



DECLARATION OF PERFORMANCE
DoP no. 1219-CPR-0180 EN

Version: 1

print date: 06.02.2018

1. Unique identification code of the product-type: **TOX S-Fix Plus / Slim Fix and S-Fix Plus A4**
2. Intended use/es:

Product	Intended use
Metal anchors for use in concrete	For fixing and/or supporting to concrete structural elements

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 1 and 2; Edition April 2013**
European Technical Assessment: **ETA-17/0830; 06.02.2018**
Technical Assessment Body: **IETcc; Instituto Eduardo Torroja de ciencias de la construcción**

Notified body/ies: **1219**

7. Declared performance/s:

Mechanical resistance and stability (BWR1)

Essential characteristics	Performances
Characteristic resistance under static or quasi static loading	See ETA-17/0830 page 4-8
Displacements under tension and shear loads	See ETA-17/0830 page 4-8

Safety in case of fire (BWR 2)

Essential characteristics	Performances
Reaction to fire	Anchorage 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, 06.02.2018

which the construction product, as installed into the construction work, will keep its performances allowing the construction work, behaving under predictable actions and with normal maintenance, to meet the basic requirements for construction works.

3. Performance of the product and references to the methods used for its assessment

The identification tests and the assessment for the intended use of this anchor according to the Basic Work Requirements (BWR) were carried out in compliance with the ETAG 001. The characteristics of the components shall correspond to the respective values laid down in the technical documentation of this ETA, checked by IETcc.

3.1 Mechanical resistance and stability (BWR 1)

Mechanical resistance and stability has been assessed according to ETAG 001 “Metal anchors to be used in concrete”, parts 1 and 2.

S-Fix Plus: GALVANIZED ANCHOR Installation parameters		Performances						
		M6	M8	M10	M12	M14	M16	M20
d_o	Nominal diameter of drill bit: [mm]	6	8	10	12	14	16	20
d_f	Fixture clearance hole diameter: [mm]	7	9	12	14	16	18	22
T_{inst}	Nominal installation torque: [Nm]	7	20	35	60	90	120	240
Standard embedment depth								
L_{min}	Total length of the bolt: [mm]	60	75	85	100	120	125	160
L_{max}		180	155	230	280	280	280	280
h_{min}	Minimum thickness of concrete member: [mm]	100	100	110	130	150	168	206
h_1	Depth of drilled hole: [mm]	55	65	75	85	100	110	135
h_{nom}	Overall anchor embed depth in concrete: [mm]	49.5	59.5	66.5	77	91	103.5	125
$h_{ef, std}$	Effective anchorage depth: [mm]	40	48	55	65	75	84	103
t_{fix}	Thickness of fixture for DIN 125 washer** [mm]	L-58	L-70	L-80	L-92	L-108	L-122	L-147
t_{fix}	Thickness of fixture for DIN 9021 and 440 washers** [mm]	L-58	L-71	L-80	L-94	L-108	L-124	L-149
s_{min}	Minimum allowable spacing: [mm]	50	65	70	85	100	110	135
c_{min}	Minimum allowable distance: [mm]	50	65	70	85	100	110	135
Reduced embedment depth								
L_{min}	Total length of the bolt: [mm]	--	60	70	80	--	--	--
L_{max}		--	155	230	280	--	--	--
h_{min}	Minimum thickness of concrete member: [mm]	--	100	100	100	--	--	--
h_1	Depth of drilled hole: [mm]	--	50	60	70	--	--	--
h_{nom}	Overall anchor embed depth in concrete: [mm]	--	46.5	53.5	62	--	--	--
$h_{ef, red}$	Effective anchorage depth: [mm]	--	35 ¹⁾	42	50	--	--	--
t_{fix}	Thickness of fixture for DIN 125 washer** [mm]	--	L-57	L-67	L-77	--	--	--
t_{fix}	Thickness of fixture for DIN 9021 and 440 washers** [mm]	--	L-58	L-67	L-79	--	--	--
s_{min}	Minimum allowable spacing: [mm]	--	65	70	85	--	--	--
c_{min}	Minimum allowable distance: [mm]	--	65	70	85	--	--	--

