DECLARATION OF PERFORMANCE
DoP no. 2873-02910/1 EN

Version: 1 print date: 04.01.2021

1. Unique identification code of the product-type: **TOX Drop-in anchor E / ES**
2. Intended use/es:

Product	Intended use
Metal anchors for use in concrete (heavy-duty type)	For fixing and/or supporting concrete structural elements or heavy units such as cladding and suspended ceilings

3. Manufacturer: **TOX-Dübel-Technik GmbH, Brunnenstraße 31, D-72505 Krauchenwies Ablach**
4. Authorised representative: **--**
5. System/s of AVCP: **1**

6. a) Harmonised standard: **--**
Notified body/ies: --

6. b) European Assessment Document: **ETAG 001-part 4; April 2013**
European Technical Assessment: **ETA-05/0139; 01.03.2016**
Technical Assessment Body: **DIBt Deutsches Institut für Bautechnik**
Notified body/ies: **2873 TU Darmstadt**

7. Declared performance/s:

Mechanical resistance and stability (BWR1)

Essential characteristics	Performances
Characteristic resistance for tension and shear loads as well as bending moments in concrete	See Annex C1 to C4
Edge distances and spacing	See Annex C1 to C2
Displacements under tension and shear loads	See Annex C5

Safety in case of fire (BWR 2)

Essential characteristics	Performances
Reaction to fire	Anchorages satisfy requirements for Class A1
Resistance to fire	No performance determined

8. Appropriate Technical Documentation and/or Specific Technical Documentation: **--**

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 the manufacturer by:

i.A. Daniel Wilhelm (Applications Engineering)
Krauchenwies-Ablach, 04.01.2021

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Table C1: 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	$\gamma_2 = \gamma_{inst}$	[-]	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	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	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 (edge distance)	$s_{cr,N}$ (= 2 $c_{cr,N}$)	[mm]	3 h_{ef}							
	$s_{cr,sp}$ (= 2 $c_{cr,sp}$)	[mm]	190	190	190	230	270	330	400	520
Factor according to CEN/TS 1992-4	k_{ucr}	[-]	10,1							

[1] Use restricted to anchoring of structural components statically indeterminate
[2] Pull-out is not decisive

TOX Drop-in Anchor E / ES

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

Annex C1

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Table C2: 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	$\gamma_2 = \gamma_{inst}$	[-]	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 according to CEN/TS 1992-4	k_{ucr}	[-]	10,1						

[1] Use restricted to anchoring of structural components statically indeterminate
[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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Performance
Characteristic values for **tension loads, stainless steel A4, HCR**
(Design method A according to ETAG 001, Annex C or CEN/TS 1992-4)

Annex C2

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Table C3: 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**[1)]	**M8x30**[1)]	**M8x40**	**M10x30**[1)]	**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	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	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										
Factor k acc. ETAG 001, Annex C or k_3 acc. CEN/TS 1992-4	$k_{(3)}$	[-]	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

[1)] Use restricted to anchoring of structural components statically indeterminate

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

Annex C3

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Table C4: 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**[1)]	**M8x30**[1)]	**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									
Factor k acc. ETAG 001, Annex C or k_3 acc. CEN/TS 1992-4	$k_{(3)}$	[-]	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

[1)] Use restricted to anchoring of structural components statically indeterminate

TOX Drop-in Anchor E / ES

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

Annex C4

Deutsches Institut für Bautechnik DIBt

Table C5: 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							

Table C6: 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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Performance
Displacements

Annex C5