highest recommended loads[1] for a single anchor.

The given loads are valid for wood screws with the specified diameter.

Type			S4	S5	S6	S8	S10	S12	S14	S16	S20
Wood screw diameter	Ø	[mm]	3	4	5	6	8	10	12	12	16
Min. edge distance concrete	c_{min}	[mm]	20	25	30	40	50	60	70	80	100
Recommended loads in the respective base material F_{rec}[2]											
Concrete	≥ C20/25	[kN]	0,16	0,28	0,40	0,60	1,10	1,50	1,85	2,26	3,88
Solid brick	≥ Mz 12	[kN]	0,14	0,24	0,28	0,50	-[3]	-[3]	-[3]	-[3]	-[3]
Solid sand-lime brick	≥ KS 12	[kN]	0,14	0,24	0,28	0,55	-[3]	-[3]	-[3]	-[3]	-[3]
Aerated concrete	≥ AAC 4	[kN]	-[3]	-[3]	0,05	0,07	0,16	0,28	0,40	-[3]	-[3]
Gypsum block		[kN]	-[3]	-[3]	-[3]	0,15	0,23	0,37	0,60	-[3]	-[3]

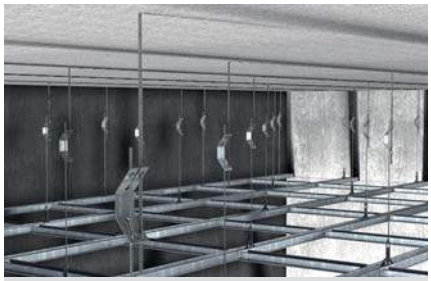
[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

[3] Due to that the failure of the substrate varies too much no reproducible values can be given.

Threaded rod plug RODFORCE FGD

The economical hammerset plug - easy and quick fixing of threaded rods



Suspended ceilings

Single pipe suspension

BUILDING MATERIALS

- Concrete
- Solid sand-lime brick
- Solid brick

ADVANTAGES

- The innovative plug geometry allows quick and easy installation of the threaded rod with a few hammer blows.
- The short plug length prevents reinforcement hits and guarantees a secure utilization in reinforced concrete.
- The teeth inside the plug allow standard, metric threads tlo be held: This saves a large assortment of stud screws.
- Installation without special tools: The only thing needed to set the plug is a hammer.Visible edge of the plug serves as visual setting check and guarantees correct setting.
- The visible edge of the plug serves as visual setting check and guarantees correct setting.
- Easy to check and adjust: To check the setting depth, the closed plug tip is used as a stop point. This predetermined break point also allows the threaded rod to be hammered-in deeper.

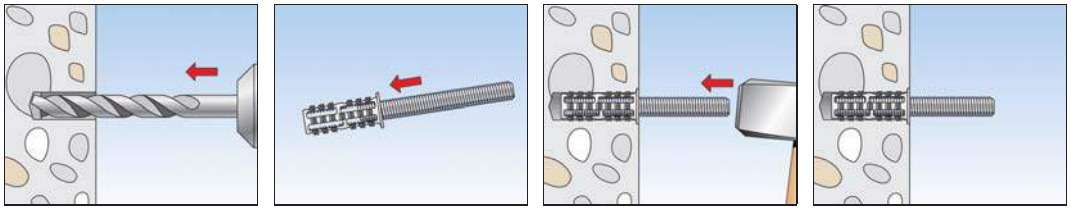
APPLICATIONS

- Suspension for individual pipes
- Plumbing and heating fixings
- Cable and pipe clips
- Suspended ceilings
- Ceiling lights
- Consoles
- Mounting rails

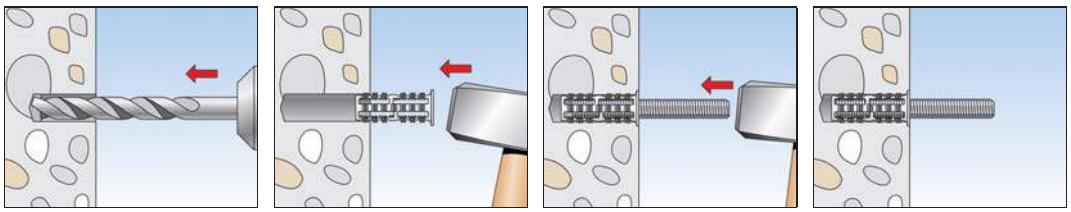
FUNCTIONING

- When hammering-in the threaded rod, the plug expands in four directions as a result of the conical inner geometry.
- The plug is set using pre-positioned installation and this is possible in two different ways: Pre-installation of the threaded rods in the plug with both being hammered into the wall together or pre-inserting of the RODFORCE into the drill hole followed by hammering-in of the threaded rod.
- The teeth inside the plug mechanically interlock the metric thread securely with the threaded rod.
- The unique elements on the outside of the plug brace against the wall of the drill hole.

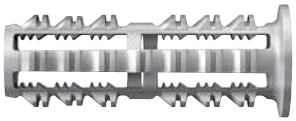
INSTALLATION WITHIN THE SYSTEM



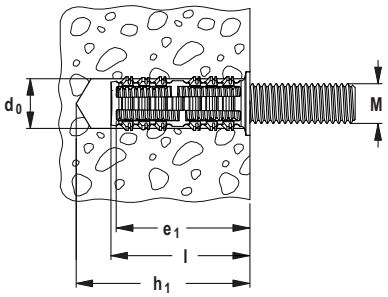
INSTALLATION WITH INDIVIDUAL COMPONENTS



TECHNICAL DATA



Threaded rod plug **RODFORCE FGD**



Item	Art.-No.	Drill diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Anchor length l [mm]	Min. drop-in penetration e_1 [mm]	Threaded rod Ø x length [mm]	Sales unit [pcs]
RODFORCE FGD 10 M6	**542106**	10	40	35	33	–	50
RODFORCE FGD 10 M6 TR 50	**542107**	10	40	35	33	M 6 x 50	25
RODFORCE FGD 10 M6 TR 60	**542108**	10	40	35	33	M 6 x 60	25
RODFORCE FGD 10 M6 TR 80	**542109**	10	40	35	33	M 6 x 80	25
RODFORCE FGD 12 M8	**542111**	12	40	35	33	–	50
RODFORCE FGD 12 M8 TR 50	**542112**	12	40	35	33	M 8 x 50	25
RODFORCE FGD 12 M8 TR 60	**542113**	12	40	35	33	M 8 x 60	25
RODFORCE FGD 12 M8 TR 80	**542114**	12	40	35	33	M 8 x 80	25

LOADS

Threaded rod plug RODFORCE FGD

Highest recommended loads[1] for a single anchor.

The given loads are valid for machine screws or threaded rods with the specifi ed thread size.

Type			RODFORCE FGD M6	RODFORCE FGD M8
Thread size	Ø	[mm]	M6	M8
Recommended loads in the respective base material F_{rec}[2]				
Concrete	≥ C20/25	[kN]	0,31	0,36
Solid brick	≥ Mz 12	[kN]	0,19	0,33
Solid sand-lime brick	≥ KS 12	[kN]	0,31	0,36

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

The metal anchor for wood and chipboard screws

Pipes

Gas meters

BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid brick made from lightweight concrete
- Solid panel made from gypsum

ADVANTAGES

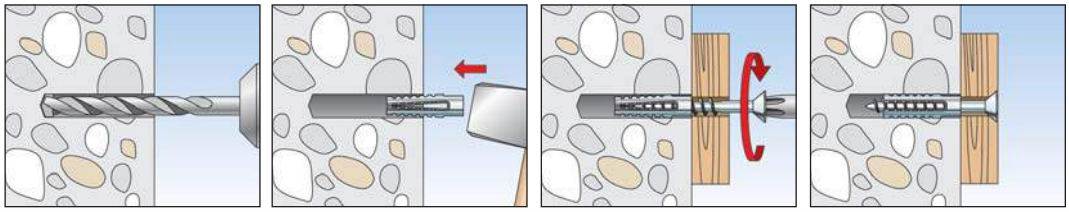
- The metal expansion anchor FMD is especially suited to applications in installation technology.
- The external teeth expand in the building material, thus ensuring a high load-bearing capacity.
- The ribbed internal geometry of the FMD is suitable for wood and chipboard screws, and makes it possible to guide the screw securely. This offers increased installation safety, and enables a broad range of applications.

APPLICATIONS

- Gas pipes
- Water pipes
- Cable and pipe clips

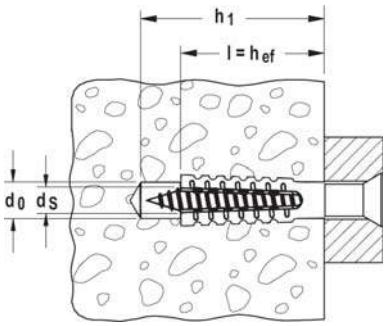
FUNCTIONING

- The FMD is suitable for pre-positioned installation.
- Inserting the screw causes the FMD to expand, and the metal teeth fix the anchor securely in the building material.
- The required (stud) screw length is given by: Anchor length + plaster and/or insulation layer thickness + fixture thickness or installation spacing + 1 x screw diameter.
- Suitable for wood and chipboard screws.
- The drill diameter is relative to the compressive strength of the building material. The higher the compressive strength, the greater the drill diameter. The 6x32 and 8x38 sizes can be hammered directly into low-strength aerated concrete without the need for pre-drilling.



TECHNICAL DATA

Metal expansion fixing **FMD**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Anchor length l [mm]	Screw diameter d_s [mm]	Sales unit [pcs]		
FMD 6 x 32	**061224** 1)	6 - 7	38	32	5 - 6	100		
FMD 8 x 38	**061225** 1)	10 - 12	46	38	6 - 8	100		
FMD 8 x 60	**061226** 1)	10 - 12	68	60	6 - 8	50		
FMD 10 x 60	**061209** 1)	12 - 14	68	60	8 - 10	50		

1) The drill diameter is relative to the substrate compressive strength. Generally, the higher the compressive strength, the greater the drill diameter.

Details see table "Recommended drill hole diameter".

RECOMMENDED DRILL HOLE DIAMETER [mm]

Type		FMD 6 x 32	FMD 8 x 38	FMD 8 x 60	FMD 10 x 60
Concrete	C 20/25	7	10	12	14
Aerated concrete	PB4	6	10	10	12
Vertically perforated brick	HLZ 12	7	10	10	12

LOADS

Metal expansion fixing FMD

Highest recommended loads[1] for a single anchor.

The given loads are valid for wood screws with maximum diameter.

Type			FMD 8 x 38	FMD 8 x 60	FMD 10 x 60
Wood screw diameter	Ø	[mm]	8	8	10
Recommended loads in the respective base material F_{rec}[2]					
Aerated concrete	≥ PB 2, PP 2 (G 2)	[kN]	0,20	0,30	0,40
Aerated concrete	≥ AAC 4	[kN]	0,30	0,40	0,60

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

Expansion plug M-S

The expansion plug for metric screws and threaded bolts

Downpipes

Folding shutters

BUILDING MATERIALS

- Concrete
- Cavity floor slabs made from bricks and concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick made from lightweight concrete
- Solid brick
- Solid panel made from gypsum
- Vertically perforated brick
- Aerated concrete

CERTIFICATES

ADVANTAGES

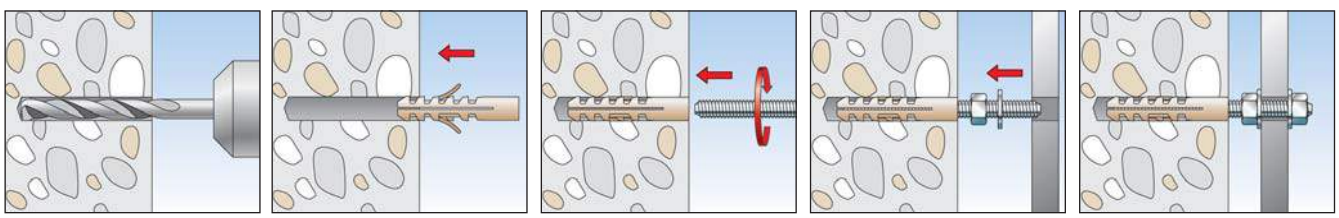
- The internal geometry of the M-S allows for the use of standard metric screws or threaded rods for the ideal adaptation to suit the intended use.
- The rimless plug sleeve allows for the plug to be set as deep as required below the plaster to the bearing substrate to achieve the maximum load-bearing capacity.
- As the plug only expands in two directions, it is possible to direct the expansion forces so that they run parallel to the edge of the building material by turning the plug. This allows for smaller edge distances.
- The slimline plug geometry makes it easy to push the plug into the drill hole, for a fast and simple installation.

APPLICATIONS

- Handles
- Folding shutters
- Trellis
- Downpipes
- Stand-off installation
- Window fittings
- Gratings

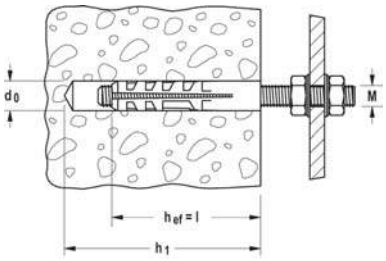
FUNCTIONING

- The M-S is suitable for pre-positioned and push-through installation.
- When turning in the screw, the M-S expands in two directions, thus providing a secure anchoring in the building material.
- The required screw length is given by: Plug length + plaster and/or insulation layer thickness + fixture thickness + 1 x screw diameter.
- Suitable for metric screws and threaded bolts.
- Chamfer the thread to make it easier to screw in screws and threaded rods.



TECHNICAL DATA

Anchor **M-S** for metric screws



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Anchor length l [mm]	Thread M	Sales unit [pcs]		
M 6 S	**050152**	8	55	40	M 6	100		
M 8 S	**050153**	10	70	50	M 8	50		
M 10 S	**050154**	14	90	70	M 10	20		
M 12 S	**050155**	16	100	80	M 12	10		

LOADS

Anchor M-S

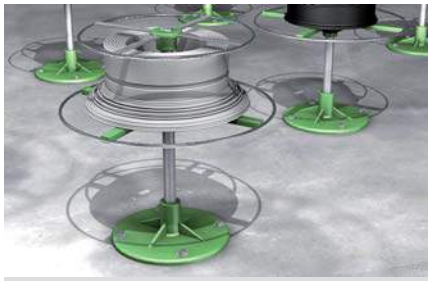
Highest recommended loads[1] for a single anchor.
The given loads are valid for metric screws with the specified thread size.

Type			M6 S	M8 S	M10 S	M12 S
Thread size		[M]	M6	M8	M10	M12
Recommended loads in the respective base material F_{rec}[2]						
Concrete	C20/25	[kN]	0,30	0,54	0,66	1,06
Solid brick	Mz 12	[kN]	0,24	0,33	0,46	0,79
Solid sand-lime brick	KS 12	[kN]	0,24	0,33	0,43	0,71

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

The powerful nylon expansion anchor with brass cone for metric threads



Plant construction

Protective grilles

BUILDING MATERIALS

- Concrete
- Natural stone with dense structure
- Solid brick
- Solid sand-lime brick
- Solid brick made from lightweight concrete
- Aerated concrete
- Solid panel made from gypsum
- Hollow blocks made from lightweight concrete

CERTIFICATES

ADVANTAGES

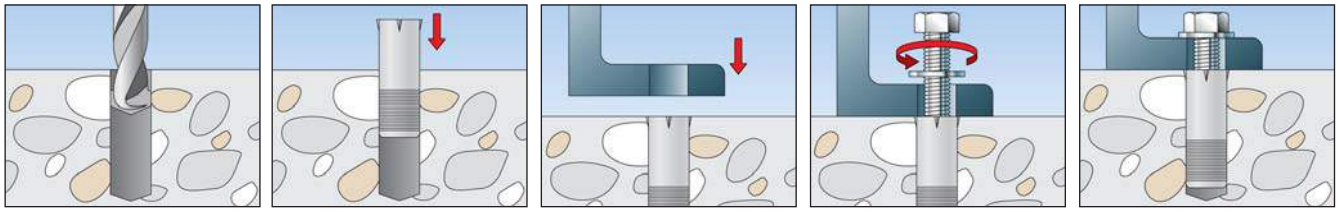
- The anchor's large external diameter helps to achieve a large applied load in the building material. This allows for maximum load-bearing capacity.
- The anchor's high expansion makes it insensitive to building material tolerances. This guarantees a simple and secure installation.
- The internal thread allows for the use of standard metric screws or threaded rods, and for surface flush removal and reuse of the fixing point. This provides great flexibility.

APPLICATIONS

- Machines
- Curbs
- Control boxes

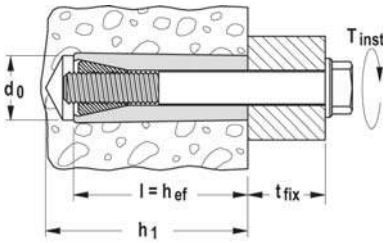
FUNCTIONING

- The M anchor is suitable for pre-positioned installation.
- Turning in the screw causes the internal brass cone to expand the M anchor, thus reliably anchoring it in the building material.
- The required screw length is given by anchor length + fixture thickness.
- Suitable for metric screws and threaded bolts.



TECHNICAL DATA

Anchor **M** for metric screws



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Anchor length l [mm]	Thread M	Max. installation torque T_{inst} [Nm]	Sales unit [pcs]	
M 5	**050505** 1)	10	45	35	M 5	4	50	
M 6	**050506** 1)	12	50	40	M 6	7	50	
M 8	**050508** 1)	16	65	50	M 8	16	20	
M 10	**050510** 1)	20	80	60	M 10	32	10	
M 12	**050512** 1)	24	90	65	M 12	54	5	

1) The given torque values apply to screws of strength class ≥ 5.8.

LOADS

Anchor M

Highest recommended loads[1)] for a single anchor.

The given loads are valid for metric screws with the specified thread size.

Type			M 5	M 6	M 8	M 10	M 12
Thread size		[M]	M5	M6	M8	M10	M12
Recommended loads in the respective base material F_{rec}[2)]							
Concrete	≥ C20/25	[kN]	1,10	1,80	2,60	4,40	5,00

[1)] Required safety factors are considered.

[2)] Valid for tensile load, shear load and oblique load under any angle.

The brass expansion fixing with metric thread

Protective wall panels

Small shelves

BUILDING MATERIALS

- Concrete
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

ADVANTAGES

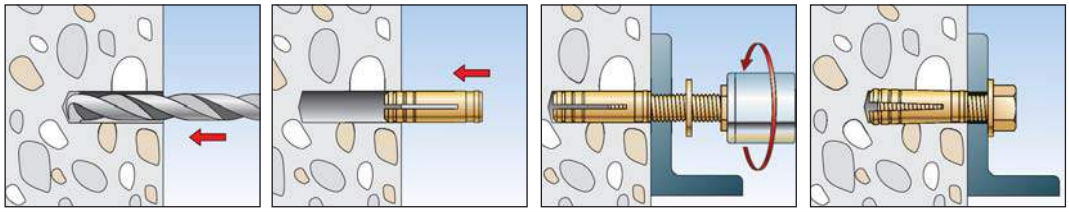
- The compact design of the brass fixing reduces the amount of drilling required, helping to ensure a fast installation.
- The special surface structure of the MS prevents the fixing from rotating in the drill hole. This provides increased installation safety.
- The internal thread allows for the use of standard metric screws or threaded rods, and for surface flush removal and reuse of the fixing point. This provides great flexibility.

APPLICATIONS

- Cellar shelves
- Substructures made of wood and metal
- Boilers
- Aggregates
- Control boxes
- Curtain rails

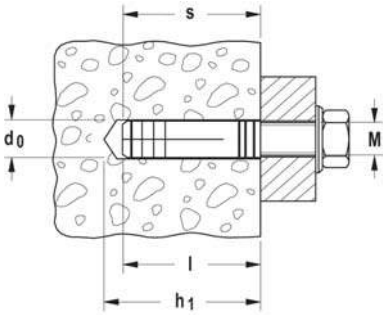
FUNCTIONING

- The MS brass fixing is suitable for pre-positioned installation.
- Turning in the metric screw causes the front part of the brass fixing to expand, thus securely anchoring it in the substrate.
- Calculating screw length for flush fixing installation: Fixing length + fixture thickness = min. screw length.
- Suitable for metric screws and threaded bolts.



TECHNICAL DATA

Brass fixing **MS** for metric screws



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Anchor length l [mm]	Internal thread A1	Min. bolt penetration $l_{E,min}$ [mm]	Sales unit [pcs]	
MS 4 x 15	**026424**	5	20	15	M 4	15	100	
MS 5 x 18	**026425**	6	25	18	M 5	18	100	
MS 6 x 22	**078660**	8	27	22	M 6	22	100	
MS 8 x 28	**078981**	10	35	28	M 8	28	50	
MS 10 x 32	**078661**	12	39	32	M 10	32	25	
MS 12 x 37	**078662**	15	46	37	M 12	37	10	
MS 16 x 43	**078663**	20	50	43	M 16	43	10	

LOADS

Brass fixing MS

Highest recommended loads[1] for a single anchor.

The given loads are valid for metric screws with the specified thread size.

Type		MS 4 x 15	MS 5 x 18	MS 6 x 22	MS 8 x 28	MS 10 x 32	MS 12 x 37	MS 16 x 43
Thread size	[M]	M4	M5	M6	M8	M10	M12	M16
Recommended loads in the respective base material F_{rec}[2]								
Concrete ≥ C20/25	[kN]	0,25	0,40	0,65	1,10	1,60	2,20	3,30
Solid brick	[kN]	0,20	0,35	0,55	0,90	1,30	1,60	2,30

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

Aircrete anchor GB

The special plug for different fixings in aerated concrete

Pipes

Suspended ceilings

BUILDING MATERIALS

Approved for (GB 10) resp. suitable for (GB 8 and GB 14):

- Aerated concrete ≥ AAC 2

Also suitable for:

Aerated concrete and ceiling panels of compressive strength ≥ 3.3

CERTIFICATES

ADVANTAGES

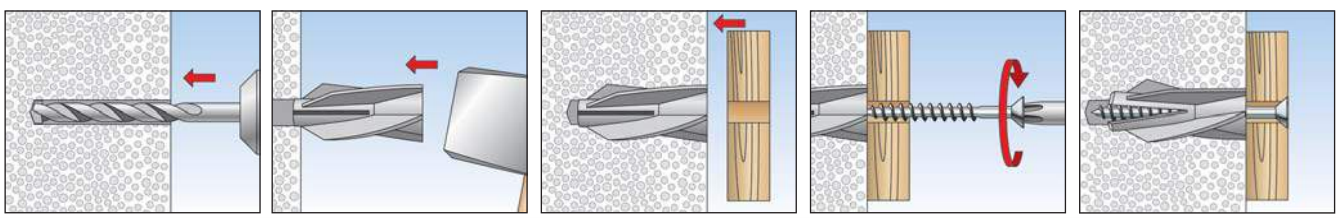
- The general building approval guarantees approved safety for use in safety-relevant applications.
- The spiral-shaped outer ribs cut a positive fit in the soft building material, thus ensuring the best pressure distribution and load-bearing capacity.
- Can be applied with a hammer - there is no need for special tools, thus saving time and money for the installation.
- The GB can also be used safely outside (e.g. in façade installation) when combined with the approved fischer safety screw in A4.

APPLICATIONS

- Light cable trays
- Pipelines
- Guard rails
- Façade and roof constructions made of wood and metal
- Light canopy brackets
- Letter boxes
- Trellis

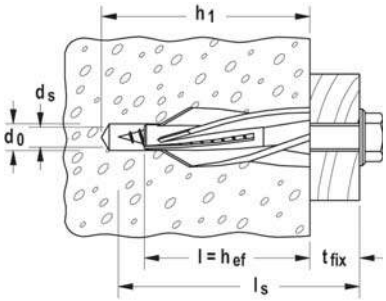
FUNCTIONING

- The GB is suitable for pre-positioned installation.
- The spiral-shaped outer ribs ensure a positive fit connection between the building material and anchor.
- The required screw length is given by: Anchor length + fixture thickness + 1 x screw diameter.
- The GB 10 must be used with fischer safety screws to fulfil the approval and to achieve the maximum load-bearing capacity.
- Use rotary drilling to create the drill hole
- Can be used in unplastered aerated concrete



TECHNICAL DATA

Aircrete anchor **GB**



Item	Art.-No.	Approval DIBt	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Plug length = min. anchorage depth $l = h_{ef}$ [mm]	fischer safety screw $d_s \times l_s$ [mm]	Sales unit [pcs]		
GB 8	**050491**	–	8	60	50	5	25		
GB 10	**050492**	●	10	65	55	7	20		
GB 14	**050493**	–	14	90	75	10	10		

FISCHER SAFETY SCREW FOR GB

Fixing type	Usable length t_{fix} [mm] min.	Usable length t_{fix} [mm] max.	Screw dimension * Ø x l_s	Screw material: Zinc plated and passivated steel – Art.-No.	Screw material: Zinc plated and passivated steel – Art.-No.	Screw material: Stainless steel of the corrosion resistance classe III, e.g. A4 – Art.-No.	Screw material: Stainless steel of the corrosion resistance classe III, e.g. A4 – Art.-No.
GB 8	5	30	5 x 85	089230[1]		089240[1]	
GB 10	0	5	7 x 67		080404		
	5	25	7 x 87	089170	080405	089244	080261
	25	45	7 x 107	089172			
	40	58	7 x 120	089174	080407		
	60	78	7 x 140	089176	080408		
	85	105	7 x 167	089178			
GB 14	0	10	10 x 95		080412		
	0	20	10 x 105	089186	080413		080271
	35	55	10 x 140	089188	080415		
	60	80	10 x 165		080416		

[1] Cross drive recess Z

* Further sizes on request

LOADS

Aircrete anchor GB

Highest permissible, respectively recommended loads[1] [2] for a single anchor in aerated concrete.
The given loads are valid for fischer safety screws[4] acc. to selection table.

Type			GB 10[2]	GB 8[9]	GB14[9]
Diameter fischer safety screw	Ø	[mm]	7	5	10
Min. spacings[6]	smin	[mm]	100	150 (100)[8]	300 (200)[8]
Min. edge distance[7]	cmin	[mm]	100	100 (75)[8]	200 (150)[8]
Minimum member thickness	hmin	[mm]	120	75	200
Anchorage depth	h_{ef} (h_v)	[mm]	55	50	75
Load in the respective base material			**Permissible loads F_{perm}[3]**	**Recommended loads F_{rec}[3]**	
Aerated concrete	AAC 2	[kN]	0,21	0,20	0,40
Aerated concrete	AAC 3	[kN]	0,32 (0,43)[5]	0,30	0,80
Aerated concrete	AAC 4	[kN]	0,54 (0,71)[5]	0,40	0,90

[1] Required safety factors are considered.

[2] In case of the design of the GB 10 for tension, shear and bending the complete approval Z-21.2-123 has to be considered.

[3] Valid for tensile load, shear load and oblique load under any angle.

[4] Galvanised steel (gvz) and stainless steel A4.

[5] The values in brackets are decisive for member thickness ≥ 150 mm.

[6] Minimum possible axial spacing while reducing the permissible load.

[7] Minimum possible edge distance.

[8] Values in brackets apply to AAC 2.

[9] GB 8 and GB 14 are not part of the approval.

Aircrete anchor GB GREEN

Secure in aerated concrete

Radiators

Suspended ceilings

BUILDING MATERIALS

- Aerated concrete ≥ AAC 2
- Aerated concrete and ceiling panels of compressive strength ≥ 3.3

CERTIFICATES

BIOBASED 50 - 85%
DIN Geprüft
8C029

ADVANTAGES

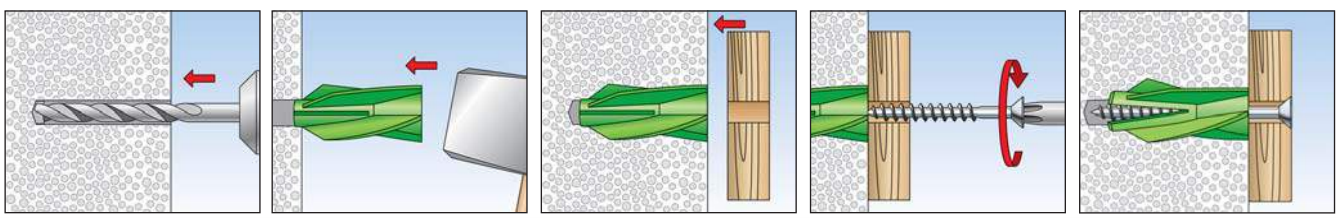
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- The spiral-shaped outer ribs cut a positive fit in the soft building material, thus ensuring best pressure distribution and load-bearing capacity.
- Can be applied with a hammer – there is no need for special tools, thus saving time and money for the installation.

APPLICATIONS

- Pipelines
- Letter boxes
- Trellis
- Handles
- Gratings
- Electrical installations

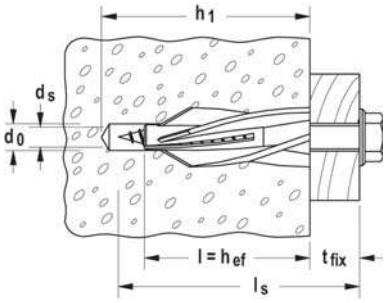
FUNCTIONING

- The aircrete anchor GB GREEN is suitable for pre-positioned installation.
- The spiral-shaped outer ribs cut a positive fit into the soft building material when knocked in, thus ensuring optimal pressure distribution and load-bearing capacity.
- The required screw length is given by the plug length + fixture thickness + 1 x screw diameter.
- Rotary drilling of the hole is required.
- Can be used in unplastered aerated concrete.



TECHNICAL DATA

Aircrete anchor **GB GREEN**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Plug length = min. anchorage depth $l = h_{ef}$ [mm]	fischer safety screw $d_s \times l_s$ [mm]	Sales unit [pcs]
GB GREEN 8	**524870**	8	60	50	5	20
GB GREEN 10	**524871**	10	65	55	7	18

LOADS

Aircrete anchor GB GREEN

Highest recommended loads[1] for a single anchor in aerated concrete.
The given loads are valid for fischer safety screws[4] acc. attached table.

Type			GB GREEN 8	GB GREEN 10
Diameter fischer safety screw	Ø	[mm]	5	7
Min. spacing[6]	smin	[mm]	150 (100)[7]	100
Min. edge distance[2]	cmin	[mm]	100 (75)[7]	100
Minimum member thickness	hmin	[mm]	75	120
Anchorage depth	hef (hv)	[mm]	50	55
Recommended load in the respective base material F_{rec}[3]				
Aerated concrete	AAC 2	[kN]	0,20	0,21
Aerated concrete	AAC 3	[kN]	0,30	0,32 (0,43)[5]
Aerated concrete	AAC 4	[kN]	0,40	0,54 (0,71)[5]

1) Required safety factors are considered.
2) Minimum possible edge distance.
3) Valid for tensile load, shear load and oblique load under any angle.
4) Galvanised steel (gvz) and stainless steel A4.
5) The values in brackets are decisive for member thickness ≥ 150 mm.
6) Minimum possible axial spacing while r educing the recommended load.
7) Values in brackets apply to AAC 2.

The versatile nylon anchor for aerated concrete

External lighting

Radiators

BUILDING MATERIALS

- Aerated concrete
- Solid panel made from gypsum

CERTIFICATES

ADVANTAGES

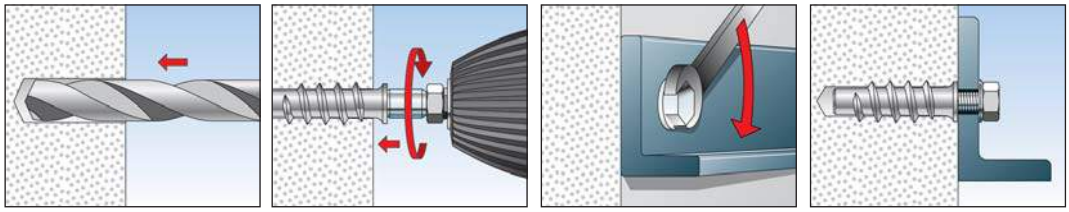
- The FTP K is suitable for both wood screws and metric screws, and thus offers flexibility in screw choice.
- The spiral-shaped outer thread taps itself into the soft aerated concrete with a positive fit, thus ensuring a secure hold.
- Setting with the FTP EK setting tool requires only a small amount of force. For a convenient installation.
- The special geometry allows for an almost expansion-force-free anchoring. This allows for small edge and spacing distances, and avoids splitting in the case of plastered surfaces.

APPLICATIONS

- Pictures
- Lighting
- Shelves
- Mirror cabinets
- Letter boxes
- Signs
- Motion detectors
- Cable and pipe clips
- Stand-off installations

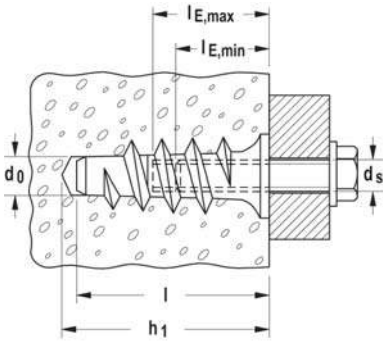
FUNCTIONING

- The FTP K is suitable for pre-positioned installation.
- Set the FTP K with setting tool FTP EK. The aircrete anchor taps itself into the aerated concrete with a positive fit during the installation process.
- Suitable for wood and metric screws with diameter 4 to 10 mm.



TECHNICAL DATA

Turbo aircrete anchor **FTP K** (nylon)



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Anchor length l [mm]	Woodscrew diameter d_s [mm]	Metric screw M	Min. bolt penetration $l_{E,min}$ [mm]	Max. bolt penetration $l_{E,max}$ [mm]	Sales unit [pcs]
FTP K 4	**078411** 1)	8 - (10)	60	50	4 - 4,5	M 4	35	60	25
FTP K 6	**078412** 1)	8 - (10)	60	50	5 - 6	M 5 - 6	40	60	25
FTP K 8	**078413** 1)	10 - (12)	70	60	7 - 8	M 8	45	70	25
FTP K 10	**078414** 1)	12 - (14)	80	70	9 - 10	M 8 - 10	50	80	10

1) Values in brackets for drill hole diameter apply for aerated concrete, compressive strength of 5,0 N/mm² or higher.

ACCESSORIES

FTP EK 4/6

FTP EK 8

FTP EK 10

Item		Match	Sales unit [pcs]
FTP EK 4/6	**090990**	FTP K4 / FTP K6	1
FTP EK 8	**090991**	FTP K8	1
FTP EK 10	**090992**	FTP K10	1

LOADS

Turbo aircrete anchor FTP K

Highest recommended loads[1] for a single anchor in aerated concrete and gypsum blocks.
The given loads are valid for screws with the specified diameter.

Type			FTP K 4	FTP K 6	FTP K 8	FTP K 10
Wood screw diameter	Ø	[mm]	4	5-6	8	8-10
Min. edge distance	c_{min}	[mm]	100	100	150	200
Recommended loads in the respective base material F_{rec}[2]						
Aerated concrete	AAC 2 (≥ 2,5 N/mm²)	[kN]	0,15	0,20	0,30	0,40
Aerated concrete	AAC 4 (≥ 5,0 N/mm²)	[kN]	0,25	0,30	0,40	0,50
Gypsum block		[kN]	-	-	0,29	0,54

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

The metal anchor for metric screws for aerated concrete

Wall consoles

Shelves

BUILDING MATERIALS

- Aerated concrete
- Solid panel made from gypsum

ADVANTAGES

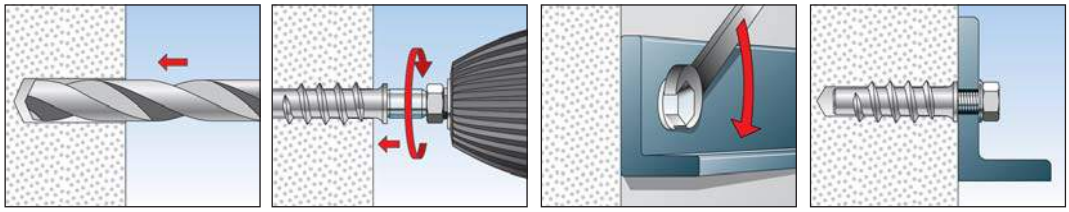
- The Allen key chuck makes it possible to set the FTP M without the need for a special setting tool. This allows for a simple installation.
- The FTP M achieves a very high load-bearing capacity in aerated concrete for increased safety.
- The spiral-shaped outer thread taps itself into the aerated concrete with a positive fit. This means that it can be set without the need for much force.
- The special geometry allows for an almost expansion-force-free anchoring. This allows for small edge and spacing distances, and avoids splitting in the case of plastered surfaces.

APPLICATIONS

- Pictures
- Lighting
- Shelves
- Mirror cabinets
- Curtain rails
- Cable and pipe clips
- Stand-off installations
- Radiators
- TV consoles

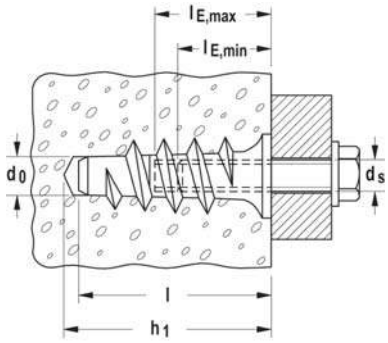
FUNCTIONALITY

- The FTP M is suitable for pre-positioned installation.
- The aircrete anchor taps itself into the aircrete with a positive fit during the installation process.
- Suitable for metric screws with diameter 6 to 10 mm.
- For installation with a hexagon socket: Size of the hexagon socket corresponds to screw diameter, e.g. FTP M6 is installed with hexagon socket size 6.
- For installation with cordless screwdriver: use a low torque and use the correct 6-kt bit FTP EM.



TECHNICAL DATA

Turbo aircrete anchor **FTP M** (metal)



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Anchor length l [mm]	Metric screw M	Min. bolt penetration $l_{E,min}$ [mm]	Max. bolt penetration $l_{E,max}$ [mm]	Sales unit [pcs]
FTP M 6	**078415** 1)	8 - (10)	60	50	M 6	15	20	25
FTP M 8	**078416** 1)	10 - (12)	70	60	M 8	20	25	25
FTP M 10	**078417** 1)	12 - (14)	80	70	M 10	25	30	25

1) Values in brackets for drill hole diameter apply for aerated concrete, compressive strength of 5,0 N/mm² or higher.

ACCESSORIES

Setting tool **FTP EM**
for FTP M (metal)

Item	Art.-No.		Match		Sales unit [pcs]
FTP EM 6	**078577**		FTP M6		1
FTP EM 8	**078578**		FTP M8		1
FTP EM 10	**078579**		FTP M10		1

LOADS

Turbo aircrete anchor FTP M

Highest recommended loads[1] for a single anchor in aerated concrete and gypsum blocks.
The given loads are valid for metric screws with the specified thread size.

Type			FTP M 6	FTP M 8	FTP M 10
Thread size		[M]	M 6	M 8	M 10
Min. edge distance	c_{min}	[mm]	100	150	200
Recommended loads in the respective base material F_{rec}[2]					
Aerated concrete	AAC 2 (≥ 2,5 N/mm²)	[kN]	0,30	0,45	0,60
Aerated concrete	AAC 4 (≥ 5,0 N/mm²)	[kN]	0,50	0,65	0,70
Aerated concrete	AAC 6 (≥ 7,5 N/mm²)	[kN]	0,70	0,80	0,90
Gypsum block		[kN]	-	0,45	0,65

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

The brass fixing for thin board building materials and solid building materials

Furniture fittings

Furniture hinges

BUILDING MATERIALS

- Wooden board building materials
- Plastic boards
- Concrete
- Solid brick
- Solid sand-lime brick
- Natural stone with dense structure

ADVANTAGES

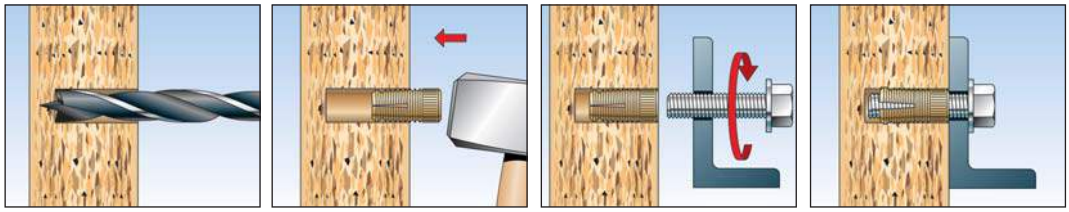
- The short brass fixing PA 4 only requires a very low anchorage depth and is therefore the solution for thin board building materials.
- The special surface structure of the PA 4 prevents the fixing from rotating in the drill hole. This provides increased installation safety.
- The internal thread allows for the use of standard metric screws and enables the ideal adaptation to suit the intended use.

APPLICATIONS

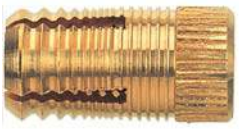
- Handles
- Angle brackets
- Furniture fittings
- Lamps

FUNCTIONING

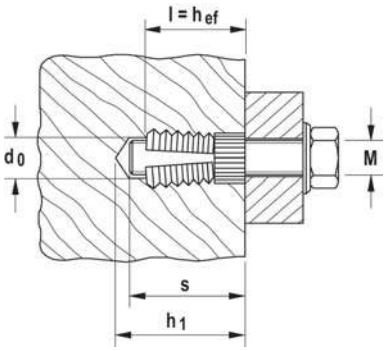
- The PA 4 is suitable for pre-positioned installation.
- Turning in the metric screw causes the front part of the brass fixing to expand, thus securely anchoring it in the substrate.
- Calculating screw length for flush fixing installation: Fixing length + fixture thickness = min. screw length



TECHNICAL DATA



Brass fixing **PA4**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Anchor length l [mm]	Thread M	Bolt penetration s [mm]	Effect. anchorage depth h_{ef} [mm]	Sales unit [pcs]
PA 4 M 6/7,5	**050484** 1)	8	7,5	7.5	M 6	7,5	7,5	200
PA 4 M 6/10,5	**058484** 1)	8	10,5	10.5	M 6	10,5	10,5	100
PA 4 M 6/13,5	**059484** 1)	8	13,5	13.5	M 6	13,5	13,5	100
PA 4 M 8/25	**050485** 1)	10	25	25	M 8	25	25	50
PA 4 M 10/25	**050486** 1)	12	25	25	M 10	25	25	25

1) Values of drill hole diameter apply for hard building materials. For soft building materials the drill diameter needs to be reduced by 0.5 mm.

LOADS

Brass fixing PA 4

Highest recommended loads[1)] for a single anchor.

The given loads are valid for metric screws with the specified thread size.

Type			PA 4 M 6/7,5	PA 4 M 6/10,5	PA 4 M 6/13,5	PA 4 M 8/25	PA 4 M 10/25
Thread size		[M]	M 6	M 6	M 6	M 8	M 10
Recommended loads in the respective base material F_{rec}[2)]							
Chipboard		[kN]	0,20	0,30	0,40	-	-
Fir wood		[kN]	0,18	0,25	0,38	-	-
Beech wood		[kN]	0,50	0,75	1,00	-	-
Plastic material		[kN]	0,75	1,50	2,00	-	-
Solid brick	Mz 12	[kN]	-	-	0,80	1,95	2,30

1) Required safety factors are considered.

2) Valid for tensile load, shear load and oblique load under any angle.

Balcony cladding fixing P 9 K

For the rear-ventilated stand-off fastening of balcony cladding to hollow profiles

Balcony cladding

BUILDING MATERIALS

- For fixing onto hollow metal profiles

ADVANTAGES

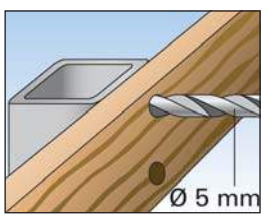
- The wide collar of the P9K plug fixes the balcony cladding to the hollow profile with a spacing. This avoids the formation of rot.
- The expansion within the railing post means that no second drilling on the opposite side of the post is necessary. This allows for a practically invisible fixing of the balcony cladding.
- The material quality of the P9K creates an elastic yet load-bearing connection. This allows for the absorption of thermal stresses, thus increasing the lifespan of the cladding.
- The short expansion element means that the balcony cladding fixing only requires a very small cavity. It is therefore suitable for narrow hollow profiles.

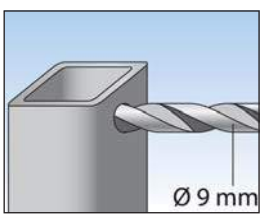
APPLICATIONS

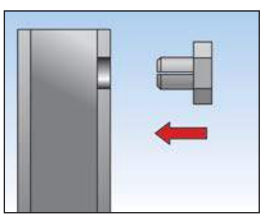
- Balcony cladding
- Fittings
- Electrical switches
- Lamps
- Motion detectors

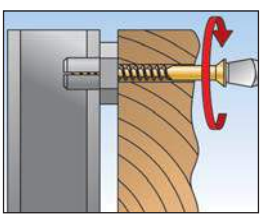
FUNCTIONING

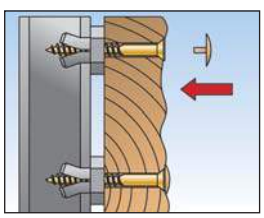
- Turning in the screw causes the plug to expand in the hollow profile, thus ensuring a load-bearing connection.
- The wide collar prevents direct contact between the fixture and the hollow profile.





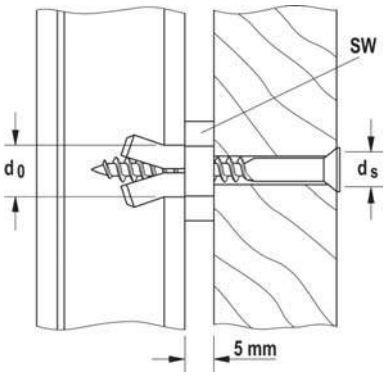






TECHNICAL DATA

Plug **P 9 K**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Screw diameter d_s [mm]	Collar height [mm]	Width across nut ⬡ SW [mm]	Sales unit [pcs]
P 9 K	**059395**	9	5,0	5	15	50

LOADS

Balcony board fixing P 9 K

Highest recommended loads[1] for a single anchor.

The given loads are valid for wood screws with the specified diameter.

Type			P 9 K
Screw diameter	Ø	[mm]	5
Recommended loads in the respective base material F_{rec}[2]			
Wall thickness of hollow profile	2 mm	[kN]	0,27
Wall thickness of hollow profile	3 mm	[kN]	0,29
Wall thickness of hollow profile	4 mm	[kN]	0,31

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

To fix wooden step treads in concrete and steel sub-structures

Stair treads on steel stair stringers

Stair treads on concrete stair stringers

BUILDING MATERIALS

TB for fixing in:
- Hollow steel profiles

TBB for fixing in:
- Concrete
- Solid building materials

ADVANTAGES

- The elastic shaft geometry allows for the absorption of vibrations, prevents creaking, and thus increases comfort.
- The stair-tread fixing for steel sub-structures (TB) only requires a very small cavity due to the short expansion element. Thus it is suitable even for narrow steel profiles.

APPLICATIONS

- Wooden step treads

FUNCTIONING

- The plastic expansion plugs are suitable for anchoring wooden step treads and wooden boards >30 mm to steel profiles (TB) or in solid building materials (TBB).
- The ideal retention forces are only achieved when using cold wood glue for the fixing in wooden step treads.
- The plastic washers included with the TBB allow you to level out any unevenness in the substrate.

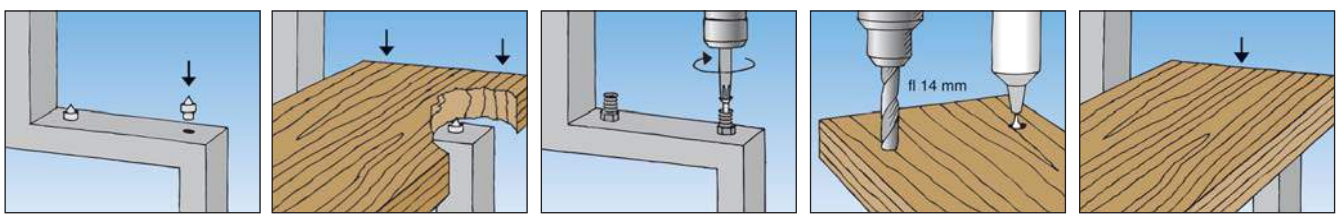
TECHNICAL DATA

Stair-tread fixing **TB** for installation on steel staircase stringers

Stair-tread fixing **TBB** for installation on concrete staircase stringers

Stair-tread fixing **TBZ 2** for centre-marking the stair-tread holes

Item	Art.-No.	Drill hole in stair thread [Ø mm]	Drill hole in steel staircase stringer [Ø mm]	Drill hole in concrete [Ø mm]	Collar height [mm]	Screw d_S x l_S [mm]	Width across nut ○ SW [mm]	Adapted for	Sales unit [pcs]
TB	**060580**	14 x 25	9	–	5	5 x 40	15	–	50
TBB	**060583**	14 x 25	–	8 x 55	–	5,5 x 70	–	–	50
TBZ 2	**060584**	–	–	–	–	–	–	TB and TBB	10



To repair over-sized or damaged drill holes

Repairing damaged drill holes

Repairing damaged drill holes

BUILDING MATERIALS

- Concrete
- Cavity floor slabs made from bricks and concrete
- Vertically perforated brick made from lightweight concrete
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid brick made from lightweight concrete
- Solid brick

ADVANTAGES

- Using FIX IT means that you can avoid having to drill another hole, and makes it possible to reuse a pre-existing drill hole.
- The repair pad FIX IT can be used as a single layer or as multiple layers, and thus can be flexibly adapted to suit various drill hole sizes and shapes.
- The pad, which is covered with a special mortar, hardens after only approx. three minutes in the drill hole. This allows for a fast installation of the fixture.

APPLICATIONS

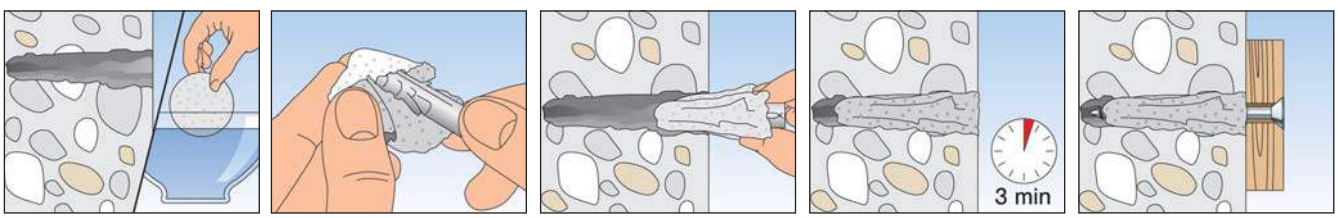
- To repair over-sized or damaged drill holes for use with plastic plugs

FUNCTIONING

- The pad, which is covered with a special mortar, hardens in the drill hole, thus anchoring the plug securely in the damaged or over-sized drill hole.
- Wet the pad with water, wrap it around the plug and push it into the damaged drill hole.
- After about three minutes the special pad will harden and the fixture can then be attached.
- Use several pads for larger tolerances.
- The curing time for the first pad is approx. three minutes. Add an additional minute for each additional pad used.

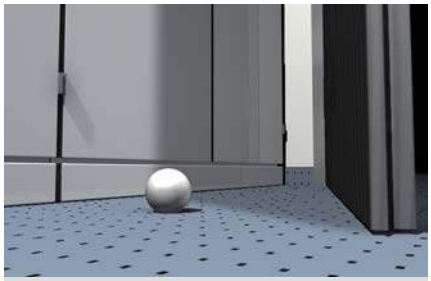
TECHNICAL DATA

Item	Art.-No.	Contents	Sales unit [pcs]
FIX IT	**092507**	card with 10 FIX IT pads	10



Doorstop TS

The installation-friendly doorstop



Doorstop

BUILDING MATERIALS

- Concrete
- Floor screed

CHARACTERISTICS

ADVANTAGES

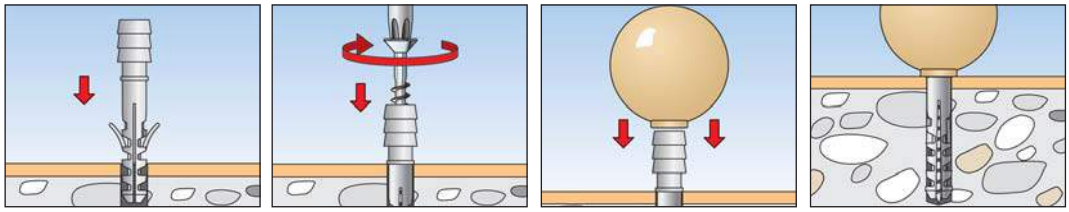
- The extended plug shaft makes it possible to attach the doorstop directly, thus simplifying installation.
- The invisible fixing ensures visual appeal.
- The TS contains all the components required for installation and is therefore a convenient complete solution.
- The doorstop is available in a range of colours to suit every floor covering and individual design wishes.

APPLICATIONS

- Doorstop with flexible positioning

FUNCTIONING

- The doorstop TS is suitable for pre-positioned installation.
- When turning in the screw, the plug expands and anchors itself in the building material.
- The plug must be pushed into the drill hole up to the point where the plug shaft thickens.
- It can be removed by removing the doorstop, unscrewing the screw, and pulling out the plug.



TECHNICAL DATA

Doorstop **TS**

Doorstop assortment **TS-SORT**

Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Colour	Contents	Sales unit [pcs]
TS 8 G	**060535**	8	50	grey	–	10
TS 8 W	**060536**	8	50	white	–	10
TS 8 S	**060539**	8	50	black	–	10
TS 8 BR	**060540**	8	50	brown	–	10
TS 8 BG	**060551**	8	50	beige	–	10
TS-SORT	**060521**	8	50	assortment	5 x grey, white, beige, black brown	1

fischer
innovative solutions

7 Cavity fixings

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Plasterboard fixing GK GREEN		410
Plasterboard fixing metal GKM		412

Nylon toggle DUOTEC

Easy to install nylon toggle for high loads in all panel building materials

Kitchen hanging cabinets

Shelves

BUILDING MATERIALS

Suitable for:

- Gypsum plasterboard
- Gypsum fibreboard
- Wooden panels, such as OSB boards, chipboard, MDF sheets
- Steel plates
- Plastic boards
- Hollow blocks made from concrete

Also functioning in:

- Solid materials, such as concrete and wood

CERTIFICATES

ADVANTAGES

- Flexible screw mount allows for the use of screws and hooks with different thread shapes.
- Glass fibre-reinforced plastics and a metal skeleton insert (fischer DUOTEC 12) allow the toggle to handle heavy tensile and transverse loads in all panel building materials.
- Soft grey nylon contact surface distributes the load over the panel surface, thereby minimising weakening of the supporting building material.
- Standard drill hole diameters and short tilting element for easy installation in narrow cavities, including cavities with insulation.
- White flush sleeve with snap function allows the plug to be pre-installed quickly and securely in the drill hole.
- With scale on the grip strap (fischer DUOTEC 12) for determining the required screw length (scale value + 20 mm).

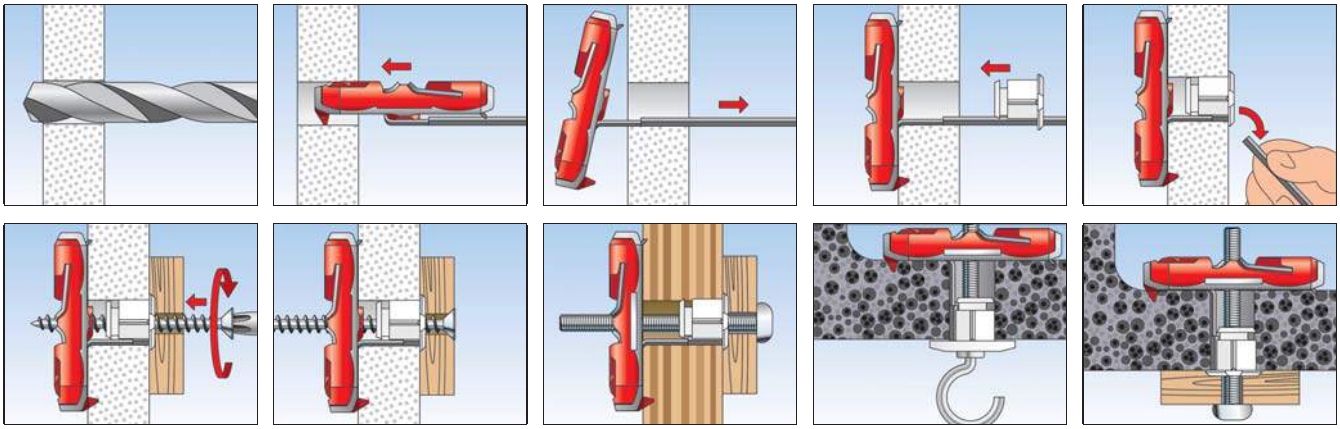
APPLICATIONS

- Kitchen hanging cabinets
- Living room cabinets
- Shelves
- Wardrobes
- Handrails
- Pictures
- Mirrors
- Lamps
- Heavy hanging baskets

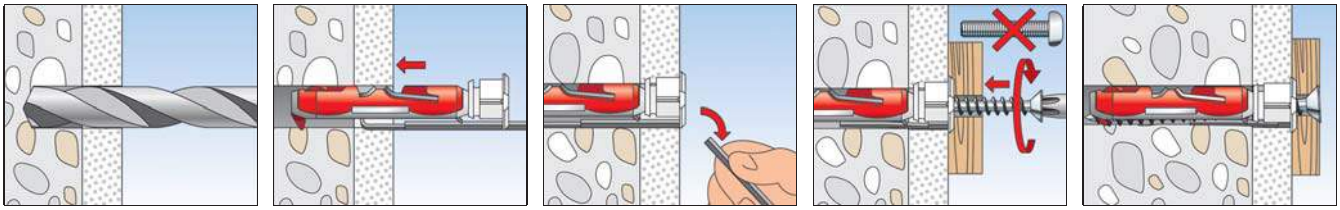
FUNCTIONING

- The fischer DUOTEC is designed for pre-positioned installation.
- Simple installation with a standard diameter 10 or 12 mm drill bit.
- The short toggle element makes it suitable for narrow and even with mineral wool insulated cavities. Note the length of the toggle element!
- Functions like an expansion plug in solid building materials such as concrete or wood. Note, not with metric screws!
- Flexible screw insert allows for the use of wood, chipboard and metric screws and hooks.

