GENERAL INFORMATION

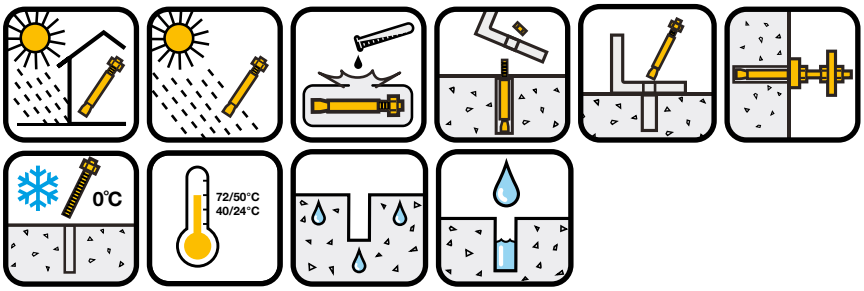
PURE500+ (Anchoring)

Epoxy Injection Adhesive Anchoring System.

PRODUCT DESCRIPTION

The PURE500+ is a two-component epoxy adhesive anchoring system. The system includes injection adhesive in plastic cartridges, mixing nozzles, dispensing tools and hole cleaning equipment. The PURE500+ is a high strength adhesive designed for various applications and hole drilling techniques including diamond coring. It is suitable for bonding anchor steel elements to cracked and uncracked concrete, and also approved for water filled holes. PURE500+ is also very suitable for bonding rebars to concrete as post-installed rebar application. The adhesive is approved for a medium range of ambient temperatures and is relatively slow setting.

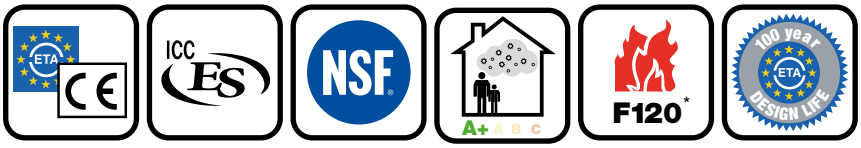
GENERAL APPLICATIONS AND USES



FEATURES AND BENEFITS

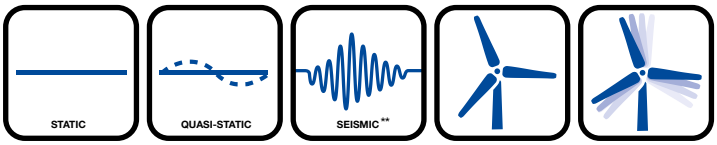
- Designed for use with threaded rod or reinforcing bar in uncracked and cracked concrete
- Consistent performance in uncracked and cracked concrete of variable strength
- Wide range of steel element diameter and embedment depth
- Superior bond strength for the most demanding applications
- Flexible fixture thicknesses
- Simple installation and low cleaning effort
- Versatile low odor formula with relatively long working and curing time
- Various drilling techniques including diamond coring
- Cartridge design allows multiple uses using extra mixing nozzels

APPROVALS AND LISTINGS



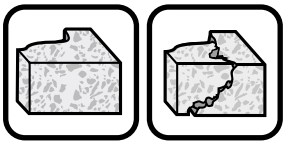
*Please refer to Fire Test Report for load capacities under fire.

LOADING CONDITIONS



**Please refer to the relevant ETA for capacities for seismic design. The capacities in this document are for static / quasi-static loads.

SUITABLE BASE MATERIALS



SYSTEM COMPONENTS

Pure500+ Epoxy

Threaded Rod

Reinforcing Bar

STEEL GRADES

Carbon Steel 4.6, 4.8, 5.6, 5.8, 8.8

Stainless Steel A2, A4

High Corrosion Resistance Steel HCR

Rebar f_y = 400 to 600 MPa

APPROVALS

- ETA-20/1287
- ESR-4809

DDA
DEWALT DESIGN ASSIST
Real-Time Anchor Design Software
DEWALT.com/DDA

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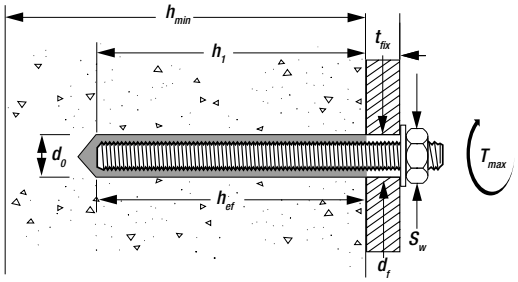
INSTALLATION INFORMATION

INSTALLATION DATA - THREADED ROD

	Notation	Unit	Pure500+ - Threaded rod							
			M8	M10	M12	M16	M20	M24	M27	M30
Nominal diameter of element	d_{nom}	[mm]	8	10	12	16	20	24	27	30
Nominal drill bit diameter	d_0	[mm]	10	12	14	18	22	28	32	35
Diameter of hole clearance in fixture: Preset installation	d_f	[mm]	9	11	13	18	22	26	30	33
Diameter of hole clearance in fixture: Through installation	d_f	[mm]	12	14	16	20	24	30	33	40
Diameter of steel brush	d_b	[mm]	10.5	12.5	14.5	18.5	22.5	28.5	30.5	35.5
Minimum embedment and drill hole depth	$h_{ef,min} = h_1$	[mm]	60	60	70	80	90	96	108	120
Maximum embedment and drill hole depth	$h_{ef,max} = h_1$	[mm]	160	200	240	320	400	480	540	600
Minimum member thickness	h_{min}	[mm]	h_{ef} + 30 mm ≥ 100 mm			$h_{ef} + 2 \cdot d_0$				
Minimum spacing	s_{min}	[mm]	40	50	60	75	95	115	125	140
Minimum edge distance	c_{min}	[mm]	35	40	45	50	60	65	75	80
Thickness of fixture	t_{fix}	[mm]	0 mm ≤ t_{fix} ≤ 1500 mm							
Maximum torque moment	T_{max}	[Nm]	10	20	40[1)]	60	100	170	250	300
Torque wrench socket size	S_w	[mm]	13	17	19	24	30	36	41	46

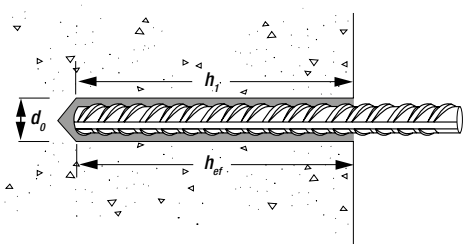
1) Maximum torque moment for M12 with steel grade 4.6 is 35 Nm



INSTALLATION DATA - REINFORCEMENT BAR

	Notation	Unit	Pure500+ - Reinforcing bar									
			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø24	Ø25	Ø28	Ø32
Nominal diameter of element	d_{nom}	[mm]	8	10	12	14	16	20	24	25	28	32
Nominal drill bit diameter	d_0	[mm]	10 12	12 14	14 16	18	20	25	30 32	30 32	35	40
Diameter of steel brush	d_b	[mm]	11.5 13.5	13.5 15.5	15.5 17.5	20.0	22.0	27.0	31.8 34.0	31.8 34.0	37.0	43.5
Minimum embedment and drill hole depth	$h_{ef,min} = h_1$	[mm]	60	60	70	75	80	90	96	100	112	128
Maximum embedment and drill hole depth	$h_{ef,max} = h_1$	[mm]	160	200	240	280	320	400	480	500	560	640
Minimum member thickness	h_{min}	[mm]	h_{ef} + 30 mm ≥ 100 mm		$h_{ef} + 2 \cdot d_0$							
Minimum edge distance	c_{min}	[mm]	40	50	60	70	75	95	120	120	130	150
Minimum spacing	s_{min}	[mm]	35	40	45	50	50	60	70	70	75	85

Note: For post-installed rebar applications, the embedment depth can be extended up 60 · d_{nom}. For more detail please refer to the post-installed rebar connections section of this technical manual.



