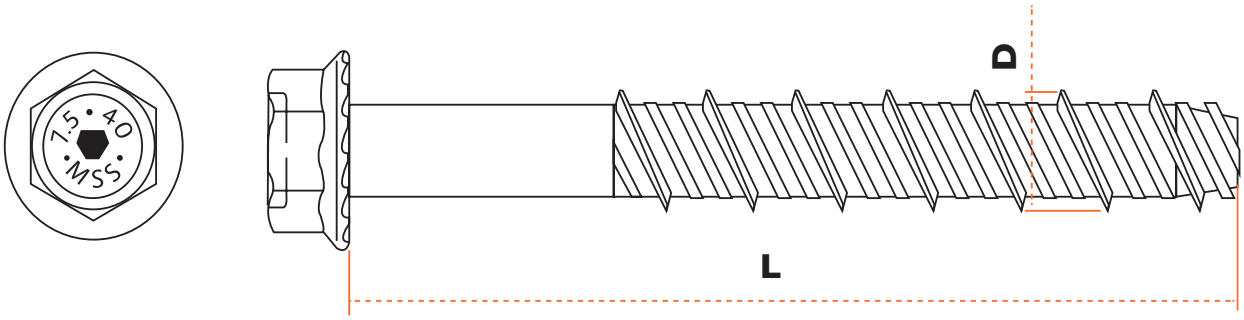
ANCHOR-FAST PRO



Sure-Fast's Anchor-Fast Pro is your go to 6mm zinc plated screw-bolt for fastening into cracked and uncracked concrete.

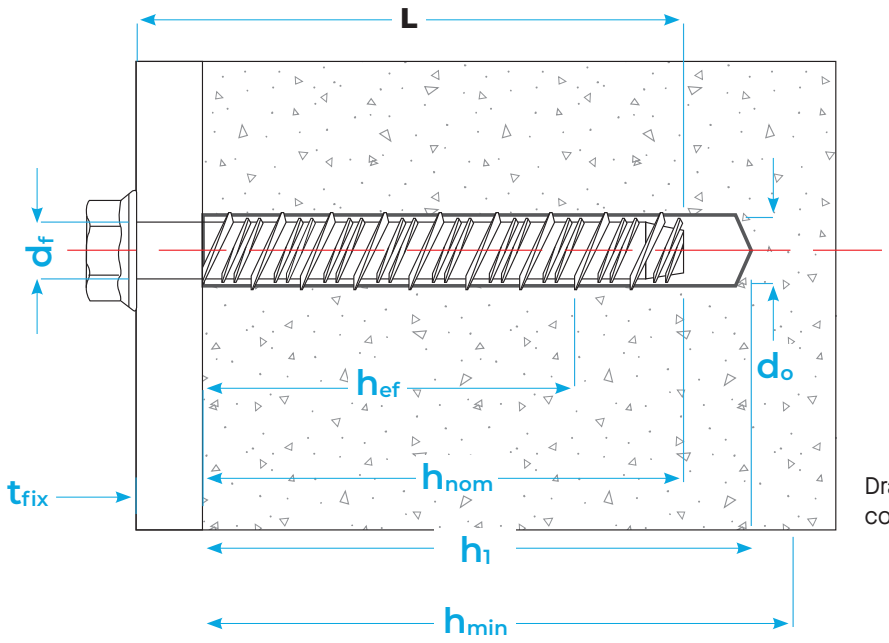
- Minimum 50 year working life
- C1 Seismic rated
- Up to 120 min fire rating
- All in accordance with AS5216-2021 & EOTA TR049

ANCHOR-FAST PRO

Outer diameter of thread: D=7.5
Drill diameter d_f = 6.0mm
Length: L =45mm
Material: Zinc plated carbon steel

FIRE RESISTANCE F120 SEISMIC C1 ETA CE

INSTALLED CONDITION



Drawing A1. Installed condition for screw-bolt

h_{ef}: Effective anchorage depth
h_1: Depth of drilled hole
h_{nom}: Overall anchor embedment depth in the concrete
h_{min}: Minimum thickness of concrete member
t_{fix}: Thickness of fixture
d_o: Nominal diameter of drill bit
d_f: Diameter of clearance hole in fixture
t_{fix}: Fixture thickness