INSTALLATION IN PLASTERBOARD AND CAVITY FIXINGS



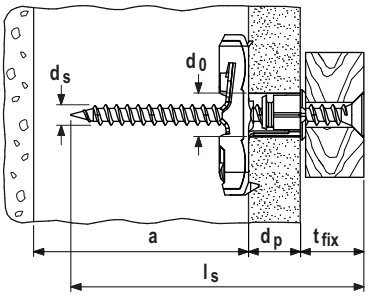
INSTALLATION HITTING IN SOLID MATERIALS



TECHNICAL DATA BOARD MATERIAL

Nylon toggle **fischer DUOTEC 10**

Nylon toggle **fischer DUOTEC 12**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. panel thickness d_p [mm]	Max. panel thickness d_p [mm]	Min. cavity depth a [mm]	Screw diameter d_s [mm]	Screw length l_s [mm]	Sales unit [pcs]
fischer DUOTEC 10	**537258**	10	12	55	40	4,5 - 5,0	≥ dp + tfix +20	50
fischer DUOTEC 10 S	**537259** 1)	10	12	55	40	5,0	70	25
fischer DUOTEC 10 S PH	**539025** 2)	10	12	55	40	5,0	70	25
fischer DUOTEC 12	**542796**	12	12	55	50	5,0 - 6,0 / M6	≥ dp + tfix +20	10
fischer DUOTEC 12 S PH M	**542797** 2)3)	12	12	55	50	M6	55	10
fischer DUOTEC 12 RH	**542798** 4)	12	12	55	50	5,5	70	10

1) fischer DUOTEC S - with chipboard screw countersunk head

2) DUOTEC S PH - with chipboard screw panhead

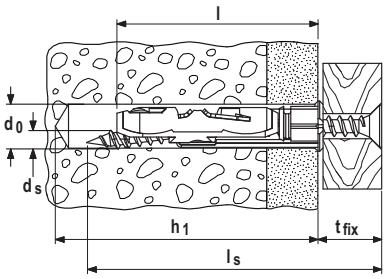
3) fischer DUOTEC S PH - with machine screw panhead

4) fischer DUOTEC RH - with screw with round hook

TECHNICAL DATA HITTING IN SOLID MATERIALS

Nylon toggle **fischer DUOTEC 10**

Nylon toggle **fischer DUOTEC 12**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Screw diameter [mm]	Min. screw length l_s [mm]	Anchor length l [mm]	Max. fixture thickness t_{fix} [mm]	Sales unit [pcs]
fischer DUOTEC 10	**537258**	10	ls - tfix + 10	4,5 - 5,0	tfix + 55	50	ls - 55	50
fischer DUOTEC 10 S	**537259** 1)	10	65	5,0	70	50	15	25
fischer DUOTEC 10 S PH	**539025** 2)	10	65	5,0	70	50	15	25
fischer DUOTEC 12	**542796**	12	ls - tfix + 10	5,0 - 6,0	tfix + 65	60	ls - 65	10
fischer DUOTEC 12 RH	**542798** 3)	12	75	5,5	55	60	–	10

1) fischer DUOTEC S - with chipboard screw countersunk head

2) DUOTEC S PH - with chipboard screw panhead

3) fischer DUOTEC RH - with screw with round hook

LOADS

Nylon toggle fischer DUOTEC

Highest recommended loads[1)4)] for a single anchor.

Type			fischer DUOTEC 10 Chipboard screw		Metrical screw	fischer Hook	fischer DUOTEC 12 Chipboard screw		Metrical screw	fischer Hook
Screw diameter		[mm]	4,5	5	5	5	5	6	6	5,5
Recommended loads in the respective base material F_{rec}[2)] for a span in the construction b = 625 mm										
Gypsum plasterboard	9,5 mm	[kN]	0,17	0,17	0,17	0,17	0,17	0,17	0,17	0,17
Gypsum plasterboard	12,5 mm	[kN]	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,43	0,43	0,43	0,30[3)]	0,43	0,43	0,43	0,43
Gypsum fibreboard	12,5 mm	[kN]	0,51	0,51	0,51	0,30[3)]	0,51	0,51	0,51	0,50[3)]
Chipboard	16 mm	[kN]	0,71	0,71	0,71	0,30[3)]	0,75	0,80	0,80	0,50[3)]
OSB board	18 mm	[kN]	0,75	0,75	0,75	0,30[3)]	0,75	1,30	1,20	0,50[3)]
Recommended loads in the respective base material F_{rec}[2)] for a span in the construction b = 120 mm										
Gypsum plasterboard	9,5 mm	[kN]	0,20	0,20	0,20	0,20	0,20	0,20	0,20	0,20
Gypsum plasterboard	12,5 mm	[kN]	0,36	0,36	0,36	0,30[3)]	0,36	0,36	0,36	0,20
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,59	0,59	0,59	0,30[3)]	0,70	0,80	0,80	0,50[3)]
Gypsum fibreboard	12,5 mm	[kN]	0,75	0,75	0,75	0,30[3)]	0,80	1,10	1,10	0,50[3)]
Chipboard	16 mm	[kN]	0,75	0,75	0,75	0,30[3)]	0,80	1,40	1,30	0,50[3)]
OSB board	18 mm	[kN]	0,75	0,75	0,75	0,30[3)]	0,80	1,50	1,40	0,50[3)]
Recommended loads in solid building materials F_{rec}[2)]										
Concrete	≥ C20/25	[kN]	0,45	0,75	-	0,30[3)]	0,40	0,75	-	0,30
Wood		[kN]	0,30	0,75	-	0,30[3)]	0,20	0,65	-	0,30
Recommended loads in the respective base material F_{rec}[2)]										
Hollow block of lightweight aggregate concrete 'Sepa Parpaing'	f_b ≥ 8 N/mm²	[kN]	-	-	-	-	0,65	1,00	1,00	0,50[3)]
Pre-stressed hollow-core concrete slabs		[kN]	-	-	-	-	1,00	1,40	1,30	0,50[3)]
Hollow block of lightweight aggregate concrete Hbl acc. EN 771-3	f_b ≥ 2 N/mm²	[kN]	-	-	-	-	0,90	1,00	1,00	0,50[3)]

[1)] Required safety factors are considered.

[2)] Valid for tensile load, shear load and oblique load under any angle.

[3)] Bending of the hook is decisive. Only for tension load.

[4)] The recommended loads are reference values and depending to the building material and the workmanship. The values are only valid for the given screw diameter.

The versatile metal cavity fixing with metric screws

Curtain rails

Shelves

BUILDING MATERIALS

- Gypsum plasterboard and gypsum fibreboards
- Cavity floor slabs
- Light building boards made of wood wool
- Chipboard
- Plywood boards

ADVANTAGES

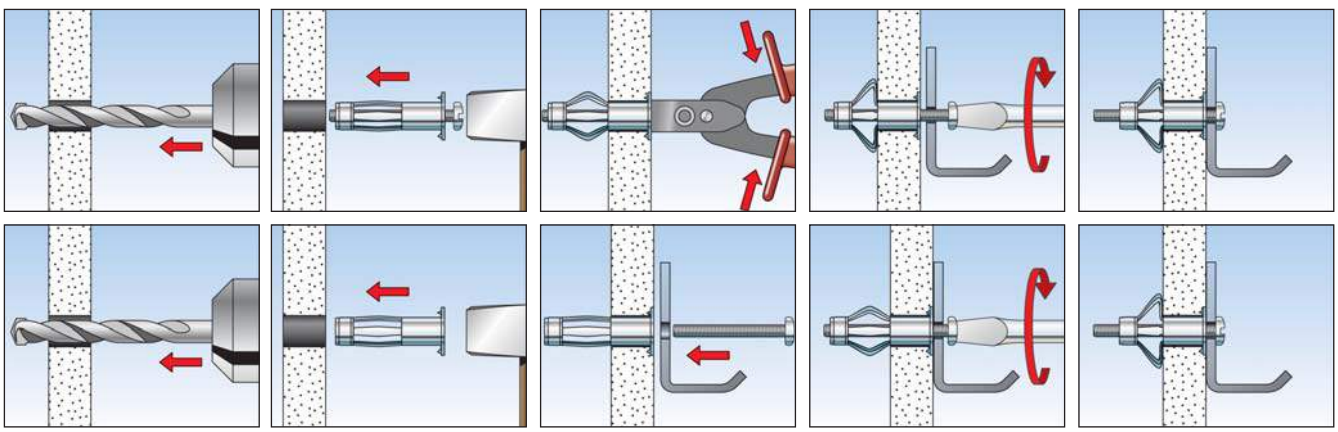
- Due to the extensive range, the HM is suitable for board building materials with a thickness of 3-50 mm and thus suitable for a number of different applications.
- The metric internal thread allows the attachment to be removed and refitted several times, thus offering the best possible flexibility.
- The HM's expanding arms ensure a large supporting surface, thus allowing a high load-bearing capacity.
- The claws around the edge of the fixing penetrate the board building material, preventing the fixing from rotating, thus ensuring a secure installation.

APPLICATIONS

- Pictures
- Lighting
- Light shelves
- Towel rails
- Mirror cabinets
- Curtain rails
- Sub-structures

FUNCTIONING

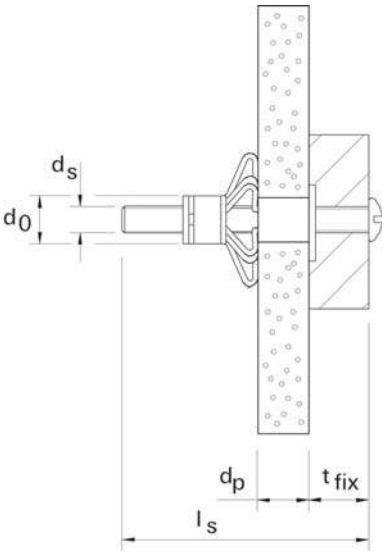
- The metal cavity fixing HM is suitable for pre-positioned installation.
- The fixing should be selected based on the thickness of the board building material, to allow the very best expansion in the cavity.
- During installation, the expanding arms swing open and press onto the reverse side of the board.
- The HM can be installed using installation pliers. If using a battery operated screwdriver or screwdriver for installation, the pre-assembled screws must be removed first. When screwing in and expanding the fixing, the attachment, or a max. 6 mm plate, needs to be used as a turning stop.



Metal cavity fixing HM

TECHNICAL DATA

HM-S with metric screw



HM-SS with hexagon headed screw

HM-H with angle hook

Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Anchor length l [mm]	Screw $d_s \times l_s$ [mm]	Panel thickness d_p [mm]	Fixture thickness t_{fix} [mm]	Drive	Sales unit [pcs]
HM 4 x 32 S	**519769**	8	40	32	M 4 x 40	3 - 13	≤ 15 - 25	PH2	50
HM 4 x 45 S	**519770**	8	52	45	M 4 x 52	16 - 23	≤ 12 - 21	PH2	50
HM 4 x 60 S	**519771**	8	65	60	M 4 x 65	31 - 40	≤ 12 - 21	PH2	50
HM 5 x 37 S	**519772**	10	45	37	M 5 x 45	6 - 15	≤ 8 - 17	PH2	50
HM 5 x 52 S	**519774**	10	58	52	M 5 x 58	7 - 21	≤ 10 - 24	PH2	50
HM 5 x 65 S	**519775**	10	71	65	M 5 x 71	20 - 34	≤ 12 - 26	PH2	50
HM 6 x 37 S	**519777**	12	45	37	M 6 x 45	6 - 15	≤ 12 - 21	PH3	50
HM 6 x 52 S	**519778**	12	58	52	M 6 x 58	7 - 21	≤ 14 - 28	PH3	50
HM 6 x 65 S	**519782**	12	71	65	M 6 x 71	17 - 34	≤ 13 - 30	PH3	50
HM 6 x 80 S	**519779**	12	88	80	M 6 x 88	32 - 50	≤ 16 - 34	PH3	50
HM 8 x 54 SS	**519783** 1)	12	60	54	M 8 x 60	7 - 21	≤ 16 - 30	SW13	50
HM 4 x 32 H	**519780**	8	45	32	–	3 - 13	–	–	50
HM 5 x 65 H	**519781**	10	71	65	–	20 - 34	–	–	50

1) with hexagon headed screw, assembly only by using the professional installation tool HM Z 1

ACCESSORIES

HM Z 1 - the professional installation tool

HM Z 2 - the DIY installation tool

Item	Art.-No.	Adapted for	Sales unit [pcs]
HM Z 1	**062320**	HM 4 - HM 8	1
HM Z 2	**062321**	HM 4 - HM 6	1

LOADS

Metal cavity fixing HM

Highest recommended loads[1] for a single anchor.

Type			HM 4 x 32 S	HM 4 x 46 S	HM 5 x 37 S	HM 5 x 52 S	HM 5 x 65 S	HM 6 x 37 S	HM 6 x 52 S	HM 6 x 65 S	HM 8 x 55 SS
Thread size		[M]	M4	M4	M5	M5	M5	M6	M6	M6	M8
Recommended loads in the respective base material F_{rec}[2]											
Gypsum plasterboard	9,5 mm	[kN]	0,15	0,15	0,15	0,15	-	0,15	-	-	-
Gypsum plasterboard	12,5 mm	[kN]	0,20	0,20	0,20	0,20	-	0,20	0,20	-	0,20
Gypsum plasterboard	19 mm (2 x 9,5 mm)	[kN]	-	-	-	0,25	-	-	0,25	-	0,25
Gypsum plasterboard	25 mm (2 x 12,5 mm)	[kN]	-	-	-	-	0,30	-	-	0,30	-
Chipboard	10 mm	[kN]	0,25	0,25	0,25	0,25	-	0,25	0,25	-	0,25
Chipboard	13 mm	[kN]	0,25	0,25	0,25	0,25	-	0,25	0,25	-	0,25
Chipboard	28 mm	[kN]	-	-	-	-	0,50	-	-	0,50	-
Plywood	4 mm	[kN]	0,10	-	-	-	-	-	-	-	-
Hardboard	3 mm	[kN]	0,10	-	-	-	-	-	-	-	-
Wood wool slab	16 mm	[kN]	-	0,05	-	0,05	-	-	0,05	-	0,05
Wood wool slab	25 mm	[kN]	-	-	-	-	0,05	-	-	0,05	-
Fibre cement board	8 mm	[kN]	0,25	0,25	0,25	0,25	-	0,25	-	-	-
Gypsum fibreboard	10 mm	[kN]	0,25	0,25	0,25	0,25	-	0,25	0,25	-	0,25
Gypsum fibreboard	15 mm	[kN]	-	0,25	0,25	0,25	-	0,25	0,25	-	0,25

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

The cavity fixing for different board thicknesses and large usage lengths

Ceiling lamps

Wash basins

BUILDING MATERIALS

- Gypsum plasterboard and gypsum fibreboards
- Cavity floor slabs made from bricks and concrete
- Chipboard
- Plywood boards

CERTIFICATES

ADVANTAGES

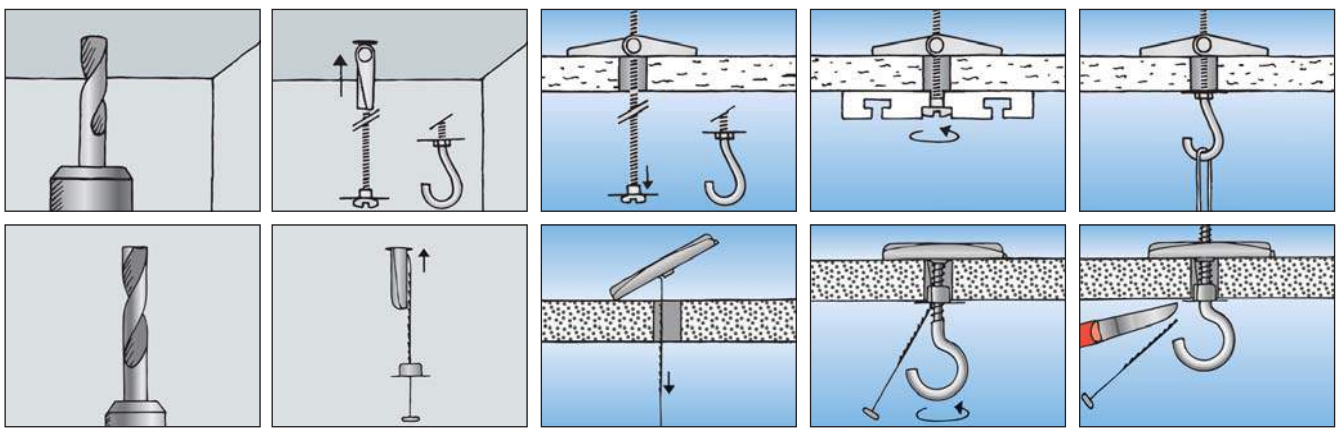
- Universal fixing for fastenings in a wide range of drywall and hollow wall materials.
- When the metal crosspiece is pushed through the drill hole, pull it firmly against the inner wall cavity by tugging the plastic pull ring on the outer wall.
- Afterwards cut the plastic legs off and fasten the fixture with e.g. a screw or screw in a hook or an eyebolt according to your demands.
- Suitable for pre-positioned installation.

APPLICATIONS

- Pictures
- Lighting
- Light shelves
- Towel rails
- Mirror cabinets
- Light cabinets
- Wash basins and urinals (KM 10)
- Cable and pipe clips

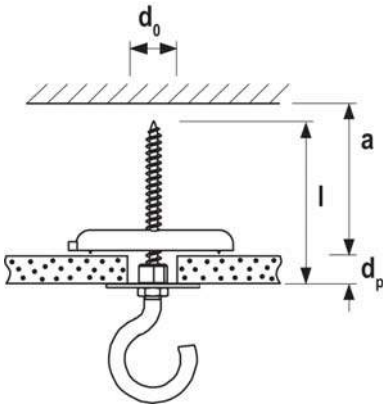
FUNCTIONING

- The gravity and spring toggle are suitable for pre-positioned installation.
- When placed in the drill hole, the bearing elements of the gravity and spring toggles independently swing open behind the board.
- The KM 10 is specially suited to fixing wash basins and urinals into installation and cavity walls.
- No special installation tool required. For a fast and convenient installation.



TECHNICAL DATA

Nylon toggle **K 54**

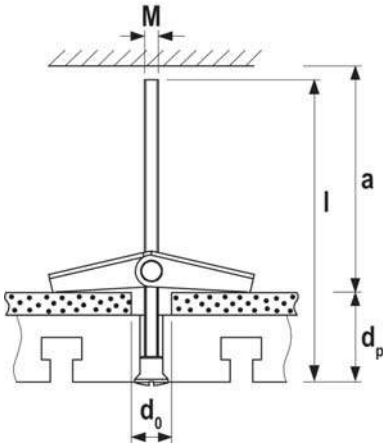


Item	Art.-No.	Drill hole diameter d_0 [mm]	Max. panel thickness d_p [mm]	Min. cavity depth a [mm]	Anchor length l [mm]	Thread Ø x length [mm]	Sales unit [pcs]
K 54	**050323**	10	65	58	125	woodscrew 4mm	25

TECHNICAL DATA

Spring toggle **KD 3 + 4**

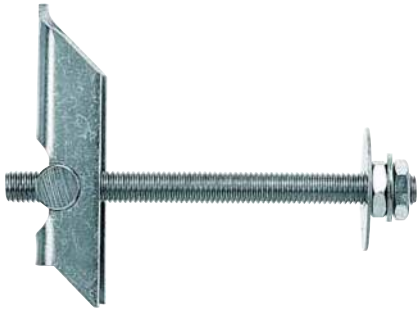
Spring toggle with hook **KDH 3 + 4**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Max. panel thickness d_p [mm]	Min. cavity depth a [mm]	Anchor length l [mm]	Thread Ø x length [mm]	Sales unit [pcs]
KD 3	**080181**	12	65	27	95	M 3 x 90	50
KDH 3	**080182**	12	51	27	105	M 3 x 80	25
KD 3 B	**080192**	12	65	27	95	M 3 x 90	10
KD 4	**080183**	14	69	34	105	M 4 x 100	25
KDH 4	**080184**	14	35	34	95	M 4 x 70	25
KD 4 B	**080193**	14	69	34	105	M 4 x 100	10

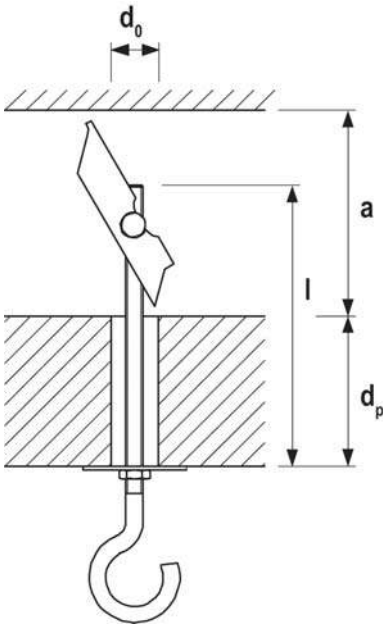
Gravity- and spring-toggle K, KD, KDH, KM

TECHNICAL DATA



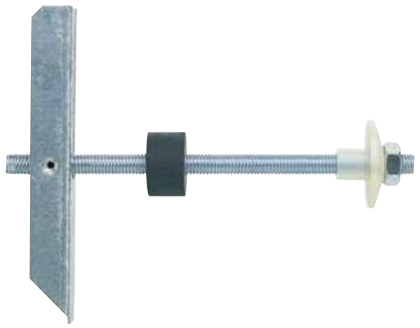
Gravity toggle **KD 5 + 6 + 8**

Gravity toggle with hook **KDH 5 + 6 + 8**

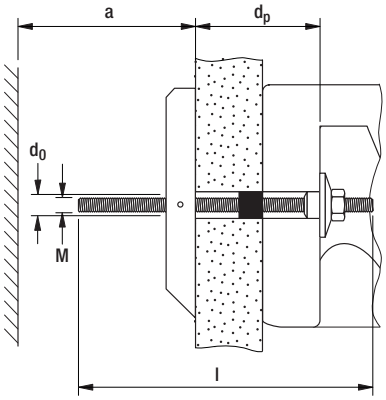


Item	Art.-No.	Drill hole diameter d_0 [mm]	Max. panel thickness d_p [mm]	Min. cavity depth a [mm]	Anchor length l [mm]	Thread Ø x length [mm]	Sales unit [pcs]
KD 5	**080187**	16	63	70	100	M 5 x 100	25
KDH 5	**080188**	16	60	70	130	M 5 x 90	20
KD 6	**080185**	16	63	70	100	M 6 x 100	25
KDH 6	**080186**	16	60	70	130	M 6 x 100	20
KD 8	**080178**	20	55	75	100	M 8 x 100	20
KDH 8	**080179**	20	55	75	130	M 8 x 100	20

TECHNICAL DATA



Gravity toggle **KM 10**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Max. panel thickness d_p [mm]	Min. cavity depth a [mm]	Anchor length l [mm]	Screw d_S x l_S [mm]	Sales unit [pcs]
KM 10	**050326**	30	90	140	180	M 10 x 180	25

LOADS

Toggle fixing KD

Highest recommended loads[1] for a single anchor.

Type			KD3	KD4	KD5	KD6	KD8	KDH3	KDH4	KDH5	KDH6	KDH8
Thread size		[M]	M3	M4	M5	M6	M8	M3	M4	M5	M6	M8
Recommended loads in the respective base material F_{rec}[2]												
Gypsum plasterboard	12,5 mm	[kN]	0,15	0,15	0,15	0,15	0,18	0,07[3]	0,13[3]	0,15	0,15	0,18
OSB board	≥15 mm	[kN]	0,34	0,58	0,85	0,85	0,89	0,07[3]	0,13[3]	0,30[3]	0,45[3]	0,89

[1] Required safety factors are considered.

[2] Valid for axial tensile load.

[3] Bending of the hook is decisive. Only for tension load.

LOADS

Toggle fixing KM10 and K54

Mean ultimate loads

Type		KM10	K54
Screw diameter		M10	4mm
Mean ultimate loads F_u[1) 2) 3)]	**[kN]**	**13,0**	**0,8**

[1] Upon these failure loads an appropriate safety factor has to be considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

[3] If the failure of the base material is not possible.

Board fixing PD

The expansion plug for fixings in gypsum plasterboard, gypsum fibreboard and wooden panels

Towel rails

Small shelves

BUILDING MATERIALS

- Gypsum plasterboard and gypsum fibreboards
- Wooden boards
- MDF boards
- Multiplex boards
- OSB boards
- Plywood boards
- Chipboard
- Wood core plywood boards

CERTIFICATES

ADVANTAGES

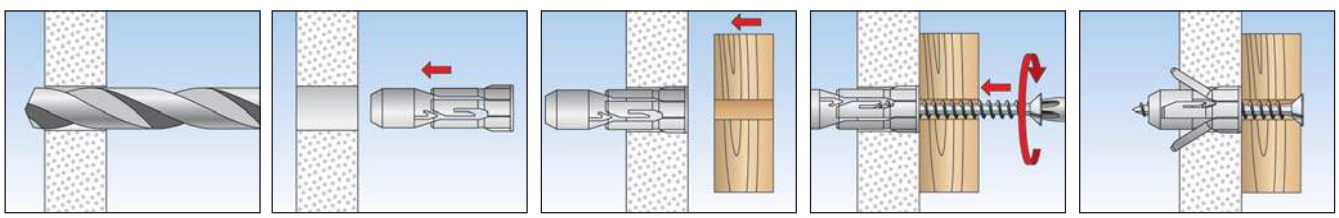
- The operating principle of the fixing allows for use in various board thicknesses, including in low cavity depths. This provides great flexibility.
- The special fixing geometry with a nylon cone ensures a high tightening torque that can be identified immediately. This offers a high level of installation safety.
- The longitudinal ribs prevent the fixing from rotating in the drill hole, thus allowing for a reliable installation.
- The board fixing PD can be used with the most wide-ranging screws, hooks and eye screws. This allows for a broad range of applications.

APPLICATIONS

- Pictures
- Lighting
- Light shelves
- Towel rails
- Mirror cabinets
- Curtain rails

FUNCTIONING

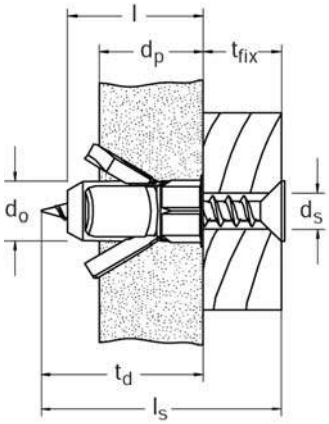
- The board fixing PD is suitable for pre-positioned installation.
- Use rotary drilling to create the drill hole.
- When the screw is tightened, the plastic cone is pulled into the sleeve and expands the fixing.
- Use full-thread screws, or alternatively, the part of the screw without thread may not be longer than the thickness of the item being attached.
- Do not use screws with double-start threads.



TECHNICAL DATA

Board fixing **PD**

Board fixing **PD S** - with chipboard screw



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Min. panel thickness d_p [mm]	Anchor length l [mm]	Chipboard screw d_s / d_s x l_s [mm]	Max. fixture thickness t_{fix} [mm]	Sales unit [pcs]
PD 8	**024771**	8	31	6	29	4	–	100
PD 10	**015935**	10	30	7	28	5	–	100
PD 12	**015937**	12	29	9	27	6	–	50
PD 8 S	**024772** 1)	8	31	6	29	4 x 40	11	50
PD 10 S	**015936** 1)	10	30	7	28	5 x 40	12	50
PD 12 S	**015938** 1)	12	29	9	27	6 x 50	22	25

1) PD-S with chipboard screw.

LOADS

Board fixing PD

Highest recommended loads[1)] for a single anchor.

The given loads are valid for chipboard screws with the specified diameter.

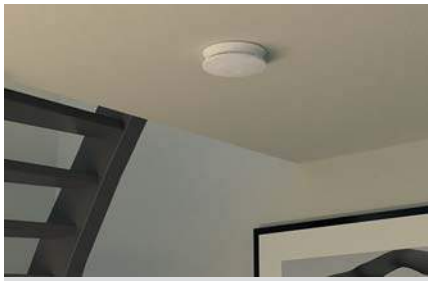
Type			PD 8	PD 10	PD 12
Chipboard screw	Ø	[mm]	4	5	6
Recommended loads in the respective base material F_{rec}[2)]					
Gypsum plasterboard	9,5 mm	[kN]	0,10	0,10	0,10
Gypsum plasterboard	12,5 mm	[kN]	0,10	0,10	0,15
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,15	0,15	0,15
Gypsum fibreboard	12,5 mm	[kN]	0,20	0,25	0,30
Plywood		[kN]	0,15	0,40	0,80
Chipboard	16 mm	[kN]	0,25	0,25	0,25

[1)] Required safety factors are considered.

[2)] Valid for tensile load, shear load and oblique load under any angle.

Plasterboard fixing DUOBLADE

The self-drilling plasterboard plug for fast and easy installation



Smoke detectors

Mirrors

BUILDING MATERIALS

- Gypsum plasterboard, single and double-planked
- Gypsum fibreboard
- Lightweight cement boards

CERTIFICATES

ADVANTAGES

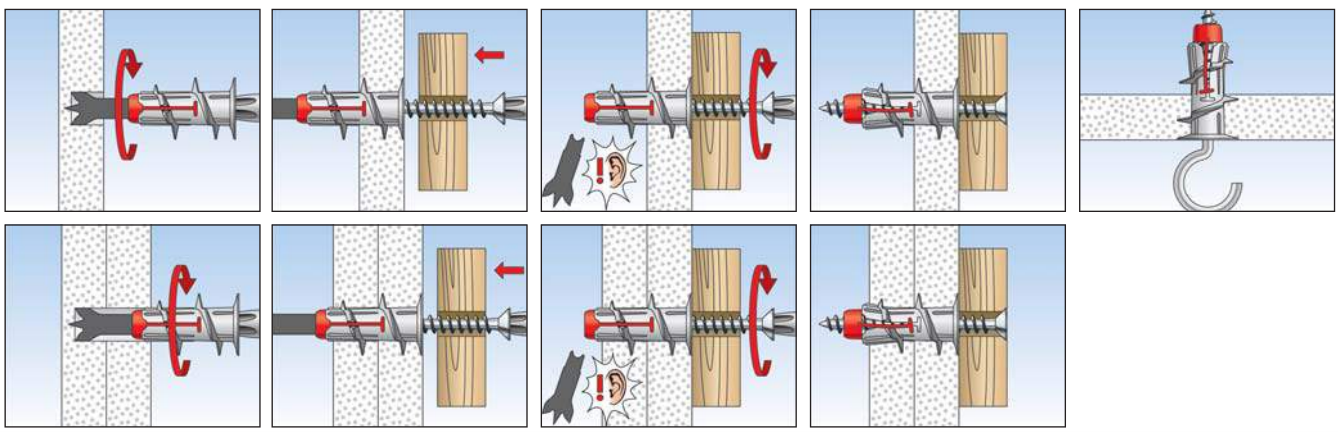
- An innovative product of the fischer DUO-Line with intelligent combinations for more power and more intelligence.
- The self-drilling fischer DUOBLADE allows fast and easy installation in gypsum plasterboard and gypsum fibreboard.
- The black metal tip guarantees simple and safe installation.
- High torque when anchor is installed for the feelgood-factor and an optimum feeling when setting.
- PZ 2 drive - same drive for plug and screw.

APPLICATIONS

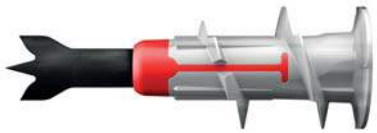
- Smoke detectors
- Mirrors
- Curtain rods
- Blinds
- Lamps
- Pictures

FUNCTIONING

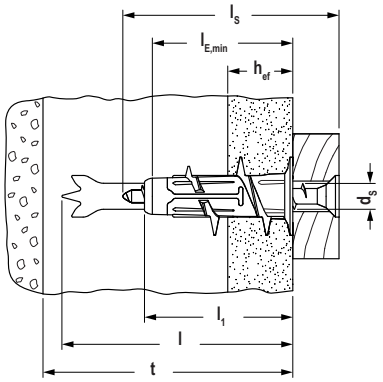
- The fischer DUOBLADE is suitable for pre-positioned installation.
- The metal tip for better heat-resistant and cutting characteristics. Especially in double-layered plasterboard.
- The fischer DUOBLADE can be used with wood, metal and chipboard screws of Ø4.0 to Ø5.0 mm.



TECHNICAL DATA



DUOBLADE



Item	Art.-No.	Min. thickness to first supporting layer t [mm]	Anchor length l [mm]	Anchor length without drill tip l_1 [mm]	Anchorage depth h_{ef} [mm]	Min. bolt penetration $l_{E,min}$ [mm]	Wood and chipboard screws d_S / d_S x l_S [mm]	Drive	Sales unit [pcs]
DUOBLADE	**545675**	50	44	29	9,5 - 25	28	4 - 5	–	50
DUOBLADE S	**545676** 1)	50	44	29	9,5 - 25	28	4,5 x 40	PZ2	25
DUOBLADE K NV	**545683**	50	44	29	9,5 - 25	28	4 - 5	–	10
DUOBLADE S K NV	**545684** 1)	50	44	29	9,5 - 25	28	4,0 x 46	PZ2	6
DUOBLADE WH K NV	**545685** 2)	50	44	29	9,5 - 25	28	4,2 x 40	–	6
DUOBLADE RH K NV	**545686** 3)	50	44	29	9,5 - 25	28	4,5 x 40	–	6

1) With chipboard screw countersunk head.

2) With screw with angle hook.

3) With screw with round hook.

LOADS

Plasterboard fixing DUOBLADE

Highest recommended loads[1)] for a single anchor.

The given loads are valid for chipboard screws with the specified diameters.

Type			DUOBLADE
Chipboard screw	Ø	[mm]	4,0 - 5,0
Recommended loads in the respective base material F_{rec}[2)]			
Gypsum plasterboard	9,5 mm	[kN]	0,08
Gypsum plasterboard	12,5 mm	[kN]	0,10
Gypsum plasterboard (e.g. Knauf Diamant board or Rigips Die Harte)	12,5 mm	[kN]	0,18
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,20
Lightweight Cement Board	12,5 mm	[kN]	0,08
Gypsum fibreboard	12,5 mm	[kN]	0,34

[1)] Required safety factors are considered.

[2)] Valid for tensile load, shear load and oblique load under any angle.

The fastest installation in gypsum plasterboard

Wall lamps

Pictures

BUILDING MATERIALS

- Gypsum plasterboard, single and double-planked

CERTIFICATES

ADVANTAGES

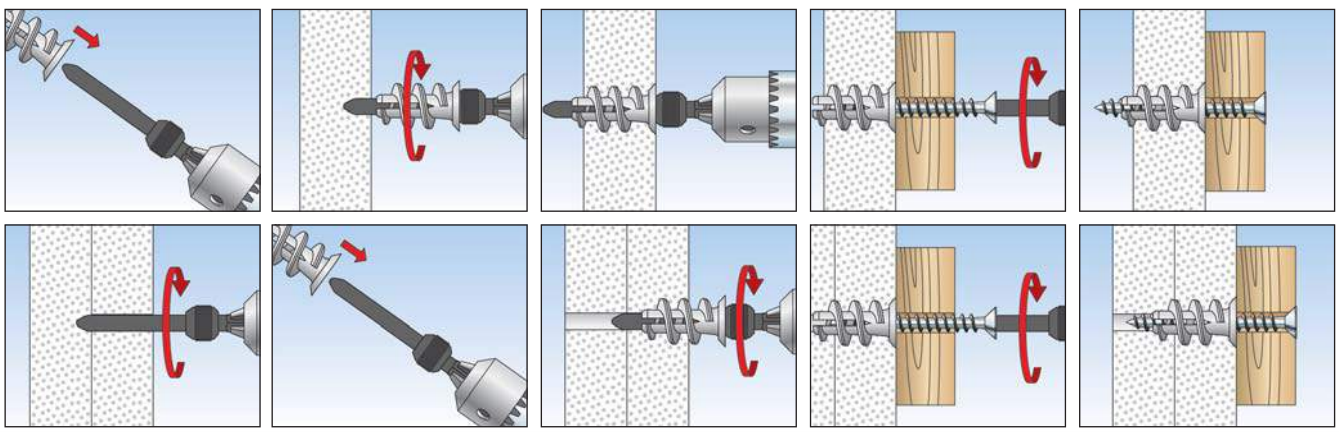
- The included setting tool combines the drilling and fixing setting functions. It thus allows for a fast and simple installation.
- The sharp, self-tapping thread of the GK enables a secure, positive fit fixing. This achieves a high load-bearing capacity.
- The short fixing length means that only a small amount of space is required behind the board. As a result, the GK can also be used in the case of unknown board thickness and cavity depth.
- The cross-drive recess in the head of the fixing means that the GK can also be screwed out like a screw without a setting tool.
- The GK can be used with the most wide-ranging screws, hooks and eye screws. This allows for a broad range of applications.

APPLICATIONS

- Pictures
- Lighting
- Electrical installations
- Fitting accessories
- Series installations

FUNCTIONING

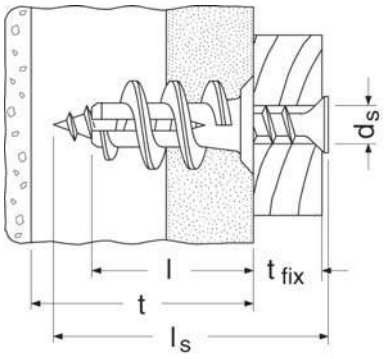
- The gypsum plasterboard fixing GK is suitable for pre-positioned installation.
- The GK is screwed flush into the gypsum plasterboard using the setting tool provided. Overtightening the fixing should be avoided. Therefore, the installation torque should be limited when using a battery operated screwdriver.
- Adapted for wood, self-tapping and chipboard screws of 4.0 to 5.0 mm diameter.
- For board thicknesses greater than 15 mm, drill a hole first by using the setting tool.
- Not suitable for gypsum fibreboard and tiled plasterboard.



TECHNICAL DATA

Plasterboard fixing **GK**

Plasterboard fixing **GKS**



Item	Art.-No.	Anchor length l [mm]	Min. thickness to first supporting layer t [mm]	Max. fixture thickness t_{fix} [mm]	Screw $d_S \times l_S$ [mm]	Drive	Sales unit [pcs]
GK	**052389** 1)2)	22	25	–	4,0 - 5,0 x Ls	–	100
GK S	**052390** 1)3)	22	25	13	4,5 x 35	PZ2	50

1) Including installation tool GKW.

2) Min. screw length = length of plug 22 mm + thickness of building component.

3) Supplied with plasterboard screw.

ACCESSORIES

Installation tool **GKW**

PROFI-BOX GK

Item	Art.-No.	Contents	Sales unit [pcs]
GKW	**052393**	-	10
PROFI-BOX GK	**518528**	50 Plasterboard fixings GK, 1 Installation tool, 38 Chipboard screws 4,5 x 35, 6 Angle hooks 4,2 x 40, 6 Round hooks 4 x 46	1

LOADS

Plasterboard fixing GK

Highest recommended loads[1] for a single anchor.

The given loads are valid for chipboard screws with the specified diameter.

Type			GK
Chipboard screw	Ø	[mm]	4,0 - 5,0
Recommended loads in the respective base material F_{rec}[2]			
Gypsum plasterboard	9,5 mm	[kN]	0,07
Gypsum plasterboard	12,5 mm	[kN]	0,08
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,11

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

Plasterboard fixing GK GREEN

The fastest installation in gypsum plasterboard

Wall lamps

Pictures

BUILDING MATERIALS

- Gypsum plasterboard, single and double-planked

CERTIFICATES

BIOBASED 50 - 85%
DIN Geprüft
8C029

ADVANTAGES

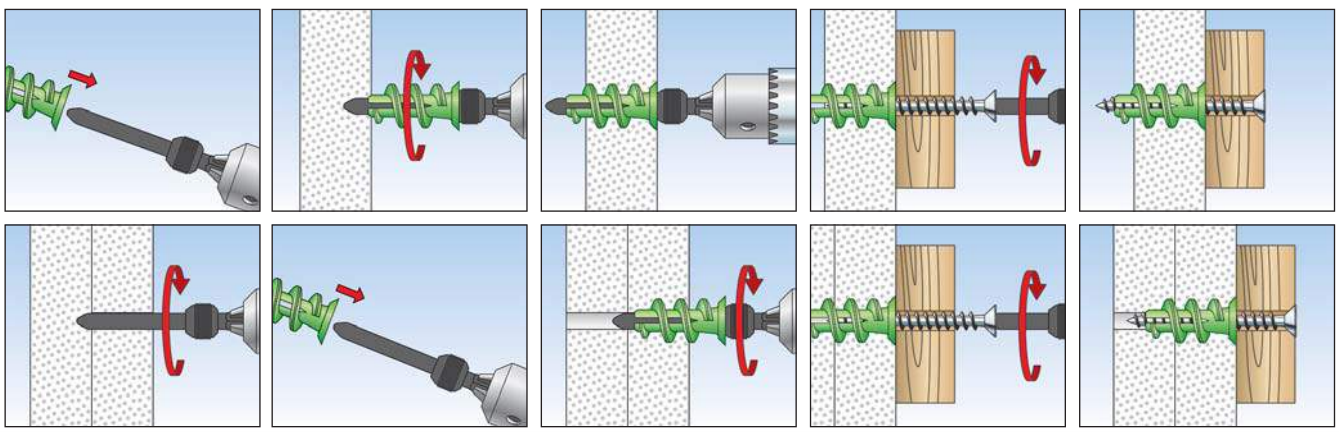
- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular GK plugs.
- The included setting tool combine the functions of drilling and setting fixings for direct and easy installation.
- Sharp, self-tapping thread for a positive-fit connection with a high load-bearing capacity.
- The cross-drive recess in the head of the fixing means that the GK GREEN can also easily be screwed out like a screw.
- The GK GREEN can be used with various screws, hooks and eye screws, making it very versatile in its applications.

APPLICATIONS

- Pictures
- Lighting
- Electrical installations
- Fitting accessories
- Series installations

FUNCTIONING

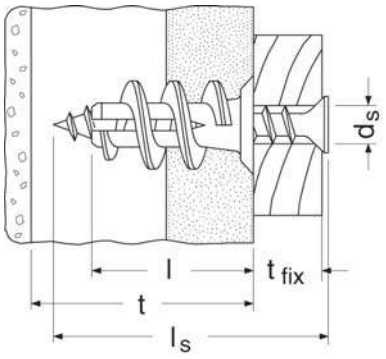
- The gypsum plasterboard fixing GK GREEN is suitable for pre-positioned installation.
- The GK GREEN is screwed flush into the gypsum plasterboard using the setting tool provided. Avoid manual and machine-aided overtightening.
- For board thicknesses greater than 15 mm, drill a hole first by using the setting tool.
- Adapted for wood, sheet metal and chipboard screws with a diameter of 4.0 to 5.0 mm.
- Not suitable for gypsum fibreboard and tiled plasterboard.



TECHNICAL DATA

Plasterboard fixing **GK GREEN**

Plasterboard fixing **GK GREEN S**



Item	Art.-No.	Anchor length l [mm]	Min. thickness to first supporting layer t [mm]	Max. fixture thickness t_{fix} [mm]	Screw $d_S \times l_S$ [mm]	Drive	Sales unit [pcs]
GK GREEN	**524868** 1) 2)	22	25	–	4,0 - 5,0 x Ls	–	90
GK GREEN S	**524869** 1) 3)	22	25	13	4,5 x 35	PZ2	45

1) Including installation tool GKW.

2) Min. screw length = length of plug 22 mm + thickness of building component.

3) Supplied with plasterboard screw.

ACCESSORIES

Installation tool **GKW**

Item	Art.-No.		Sales unit [pcs]
GKW	**052393**		10

LOADS

Plasterboard fixing GK GREEN

Highest recommended loads[1)] for a single anchor.

The given loads are valid for chipboard screws with the specified diameter.

Type			GK GREEN
Chipboard screw	Ø	[mm]	4,0 - 5,0
Recommended loads in the respective base material F_{rec}[2)]			
Gypsum plasterboard	9,5 mm	[kN]	0,07
Gypsum plasterboard	12,5 mm	[kN]	0,08
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,11

[1)] Required safety factors are considered.

[2)] Valid for tensile load, shear load and oblique load under any angle.

Plasterboard fixing metal GKM

The self-tapping metal fixing for gypsum plasterboard and gypsum fibreboard

Wall lamps

Speaker cabinets

BUILDING MATERIALS

- Gypsum fibreboard
- Gypsum plasterboard

ADVANTAGES

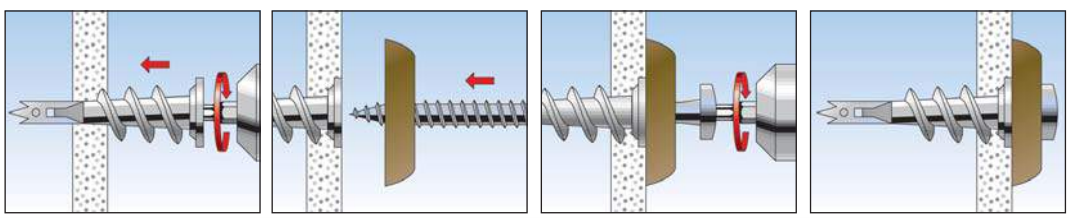
- Due to its material properties, the GKM can be used in gypsum plasterboard and gypsum fibreboard, and can be used with the most wide-ranging screws, hooks and eye screws. This allows for a broad range of applications.
- The sharp, self-tapping thread enables a secure, positive fit fixing. This achieves a high load-bearing capacity.
- The cross-drive recess means that a standard screwdriver or bit can be used. No special setting tool is required.
- The short fixing length means that only a small amount of space is required behind the board. As a result, the GKM can also be used in the case of unknown board thickness and cavity depth.

APPLICATIONS

- Pictures
- Lighting
- Electrical installations
- Fitting accessories

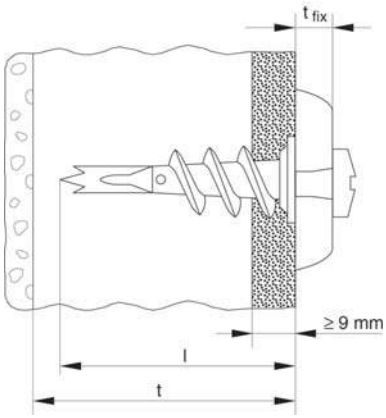
FUNCTIONING

- The GKM is suitable for pre-positioned installation.
- The self-tapping metal fixing GKM taps itself into the plasterboard with a positive fit.
- Flush installation in the board building material. Overtightening the fixing should be avoided. Therefore, the installation torque should be limited when using a battery operated screwdriver.
- Adapted for wood, self-tapping and chipboard screws of 4.0 to 5.0 mm diameter.
- Pre-drill with a Ø 8 mm drill bit when using gypsum fibreboard and double-planked gypsum plasterboard.
- Not suitable for tiled plasterboard.



TECHNICAL DATA

Plasterboard fixing metal **GKM**



Item	Art.-No.	Anchor length l [mm]	Min. thickness to first supporting layer t [mm]	Max. fixture thickness t_{fix} [mm]	Screw $d_s \times l_s$ [mm]	Drive	Sales unit [pcs]
GKM	**024556**	31	35	–	4,0 - 5,0 x Ls	–	100
GKM 12	**040432** 1)	31	35	12	4,5 x 35	PZ2	100
GKM 27	**040434** 2)	31	35	27	4,5 x 50	PZ2	100

1) Supplied with plasterboard screws panhead.

2) Supplied with plasterboard screws countersunk head.

LOADS

Plasterboard fixing metal GKM

Highest recommended loads[1)] for a single anchor.

The given loads are valid for chipboard screws with the specified diameter.

Type			GKM
Chipboard screw	Ø	[mm]	4,0 - 5,0
Recommended loads in the respective base material F_{rec}[2)]			
Gypsum plasterboard	9,5 mm	[kN]	0,07
Gypsum plasterboard	12,5 mm	[kN]	0,08
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,11

[1)] Required safety factors are considered.

[2)] Valid for tensile load, shear load and oblique load under any angle.

fischer
innovative solutions

8 Electrical fixings

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Locking clip SCN

The easy-to-install and secure locking clip for fixing of pipes

Plastic pipes

Plastic pipes

BUILDING MATERIALS

When using 2-component DUOPOWER plug:

- Concrete
- Solid brick
- Solid sand-lime brick
- Aerated concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Plasterboard
- Gypsum plasterboard and gypsum fibreboards
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete or similar
- Natural stone
- Chipboard
- Solid panel made from gypsum
- Solid brick made from lightweight concrete

CHARACTERISTICS

ADVANTAGES

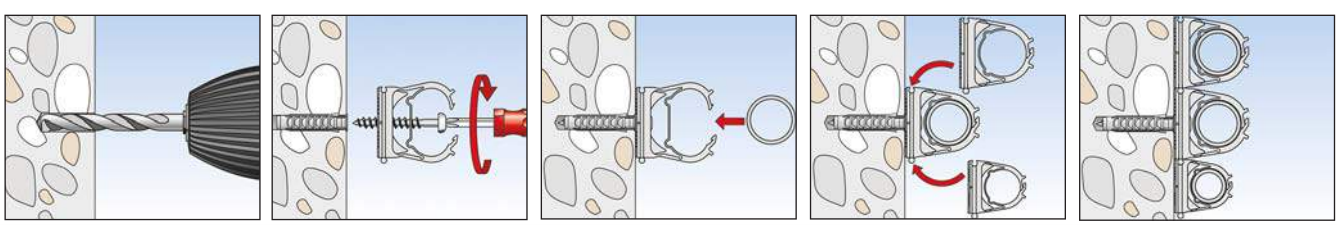
- When pressing, the locking clip SCN automatically embraces and locks the pipe, thus enabling convenient installation.
- The mechanical lock provides a secure and reopenable fixing.
- The integrated slotted hole allows for an easy and adjustable installation.
- The double-sided couplings allow several clips to be coupled together. This saves installation time and money.
- Flexible mounting with plugs and screws or with 11 mm C-profile rails.
- The durable nylon material is halogen- and silicone-free, allows year-round use even under frost and thus ensures a high level of safety.

APPLICATIONS

- Plastic, empty pipes
- Flexible and rigid electric tubes
- Aluminium-, copper- and steel pipes

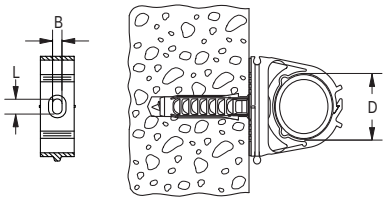
FUNCTIONING

- The locking clip SCN is fixed in pre-positioned installation with a suitable plug and screw or in 11 mm C-profile rails.
- Due to the mechanical locking, the pipes are securely fixed with the clip.
- Installation temperature -20 °C + 60 °C
- Temperature resistance when installed -40 °C to +80 °C.



TECHNICAL DATA

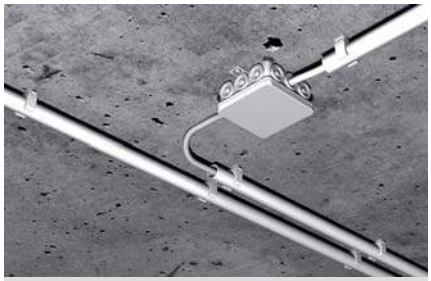
Locking clip **SCN**



Item	Art.-No.	Pipe to wall distance [mm]	Clamping range D [mm]	Dimension of slot B x L [mm]	Sales unit [pcs]			
SCN 16	**501261**	11	16	4,5 x 4,5	100			
SCN 20	**501262**	11	20	4,5 x 6,5	100			
SCN 25	**501263**	11	25	4,5 x 6,5	50			
SCN 32	**501264**	13	32	4,5 x 7,5	50			
SCN 40	**501265**	13	40	4,5 x 7,5	25			
SCN 50	**501266**	14	50	4,5 x 7,5	25			

Pipe clip RC

The convenient pipe fixing



Fixing plastic insulating conduits

Fixing plastic insulating conduits

BUILDING MATERIALS

When using ClipFix SD:

- Concrete
- Solid pumice block
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

CHARACTERISTICS

ADVANTAGES

- The pipe clip RC can be used with pre-installed clip fixing SD, with Hammerfix N 6 or in 11 mm C-shaped profile-rails, and thus allows for a flexible and cost-effective installation.
- The 6 mm-long hole allows for the optimal alignment of the pipe fixing and ensures a more user-friendly installation.
- Two additional pipe clips can be added to the sides of a pre-fixed pipe clip. This saves assembly time and materials.
- The long-lasting nylon material is halogen- and silicone-free. It can be used all year round, including during a frost. This ensures a high level of safety.

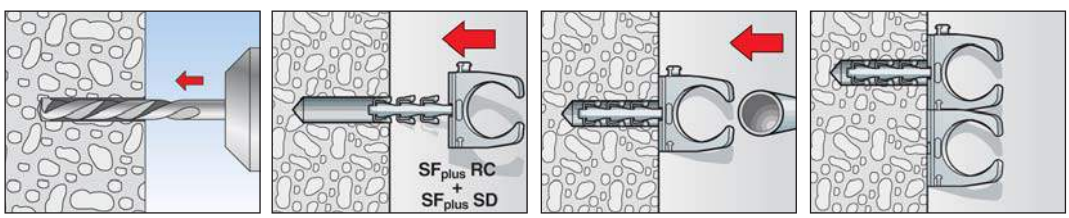
APPLICATIONS

For fixing of:

- Flexible and rigid plastic insulating pipes

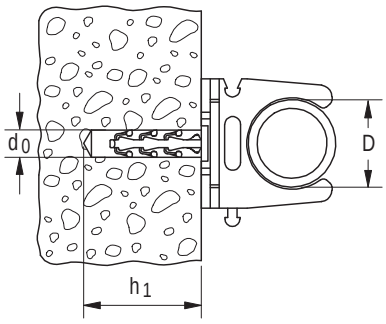
FUNCTIONING

- Plastic insulation pipes are laid into the pipe clip. The pre-tensioning of the pipe clip holds the pipes securely.
- The pipe clip RC is adapted to be fixed with either clip fixing SD or Hammerfix N 6.
- Manually place the ClipFix plus SD directly into the drill hole. No additional screws are needed.
- The Hammerfix N is expanded when the nail is driven in, and holds by friction in the drill hole.
- Temperature resistance once installed from -20 °C to +80 °C.

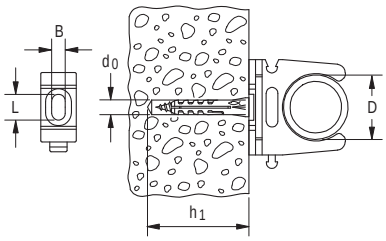


TECHNICAL DATA

Clipfix plus pipe clip **RC**



Pipe clip **RC PG**

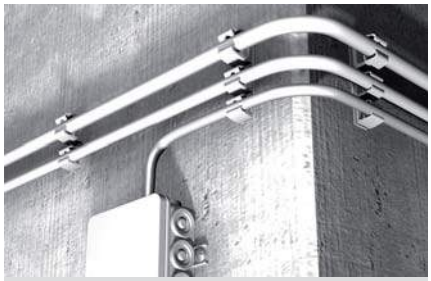


Item	Art.-No.	Drill hole d_0 [Ø mm]	Min. drill hole depth h_1 [mm]	Suitable for IEC	Clamping range D [mm]	Dimension of slot B x L [mm]	Sales unit [pcs]
SF plus RC IEC 12	**048190**	6	35	12	12 - 13	6 x 7	100
SF plus RC IEC 16	**048191**	6	35	16	15 - 16	6 x 8	100
SF plus RC IEC 20	**048193**	6	35	20	20 - 21	6 x 10	100
SF plus RC IEC 25	**048197**	6	35	25	24 - 25	6 x 10	50
SF plus RC IEC 32	**048198**	6	35	32	31 - 32	6 x 10	25
SF plus RC IEC 40	**048199**	6	35	40	38 - 40	6 x 10	25
RC IEC 12	**058194**	–	–	12	12 - 13	6 x 7	100
RC IEC 16	**058120**	–	–	16	15 - 16	6 x 8	100
RC IEC 20	**058122**	–	–	20	20 - 21	6 x 10	100
RC IEC 25	**058198**	–	–	25	24 - 25	6 x 10	50
RC IEC 32	**058199**	–	–	32	31 - 32	6 x 10	40
RC IEC 40	**058200**	–	–	40	39 - 40	6 x 10	40
RC IEC 50	**079194** 1	–	–	50	50 - 51	6 x 10	20
RC IEC 63	**079196** 1	–	–	63	62 - 64	6 x 10	15

1) Does not include latching catches, therefore cannot be mounted side by side.

Pipe clip FC

The flexible pipe clip for various diameters



Cable fixing

Fixing plastic insulating conduits

BUILDING MATERIALS

When using Hammerfix N:

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Building brick
- Natural stone
- Aerated concrete
- Solid panel made from gypsum
- Solid brick made from lightweight concrete

CHARACTERISTICS

ADVANTAGES

- The flexible pipe clip socket ensures a secure hold for various cable and pipe diameters, and reduces the number of products required.
- The pipe clip FC can be installed with both N 5 Hammerfixes and 11 mm-C-shaped profile-rails, and thus offers great flexibility.
- Two additional pipe clips can be added to the sides of a pre-fixed clip clamp. This saves assembly time and materials.
- The long-lasting nylon material is halogen-free. It can be used all year round, including during a frost. This ensures a high level of safety.

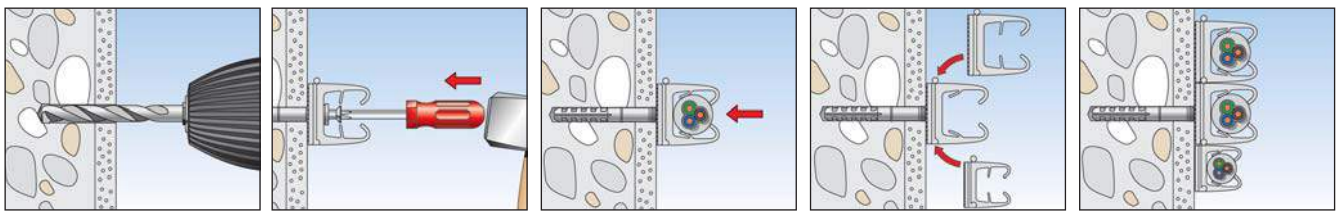
APPLICATIONS

For fixing of:

- Electric cables
- Flexible and rigid plastic insulating pipes

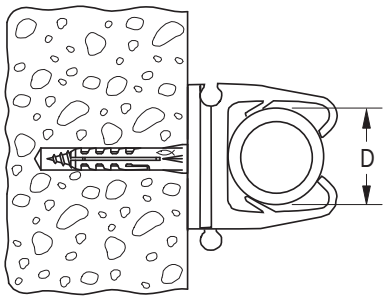
FUNCTIONALITY

- The clip clamp FC is adapted to suit the fixture using N5 Hammerfixes.
- The Hammerfix N is expanded when the nail is driven in, and holds by friction in the drill hole.
- The cables or pipes are then laid in the clip clamp FC. The pre-tensioning of the clip clamp holds the cables or pipes securely.
- Temperature resistance once installed from -40 °C to +80 °C.



