



Declaration of Performance

No. DEA990925

Expandet ESP Pro (galvanized or stainless steel bonded anchor)

Intended use or uses of the construction product according to ETAG 001 parts 1 and 5		
Generic type	Bonded anchor for anchorage of threaded rod	
Base material	Cracked and Un-cracked concrete C20/25 to C50/60 acc. to EN 206-1:2003	
A	Material	Steel, zinc plated $\geq 5 \mu\text{m}$ acc. to EN ISO 4042:1999 or hot-dip galvanised $\geq 40 \mu\text{m}$ acc. to EN ISO 1461:2009 and EN ISO 10684:2004+AC:2009 Property class 4.6, 4.8, 5.8, 8.8 acc. EN 898-1 & EN 898-2
	Durability	Internal dry conditions
B	Material	Stainless steel: A4-70
	Durability	Dry internal conditions, external atmospheric exposure (including industrial and marine environment) or exposure in permanently damp internal conditions if no particular aggressive conditions exist.
C	Material	Stainless steel 1.4529 & 1.4565: Class 70 according to EN ISO 3506
	Durability	dry internal conditions, external atmospheric exposure, in permanently damp internal conditions or in other particular aggressive conditions - e.g. permanent, alternating immersion in seawater, splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).
Loading (A,B,C)	Static, quasi-static	
Fire Resistance	NPD	
Fire Reaction	A1 according to EN13501-1	
Service temperature range	I: -40°C to +40°C (max. short term temperature +40°C and max. long term temperature +24°C). II: -40°C to +80°C (max. short term temperature +80°C and max. long term temperature +50°C).	
Use category	Category 1 & 2: dry and wet concrete, flooded holes are allowed. Drilling method: Hammer drilling.	
ETA – 16/0975 issued by	TZUS	
On the basis of	ETAG 001, according to Article 29 of the Regulation (EU) No 305/2011	
Certificate of constancy of performance	STAATLICHE MATERIALPRÜFUNGSANSTALT DARMSTADT 1343-CPR-M 628-4	



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Installation parameters for threaded rod

Anchor size		M 8	M 10	M 12	M 16	M 20	M 24
Nominal drill hole diameter	d_0 [mm] =	10	12	14	18	24	28
Effective anchorage depth	$h_{ef,min}$ [mm] =	60	60	70	80	90	96
	$h_{ef,max}$ [mm] =	160	200	240	320	400	480
Diameter of clearance hole in the fixture	d_f [mm] ≤	9	12	14	18	22	26
Diameter of steel brush	d_b [mm] ≥	12	14	16	20	26	30
Torque moment	T_{inst} [Nm] ≤	10	20	40	80	120	160
Thickness of fixture	$t_{fix,min}$ [mm] >	0					
	$t_{fix,max}$ [mm] <	1500					
Minimum thickness of member	h_{min} [mm]	$h_{ef} + 30$ mm ≥ 100 mm			$h_{ef} + 2d_0$		
Minimum spacing	s_{min} [mm]	40	50	60	80	100	120
Minimum edge distance	c_{min} [mm]	40	50	60	80	100	120



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Characteristic values of *tension* loads under static, quasi-static action

Anchor size threaded rod				M 8	M 10	M 12	M 16	M 20	M24
Steel failure									
Characteristic tension resistance		$N_{Rk,s}$	[kN]	$A_s \times f_{uk}$					
Combined pull-out and concrete failure									
Characteristic bond resistance in non-cracked concrete C20/25									
Temperature range I: 40°C/24°C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm ²]	8,5	8,0	8,0	8,0	8,0	8,0
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm ²]	8,5	8,0	8,0	8,0	8,0	8,0
Temperature range II: 80°C/50°C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm ²]	6,5	6,0	6,0	6,0	6,0	6,0
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm ²]	6,5	6,0	6,0	6,0	6,0	6,0
Increasing factors for concrete ψ_c		C25/30		1,04					
		C30/37		1,08					
		C35/45		1,13					
		C40/50		1,15					
		C45/55		1,17					
		C50/60		1,19					
Factor according to CEN/TS 1992-4-5 Section 6.2.2.3		k_8	[-]	10,1					
Concrete cone failure									
Factor according to CEN/TS 1992-4-5 Section 6.2.3.1		k_{ucr}	[-]	10,1					
Edge distance		$c_{cr,N}$	[mm]	1,5 h_{ef}					
Axial distance		$s_{cr,N}$	[mm]	3,0 h_{ef}					
Splitting failure									
Edge distance		$c_{cr,sp}$	[mm]	$1,0 \cdot h_{ef} \leq 2 \cdot h_{ef} \left(2,5 - \frac{h}{h_{ef}} \right) \leq 2,4 \cdot h_{ef}$					
Axial distance		$s_{cr,sp}$	[mm]	2 $c_{cr,sp}$					
Installation safety factor (dry and wet concrete)		$\gamma_2 = \gamma_{inst}$	[-]	1,2					
Installation safety factor (flooded bore hole)		$\gamma_2 = \gamma_{inst}$	[-]	1,2					



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Characteristic values of *shear* loads under static, quasi-static action

Anchor size threaded rod	M 8	M 10	M 12	M 16	M 20	M 24		
Steel failure without lever arm								
Characteristic shear resistance,	$V_{Rk,s}$	[kN]	0,5 x A_s x f_{uk}					
Ductility factor according to CEN/TS 1992-4-5 Section 6.3.2.1	k_2	[-]	0,8					
Steel failure with lever arm								
Characteristic bending moment,	$M^0_{Rk,s}$	[Nm]	1.2 x W_{el} x f_{uk}					
Concrete pry-out failure								
Factor k_3 in equation (27) of CEN/TS 1992-4-5 Section 6.3.3 Factor k in equation (5.7) of Technical Report TR 029	$k_{(3)}$	[-]	2,0					
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0					
Concrete edge failure								
Effective length of anchor	l_f	[mm]	$l_f = \min(h_{ef}; 8 d_{nom})$					
Outside diameter of anchor	d_{nom}	[mm]	8	10	12	16	20	24
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0					



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Displacements under tension load (threaded rod)

Anchor size threaded rod			M 8	M 10	M 12	M 16	M 20	M 24
Non-cracked concrete C20/25								
Temperature range I: 40°C/24°C	δ_{N0} -factor	[mm/(N/mm ²)]	0,03	0,04	0,05	0,07	0,08	0,10
	$\delta_{N\infty}$ -factor	[mm/(N/mm ²)]	0,07	0,08	0,08	0,08	0,08	0,10
Temperature range II: 80°C/50°C	δ_{N0} -factor	[mm/(N/mm ²)]	0,02	0,03	0,03	0,04	0,04	0,05
	$\delta_{N\infty}$ -factor	[mm/(N/mm ²)]	0,15	0,17	0,17	0,17	0,17	0,17

Displacements under shear load (threaded rod)

Anchor size threaded rod			M 8	M 10	M 12	M 16	M 20	M 24
For non-cracked concrete C20/25								
All temperature ranges	δ_{V0} -factor	[mm/(kN)]	0,02	0,02	0,01	0,01	0,01	0,01
	$\delta_{V\infty}$ -factor	[mm/(kN)]	0,03	0,02	0,02	0,01	0,01	0,01

The performance of the product identified above is in conformity with the set of declared performance/s.

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

Signed for and on behalf of Expandet Screw Anchors A/S by:

Place and date of issue: Græsted, 31/12/2016

Lars Mortensen, Head of Technical Department