¹⁾ Use restricted to anchoring of structural components which are statically indeterminate

**²⁾ L= total anchor length

S-Fix Plus / Slim Fix: GALVANIZED ANCHOR Characteristic values of resistance to tension loads of design method A				Performances					
				M6	M8	M10	M12	M14	M16
STEEL FAILURE									
$N_{Rk,s}$	Characteristic resistance:	[kN]	7.7	16.4	25.6	35.4	51.7	65.0	104.4
$\gamma_{M,s}$	Partial safety factor: ****)	[-]	1.40	1.40	1.40	1.43	1.43	1.43	1.47
PULL OUT FAILURE									
Standard embedment depth									
$N_{Rk,p}$	Char. resistance in C20/25 non cracked concrete:	[kN]	-- **)	12	16	25	30	35	50
$\gamma_{M,p}$	Partial safety factor: ****)	[-]	--	1.5	1.8	1.8	1.8	1.8	1.8
Reduced embedment depth									
$N_{Rk,p}$	Char. resistance in C20/25 non cracked concrete:	[kN]	-- **)	9 *)	12	16	--	--	--
$\gamma_{M,p}$	Partial safety factor: ****)	[-]	--	1.5	1.5	1.5	--	--	--
Ψ_c	Increasing factors for both embedment depths:	C30/37	1.22						
Ψ_c		C40/50	1.41						
Ψ_c		C50/60	1.55						
CONCRETE CONE FAILURE AND SPLITTING FAILURE									
Standard embedment depth									
$h_{ef, std}$	Effective anchorage depth:	[mm]	40	48	55	65	75	84	103
$N_{Rk,c}$	Characteristic resistance in C20/25 non cracked concrete:	[kN]	12.7	16.7	20.5	26.4	32.7	38.8	52.6
$\gamma_{M,c=}$ $\gamma_{M,sp}$	Partial safety factor: ****)	[-]	1.5	1.5	1.8	1.8	1.8	1.8	1.8
$s_{cr,N}$	Spacing:	[mm]	120	144	165	195	225	252	309
$s_{cr,sp}$		[mm]	160	192	220	260	300	336	412
$c_{cr,N}$	Edge distance:	[mm]	60	72	83	98	113	126	155
$c_{cr,sp}$		[mm]	80	96	110	130	150	168	206
Reduced embedment depth									
$h_{ef, std}$	Effective anchorage depth:	[mm]	--	35 *)	42	50	--	--	--
$N_{Rk,c}$	Characteristic resistance in C20/25 non cracked concrete:	[kN]	--	10.4	13.7	17.8	--	--	--
$\gamma_{M,c=}$ $\gamma_{M,sp}$	Partial safety factor: ****)	[-]	--	1.5	1.5	1.5	--	--	--
$s_{cr,N}$	Spacing:	[mm]	--	105	126	150	--	--	--
$s_{cr,sp}$		[mm]	--	140	168	200	--	--	--
$c_{cr,N}$	Edge distance:	[mm]	--	53	63	75	--	--	--
$c_{cr,sp}$		[mm]	--	70	84	100	--	--	--
Ψ_c	Increasing factor:	C30/37	1.22						
Ψ_c		C40/50	1.41						
Ψ_c		C50/60	1.55						

*) Use restricted to anchoring of structural components which are statically indeterminate

**) Pull out failure is not decisive

***) In absence of other national regulations

S-Fix Plus / Slim Fix: GALVANIZED ANCHOR Displacements under tension loads in C20/25 to C50/60 concrete				Performances					
				M6	M8	M10	M12	M14	M16
Standard embedment depth									
	Tension load in non cracked concrete:	[kN]	2.8	5.0	6.0	9.3	10.7	16.0	17.0
δ_{N0}	Displacement:	[mm]	0.70	1.12	1.07	1.32	1.82	2.38	3.56
$\delta_{N\infty}$		[mm]	1.47	2.34	2.24	2.77	3.82	4.99	7.47
Reduced embedment depth									
	Tension load in non cracked concrete:	[kN]	--	4.2	5.7	7.6	--	--	--
δ_{N0}	Displacement:	[mm]	--	0.20	0.13	0.06	--	--	--
$\delta_{N\infty}$		[mm]	--	1.78	1.78	1.78	--	--	--