TECHNICAL DATA

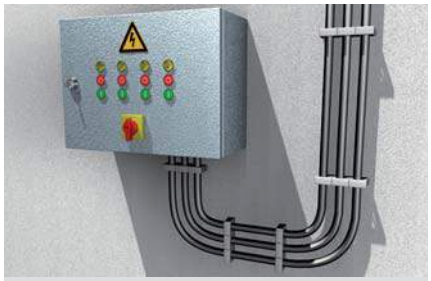
Pipe clip **FC**



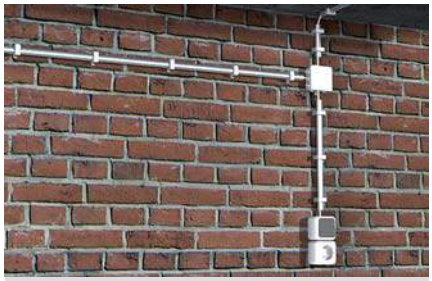
Item	Art.-No.	Clamping range D [mm]	Sales unit [pcs]					
FC 6 - 9 GR	**068060**	6 - 9	100					
FC 9 - 12 GR	**068062**	9 - 12	100					
FC 12 - 16 GR	**068064**	12 - 16	50					
FC 16 - 20 GR	**068066**	16 - 20	25					

Saddle clip SCH

The flexible cable clamp for various diameters



Fixing cable harnesses



Cable fixing

BUILDING MATERIALS

When using Hammerfix N:

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Building brick
- Natural stone
- Aerated concrete
- Solid panel made from gypsum
- Solid brick made from lightweight concrete

CHARACTERISTICS

ADVANTAGES

- With its elastic spring tabs, the saddle clip SCH can bear different cable diameters. This increases flexibility and reduces the number of products required.
- Additional clips can be added to the sides of a pre-fixed clip. This saves installation time and materials.
- The long-lasting nylon material is halogen- and silicone-free. It can be used all year round, including during a frost. This ensures a high level of safety.

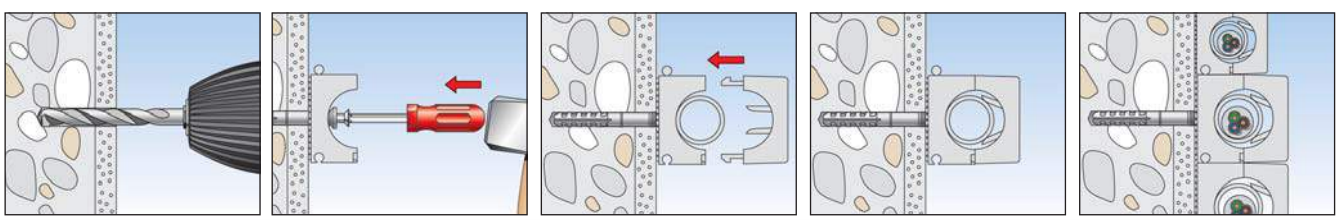
APPLICATIONS

For fixing of:

- Electric cables
- Flexible and rigid plastic insulating pipes

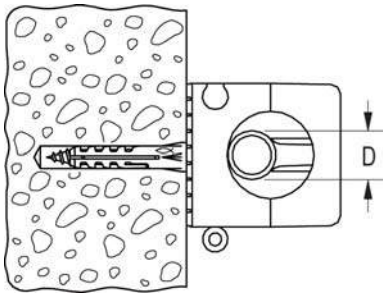
FUNCTIONALITY

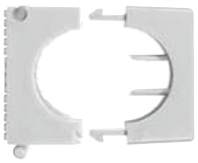
- The clamp SCH is adapted to suit the fixture using N 5 Hammerfixes.
- The Hammerfix N is expanded when the nail is driven in, and holds by friction in the drill hole.
- The cables or pipes are then laid in the clamp SCH and fixed by inserting the locking latch.
- The internal tabs adapt to fit various cable or pipe diameters.
- Temperature resistance once installed from -40 °C to +80 °C.



Saddle clip SCH

Saddle **SCH**, colour: Nylon transparent





Saddle **SCH**, colour: grey RAL 7035

	Art.-No.		Clamping range	Dimension of insulated pipes	Sales unit			
	Grey RAL 7035	Nylon trans-parent	D [mm]		[pcs]			
SCH 812	**068012**	**060012**	8 - 12	6 x 1 - 8 x 1	100			
SCH 1216	**068016**	**060016**	12 - 16	10 x 1 - 12 x 1	50			
SCH 1619	**068019**	**060019**	16 - 19	–	50			
SCH 1623	**068023**	**060023**	16 - 23	15 x 1 - 18 x 1	50			
SCH 2332	**068032**	**060032**	23 - 32	22 x 1 - 22 x 1,5	25			
SCH 3242	–	**060042**	32 - 42	22 x 1 - 22 x 1,5	25			

Fixing tie for bundling and fixing of cables and pipes to the substrate

Electric cables

Plastic pipes

BUILDING MATERIALS

When using 2-component DUOPOWER plug:

- Concrete
- Solid brick
- Solid sand-lime brick
- Aerated concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Plasterboard
- Gypsum plasterboard and gypsum fibreboards
- Hollow blocks made from lightweight concrete
- Cavity floor slabs made from bricks and concrete or similar
- Natural stone
- Chipboard
- Solid panel made from gypsum
- Solid brick made from lightweight concrete

CHARACTERISTICS

ADVANTAGES

- The socket of the FF fixing tie is fixed to the substrate with a screw or screw and plug.
- The fixing tie can be used to bundle and fix several cables or pipes.
- Adjustable diameter of the tie loop.
- The socket of the fixing tie can be adjusted through its slotted hole.

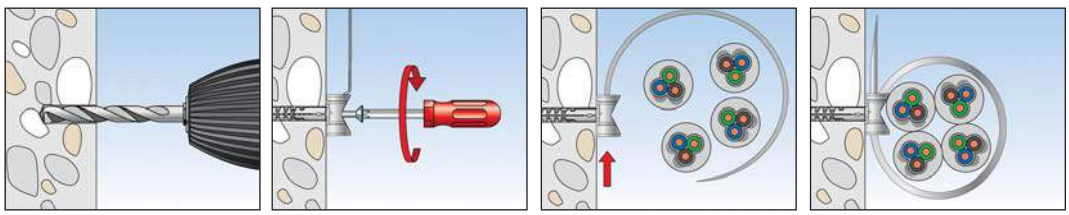
APPLICATIONS

For bundling and fixing of:

- Electric cables
- Flexible and rigid electric tubes
- Steel conduits

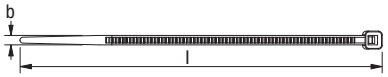
FUNCTIONING

- The Socket of the fixing tie is fixed with the plug and screw suitable for the substrate.
- Recommended application temperature -20 °C to +60 °C.
- Temperature resistant when installed -40 °C to +80 °C.



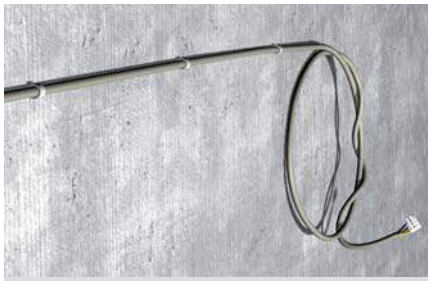
TECHNICAL DATA

Fastening tie **FF**



Item	Art.-No.	Length l [mm]	Dimension fixing base [mm]	For cables and pipes from / to d_{min} - d_{max} [Ø mm]	max. screw diameter [mm]	Sales unit [pcs]		
FF 8 - 32	**519808**	172	25 x 15 x 20	8 - 32	4.5	80		
FF 16 - 63	**519809**	270	25 x 15 x 20	16 - 63	4.5	40		

The user-friendly clip fixing for pipes and conduits



Cable fixing

Fixing flexible pipes

BUILDING MATERIALS

- Concrete
- Solid pumice block
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

CHARACTERISTICS

960° SELF EXTINGUISHING

ADVANTAGES

- The complete element combines anchor, screw and clamp. This saves materials, allows for one-handed installation, and reduces assembly time.
- The slimline geometry of the fixing element only protrudes slightly, thus saving space.
- The three different sizes of each of the cable strap LS, twin clamp ZS and single clamp ES cover a range of cable diameters, thus reducing storage.
- The long-lasting nylon material is flame resistant, halogen- and silicone-free, can be used all year round, including during a frost. This ensures a high level of safety.

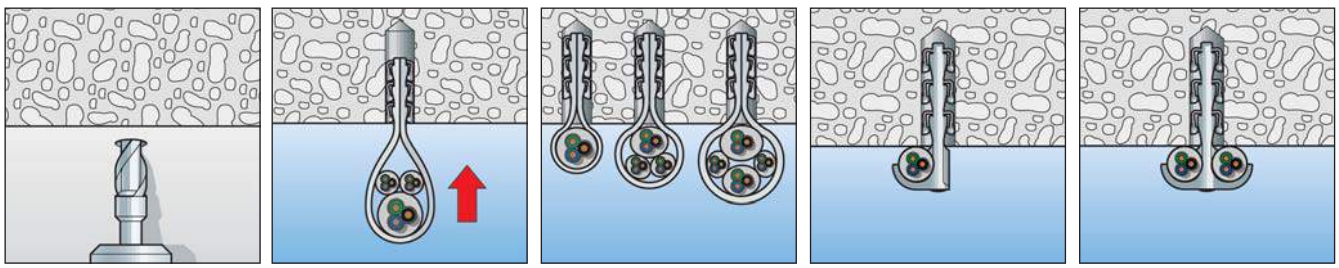
APPLICATIONS

For fixing of:

- Individual electric cables
- Cable bundles
- Flexible pipes
- Rigid plastic pipes

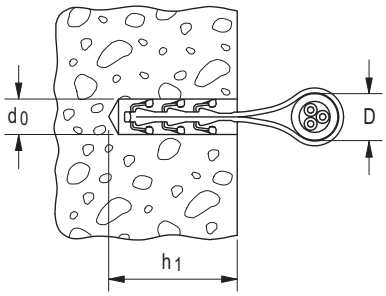
FUNCTIONING

- The clip fixing is set into the drill hole without the need for any additional screws and fixes the pipe directly to the base material.
- The clamping force of the locking catch allows the ClipFix to hold itself in the drill hole.
- Place the clasp of the cable strap LS into the drill hole so that it is level and the teeth grip.
- Recommended loads (required safety factor considered): cable strap LS up to 6 kg, twin clamp ZS and single clamp ES up to 11 kg.
- Temperature resistance once installed from -20 °C to +80 °C.

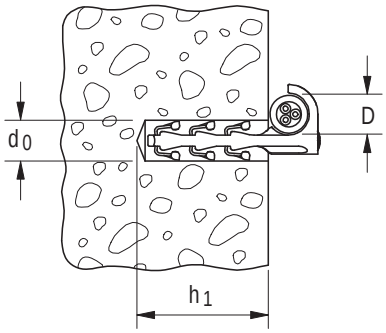


TECHNICAL DATA

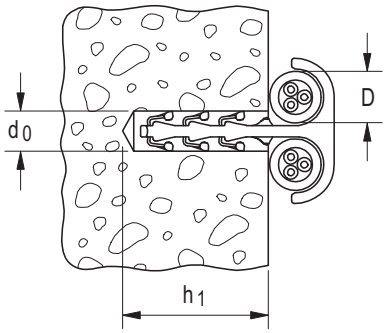
Clip fix plus cable strap **SF plus LS**



Clip fix plus single clamp **SF plus ES**



ClipFix plus twin clamp **SF plus ZS**



Item	Art.-No.	Drill hole d_0 [Ø mm]	Min. drill hole depth h_1 [mm]	Clamping range D [mm]	Sales unit [pcs]			
SF plus LS 3/13	**058155**	6	35	3 - 13	100			
SF plus LS 8/28	**058156**	6	50	8 - 28	100			
SF plus LS 20/40	**058157**	6	50	20 - 40	100			
SF plus ES 10	**048151**	6	40	3 - 12	100			
SF plus ES 18	**048152**	6	40	10 - 25	100			
SF plus ES 28	**058183**	6	40	15 - 31	100			
SF plus ZS 10	**058184**	6	35	3 - 12	100			
SF plus ZS 18	**048161**	6	40	10 - 25	100			
SF plus ZS 28	**048162**	6	40	15 - 31	75			

The user-friendly clip fixing for cable ducts and cable clasps

Fixing cable ducts

Fixing cable harnesses

BUILDING MATERIALS

- Concrete
- Solid pumice block
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

CHARACTERISTICS

960° SELF EXTINGUISHING

ADVANTAGES

- The ClipFix plus SD combines anchor and screw. This saves on materials and makes it easier to affix cable ducts that are difficult to access without the need for additional tools.
- The simple clip fixing reduces installation time.
- The extended shank of the FS plus SD 40 allows bridging of non-bearing plaster layers, as well as the fixing of thicker attachments.
- The long-lasting nylon material is flame resistant, halogen- and silicone-free. It can be used all year round, including during a frost. This ensures a high level of safety.

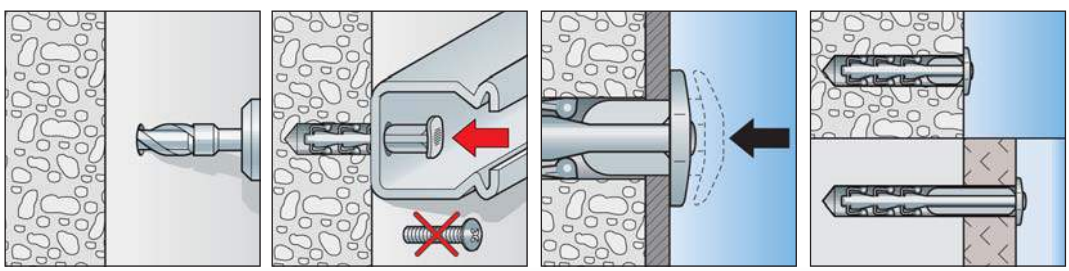
APPLICATIONS

For fixing of:

- Cable channels
- Cable clasps
- Installation base cable harness
- Flat building components

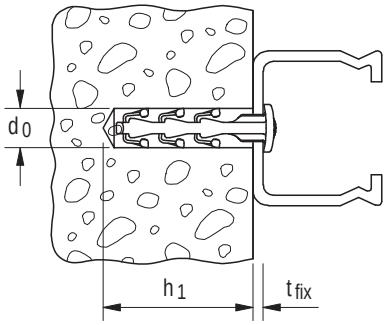
FUNCTIONING

- To fix, manually place the ClipFix plus SD directly into the drill hole. No additional screws are needed.
- The clamping force of the locking catch allows the ClipFix to hold itself in the drill hole.
- Recommended loads (required safety factor considered): clip fixing SD up to 11 kg.
- Temperature resistance once installed from -20 °C to +80 °C.



TECHNICAL DATA

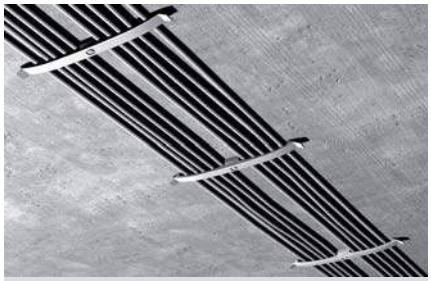
fischer ClipFix plus clip fixing **SF plus SD**



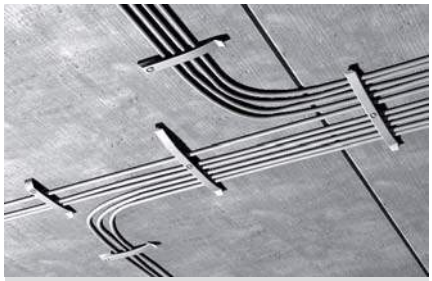
Item	Art.-No.	Drill hole d_0 [Ø mm]	Min. drill hole depth h_1 [mm]	Max. usable length t_{fix} [mm]	Sales unit [pcs]			
SF plus SD 30	**058178**	6	35	4	200			
SF plus SD 40	**058179**	6	35	15	100			

Cable clasp KB

The flat cable clasp for space-saving cable fixing



Fixing cable harnesses



Fixing cable harnesses

BUILDING MATERIALS

When using ClipFix SD:

- Concrete
- Solid pumice block
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

CHARACTERISTICS

ADVANTAGES

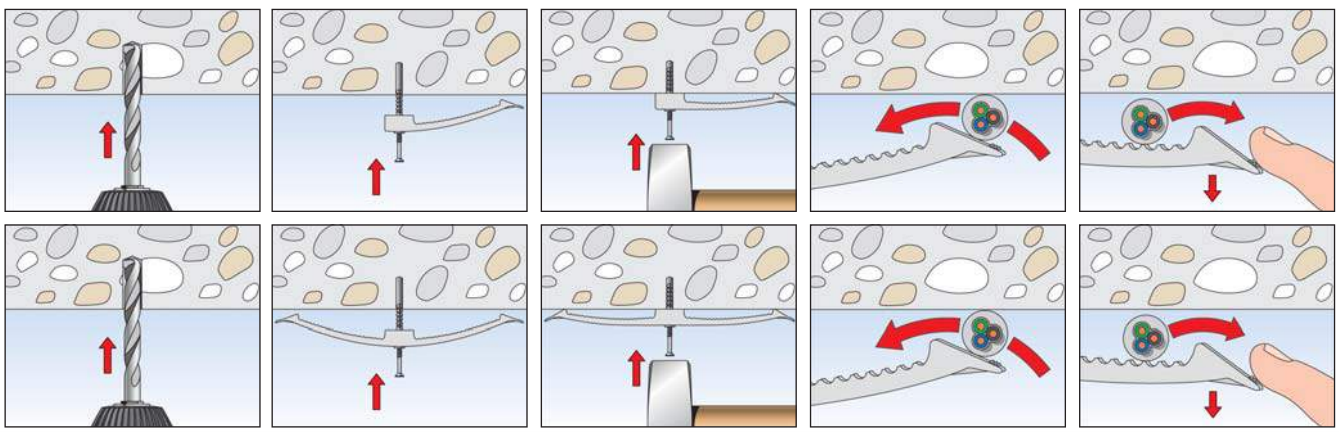
- The flat design of the KB cable clasp allows for a space-saving cable fixing, and simplifies subsequent cable-laying.
- The combination of cable clasp KB and ClipFix SD allows for one-handed installation, thus enabling a flexible and economic installation.
- The long-lasting nylon material is halogen- and silicone-free. It can be used all year round, including during a frost. This ensures a high level of safety.

APPLICATIONS

- For the fixing of several individual cables

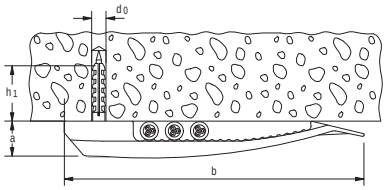
FUNCTIONALITY

- The cable clasp KB is adapted to suit the fixture with clip fixing SD or Hammerfix N6.
- Place the ClipFix plus SD directly into the drill hole by hand. No additional screws are needed.
- The Hammerfix N is expanded when the nail is driven in, and holds by friction in the drill hole.
- After installation, the cables are pulled under the clasp. Additional cables can be easily laid after installation too.
- Temperature resistance once installed from -20 °C to +80 °C.

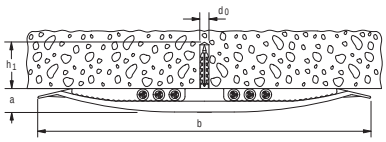


TECHNICAL DATA

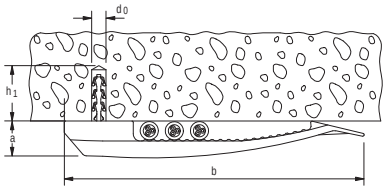
Cable clasp with nailplug **KB N 8**



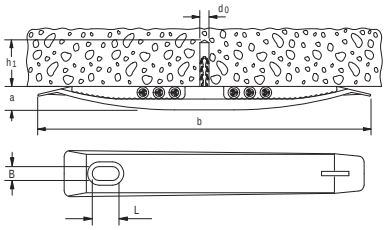
Cable clasp with nailplug **KB N 16**



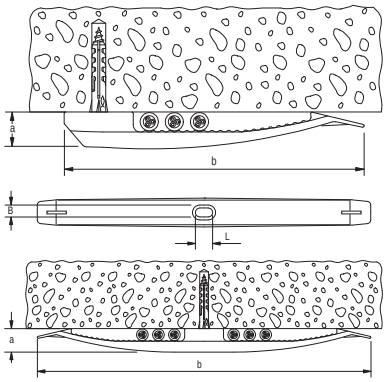
ClipFix plus cable clasp **SF plus KB 8**



ClipFix plus cable clasp **SF plus KB 16**



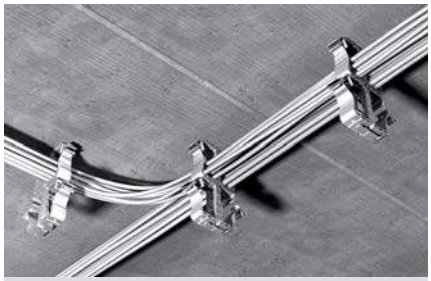
Cable clasp **KB 8**



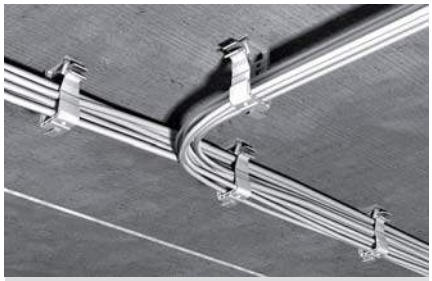
Cable clasp **KB 16**

Item	Art.-No.	Drill hole d_0 [Ø mm]	Min. drill hole depth h_1 [mm]	Dimensions a x b [mm]	Dimension of slot B x L [mm]	Max. number of ducts	Sales unit [pcs]
KB N 8	**545522**	6	35	15 x 133	6 x 10	8 ducts NYM 3 x 1,5	50
KB N 16	**545523**	6	35	15 x 133	6 x 10	16 ducts NYM 3 x 1,5	25
SF plus KB 8	**048171**	6	35	15 x 133	6 x 10	8 ducts NYM 3 x 1,5	50
SF plus KB 16	**048172**	6	35	15 x 230	6 x 10	16 ducts NYM 3 x 1,5	25
KB 8	**058135**	–	–	15 x 133	6 x 10	8 ducts NYM 3 x 1,5	50
KB 16	**058136**	–	–	15 x 230	6 x 10	16 ducts NYM 3 x 1,5	50

The adaptable cable harness for fixing cable bundles



Fixing cable bundles



Fixing cable bundles

BUILDING MATERIALS

When using ClipFix SD:

- Concrete
- Solid pumice block
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

CHARACTERISTICS

ADVANTAGES

- Simple bundling and economical laying of multiple electric cables.
- The seal of the cable harness SHA makes it easy to lay cables at a later date, thus ensuring high user-friendliness.
- Combining several SHA cable harnesses allows for a cost-effective fixing of cables to just one MS installation base.
- The MS installation base allows for various fixing options, and offers great flexibility for the installation.
- The long-lasting nylon material is halogen- and silicone-free, can be used all year round, including during a frost, and thus ensures a high level of safety.

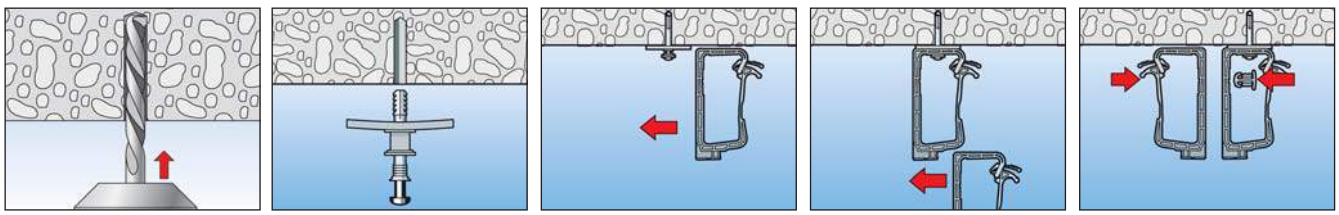
APPLICATIONS

For fixing of:

- Electric cables, loose and bundled

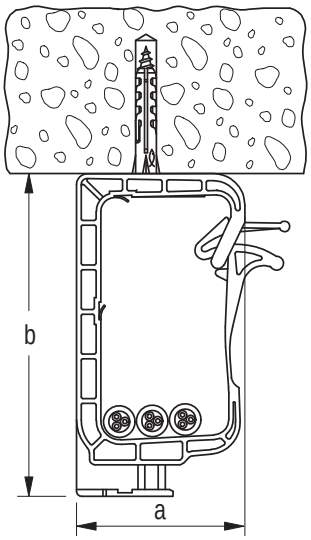
FUNCTIONING

- Cable bundles can be laid in the cable harness SHA. The seal makes it easy to lay cables at a later date.
- The cable harness SHA can either be affixed with ClipFix plus, installation base MS or with plugs and screws.
- Several SHA cable harnesses can be combined below one another.
- The SHA cable harnesses can also be lined up adjacent to one another with the connection piece SHA KP.
- The maximum installation distance of 80 cm must not be exceeded.
- Temperature resistance once installed from -20 °C to +80 °C.

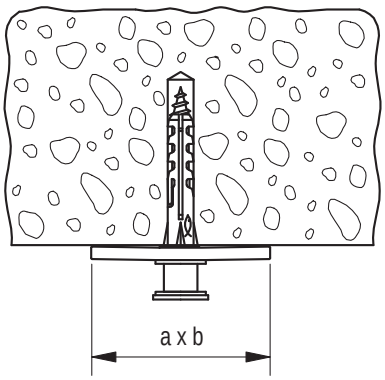


TECHNICAL DATA

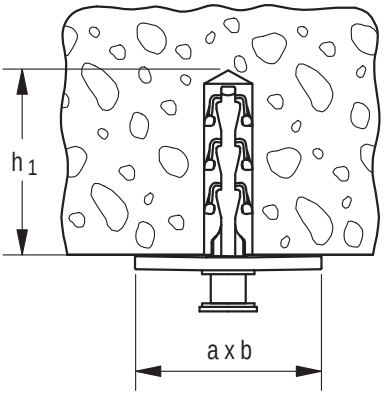
Cable harness **SHA**



Installation base **SHA MS**



Steckfix plus installation base **SF plus MS**



Connection piece **SHA KP**

Item	Art.-No.	Drill hole d_0 [Ø mm]	Min. drill hole depth h_1 [mm]	Dimensions a x b [mm]	Max. number of ducts	Sales unit [pcs]	
SHA 15	**058139**	–	–	93 x 49	15 ducts NYM 3 x 1,5	50	
SHA 30	**058140**	–	–	128 x 59	30 ducts NYM 3 x 1,5	25	
SHA MS	**058141**	–	–	41 x 27	connection piece	50	
SF plus MS	**048181**	6	35	41 x 27	installation base with clip-plug	50	
SHA KP	**058142**	–	–	–	installation base	50	

Metal multi-cable support with high mechanical resistance and approval

Cable fixing to the ceiling

Cable fixing to the wall

ADVANTAGES

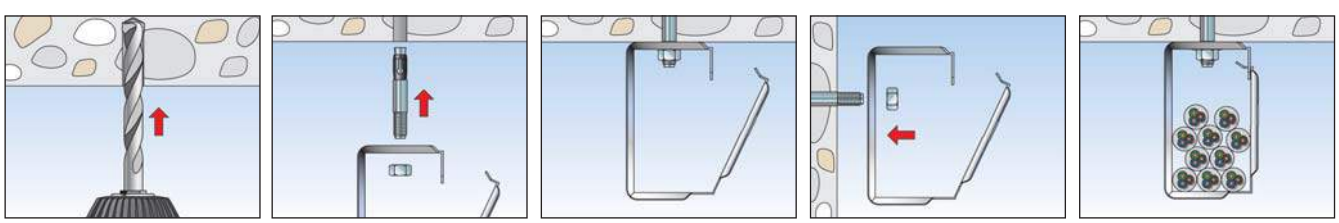
- The fischer metal multi cable support SHA M has a high mechanical strength and thus offers a long service life and safety in the event of fire.
- It is approved as a cable-specific variant for circuit integrity maintenance of electric cable systems in accordance with DIN 4102 Part 12.
- This makes it suitable for safe installation above fire protection ceilings.
- Depending on the version, 15, 30 or 70 cables can be fixed.
- The lock, which can be operated without tools, allows easy subsequent cable-laying and thus ensures a high degree of ease of installation.
- The multi cable support is variably suitable for wall and ceiling installation.
- Halogen-free and without fire load.

APPLICATIONS

- Fixing of cables with circuit integrity maintenance.
- Installation of electrical cables above fire protection ceilings.

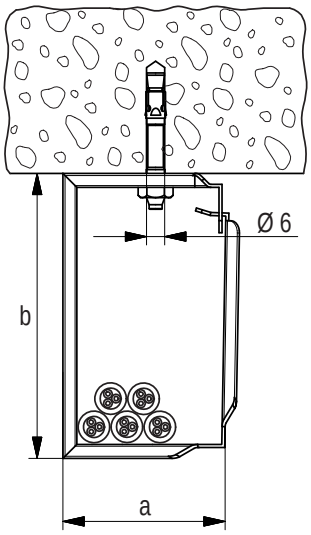
FUNCTIONING

- The multi cable support is fixed to walls or ceilings with plugs and screws or metal anchors suitable for the substrate and application.



TECHNICAL DATA

Multi cable support metal **SHA M**



Item	Art.-No.	Mounting pipe Ø [mm]	Dimension in [mm]	Max. number of ducts	Sales unit [pcs]
SHA M 15	**544933**	6	66,7 x 41,9 x 30,6	15 ducts NYM 3 x 1,5	50
SHA M 30	**544934**	6	92,8 x 58,1 x 33,6	30 ducts NYM 3 x 1,5	25
SHA M 70	**544935**	6	126,0 x 104,0 x 80,0	70 ducts NYM 3 x 1,5	10

Wall slot clip FWSC

The quick tool-free cable fixing in wall slots

Cable fixing in wall slots > 30 mm

Cable fixing in wall slots < 55 mm

BUILDING MATERIALS

- Concrete
- Masonry

ADVANTAGES

- With the fischer FWSC wall slot clip, cables can be fixed quickly and without tools in wall slots 20 to 60 mm wide.
- This reduces installation time by up to 50%.
- The high expansion power of the wall slot clip guarantees a reliable fixing of the cables.
- Damage to the cables can be excluded due to the expansion principle.
- Thanks to its neutral colour, the wall slot clip does not shine through the plaster.
- The wall slot clip is made of halogen-free material.

APPLICATIONS

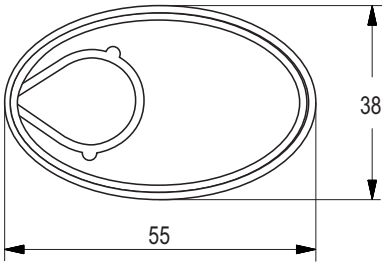
- Fixing of cables in wall slots of 20 - 60 mm width.

FUNCTIONING

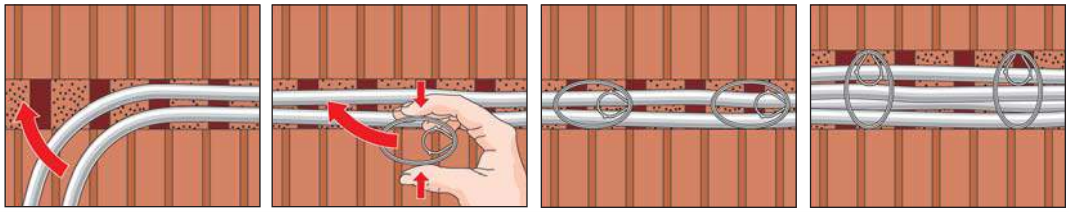
- The cables to be fastened are inserted into the wall slot.
- By pressing together the wall slot clip is compressed and tensed to be ready for installation in the wall slot.
- The wall slot clip can be compressed in length or width as required and thus used for wall slots with a width of 20 to 60 mm.

TECHNICAL DATA

Wall slot clip **FWSC**



Item	Art.-No.	Max. slot width [mm]	Dimension in [mm]	Sales unit [pcs]			
FWSC 20 - 60	**545792**	60	38 x 60 x 4	50			



The secure cable fixing in wall slots

Cable fixing

Cable fixing in slits

BUILDING MATERIALS

- Vertically perforated brick
- Pumice
- Lightweight aggregate concrete
- Aerated concrete
- Hardboard
- Wood
- Chipboard
- Plywood
- Solid panel made from gypsum

ADVANTAGES

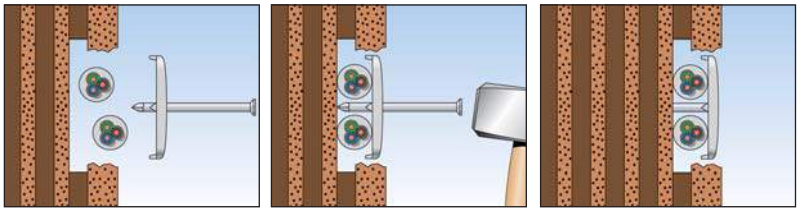
- The nail disc NSB allows for use in two slot widths.
- The vaulted structure of the nail disc ensures an optimal contact pressure and, as such, for a secure hold.
- The flat nail disc only protrudes slightly, and can thus be easily plastered over.
- The nail disc NSB is made from high-strength polypropylene. The nail is made from hardened, galvanised steel. The tried and tested material combination for in-wall installation.

APPLICATIONS

- For fixing cables in wall slots

FUNCTIONALITY

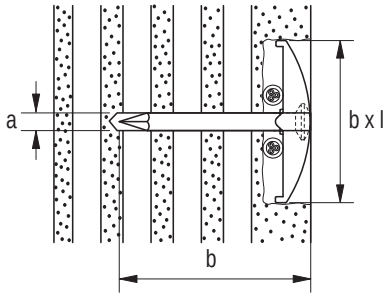
- Remove cable.
- Align the nail disc with either dimensions 27 mm or 34 mm, depending on the slot width, and hit the nail in with a hammer.
- The cables are fixed in the wall slots by the curved washer.



Nail disc NSB

TECHNICAL DATA

Nail disc **NSB**



Item	Art.-No.	Dimension of nail a x b [mm]	Dimension of disc b x l [mm]	Sales unit [pcs]				
NSB 2/40	**048308**	2 x 40	27 x 34	200				
NSB 2/50	**048309**	2 x 50	27 x 34	150				
NSB 2/60	**048310**	2 x 60	27 x 34	100				
NSB 3/40	**048311**	3 x 40	27 x 34	150				
NSB 3/50	**048312**	3 x 50	27 x 34	150				
NSB 3/60	**048313**	3 x 60	27 x 34	100				

The fast fixing for electric cables

Cable fixing

Cable fixing

BUILDING MATERIALS

- Hardboard
- Wood
- Aerated concrete
- Chipboard
- Plywood
- Solid gypsum panels and other plastered substrates

ADVANTAGES

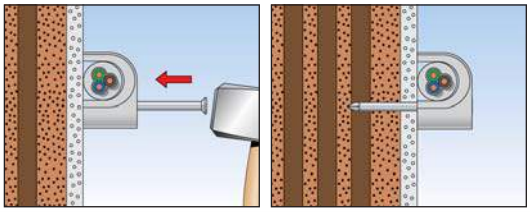
- The nail clip features a pre-assembled zinc-plated nail, allowing for a fast fixing, thus reducing assembly time.
- The small space required for fixing simplifies installation in narrow spaces.
- The nail clip MNS covers cable diameters from 4 mm to 14 mm with just 3 sizes.

APPLICATIONS

- To fix single electric cables with varying diameters

FUNCTIONING

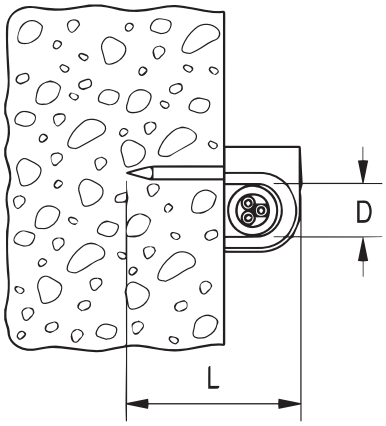
- Position the nail clip with the laid cable. Hammer in the pre-assembled nail with a hammer.



Nail clip NS/MNS

TECHNICAL DATA

Nail clip **NS**



Nail clip **MNS**

Item	Art.-No.	For cable [Ø mm]	Clamping range D [mm]	Length of nail L [mm]	Sales unit [pcs]			
NS 7	**058173**	7	7	25	100			
NS 8	**058174**	8	8	25	100			
NS 9	**058175**	9	9	25	100			
NS 10	**058176**	10	10	30	100			
NS 12	**058177**	12	12	35	100			
MNS 4-7	**094673**	–	4 - 7	25	100			
MNS 7-11	**094674**	–	7 - 11	25	100			
MNS 10-14	**094675**	–	10 - 14	30	100			

The installation-friendly metal spacing disc for cables and pipes

Fixing steel armoured conduits

Fixing conduits

BUILDING MATERIALS

When using nail anchor FNA II:
- Concrete
- Solid sand-lime brick
- Natural stone with dense structure
- Pre-stressed concrete hollow slabs

When using Hammerfix N:
- Concrete
- Solid sand-lime brick
- Building brick
- Natural stone
- Solid brick made from lightweight concrete

ADVANTAGES

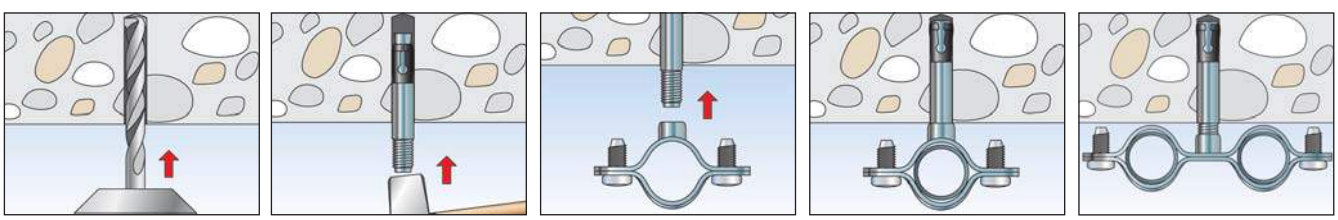
- The fast-locking latch ensures easy opening and closing without completely removing the screw, and allows for a simple and fast installation.
- The pre-fitted combination screw with conventional slotted or recessed screw head allows for the use of different screwdrivers, thus allowing for a simple installation.

APPLICATIONS

For fixing of:
- Steel conduits
- Electric cables
- Copper and metal pipes

FUNCTIONING

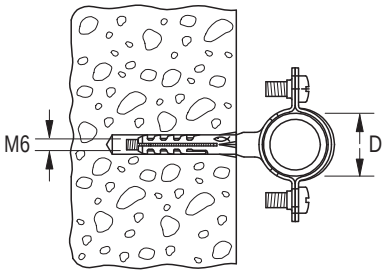
- The spacer clamp AM with M6 thread can either be affixed with fischer nail anchor FNA II 6x30 M6x43, stud screw STST 6x60 and STST 6x80 or with Hammerfix N 6x40/10 M6.



Spacer pipe clamp AM

TECHNICAL DATA

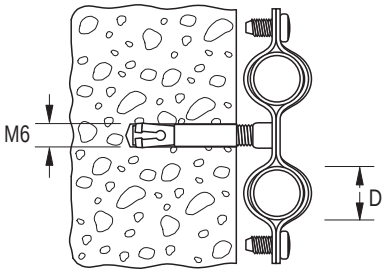
Metal two-piece pipe clamp **AM**



Item	Art.-No.	Dimension IEC	Clamping range D [mm]	Sales unit [pcs]				
AM 8	**060185**	–	8 - 10	50				
AM 10	**060186**	–	10 - 11	50				
AM 12	**060187**	12	12 - 13	50				
AM 14	**060188**	–	14 - 15	50				
AM 16	**060189**	16	15 - 17	50				
AM 18	**060190**	–	18 - 19	50				
AM 20	**060191**	20	20 - 21	50				
AM 22	**060192**	–	22 - 23	50				
AM 24	**060193**	–	24 - 25	50				
AM 26	**060194**	25	26 - 27	50				
AM 28	**060195**	–	28 - 29	50				
AM 30	**060196**	–	30 - 31	50				
AM 32	**060209**	32	32 - 33	25				
AM 34	**060210**	–	34 - 35	25				
AM 37	**060211**	37	37 - 39	20				
AM 40	**090849**	40	40 - 42	15				
AM 50	**090850**	50	50 - 52	10				
AM 63	**090851**	63	63 - 65	10				

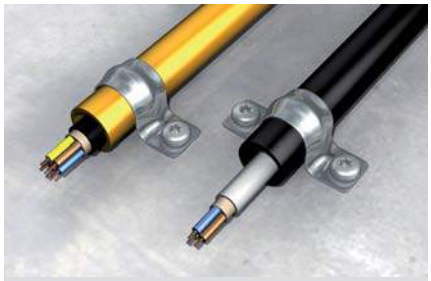
TECHNICAL DATA

Metal two-piece pipe clamp **AMD**

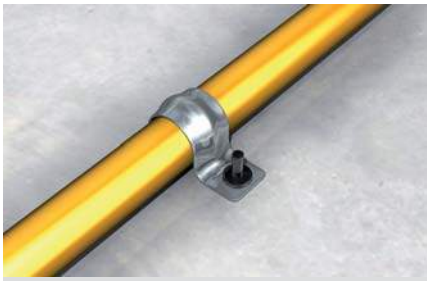


Item	Art.-No.	Clamping range D [mm]	Sales unit [pcs]					
AMD 10 - 12	**545772**	10 - 12	25					
AMD 14 - 16	**545773**	14 - 16	25					
AMD 17 - 19	**545774**	17 - 19	25					
AMD 20 - 23	**545775**	20 - 23	25					
AMD 24 - 27	**545776**	24 - 27	25					

The flat metal clip for cables and pipes



Fixing armoured conduits



Fixing armoured conduits

BUILDING MATERIALS

When using impact nail ED:

- Concrete

ADVANTAGES

- The open conduit clip BSM is ideal for the post-installation fixing of conduits.
- The conduit clip allows for a direct fixing with impact nails and is, therefore, quick and easy to install.
- Two conduits or pipes can be fixed with just one fixing point with the twin clamp BSMZ.

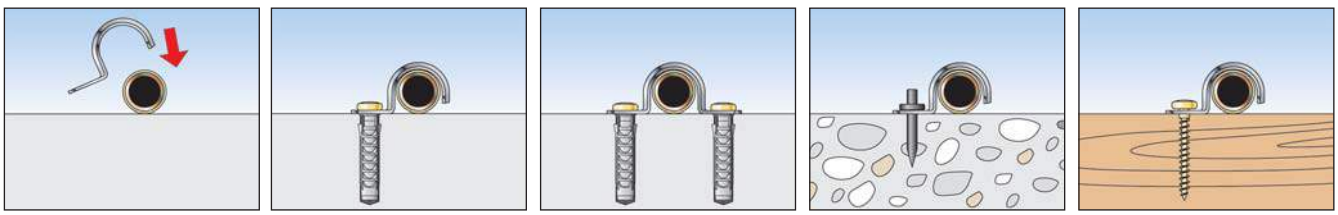
APPLICATIONS

For fixing of:

- Electrical conduits
- Flexible and rigid plastic insulating pipes
- Steel conduits

FUNCTIONING

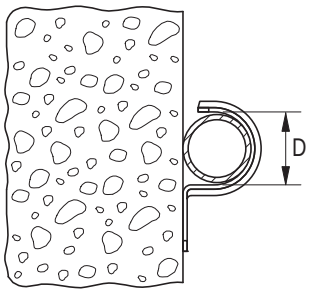
- Depending on your requirements, use a conduit clip with 1 or 2 fixing points, or a twin clamp.
- The conduits or pipes are laid in the conduit clip. Assembling the clip fixes the conduits / pipes.
- Our recommendation for fixtures on concrete (not older than 6 months): Impact nail.



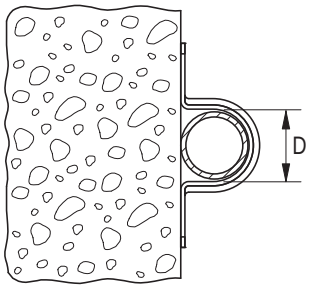
Conduit clip BSM

TECHNICAL DATA

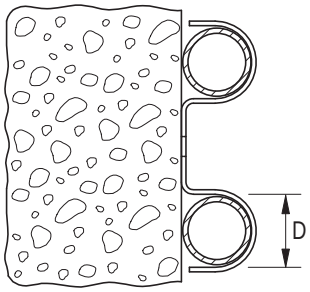
Conduit clip **BSM**



Conduit clip **BSMD**

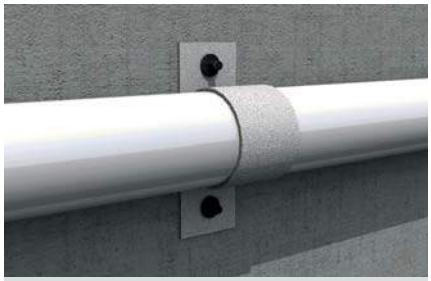


Conduit clip **BSMZ**



Item	Art.-No. BSM	BSMD	BSMZ	Dimension IEC	Clamping range D [mm]	Sales unit [pcs]	
6	**015014**	–	–	–	6	100	
8	**015015**	–	–	–	8	100	
10	**015016**	–	–	–	10	100	
10	–	**015068**	–	–	10	50	
12	**015017**	**015069**	–	–	12	50	
14	**015018**	**015070**	–	–	14	50	
15	**015093**	–	–	15	15	50	
16	**060149**	**060169**	–	16	16	50	
18	**060150**	**060170**	–	–	18	50	
20	**060151**	**060171**	**079535**	20	20	50	
22	**060152**	**060172**	–	–	22	50	
24	**060153**	–	**079536**	–	24	50	
25	**090839**	**090844**	–	25	25	50	
26	**096958**	**015076**	–	–	26	50	
28	–	**060175**	–	–	28	25	
28	**060155**	–	**079537**	–	28	50	
30	**015019**	–	–	–	30	50	
32	**090840**	–	–	32	32	50	
32	–	**090845**	–	32	32	25	
37	**060158**	**060178**	–	–	37	25	
40	**090841**	**090846**	–	40	40	25	
42	–	**015081**	–	–	42	20	
42	**015021**	–	–	–	42	25	
47	–	**015082**	–	–	47	20	
50	**090842**	–	–	50	50	20	
50	–	**090847**	–	50	50	15	
63	–	**090848**	–	63	63	10	
63	**090843**	–	–	63	63	15	

Textile web strapping GWB for cost-effective, easy pipe fixings



Flexible and rigid plastic insulation pipes

ADVANTAGES/BENEFITS

- Pipe fastening using textile tape allows cheap and simple installation.
- The textile tape roll allows the correct tape length to be chosen to suit the diameter in question.
- Hangings with textile tape are a fast solution for temporary fixings.

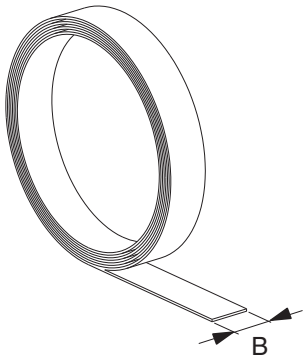
APPLICATIONS

- Tear-proof textile tape for simple and load-bearing installation
- Fixing to concrete using the fischer impact nail ED

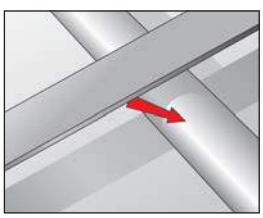
PROPERTIES

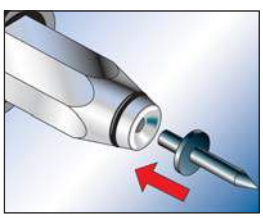
- **Material:** polypropylene

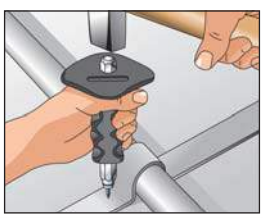
TECHNICAL DATA

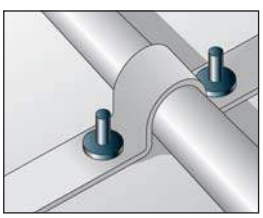


Item	Art.-No.	Total length [mm]	Width [mm]	Thickness S [mm]	Sales unit [pcs]
GWB	**020959**	10000	15	1.1	10









Perforated steel banding LBV / LBK for the fast fixing of pipelines

Plastic pipes

ADVANTAGES/BENEFITS

- The perforated tape's material thicknesses and plastic covering allows the tapes to be easily cut to size using metal shears.
- The perforated tape's hole geometry enables concrete fixing using the fischer impact nail ED.

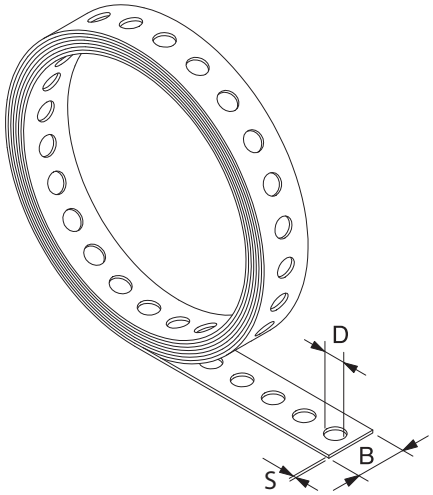
APPLICATIONS

- Steel tape with stamped holes for simple installation; available zinc-plated LBV or plastic-covered LKB
- The fischer nail anchor FNA II is suitable for ceiling fixing in concrete
- Use fischer thread hanger RAH for fastening to threaded rods

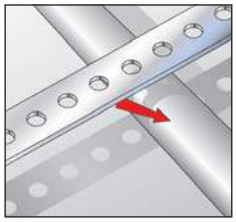
PROPERTIES

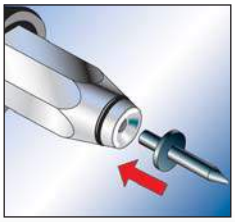
- **Material:** steel DX51D+Z (material no. 1.0226) acc. to DIN EN 10327
- **Zinc plating:** electro zinc-plated, min. 7 µm
- **Protective coating LBK:** PE

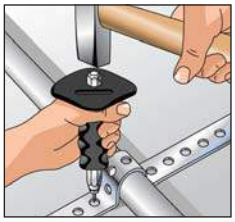
TECHNICAL DATA

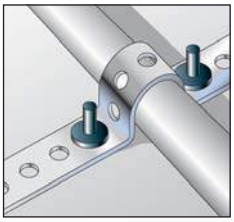


Item	Art.-No.	Total length l [mm]	Width B B [mm]	Thickness S S [mm]	Eye-Ø D D [mm]	Sales unit [pcs]
LBV 12	**079549**	10000	12	0.75	5	10
LBV 17	**079550**	10000	17	0.75	6.5	10
LBV 25	**079551**	10000	25	0.88	8.5	8
LBK 14	**079553**	10000	14	2.6	5	10
LBK 19	**079554**	10000	19	2.4	6.5	8
LBK 27	**079555**	10000	27	2.4	8.5	5

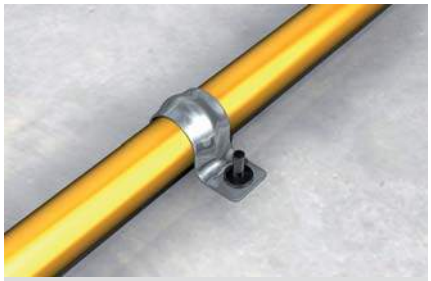








Fixing in concrete without pre-drilling



Fixing armoured conduits

Fixing perforated tapes

BUILDING MATERIALS

- Fresh concrete (not older than 6 months)

ADVANTAGES

- The stable impact nail ED can be set in concrete with the impact nail setting tool SZE without pre-drilling. This allows for a fast installation.
- The setting tool SZE impact protection provides the best protection for your hand, thus ensuring a safe installation.

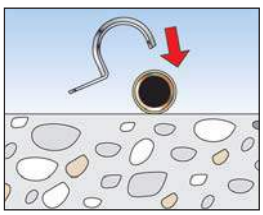
APPLICATIONS

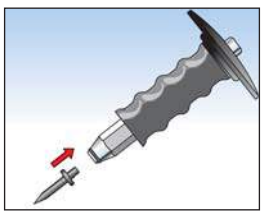
For fixing of:

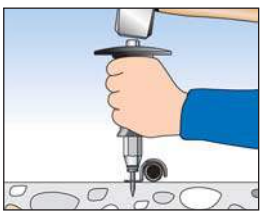
- Conduit clips such as BSM, BSMD, BSMZ
- Perforated band such as LBK, LBV

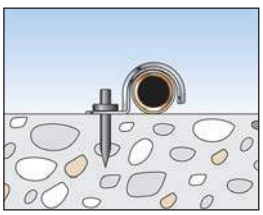
FUNCTIONALITY

- The impact nail ED is set in the setting tool SZE.
- The bracket in the setting tool holds the nail securely in place during the installation procedure.
- Pre-positioning of the element to be fixed.
- The nail can be hammered through the fixing element directly into the concrete (not older than 6 months).





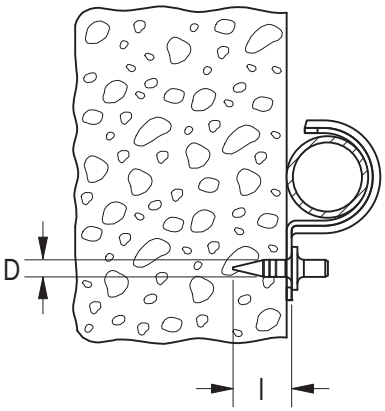




Impact nail ED

TECHNICAL DATA

Impact nail **ED**



Item	Art.-No.	Length l [mm]	Diameter d [mm]	Sales unit [pcs]				
ED 15	**048212**	15	4.0	200				
ED 18	**079815**	18	4.0	200				
ED 22	**014570**	22	4.0	200				

TECHNICAL DATA

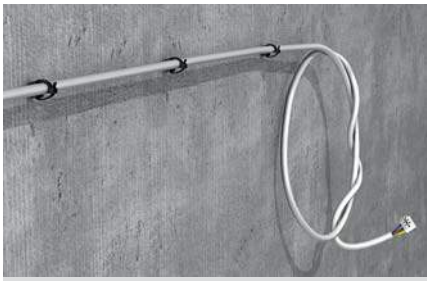
Impact nail setting tool **SZE**

Toolset for **SZE**

Item	Art.-No.	Sales unit [pcs]						
SZE	**079820**	1						
Toolset for SZE	**043365**	4						

For the simple bundling of cables and pipes

Bundling electric cables



Pipe fixing with cable tie plug

CHARACTERISTICS

ADVANTAGES

- The long-lasting nylon material is halogen- and silicone-free.
- The cable tie UBN (black) is made from UV-stabilised material.

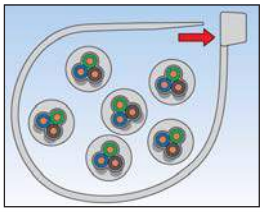
APPLICATIONS

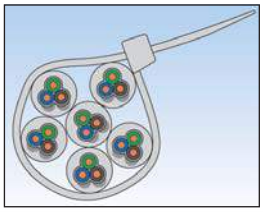
For bundling of:

- Electric cables
- Flexible and rigid plastic insulating pipes
- Steel conduits

FUNCTIONING

- Lie the cable tie around the object to be fixed, and pull the band through the head of the cable tie. The cable tie can no longer be opened due to the latching of the tab in the teeth.
- Temperature resistance once installed from -10 °C to +85 °C.
- Recommended installation temperature from -10 °C to +85 °C.

