EC DECLARATION OF PERFORMANCE

DOP 1260 - 1722 - EN

KUZEY TOPTAN HIRDAVAT YAPI

KIMYASALLARI SANAYI VE TICARET LTD. ŞTİ.

Unique identification code of the product-type:	NORTHFIX 345 Chemical Anchor NORTHFIX 410 Chemical Anchor
Intended use/es:	Bonded anchor for anchorage of threaded rod in uncracked concrete
On the basis of:	EAD 330499-01-0601
Category	• Dry, wet and flooded holes – All sizes of studs • Overhead installations – All sizes of studs • Non-cracked concrete – All sizes of studs
Option	• 7
Durability	50 years
Load type	Static and quasi-static
Material	• Carbon galvanized steel class 4.6, 4.8, 5.8, 8.8 according to EN ISO 898-1 for dry internal conditions. • Stainless steel A4-70 and A4-80 according to EN ISO 3506-1 for dry internal conditions, external atmospheric exposure (including industrial and marine environment) or exposure in permanently damp internal conditions if no particular aggressive conditions exist. • High resistant corrosion stainless steel class 1.4529 / 1.4565 / 1.4547 according to EN 10088 for all conditions.
Service temperature	I: -40°C to +40°C (max long-term temperature + 24 °C max short-term temperature + 40 °C) II: -40°C to +80°C (max long-term temperature + 50 °C max short-term temperature + 80 °C)

Declared performances

Essential Characteristics	Design Method	Performance	Technical Specification
Characteristic resistance to tension	TR 029 and CEN/TS 1992-4:2009	Annex C1, C2	EAD 330499-01-0601
Characteristic resistance to shear	TR 029 and CEN/TS 1992-4:2009	Annex C3	
Minimum spacing and minimum edge distance	TR 029 and CEN/TS 1992-4:2009	Annex B2	
Displacement for serviceability limit state	TR 029 and CEN/TS 1992-4:2009	Annex C4	

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

On behalf of the manufacturer:

Istanbul, 18/01/2023

Specific Part

1 Technical description of the product

The "Northfix Chemical Anchor" is a bonded anchor consisting of a cartridge with injection mortar and a steel element. The steel element consists of a commercial threaded rod with washer and hexagon nut in the range of M8 to M24 according to Annex A5.

The steel element is placed into a drilled hole filled with injection mortar and is anchored via the bond between metal part, injection mortar and concrete.

The product description is given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document Technical description of the product

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchor of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance tension and shear loads	See Annex C1 to C3
Displacements under tension and shear loads	See Annex C4

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A1
Resistance to fire	No performance assessed

3.3 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Content, emission and/or release of dangerous substances	No performance assessed

3.4 Safety in use (BWR 4)

The essential characteristics regarding Safety in use are included under the Basic Works Requirement Mechanical resistance and stability.

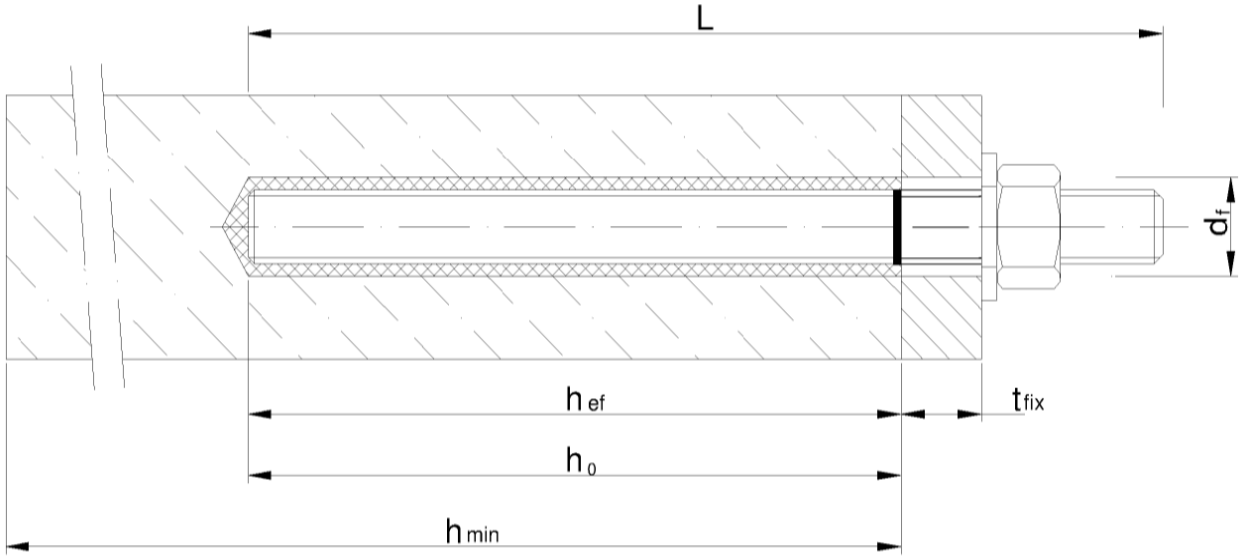
4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with the European Assessment Document EAD 330499-01-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

