

WB300 Chemical Anchoring System

High performance chemical anchoring system for all applications

Walraven Injection System



**Foil-pack
Cartridge**
WB300 300ml

**System
Accessories**
Cleaning Brushes
Dispensing Guns
EF Mixer Nozzle
Extension Pipes
Threaded Rods

- WB300 is the high-performance chemical anchoring system for medium to heavy loads. It is approved for installations in cracked and non-cracked concrete under normal and seismic C2 conditions, for post-installed rebar connections' applications and for applications in various masonry types.

Features and benefits

- ETA Option 1 approval for cracked and non-cracked concrete
- ETA TR023 for post-installed rebar connections
- ETA approval for hollow and solid masonry
- Seismic performance categories C2 for design of anchorages under seismic actions
- ETA-approved for 50 and 100 years of service life
- Reduced concrete edge and anchor spacing distances
- Cartridge may be used up over several times (each installation after a break requires a new mixing nozzle)
- Always correct mixing ratio thanks to the static mixer nozzle

Suitable base materials



Concrete
(cracked and
non-cracked)



Hollow
concrete
blocks



Solid
bricks



Sand-lime
bricks



Hollow
bricks



Hollow
sand-lime
bricks



Aerated
concrete
blocks and
elements

Approvals and certificates

- European Technical Assessment
Cracked and non-cracked concrete
- European Technical Assessment
Post-installed rebar connections
- European Technical Assessment
Masonry Applications
- ETA 23/0310 of
28/11/2024
- ETA 23/0311 of
28/11/2024
- ETA 23/0312 of
28/11/2024



Storage conditions and shelf life

Store in cool, dry place, out of direct sunlight or other sources of heat, within +5 °C to +25 °C temperature. Expiry date and batch number are printed on each cartridge.

1. Product and packaging details

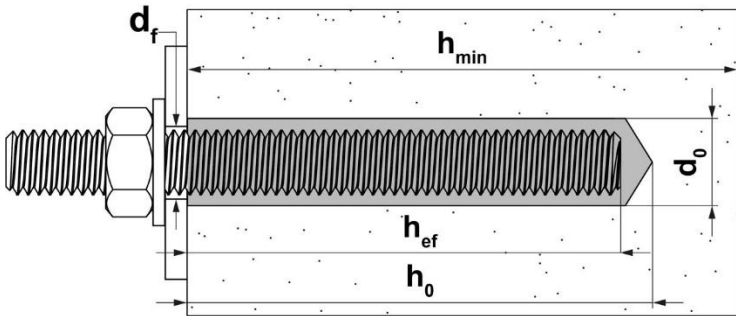
Article	Description	Label languages	Pack 1		Pack 2	
			[pcs]	EAN13	[pcs]	EAN13
6099030W	WB300 300ml	EN,NL,DE,FR,ES,DK,SE,IT	1	8719942066631	12	8719942066648
6099030E	WB300 300ml	PL,CZ,SK,HU,LV,LT,RO,UA	1	8719942066600	12	8719942066617

2. System accessories

Article	Description	For	Pack 1	
			[pcs]	EAN13
6097017	Plastic Sleeve 16x85	M8/M10/M12	10	8712993160112
6097018	Plastic Sleeve 16x130	M8/M10/M12	10	8712993160129
6097020	Plastic Sleeve 20x85	M16	10	8712993160136
6099980	Cleaning Brush ø14mm	M8/M10	10	8719942040495
6099981	Cleaning Brush ø20mm	M12/M16	10	8719942040525
6099982	Cleaning Brush ø29mm	M20/M24	10	8719942040556
6099985	Cleaning Blow Pump	-	1	8712993160174
6099986	Dispenser Gun	300ml cartridge	1	8712993160181
6099988	Dispenser Gun	410ml cartridge	1	8712993160204
6099363	EF Mixer Nozzle	-	12	8719942030663
6099992	Extension pipe	-	12	8712993160105

3. Installation data

3.1 Installation parameters for threaded rods in concrete

Anchor Type			WB300, WB300W, WB300T					
Anchor Size			M8	M10	M12	M16	M20	M24
Drill hole diameter	d ₀	[mm]	10	12	14	18	22	26
Cleaning brush	d _b	[mm]	14	14	20	20	29	29
Manual pump cleaning			h _{ef} ≤ 300mm					
Installation torque	T _{inst}	[mm]	10	20	40	80	120	160
Embedment depth, min	h _{ef,min}	[mm]	60	60	70	80	90	96
Embedment depth, max	h _{ef,max}	[mm]	160	200	240	320	400	480
Depth of drill hole	h ₀	[mm]	h _{ef} + 5mm					
Min. edge distance	C _{min}	[mm]	40	40	50	70	80	100
Min. spacing	S _{min}	[mm]	40	40	50	70	80	100
Min. concrete member thickness	h _{min}	[mm]	h _{ef} + 30mm ≥ 100mm				h _{ef} + 2 d ₀	
Critical edge spacing distance for splitting failure	C _{cr,sp}	[mm]	2 • h _{ef}					
Critical spacing distance for splitting failure	S _{cr,sp}	[mm]	2 • C _{cr,sp}					
Critical edge spacing distance for concrete cone failure	C _{cr,N}	[mm]	1.5 • h _{ef}					
Installation data is provided for two anchoring depths: h _{ef,min} = minimum embedment depth and h _{ef,max} = maximum embedment depth. Any anchoring depth h _{ef} in between h _{ef,min} and h _{ef,max} is allowed and the intermediate values can be interpolated.								

3.2 Installation parameters for rebars in concrete

Anchor Type			WB300, WB300W, WB300T					
Anchor Size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25
Drill hole diameter	d ₀	[mm]	12	14	16	20 / 22*	25	30* / 32
Cleaning brush	d _b	[mm]	14	14	19	22	29	40
Manual pump cleaning			h _{ef} ≤ 300mm					-
Embedment depth, min	h _{ef,min}	[mm]	60	60	70	80	90	100
Embedment depth, max	h _{ef,max}	[mm]	160	200	240	320	400	480
Depth of drill hole	h ₀	[mm]	h _{ef} + 5mm					
Min. edge distance	C _{min}	[mm]	40	40	50	70	80	100
Min. spacing	S _{min}	[mm]	40	40	50	70	80	100
Min. concrete member thickness	h _{min}	[mm]	h _{ef} + 30mm ≥ 100mm			h _{ef} + 2 d ₀		
Critical edge spacing distance for splitting failure	C _{cr,sp}	[mm]	2 • h _{ef}					
Critical spacing distance for splitting failure	S _{cr,sp}	[mm]	2 • C _{cr,sp}					
Critical edge spacing distance for concrete cone failure	C _{cr,N}	[mm]	1.5 • h _{ef}					

*Only for hammer and dustless drilling

3.3 Gelling and curing times

WB300			
Resin cartridge temperature [°C]	Working time t_{work} [min]	Base material temperature [°C]	Curing time t_{cure} [min]
5	18	5	145
5 to 10	10	5 to 10	145
10 to 20	6	10 to 20	85
20 to 25	5	20 to 25	50
25 to 30	4	25 to 30	40
30	4	30	35

Working time relates to the highest temperature in the range. Curing time relates to the lowest temperature in the range. Cartridge must be conditioned to a minimum of +5 °C before use.