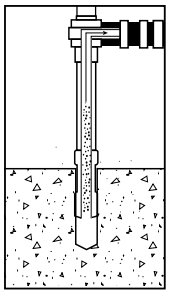
INSTALLATION INSTRUCTIONS

Compressed Air Cleaning (CAC)
Cleaning for dry, wet and water filled bore hole with all diameter and hole depth, uncracked and cracked concrete

Hollow Drill Bit (HDB)
Cleaning while drilling the hole using a hollow drill bit connected to a vacuum

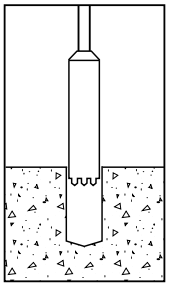
Diamond Drill Bit (DDB)
Cleaning as for holes drilled with a standard bit, but only after rinsing the hole with water

Hollow Drill Bit (HDB)

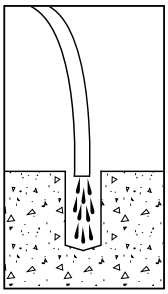


1a.) Connect the hollow drill bit of proper size to a vacuum, and drill a hole into the base material to the required depth while the vac is running. The dust is removed during the drilling process. Proceed with **Step 5.**

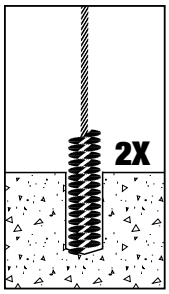
Diamond Drill Bit (DDB)



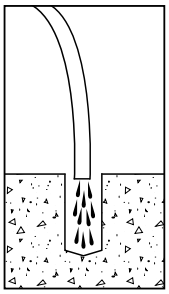
1b.) 1 Using the proper drill bit size, drill a hole into the base material to the required depth.



1b.) 2 Rinse the hole until access water is clear.

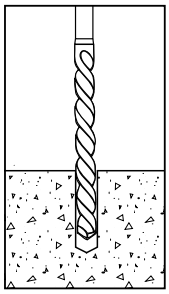


1b.) 3 Brush the hole with the proper wire brush 2 times minimum.

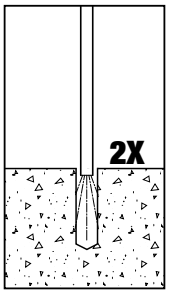


1b.) 4 Rinse the hole until access water is clear. Proceed with **Step 2.**

Standard Drill Bit



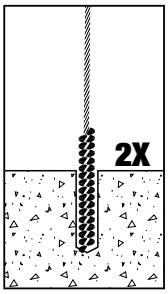
1c.) Using the proper drill bit size, drill a hole into the base material to the required depth. Proceed with **Step 2.**



2.) Before cleaning, remove any standing water out of the drill hole.

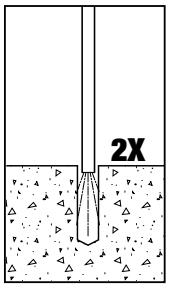
Starting from the bottom of the hole, blow the hole clean with compressed air (min. 6 bar) minimum of 2 times.

If the bore hole ground cannot be reached, an extension must be used.



3.) Select a brush of the correct diameter. Starting from the hole ground, brush the hole a minimum of 2 times.

If the bore hole ground is not reached, a brush extension must be used.



4.) Finally, blow the hole clean again with compressed air (min. 6 bar) minimum of 2 times.

If the bore hole ground cannot be reached, an extension must be used.

Proceed with **Step 5.**

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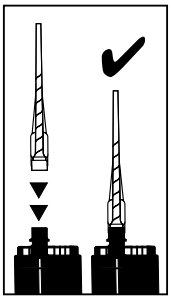
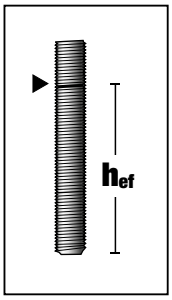
INSTALLATION INSTRUCTIONS



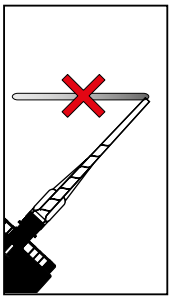
5.) Attach a supplied static-mixing nozzle to the cartridge and load the cartridge into the correct dispensing tool.

For foil tube type cartridges, cut off the foil tube clip before use.

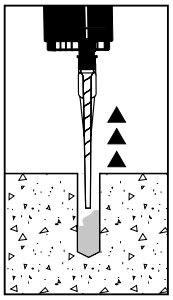
For every working interuption longer than the recommended working time as well for new cartridges, a new mixer nozzle must be used.



6.) Mark the required embedment depth on the anchor rod.



7.) Squeeze out a minimum of 3 full strokes and discard non-uniformly mixed adhesive until the mortar shows a consistant colour.

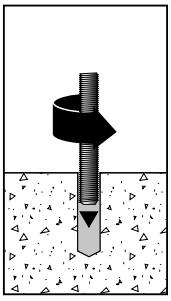


8.) Starting from the back of the cleaned anchor hole, fill the hole to approximately two thirds with adhesive.

Slowly withdraw the nozzle as the hole fills to avoid creating air pockets.

For holes with embedment depths greater than 190 mm, an extension must be used.

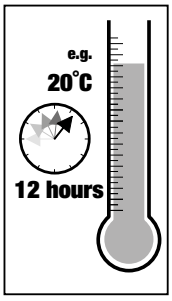
For horizontal and floor installations in holes deeper than 250 mm, and for overhead installations always, use a piston plug if the hole is 18 mm or larger.



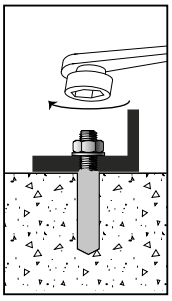
9.) Push the threaded rod or reinforcing bar into the hole while turning slightly to properly distribute the adhesive. The anchor should be clean and free of dirt, grease and oil.

Be sure that the gap is completely filled with mortar. Excess mortar should be visible at the top of the hole.

For overhead application, the threaded rod or reinforcing bar shall be fixed (e.g. wedges) until the mortar has started to harden.



10.) Allow the adhesive to cure for the specified time prior to applying any load. Do not load the anchor until it is fully cured.



11.) After full curing, the fixture can be installed. Make sure the maximum torque is not exceeded.

INSTALLATION INFORMATION

INSTALLATION DATA - THREADED ROD

Concrete Temperature	Working Time	Minimum Curing Time in dry concrete	Minimum Curing Time in wet concrete
0°C to +4°C	90 min	144 h	288 h
+5°C to +9°C	80 min	48 h	96 h
+10°C to +14°C	60 min	28 h	56 h
+15°C to +19°C	40 min	18 h	36 h
+20°C to +24°C	30 min	12 h	24 h
+25°C to +34°C	12 min	9 h	18 h
+35°C to +39°C	8 min	6 h	12 h
+40°C	8 min	4 h	8 h

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DESIGN INFORMATION

TENSION LOAD CAPACITIES - THREADED ROD

According to EN 1992-4 for a working life of 50 years (temperature range I and II) and 100 years (temperature range I and II).