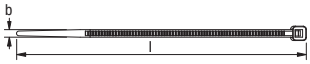




Cable tie BN/UBN

TECHNICAL DATA

Cable tie **BN**, colour: transparent

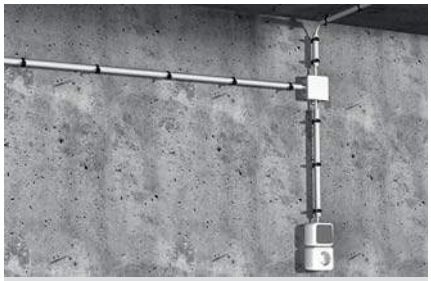


Cable tie **UBN**, colour: black

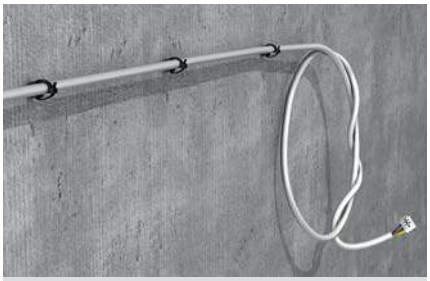
Cable tie **GBN**, colour: green

Item	Art.-No. Colour: black	Colour: transparent	Colour: green	Dimensions [mm]	Sales unit [pcs]	Outer carton [pcs]	
BN/UBN/GBN 2,5 x 100	**087488**	**087478**	**543924**	2,5 x 100	100	20000	
BN/UBN 2,5 x 120	**087489**	**087479**	–	2,5 x 120	100	15000	
GBN 2,5 x 150	–	–	**543925**	2,5 x 150	100	20000	
BN/UBN/GBN 2,5 x 200	**087490**	**087480**	**543926**	2,5 x 200	100	10000	
BN/UBN 2,5 x 160	**069363**	**037489**	–	2,5 x 160	100	20000	
BN/UBN/GBN 3,6 x 150	**087491**	**087481**	**543927**	3,6 x 150	100	10000	
BN/UBN 3,6 x 200	**037573**	**019802**	–	3,6 x 200	100	10000	
BN/UBN 3,6 x 300	**069364**	**037490**	–	3,6 x 300	100	7500	
BN/UBN 4,6 x 160	**069365**	**037501**	–	4,6 x 160	100	10000	
BN/UBN 4,6 x 190	**069366**	**037581**	–	4,6 x 190	100	10000	
BN/UBN/GBN 4,6 x 200	**087494**	**087484**	**543928**	4,6 x 200	100	7500	
BN/UBN 4,8 x 250	**069367**	–	–	4,8 x 250	100	5000	
BN/UBN 4,8 x 250	–	**037582**	–	4,8 x 250	100	5000	
BN/UBN/GBN 4,8 x 280	**087495**	**087485**	**543929**	4,8 x 280	100	5000	
BN/UBN 4,8 x 350	**069368**	**037653**	–	4,8 x 350	100	5000	
BN/UBN 4,8 x 370	**069369**	**037583**	–	4,8 x 370	100	5000	
BN/UBN 4,8 x 430	**069370**	**037708**	–	4,8 x 430	100	5000	
BN/UBN 7,6 x 200	**069372**	**037945**	–	7,6 x 200	100	4500	
BN/UBN 7,8 x 300	**069373**	**037949**	–	7,6 x 300	100	2500	
BN/UBN 7,6 x 350	**087497**	**087487**	–	7,6 x 350	100	2500	
BN/UBN 7,6 x 450	**069374**	**037996**	–	7,6 x 450	100	2500	
BN/UBN 7,6 x 550	**069375**	**037997**	–	7,6 x 550	100	2000	
BN/UBN 8,8 x 760	**069376**	**037998**	–	8,8 x 760	100	1000	
BN/UBN 8,8 x 810	**069377**	**038000**	–	8,8 x 810	100	1000	
BN/UBN 8,8 x 1168	**069379**	**038002**	–	8,8 x 1168	100	500	

The universal fixing point for cable ties



Flexible and rigid plastic pipes



Electric cables

BUILDING MATERIALS

- Concrete
- Solid brick
- Solid sand-lime brick

ADVANTAGES

- The FCTP cable tie plug combines the function of a plug and an eyelet to which cable ties up to 9.5 mm width can be attached (e.g. fischer BN or UBN).
- It offers a universal fixing point to which various cables and pipes can be attached.
- Installation is simple and time-saving by driving the plug into the drill hole.
- The lamellas of the plug ensure a secure hold in the building material and thus fix the cable tie in the intended position.

APPLICATIONS

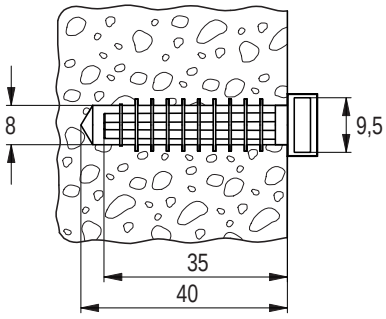
- Universal fixing point for fixing of cables and pipes using cable ties

FUNCTIONING

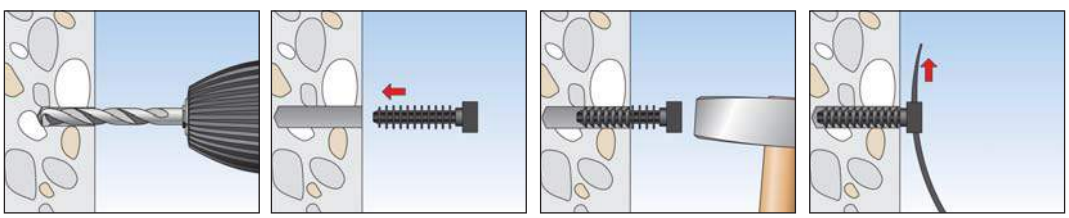
- The cable tie plug can be hammer set.
- A cable tie is inserted through the eyelet and the object to be fastened is fixed in the intended position.
- The eyelet with a width of 9.5 mm and a height of 3 mm is suitable for all fischer cable ties.

TECHNICAL DATA

Cable tie plug FCTP



Item	Art.-No.	Drill diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Anchorage depth h_{ef} [mm]	Total length l [mm]	Sales unit [pcs]		
FCTP-W	**545786**	8	40	35	45	100		
FCTP-B	**545787**	8	40	35	45	100		



Infinitely variable fixing of wire suspensions

Suspension of signs

Suspensions for trade show exhibits

ADVANTAGES

- The simple system guarantees ease of use.
- The Wireclip's simple closing mechanism means that no tools are needed. This allows for a cost-effective installation.
- The reclosable Wireclips make it possible to adjust the length at any time. This guarantees the greatest flexibility.

APPLICATIONS

For suspension of:

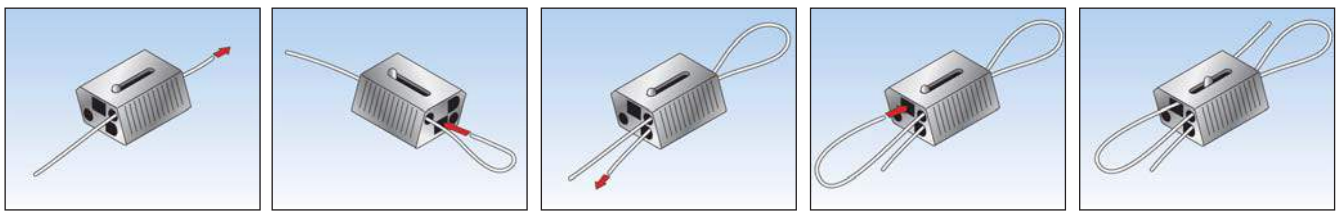
- Lighting strips
- Cable trays
- Ventilation ducts
- Pipes
- Signs
- Chilled ceilings

FUNCTIONALITY

- Loops are formed from the wire, which can be threaded through the wireclip. This allows objects to be hung. The wireclips can be adjusted at any time.
- The FNA II 6x25 OE is suitable for fixing the wire.

Note:

- Do not apply paint or any other coating.
- Do not apply lubricant.
- Do not use for lifting loads.
- Remove damaged wire ends using the wire cutter WIZ prior to introducing wires into the wire clip.



TECHNICAL DATA

WIC 2 **WIC 3** **WIC 4**

Item	Art.-No.	Wire-Ø [mm]	Sales unit [pcs]					
WIC 2 VE20	**044559**	2 - 2,5	20					
WIC 3 VE20	**044561**	2,5 - 3,5	20					
WIC 2 VE100	**044560**	2 - 2,5	100					
WIC 4 VE50	**044564**	3 - 4	50					

TECHNICAL DATA

WIS cable set with eyelet

Wire cutter **WIZ**

Item	Art.-No.	Cable length [m]	Wire-Ø [mm]	Sales unit [pcs]				
WIS 2/1	**045956**	1	2	10				
WIS 2/2	**045957**	2	2	10				
WIS 2/3	**045958**	3	2	10				
WIS 2/5	**045959**	5	2	10				
WIS 2/10	**045960**	10	2	10				
WI Ø 2 mm	**044565** 1)	200	2	1				
WIZ	**044721**	–	–	1				

1) on a roll

LOADS

Wireclip

Highest recommended loads[1] per Wireclip

Type	Diameter of wire cable [mm]	Recommended tensile load [kN]
WIS complete system	2,0	0,5
WIC 2[2]	2,0	0,6
WIC 2[2]	2,5	1,0
WIC 3[2]	3,0	1,2
WIC 4[2]	4,0	2,3

[1] Required safety factors are considered.

[2] Only in combination with fischer wire cable.

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9 Sanitary fixings

		Page
Sanitary fixings for board materials		456
Ceramic fixings		458
Wash basin and urinal fixings		460

Complete fixing sets for wash basins and urinals in board building materials and plumbing walls

Urinals

Wash basins

BUILDING MATERIALS

- Gypsum plasterboard and gypsum fibreboards
- Chipboard

ADVANTAGES

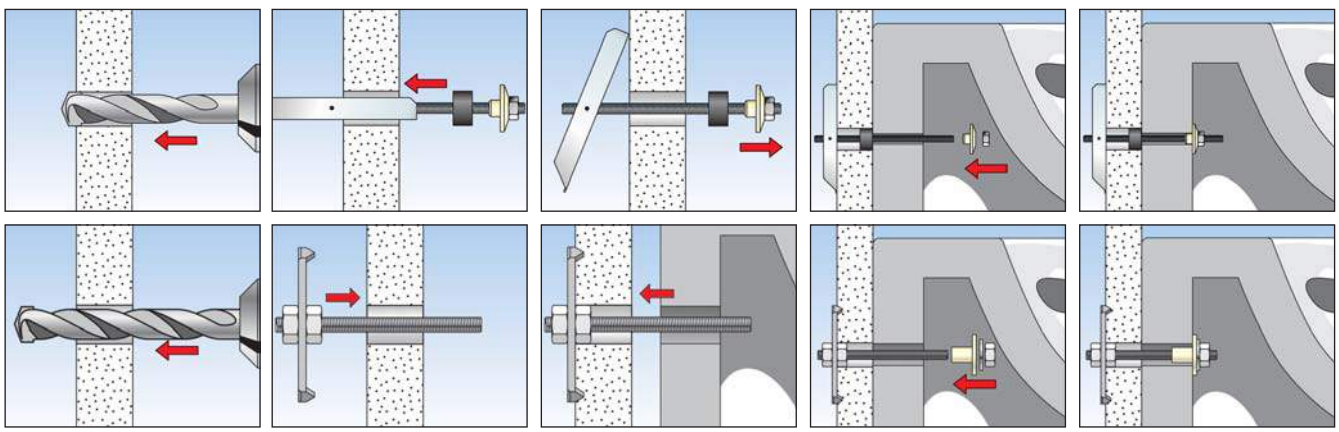
- With their special geometries, KM and WDP are the specialists for fixings in plumbing and hollow walls.
- The wide transition beams of the KM and the large base plate of the WDP ensure a good load distribution, thus allowing for a high load-bearing capacity.

APPLICATIONS

- Wash basins
- Urinals

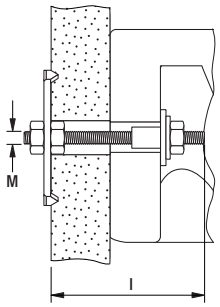
FUNCTIONING

- KM is suitable for push-through installation.
- When placed in the drill hole, the wide transition beam of the KM independently swings open behind the board.
- WDP is set into the plumbing walls during wall installation.



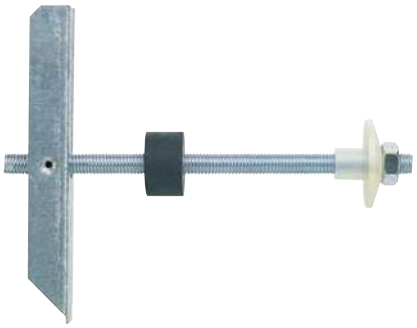
TECHNICAL DATA

Wash basin and urinal fixing **WDP**

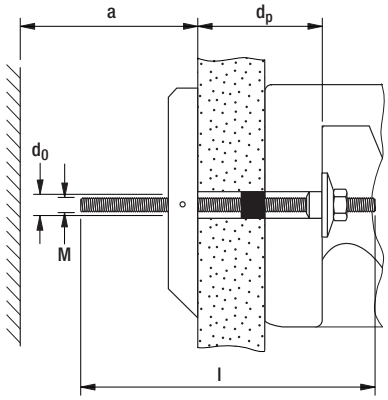


Item	Art.-No.	Contents per plastic bag [pcs]	Sales unit [pcs]
WDP 10 x 170	**014320**	2 Threaded rods M10 x 170 with base plate 60x60x3, 2 flanged bushes BDH M10, 2 hexagon nuts M10 zinc-plated	10

TECHNICAL DATA



Gravity toggle **KM 10**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Anchor length l [mm]	Min. cavity depth a [mm]	Max. panel thickness d_p [mm]	Screw d_s x l_s [mm]	Sales unit [pcs]
KM 10	**050326**	30	180	140	90	M 10 x 180	25

Complete fixing sets for free-standing toilets and bidets

Free-standing toilets

Bidets

BUILDING MATERIALS

- Concrete
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick made from lightweight concrete
- Solid brick

CHARACTERISTICS

ADVANTAGES

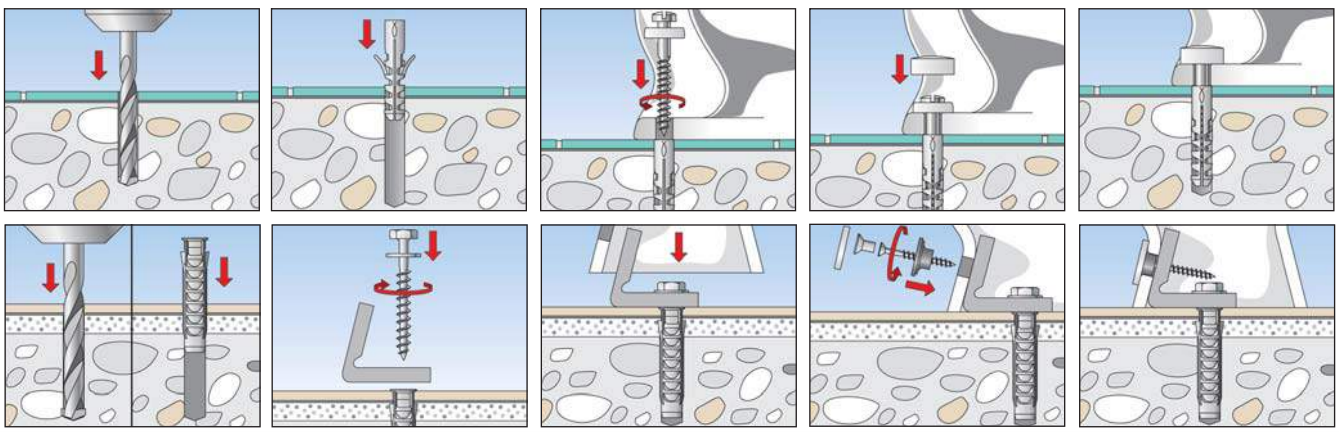
- Complete fixing sets including brass screws allow for quick and easy installation.
- A pronounced rim prevents contact between the screw and ceramics, thus ensuring nothing gets damaged during fixing.
- The WB5N's assembly bracket with pre-drilled rows of holes allows for a flexible fixing with two directions.
- The WCN is also suitable for fixing ceramic shelves and mirrors, and can thus be used for a wide range of applications.

APPLICATIONS

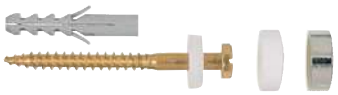
- Free-standing toilets
- Bidets
- Ceramic shelves
- Mirrors

FUNCTIONING

- S 8 RD is suitable for push-through installation.
- WCN and S 8 D are suitable for both pre-positioned and push-through installation.
- The WB5N's assembly bracket is flexibly positioned on the base using the long hole. The ceramics are then fixed to the bracket via the rows of holes. These counterbalance any height differences in the ceramic assembly holes.



TECHNICAL DATA



WCN

Item	Art.-No.	Contents per plastic bag [pcs]	Sales unit [pcs]
WCN 1	**060561**	2 wall plugs S 8, 2 brass screws 6 x 70 hex., 2 cover caps white, 2 snap-fit sleeves	50
WCN 2	**060562**	2 wall plugs S 8, 2 brass screws 6 x 70 hex., 2 cover caps chrome, 2 snap-fit sleeves	50

TECHNICAL DATA

S 8 D 70 WCR

Item	Art.-No.	Contents per plastic bag [pcs]	Sales unit [pcs]
S 8 D 70 WCR	**060564**	2 wall plugs S 8, 2 brass screws 6 x 70 hex., 2 cover caps chrome and white, 2 snap-fit sleeves	50

TECHNICAL DATA

S 8 RD WCR

Item	Art.-No.	Contents per plastic bag [pcs]	Sales unit [pcs]
S 8 RD 60 WCR	**060570**	2 wall plugs S 8 RD 60, 2 brass screws 6 x 65 hex., 2 cover caps chrome and white	50
S 8 RD 80 WCR	**060568**	2 wall plugs S 8 RD 80, 2 brass screws 6 x 85 hex., 2 cover caps chrome and white	50

TECHNICAL DATA

WC fixing **WB 5N**

Item	Art.-No.	Contents	Sales unit [pcs]
WB 5N	**018652**	2 S plugs SX 10, 2 Screws 7x65 zinc-plated, 2 Nylon angles, 2 washers 8mm, 2 screws A2 stainless steel, 2 flanged sleeves, 2 cover caps chrom	50

Complete fixing sets for wash basins, urinals and sanitary installations

Urinals

Wash basins

BUILDING MATERIALS

- Concrete
- Vertically perforated brick
- Hollow blocks made from lightweight concrete
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone
- Aerated concrete
- Solid panel made from gypsum
- Solid brick made from lightweight concrete
- Solid brick

CHARACTERISTICS

ADVANTAGES

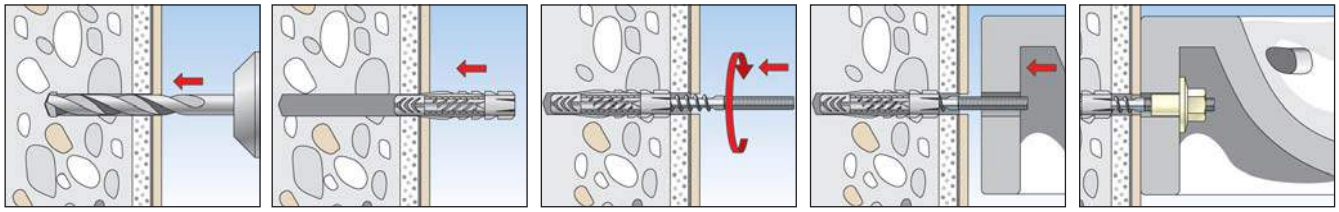
- Complete fixing sets allow for quick and easy installation.
- The universal plug UX can be used in solid and hollow materials, thus offering a high level of flexibility.
- Flanged nuts and collar sleeves made of high-strength nylon are resistant to ageing and chemicals, and guarantee a long-lasting fixing that will not damage the ceramics.
- Cover caps with a high-quality chrome finish ensure the fixture remains visually attractive for a long period of time.

APPLICATIONS

- Wash basins
- Urinals
- Built-in toilets
- Boilers
- Gas heaters
- Cisterns
- Consoles

FUNCTIONING

- The rimless UX is suitable for pre-positioned and push-through installation.
- Screwing in the screw causes the UX to expand in solid and hollow building material.
- Maximum load-bearing capacity is only achieved when the minimum screw-in depth is reached.
- Tiles and plaster are not classed as load-bearing base materials.



TECHNICAL DATA

Wash basin and urinal fixing **WD**

Item	Art.-No.	Contents per plastic bag [pcs]	Sales unit [pcs]
WD 8 x 90	**080659**	2 wall plugs UX 10 x 60, 2 stud screws M8 x 90 zinc-plated, 2 flanged nuts BU M8	50
WD 8 x 110	**080658**	2 wall plugs UX 10 x 60, 2 stud screws M8 x 110 zinc-plated, 2 flanged nuts BU M8	50
WD 10 x 120	**080655**	2 wall plugs UX 14 x 75, 2 stud screws M10 x 120 zinc-plated, 2 flanged nuts BU M10 MH	50
WD 10 x 140	**080656**	2 wall plugs UX 14 x 75, 2 stud screws M10 x 140 zinc-plated, 2 flanged nuts BU M10 MH	50

TECHNICAL DATA

Boiler fixing **BO**

Item	Art.-No.	Contents per plastic bag [pcs]	Sales unit [pcs]
BO 120	**080654**	4 wall plugs UX 14 x 75, 4 stud screws M10 x 120 zinc-plated, 4 flanged nuts BU M10	25

TECHNICAL DATA

Washbasin fixing **WST**

Item	Art.-No.	Contents per plastic bag [pcs]	Sales unit [pcs]
WST 10 x 140	**080660**	2 wall plugs UX 14 x 75, 2 stud screws M10 x 140 zinc-plated, 2 hexagon nuts M10 zinc-plated, 2 flanged bushes BDH M10	50
WST 12 x 150	**080661**	2 wall plugs UX 14 x 75, 2 stud screws M12 x 150 zinc-plated, 2 hexagon nuts M12 zinc-plated, 2 flanged bushes BDH M12	50
WST 12 x 180	**080662**	2 wall plugs UX 14 x 75, 2 stud screws M12 x 180 zinc-plated, 2 hexagon nuts M12 zinc-plated, 2 flanged bushes BDH M12	50

TECHNICAL DATA

Urinal fixing **UST 8 x 110**

Urinal fixing **UST 10 x 120**

Item	Art.-No.	Contents per plastic bag [pcs]	Sales unit [pcs]
UST 8 x 110	**083578**	2 wall plugs UX 10 x 60, 2 stud screws M8 x 110, 2 washers B 8.4 DIN 125, 2 plastic washer 8,4 x 16 x 1,6, 2 cap nuts FA 8, 2 cover caps chrome plated	50
UST 10 x 120	**080668**	2 wall plugs UX 14 x 75, 2 stud screws M10 x 120, 2 flanged nuts BU M10, 2 cover caps AKM 10 CR	10

TECHNICAL DATA

Sanitary fixing **WL**

Item	Art.-No.	Contents per plastic bag [pcs]	Sales unit [pcs]
WL 7 x 60	**080651**	2 plugs S 10, 2 screws 7 x 65 hex. head zinc-plated, 2 washers zinc-plated	100
WL 8 x 70	**080652**	2 plugs S 10, 2 screws 8 x 70 hex. DIN 571 zinc-plated, 2 washers zinc-plated	100
WL 10 x 80	**080650**	2 plugs S 12, 2 screws 10 x 80 hex. DIN 571 zinc-plated, 2 washers zinc-plated	50

ACCESSORIES

Flanged nut **BUM**

Item	Art.-No.	Thread M	Width across nut ⬡ SW [mm]	Washer [mm]	Match	Sales unit [pcs]
BU M8 MH	**060200**	M 8	17	40	STS M8	25
BU M10 MH	**060201**	M 10	17	40	STS M10	25
BU M12 MH	**060204**	M 12	19	40	STS M12	25

ACCESSORIES

Cover cap **AKM**

Item	Art.-No.	Colour	Match	Sales unit [pcs]
AKM 10 W	**080972**	white	BU M10 MH	20
AKM 10 CR	**080951**	chrome	BU M10 MH	100
AKM 12 CR	**080952**	chrome	BU M12 MH	100

ACCESSORIES

Installation tool **HED**

Item	Art.-No.	Match	Sales unit [pcs]
HED	**079831**	M6, M8, M10, M12	1

INSTALLATION DATA

Item	Art.-No.	Drill diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Usable length (with assembled flanged nut) t_{fix} [mm]	Min. bolt penetration $l_{E,min}$ [mm]
WD 8 x 90	**080659**	10	75	5	68
WD 8 x 110	**080658**	10	75	25	68
WD 10 x 120	**080655**	14	95	18	85
WD 10 x 140	**080656**	14	95	38	85
BO 120	**080654**	14	95	18	85
WST 10 x 140	**080660**	14	95	38	85
WST 12 x 150	**080661**	14	95	48	85
WST 12 x 180	**080662**	14	95	78	85
UST 8 x 110	**083578**	10	75	32	68
UST 10 x 120	**080668**	14	95	18	85
WL 7 x 60	**080651**	10	70	10	57
WL 8 x 70	**080652**	10	70	12	58
WL 10 x 80	**080650**	12	80	10	70

LOADS

Washbasin and urinal fixings

Highest recommended loads[1] for a single anchor.
The given loads are valid for stud screws with the specified diameter.

Type			WD 8x90 WD 8x110	WD 10x120 WD 10x140	WST 10x140 BO 120	WST 12x150 WST 12x180	UST 8x110	UST 10x120	WL 7x60	WL 8x70	WL 10x80
Screw diameter	Ø	[mm]	8	10	10	12	8	10	7	8	10
Recommended loads in the respective base material F_{rec}[2]											
Concrete	≥ C20/25	[kN]	0,90	0,90	0,90	1,80	0,90	0,90	1,10	1,10	1,50
Solid brick	≥ Mz 12	[kN]	0,50	0,50	0,50	0,80	0,50	0,50	-[3]	-[3]	-[3]
Perforated sand-lime brick	≥ KSL 12	[kN]	0,40	0,40	0,40	0,80	0,40	0,40	-	-	-
Vertically perforated brick	≥ Hlz 12	[kN]	0,20	0,30	0,30	0,40	0,20	0,30	-	-	-
Aerated concrete	≥ PB 4, PP 4 (G4)	[kN]	0,30	0,30	0,30	0,70	0,30	0,30	0,16	0,16	0,28

[1] Required safety factors are considered.

[2] Valid for tensile load, shear load and oblique load under any angle.

[3] Due to that the failure of the substrate varies too much no reproducible values can be given.

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10 Scaffold and eye screw fixings

		Page
Scaffold anchoring GS 12 + plug		466
Scaffold anchoring FI G		468
Eye screw GS		470
Ring nut RI		472

The standard scaffold anchoring

Scaffold anchoring

Façade scaffolds

BUILDING MATERIALS

GS 12 + S 14 ROE suitable for:

- Concrete
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick
- Solid brick made from lightweight concrete

GS 12 + S 16 H R suitable for:

- Vertically perforated brick
- Perforated sand-lime brick
- Aerated concrete

CERTIFICATES

ADVANTAGES

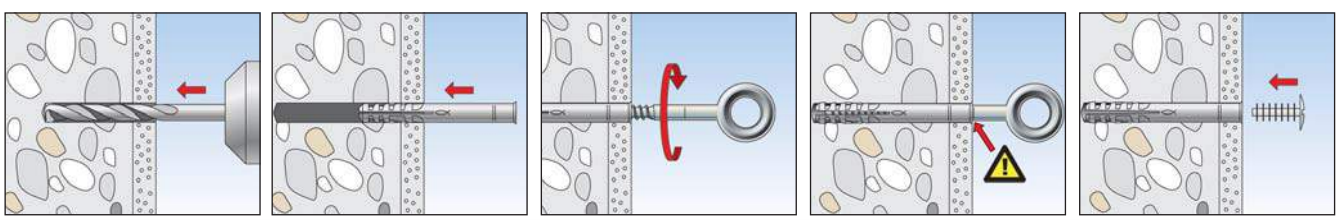
- The ideal interaction of the scaffold eyebolt and plug allows for a high load-bearing capacity, thus providing increased safety.
- The high-quality weld stops the eye from opening.
- The large diameter of the cover caps (available separately) covers drill holes completely and discreetly, even those with slightly broken edges.

APPLICATIONS

- Façade scaffolds
- Ropes
- Chains
- Trellises
- Lighting
- Clothes lines
- Hanging baskets

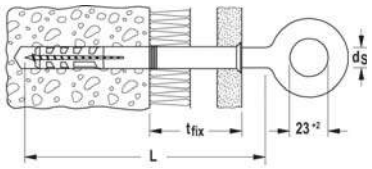
FUNCTIONING

- In order to achieve the maximum load-bearing capacity, nylon plugs should only be used once.
- The combination with plug S 16 H R is recommended for perforated brick and aerated concrete.
- The screw-in markings provide a visual control during assembly, and thus allow for a simple and problem-free installation.
- Pre-drill into wood when not using plugs. The drill bit diameter should equal the core diameter of the screw.
- Suitable cover caps AD 12x40 (see page 469) for closing off remaining drill holes for S14 ROE.
- Not suitable for swings, hammocks etc.



TECHNICAL DATA

Scaffold eyebolt **GS 12**

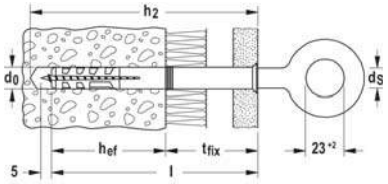


Item	Art.-No.	Shaft diameter d_s [mm]	Shaft length L [mm]	Max. thickness of non-bearing layer t_{fix} [mm]	Eye-Ø [mm]	Match	Sales unit [pcs]
GS 12 x 90	**080925**	12	90	15	23	S 14 ROE 70	25
GS 12 x 120	**080926**	12	120	30 / 10	23	S 14 ROE 100 / S16 H 100 R	25
GS 12 x 160	**080927**	12	160	65 / 45	23	S 14 ROE 135 / S 16 H 135 R	25
GS 12 x 190	**080960**	12	190	110 / 70	23	S 14 ROE 185 / S 16 H 160 R	25
GS 12 x 230	**080961**	12	230	110 / 70	23	S 14 ROE 185 / S 16 H 160 R	25
GS 12 x 300	**081269**	12	300	110 / 70	23	S 14 ROE 185 / S 16 H 160 R	25
GS 12 x 350	**080962**	12	350	110 / 70	23	S 14 ROE 185 / S 16 H 160 R	25

TECHNICAL DATA

Plug **S 14 ROE**

Plug **S 16 H R**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth for through fixings h_2 [mm]	Effect. anchorage depth h_{ef} [mm]	Anchor length l [mm]	Max. thickness of non-bearing layer t_{fix} [mm]	Min. bolt penetration l + 5 [mm]	Sales unit [pcs]
S 14 ROE 70	**052160**	14	80	70	70	–	75	25
S 14 ROE 100	**052161**	14	110	70	100	30	105	25
S 14 ROE 135	**052162**	14	145	70	135	65	140	25
S 14 ROE 185	**052164**	14	195	70	185	110	190	25
S 16 H 100 R	**059187** 1)	16	120	90	100	10	105	50
S 16 H 135 R	**059188** 1)	16	155	90	135	45	140	50
S 16 H 160 R	**059189** 1)	16	180	90	160	70	165	50

1) Also suitable for screws with metric thread M12.

LOADS

Scaffold anchoring S14 ROE / S 16 H R + GS 12

Mean ultimate loads[1)] for tension of a single anchor.

Type			S 14 ROE + GS 12	S 16 H R + GS 12
Mean ultimate loads for tension in the respective base material N_u				
Concrete	≥ C20/25	[kN]	14,5	-
Solid brick	≥ Mz 12	[kN]	13,0	-
Solid sand-lime brick	≥ KS 12	[kN]	14,5	-
Solid brick of lightweight aggregate concrete	≥ V 2	[kN]	3,0	-
Perforated sand-lime brick	≥ KSL 12	[kN]	-	5,0
Vertically perforated brick	≥ Hlz 12	[kN]	-	3,5
Aerated concrete	≥ AAC 4	[kN]	3,0	3,0

1) On these values an appropriate safety factor has to be considered.

The scaffold anchoring with metric thread M 12

Scaffold anchoring

Façade scaffolds

BUILDING MATERIALS

When combined with internal threaded anchor:

- Concrete C20/25 - C50/60:
  Injection mortar FIS EM / FIS V
  Internal threaded anchor
  RG 18x125 M12 I,
  Art.-No. 50562 /
  ZYKON undercut anchor FZA-I
  FZA 22x100 M12 I, Art.-No. 060763
- Masonry:
  Injection mortar FIS V 360 S
  Perforated sleeve FIS H 20x85 K,
  Art.-No. 41904 /
  Internal threaded anchor
  FIS E 15x85 M12,
  Art.-No. 43634

ADVANTAGES

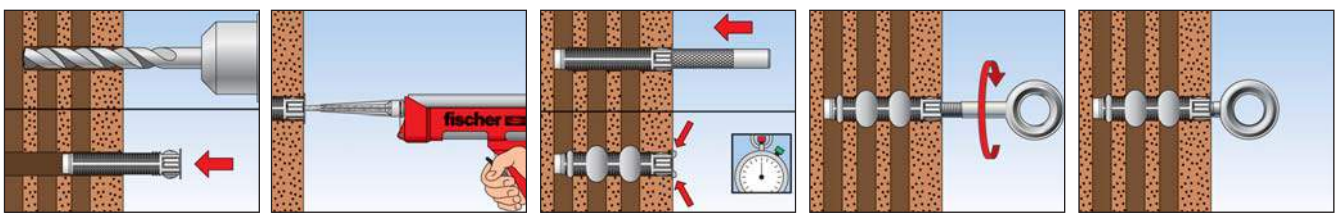
- When used together with an internal threaded anchor or a steel fixture with internal thread M 12, the scaffold screw FI G allows for repeated installation and removal using the same fixing point.
- The high-quality weld stops the eye from opening, thus providing increased safety.

APPLICATIONS

- Façade scaffolds
- Trellises
- Tensioning ropes
- Chains
- Lighting
- Clothes lines
- Hanging baskets

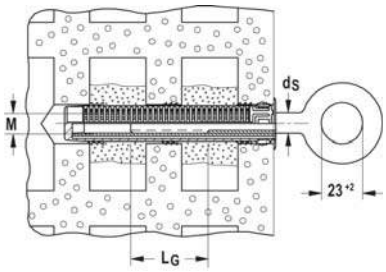
FUNCTIONING

- The scaffold anchoring FI G should be used with an internal threaded anchor. Detailed information about its functioning can be found in the „Chemical fixings" chapter.
- Not suitable for swings, hammocks etc.



TECHNICAL DATA

Scaffold eyebolt **FI G 12**



Item	Art.-No.	Thread M	Thread length l_G [mm]	Shaft diameter d_s [mm]	Max. thickness of non-bearing layer t_{fix} [mm]	Eye-Ø [mm]	Sales unit [pcs]
FI G 12 x 40	**080933**	M 12	30	12	40	23	20
FI G 12 x 80	**080934**	M 12	30	12	80	23	20

ACCESSORIES

Cover cap **AD 12 x 40**

Item	Art.-No.	Colour	Length l [mm]	Head height [mm]	Match	Sales unit [pcs]
AD 12 x 40 W	**060259**	white	40	3	Plug-Ø 14 mm	100
AD 12 x 40 G	**060260**	grey	40	3	Plug-Ø 14 mm	100

Eye screw GS

The universal eye screw for use with fischer plugs or for direct use in wood

Hanging baskets

Trellis

BUILDING MATERIALS

GS 8 + SX 10 suitable for:
- Concrete
- Solid brick
- Perforated brick
- Aerated concrete

GS 10 + S 12 R suitable for:
- Concrete
- Solid brick

GS 10 + S 14 H R suitable for:
- Perforated brick

GS 8 or GS 10 without plug suitable for:
- Wood

CERTIFICATES

ADVANTAGES

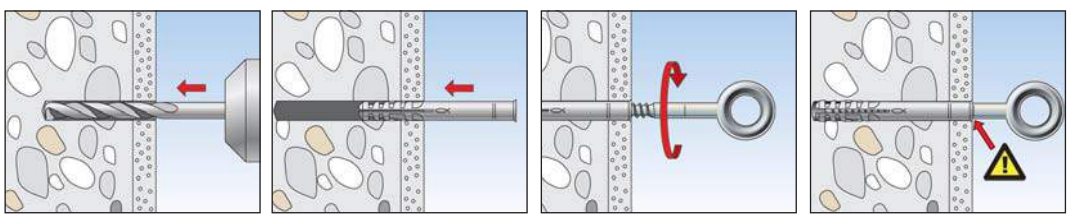
- The ideal interaction of the eye screw and plug allows for a high load-bearing capacity, thus providing increased safety.
- The high-quality weld stops the eye from opening.

APPLICATIONS

- Ropes
- Chains
- Trellises
- Lighting
- Clothes lines
- Hanging baskets

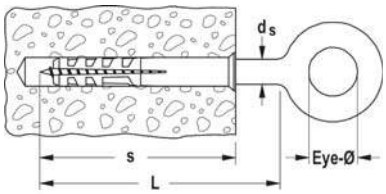
FUNCTIONING

- Pre-drill when using with wood. The drill bit diameter should equal the core diameter of the screw.
- The maximum load-bearing capacity is achieved when combined with the plugs recommended by fischer (see table "Technical Data"). The nylon plug must only be used once.
- Not suitable for swings, hammocks etc.



TECHNICAL DATA

Eye screw **GS**

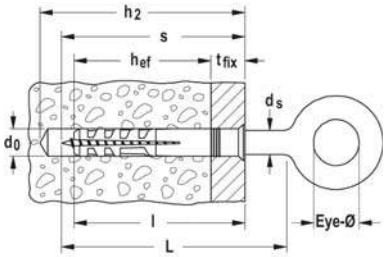


Item	Art.-No.	Shaft diameter d_s [mm]	Shaft length L [mm]	Bolt penetration s [mm]	Match	Eye-Ø [mm]	Sales unit [pcs]
GS 8 x 50 Ø15	**502620**	8	50	50	SX 10	15	20
GS 8 x 80 Ø15	**540677**	8	80	58	SX 10	15	20
GS 8 x 120 Ø15	**540678**	8	120	58	SX 10	15	20
GS 8 x 80 Ø22	**080918**	8	80	58	SX 10	22	20
GS 8 x 100 Ø22	**080919**	8	100	58	SX 10	22	20
GS 8 x 120 Ø22	**080920**	8	120	58	SX 10	22	20
GS 10 x 160 Ø30	**080929**	10	160	–	S 12 R, S 14 H R, SX12	30	20

TECHNICAL DATA

Plug **S 12 R**

Plug **S 14 H R**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth for through fixings h_2 [mm]	Bolt penetration s [mm]	Effect. anchorage depth h_{ef} [mm]	Anchor length l [mm]	Max. fixture thickness t_{fix} [mm]	Sales unit [pcs]
S 12 R 100	**050177**	12	120	110	60	100	40	100
S 12 R 135	**050178**	12	155	145	60	135	75	100
S 14 H 100 R	**059179**	14	120	110	90	100	10	50
S 14 H 135 R	**059180**	14	155	145	90	135	45	50

LOADS

Eye screw GS

Highest recommended tensile loads[1)] for a single anchor.

The given loads are valid for the eye screw GS with the specified fischer plugs.

Type			SX 10x50 + GS 8	SX 12 + GS 10	S 12 R + GS 10	S 14 H-R + GS 10
Recommended tensile loads in the respective base material N_{rec}						
Concrete	≥ C12/15	[kN]	1,20	1,70	1,03	-
Solid brick	≥ Mz 12	[kN]	0,65	0,70	1,00	-
Solid sand-lime brick	≥ KS 12	[kN]	1,20	1,70	0,84	-
Solid brick of lightweight aggregate concrete	≥ V 4	[kN]	-	-	0,29	0,43
Perforated sand-lime brick	≥ KSL 12	[kN]	0,35	0,35	0,30	0,34
Vertically perforated brick	≥ Hlz 12 ($\rho \geq 1$ kg/dm³)	[kN]	-	-	0,36	0,50
Aerated concrete	≥ AAC 2	[kN]	0,09	0,20	–	-
Aerated concrete	≥ AAC 4	[kN]	0,30	0,60	-	-

[1)] Required safety factors are considered.

The ring nut for all fixings with threaded studs

Transmission of loads

BUILDING MATERIALS

In line with the anchor used:

- Concrete, cracked and non-cracked
- Solid and perforated brick

ADVANTAGES

- The metric internal thread gives the ring nut RI flexibility and means it can be used with a range of steel anchors or threaded rods; e.g. FH II, FHB II-A, RG M, FZA, FAZ II, FIS A.

APPLICATIONS

- Ropes
- Chains
- Trellises
- Lighting
- Clothes lines
- Hanging baskets

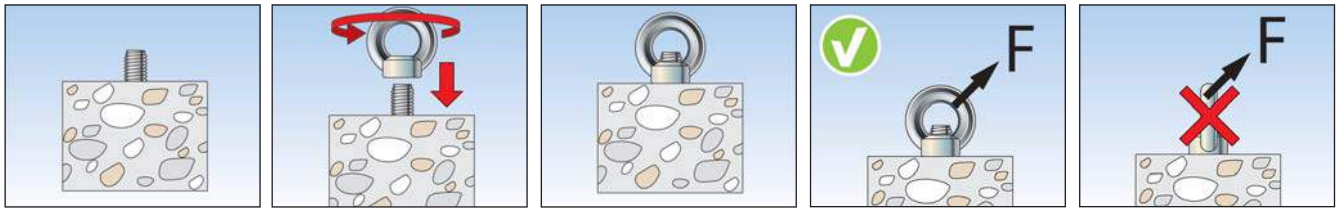
FUNCTIONING

- The ring nut is to be used with an anchor with threaded studs. Detailed information about its functioning can be found in the „High performance steel anchors" and „Chemical fixings" chapters. The following anchors, for example, can be used: FHB II, RG M, FZA, FAZ II, FIS A.
- Not suitable for swings, hammocks etc.

TECHNICAL DATA

Ring nut **RI**

Item	Art.-No.	Match	Eye-Ø [mm]	Total height [mm]	Sales unit [pcs]
RI M 8	**080840**	M 8	20	36	20
RI M 10	**080842**	M 10	25	45	10
RI M 12	**080844**	M 12	30	53	10

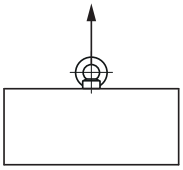
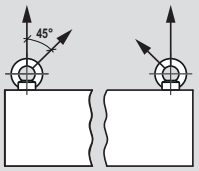
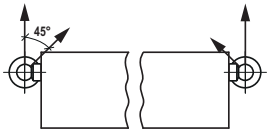


LOADS

Ring nut RI

Highest recommended loads[1] for ring nuts.

The given loads apply for the use of ring nuts as permanent anchorage. For varying use at different components to be lifted ring nuts with next larger thread diameter has to be use (see DIN 582).

Type			RI M 8	RI M 10	RI M 12
Thread size		[M]	M 8	M 10	M 12
Recommended load per ring nut for respective set-up F_{rec}					
Axial tension on single ring nut		[kN]	1,40	2,30	3,40
Axial tension or oblique tension up to 45° on a group of two ring nuts		[kN]	1,00	1,70	2,40
Shear or oblique tension up to 45° on a group of two ring nuts for lateral set-up		[kN]	0,70	1,15	1,70

[1] Required safety factors are considered.

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11 Insulation fixings / Façade fixings

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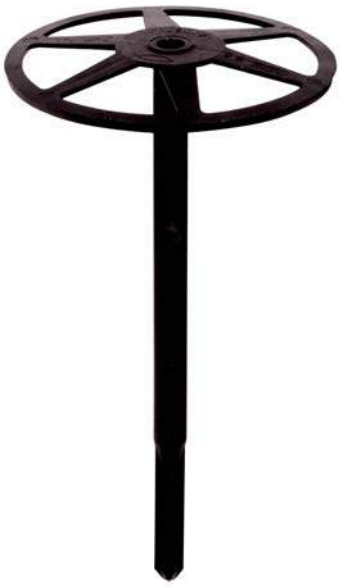
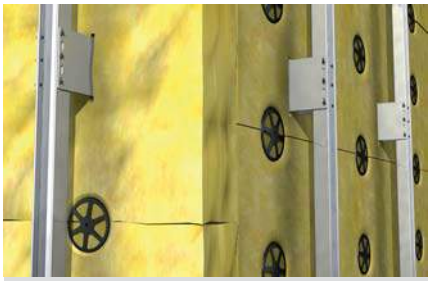
Insulation support DHK

The cost-effective plastic insulation support for all conventional insulating boards



Insulating materials in rear-ventilated façades



Insulating materials in rear-ventilated façades

BUILDING MATERIALS

- Concrete
- Hollow blocks made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid brick made from lightweight concrete
- Solid brick

ADVANTAGES

- The optimised geometry of the expansion section ensures a low anchorage depth and reduces the amount of drilling required.
- Flexible pins in the plate area adapt to the insulating material, and ensure a sustained contact pressure.
- The simple hammerset installation allows for a quick installation process and thus reduces workload.
- The colouring of the DHK means that it does not stand out on black clad insulating material in rear-ventilated façades.
- The DHK 45 is suitable for use in pressure-resistant insulating boards and reveals.

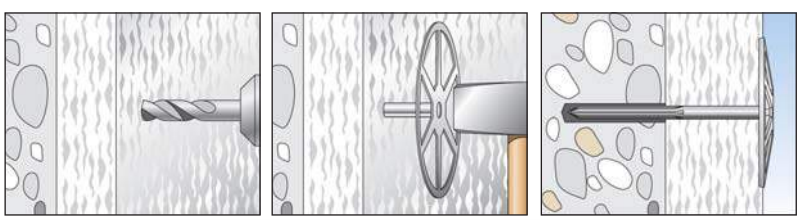
APPLICATIONS

To fix soft and pressure-resistant insulating materials in rear-ventilated façades, such as:

- Mineral / glass wool
- PU panels
- Light building boards made of wood wool
- Cork boards / coir matting
- Polystyrene
- Foam glass tiles

FUNCTIONING

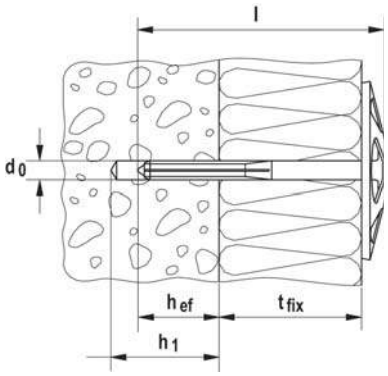
- The DHK is set in push-through installation using a hammer.
- The plate size of the insulation support is to be selected in line with the compressive strength of the insulating material: DHK 45 for pressure-resistant; DHK 90 for soft insulating materials.
- The expansion of the ribs in the drill hole gives the DHK an ideal contact pressure.
- Temperature range when installed: -40 °C to +80 °C.



TECHNICAL DATA

Insulation support **DHK 45**,
plate-ø 45 mm

Insulation support **DHK**,
plate-ø 90 mm



Item	Art.-No.	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Effect. anchorage depth h_{ef} [mm]	Anchor length l [mm]	Max. fixture thickness t_{fix} [mm]	Sales unit [pcs]
DHK 40	**080937**	8	30	20	65	40	250
DHK 60	**080938**	8	30	20	85	60	250
DHK 80	**080939**	8	30	20	105	80	250
DHK 100	**080940**	8	30	20	125	100	250
DHK 120	**080941**	8	30	20	145	120	200
DHK 140	**080949**	8	30	20	165	140	200
DHK 160	**512150**	8	30	20	185	160	100
DHK 180	**512151**	8	30	20	205	180	100
DHK 200	**512153**	8	30	20	225	200	100
DHK 220	**512154**	8	30	20	245	220	100
DHK 45/40	**080892**	8	30	20	65	40	250
DHK 45/60	**080893**	8	30	20	85	60	250
DHK 45/80	**080894**	8	30	20	105	80	250
DHK 45/100	**080895**	8	30	20	125	100	250

LOADS

Insulation support DHK

Highest recommended loads[1] for a single anchor.

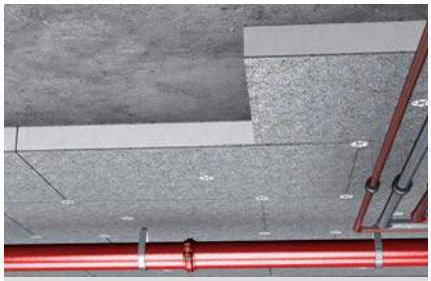
Type			DHK
Recommended loads in the respective base material F_{rec}[2]			
Concrete	≥ C12/15	[kN]	0,03
Solid brick	Mz 12	[kN]	0,03
Solid sand-lime brick	KS 12	[kN]	0,03
Perforated sand-lime brick	KSL 6	[kN]	0,03
Vertically perforated brick	Hlz 12	[kN]	0,02
Aerated concrete	≥ PB 2, PP 2 (G2)	[kN]	0,02

[1] Required safety factors are considered.

[2] Valid for tensile load.

Insulation support DHM

The fire-protection-tested metal insulation support for fire-resistant insulating boards



Pressure-resitant insulating materials on ceiling undersides

Pressure-resistant insulating materials in curtain façades

BUILDING MATERIALS

- Concrete
- Hollow blocks made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Aerated concrete
- Solid brick made from lightweight concrete
- Solid brick

CERTIFICATES

ADVANTAGES

- The metal insulation support achieves fire resistance F 120. This means that it can be used where there are fire resistance requirements.
- The DTM 80 plate for soft insulating materials (available separately) simplifies storage and minimises costs.
- The simple hammerset installation allows for a quick installation process and thus reduces workload.
- The shaft geometry allows setting in aerated concrete without pre-drilling, thus saving a stage of installation.
- Stainless steel version DHM A2 (1.4301) for wet and extirior applications.

APPLICATIONS

To fix fire-resistant soft or pressure-resistant insulating materials, such as:

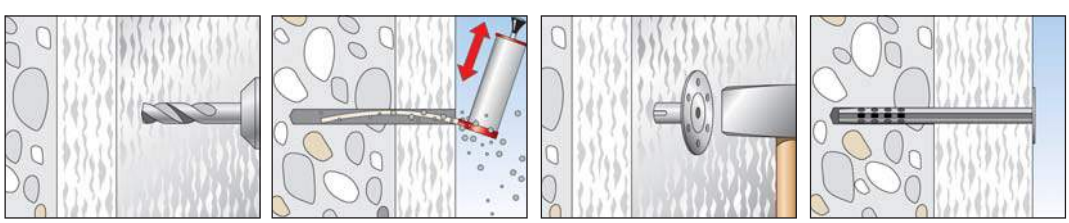
- Mineral / glass wool
- Light building boards made of wood wool
- Foam glass tiles

Also suitable for:

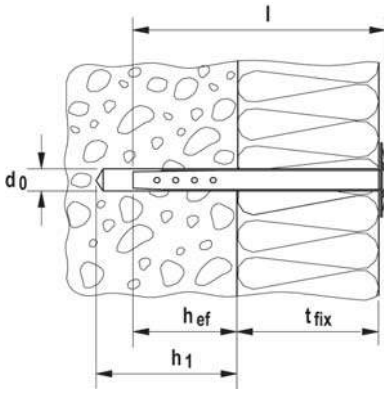
- Polystyrene boards
- Coir matting

FUNCTIONING

- The insulation support is set in push-through installation using a hammer.
- The spring steel expands when hammered into the base material.
- Use the DTM 80 plate (available separately) to fix soft insulating materials.



TECHNICAL DATA



Insulation support metal **DHM**, washer-ø 35 mm

Insulation retaining metal washer **DTM 80**, washer-ø 80 mm, inside-ø 11 mm

	Hot-dip galvanised steel	Stainless steel A2	Approval	Drill hole diameter	Min. drill hole depth	Effect. anchorage depth	Anchor length	Usable length	Sales unit
	Art.-No.	Art.-No.	DIBt	d_0 [mm]	h_1 [mm]	h_{ef} [mm]	l [mm]	t_{fix} [mm]	[pcs]
Item	hdg	A2							
DHM 40	536253	536262	●	8	50	40	80	10 - 40	250
DHM 70	536254	536264	●	8	50	40	110	40 - 70	250
DHM 100	536256	536265	●	8	50	40	140	70 - 100	250
DHM 130	536257	536266	●	8	50	40	170	100 - 130	250
DHM 160	536258	536267	●	8	50	40	200	130 - 160	250
DHM 210	536259	536268	●	8	50	40	250	170 - 210	125
DHM 260	536260	536269	●	8	50	40	300	220 - 260	125
DTM 80	536261	536271	●	–	–	–	–	–	250

ACCESSORIES

Cover cap **DHM ADK-W**

Cover cap **DHM ADK-GR**

Cover cap **DHM ADK-BG**

Item	Art.-No.	Diameter d [mm]	Colour	Outer carton [pcs]	Sales unit [pcs]
DHM ADK-W	**013330**	37	white	5000	250
DHM ADK-GR	**046843**	37	grey	10000	250
DHM ADK-BG	**046844**	37	beige	2500	250

LOADS

Insulation support DHM

Highest recommended loads[1] for a single anchor.

Type			DHM
Recommended loads in the respective base material F_{rec}[2]			
Concrete[3]	≥ C12/15	[kN]	0,25
Solid brick	Mz 12	[kN]	0,25
Solid sand-lime brick	KS 12	[kN]	0,25
Aerated concrete (without pre-drilling)	≥ PB 2, PP 2 (G2)	[kN]	0,10

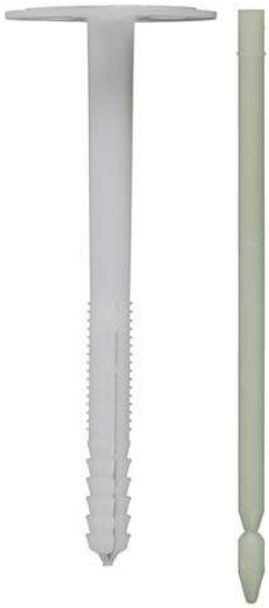
[1] Required safety factors are considered.

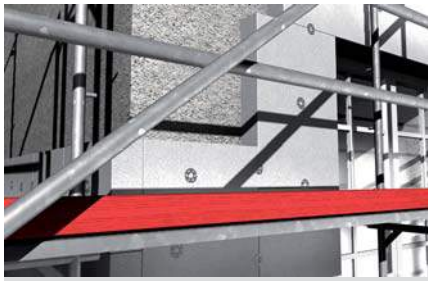
[2] Valid for tensile load.

[3] Acc. to German approval in cracked concrete 0,07 kN. The complete approval has to be considered.

Render fixing DIPK

The cost-effective drive anchor with plastic nail





Pressure-resistant insulation boards with rendering

BUILDING MATERIALS

- Concrete
- Hollow blocks made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Solid sand-lime brick
- Natural stone with dense structure
- Solid brick

ADVANTAGES

- The glass-fibre-reinforced plastic nail (GRP nail) reduces the heat transmission and prevents marks on the plaster surface.
- The simple hammerset installation allows for a quick installation process and thus reduces workload.
- The well-proven design with low anchorage depth reduces the amount of drilling required, thus achieving a high level of efficiency.
- The DIPK can be used universally in rear-ventilated curtain façades, as well as in plaster façades.
- The surface of the anchor plate is suitable to use as a plaster base

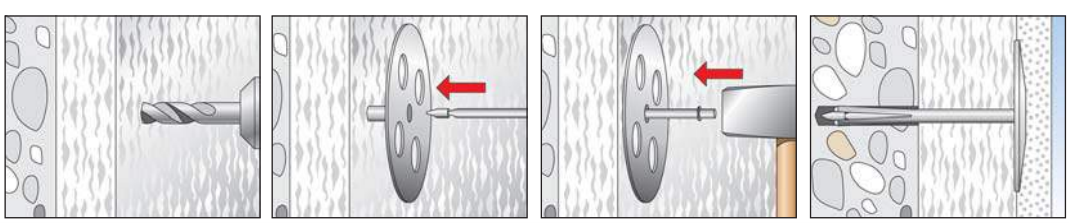
APPLICATIONS

To fix pressure-resistant insulating materials in façades, such as:

- Polystyrene boards
- Light building boards made of wood wool
- Cork boards / coir matting
- PU panels

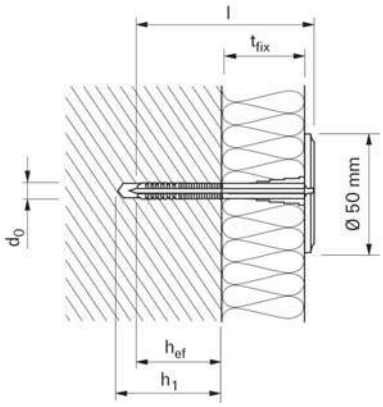
FUNCTIONING

- Non-bearing layers, such as adhesive and/or old render, are to be included in the anchor's useful length.
- The DIPK is set in push-through installation using a hammer.
- In solid materials the GRP nail needs to be shortened at the predetermined breaking point.
- Driving the nail into the anchor shaft causes the DIPK to expand in the base material.



TECHNICAL DATA

Render fixing **DIPK**



Item	Art.-No.	Drill hole diameter d_0 [mm]	Usable length t_{fix} [mm]	Min. drill hole depth h_1 [mm]	Effect. anchorage depth h_{ef} [mm]	Nail length [mm]	Fixing length l [mm]	Sales unit [pcs]
DIPK 8/20-40	**041865**	8	20 - 40	40	30	77	70	200
DIPK 8/40-60	**041866**	8	40 - 60	40	30	97	90	200
DIPK 8/60-80	**041867**	8	60 - 80	40	30	117	110	200
DIPK 8/80-100	**041868**	8	80 - 100	40	30	137	130	200
DIPK 8/100-120	**041869**	8	110 - 120	40	30	157	150	200
DIPK 10/10-30	**043966**	10	10 - 30	40	30	67	60	200
DIPK 10/40-60	**043967**	10	40 - 60	40	30	97	90	200
DIPK 10/60-80	**043968**	10	60 - 80	40	30	117	110	200
DIPK 10/80-100	**043969**	10	80 - 100	40	30	137	130	200
DIPK 10/100-120	**043970**	10	110 - 120	40	30	157	150	200
DIPK 10/120-140	**043971** 1)	10	120 - 140	40	30	117	170	200
DIPK 10/140-160	**043972** 1)	10	140 - 160	40	30	137	190	200

1) Installation with setting tool, included in each package.

The pre-assembled drive anchor with reinforced plastic nail

Polystyrene rigid foam boards

Setting the hammerset fixing on polystyrene rigid foam boards

BUILDING MATERIALS

- Building material classes A, B, C, D, E
- Concrete
- Building brick
- Solid sand-lime brick
- Hollow blocks made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Lightweight aggregate concrete
- Aerated concrete

APPROVALS

ETA-18/0253
ETAG 014

Use categories A, B, C, D, E

ADVANTAGES

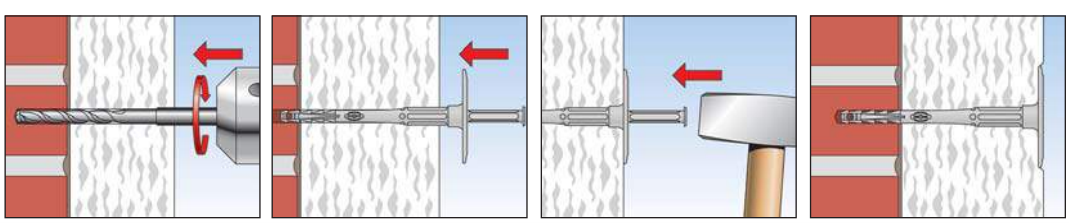
- To set with few hammer blows.
- The disc fits tight into the insulation thanks to its thickness of only 2.5 mm. Thus allows the application of low-cost, thin reinforcement layers.
- Optimised retention forces thanks to the glass fibre reinforced plastic nail (GRP).
- Small anchoring depth of 35 mm saves on drilling times.
- Thanks to the GRP nail, the fixing is free of thermal bridging with the Chi value 0.000 [W/K].
- The compression zone in the shank allows the disc to be drawn precisely into the insulation.
- For insulating material thicknesses up to 180 mm.

