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Authorised and notified according to Article 29 of the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011

European Technical Assessment ETA-25/0543 of 2025/07/22

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S	
Trade name of the construction product:	RAWLPLUG R-KF2, R-KF2-S, R-KF2-W
Product family to which the above construction product belongs:	Bonded anchor for Masonry. with anchor rod made of galvanized carbon steel, stainless steel or high corrosion resistant stainless steel. Threaded rod sizes: M8, M10, M12 and M16 Rebar sizes: Ø8, Ø10, Ø12 and Ø16
Manufacturer:	Rawlplug SA ul. Kwidzyńska 6 PL-51-416 Wrocław
Manufacturing plant:	Manufacturing plant no. 3
This European Technical Assessment contains:	62 pages including 56 annexes which form an integral part of the document
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	EAD 330076-01-0604: Metal injection anchors for use in masonry
This version replaces:	

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product

The R-KF2 / R-KF2-S / R-KF2-W are bonded anchors (injection type) consisting of an injection mortar cartridge, a perforated sleeve, a threaded rod of M8, M10, M12 or M16, with hexagonal nut and washer, or a rebar stud of Ø8, Ø10, Ø12 or Ø16.

The product specification is given in annex A.

The anchor rod or rebar stud is placed into a drilled and cleaned hole, previously filled with injection mortar and is anchored via the bond between steel element, injection mortar and masonry.

The characteristic material values, dimensions and tolerances of the anchors not indicated in Annexes shall correspond to the respective values laid down in the technical documentation[1] of this European Technical Assessment.

2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

The anchors are intended to be used for anchorages for which requirements for mechanical resistance and stability and safety in use in the sense of the Basic Works Requirements 1 of Regulation (EU) 305/2011 shall be fulfilled and failure of anchorages made with these products would compromise the stability of the works, cause risk to human life and/or lead to considerable economic consequences.

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 provisions made in this European Technical Assessment are based on an assumed intended working life of the anchor of 50 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body, 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.

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1 The technical documentation of this European Technical Assessment is deposited at ETA-Danmark and, as far as relevant for the tasks of the Notified bodies involved in the attestation of conformity procedure, is handed over to the notified bodies.

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

3.1 Characteristics of product

Mechanical resistance and stability (BWR 1):
The essential characteristics are detailed in the Annex from C1 to C21.

Safety in case of fire (BWR 2):
No performance assessed.

Hygiene, health and the environment (BWR3):
No performance assessed.

3.2 Methods of assessment

The assessment of fitness of the anchor for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Basic Requirements 1 has been made in accordance with EAD 330076-01-0604, based on the Use Categories b, c or d in respect of the base material and Category d/d, w/d and w/w in respect of installation and use.

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

4.1 AVCP system

According to the decision 1997/177/EC of the European Commission, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is **1**.

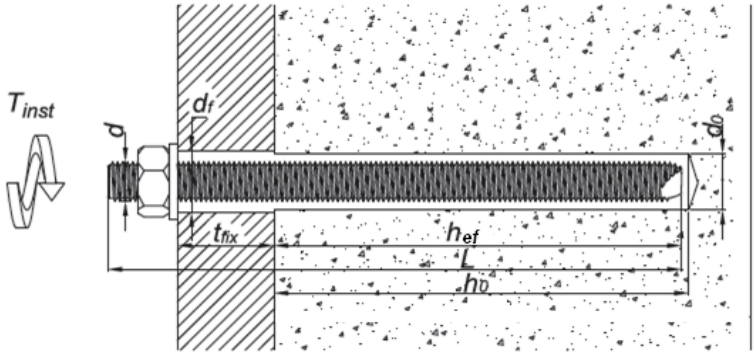
5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking

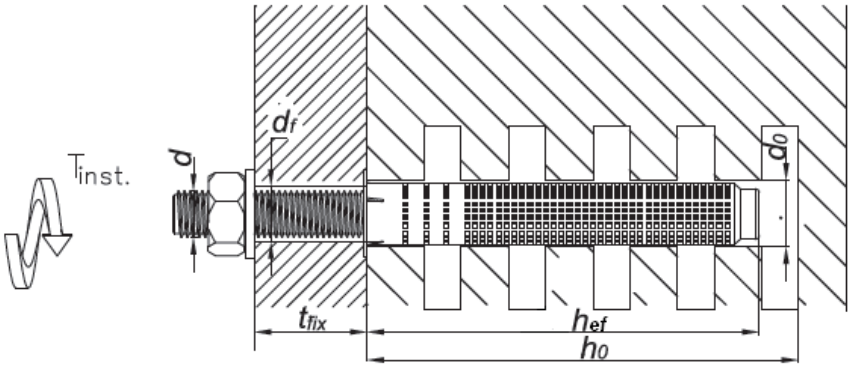
Issued in Copenhagen on 2025-07-22 by

Thomas Bruun
Manager, ETA-Danmark

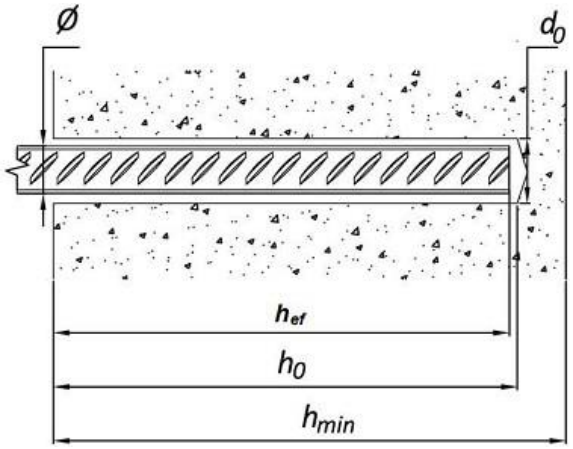
Anchor rod without perforated sleeve – installation in solid masonry



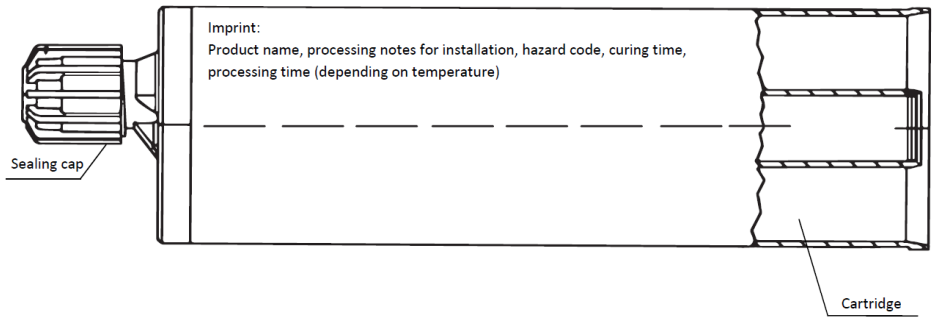
Anchor rod with perforated sleeve – installation in perforated masonry



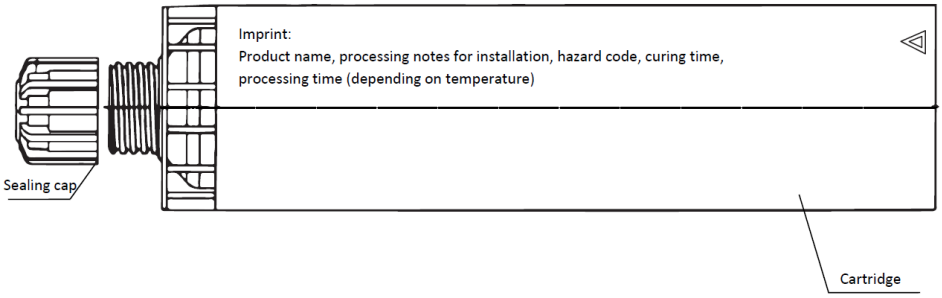
Rebar – installation in solid masonry



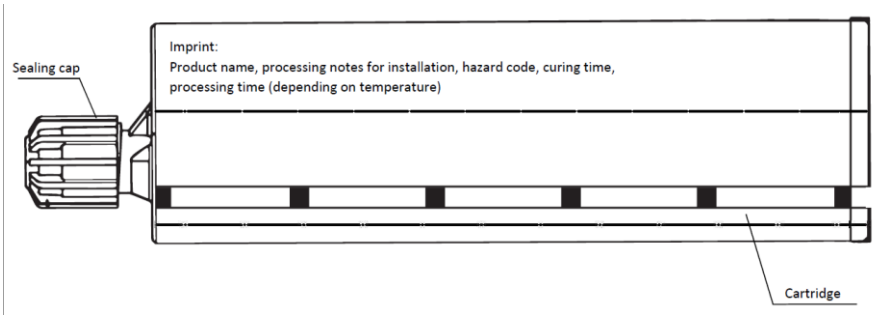
Coaxial cartridge – 150ml, 280ml, 300ml, 310ml, 330ml, 380ml, 400ml, 410ml, 420ml:



Cartridge – single component for two part foil capsules – 150ml, 175ml, 280ml, 300ml, 310ml, 380ml, 400ml, 550ml, 600ml:



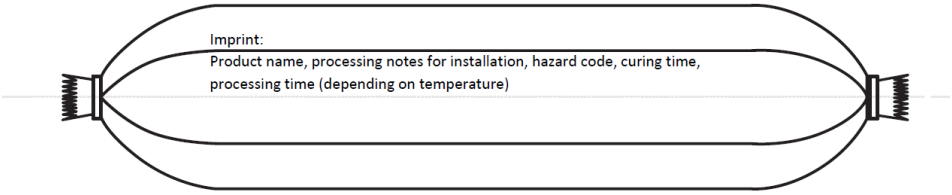
Side by side cartridge – 345ml, 425ml, 825ml:



Mixer for the cartridge:

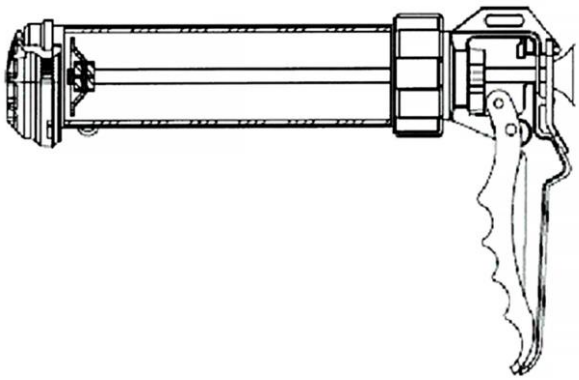
R-KF2, R-KF2-S, R-KF2-W	**Annex A2** of European Technical Assessment ETA-25/0543
Product description Injection mortar / static mixer / steel elements / sleeves	