Parameter for calculation of ultimate strength	Notation	Unit	Pure500+ - Threaded rod							
			M8	M10	M12	M16	M20	M24	M27	M30
Steel failure										
Carbon steel										
Characteristic resistance, strength class 4.6 and 4.8	$N_{Rk,s} = N_{Rk,s,C1} = N_{Rk,s,C2}$	[kN]	15	23	34	63	98	141	184	224
Characteristic resistance, strength class 5.6 and 5.8	$N_{Rk,s} = N_{Rk,s,C1} = N_{Rk,s,C2}$	[kN]	18	29	42	78	122	176	230	280
Characteristic resistance, strength class 8.8	$N_{Rk,s} = N_{Rk,s,C1} = N_{Rk,s,C2}$	[kN]	29	46	67	125	196	282	368	449
Stainless steel A2 and A4, and HCR steel										
Characteristic resistance, strength class 50	$N_{Rk,s} = N_{Rk,s,C1} = N_{Rk,s,C2}$	[kN]	18	29	42	79	123	177	230	281
Characteristic resistance, strength class 70	$N_{Rk,s} = N_{Rk,s,C1} = N_{Rk,s,C2}$	[kN]	26	41	59	110	171	247	-	-
Characteristic resistance, strength class 80	$N_{Rk,s} = N_{Rk,s,C1} = N_{Rk,s,C2}$	[kN]	29	46	67	126	196	282	-	-
Partial safety factor[1)]										
Strength class 4.6 and 5.6	$\gamma_{Ms,N} (= 1/\phi_{Ms,N})$	[-]	2.00							
Strength class 4.8, 5.8 and 8.8	$\gamma_{Ms,N} (= 1/\phi_{Ms,N})$	[-]	1.50							
Strength class 50	$\gamma_{Ms,N} (= 1/\phi_{Ms,N})$	[-]	2.86							
Strength class 70	$\gamma_{Ms,N} (= 1/\phi_{Ms,N})$	[-]	1.87							
Strength class 80	$\gamma_{Ms,N} (= 1/\phi_{Ms,N})$	[-]	1.60							
Combined pullout and concrete failure										
Characteristic resistance in cracked concrete										
Temperature range I: 40°C / 24°C	$\tau_{Rk,cr} = \tau_{Rk,C1}$	[N/mm²]	7.0	7.0	8.5	8.5	8.5	8.5	8.5	8.5
	$\tau_{Rk,C2}$	[N/mm²]	-	-	5.8	4.8	5.0	5.1	-	-
	$\tau_{Rk,cr,100}$	[N/mm²]	6.5	6.5	7.5	7.5	7.5	7.5	7.5	7.5
Temperature range III: 120°C / 72°C	$\tau_{Rk,cr} = \tau_{Rk,C1}$	[N/mm²]	6.0	6.0	7.0	7.0	7.0	7.0	7.0	7.0
	$\tau_{Rk,C2}$	[N/mm²]	-	-	5.0	4.1	4.3	4.4	-	-
	$\tau_{Rk,cr,100}$	[N/mm²]	5.5	5.5	6.5	6.5	6.5	6.5	6.5	6.5
Characteristic resistance in uncracked concrete										
Temperature Range I: 40°C / 24°C (CAC)	$\tau_{Rk,ucr} = \tau_{Rk,ucr,100}$	[N/mm²]	20.0	20.0	19.0	19.0	18.0	17.0	16.0	16.0
Dry and wet concrete (HDB)	$\tau_{Rk,ucr} = \tau_{Rk,ucr,100}$	[N/mm²]	17.0	16.0	16.0	16.0	15.0	14.0	14.0	13.0
Flooded hole (HDB)	$\tau_{Rk,ucr} = \tau_{Rk,ucr,100}$	[N/mm²]	16.0	16.0	16.0	15.0	15.0	14.0	14.0	13.0
Dry and wet concrete, flooded hole (DD)	$\tau_{Rk,ucr}$	[N/mm²]	15.0	14.0	14.0	13.0	12.0	12.0	11.0	11.0
	$\tau_{Rk,ucr,100}$	[N/mm²]	15.0	14.0	14.0	13.0	12.0	12.0	11.0	11.0
Temperature Range II: 72°C / 50°C (CAC)	$\tau_{Rk,ucr} = \tau_{Rk,ucr,100}$	[N/mm²]	15.0	15.0	15.0	14.0	13.0	13.0	12.0	12.0
Dry and wet concrete (HDB)	$\tau_{Rk,ucr} = \tau_{Rk,ucr,100}$	[N/mm²]	14.0	14.0	14.0	13.0	13.0	12.0	12.0	11.0
Flooded hole (HDB)	$\tau_{Rk,ucr} = \tau_{Rk,ucr,100}$	[N/mm²]	14.0	14.0	14.0	13.0	13.0	12.0	12.0	11.0
Dry and wet concrete, flooded hole (DD)	$\tau_{Rk,ucr}$	[N/mm²]	12.0	12.0	11.0	10.0	9.5	9.5	9.0	9.0
	$\tau_{Rk,ucr,100}$	[N/mm²]	11.0	11.0	10.0	10.0	9.5	9.0	8.5	8.5
Reduction factor for sustained loads										
Temperature range I: 40°C / 24°C	Ψ^0_{sus}	[-]	0.80							
Temperature range II: 80°C / 50°C	Ψ^0_{sus}	[-]	0.77							
Temperature range III: 120°C / 72°C	Ψ^0_{sus}	[-]	0.68							
Temperature range IV: 160°C / 100°C	Ψ^0_{sus}	[-]	0.72							
Increasing factor for concrete strength										
C30/37	Ψ_c	[-]	1.04							
C40/50	Ψ_c	[-]	1.08							
C50/60	Ψ_c	[-]	1.10							
Partial safety factor[1)]										
Dry and wet concrete, manual air cleaning (MAC)	$\gamma_{Mp} (= 1/\phi_{Mp})$	[-]	1.5[2)]							
Dry and wet concrete, compressed air cleaning (CAC)	$\gamma_{Mp} (= 1/\phi_{Mp})$	[-]	1.8[3)]							
Dry and wet concrete, hollow drill bit (HDB)	$\gamma_{Mp} (= 1/\phi_{Mp})$	[-]	1.5[2)]							
Flooded hole, compressed air cleaning (CAC)	$\gamma_{Mp} (= 1/\phi_{Mp})$	[-]	1.8[3)]				2.1[4)]			
Concrete failure										
Data base for concrete cone failure										
Cracked concrete	$k_{cr,N}$	[-]	7.7							
Uncracked concrete	$k_{ucr,N}$	[-]	11.0							
Characteristic spacing	$s_{cr,N}$	[mm]	$3.0 \cdot h_{ef}$							
Characteristic edge distance	$c_{cr,N}$	[mm]	$1.5 \cdot h_{ef}$							
Data base for splitting failure										
Characteristic spacing	$s_{cr,sp}$	[mm]	$2 \cdot c_{cr,sp}$							
Characteristic edge distance	$c_{cr,sp}$	[mm]	$1.0 \cdot h_{ef} \le 2 \cdot h_{ef}(2.5 - (h/h_{ef})) \le 2.4 \cdot h_{ef}$							
Increasing factor for concrete strength										
C30/37	Ψ_c	[-]	1.21							
C40/50	Ψ_c	[-]	1.41							
C50/60	Ψ_c	[-]	1.55							
Partial safety factor[1)]										
Dry and wet concrete, manual air cleaning (MAC)	$\gamma_{Mc} (= 1/\phi_{Mc})$	[-]	1.5[2)]							
Dry and wet concrete, compressed air cleaning (CAC)	$\gamma_{Mc} (= 1/\phi_{Mc})$	[-]	1.8[3)]							
Dry and wet concrete, hollow drill bit (HDB)	$\gamma_{Mc} (= 1/\phi_{Mc})$	[-]	1.5[2)]							
Flooded hole, compressed air cleaning (CAC)	$\gamma_{Mc} (= 1/\phi_{Mc})$	[-]	1.8[3)]				2.1[4)]			

1) In absence of other national regulations
2) Partial safety factor γ_{inst}=1.0 is included
3) Partial safety factor γ_{inst}=1.2 is included
4) Partial safety factor γ_{inst}=1.4 is included

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SHEAR LOAD CAPACITIES - THREADED ROD

According to EN 1992-4 for a working life of 50 years (temperature range I and II) and 100 years (temperature range I and II).

