



## Direct fixing bimetal concrete screw, for use in cracked and non-cracked concrete.

**TXE**

Assessed ETA Option 1 for structural use and ETA assessed for non structural use. Stainless steel A4 and hardened carbon steel.



### PRODUCT INFORMATION

#### DESCRIPTION

Bimetal screw, with thread for fixing in cracked and non-cracked concrete

#### OFFICIAL DOCUMENTATION

- CE-1219-CPR-0254.
- ETA 20/0046 option 1.
- Declaration of Performance DoP THE.

#### SIZES

Ø6x40(Ø6) to Ø12x110(Ø12).

#### DESIGN LOAD RANGE

From 3,06 to 25,02 kN (non-cracked)  
From 0,56 to 17,52 kN (cracked).



#### BASE MATERIAL

Concrete class C20/25 to C50/60 cracked or non-cracked.



Stone Concrete Reinforced Concrete Cracked Concrete

#### ASSESSMENTS

- Option 1 (Cracked and non cracked concrete).
- Fire Resistance R30-120.
- Seismic C1 Ø6÷Ø12.
- VdS Certificate CEA 4001.



#### CHARACTERISTICS AND BENEFITS

- Easy installation
- Use in cracked and non-cracked concrete.
- Use for heavy duty loads.
- Several versions with different heads (see full range).
- Variety of length and diameters: flexibility in assembly.
- Suitable when reduced distance to edge and between anchors is required.
- Working by mechanical interlock between concrete and thread.
- For static and quasi static loads and seismic.
- Direct fixing; no wrench needed.
- Can be uninstalled leaving the surface clear. (Reusable).
- Available at INDEXcal.



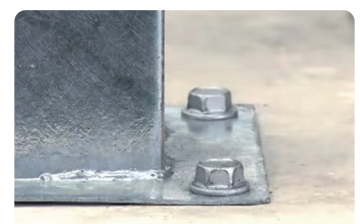
#### MATERIALS

Screw: Stainless steel A4 and hardened carbon steel.



#### APPLICATIONS

- Structural fixings cracked and non cracked concrete, including industrial and marine environments.
- Glazing, windows and shop windows.
- Industrial racks.
- Installation of railings and handrails in interiors.
- Fixation of steel structures, canals, machinery, boilers, signs, stadium seats, facade substructures, etc.
- Fixing of wood structures in concrete.



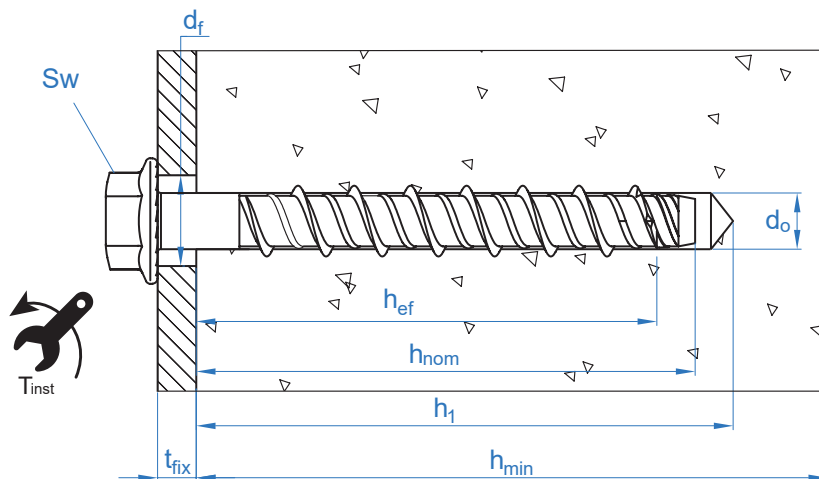


**MECHANICAL PROPERTIES**

			Ø6	Ø8	Ø10	Ø12
Threaded area section						
$A_s$	(mm <sup>2</sup> )	Threaded area section	26,0	45,3	71,2	100,6
$F_{u,s}$	(N/mm <sup>2</sup> )	Characteristic tension resistance	740	740	740	720
$F_{y,s}$	(N/mm <sup>2</sup> )	Yield strength	592	592	592	576