Installed condition

Installation threaded rod



d_f = diameter of clearance hole in the fixture

t_{fix} = thickness of fixture

h_{ef} = effective anchrogare depth

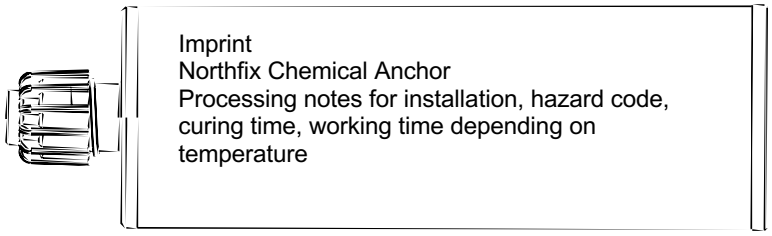
h_0 = depth of drill hole

h_{min} = minimum thickness of member

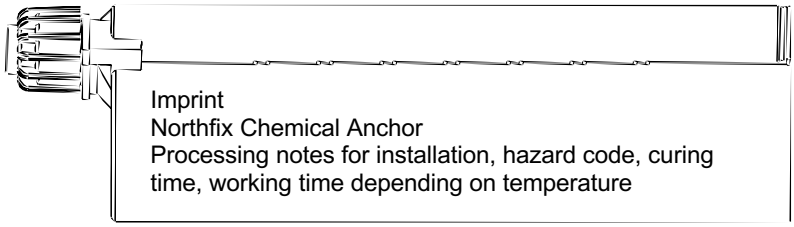
Injection system

Cartridge:

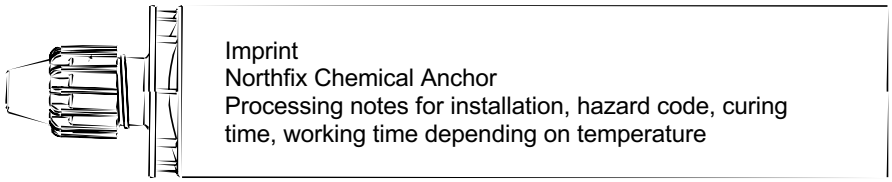
Type: Coaxial , 380ml up to 420ml cartridge