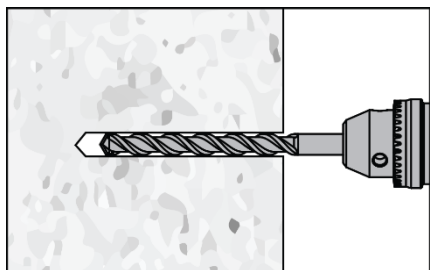
WB300W (winter)*			
Resin cartridge temperature [°C]	Working time t_{work} [min]	Base material temperature [°C]	Curing time t_{cure}
20	90	-20 to -15*	110 hours
20	35	-15 to -10*	55 hours
5	10	-10 to -5	30 hours
5	3,5	-5 to 0	9 hours
5	2	0 to +5	125 minutes
5 to 10	2	+5 to +10	60 minutes
10 to 20	2	+10 to +20	40 minutes
20 to 25	1,5	+20 to +25	20 minutes
25 to 30	1	+25 to +30	15 minutes
30	1	+30	10 minutes

*please refer to the European Technical Assessment ETA 23/0310 for performance data

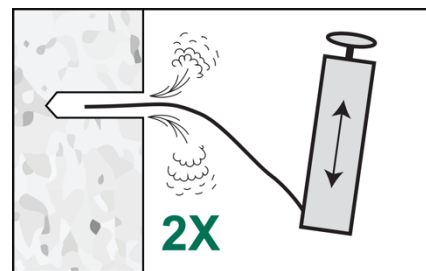
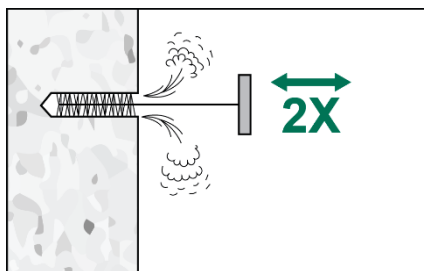
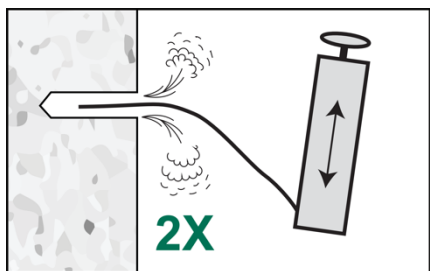
WB300T (tropical)			
Resin cartridge temperature [°C]	Working time t_{work} [min]	Base material temperature [°C]	Curing time t_{cure} [min]
min 10	30	min 10	300
10 to 20	15	10 to 20	300
20 to 25	10	20 to 25	145
25 to 30	7,5	25 to 30	85
30 to 35	5	30 to 35	50
35 to 40	3,5	35 to 40	40
40 to 45	2,5	40 to 45	35
45	2,5	45	12

3.4 Instructions for use in concrete

Hammer drilling mode



Drill hole in concrete to correct diameter d_0 and depth h_0 using hammer drilling mode



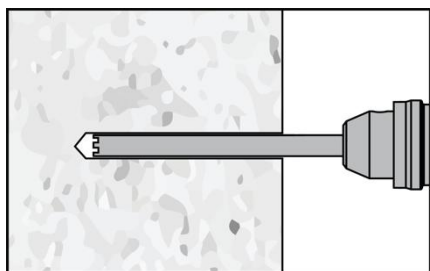
Blow: Clean the hole using compressed air, e.g. a manual blow pump.

For installation depths of $h_{ef} \geq 300$ mm, use compressed air with minimum pressure of 6 bar.

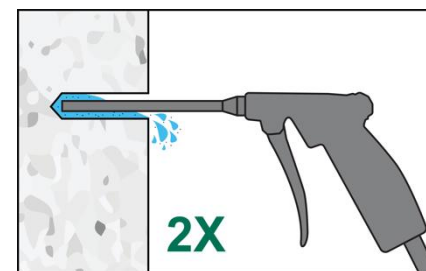
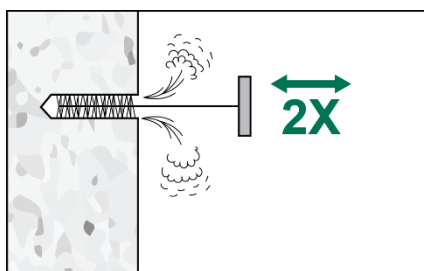
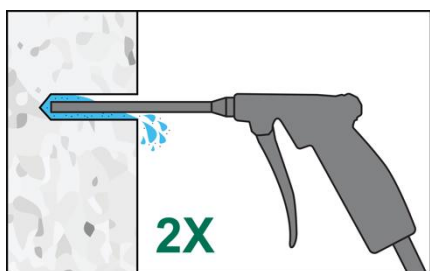
Brush: Insert the correct diameter brush to the bottom of the hole and remove it with a twisting motion.

Observe the following cleaning sequence: 2x blow → 2x brush → 2x blow → 2x brush → 2x blow

Diamond core drilling mode



Drill hole in concrete to correct diameter d_0 and depth h_0 using diamond core drill

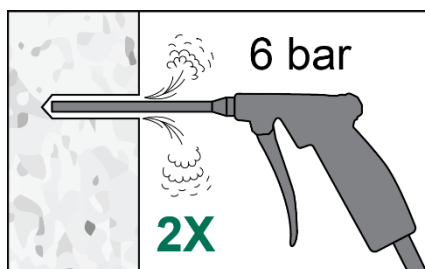
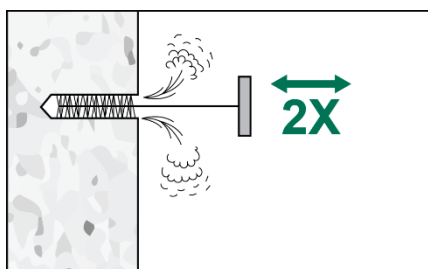


Flush: Starting from the back of the hole, flush it with pressurised water minimum two times until there is only clean water.

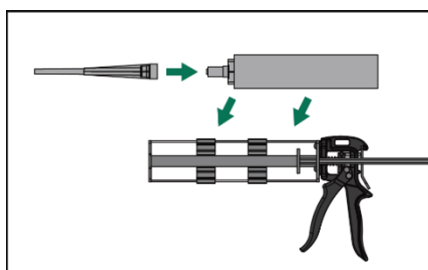
Brush: Insert the correct diameter brush to the bottom of the hole and remove it with a twisting motion.