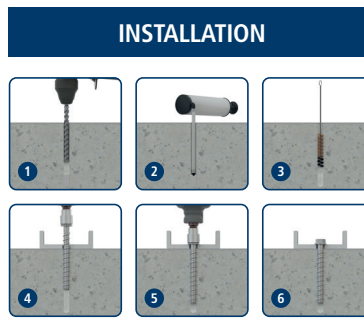
**INSTALLATION DATA**

SIZE			Ø6		Ø8		Ø10		Ø12	
Code			TXX06XXX		TXX08XXX		TXX10XXX		TXX12XXX	
			$h_{ef1}$	$h_{ef3}$	$h_{ef1}$	$h_{ef3}$	$h_{ef1}$	$h_{ef3}$	$h_{ef1}$	$h_{ef3}$
$d_0$	Drill diameter	[mm]	6		8		10		12	
$T_{ins}$	Recommended torque ≤	[Nm]	10		20		30		50	
$d_f$	Fixture diameter	[mm]	9		12		14		16	
$h_1$	Minimum drill depth	[mm]	45	65	60	75	65	95	90	120
$h_{nom}$	Embedment depth	[mm]	35	55	50	65	55	85	75	105
$h_{ef}$	Min. effective depth	[mm]	26	43	37,5	50,5	41,5	67	58	83,5
$h_{min}$	Base material minimum thickness	[mm]	80	80	80	80	80	100	120	160
$t_{fix}$	Maximum fixture thickness	[mm]	L-35	L-55	L-50	L-65	L-55	L-85	L-75	L-105
$S_{cr,N}$	Critical spacing	[mm]	78	129	113	151,5	125	201	174	250,5
$C_{cr,N}$	Critical edge distance	[mm]	39	64,5	56,5	75,75	62,5	100,5	87	125,25
$S_{cr,sp}$	Critical spacing to cracking	[mm]	90	180	130	220	140	230	190	240
$C_{cr,sp}$	Critical edge distance to cracking	[mm]	45	95	65	110	70	115	95	120
$S_{min}$	Minimum spacing	[mm]	35		35		50		75	
$C_{min}$	Minimum edge distance	[mm]	35		35		40		45	
SW	Installation wrench		10/30		13/45		15/50		18/55	





Code	INSTALLATION PRODUCTS
	Hammer drill
BHDSXXXXX	Concrete Drill bits
MOBOMBA	Blow pump
MORCEPKIT	Cleaning Brush
	Impact wrench
	Hexagonal socket



### Resistances in C20/25 concrete for an isolated anchor, without effects of edge distance or spacing

Characteristic Resistance													
TENSION						SHEAR							
Size		Ø6	Ø8	Ø10	Ø12	Size		Ø6	Ø8	Ø10	Ø12		
$N_{Rk}$	Non-cracked concrete	$h_{ef3}$	12,00	17,65	26,98	37,54	$V_{Rk}$	Non-cracked concrete	$h_{ef3}$	8,79	14,65	24,06	34,84
		$h_{ef2}$	-	-	-	-			$h_{ef2}$	-	-	-	-
		$h_{ef1}$	5,50	10,00	13,15	21,73			$h_{ef1}$	8,79	14,65	24,07	34,84
$N_{Rk}$	Cracked concrete	$h_{ef3}$	7,50	12,36	18,89	26,27	$V_{Rk}$	Cracked concrete	$h_{ef3}$	10,20	17,18	24,06	34,84
		$h_{ef2}$	-	-	-	-			$h_{ef2}$	-	-	-	-
		$h_{ef1}$	1,00	5,00	9,21	14,10			$h_{ef1}$	8,54	13,52	16,85	33,31

Design Resistance													
TENSION						SHEAR							
Size		Ø6	Ø8	Ø10	Ø12	Size		Ø6	Ø8	Ø10	Ø12		
$N_{Rd}$	Non-cracked concrete	$h_{ef3}$	6,67	9,81	14,99	25,02	$V_{Rd}$	Non-cracked concrete	$h_{ef3}$	7,03	11,72	19,25	27,87
		$h_{ef2}$	-	-	-	-			$h_{ef2}$	-	-	-	-
		$h_{ef1}$	3,06	5,56	7,31	12,07			$h_{ef1}$	7,03	11,72	16,04	27,87
$N_{Rd}$	Cracked concrete	$h_{ef3}$	4,17	6,87	10,49	17,52	$V_{Rd}$	Cracked concrete	$h_{ef3}$	6,80	11,45	19,25	27,87
		$h_{ef2}$	-	-	-	-			$h_{ef2}$	-	-	-	-
		$h_{ef1}$	0,56	2,78	5,11	7,83			$h_{ef1}$	5,69	9,01	11,23	22,21

Maximum Loads Recommended													
TENSION						SHEAR							
Size		Ø6	Ø8	Ø10	Ø12	Size		Ø6	Ø8	Ø10	Ø12		
$N_{rec}$	Non-cracked concrete	$h_{ef3}$	4,76	7,01	10,71	17,87	$V_{rec}$	Non-cracked concrete	$h_{ef3}$	5,02	8,37	13,75	19,91
		$h_{ef2}$	-	-	-	-			$h_{ef2}$	-	-	-	-
		$h_{ef1}$	2,18	3,97	5,22	8,62			$h_{ef1}$	5,02	8,37	11,46	19,91
$N_{rec}$	Cracked concrete	$h_{ef3}$	2,98	4,90	7,49	12,51	$V_{rec}$	Cracked concrete	$h_{ef3}$	4,85	8,18	13,75	19,91
		$h_{ef2}$	-	-	-	-			$h_{ef2}$	-	-	-	-
		$h_{ef1}$	0,40	1,98	3,65	5,60			$h_{ef1}$	4,07	6,44	8,02	15,86

### Simplified calculation method. European Technical Assessment ETA 20/0046

Simplified version of the calculation method according to Eurocode 2 EN 1992-4. Resistance is calculated according to the data shown in assessment 20/0046.

