



# EXPANDET®



Declaration of Performance

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No. DEA991000

## Multi-Monti-plus Concrete Screw

Intended use or uses of the construction product according to ETAG 001 parts 1 and 3/ Option 1		
Generic type	Concrete Screw	
Base material	Cracked & Un-cracked concrete C20/25 to C50/60 acc. to EN 206-1:2003	
A	Material	Galvanized carbon steel acc. EN10263
	Durability	Internal dry conditions
Loading	static, quasi-static, fire exposure & seismic (C1)	
Fire Reaction	A1 according to EN13501-1	
ETA-15/0784 issued by		DEUTSCHES INSTITUT FÜR BAUTECHNIK (DIBt)
On the basis of		ETAG 001, used as EAD acc. to article 66 §3 of Regulation (EU) No 305/2011
Certificates of Conformity issued by		Otto-Graf-Institut Stuttgart (NB 0672)
ETA-15/0784		0672-CPR-0635
Under System		1

Declared performances										
Essential Characteristics			Performance							
			MMS+ 6		MMS+ 7,5		MMS+ 10		MMS+ 12	
$h_{nom}$	Embedment Depth	[mm]	35	45	35	55	50	65	75	90
d	Nominal Diameter of anchor bolt	[mm]	5	5	6	6	8	8	10	10
$d_0$	Nominal diameter of drill bit	[mm]	5	5	6	6	8	8	10	10
$d_{fix}$	Diameter of clearance hole in the fixture	[mm]	7	7	9	9	12	12	14	14
$h_{eff}$	Minimum effective anchorage depth	[mm]	26	35	26	43	36	50	57	70
$h_1$	Depth of the drilling hole	[mm]	40	50	40	65	60	75	85	100
$h_{min}$	Minimum thickness of the concrete member	[mm]	100	100	100	100	100	115	125	150
$s_{min}$	Minimum spacing	[mm]	30	30	40	40	40	50	60	60
	for $c \geq$ Edge distance	[mm]	30	30	40	40	40	50	60	60
$c_{min}$	Minimum edge distance	[mm]	30	30	40	40	40	50	60	60
	for $s \geq$ Anchor spacing	[mm]	30	30	40	40	40	50	60	60



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Essential Characteristics (for static and quasi static load)			Performance								
			MMS+ 6		MMS+ 7,5		MMS+ 10		MMS+ 12		
$h_{nom}$	Embedment Depth	[mm]	35	45	35	55	50	65	75	90	
<b>Steel Failure, tension</b>											
$N_{Rk,s}$	Characteristic resistance	[kN]	10,8		17,6		32,1		49,9		
	$k_2$	[-]	0,8								
$\gamma_{Ms}$	Partial safety factor	[-]	1,5								
<b>Pullout Failure</b>											
$N_{Rk,p,ucr}$	Characteristic resistance in un-cracked concrete class C20/25	[kN]	5,0	6,0	4,0	9,0	12,0	16,0	20,0	25,0	
$N_{Rk,p,cr}$	Characteristic resistance in cracked concrete class C20/25	[kN]	1,0	1,5	2,0	4,0	6,0	9,0	12,0	16,0	
$\gamma_2$	Partial safety factor	[-]	1,0								
$\psi_{C,ucr}$ C30/37	Increasing factor for un-cracked concrete C30/37	[-]	1,22								
$\psi_{C,ucr}$ C40/50	Increasing factor for un-cracked concrete C40/50	[-]	1,41								
$\psi_{C,ucr}$ C50/60	Increasing factor for un-cracked concrete C50/60	[-]	1,55								
<b>Resistance for Concrete Cone failure &amp; Splitting failure</b>											
$s_{cr,N}$	Critical spacing	[mm]	3,0 $h_{eff}$								
$c_{cr,N}$	Critical edge distance	[mm]	1,5 $h_{eff}$								
$s_{cr,sp}$	Critical spacing (splitting)	[mm]	3,6 $h_{eff}$								
$c_{cr,sp}$	Critical edge distance(splitting)	[mm]	1,8 $h_{eff}$								
$k_{cr}$	Factor for cracked concrete	[-]	7,2								
$k_{ucr}$	Factor for uncracked concrete	[-]	10,1								
<b>Displacement on Tension Load</b>											
N	Service tension value in un-cracked concrete	[kN]	1,9	3,0	1,9	5,3	5,7	7,9	10,7	12,8	
$\delta_0$	Short term displacement under tension load (uncracked)	[mm]	0,11	0,11	0,06	0,12	0,06	0,07	0,05	0,19	
$\delta_{\infty}$	Long term displacement under tension load (uncracked)	[mm]	0,3	0,28	0,38	1,03	0,75	0,72	0,74	0,6	
N	Service tension value in cracked concrete	[kN]	0,5	0,7	0,9	2,0	2,9	4,3	5,7	6,4	
$\delta_0$	Short term displacement under tension load (cracked)	[mm]	0,01	0,02	0,03	0,04	0,03	0,09	0,05	0,02	
$\delta_{\infty}$	Long term displacement under tension load (cracked)	[mm]	0,14	0,09	0,12	0,11	0,08	0,09	0,07	0,22	
<b>Shear, steel failure</b>											
$V_{Rk,s}$	Shear Steel characteristic failure	[kN]	4,1		6,1		13,7		24,1		
$M^0_{Rk,s}$	Bending Moment characteristic failure	[Nm]	6,7		14,1		34,5		66,8		
$\gamma_{m,sV}$	Partial safety factor for shear steel failure	[-]	1,5								
<b>Shear Concrete Edge failure mode</b>											
k	Factor for concrete edge failure	[-]	1,0							2,0	
<b>Shear Concrete Edge failure mode</b>											
$l_f$	Effective length of anchor under shear loading	[mm]	26	35	26	43	36	50	57	70	
$d_{nom}$	Effective diameter of the anchor	[mm]	5		6		8		10		
<b>Displacement on Shear Load</b>											
V	Service shear load in concrete	[kN]	2,0		4,0		8,0		12,0		
$\delta_{V0}$	Short term displacement under shear load	[mm]	0,14	0,13	0,09	0,11	0,18	0,13	0,18	0,18	
$\delta_{V\infty}$	Long term displacement under shear load	[mm]	0,20	0,19	0,13	0,16	0,27	0,20	0,27	0,27	