Blow: Clean the hole using compressed air with minimum pressure of 6 bar

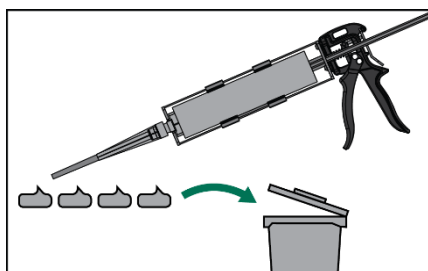
Observe the following cleaning sequence: 2x flush → 2x brush → 2x flush → 2x brush → 2x blow.



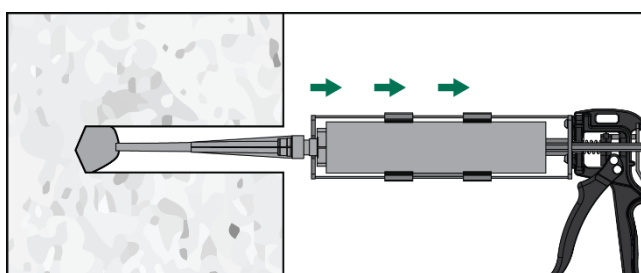
Installation process for both hammer drilling and diamond core drilling modes



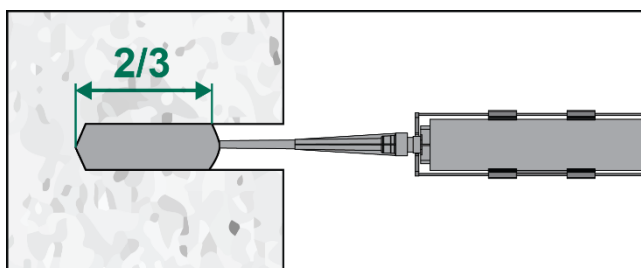
Apply the EF Nozzle to the cartridge and place the cartridge in the dispensing tool



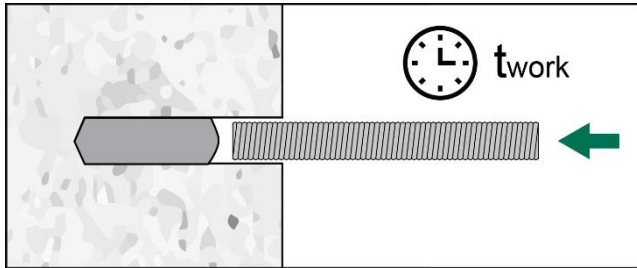
Extrude the first part waste until an even mixing colour is achieved



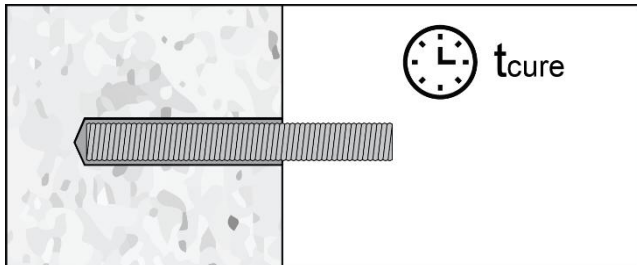
Inject the resin while slowly withdrawing the nozzle from the hole. Ensure no air voids are created as the nozzle is withdrawn



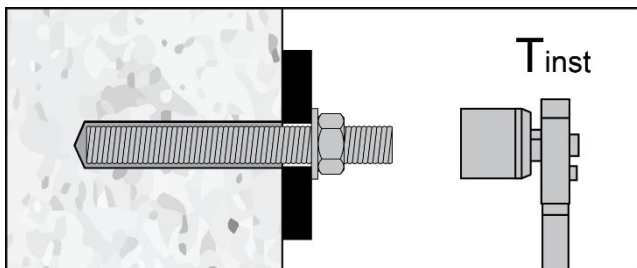
Inject the resin until the hole is approximately 2/3 full



Insert the correct diameter threaded rod with a slight forth and back twisting motion within working time t_{work}



Allow the curing time t_{cure} to elapse



Apply the fixture and tighten the nut without exceeding the maximum installation torque T_{inst}

4. Performance information

4.1 Loading in concrete with threaded rods

Tension loads presented in paragraphs 4.1.1 –4.1.12 apply to:

- correctly installed anchors
- C20/25 or C30/37 concrete
- threaded rods, steel grade 4.8, 5.8 or 8.8
- holes drilled with a hammer drill
- anchors not affected by anchor spacing or concrete edge influence
- anchor in-service temperature range of -40°C to +80°C
- recommended loads include partial safety factor and an overall partial safety factor for action of 1.4. The partial safety factor for action depends on the type of loading and shall be taken from national regulations. All anchor failure modes and the entire relevant product European Technical Assessment must be considered during anchor design
- loads are applicable for the given effective embedment depth and concrete member thickness
- installation in dry/wet or water-filled concrete holes
- **steel failure**

4.1.1 Tension loads for threaded rods (steel grade 4.8) in non-cracked C20/25 concrete for 50 and 100 years working life

Anchor type			WB300, WB300T							
Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Embedment depth	hef	[mm]	60	60	70	80	90	96	108	120
Characteristic load	N _{Rk}	[kN]	15.00	18.85	26.39	36.19	42.41	50.67	-	-
Design load	N _{Rd}	[kN]	9.22	10.47	14.66	20.11	23.56	28.15	-	-
Recommended load	N _{Rec}	[kN]	6.58	7.47	10.47	14.36	16.82	20.10	-	-
Embedment depth	hef	[mm]	80	90	110	125	170	210	240	270
Characteristic load	N _{Rk}	[kN]	15.00	23.00	34.00	56.55	80.11	110.83	-	-
Design load	N _{Rd}	[kN]	10.00	15.33	22.67	31.42	44.50	61.57	-	-
Recommended load	N _{Rec}	[kN]	7.14	10.95	16.19	22.44	31.78	43.97	-	-
Embedment depth	hef	[mm]	160	200	240	320	400	480	540	600
Characteristic load	N _{Rk}	[kN]	15.00	23.00	34.00	63.00	98.00	141.00	-	-
Design load	N _{Rd}	[kN]	10.00	15.33	22.67	42.00	65.33	94.00	-	-
Recommended load	N _{Rec}	[kN]	7.14	10.95	16.19	30.00	44.66	67.14	-	-