Type: Side-by-side, 345ml up to 360ml

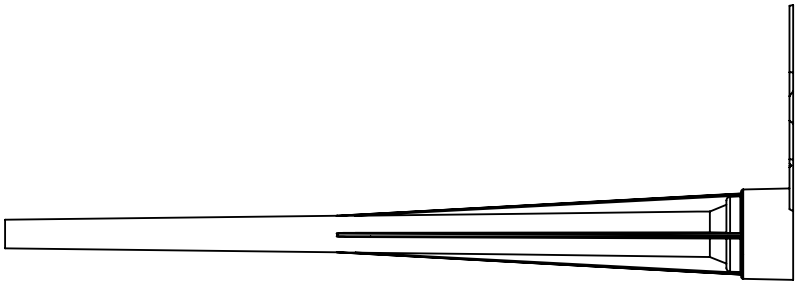


Type: Foil tube, 165ml and 300ml cartridge



Static mixer A and B

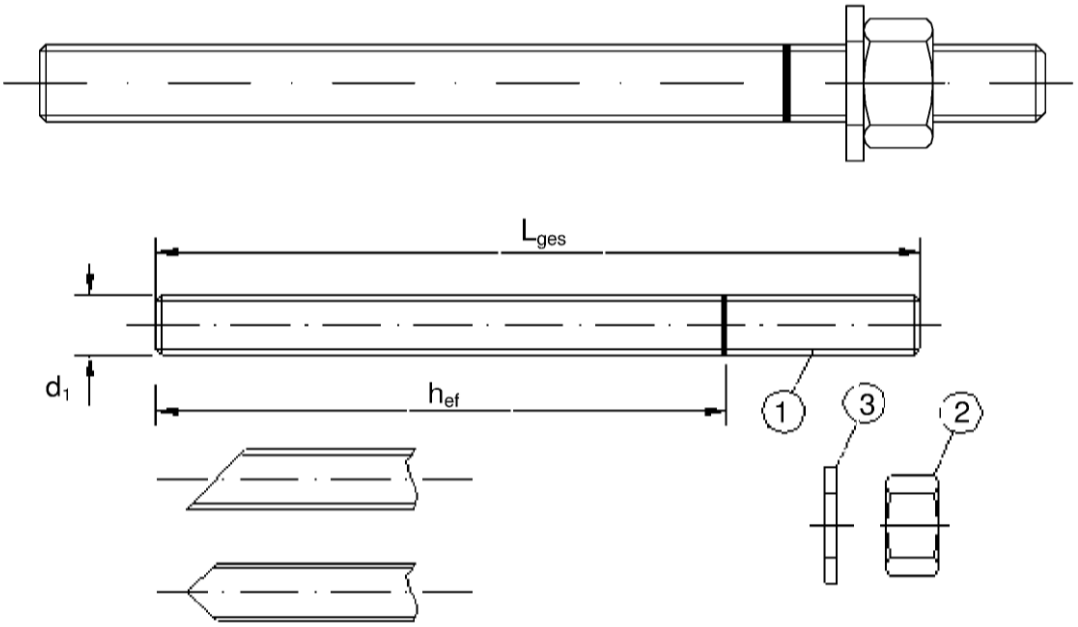




Northfix Chemical Anchor	**Annex A2**
Product description Injection system	Appendix 3/15

Threaded rod

Threaded rod M8, M10, M12, M16, M20 and M24 with washer and hexagon nut



Commercial standard threaded rod with:

- Materials, dimensions and mechanical properties according to Table A1
- Inspection certificate 3.1 according to EN 10204:2004
- Marking of embedment depth

Table A1: Materials

Part	Designation	Material
Steel, zinc plated ≥ 5 µm according to EN ISO 4042:1999 or Steel, hot-dip galvanised ≥ 40 µm according to EN ISO 1461:2009 and EN ISO 10684:2004+AC:2009		
1	Anchor rod	Steel, EN 10087:1998 or EN 10263:2001 Property class 4.6, 4.8, 5.8, 8.8, EN 1993-1-8:2005+AC:2009 A5 > 8% fracture elongation
2	Hexagon nut, EN ISO 4032:2012	Steel according to EN 10087:1998 or EN 10263:2001 Property class 4 (for class 4.6 or 4.8 rod) EN ISO 898-2:2012 Property class 5 (for class 5.8 rod) EN ISO 898-2:2021 Property class 8 (for class 8.8 rod) EN ISO 898-2:2021
3	Washer, EN ISO 887:2006, EN ISO 7089:2000, EN ISO 7093:2000 or EN ISO 7094:2000	Steel, zinc plated or hot-dip galvanised
Stainless steel		
1	Anchor rod	Material 1.4401 / 1.4404 / 1.4571, EN 1088-1:2005 Property class 70 and 80, EN ISO 3506-1:2009
2	Hexagon nut, EN ISO 4032:2012	Material 1.4401 / 1.4404 / 1.4571, EN 1088-1:2005 Property class 70 and 80, EN ISO 3506-2:2009
3	Washer, EN ISO 887:2006, EN ISO 7089:2000, EN ISO 7093:2000 or EN ISO 7094:2000	Material 1.4401 / 1.4404 / 1.4571, EN 1088-1:2005
High corrosion resistance steel		
1	Anchor rod	Material 1.4529 / 1.4565 / 1.4547, EN 1088-1:2005 Property class 70 EN ISO 3506-1:2009
2	Hexagon nut, EN ISO 4032:2012	Material 1.4529 / 1.4565 / 1.4547, EN 1088-1:2005 Property class 70 EN ISO 3506-2:2009
3	Washer, EN ISO 887:2006, EN ISO 7089:2000, EN ISO 7093:2000 or EN ISO 7094:2000	Material 1.4529 / 1.4565 / 1.4547, EN 1088-1:2005