INSTALLATION PARAMETERS CARBON STEEL			
h_{nom}	Overall anchor embedment depth in the concrete:	[mm]	40
d_o	Nominal diameter of drill bit:	[mm]	6
d_f	Diameter of clearance hole in fixture:	[mm]	9
d_s	Outer diameter of the thread:	[mm]	7.5
d_k	Core diameter:	[mm]	5.4
h_{min}	Minimum thickness of concrete member:	[mm]	100
h_1	Depth of drilled hole:	[mm]	50
h_{ef}	Effective anchorage depth:	[mm]	29
T_{ins}	Installation torque:	[Nm]	15
t_{fix}	Thickness of fixture(1):	[mm]	L-40
S_{min}	Minimum allowable spacing:	[mm]	35
C_{min}	Minimum allowable edge distance:	[mm]	35

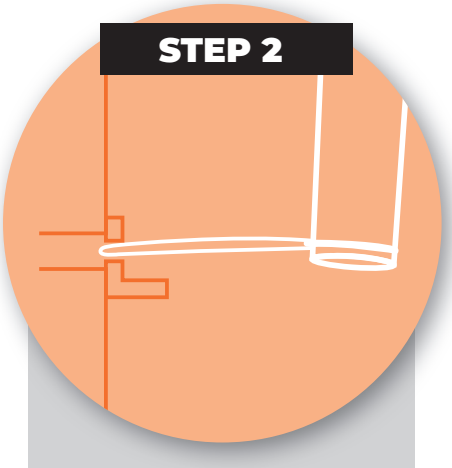
ANCHOR-FAST PRO INSTALLATION STEP-BY-STEP PROCESS

STEP 1

DRILL

Drill a hole into the base material of correct diameter and depth by using a carbide drill bit into rotary plus hammer mode.

STEP 2



BLOW AND CLEAN

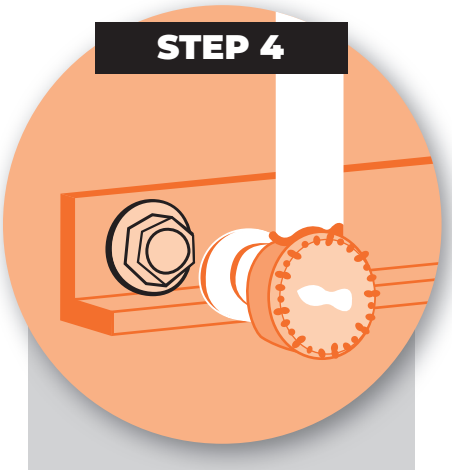
Remove dust and debris from hole and loose particles left from drilling by using hand pump, compress air or vacuum.

STEP 3

INSTALL

Hold screw anchor perpendicular direction into the base material through fixtures.

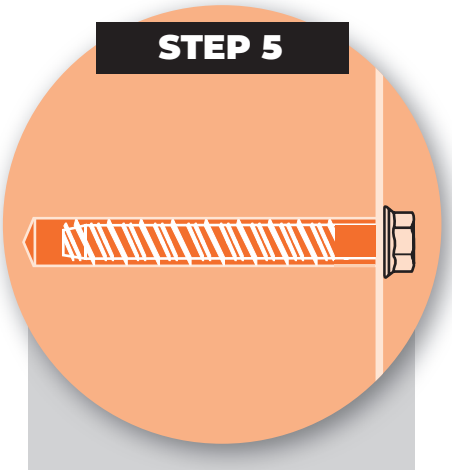
STEP 4



APPLY TORQUE

Select a power impact wrench or a torque wrench (e.g: bosch GDS 18E, power input: 500 W; torque: 50-250 Nm). Power impact wrench does not exceed over torque Tinst.

STEP 5



CHECK

The head must be undamaged and in contact with the fixture. When screw head attach fixture or concrete surface firmly, further turning of the head is unnecessary.