4.1.2 Tension loads for threaded rods (steel grade 4.8) in non-cracked C30/37 concrete for 50 and 100 years working life

Anchor type			WB300, WB300T							
Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Embedment depth	hef	[mm]	60	60	70	80	90	96	108	120
Characteristic load	N _{Rk}	[kN]	15.00	20.36	28.50	39.09	45.80	54.72	-	-
Design load	N _{Rd}	[kN]	9.95	11.31	15.83	21.71	25.45	30.40	-	-
Recommended load	N _{Rec}	[kN]	7.10	8.07	11.30	15.50	18.17	21.71	-	-
Embedment depth	hef	[mm]	80	90	110	125	170	210	240	270
Characteristic load	N _{Rk}	[kN]	15.00	23.00	34.00	61.07	86.52	119.70	-	-
Design load	N _{Rd}	[kN]	10.00	15.33	22.67	33.93	48.06	66.50	-	-
Recommended load	N _{Rec}	[kN]	7.14	10.95	16.19	24.23	34.32	47.50	-	-
Embedment depth	hef	[mm]	160	200	240	320	400	480	540	600
Characteristic load	N _{Rk}	[kN]	15.00	23.00	34.00	63.00	98.00	141.00	-	-
Design load	N _{Rd}	[kN]	10.00	15.33	22.67	42.00	65.33	94.00	-	-
Recommended load	N _{Rec}	[kN]	7.14	10.95	16.19	30.00	44.66	67.14	-	-

4.1.3 Tension loads for threaded rods (steel grade 5.8) in non-cracked C20/25 concrete for 50 and 100 years working life

Anchor type			WB300, WB300T							
Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Embedment depth	hef	[mm]	60	60	70	80	90	96	108	120
Characteristic load	N _{Rk}	[kN]	16.59	18.85	26.39	36.19	42.41	50.67	-	-
Design load	N _{Rd}	[kN]	9.22	10.47	14.66	20.11	23.56	28.15	-	-
Recommended load	N _{Rec}	[kN]	6.58	7.47	10.47	14.36	16.82	20.10	-	-
Embedment depth	hef	[mm]	80	90	110	125	170	210	240	270
Characteristic load	N _{Rk}	[kN]	18.00	28.27	41.47	56.55	80.11	110.83	-	-
Design load	N _{Rd}	[kN]	12.00	15.71	23.04	31.42	44.50	61.57	-	-
Recommended load	N _{Rec}	[kN]	8.57	11.22	16.45	22.44	31.78	43.97	-	-
Embedment depth	hef	[mm]	160	200	240	320	400	480	540	600
Characteristic load	N _{Rk}	[kN]	18.00	29.00	42.00	79.00	123.00	177.00	-	-
Design load	N _{Rd}	[kN]	12.00	19.33	28.00	52.67	82.00	118.00	-	-
Recommended load	N _{Rec}	[kN]	8.57	13.80	20.00	37.62	58.57	84.28	-	-

4.1.4 Tension loads for threaded rods (steel grade 5.8) in non-cracked C30/37 concrete for 50 and 100 years working life

Anchor type			WB300, WB300T							
Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Embedment depth	hef	[mm]	60	60	70	80	90	96	108	120
Characteristic load	N _{Rk}	[kN]	17.91	20.36	28.50	39.09	45.80	54.72	-	-
Design load	N _{Rd}	[kN]	9.95	11.31	15.83	21.71	25.44	30.4	-	-
Recommended load	N _{Rec}	[kN]	7.10	8.07	11.30	15.50	18.17	21.71	-	-
Embedment depth	hef	[mm]	80	90	110	125	170	210	240	270
Characteristic load	N _{Rk}	[kN]	18.00	29.00	42.00	61.07	86.52	119.70	-	-
Design load	N _{Rd}	[kN]	12.00	16.96	24.88	33.93	48.06	66.5	-	-
Recommended load	N _{Rec}	[kN]	8.57	12.11	17.77	24.23	34.32	47.50	-	-
Embedment depth	hef	[mm]	160	200	240	320	400	480	540	600
Characteristic load	N _{Rk}	[kN]	18.00	29.00	42.00	79.00	123.00	177.00	-	-
Design load	N _{Rd}	[kN]	12.00	19.33	28.00	52.67	82.00	118.00	-	-
Recommended load	N _{Rec}	[kN]	8.57	13.80	20.00	37.62	58.57	84.28	-	-

4.1.5 Tension loads for threaded rods (steel grade 8.8) in non-cracked C20/25 concrete for 50 and 100 years working life

Anchor type			WB300, WB300T							
Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Embedment depth	hef	[mm]	60	60	70	80	90	96	108	120
Characteristic load	N _{Rk}	[kN]	16.59	18.85	26.39	36.19	42.41	50.67	-	-
Design load	N _{Rd}	[kN]	9.22	10.47	14.66	20.11	23.56	28.15	-	-
Recommended load	N _{Rec}	[kN]	6.58	7.47	10.47	14.36	16.82	20.10	-	-
Embedment depth	hef	[mm]	80	90	110	125	170	210	240	270
Characteristic load	N _{Rk}	[kN]	22.12	28.27	41.47	56.55	80.11	110.83	-	-
Design load	N _{Rd}	[kN]	12.29	15.71	23.04	31.42	44.50	61.57	-	-
Recommended load	N _{Rec}	[kN]	8.77	11.22	16.45	22.44	31.78	43.97	-	-
Embedment depth	hef	[mm]	160	200	240	320	400	480	540	600
Characteristic load	N _{Rk}	[kN]	29.00	46.00	67.00	126.00	196.00	282.00	-	-
Design load	N _{Rd}	[kN]	19.33	30.66	44.66	84.00	130.66	188.00	-	-
Recommended load	N _{Rec}	[kN]	13.81	21.90	31.90	60.00	93.33	134.29	-	-

4.1.6 Tension loads for threaded rods (steel grade 8.8) in non-cracked C30/37 concrete for 50 and 100 years working life

Anchor type			WB300, WB300T							
Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Embedment depth	hef	[mm]	60	60	70	80	90	96	108	120
Characteristic load	N _{Rk}	[kN]	17.91	20.36	28.50	39.09	45.80	54.72	-	-
Design load	N _{Rd}	[kN]	9.95	11.31	15.83	21.71	25.44	30.4	-	-
Recommended load	N _{Rec}	[kN]	7.10	8.07	11.30	15.50	18.17	21.71	-	-
Embedment depth	hef	[mm]	80	90	110	125	170	210	240	270
Characteristic load	N _{Rk}	[kN]	23.89	30.54	44.79	61.07	86.52	119.70	-	-
Design load	N _{Rd}	[kN]	13.27	16.96	24.88	33.92	48.06	66.5	-	-
Recommended load	N _{Rec}	[kN]	9.47	12.11	17.77	24.22	34.32	47.50	-	-
Embedment depth	hef	[mm]	160	200	240	320	400	480	540	600
Characteristic load	N _{Rk}	[kN]	29.00	46.00	67.00	126.00	196.00	282.00	-	-
Design load	N _{Rd}	[kN]	19.33	30.66	44.66	84.00	130.66	188.00	-	-
Recommended load	N _{Rec}	[kN]	13.81	21.90	31.90	60.00	93.33	134.29	-	-