Parameter for calculation of ultimate strength	Notation	Unit	Pure500+ - Threaded rod							
			M8	M10	M12	M16	M20	M24	M27	M30
Steel failure										
Data base for steel failure without level arm										
Carbon steel										
Characteristic resistance, strength class 5.8	$V^0_{Rk,s}$	[kN]	9	14	20	38	59	85	110	135
	$V^0_{Rk,s,\,C1}$	[kN]	6.3	9.8	14.0	26.6	41.3	59.5	77.0	94.5
	$V^0_{Rk,s,\,C2}$	[kN]	-		14.0	26.6	41.3	59.5	-	
Characteristic resistance, strength class 8.8	$V^0_{Rk,s}$	[kN]	11	17	25	47	74	106	138	168
	$V^0_{Rk,s,\,C1}$	[kN]	7.7	11.9	17.5	32.9	51.8	74.2	96.6	117.6
	$V^0_{Rk,s,\,C2}$	[kN]	-		17.5	32.9	51.8	74.2	-	
Partial safety factor	$V^0_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
	$V^0_{Rk,s,\,C1}$	[kN]	10.5	16.1	23.8	44.1	68.6	98.7	128.8	156.8
	$V^0_{Rk,s,\,C2}$	[kN]	-		23.8	44.1	68.6	98.7	-	
Stainless steel A2 and A4, and HCR steel										
Characteristic resistance, strength class 50	$V^0_{Rk,s}$	[kN]	9	15	21	39	61	88	115	140
	$V^0_{Rk,s,\,C1}$	[kN]	6.3	10.5	14.7	27.3	42.7	61.6	80.5	98.0
	$V^0_{Rk,s,\,C2}$	[kN]	-		14.7	27.3	42.7	61.6	-	
Characteristic resistance, strength class 70	$V^0_{Rk,s}$	[kN]	13	20	30	55	86	124	-	-
	$V^0_{Rk,s,\,C1}$	[kN]	9.1	14.0	21.0	38.5	60.2	86.8	-	-
	$V^0_{Rk,s,\,C2}$	[kN]	-		21.0	38.5	60.2	86.8	-	
Characteristic resistance, strength class 80	$V^0_{Rk,s}$	[kN]	15	23	34	63	98	141	-	-
	$V^0_{Rk,s,\,C1}$	[kN]	10.5	16.1	23.8	44.1	68.6	98.7	-	-
	$V^0_{Rk,s,\,C2}$	[kN]	-		23.8	44.1	68.6	98.7	-	
Ductility factor	k_7	[-]	1.0							
Data base for steel failure with level arm										
Carbon steel										
Characteristic resistance, strength class 4.6 and 4.8	$M^0_{Rk,s}$	[Nm]	15	30	52	133	260	449	666	900
Characteristic resistance, strength class 5.6 and 5.8	$M^0_{Rk,s}$	[Nm]	19	37	65	166	324	560	833	1123
Characteristic resistance, strength class 8.8	$M^0_{Rk,s}$	[Nm]	30	60	105	266	519	896	1333	1797
Stainless steel A2 and A4, and HCR steel										
Characteristic resistance, strength class 50	$M^0_{Rk,s}$	[Nm]	19	37	66	167	325	561	832	1125
Characteristic resistance, strength class 70	$M^0_{Rk,s}$	[Nm]	26	52	92	232	454	784	-	-
Characteristic resistance, strength class 80	$M^0_{Rk,s}$	[Nm]	30	59	105	266	519	896	-	-
Partial safety factor[1]										
Strength class 4.6 and 5.6	$\gamma_{Ms,v}$ (= $1/\Phi_{Ms,v}$)	[-]	1.67							
Strength class 4.8, 5.8 and 8.8	$\gamma_{Ms,v}$ (= $1/\Phi_{Ms,v}$)	[-]	1.25							
Strength class 50	$\gamma_{Ms,v}$ (= $1/\Phi_{Ms,v}$)	[-]	2.38							
Strength class 70	$\gamma_{Ms,v}$ (= $1/\Phi_{Ms,v}$)	[-]	1.56							
Strength class 80	$\gamma_{Ms,v}$ (= $1/\Phi_{Ms,v}$)	[-]	1.33							
Concrete failure										
Data base for pry-out failure										
Pryout factor	k_8	[-]	2.0							
Partial safety factor[1]	γ_{Mc} (= $1/\Phi_{Mc}$)	[-]	1.5[2]							
Data base for edge failure										
Effective length of anchor	ℓ_f	[-]	$\min(h_{ef};\ 12\ d_{nom})$						$\min(h_{ef};\ 300mm)$	
Partial safety factor	γ_{Mc} (= $1/\Phi_{Mc}$)	[-]	1.5[2]							

1) In absence of other national regulations
2) Partial safety factor γ_2=1.0 is included.

TENSION LOAD CAPACITIES - REINFORCING BAR

According to EN 1992-4 for a working life of 50 years (temperature range I and II) and 100 years (temperature range I and II).

Parameter for calculation of ultimate strength	Notation	Unit	Pure500+ - Reinforcing bar									
			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø24	Ø25	Ø28	Ø32
Steel failure												
Characteristic resistance	$N_{Rk,s} = N_{Rk,s,C1}$	[kN]	$A_s \cdot f_{uk}$									
Cross section area	A_s	[kN]	50	79	113	154	201	314	452	491	616	804
Cross section area	f_{uk}	[kN]	To be taken from specification of reinforcing bar									
Partial safety factor[1]	$\gamma_{Ms,N} (= 1/\Phi_{Ms,N})$	[-]	1.40									
Combined pullout and concrete failure												
Characteristic resistance in cracked concrete												
Temperature Range I: 40°C / 24°C	$\tau_{Rk,cr} = \tau_{Rk,C1}$	[N/mm²]	7.0	7.0	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
	$\tau_{Rk,cr,100}$	[N/mm²]	6.5	6.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Temperature Range II: 72°C / 50°C	$\tau_{Rk,cr} = \tau_{Rk,C1}$	[N/mm²]	6.0	6.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
	$\tau_{Rk,cr,100}$	[N/mm²]	5.5	5.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Characteristic resistance in uncracked concrete												
Temperature Range I: 40°C / 24°C (CAC)	$\tau_{Rk,ucr} = \tau_{Rk,ucr,100}$	[N/mm²]	16.0	16.0	16.0	16.0	16.0	16.0	15.0	15.0	15.0	15.0
Dry and wet concrete (HDB)	$\tau_{Rk,ucr} = \tau_{Rk,ucr,100}$	[N/mm²]	14.0	14.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Flooded hole (HDB)	$\tau_{Rk,ucr} = \tau_{Rk,ucr,100}$	[N/mm²]	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Dry and wet concrete, flooded hole (DDB)	$\tau_{Rk,ucr}$	[N/mm²]	14.0	13.0	13.0	13.0	12.0	12.0	11.0	11.0	11.0	11.0
	$\tau_{Rk,ucr,100}$	[N/mm²]	14.0	13.0	13.0	13.0	12.0	12.0	11.0	11.0	11.0	11.0
Temperature Range II: 72°C / 50°C (CAC)	$\tau_{Rk,ucr} = \tau_{Rk,ucr,100}$	[N/mm²]	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	11.0	11.0
Dry and wet concrete (HDB)	$\tau_{Rk,ucr} = \tau_{Rk,ucr,100}$	[N/mm²]	12.0	12.0	12.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Flooded hole (HDB)	$\tau_{Rk,ucr} = \tau_{Rk,ucr,100}$	[N/mm²]	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Dry and wet concrete, flooded hole (DDB)	$\tau_{Rk,ucr}$	[N/mm²]	11.0	11.0	10.0	10.0	10.0	9.5	9.5	9.5	9.0	9.0
	$\tau_{Rk,ucr,100}$	[N/mm²]	11.0	10.0	10.0	10.0	9.5	9.0	9.0	9.0	8.5	8.5
Increasing factor for sustained load												
Temperature range I: 40°C / 24°C	Ψ^0_{sus}	[-]	0.80									
Temperature range II: 80°C / 50°C	Ψ^0_{sus}	[-]	0.77									
Temperature range III: 120°C / 72°C	Ψ^0_{sus}	[-]	0.68									
Temperature range IV: 160°C / 100°C	Ψ^0_{sus}	[-]	0.72									
Increasing factor for concrete strength												
C30/37	Ψ_c	[-]	1.04									
C40/50	Ψ_c	[-]	1.08									
C50/60	Ψ_c	[-]	1.10									
Partial safety factor[1]												
Dry and wet concrete (CAC and HDB)	$\gamma_{Mp} (= 1/\Phi_{Mp})$	[-]	1.5[2]									
Flooded hole, compressed air cleaning (CAC and HDB)	$\gamma_{Mp} (= 1/\Phi_{Mp})$	[-]	1.8[3]									
Dry and wet concrete (DDB)	$\gamma_{Mp} (= 1/\Phi_{Mp})$	[-]	1.5[2]									
Flooded hole (DDB)	$\gamma_{Mp} (= 1/\Phi_{Mp})$	[-]	1.8[3]					2.1[4]				
Concrete failure												
Data base for concrete cone failure												
Cracked concrete	$k_{cr,N}$	[-]	7.7									
Uncracked concrete	$k_{ucr,N}$	[-]	11.0									
Characteristic spacing	$s_{cr,N}$	[mm]	$3.0 \cdot h_{ef}$									
Characteristic edge distance	$c_{cr,N}$	[mm]	$1.5 \cdot h_{ef}$									
Data base for splitting failure												
Characteristic spacing	$s_{cr,sp}$	[mm]	$2 \cdot c_{cr,sp}$									
Characteristic edge distance	$c_{cr,sp}$	[mm]	$1.0 \cdot h_{ef} \le 2 \cdot h_{ef}(2.5 - (h/h_{ef})) \le 2.4 \cdot h_{ef}$									
Increasing factor for concrete strength												
C30/37	Ψ_c	[-]	1.21									
C40/50	Ψ_c	[-]	1.41									
C50/60	Ψ_c	[-]	1.55									
Partial safety factor[1]												
Dry and wet concrete (CAC and HDB)	$\gamma_{Mc} (= 1/\Phi_{Mc})$	[-]	1.5[2]									
Flooded hole (CAC and HDB)	$\gamma_{Mc} (= 1/\Phi_{Mc})$	[-]	1.8[3]									
Dry and wet concrete (DDB)	$\gamma_{Mc} (= 1/\Phi_{Mc})$	[-]	1.5[2]									
Flooded hole (DDB)	$\gamma_{Mc} (= 1/\Phi_{Mc})$	[-]	1.8[3]					2.1[4]				