ANCHOR-FAST PRO

CHARACTERISTIC VALUES OF RESISTANCE TO TENSION LOADS OF DESIGN METHOD A			
h_{nom}	Overall anchor embedment depth in the concrete:	[mm]	40
	TENSION LOADS: STEEL FAILURE		
$N_{Rk,s}$	Tension steel characteristic resistance:	[kN]	18.7
γ_{Ms}	Partial safety factor: (1)	[-]	1.5
	TENSION LOADS: PULL-OUT FAILURE IN CONCRETE		
$N_{Rk,p,ucr}$	Tension characteristic resistance in C20/25 uncracked concrete:	[kN]	6.0
$N_{Rk,p,cr}$	Tension characteristic resistance in C20/25 cracked concrete:	[kN]	3.0
ψ_c	C30/37:	[-]	1.16
ψ_c	C40/45:	[-]	1.29
ψ_c	C50/60:	[-]	1.40
	TENSION LOADS: CONCRETE CONE AMD SPLITTING FAILURE		
γ_{ins}	Installation safety factor: (1)	[-]	1.2
h_{ef}	Effective embedment depth:	[mm]	29
$k_{ucr,N}$	Factor for uncracked concrete:	[-]	11.0
$N^0_{Rk,c,ucr}$	Tension characteristic resistance in C20/25 uncracked concrete: (3)	[kN]	7.7
$k_{cr,N}$	Factor for cracked concrete:	[-]	7.7
$N^0_{Rk,c,ucr}$	Tension characteristic resistance in C20/25 cracked concrete: (3)	[kN]	5.4
$s_{cr,N}$	Critical spacing:	[mm]	3.0 x h_{ef}
$c_{cr,N}$	Critical edge distance:	[mm]	1.5 x h_{ef}
$s_{cr,sp}$	Critical spacing (splitting):	[mm]	3.0 x h_{ef}
$c_{cr,sp}$	Critical spacing distance (splitting):	[mm]	1.5 x h_{ef}
	DISPLACEMENTS UNDER TENSION LOADS IN UNCRACKED CONCRETE		
N	Service tension load in uncracked concrete C20/25 to C50/60: (3)	[kN]	2.4
δ_{N0}	Short term displacement under tension loads:	[mm]	0.06
$\delta_{N\infty}$	Long term displacement under tension loads:	[mm]	0.30
	DISPLACEMENTS UNDER TENSION LOADS IN CRACKED CONCRETE		
N	Service tension load in cracked concrete C20/25 to C50/60: (3)	[kN]	1.2
δ_{N0}	Short term displacement under tension loads:	[mm]	0.10
$\delta_{N\infty}$	Long term displacement under tension loads:	[mm]	1.10

[1] In absence of other national regulations [2] Pull-out failure is not decisive (NORk,c < NRk,p) [3] Equation 7.2 from EN 1992-4:2018

ANCHOR-FAST PRO

CHARACTERISTIC VALUES OF RESISTANCE TO SHEAR LOADS

	SHEAR LOADS: STEEL FAILURE WITHOUT LEVER ARM		
$V_{Rk,s}$	Shear steel characteristic resistance:	[kN]	**9.3**
k_7	k_7 factor:(1)	[-]	**0.8**
γ_{Ms}	Partial safety factor: (2)	[-]	**1.25**
	SHEAR LOADS: STEEL FAILURE WITH LEVER ARM		
$M^0_{rk,s}$	Characteristic bending moment:	[Nm]	**15.2**
γ_{inst}	Partial safety factor: (2)	[-]	**1.25**
	SHEAR LOADS: CONCRETE PRY-OUT FAILURE		
k_8	k_8 factor:(1)	[-]	**1.0**
γ_{inst}	Installation safety factor: (2)	[-]	**1.0**
	SHEAR LOADS: CONCRETE EDGE FAILURE		
l_f	Effective anchorage depth under shear loads:	[mm]	**29**
d_{nom}	Nominal outer diameter of screw:	[mm]	**6**
γ_{inst}	Installation safety factor: (2)	[-]	**1.0**
	DISPLACEMENTS UNDER SHEAR LOADS IN UNCRACKED CONCRETE		
V	Service shear load in uncracked concrete C20/25 to C50/60:	[kN]	**3.0**
δ_{v0}	Short term displacement under shear loads:	[mm]	**0.47**
$\delta_{v\infty}$	Long term displacement under shear loads: (2)	[mm]	**0.70**
	DISPLACEMENTS UNDER SHEAR LOADS IN CRACKED CONCRETE		
V	Service shear load in cracked concrete C20/25 to C50/60:	[kN]	**2.1**
δ_{v0}	Short term displacement under shear loads:	[mm]	**0.40**
$\delta_{v\infty}$	Long term displacement under shear loads:	[mm]	**0.60**

(1) The diameter of the clearance hole does not meet the values given in EN 1992-4 Table 6.1. However, the group resistance under shear loading has been verified in the assessment through testing and accounted for in the factor k7.
(2) In absence of other national regulations.