4.1.7 Tension loads for threaded rods (steel grade 4.8) in cracked C20/25 concrete for 50 years working life

Anchor type			WB300, WB300T							
Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Embedment depth	hef	[mm]	60	60	70	80	90	96	108	120
Characteristic load	N _{Rk}	[kN]	7.53	9.42	11.87	16.08	22.61	28.95	-	-
Design load	N _{Rd}	[kN]	4.18	5.23	6.59	8.93	12.56	16.08	-	-
Recommended load	N _{Rec}	[kN]	2.98	3.73	4.7	6.37	8.97	11.48	-	-
Embedment depth	hef	[mm]	80	90	110	125	170	210	240	270
Characteristic load	N _{Rk}	[kN]	10.05	14.13	18.66	25.13	42.72	63.33	-	-
Design load	N _{Rd}	[kN]	5.58	7.85	10.36	13.96	23.73	35.18	-	-
Recommended load	N _{Rec}	[kN]	3.98	5.60	7.40	9.97	16.95	25.12	-	-
Embedment depth	hef	[mm]	160	200	240	320	400	480	540	600
Characteristic load	N _{Rk}	[kN]	15.00	23.00	24.00	63.00	98.00	141.00	-	-
Design load	N _{Rd}	[kN]	10.00	15.33	16.00	42.00	65.33	94.00	-	-
Recommended load	N _{Rec}	[kN]	7.14	10.95	11.42	30.00	46.66	67.14	-	-

4.1.8 Tension loads for threaded rods (steel grade 4.8) in cracked C30/37 concrete for 50 years working life

Anchor type			WB300, WB300T							
Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Embedment depth	hef	[mm]	60	60	70	80	90	96	108	120
Characteristic load	N _{Rk}	[kN]	8.14	10.17	12.82	17.37	24.42	31.26	-	-
Design load	N _{Rd}	[kN]	4.52	5.65	7.12	9.65	13.56	17.36	-	-
Recommended load	N _{Rec}	[kN]	3.22	4.03	5.08	6.89	9.68	12.4	-	-
Embedment depth	hef	[mm]	80	90	110	125	170	210	240	270
Characteristic load	N _{Rk}	[kN]	10.85	15.26	20.15	27.14	46.14	68.4	-	-
Design load	N _{Rd}	[kN]	6.02	8.47	11.19	15.07	25.63	38	-	-
Recommended load	N _{Rec}	[kN]	4.30	6.05	7.99	10.76	18.30	27.14	-	-
Embedment depth	hef	[mm]	160	200	240	320	400	480	540	600
Characteristic load	N _{Rk}	[kN]	15.00	23.00	24.00	63.00	98.00	141.00	-	-
Design load	N _{Rd}	[kN]	10.00	15.33	16.00	38.6	60.31	86.85	-	-
Recommended load	N _{Rec}	[kN]	7.14	10.95	11.42	27.57	43.07	62.03	-	-

4.1.9 Tension loads for threaded rods (steel grade 5.8) in cracked C20/25 concrete for 50 years working life

Anchor type			WB300, WB300T							
Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Embedment depth	hef	[mm]	60	60	70	80	90	96	108	120
Characteristic load	N _{Rk}	[kN]	7.53	9.42	11.87	16.08	22.61	28.95	-	-
Design load	N _{Rd}	[kN]	4.18	5.23	6.59	8.93	12.56	16.08	-	-
Recommended load	N _{Rec}	[kN]	2.98	3.73	4.70	6.37	8.97	11.48	-	-
Embedment depth	hef	[mm]	80	90	110	125	170	210	240	270
Characteristic load	N _{Rk}	[kN]	10.05	14.13	18.66	25.13	42.72	63.33	-	-
Design load	N _{Rd}	[kN]	5.58	7.85	10.36	13.96	23.73	35.18	-	-
Recommended load	N _{Rec}	[kN]	3.98	5.60	7.40	9.97	16.95	25.12	-	-
Embedment depth	hef	[mm]	160	200	240	320	400	480	540	600
Characteristic load	N _{Rk}	[kN]	18.00	29.00	40.71	64.33	100.53	144.76	-	-
Design load	N _{Rd}	[kN]	11.16	17.45	22.61	35.73	55.85	80.42	-	-
Recommended load	N _{Rec}	[kN]	7.97	12.46	16.15	25.52	39.89	57.44	-	-

4.1.10 Tension loads for threaded rods (steel grade 5.8) in cracked C30/37 concrete for 50 years working life

Anchor type			WB300, WB300T							
Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Embedment depth	hef	[mm]	60	60	70	80	90	96	108	120
Characteristic load	N _{Rk}	[kN]	8.14	10.17	12.82	17.37	24.42	31.26	-	-
Design load	N _{Rd}	[kN]	4.52	5.65	7.12	9.65	13.56	17.36	-	-
Recommended load	N _{Rec}	[kN]	3.22	4.03	5.08	6.89	9.68	12.40	-	-
Embedment depth	hef	[mm]	80	90	110	125	170	210	240	270
Characteristic load	N _{Rk}	[kN]	10.85	15.26	20.15	27.14	46.14	68.40	-	-
Design load	N _{Rd}	[kN]	6.02	8.47	11.19	15.07	25.63	38.00	-	-
Recommended load	N _{Rec}	[kN]	4.30	6.05	7.99	10.76	18.30	27.14	-	-
Embedment depth	hef	[mm]	160	200	240	320	400	480	540	600
Characteristic load	N _{Rk}	[kN]	18.00	29.00	42.00	69.48	108.57	156.34	-	-
Design load	N _{Rd}	[kN]	12.00	18.84	24.42	38.60	60.31	86.85	-	-
Recommended load	N _{Rec}	[kN]	8.57	13.45	17.44	27.57	43.07	62.03	-	-

4.1.11 Tension loads for threaded rods (steel grade 8.8) in cracked C20/25 concrete for 50 years working life

Anchor type			WB300, WB300T							
Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Embedment depth	hef	[mm]	60	60	70	80	90	96	108	120
Characteristic load	N _{Rk}	[kN]	7.53	9.42	11.87	16.08	22.61	28.95	-	-
Design load	N _{Rd}	[kN]	4.18	5.23	6.59	8.93	12.56	16.08	-	-
Recommended load	N _{Rec}	[kN]	2.98	3.73	4.70	6.37	8.97	11.48	-	-
Embedment depth	hef	[mm]	80	90	110	125	170	210	240	270
Characteristic load	N _{Rk}	[kN]	10.05	14.13	18.66	25.13	42.72	63.33	-	-
Design load	N _{Rd}	[kN]	5.58	7.85	10.36	13.96	23.73	35.18	-	-
Recommended load	N _{Rec}	[kN]	3.98	5.60	7.40	9.97	16.95	25.12	-	-
Embedment depth	hef	[mm]	160	200	240	320	400	480	540	600
Characteristic load	N _{Rk}	[kN]	20.10	31.41	40.71	64.33	100.53	144.76	-	-
Design load	N _{Rd}	[kN]	11.16	17.45	22.61	35.73	55.85	80.42	-	-
Recommended load	N _{Rec}	[kN]	7.97	12.46	16.15	25.52	39.89	57.44	-	-