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Essential Characteristics (for seismic action, category C1)			Performance		
			MMS+ 10		MMS+ 12
$h_{nom}$	Embedment Depth	[mm]	65	75	90
<b>Steel Failure, tension</b>					
$N_{Rk,s,seis}$	Characteristic resistance	[kN]	24,1	37,4	
<b>Pullout Failure</b>					
$N_{Rk,p,seis}$	Characteristic resistance in cracked concrete class C20/25	[kN]	6,8	9,0	12,0
$\gamma_2$	Partial safety factor	[-]	1,0		
<b>Resistance for Concrete Cone failure</b>					
$s_{cr,N}$	Critical spacing	[mm]	3,0 $h_{eff}$		
$c_{cr,N}$	Critical edge distance	[mm]	1,5 $h_{eff}$		
<b>Shear, steel failure</b>					
$V_{Rk,s,seis}$	Shear Steel characteristic failure	[kN]	9,6	16,9	
<b>Shear Concrete Edge failure mode</b>					
k	Factor for concrete edge failure	[-]	1,0	2,0	
<b>Shear Concrete Edge failure mode</b>					
$l_f = h_{ef}$	Effective length of anchor under shear loading	[mm]	50	57	70
$d_{nom}$	Effective diameter of the anchor	[mm]	8	10	



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Essential Characteristics (for fire exposure)				Performance							
				MMS+ 6		MMS+ 7,5		MMS+ 10		MMS+ 12	
$S_{min}$	Minimum spacing	[mm]		35	45	35	55	50	65	75	90
Fire resistance, Concrete C20/25 to C50/60											
$F_{Rk,s,fi,30}$	Load Capacity	For fire resistance duration = 30 minutes	[kN]	0,25	0,4	0,5	1,0	1,5	2,3	3,0	3,9
$F_{Rk,s,fi,60}$		For fire resistance duration = 60 minutes	[kN]	0,25	0,4	0,5	0,8	1,4	1,4	2,1	2,1
$F_{Rk,s,fi,90}$		For fire resistance duration = 90 minutes	[kN]	0,25	0,4	0,5	0,5	1,0	1,0	1,5	1,5
$F_{Rk,s,fi,120}$		For fire resistance duration = 120 minutes	[kN]	0,2	0,3	0,4	0,4	0,8	0,8	1,2	1,2
$M_{Rk,s,fi,30}$	Shear Steel failure w/ leverarm	For fire resistance duration = 30 minutes	[Nm]	0,5		1,1		2,7		5,3	
$M_{Rk,s,fi,60}$		For fire resistance duration = 60 minutes	[Nm]	0,3		0,6		1,5		2,8	
$M_{Rk,s,fi,90}$		For fire resistance duration = 90 minutes	[Nm]	0,2		0,4		1,1		2,0	
$M_{Rk,s,fi,120}$		For fire resistance duration = 120 minutes	[Nm]	0,2		0,3		0,9		1,6	
Spacing and edge distance under fire exposure R30 to R120											
$S_{cr,fi}$	Critical spacing	[mm]	$2 \times C_{cr,fi}$								
$C_{cr,fi}$	Critical edge distance	[mm]	$2 \times h_{eff}$								

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, 01/08/2017

Lars Mortensen, Head of Technical Department