APPLICATIONS

- Attachment of ETICS insulating boards on concrete and masonry
- Flush-to-surface installation in ETICS insulating materials e.g. polystyrene

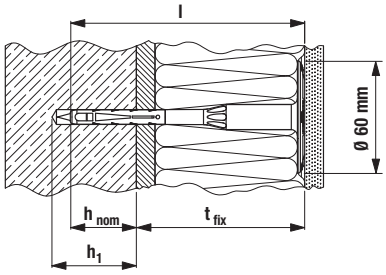
FUNCTIONING

- The fixing is set in push-through installation.
- Simple, fast setting by driving the GRP nail in using a standard hammer.
- Non load bearing layers such as adhesive and old plaster are included in the maximum useful length.



TECHNICAL DATA

Render fixing **FIF-PN 8**



t_{fix} = thickness of insulation + glue + old render

For building matarial categorie A, B, C

Item	Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Min. anchorage depth h_{nom} [mm]	Anchor length l [mm]	Max. fixture thickness t_{fix} [mm]	Disc Ø [mm]	Sales unit [pcs]
FIF-PN 8/60	**546803**	■	8	45	35	108	70	60	100
FIF-PN 8/80	**546804**	■	8	45	35	128	90	60	100
FIF-PN 8/100	**546805**	■	8	45	35	148	110	60	100
FIF-PN 8/120	**546806**	■	8	45	35	168	130	60	100
FIF-PN 8/140	**546807**	■	8	45	35	188	150	60	100
FIF-PN 8/160	**546808**	■	8	45	35	208	170	60	100
FIF-PN 8/180	**546809**	■	8	45	35	228	190	60	100

For building matarial categorie D, E

Item	Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Min. anchorage depth h_{nom} [mm]	Anchor length l [mm]	Max. fixture thickness t_{fix} [mm]	Disc Ø [mm]	Sales unit [pcs]
FIF-PN 8/60	**546803**	■	8	65	55	108	50	60	100
FIF-PN 8/80	**546804**	■	8	65	55	128	70	60	100
FIF-PN 8/100	**546805**	■	8	65	55	148	90	60	100
FIF-PN 8/120	**546806**	■	8	65	55	168	110	60	100
FIF-PN 8/140	**546807**	■	8	65	55	188	130	60	100
FIF-PN 8/160	**546808**	■	8	65	55	208	150	60	100
FIF-PN 8/180	**546809**	■	8	65	55	228	170	60	100

Render fixing FIF-PN 8

LOADS

Render fixing FIF-PN 8

Highest permissible loads for a single anchor[1) 4)] for fixing of external thermal insulation composite systems with rendering.

For the design the complete assessment ETA-18/0253 has to be considered.

					Beton und Mauerwerk[5)]		
Base material	**Brick raw density** ρ [kg/dm³]	**Minimum compressive brick strength** f_b [N/mm²]	**Min. embedment depth** h_{nom} [mm]	**Min. member thickness** h_{min} [mm]	**Permissible tensile load** [3)] N_{perm} [kN]	**Minimum spacing** [2)] s_{min} [mm]	**Minimum edge distance** [2)] c_{min} [mm]
Concrete according to EN 206-1:2013							
FIF-PN 8	C12/15 - C50/60		35[6)]	100	0,17	100	100
Solid clay bricks Mz according to EN 771-1:2011							
FIF-PN 8	≥ 2,0	12	35[6)]	100	0,17	100	100
Vertically perforated clay bricks HLz according to EN 771-1:2011							
FIF-PN 8	≥ 1,0	12	35[7)]	100	0,13	100	100
Lightweight aggregate concrete LAC according to EN 1520:2011							
FIF-PN 8	≥ 0,8	6	55[6)]	100	0,10	100	100
Autoclaved aerated concrete blocks AAC according to EN 771-4:2011							
FIF-PN 8	≥ 0,5	6	55[7)]	100	0,10	100	100

[1)] The partial safety factors for material resistance as regulated in the assessment as well as a partial safety factor for load actions of γ_F = 1,5 are considered.

[2)] Possible minimum spacing resp. edge distance according to assessment.

[3)] Plastic anchor for fixing of external thermal insulation composite systems with rendering according to ETAG014. Only tensile wind loads are permitted.

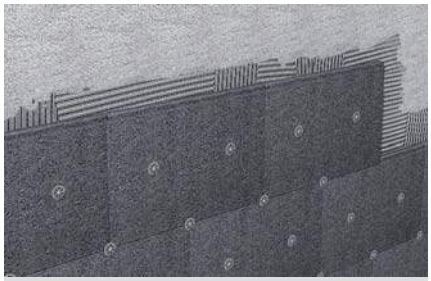
[4)] The given loads are valid for installation and use of fixations in dry base material for temperatures in the substrate up to +24 °C (resp. short term up to +40 °C).

[5)] Restrictions concerning the manufacturer and the permissible hole patterns as well as the web thickness see assessment.

[6)] Drill method hammer drilling.

[7)] Hammer drilling.

The pre-assembled drive anchor with innovative steel-plastic nail



Additional reinforcement of ETICS

Detail: innovative steel-plastic combination

BUILDING MATERIALS

- Building material classes A, B, C, D, E
- Concrete
- Full blocks made from concrete
- Building brick
- Solid sand-lime brick
- Hollow blocks made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Lightweight aggregate concrete
- Aerated concrete

APPROVALS

ETA-18/0393
ETAG 014
Use categories A, B, C, D, E

ADVANTAGES

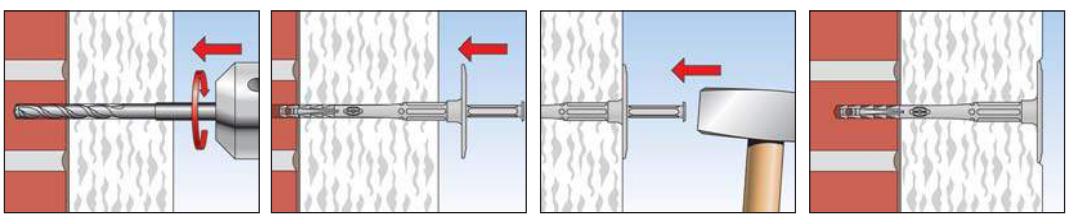
- To set with few hammer blows.
- The disc fits tight into the insulation thanks to its thickness of only 2.5 mm. Thus allows the application of low-cost, thin reinforcement layers.
- High retention forces thanks to the steel tip of the compound nail.
- Small anchoring depth of 35 mm saves on drilling times.
- The FIF-CN II 8 is virtually free of thermal bridging due to the compound nail.
- The compression zone in the shank allows the disc to be drawn in precisely.
- For insulating material thicknesses up to 340 mm.

APPLICATIONS

- Attachment of ETICS insulating boards on concrete and masonry
- Flush-to-surface installation in ETICS insulating materials and mineral wool e.g. polystyrene

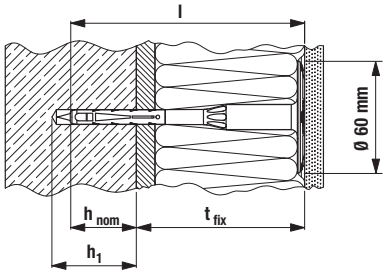
FUNCTIONING

- The fixing is set in push-through installation.
- Simple, fast setting by driving the compound nail in using a standard hammer.
- Non load bearing layers such as adhesive and old plaster are included in the maximum useful length.



TECHNICAL DATA

Render fixing **FIF-CN II 8**



t_{fix} = thickness of insulation + glue + old render

For building matarial categorie A, B, C

Item	Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Min. anchorage depth h_{nom} [mm]	Anchor length l [mm]	Max. fixture thickness t_{fix} [mm]	Disc Ø [mm]	Sales unit [pcs]
FIF-CN II 8/60	**546443**	■	8	45	35	108	70	60	100
FIF-CN II 8/80	**546444**	■	8	45	35	128	90	60	100
FIF-CN II 8/100	**546445**	■	8	45	35	148	110	60	100
FIF-CN II 8/120	**546446**	■	8	45	35	168	130	60	100
FIF-CN II 8/140	**546447**	■	8	45	35	188	150	60	100
FIF-CN II 8/160	**546448**	■	8	45	35	208	170	60	100
FIF-CN II 8/180	**546449**	■	8	45	35	228	190	60	100
FIF-CN II 8/200	**546450**	■	8	45	35	248	210	60	100
FIF-CN II 8/220	**546451**	■	8	45	35	268	230	60	100
FIF-CN II 8/240	**546452**	■	8	45	35	288	250	60	100
FIF-CN II 8/260	**546453**	■	8	45	35	308	270	60	100
FIF-CN II 8/280	**546454**	■	8	45	35	328	290	60	100
FIF-CN II 8/300	**546455**	■	8	45	35	348	310	60	100
FIF-CN II 8/320	**546456**	■	8	45	35	368	330	60	100
FIF-CN II 8/340	**546457**	■	8	45	35	388	350	60	100

For building matarial categorie D, E

Item	Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Min. anchorage depth h_{nom} [mm]	Anchor length l [mm]	Max. fixture thickness t_{fix} [mm]	Disc Ø [mm]	Sales unit [pcs]
FIF-CN II 8/60	**546443**	■	8	65	55	108	50	60	100
FIF-CN II 8/80	**546444**	■	8	65	55	128	70	60	100
FIF-CN II 8/100	**546445**	■	8	65	55	148	90	60	100
FIF-CN II 8/120	**546446**	■	8	65	55	168	110	60	100
FIF-CN II 8/140	**546447**	■	8	65	55	188	130	60	100
FIF-CN II 8/160	**546448**	■	8	65	55	208	150	60	100
FIF-CN II 8/180	**546449**	■	8	65	55	228	170	60	100
FIF-CN II 8/200	**546450**	■	8	65	55	248	190	60	100
FIF-CN II 8/220	**546451**	■	8	65	55	268	210	60	100
FIF-CN II 8/240	**546452**	■	8	65	55	288	230	60	100
FIF-CN II 8/260	**546453**	■	8	65	55	308	250	60	100
FIF-CN II 8/280	**546454**	■	8	65	55	328	270	60	100
FIF-CN II 8/300	**546455**	■	8	65	55	348	290	60	100
FIF-CN II 8/320	**546456**	■	8	65	55	368	310	60	100
FIF-CN II 8/340	**546457**	■	8	65	55	388	330	60	100

LOADS

Render fixing FIF-CN II 8 3)

Highest permissible loads for a single anchor[1) 4)] for fixing of external thermal insulation composite systems with rendering.

For the design the complete assessment ETA-18/0393 has to be considered.

					Beton und Mauerwerk[5)]		
Base material	**Brick raw density** ρ [kg/dm³]	**Minimum compressive brick strength** f_b [N/mm²]	**Min. embedment depth** h_{nom} [mm]	**Min. member thickness** h_{min} [mm]	**Permissible tensile load** [3)] N_{perm} [kN]	**Minimum spacing** [2)] s_{min} [mm]	**Minimum edge distance** [2)] c_{min} [mm]
Concrete according to EN 206-1:2000							
FIF-CN II 8	C12/15 - C50/60		35[6)]	100	0,25	100	100
Solid clay bricks Mz according to EN 771-1:2011							
FIF-CN II 8	≥ 2,0	12	35[6)]	100	0,25	100	100
Vertically perforated clay bricks HLz according to EN 771-1:2011							
FIF-CN II 8	≥ 1,0	12	35[7)]	100	0,17	100	100
Lightweight aggregate concrete LAC according to EN 1520:2011							
FIF-CN II 8	≥ 0,8	6	55[6)]	100	0,17	100	100
Autoclaved aerated concrete blocks AAC according to EN 771-4:2011							
FIF-CN II 8	≥ 0,5	4	55[7)]	100	0,10	100	100

[1)] The partial safety factors for material resistance as regulated in the assessment as well as a partial safety factor for load actions of γ_L = 1,5 berücksichtigt.

[2)] Possible minimum spacing resp. edge distance according to assessment.

[3)] Plastic anchor for fixing of external thermal insulation composite systems with rendering according to ETAG014. Only tensile wind loads are permitted.

[4)] The given loads are valid for installation and use of fixations in dry base material for temperatures in the substrate up to +24 °C (resp. short term up to +40 °C).

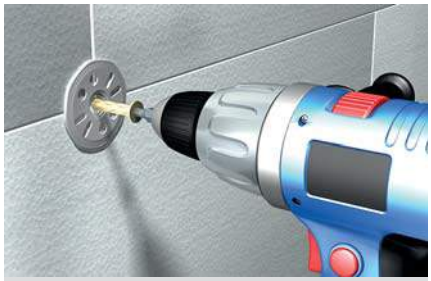
[5)] Restrictions concerning the manufacturer and the permissible hole patterns as well as the web thickness see assessment.

[6)] Drill method hammer drilling.

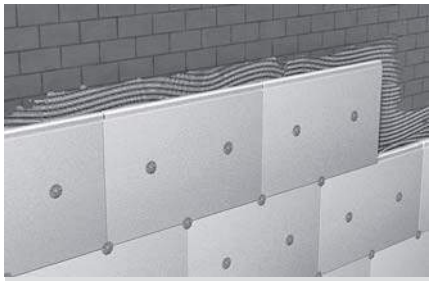
[7)] Hammer drilling.

Render fixing FIF-CS 8

The economic screw fixing for all ETICS insulation materials



Screwed fixing of insulation boards



Polystyrene rigid foam boards 035 on perforated sand-lime brick

BUILDING MATERIALS

- Building material classes A, B, C, D, E
- Concrete
- Concrete (weather shell)
- Building brick
- Solid sand-lime brick
- Hollow blocks made from lightweight concrete
- Vertically perforated brick
- Perforated sand-lime brick
- Lightweight aggregate concrete
- Aerated concrete

APPROVALS

ETA-15/0006
ETAG 014
Use categories A, B, C, D, E

ADVANTAGES

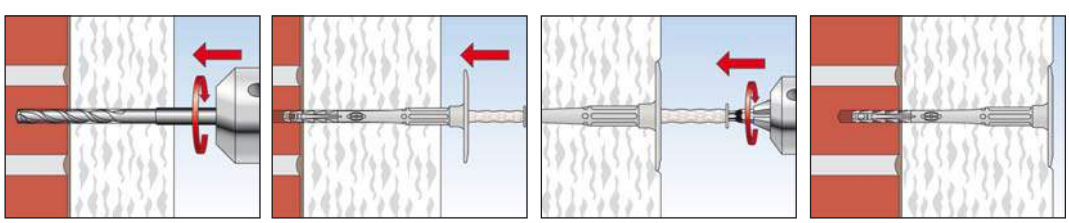
- Compound screw minimises the thermal bridge, thus there are no fixing marks on the façade.
- Less drill wear and drill time due to minimum installation depth of 35 mm in the substrate.
- With flush installation, the disc tapers to a very thin edge, thus providing for optimal retaining of the insulation panel and for application of thin render.
- For insulation material thicknesses up to 340 mm.
- Standard embedment depth for all building materials.

APPLICATIONS

- Attachment of ETICS insulating boards on concrete and masonry
- Flush installation in all conventional insulation materials

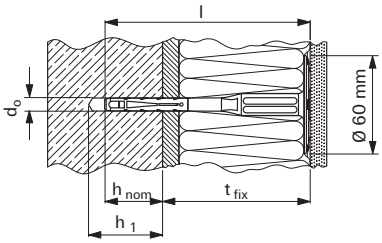
FUNCTIONING

- The fixing is pushed through the insulation into the drilled hole and is screwed tight.
- For lengths from 250 mm, at least 180 mm long T25 bits are required. These are not included in the delivery assortment.



TECHNICAL DATA

Render fixing **FIF-CS 8**



Item	Art.-No.	Approval ETA	Drill hole diameter d_0 [mm]	Min. drill hole depth h_1 [mm]	Effect. anchorage depth h_{nom} [mm]	Anchor length l [mm]	Max. fixture thickness t_{fix} [mm]	Disc Ø [mm]	Sales unit [pcs]
FIF-CS 8/60	**534157**	■	8	45	35	108	70	60	100
FIF-CS 8/80	**534158**	■	8	45	35	128	90	60	100
FIF-CS 8/100	**534159**	■	8	45	35	148	110	60	100
FIF-CS 8/120	**534160**	■	8	45	35	168	130	60	100
FIF-CS 8/140	**534161**	■	8	45	35	188	150	60	100
FIF-CS 8/160	**534162**	■	8	45	35	208	170	60	100
FIF-CS 8/180	**534163**	■	8	45	35	228	190	60	100
FIF-CS 8/200	**534164**	■	8	45	35	248	210	60	100
FIF-CS 8/220	**534165**	■	8	45	35	268	230	60	100
FIF-CS 8/240	**534166**	■	8	45	35	288	250	60	100
FIF-CS 8/260	**534167**	■	8	45	35	308	270	60	100
FIF-CS 8/280	**534168**	■	8	45	35	328	290	60	100
FIF-CS 8/300	**534169**	■	8	45	35	348	310	60	100
FIF-CS 8/320	**534170**	■	8	45	35	368	330	60	100
FIF-CS 8/340	**534171**	■	8	45	35	388	350	60	100

LOADS

Render fixing FIF-CS 8 [3]

Highest permissible loads for a single anchor[1] [4] for fixing of external thermal insulation composite systems with rendering.

For the design the complete assessment ETA-15/0006 has to be considered.

					Beton und Mauerwerk[5]		
Base material	**Brick raw density** ρ [kg/dm³]	**Minimum compressive brick strength** f_b [N/mm²]	**Min. embedment depth** h_{nom} [mm]	**Min. member thickness** h_{min} [mm]	**Permissible tensile load** [3] N_{perm} [kN]	**Minimum spacing** [2] s_{min} [mm]	**Minimum edge distance** [2] c_{min} [mm]
Concrete according to EN 206-1:2000							
FIF-CS 8	C12/15 - C50/60		35[6]	100	0,40	100	100
Solid clay bricks Mz according to EN 771-1:2011							
FIF-CS 8	≥ 1,8	20	35[6]	100	0,40	100	100
Vertically perforated clay bricks HLz according to EN 771-1:2011							
FIF-CS 8	≥ 1,0	12	25[7]	100	0,20	100	100
Lightweight aggregate concrete LAC according to EN 1520:2011							
FIF-CS 8	≥ 0,9	6	35[6]	100	0,20	100	100
Autoclaved aerated concrete blocks AAC according to EN 771-4:2011							
FIF-CS 8	≥ 0,5	4	35[7]	100	0,10	100	100

[1] The partial safety factors for material resistance as regulated in the assessment as well as a partial safety factor for load actions of γ_L = 1,5 are considered.

[2] Possible minimum spacing resp. edge distance according to assessment.

[3] Plastic anchor for fixing of external thermal insulation composite systems with rendering according to ETAG014. Only tensile wind loads are permitted.

[4] The given loads are valid for installation and use of fixations in dry base material for temperatures in the substrate up to +24 °C (resp. short term up to +40 °C).

[5] Restrictions concerning the manufacturer and the permissible hole patterns as well as the web thickness see assessment.

[6] Drill method hammer drilling.

[7] Hammer drilling.

Discs for combining nail and frame fixings, as well as screws

Insulating materials in two-leaf external walls

ADVANTAGES

- The various disc diameters allow for individual adaptation to various insulation materials and requirements and offer the greatest flexibility with wide-ranging applications.
- The flexible pins in the DT 90 ensure sustained pressure on the insulation, thus providing a secure hold.
- The DTM 60 made of stainless steel A4 makes it possible to use a frame fixing, and allows for a secure fixing of the insulation material in façade construction in cases of high requirements.

APPLICATIONS

- To fix soft and pressure-resistant insulation materials.
- DT 90/4 on VB wall tie
- DT 60/10, DTM 60/10 and DTM 70/10 in combination with 10 mm frame fixing
- DT 90/8 and insulation washer 8/60 in combination with 8 mm hammerfix
- HV and HK 36 with 5 mm screws

FUNCTIONING

- The disc size is to be selected in line with the compressive strength of the insulating material.
- To be combined with anchors, screws or nails corresponding to the available base material.
- DT 90/4 is suitable for pushing on to fischer wall tie VB.

TECHNICAL DATA

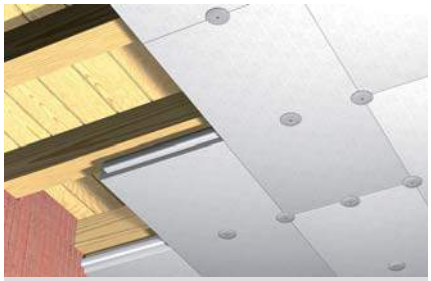
HV 36 plastic | HV 36 zinc | ISO-disk 8/60 | DT 60/10 | DTM-A4 | DTM 70/10 | DT 90

Item	Art.-No.	Disc Ø [mm]	Disc height [mm]	Through hole d_f [mm]	Steel sheet thickness s [mm]	Sales unit [pcs]
HK 36 plastic	**004283**	36	4.5	5	–	100
HV 36 zinc	**004286**	36	3.5	5	0,7	100
ISO-disk 8/60	**001680**	60	7	8	–	100
DT 60/10	**044317**	60	7	10	–	50
DTM 60/10 A4	**088805**	60	3	10,5	0,5	100
DTM 70/10 zinc	**044318**	70	3	10,5	–	50
DT 90/4	**080957** 1)	90	9.3	4	–	250
DT 90/8	**080958**	90	9.3	8,2	–	250

1) The central hole is adapted in such a way that the disc clamps well on the 4 mm wire of the VB walltie.

Retaining disc with screw DHT S

The installation-friendly polyamide retaining disc for panel building materials



Pressure-resistant insulation boards on timber constructions

Pressure-resistant insulation boards on timber constructions

BUILDING MATERIALS

- Wood and wooden materials
- Sheet thickness up to 0.8 mm

CERTIFICATES

ADVANTAGES

- The DHT-S screw allows setting without pre-drilling, thus saving a stage of installation.
- The plug reduces the heat transmission and prevents marks on the plaster surface.
- The extremely thin disc construction allows for use with thin layers of plaster and reinforcements and offers maximum flexibility.

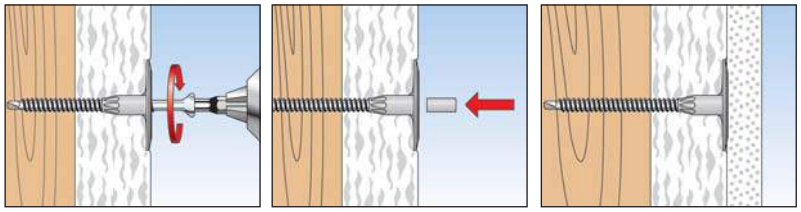
APPLICATIONS

To fix pressure-resistant insulating materials in plaster façades, such as:

- Polystyrene
- PU panels
- Light building boards made of wood wool
- Cork boards / coir matting

FUNCTIONING

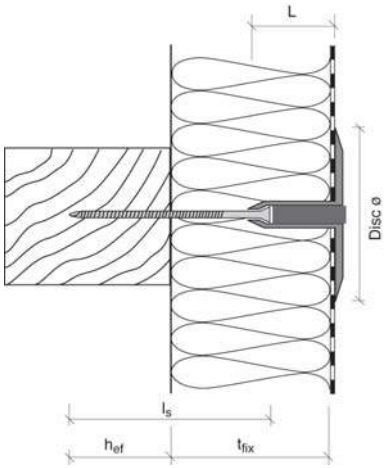
- Non-bearing layers, such as adhesive, are to be included in the useful length.
- The retaining disc with screw is set in push-through installation with a cordless screwdriver.
- A PH2 bit is required for installation.
- After installation, seal the screw hole with the enclosed plug.



TECHNICAL DATA

DHT 50/ ... disc

Retaining disc with screw **DHT S**



Item	Art.-No.	Colour	Usable length t_{fix} [mm]	Shaft length L [mm]	Screw length l_s [mm]	Effect. anchorage depth h_{ef} [mm]	Disc Ø [mm]	Sales unit [pcs]
DHT 50/20 W	**044490**	white	–	20	–	–	50	500
DHT 50/40 W	**044491**	white	–	40	–	–	50	500
DHT S 30 W	**044390**	white	30	20	45	25	50	500
DHT S 50 W	**044392**	white	40 - 50	20	65	25	50	500
DHT S 70 W	**044394**	white	60 - 70	40	65	25	50	500
DHT S 80 W	**044395**	white	70 - 80	40	75	25	50	500
DHT S 100 W	**044388**	white	90 - 105	40	100	25	50	500
DHT S 120 W	**044389**	white	110 - 125	40	120	25	50	500
DHT S 150 W	**516154**	white	140 - 155	40	150	25	50	500

Thermal bridge-free installation in insulation materials

Letterbox

External lighting

BUILDING MATERIALS

- Non-plastered, pressure-resistant insulating boards
- Plastered, pressure-resistant insulating boards
- ETICS insulating boards

ADVANTAGES

- Since the anchor is set exclusively in the insulation itself, fixtures can be installed without thermal bridges.
- The geometry of the FID allows for a simple installation in thin layers of plaster, without the need for pre-drilling, thus saving a stage of installation.
- The FID 50 is used in thin insulating boards from 50mm. The FID 90 is used in thicker insulating boards, and can bear higher loads.
- The bit mounting allows for setting with standard tools, thus allowing for a fast and economic installation.

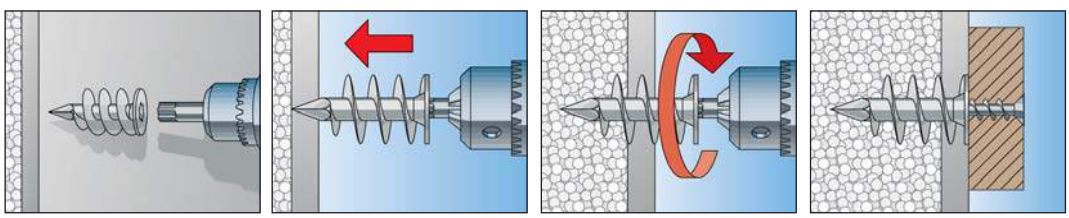
APPLICATIONS

To fix lightweight fixtures in plastered and non-plastered insulating boards made of polystyrene and polyurethane.
The areas of application are:

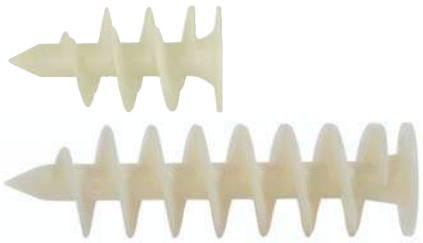
- Façade construction (ETICS)
- Insulating construction
- Electric construction
- Refrigerated and climate construction
- Acoustic construction

FUNCTIONING

- The FID can be set in the insulating board with a cordless screwdriver or by hand.
- The special spiral thread taps itself in the insulating board.
- Fixtures are fixed with a 4.5 mm screw for the FID 50, and with a 6 mm screw for the FID 90.
- Water ingress in the insulation can be prevented by sealing the plug collar with a suitable sealant after successful pre-positioned installation.
- We recommend to predrill an 6 mm hole in ETICs rendering.

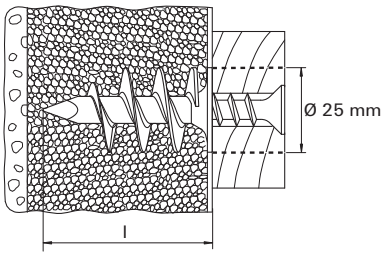


TECHNICAL DATA



Insulation fixing **FID 50**

Insulation fixing **FID 90**



Item	Art.-No.	Anchor length l [mm]	Min. bolt penetration [mm]	Wood and chipboard screws d_S [mm]	Drive	Sales unit [pcs]
FID 50	**048213**	50	50	4,5 - 5	T40	50
FID 90	**510971**	90	90	6	6 mm / 6-kt	25

LOADS

Insulation fixing FID

Highest recommended loads[1)] for a single anchor.

The given loads are valid for chipboard screws with maximum diameter.

Type			FID 50	FID 90
Screw diameter	Ø	[mm]	4,5 - 5,0	6,0
Recommended loads in the respective base material N_{rec}[2)]				
Polystyrene	PS 15	[kN]	0,07	0,17
Polystyrene	PS 20	[kN]	0,10	0,20

[1)] Required safety factors are considered.

[2)] Valid for tensile load.

Thermal bridge-free installation in insulation materials

External lighting

Letterbox

BUILDING MATERIALS

- Non-plastered, pressure-resistant insulating boards
- Plastered, pressure-resistant insulating boards
- ETICS insulating boards

CERTIFICATES

BIOBASED 50 - 85% DIN Geprüft 8C029

fischer PURE MATERIAL NYLON QUALITY HIGH-QUALITY NYLON

ADVANTAGES

- Produced with at least 50% renewable raw materials and therefore particularly environmentally friendly.
- Just as effective, secure and durable as regular FID plugs. To fix lightweight fixtures in plastered and non-plastered insulating boards.
- Thermal bridge-free mounting when exclusively set in insulation material.
- Installation without pre-drilling even through thin plaster layers, thus saving a work step.
- Easy to set using a standard bit.

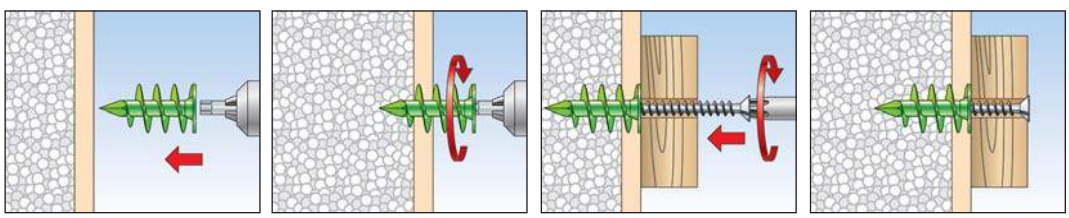
APPLICATIONS

To fix lightweight fixtures in plastered and non-plastered insulating boards made of polystyrene and polyurethane.
The areas of application are:

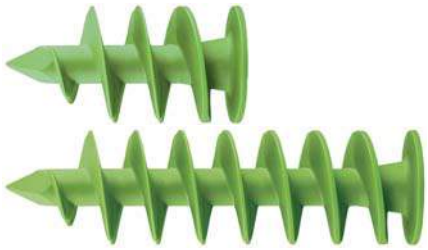
- Façade construction (ETICS)
- Insulating construction
- Electric construction
- Refrigerated and climate construction
- Acoustic construction

FUNCTIONING

- The FID GREEN can be set in pre-positioned installation with a cordless screwdriver or by hand.
- With its strong drill tip, the insulation fixing FID GREEN breaks through thin plaster layers and cuts a positive fit into the insulation panel with its specially shaped spiral thread.
- From a plaster thickness of 5 mm, we recommend to create a 6 mm hole. This serves for better guidance of the fastener in the setting process.
- Water ingress in the insulation material can be prevented by sealing the plug collar after successful installation.
- Attachment parts can be easily attached with screws.
- We recommend to predrill an 6 mm hole in ETICs rendering.

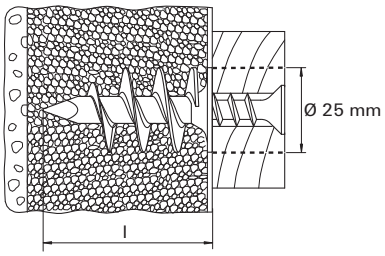


TECHNICAL DATA



Insulation fixing **FID GREEN 50**

Insulation fixing **FID GREEN 90**



Item	Art.-No.	Anchor length l [mm]	Min. bolt penetration [mm]	Wood and chipboard screws d_S [mm]	Drive	Sales unit [pcs]
FID GREEN 50	**524851**	50	50	4,5 - 5	T40	45
FID GREEN 90	**524852**	90	90	6	Inbus 6 mm	20

LOADS

Insulation fixing FID GREEN

Highest recommended loads[1] for a single anchor.

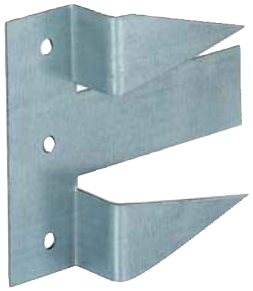
The given loads are valid for chipboard screws with maximum diameter.

Type			FID GREEN 50	FID GREEN 90
Screw diameter	Ø	[mm]	4,5 - 5,0	6,0
Recommended loads in the respective base material N_{rec}[2]				
Polystyrene	PS 15	[kN]	0,07	0,17
Polystyrene	PS 20	[kN]	0,10	0,20

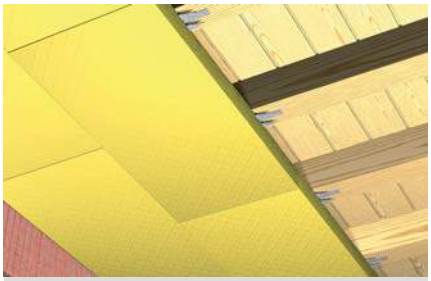
[1] Required safety factors are considered.

[2] Valid for tensile load.

The installation-friendly insulation clamp



Pressure-resistant insulation boards on timber constructions



Pressure-resistant insulation boards on ceiling undersides

BUILDING MATERIALS

- Wooden materials
- Wooden panel materials

ADVANTAGES

- The holding clamp DVN allows for a hidden installation for a homogeneous surface.
- The complete fixing system, comprising the clamp and zinc-plated nails, allows for an immediate installation in line with building requirements.
- The Sendzimir-galvanised steel claw allows for durable use for the secure anchoring of pressure-resistant insulation materials.

APPLICATIONS

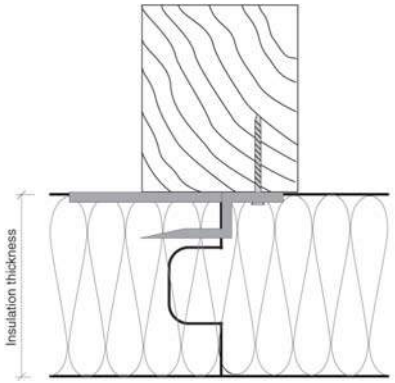
- To fix pressure-resistant insulation materials (e.g. polystyrene, PU panels, glass foam boards) onto timber sub-structures, predominantly in the ceiling area

FUNCTIONING

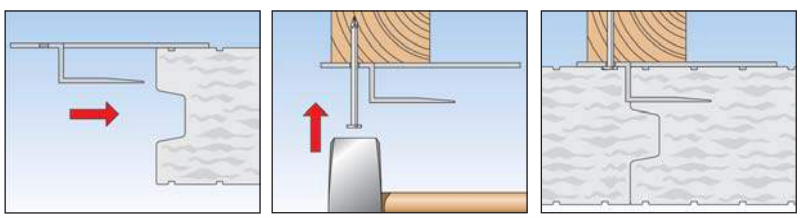
- The holding clamp is fixed with the supplied nails on the wooden substrate with a hammer.
- The points of the holding clamp DVN are pushed into the slot side of the insulating board until it is held securely.

TECHNICAL DATA

Clamp **DVN**



Item	Art.-No.	For insulation thickness [mm]	Sales unit [pcs]
DVN 15	**047240**	up to 60	250
DVN 30	**047243**	from 80	250



The pre-assembled fibre cement panel screw

Corrugated root tiles made of fibre cement

BUILDING MATERIALS

- Wood
- Wooden panel materials

ADVANTAGES

- The screw is pre-fitted with a seal washer. This provides a complete fixing set for a simple installation.
- The screw is protected against corrosion and thus withstands the stresses of weather when used outside.

APPLICATIONS

For fixing of:

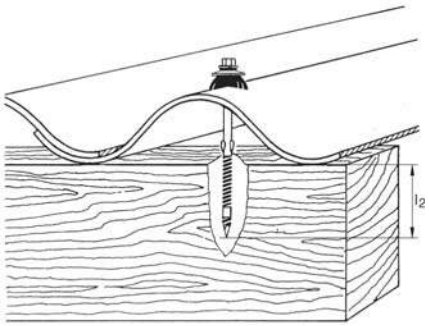
- Fibre cement panels
- Undulating roof tiles

FUNCTIONING

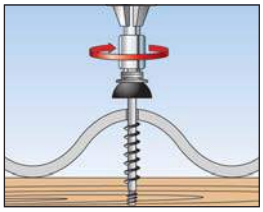
- The screw is set in push-through installation using a cordless screwdriver. No pre-drilling of the fibre cement panel is required.

TECHNICAL DATA

Fibre cement panel screw **FAFZ H**



Item	Art.-No.	Diameter x length [mm]	Min. bolt penetration l + 5 [mm]	Sales unit [pcs]
FAFZ-H 6,5 x 130 DS 25	**092210**	6,5 x 130	50	100



fischer
innovative solutions

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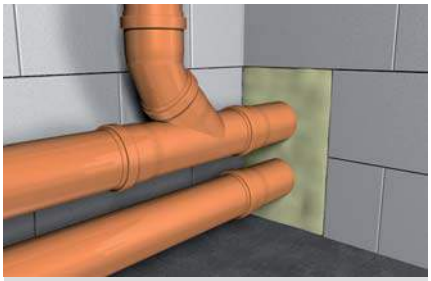
One-component gun foam PUP S 750

The gun foam with proven joint sound-proofing, thermal insulation and water pressure resistance for professionals

Window connection joints



Filling pipe penetrations

BUILDING MATERIALS

Bonds to all standard building materials such as:

- Concrete
- Anodised layer
- Fibre cement
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster
- Stone

CERTIFICATES

- General test certificate from building authorities P-NDS04-137 for B2
- Proven joint soundproofing R(ST,w)=61 (-1;-3) dB in line with ISO EN 717-1
- Proven thermal conductivity: Reduces heat loss at 0.0345 W / (m * K)
- Based on DIN 18542 proven air tightness of a<0,1 m³/[h*m*(daPa)²/3]
- Test for watertightness for the adhesion of manhole rings
- French VOC-emission class A+

ADVANTAGES

- The proven 61dB sound insulation fulfills the standards of modern sound insulation and helps to reduce noise.
- The thermal protection and proven airtightness allows compliance with energy saving according to EnEV and substantiated as effective reduction of heat loss.
- External testing of watertightness when used in connection with hinged manhole rings fulfils the requirements for a well foam.
- The low level foam expansion during the curing period avoids reworking, thus guaranteeing a simple and time-saving application.
- The new non-sticking safety valve guarantees long-lasting functionality.

APPLICATIONS

- Insulating and filling window connection joints, around window sills and shutter boxes
- To insulate and fill wall penetrations, cavities, wall connections and finished elements
- To seal and bind well shafts, manhole shafts, domestic sewage treatment plants and cisterns

FUNCTIONING

- 1-component PU foam
- Building material class B2
- Processing temperature environment: +10 °C to +30 °C (can temperature: +5 °C to +30 °C)
- Non-tacky after approx. 15 minutes
- Hardened after approx. 24 hours
- Temperature resistant from -40 °C to +90 °C
- Layer thicknesses > 50 mm foam in several layers and then dampen.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

TECHNICAL DATA

Item	Art.-No.	Content per can [ml]	Max. foam yield (free foaming) [l]	Colour	Sales unit [pcs]
PUP S 750 (DE)	**539197** 1)	750	45	beige	12
PUP S 750 B2	**040302**	750	45	beige	12

1) Without protective gloves, for commercial users only.

The gun foam with proven sound and thermal insulation as well as increased foam yield

Window connection joints

Connection joints around shutter boxes

BUILDING MATERIALS

Bonds to all standard building materials such as:

- Concrete
- Anodised layer
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

CERTIFICATES

- General test certificate from building authorities P-NDS04-137
- Proven joint soundproofing R(ST,w)=61 (-1;-3) dB in line with ISO EN 717-1
- Proven thermal conductivity: Reduces heat loss by 0.0345 W/(m*K)
- Based on DIN 18542, proven airtightness of a<0.1 $m^3/[h*m*(daPa)^{2/3}]$
- French VOC-emission class A+

ADVANTAGES

- The thermal protection and proven reduction of air permeability fulfil the high standards for modern thermal protection.
- The proven 61dB sound insulation fulfils the standards of modern sound insulation and helps to reduce noise.
- The high yield of up to 55 l reduces the number of cans needed, thus ensuring maximum economic efficiency.
- The low level of foam expansion during the curing period avoids reworking, thus guaranteeing a simple and time-saving application.
- The new safety valve prevents adhesion when being stored horizontally or during long interruptions of work, thus guaranteeing long-lasting functionality.

APPLICATIONS

- Insulating and filling window connection joints, around window sills and shutter boxes
- Insulating and filling in roofing work and dry construction
- Insulating and filling finished elements, wall connections, wall penetrations and cavities
- Insulating and filling pipe penetrations and ventilation ducts

FUNCTIONING

- 1-component PU foam
- Building material class B2
- Processing temperature environment: +5 °C to +35 °C (can temperature: +5 °C to +30 °C)
- Non-tacky after approx. 25 minutes
- Can be cut after approx. 1 hour
- Hardened after approx. 24 hours
- Temperature resistant from -40 °C to +90 °C
- Layer thicknesses > 50 mm: foam in several layers and then dampen.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

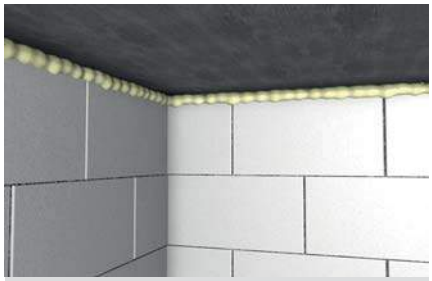
TECHNICAL DATA

Item	Art.-No.	Content per can [ml]	Max. foam yield (free foaming) [l]	Colour	Sales unit [pcs]
PUP 750 (DE)	**053084**	825	55	beige	12

One-component maxi gun foam PUP S 500

The proven sound and thermal insulation foam with higher foam yield for professionals in a short can

Window connection joints



Closing joints in structural work

BUILDING MATERIALS

Bonds to all standard building materials such as:

- Concrete
- Anodised layer
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

CERTIFICATES

- General test certificate from buildingh authorities P-NDS04-137 für B2
- Proven joint soundproofing: R(ST,w)=61 (-1;-3) dB in line with ISO EN 717-1
- Proven thermal conductivity: Reduces heat loss at 0.0345 W/(m * K)
- Based on DIN 18542 proven airtightness of a<0,1 m³/[h*m*(daPa)²/3]
- French VOC-emission class A+

ADVANTAGES

- The short, handy can allows the correct positioning in awkward places and leads without premature gas loss to a high emptying of residues.
- The low level of foam expansion during the curing period avoids reworking, thus guaranteeing a simple and time-saving application.
- The thermal protection and proven airtightness allows compliance with energy saving according to EnEV and substantiated as effective reduction of heat loss.
- The high joint soundproofing of 61dB fulfils the standards of modern sound insulation and helps to reduce noise.

APPLICATIONS

- Insulating and filling window connection joints, around window sills and shutter boxes
- Insulating and filling finished elements, wall connections, wall penetrations and cavities
- Insulating and filling in roofing work and dry construction (e.g. in the ceiling area)
- Insulating and filling pipe penetrations and ventilation ducts

FUNCTIONING

- 1-component PU foam
- Building material class B2
- Low post-expansion
- Processing temperature environment: ±0 °C to +35 °C (can temperature: +5 °C to +20 °C)
- Non-tacky after approx. 8 minutes
- Can be cut after approx. 20 minutes
- Temperature resistant from -40 °C to +90 °C
- Fresh foam stains can be removed immediately with fischer PU cleaner.

TECHNICAL DATA

Item	Art.-No.	Content per can [ml]	Max. foam yield (free foaming) [l]	Colour	Sales unit [pcs]
PUP S 500 (DE)	**539163**	500	43	beige	12

1) Without protective gloves, for commercial users only.

The grey gun foam in the compact can with high foam yield

Window connection joints

Closing joints in structural work

BUILDING MATERIALS

Bonds to all standard building materials such as:

- Concrete
- Anodised layer
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

CERTIFICATES

- General test certificate from building authorities P-NDS04-137
- Proven joint soundproofing R(ST,w)=61 (-1;-3) dB in line with ISO EN 717-1
- Proven thermal conductivity: Reduces heat loss by 0.0345 W/(m*K)
- Based on DIN 18542, proven airtightness of a<0.1 $m^3/[h*m*(daPa)^{2/3}]$

ADVANTAGES

- The compact, handy can allows for use in difficult to access areas, and achieves a high degree of emptying without premature loss of gas.
- The grey colour of the foam is ideally suited to concrete substrates and allows for an inconspicuous filling of joints.
- The proven thermal protection and reduction of air permeability fulfil the high standards for modern thermal protection.
- The proven 61dB sound insulation fulfils the standards of modern sound insulation and helps to reduce noise.
- The new safety valve prevents adhesion when being stored horizontally or during long interruptions of work, thus guaranteeing long-lasting functionality.

APPLICATIONS

- Insulating and filling component joints, wall connections and wall penetrations
- Insulating and filling in roofing work and dry construction (e.g. in the ceiling area)
- Insulating and filling window connection joints, around window sills and shutter boxes
- Insulating and filling pipe penetrations and ventilation ducts

FUNCTIONING

- 1-component PU foam
- Building material class B2
- Processing temperature environment: of -5 °C to +35 °C (can temperature: +5 °C to +20 °C)
- Non-tacky after approx. 8 minutes
- Can be cut after approx. 20 minutes
- Cures within 5 to 8 hours
- Temperature resistant from -40 °C to +90 °C
- Layer thicknesses > 50 mm: foam in several layers and then dampen.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

TECHNICAL DATA

Item	Art.-No.	Content per can [ml]	Max. foam yield (free foaming) [l]	Colour	Sales unit [pcs]
PUP 500 (DE)	**503259**	500	43	concrete grey	12

One-component premium gun foam PUP 750 B3

The gun foam with the perfect dosage

Window connection joints

Connection joints around shutter boxes

BUILDING MATERIALS

Bonds to all standard building materials such as:

- Concrete
- Anodised layer
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

CERTIFICATES

- Proven joint soundproofing R(ST,w)=60 (-1;-4) dB in line with ISO EN 717-1

ADVANTAGES

- The low level of foam expansion during the curing period avoids reworking, thus guaranteeing a simple and time-saving application.
- The easy dosage allows for a controlled filling and sealing, and ensures that the correct amount is used.
- The proven 60dB sound insulation fulfils the standards of modern sound insulation and helps to reduce noise.
- The new non-sticking safety valve guarantees long-lasting functionality.

APPLICATIONS

- Insulating and filling window connection joints, around window sills and shutter boxes
- Insulating and filling in roofing work and dry construction
- Insulating and filling finished elements, wall connections, wall penetrations and cavities
- Insulating and filling pipe penetrations and ventilation ducts

FUNCTIONING

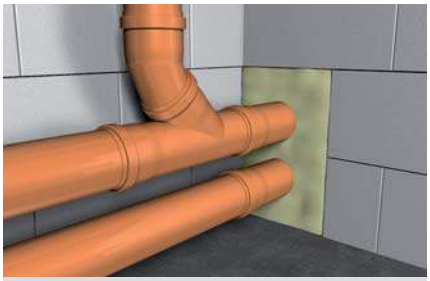
- 1-component PU foam
- Building material class B3
- Processing temperature environment: +5 °C to +35 °C (can temperature: +10 °C to +30 °C)
- Non-tacky after approx. 15 minutes
- Can be cut after approx. 45 minutes
- Cures within 5 to 8 hours
- Temperature resistant from -40 °C to +90 °C
- Layer thicknesses > 50 mm: foam in several layers and then dampen.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

TECHNICAL DATA

Item	Art.-No.	Content per can [ml]	Max. foam yield (free foaming) [l]	Colour	Sales unit [pcs]
PUP 750 B3 (EN)	**058501**	750	41	beige	12
PUP 750 B3 GunGrade (EN/FR)	**098012**	750	41	beige	12

The gun foam with proven resistance to water pressure

Sealing concrete manhole rings



Filling pipe penetrations

BUILDING MATERIALS

Bonds to all standard building materials such as:

- Concrete
- Anodised layer
- Fibre cement
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster
- Stone

CERTIFICATES

- General test certificate from building authorities P-NDS04-137
- Test for watertightness up to 0.5 bar for the adhesion of manhole rings
- Proven joint soundproofing: R(ST,w)=61 (-1;-3) dB in line with ISO EN 717-1
- Proven thermal conductivity: Reduces heat loss by 0.0345 W/(m*K)
- Based on DIN 18542, proven airtightness of a < 0.1 $m^3/[h*m*(daPa)^{2/3}]$
- French VOC-emission class A+

ADVANTAGES

- External testing of watertightness when used in connection with hinged manhole rings fulfils the requirements for a well foam.
- The special foam is ready and easy to use, and replaces the time- and work-intensive application of mortar.
- The high resistance to dilute chemicals and mineral oil, the resistance to acids and bacteria found in soil, and the resistance to rot all guarantee a lasting function.
- The easy dosage allows for a controlled filling and sealing, and ensures that the correct amount is used.
- The new non-sticking safety valve guarantees long-lasting functionality.

APPLICATIONS

- To quickly fill joints between hinged manhole rings
- To seal and bind well shafts, manhole shafts, domestic sewage treatment plants and cisterns
- To insulate and fill wall penetrations, cavities, wall connections and finished elements

FUNCTIONING

- 1-component PU foam
- Building material class B2
- Processing temperature environment: +10 °C to +30 °C (can temperature: +5 °C to +30 °C)
- Non-tacky within approx. 15 minutes
- Bind manholes together before skin formation.
- Do not cut or spread foam coming from the hinge.
- Hardened after approx. 24 hours
- Temperature resistant from -40 °C to +90 °C
- Layer thicknesses > 50 mm foam in several layers and then dampen.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

TECHNICAL DATA

Item	Art.-No.	Content per can [ml]	Max. foam yield (free foaming) [l]	Colour	Sales unit [pcs]
PUP BS 750 B2 (DE/EN)	**513763**	750	45	beige	12

One-component premium B1 gun foam PUP B1 750

The hardly flammable B1 gun foam

Filling cavities in the insulation

Foaming steel door frames

BUILDING MATERIALS

Bonds to all standard building materials such as:

- Concrete
- Anodised layer
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

CERTIFICATES

- General test certificate from building authorities P-NDS04-620
- Proven joint soundproofing: of 10 and 20 mm joint width: Rs,w (C; Ctr) ≥ 63 (-2;-5) dB
- French VOC-emission class A+

ADVANTAGES

- The PUFS is hardly flammable in line with the B1 test and can therefore be used between solid, mineral or metal building materials. Thus it provides the highest level of safety.
- The new high-quality safety valve prevents adhesion when being stored horizontally or during long interruptions of work, thus guaranteeing long-lasting functionality.
- The easy dosage allows for a controlled filling and sealing, and ensures that the correct amount is used.

APPLICATIONS

- High-efficiency thermal insulation on façades
- Insulating and filling in roofing work
- Insulating and filling window connection joints, around window sills and shutter boxes
- Insulating and filling finished elements, wall connections, wall penetrations and cavities

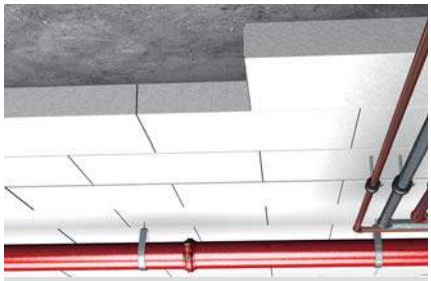
FUNCTIONING

- 1-component PU foam
- Building material class B1
- Foam yield of extruded foam 45 l
- Processing temperature environment: +10 °C to +25 °C (can temperature: +10 °C to +25 °C)
- Non-tacky after approx. 10 minutes
- Can be cut after approx. 40 minutes
- Cures within 5 to 8 hours
- Temperature resistant from -40 °C to +90 °C
- Layer thicknesses > 50 mm: foam in several layers and then dampen.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

TECHNICAL DATA

Item	Art.-No.	Content per can [ml]	Max. foam yield (free foaming) [l]	Colour	Sales unit [pcs]
PUP B1 750 (DE/EN)	**045300**	750	45	concrete grey	12

The adhesive foam for ETIC systems with general technical approval



Insulation of cellar ceiling

Wall insulation

BUILDING MATERIALS

- EPS-insulation panels
- Concrete
- Bitumen coatings
- Anodised layer
- Gypsum plasterboard
- Wood
- Cold bitumen sheeting
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

CERTIFICATES

- Building approval for bonding EPS boards in ETIC systems
- Adhesive tensile strength values (based on ETAG guideline 004/2013, section 5.1.4.1.2)
- French VOC-emission class A+

ADVANTAGES

- The special recipe guarantees high adhesive tensile strength for secure fixing.
- The high foam yield allows for the bonding of up to 12 m² of wall space and is therefore especially economical.
- Really low post-expansion avoids the formation of cavities between the wall and insulation panel and guarantees a secure connection.
- The use of the can/gun system provides a time saving of approx. 30% and thus guarantees efficient work.
- The new non-sticking safety valve guarantees long-lasting functionality.

APPLICATIONS

- Bonding of EPS rigid foam panels in accordance with ETAG Guideline 004/2013
- Fixing of external wall insulation, internal wall insulation and attic insulation
- Fixing of basement ceiling insulation
- Bonding of perimeter insulation panels

FUNCTIONING

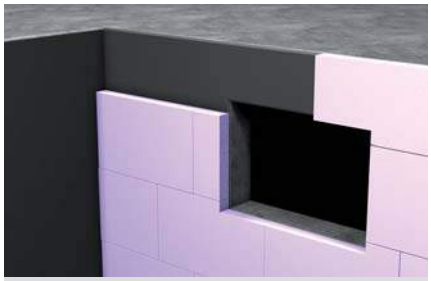
- 1-component PU foam
- Foam yield sufficient for up to 12 m² wall area
- Processing temperature environment: +5 °C to +25 °C (can temperature: +10 °C to +25 °C)
- Open Time approx. 10 minutes
- Can be cut after approx. 20 minutes
- Temperature resistant from -40 °C to +90 °C
- Extremely high heat insulation properties
- Shear resistance (EN 12090) 38,7 kPa
- Fresh foam stains can be removed immediately with fischer PU cleaner.
- When pressed on, an adhesive surface percentage of at least 40% must be achieved.
- Do not knock the insulation panels against the wall (this damages the foam structure).

TECHNICAL DATA

Item	Art.-No.	Content per can [ml]	Max. foam yield [m²]	Colour	Sales unit [pcs]
PUP WDVS 750 (DE)	**539164**	750	up to 12	light green	12
PUP 750 ETICS (EN)	**543448**	750	up to 12	light green	12

One-component premium perimeter adhesive foam PUP P 750

The economic adhesive foam for perimeter insulation boards



Bonding perimeter insulation boards

Filling pipe penetrations

BUILDING MATERIALS

- Concrete
- Bitumen coatings
- Anodised layer
- Gypsum plasterboard
- Wood
- Cold bitumen sheeting
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

CERTIFICATES

- General test certificate from building authorities P-NDS04-772
- French VOC-emission class A+

ADVANTAGES

- The high foam yield allows for the bonding of approx. 13 m² of wall space, and is therefore especially economical.
- The use of the can/gun system provides a time saving of approx. 30% and thus guarantees efficient work.
- The special PU foam formulation ensures the best adhesion to concrete and bituminous substrates, and allows for the long-term fixing of insulation boards.
- The very low level of post-expansion avoids the formation of cavities and guarantees a long-lasting insulation.
- The new non-sticking safety valve guarantees long-lasting functionality.

APPLICATIONS

- Bonding expanded polystyrene panels
- Insulating and filling wall penetrations
- Foaming in electrical installations
- Filling joints and cavities in all internal constructions
- Fixing and sealing walls and ceilings

FUNCTIONING

- 1-component PU foam
- Building material class B2
- Processing temperature environment: +10 °C to +25 °C (can temperature: +5 °C to +25 °C)
- Non-tacky after approx. 10 minutes
- Can be cut after approx. 40 minutes
- Temperature resistant from -40 °C to +90 °C
- Low heat conductivity
- Apply a min. of 3 end-to-end stripes per board, vertically from bottom to top on the external wall (spacing approx. 30 cm). The bottom board should be on fixed ground as protection from later slipping. After approx. 10 minutes apply the boards onto the holding surface and press hard.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

TECHNICAL DATA

Item	Art.-No.	Content per can [ml]	Max. foam yield (free foaming) [l]	Colour	Sales unit [pcs]
PUP P 750 (DE)	**506671**	750	45	concrete grey	12

The high-quality rapid installation foam with proven sound insulation and resistance of water pressure for professionals

Window connection joints

Sealing concrete manhole rings

BUILDING MATERIALS

Bonds to all standard building materials such as:

- Concrete
- Anodised layer
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

CERTIFICATES

- General test certificate from building authorities P-NDS04-136 for B2
- Proven joint soundproofing for B2: R(ST,w) ≥ 63 (-1; -4) dB according ISO 10140-1
- Test for watertightness for the adhesion of manhole rings
- French VOC-emission class A+

ADVANTAGES

- The proven 63 dB sound insulation fulfills the modern sound insulation and helps to reduce noise.
- The adapter foam has been approved as watertight by an external inspection and is thus suitable for use in wet conditions. It fulfils the requirements of a well foam.
- The fast screwed adapter allows immediate use and is thus uncomplicated to use without need for additional processing equipment.
- The new non-sticking safety valve guarantees long-lasting functionality.

APPLICATIONS

- Insulating and filling window connection joints, around window sills and shutter boxes
- Bonding and sealing manhole rings
- Insulating and filling in roofing work and dry construction
- Insulating and filling finished elements, wall connections, wall penetrations and cavities

FUNCTIONING

- 1-component PU foam
- Building material class B2
- Processing temperature environment: +5 °C to +30 °C (can temperature: +5 °C to +25 °C)
- Non-tacky after approx. 15 minutes
- Can be cut after approx. 45 minutes
- Hardened after approx. 24 hours
- Temperature resistant from -40 °C to +90 °C
- Layer thicknesses > 50 mm: foam in several layers and then dampen.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

TECHNICAL DATA

Item	Art.-No.	Content per can [ml]	Max. foam yield (free foaming) [l]	Colour	Sales unit [pcs]
PU S 750 (DE)	**040301** 1)	750	45	beige	12
PU S 1/500 B2 (DE)	**040300**	500	30	beige	12

1) Without protective gloves, for commercial users only.