ESSENTIAL CHARACTERISTICS FOR SEISMIC PERFORMANCE CATEGORY C1

	STEEL FAILURE FOR TENSION AND SHEAR LOADS		
$N_{Rk,s,C1}$	Tension steel characteristic resistance:	[kN]	**18.7**
γ_{Ms}	Partial safety factor: [1]	[-]	**1.5**
$V_{Rk,s,C1}$	Characteristic resistance:	[kN]	**6.4**
γ_{Ms}	Partial safety factor: [1]	[-]	**1.25**
	PULL-OUT FAILURE		
$N_{Rk,p,C1}$	Characteristic resistance in cracked concrete:	[kN]	**2.9**
γ_{inst}	Robustness:	[-]	**1.2**
	CONCRETE CONE FAILURE		
h_{ef}	Effective embedment depth:	[mm]	**29**
$S_{cr,N}$	Concrete Spacing:	[mm]	**87**
$C_{cr,N}$	Cone failure edge distance:	[mm]	**43**
γ_{inst}	Installation safety factor: [1]	[-]	**1.2**
	CONCRETE PRY-OUT FAILURE		
N	Pry-out factor:	[-]	**1.0**
γ_{inst}	Installation safety factor:	[-]	**1.0**
	CONCRETE EDGE FAILURE		
$\ell_f = h_{ef}$	Effective length of fastener under shear loads:	[mm]	**29**
d_{nom}	Nominal outer diameter of screw:	[mm]	**6**
γ_{inst}	Installation safety factor:	[-]	**1.0**

[1] In absence of other national regulations

ANCHOR-FAST PRO

FIRE RESISTANCE DURATION			MINUTES			
			30	60	90	120
	TENSION LOADS, STEEL FAILURE					
$N_{Rk,s,fi,30}$	Characteristic resistance:	[kN]	0.23	0.21	0.16	0.11
	PULL-OUT FAILURE					
$N_{Rk,p,fi,30}$	Characteristic resistance in concrete:	[kN]	0.77	0.77	0.77	0.62
	CONCRETE CONE FAILURE [1]					
$N_{Rk,p,fi,30}$	Characteristic resistance in concrete:	[kN]	0.78	0.78	0.78	0.62
	SHEAR LOADS STEEL FAILURE WITHOUT LEVER ARM					
$V_{Rk,s,fi,30}$	Characteristic resistance:	[kN]	0.23	0.21	0.16	0.11
	SHEAR LOADS, STEEL FAILURE WITH LEVER ARM					
$M_{Rk,s,fi,30}$	Characteristic bending resistance:	[Nm]	0.19	0.17	0.13	0.09

h_{ef}	Effective anchorage depth:	[mm]	29
$S_{cr,N}$	Spacing	[mm]	116
S_{min}	Minimum spacing	[mm]	35
$C_{12\,N}$	Edge distance	[mm]	58
C_{min}	Minimum edge distance (one side fire)	[mm]	35
C_{min}	Minimum edge distance (two sides fire)	[mm]	300
γ_{Msp}	Partial safety factor: [1]	[-]	1.0

[1] As a rule, splitting failure can be neglected when cracked concrete and reinforcement is assumed.
Note: In absence of other national regulations, the partial safety factor for resistance under fire exposure M,fi = 1.0 is recommended for steel failure and concrete related failure modes under shear loading. In case of concrete related failure modes under tension M,fi = inst.

BASE MATERIALS:

- Reinforced and unreinforced normal weight concrete without fibers according to EN 206:2013 + A1:2016.
- Strength classes C20/25 to C50/60 according to EN 206:2013 + A1:2016.
- Cracked and uncracked concrete.

USE CONDITIONS (ENVIRONMENTAL CONDITIONS):

- The Anchor-Fast Pro Carbon Steel shall be used in dry internal conditions.

DESIGN:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete.
- Verifiable calculation rules and drawings are prepared taking into account of the loads to be attached. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.)
- Anchorages under static or quasi-static loads are designed for design Method A in accordance with EN 1992-4:2018
- Anchorages under seismic actions are designed in accordance with EN 1992-4:2018. Anchorages shall be positioned outside of critical regions (e.g. plastic hinges) of the concrete structure. Fastening in stand-off installation or with grout layer are not allowed.
- Anchorages under fire exposure are designed in accordance with EN 1992-4:2018. It must be ensured that local spalling of the concrete cover does not occur.
- Shear assessment only covers the shear force induced by the fixed piece, i.e. the piece located between the anchor head and the concrete block (piece contained in tfix, see Drawing A1).