CE Declaration of Performance

EXPANDET®

Svendebuen 2-6 DK-3230
Tlf.: +45 70227979
expandet@expandet.dk

No. DEA990076

Expandet Drop-In anchor E (Zinc plated, Stainless steel A4 & HCR)

Intended use or uses of the construction product according to ETAG 001, Annex C	
Generic type	Deformation-controlled expansion anchor (Drop-in)
Base Material	Reinforced and unreinforced normal weight concrete according to EN 206-1:2000. Non-cracked concrete. Strength classes C20/25 to C C50/60 according to EN 206-1:2000
Anchor material type	Zinc plated
Durability and Use	Zinc plated: Structures subject to Internal conditions.
Anchor material types	Stainless steel A4 and High corrosion resistant steel HCR
Durability and Use	Stainless steel or High corrosion resistant steel: Structures subject to external atmospheric exposure including industrial and marine environment or exposure to permanent damp internal condition, if no particular aggressive condition exist High corrosion resistant steel HCR: Structures subject to external atmospheric exposure and to permanent damp internal condition, if no particular aggressive condition exist.
Loading	static, quasi-static
Fire Reaction	A1 according to EN13501-1
Fire Resistance	No performance assessed
Intended use I	
ETA - 11/0499 issued by	DEUTSCHES INSTITUT FÜR BAUTECHNIK (DIBt)
On the basis of	ETAG 001
Certificate of Conformity 143-CPR-M559-1/11.14 issued by	Technishe Universität Darmstadt Institut für Massivbau
Under System	1

Designations of anchor parts and material

Part	Designation	Steel, zinc plated	Stainless steel A4	High corrosion resistant steel HCR
1	Anchor sleeve	Cold formed or machining steel, zinc plated, EN ISO 4042:1999	Stainless steel, 1.4401, 1.4404, 1.4571, 1.4362, EN 10088:2005, Property class 70, acc. to EN ISO 3506:2010	Stainless steel, 1.4529, 1.4565, EN 10088:2005, Property class 70, acc. to EN ISO 3506:2010
2	Cone	Steel for cold forming acc. to EN 10263-2:2001	Stainless steel, 1.4401, 1.4404, 1.4571, 1.4362, EN 10088:2005	

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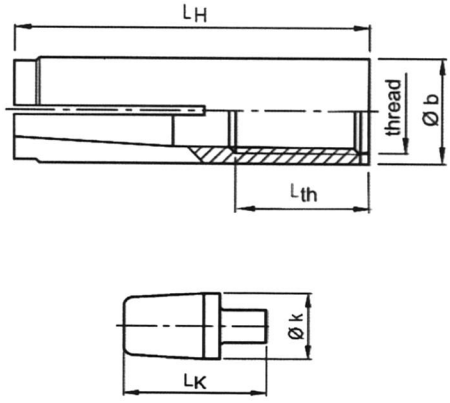
Dimensions and marking

Anchor size	Anchor sleeve				Cone		Marking
	thread	Ø b	L_H	L_{th}	Ø k	L_K	version E
M6x30	M6	8	30	13	5,0	13	◇ E M6x30
M8x30	M8	10	30	13	6,5	12	◇ E M8x30
M8x40	M8	10	40	20			◇ E M8x40
M10x30	M10	12	30	12	8,2	12	-
M10x40	M10	12	40	15	8,2	16	◇ E M10x40
M12x50	M12	15	50	18	10,3	20	◇ E M12x50
M12x80	M12	15	80	45			◇ E M12x80
M16x65	M16	19,7	65	23	13,8	29	◇ E M16x65
M16x80	M16	19,7	80	38			◇ E M16x80
M20x80	M20	24,7	80	34	16,5	30	◇ E M20x80