1) In absence of other national regulations

2) Partial safety factor γ_{inst}=1.0 is included

3) Partial safety factor γ_{inst}=1.2 is included

4) Partial safety factor γ_{inst}=1.4 is included

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SHEAR LOAD CAPACITIES - REINFORCING BAR

According to EN 1992-4 for a working life of 50 years (temperature range I and II) and 100 years (temperature range I and II).

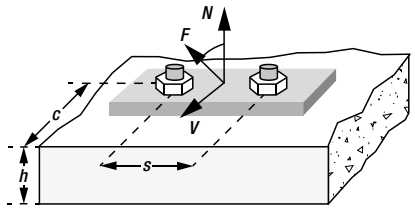
Parameter for calculation of ultimate strength	Notation	Unit	Pure500+ - Reinforcing bar									
			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø24	Ø25	Ø28	Ø32
Steel failure												
Data base for steel failure without level arm												
Characteristic resistance	$V^0_{Rk,s}$	[kN]	$0.5 \cdot A_s \cdot f_{uk}$									
	$V^0_{Rk,s,C1}$	[kN]	$0.35 \cdot A_s \cdot f_{uk}$									
Cross section area	A_s	[kN]	50	79	113	154	201	314	452	491	616	804
Cross section area	f_{uk}	[kN]	To be taken from specification of reinforcing bar									
Partial safety factor[1)]	$\gamma_{Ms,V}$ (= $1/\phi_{Ms,V}$)	[-]	1.50									
Ductility factor	k_7	[-]	1.0									
Data base for steel failure with level arm												
Characteristic resistance	$M^0_{Rk,s}$	[kN]	$1.2 \cdot W_{el} \cdot f_{uk}$									
Cross section area	W_{el}	[kN]	50	98	170	269	402	785	1357	1534	2155	3217
Cross section area	f_{uk}	[kN]	To be taken from specification of reinforcing bar									
Partial safety factor[1)]	$\gamma_{Ms,V}$ (= $1/\phi_{Ms,V}$)	[-]	1.50									
Concrete failure												
Data base for pry-out failure												
Pryout factor	k_8	[-]	2.0									
Partial safety factor[1)]	γ_{Mc} (= $1/\phi_{Mc}$)	[-]	1.5[2)]									
Data base for edge failure												
Effective length of anchor	ℓ_f	[-]	$\min(h_{ef}; 12\ d_{nom})$							$\min(h_{ef}; 300mm)$		
Partial safety factor[1)]	γ_{Mc} (= $1/\phi_{Mc}$)	[-]	1.5[2)]									

1) In absence of other national regulations
2) Partial safety factor γ_2=1.0 is included.

PRECALCULATED TENSION AND SHEAR CAPACITIES - THREADED ROD

According to EN 1992-4 (and AS 5216).

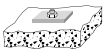
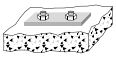
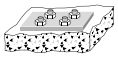
- The following tables are meant to give the designer aid in the preliminary design process. No responsibility is taken for the correctness of these data.
- The given values are valid for normal concrete C20/25 (f'_c = 20 MPa) and static/quasi-static loads with the exact dimensional information given. For any other conditions, the use of DDA is recommended.
- The values in the table below are strength design level loads. This assumes a safety factor is included both on the loading and the resistance.
- For cracked concrete, splitting failure is not considered assuming that a reinforcement is present which limits the cracks to 0.3 mm.
- Precalculated design resistance capacities are given for threaded rods only, values for reinforcing bars can be found in the relevant approval documents.
- For further details and background information, please see the introduction of this manual.



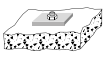
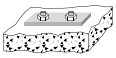
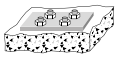
Influence of steel grades									
Size	Property	Carbon steel					Stainless steel / HCR steel		
		4.6	4.8	5.6	5.8	8.8	Class 50	Class 70	Class 80
M8	N_{Rd} [kN]	7.5	10.0	9.0	12.0	19.3	6.3	13.9	18.1
	V_{Rd} [kN]	5.4	7.2	6.6	8.8	12.0	3.8	8.3	11.3
M10	N_{Rd} [kN]	11.5	15.3	14.5	19.3	30.7	10.1	21.9	28.8
	V_{Rd} [kN]	8.4	11.2	10.2	13.6	18.4	6.3	12.8	17.3
M12	N_{Rd} [kN]	17.0	22.7	15.0	28.0	44.7	14.7	31.6	41.9
	V_{Rd} [kN]	12.0	16.0	15.0	20.0	27.2	8.8	19.2	25.6
M16	N_{Rd} [kN]	31.5	42.0	39.0	52.0	83.3	27.6	58.8	78.8
	V_{Rd} [kN]	22.8	30.4	28.1	37.6	50.4	16.4	35.3	47.4
M20	N_{Rd} [kN]	49.0	65.3	61.0	81.3	130.7	43.0	91.4	122.5
	V_{Rd} [kN]	35.3	47.2	44.3	59.2	78.4	25.6	55.1	73.7
M24	N_{Rd} [kN]	70.5	94.0	88.0	117.3	188.0	61.9	132.1	176.3
	V_{Rd} [kN]	50.9	68.0	63.5	84.8	112.8	37.0	79.5	106.0
M27	N_{Rd} [kN]	92.0	122.7	115.0	153.3	245.3	80.4	-	-
	V_{Rd} [kN]	65.9	88.0	82.6	110.4	147.2	48.3	-	-
M30	N_{Rd} [kN]	112.0	149.3	140.0	186.7	299.3	98.3	-	-
	V_{Rd} [kN]	80.8	108.0	100.6	134.4	179.2	58.8	-	-

Instructions:

- The steel grade potentially influences the load capacity of the anchor. Table depicts ultimate steel strengths of threaded rods for given steel grades.
- The steel strength equals the load capacity of the anchor provided other failure modes, i.e. concrete failure or pullout failure, do not yield lower strengths and therefore do not control the anchor capacity.
- To determine the critical failure mode, the steel strength identified in the table has to be compared with the concrete and pullout strengths in the following tables.

