



# CFA Guidance Note: Self-tapping (concrete) Screw Anchors.

## SUMMARY

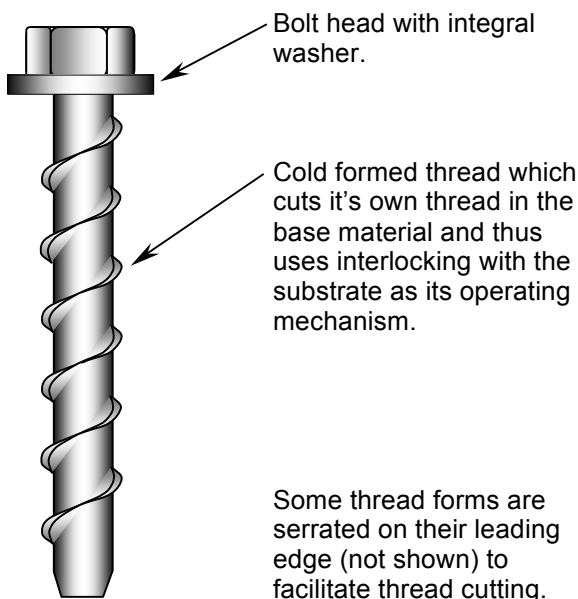
- ❑ Undercutting anchor by self-tapping of thread
- ❑ Suitable for concrete and hard solid masonry
- ❑ Through fixed so no marking out
- ❑ For 5mm to 14mm hole diameters
- ❑ Medium duty applications
- ❑ Variety of head styles
- ❑ Versions with projecting threaded stud
- ❑ Versions with projecting internally threaded socket
- ❑ Some with ETA for cracked concrete and non-cracked concrete
- ❑ Zinc plated carbon steel
- ❑ Stainless steel (A4) available – limited availability
- ❑ Removable leaving no parts to corrode
- ❑ Re-use may be allowed by manufacturer - with gauge

## 1 Introduction

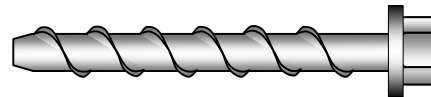
Often referred to as “Concrete Screws” these anchors also work well in masonry as they exert minimal expansion stresses due to installation. They are easy to install, are removable and offer surprising levels of performance. This guidance note sets out the factors to be born in mind when selecting and installing them.

## 2 DESCRIPTION

The specially developed thread form is the secret of these anchors and has a significant effect on thread tapping ability and on performance. Types with shallow threads may be easier to insert but will have lower load capacity. Versions are available with Approvals for use in cracked concrete.

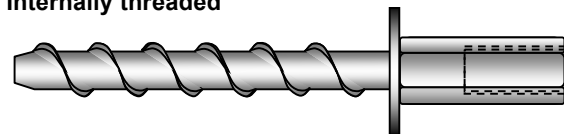


Hexagon head style



The most popular version for obvious reasons as it may be fixed through the fixture and will clamp the fixture directly. Many have integral washers built into the hexagon head, some have a drive indent for use with torx or other positive driving systems.

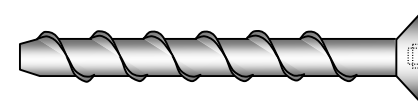
Internally threaded



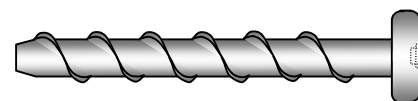
Threaded stud



Counter-sunk head



Panhead

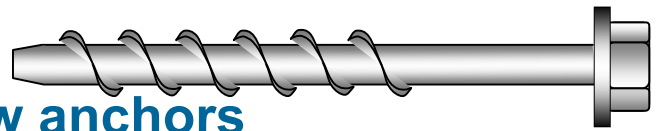


**Note:** Internally threaded and projecting stud types should not be used for shear or bending loads.

## 3 TYPICAL APPLICATIONS

Self-tapping screws are particularly suited to uses in dry internal conditions or temporary applications where they need to be removed leaving nothing in the substrate. Popular for scaffold ties see CFA/NASC Guidance Note: Anchorage systems for scaffolding TG4:11.

# CFA Guidance Note: Self-tapping (concrete) screw anchors



## 4 SELECTION

If screw anchors are to be used for applications involving any safety implications it is important that the anchors function reliably and deliver the quoted performance. This can only be guaranteed if anchors have been awarded a European Technical Approval (to ETAG 001 Part 3 "Undercut anchors"). This means, for instance, that, in addition to the comprehensive and rigorous testing applied to all anchor types, they have been assessed to ensure that the heads do not twist off during installation with properly calibrated impact wrenches. Quoted performance will have been determined by standardised test methods in concrete made to a prescribed mix. Recommended loads derived from characteristic loads quoted in ETAs are therefore reliable and comparable between makes. Self-tapping concrete screws without ETA are not recommended.