Foil capsule (CFS system) – 150ml, 175mml, 280ml, 300ml, 310ml, 380ml, 400ml, 550ml, 600ml:

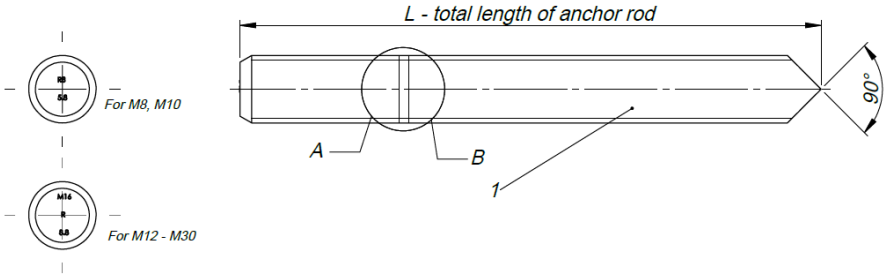


Mixer for the foil capsule:

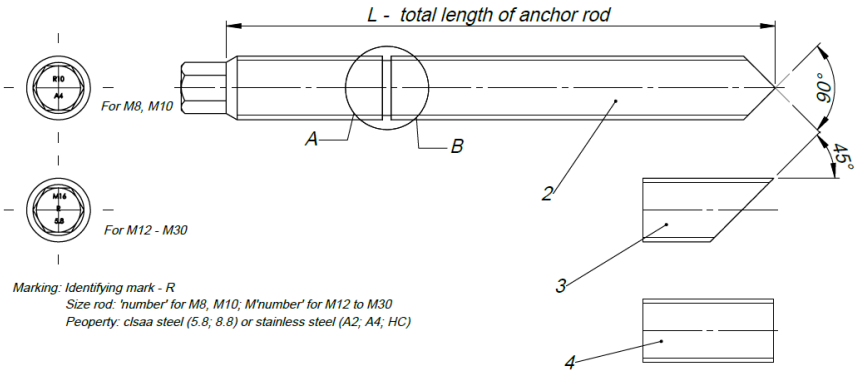
Gun for the foil capsule:



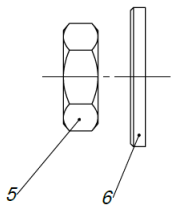
Threaded anchor rods:



Marking: Identifying mark - R
Size rod: 'number' for M8, M10; M'number' for M12 to M30
Peoperty: clsaa steel (5.8; 8.8) or stainless steel (A2; A4; HC)



Marking: Identifying mark - R
Size rod: 'number' for M8, M10; M'number' for M12 to M30
Peoperty: clsaa steel (5.8; 8.8) or stainless steel (A2; A4; HC)



DETAIL A
SCALE 2 : 1

Painted Mark Version

Depth h_{mld}

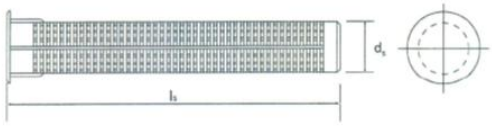
DETAIL B
SCALE 2 : 1

Notched Mark Version

Depth h_{mld}

1. *Anchor rod R-STUDS-(88), (A2), (HC)-FL*
2. *Anchor rod R-STUDS-(88), (A2), (A4), (HC) with the hexagonal tip*
3. *45° shapewith anchor rod*
4. *The flat end of anchor rod*
5. *Hexagonal nut*
6. *Washer*

Perforated plastic or metal sleeve:



Rebar:

embedment depth marking h_{ef}

Table A1: Threaded rods

Designation		**Material**			
Steel, zinc electroplated ≥ 5 µm according to EN ISO 4042 **Steel, hot-dip galvanized ≥ 40 µm according to EN ISO 10684** **Steel, non-electrolytically applied zinc flake coating ≥ 8 µm according to EN ISO 10683** **Ultra-high Strength Steel, non-electrolytically applied zinc flake coating ≥ 8 µm according to EN ISO 10683**					
Threaded rod	Property class	Characteristic steel ultimate strength	Characteristic steel yield strength	Fracture elongation	
	5.8	$f_{uk} \geq 500$ N/mm²	$f_{yk} \geq 400$ N/mm²	$A_5 > 8\%$	EN ISO 898-1
	8.8	$f_{uk} \geq 800$ N/mm²	$f_{yk} \geq 640$ N/mm²	$A_5 \geq 12\%$	
	10.9	$f_{uk} \geq 1000$ N/mm²	$f_{yk} \geq 900$ N/mm²	$A_5 > 9\%$	
	12.9	$f_{uk} \geq 1200$ N/mm²	$f_{yk} \geq 1080$ N/mm²	$A_5 > 8\%$	
Hexagon nut	5	for class 5.8 rods			EN ISO 898-2
	8	for class 8.8 rods			
	10	for class 10.9 rods			
	12	for class 12.9 rods			
	14.8U	for class 14.8U rods			UHSFG-1416U-2014
	15.8U	for class 15.8U rods			
	16.8U	for class 16.8U rods			
Washer	Steel according to EN ISO 7089; corresponding to anchor rod material				
Stainless steel A4 **(Materials) 1.4401, 1.4404, 1.4571** **High corrosion resistance stainless steel (HCR) (Materials) 1.4529, 1.4565, 1.4547**					
Threaded rod	Property class	Characteristic steel ultimate strength	Characteristic steel yield strength	Fracture elongation	
	70	$f_{uk} \geq 700$ N/mm²	$f_{yk} \geq 450$ N/mm²	$A_5 \geq 12\%$	EN 10088 EN ISO 3506
	80	$f_{uk} \geq 800$ N/mm²	$f_{yk} \geq 600$ N/mm²	$A_5 \geq 12\%$	
Hexagon nut	70	for class 70 rods			EN 10088 EN ISO 3506
	80	for class 80 rods			
Washer	Steel, according to EN 10088; corresponding to anchor rod material				
For anchorages under seismic actions which are designed in accordance with EN 1992-4:2018, Section 9.2 (3), option b): $A_5 \geq 12\%$ and $f_{uk} \leq 800$ N/mm².					

Commercial threaded rods (in the case of rods made of galvanized steel – standard rods with property class ≤ 8.8 only), with:

- material and mechanical properties according to Table A1,
- confirmation of material and mechanical properties by inspection certificate 3.1 according to EN-10204:2004; the documents shall be stored,
- marking of the threaded rod with the embedment depth.

Note: Commercial standard threaded rods made of galvanized steel with property class above 8.8 are not permitted in some Member States.

Table A2: Reinforcing bars according to EN 1992-1-1, Annex C

Product form		**Bars and de-coiled rods**	
Class		B	C
Characteristic yield strength f_{yk} or $f_{0,2k}$ [N/mm²]		400 to 600	
Minimum value of $k = (f_t / f_y)_k$		≥ 1,08	≥ 1,15 < 1,35
Characteristic strain at maximum force, ε_{uk} [%]		≥ 5,0	≥ 7,5
Bendability		Bend / Rebend test	
Maximum deviation from nominal mass (individual bar) [%]	Nominal bar size [mm] ≤ 8 > 8	 ± 6,0 ± 4,5	
Bond: minimum relative rib area, $f_{R,min}$	Nominal bar size [mm] 8 to 12 > 12	 0,040 0,056	

Rib height h: The maximum rib height h_{rib} shall be: $h_{rib} \leq 0,07 \cdot Ø$

Specification of intended use:

Anchorages subject to:

- Static and quasi-static loads: Threaded rod sizes: M8, M10, M12 and M16
- Static and quasi-static loads: Rebar sizes: Ø8, Ø10, Ø12 and Ø16

Base materials:

- Solid clay bricks (base material group b), according to Annex B2
- Autoclaved aerated concrete blocks AAC (base material group d), according to Annex B2
- Solid silicate bricks (base material group b), according to Annex B2
- Silicate hollow blocks (base material group c), according to Annex B2
- Perforated ceramic blocks (base material group c), according to Annex B2
- Lightweight concrete hollow blocks (base material group c), according to Annex B2
- Mortar strength class M2,5 at minimum according to EN 998-2.
- For smaller brick size or smaller compressive strength in solid masonry or other bricks and blocks in hollow or perforated masonry the characteristic resistance of the anchor may be determined by job site tests according to EOTA Technical Report TR 053 under consideration of the β-factor according to Table C10.

Temperature range:

- Ta: -40°C to +40°C (max. short-term temperature +40°C and max. long-term temperature +24°C).
- Tb: -40°C to +80°C (max. short-term temperature +80°C and max. long-term temperature +50°C).

Use conditions (Environmental conditions):

- Condition w/w: installation in dry or wet base material and use in structures subject to dry or wet environmental conditions.
- Structures subject to dry internal conditions: all materials.
- For all other conditions according to EN 1993-1-4 corresponding to corrosion resistance class (CRC):
  - stainless steel A4 according to Annex A, Table A3: CRC III,
  - high corrosion resistance steel (HCR) according to Annex A, Table A3: CRC V.

Design:

- Verifiable calculation notes and drawings are prepared taking account the relevant masonry in the region of the anchorage, the loads to be transmitted and their transmission to the supports of the structure. The position of the anchor is indicated on the design drawings.
- The anchorages are designed in accordance with to the EOTA Technical Report TR 054 under the responsibility of an engineer experienced in anchorages and masonry work.

Installation:

- Hole drilling by rotary drill mode (AAC, hollow and perforated masonry) and hammer drill mode (solid masonry)
- Anchor installation carried out by appropiately qualified personnel and under the supervision of the person responsible for technical matters of the site.