M8	C20/25 (f'_c = 20 MPa) 8.8 steel dry/wet concrete CAC, 50 years	Anchoring located far from any edge					Anchoring located close to an edge				
											
Embedment depth	h_{ef} [mm]	80									
Member thickness	h [mm]	110									
Edge distance	c [mm]	-	-	-	-	-	35.0	35.0	35.0	35.0	35.0
Anchor spacing	s [mm]	0	40.0	240	40.0	240	0	40.0	240	40.0	240
40/24 	N_{Rd} [kN]	9.4	12.4	18.8	16.7	37.5	4.8	6.3	9.5	9.2	19.1
	$F_{Rd}^{45°}$ [kN]	8.8	13.7	17.7	18.9	35.3	2.4	3.2	4.8	3.6	5.6
	V_{Rd} [kN]	11.7	23.4	23.4	33.5	46.7	2.0	2.8	4.0	2.8	4.0
72/50 	N_{Rd} [kN]	8.0	10.9	16.1	15.2	32.2	4.2	5.6	8.3	8.5	16.7
	$F_{Rd}^{45°}$ [kN]	8.1	12.3	16.2	17.2	32.3	2.3	3.1	4.6	3.5	5.5
	V_{Rd} [kN]	11.7	21.8	23.4	30.3	46.7	2.0	2.8	4.0	2.8	4.0
40/24 	N_{Rd} [kN]	19.3	27.4	38.7	31.9	77.3	10.6	11.8	17.7	14.0	37.5
	$F_{Rd}^{45°}$ [kN]	12.4	21.4	24.7	32.2	49.4	3.8	5.0	7.2	5.2	8.0
	V_{Rd} [kN]	11.7	23.4	23.4	46.7	46.7	2.8	3.9	5.6	3.9	5.6
72/50 	N_{Rd} [kN]	19.3	24.2	38.7	29.3	77.3	10.4	11.8	17.7	14.0	37.5
	$F_{Rd}^{45°}$ [kN]	12.4	20.2	24.7	30.6	49.4	3.8	5.0	7.2	5.2	8.0
	V_{Rd} [kN]	11.7	23.4	23.4	46.7	46.7	2.8	3.9	5.6	3.9	5.6

■ - Steel strengths controls ■ - Concrete strength controls ■ - Anchor pullout strength controls

M10	C20/25 (f'_c = 20 MPa) 8.8 steel dry/wet concrete CAC, 50 years	Anchoring located far from any edge					Anchoring located close to an edge				
											
Embedment depth	h_{ef} [mm]	100									
Member thickness	h [mm]	130									
Edge distance	c [mm]	-	-	-	-	-	40.0	40.0	40.0	40.0	40.0
Anchor spacing	s [mm]	0	50.0	300	50.0	300	0	50.0	300	50.0	300
40/24 	N_{Rd} [kN]	14.7	18.9	29.3	25.1	58.6	7.2	9.4	14.5	13.4	29.0
	$F_{Rd}^{45°}$ [kN]	13.9	21.3	27.8	28.4	55.6	3.3	4.5	6.5	4.9	7.4
	V_{Rd} [kN]	18.6	37.1	37.1	50.3	74.2	2.6	3.7	5.2	3.7	5.2
72/50 	N_{Rd} [kN]	12.6	16.8	25.1	23.0	50.3	6.3	8.4	12.7	12.5	25.3
	$F_{Rd}^{45°}$ [kN]	12.7	19.0	25.4	26.0	50.9	3.1	4.4	6.3	4.9	7.4
	V_{Rd} [kN]	18.6	33.5	37.1	46.0	74.2	2.6	3.7	5.2	3.7	5.2
40/24 	N_{Rd} [kN]	30.7	38.3	61.3	44.6	122.7	14.3	15.8	23.3	18.7	48.3
	$F_{Rd}^{45°}$ [kN]	19.6	32.0	39.2	47.3	78.5	5.0	6.7	9.5	6.9	10.4
	V_{Rd} [kN]	18.6	37.1	37.1	74.2	74.2	3.7	5.2	7.4	5.2	7.4
72/50 	N_{Rd} [kN]	30.7	37.0	61.3	43.5	122.7	14.3	15.8	23.3	18.7	48.3
	$F_{Rd}^{45°}$ [kN]	19.6	31.4	39.2	46.6	78.5	5.0	6.7	9.5	6.9	10.4
	V_{Rd} [kN]	18.6	37.1	37.1	74.2	74.2	3.7	5.2	7.4	5.2	7.4

■ - Steel strengths controls ■ - Concrete strength controls ■ - Anchor pullout strength controls

DDA DEWALT DESIGN ASSIST

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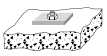
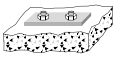
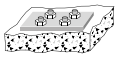
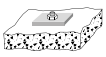
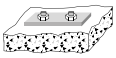
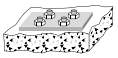
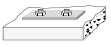
M12	C20/25 (f'_c = 20 MPa) 8.8 steel dry/wet concrete CAC, 50 years	Anchoring located far from any edge					Anchoring located close to an edge				
											
Embedment depth	h_{ef} [mm]	120									
Member thickness	h [mm]	150									
Edge distance	c [mm]	-	-	-	-	-	45.0	45.0	45.0	45.0	45.0
Anchor spacing	s [mm]	0	60.0	360	60.0	360	0	60.0	360	60.0	360
40/24 	N_{Rd} [kN]	25.6	30.9	51.3	37.8	102.5	12.4	15.0	24.8	19.9	49.7
	$F_{Rd}^{45°}$ [kN]	22.3	33.4	44.6	42.7	89.2	4.4	6.2	8.9	6.5	9.4
	V_{Rd} [kN]	27.0	53.9	53.9	75.5	107.8	3.3	4.8	6.6	4.8	6.6
72/50 	N_{Rd} [kN]	21.1	27.0	42.2	35.3	84.4	10.4	13.3	20.8	18.9	41.6
	$F_{Rd}^{45°}$ [kN]	20.1	30.5	40.2	39.9	80.4	4.3	6.0	8.5	6.5	9.4
	V_{Rd} [kN]	27.0	53.9	53.9	70.5	107.8	3.3	4.8	6.6	4.8	6.6
40/24 	N_{Rd} [kN]	43.1	50.3	86.2	58.7	172.4	18.6	20.6	30.2	24.3	63.0
	$F_{Rd}^{45°}$ [kN]	28.1	44.2	56.3	64.5	112.6	6.3	8.6	12.1	9.0	13.2
	V_{Rd} [kN]	27.0	53.9	53.9	107.8	107.8	4.7	6.8	9.4	6.8	9.4
72/50 	N_{Rd} [kN]	43.1	50.3	86.2	58.7	172.4	18.6	20.6	30.2	24.3	63.0
	$F_{Rd}^{45°}$ [kN]	28.1	44.2	56.3	64.5	112.6	6.3	8.6	12.1	9.0	13.2
	V_{Rd} [kN]	27.0	53.9	53.9	107.8	107.8	4.7	6.8	9.4	6.8	9.4

■ - Steel strengths controls ■ - Concrete strength controls ■ - Anchor pullout strength controls

M16	C20/25 (f'_c = 20 MPa) 8.8 steel dry/wet concrete CAC, 50 years	Anchoring located far from any edge					Anchoring located close to an edge				
											
Embedment depth	h_{ef} [mm]	160									
Member thickness	h [mm]	196									
Edge distance	c [mm]	-	-	-	-	-	50.0	50.0	50.0	50.0	50.0
Anchor spacing	s [mm]	0	75.0	480	75.0	480	0	75.0	480	75.0	480
40/24 	N_{Rd} [kN]	45.6	52.7	91.1	60.9	182.3	21.0	24.3	42.0	30.6	84.0
	$F_{Rd}^{45°}$ [kN]	40.6	58.7	81.1	68.9	162.2	6.2	8.8	12.4	9.2	12.5
	V_{Rd} [kN]	50.2	100.5	100.5	121.9	201.0	4.4	6.6	8.8	6.6	8.8
72/50 	N_{Rd} [kN]	40.2	48.4	80.4	58.9	160.8	19.0	22.9	38.0	30.4	76.0
	$F_{Rd}^{45°}$ [kN]	37.9	54.8	75.8	66.6	151.6	6.1	8.7	12.1	9.2	12.5
	V_{Rd} [kN]	50.2	96.8	100.5	117.8	201.0	4.4	6.6	8.8	6.6	8.8
40/24 	N_{Rd} [kN]	66.4	76.7	132.7	88.7	265.5	27.7	30.4	45.0	35.7	94.9
	$F_{Rd}^{45°}$ [kN]	48.5	73.8	97.1	100.4	194.1	8.6	12.1	16.5	12.6	17.6
	V_{Rd} [kN]	50.2	100.5	100.5	177.5	201.0	6.2	9.3	12.4	9.3	12.4
72/50 	N_{Rd} [kN]	66.4	76.7	132.7	88.7	265.5	27.7	30.4	45.0	35.7	94.9
	$F_{Rd}^{45°}$ [kN]	48.5	73.8	97.1	100.4	194.1	8.6	12.1	16.5	12.6	17.6
	V_{Rd} [kN]	50.2	100.5	100.5	177.5	201.0	6.2	9.3	12.4	9.3	12.4