S-Fix Plus / Slim Fix: GALVANIZED ANCHOR Characteristic values of resistance to shear loads of design method A				Performances						
				M6	M8	M10	M12	M14	M16	M20
STEEL FAILURE WITHOUT LEVER ARM										
$V_{Rk,s}$	Characteristic resistance:	[kN]	5.1	9.3	14.7	20.6	28.1	38.4	56.3	
$\gamma_{M,s}$	Partial safety factor: ^{*)}	[-]	1.25							
STEEL FAILURE WITH LEVER ARM										
$M_{Rk,s}^0$	Characteristic bending moment:	[Nm]	7.7	19.1	38.1	64.1	102.2	163.1	298.5	
$\gamma_{M,s}$	Partial safety factor: ^{*)}	[-]	1.25							
CONCRETE PRYOUT RESISTANCE										
k	Factor in equation (5.6) of	for $h_{ef, std}$	[-]	1.0	1.0	1.0	2.0	2.0	2.0	
k	ETAG, Annex C §5.2.3.3:	for $h_{ef, red}$	[-]	--	1.0	1.0	1.0	--	--	
$\gamma_{M,c}$	Partial safety factor: ^{**)}	[-]	1.5							
CONCRETE EDGE FAILURE										
l_f	Effective length of anchor	for $h_{ef, std}$	[mm]	40	48	55	65	75	84	103
l_f	under shear loads:	for $h_{ef, red}$	[mm]	--	35 ^{*)}	42	50	--	--	
d_{nom}	Outside diameter of anchor:		[mm]	6	8	10	12	14	16	20
$\gamma_{M,c}$	Partial safety factor: ^{**)}	[-]	1.5							

^{*)} Use restricted to anchoring of structural components which are statically indeterm. ^{**)} In absence of other national regulat..

S-Fix Plus / Slim Fix: GALVANIZED ANCHOR Displacements under shear loads in C20/25 to C50/60 concrete				Performances					
				M6	M8	M10	M12	M14	M16
Standard embedment depth									
	Shear load in non cracked concrete:	[kN]	2.9	5.3	8.4	11.8	16.0	21.9	32.1
δ_{V0}	Displacement:	[mm]	0.65	2.80	1.75	2.45	2.78	3.53	4.13
$\delta_{V\infty}$		[mm]	0.98	4.20	2.63	3.68	4.16	5.29	6.19
Reduced embedment depth									
	Shear load in non cracked concrete:	[kN]	--	5.3	8.4	11.8	--	--	--
δ_{V0}	Displacement:	[mm]	--	0.59	1.22	1.10	--	--	--
$\delta_{V\infty}$		[mm]	--	0.89	1.83	1.65	--	--	--

S-Fix Plus A4: STAINLESS STEEL ANCHOR Installation parameters				Performances					
				M6	M8	M10	M12	M16	M20
d_o	Nominal diameter of drill bit:	[mm]	6	8	10	12	16	20	
d_f	Fixture clearance hole diameter:	[mm]	7	9	12	14	18	22	
T_{inst}	Nominal installation torque:	[Nm]	7	20	35	60	120	240	
Standard embedment depth									
L_{min}	Total length of the bolt:	[mm]	60	75	85	100	125	160	
L_{max}		[mm]	180	155	170	180	170	220	
h_{min}	Minimum thickness of concrete member:	[mm]	100	100	110	130	168	206	
h_1	Depth of drilled hole:	[mm]	55	65	75	85	110	135	
h_{nom}	Overall anchor embed depth in concrete:	[mm]	49.5	59.5	66.5	77	103.5	125	
$h_{ef, std}$	Effective anchorage depth:	[mm]	40	48	55	65	84	103	
t_{fix}	Thickness of fixture	[mm]	L-58	L-70	L-80	L-92	L-122	L-147	
s_{min}	Minimum allowable spacing:	[mm]	50	65	70	85	110	135	
c_{min}	Minimum allowable distance:	[mm]	50	65	70	85	110	135	
Reduced embedment depth									
L_{min}	Total length of the bolt:	[mm]	--	60	70	80	--	--	
L_{max}		[mm]	--	155	170	280	--	--	
h_{min}	Minimum thickness of concrete member:	[mm]	--	100	100	100	--	--	
h_1	Depth of drilled hole:	[mm]	--	50	60	70	--	--	
h_{nom}	Overall anchor embed depth in concrete:	[mm]	--	46.5	53.5	62	--	--	
$h_{ef, red}$	Effective anchorage depth:	[mm]	--	35 ^{*)}	42	50	--	--	
t_{fix}	Thickness of fixture	[mm]	--	L-57	L-67	L-77	--	--	
s_{min}	Minimum allowable spacing:	[mm]	--	65	70	85	--	--	
c_{min}	Minimum allowable distance:	[mm]	--	65	70	85	--	--	