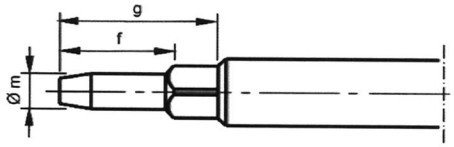
Dimensions in mm



Dimensions and marking of setting tools

Anchor size	Ø m	f	g	Setting tool	
				Marking	alternatively
M6x30	4,9	17	27	◇ E/ES M6x30	◇ E M6
M8x30	6,4	18	28	◇ E/ES M8x30	◇ E M8
M8x40	6,4	28	38	◇ E/ES M8x40	◇ E M8x40
M10x30	8,0	18	28	◇ ES M10x30	◇ E M10x30
M10x40	8,0	24	34	◇ E/ES M10x40	◇ E M10
M12x50	10,0	30	40	◇ E/ES M12x50	◇ E M12
M12x80	10,0	60	70	◇ E/ES M12x80	◇ E M12x80
M16x65	13,5	36	46	◇ E/ES M16x65	◇ E M16
M16x80	13,5	51	61	◇ E/ES M16x80	◇ E M16x80
M20x80	16,5	50	60	◇ E M20x80	◇ E M20

Dimensions in mm



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Installation parameters

Anchor size			M6x30	M8x30	M8x40	M10x30	M10x40	M12x50	M12x80	M16x65	M16x80	M20x80
Depth of drill hole	h_0 =	[mm]	30	30	40	30	40	50	80	65	80	80
Drill hole diameter	d_0 =	[mm]	8	10	10	12	12	15	15	20	20	25
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45	10,45	10,45	12,5	12,5	15,5	15,5	20,55	20,55	25,55
Max. installation torque [1]	$T_{inst} \leq$	[Nm]	4	8	8	15	15	35	35	60	60	120
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	7	9	9	12	12	14	14	18	18	22
Available thread length	L_{th}	[mm]	13	13	20	12	15	18	45	23	38	34
Minimum screw-in depth	L_{sdmin}	[mm]	7	9	9	10	11	13	13	18	18	22
Steel, zinc plated												
Minimum thickness of member	h_{min}	[mm]	100	100	100	120	120	130	130	160	160	200
Minimum spacing	s_{min}	[mm]	55	60	80	100	100	120	120	150	150	160
Minimum edge distance	c_{min}	[mm]	95	95	95	115	135	165	165	200	200	260
Stainless steel A4, HCR												
Minimum thickness of member	h_{min}	[mm]	100	100	100	-	130	140	140	160	160	250
Minimum spacing	s_{min}	[mm]	50	60	80	-	100	120	120	150	150	160
Minimum edge distance	c_{min}	[mm]	80	95	95	-	135	165	165	200	200	260

[1] If the screw or threaded rod is otherwise secured against unscrewing, the torque can be omitted.

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Characteristic values for **tension loads, zinc plated steel** (Design method A according to ETAG 001, Annex C or CEN/TS 1992-4)

Anchor size			**M6x30[1)]**	**M8x30[1)]**	**M8x40**	**M10x30[1)]**	**M10x40**	**M12x50**	**M12x80**	**M16x65 M16x80**	**M20x80**
Installation safety factor	γ_2	[-]	1,2								
Steel failure											
Characteristic resistance Steel 4.6	$N_{Rk,s}$	[kN]	8,0	14,6		23,2		33,7		62,8	98,0
Partial safety factor	γ_{Ms}	[-]	2,0								
Characteristic resistance Steel 5.6	$N_{Rk,s}$	[kN]	10,0	18,3		18,0	20,2	42,1		78,3	122,4
Partial safety factor	γ_{Ms}	[-]	2,0			1,5		2,0			
Characteristic resistance Steel 5.8	$N_{Rk,s}$	[kN]	10,0	17,6	18,3	18,0	20,2	40,2	42,1	67,1	106,4
Partial safety factor	γ_{Ms}	[-]	1,5							1,6	
Characteristic resistance Steel 8.8	$N_{Rk,s}$	[kN]	15,0	17,6	19,9	18,0	20,2	40,2	43,0	67,1	106,4
Partial safety factor	γ_{Ms}	[-]	1,5							1,6	
Pull-out failure											
Characteristic resistance in concrete C20/25	$N_{Rk,p}$	[kN]	[2)]	[2)]	9	[2)]	[2)]	[2)]		[2)]	[2)]
Increasing factor for $N_{Rk,p}$	ψ_C	[-]			$\left(\frac{f_{ck,cube}}{25}\right)^{0,3}$						
Concrete cone failure and splitting											
Effective anchorage depth	h_{ef}	[mm]	30	30	40	30	40	50		65	80
Spacing	$s_{cr,N}$ (= 2 $c_{cr,N}$)	[mm]	3 h_{ef}								
(edge distance)	$s_{cr,sp}$ (= 2 $c_{cr,sp}$)	[mm]	190	190	190	230	270	330		400	520
Factor for non-cracked concrete	k_{ucr}	[-]	10,1								