The calculation method is based on the following simplification: **Different loads do not act on individual anchors, without eccentricity.**

- Influence of concrete strength.
- Influence of edge distance.
- Influence of spacing between anchors.
- Influence of reinforcements.
- Influence of base material thickness.
- Influence of load application angle.
- Valid for a group of two anchors.



#### INDEXcal

For a more accurate calculation and to take more constructive provisions into account, we recommend using our calculation program INDEXcal. It may be easily downloaded from our website [www.indexfix.com](http://www.indexfix.com)

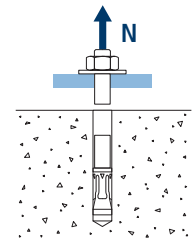


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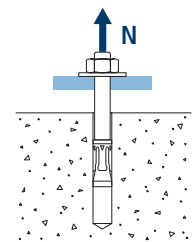
## TENSION LOADS

- Steel design resistance:  $N_{Rd,s}$
- Pull-out design resistance:  $N_{Rd,p} = N_{Rd,p}^o \cdot \psi_c$
- Concrete cone design resistance:  $N_{Rd,c} = N_{Rd,c}^o \cdot \psi_b \cdot \psi_{s,N} \cdot \psi_{c,N} \cdot \psi_{re,N}$
- Concrete splitting design resistance:  $N_{Rd,sp} = N_{Rd,c}^o \cdot \psi_b \cdot \psi_{s,sp} \cdot \psi_{c,sp} \cdot \psi_{re,N} \cdot \psi_{h,sp}$

Steel Design resistance						
$N_{Rd,s}$						
Size			Ø6	Ø8	Ø10	Ø12
$N_{Rd}^o$	Non-cracked concrete	$h_{ef3}$	11,72	19,53	32,09	46,45
		$h_{ef2}$	-	-	-	-
		$h_{ef1}$	11,72	19,53	32,09	46,45
$N_{Rd}^o$	Cracked concrete	$h_{ef3}$	11,72	19,53	32,09	46,45
		$h_{ef2}$	-	-	-	-
		$h_{ef1}$	11,72	19,53	32,09	46,45

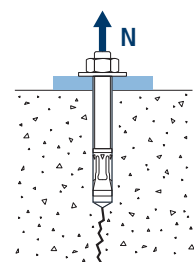
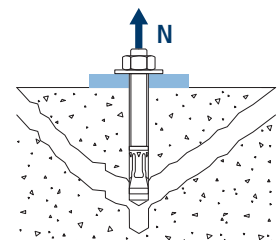


Pull-out design resistance						
$N_{Rd,p} = N_{Rd,p}^o \cdot \psi_c$						
Size			Ø6	Ø8	Ø10	Ø12
$N_{Rd,p}^o$	Non-cracked concrete	$h_{ef3}$	6,67	-*	-*	-*
		$h_{ef2}$	-	-	-	-
		$h_{ef1}$	3,06	5,56	-*	-*
$N_{Rd,p}^o$	Cracked concrete	$h_{ef3}$	4,17	-*	-*	-*
		$h_{ef2}$	-	-	-	-
		$h_{ef1}$	0,56	2,78	-*	7,83



\* Pull-out failure is not decisive.

Concrete cone design resistance						
$N_{Rd,c} = N_{Rd,c}^o \cdot \psi_b \cdot \psi_{s,N} \cdot \psi_{c,N} \cdot \psi_{re,N}$						
Concrete cone design resistance*						
$N_{Rd,sp} = N_{Rd,c}^o \cdot \psi_b \cdot \psi_{s,sp} \cdot \psi_{c,sp} \cdot \psi_{re,N} \cdot \psi_{h,sp}$						
Size			Ø6	Ø8	Ø10	Ø12
$N_{Rd,c}^o$	Non-cracked concrete	$h_{ef3}$	7,71	9,81	14,99	25,02
		$h_{ef2}$	-	-	-	-
		$h_{ef1}$	3,62	6,28	7,31	12,07
$N_{Rd,c}^o$	Cracked concrete	$h_{ef3}$	5,39	6,87	10,49	17,52
		$h_{ef2}$	-	-	-	-
		$h_{ef1}$	2,54	4,39	5,11	8,45



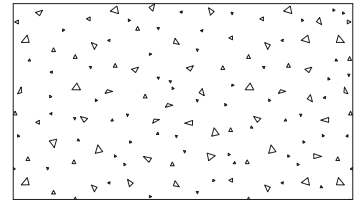
\*Concrete splitting design resistance must only be considered for non-cracked concrete.