■ - Steel strengths controls ■ - Concrete strength controls ■ - Anchor pullout strength controls

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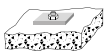
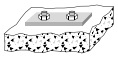
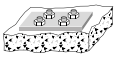
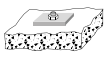
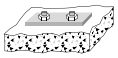
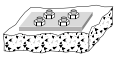
M20	C20/25 (f'_c = 20 MPa) 8.8 steel dry/wet concrete CAC, 50 years	Anchoring located far from any edge					Anchoring located close to an edge				
											
Embedment depth	h_{ef} [mm]	200									
Member thickness	h [mm]	248									
Edge distance	c [mm]	-	-	-	-	-	60.0	60.0	60.0	60.0	60.0
Anchor spacing	s [mm]	0	95.0	600	95.0	600	0	95.0	600	95.0	600
40/24 	N_{Rd} [kN]	64.9	75.2	129.9	87.1	259.7	29.6	34.3	59.2	43.3	129.9
	$F_{Rd}^{45°}$ [kN]	60.3	85.1	120.5	98.6	241.1	8.7	12.6	17.5	13.2	17.6
	V_{Rd} [kN]	78.4	150.4	156.8	174.2	313.6	6.2	9.5	12.5	9.5	12.5
72/50 	N_{Rd} [kN]	58.6	70.1	117.3	84.3	234.6	27.7	33.1	55.3	43.3	110.7
	$F_{Rd}^{45°}$ [kN]	56.9	79.4	113.9	95.4	227.7	8.6	12.5	17.3	13.2	17.6
	V_{Rd} [kN]	78.4	140.3	156.8	168.7	313.6	6.2	9.5	12.5	9.5	12.5
40/24 	N_{Rd} [kN]	92.8	107.4	185.5	124.5	371.0	38.5	42.3	62.5	49.7	132.0
	$F_{Rd}^{45°}$ [kN]	72.1	108.2	144.2	140.8	288.4	12.1	17.3	23.3	17.9	24.9
	V_{Rd} [kN]	78.4	156.8	156.8	248.9	313.6	8.8	13.4	17.6	13.4	17.6
72/50 	N_{Rd} [kN]	92.8	107.4	185.5	124.5	371.0	38.5	42.3	62.5	49.7	132.0
	$F_{Rd}^{45°}$ [kN]	72.1	108.2	144.2	140.8	288.4	12.1	17.3	23.3	17.9	24.9
	V_{Rd} [kN]	78.4	156.8	156.8	248.9	313.6	8.8	13.4	17.6	13.4	17.6

■ - Steel strengths controls ■ - Concrete strength controls ■ - Anchor pullout strength controls

M24	C20/25 (f'_c = 20 MPa) 8.8 steel dry/wet concrete CAC, 50 years	Anchoring located far from any edge					Anchoring located close to an edge				
											
Embedment depth	h_{ef} [mm]	240									
Member thickness	h [mm]	296									
Edge distance	c [mm]	-	-	-	-	-	120.0	120.0	120.0	120.0	120.0
Anchor spacing	s [mm]	0	115.0	720	115.0	720	0	115.0	720	115.0	720
40/24 	N_{Rd} [kN]	85.4	99.0	170.7	114.8	341.4	45.5	52.8	91.0	65.4	218.8
	$F_{Rd}^{45°}$ [kN]	82.5	112.0	164.9	129.9	329.8	19.7	25.1	39.3	26.5	43.9
	V_{Rd} [kN]	112.8	198.0	225.6	229.6	451.2	15.5	20.5	31.1	20.5	31.1
72/50 	N_{Rd} [kN]	84.4	99.0	168.9	114.8	337.8	45.5	52.8	91.0	65.4	189.7
	$F_{Rd}^{45°}$ [kN]	82.0	112.0	163.9	129.9	327.8	19.7	25.1	39.3	26.5	43.9
	V_{Rd} [kN]	112.8	198.0	225.6	229.6	451.2	15.5	20.5	31.1	20.5	31.1
40/24 	N_{Rd} [kN]	121.9	141.4	243.9	164.0	487.7	56.2	61.8	91.3	72.0	185.7
	$F_{Rd}^{45°}$ [kN]	99.4	147.5	198.9	185.5	397.8	26.8	33.4	50.3	35.0	60.2
	V_{Rd} [kN]	112.8	225.6	225.6	328.0	451.2	21.9	28.9	43.9	28.9	43.9
72/50 	N_{Rd} [kN]	121.9	141.4	243.9	164.0	487.7	56.2	61.8	91.3	72.0	185.7
	$F_{Rd}^{45°}$ [kN]	99.4	147.5	198.9	185.5	397.8	26.8	33.4	50.3	35.0	60.2
	V_{Rd} [kN]	112.8	225.6	225.6	328.0	451.2	21.9	28.9	43.9	28.9	43.9

■ - Steel strengths controls ■ - Concrete strength controls ■ - Anchor pullout strength controls

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M27	C20/25 (f'_c = 20 MPa) 8.8 steel dry/wet concrete CAC, 50 years	Anchoring located far from any edge					Anchoring located close to an edge				
Embedment depth	h_{ef} [mm]	270									
Member thickness	h [mm]	334									
Edge distance	c [mm]	-	-	-	-	-	125.0	125.0	125.0	125.0	125.0
Anchor spacing	s [mm]	0	75.0	810	75.0	810	0	75.0	810	75.0	810
40/24 	N_{Rd} [kN]	101.8	111.3	203.7	121.6	407.4	52.8	57.7	105.6	65.9	267.1
	$F_{Rd}^{45°}$ [kN]	102.2	125.9	204.3	137.6	408.6	22.2	26.0	44.3	26.9	49.1
	V_{Rd} [kN]	147.2	222.6	294.4	243.2	588.8	17.4	20.8	34.7	20.8	34.7
72/50 	N_{Rd} [kN]	101.8	111.3	203.7	121.6	407.4	52.8	57.7	105.6	65.9	236.5
	$F_{Rd}^{45°}$ [kN]	102.2	125.9	204.3	137.6	408.6	22.2	26.0	44.3	26.9	49.1
	V_{Rd} [kN]	147.2	222.6	294.4	243.2	588.8	17.4	20.8	34.7	20.8	34.7
40/24 	N_{Rd} [kN]	145.5	159.0	291.0	173.7	582.0	65.8	69.6	106.9	76.3	218.9
	$F_{Rd}^{45°}$ [kN]	124.2	175.2	248.4	196.5	496.7	30.3	35.1	57.0	36.0	68.0
	V_{Rd} [kN]	147.2	294.4	294.4	347.4	588.8	24.5	29.4	49.0	29.4	49.0
72/50 	N_{Rd} [kN]	145.5	159.0	291.0	173.7	582.0	65.8	69.6	106.9	76.3	218.9
	$F_{Rd}^{45°}$ [kN]	124.2	175.2	248.4	196.5	496.7	30.3	35.1	57.0	36.0	68.0
	V_{Rd} [kN]	147.2	294.4	294.4	347.4	588.8	24.5	29.4	49.0	29.4	49.0

■ - Steel strengths controls ■ - Concrete strength controls ■ - Anchor pullout strength controls

