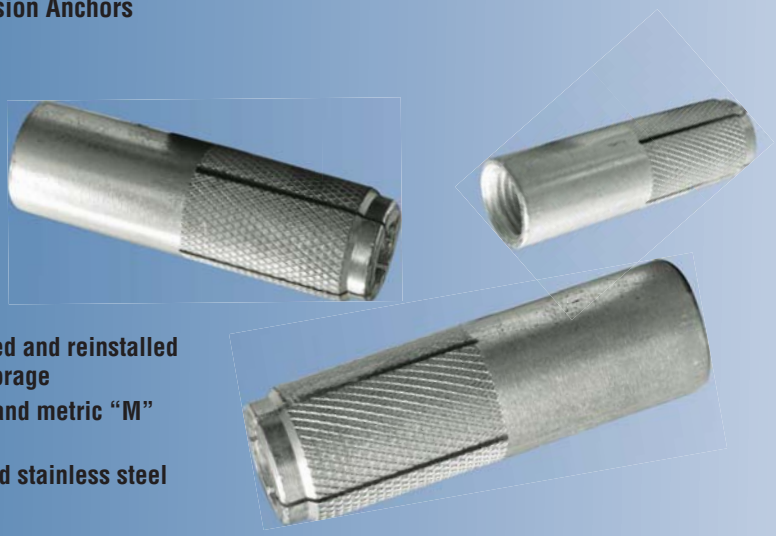
TENN PFA Drop-In Anchors

Deformation-Controlled Expansion Anchors



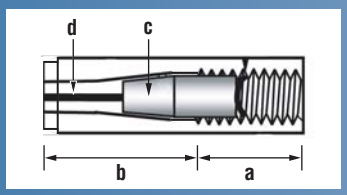
- **Attachments may be removed and reinstalled without disturbing the anchorage**
- **Available with BSW (inch) and metric "M" threadforms**
- **Available in carbon steel and stainless steel**

Tenn PFA Drop-In Anchors are internally threaded expansion anchors designed to provide a dependable socket fixing point in hard concrete. They are most frequently used in ceilings in combination with threaded rods.

DESCRIPTION

Tenn PFA Drop-In Anchor consists of a cylindrical shell with an internally threaded section (a) leading to the internally tapered expansion section (b). A tapered expander cone (c) is pre-fitted inside the shell. A cone retention system prevents the expander cone from falling out.

The shell has four longitudinal slots (d) to facilitate expansion.



An integral part of this anchor system is the setting punch, which is used to force the expander cone to the base of the anchor. A specific setting punch is used for each size of PFA Anchor. The punch is so designed that the expander cone will not be driven out of the anchor shell.

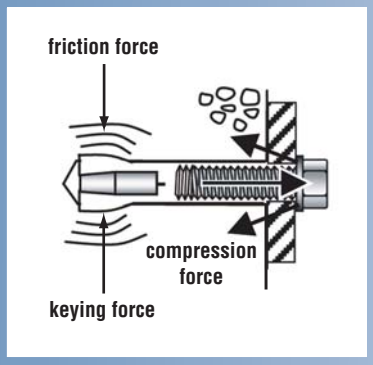
ADVANTAGES

Tenn PFA Drop-In Anchors' shallow embedment depths mean that most sizes may be set in the concrete cover above the steel reinforcement. This makes PFA anchors ideal for use in concrete deck undersides for the suspension of services, pipework, ductwork, cable trays, ceilings etc.

PFA anchors are also useful in floors such as for mounting machinery. Due to flush installation there are no projecting studs to get in the way when the machinery has to be moved.

OPERATING PRINCIPLE

The anchor is expanded by the expander cone being driven to the base of the anchor by a



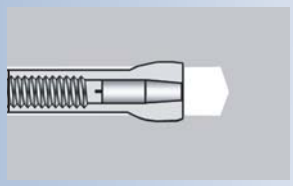
setting punch. Full expansion is achieved when the shoulder of the punch reaches the top of the anchor shell.

Anchor expansion places compressive forces into the base material so that pull-out forces are opposed by a combination of mechanical interlock ("keying") and frictional force.

It is necessary to use PFA setting punches to ensure that the anchors are always fully expanded.

HOLE DEPTH

PFA Drop-In Anchors are commonly used with fully threaded rods. The anchor may be set either flush with the surface of the concrete, or deeper in the drill-hole. However, when using with headed bolts, special care must be taken to ensure that the hole is not overdrilled.

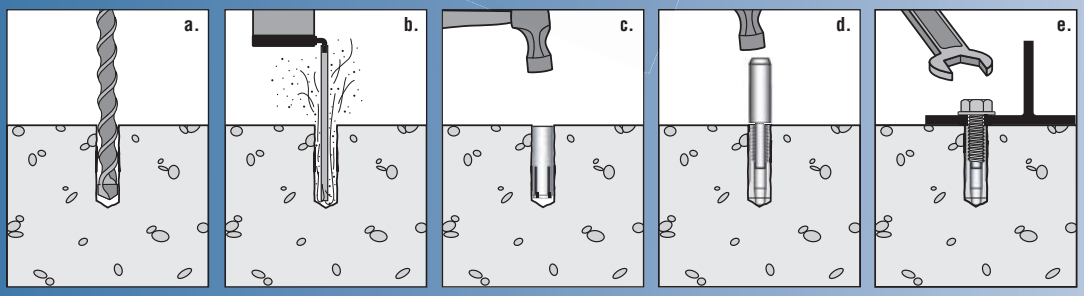


BASE MATERIAL SUITABILITY

PFA drop-in anchors are designed for use in concrete. The shock loads introduced during the setting operation together with the high expansion ratio mean that drop-in anchors will crack all but the strongest masonry, so they should not be used in brick, stone or any sort of blockwork.