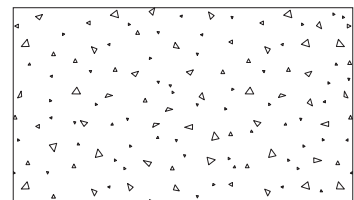
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## Coefficients of influence

Influence of concrete strength resistance in pul-out failure $\psi_c$			Ø6	Ø8	Ø10	Ø12
$\psi_c$	$h_{efB}$	C 20/25	1,00			
		C 30/37	1,06	1,08	1,08	1,08
		C 40/50	1,10	1,15	1,14	1,15
		C 50/60	1,14	1,19	1,18	1,19
	$h_{ef2}$	C 20/25	1,00			
		C 30/37	-	-	-	-
		C 40/50	-	-	-	-
		C 50/60	-	-	-	-
	$h_{ef1}$	C 20/25	1,00			
		C 30/37	1,12	1,10	1,08	1,10
		C 40/50	1,21	1,17	1,14	1,18
		C 50/60	1,29	1,23	1,19	1,25



Influence of concrete strength in concret cone and splitting failure $\psi_b$			Ø6	Ø8	Ø10	Ø12
$\psi_b$	C 20/25	1,00				
	C 30/37	1,22				
	C 40/50	1,41				
	C 50/60	1,58				



$$\psi_b = \sqrt{\frac{f_{ck,cube}}{25}} \geq 1$$



**TXE**



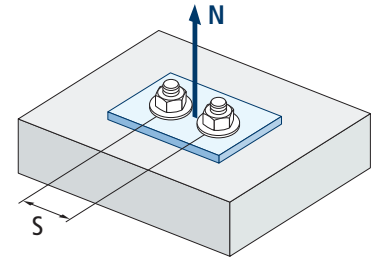
$$\psi_{s,N} = 0,5 + \frac{s}{2 \cdot s_{cr,N}} \leq 1$$

Influence of spacing (concrete cone) $\psi_{s,N}$									
s [mm]	TXE								
	Ø6		Ø8		Ø10		Ø12		
	$h_{eff}$	$h_{ef3}$	$h_{eff}$	$h_{ef3}$	$h_{eff}$	$h_{ef3}$	$h_{eff}$	$h_{ef3}$	
35	0,72	0,64	0,66	0,62	Invalid value				
40	0,76	0,66	0,68	0,63					
50	0,82	0,69	0,72	0,67					
60	0,88	0,73	0,77	0,70					
70	0,95	0,77	0,81	0,73	0,78	0,67	Invalid value		
75	0,98	0,79	0,83	0,75	0,80	0,69			
78	1,00	0,80	0,85	0,76	0,81	0,69			
80		0,81	0,86	0,76	0,82	0,70			
90		0,85	0,90	0,80	0,86	0,72			
100		0,89	0,94	0,83	0,90	0,75			
110		0,93	0,99	0,86	0,94	0,77			
113		0,94	1,00	0,87	0,95	0,78			
120		0,97		0,90	0,98	0,80			
125		0,98		0,91	1,00	0,81			
130		1,00		0,93		0,82			
140				0,96		0,85			
150				1,00		0,87			
152				1,00		0,88			
160						0,90			
170						0,92			
174						0,93			
176						0,94			
180						0,95			
190						0,97			
200						1,00			
201						1,00			
209	Value without reduction = 1								0,92
210							0,92		
220							0,94		
230							0,96		
240							0,98		
250							1,00		



Influence of spacing (concrete splitting) $\psi_{s,sp}$									
s [mm]	TXE								
	Ø6		Ø8		Ø10		Ø12		
	$h_{ef1}$	$h_{ef3}$	$h_{ef1}$	$h_{ef3}$	$h_{ef1}$	$h_{ef3}$	$h_{ef1}$	$h_{ef3}$	
35	0,69	0,59	0,63	0,58	Invalid value				
40	0,72	0,61	0,65	0,59					
50	0,78	0,63	0,69	0,61					
60	0,83	0,66	0,73	0,64					
70	0,89	0,68	0,77	0,66	0,75	0,65			
75	0,92	0,70	0,79	0,67	0,77	0,66	0,70	0,66	
78	0,93	0,71	0,80	0,68	0,78	0,67	0,71	0,66	
80	0,94	0,71	0,81	0,68	0,79	0,67	0,71	0,67	
90	1,00	0,74	0,85	0,70	0,82	0,70	0,74	0,69	
100			0,76	0,88	0,73	0,86	0,72	0,76	0,71
110			0,79	0,92	0,75	0,89	0,74	0,79	0,73
113			0,80	0,93	0,76	0,90	0,75	0,80	0,74
120			0,82	0,96	0,77	0,93	0,76	0,82	0,75
125			0,83	0,98	0,78	0,95	0,77	0,83	0,76
130			0,84	1,00	0,80	0,96	0,78	0,84	0,77
140			0,87		0,82	1,00	0,80	0,87	0,79
150			0,89		0,84		0,83	0,89	0,81
152			0,90		0,85		0,83	0,90	0,82
160			0,92		0,86		0,85	0,92	0,83
170			0,95		0,89		0,87	0,95	0,85
174			0,96		0,90		0,88	0,96	0,86
176			0,96		0,90		0,88	0,96	0,87
180			0,97		0,91		0,89	0,97	0,88
190			1,00		0,93		0,91	1,00	0,90
200					0,95		0,93		0,92
201					0,96		0,94		0,92
209					0,98		0,95		0,94
210					0,98		0,96		0,94
220	Value without reduction = 1			1,00		0,98			0,96
230						1,00			0,98
240									1,00