R-KF2, R-KF2-S, R-KF2-W	**Annex B1** of European Technical Assessment ETA-25/0543
Intended use **Specification of intended use**	

Table B1: Overview of brick types and properties

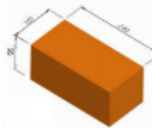
Brick type	Picture	Brick size [mm]	Compressive strength $f_{b, ETA}$ [N/mm²]	Density [kg/dm³]	Norm	Annex
Solid clay brick Mz, 2DF		l: ≥ 240 b: ≥ 115 h: ≥ 113	≥ 20	2,0	EN 771-1	C2
Clay Masonry Units		l:≥215 b:≥102.5 h:≥ 65	≥ 20	2,0	EN 771-1	C3
Solid silica brick, 1DF		l: ≥ 240 b: ≥ 115 h: ≥ 52	≥ 20	2,0	EN 771-2	C4
Solid normal weight concrete brick Vbn, 1DF		l: ≥ 240 b: ≥ 115 h: ≥ 70	≥ 6	0,7	EN 771-3	C5
Solid Blocks		l:≥ 390 b:≥ 190 h:≥ 140	≥ 7,5	0,8	EN 771-3	C6
AAC2		l:≥ 599 b:≥ 100 h:≥ 240	≥ 2	0,22	EN 771-4	C7
AAC7		l:≥ 599 b:≥ 100 h:≥ 240	≥ 6	0,65	EN 771-4	C8
Aggregate Concrete		l:≥440 b:≥ 100 h:≥ 215	≥ 3,6	0,7	EN 771-3	C9
Aggregate Concrete		l:≥440 b:≥ 100 h:≥ 215	≥ 7,3	0,8	EN 771-3	C10
Hollow Aggregate Concrete		l:≥440 b:≥ 140 h:≥ 215	≥ 7,3	0,8	EN 771-3	C11
Hollow clay brick		l:≥440 b:≥ 140 h:≥ 215	≥ 20	0,9	EN 771-3	C12

Table B2: Overview of brick types and properties

Brick type	Picture	Brick size [mm]	Compressive strength $f_{b, ETA}$ [N/mm²]	Density [kg/dm³]	Norm	Annex
Hollow clay brick		l:≥ 300 b:≥ 240 h:≥ 238	≥ 12	0,8	EN 771-1	C13
Hollow silica brick		l:≥ 248 b:≥ 240 h:≥ 238	≥ 20	1,4	EN 771-2	C14
Hollow silica brick		l:≥ 248 b:≥ 240 h:≥ 238	≥ 12	1,4	EN 771-2	C15
Hollow Masonry Units		l:≥215 b:≥102.5 h:≥ 65	≥ 20	1,4	EN 771-3	C16
Hollow lightweight concrete brick		l:≥ 495 b:≥ 240 h:≥ 238	≥ 2	0,8	EN 771-3	C17
Hollow normal weight concrete brick		l:≥ 500 b:≥ 200 h:≥ 200	≥ 4	0,8	EN 771-3	C18
Hollow normal weight concrete brick		l:≥ 500 b:≥ 200 h:≥ 200	≥ 10	0,9	EN 771-3	C19
Thermal Block		l:≥390 b:≥190 h:≥120	≥ 7,5	2	EN 771-3	C21
TeknoAmer Blok		l:≥ 400 b:≥ 200 h:≥ 200	≥ 12,5	1,2	EN 771-3	C20

Table B3: Installation parameters of anchor rods in AAC (without perforated sleeves)

Size of rod			M8	M10	M12	M16
Nominal diameter	d_{nom}	[mm]	8	10	12	16
Nominal drill hole diameter	d_0	[mm]	10	12	14	18
Diameter of clearance hole of the fixture	$d_f \leq$	[mm]	9	12	14	18
Drill hole depth	h_0	[mm]	85	90	100	110
Effective embedment depth	h_{ef}	[mm]	80	85	95	105
Maximum torque moment	max. T_{inst}	[Nm]	2	2	2	2
Minimum spacing and edge distance						
Minimum spacing	s_{min}	[mm]	50	50	50	60
Minimum edge distance	c_{min}	[mm]	50	50	50	60

Table B4: Installation parameters of anchor rods in solid masonry and solid blocks (without perforated sleeves)

Size of rod			M8	M10	M12	M16
Nominal diameter	d_{nom}	[mm]	8	10	12	16
Nominal drill hole diameter	d_0	[mm]	10	12	14	18
Diameter of clearance hole of the fixture	$d_f \leq$	[mm]	9	12	14	18
Drill hole depth	h_0	[mm]	85	90	100-165	110-205
Effective embedment depth	h_{ef}	[mm]	80	85	95-160	105-200
Maximum torque moment	max. T_{inst}	[Nm]	5	8	10	10
Minimum spacing and edge distance						
Minimum spacing	s_{min}	[mm]	50	50	50	60
Minimum edge distance	c_{min}	[mm]	50	50	50	60

Table B5: Installation parameters of anchor rods in perforated ceramic blocks (with perforated sleeves)

Size of rod			M8	M10	M10	M12	M12	M16
Nominal diameter	d_{nom}	[mm]	8	10	10	12	12	16
Nominal drill hole diameter	d_0	[mm]	12	16	16	16	16	20
Diameter of clearance hole of the fixture	$d_f \leq$	[mm]	9	12	12	14	14	18
Drill hole depth	h_0	[mm]	55	90	135	90	135	90
Effective embedment depth	h_{ef}	[mm]	50	85	130	85	130	85
Maximum torque moment	max. T_{inst}	[Nm]	4	4	4	4	4	4
Size of sleeve	d x L	[mm]	12x50	16x85	16x130	16x85	16x130	20x85
Minimum spacing and edge distance								
Minimum spacing	s_{min}	[mm]	100	100	100	100	100	120
Minimum edge distance	c_{min}	[mm]	100	100	100	100	100	120

Table B6: Installation parameters of rebars in solid masonry and AAC (without perforated sleeves)

Size of rebar			Ø8	Ø10	Ø12	Ø16
Nominal diameter	d_{nom}	[mm]	8	10	12	16
Nominal drill hole diameter	d_0	[mm]	10	12	14	18
Diameter of clearance hole of the fixture	$d_f \leq$	[mm]	9	12	14	18
Drill hole depth	h_0	[mm]	85	90	100	110
Effective embedment depth	h_{ef}	[mm]	80	85	95	105
Maximum torque moment	max. T_{inst}	[Nm]	2	2	2	2
Minimum spacing and edge distance						
Minimum spacing	s_{min}	[mm]	50	50	50	60
Minimum edge distance	c_{min}	[mm]	50	50	50	60

Table B7: Installation parameters of rebars in solid masonry and solid blocks (without perforated sleeves)

Size of rebar			Ø8	Ø10	Ø12	Ø16
Nominal diameter	d_{nom}	[mm]	8	10	12	16
Nominal drill hole diameter	d_0	[mm]	10	12	14	18
Diameter of clearance hole of the fixture	$d_f \leq$	[mm]	9	12	14	18
Drill hole depth	h_0	[mm]	85	90	100-165	110-205
Effective embedment depth	h_{ef}	[mm]	80	85	95-160	105-200
Maximum torque moment	max. T_{inst}	[Nm]	5	8	10	10
Minimum spacing and edge distance						
Minimum spacing	s_{min}	[mm]	50	50	50	60
Minimum edge distance	c_{min}	[mm]	50	50	50	60

Table B8: Working time and curing time

R-KF2		
Temperature in base material	**Maximum working time**	**Minimum curing time**
-5°C to 0°C	22 min	8 h
> 0°C to 5°C	14 min	4 h
> 5°C to 10°C	9 min	2 h
> 10°C to 15°C	5 min 30 sec	1.5 h
> 15°C to 20°C	3 min 30 sec	1 h
> 20°C to 25°C	2 min	45 min
> 25°C to 30°C	1 min 30 sec	35 min
> 30°C to 35°C	1 min	30 min
> 35°C to 40°C	1 min	25 min

Minimum resin temp = 5°C
Maximum resin temp = 25°C
Times are provided for resin temperatures equal or the closest to base material temperature

Table B9: Working time and curing time

R-KF2-S					
Temperature in base material				**Maximum working time**	**Minimum curing time**
	-5°C	to	0°C	70 min	24 h
>	0°C	to	5°C	43 min	18 h
>	5°C	to	10°C	24 min	12 h
>	10°C	to	15°C	15 min	8 h
>	15°C	to	20°C	8 min	6 h
>	20°C	to	25°C	6 min	4 h
>	25°C	to	30°C	5 min 30 sec	3 h
>	30°C	to	35°C	4 min	1.5 h
>	35°C	to	40°C	3 min 30 sec	1 h

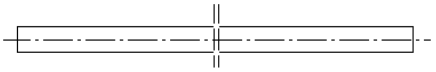
Minimum resin temp = 5°C
Maximum resin temp = 25°C
Times are provided for resin temperatures equal or the closest to base material temperature

Table B10: Working time and curing time

R-KF2-W					
Temperature in base material				**Maximum working time**	**Minimum curing time**
	-20°C	to	-15°C	45 min	24 h
>	-15°C	to	-10°C	32 min	18 h
>	-10°C	to	-5°C	22 min	8 h
>	-5°C	to	0°C	14 min	5 h
>	0°C	to	5°C	9 min	2 h
>	5°C	to	10°C	6 min 30 sec	1 h
>	10°C	to	15°C	4 min	45 min
>	15°C	to	20°C	2 min 30 sec	30 min
>	20°C	to	25°C	1 min	15 min
>	25°C	to	30°C	45 sec	15 min

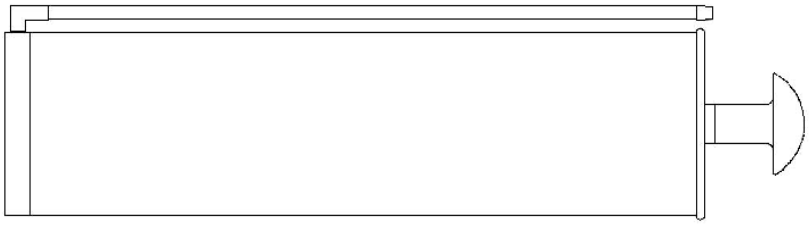
Minimum resin temp = 5°C
Maximum resin temp = 25°C
Times are provided for resin temperatures equal or the closest to base material temperature

Additional mixer extension



*Variable length from 300mm up to 1000mm.