[1)] Use restricted to anchoring of structural components statically indeterminate and in dry interior conditions

[2)] Pull-out is not decisive

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Characteristic values for **tension loads, stainless steel A4, HCR** (Design method A according to ETAG 001, Annex C or CEN/TS 1992-4)

Anchor size			**M6x30**[1]	**M8x30**[1]	**M8x40**	**M10x40**	**M12x50** **M12x80**	**M16x65** **M16x80**	**M20x80**
Installation safety factor	γ_2	[-]	1,0						
Steel failure									
Characteristic resistance (property class 70)	$N_{Rk,s}$	[kN]	14,1	23,3		29,4	50,2	83,8	133,0
Characteristic resistance (property class 80)	$N_{Rk,s}$	[kN]	17,5	23,3		29,4	50,2	83,8	133,0
Partial safety factor	γ_{Ms}	[-]	1,87						
Pull-out failure									
Characteristic resistance in concrete C20/25	$N_{Rk,p}$	[kN]	[2]	[2]	9	[2]	[2]	[2]	[2]
Increasing factor for $N_{Rk,p}$	ψ_C	[-]			$\left(\frac{f_{ck,cube}}{25}\right)^{0,5}$				
Concrete cone failure and splitting									
Effective anchorage depth	h_{ef}	[mm]	30 [3]	30	40	40	50	65	80
Spacing (edge distance)	$s_{cr,N}$ (= 2 $c_{cr,N}$)	[mm]	3 h_{ef}						
	$s_{cr,sp}$ (= 2 $c_{cr,sp}$)	[mm]	160	190	190	270	330	400	520
Factor for non-cracked concrete	k_{ucr}	[-]	10,1						

[1] Use restricted to anchoring of structural components statically indeterminate and in dry interior conditions

[2] Pull-out is not decisive

[3] For proof against concrete cone failure as per ETAG 001, annex C or CEN/TS 1992-4-4, $N^0_{Rk,c}$ must be multiplied by the factor $(25/f_{ck,cube})^{0.2}$.

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Characteristic values for **shear loads, zinc plated steel** (Design method A according to ETAG 001, Annex C or CEN/TS 1992-4)

Anchor size			M6x30	M8x30	M8x40	M10x30	M10x40	M12x50	M12x80	M16x65 M16x80	M20x80
Steel failure without lever arm											
Characteristic resistance Steel 4.6	$V_{Rk,s}$	[kN]	4,0	7,3		11,6	9,6	16,8		31,3	49,0
Partial safety factor	γ_{Ms}	[-]	1 ,67								
Characteristic resistance Steel 5.6	$V_{Rk,s}$	[kN]	5,0	9,1		10,1	9,6	21,1		39,2	61,2
Partial safety factor	γ_{Ms}	[-]	1,67			1,25	1,67				
Characteristic resistance Steel 5.8	$V_{Rk,s}$	[kN]	5,0	6,9		10,1	7,2	19,4	21,1	33,5	53,2
Partial safety factor	γ_{Ms}	[-]	1,25							1, 33	
Characteristic resistance Steel 8.8	$V_{Rk,s}$	[kN]	5,0	6,9		10,1	7,2	19,4	21,5	33,5	53,2
Partial safety factor	γ_{Ms}	[-]	1,25							1, 33	
Factor of ductility	k_2	[-]	1,0								
Steel failure with lever arm											
Characteristic resistance Steel 4.6	$M^0_{Rk,s}$	[Nm]	6,1	15		30	30	52		133	259
Partial safety factor	γ_{Ms}	[-]	1,67								
Characteristic resistance Steel 5.6	$M^0_{Rk,s}$	[Nm]	7,6	19		37	37	65		166	324
Partial safety factor	γ_{Ms}	[-]	1,67								
Characteristic resistance Steel 5.8	$M^0_{Rk,s}$	[Nm]	7,6	19		37	37	65		166	324
Partial safety factor	γ_{Ms}	[-]	1,25								
Characteristic resistance Steel 8.8	$M^0_{Rk,s}$	[Nm]	12	30		59	60	105		266	519
Partial safety factor	γ_{Ms}	[-]	1,25								
Factor of ductility	k_2	[-]	1,0								
Concrete pry-out failure											
k-factor	$k_{(3)}$	[-]	1,0					1,5		2, 0	
Concrete edge failure											
Effective length of anchor under shear loading	l_f	[mm]	30	30	40	30	40	50		65	80
Outside diameter of anchor	d_{nom}	[mm]	8	10	10	12	12	15		20	25