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$$\psi_{s,sp} = 0,5 + \frac{s}{2 \cdot s_{cr,sp}} \leq 1$$



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$$\psi_{c,sp} = 0,35 + \frac{0,5 \cdot c}{C_{cr,sp}} + \frac{0,15 \cdot c^2}{C_{cr,sp}^2} \leq 1$$

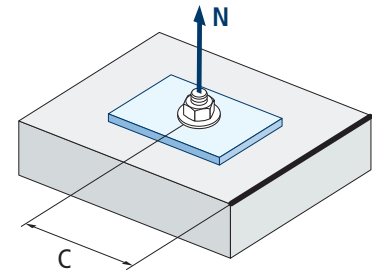
Influence of concrete edge distance (splitting) $\psi_{c,sp}$										
c [mm]	TXE									
	Ø6		Ø8		Ø10		Ø12			
	$h_{eff}$	$h_{ef3}$	$h_{eff}$	$h_{ef3}$	$h_{eff}$	$h_{ef3}$	$h_{eff}$	$h_{ef3}$		
35	0,83	0,55	0,66	0,52	Invalid value					
39	0,90	0,58	0,70	0,55						
40	0,91	0,59	0,71	0,55	0,68	0,54	Invalid value			
45	1,00	0,62	0,77	0,58	0,73	0,57			0,62	0,56
50	Value without reduction = 1		0,65	0,82	0,61	0,78	0,60	0,65	0,58	
55			0,69	0,88	0,64	0,84	0,62	0,69	0,61	
57			0,70	0,90	0,65	0,86	0,63	0,70	0,62	
60			0,73	0,94	0,67	0,89	0,65	0,73	0,64	
63			0,75	0,98	0,69	0,92	0,67	0,75	0,65	
65			0,76	1,00	0,70	0,94	0,68	0,76	0,66	
70			0,80	Value without reduction = 1		0,73	1,00	0,71	0,80	0,69
76			0,85			0,77	0,75	0,85	0,73	
80			0,88			0,79	0,77	0,88	0,75	
85			0,92			0,83	0,80	0,92	0,78	
87			0,93			0,84	0,81	0,93	0,79	
88			0,94			0,85	0,82	0,94	0,80	
90	0,96	0,86	0,83			0,96	0,81			
95	1,00	0,89	0,87			1,00	0,84			
100	Value without reduction = 1		0,93			0,90	0,87	0,87		
101			0,94			0,90	0,88	0,88		
104			0,96			0,92	0,90	0,90		
105			0,96			0,93	0,90	0,90		
110			1,00	0,97	0,93	0,93				
115			1,00	0,97	0,93	0,93				
120			1,00	1,00	1,00	1,00				





Influence of concrete edge distance (concrete cone) $\psi_{c,N}$															
c [mm]	TXE														
	Ø6		Ø8		Ø10		Ø12								
	$h_{ef1}$	$h_{ef3}$	$h_{ef1}$	$h_{ef3}$	$h_{ef1}$	$h_{ef3}$	$h_{ef1}$	$h_{ef3}$							
35	0,92	0,67	0,72	0,61	Invalid value										
39	1,00	0,71	0,77	0,65											
40	Value without reduction = 1		0,72	0,78	0,66	0,73	0,57	0,65	0,55						
45			0,77	0,85	0,70	0,79	0,60	0,69	0,57						
50			0,83	0,91	0,75	0,85	0,64	0,73	0,60						
55			0,89	0,98	0,79	0,91	0,67	0,74	0,61						
57			0,91	1,00	0,81	0,93	0,68	0,77	0,62						
60			0,94	Value without reduction = 1		0,84	0,97	0,70	0,79	0,64					
63			0,98			0,87	1,00	0,72	0,79	0,65					
65			1,00			0,89	Value without reduction = 1		0,74	0,81	0,68				
70			Value without reduction = 1			0,94			0,77	0,85	0,71				
76						1,00			0,81	0,90	0,73				
80						Value without reduction = 1			Value without reduction = 1		0,84	0,94	0,76		
85											0,88	0,98	0,77		
87	0,90	1,00									0,78				
88	0,90	Value without reduction = 1									0,79				
90	0,92										0,82				
95	0,96										0,84				
100	1,00										0,85				
101	1,00				0,87										
104	Value without reduction = 1				Value without reduction = 1						0,87				
105								0,90							
110				0,94											
115				0,97											
120				1,00											
125				Value without reduction = 1			Value without reduction = 1		0,90						