Manual blower pump



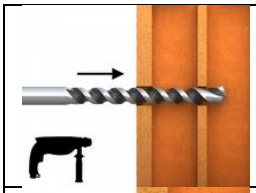
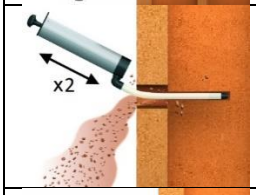
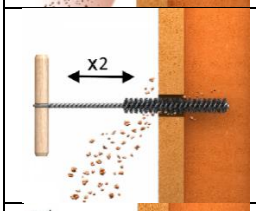
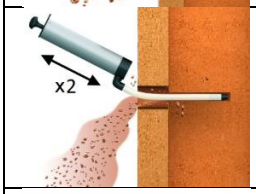
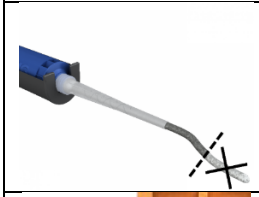
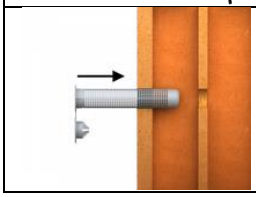
Steel brush

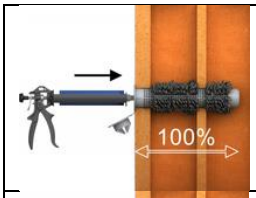
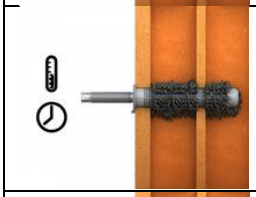
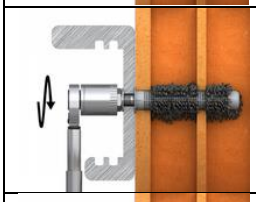
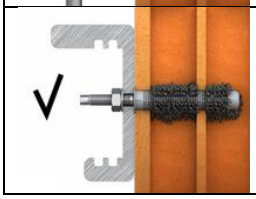
Brush diameter for solid masonry

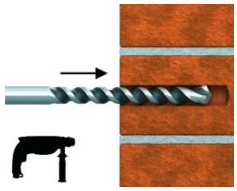
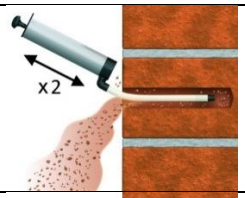
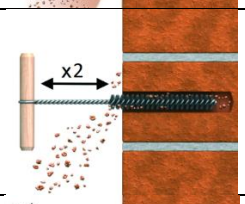
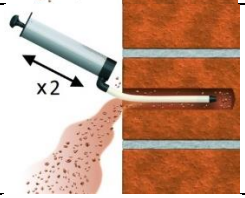
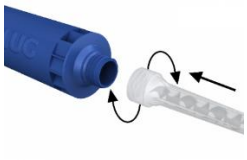
Size of rod			M8	M10	M12	M16
Brush diameter	d_b	[mm]	12	14	16	20

Brush diameter for hollow or perforated masonry

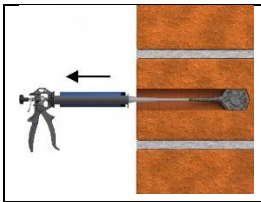
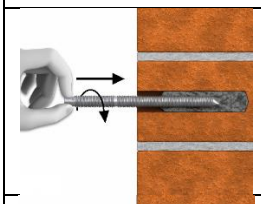
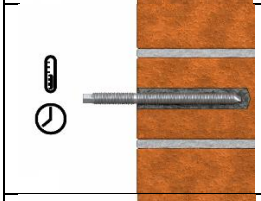
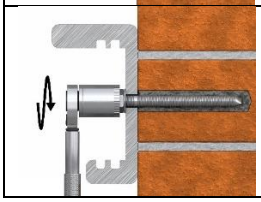
Size of rod			M8	M10	M12	M16
Brush diameter	d_b	[mm]	12	16	16	20

	Drill a hole to the required diameter and depth for rebar size being used.
  	Clean the hole with a pump and brush: - starting from the bottom of the hole, clean it by blowing it out at least 2times using a hand pump; - using an appropriate brush, clean the hole at least 2 times, - starting from the bottom of the hole, clean it by blowing it out at least 2 times using a hand pump.
	Unscrew the cap and screw on the resin dispensing tip.
	Place the cartridge in the dispenser.
	Dispense to waste until even colour is obtained.
	Place the mesh sleeve in the drilled hole.

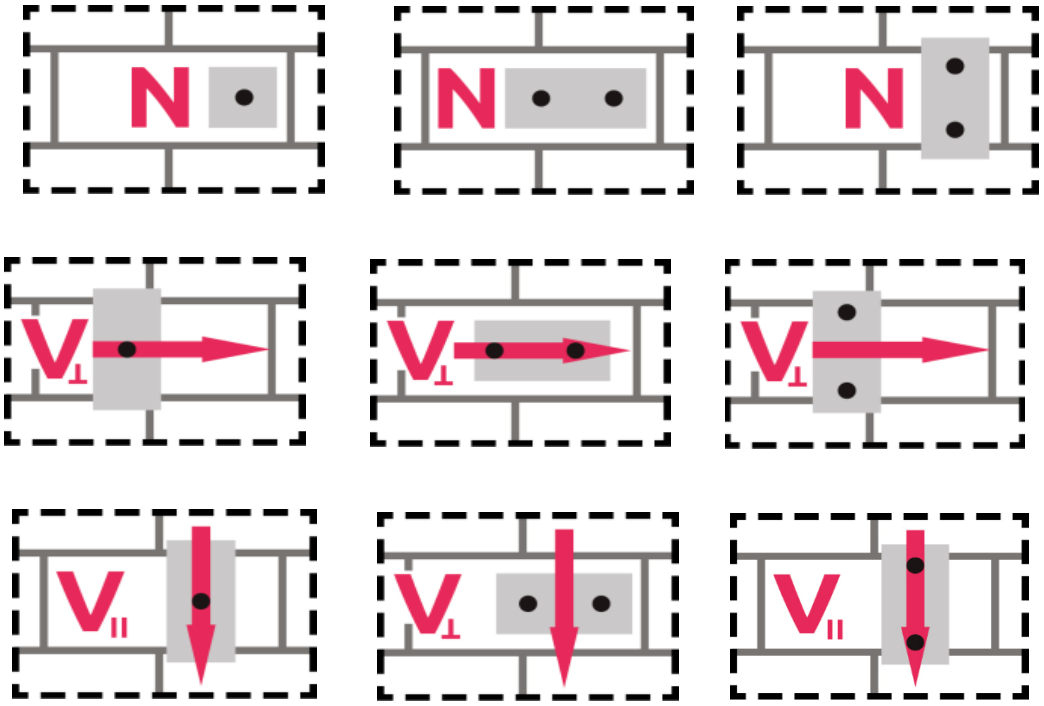
	Starting from the bottom of the hole, fill 100% of the hole depth with resin.
	Immediately after dispensing the resin, insert the threded rod or rebar into the hole with a slow twisting motion. Remove the unnecessary amount of resin that flowed from the hole and wait for the appropriate time for the resin to cure.
	Attach the fastened element and screw the nut to the required tightening torque. The tightening torque should not exceed $T_{inst., max.}$
	Bonded anchor with threaded rod installed correctly.

	Drill a hole using hammer mode, ensuring the correct diameter and depth.
	Use a hand pump to blow out the hole at least twice, starting from the bottom. Clean the hole with an appropriate brush at least twice. Use the hand pump again to blow out the hole at least twice, starting from the bottom.
	
	
	Remove the cap and attach the resin dispensing nozzle.
	Place the cartridge in the applicator gun.
	Dispense a small amount of resin (about 10 cm) to ensure proper mixing.

R-KF2, R-KF2-S, R-KF2-W	**Annex B6** of European Technical Assessment ETA-25/0543
Intended use Installation instructions – solid masonry	

	Starting from the bottom of the hole, fill 70% of the hole's depth with resin.
	Immediately after dispensing the resin, insert the threaded rod or rebar into the hole with a slow twisting motion.
	Remove any excess resin that flows out of the hole and allow the resin to cure for the recommended time.
	Attach the fixture and tighten the nut to the required torque. Ensure the torque does not exceed $T_{inst.\ max.}$

Spacing dependent on edge distance for all anchor combinations:



The characteristic values of resistance of an anchor group are calculate by using the group-factors α_g according to Annexes C2 to C21

Group of two anchors: $N_{Rk}^{g} = \alpha_{g,N} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V} \cdot V_{Rk}$ (with the relevant α_g)

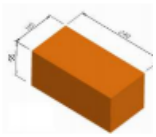
Group of four anchors: $N_{Rk}^{g} = \alpha_{g,N\parallel} \cdot \alpha_{g,N\perp} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V\parallel} \cdot \alpha_{g,V\perp} \cdot V_{Rk}$

Table C0: Characteristic values of steel resistance for threaded rods and rebars under tension and shear loads in masonry

Steel failure tension loads		**M8**	**M10**	**M12**	**M16**
Characteristic steel resistance	$N_{rk,s}$ [kN]	$A_s \cdot f_{uk}$			
Steel failure shear loads without lever arm					
Characteristic steel resistance	$V_{rk,s}$ [kN]	$0{,}5 \cdot A_s \cdot f_{uk}$			
Steel failure shear loads with lever arm					
Characteristic bending moment	$M_{rk,s}$ [kN]	$1{,}2 \cdot W_{el} \cdot f_{uk}$			

Brick type: Solid Clay Brick Mz, 2DF

Table C1: Description of the brick

Brick type		Solid clay brick Mz, 2DF	
Brick dimensions	mm	l: ≥ 240 b: ≥ 115 h: ≥ 113	
Code	-	EN 771-1	
Compressive strength	N/mm^2	≥ 20	
Density	kg/dm^3	2,0	

Partial safety factor γ_M = 2,5 (in the absence of other national regulation)

[1] $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$

[2] $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$

Table C2: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} [1]	V_{Rk} [2]
[-]	[-]	[mm]	[kN]	[kN]
without	M8	80	6,5	10,0
	M10	85	8,5	13,0
	M12	95	10,0	14,0
	M16	105	11,5	17,0

Table C3: Characteristic resistance under tension and shear loading – single anchor – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} [1]	V_{Rk} [2]
[-]	[-]	[mm]	[kN]	[kN]
without	8	80	6,5	9,5
	10	85	8,0	12,0
	12	95	10,0	13,5
	16	105	10,5	17,0