4.1.12 Tension loads for threaded rods (steel grade 8.8) in cracked C30/37 concrete for 50 years working life

Anchor type			WB300, WB300T							
Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Embedment depth	hef	[mm]	60	60	70	80	90	96	108	120
Characteristic load	N _{Rk}	[kN]	8.14	10.17	12.82	17.37	24.42	31.26	-	-
Design load	N _{Rd}	[kN]	4.52	5.65	7.12	9.65	13.56	17.36	-	-
Recommended load	N _{Rec}	[kN]	3.22	4.03	5.08	6.89	9.68	12.40	-	-
Embedment depth	hef	[mm]	80	90	110	125	170	210	240	270
Characteristic load	N _{Rk}	[kN]	10.85	15.26	20.15	27.14	46.14	68.40	-	-
Design load	N _{Rd}	[kN]	6.02	8.47	11.19	15.07	25.63	38.00	-	-
Recommended load	N _{Rec}	[kN]	4.30	6.05	7.99	10.76	18.30	27.14	-	-
Embedment depth	hef	[mm]	160	200	240	320	400	480	540	600
Characteristic load	N _{Rk}	[kN]	21.71	33.92	43.97	69.48	108.57	156.34	-	-
Design load	N _{Rd}	[kN]	12.06	18.84	24.42	38.60	60.31	86.85	-	-
Recommended load	N _{Rec}	[kN]	8.61	13.45	17.44	27.57	43.07	62.03	-	-

4.2 Seismic loading in concrete with threaded rods

Tension and shear loads presented in paragraphs from 4.2.1 to 4.2.3 apply to:

- correctly installed anchors
- C20/25 concrete
- threaded rod, steel grade 8.8
- holes drilled with a hammer drill
- anchors not affected by anchor spacing or concrete edge influence
- anchor in-service temperature range of -40°C to +80°C
- loads are applicable for the given effective embedment depth and concrete member thickness
- **steel failure**

Anchor type			WB300, WB300T							
Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Effective embedment depth	hef	[mm]	80	90	110	125	170	210	-	-
Concrete member thickness	≥ h	[mm]	110	120	140	161	214	272	-	-

4.2.1 Characteristic tension and shear loads for seismic performance category C1

Anchor type			WB300, WB300T							
Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Cracked concrete										
Tension load	N _{Rk}	[kN]	Steel grade 8.8	-	-	-	-	-	-	-
Shear load	V _{Rk}	[kN]	Steel grade 8.8	-	-	-	-	-	-	-

4.2.2 Design tension and shear loads for seismic performance category C1

Anchor type			WB300, WB300T							
Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Cracked concrete										
Tension load	N _{Rd}	[kN]	Steel grade 8.8	-	-	-	-	-	-	-
Shear load	V _{Rd}	[kN]	Steel grade 8.8	-	-	-	-	-	-	-

4.2.3 Design tension and shear loads for seismic performance category C2 for 50 years working life

Anchor type				WB300, WB300T							
Anchor size				M8	M10	M12	M16	M20	M24	M27	M30
Cracked concrete											
Tension load	N _{Rd}	[kN]	Steel grade 8.8	-	-	1.94	1.95	-	-	-	-
Shear load	V _{Rd}	[kN]	Steel grade 8.8	-	-	1.97	1.99	-	-	-	-

4.3 Loading in concrete with rebars

Tension loads presented in paragraphs from 4.3.1 to 4.3.4 apply to:

- correctly installed anchors
- rebar, BSt 500 S
- holes drilled with a hammer drill
- anchors not affected by anchor spacing or concrete edge influence
- anchor in-service temperature range of -40°C to +80°C
- recommended loads include partial safety factor and an overall partial safety factor for action of 1.4. The partial safety factor for action depends on the type of loading and shall be taken from national regulations. All anchor failure modes and the entire relevant product European Technical Assessment must be considered during anchor design
- loads are applicable for the given effective embedment depth and concrete member thickness required within European Technical Assessment ETA-19/0641
- installation in dry/wet holes
- *steel failure*

4.3.1 Tension loads for rebars BSt 500 S in non-cracked C20/25 concrete for 50 and 100 years working life

Anchor type				WB300, WB300T							
Anchor size				Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Embedment depth hef [mm]				60	60	70	80	90	100	128	
Characteristic load	N _{Rk}	[kN]		12.81	15.07	21.11	28.14	39.58	41.46	-	
Design load	N _{Rd}	[kN]		7.11	8.37	11.72	15.63	21.98	23.03	-	
Recommended load	N _{Rec}	[kN]		5.07	5.97	8.37	11.16	15.70	16.45	-	
Embedment depth hef [mm]				80	90	110	128	170	250	300	
Characteristic load	N _{Rk}	[kN]		17.09	22.61	33.17	43.98	74.76	90.71	-	
Design load	N _{Rd}	[kN]		9.49	12.56	18.42	24.43	41.53	50.39	-	
Recommended load	N _{Rec}	[kN]		6.77	8.97	13.15	17.45	29.66	35.99	-	
Embedment depth hef [mm]				160	200	240	320	400	500	640	
Characteristic load	N _{Rk}	[kN]		28.00	43.00	62.00	111.00	173.00	207.34	-	
Design load	N _{Rd}	[kN]		18.98	27.92	40.21	62.55	97.73	115.18	-	
Recommended load	N _{Rec}	[kN]		13.55	19.94	28.72	44.67	69.80	82.27	-	

4.3.2 Tension loads for rebars BSt 500 S in non-cracked C30/37 concrete for 50 and 100 years working life

Anchor type			WB300, WB300T						
Anchor size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Embedment depth	hef	[mm]	60	60	70	80	90	100	128
Characteristic load	N _{Rk}	[kN]	13.84	16.28	22.80	30.40	42.75	44.78	-
Design load	N _{Rd}	[kN]	7.68	9.04	12.66	16.88	23.75	24.87	-
Recommended load	N _{Rec}	[kN]	5.48	6.45	9.04	12.05	16.96	17.76	-
Embedment depth	hef	[mm]	80	90	110	128	170	250	300
Characteristic load	N _{Rk}	[kN]	18.45	24.42	35.82	47.50	80.75	97.97	-
Design load	N _{Rd}	[kN]	10.25	13.56	19.90	26.38	44.86	54.42	-
Recommended load	N _{Rec}	[kN]	7.32	9.68	14.21	18.84	32.04	38.87	-
Embedment depth	hef	[mm]	160	200	240	320	400	500	640
Characteristic load	N _{Rk}	[kN]	28.00	43.00	62.00	111.00	173.00	223.93	-
Design load	N _{Rd}	[kN]	20.00	30.15	43.42	67.55	105.55	124.40	-
Recommended load	N _{Rec}	[kN]	14.28	21.53	31.01	48.25	75.39	88.85	-