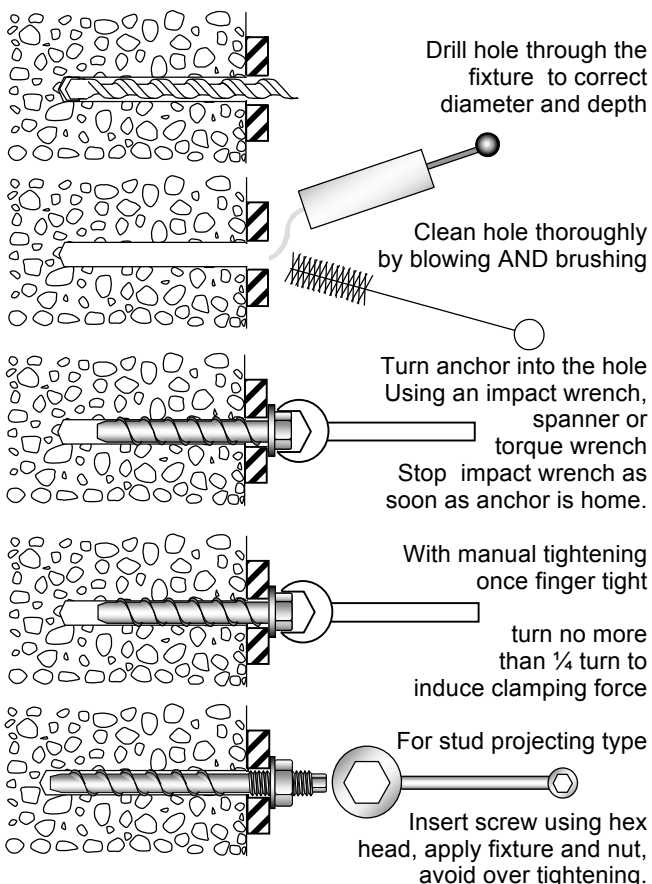
They may be specified for use in timber if approved by the manufacturer but care must be taken not to over tighten them.

## Corrosion

Self-tapping concrete screws are usually made from high strength steels which, if having a tensile strength greater than 800N/mm<sup>2</sup>, may suffer from hydrogen embrittlement – particularly in damp or wet conditions – which can lead to overnight failure. Self-tapping screws with a valid ETA are assessed for hydrogen embrittlement during the approval process. For long term external use stainless steel versions are recommended, there is limited availability of styles.

## 5 INSTALLATION

Screw anchors are relatively easy to install



A Sample Method Statement, for the use of installers with more detail on the installation of Self-tapping screw anchors, is downloadable from the CFA website.

## Mechanical Installation

When large numbers of anchors are to be set the use of an impact wrench will make the job much easier and quicker and should give reliable installation. They may be provided by the manufacturer in which case torque settings are usually preset and will relate to concrete only. Proprietary tools may also be used but must be set to the torque setting recommended by the manufacturer. Care is needed in weaker materials, especially soft bricks and stonework, in which impact wrenches may lead to over tightening and stripping of the thread cut in the substrate. In these materials trial installations should be carried out first, in a part of the base material that is typical of the job but not an area that will be used. The propose of trial tests will be to ensure that once the anchor head meets the fixture it does not continue turning for more than a fraction of a turn and strip the thread.

## Manual Installation

Pressure may be needed initially to engage with the base material. The anchor may then be turned into the hole using a spanner. Once finger tight minimal turning is necessary to induce the required clamping force. Tightening torques are largely irrelevant, if specified they should be regarded as a maximum value to be applied in concrete only (unless otherwise specified by the manufacturer) and may be useful for setting impact wrenches. They are specified to ensure that the head is not twisted off the bolt during installation.

## 6 INSTALLATION USING RESIN

When masonry is weak or soft the performance of self tapping screws is reduced, as is the performance of any anchor suitable for use in masonry. There is also the increased risk of stripping the thread cut in the base material if over tightened. One solution, currently being proposed by some suppliers of self-tapping screws, is the additional use of an injection resin which stabilises and strengthens the interface between the screw and the masonry. While this can be shown to yield significantly increased performance, and may overcome problems of thread stripping on tightening, such techniques are not well developed. With this in mind, and until such time as a manufacturer acquires a European Technical Approval or similar independent endorsement for such a system, the Construction Fixings Association cannot currently endorse this method.

## 7 REMOVAL AND RE-USE

Easy removal means no parts are left in the structure to corrode. There are no special requirements or tools needed for the removal of screw anchors.

Screw anchors wear during use and eventually lose strength. They may only be re-used if the manufacturer approves their re-use. This usually involves the use of a gauge to demonstrate that cutting diameters are still an acceptable diameter.

This Guidance Note is one of a series published by the **Construction Fixings Association** and may be downloaded free of charge, along with **Sample Method Statements** designed to assist installers with correct installation, from the CFA website, logon to [www.the-cfa.co.uk](http://www.the-cfa.co.uk). For details of the Association, members and activities use the contact us page on the website.