Table C4: Characteristic resistance under tension and shear loading – anchor group – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	α_g
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	M8	80	5,0	9,5	2
	M10	85	7,5	10,5	2
	M12	95	9,0	11,0	2
	M16	105	10,0	13,0	2

Table C5: Characteristic resistance under tension and shear loading – anchor group – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	α_g
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	8	80	5,0	8,5	2
	10	85	7,0	9,5	2
	12	95	8,5	11,0	2
	16	105	10,0	14,0	2

Table C6: Displacements under tension and shear loading – threaded rods

Displacement under tension loading					
Size of rod		M8	M10	M12	M16
δ_{N0}	[mm]	0,23	0,24	0,25	0,31
$\delta_{N\infty}$	[mm]	0,46	0,48	0,50	0,62
Displacement under shear loading					
Size of rod		M8	M10	M12	M16
δ_{N0}	[mm]	0,65	0,70	0,73	0,75
$\delta_{N\infty}$	[mm]	0,98	1,05	1,10	1,13

Table C7: Displacements under tension and shear loading – rebars

Displacement under tension loading					
Size of rod		8	10	12	16
δ_{N0}	[mm]	0,25	0,28	0,3	0,34
$\delta_{N\infty}$	[mm]	0,50	0,56	0,60	0,68
Displacement under shear loading					
Size of rod		8	10	12	16
δ_{N0}	[mm]	0,66	0,69	0,72	0,74
$\delta_{N\infty}$	[mm]	0,99	1,04	1,08	1,11

Brick type: Clay Masonry Units

Table C8: Description of the brick

Brick type		Solid clay brick Mz, 2DF	
Brick dimensions	mm	l:≥215 b:≥102.5 h:≥ 65	
Code	-	EN 771-1	
Compressive strength	N/mm^2	≥ 20	
Density	kg/dm^3	2,0	

Partial safety factor γ_M = 2,5 (in the absence of other national regulation)

[1] $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$

[2] $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$

Table C9: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	**M**	**h_{ef}**	**N_{Rk} [1)]**	**V_{Rk} [2)]**
[-]	[-]	[mm]	[kN]	[kN]
without	M8	80	7,5	9,5
	M10	85	9,0	13,0
	M12	95	10,5	13,5
	M16	105	13,0	18,5

Table C10: Characteristic resistance under tension and shear loading – single anchor – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	**M**	**h_{ef}**	**N_{Rk} [1)]**	**V_{Rk} [2)]**
[-]	[-]	[mm]	[kN]	[kN]
without	8	80	7,0	10,0
	10	85	8,5	12,0
	12	95	9,5	13,5
	16	105	11,0	17,5

Table C11: Characteristic resistance under tension and shear loading – anchor group – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	α_g *)
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	M8	80	6,0	9,5	2
	M10	85	7,5	10,5	2
	M12	95	8,5	11,5	2
	M16	105	10,0	15,5	2
Group of two anchors: $N_{Rk}^g = \alpha_{g,N} \cdot N_{Rk}$ and $V_{Rk}^g = \alpha_{g,V} \cdot V_{Rk}$ (with the relevant α_g) Group of four anchors: $N_{Rk}^g = \alpha_{g,N\parallel} \cdot \alpha_{g,N\perp} \cdot N_{Rk}$ and $V_{Rk}^g = \alpha_{g,V\parallel} \cdot \alpha_{g,V\perp} \cdot V_{Rk}$					

Table C12: Characteristic resistance under tension and shear loading – anchor group – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	α_g *)
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	8	80	5,5	8,5	2
	10	85	7,5	10,0	2
	12	95	7,0	13,0	2
	16	105	9,5	15,0	2
Group of two anchors: $N_{Rk}^g = \alpha_{g,N} \cdot N_{Rk}$ and $V_{Rk}^g = \alpha_{g,V} \cdot V_{Rk}$ (with the relevant α_g) Group of four anchors: $N_{Rk}^g = \alpha_{g,N\parallel} \cdot \alpha_{g,N\perp} \cdot N_{Rk}$ and $V_{Rk}^g = \alpha_{g,V\parallel} \cdot \alpha_{g,V\perp} \cdot V_{Rk}$					

Table C13: Displacements under tension and shear loading – threaded rods

Displacement under tension loading					
Size of rod		M8	M10	M12	M16
δ_{N0}	[mm]	0,24	0,28	0,32	0,33
$\delta_{N\infty}$	[mm]	0,48	0,56	0,64	0,66
Displacement under shear loading					
Size of rod		M8	M10	M12	M16
δ_{N0}	[mm]	0,61	0,65	0,69	0,78
$\delta_{N\infty}$	[mm]	0,92	0,98	1,04	1,17

Table C14: Displacements under tension and shear loading – rebars

Displacement under tension loading					
Size of rod		8	10	12	16
δ_{N0}	[mm]	0,27	0,31	0,36	0,38
$\delta_{N\infty}$	[mm]	0,54	0,62	0,72	0,76
Displacement under shear loading					
Size of rod		8	10	12	16
δ_{N0}	[mm]	0,66	0,72	0,73	0,80
$\delta_{N\infty}$	[mm]	0,99	1,08	1,10	1,20

Brick type: Solid silica brick, 1DF

Table C15: Description of the brick

Brick type		Solid silica brick, 1DF	
Brick dimensions	mm	l: ≥ 240 b: ≥ 115 h: ≥ 52	
Code	-	EN 771-2	
Compressive strength	N/mm^2	≥ 20	
Density	kg/dm^3	2,0	

Partial safety factor γ_M = 2,5 (in the absence of other national regulation)

[1] $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$

[2] $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$

Table C16: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} [1]	V_{Rk} [2]
[-]	[-]	[mm]	[kN]	[kN]
without	M8	80	9,0	11,5
	M10	85	12,5	14,5
	M12	95	13,0	18,0
	M16	105	15,5	23,5

Table C17: Characteristic resistance under tension and shear loading – single anchor – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} [1]	V_{Rk} [2]
[-]	[-]	[mm]	[kN]	[kN]
without	8	80	8,5	10,0
	10	85	10,0	11,0
	12	95	12,5	14,5
	16	105	13,0	20,5

Table C18: Characteristic resistance under tension and shear loading – anchor group – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	$\alpha_{g,}$ *)
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	M8	80	8,5	10,5	2
	M10	85	10,5	12,0	2
	M12	95	12,0	14,0	2
	M16	105	15,0	19,0	2
Group of two anchors: $N_{Rk}^{g} = \alpha_{g,N} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V} \cdot V_{Rk}$ (with the relevant α_g) Group of four anchors: $N_{Rk}^{g} = \alpha_{g,N\parallel} \cdot \alpha_{g,N\perp} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V\parallel} \cdot \alpha_{g,V\perp} \cdot V_{Rk}$					

Table C19: Characteristic resistance under tension and shear loading – anchor group – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	α_g *)
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	8	80	7,5	10,0	2
	10	85	10,0	9,5	2
	12	95	10,5	13,0	2
	16	105	13,5	18,5	2
Group of two anchors: $N_{Rk}^{g} = \alpha_{g,N} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V} \cdot V_{Rk}$ (with the relevant α_g) Group of four anchors: $N_{Rk}^{g} = \alpha_{g,N\parallel} \cdot \alpha_{g,N\perp} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V\parallel} \cdot \alpha_{g,V\perp} \cdot V_{Rk}$					

Table C20: Displacements under tension and shear loading – threaded rods

Displacement under tension loading					
Size of rod		M8	M10	M12	M16
δ_{N0}	[mm]	0,25	0,31	0,32	0,36
$\delta_{N\infty}$	[mm]	0,50	0,62	0,64	0,72
Displacement under shear loading					
Size of rod		M8	M10	M12	M16
δ_{N0}	[mm]	0,7	0,75	0,83	0,85
$\delta_{N\infty}$	[mm]	1,05	1,13	1,25	1,28

Table C21: Displacements under tension and shear loading – rebars

Displacement under tension loading					
Size of rod		8	10	12	16
δ_{N0}	[mm]	0,23	0,28	0,30	0,37
$\delta_{N\infty}$	[mm]	0,46	0,56	0,60	0,74
Displacement under shear loading					
Size of rod		8	10	12	16
δ_{N0}	[mm]	0,75	0,78	0,85	0,9
$\delta_{N\infty}$	[mm]	1,13	1,17	1,28	1,35

Brick type: Solid normal weight concrete brick Vbn, 1DF

Table C22: Description of the brick

Brick type		Solid normal weight concrete brick Vbn, 1DF	
Brick dimensions	mm	l: ≥ 240 b: ≥ 115 h: ≥ 70	
Code	-	EN 771-3	
Compressive strength	N/mm^2	≥ 6	
kg/dm^3	kg/dm^3	0,7	

Partial safety factor γ_M = 2,5 (in the absence of other national regulation)

[1] $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$

[2] $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$

Table C23: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} [1]	V_{Rk} [2]
[-]	[-]	[mm]	[kN]	[kN]
without	M8	80	4,0	6,0
	M10	85	5,0	7,0
	M12	95	5,5	8,0
	M16	105	7,0	10,0

Table C24: Characteristic resistance under tension and shear loading – single anchor – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} [1]	V_{Rk} [2]
[-]	[-]	[mm]	[kN]	[kN]
without	8	80	3,5	5,5
	10	85	4,0	6,5
	12	95	4,5	7,0
	16	105	6,0	9,5

Table C25: Characteristic resistance under tension and shear loading – anchor group – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	$\alpha_{g,}$ *)
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	M8	80	3,5	5,5	2
	M10	85	3,5	5,5	2
	M12	95	4,5	6,5	2
	M16	105	5,5	8,0	2
Group of two anchors: $N_{Rk}^{g} = \alpha_{g,N} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V} \cdot V_{Rk}$ (with the relevant α_g) Group of four anchors: $N_{Rk}^{g} = \alpha_{g,N\parallel} \cdot \alpha_{g,N\perp} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V\parallel} \cdot \alpha_{g,V\perp} \cdot V_{Rk}$					

Table C27: Characteristic resistance under tension and shear loading – anchor group – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	α_g *)
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	8	80	7,5	10,0	2
	10	85	10,0	9,5	2
	12	95	10,5	13,0	2
	16	105	13,5	18,5	2
Group of two anchors: $N_{Rk}^{g} = \alpha_{g,N} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V} \cdot V_{Rk}$ (with the relevant α_g) Group of four anchors: $N_{Rk}^{g} = \alpha_{g,N\parallel} \cdot \alpha_{g,N\perp} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V\parallel} \cdot \alpha_{g,V\perp} \cdot V_{Rk}$					