Tenn FASTENING SYSTEMS

INSTALLATION PROCEDURE



a. Drill hole to correct diameter and depth.
b. Blow out drill dust.
c. Tap in Tenn PFA Drop-In Anchor.
d. Drive expander cone home using setting punch.
e. Apply fixture, insert bolt and tighten to the recommended torque.

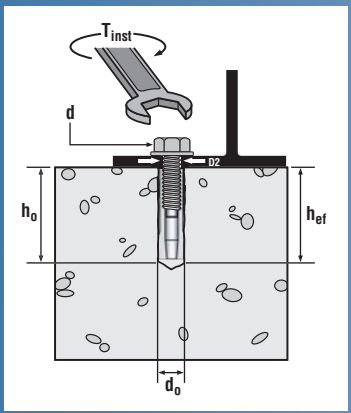
Flush setting

For flush installation, the hole depth is important for drop-in-anchors. To set flush the hole depth should be drilled to the length of the anchor.

Tightening

Bolts should be tightened using a torque wrench. This will ensure the clamping force is reached and will protect both the bolt and anchor shell from being overtightened.

INSTALLATION DATA



TENN PFA ANCHOR RANGE AND INSTALLATION DATA

Type		Anchor Size & Bolt Diameter d, mm		Anchor Length & Embedment Depth l & h_{ef}, mm	Internal Thread Length l_{int}, mm	Drill Hole Diameter d_o, mm	Drill Hole Depth (for flush setting) h_o, mm	Max. Installation Torque T_{inst}, Nm	Clearance Hole Diameter D2, mm	Setting Punch ID No.
PFA.M6	PFA.20	M6	1/4”	25	11	8	30	5	8	110.TP20
PFA.M8	PFA.25	M8	5/16”	30	13	10	35	11	10	110.TP25
PFA.M10	PFA.30	M10	3/8”	40	15	12	45	15	12	110.TP30
PFA.M12	PFA.40	M12	1/2”	50	18	16	55	30	14	110.TP40
PFA.M16	PFA.50	M16	5/8”	65	23	20	75	50	18	110.TP50
PFA.M20	PFA.60	M20	3/4”	80	34	25	90	108	22	110.TP60

BOLT STRENGTH

The tensile strength of drop-in anchors is limited by the strength of the shell itself, so there is no benefit in specifying bolts or drop rods stronger than UTS 4.6.

BASE MATERIAL DIMENSIONAL LIMITATIONS

All anchors need certain centre-to-centre spacing and edge distances to fully achieve their recommended safe working loads. These are called “critical” spacing and edge distances.

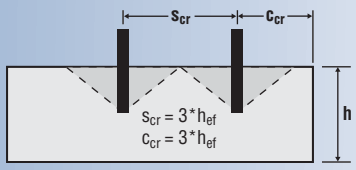
In most cases, anchors may be set closer than their critical spacing and edge distances, but with reduced performance.

Anchors should not be installed closer than the “minimum” edge and spacing distances.

COMBINED LOADING

Anchors that are loaded in tension and shear simultaneously will have ultimate capacities lower than an anchor loaded in tension or shear separately. Therefore, designers must check that the tensile stress and shear stress are proportioned to satisfy the following interaction equation:

$$\frac{\text{Applied tension load}}{\text{Safe working tension load}} + \frac{\text{Actual shear load}}{\text{Safe working shear load}} \leq 1.4$$



Safe Working Loads in C20/25 Concrete

PFA Anchor Size d, mm	Effective Embedment Depth h_{ef}, mm	Minumum Concrete Thickness h, mm	Critical Spacing s_{cr}, mm	Critical Edge Distance c_{cr}, mm	Safe Working Loads	
					Tension kN	Shear kN
M6 (1/4”)	25	100	75	75	2.2	2.0
M8 (1/4”)	30	100	90	90	3.5	3.0
M10 (1/4”)	40	100	120	120	4.5	5.0
M12 (1/4”)	50	125	150	150	7.5	7.0
M16 (1/4”)	65	140	195	195	11.0	16.0
M20 (1/4”)	80	150	240	240	18.0	22.0

Minimum Spacing and Edge Distances & Load Reduction Factors

Installation Details	PFA Anchor Size						Load Reduction Factors	
	M6 (1/4”)	M8 (5/16”)	M10 (3/8”)	M12 (1/2”)	M16 (5/8”)	M20 (3/4”)	Tension	Shear
Minimum Anchor Spacing s_{min}, mm	50	60	80	100	130	160	0.50	0.50
Minimum Edge Distance c_{min}, mm	50	60	80	100	130	160	0.70	0.70