The high-quality installation foam with reusable fix adapter system

Window connection joints

Sealing concrete manhole rings

BUILDING MATERIALS

Bonds to all standard building materials such as:

- Concrete
- Anodised layer
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

CERTIFICATES

- General test certificate from building authorities P-NDS04-136 for B2
- Proven joint soundproofing: R(ST,w)=61 (-1; -3) dB in line with ISO EN 717-1
- Test for watertightness for the adhesion of manhole rings

ADVANTAGES

- The reclosable fix adapter allows for immediate use and for the reuse of opened cans, thus guaranteeing long-lasting functionality.
- The used solid valve prevents adhesion when being stored horizontally and premature gas loss.
- The rapid installation foam has been approved as watertight by an external inspection and is thus suitable for use in wet conditions. It fulfils the requirements of a well foam.
- The ergonomic handle sits perfectly in the hand and allows for easy use.

APPLICATIONS

- Bonding and sealing manhole rings
- Insulating and filling in roofing work and dry construction
- Insulating and filling window connection joints, around window sills and shutter boxes
- Insulating and filling finished elements, wall connections and wall penetrations

FUNCTIONING

- 1-component PU foam
- Building material class B2 or B3
- Processing temperature environment: +5 °C to +35 °C (can temperature: +5 °C to +25 °C)
- Non-tacky after approx. 20 minutes
- Can be cut after approx. 40 minutes
- Cures within 5 to 8 hours
- Temperature resistant from -40 °C to +90 °C
- Layer thicknesses > 50 mm: foam in several layers and then dampen.
- Fresh foam stains can be removed immediately with fischer PU cleaner.

TECHNICAL DATA

Item	Art.-No.	Content per can [ml]	Max. foam yield (free foaming) [l]	Colour	Sales unit [pcs]
PU 500 B2 (DE)	**050426**	500	30	beige	12
PU 500 B3 (EN/FR/AR)	**058500**	500	28	beige	12
PU 750 B2 (DE)	**053080**	750	45	beige	12
PU 750 B3 (EN/FR/AR)	**050427**	750	41	beige	12
PU 750 B2 (EN, FR, AR)	**534466**	750	45	beige	12
PU 1/500 B3 HandHeld (EN/FR)	**098010**	500	28	beige	12
PU 1/750 B3 HandHeld (EN/FR)	**098011**	750	41	beige	12

The high-quality 2-component rapid foam with high yield for secure fixing with pull activation

Foaming door frames

Foaming below bath tubs

BUILDING MATERIALS

Bonds to all standard building materials such as:

- Concrete
- Anodised layer
- Gypsum plasterboard
- Wood
- Sand-lime brick
- Plastics (not on PE, PP, Teflon, silicone)
- Masonry
- Metals with priming coat
- Plaster

CERTIFICATES

- General test certificate from building authorities P-NDS04-666

ADVANTAGES

- The humidity-independent system guarantees a controlled foaming, thus ensuring a safe and fast curing without repressing.
- The pull mechanism allows for a simple, safe activation of the components.
- The used solid valve prevents adhesion when being stored horizontally and premature gas loss.
- The extremely uniform and fine-pore foam structure provides high strength values and offers a maximum of functionality.
- The high foam yield allows for the setting of up to 3 door frames. Thus the foam is particularly economical.
- The high resistance to rotting and ageing ensures consistent quality and guarantees a long-lasting fixing.

APPLICATIONS

- Installation of door frames (install expanders)
- Filling and insulating of cavities in walls and ceilings
- Foaming in windows, bath tubs and showers
- Fixing insulating elements, wooden cladding, sheet metal panels, control boxes

FUNCTIONING

- 2-component PU foam
- Building material class B2
- Foam yield of extruded foam 13 l
- Processing temperature +15 °C to +25 °C
- Non-tacky after approx. 6 minutes
- Can be cut after approx. 10 minutes
- Cures after approx. 30 minutes
- Temperature resistant from -40 °C to +90 °C
- Fresh foam stains can be removed immediately with fischer PU cleaner.

TECHNICAL DATA

Item	Art.-No.	Content per can [ml]	Max. foam yield (free foaming) [l]	Colour	Sales unit [pcs]
2K PU 400 (DE)	**053081**	400	13	light blue	12

PUP K2

ADVANTAGES

- The light construction facilitates use on construction sites and allows for fatigue-free work.
- The impact-requiring control prevents the unintentional unscrewing of the regulating screw, and is therefore particularly user-friendly.
- The gun adapter is suitable for all standard systems and enables universal application.
- Opened cans can remain screwed onto the gun during interruptions of work without curing.

PUP M3

ADVANTAGES

- The PUP M3 meets the tough requirements of a construction site and thus offers a long lifespan.
- The ergonomic handle allows for an ideal position of centre of gravity, and therefore precise handling.
- The infinitely variable control of the foam expulsion allows for a controlled filling and insulating, and enables application-orientated work.
- Opened cans can remain screwed onto the gun during interruptions of work without curing.

PUP M4 BLACK

ADVANTAGES

- The complete PTFE coating reduces cleaning to a minimum.
- Non-return ball and basket are coated with PTFE. This prevents bonding and guarantees a long-lasting function.
- The perfect combination of the ergonomically shaped handle and trigger makes handling particularly user-friendly.
- The tubes included with the 19 cm long, tapered pistol pipe mean that it can be individually lengthened for use in the narrowest joints, thus offering a high degree of flexibility.

TECHNICAL DATA

Item	Art.-No.		Sales unit [pcs]
PUP K2	**062400**		1
PUP M3	**033208**		1
PUP M4 BLACK	**513429**		1

PU-cleaner

ADVANTAGES

- The active components ensure a high cleaning effect, making the cleaner ideal for the safe removal of fresh PU foam.
- The gun adapter is suitable for all standard systems and enables universal application.
- The separate spray head allows for the cleaning of external surfaces, making the product extremely versatile.
- The highly active cleaner can etch sensitive surfaces (paint, dye, textiles, plastics). Thus you should always conduct preliminary tests.

TECHNICAL DATA

Item	Art.-No.	Contents [ml]	Sales unit [pcs]
PUR 150 (DE)	**053083**	150	12
PUR 500 (DE/EN)	**053085**	500	12

Premium sanitary silicone DSSA

The high-quality premium sanitary silicone

Joints in sanitary areas

Sealings in the kitchen

BUILDING MATERIALS

- Chrome
- Stainless steel
- Anodised layer
- Enamel, Tiles
- Glass, glazed surfaces
- Wood (with primer)
- H-PVC
- Ceramics
- Polyester
- Sanitary acrylic

CERTIFICATES

- EN 15651 - Part 1: F EXT-INT-CC
- EN 15651 - Part 3: S (class XS1)

ADVANTAGES

- The high-quality formulation allows for easy application and smoothing, and ensures efficient work.
- The outstanding movement capacity means that DSSA is ideal for high-stress expansion joints. This guarantees long-lasting jointing.
- The very good hold on smooth surfaces prevents damp from forming in the substrate and guarantees reliable functioning.
- The high wear resistance gives the surface a high level of protection when cleaning. Together with the fungicidal properties, an ideal jointing can be achieved that will last over the long term.

APPLICATIONS

- Corner, movement and connection joints in sanitary areas (sinks, showers, bath tubs, expansion joints between tiles etc.)
- Connection joints in the kitchen
- Window and glass sealings
- Seal welds for display cabinets and glass blocks
- Small-scale adhesions (e.g. window bars)

FUNCTIONING

- Chemical base: 1-component silicone acetate
- Permanently elastic
- With fungicide
- Skin formation time: approx. 6 minutes
- Processing temperature: +5 °C to +35 °C
- Temperature resistance: -50 °C to +200 °C
- Good chemical resistance
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Not paintable
- Free of MDI and solvents
- Selection table for substrates - refer to page 534

TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DSSA TP (DE/EN)	**053100**	transparent	310	12
DSSA W (DE/EN)	**053101**	white	310	12
DSSA GR (DE/EN)	**053102**	grey	310	12
DSSA BG (DE/EN)	**053103**	bahama beige	310	12
DSSA DG (DE/EN)	**053105**	dark grey	310	12
DSSA SW (DE/EN)	**053120**	black	310	12
DSSA SG (DE/EN)	**058530**	silver grey	310	12
DSSA FUG (DE/EN)	**512208**	joint grey	310	12
DSSA SAG (DE/EN)	**512209**	sanitary grey	310	12
DSSA MA (DE/EN)	**512210**	manhattan	310	12
DSSA AN (DE/EN)	**512211**	anthracite	310	12

The standard sanitary silicone

Joints in sanitary areas

Wash basins

BUILDING MATERIALS

- Stainless steel
- Anodised layer
- Epoxy
- Tiles
- Glazed surfaces
- Glass
- H-PVC
- Ceramics
- Painted wood
- Polyester

CERTIFICATES

- EN 15651 - Part 1: F EXT-INT-CC
- EN 15651 - Part 2: G-CC
- EN 15651 - Part 3: S (class S1)

ADVANTAGES

- The 20% elasticity means that DSSI is ideal for expansion and connection joints. This guarantees long-lasting jointing.
- The very good hold on smooth surfaces, e.g. tiles, prevents damp forming in the substrate and guarantees reliable functioning.
- The fungicidal properties ensure a clean look over the long term.

APPLICATIONS

- Joints in sinks and toilets
- Expansion joints between floor and wall tiles
- Joints around enamel and plastic showers and bath tubs
- Connection joints between timber and tiles
- Connection joints in the kitchen
- Seal welds for display cabinets and glass blocks
- Glazing wood and aluminium windows

FUNCTIONING

- Chemical base: 1-component silicone acetate
- Permanently elastic
- With fungicide
- Skin formation time: approx. 25 minutes
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -40 °C to +100 °C
- Shore-A hardness 18
- Permitted overall deformation: 20% (ISO 11600)
- Good chemical resistance
- Very good resistance to weather, ageing and UV
- Not paintable
- Selection table for substrates - refer to page 534

TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DSSI TP (EN/FR/AR)	**058515**	transparent	280	18
DSSI W (EN/FR/AR)	**058516**	white	280	18

The silicone sealant with an acetate base for internal and external applications

Joints in sanitary areas

Sealings in the kitchen

BUILDING MATERIALS

- Stainless steel
- Anodised layer
- Epoxy
- Tiles
- Glazed surfaces
- Glass
- H-PVC
- Ceramics
- Painted wood
- Polyester

CERTIFICATES

- EN 15651 - Part 1: F EXT-INT-CC
- EN 15651 - Part 2: G-CC
- EN 15651 - Part 3: S

ADVANTAGES

- Thanks to the practical elasticity of 20%, DMS is ideally suited to connection joints with expansion. This guarantees long-lasting jointing.
- The fungicidal properties ensure a clean look over the long term.
- The very good hold on smooth surfaces prevents damp from forming in the substrate and guarantees reliable functioning.
- The good resistance to UV, weathering and ageing means that DMS can be used both indoors and outdoors, and offers a high level of security over the long term.

APPLICATIONS

- Bathrooms, showers and toilets
- Connection joints to sinks
- Expansion joints between tiles
- Connection joints in the kitchen
- Joints between timber and tiles
- Seal welds for display cabinets and glass blocks

FUNCTIONING

- Chemical base: 1-component silicone acetate
- Permanently elastic
- With fungicide
- Skin formation time: approx. 25 minutes
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -40 °C to +100 °C
- Shore-A Härte 18
- Permitted overall deformation: 20% (ISO 11600)
- Very good resistance to weather, ageing and UV
- Not paintable
- Selection table for substrates - refer to page 534

TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DMS TP (EN/FR/AR)	**040385**	transparent	280	18
DMS W (EN/FR/AR)	**040386**	white	280	18
DMS GR (EN/FR/AR)	**040389**	grey	280	18
DMS SW (EN/FR/AR)	**504413**	black	280	18

The silicone sealant for high temperature requirements

Sealing fireplaces

Sealing cookers

BUILDING MATERIALS

- Aluminium (with primer)
- Chrome
- Stainless steel
- Anodised layer
- Enamel
- Tiles
- Glass
- Glazed surfaces
- Ceramics
- Not for corrosive adhesive surfaces such as non ferrous heavy metal, sheet zinc etc.

ADVANTAGES

- The high temperature resistance of up to +300°C means that DHS can be used for joints with increased thermal load.
- Meanwhile, the high resistance to chemicals also allows for use in areas subjected to chemical loads, thus offering a high level of application safety.
- The very good adhesion to smooth surfaces allows for the components to be completely sealed. This allows for reliable functioning.
- DHS is easy to apply and smooth out. This allows for efficient work, and helps to guarantee a simple and time-saving application.

APPLICATIONS

- Sealing of joints around cookers, ovens and fireplaces
- Sealing of joints around boilers and industrial furnaces
- Sealing of joints around pipes and channels subjected to high temperatures
- Sealing of ventilation grilles
- Sealing of air conditioning units

FUNCTIONING

- Chemical base: 1-component silicone acetate
- Permanently elastic
- Skin formation time: approx. 5 - 6 minutes
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -60 °C to +280 °C (short term to +300 °C)
- Shore-A hardness 40
- Very good resistance to chemicals
- Very good resistance to weather, ageing and UV
- Not paintable
- Free of MDI and solvents
- Selection table for substrates - refer to page 534

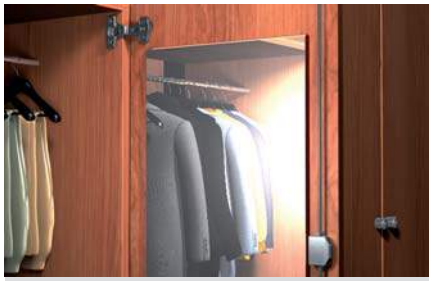
TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DHS RB (DE/EN)	**053125**	reddish brown	310	12

Premium construction silicone DBSA

The low-odour premium construction silicone with high adhesive spectrum

External connection joints



Fixing mirrors

BUILDING MATERIALS

- Concrete
- Chrome
- Stainless steel
- Anodised layer
- Enamel, Tiles, Ceramics
- Glass, glazed surfaces
- Wood (with primer)
- H-PVC
- Copper, brass
- Masonry
- PMMA, PC, Polyester
- Steel
- Zinc

CERTIFICATES

- EN 15651 - Part 1: F-EXT-INT-CC (class 25LM)
- EN 15651 - Part 2: G-CC (class 25LM)
- EN 15651 - Part 3: S (class XS1)

ADVANTAGES

- The high-quality, neutral silicone sealant with a very low volume shrinkage is suitable for demanding applications in construction and the industrial sector, and guarantees a high degree of functional safety.
- DBSA is low-odour and is therefore ideal for use in confined spaces.
- The silicone is easy to apply and smooth out, thus allowing for efficient work and a simple and time-saving jointing.
- The high wear resistance gives the surface a high level of protection when cleaning and thus ensures a perfect look over a long period.

APPLICATIONS

- Connection and expansion joints in the construction industry (e.g. windows, doors, façades, light domes)
- Window glazing
- Movement and connection joints in kitchens, sanitary areas and installations
- Fixing mirrors (transparent version)
- Sealing machines, containers and building apparatus

FUNCTIONING

- Chemical base: 1-component silicone neutral alkoxy
- Fulfils DIN EN ISO 11600 F+G 25
- Permanently elastic
- Low-odour
- With fungicide
- Skin formation time: approx. 12 min
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -40 °C to +120 °C
- Shore-A hardness 24
- Permitted overall deformation: 25%
- Non-corrosive
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Not paintable
- Resistant to wear and streak-free
- Selection table for substrates - refer to page 534

TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DBSA TP (DE/EN)	**053090**	transparent	310	12
DBSA W (DE/EN)	**053091**	white	310	12
DBSA GR (DE/EN)	**053092**	concrete grey	310	12
DBSA BR (DE/EN)	**053093**	brown	310	12
DBSA SW (DE/EN)	**053094**	black	310	12
DBSA BG (DE/EN)	**053095**	beige	310	12
DBSA SLG (DE/EN)	**512213**	slate grey	310	12
DBSA ANG (DE/EN)	**540084**	anthracite	310	12

The versatile construction silicone

External connection joints

Joints between buildings

BUILDING MATERIALS

- Concrete
- Chrome
- Stainless steel
- Anodised layer
- Enamel
- Epoxy
- Tiles
- Glass, glazed surfaces
- Wood (with primer)
- H-PVC
- Ceramics
- Copper
- Masonry
- Brass
- Polyester
- Steel
- Zinc

CERTIFICATES

- EN 15651 - Part 1: F-EXT-INT
- EN 15651 - Part 2: G
- EN 15651 - Part 3: S

ADVANTAGES

- The neutral silicone sealant is suitable for various applications in construction and the industrial sector, and thus offers a high level of flexibility.
- The high movement capacity means that DBSI is ideal for expansion joints. This guarantees long-lasting jointing.
- DBSI is non-corrosive and is therefore well suited to copper and zinc-plated surfaces. Thus it can be used without problems in the metal processing industry.

APPLICATIONS

- Connection and expansion joints in the construction industry (e.g. windows, doors, façades, light domes)
- Connection joints on windows and doors
- Sealing façades, curtain walling panels and metal structures
- Movement and connection joints in kitchens, sanitary areas and installations

FUNCTIONING

- Chemical base: 1-component silicone neutral oxime
- Permanently elastic
- With fungicide
- Skin formation time: approx. 5 minutes
- Processing temperature: +5 °C to +30 °C
- Temperature resistance: -40 °C to +120 °C
- Shore-A hardness 24
- Non-corrosive
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Not paintable
- Selection table for substrates - refer to page 534

TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DBSI W (DE/EN)	**094416**	white	310	12
DBSI TP (DE/EN)	**094417**	transparent	310	12

Premium silicone for natural stone DNS

The discolouration-free silicone sealant for marble and natural stone

Joints on natural stone panels

Joints on tiles and natural stone and marble panels

BUILDING MATERIALS

- Marble
- Natural stone (e.g. granite, porphyry, quartzite, sandstone)

Also suitable for:

- Concrete
- Stainless steel
- Anodised layer
- Tiles, Ceramics
- Glass
- Wood (with primer)
- H-PVC
- Copper
- Masonry
- PMMA, PC
- Sanitary acrylic
- Steel
- Zinc

CERTIFICATES

- EN 15651 - Part 1: F-EXT-INT-CC (class 25LM)
- EN 15651 - Part 2: G-CC (class 25LM)
- EN 15651 - Part 3: S

ADVANTAGES

- The specially adapted formulation prevents edge soiling and gives a lasting clean look, particularly for natural stone and marble.
- DNS is easy to use and smooth, thus allowing for efficient work. This guarantees a fast and simple jointing.
- The neutral interlacing silicone with an alkoxy base is low-odour and is therefore ideal for use in confined spaces.

APPLICATIONS

- Sealing and jointing marble and natural stone for internal and external use
- Joints in sanitary areas
- Joints in façade construction
- Corner joints in floors and walls
- Movement-compensating adhesion of natural stone onto metal structures (e.g. stair treads)

FUNCTIONING

- Chemical base: 1-component silicone neutral alkoxy
- Permanently elastic
- Low-odour
- With fungicide
- Skin formation time approx. 15 minutes
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -40 °C to +120 °C
- Shore-A hardness 21
- Non-corrosive
- Good chemical resistance
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Not paintable
- Selection table for substrates - refer to page 534

TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DNS TP (DE/EN)	**053121**	transparent	310	12

The hardly flammable silicone sealant

Joints on fire protection doors

Sealings in public buildings

BUILDING MATERIALS

- Concrete
- Chrome
- Stainless steel
- Anodised layer
- Enamel
- Tiles
- Glass, glazed surfaces
- Ceramics
- Copper, brass
- Masonry
- Polyester
- Steel
- Zinc

CERTIFICATES

- EN 15651 - Part 1: F-EXT-INT-CC (class 25LM)
- EN 15651 - Part 2: G-CC (class 25LM)

ADVANTAGES

- The good fire-inhibiting properties provide maximum safety for the sealing of solid, mineral or metal building materials.
- Non-corrosive, thus can be used on aluminium, copper and zinc-plated surfaces. This guarantees problem-free use within the metal processing industry.
- Due to the audited, high 25% elasticity, DFS is particularly suitable for joints subjected to high stress. This guarantees a permanent seal.

APPLICATIONS

- Sealing connection and expansion joints that are required to have a fire-resistant effect against the spreading of fire, water, smoke and poisonous fumes
- Sealing components that have increased requirements concerning their properties in the case of fire

FUNCTIONING

- Chemical base: 1-component silicone neutral
- Hardly flammable material (building material class DIN 4102-B1) in line with DIN 4102-1
- Permanently elastic
- Shore-A hardness 20
- Skin formation time: approx. 10 minutes
- Processing temperature: +5 °C to +40 °C
- 100% modulus 0,40 N/mm²
- Temperature resistance: -40 °C to +120 °C
- Non-corrosive
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Not paintable
- Selection table for substrates - refer to page 534

TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DFS GR (DE/EN)	**053131**	grey	310	12

Construction sealant Premium DKM

The universal hybrid-sealant-adhesive for indoor and outdoor use

Bonding and sealing of attachments

Sealing ventilation ducts

BUILDING MATERIALS

- Aluminium
- Concrete
- Chrome
- Stainless steel
- Anodised layer
- Tiles
- Glass, glazed surfaces
- H-PVC
- Ceramics
- Copper, brass
- Masonry
- PMMA, PC
- Polyester
- Steel
- Zinc

CERTIFICATES

- LEED® IEQ-credits 4.1 (Indoor Environmental Quality) adhesives and sealants
  Coloured version:
- EN 15651 part 1: F-EXT-INT-CC (Class 25 HM)
  EN 15651 - Part 3: S (XS3)
  EN 15651 - Part 4: PW-EXT-INT-CC (Class 25 HM)
- Suitable for use in room ventilation systems according to VDI 6022 (Ass. Of Germ. Engeneers), sheet 1 tested according to DIN EN ISO 846
- Declaration of no objection - tested for use in food-related area (ISEGA)
- GEV-EMICODE EC1 PLUS - very low emission
- M1 emission classification for building materials

ADVANTAGES

- Due to the high 25% flexibility, DKM is particularly suitable for joints subjected to high stress. This guarantees a permanent seal.
- The high initial adhesion from up to 75 kg/m² (50 kg/m² crystal clear) makes it possible to attach lots of components without the need for additional fixing, and thus reduces the amount of time required.
- The mould inhibiting quality guarantees the tested antibacterial inertness over a long period.
- DKM is low-odour and is therefore ideal for the use in confined spaces.

APPLICATIONS

- Attachment of strips, panels, cladding and insulation materials to wall
- Connection and expansion joints in the building industry according to EN 15651-1 (20 HM) as well as for general joint sealing
- In building work, and joint and seam sealing in climate and ventilation technology (HVAC systems according to DIN EN ISO 846)
- Sealing and attaching metal constructions, sheet reinforcements on chimneys and windowsills, eaves flashing attachment on flat roofs and skylights
- Colored version suitable for mirror bonding

FUNCTIONING

- Chemical base: 1K Hybrid
- Approved acc. to DIN EN ISO 846 (coloured version)
- Permanently elastic
- Low-odour
- Mould inhibiting quality
- Skin formation time: approx. 10 minutes
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -40 °C to +90 °C
- Total authorised deformation: 25 %
- Non-corrosive
- Bonds on a moist base material
- Very good resistance to weather, ageing and UV (coloured version)
- Compatible with paint and paintable
- Free of silicone, MDI and solvents
- Selection table for substrates - refer to page 534

TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DKM-290ML	**517598**	white	290	12
DKM-290 ML grey (DE/EN)	**517599**	grey	290	12
DKM-290 ML black (DE/EN)	**517600**	black	290	12
DKM-290 ML beige (DE/EN)	**533831**	beige	290	12
DKM-290 ML transparent (DE/EN)	**533830**	crystal clear	290	12

The elastic acrylic sealant for internal and external applications with immediate rain resistance

External connection joints

Connection joints in the outdoor area

BUILDING MATERIALS

- Concrete
- Anodised layer
- Fibre cement
- Gypsum
- Gypsum plasterboard
- Wood
- H-PVC
- Sand-lime brick
- Clinker brick
- Masonry
- Metal
- Aerated concrete
- Plaster
- Brick
- Zinc

TEST CERTIFICATE

- EN 15651-1: F-EXT-INT (class 12.5P)
- GEV-EMICODE EC1 PLUS - very low emission
- French VOC-emission class A+

ADVANTAGES

- The immediate rain resistance allows for external application in all weather conditions, thus avoiding interruption of work.
- The high movement capacity means that DFA is ideal for expansion joints. This guarantees long-lasting jointing.
- The optimised formulation ensures that strongly absorbent substrates do not cause splitting in the joints. This increases functional safety.
- The water-based acrylate sealant has a neutral odour and is therefore ideal for use in confined spaces.

APPLICATIONS

- For internal and external application
- Internal connection joints between wood, plastic and metal windows and walls
- Joints in dry and internal construction
- Joints between stairs and walls, ceilings and walls
- Connection joints for shutter boxes and window sills
- Renovation work (split jointing)

FUNCTIONING

- Chemical base: 1-component dispersion acrylic
- Elasto-plastic
- Low-odour
- Skin formation time: approx. 5 minutes
- Processing temperature: +5 °C to +40 °C
- Permissible total deformation 20 % (according to ISO 7389)
- Temperature resistance: -20 °C to +75 °C
- Non-corrosive
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Can be painted and plastered
- Frost-protected in the cartridge
- Free of silicone, MDI and solvents

TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DFA WH 310 (DE/EN)	**541709**	white	310	12

Premium painting acrylic DMA

Quick paintable sealant with maximum security against cracks and discolourations

Wall connection joints

Internal expansion joints

BUILDING MATERIALS

- Concrete
- Anodised layer
- Gypsum
- Gypsum plasterboard
- Wood
- H-PVC
- Sand-lime brick
- Clinker brick
- Masonry
- Polystyrene
- Aerated concrete
- Plaster
- Brick

PRÜFZEUGNIS

- EN 15651-1:2012: Type F -EXT-INT (class 7,5P)
- GEV-EMICODE EC1 PLUS - very low emission
- French VOC-emission class A+

ADVANTAGES

- The sealant can be painted after already one hour, allowing subsequent painting work to start more quickly.
- The further-developed DMA formulation suppresses paint cracking, thus eliminating the need for time-consuming rework.
- The really good paint compatibility ensures the great adhesion of commercially available paints to the sealant and prevents the discolouration of the paint layer. This guarantees a good, even appearance.
- The water-based acrylate sealant has a neutral odour and is free from phthalate plasticisers, making it ideal for use in confined spaces.

APPLICATIONS

- For internal and external application
- For sealing joints between wooden and metal window frames and concrete/masonry
- Joints between walls and ceilings, steps and walls, concrete and ceiling elements and skirting
- Connection joints for shutter boxes and window sills
- Joints in dry and internal construction
- Renovation work (split jointing)

FUNCTIONING

- Chemical base: 1-component dispersion acrylic
- Elasto-plastic
- Low-odour
- Skin formation time: approx. 10 minutes
- Processing temperature: +5 °C to +40 °C
- Adheres on moist substrates
- Practically no shrinkage
- Temperature resistance: -20 °C to +75 °C
- Non-corrosive
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Can be painted and plastered
- Free of silicone, MDI and solvents
- Selection table for substrates - refer to page 534

TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DMA W (DE/EN)	**512186**	pure white	310	12

The structured acrylic sealant for plastered walls

Joints in the roof area

Closing external masonry cracks

BUILDING MATERIALS

- Concrete
- Anodised layer
- Gypsum
- Gypsum plasterboard
- Wood
- H-PVC
- Sand-lime brick
- Clinker brick
- Masonry
- Polystyrene
- Aerated concrete
- Plaster
- Brick

CERTIFICATES

- EN 15651 - Part 1: F-EXT-INT

ADVANTAGES

- The pitted structure is ideal for coarse surfaces, and ensures a perfect appearance, e.g. on rough plaster.
- The sealant can be painted and plastered and allows for an outstanding hold of standard paints/plasters on the sealant, thus guaranteeing a non-critical post-treatment.
- The good resistance to UV, weather and ageing allows for use both indoors and outdoors. This guarantees versatile and long-lasting jointing.

APPLICATIONS

- Filler paste to repair coarse surfaces on internal and external walls
- Connection joints with low movement
- Joints in dry and internal construction
- Joints between walls and ceilings
- Joints on window and shutter connections

FUNCTIONING

- Chemical base: 1-component dispersion acrylic
- Elasto-plastic
- Low-odour
- Skin formation time: approx. 5 minutes
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -20 °C to +75 °C (rain-resistant once cured)
- Non-corrosive
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Paintable
- Frost-protected in the cartridge
- Free of silicone, MDI and solvents
- Selection table for substrates - refer to page 534

TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DSA W (DE/EN)	**512185**	white	310	12

Acrylic sealant DA

The acrylic sealant for internal joints

Sealing door frames

Closing internal masonry cracks

BUILDING MATERIALS

- Concrete
- Anodised layer
- Gypsum
- Gypsum plasterboard
- Wood
- H-PVC
- Sand-lime brick
- Clinker brick
- Masonry
- Aerated concrete
- Plaster
- Brick

CERTIFICATES

- EN 15651 - Part 1: F-EXT-INT

ADVANTAGES

- The good hold on absorbent substrates guarantees a secure sealing and thus allows for a reliable and economic application.
- The sealant can be painted and plastered and allows for a good hold of standard paints/plasters on the sealant, thus guaranteeing a non-critical post-treatment.
- The water-based acrylate sealant has a neutral odour and is therefore ideal for use in confined spaces.

APPLICATIONS

- Fractures in masonry and other solid building materials in internal areas
- Connection joints with low movement
- Joints in window sill connections
- Connection joints inside buildings between windows, doors, stairs, ceilings and walls

FUNCTIONING

- Chemical base: 1-component dispersion acrylic
- Elasto-plastic
- Low-odour
- Skin formation time: approx. 20 minutes
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -20 °C to +75 °C
- Non-corrosive
- Compatible with paint
- Can be painted and plastered
- Frost-protected in the cartridge
- Free of silicone, MDI and solvents
- Selection table for substrates - refer to page 534

TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DA W (DE/EN)	**053110**	white	310	12
DA GR (DE/EN)	**053111**	grey	310	12
DA BR (DE/EN)	**053112**	brown	310	12
DA W (EN/FR/AR)	**058512**	white	280	24

The ready-to-use, extrudable joint mortar for the long-lasting closing of masonry joints

Masonry joints

Wall breakthrough

BUILDING MATERIALS

- Concrete
- Pumice
- Fibre cement
- Gypsum
- Wooden materials
- Sand-lime brick
- Ceramics
- Clinker brick
- Masonry
- Aerated concrete
- Plaster
- Cement
- Brick

ADVANTAGES

- The ready-to-use, sprayable joint mortar means that there is no need to add water or carry out time-consuming pre-mixing work. It enables clean, purposeful work. This means that you avoid dirtying surrounding areas and wasting material.
- Good adhesion even on slightly damp substrates practically allows for all-weather work and prevents forced interruptions.
- The structure of the high-quality water-based polymer has been perfectly designed with the visual appearance of the mortar in mind. This ensures a discreet joint and perfect appearance.

APPLICATIONS

- Repairing masonry joints
- Closing masonry cracks
- Fixing roof tiles
- Bonding tiling and bricks
- Repairing chipped edges
- Closing drill holes in facing masonry during repair work
- General repair work (e.g. drill holes with cracked edges)
- For a better reusability, to close opened cartridges with adhesive tape

FUNCTIONING

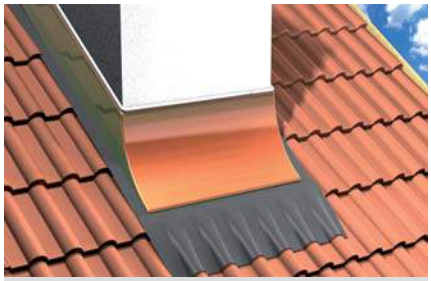
- Chemical base: 1C polymer dispersion
- Plastic
- Consistency: Firm
- Practically odour-free
- Skin formation time: Approx. 10 minutes.
- Processing temperature: +5 °C to +40 °C (not below +5 °C)
- Temperature resistance up to -30 °C (fully cured)
- Weather-proof after approx. 24 hours.
- Very good resistance to UV, weather and ageing
- Paintable
- Frost-protected in the cartridge
- Free of silicone, MDI and solvents-Selection table for substrates - refer to page 534

TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Contents per plastic bag [pcs]	Sales unit [pcs]
DEC CG (DE/EN)	**534474**	cement grey	310	–	12
V-Nozzle Express Cement	**524315**	–	–	5	1

Premium all-weather sealant DDK

The permanently elastic joint sealant with a strong hold on all substrates



Chimney flashings

Sealing gutters

BUILDING MATERIALS

- Concrete
- Bitumen sheeting
- Roofing felt
- Stainless steel
- Wood
- Clinker brick
- Copper
- Masonry
- Metal
- Brick
- Zinc

ADVANTAGES

- Thanks to the high elasticity of 25%, DDK is ideally suited to high-stress joints. This guarantees long-lasting jointing.
- DDK holds without a base coat, including on moist and bituminous substrates, and is therefore suitable for all applications in the roofing area. For a high degree of economy.
- The immediate rain resistance allows for external application in all weather conditions, thus avoiding interruption of work.
- DDK is non-corrosive, and thus can be used on aluminium, copper and zinc-plated surfaces. This offers maximum flexibility.

APPLICATIONS

- Sealing of roofing membranes
- Grouting roof penetrations such as chimneys or light domes, as well as edge connections
- Sealing of metal and plastic gutters
- Sealings around antennas and ventilation ducts
- Sealing of chimney flashings
- Sealant for metal structures

FUNCTIONING

- Chemical base: 1-component synthetic rubber
- Permanently elastic
- Highly transparent formulation
- Skin formation time: 15 - 20 minutes
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -25 °C to +100 °C
- Permitted overall deformation: 25%
- Allows for emergency roof repairs
- Non-corrosive
- Very good resistance to weather, ageing and UV
- Compatible with paint
- Paintable
- Frost-protected in the cartridge
- Selection table for substrates - refer to page 534

TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DDK TR (DE/EN)	**049103**	transparent	310	12

The special sealant to fill joints between bitumen sheeting

Sealings around skylights

Sealings around roofs with bitumen sheeting

BUILDING MATERIALS

- Concrete
- Bitumen sheeting
- Roofing felt
- Stainless steel
- Wood
- Clinker brick
- Copper
- Plastics
- Masonry
- Metal
- Brick
- Zinc
- Polystyrene

ADVANTAGES

- The special bitumen-based formulation seals roofing membranes and roofing felt securely. This guarantees long-lasting functionality.
- DD also holds to moist substrates without a base layer. This makes application largely independent of the weather and thus helps to avoid interruption of work.
- DD is non-corrosive, and thus can be used on aluminium, copper, zinc-plated surfaces and polystyrene. This offers maximum flexibility.

APPLICATIONS

- Sealing roofing membranes and roofing felt
- Bonding bitumen shingle
- Grouting roof penetrations such as chimneys or light domes, as well as edge connections
- Sealing of metal and plastic gutters
- Sealings around antennas and ventilation ducts

FUNCTIONING

- Chemical base: 1-component bitumen
- Odorless, because it is solvent-free
- Plastic
- Skin formation time > 15 hours
- Processing temperature: +5 °C to +40 °C
- Temperature resistance: -20 °C to +80 °C
- Max. movement absorption 10%
- Non-corrosive
- Selection table for substrates - refer to page 534

TECHNICAL DATA

Item	Art.-No.	Colour	Contents [ml]	Sales unit [pcs]
DD SW (DE/EN)	**053127**	black	300	12

KP M1

ADVANTAGES

- The handy, robust solid metal construction for standard cartridges up to 310 ml bears up against requirements on the construction site and, as such, is also suitable for professional use.
- The continuous in-feed allows for a precise dosage, making it easy to use.
- The slim shape of the device allows for an exact application, even in difficult to reach spots, thus offering a high level of flexibility

KP M2

ADVANTAGES

- The 18:1 transmission ratio makes extrusion rapid and energy-efficient even in the case of highly viscous materials, thus guaranteeing stress-free work.
- The robust design with the special, hardened drive block meets the tough requirements of a construction site and thus offers a long lifespan.
- Due to the accessible cartridge, it is possible to align the extrusion nozzle perfectly in place and guarantee application-orientated work.

KP M3

ADVANTAGES

- The 18:1 transmission ratio makes extrusion rapid and energy-efficient even in the case of highly viscous materials, thus guaranteeing stressfree work.
- The robust design with the hardened twice drive blocks and the hardened push rod meets the tough requirements of a construction site and thus offers a long lifespan.
- The electro-welded cartridge shell is freely rotatable.
- Due to the accessible cartridge, it is possible to align the extrusion nozzle perfectly in place and guarantee application-orientated work.
- The equipment with a ladder hook facilitates the retraction of the push rod and offers a convenient possibility of depositing during work interruptions.

TECHNICAL DATA

Item	Art.-No.	Sales unit [pcs]
KP M1	**053115**	1
KP M2	**053117**	1
KP M3	**541441**	1

KP M600

ADVANTAGES

- The 18:1 transmission ratio makes extrusion rapid and energy-efficient even in the case of highly viscous materials, thus guaranteeing stressfree work.
- The robust design with the hardened push rod with anti-slip effect withstands the tough requirements of a construction site and thus offers a long lifespan.
- The equipment with a ladder hook facilitates the retraction of the push rod and offers a convenient possibility of depositing during work interruptions.
- Automatic tension remove (with on / off function) prevents run after.
- 2 different pusher plates (plastic for tubular bags & metal for cartridges) enable flexible use.

TECHNICAL DATA

Item	Art.-No.	Sales unit [pcs]
KP M600	**540941**	1

SEALANT SELECTION MATRIX

+ suitable T requires test - not suitable	Chem. basis	ABS / Polystyrene	Acrylic glass (Macrolon, perspex etc.)	Acrylic tubs (sanitary acrylic)	Aluminium	Concrete	Concrete block	Bitumen	Non ferrous heavy metal (copper, brass)	Stainless steel	Sandblasted iron	Enamel	Tiles	Gypsum / gypsum plasterboard	Glass	Hard PVC	Wood	Ceramics	Natural stone / marble	Polyester	Aircrete	Plaster	Resopal	Stoneware	Brick / clinker brick	Zinc / galvanizing
DSSA Premium sanitary silicone	Silicone acetate	+	-	+	+	-	-	-	-	+	-	+	+	-	+	+	+	+	-	+	-	-	+	+	-	-
DSSI Sanitary silicone	Silicone acetate	-	-	+	+	-	-	-	-	+	-	+	+	-	+	+	+	+	-	+	-	-	+	+	-	-
DMS Multi-silicone	Silicone acetate	+	-	T	+	-	-	-	-	+	-	+	+	-	+	-	+	+	-	+	-	-	+	+	-	-
DHS Premium high temperature silicon	Silicone acetate	+	-	-	+	T	-	-	T	+	-	+	+	T	+	-	+	+	-	+	T	T	+	+	T	T
DBSA Premium construction silicone	Silicone alkoxy	+	+	T	+	+	-	-	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+
DBSI Roof and wall silicone	Silicone oxime	+	-	+	+	+	-	-	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+
DNS Premium silicone for natural stone	Silicone oxime	+	-	+	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
DFS Premium B1 silicone	Silicone oxime	+	+	+	+	+	-	-	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+
DKM Construction sealant Premium	Hybride	T	+[1)]	+	+	+	-	-	+	+	+	+	+	+	+	+	+	+	-	+	+	+	+	+	+	+
DFA Facade acrylic Premium	Dispersion acrylic	-	-	-	+	+	-	-	+	+	-	+	+	+	-	+	+	+	-	+	+	+	+	+	+	+
DMA Premium painting acrylic	Dispersion acrylic	-	-	-	+	+	-	-	+	+	-	+	+	+	-	+	+	+	-	+	+	+	+	+	+	+
DSA Premium structured acrylic	Dispersion acrylic	-	-	-	+	+	-	-	-	+	-	-	+	+	-	T	+	T	-	+	+	+	+	+	+	+
DA Acrylic Sealant	Dispersion acrylic	-	-	-	+	+	-	-	-	+	-	-	+	T	-	-	+	T	-	+	+	+	+	+	+	T
DDK Premium all-weather sealant	Synthetic rubber	+	-	-	+	+	-	+	+	+	+	-	+	-	-	+	+	+	-	+	+	+	+	+	+	+
DD Roof sealing compound	Bitumen	-	-	-	+	+	-	+	+	+	+	-	+	-	-	-	+	+	-	+	-	T	-	+	+	+

[1)] perspex not

Note: Avoid direct contact between the silicone and bituminous or plasticiser materials (e.g. EPDM, butyl, neoprene). The written and spoken information contained in this technical datasheet and our practical support is provided to the best of our knowledge and does not represent binding information or guarantees as described in § 443 of the German Civil Code. We recommend that you test the suitability of our products for the intended application prior to use. Due to the diverse range of applications of the individual product and the unpredictable conditions on site, we also recommend testing the adhesion prior to use.

SEALANT COLOUR BOARD

DSSA Premium sanitary silicone

Art.-No. 53100	Art.-No. 53101	Art.-No. 53103	Art.-No. 58530	Art.-No. 512208	Art.-No. 53102	Art.-No. 512209	Art.-No. 512210	Art.-No. 53105	Art.-No. 512211	Art.-No. 53120
transparent	white	bahama beige	silver grey	joint grey	grey	sanitary grey	manhattan	dark grey	anthracite	black

DHS Premium high temperature silicone

Art.-No. 53125
reddish brown

DBSA Construction silicone

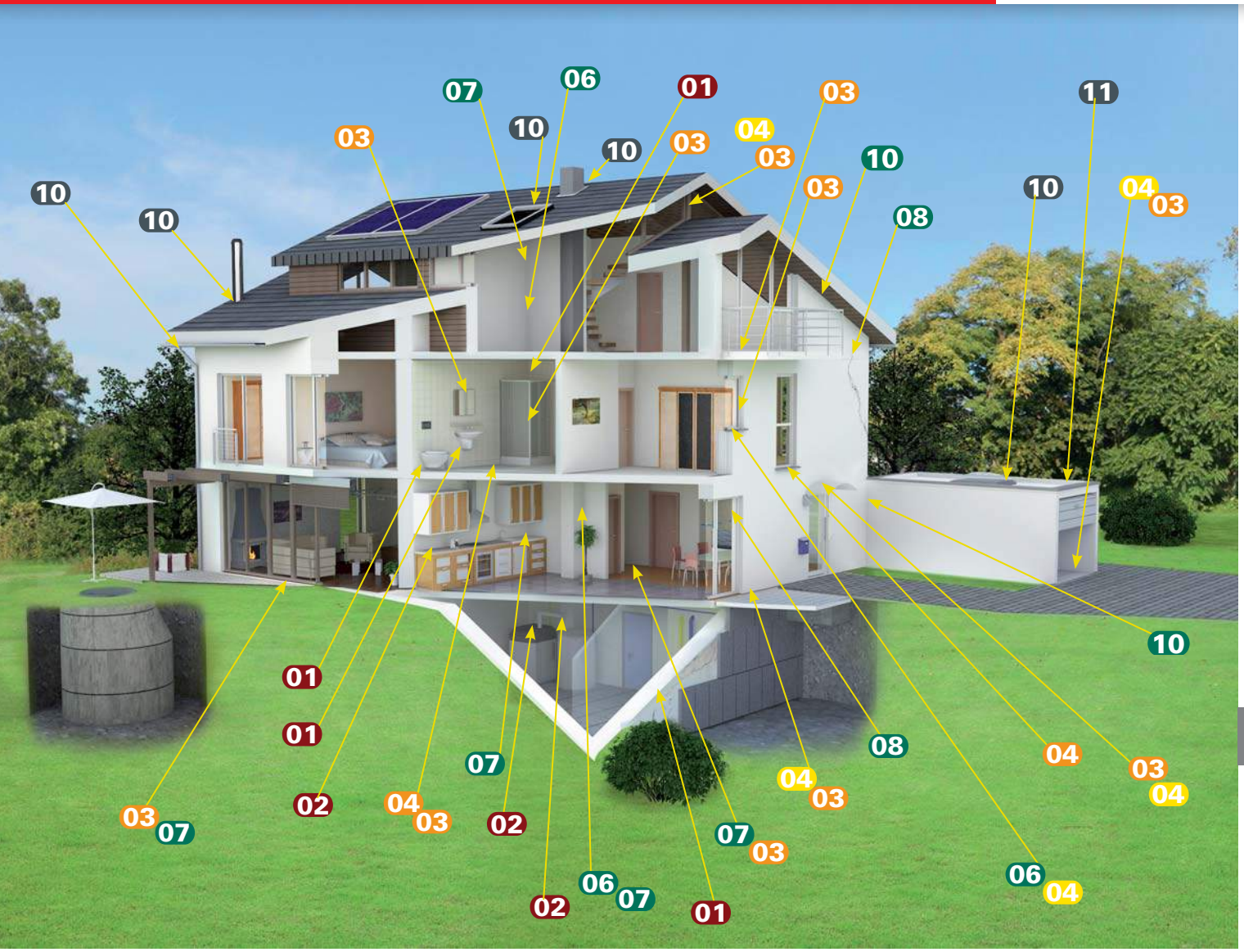
Art.-No. 53090	Art.-No. 53091	Art.-No. 540085	Art.-No. 53095	Art.-No. 540084	Art.-No. 540086	Art.-No. 53092	Art.-No. 540087	Art.-No. 53093	Art.-No. 512213	Art.-No. 53094
transparent	white	cream white RAL 9001	beige	anthracite grey	white aluminium RAL 9006	concrete grey	grey aluminium RAL 9007	brown	slate grey	black

DFS Premium B1 silicone

Art.-No. 53131
grey

DA Acrylic sealant

Art.-No. 53110	Art.-No. 58512	Art.-No. 53111	Art.-No. 53112
white	white	grey	brown



Example of use for sealants

- 01 DSSA Premium sanitary silicone
- 02 DHS Premium high temperature silicone
- 03 DBSA Premium construction silicone
- 04 DBSI Roof and wall silicone
- 04 DNS Premium silicone for natural stone
- 05 DFS Premium B1 silicone
- 06 DMA Premium painting acrylic
- 07 DA Acrylic sealant
- 08 DSA Premium structured acrylic
- 09 DFA Premium acrylic sealant facade
- 10 DDK Premium all-weather sealant
- 11 DD Roof sealing compound

Zinc spray FTC-ZS

Fast-drying surface and corrosion protection with outstanding long-term effect for metals.

Column bases

Stand mounting

BUILDING MATERIALS

- All iron and steel surfaces
- Blank laminations

ADVANTAGES

- In the salt spray test in line with DIN 50021, coated metal parts displayed no corrosion, even after 500 hours.
- The high proportion of zinc in the dry film provides secure protection to all metal surfaces that are permanently exposed to the elements.
- Thanks to the adhesive layer of corrosion protection and the fact that it can be painted over, it is also ideal as a high-quality base layer.
- The high resistance to cracking and flaking of a metal base material was confirmed by the mandrel flex test in line with DIN EN ISO 1519 (without damage).

APPLICATIONS

- For all metals that need corrosion protection
- Rust protection base layer for surfaces threatened by water and weather
- For the coating of drilling and cutting points as well as welded joints
- Conductive interlayer for spot welding
- Repairing damaged zinc coatings

FUNCTIONING

- Dark-grey colour (similar to RAL 7042)
- Metal proportion of over 92% in dry film
- Shake can well for approx. 3 minutes
- Apply at a distance of 20–30 cm in a cross coat
- Surface dust-dry after just approx. 8 minutes
- Fully hardened within 24 hours
- Smooth, non-porous film
- Abrasion-resistant
- Excellent corrosion protection with long-term effect
- Heat-resistant up to approx. 500 °C
- Electroconductive and suitable for spot welding
- Ideal processing temperature of 16 °C to 25 °C

TECHNICAL DATA

Item	Art.-No.	Contents [ml]	Sales unit [pcs]
FTC-ZS (EN/FR/ES/PT)	**509242**	400	12

Bright color as newly galvanised metals in combination with heat-resistant corrosion protection due to flake technology.

Metal stairs

Roof construction: metal structures

BUILDING MATERIALS

- All iron and steel surfaces
- Hot-dip galvanised surfaces following drilling, ironwork or welding
- Non-ferrous heavy metal
- Blank laminations

ADVANTAGES

- In the salt spray test in line with DIN EN ISO 9227, coated metal parts displayed no corrosion, even after 300 hours.
- The innovative metal flakes form a highly resistant protective layer, even against extreme weather influences. This guarantees long-lasting protection.
- The color "bright grade" has been perfectly adapted to that of hot-dip galvanisation. This acts as an optical color compensator.
- Thanks to the excellent holding properties on blank metal, it guarantees a lasting connection to the base material.

APPLICATIONS

- For all metals that need corrosion protection
- For HVAC systems
- For post-galvanising and repairing damaged areas of galvanised parts
- Metal constructions
- Guard rails
- For the coating of drilling and cutting points as well as welded joints
- Conductive interlayer for spot welding

FUNCTIONING

- Zinc coating in fresh hot-dipped coloring with high gloss level (RAL 9006)
- Flaky metal pigments
- Metal content in dry film > 60%
- Shake can well for approx. 2 minutes
- Apply at a distance of 25 - 30 cm in a cross coat
- Surface dust-dry after just approx. 8 minutes
- Surface is dust-dry after approx. 15 minutes and fast to handle after approx. 60 minutes
- Fully hardened within 24 hours
- Long-term heat resistance up to approx. +300 °C
- Ideal processing temperature of +16 °C to +25 °C
- High abrasion resistance

TECHNICAL DATA

Item	Art.-No.	Contents [ml]	Sales unit [pcs]
FTC-ZB (EN/FR/ES/PT)	**534786**	400	12
FTC-ZB (EN/AR/FR/PT)	**537223**	400	12

Zinc-alu spray FTC-ZA

Ideal for repairing damaged zinc coatings using colour-matching corrosion protection.

Ventilation systems

Ladders

BUILDING MATERIALS

- All iron and steel surfaces
- Hot-dip galvanised surfaces following drilling, ironwork or welding
- Non-ferrous heavy metal

ADVANTAGES

- Zinc-alu spray represents a subtle repair to damaged hot-dip galvanised areas thanks to its colour matching with the hot-dip galvanisation.
- Thanks to the excellent holding properties on blank metal, it guarantees a lasting connection to the base material.
- The fast-drying Zinc-alu spray guarantees good, weatherproof corrosion protection and, as such, is suitable for use both indoors and out.

APPLICATIONS

- For post-galvanising and repairing damaged areas of galvanised parts, drilling and cutting points and welded joints
- Repairing damaged zinc coatings
- Climate control and ventilation technology
- Guard rails
- Metal constructions
- Sheet metal coverings

FUNCTIONING

- Silver-grey colour (similar to RAL 9006) with high gloss level
- Shake can well for approx. 2 minutes
- Apply at a distance of 25–30 cm in a cross coat
- Surface dust-dry after just approx. 8 minutes
- Touch-dry after 20–25 minutes
- Fully hardened within 24 hours
- Smooth, non-porous film
- High abrasion resistance
- Long-term heat resistance up to approx. 200 °C (briefly up to 300 °C)
- Ideal processing temperature of 16 °C to 25 °C

TECHNICAL DATA

Item	Art.-No.	Contents [ml]	Sales unit [pcs]
FTC-ZA (EN/FR/ES/PT)	**509241**	400	12

fischer
KD
WEISS/
WHITE
Multi Kleb- und
Dichtstoff
MS Polymer®
All Round
Adhesive Gluing
& Sealing
MS Polymer®
fischer
BEIGE
KK
Kraft-Kleber
Express
Polyurethan
Power Adhesive
Express
Polyurethane
-40°C
+110°C
310 ml

13 Adhesives

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Assembly adhesive MK		542
Power adhesive express KK		543
All-round adhesive gluing and sealing KD		544
All-round adhesive gluing and sealing KD transparent		545
Flexible power adhesive premium HTM		546

Assembly adhesive MK

The building adhesive for interior areas with high initial adhesion

Skirting

Timber constructions

BUILDING MATERIALS

- Concrete
- Pumice
- Fibre cement
- Gypsum
- Gypsum plasterboard
- Wood
- H-PVC
- Sand-lime brick
- Clinker brick
- Masonry
- Metal
- Polystyrene hard foam
- Aerated concrete
- Plaster
- Brick

CERTIFICATES

- Conform to LEED® IEQ-credits 4.1 (Indoor Environmental Quality) adhesives and sealants

ADVANTAGES

- The extremely high initial adhesion of 140 kg/m² makes it possible to attach lots of components without the need for additional fixings, and thus reduces the amount of time required.
- The components can be adjusted for a few minutes after they have been attached. This makes installation easier.
- The acrylate adhesive has a neutral odour and is therefore ideal for use in confined spaces.
- The special recipe makes it compatible with foamed polystyrene, e.g. Styrofoam®. MK is, therefore, suitable for a broad range of applications.

APPLICATIONS

- Skirting
- Timber sub-structures
- Décorative, acoustic and insulation panels
- Cable ducts
- Window sills
- Tiles
- Door signs

FUNCTION / ASSEMBLY

- Chemical base: One-component acrylate dispersion
- Creme white in colour
- Processing temperature +5 °C to +35 °C
- Setting time approx. 15 minutes
- High initial adhesion of 140 kg/m²
- Fully functional after 24 to 48 hours
- High ultimate strength (up to 22 kg/cm² for wood to wood)
- Temperature resistance -20 °C to +70 °C
- Non-drip (suitable for use on ceilings)
- Addresses uneven surfaces
- At least one of the components to be bonded must be absorbent.
- Reclosable nozzle
- Free from solvents, silicone and MDI
- Extrude with silicone application gun

TECHNICAL DATA

Item	Art.-No.	Contents [ml]	Contents [g]	Type of packaging	Colour	Sales unit [pcs]
MK WHITE 310ML (DE/EN)	**053128**	310	400	Cartridge	white	12

The buliding adhesive for extremely fast and water-resistant bond with a high final strength

Capstones

Bonding in interior construction

BUILDING MATERIALS

- ABS
- Concrete
- Pumice
- Anodised layer
- Fibre cement
- Gypsum
- Gypsum plasterboard
- Wooden materials
- H-PVC
- Sand-lime brick
- Ceramics
- Clinker brick
- Masonry
- Metal
- Natural stone
- Polystyrene hard foam
- Aerated concrete
- Plaster
- Brick

CERTIFICATES

- According to the requirements of DIN EN 204-D4 to weathering resistant bondings of wood and derived wood products
- According to the requirements of DIN EN 14257 (Watt 91) to temperature-resistant bondings of wood and derived wood products
- Conform to LEED® IEQ-credits 4.1 (Indoor Environmental Quality) adhesives and sealants
- EMICODE® EC 1 Plus - very low emission

ADVANTAGES

- The polyurethane adhesive is resistant to moisture and thus can be used in exterior areas.
- The extremely quick hardening shortens the pressing and joining times. Thus subsequent work can be completed more quickly.
- The optimised recipe achieves a high adhesion, including in the case of high temperatures, for high security.
- The special recipe makes it compatible with foamed polystyrene, e.g. Styrofoam®. Thus, KK is suitable for a broad range of applications.

APPLICATIONS

- Gluing timber sub-structures
- Stair construction and stair renovations
- Laminate cladding
- Skirting boards
- Décorative, acoustic and insulation panels
- Professional modelling
- Door signs
- Cable ducts
- General repair and installation mortar

FUNCTION / ASSEMBLY

- Chemical base: One-component PUR adhesive
- Beige in colour
- Processing temperature 0 °C to +35 °C
- Setting time approx. 3 minutes
- Fully functional after approx. 10 minutes (for invisible joints)
- High final strength of > 10 N/mm² (> 100 kg/cm²)
- Temperature resistance -40 °C to +110 °C
- Non-drip (suitable for use on ceilings)
- Lightly foaming / bridges gaps
- Assembly parts have to be fixed until functional strength has been reached
- Reclosable nozzle
- Free from solvents and silicone
- Extrude with silicone application gun

TECHNICAL DATA

Item	Art.-No.	Contents [ml]	Contents [g]	Type of packaging	Colour	Sales unit [pcs]
KK BEIGE 310ML (DE/EN)	**059014**	310	460	Cartridge	beige	12

All-round adhesive gluing and sealing KD

The flexible adhesive and sealant for interior and exterior use with high initial tack even on wet surfaces

Sheet metal coverings

Bonding an sealing of mirrors

BUILDING MATERIALS

- ABS
- Concrete
- Pumice
- Gypsum plasterboard
- Glass
- Wooden materials
- H-PVC
- Ceramics
- Copper
- Masonry, clinker brick
- Metals
- Natural stone
- Polycarbonate and PMMA
- Polystyrene hard foam
- Aerated concrete
- Plaster
- Brick

CHARACTERISTICS

- EN 15651 - Part 1: F EXT-INT (class 20 HM)
- EN 15651 - Part 3: S (class XS1)
- EN 15651 - Part 4: PW-INT
- LEED® IEQ-credits 4.1 (Indoor Environmental Quality) adhesives and sealants

ADVANTAGES

- The extremely high initial adhesion of 110 kg/m² makes it possible to attach lots of components without the need for additional fixing, and thus reduces the amount of time required.
- The MS polymer® allows for an elastic adhesion for vibration-dampening and stress-compensating connections for demanding applications.
- KD is almost odour-free and therefore particularly suitable for closed rooms.
- Non-corrosive, thus can be used on copper and zinc plated surfaces for maximum flexibility in application.