Table C28: Displacements under tension and shear loading – threaded rods

Displacement under tension loading					
Size of rod		M8	M10	M12	M16
δ_{N0}	[mm]	0,25	0,31	0,32	0,36
$\delta_{N\infty}$	[mm]	0,50	0,62	0,64	0,72
Displacement under shear loading					
Size of rod		M8	M10	M12	M16
δ_{N0}	[mm]	0,7	0,75	0,83	0,85
$\delta_{N\infty}$	[mm]	1,05	1,13	1,25	1,28

Table C29: Displacements under tension and shear loading – rebars

Displacement under tension loading					
Size of rod		8	10	12	16
δ_{N0}	[mm]	0,25	0,31	0,32	0,36
$\delta_{N\infty}$	[mm]	0,50	0,62	0,64	0,72
Displacement under shear loading					
Size of rod		8	10	12	16
δ_{N0}	[mm]	0,7	0,75	0,83	0,85
$\delta_{N\infty}$	[mm]	1,05	1,13	1,25	1,28

Brick type: Solid blocks

Table C26: Description of the brick

Brick type		Solid Blocks	
Brick dimensions	mm	l:≥ 390 b:≥ 190 h:≥ 140	
Code	-	EN 771-3	
Compressive strength	N/mm^2	≥ 7,5	
Density	kg/dm^3	0,8	
Partial safety factor γ_M = 2,5 (in the absence of other national regulation) 1) $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$ 2) $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$			

Table C27: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)
[-]	[-]	[mm]	[kN]	[kN]
without	M8	80	5,5	7,0
	M10	85	6,5	8,0
	M12	95	7,5	1,0
	M16	105	8,0	13,5

Table C28: Characteristic resistance under tension and shear loading – single anchor – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)
[-]	[-]	[mm]	[kN]	[kN]
without	8	80	4,5	7,0
	10	85	6,0	7,5
	12	95	6,5	10,0
	16	105	7,0	12,5

Table C29: Characteristic resistance under tension and shear loading – anchor group – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	$\alpha_{g,}$ *)
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	M8	80	4,5	6,5	2
	M10	85	6,0	7,5	2
	M12	95	6,0	9,5	2
	M16	105	6,5	11,0	2
Group of two anchors: $N_{Rk}^{g} = \alpha_{g,N} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V} \cdot V_{Rk}$ (with the relevant α_g) Group of four anchors: $N_{Rk}^{g} = \alpha_{g,N\parallel} \cdot \alpha_{g,N\perp} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V\parallel} \cdot \alpha_{g,V\perp} \cdot V_{Rk}$					

Table C30: Characteristic resistance under tension and shear loading – anchor group – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	α_g *)
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	8	80	4,5	6,5	2
	10	85	5,0	7,5	2
	12	95	5,5	9,0	2
	16	105	6,0	10,5	2
Group of two anchors: $N_{Rk}^{g} = \alpha_{g,N} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V} \cdot V_{Rk}$ (with the relevant α_g) Group of four anchors: $N_{Rk}^{g} = \alpha_{g,N\parallel} \cdot \alpha_{g,N\perp} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V\parallel} \cdot \alpha_{g,V\perp} \cdot V_{Rk}$					

Table C31: Displacements under tension and shear loading – threaded rods

Displacement under tension loading					
Size of rod		M8	M10	M12	M16
δ_{N0}	[mm]	0,16	0,17	0,25	0,28
$\delta_{N\infty}$	[mm]	0,32	0,34	0,50	0,56
Displacement under shear loading					
Size of rod		M8	M10	M12	M16
δ_{N0}	[mm]	0,51	0,56	0,67	0,72
$\delta_{N\infty}$	[mm]	0,77	0,84	1,01	0,72

Table C32: Displacements under tension and shear loading – rebars

Displacement under tension loading					
Size of rod		8	10	12	16
δ_{N0}	[mm]	0,18	0,2	0,27	0,34
$\delta_{N\infty}$	[mm]	0,36	0,40	0,54	0,68
Displacement under shear loading					
Size of rod		8	10	12	16
δ_{N0}	[mm]	0,55	0,62	0,7	0,75
$\delta_{N\infty}$	[mm]	0,83	0,93	1,05	1,13

Brick type: AAC2

Table C33: Description of the brick

Brick type		AAC2	
Brick dimensions	mm	l:≥ 599 b:≥ 100 h:≥ 240	
Code	-	EN 771-4	
Compressive strength	N/mm^2	≥ 2	
Density	kg/dm^3	0,22	
Partial safety factor γ_M = 2 (in the absence of other national regulation) 1) $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$ 2) $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$			

Table C34: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	**M**	**h_{ef}**	**N_{Rk} 1)**	**V_{Rk} 2)**
[-]	[-]	[mm]	[kN]	[kN]
without	M8	80	1,5	1,5
	M10	85	2,0	2,0
	M12	95	2,0	2,5

Table C35: Characteristic resistance under tension and shear loading – single anchor – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	**M**	**h_{ef}**	**N_{Rk} 1)**	**V_{Rk} 2)**
[-]	[-]	[mm]	[kN]	[kN]
without	8	80	1,0	1,5
	10	85	1,5	2,0
	12	95	2,0	2,5

Table C36: Characteristic resistance under tension and shear loading – anchor group – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	$\alpha_{g,}$ *)
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	M8	80	1,5	1,5	2
	M10	85	2,0	2,0	2
	M12	95	2,0	2,5	2
Group of two anchors: $N_{Rk}^{g} = \alpha_{g,N} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V} \cdot V_{Rk}$ (with the relevant α_g) Group of four anchors: $N_{Rk}^{g} = \alpha_{g,N\parallel} \cdot \alpha_{g,N\perp} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V\parallel} \cdot \alpha_{g,V\perp} \cdot V_{Rk}$					

Table C37: Characteristic resistance under tension and shear loading – anchor group – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	α_g *)
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	8	80	1,0	1,0	2
	10	85	1,5	1,5	2
	12	95	1,5	2,0	2
Group of two anchors: $N_{Rk}^{g} = \alpha_{g,N} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V} \cdot V_{Rk}$ (with the relevant α_g) Group of four anchors: $N_{Rk}^{g} = \alpha_{g,N\parallel} \cdot \alpha_{g,N\perp} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V\parallel} \cdot \alpha_{g,V\perp} \cdot V_{Rk}$					

Table C38: Displacements under tension and shear loading – threaded rods

Displacement under tension loading				
Size of rod		M8	M10	M12
δ_{N0}	[mm]	0,1	0,1	0,14
$\delta_{N\infty}$	[mm]	0,20	0,20	0,28
Displacement under shear loading				
Size of rod		M8	M10	M12
δ_{N0}	[mm]	0,35	0,36	0,47
$\delta_{N\infty}$	[mm]	0,53	0,54	0,71

Table C39: Displacements under tension and shear loading – rebars

Displacement under tension loading				
Size of rod		8	10	12
δ_{N0}	[mm]	0,11	0,12	0,15
$\delta_{N\infty}$	[mm]	0,22	0,24	0,30
Displacement under shear loading				
Size of rod		8	10	12
δ_{N0}	[mm]	0,39	0,40	0,42
$\delta_{N\infty}$	[mm]	0,59	0,60	0,63

Brick type: AAC7

Table C40: Description of the brick

Brick type		AAC7	
Brick dimensions	mm	l:≥ 599 b:≥ 100 h:≥ 240	
Code	-	EN 771-4	
Compressive strength	N/mm^2	≥ 6	
Density	kg/dm^3	0,65	
Partial safety factor γ_M = 2 (in the absence of other national regulation) 1) $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$ 2) $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$			

Table C41: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	**M**	**h_{ef}**	**N_{Rk} 1)**	**V_{Rk} 2)**
[-]	[-]	[mm]	[kN]	[kN]
without	M8	80	4,0	6,0
	M10	85	4,0	7,0
	M12	95	5,0	7,0

Table C42: Characteristic resistance under tension and shear loading – single anchor – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	**M**	**h_{ef}**	**N_{Rk} 1)**	**V_{Rk} 2)**
[-]	[-]	[mm]	[kN]	[kN]
without	8	80	3,0	5,0
	10	85	4,0	6,0
	12	95	4,0	6,0

Table C43: Characteristic resistance under tension and shear loading – anchor group – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	$\alpha_{g,}$ *)
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	M8	80	3,5	5,5	2
	M10	85	3,5	6,5	2
	M12	95	4,5	6,5	2
Group of two anchors: $N_{Rk}^{g} = \alpha_{g,N} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V} \cdot V_{Rk}$ (with the relevant α_g) Group of four anchors: $N_{Rk}^{g} = \alpha_{g,N\parallel} \cdot \alpha_{g,N\perp} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V\parallel} \cdot \alpha_{g,V\perp} \cdot V_{Rk}$					

Table C44: Characteristic resistance under tension and shear loading – anchor group – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	α_g *)
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	8	80	3,0	5,0	2
	10	85	3,5	6,0	2
	12	95	4,0	6,0	2
Group of two anchors: $N_{Rk}^{g} = \alpha_{g,N} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V} \cdot V_{Rk}$ (with the relevant α_g) Group of four anchors: $N_{Rk}^{g} = \alpha_{g,N\parallel} \cdot \alpha_{g,N\perp} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V\parallel} \cdot \alpha_{g,V\perp} \cdot V_{Rk}$					

Table C48: Displacements under tension and shear loading – threaded rods

Displacement under tension loading				
Size of rod		M8	M10	M12
δ_{N0}	[mm]	0,14	0,15	0,19
$\delta_{N\infty}$	[mm]	0,28	0,30	0,38
Displacement under shear loading				
Size of rod		M8	M10	M12
δ_{N0}	[mm]	0,6	0,67	0,73
$\delta_{N\infty}$	[mm]	0,90	1,01	1,10

Table C49: Displacements under tension and shear loading – rebars

Displacement under tension loading				
Size of rod		8	10	12
δ_{N0}	[mm]	0,15	0,18	0,23
$\delta_{N\infty}$	[mm]	0,30	0,6	0,46
Displacement under shear loading				
Size of rod		8	10	12
δ_{N0}	[mm]	0,66	0,72	0,76
$\delta_{N\infty}$	[mm]	0,99	1,08	1,14