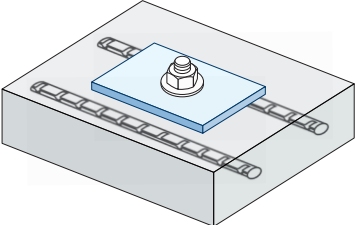
**TXE**



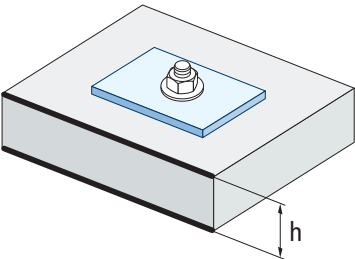
$$\psi_{c,N} = 0,35 + \frac{0,5 \cdot c}{C_{cr,N}} + \frac{0,15 \cdot c^2}{C_{cr,N}^2} \leq 1$$



**TXE**



$$\Psi_{re,N} = 0,5 + \frac{h_{ef}}{200} \leq 1$$



Influence of reinforcements $\Psi_{re,N}$								
$\Psi_{re,N}$	TXE							
	Ø6		Ø8		Ø10		Ø12	
	$h_{ef1}$	$h_{ef3}$	$h_{ef1}$	$h_{ef3}$	$h_{ef1}$	$h_{ef3}$	$h_{ef1}$	$h_{ef3}$
	0,63	0,715	0,6875	0,7525	0,7075	0,835	0,79	0,9175

\*This factor only applies for a high density of reinforcements. If in the area of the anchor there are reinforcements with a distancing of  $\geq 150$  mm (any diameter) or with a diameter  $\leq 10$  mm and a distancing of  $\geq 100$  mm, a  $f_{re,N} = 1$  factor may be applied.

Influence of base material thickness $\Psi_{h,sp}$										
$\Psi_{h,sp}$	TXE									
	h/h <sub>ef</sub>	2,00	2,20	2,40	2,60	2,80	3,00	3,20	3,40	3,60
fh	1,00	1,07	1,13	1,19	1,25	1,31	1,37	1,42	1,48	1,50

$$\Psi_{h,sp} = \left( \frac{h}{2 \cdot h_{ef}} \right)^{2/3} \leq 1,5$$

**SHEAR LOADS**

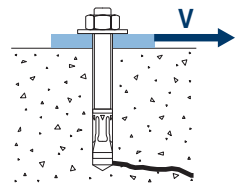
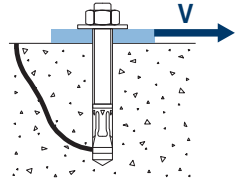
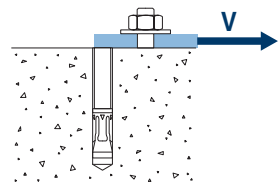
- Steel design resistance without lever arm:  $V_{Rd,s}$
- Pry-out design resistance:  $V_{Rd,cp} = k \cdot N_{Rd,c}^o$
- Concrete edge design resistance:  $V_{Rd,c} = V_{Rd,c}^o \cdot \Psi_b \cdot \Psi_{se,V} \cdot \Psi_{c,V} \cdot \Psi_{re,V} \cdot \Psi_{\alpha,V} \cdot \Psi_{h,V}$

Steel design resistance				
$V_{Rd,s}$				
Size	Ø6	Ø8	Ø10	Ø12
$V_{Rd,s}$	7,03	11,72	19,25	27,87

Pry-out design resistance*					
$V_{Rd,cp} = k \cdot N_{Rd,c}^o$					
Size	Ø6	Ø8	Ø10	Ø12	
K	$h_{ef3}$	1,05	1,39	2,00	2,00
	$h_{ef2}$	-	-	-	-
	$h_{ef1}$	1,87	1,71	1,83	2,19

\*  $N_{Rd,c}^o$  Concrete cone design resistance for tension loads

Concrete edge resistance					
$V_{Rd,c} = V_{Rd,c}^o \cdot \Psi_b \cdot \Psi_{se,V} \cdot \Psi_{c,V} \cdot \Psi_{re,V} \cdot \Psi_{\alpha,V} \cdot \Psi_{h,V}$					
Size	Ø6	Ø8	Ø10	Ø12	
$V_{Rd,c}$ Non-cracked concrete	$h_{ef3}$	5,2	6,7	10,8	15,6
	$h_{ef2}$	-	-	-	-
	$h_{ef1}$	1,8	3,4	4,7	8,3
$V_{Rd,c}$ Cracked concrete	$h_{ef3}$	3,7	4,8	7,7	11,1
	$h_{ef2}$	-	-	-	-
	$h_{ef1}$	1,3	2,4	3,4	5,9