Specifications of intended use

Anchorages subject to:

- Static and quasi-static loads: M8 to M24

Base materials:

- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000.
- Strength classes C20/25 to C50/60 according to EN 206-1:2000.
- Non-cracked concrete: M8 to M24

Temperature range:

- I: -40°C to +40°C (max long-term temperature + 24 °C max short-term temperature + 40 °C)
- II: -40°C to +80°C (max long-term temperature + 50 °C max short-term temperature + 80 °C)

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions (zinc coated steel, stainless steel or high corrosion resistant steel).
- Structures subject to external atmospheric exposure (including industrial and marine enviroment) and to permanently damp internal condition, if no particular aggresive conditions exist (stainless steel or high corrosion resistant steel).
- Structures subject to external atmospheric exposure and to permanently damp internal condition, if other particular aggressive conditions exist (high corrosion resistant steel).
  Note: Particular aggresive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

Design:

- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. 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 are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Anchorages under static or quasi-static actions are designed in accordance with:
  - EOTA Technical Report TR 029 “Design of bonded anchors”, Edition September 2010 or
  - CEN/TS 1992-4:2009

Installation:

- Dry, wet and flooded holes(not sea water)
- Hole drilling by hammer or compressed air drill mode.
- Overhead installation allowed.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.

Installation parameters

Table B1: Installation parameters for threaded rod

Anchor size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Diameter of anchor bolt or thread diameter	d	mm	8	10	12	16	20	24
Nominal diameter of drill bit	d_0	mm	10	12	14	18	24	28
Diameter of clearance hole in the fixture (≤)	d_f	mm	9	12	14	18	22	26
Diameter of steel brush (≥)	d_b	mm	12	14	16	20	26	30
Minimum effective anchorage depth	$h_{ef,min}$	mm	60	60	70	80	90	96
Maximum effective anchorage depth (20*d)	$h_{ef,max}$	mm	160	200	240	320	400	480
Minimum thickness of the concrete member	h_{min}	mm	h_{ef}+30mm ≥100mm			h_{ef} + 2*d_0		
Nominal torque moment	T_{inst}	Nm	10	20	40	80	120	160
Thickness of the fixture	t_{fix}	mm	0 < t_{fix} < 1500					
Minimum spacing (5*d)	s_{min}	mm	40	50	60	80	100	120
Minimum edge distance (5*d)	c_{min}	mm	40	50	60	80	100	120

Cleaning and setting tools

Cleaning brush (steel brush with steel bristles)

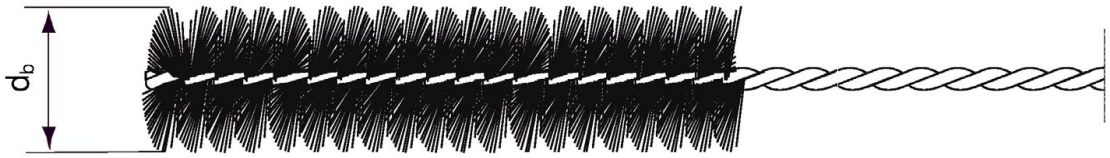


Table B3: Cleaning and setting parameters

Threaded Rod	d_0	d_b	$d_{b,min}$	Piston Plug
mm	mm	mm	mm	#
M8	10	12	10,5	Not required to use piston plug
M10	12	14	12,5	
M12	14	16	14,5	
	16	18	16,5	
M16	18	20	18,5	
	20	22	20,5	
M20	24	26	24,5	24
M24	28	30	28,5	28