M30	C20/25 (f'_c = 20 MPa) 8.8 steel dry/wet concrete CAC, 50 years	Anchoring located far from any edge					Anchoring located close to an edge				
Embedment depth	h_{ef} [mm]	300									
Member thickness	h [mm]	370									
Edge distance	c [mm]	-	-	-	-	-	80.0	80.0	80.0	80.0	80.0
Anchor spacing	s [mm]	0	140.0	900	140.0	900	0	140.0	900	140.0	900
40/24 	N_{Rd} [kN]	119.3	137.8	238.6	159.3	477.2	52.9	61.2	105.8	77.3	285.6
	$F_{Rd}^{45°}$ [kN]	121.5	156.0	243.1	180.2	486.1	15.7	23.3	31.4	24.5	31.7
	V_{Rd} [kN]	179.2	275.7	358.4	318.6	716.8	11.2	17.7	22.4	17.7	22.4
72/50 	N_{Rd} [kN]	119.3	137.8	238.6	159.3	477.2	52.9	61.2	105.8	77.3	243.9
	$F_{Rd}^{45°}$ [kN]	121.5	156.0	243.1	180.2	486.1	15.7	23.3	31.4	24.5	31.7
	V_{Rd} [kN]	179.2	275.7	358.4	318.6	716.8	11.2	17.7	22.4	17.7	22.4
40/24 	N_{Rd} [kN]	170.4	196.9	340.8	227.6	681.6	69.4	76.2	112.8	89.5	239.7
	$F_{Rd}^{45°}$ [kN]	148.2	215.7	296.5	257.4	592.9	21.9	32.0	41.9	33.2	44.7
	V_{Rd} [kN]	179.2	358.4	358.4	455.1	716.8	15.8	25.0	31.6	25.0	31.6
72/50 	N_{Rd} [kN]	170.4	196.9	340.8	227.6	681.6	69.4	76.2	112.8	89.5	239.7
	$F_{Rd}^{45°}$ [kN]	148.2	215.7	296.5	257.4	592.9	21.9	32.0	41.9	33.2	44.7
	V_{Rd} [kN]	179.2	358.4	358.4	455.1	716.8	15.8	25.0	31.6	25.0	31.6

■ - Steel strengths controls ■ - Concrete strength controls ■ - Anchor pullout strength controls

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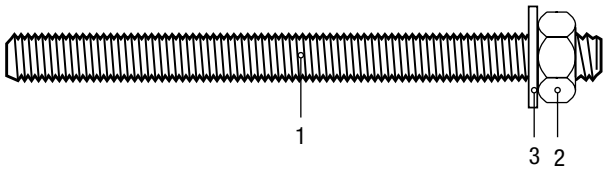
MATERIAL INFORMATION

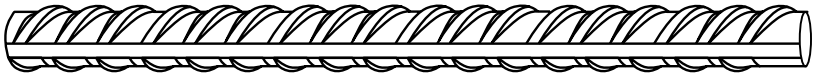
MATERIAL SPECIFICATIONS - THREADED ROD



Part no.	Designation	Material
Carbon steel 4.6, 4.8, 5.6, 5.8, 8.8		
Material acc. to EN ISO 683-4:2018 or EN 10263:2017 Electro plated ≥ 5 µm acc. to EN ISO 4042:2018 Hot-dip galvanised ≥ 40 µm acc. to EN ISO 1461:2009 or EN ISO 10684:2004 Sheradised ≥ 45 µm acc. to EN ISO 17688:2016		
1	Anchor rod	Strength class 4.6, f_{uk} = 400 MPa; f_{yk} = 240 MPa Strength class 4.8, f_{uk} = 400 MPa; f_{yk} = 320 MPa Strength class 5.6, f_{uk} = 500 MPa; f_{yk} = 300 MPa Strength class 5.8, f_{uk} = 500 MPa; f_{yk} = 400 MPa Strength class 8.8, f_{uk} = 800 MPa; f_{yk} = 640 MPa
2	Hexagon nut	Strength class 4 for threaded rod class 4.6 & 4.8 Strength class 5 for threaded rod class 5.6 & 5.8 Strength class 8 for threaded rod class 8.8
3	Washer	EN ISO 887:2006; EN ISO 7089:2000; EN ISO 7093:2000; EN ISO 7094:2000
Stainless steel A2, A4, and HCR		
Material acc. to EN ISO 3506-1:2020 Stainless steel A2: 1.4301 / 1.4307 / 1.4311 / 1.4567 / 1.4541 Stainless steel A4: 1.4401 / 1.4404 / 1.4571 / 1.4362 / 1.4578 High corrosion resistance steel: 1.4529 / 1.4565		
1	Anchor rod	Strength class 50, f_{uk} = 500 MPa; f_{yk} = 210 MPa Strength class 701), f_{uk} = 700 MPa; f_{yk} = 450 MPa Strength class 801)2), f_{uk} = 800 MPa; f_{yk} = 600 MPa
2	Hexagon nut	Strength class 50 for threaded rod class 50 Strength class 70 for threaded rod class 70 Strength class 80 for threaded rod class 80
3	Washer	EN ISO 887:2006; EN ISO 7089:2000; EN ISO 7093:2000; EN ISO 7094:2000

1) Property class 70 or 80 for threaded rods and hexagon nuts up to M24
2) Property class 80 only for stainless steel A4 and high corrosion resistance steel HCR

MATERIAL SPECIFICATIONS - REINFORCING BAR



Extract of EN 1992-1-1 Annex C, Table C.1	Class B	Class C
Characteristic yield strength f_{yk} or $f_{0.2k}$ [MPa]	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 [%]	± 6.0 for nominal bar size ≤ 8 mm ; ± 4.5 for nominal bar size > 12 mm	
Extract of EN 1992-1-1 Annex C, Table C.2N	**Class B**	**Class C**
Minimum value of related rib area $f_{R,min}$	0.040 for nominal bar size 8 mm to 12 mm; 0.056 for nominal bar size > 12 mm	

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PURE500+

Part No.	Description	Box qty.
DFC1110500	585ml 3:1 Cartridge + 1 Mixing Nozzle	6

Mixing nozzles

Part No.	Description	Box qty.
DFC1640550	Mixing nozzle - 19 element	1
MNEXT-PWR	Mixing nozzle extension (200mm)	10
AEXTN-PWR	Mixing nozzle extension (1000mm)	10

DFC1640550

MNEXT-PWR

Cartridge guns

Part No.	Description	Box qty.
CG585-PWR	Cartridge Gun For 385/585ml Cartridge	1
CGPRO-PWR	4 In 1 Injection Tool	1
CGB-585-PWR	Battery Tool For 385/585ml Cartridge	1

CG585-PWR

CGPRO-PWR

CGB-585-PWR

Accessories

Part No.	Description	Box qty.
BLOWPUMP-PWR	Blow pump	1
PAWB10-PWR	SDS-Plus premium adhesive wire brush 12mm	1
PAWB12-PWR	SDS-Plus premium adhesive wire brush 14mm	1
PAWB14-PWR	SDS-Plus premium adhesive wire brush 16mm	1
PAWB16-PWR	SDS-Plus premium adhesive wire brush 18mm	1
PAWB18-PWR	SDS-Plus premium adhesive wire brush 20mm	1
PAWB20-PWR	SDS-Plus premium adhesive wire brush 22mm	1
PAWB22-PWR	SDS-Plus premium adhesive wire brush 24mm	1
PAWB25-PWR	SDS-Plus premium adhesive wire brush 27mm	1
PAWB28-PWR	SDS-Plus premium adhesive wire brush 30mm	1
PAWB30-PWR	SDS-Plus premium adhesive wire brush 32mm	1
PAWB32-PWR	SDS-Plus premium adhesive wire brush 34mm	1
PAWB35-PWR	SDS-Plus premium adhesive wire brush 37mm	1
PAWB40-PWR	SDS-Plus premium adhesive wire brush 42mm	1
PAWBHANDLE-PWR	Premium steel brush - wooden handle	1
PAWBSDM8-PWR	Premium steel brush - SDS Plus adapter	1
PAWBEXTM8-PWR	Premium steel brush - SDS Plus extension	1
APP14-PWR	Adhesive piston plug for 14mm hole	10
APP16-PWR	Adhesive piston plug for 16mm hole	10
APP18-PWR	Adhesive piston plug for 18mm hole	10
APP20-PWR	Adhesive piston plug for 20mm hole	10
APP22-PWR	Adhesive piston plug for 22mm hole	10
APP24-PWR	Adhesive piston plug for 24mm hole	10
APP25-PWR	Adhesive piston plug for 25mm hole	10
APP28-PWR	Adhesive piston plug for 28mm hole	10
APP32-PWR	Adhesive piston plug for 32mm hole	10
APP40-PWR	Adhesive piston plug for 40mm hole	10

BLOW PUMP

STEEL BRUSH

WOODEN HANDLE

SDS ADAPTER

SDS EXTENSION

PISTON PLUG