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Characteristic values for **shear loads, stainless steel A4, HCR** (Design method A according to ETAG 001, Annex C or CEN/TS 1992-4)

Anchor size			**M6x30**	**M8x30**	**M8x40**	**M10x40**	**M12x50 M12x80**	**M16x65 M16x80**	**M20x80**
Steel failure without lever arm									
Characteristic resistance (property class 70)	$V_{Rk,s}$	[kN]	7,0	10,6		13,4	25,1	41,9	66,5
Characteristic resistance (property class 80)	$V_{Rk,s}$	[kN]	8,7	10,6		13,4	25,1	41,9	66,5
Partial safety factor	γ_{Ms}	[-]	1,56						
Factor of ductility	k_2	[-]	1,0						
Steel failure with lever arm									
Characteristic resistance (property class 70)	$M^0_{Rk,s}$	[Nm]	11	26		52	92	233	454
Partial safety factor	γ_{Ms}	[-]	1,56						
Characteristic resistance (property class 80)	$M^0_{Rk,s}$	[Nm]	12	30		60	105	266	519
Partial safety factor	γ_{Ms}	[-]	1,33						
Factor of ductility	k_2	[-]	1,0						
Concrete pry-out failure									
k-factor	$k_{(3)}$	[-]	1,0	1,7		1,7		2,0	
Concrete edge failure									
Effective length of anchor under shear loading	l_f	[mm]	30	30	40	40	50	65	80
Outside diameter of anchor	d_{nom}	[mm]	8	10	10	12	15	20	25

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Displacements under tension loads

Anchor size			M6x30	M8x30	M8x40	M10x30	M10x40	M12x50 M12x80	M16x65 M16x80	M20x80
Steel zinc plated										
Tension load in non-cracked concrete	N	[kN]	3	3	3,6	3,3	4,8	6,4	10	14,8
Displacement	δ_{N0}	[mm]	0,24							
	$\delta_{N\infty}$	[mm]	0,36							
Stainless steel A4 / HCR										
Tension load in non-cracked concrete	N	[kN]	4	4	4,3	-	6,1	8,5	12,6	17,2
Displacement	δ_{N0}	[mm]	0,12							
	$\delta_{N\infty}$	[mm]	0,24							

Displacements under shear loads

Anchor size			M6x30	M8x30	M8x40	M10x30	M10x40	M12x50 M12x80	M16x65 M16x80	M20x80
Steel zinc plated										
Shear load in non-cracked concrete	V	[kN]	2	4	4	5,7	4,0	11,3	18,8	32,2
Displacement	δ_{V0}	[mm]	0,9	0,9	1,0	1,5	0,6	1,2	1,2	1,6
	$\delta_{V\infty}$	[mm]	1,3	1,3	1,5	2,3	0,9	1,9	1,9	2,4
Stainless steel A4 / HCR										
Shear load in non-cracked concrete	V	[kN]	3,5	5,2	5,2	-	6,5	11,5	19,2	30,4
Displacement	δ_{V0}	[mm]	1,9	1,1	0,7	-	1,0	1,7	2,4	2,6
	$\delta_{V\infty}$	[mm]	2,8	1,6	1,0	-	1,5	2,6	3,6	3,8

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The above performances apply for the following article numbers:

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, 19/01/2016

Peter van der Wel, Managing Director