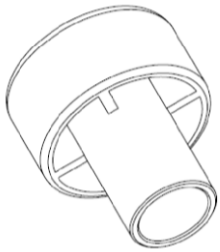
Compressed air tool

d_0 between 10mm to 28mm



Hand operated blowing pump

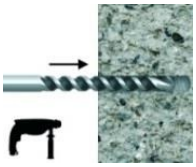
d_0 between 10mm to 20mm



Piston plug for overhead and horizontal installation

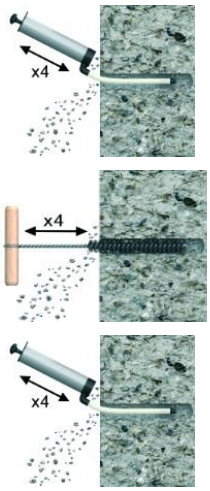
d_0 between 24mm to 28mm

Installation instructions



1. Drill with hammer drill a hole into the base material to the size and embedment depth required by the selected anchor. In case of aborted drill hole: the drill hole shall be filled with mortar.

a.



b.



2. Hole cleaning

Attention! Standing water in the bore hole must be removed before cleaning.

a. Clean the hole with brush and hand pump:

- starting from the drill hole bottom blow the hole at least 4 times using the hand pump,

- using the specified brush, mechanically brush out the hole at least 4 times,

- starting from the drill hole bottom, blow at least 4 times with the hand pump.

The hand-pump can only be used for anchor sizes in uncracked concrete up to bore hole diameter 20mm or embedment depth up to 240mm.

b. Cleaning hole with compressed air:

- starting from the drill hole bottom blow the hole at least twice by compressed air (6 atm),

- using the specified brush, mechanically brush out the hole at least twice,

- blow the hole at least twice by compressed air (6 atm),

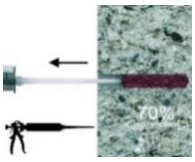
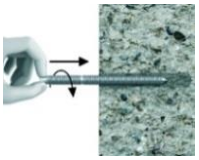
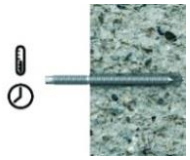
- brush out the hole at least twice,

- blow over the hole at least twice by compressed air (6 atm).

Compressed air (min.6 bar) can be used for all sizes in cracked and uncracked concrete.

After cleaning, the bore hole has to be protected against re-contamination in an appropriate way, until dispensing the mortar in the bore hole. If necessary, the cleaning repeated has to be directly before dispensing the mortar. In-flowing water must not contaminate the bore hole again.

Installation instructions (continuation)

	3. Attach a supplied static-mixing nozzle to the cartridge and load the cartridge into the correct dispensing tool. Cut off the foil tube clip before use. For every working interruption longer than the recommended working time as well as for new cartridges, a new static-mixer shall be used.Dispense to waste until even colour is obtained (min. 10 cm).
	4. Starting from the bottom or back of the cleaned anchor hole fill the hole up to approximately two-thirds with adhesive. Slowly withdraw the static mixing nozzle as the hole fills to avoid creating air pockets. For embedment larger than 190 mm and extension nozzle shall be used. In overhead installation to avoid the slipping of the stud during the open time of the product (due to the stud own weight) use a temporary interlocking element. Observe the gel-/ working times.
	5. Push the threaded rod or reinforcing bar into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached. The anchor should be free of dirt, grease, oil or other foreign material. Be sure that the anchor is fully seated at the bottom of the hole and that excess mortar is visible at the top of the hole. If these requirements are not maintained, the application has to be renewed. For overhead application the anchor rod should be fixed (e.g wedges).
	6. Allow the adhesive to cure to the specified time prior to applying any load or torque. Do not move or load the anchor until it is fully cured.
	7. After full curing, the add-on part can be installed with the max. torque by using a calibrated torque wrench.