4.3.3 Tension loads for rebars BSt 500 S in cracked C20/25 concrete for 50 years working life

Anchor type			WB300						
Anchor size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Embedment depth	hef	[mm]	60	60	70	80	90	100	128
Characteristic load	N _{Rk}	[kN]	6.03	6.59	9.23	14.07	19.79	18.84	-
Design load	N _{Rd}	[kN]	3.35	3.66	5.12	7.81	10.99	10.46	-
Recommended load	N _{Rec}	[kN]	2.39	2.61	3.65	5.57	7.85	7.47	-
Embedment depth	hef	[mm]	80	90	110	128	170	250	300
Characteristic load	N _{Rk}	[kN]	8.04	9.89	14.51	21.99	37.38	41.23	-
Design load	N _{Rd}	[kN]	4.46	5.49	8.06	12.21	20.76	22.90	-
Recommended load	N _{Rec}	[kN]	3.18	3.92	5.75	8.72	14.82	16.35	-
Embedment depth	hef	[mm]	160	200	240	320	400	500	640
Characteristic load	N _{Rk}	[kN]	16.08	21.99	31.66	56.29	87.96	94.24	-
Design load	N _{Rd}	[kN]	8.93	12.21	17.58	31.27	48.86	52.35	-
Recommended load	N _{Rec}	[kN]	6.37	8.72	12.55	22.33	34.90	37.39	-

4.3.4 Tension loads for rebars BSt 500 S in cracked C30/37 concrete for 50 years working life

Anchor type			WB300, WB300T						
Anchor size			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Embedment depth	hef	[mm]	60	60	70	80	90	100	128
Characteristic load	N _{Rk}	[kN]	6.51	7.12	9.97	15.20	21.37	20.35	-
Design load	N _{Rd}	[kN]	3.61	3.95	5.53	8.44	11.87	11.30	-
Recommended load	N _{Rec}	[kN]	2.57	2.82	3.95	6.02	8.47	8.07	-
Embedment depth	hef	[mm]	80	90	110	128	170	250	300
Characteristic load	N _{Rk}	[kN]	8.68	10.68	15.67	23.75	40.37	44.53	-
Design load	N _{Rd}	[kN]	4.82	5.93	8.70	13.19	22.42	24.73	-
Recommended load	N _{Rec}	[kN]	3.44	4.23	6.21	9.42	16.01	17.66	-
Embedment depth	hef	[mm]	160	200	240	320	400	500	640
Characteristic load	N _{Rk}	[kN]	17.37	23.75	34.20	60.80	95.00	101.78	-
Design load	N _{Rd}	[kN]	9.65	13.19	19.00	33.77	52.77	56.54	-
Recommended load	N _{Rec}	[kN]	6.89	9.42	13.57	24.12	37.69	40.38	-

4.4 Characteristic bond resistance for combined pullout and concrete cone failure

Characteristic bond resistance data allows calculations of resistance for combined pull-out and concrete cone failure in concrete at any allowed anchoring depth.

4.4.1 Threaded rods in concrete, working life of 50 years

Anchor type		WB300, WB300T								
Anchor size		M8	M10	M12	M16	M20	M24	M27	M30	
Non-cracked concrete										
Characteristic bond resistance in dry, wet and flooded holes, hammer drilling (temperature range -40°C to +80°C)		τ_{RK} [N/mm²]	11	10	10	9	7.5	7	-	-
Partial safety factor		γ_{MP} [-]	1.8							
Increasing factor for concrete	C25/30	ψ_c [-]	1.04							
	C30/37		1.08							
	C35/45		1.12							
	C40/50		1.15							
	C45/55		1.17							
	C50/60		1.19							
Cracked concrete										
Characteristic bond resistance in dry, wet and flooded holes, hammer drilling (temperature range -40°C to +80°C)		τ_{RK} [N/mm²]	5	5	4.5	4	4	4	-	-
Partial safety factor		γ_{MC} [-]	1.8							
Increasing factor for concrete	C25/30	ψ_c [-]	1.04							
	C30/37		1.08							
	C35/45		1.12							
	C40/50		1.15							
	C45/55		1.17							
	C50/60		1.19							

4.4.2 Threaded rods in concrete, seismic category C2 for 50 years working life

Anchor type		WB300, WB300T							
Anchor size		M8	M10	M12	M16	M20	M24	M27	M30
Cracked concrete									
Characteristic bond resistance in dry, wet and flooded holes, hammer drilling (temperature range -40°C to +80°C)	$\tau_{Rk,p,eq,C2}$ [N/mm ²]	-	-	0.84	0.56	-	-	-	-
Installation Safety Factor	γ_{inst} [-]	1.2							

4.4.3 Rebars in concrete for 50 years working life

Anchor type		WB300, WB300T							
Rebar size, BST 500 S		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
Non-cracked concrete									
Characteristic bond resistance in dry, wet and flooded holes, hammer drilling (temperature range -40°C to +80°C)		τ_{Rk} [N/mm ²]	8.5	8	8	7	7	5.5	-
Partial safety factor for dry and wet concrete		γ_{Mc} [-]	1.8						
Partial safety factor for flooded holes		γ_{Mc} [-]	1.8						
Increasing factor for concrete	C25/30	ψ_c [-]	1.04						
	C30/37		1.08						
	C35/45		1.12						
	C40/50		1.15						
	C45/55		1.17						
	C50/60		1.19						
Cracked concrete									
Characteristic bond resistance in dry, wet and flooded holes, hammer drilling (temperature range -40°C to +80°C)		τ_{Rk} [N/mm ²]	4	3.5	3.5	3.5	3.5	2.5	-
Partial safety factor for dry and wet concrete		γ_{Mc} [-]	1.8						
Partial safety factor for flooded holes		γ_{Mc} [-]	1.8						
Increasing factor for concrete	C25/30	ψ_c [-]	1.04						
	C30/37		1.08						
	C35/45		1.12						
	C40/50		1.15						
	C45/55		1.17						
	C50/60		1.19						

4.5 Steel failure information for threaded bars and rebars

4.5.1 Steel failure – threaded rods' characteristic resistance values to tension load

Anchor size		M8	M10	M12	M16	M20	M24	M27	M30
Steel grade 4.6	$N_{Rk,s}$ [kN]	15	23	34	63	98	141	184	224
Partial safety factor	$\gamma_{Ms,N}$ [-]	2.00							
Steel grade 4.8	$N_{Rk,s}$ [kN]	15	23	34	63	98	141	184	224
Partial safety factor	$\gamma_{Ms,N}$ [-]	1.50							
Steel grade 5.8	$N_{Rk,s}$ [kN]	18	29	42	79	123	177	230	281
Partial safety factor	$\gamma_{Ms,N}$ [-]	1.50							
Steel grade 8.8	$N_{Rk,s}$ [kN]	29	46	67	126	196	282	367	449
Partial safety factor	$\gamma_{Ms,N}$ [-]	1.50							
Steel grade 10.9	$N_{Rk,s}$ [kN]	37	58	84	157	245	353	459	561
Partial safety factor	$\gamma_{Ms,N}$ [-]	1.33							
Stainless steel grade A4-70	$N_{Rk,s}$ [kN]	26	41	59	110	172	247	321	393
Partial safety factor	$\gamma_{Ms,N}$ [-]	1.87							
Stainless steel grade A4-80	$N_{Rk,s}$ [kN]	29	46	67	126	196	282	367	449
Partial safety factor	$\gamma_{Ms,N}$ [-]	1.60							
Stainless steel grade 1,4529	$N_{Rk,s}$ [kN]	26	41	59	110	172	247	321	393
Partial safety factor	$\gamma_{Ms,N}$ [-]	1.50							
Stainless steel grade 1,4565	$N_{Rk,s}$ [kN]	26	41	59	110	172	247	321	393
Partial safety factor	$\gamma_{Ms,N}$ [-]	1.87							