Brick type: Aggregate Concrete

Table C50: Description of the brick

Brick type		Aggregate Concrete	
Brick dimensions	mm	l:≥440 b:≥ 100 h:≥ 215	
Code	-	EN 771-3	
Compressive strength	N/mm^2	≥ 3,6	
Density	kg/dm^3	0,7	
Partial safety factor γ_M = 2,5 (in the absence of other national regulation) 1) $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$ 2) $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$			

Table C51: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	**M**	**h_{ef}**	**N_{Rk} 1)**	**V_{Rk} 2)**
[-]	[-]	[mm]	[kN]	[kN]
without	M8	80	2,0	3,0
	M10	85	3,5	4,5
	M12	95	4,0	5,0
	M16	105	4,5	5,5

Table C52: Characteristic resistance under tension and shear loading – single anchor – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	**M**	**h_{ef}**	**N_{Rk} 1)**	**V_{Rk} 2)**
[-]	[-]	[mm]	[kN]	[kN]
without	8	80	1,5	7,0
	10	85	3,0	7,5
	12	95	4,0	10,0
	16	105	4,0	12,5

Table C53: Characteristic resistance under tension and shear loading – anchor group – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	$\alpha_{g,}$ *)
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	M8	80	1,5	2,5	2
	M10	85	2,5	3,5	2
	M12	95	3,5	3,5	2
	M16	105	4,5	4,5	2
Group of two anchors: $N_{Rk}^{g} = \alpha_{g,N} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V} \cdot V_{Rk}$ (with the relevant α_g) Group of four anchors: $N_{Rk}^{g} = \alpha_{g,N\parallel} \cdot \alpha_{g,N\perp} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V\parallel} \cdot \alpha_{g,V\perp} \cdot V_{Rk}$					

Table C54: Characteristic resistance under tension and shear loading – anchor group – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	α_g *)
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	8	80	1,5	2,0	2
	10	85	3,0	3,0	2
	12	95	3,0	3,5	2
	16	105	3,0	4,5	2
Group of two anchors: $N_{Rk}^{g} = \alpha_{g,N} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V} \cdot V_{Rk}$ (with the relevant α_g) Group of four anchors: $N_{Rk}^{g} = \alpha_{g,N\parallel} \cdot \alpha_{g,N\perp} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V\parallel} \cdot \alpha_{g,V\perp} \cdot V_{Rk}$					

Table C55: Displacements under tension and shear loading – threaded rods

Displacement under tension loading					
Size of rod		M8	M10	M12	M16
δ_{N0}	[mm]	0,08	0,09	0,13	0,15
$\delta_{N\infty}$	[mm]	0,16	0,18	0,26	0,30
Displacement under shear loading					
Size of rod		M8	M10	M12	M16
δ_{N0}	[mm]	0,25	0,36	0,45	0,52
$\delta_{N\infty}$	[mm]	0,38	0,54	0,68	0,78

Table C56: Displacements under tension and shear loading – rebars

Displacement under tension loading					
Size of rod		8	10	12	16
δ_{N0}	[mm]	0,11	0,14	0,17	0,19
$\delta_{N\infty}$	[mm]	0,22	0,28	0,34	0,38
Displacement under shear loading					
Size of rod		8	10	12	16
δ_{N0}	[mm]	0,29	0,39	0,48	0,55
$\delta_{N\infty}$	[mm]	0,44	0,59	0,72	0,83

Brick type: Aggregate Concrete

Table C61: Description of the brick

Brick type		Aggregate Concrete	
Brick dimensions	mm	l:≥440 b:≥ 100 h:≥ 215	
Code	-	EN 771-3	
Compressive strength	N/mm^2	≥ 7,3	
Density	kg/dm^3	0,8	
Partial safety factor γ_M = 2,5 (in the absence of other national regulation) 1) $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$ 2) $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$			

Table C62: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)
[-]	[-]	[mm]	[kN]	[kN]
without	M8	80	4,0	5,5
	M10	85	5,5	7,5
	M12	95	7,0	8,5
	M16	105	8,0	10,5

Table C63: Characteristic resistance under tension and shear loading – single anchor – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)
[-]	[-]	[mm]	[kN]	[kN]
without	8	80	3,5	5,0
	10	85	4,5	6,5
	12	95	6,0	8,5
	16	105	6,5	10,0

Table C64: Characteristic resistance under tension and shear loading – anchor group – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	$\alpha_{g,}$ *)
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	M8	80	3,0	4,0	2
	M10	85	5,0	7,0	2
	M12	95	6,0	7,0	2
	M16	105	6,5	10,5	2
Group of two anchors: $N_{Rk}^{g} = \alpha_{g,N} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V} \cdot V_{Rk}$ (with the relevant α_g) Group of four anchors: $N_{Rk}^{g} = \alpha_{g,N\parallel} \cdot \alpha_{g,N\perp} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V\parallel} \cdot \alpha_{g,V\perp} \cdot V_{Rk}$					

Table C65: Characteristic resistance under tension and shear loading – anchor group – rebars

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance	α_g *)
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)	
[-]	[-]	[mm]	[kN]	[kN]	[-]
without	8	80	3,5	4,5	2
	10	85	4,5	5,5	2
	12	95	6,0	7,0	2
	16	105	6,5	10,0	2
Group of two anchors: $N_{Rk}^{g} = \alpha_{g,N} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V} \cdot V_{Rk}$ (with the relevant α_g) Group of four anchors: $N_{Rk}^{g} = \alpha_{g,N\parallel} \cdot \alpha_{g,N\perp} \cdot N_{Rk}$ and $V_{Rk}^{g} = \alpha_{g,V\parallel} \cdot \alpha_{g,V\perp} \cdot V_{Rk}$					

Table C66: Displacements under tension and shear loading – threaded rods

Displacement under tension loading					
Size of rod		M8	M10	M12	M16
δ_{N0}	[mm]	0,11	0,13	0,15	0,16
$\delta_{N\infty}$	[mm]	0,22	0,26	0,30	0,32
Displacement under shear loading					
Size of rod		M8	M10	M12	M16
δ_{N0}	[mm]	0,28	0,32	0,37	0,45
$\delta_{N\infty}$	[mm]	0,42	0,48	0,56	0,68

Table C67: Displacements under tension and shear loading – rebars

Displacement under tension loading					
Size of rod		8	10	12	16
δ_{N0}	[mm]	0,12	0,15	0,18	0,21
$\delta_{N\infty}$	[mm]	0,24	0,30	0,36	0,42
Displacement under shear loading					
Size of rod		8	10	12	16
δ_{N0}	[mm]	0,3	0,33	0,4	0,48
$\delta_{N\infty}$	[mm]	0,45	0,50	0,60	0,72

Brick type: Hollow Aggregate Concrete

Table C68: Description of the brick

Brick type		Hollow Aggregate Concrete	
Brick dimensions	mm	l:≥440 b:≥ 140 h:≥ 215	
Code	-	EN 771-3	
Compressive strength	N/mm^2	≥ 7,3	
Density	kg/dm^3	0,8	
Partial safety factor γ_M = 2,5 (in the absence of other national regulation) 1) $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$ 2) $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$			

Table C69: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)
[-]	[-]	[mm]	[kN]	[kN]
12x50	M8	50	3,0	3,5
16x85	M10	85	4,5	6,0
16x130	M10	130	5,0	6,5
16x85	M12	85	5,5	6,0
16x130	M12	130	5,0	7,5

Table C70: Displacements under tension and shear loading – threaded rods

Displacement under tension loading						
Size of rod		M8	M10	M10	M12	M12
δ_{N0}	[mm]	0,12	0,14	0,16	0,18	0,19
$\delta_{N\infty}$	[mm]	0,24	0,28	0,32	0,36	0,38
Displacement under shear loading						
Size of rod		M8	M10	M10	M12	M12
δ_{N0}	[mm]	0,29	0,32	0,35	0,36	0,48
$\delta_{N\infty}$	[mm]	0,44	0,48	0,53	0,54	0,72

Brick type: Hollow Clay Brick

Table C71: Description of the brick

Brick type		Hollow Clay Brick	
Brick dimensions	mm	l:≥440 b:≥ 140 h:≥ 215	
Code	-	EN 771-3	
Compressive strength	N/mm^2	≥ 12	
Density	kg/dm^3	0,9	
Partial safety factor γ_M = 2,5 (in the absence of other national regulation) 1) $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$ 2) $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$			

Table C69: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)
[-]	[-]	[mm]	[kN]	[kN]
12x50	M8	50	2,0	3,0
16x85	M10	85	3,0	4,0
16x130	M10	130	3,5	5,0
16x85	M12	85	4,0	5,0
16x130	M12	130	4,5	7,0
20x85	M16	85	4,0	7,5

Table C70: Displacements under tension and shear loading – threaded rods

Displacement under tension loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,11	0,13	0,14	0,18	0,21	0,22
$\delta_{N\infty}$	[mm]	0,22	0,26	0,28	0,36	0,42	0,44
Displacement under shear loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,25	0,28	0,3	0,33	0,36	0,38
$\delta_{N\infty}$	[mm]	0,38	0,42	0,45	0,50	0,54	0,57

Brick type: Hollow Clay Brick

Table C71: Description of the brick

Brick type		Hollow Clay Brick	
Brick dimensions	mm	l:≥300 b:≥ 240 h:≥ 238	
Code	-	EN 771-1	
Compressive strength	N/mm^2	≥ 20	
Density	kg/dm^3	0,8	
Partial safety factor γ_M = 2,5 (in the absence of other national regulation) 1) $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$ 2) $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$			

Table C72: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)
[-]	[-]	[mm]	[kN]	[kN]
12x50	M8	50	2,5	3,5
16x85	M10	85	4,0	5,0
16x130	M10	130	4,0	6,5
16x85	M12	85	4,5	6,5
16x130	M12	130	5,5	8,0
20x85	M16	85	5,0	8,0

Table C73: Displacements under tension and shear loading – threaded rods

Displacement under tension loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,16	0,17	0,19	0,23	0,24	0,25
$\delta_{N\infty}$	[mm]	0,32	0,34	0,38	0,46	0,48	0,50
Displacement under shear loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,33	0,35	0,40	0,42	0,46	0,53
$\delta_{N\infty}$	[mm]	0,50	00,53	0,60	0,63	0,69	0,80