Curing time

Table B4: Maximum working time and minimum curing time of PE, PE-C, PE-E

Temperature of base material	Temperature of cartridge	Maximum working time t_{work}			Minimum curing time[1] t_{load} or t_{cure}		
		PE-C	PE	PE-E	PE-C	PE	PE-E
-20°C to -11°C	+5°C to +9°C	45	-	-	960	-	-
-10°C to -1°C	+5°C to +9°C	20	-	-	360	-	-
0°C to +4°C	+5°C to +9°C	6	-	-	240	-	-
+5°C to +9°C	+5°C to +9°C	3	10	-	75	150	-
+10°C to +19°C	+10°C to +19°C	1,5	6	15	45	85	300
+20°C to +24°C	+20°C to +24°C	-	5	10	-	50	150
+25°C to +29°C	+25°C to +29°C	-	4	7,5	-	40	85
+30°C to +34°C	+30°C to +34°C	-	2	5	-	35	50
+35°C to +39°C	+35°C to +39°C	-	-	3,5	-	-	40
+40°C to +44°C	+40°C to +44°C	-	-	2,5	-	-	35

[1] In wet or water filled holes the curing times must be doubled.

Characteristic values of resistance for threaded rods under tension loads

Table C1: Characteristic values of resistance for threaded rods under tension loads

Steel Failure - Characteristic resistance								
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Steel grade 5.8	$N_{Rk,s}$	[kN]	18	29	42	79	123	177
Partial safety factor	γ_{Ms}	[-]	1,5					
Steel grade 8.8	$N_{Rk,s}$	[kN]	29	46	67	126	196	282
Partial safety factor	γ_{Ms}	[-]	1,5					
Steel grade 10.9	$N_{Rk,s}$	[kN]	37	58	84	157	245	353
Partial safety factor	γ_{Ms}	[-]	1,4					
Stainless Steel grade A4-70	$N_{Rk,s}$	[kN]	26	41	59	110	172	247
Partial safety factor	γ_{Ms}	[-]	1,9					
Stainless Steel grade A4-80	$N_{Rk,s}$	[kN]	29	46	67	126	196	282
Partial safety factor	γ_{Ms}	[-]	1,6					
Stainless Steel grade 1,4529	$N_{Rk,s}$	[kN]	26	41	59	110	172	247
Partial safety factor	γ_{Ms}	[-]	1,5					

Characteristic values of resistance for threaded rods under tension loads (continuation)

Table C1: Characteristic values of resistance for threaded rods under tension loads (continuation)

Combined pullout and concrete failure									
Characteristic bond resistance in non-cracked concrete C20/25									
Size				**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Temperature (I): 24˚C / 40˚C	dry,wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	9,3	8,5	8,7	8,2	7,8	7,2
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm²]	6,5	5,7	5,8	5,5	no data	
Temperature (II): 50˚C / 80˚C	dry,wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	6,5	5,8	6,0	5,8	6,0	5,5
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm²]	4,6	3,9	4,0	3,9	no data	
Factor k_8	Non-cracked con.	k_8	[-]	10,0					
Concrete increasing factor (only valid for static or quasi static actions)	C25/C30	ψ_c	[-]	1,02					
	C30/C37	ψ_c	[-]	1,03					
	C35/C45	ψ_c	[-]	1,06					
	C40/C50	ψ_c	[-]	1,08					
	C45/C55	ψ_c	[-]	1,09					
	C50/C60	ψ_c	[-]	1,10					
Concrete cone failure									
Edge distance		$c_{cr,N}$	[mm]	$1,5*h_{ef}$					
Axial spacing distance		$s_{cr,N}$	[mm]	$3,0*h_{ef}$					
Installation safety factor	dry,wet concrete	$\gamma_2 = \gamma_{inst}$	[-]	1,0	1,2				
	flooded bore hole	$\gamma_2 = \gamma_{inst}$	[-]	1,4				no data	
Partial safety factor	Non-cracked con.	k_{ucr}	[-]	10,0					

Characteristic values of resistance for threaded rods under shear loads

Table C2: Characteristic values of resistance for threaded rods under shear loads

Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Steel Failure - Without Lever Arm								
Steel grade 5.8	$V_{Rk,s}$	[kN]	9	15	21	39	61	88
Partial safety factor	γ_{Ms}	[-]	1,25					
Steel grade 8.8	$V_{Rk,s}$	[kN]	15	23	34	63	98	141
Partial safety factor	γ_{Ms}	[-]	1,25					
Steel grade 10.9	$V_{Rk,s}$	[kN]	18	29	42	79	123	177
Partial safety factor	γ_{Ms}	[-]	1,5					
Stainless Steel grade A4-70	$V_{Rk,s}$	[kN]	13	20	30	55	86	124
Partial safety factor	γ_{Ms}	[-]	1,56					
Stainless Steel grade A4-80	$V_{Rk,s}$	[kN]	15	23	34	63	98	141
Partial safety factor	γ_{Ms}	[-]	1,33					
Stainless Steel grade 1,4529	$V_{Rk,s}$	[kN]	13	20	30	55	86	124
Partial safety factor	γ_{Ms}	[-]	1,25					
Steel Failure - With Lever Arm								
Steel grade 5.8	$M^0_{Rk,s}$	[kN]	19	37	66	166	325	561
Partial safety factor	γ_{Ms}	[-]	1,25					
Steel grade 8.8	$M^0_{Rk,s}$	[kN]	30	60	105	266	519	898
Partial safety factor	γ_{Ms}	[-]	1,25					
Steel grade 10.9	$M^0_{Rk,s}$	[kN]	37	75	131	333	649	1123
Partial safety factor	γ_{Ms}	[-]	1,5					
Stainless Steel grade A4-70	$M^0_{Rk,s}$	[kN]	26	52	92	233	454	786
Partial safety factor	γ_{Ms}	[-]	1,56					
Stainless Steel grade A4-80	$M^0_{Rk,s}$	[kN]	30	60	105	266	519	898
Partial safety factor	γ_{Ms}	[-]	1,33					
Stainless Steel grade 1,4529	$M^0_{Rk,s}$	[kN]	26	52	92	233	454	786
Partial safety factor	γ_{Ms}	[-]	1,25					
Concrete pry-out failure								
Factor for resistance to pry-out failure	k_3	[-]	2,0					
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0					
Outside diameter of anchor	d_{nom}	[mm]	8	10	12	16	20	24
Effective length of anchor	ℓ_f	[mm]	min (h_{ef}, 8*d_{nom})					
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,00					

Displacements (threaded rods)

Table C5: Displacement under tension load (threaded rod)

Size			M8	M10	M12	M16	M20	M24
Non-cracked concrete C20/25								
Temperature (I): 24˚C / 40˚C	δ_{N0} - factor	mm/(N/mm^2)	0,055	0,048	0,048	0,036	0,030	0,028
	$\delta_{N\infty}$ - factor	mm/(N/mm^2)	0,157	0,134	0,097	0,064	0,051	0,038
Temperature (II): 50˚C / 80˚C	δ_{N0} - factor	mm/(N/mm^2)	0,127	0,110	0,110	0,083	0,069	0,064
	$\delta_{N\infty}$ - factor	mm/(N/mm^2)	0,361	0,309	0,223	0,147	0,118	0,088

Calculation of the displacement as mm

$\delta_{N0} = \delta_{N0}$ - factor * τ $\quad$ $\delta_{N\infty} = \delta_{N\infty}$ - factor * τ $\quad$ τ: tension bond stress

Table C6: Displacement under shear load (threaded rod)

Size			M8	M10	M12	M16	M20	M24
Non-cracked concrete C20/25								
Valid for all temperature ranges	δ_{V0}	[mm/kN]	0,035	0,033	0,038	0,035	0,033	0,036
	$\delta_{V\infty}$	[mm/kN]	0,100	0,092	0,077	0,062	0,056	0,049

Calculation of the displacement as mm

$\delta_{V0} = \delta_{V0}$ - factor * V $\quad$ $\delta_{V\infty} = \delta_{V\infty}$ - factor * V $\quad$ V: shear load