APPLICATIONS

Stress-compensating bonding and sealing of:

- Standard mirrors
- Vibrating constructions
- Metal profiles
- Joints and seams in ventilated constructions
- Insulation material, ledges, panels and cladding
- Kitchens and built-in furniture
- Stair treads and window sills
- Floor joints, connection joints in car body, vehicle construction, metal construction and ship building

FUNCTION / ASSEMBLY

- Chemical base: One-component hybrid polymer
- Processing temperature +5 °C to +35 °C
- Setting time approx. 5 minutes
- High initial adhesion of 110 kg/m²
- Curing: approx. 3 mm per day
- High elasticity of 20 %
- Shore A 50 ± 5
- Temperature resistance: -40 °C to +90 °C
- Also bonds on a moist base material
- Prevents mould build-up, even without additional ingredients
- Suitable for bonding non-absorbent components (see TDS)
- Can be painted (see TDS)
- Free from solvents and silicone
- Waterproof and Sea water resistant
- Very good resistance to weather, age and UV

TECHNICAL DATA

Item	Art.-No.	Contents [ml]	Contents [g]	Type of packaging	Colour	Sales unit [pcs]
KD WHITE 290ML	**059389**	290	420	Cartridge	white	12
KD GREY 290ML (DE/EN)	**503318**	290	420	Cartridge	grey	12
KD BLACK 290ML (DE/EN)	**503319**	290	420	Cartridge	black	12

The transparent hybrid polymer for discreet adhesive and sealant joints for interior and exterior use.

Bonding and sealing aluminium profiles

For invisible glued and sealed joints

BUILDING MATERIALS

- ABS
- Concrete
- Stainless steel
- Anodised layer
- Tiles
- Glass, glazed surfaces
- Wooden materials
- H-PVC
- Ceramics
- Copper, brass
- Masonry, Clinker brick
- Metals
- Polycarbonate and PMMA
- Polystyrene hard foam
- Steel
- Brick
- Zinc

CERTIFICATES

- EN 15651 - Part 1: F INT
- LEED® IEQ-credits 4.1 (Indoor Environmental Quality) adhesives and sealants

ADVANTAGES

- The transparent formula is perfect for discreet adhesion and sealing and guarantees the optimum appearance.
- The high initial adhesion of 70 kg/m² allows many components to be attached without additional fixing.
- Thanks to the high elasticity of 20%, KD transparent is also ideally suited for high-stress expansion joints and guarantees permanent sealing at all times.
- Non-corrosive, thus can be used on copper and zinc plated surfaces for maximum flexibility in application.
- KD clear is almost odour-free and therefore particularly suitable for closed rooms.

APPLICATIONS

Stress-compensating bonding and sealing of:

- Glass and other transparent materials, preferably in interior areas
- Insulation material, ledges, panels and cladding
- Kitchens and built-in furniture
- Constructions in timber, bodywork, metal, container and shipbuilding industries

FUNCTIONING

- Chemical Base: One-component hybrid polymer
- Very easy to apply
- Prevents the formation of mould, even without additional active substances
- Skin formation time: approx. 10 minutes
- High initial adhesion of 50 kg/m²
- Cures after approx. 3 mm/24h
- Processing temperature: +5 °C to +35 °C
- High elasticity of 20%
- Shore A 38 ± 5
- Also bonds on a moist base material
- Temperature resistance: -40 °C to +90 °C
- Compatible with paint; paintable
- Natural stone may discolour
- Free from solvents, isocyanat- and silicon

TECHNICAL DATA

Item	Art.-No.	Contents [ml]	Contents [g]	Type of packaging	Colour	Sales unit [pcs]
KD CRYSTAL CLEAR 290ML (DE/EN)	**503317**	290	300	Cartridge	crystal clear	12

Flexible power adhesive premium HTM

The flexible high-performance adhesive with very high initial adhesion to many absorbent and non-absorbent substrates

Bonding of wall cladding

Bonding of mirrors

BUILDING MATERIALS

- ABS
- Concrete
- Stainless steel
- Anodised layer
- Natural stone, marble
- Glass, glazed surfaces
- Wooden materials
- H-PVC
- Ceramics
- Copper, brass
- Masonry, clinker brick, tiles
- Metals
- Polycarbonate and PMMA
- Polystyrene hard foam
- HPL panels
- Brick
- Zinc

TEST CERTIFICATE

- EMICODE EC 1 Plus - very low emission
- French VOC emission class A+

ADVANTAGES

- The extremely high initial adhesion of > 290 kg/m² makes it possible to attach lots of components without the need for additional fixings, and thus reduces the amount of time required.
- The high final tensile strength of 2.2 N/mm² guarantees really safe glued connections.
- The MS Polymer® enables elastic bonding for vibration-dampening and stress-compensating connections in challenging applications.
- HTM is practically odourless and is therefore ideal for use in confined spaces.
- It is non-corrosive and can therefore be used on aluminium, copper and zinc-plated surfaces, making it particularly flexible.

APPLICATIONS

Stress compensating bonding of:

- Standard mirrors
- Vibrating constructions
- Metal profiles
- Seams in ventilation construction
- Insulation material, ledges, panels and cladding
- Kitchens and built-in furniture
- Stair treads and window sills
- Different types of stone
- Also of non-absorbent materials (see technical data sheet)
- A wide variety of materials in container, body, metal, ship and vehicle construction

FUNCTIONALITY

- Chemical base: One-component hybrid polymer
- Colour: White
- Processing temperature +5 °C to +40 °C
- Processing time of around 10 minutes
- Hardening time of 2-3 mm/24 h
- Extremely high initial adhesion > 290 kg/m²
- Shore A 56
- Temperature resistance: -40 °C to +90 °C
- Adhesive, even on a damp base
- Suitable for bonding non-absorbent components (see TDS)
- Can be painted (see TDS)
- Free from solvents, MDI and silicone
- Very good resistance to weather, ageing and UV

TECHNICAL DATA

Item	Art.-No.	Contents [ml]	Contents [g]	Type of packaging	Colour	Sales unit [pcs]
HTM WH 290 (DE/EN)	**541712**	290	450	Cartridge	white	12
V-Nozzle Express Cement	**524315**	–	–	–	–	1

fischer
innovative solutions

14 Drills and bits

	Page
Hammer drill bit Quattric II	550
Hammer drill bit SDS Plus II Pointer	553
Masonry drill bit Pointer M	557
Hammer drill bit SDS Max II / SDS Max IV	558
Hollow drill bit FHD	561
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Standard chisel	564
Profi-bit FPB	565
Diamond-bit FDB	566
Maxx-bit FMB	567
Bit holder FBH	568
Bit-Set	569
Accessories for impact driver	570

The expert for the best performance in reinforced concrete

ADVANTAGES

- Carbide head (up to ø 10 mm) for long service life.
- Power shoulders for improved breakup performance in concrete.
- Massive main cutting edges for quick drilling progress.
- Reinforcement chamfers prevent jamming in the reinforcement.
- Centring tip for simple positioning.
- Wear mark for simple recognition of wear limit in accordance with PGM.
- Two-piece spiral for quick drilling progress and increased service life.

APPLICATIONS

To create approval-compliant drill holes in:

- Reinforced concrete
- Concrete
- Solid brick
- Sand-lime brick

Also suitable for:

- Natural stone

CHARACTERISTICS

PGM®

SDS Plus

TECHNICAL DATA

Hammer drill **Quattric II**

Detail:
Top of drill Quattric II
Ø 5 - 10 mm

Detail:
Top of drill Quattric II
Ø 11 - 16 mm

Detail:
Top of drill Quattric II
17 - 32 mm

Item	Art.-No.	Drill hole diameter d_0 [mm]	Working length [mm]	Total length [mm]	Type of packaging	Contents	Sales unit [pcs]
Quattric II 5/50/115	**549973**	5	50	115	Plastic clip	1	1
Quattric II 5/100/165	**549974**	5	100	165	Plastic clip	1	1
Quattric II 5/150/215	**544214**	5	150	215	Plastic clip	1	1
Quattric II 5,5/50/115	**549971**	5,5	50	115	Plastic clip	1	1
Quattric II 5,5/100/165	**549972**	5,5	100	165	Plastic clip	1	1
Quattric II 6/50/115	**549983**	6	50	115	Plastic clip	1	1
Quattric II 6/100/165	**549979**	6	100	165	Plastic clip	1	1
Quattric II 6/150/215	**549981**	6	150	215	Plastic clip	1	1
Quattric II 6/200/265	**549985**	6	200	265	Plastic clip	1	1
Quattric II 6/250/315	**549986**	6	250	315	Plastic clip	1	1
Quattric II 6,5/100/165	**549975**	6,5	100	165	Plastic clip	1	1
Quattric II 6,5/150/215	**549976**	6,5	150	215	Plastic clip	1	1
Quattric II 6,5/200/265	**549977**	6,5	200	265	Plastic clip	1	1
Quattric II 6,5/250/315	**549978**	6,5	250	315	Plastic clip	1	1
Quattric II 8/50/115	**549993**	8	50	115	Plastic clip	1	1
Quattric II 8/100/165	**549988**	8	100	165	Plastic clip	1	1
Quattric II 8/150/215	**549990**	8	150	215	Plastic clip	1	1
Quattric II 8/200/265	**549994**	8	200	265	Plastic clip	1	1
Quattric II 8/250/315	**549992**	8	250	315	Plastic clip	1	1
Quattric II 8/300/365	**549995**	8	300	365	Plastic clip	1	1
Quattric II 8/400/465	**549996**	8	400	465	Plastic clip	1	1
Quattric II 10/50/115	**549928**	10	50	115	Plastic clip	1	1
Quattric II 10/100/165	**549922**	10	100	165	Plastic clip	1	1
Quattric II 10/150/215	**549925**	10	150	215	Plastic clip	1	1
Quattric II 10/200/265	**549929**	10	200	265	Plastic clip	1	1
Quattric II 10/250/315	**549927**	10	250	315	Plastic clip	1	1
Quattric II 10/300/365	**544224**	10	300	365	Plastic clip	1	1
Quattric II 10/390/455	**549930**	10	390	455	Plastic clip	1	1
Quattric II 10/540/600	**544222**	10	540	600	Plastic clip	1	1
Quattric II 12/110/160	**549932**	12	110	160	Plastic clip	1	1
Quattric II 12/160/210	**549936**	12	160	210	Plastic clip	1	1
Quattric II 12/210/260	**549934**	12	210	260	Plastic clip	1	1
Quattric II 12/260/310	**549939**	12	260	310	Plastic clip	1	1
Quattric II 12/400/450	**549935**	12	400	450	Plastic clip	1	1
Quattric II 12/550/600	**544213**	12	550	600	Plastic clip	1	1
Quattric II 12/950/1000	**549931**	12	950	1000	Plastic clip	1	1
Quattric II 14/110/160	**549941**	14	110	160	Plastic clip	1	1
Quattric II 14/160/210	**549944**	14	160	210	Plastic clip	1	1
Quattric II 14/210/260	**549942**	14	210	260	Plastic clip	1	1
Quattric II 14/260/310	**549945**	14	260	310	Plastic clip	1	1
Quattric II 14/400/450	**549943**	14	400	450	Plastic clip	1	1
Quattric II 14/550/600	**544223**	14	550	600	Plastic clip	1	1
Quattric II 14/950/1000	**549940**	14	950	1000	Plastic clip	1	1
Quattric II 15/110/160	**549946**	15	110	160	Plastic clip	1	1
Quattric II 15/160/210	**549947**	15	160	210	Plastic clip	1	1
Quattric II 15/210/260	**544215**	15	210	260	Plastic clip	1	1
Quattric II 16/110/160	**549950**	16	110	160	Plastic clip	1	1
Quattric II 16/160/210	**549951**	16	160	210	Plastic clip	1	1
Quattric II 16/210/260	**549952**	16	210	260	Plastic clip	1	1
Quattric II 16/260/310	**549953**	16	260	310	Plastic clip	1	1
Quattric II 16/400/450	**549954**	16	400	450	Plastic clip	1	1

Hammer drill bit Quattric II

TECHNICAL DATA

Hammer drill **Quattric II**

Detail:
Top of drill Quattric II
Ø 5 - 10 mm

Detail:
Top of drill Quattric II
Ø 11 - 16 mm

Detail:
Top of drill Quattric II
17 - 32 mm

Item	Art.-No.	Drill hole diameter d_0 [mm]	Working length [mm]	Total length [mm]	Type of packaging	Contents	Sales unit [pcs]
Quattric II 16/550/600	**549955**	16	550	600	Plastic clip	1	1
Quattric II 16/950/1000	**549948**	16	950	1000	Plastic clip	1	1
Quattric II 18/200/250	**549956**	18	200	250	Plastic tube	1	1
Quattric II 18/400/450	**549957**	18	400	450	Plastic tube	1	1
Quattric II 20/200/250	**549958**	20	200	250	Plastic tube	1	1
Quattric II 20/400/450	**549959**	20	400	450	Plastic tube	1	1
Quattric II 22/200/250	**549960**	22	200	250	Plastic tube	1	1
Quattric II 22/400/450	**549961**	22	400	450	Plastic tube	1	1
Quattric II 24/200/250	**549962**	24	200	250	Plastic tube	1	1
Quattric II 24/400/450	**549963**	24	400	450	Plastic tube	1	1
Quattric II 25/200/250	**549964**	25	200	250	Plastic tube	1	1
Quattric II 25/400/450	**549965**	25	400	450	Plastic tube	1	1
Quattric II 28/200/250	**549966**	28	200	250	Plastic tube	1	1
Quattric II 28/400/450	**549967**	28	400	450	Plastic tube	1	1
Quattric II 30/200/250	**549968**	30	200	250	Plastic tube	1	1
Quattric II 30/400/450	**549969**	30	400	450	Plastic tube	1	1
Quattric II 32/400/450	**549970**	32	400	450	Plastic tube	1	1
Quattric II 6/50/115 XP5	**549984**	6	50	115	Plastic box	5	1
Quattric II 6/100/165 XP5	**544225**	6	100	165	Plastic box	5	1
Quattric II 6/150/215 XP5	**549982**	6	150	215	Plastic box	5	1
Quattric II 6,5/100/165 XP5	**544217**	6,5	100	165	Plastic box	5	1
Quattric II 6,5/150/215 XP5	**544218**	6,5	150	215	Plastic box	5	1
Quattric II 6,5/200/265 XP5	**544219**	6,5	200	265	Plastic box	5	1
Quattric II 8/100/165 XP5	**549989**	8	100	165	Plastic box	5	1
Quattric II 8/150/215 XP5	**549991**	8	150	215	Plastic box	5	1
Quattric II 10/100/165 XP5	**549924**	10	100	165	Plastic box	5	1
Quattric II 10/150/215 XP5	**549926**	10	150	215	Plastic box	5	1
Quattric II 12/110/160 XP5	**549933**	12	110	160	Plastic box	5	1
Quattric II 12/160/210 XP5	**549937**	12	160	210	Plastic box	5	1
Quattric II 12/210/260 XP5	**549938**	12	210	260	Plastic box	5	1
Quattric II 14/110/160 XP5	**544220**	14	110	160	Plastic box	5	1
Quattric II 14/160/210 XP5	**544221**	14	160	210	Plastic box	5	1
Quattric II 6/100/165 XP10	**549980**	6	100	165	Plastic box	10	1
Quattric II 8/100/165 XP10	**544216**	8	100	165	Plastic box	10	1
Quattric II 10/100/165 XP10	**549923**	10	100	165	Plastic box	10	1

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The two-flute cutter is setting new standards when it comes to drilling speed

ADVANTAGES

- The optimised drill geometry allows for rapid drilling progress, reduced wear and tear, and less effort.
- The centring tip allows for easy and precise drilling and prevents slipping on smooth surfaces.
- The “Power Breakers” on the drill bit head have a “destructive eff ect”. They create micro-cracks in the material and achieve a noticeably improved drilling speed.
- The larger reinforcement chamfers (+35%) guarantee that the drill acts in the best possible way when it hits concrete reinforcements. This considerably reduces the risk of problems caused by drill jamming.
- The new Vario KVS helix off ers further benefi ts: The narrow crown width behind the drill bit head reduces friction and ensures a more powerful transfer of energy during impact drilling. The improved helix allows for an ideal transportation of the drill residue. The spiral shape increases stability and, with it, the break resistance.

APPLICATIONS

To create approval-compliant drill holes in:

- Concrete
- Solid brick
- Sand-lime brick

Also suitable for:

- Natural stone

CHARACTERISTICS

PGM®

SDS Plus

Hammer drill bit SDS Plus II Pointer

TECHNICAL DATA

Hammer drill bit **SDS Plus II Pointer**

Detail: top of drill

Item	Art.-No.	Drill hole diameter d_0 [mm]	Working length [mm]	Total length l [mm]	Type of packaging	Contents [pcs]	Sales unit [pcs]
SDS Plus II 4/50/110	**531753**	4	50	110	Plastic clip	1	1
SDS Plus II 4/100/160	**531754**	4	100	160	Plastic clip	1	1
SDS Plus II 5/50/110	**531755**	5	50	110	Plastic clip	1	1
SDS Plus II 5/100/160	**531756**	5	100	160	Plastic clip	1	1
SDS Plus II 5/150/210	**531757**	5	150	210	Plastic clip	1	1
SDS Plus II 5/250/310	**531759**	5	250	310	Plastic clip	1	1
SDS Plus II 5,5/100/160	**531761**	5,5	100	160	Plastic clip	1	1
SDS Plus II 5,5/150/210	**531762**	5,5	150	210	Plastic clip	1	1
SDS Plus II 5,5/250/310	**531763**	5,5	250	310	Plastic clip	1	1
SDS Plus II 6/50/110	**531765**	6	50	110	Plastic clip	1	1
SDS Plus II 6/100/160	**531766**	6	100	160	Plastic clip	1	1
SDS Plus II 6/150/210	**531767**	6	150	210	Plastic clip	1	1
SDS Plus II 6/200/260	**531768**	6	200	260	Plastic clip	1	1
SDS Plus II 6/250/310	**531769**	6	250	310	Plastic clip	1	1
SDS Plus II 6,5/50/110	**531770**	6,5	50	110	Plastic clip	1	1
SDS Plus II 6,5/100/160	**531771**	6,5	100	160	Plastic clip	1	1
SDS Plus II 6,5/150/210	**531772**	6,5	150	210	Plastic clip	1	1
SDS Plus II 6,5/200/260	**531773**	6,5	200	260	Plastic clip	1	1
SDS Plus II 6,5/250/310	**531774**	6,5	250	310	Plastic clip	1	1
SDS Plus II 7/50/110	**531775**	7	50	110	Plastic clip	1	1
SDS Plus II 7/100/160	**531776**	7	100	160	Plastic clip	1	1
SDS Plus II 7/150/210	**531777**	7	150	210	Plastic clip	1	1
SDS Plus II 7/200/250	**531778**	7	200	250	Plastic clip	1	1
SDS Plus II 8/50/110	**531779**	8	50	110	Plastic clip	1	1
SDS Plus II 8/100/160	**531780**	8	100	160	Plastic clip	1	1
SDS Plus II 8/150/210	**531781**	8	150	210	Plastic clip	1	1
SDS Plus II 8/200/260	**531782**	8	200	260	Plastic clip	1	1
SDS Plus II 8/250/310	**531783**	8	250	310	Plastic clip	1	1
SDS Plus II 8/350/400	**531784**	8	350	400	Plastic clip	1	1
SDS Plus II 8/400/460	**531785**	8	400	460	Plastic clip	1	1
SDS Plus II 8/550/600	**531786**	8	550	600	Plastic clip	1	1
SDS Plus II 9/100/160	**531788**	9	100	160	Plastic clip	1	1
SDS Plus II 9/150/210	**531789**	9	150	210	Plastic clip	1	1
SDS Plus II 9,5/100/160	**531790**	9,5	100	160	Plastic clip	1	1
SDS Plus II 10/50/110	**531791**	10	50	110	Plastic clip	1	1
SDS Plus II 10/100/160	**531792**	10	100	160	Plastic clip	1	1
SDS Plus II 10/150/210	**531793**	10	150	210	Plastic clip	1	1
SDS Plus II 10/200/260	**531794**	10	200	260	Plastic clip	1	1
SDS Plus II 10/250/310	**531795**	10	250	310	Plastic clip	1	1
SDS Plus II 10/300/350	**531796**	10	300	350	Plastic clip	1	1
SDS Plus II 10/400/450	**531797**	10	400	450	Plastic clip	1	1
SDS Plus II 10/550/600	**531798**	10	550	600	Plastic clip	1	1
SDS Plus II 10/750/800	**531799**	10	750	800	Plastic clip	1	1
SDS Plus II 10/950/1000	**531800**	10	950	1000	Plastic clip	1	1
SDS Plus II 11/100/160	**531801**	11	100	160	Plastic clip	1	1
SDS Plus II 11/250/310	**531802**	11	250	310	Plastic clip	1	1
SDS Plus II 12/100/160	**531803**	12	100	160	Plastic clip	1	1
SDS Plus II 12/150/210	**531804**	12	150	210	Plastic clip	1	1
SDS Plus II 12/200/260	**531805**	12	200	260	Plastic clip	1	1
SDS Plus II 12/250/310	**531806**	12	250	310	Plastic clip	1	1
SDS Plus II 12/300/360	**531807**	12	300	360	Plastic clip	1	1
SDS Plus II 12/400/450	**531808**	12	400	450	Plastic clip	1	1
SDS Plus II 12/550/600	**531809**	12	550	600	Plastic clip	1	1

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TECHNICAL DATA

Hammer drill bit **SDS Plus II Pointer**

Detail: top of drill

Item	Art.-No.	Drill hole diameter d_0 [mm]	Working length [mm]	Total length l [mm]	Type of packaging	Contents [pcs]	Sales unit [pcs]
SDS Plus II 12/950/1000	**531810**	12	950	1000	Plastic clip	1	1
SDS Plus II 13/100/160	**531811**	13	100	160	Plastic clip	1	1
SDS Plus II 13/150/210	**531812**	13	150	210	Plastic clip	1	1
SDS Plus II 13/200/260	**531813**	13	200	260	Plastic clip	1	1
SDS Plus II 13/250/310	**531814**	13	250	310	Plastic clip	1	1
SDS Plus II 14/100/160	**531815**	14	100	160	Plastic clip	1	1
SDS Plus II 14/150/210	**531816**	14	150	210	Plastic clip	1	1
SDS Plus II 14/200/260	**531817**	14	200	260	Plastic clip	1	1
SDS Plus II 14/250/310	**531818**	14	250	310	Plastic clip	1	1
SDS Plus II 14/400/450	**531819**	14	400	450	Plastic clip	1	1
SDS Plus II 14/550/600	**531820**	14	550	600	Plastic clip	1	1
SDS Plus II 14/950/1000	**531821**	14	950	1000	Plastic clip	1	1
SDS Plus II 15/100/160	**531822**	15	100	160	Plastic clip	1	1
SDS Plus II 15/150/210	**531823**	15	150	210	Plastic clip	1	1
SDS Plus II 15/200/260	**531824**	15	200	260	Plastic clip	1	1
SDS Plus II 15/400/450	**531825**	15	400	450	Plastic clip	1	1
SDS Plus II 16/100/160	**531826**	16	100	160	Plastic clip	1	1
SDS Plus II 16/150/210	**531827**	16	150	210	Plastic clip	1	1
SDS Plus II 16/200/260	**531828**	16	200	260	Plastic clip	1	1
SDS Plus II 16/250/310	**531829**	16	250	310	Plastic clip	1	1
SDS Plus II 16/400/450	**531830**	16	400	450	Plastic clip	1	1
SDS Plus II 16/550/600	**531831**	16	550	600	Plastic clip	1	1
SDS Plus II 16/750/800	**531832**	16	750	800	Plastic clip	1	1
SDS Plus II 16/950/1000	**531833**	16	950	1000	Plastic clip	1	1
SDS Plus II 17/150/210	**531834**	17	150	210	Plastic clip	1	1
SDS Plus II 17/400/450	**531835**	17	400	450	Plastic clip	1	1
SDS Plus II 18/150/200	**531836**	18	150	200	Plastic clip	1	1
SDS Plus II 18/250/300	**531837**	18	250	300	Plastic clip	1	1
SDS Plus II 18/400/450	**531838**	18	400	450	Plastic clip	1	1
SDS Plus II 18/550/600	**531839**	18	550	600	Plastic clip	1	1
SDS Plus II 18/950/1000	**531840**	18	950	1000	Plastic clip	1	1
SDS Plus II 19/150/200	**531841**	19	150	200	Plastic clip	1	1
SDS Plus II 19/400/450	**531842**	19	400	450	Plastic clip	1	1
SDS Plus II 20/150/200	**531843**	20	150	200	Plastic clip	1	1
SDS Plus II 20/250/300	**531844**	20	250	300	Plastic clip	1	1
SDS Plus II 20/400/450	**531845**	20	400	450	Plastic clip	1	1
SDS Plus II 20/550/600	**531846**	20	550	600	Plastic clip	1	1
SDS Plus II 20/950/1000	**531847**	20	950	1000	Plastic clip	1	1
SDS Plus II 22/200/250	**531849**	22	200	250	Plastic clip	1	1
SDS Plus II 22/400/450	**531850**	22	400	450	Plastic clip	1	1
SDS Plus II 22/550/600	**531851**	22	550	600	Plastic clip	1	1
SDS Plus II 22/950/1000	**531852**	22	950	1000	Plastic clip	1	1
SDS Plus II 24/200/250	**531853**	24	200	250	Plastic clip	1	1
SDS Plus II 24/400/450	**531854**	24	400	450	Plastic clip	1	1
SDS Plus II 25/200/250	**531855**	25	200	250	Plastic clip	1	1
SDS Plus II 25/400/450	**531856**	25	400	450	Plastic clip	1	1
SDS Plus II 25/550/600	**531857**	25	550	600	Plastic clip	1	1
SDS Plus II 26/200/250	**531858**	26	200	250	Plastic clip	1	1
SDS Plus II 26/400/450	**531859**	26	400	450	Plastic clip	1	1
SDS Plus II 6/50/110 QP	**531860**	6	50	110	Plastic box	10	1
SDS Plus II 6/100/160 QP	**531861**	6	100	160	Plastic box	10	1
SDS Plus II 8/100/160 QP	**531862**	8	100	160	Plastic box	10	1
SDS Plus II 8/150/210 QP	**531863**	8	150	210	Plastic box	10	1

Hammer drill bit SDS Plus II Pointer

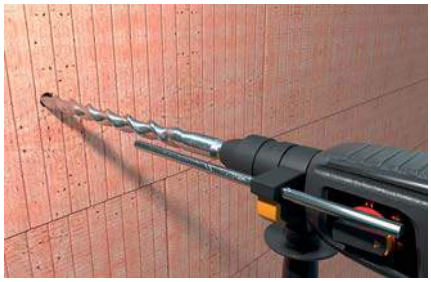
TECHNICAL DATA

Hammer drill bit **SDS Plus II Pointer**

Detail: top of drill

Item	Art.-No.	Drill hole diameter d_0 [mm]	Working length [mm]	Total length l [mm]	Type of packaging	Contents [pcs]	Sales unit [pcs]
SDS Plus II 10/100/160 QP	**531864**	10	100	160	Plastic box	10	1
SDS Plus II 10/150/210 QP	**531865**	10	150	210	Plastic box	10	1
SDS Plus II 10/200/260 QP	**531866**	10	200	260	Plastic box	10	1
SDS Plus II 10/250/310 QP	**531867**	10	250	310	Plastic box	10	1
SDS Plus II 12/100/160 QP	**531868**	12	100	160	Plastic box	10	1
SDS Plus II 12/150/210 QP	**531869**	12	150	210	Plastic box	10	1
SDS Plus II 12/200/260 QP	**531870**	12	200	260	Plastic box	10	1

The perfect drill bit for all perforated building materials



ADVANTAGES

- Shortened SDS-Plus shank reduces the impact of the machine on the drill and prevents possible damage to the substrate (it is recommended to use the drill bit without impact).
- Precise and accurate drill holes without damage to the substrate thanks to shortened SDS-Plus shank to guarantee correct fixing with increased load capacities in all types of perforated building materials.
- Diamond sharpened carbide tip with advanced cutting edges ensure fast and safe drilling progress in different materials.
- Large spiral flutes for optimal removal of dust.

APPLICATIONS

To create drill holes in:

- Hollow bricks
- Aerated concrete
- Perforated sand-lime bricks

Ideal for:

- Frame-fixings or ETICS systems e.g. SXRL, FIS HK, fischer Thermax, EWI and VBS-M

CHARACTERISTICS

PGM®

SHORT

TECHNICAL DATA

Masonry drill bit **Pointer M**

Item	Art.-No.	Drill hole diameter d_0 [mm]	Working length [mm]	Total length [mm]	Type of packaging	Contents [pcs]	Sales unit [pcs]
Pointer M 6/350/410	**546204**	6	350	410	Pouch	1	1
Pointer M 8/200/260	**544382**	8	200	260	Pouch	1	1
Pointer M 10/200/260	**543630**	10	200	260	Pouch	1	1
Pointer M 12/200/260	**543631**	12	200	260	Pouch	1	1
Pointer M 14/200/260	**543632**	14	200	260	Pouch	1	1
Pointer M 16/200/260	**543633**	16	200	260	Pouch	1	1
Pointer M 16/100/400	**543634**	16	100	400	Pouch	1	1
Pointer M 18/350/410	**546205**	18	350	410	Plastic tube	1	1
Pointer M 20/100/400	**543635**	20	100	400	Plastic tube	1	1
Pointer M 22/350/410	**546206**	22	350	410	Plastic tube	1	1

The hammer drill bits with SDS Max drill chuck

ADVANTAGES

- The SDS Max drill chuck ensures optimum transfer of force and allows for quick drilling progress for large volume drill holes.
- The drill bit head with four cutting edges prevents jamming in the concrete reinforcement.
- The quadruple flute reliably transports the drilling dust from the drill hole, thus reducing wear.
- The core-reinforced flute ensures maximum transfer of energy, and guarantees a low-vibration drilling.
- The PGM®-compliant cutting element guarantees perfect-fit drill holes to fulfil the highest safety requirements.

APPLICATIONS

To create approval-compliant drill holes in:

- Reinforced concrete (SDS Max IV)
- Concrete
- Solid brick
- Sand-lime brick

Also suitable for:

- Natural stone

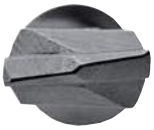
CHARACTERISTICS

PGM®

SDS Max

TECHNICAL DATA

Hammerdrill **SDS Max II and IV**



Detail:
Top of drill SDS Max II
Ø 12 - 15 mm

Detail:
Top of drill SDS Max IV
from Ø 16 mm

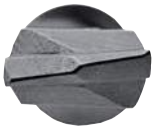
Item	Art.-No.	Drill hole diameter d_0 [mm]	Working length [mm]	Total length l [mm]	Type of packaging	Contents [pcs]	Sales unit [pcs]
SDS Max II 12/200/340	**504188**	12	200	340	Plastic tube	1	1
SDS Max II 12/400/540	**504189**	12	400	540	Plastic tube	1	1
SDS Max II 12/800/920	**098278**	12	800	920	Plastic tube	1	1
SDS Max II 14/200/340	**504192**	14	200	340	Plastic tube	1	1
SDS Max II 14/400/540	**504194**	14	400	540	Plastic tube	1	1
SDS Max II 14/1000/1120	**098279** 1)	14	1000	1120	Plastic tube	1	1
SDS Max II 15/200/340	**504196**	15	200	340	Plastic tube	1	1
SDS Max IV 15/400/540	**524562**	15	400	540	Plastic tube	1	1
SDS Max IV 16/200/340	**504198**	16	200	340	Plastic tube	1	1
SDS Max IV 16/400/540	**504199**	16	400	540	Plastic tube	1	1
SDS Max IV 16/800/920	**504200**	16	800	920	Plastic tube	1	1
SDS Max IV 16/1200/1320	**504206**	16	1200	1320	Plastic tube	1	1
SDS Max IV 18/200/340	**504207**	18	200	340	Plastic tube	1	1
SDS Max IV 18/400/540	**504208**	18	400	540	Plastic tube	1	1
SDS Max IV 18/800/920	**504209**	18	800	920	Plastic tube	1	1
SDS Max IV 18/1200/1320	**504213**	18	1200	1320	Plastic tube	1	1
SDS Max IV 20/200/320	**504214**	20	200	320	Plastic tube	1	1
SDS Max IV 20/400/520	**504217**	20	400	520	Plastic tube	1	1
SDS Max IV 20/800/920	**504222**	20	800	920	Plastic tube	1	1
SDS Max IV 20/1200/1320	**504223**	20	1200	1320	Plastic tube	1	1
SDS Max IV 22/200/320	**504224**	22	200	320	Tube	1	1
SDS Max IV 22/400/520	**504225**	22	400	520	Plastic tube	1	1
SDS Max IV 22/800/920	**504226**	22	800	920	Plastic tube	1	1
SDS Max IV 24/200/320	**504228**	24	200	320	Plastic tube	1	1
SDS Max IV 24/400/520	**504229**	24	400	520	Plastic tube	1	1
SDS Max IV 25/200/320	**504235**	25	200	320	Plastic tube	1	1
SDS Max IV 25/400/520	**504236**	25	400	520	Plastic tube	1	1
SDS Max IV 25/800/920	**504237**	25	800	920	Plastic tube	1	1
SDS Max IV 25/1200/1320	**504238**	25	1200	1320	Plastic tube	1	1
SDS Max IV 25/2000/2120	**098287**	25	2000	2120	Plastic tube	1	1
SDS Max IV 28/250/370	**504240**	28	250	370	Plastic tube	1	1
SDS Max IV 28/450/570	**504241**	28	450	570	Plastic tube	1	1
SDS Max IV 28/550/670	**504242**	28	550	670	Plastic tube	1	1
SDS Max IV 28/800/920	**504243**	28	800	920	Plastic tube	1	1
SDS Max IV 30/250/370	**504245**	30	250	370	Plastic tube	1	1
SDS Max IV 30/450/570	**504246**	30	450	570	Plastic tube	1	1
SDS Max IV 30/800/920	**057779**	30	800	920	Plastic tube	1	1
SDS Max IV 30/1230/1350	**040187** 1)	30	1210	1350	Plastic tube	1	1
SDS Max IV 30/1620/1740	**040188** 1)	30	1620	1740	Plastic tube	1	1
SDS Max IV 30/2020/2140	**040189** 1)	30	2000	2140	Plastic tube	1	1
SDS Max IV 32/450/570	**504248**	32	450	570	Plastic tube	1	1
SDS Max IV 32/800/920	**504249**	32	800	920	Plastic tube	1	1
SDS Max IV 35/250/370	**504251**	35	250	370	Plastic tube	1	1
SDS Max IV 35/450/570	**504256**	35	450	570	Plastic tube	1	1
SDS Max IV 35/550/670	**504257**	35	550	670	Plastic tube	1	1
SDS Max IV 35/800/920	**504258**	35	800	920	Plastic tube	1	1
SDS Max IV 35/1200/1320	**504259**	35	1200	1320	Plastic tube	1	1
SDS Max IV 35/1620/1740	**040191**	35	1620	1740	Plastic tube	1	1
SDS Max IV 35/2020/2140	**040192**	35	2000	2140	Plastic tube	1	1
SDS Max IV 38/450/570	**504268**	38	450	570	Plastic tube	1	1
SDS Max IV 40/250/370	**504269**	40	250	370	Plastic tube	1	1

1) delivery on request

Hammer drill bit SDS Max II / SDS Max IV

TECHNICAL DATA

Hammerdrill **SDS Max II and IV**



Detail:
Top of drill SDS Max II
Ø 12 - 15 mm

Detail:
Top of drill SDS Max IV
from Ø 16 mm

Item	Art.-No.	Drill hole diameter d_0 [mm]	Working length [mm]	Total length l [mm]	Type of packaging	Contents [pcs]	Sales unit [pcs]
SDS Max IV 40/450/570	**504270**	40	450	570	Plastic tube	1	1
SDS Max IV 40/800/920	**504271**	40	800	920	Plastic tube	1	1

1) delivery on request

Hollow drill bit for drilling with low dust as well as for efficient and approved anchoring

ADVANTAGES

- Drilling and drill hole cleaning in one single step saves the normal cleaning of chemical and mechanical anchoring when the hollow drill bit is regulated by their respective approvals. This saves up to 55% of the complete drill hole creation process.
- The drill hole will be cleaned thoroughly guaranteeing a secure fixing (drilling dust reduces performance of fixing materials).
- Reducing the drill dust prevents jamming when drilling therefore provides a faster and frictionless drilling progress.
- Immediate extraction of drilling dust at the drill tip for a clean and healthy work place.
- Centering tip allows for accurate positioning on uneven surfaces reducing slip.

APPLICATIONS

To create approval-compliant drill holes in:

- Reinforced concrete
- Concrete

Also suitable for:

- Solid brick
- Solid sand-lime brick
- Natural stone

CHARACTERISTICS

PGM®

SDS Plus

SDS Max

TECHNICAL DATA

Hollow drill bit **FHD**

Detail:
Top of drill FHD
Ø 12 - 14 mm

Detail:
Top of drill FHD
Ø 16 - 18 mm
Top of drill FHD Max
Ø 16 - 35 mm

Item	Art.-No.	Drill hole diameter d_0 [mm]	Working length [mm]	Total length [mm]	Type of packaging	Contents	Sales unit [pcs]
FHD 12/200/330	**546597**	12	200	330	Plastic clip	1	1
FHD 14/250/380	**546598**	14	250	380	Plastic clip	1	1
FHD 16/250/380	**546599**	16	250	380	Plastic clip	1	1
FHD 18/320/450	**546600**	18	320	450	Plastic clip	1	1
FHD Max 16/400/620	**546601**	16	400	620	Plastic clip	1	1
FHD Max 18/400/620	**546602**	18	400	620	Plastic clip	1	1
FHD Max 20/400/620	**546603**	20	400	620	Plastic clip	1	1
FHD Max 24/400/620	**546604**	24	400	620	Plastic clip	1	1
FHD Max 28/600/820	**546605**	28	600	820	Plastic clip	1	1
FHD Max 30/600/820	**546606**	30	600	820	Plastic clip	1	1
FHD Max 35/650/870	**546607**	35	650	870	Plastic clip	1	1

Universal masonry drill bit for impact and rotary drilling in masonry and natural stone

ADVANTAGES

- 130° carbide cutting edge for long service life, very heat resistant.
- Robust version in accordance with DIN 8039, roll forged.
- Optimum drill dust removal through special spiral geometry.
- Suitable for rotary and impact drilling.

APPLICATIONS

- For regular drilling especially in stone and masonry

CHARACTERISTICS

DIN 8039

130°

TECHNICAL DATA

Stone drill bit **D-S**

Item	Art.-No.	Drill hole diameter d_0 [mm]	Working length [mm]	Total length l [mm]	Type of packaging	Contents [pcs]	Sales unit [pcs]
D-S HM 3,0 x 30/60	**542976**	3	30	60	Pouch	1	1
D-S HM 4,0 x 38/75	**542977**	4	38	75	Pouch	1	1
D-S HM 5,0 x 44/85	**542978**	5	44	85	Pouch	1	1
D-S HM 6,0 x 54/100	**542979**	6	54	100	Pouch	1	1
D-S HM 6,0 x 135/200	**551390**	6	135	200	Pouch	1	1
D-S HM 7,0 x 54/100	**542980**	7	54	100	Pouch	1	1
D-S HM 8,0 x 67/120	**542981**	8	67	120	Pouch	1	1
D-S HM 8,0 x 135/200	**542991**	8	135	200	Pouch	1	1
D-S HM 10,0 x 67/120	**542982**	10	67	120	Pouch	1	1
D-S HM 10,0 x 135/200	**542992**	10	135	200	Pouch	1	1
D-S HM 12,0 x 85/150	**542983**	12	85	150	Pouch	1	1
D-S HM 12,0 x 135/200	**542993**	12	135	200	Pouch	1	1
D-S HM 13,0 x 85/150	**542984**	13	85	150	Pouch	1	1
D-S HM 14,0 x 85/150	**542985**	14	85	150	Pouch	1	1
D-S HM 15,0 x 85/150	**542986**	15	85	150	Pouch	1	1
D-S HM 16,0 x 85/150	**542987**	16	85	150	Pouch	1	1
D-S HM 18,0 x 100/160	**542988**	18	100	160	Pouch	1	1
D-S HM 20,0 x 100/160	**542989**	20	100	160	Pouch	1	1
D-S Set 4-10mm 5pcs P	**543025**	4-5-6-8-10	–	–	Plastic cassette	5	1
D-S Set 3-10mm 8pcs P	**543027**	3-10	–	–	Plastic cassette	8	1

Premium Chisel with SDS Plus and SDS Max shank for maximum performance and lifetime

ADVANTAGES

- Extended working tip in comparison to the standard chisel for an increased lifetime.
- Self-sharpening design for economical working and reducing downtime.
- Advanced 'jam protection' for reduced friction.
- Specially designed working tip increases the performance and ensures a high removal of material.

APPLICATIONS

Suitable for creating holes, slots and installation paths as well as break-throughs in:

- Concrete
- Masonry
- Natural stone

CHARACTERISTICS

TECHNICAL DATA

FCP Pointed

FCP Flat

FCP Spade

FCP Max Pointed

FCP Max Flat

FCP Max Spade

Item	Art.-No.	Type	Length l [mm]	Width B [mm]	Contents [pcs]	Sales unit [pcs]
FCP Pointed 250	**546314**	Pointed	250	–	1	1
FCP Flat 20/250	**546315**	Flat	250	20	1	1
FCP Spade 40/250	**546316**	Spade	250	40	1	1
FCP Max Pointed 400	**546317**	Pointed	400	–	1	1
FCP Max Flat 25/400	**546318**	Flat	400	25	1	1
FCP Max Spade 50/380	**546319**	Spade	380	50	1	1
FCP Set	**546320**	Pointed, Flat, Spade	–	–	3	1
FCP Max Set	**546321**	Pointed, Flat, Spade	–	–	3	1

High-performance Standard chisel with SDS Plus and SDS Max drill chuck

ADVANTAGES

- The SDS Plus and SDS Max drill chuck for the chisel allow for use with professional hammer drilling machines, and ensure a proven and safe transfer of force.
- The use of a high quality, specially hardened steel with surface protection increases the life span of the tools.
- The high oscillation endurance allows for high work comfort and contributes to the achievement of clean results.

APPLICATIONS

Suitable for creating holes, slots and installation paths in:

- Concrete
- Masonry
- Natural stone

CHARACTERISTICS

TECHNICAL DATA

SDS Plus and SDS Max Pointed

SDS Plus and SDS Max Flat

SDS Plus and SDS Max Spade

SDS Plus and SDS Max Hollow

SDS Plus and SDS Max Tile

Item	Art.-No.	Type	Length l [mm]	Width B [mm]	Contents [pcs]	Sales unit [pcs]	
SDS Plus Pointed 250	**504277**	Pointed	250	12	1	1	
SDS Max Pointed 280	**504281**	Pointed	280	16	1	1	
SDS Max Pointed 400	**504282**	Pointed	400	20	1	1	
SDS Max Pointed 600	**504283**	Pointed	600	27	1	1	
SDS Plus Flat 20/250	**504278**	Flat	250	20	1	1	
SDS Max Flat 25/280	**504284**	Flat	280	25	1	1	
SDS Max Flat 25/400	**504286**	Flat	400	25	1	1	
SDS Max Flat 25/600	**504287**	Flat	600	25	1	1	
SDS Plus Scaling 40/250	**504279**	Spade	250	40	1	1	
SDS Max Scaling 50/400	**504288**	Spade	400	50	1	1	
SDS Max Scaling 80/300	**504290**	Spade	300	80	1	1	
SDS Max Scaling 115/350	**504291**	Spade	350	115	1	1	
SDS Plus Hollow 22/250	**504280**	Hollow	250	22	1	1	
SDS Max Hollow 26/300	**504293**	Hollow	300	26	1	1	
SDS Plus I M-Tile scaling 40/250	**531437**	Tile scaling	250	40	1	1	
SDS Max Tile Scaling 50/400	**504295**	Tile scaling	400	50	1	1	

The all-rounding bit within convincing quality

ADVANTAGES

- The bits manufactured from special steel with high hardness degree are suitable for both hand driven and machine guided applications.
- The perfect fitting inside screws ensures working with low-wear of the product and consequently long lifetime and clean working results.
- The profile guarantees an ideal connection for an optimal power and torque transmission that prevents damages of the surface or the screw-heads.
- Also available as clearly arranged bit-set with 11 or 31pcs including bit-holder.

APPLICATIONS

Number of internal drives in various profile sizes, such as:

- PH, PZ cross-slot
- TX star recess
- Suitable for ¼" drives

TECHNICAL DATA

Profi-bit **FPB T W**

Profi-bit **FPB PZ W**

FPB PH 2 DRYWALL W 1

Item	Art.-No.	Drive	Length l [mm]	Contents	Sales unit [pcs]
FPB T 30 90 mm PROFI Bit W 1	**542369**	TX30	90	1 Bit	1
FPB T 30 150 mm PROFI Bit W 1	**542372**	TX30	150	1 Bit	1
FPB T 40 90 mm PROFI Bit W 1	**542370**	TX40	90	1 Bit	1
FPB T 40 150 mm PROFI Bit W 1	**542373**	TX40	150	1 Bit	1
FPB T 50 PROFI Bit W 1	**533085**	TX50	25	1 Bit	10
FPB T 50 90 mm PROFI Bit W 1	**542371**	TX50	90	1 Bit	1
FPB PH 2 50MM PROFI Bit W 1	**533105** 1)	PH 2	50	1 Bit	10
FPB PH 2 DRYWALL W 1	**533090**	PH 2	25	1 Bit	10
FPB PZ 2 50MM PROFI Bit W 1	**533109**	PZ2	50	1 Bit	10
FPB PZ 4 PROFI Bit W 1	**533099**	PZ 4	32	1 Bit	10
FPB T 10 PROFI Bit W 10	**533112**	TX10	25	10 Bit	10
FPB T 15 PROFI Bit W 10	**533113**	TX15	25	10 Bit	10
FPB T 20 PROFI Bit W 10	**533114**	TX20	25	10 Bit	10
FPB T 25 PROFI Bit W 10	**533115**	TX25	25	10 Bit	10
FPB T 30 PROFI Bit W 10	**533116**	TX30	25	10 Bit	10
FPB T 40 PROFI Bit W 10	**533117**	TX40	25	10 Bit	10
FPB PH 1 PROFI Bit W 10	**533118**	PH1	25	10 Bit	10
FPB PH 2 PROFI Bit W 10	**533119**	PH 2	25	10 Bit	10
FPB PH 3 PROFI Bit W 10	**533120**	PH3	25	10 Bit	10
FPB PZ 1 PROFI Bit W 10	**533121**	PZ1	25	10 Bit	10
FPB PZ 2 PROFI Bit W 10	**533122**	PZ2	25	10 Bit	10
FPB PZ 3 PROFI Bit W 10	**533123**	PZ3	25	10 Bit	10

1) Delivery time on request.

The non-slip bit

ADVANTAGES

- The coating with diamond-saphire-particles ensures the best possible power-transfer and prevents the bit tip from slipping out of the screw head.
- The diamond-coated bit with a high hardness grade guarantees the greatest service life and corrosion resistance.
- The torsion zones created by the tapered bit cross-section offers relief in the case of extreme loads. For a more effortless installation and maximum operating efficiency.
- The high dimensional accuracy allows for an ideal fit. For clean results and a long life span.

APPLICATIONS

Number of internal drives in various profile sizes, such as:

- PH, PZ cross-slot
- TX star recess
- Suitable for ¼" drives

TECHNICAL DATA

Diamond-bit **FDB T W**

Item	Art.-No.	Drive	Length l [mm]	Contents	Sales unit [pcs]
FDB T 10 DIAMANT Bit W 10	**533136**	TX10	25	10 Bit	10
FDB T 15 DIAMANT Bit W 10	**533137**	TX15	25	10 Bit	10
FDB T 20 DIAMANT Bit W 10	**533138**	TX20	25	10 Bit	10
FDB T 25 DIAMANT Bit W 10	**533139**	TX25	25	10 Bit	10
FDB T 30 DIAMANT Bit W 10	**533140**	TX30	25	10 Bit	10
FDB T 40 DIAMANT Bit W 10	**533141**	TX40	25	10 Bit	10
FDB PH 1 DIAMANT Bit W 10	**533142**	PH1	25	10 Bit	10
FDB PH 2 DIAMANT Bit W 10	**533143**	PH 2	25	10 Bit	10
FDB PH 3 DIAMANT Bit W 10	**533144**	PH3	25	10 Bit	10
FDB PZ 1 DIAMANT Bit W 10	**533145**	PZ1	25	10 Bit	10
FDB PZ 2 DIAMANT Bit W 10	**533146**	PZ2	25	10 Bit	10
FDB PZ 3 DIAMANT Bit W 10	**533147**	PZ3	25	10 Bit	10

The ultimate torsion-bit

ADVANTAGES

- The ultimate solution for extreme installation torques. Ideal for usage in high-performance power-and impact-tools.
- Optimal geometry of the profile guarantees unique performance and durability for sophisticated applica-tions and users.
- The elastic torsion zone releases at extreme loads to ensure a gentle working and maximum operating efficiency.
- The high dimensional accuracy allows for an ideal fit. For clean results and a long life span.
- Also available as clearly arranged bit-set with 8pcs including bit-holder.

APPLICATIONS

Number of internal drives in various profile sizes, such as:

- TX star recess
- Suitable for ¼" drives

TECHNICAL DATA

Maxx-bit **FMB T**

Item	Art.-No.	Drive	Length l [mm]	Contents	Sales unit [pcs]
FMB T10 Maxx Bit W 5	**533154**	TX10	29	5 Bit	10
FMB T15 Maxx Bit W 5	**533155**	TX15	29	5 Bit	10
FMB T20 Maxx Bit W 5	**533156**	TX20	29	5 Bit	10
FMB T25 Maxx Bit W 5	**533157**	TX25	29	5 Bit	10
FMB T30 Maxx Bit W 5	**533158**	TX30	29	5 Bit	10
FMB T40 Maxx Bit W 5	**533159**	TX40	29	5 Bit	10

Bit holder FBH

The bit holder for rapid bit exchange

ADVANTAGES

- The bit holder family for ¼" bits with magnetic insert hold the bit securely in the drill chuck and offers a smooth installation procedure.
- Robust and slim bit holder for an easy bit exchange.
- Ideal for direct machine connection or enlargement of the bits to reach difficult areas.
- With the FBH Quick Bit Slim the Bit automatically locked when plugged in and provides a secure hold. By pulling back the sleeve the bit can be easily taken out.

APPLICATIONS

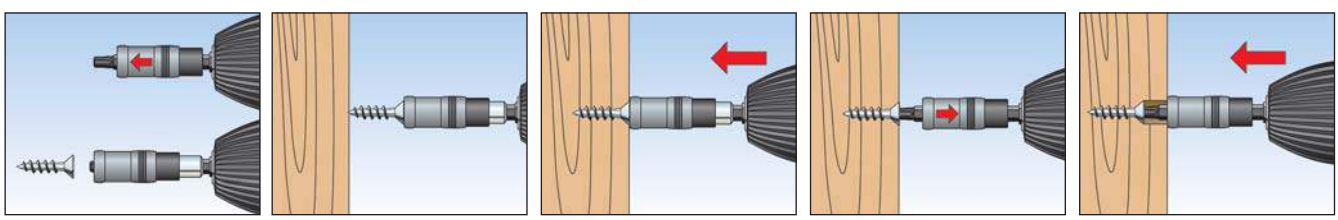
- The bit holders for use in cylinder drill chucks

TECHNICAL DATA

Bit holder **FBH W 1**

Bit holder **FBH Quick Bit Slim W 1**

Item	Art.-No.	Drive	Length l [mm]	Contents [pcs]	Sales unit [pcs]
FBH Bit Holder W 1	**533148**	1/4"	50	1	1
FBH Quick Bit Slim W 1	**533150**	1/4"	50	1	1



Useful bit sets for a multitude of applications

ADVANTAGES

- Safe and clearly arranged keeping of the content assuring a reliable usage day by day.
- The robust and durable construction fulfilling even hardest requirements.
- The bit sets combining compact dimensions with easy handling and containing the most common bits as well as the bit holder.

APPLICATIONS

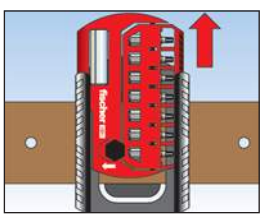
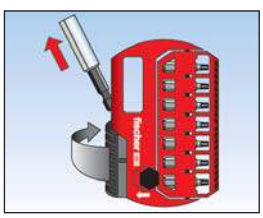
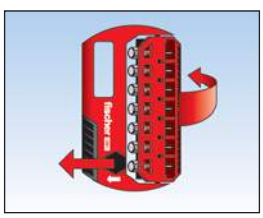
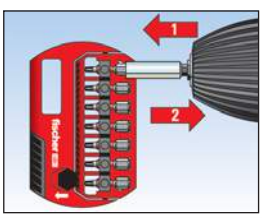
- The ideal bit sets for quick and efficient working.
- For a high variation of applications

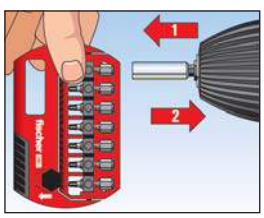
TECHNICAL DATA

Bit Set **FPB Profi W 31** with belt clip

Bit Set **FPB Profi W 11**

Item	Art.-No.	Contents	Sales unit [pcs]
FPB Bit Set Profi W 31	**533152**	2x PZ1, 4x PZ2, 2x PZ 3, 2x PH1, 4x PH2, 2x PH 3, 1x TX8, 2x TX10, 1x TX15, 2x TX20, 2x TX25, 1x TX27, 1x TX30, 1x TX40, each 1x Slot 4,5; 5,5; 6,0, 1x Universal bit holder	1
FPB Bit Set Profi W 11	**533153**	each 1x PZ1, PZ3, 2x PZ2, each 1x TX10, TX15, TX20, TX25, TX30, TX40, 1x Universal bit holder	1



Ideal for use in high-performance power- and impact-tools

ADVANTAGES

- Optimal geometry of the profile guarantees unique performance and durability for complex applications and users.
- The high dimensional accuracy allows for an ideal fit. For clean results and a long life span.

APPLICATIONS

- The ultimate solution for extreme installation torques

TECHNICAL DATA

Nut SW

Nut TX

Profi-bit **FPB T50 5/16"**

Item	Art.-No.	Connection / drive	Total length l [mm]	Sales unit [pcs]
Nut SW10	**538577**	1/2" / SW10	78	1
Nut SW13	**538578**	1/2" / SW13	38	1
Nut SW15	**538579**	1/2" / SW15	38	1
Nut SW17	**538580**	1/2" / SW17	38	1
Nut SW21	**538581**	1/2" / SW21	38	1
Nut TX40	**538575** 1)	1/2" / 1/4"	35	1
Nut TX50	**538576** 2)	1/2" / 5/16"	35	1
FPB Profi-Bit T50 5/16"	**538574**	5/16" / TX50	35	1

1) Suitable for FMB T40 Maxx Bit

2) Suitable for FPB Profi-Bit T50 5/16"

Building Material – Concrete

The substrate's quality is crucial when selecting the correct fixing: A differentiation is made between concrete, masonry and panel building materials. Concrete is made from a mixture of cement, aggregates and water.

Concrete's main properties are:

- High level of compressive strength, but only low tensile strength (≈ 10 % of the compressive strength).
- Inserting individual rebars and or mats will increase tensile strength (steel + concrete = reinforced concrete).
- Structure easily reproducible as it is regulated by standards, therefore it is an ideal anchor base.

Concrete is mainly split into two categories:

Standard concrete and lightweight concrete. While standard concrete contains gravel; lightweight concrete contains additives such as pumice, expanded clay or polystyrene® usually with a lower compressive strength or bulk density. This leads to unfavourable conditions for anchor fixings.

The load bearing capacity of heavy duty fixings depends on the concrete's compressive and tensile strength. This is indicated by the numbers in the abbreviations: e. g. the most commonly used concrete compressive strength is C20/25 with a cube compressive strength of 25 N/mm².

EXPERT TIP

- **Standard concrete qualities:**
  C12/15 to C50/60, even higher grades are also available for special applications. The majority of anchors approved for concrete may only be used from concrete quality from C20/25 up to a max. of C50/60. In the past, designations from DIN 1045 were used in Germany: B25 (≈ C20/25) to B55 (≈ C45/55).
- **C20/25 means:**
  C = concrete
  20 = compressive strength f_{ck} or $f_{ck,cyl}$ of a concrete test cylinder (Ø 150 mm, height 300 mm) in N/mm²
  25 = compressive strength $f_{ck,cube}$ of a concrete test cube (edge length 150 mm) in N/mm²
- **Normal concrete** without accelerating additives reaches its nominal strength after 28 days. Only then can the fixing be installed in compliance with the approval/assessment.
- **Fresh concrete:** still workable up to approx. one hour after pouring.
- **Green concrete:** starts to harden after four hours, no longer workable.
- **New concrete:** is hardened after 28 days, however minimum compressive strength not yet reached.
- **Hard concrete:** more than 28 days old, nominal strength reached.