4.5.2 Steel failure – threaded rods' characteristic resistance values to shear load without lever arm

Anchor size		M8	M10	M12	M16	M20	M24	M27	M30
Steel grade 4.6	$V_{Rk,s}$ [kN]	7	12	17	31	49	71	92	112
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.67							
Steel grade 4.8	$V_{Rk,s}$ [kN]	7	12	17	31	49	71	92	112
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.25							
Steel grade 5.8	$V_{Rk,s}$ [kN]	9	15	21	39	61	88	115	140
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.25							
Steel grade 8.8	$V_{Rk,s}$ [kN]	15	23	34	63	98	141	184	224
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.25							
Steel grade 10.9	$V_{Rk,s}$ [kN]	18	29	42	79	123	177	230	281
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.50							
Stainless steel grade A4-70	$V_{Rk,s}$ [kN]	13	20	30	55	86	124	161	196
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.56							
Stainless steel grade A4-80	$V_{Rk,s}$ [kN]	15	23	34	63	98	141	184	224
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.33							
Stainless steel grade 1,4529	$V_{Rk,s}$ [kN]	13	20	30	55	86	124	161	196
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.25							
Stainless steel grade 1,4565	$V_{Rk,s}$ [kN]	13	20	30	55	86	124	161	196
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.56							

4.5.3 Steel failure –threaded rods’ characteristic resistance values to shear load with lever arm

Anchor size		M8	M10	M12	M16	M20	M24	M27	M30
Steel grade 4.6	$M^{0}_{Rk,s}$ [kN]	15	30	52	133	260	449	666	900
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.67							
Steel grade 4.8	$M^{0}_{Rk,s}$ [kN]	15	30	52	133	260	449	666	900
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.25							
Steel grade 5.8	$M^{0}_{Rk,s}$ [kN]	19	37	66	166	325	561	832	1125
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.25							
Steel grade 8.8	$M^{0}_{Rk,s}$ [kN]	30	60	105	266	519	898	1332	1799
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.25							
Steel grade 10.9	$M^{0}_{Rk,s}$ [kN]	37	75	131	333	649	1123	1664	2249
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.50							
Stainless steel grade A4-70	$M^{0}_{Rk,s}$ [kN]	26	52	92	233	454	786	1165	1574
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.56							
Stainless steel grade A4-80	$M^{0}_{Rk,s}$ [kN]	30	60	105	266	519	898	1332	1779
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.33							
Stainless steel grade 1,4529	$M^{0}_{Rk,s}$ [kN]	26	52	92	233	454	786	1165	1574
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.25							
Stainless steel grade 1,4565	$M^{0}_{Rk,s}$ [kN]	26	52	92	233	454	786	1165	1574
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.56							

4.5.4 Steel failure – rebar characteristic resistance values to tension load

Rebar size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar grade BST 500 S	$N_{Rk,s}$ [kN]	28	43	62	111	173	270	442
Partial safety factor	$\gamma_{Ms,N}$ [-]	1.4	1.4	1.4	1.4	1.4	1.4	1.4

4.5.5 Steel failure – rebar characteristic resistance values to shear load without lever arm

Rebar size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar grade BST 500 S	$V_{Rk,s}$ [kN]	14	22	31	55	86	135	221
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.5	1.5	1.5	1.5	1.5	1.5	1.5

4.5.6 Steel failure – rebar characteristic resistance values to shear load with lever arm

Rebar size		Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar grade BST 500 S	$M^{0}_{Rk,s}$ [Nm]	33	65	112	265	518	1013	2122
Partial safety factor	$\gamma_{Ms,V}$ [-]	1.5	1.5	1.5	1.5	1.5	1.5	1.5

5.0 Additional product information

5.1 Chemical resistance

Chemical environment	Concentration	Result	Chemical environment	Concentration	Result
Aqueous Solution Acetic Acid	10%	C	Hexane	100%	C
Acetone	100%	✗	Hydrochloric Acid	10%	✓
Aqueous Solution Aluminium Chloride	Saturated	✓	Hydrochloric Acid	15%	✓
Aqueous Solution Aluminium Nitrate	10%	✓	Hydrochloric Acid	20%	C
Ammonia Solution	5%	✗	Hydrogen Sulphide Gas	100%	✓
Jet Fuel	100%	✗			
Benzoic Acid	Saturated	✓	Lubricating Oil	100%	✓
Sodium Hypochlorite Solution	5 - 15%	✓	Mineral Oil	100%	✓
Butyl Alcohol	100%	C			
Calcium Sulphate Aqueous Solution	Saturated	✓	Paraffin / Kerosene (Domestic)	100%	C
Carbon Monoxide	Gas	✓	Phenol Aqueous Solution	1%	✗
Carbon Tetrachloride	100%	C	Phosphoric Acid	50%	✓
Chlorine Water	Saturated	✗	Potassium Hydroxide	10% / pH13	✓
Chloro Benzene	100%	C	Sea Water	100%	C
Citric Acid Aqueous Solution	Saturated	✓	Sulphur Dioxide Solution	10%	✓
Cyclohexanol	100%	✓	Sulphur Dioxide (40°C)	5%	✓
Diesel Fuel	100%	C	Sulphuric Acid	10%	✓
Diethylene Glycol	100%	✓	Sulphuric Acid	30%	✓
Ethanol	95%	✗	Turpentine	100%	C
Ethanol Aqueous Solution	20%	C	White Spirit	100%	✓
Heptane	100%	C	Xylene	100%	✗

✓ = Resistant to 75°C with at least 80% of physical properties retained.

C = Contact only to a maximum of 25°C.

✗ = Not resistant.

5.2 Physical properties

Property		Unit	Value	Test Standard
Compressive Strength	24 hours	N/mm ²	75	BS6319
	7 days		80	
Tensile Strength	24 hours	N/mm ²	11.5	ASTM D 638 @ +20°C
	7 days		12.2	
Elongation at Break	24 hours	%	0.1	ASTM D 638 @ +20°C
	7 days		0.1	
Tensile Modulus	24 hours	GN/m ²	3	ASTM D 638 @ +20°C
	7 days		4	
Flexural Strength	7 days	N/mm ²	25	ASTM D 790 @ +20°C