^{*)} Use restricted to anchoring of structural components which are statically indeterminate

S-Fix Plus-A4: STAINLESS STEEL ANCHOR Characteristic values of resistance to tension loads of design method A		Performances						
		M6	M8	M10	M12	M16	M20	
STEEL FAILURE								
$N_{Rk,s}$	Characteristic resistance:	[kN]	10.1	19.1	34.3	49.6	85.9	140.7
$\gamma_{M,s}$	Partial safety factor: ***)	[-]	1.68					
PULL OUT FAILURE								
Standard embedment depth								
$N_{Rk,p}$	Char. resistance in C20/25 non cracked concrete:	[kN]	-- **)	12	16	25	35	50
$\gamma_{M,p}$	Partial safety factor: ***)	[-]	--	1.5	1.8	1.8	1.8	1.8
Reduced embedment depth								
$N_{Rk,p}$	Char. resistance in C20/25 non cracked concrete:	[kN]	--	9 *)	12	16	--	--
$\gamma_{M,p}$	Partial safety factor: ***)	[-]	--	1.8	1.8	1.8	--	--
Ψ_c	Increasing factors for both embedment depths:	C30/37	1.22					
Ψ_c		C40/50	1.41					
Ψ_c		C50/60	1.55					
CONCRETE CONE FAILURE								
Standard embedment depth								
$h_{ef, std}$	Effective anchorage depth:	[mm]	40	48	55	65	84	103
$N_{Rk,c}$	Characteristic resistance in C20/25 non cracked concrete:	[kN]	12.7	16.7	20.5	26.4	38.8	52.6
$\gamma_{M,c=}$ $\gamma_{M,sp}$	Partial safety factor: ***)	[-]	1.5	1.5	1.8	1.8	1.8	1.8
$s_{cr,N}$	Spacing:	[mm]	120	144	165	195	252	309
$s_{cr,sp}$		[mm]	160	192	220	260	336	412
$c_{cr,N}$	Edge distance:	[mm]	60	72	83	98	126	155
$c_{cr,sp}$		[mm]	80	96	110	130	168	206
Reduced embedment depth								
$h_{ef, std}$	Effective anchorage depth:	[mm]	--	35 *)	42	50	--	--
$N_{Rk,c}$	Characteristic resistance in C20/25 non cracked concrete:	[kN]	--	10.4	13.7	17.8	--	--
$\gamma_{M,c=}$ $\gamma_{M,sp}$	Partial safety factor: ***)	[-]	--	1.8	1.8	1.8	--	--
$s_{cr,N}$	Spacing:	[mm]	--	105	126	150	--	--
$s_{cr,sp}$		[mm]	--	140	168	200	--	--
$c_{cr,N}$	Edge distance:	[mm]	--	53	63	75	--	--
$c_{cr,sp}$		[mm]	--	70	84	100	--	-
Ψ_c	Increasing factor:	C30/37	1.22					
Ψ_c		C40/50	1.41					
Ψ_c		C50/60	1.55					

*) Use restricted to anchoring of structural components which are statically indeterminate