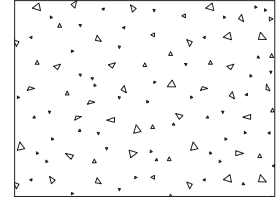


TXE

## Coefficients of influence

Influence of concrete strength in concrete edge failure  $\Psi_b$ 

		Ø6	Ø8	Ø10	Ø12
$\Psi_b$	C 20/25	1,00			
	C 30/37	1,22			
	C 40/50	1,41			
	C 50/60	1,55			



$$\Psi_b = \sqrt{\frac{f_{ck,cube}}{25}} \geq 1$$

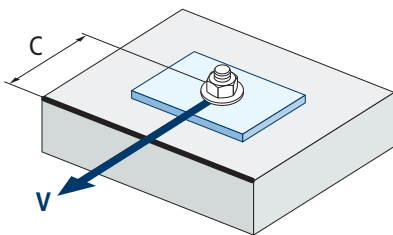
Influence of edge distance and spacing  $\Psi_{se,V}$ 

FOR ONE ANCHOR ONLY

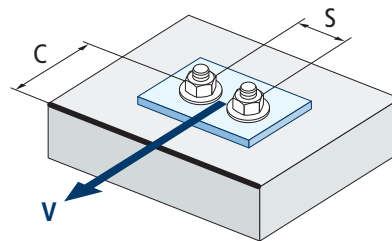
$c/h_{ef}$	0,50	0,75	1,00	1,25	1,50	1,75	2,00	2,25	2,50	2,75	3,00	3,25	3,50	3,75	4,00	4,50	5,00
Isolated	0,35	0,65	1,00	1,40	1,84	2,32	2,83	3,38	3,95	4,56	5,20	5,86	6,55	7,26	8,00	9,55	11,18

FOR TWO ANCHORS

$s/c$	$c/h_{ef}$	0,50	0,75	1,00	1,25	1,50	1,75	2,00	2,25	2,50	2,75	3,00	3,25	3,50	3,75	4,00	4,50	5,00
1,0	1,0	0,24	0,43	0,67	0,93	1,22	1,54	1,89	2,25	2,64	3,04	3,46	3,91	4,37	4,84	5,33	6,36	7,45
	1,5	0,27	0,49	0,75	1,05	1,38	1,74	2,12	2,53	2,96	3,42	3,90	4,39	4,91	5,45	6,00	7,16	8,39
	2,0	0,29	0,54	0,83	1,16	1,53	1,93	2,36	2,81	3,29	3,80	4,33	4,88	5,46	6,05	6,67	7,95	9,32
	2,5	0,32	0,60	0,92	1,28	1,68	2,12	2,59	3,09	3,62	4,18	4,76	5,37	6,00	6,66	7,33	8,75	10,25
	≥ 3,0	0,35	0,65	1,00	1,40	1,84	2,32	2,83	3,38	3,95	4,56	5,20	5,86	6,55	7,26	8,00	9,55	11,18



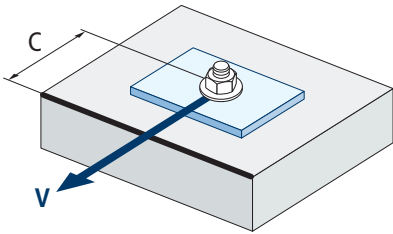
$$\Psi_{se,V} = \left(\frac{c}{h_{ef}}\right)^{1,5}$$



$$\Psi_{se,V} = \left(\frac{c}{h_{ef}}\right)^{1,5} \cdot \left(1 + \frac{s}{3 \cdot c}\right) \cdot 0,5 \leq \left(\frac{c}{h_{ef}}\right)^{1,5}$$



**TXE**

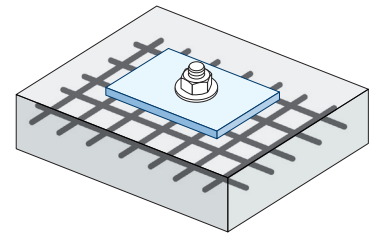


$$\psi_{c,v} = \left( \frac{d}{c} \right)^{0,20}$$

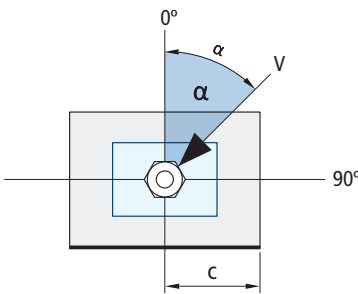
Influence of concrete edge distance $\psi_{c,v}$				
s [mm]	TXE			
	Ø6	Ø8	Ø10	Ø12
45	0,67			
50	0,65	0,69	Invalid value	
60	0,63	0,67		
70	0,61	0,65	0,68	
80	0,60	0,63	0,66	
85	0,59	0,62	0,65	0,68
90	0,58	0,62	0,64	0,67
100	0,57	0,60	0,63	0,65
105	0,56	0,60	0,62	0,65
110	0,56	0,59	0,62	0,64
120	0,55	0,58	0,61	0,63
125	0,54	0,58	0,60	0,63
128	0,54	0,57	0,60	0,62
130	0,54	0,57	0,60	0,62
135	0,54	0,57	0,59	0,62
140	0,53	0,56	0,59	0,61
150	0,53	0,56	0,58	0,60
160	0,52	0,55	0,57	0,60
170	0,51	0,54	0,57	0,59
175	0,51	0,54	0,56	0,59
180	0,51	0,54	0,56	0,58
190	0,50	0,53	0,55	0,58
200	0,50	0,53	0,55	0,57
210	0,49	0,52	0,54	0,56
220	0,49	0,52	0,54	0,56
230	0,48	0,51	0,53	0,55
240	0,48	0,51	0,53	0,55
250	0,47	0,50	0,53	0,54
260	0,47	0,50	0,52	0,54
270	0,47	0,49	0,52	0,54
280	0,46	0,49	0,51	0,53
290	0,46	0,49	0,51	0,53
300	0,46	0,48	0,51	0,53