Brick type: Hollow Silica Brick

Table C74: Description of the brick

Brick type		Hollow Silica Brick	
Brick dimensions	mm	l:≥248 b:≥ 240 h:≥ 238	
Code	-	EN 771-2	
Compressive strength	N/mm^2	≥ 20	
Density	kg/dm^3	1,4	
Partial safety factor γ_M = 2,5 (in the absence of other national regulation) [1] $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$ [2] $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$			

Table C75: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} [1]	V_{Rk} [2]
[-]	[-]	[mm]	[kN]	[kN]
12x50	M8	50	6,0	8,5
16x85	M10	85	9,0	11,5
16x130	M10	130	11,0	15,5
16x85	M12	85	10,5	16,0
16x130	M12	130	12,0	20,0
20x85	M16	85	13,0	20,0

Table C76: Displacements under tension and shear loading – threaded rods

Displacement under tension loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,15	0,17	0,17	0,121	0,23	0,32
$\delta_{N\infty}$	[mm]	0,30	0,34	0,34	0,42	0,46	0,64
Displacement under shear loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,55	0,64	0,65	0,71	0,74	0,82
$\delta_{N\infty}$	[mm]	0,83	0,96	0,98	1,07	1,11	1,23

Brick type: Hollow Silica Brick

Table C77: Description of the brick

Brick type		Hollow Silica Brick	
Brick dimensions	mm	l:≥248 b:≥ 240 h:≥ 238	
Code	-	EN 771-2	
Compressive strength	N/mm^2	≥ 12	
Density	kg/dm^3	1,4	
Partial safety factor γ_M = 2,5 (in the absence of other national regulation) 1) $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$ 2) $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$			

Table C78: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)
[-]	[-]	[mm]	[kN]	[kN]
12x50	M8	50	5,5	7,0
16x85	M10	85	7,5	10,5
16x130	M10	130	9,0	12,0
16x85	M12	85	8,5	13,0
16x130	M12	130	9,5	14,0
20x85	M16	85	10,5	17,5

Table C79: Displacements under tension and shear loading – threaded rods

Displacement under tension loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,16	0,17	0,19	0,23	0,24	0,25
$\delta_{N\infty}$	[mm]	0,32	0,34	0,38	0,46	0,48	0,50
Displacement under shear loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,33	0,35	0,40	0,42	0,46	0,53
$\delta_{N\infty}$	[mm]	0,50	00,53	0,60	0,63	0,69	0,80

Brick type: Hollow Masonry Units

Table C80: Description of the brick

Brick type		Hollow Masonry Units	
Brick dimensions	mm	l:≥215 b:≥ 102,5 h:≥ 65	
Code	-	EN 771-3	
Compressive strength	N/mm^2	≥ 20	
Density	kg/dm^3	1,4	
Partial safety factor γ_M = 2,5 (in the absence of other national regulation) 1) $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$ 2) $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$			

Table C81: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)
[-]	[-]	[mm]	[kN]	[kN]
12x50	M8	50	5,5	8,5
16x85	M10	85	8,5	12,0
16x130	M10	130	10,5	15,0
16x85	M12	85	8,5	11,5
16x130	M12	130	13,0	18,0
20x85	M16	85	13,0	20,5

Table C82: Displacements under tension and shear loading – threaded rods

Displacement under tension loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,73	0,75	0,81	0,84	0,85	0,93
$\delta_{N\infty}$	[mm]	1,10	1,13	1,22	1,26	1,28	1,40
Displacement under shear loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,18	0,21	0,22	0,34	0,35	0,39
$\delta_{N\infty}$	[mm]	0,36	0,42	0,44	0,68	0,70	0,78

Brick type: Hollow Lightweight Concrete Brick

Table C83: Description of the brick

Brick type		Hollow Lightweight Concrete Brick	
Brick dimensions	mm	l:≥ 495 b:≥ 240 h:≥ 238	
Code	-	EN 771-3	
Compressive strength	N/mm^2	≥ 2	
Density	kg/dm^3	0,8	
Partial safety factor γ_M = 2,5 (in the absence of other national regulation) 1) $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$ 2) $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$			

Table C84: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)
[-]	[-]	[mm]	[kN]	[kN]
12x50	M8	50	2,0	2,5
16x85	M10	85	2,0	2,5
16x130	M10	130	2,5	3,0
16x85	M12	85	2,5	3,0
16x130	M12	130	2,5	3,5
20x85	M16	85	3,0	4,0

Table C82: Displacements under tension and shear loading – threaded rods

Displacement under tension loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,11	0,11	0,12	0,14	0,18	0,19
$\delta_{N\infty}$	[mm]	0,22	0,22	0,24	0,28	0,36	0,38
Displacement under shear loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,34	0,35	0,42	0,45	0,55	0,56
$\delta_{N\infty}$	[mm]	0,51	0,53	0,63	0,68	0,83	0,84

Brick type: Hollow Normal Weight Concrete Brick

Table C83: Description of the brick

Brick type		Hollow normal weight concrete brick	
Brick dimensions	mm	l:≥ 500 b:≥ 200 h:≥ 200	
Code	-	EN 771-3	
Compressive strength	N/mm^2	≥ 4	
Density	kg/dm^3	0,8	

Partial safety factor γ_M = 2,5 (in the absence of other national regulation)

[1] $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$

[2] $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$

Table C84: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} [1]	V_{Rk} [2]
[-]	[-]	[mm]	[kN]	[kN]
12x50	M8	50	2,5	3,0
16x85	M10	85	2,5	3,5
16x130	M10	130	3,0	3,5
16x85	M12	85	3,0	4,0
16x130	M12	130	3,5	4,5
20x85	M16	85	3,5	5,0

Table C82: Displacements under tension and shear loading – threaded rods

Displacement under tension loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,09	0,1	0,1	0,14	0,15	0,18
$\delta_{N\infty}$	[mm]	0,18	0.20	0,20	0,28	0,30	0,36
Displacement under shear loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,31	0,40	0,42	0,45	0,55	0,55
$\delta_{N\infty}$	[mm]	0,47	0,60	0,63	0,68	0,83	0,83

Brick type: Hollow Normal Weight Concrete Brick

Table C83: Description of the brick

Brick type		Hollow normal weight concrete brick	
Brick dimensions	mm	l:≥ 500 b:≥ 200 h:≥ 200	
Code	-	EN 771-3	
Compressive strength	N/mm^2	≥ 10	
Density	kg/dm^3	0,8	
Partial safety factor γ_M = 2,5 (in the absence of other national regulation) 1) $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$ 2) $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$			

Table C84: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)
[-]	[-]	[mm]	[kN]	[kN]
12x50	M8	50	3,0	3,0
16x85	M10	85	3,5	4,5
16x130	M10	130	4,0	5,5
16x85	M12	85	4,0	5,0
16x130	M12	130	4,5	6,0
20x85	M16	85	5,0	7,5

Table C85: Displacements under tension and shear loading – threaded rods

Displacement under tension loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,12	0,14	0,14	0,16	0,16	0,21
$\delta_{N\infty}$	[mm]	0,24	0,28	0,28	0,32	0,32	0,42
Displacement under shear loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,25	0,28	0,34	036	0,44	0,46
$\delta_{N\infty}$	[mm]	0,38	0,42	0,51	0,54	0,66	0,69

Brick type: TeknoAmerBlok

Table C86: Description of the brick

Brick type		TeknoAmerBlok	
Brick dimensions	mm	l:≥ 400 b:≥ 200 h:≥ 200	
Code	-	EN 771-3	
Compressive strength	N/mm^2	≥ 12,5	
Density	kg/dm^3	1,2	
Partial safety factor γ_M = 2,5 (in the absence of other national regulation) 1) $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$ 2) $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$			

Table C87: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} 1)	V_{Rk} 2)
[-]	[-]	[mm]	[kN]	[kN]
12x50	M8	50	3,5	5,0
16x85	M10	85	4,5	5,5
16x130	M10	130	4,5	6,0
16x85	M12	85	5,0	7,0
16x130	M12	130	6,0	8,0
20x85	M16	85	6,0	9,0

Table C88: Displacements under tension and shear loading – threaded rods

Displacement under tension loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,16	0,18	0,18	0,22	0,22	0,27
$\delta_{N\infty}$	[mm]	0,32	0,36	0,36	0,44	0,44	0,54
Displacement under shear loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,16	0,18	0,18	0,22	0,22	0,27
$\delta_{N\infty}$	[mm]	0,32	0,36	0,36	0,44	0,44	0,54

Brick type: Thermal Block

Table C89: Description of the brick

Brick type		Thermal Block	
Brick dimensions	mm	l:≥ 390 b:≥ 190 h:≥ 120	
Code	-	EN 771-3	
Compressive strength	N/mm^2	≥ 7,5	
Density	kg/dm^3	2	

Partial safety factor γ_M = 2,5 (in the absence of other national regulation)

[1] $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$

[2] $V_{Rk} = V_{Rk,b} = V_{Rk,c} = V_{Rk,s}$

Table C90: Characteristic resistance under tension and shear loading – single anchor – threaded rods

Sleeve	Anchor size	Effective embedment depth	Characteristic resistance	Characteristic resistance
$\phi d_s x l_s$	M	h_{ef}	N_{Rk} [1]	V_{Rk} [2]
[-]	[-]	[mm]	[kN]	[kN]
12x50	M8	50	3,0	4,0
16x85	M10	85	4,0	5,0
16x130	M10	130	4,5	5,5
16x85	M12	85	3,5	5,5
16x130	M12	130	4,5	6,0
20x85	M16	85	5,0	7,0

Table C91: Displacements under tension and shear loading – threaded rods

Displacement under tension loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,13	0,14	0,18	0,22	0,23	0,25
$\delta_{N\infty}$	[mm]	0,26	0,28	0,36	0,44	0,46	0,50
Displacement under shear loading							
Size of rod		M8	M10	M10	M12	M12	M16
δ_{N0}	[mm]	0,29	0,30	0,32	0,43	0,44	0,50
$\delta_{N\infty}$	[mm]	0,44	0,45	0,48	0,36	0,66	0,75