**) Pull out failure is not decisive

***) In absence of other national regulations

S-Fix Plus A4: STAINLESS STEEL ANCHOR Displacements under tension loads in C20/25 to C50/60 concrete		Performances						
		M6	M8	M10	M12	M16	M20	
Standard embedment depth								
	Tension load in non cracked concrete:	[kN]	4.3	5.7	6.3	9.9	13.8	19.8
δ_{N0}	Displacement:	[mm]	0.42	0.22	0.17	0.19	0.19	0.11
$\delta_{N\infty}$		[mm]	1.33	1.33	1.33	1.33	1.33	1.33
Reduced embedment depth								
	Tension load in non cracked concrete:	[kN]	--	4.2	5.7	7.6	--	--
δ_{N0}	Displacement:	[mm]	--	0.07	0.04	0.32	--	--
$\delta_{N\infty}$		[mm]	--	0.60	0.60	0.60	--	--

S-Fix Plus A4: STAINLESS STEEL ANCHOR Characteristic values of resistance to shear loads of design method A				Performances					
				M6	M8	M10	M12	M16	M20
STEEL FAILURE WITHOUT LEVER ARM									
$V_{Rk,s}$	Characteristic resistance:	[kN]	6.0	10.9	17.4	25.2	47.1	73.5	
$\gamma_{M,s}$	Partial safety factor	[-]	1.52						
STEEL FAILURE WITH LEVER ARM									
$M_{Rk,s}^0$	Characteristic bending moment:	[Nm]	9.2	22.5	44.9	78.6	200	389	
$\gamma_{M,s}$	Partial safety factor: **)	[-]	1.52						
CONCRETE PRYOUT FAILURE									
k	Factor in equation (5.6) of	for $h_{ef, std}$	[-]	1.0	1.0	1.0	2.0	2.0	
k	ETAG, Annex C §5.2.3.3:	for $h_{ef, red}$	[-]	--	1.0 ¹⁾	1.0	1.0	--	
$\gamma_{M,c}$	Partial safety factor: **)	[-]	1.5						
CONCRETE EDGE FAILURE									
l_f	Effective length of anchor	for $h_{ef, std}$	[mm]	40	48	55	65	84	
l_f	under shear loads:	for $h_{ef, red}$	[mm]	--	35 ^{*)}	42	50	--	
d_{nom}	Outside diameter of anchor:		[mm]	6	8	10	12	16	
$\gamma_{M,c}$	Partial safety factor: **)	[-]	1.5						

¹⁾ Use restricted to anchoring of structural components which are statically indeterminate

^{**) In absence of other national regulations}

S-Fix Plus A4: STAINLESS STEEL ANCHOR Displacements under shear loads in C20/25 to C50/60 concrete				Performances					
				M6	M8	M10	M12	M16	M20
Standard embedment depth									
	Shear load in non cracked concrete:	[kN]	2.8	5.1	8.1	11.8	22.1	34.5	
δ_{V0}	Displacement:	[mm]	1.66	1.79	3.83	4.13	5.75	6.59	
$\delta_{V\infty}$		[mm]	2.49	2.68	5.74	6.19	8.62	9.88	
Reduced embedment depth									
	Shear load in non cracked concrete:	[kN]	--	5.1	8.1	11.8	--	--	
δ_{V0}	Displacement:	[mm]	--	0.60	3.83	4.13	--	--	
$\delta_{V\infty}$		[mm]	--	0.90	5.74	6.19	--	--	

3.2 Safety in case of fire (BWR 2)

Reaction to fire has been assessed according to Commission Decision 96/603/EC, amended by 2000/605/EC. See class in table below:

Reaction to fire	M6	M8	M10	M12	M14	M16	M20
Anchor S-Fix Plus Anchor S-Fix Plus A4	Class A1						

Resistance to fire: No Performance Determined

3.3 Hygiene, health and the environment (BWR 3)

This requirement is not relevant for the anchors.

3.4 Safety in use (BWR 4)

Requirements with respect to the safety in use are not included in this Essential Requirement but are treated under the Essential Requirement Mechanical Resistance and Stability (see section 3.1)

3.5 Protection against noise (BWR 5)

This requirement is not relevant for the anchors.