Compressive strength classes in different countries

Country	Specimen	Dimensions [1] [cm]	Concrete strength class	Unit	Standard
China	Cube	15x15x15	C15, C20, C25, C30, C35, C40, C45, C50, C55, C60	N/mm²	GB50010-2010
Denmark	Cube	15x15x15	C12/15, C16/20, C20/25, C25/30, C30/37, C40/50, C45/55, C50/60	N/mm²	DS/EN 206
Germany	Cube	15x15x15	C12/15, C16/20, C20/25, C25/30, C30/37, C40/50, C45/55, C50/60	N/mm²	EN 206
France	Cylinder	16x32	B20, B25, B30, B35, B40, B45, B50	N/mm²	BAEL 91
Great Britain	Cube	15x15x15	C20, C25, C30, C37, C40, C45, C55, C60	N/mm²	BS EN 12390-3:2009
Italy	Cube	15x15c15	C 8/10, C12/15, C16/20, C20/25, C25/30, C28/35, C30/37, C32/40, C35/45, C40/50, C45/55, C50/60	N/mm²	UNI EN 206
Japan	Cylinder	10x20	≥ 15	N/mm²	JIS A 1108
Korea	Cylinder	10x20, 15x30	18, 21, 24, 27, 30	N/mm²	KS F 2405
The Netherlands	Cylinder	15x30	C 8/10, C12/15, C16/20, C20/25, C25/30, C30/37, C35/45, C40/50, C45/55, C50/60	N/mm²	NEN-EN 206-1
Austria	Cube	15x15x15	C 8/10, C12/15, C16/20, C20/25, C25/30, C30/37, C35/45, C40/50, C45/55, C50/60	N/mm²	ÖNORM B 4710-1
Sweden	Cube	15x15x15	C12/15, C16/20, C20/25, C25/30, C30/37, C40/50, C45/55, C50/60	N/mm²	SS-EN206
Switzerland	Cube	15x15x15	C12/15, C16/20, C20/25, C25/30, C30/37, C40/50, C45/55, C50/60	N/mm²	SIA 262
Spain	Cylinder	15x30	Unreinforced concrete: HM-20, HM-25, HM-30, HM-35, HM-40, HM-45, HM-50 Reinforced concrete: HA-25, HA-30, HA-35, HA-40, HA-45, HA-50 Pre-stressed concrete: HP-25, HP-30, HP-35, HP-40, HP-45, HP-50	N/mm²	EHE-08
USA	Cylinder	15x30	2000, 2500, 3000, 3500, 4000, 5000, 6000, 7000, 8000	Psi	ACI 318

[1] Conversion: $f_{Cylinder} = 0.85 \times f_{Cube,\ 20x20x20}$; $f_{Cube,\ 15x15x15} = 1.05 \times f_{Cube,\ 20x20x20}$

EXPERT TIP

- **Anchors** used in **new concrete** must be **suitable** for this purpose, or may only bear loads after reaching the minimum compressive strength.
- **Concrete** always shows **cracks** (shrinkage during hardening, loading).
- **In cracked concrete,** anchors which are tested in cracked concrete must be used. These **anchors** must be able to **expand** when concrete starts to crack e. g, expansion anchors (e. g. FAZ II), form locking anchors or undercut anchors (e. g. FZA), or bonded anchors (e. g. FIS SB).
- **Cutting** through **reinforcement steel** while making **drill holes** is **not permitted.** In special cases, non load-bearing steels can be cut after consultation with the responsible engineer.
- The load bearing capacity of the concrete along the entire drill hole must be guaranteed (no honeycombing in the concrete, no voids and pockets).
- **Pre-stressed concrete:** A certain drilling distance must be maintained from the tensioning strands as stated in the approval/assessment (e. g. FHY, FBS 6 or EA II).

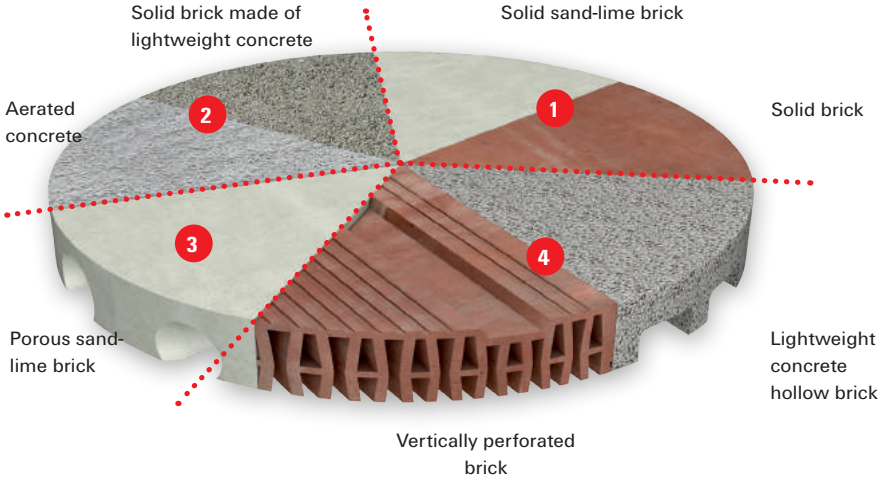
NOTE

Building Material – Masonry

Compared to concrete, there is a larger variety of masonry building materials.

Masonry can be classified according to:

- brick type used (e. g. natural stone, lime stone or aerated concrete).
- wall type (e. g. single or double layer).
- brick strength class and gross density.



Generally, masonry is classified into four groups:

1 **Solid bricks with a dense structure** are a highly compression resistant building material, without cavities or low hole surface percentage (up to a max. 15 % e. g. as grip holes). This type is very well suited for anchor fixings.

2 **Solid bricks with porous structure** usually have a very large number of pores and low compressive strength. Therefore, special fixings should be used, e. g. fixings with a longer expansion zone or bonded anchors.

3 **Perforated bricks with a compact structure** (perforated and hollow bricks) are mostly manufactured from the same compressive strength materials as solid blocks but with cavities. If higher loads are introduced into these building materials, special fixings should be used (e. g. bonded anchors, FIS V), which bridge or fill the cavities.

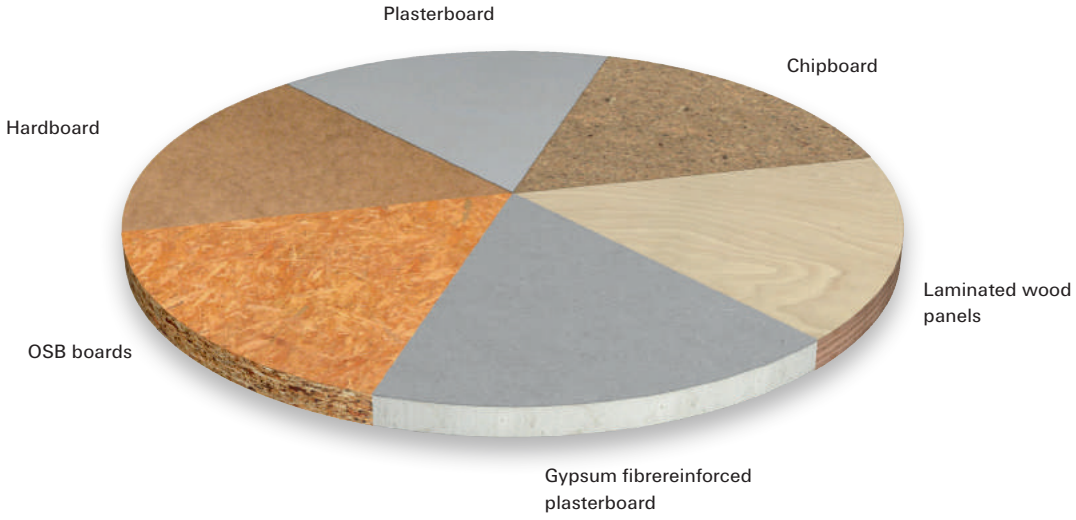
4 **Perforated bricks with porous structure** have many cavities and pores and thus generally a low compressive strength. In this case, special care is required when selecting the fixing. Suitable fixings include those with a long expansion zone or form locking injection anchors.

EXPERT TIP

- Before **fixing in masonry,** determine which brick type (designation, size, compressive strength) and mortar type (mortar category) has been used.
- For **safety anchoring** in unknown or old masonry, pull out tests must be carried out on-site to determine the anchor load bearing capacity.
- For **fixings close to the edge,** it is important to know if the wall is a load bearing wall as this prevents the risk of brick pull out.
- Even **solid brick** can have holes (e. g. MZ, KS). The holes are mostly larger grip-holes in the centre of the brick (up to max. 15 % cavity proportion per brick).
- Always drill without hammer function in **perforated and hollow bricks.** Here, special, sharply ground drills with hard metal tips are suitable.
- **Plaster or other non load-bearing layers** may not be added to the load-bearing base and are not to be used in calculating the anchorage depth.
- **Avoid anchoring into masonry joints** as much as possible due to joint inhomogeneity. If anchoring into a joint cannot be avoided (e. g. plaster on masonry) loads should be reduced.
- For **systems approved by building authorities, anchoring in joints** (vertical or horizontal joints) is regulated in the approval notices.
- For **anchoring high loads** in performated bricks, the anchorage depth should be increased.
- **Expansion fixings** (e. g. FAZ II or FBN II) are not suitable for use in masonry due to its high expansion forces which may lead to cracks in the brick. Frame fixings are suitable due to its longer exapnsion part.
- **Bonded anchors** achieve the highest possible loads in masonry.

Building Material – Drywall Panels

Panel building materials are thin-walled materials that often have limited strength – e. g. plasterboard like “Rigips”, “Knauf”, “LaGyp”, “Norgips”; Gypsum fibreboard like “Fermacell”, “Rigicell” or chip board, hard fibre boards, plywood and others.



The main characteristics of panel building materials are:

- Often thin-walled materials, mainly with limited strength.
- Easy-to-process materials for non load-bearing walls and also used as cladding material (e. g. walls, roofs or ceilings).
- A wide range of different building materials.

Special fixing elements must be used:

Cavity fixings are fixings made of plastic or metal, which anchor by form locking into the material, e. g. by knotting or a snap on mechanism (e. g. toggles).

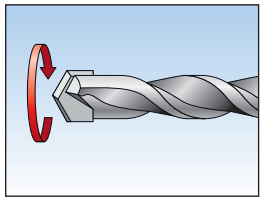
EXPERT TIP

- Only approved anchors should be used for **lightweight materials, prestressed hollow core slabs and panel materials.**
- Contact your **fischer consultant** on site before anchoring **heavy or safety-relevant loads** in the above-mentioned substrates.

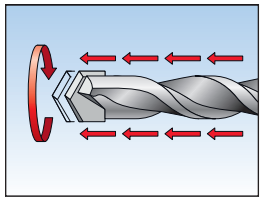
NOTE

Drilling

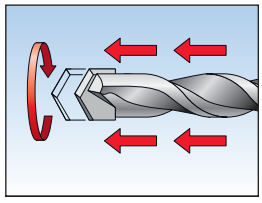
The building material determines the drilling method.
Five methods are possible:



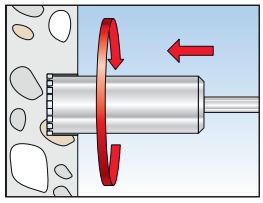
Rotary drilling
Rotary drilling without impact, uses a sharply ground carbide drill bit. When this method is used, the drill hole does not become too large and the perforated brick's webs do not break.



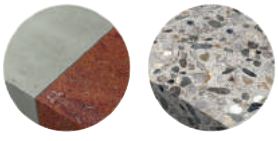
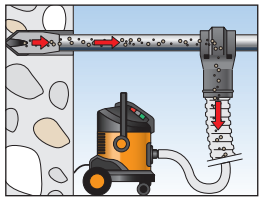
Impact drilling (mechanical)
Impact drill with rotation and a high number of light strokes, is suitable for dense structured building materials.



Hammer drilling (pneumatic)
Hammer drill uses rotation and a low number of light strokes with high impact energy, also suitable for dense structured solid building materials.



Diamond or core drilling process
Mainly used for larger drill hole diameters or for heavily reinforced components and/or if noise or vibration must be reduced.

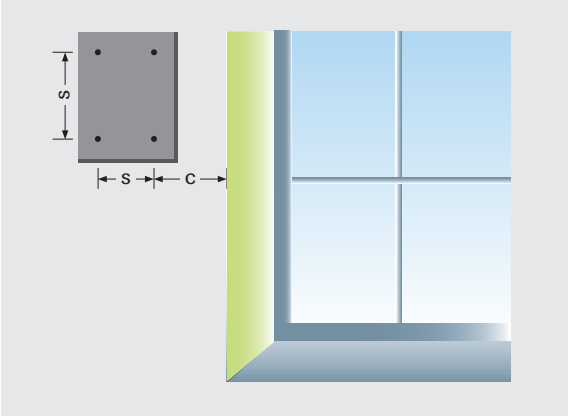
Hollow drilling
Special drill with a hollow core, which is connected to a vacuum cleaner. Cleans the drilled hole during the drilling operation. No further brushing or blowing is required. Can be used in concrete and masonry with dense structure.

EXPERT TIP

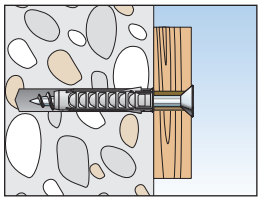
- The drilling method for approved anchors is specified in the **approval / assessment.**
- Drill bits with **excessively worn cutting** edges should **not be used** (see approval / assessment).
- For certain fixings, **special drills** are required (e. g. a stop drill) as per approval / assessment.
- **Drill holes** must be **carefully cleaned** (blown out and brushed). See the respective approval / assessment or manufacturer's specifications.
- The **drill hole depth** is always exacly specified and relates to a given anchoring base thickness. For general applications without an approval / assessment the following applies: the drill hole depth + 30 mm should not exceed the anchoring base thickness.
- In case of **incorrect drilled** holes (hitting reinforcements or wrong location), the location for the new drill hole is regulated in the applicable fixing approval / assessment). Usually, the distance for the new drill hole must be twice the depth of the incorrect drill hole. The wrong drill hole must be filled with injection mortar (e. g. FIS V).
- **Diamond core drilling** is only permitted if stated in the approval/assessment or according to manufacturer's guidelines (e. g. RSB, FIS EM, FAZ II, FBS II...).
- **The load bearing capacity is reduced** by water filled holes or wet substrates especially for chemical or plastic fixings.
- **Cutting** through a reinforcement is not permitted.
- **The drill hole** must be drilled perpendicular to the anchor base (an inclinement of up to 5° is permiited). Exceptional cases are regulated in the anchor approval / assessment and or according to manufacturer's guidelines.

Installation

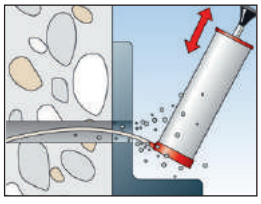
In general, the following aspects must be taken into consideration during installation:



The edge distance and centre distance, as well as the component thickness and width, must be carefully observed to ensure that the fixing can take the required load. Otherwise, it may lead to spalling of the construction material or cracks. For fixings without approval, e. g. nylon fixings, a minimum edge distance of $c = 1 \times h_{ef}$ (h_{ef} = anchorage depth) and a minimum spacing of $s = 1 \times h_{ef}$ must be adhered to for concrete. When using non approved metal anchors, a minimum edge distance of $c = 1.5 \times h_{ef}$ and a minimum spacing of $s = 3 \times h_{ef}$ must be adhered to. When using hammerset anchors, spacing and edge distance can increase due to higher expansion forces.



The drill hole depth must be larger than the anchorage depth (exception chemical anchor systems), to ensure that the screw has enough room at the end of the fixing element to penetrate at least one time the screw's diameter.



Drill hole cleaning after drilling, e. g. by blowing out, brushing or suction, is generally necessary. The load bearing capacity will be reduced, if the hole is not cleaned. (Exceptions: approved anchor systems where no hole cleaning is required, e. g. FHB II + PF - High speed capsule).

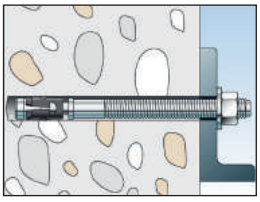
EXPERT TIP

- **Strictly adhere to specifications** for component geometry, edge and spacing distances. If this is not taken into account, the component will be damaged or the anchor capacity will be reduced.
- **Drill hole cleaning is essential.** The specifications in the approvals and the manufacturer's specifications must be observed.

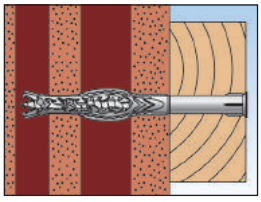
NOTE

Installation types

There are three different types of installation.



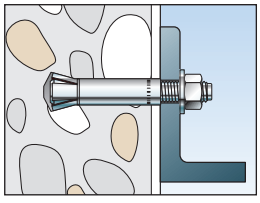
Anchor bolt FAZ II



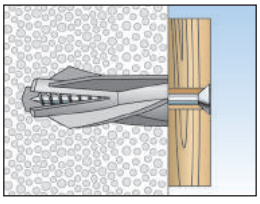
Frame fixing SXRL

Push-through installation
In particular for simplifying installation for series installations or for attachments with two or more fixing points:

- If the attachment's hole diameter is larger than the drill bit diameter, then the attachment can be used as a template. Please note: The drill bit tip is generally larger than the nominal diameter of the drill.
- In addition to facilitating a simple installation, an exact fit is also achieved.
- The fixing is inserted into the drill hole through the attachment and then tightened (e. g. FAZ II, FBN II, FH II).



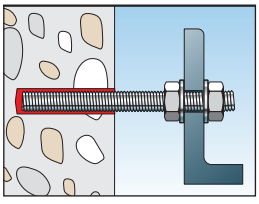
Zykon anchor FZA



Aircrete anchor GB

Pre-positioned installation
The anchor is installed before fastening the attachment. If drilling is not done precisely, then the holes in the attachment will not match up. This could mean that the anchors cannot be installed or could cause damage to the anchors. The installation sequence:

- Transfer the hole pattern of the fixture to the anchor base.
- Drill and clean the holes, install the attachment and then fix the attachment (e. g plastic fixings: S, SX, UX; metal fixings: FZA, EA II).



Threaded rod FIS A

Stand-off installation
This allows attachments to be compression and tension resistant at a certain distance from the anchor base. For this purpose, external threaded metal anchors (e. g. FAZ II, FBN II) or internal threaded anchors (e. g. EA II) with screws or threaded rods are clamped against the anchor base surface while using a bearing washer and nut. When using chemical systems with threaded rods (e. g. FIS SB, FIS V, FIS EM, and FIS A), the installation can be done without using a bearing washer and nut.

EXPERT TIP

- **Clearance holes in the attachment** are specified for the respective anchor size in the approvals/assessments and manufacturer's guidelines.
- **For stand -** off installations with shear loads on the anchor, additional bending moment occurs and this must be considered.
- **The attachment must lie** fully flush on the surface base or it must have either a compression resistant levelling layer of max. 3 mm or half the anchor's diameter, otherwise the anchor must be checked for bending.
- **The attachment shall be in contact with the anchor** over its entire thickness, otherwise the anchor must be checked for bending.
- **Usable length is the maximum fixing height** t_{fix} which takes into account the attachment's thickness plus additional non-bearing layers (e. g. plaster, air, insulation etc.).
- Post-installed anchors must be tightened with a specific torque. A calibrated torque wrench must be used to ensure the correct pre-stressing force and the correct installation of the anchor. For **chemical anchors, the prescribed hardening time must be adhered to** before tightening torque or service load can be applied.
- Anchors must be mounted as a standard unit as delivered. The exchange or removal of parts is not permitted.

Loads

When selecting an anchor, it is necessary to know the load on the total construction and the resulting action forces.

Action forces can differ based on:

Dimension ▪ Direction ▪ Type of load ▪ Point of application

There are various types of loads:

Approvals generally give characteristic resistance. In the manufacturer's guidelines, **"permissible loads"** are specified for products with approvals. For anchors without an approval, **"recommended loads"** are given by the manufacturer.

- **Determine the size,** direction and point of application of the load. These parameters determine which anchor should be used.
- **Characteristic resistance** (N_{RK} or V_{RK}) describes the 5 % fractile of resistance. (Value with a 95 % probability of being exceeded, with a confidence level of 90 %).
- **Permissible loads** are working loads that already include an appropriate safety factor. These only apply if the approval conditions are complied with (N_{zul} or V_{zul}).
- **Recommended loads or maximum working loads** include an adequate safety factor. These only apply if the manufacturer's specifications are complied with (F_{rec} – valid for all load directions, N_{rec} - for compressive or tensile load or V_{rec} for shear load).
- **The calculation** is carried out by dividing the respective failure load or characteristic loads by a safety factor.
- **Recommended safety factors compared to the average failure load:**

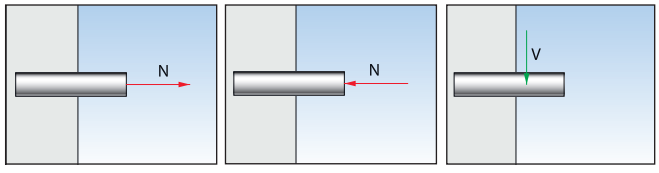
Steel and bonded anchors	$\gamma \geq 4$
Plastic anchors	$\gamma \geq 7$
Hammerfix anchors N	$\gamma \geq 4$

- **Recommended safety factors compared to the characteristic failure loads:**

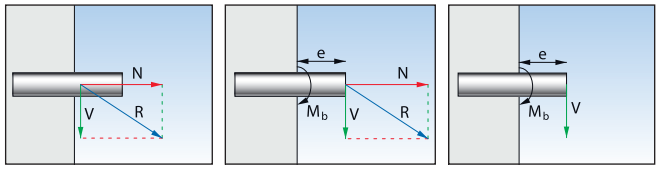
Steel and bonded anchors	$\gamma \geq 3$
Plastic anchors	$\gamma \geq 5$

  For deviations to the regulation, see load tables. For certain products, the safety factors may deviate. In general, the global safety factor is calculated using the scatter of the faillure load, the failure probability and the reliability index of a product.
- **The specified loads** apply to individual anchors that are installed away from the edge, i. e. there is no influence from edges or other anchors.
- **The characteristic spacing and edge distances,** marked with $c_{cr,N}$ and $c_{cr,V}$, give the distances at which an anchor achieves its max. characteristic load.

Load directions

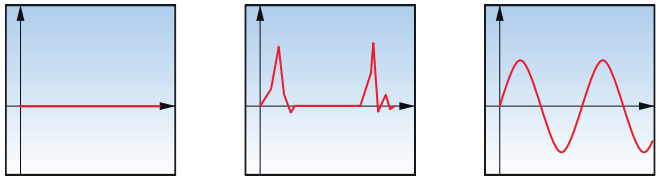


Tensile load | Compression load | Shear load

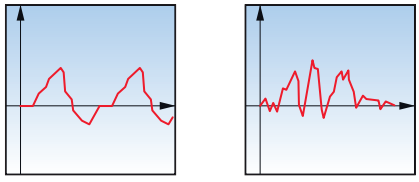


Oblique load (tension and shear load) | Oblique load at distance e (Bend + tension + shear load) | Shear load and bending moment

Types of loads



statically dormant | dynamically rising | dynamically changing

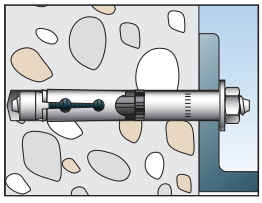


shock | seismic activity

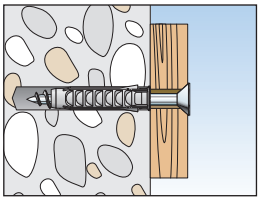
- **The specified minimum spacing and edge distance,** marked with s_{min} and c_{min}, indicates the distance at which no failure of the building material will occur when installing the anchor (cracks). These distances are mandatory and must be complied with. The characteristic spacing and edge distances may be shorter but not less than the minimum values but at the same time the load bearing capacity must be reduced. When combined loads occur, loads are determined separately for tensile and shear load and the overall utilization is determined by means of an interaction equation. As a rule, the sum of the ratio values from tensile and shear loads is less than 1.2.

Working Principles

There are different load transfer mechanisms which induce forces acting on the anchor in a building material.

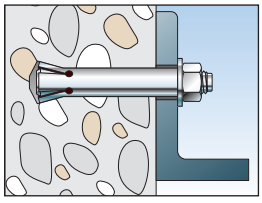


Sleeve anchor (e. g. FH II)

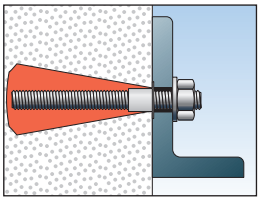


Plastic anchor (e. g. SX)

For frictional locking, the expanding part of the anchor is pressed against the drill hole wall.

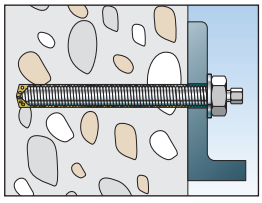


Undercut anchor (e. g. FZA)

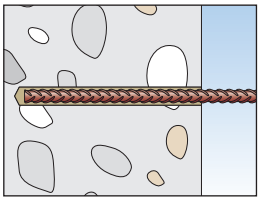


Injection anchor (e. g. FISV with cone drill PBB)

For form locking, the anchor geometry adapts to the subtrate's form or drill hole shape (e. g. conical drill hole).



Resin anchor (e. g. Superbond RSB)



Subsequent reinforcement connector with concrete reinforcing bars

For adhesive bonding, the load will be transferred by a combination of adhesion and micro-keying (e. g. using resin / injection mortar).

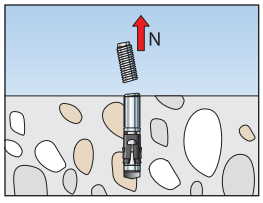
EXPERT TIP

- **For many fixings, a combination of working principles occurs** (e. g. in soft base material a combination of friction and form locking takes place).

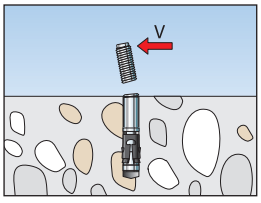
NOTE

Failure modes

If there is excessive stress, incorrect installation or a substrate with inadequate load bearing capacity, the following types of failure can occur.



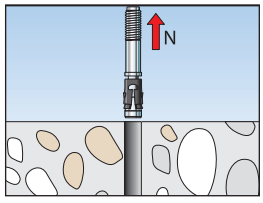
Steel failure tension



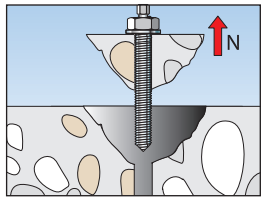
Steel failure shear

Steel failure:

- Insufficient steel stength for the applied load



Pull out



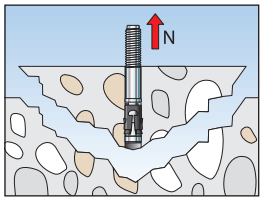
Combined failure

Pull out failure:

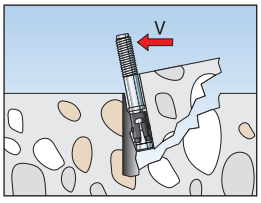
- Friction failure and or adhesion failure due to high load or incorrect installation

Combined failure:

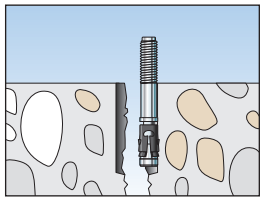
- Pull out
- Concrete failure near the surface



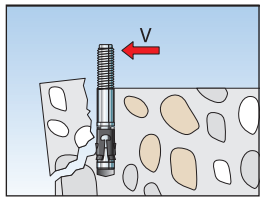
Concrete cone failure



Pry-out failure



Concrete splitting failure



Concrete edge failure

Anchor base failure:

- Tensile load "N" or shear load "V" too high
- Inadequate strength of anchor base
- Insufficient embedment depth

Anchor base splitting:

- Insufficient component dimensions
- Deviation from the spacing and edge distances
- Excessive expansion pressure

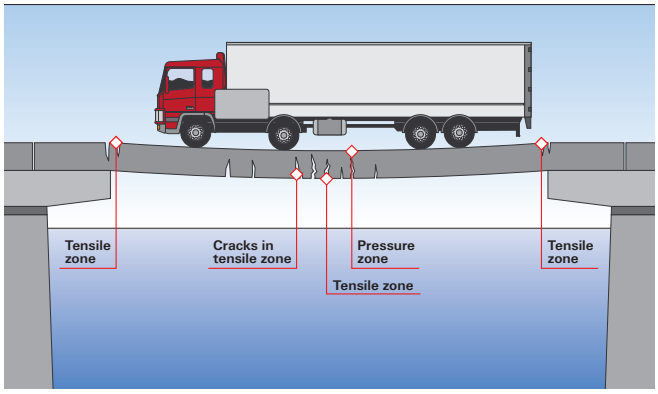
EXPERT TIP

- In most anchor approvals/assessments, the anchoring of **predominately static loads** is regulated. However, there are also approvals which regulate non-static loads (fatigue loads, e. g. FHB dyn).
- Seismic loads for post-installed anchors are regulated in Europe according to ETAG 001 Appendix E. The assessment is to be carried out in accordance with EOTA TR045 until the Eurocode 1992-4 is introduced. The seismic performance of an anchor system is categorised by performance categories C1 and C2. The classification of the seismic performance categories C1 and C2 for seismicity level and the evaluation category is the responsibility of the respective Member State (in Germany, an approval in accordance with ETAG 001 is sufficient. Classification in accordance with C1 and C2 is not necessary). The performance category and the characteristic values are found in the respective ETA (e. g. FAZ II, FH II, FIS SB, FIS EM...).
- **The main causes for anchor failure are overloading, incorrect installation or an insufficient load bearing anchoring base.**

NOTE

Cracks in concrete components

Cracks can occur anywhere in concrete at any time:
Factors involved in this are loads such as dead loads, traffic or wind loads, concrete shrinkage and creeping or external influences such as seismic activity or ground motion result in stresses and deformations thus leading to cracks.



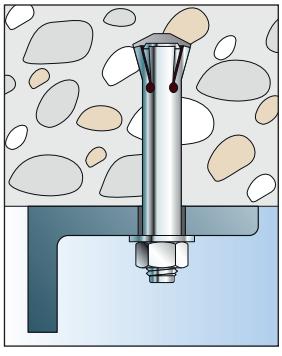
Example:
If a bridge designed as a single-span element is loaded, the bridge will buckle. Due to this buckling, cracks could occur in the element's tensile area.

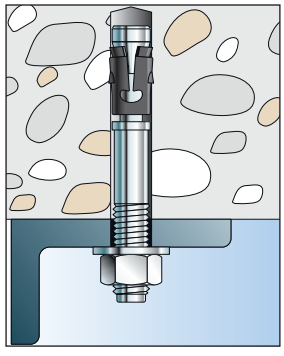
Concrete is not able to support tensile loads, therefore, reinforcements are placed in the element to take the tensile load area numerous cracks are formed that are barely visible to the naked eye. This is called the cracked tensile zone.

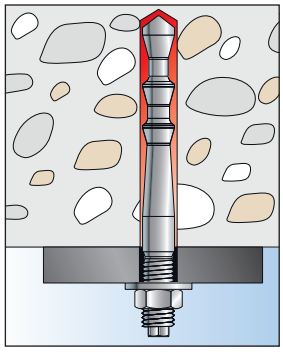
Suitable anchor systems for cracked concrete

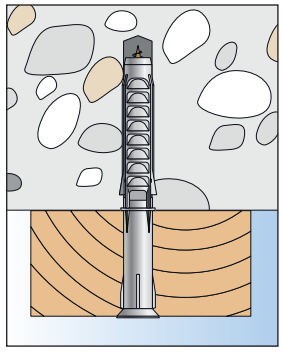
When fixing in concrete, **cracks** are always **expected in the anchoring area which will have an impact on the load bearing capacity** of the anchor system. However, it is very complicated, if not impossible, to prove whether the concrete is cracked or not cracked.

For safety reasons, designers and craftsmen should **always use anchor bolts which are suitable for cracked concrete.** Fixings with an approval/assessment according to ETAG 001 for cracked concrete have proven their suitability in cracks, therefore they can be used without any restrictions in tensile and compression zones of a concrete member.


Undercut anchor FZA


Bolt anchor FAZ II


Threaded rod FHB II


Frame fixing SXS

Due to safety reasons, always use crack-suitable anchor systems such as FAZ II, FH II, FHB II, FIS SB, FIS EM or FIS V.

Fire protection – Fundamentals

General requirements of building structures
for fire protection.

Structural installations

Structural installations are to be ordered, erected, changed and brought into commission in such a way that:

- the emergence of a fire is prevented from breaking out.
- the spread of fire and smoke (spread of fire) is prevented.
- in the event of a fire, the rescue of people and animals is possible.
- effective fire-fighting operations are possible.

German regulation

In Germany, the procedure for construction and operational fire protection are specified by the fire protection standard DIN 4102, the Model Building Ordinance (MBO), Regional Construction Ordinances (LBO) and various trade-specific regulations from professional associations.

The following applies as per Section 1 and 2 of DIN 4102:

Building materials such as **concrete, wood, stone, metal** etc., are classified according to their behaviour **into flammable or non-flammable building material classes.**

However, **components composed** of different **flammable and non- flammable materials** are not classified into fire classes in building construction but they are evaluated as a complete system according to their fire resistance duration. The fire resistance duration R is indicated in minutes and classified according to two categories:

- **Components with a fire resistance duration** of R30 and R60 are fire-inhibiting.
- **Fire-resistant,** are all components with a fire resistance duration of R90, R120 and R180.

  Tested systems such as cable, ventilation or duct systems are not only tested for fire resistance, but also for functional capability in the event of fire (e.g. supply lines to sprinkler systems). The fire resistance duration of these systems is e.g. E30 to E120 for electrical cable systems or L30 to L120 for specified ventilation ducts. The anchors that are used to fasten these systems must have at least the same fire resistance duration.

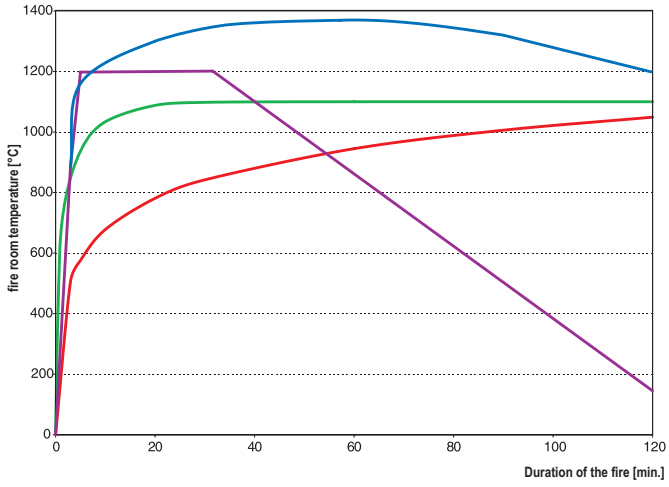
European standardisation

In accordance with the European Norm DIN EN 13501-1, the classification of fire behaviour of building materials / products is similar to that of DIN 4102. The classifications are, however, much more precise.

In addition to, the main classification criteria concerning flammability, flame spread and heat released, e.g. smoke development and dropping behaviour is tested.

Fire resistance of components has been tested in Germany in accordance with the European Norm DIN EN 1363 or DIN EN 1365 since 2000. The fire resistance duration is then labelled with the letter R for "Resistance".

The standard temperature-time curve (ETK) of DIN 4102 and ISO 834 is based on a simulation of real fire conditions and forms the evaluation basis that is used worldwide to determine the fire resistance duration. In addition, there are other temperature curves for special fire exposures, e.g. the hydrocarbon curve for destructive fires caused by flammable liquids or the RAB/ZTV tunnel curve (Germany) or the Rijkswaterstaat tunnel curve (the Netherlands), which describe tunnel fires.



Temperature curves: — (ETC), — Hydrocarbon curve, — RABT/ZTV tunnel curve — Rijkswaterstaat tunnel curve

Fire protection in fastening technology

The fastening technology has a vital importance in fire protection.
To ensure the functional capability and stability
of railings, pipe systems, fire safety doors or ceiling elements.

Assessing fixings for fire is carried out in accordance with the technical regulation EOTA TR020 or in accordance with fire protection reports.

The labelling and classification of anchors and fixings is classified in:

1 Fire behaviour (e. g. non-flammable)
2 Fire resistance duration (e. g. R90)

For this purpose, the legal regulations set down in the final draft of the Delegated Act "Fire Behaviour" must be observed.

EOTA TR020 only states anchor performance ratings that have an **ETA for cracked concrete!** Meanwhile, a new evaluation document issued by the German Institute for Construction Engineering (DIBt) is used to determine the characteristic load values and the corresponding fire resistance duration.

A partial safety factor of $\gamma_M = 1.0$ on the load side is used in the event of fire.

The fire values only refer to anchor bolts that are directly exposed to flames.

Alternatively, anchors can be protected from direct exposure to fire by using fire protection panels or fire protecting coatings.

For fixing cladding systems, it is assumed that the load bearing capacity of specified plastic screw anchors in concrete with an external diameter of 10 mm and a metal screw diameter of 7 mm and an anchoring depth of $h_{ef} = 50$ mm with a polyamide PA6 plastic sleeve has a sufficient fire resistance of at least 90 minutes (R90), if the permissible load (no permanent centric tensile load) is ≤ 0.8 kN.

Before the fire test

During the fire test

After the fire test

Corrosion – Fundamentals

Corrosion is a chemical reaction which degrades metal.

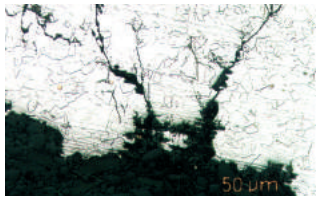
The less noble the metal ("electrochemical potential"), the more severe the material damage is, resulting in metal loss or corrosion flakes. For this reason, different appearance patterns have been determined. **The most common types of corrosion in fixings and anchors are:**

Surface corrosion: In this case, the metal corrodes relatively uniformly over the entire surface or over a part of the surface. An example of this is the invisible rusting of a screw in the transition area from anchor plate to hole due to condensation. The result: A connection that appears completely intact from the outside, but suddenly fails.

Contact corrosion: If metals with a different nobility are in contact with each other in a conductive medium, the less noble metal always corrodes (the anode). Whereas stainless is not affected. A decisive factor is the surface ratios of the two types of metal: The greater the surface area of the most noble metal in comparison with the less noble, the greater the corrosion. For example, if larger stainless steel sheets are screwed with galvanised screws, the screws will be agressively attacked within a very short time. Whereas using stainless screws in galvinised sheets poses no problems.

Stress corrosion cracking: Permanent internal or external tensile stresses lead to metal strain or corrosion. In this process, a crack develops due to mechanical stresses, which grows under increasing loads and thus creates a path for progressive corrosion. For example, this occurs with stainless steel of corrosion resistance Class III e. g. A4, in an atmosphere containing chlorine (swimming pools). Generally, stress corrosion cracking is not visible with fixings and usually leads to sudden failure of the anchoring.

In 1985, the suspended concrete ceiling of an indoor swimming pool collapsed in Uster, Switzerland. The stainless steel ceiling attachments exhibited no external defects, but were completely destroyed internally in some cases due to stress corrosion cracking.



Example of trans-crystalline stress corrosion cracking on stainless steel 1.4401 with high chloride concentration

Corrosion protection

There are different ways to protect fastenings from corrosion. The most important are:

Galvinised zinc coating (or also electrolytic zinc coating) followed by passivation is the most common corrosion protection used in metal finishing. A zinc coating thickness of 3 – 10 µm offers excellent corrosion protection for damp rooms and outdoor use.

Hot-dip galvanising is the application of a metal zinc coating by dipping it in molten zinc (at approx. 450 °C). Zinc layer thickness's of 45 – 80 µm offer an excellent corrosion protection for moist rooms and outdoor use.

Stainless steel fixings of corrosion resistance class III e. g. A4, material no. 1.4401, 1.4404 and 1.4571 as well as two phased duplex steel (austenitic and ferritic structure / magnetic) are suitable for anchoring in damp rooms, in open air, in industrial atmospheres or near the sea (but not directly in sea water).

Stainless steel anchors made from high corrosion-resistant steel of the corrosion resistance class V e. g. material no. 1.4529 are used in especially aggressive environments e. g. in atmospheres containing chlorine (swimming pools), in road tunnels or with direct sea water contact. Due to their high molybdenum content they are risistant is such aggressive enviroments. That means that steel type 1.4529 – containing chrome, molybdenum and nicklel – has an alloy content of 58 %. The rest consists of iron and carbon. Due to this very high alloy content, the production for this steel type is very expensive, but on the other hand the conection is safe and maintenance – free in terms of corrosion.

Dynamics

For predominantly non-static loads.

The general building approvals issued by the **German Institute of Construction Engineering (DiBt)** and the **European Technical Approvals / Assessments (ETA)** are mainly valid for predominately static loads. However, there are certain applications e.g. swinging cranes, crane rails, jib cranes, elevator guide rails, machines, industrial robots and blast fans in tunnels including antenna and masts which are subjeted to dynamic effects.

In general, the anchoring of components with more than > 1000 load cycles must be carried out using fastening elements that have been checked and approved for this purpose. Until recently, the design for post-installed anchors for such dynamically loaded applications was nearly impossible. Time consuming and costly expert reports and or approvals for individual applications were required.

The bonded anchors: fischer Highbond anchor FHB dyn and fischer UMV multicone dyn and FDA **have a German DiBt approval for dynamic loads.** In the approval, only fatigue loads are considered as dynamic loads and not loads from shock or seismic activity.

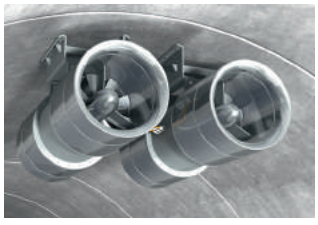
The approvals apply to the anchoring of dynamic loads with unlimited numbers of load cycles, for tension and for shear loads.

In addition, the FHB dyn is manufactured in anchor size M12 and M16 from highly corrosion-resistant steel (e.g. corrosion resistant Class V - 1.4529).

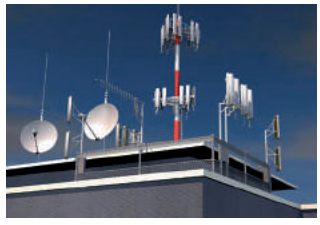
Dynamic load tests have shown - compared to normal stainless steel grades of corrosion resistant class III (e.g. 1.4401 also known as 316) – that this material is not only highly suitable for indoor and outdoor humid environments, as well as other agressive conditions, it is also highly suitable for dynamic loadings.

Elevator guide rails

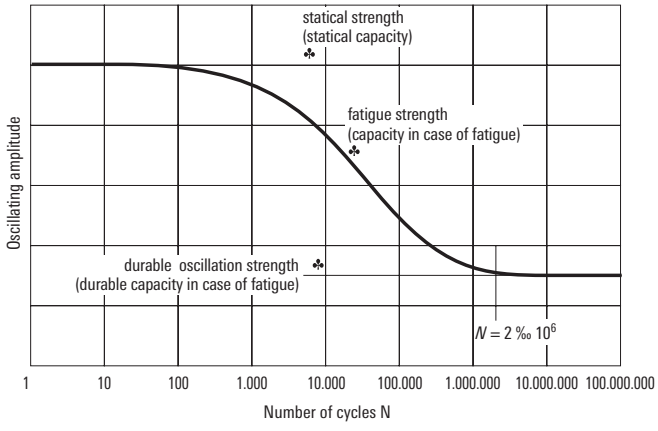
Industrial robots



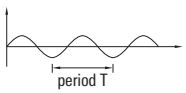
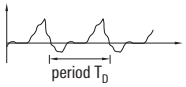
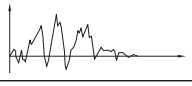
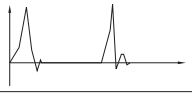
Blast fans



Antenna and masts



Wöhler curve

Action	Run of the oscillation	Possible cause
harmonic	 sinusoidal	Unbalances, tumbling machines
periodic	 optional, periodical	Regularly abutting parts (e.g. punching machines), rail- and road traffic
transient	 optional, nonperiodical	Earthquakes
impulsive	 optional, with very short time of influence	Impact, explosion

Legal basis

The European Union (EU) determines the legal foundation for the assessment, CE labelling and bringing building products into the European Economic Area (EEA).

The aim is to reduce trade barriers by harmonising the requirements of building products.

REGULATION (EU) No 305/2011 (Construction Products Regulations) OF THE EUROPEAN PARLIAMENT AND COUNCIL fully came into force on 1st July 2013. The Construction Products Regulation is law in all EU countries. However, the Construction Product Directive 89/106 / EEC is not law in all EU countries.

Construction products are products, or parts which are permanently incorporated into buildings. Their performance influences the structure's basic requirements (e.g. mechanical strength). Therefore, construction products and materials for safetly relevant applications are affected.

Important building requirements include:

1 Mechanical strength and stability
2 Fire protection
3 Hygiene, health and environmental protection
4 Safety and accessibility during use
5 Sound protection
6 Energy saving and heat protection
7 Sustainable use of natural resources

When a construction product is covered by a harmonised standard (hEN), or a European Technical Assessment or Approval (ETA) has been issued for this product, the manufacturer is obligated to draw up a Declaration of Performance (DoP) for this product and affix the CE marking on the product. The application for an ETA for a construction product by the manufacturer is voluntary. National approvals may only be issued if a construction product is not marked with a CE label.

Existing European Technical Approvals (ETA) are valid until the end of the validity date and will be amended with the Declaration of Performance (DoP) by the manufacturer from the due date. The reference number of the DoP is part of the CE marking and must be determined by the manufacturer. The Declarations of Performance (DoP) are available on the fischer website under "Approvals/Assessments": http://www.fischer.de/sdb.

The CE mark is the only means to certify whether the manufacturer has conformed to the applicable harmonised requirements of construction products. The CE label allows the construction product to be freely traded without trade barriers in the European Economic Area.

Each Member State determines the essential characteristics for use of the construction product and its performance in its territory. The unrestricted use of a construction product in a Member State depends on whether performance values exist in the DoP for the essential characteristics determined by the Member State. If one characteristic is declared with "NPD" (No Performance Determined), this can lead to a ban on use in a Member State. Therefore, each member State must establish Product Contact Points, which will provide information on these regulations. In Germany, this is the Federal Institute for Material Research and Testing (BAM: see www.pcp.bam.de).

Assessment procedure

Fasteners which are not covered by a harmonised standard (hEN) can apply for an ETA (European Technical Assessment) on the basis of a European Assessment Document (EAD).

Existing assessment documents, such as ETAGs (European Technical Approval Guidelines) for metal and plastic fixings are still valid and transferred into EADs in accordance with the EU Construction Products Regulation (CRP). The ETAGs and the new EADs can be downloaded from the EOTA website: http://www.eota.eu

The assessment document for mechanical fasteners (ETAG 001-1, -2, -3, -4 or in the future, EAD 33-0232) and the assessment document for bonded anchors (ETAG 001-5 or in the future, EAD 33-0499) divides possible approvals of metal fixings into 12 options.

Options 1-6 are for use in cracked and non-cracked concrete, options 7-12 are only for use in non-cracked concrete. Anchors of Option 1 offer the largest range of flexibility for assessment, since performance values for concrete of the strength classes C20/25 to C50/60, as well as the minimum spacing and edge distances are available (see table below).

Section 6 of the ETAG 001 (in the future, EAD 33-0747) regulates the assessment of metal fixings in cracked and non-cracked concrete for multiple use for non-structural systems. Non-load bearing systems include components which do not contribute to the stability of the construction, they only transmit their dead or wind load. These are, for instance, simple suspended ceilings and false ceilings, pipelines and façade claddings.

When using fixings for multiple use, it is assumed that if excessive slippage or failure of a fixing point occurs, that the load will be transferred to neighbouring fixing point. A fixing point can be defined as a single anchor or a group of anchors.

This is known as a redundant system, where stability is not affected by an individual anchor failure.

Possible assessment options according to EAD

Options	Cracked concrete	Non-cracked concrete	One value for all concrete strengths	Different values for C20/25 to C50/60	One value for load direction	Separate values for tensile and shear capacity	c_{cr} / s_{cr}	$c_{min} < c_{cr}$ / $s_{min} < s_{cr}$	Design method as per EN 1992-4
1	✓	✗	✗	✓	✗	✓	✓	✓	A
2			✓	✗					
3			✗	✓	✓	✗			B
4			✓	✗					
5			✗	✓			✓	✗	C
6			✓	✗					
7	✗	✓	✗	✓	✗	✓	✓	✓	A
8			✓	✗					
9			✗	✓	✓	✗			B
10			✓	✗					
11			✗	✓			✓	✗	C
12			✓	✗					

Design of fastenings

Two different anchor designs are differentiated.

Method with global safety factors

Permissible loads are determined from the average failure load or from the 5 % fractile load and compared with the action load.

The safety factor depends on the anchoring system, the type of installation and external influences such as temperature and or humidity. Global safety factors are generally $\gamma = 3$ for steel and bonded anchors and $\gamma = 5$ for plastic anchors.

Methods with partial safety factors

According to this method, it is shown that the value of the design actions S_d does not exceed the value of the design resistance R_d ($S_d \leq R_d$).

The action on fixings are determined according to the same rules and used the same partial safety factors employed in reinforcred concrete design (see Eurocode 1990; national appendix must be observed).

The design resistance is determined by using the characteristic resistance and the partial safety factor of the material (γ_M), which takes into account the scatter of the material. The values can be taken directly form the ETA. Safety is national law. The design method as well as the related partial safety factors are determined by the Member State.

Only the product-specific coefficient for installation is specified in the ETA, which is used to calculate the partial factor γ_M. The design standard EN 1992-4, which is expected to be ratified in 2018, contains the national determined partial safety factors (observe the respective national appendex).

The design method as set down according to ETAG 001, Annex C - design method for metal anchors and the design method according to TR029 - bonded anchor design in concrete, as well as CEN/TS 1992-4, Section 4 (mechanical anchors) and Section 5 (chemical anchors) are the current methods for anchor design based on a European Technical Approval or Assessment (ETA). Moreover, the ETAG 001 Annex C distinguishes between three different design methods (A, B and C), method A being the most important and the most economical method since anchors are considered separately for all load directions and failure modes. Methods B and C play a minor role and are hardly used.

Other important design provisions are:

EOTA TR020
Anchor design in concrete under fire exposure, or CEN/TS 1992-4, Part 1, Appendix D

EOTA TR045
Anchor design in concrete for seismic actions

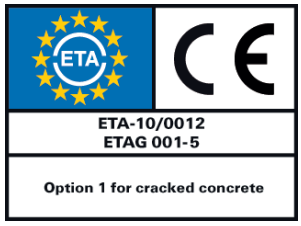
The applicable assessment design methods are generally indicated in the respective ETA. It is important that design methods are not commingled.

The design for metal anchor (under static and seismic loads as well as under fire exposure) is summarised in EN1992-4, i.e. in Section 4 of the Eurocode 2, but then must be ratified by each Member State and, if applicable, adapted for national annexes. As soon as EN1992-4 is published, all other design methods (ETAG 001 Annex C, TR045, TR020, TR029 and CEN/TS 1992-4) are no longer valid.

fischer has developed a simple yet powerful design software for daily use: the fischer - C-FIX. The software enables designers and users to carry out anchor designs according to different design methods. Complex anchor arrangements can be calculated quickly and easily. The feature "multple design" makes it possible to select the best technical and cost saving solution.

Approvals, markings and their importance

The most important symbols
are presented below.

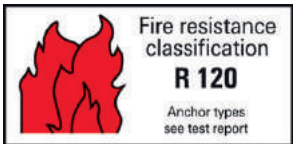


European Technical Approval / Assessment
Issued by a European approval authority (e.g. DIBt) on the basis of the guidelines for European technical approvals (ETAG). ETA (English): European Technical Approval/Assessment. CE: The CE marks the conformity of the product to all applicable legal provisions in which their installation is intended. This means that the CE mark only certifies that the requirements determined in the relevant harmonisation legal provisions of the union have been complied with. Products with the CE mark can be freely traded in the European Economic Market.

ICC International Code Council
ICC Evaluation Service Inc. (ICC ES) issues reports, e.g. for subsequent anchoring on the basis of the International Building Code® and the related standards in the United States of America

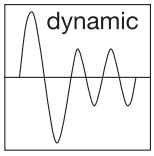
FM Certificate
Recognised for use in local water- based fire extinguisher systems (Factory Mutual Research Corporation for Property Conservation, American insurance company).

General building authority approval
German approval, issued by the DIBt, Berlin with the accompanying certificate of conformity for construction products with the general building authority approval. Confirmed by a material testing institute.



Fire-tested fixing
The anchor was subjected to a fire test. It is an "investigation report to test the anchor under fire exposure (fire behaviour) (with R-Class). Fire tests are not required when using the simplified verification method according to TR020 - then the values can be transferred directly to the ETA.

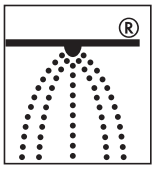
This product is made from **high corrosion resistant steel** of corrosion resistance class V, e.g. 1.4529.



Dynamically loadable anchors
The anchor is suitable and approved for anchoring of "not predominantly static" (i.e. dynamic) loads.static" (i.e. dynamic) loads.
static" (i.e. dynamic) loads.

General construction-related test certificate

The fixing is suitable for anchoring under **seismic influence.** Please note: The ICC-ESRs also allow seismic stress (see Category C1 and C2 in accordance with the ETAG 001 Annex E).



Mark for labels that confirm compliance with the VDS-CEA guidelines for **sprinkler systems, planning and installation.** Fixings labelled as such may be used for fixing pipes for extinguishing systems.

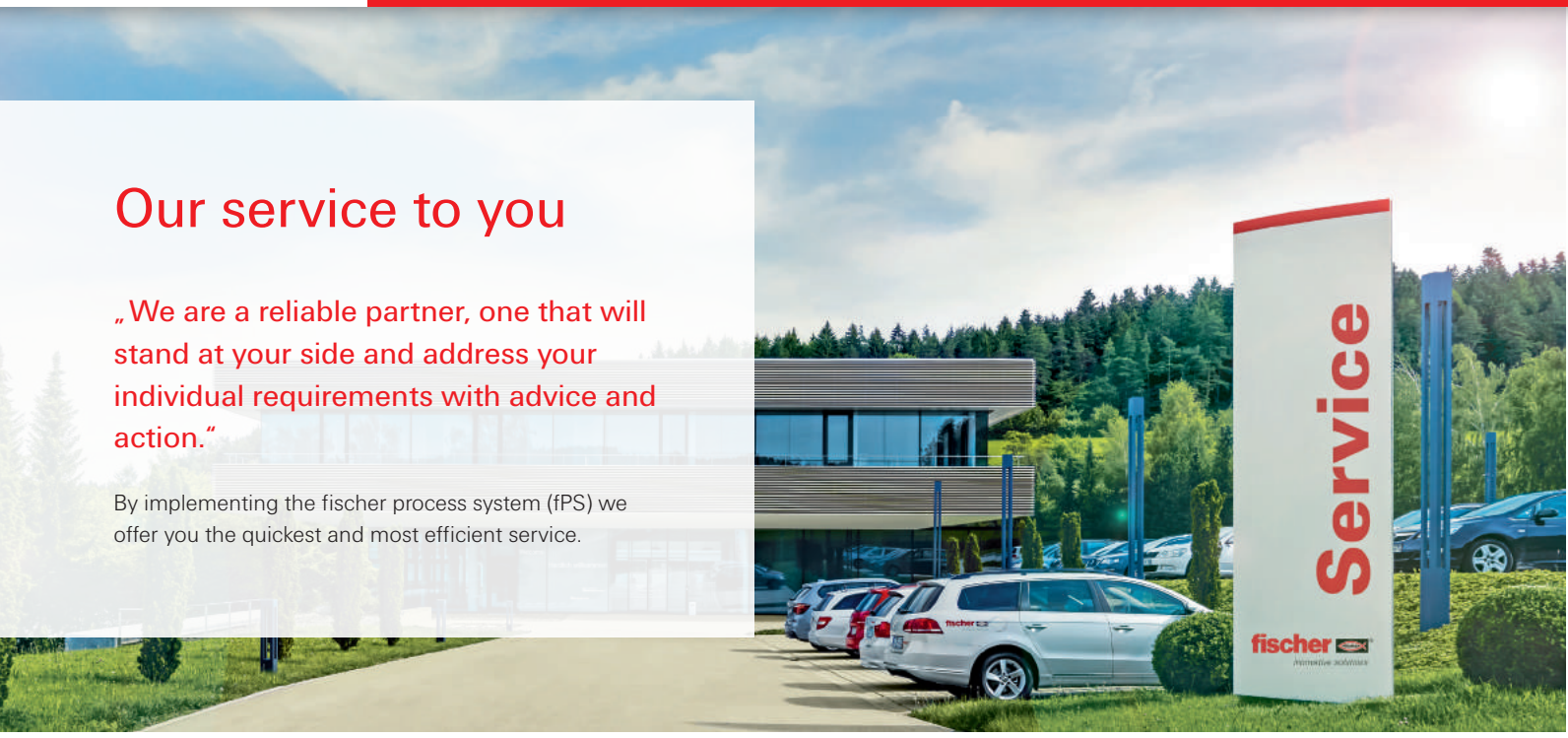
Tested for **flammability** in accordance with VDE.

Fixings for tensile zones
The fixing is suitable and approved for anchoring in cracked concrete (tensile zone) and in uncracked concrete (compression zone).

Fixing made of high-quality, ageing-resistant **nylon** (polyamide).

Component test with window frame screws in accordance with ift guideline M0-01/1; Testing structural connections on windows.

The term "approvals" used in the catalogue consists of documents that are available and can be used as evidence of the usability of building products for which the documents were issued. These are (fire) reports, general construction-related approvals issued by the German Institute for Construction Technology Berlin (e. g. Z-21...) or European Technical Approvals or Assessments (ETA). In general, the usability of construction products in an EU Member State is given, if the performance of the significant characteristics required in each Member State has been clarified/ confirmed by the manufacturer. Information on the significant necessary characteristics in a country can be found at the national Product Information Contact (Link: http://ec.europa.eu/Docs- Room/documents/4170/attachments/1/translations/en/renditions/native).



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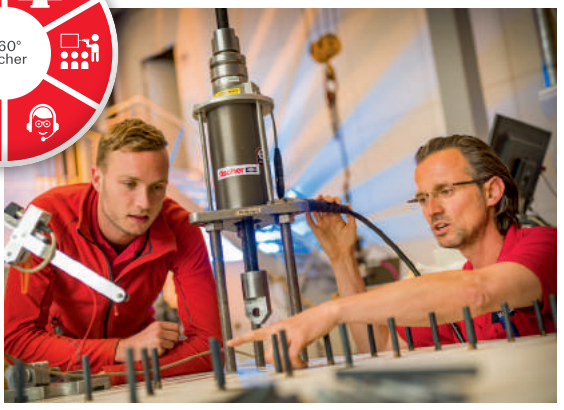

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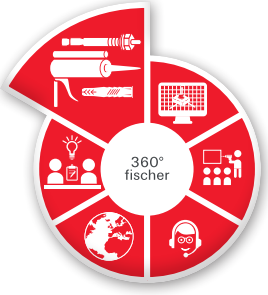

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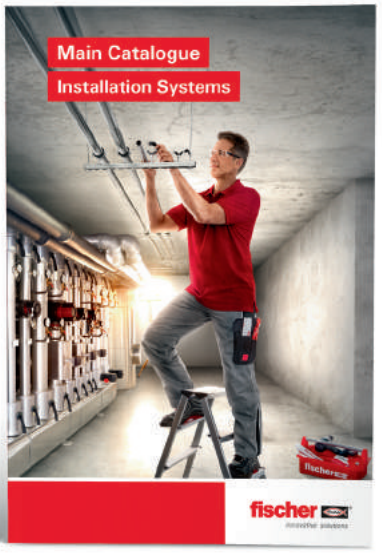

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