Influence of reinforcements $\Psi_{re,v}$			
	Without perimetral reinforcements	Perimetral reinforcements $\geq \text{Ø}12 \text{ mm}$	Perimetral reinforcements with brackets $\leq 100 \text{ mm}$
Non-cracked concrete	1	1	1
Cracked concrete	1	1,2	1,4

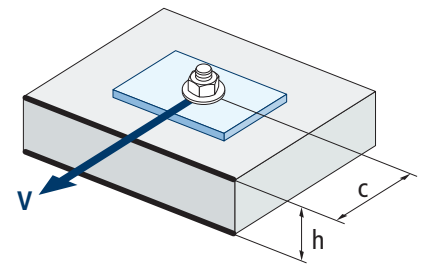


Influence of load application angle $\Psi_{\alpha,v}$										
Angle, $\alpha(^{\circ})$	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°
$\Psi_{\alpha,v}$	1,00	1,01	1,05	1,13	1,24	1,40	1,64	1,97	2,32	2,50



$$\Psi_{\alpha,v} = \sqrt{\frac{1}{(\cos \alpha_v)^2 + \left(\frac{\sin \alpha_v}{2,5}\right)^2}} \geq 1$$

Influence of base material thickness $\Psi_{h,v}$										
TXE										
h/c	0,15	0,30	0,45	0,60	0,75	0,90	1,05	1,20	1,35	$\geq 1,5$
$\Psi_{h,v}$	0,32	0,45	0,55	0,63	0,71	0,77	0,84	0,89	0,95	1,00



$$\Psi_{h,v} = \left(\frac{h}{1,5 \cdot c}\right)^{0,5} \geq 1,0$$

## FIRE RESISTANCE

Characteristic Resistance*									
	TENSION				SHEAR				
	Ø6	Ø8	Ø10	Ø12		Ø6	Ø8	Ø10	Ø12
RF30	0,24	0,79	1,64	2,95	RF30	0,24	0,79	1,64	2,95
RF60	0,22	0,63	1,31	2,45	RF60	0,22	0,63	1,31	2,45
RF90	0,17	0,48	1,05	1,96	RF90	0,17	0,48	1,05	1,96
RF120	0,12	0,40	0,92	1,57	RF120	0,12	0,40	0,92	1,57



\*The safety factor for design resistance under fire exposure is  $\gamma_{M,fi}=1$  (in absence of other national regulations). As a result the Characteristic Resistance is the same as Design Resistance.

Maximum Load Recommended									
	TENSION				SHEAR				
	Ø6	Ø8	Ø10	Ø12		Ø6	Ø8	Ø10	Ø12
RF30	0,17	0,56	1,17	2,11	RF30	0,17	0,56	1,17	2,11
RF60	0,16	0,45	0,94	1,75	RF60	0,16	0,45	0,94	1,75
RF90	0,12	0,34	0,75	1,40	RF90	0,12	0,34	0,75	1,40
RF120	0,09	0,29	0,66	1,12	RF120	0,09	0,29	0,66	1,12






# TXE

## RANGE

TXE					
Code	Size		Maximum thickness of fixture		
TXE06040	Ø6 x 40	10	5	100	1600
TXE06060	Ø6 x 60	10	5	100	1200
TXE08070	Ø8 x 70	13	5	50	200
TXE08080	Ø8 x 80	13	15	25	400
TXE08090	Ø8 x 90	13	25	25	400
TXE08105	Ø8 x 105	13	40	25	400
TXE10070	Ø10 x 70	15	15	50	200
TXE10090	Ø10 x 90	15	5	25	300
TXE10100	Ø10 x 100	15	15	25	300
TXE10120	Ø10 x 120	15	35	25	200
TXE12080	Ø12 x 80	18	5	25	100
TXE12110	Ø12 x 110	18	5	25	100



TXA					
Code	Size		Maximum thickness of fixture		
TXA08060	Ø8 x 60	TX45	10	50	200
TXA08080	Ø8 x 80	TX45	15	25	400
TXA08120	Ø8 x 120	TX45	25	25	400
TXA10070	Ø10 x 70	TX50	15	50	200
TXA10090	Ø10 x 90	TX50	5	25	300
TXA10120	Ø10 x 120	TX50	35	25	200

