DECLARATION OF PERFORMANCE

CONF-DOP_T-FIXX-03-25
No. H03-13/0222

1.	Unique identification code of the product-type	**DEMU Fixing anchor T-FIXX and Halfen Hexagon plate anchor TWS**
2.	Type, batch or serial number or any other element allowing identification of the construction product as required pursuant to Article 11(4)	**DEMU Fixing anchor T-FIXX** **- See ETA-13/0222, Annex A5** **Halfen Hexagon plate anchor TWS** **- See ETA-13/0222, Annex A6**
3.	Intended use or uses of the construction product, in accordance with the applicable harmonized technical specification, as foreseen by the manufacturer:	
	Generic type and use	Cast-in fixing anchor with internal threaded socket
	Product size covered	T-FIXX: M10×50, M10×65, M10×75, M12×50, M12×70, M12×95, M12×115, M16×60, M16×80, M16×100, M16×110, M16×125, M20×70, M20×100, M20×125, M20×145 TWS: M12×40, M12×70, M16×43, M16×80
	For use in	Cracked and non-cracked concrete C20/25 to C90/105 according EN 206:2013+A1:2016
	Base material / base material strength	• Electroplated steel for dry internal conditions (T-FIXX/TWS) • Stainless steel for medium corrosion exposure (T-FIXX)
	Loading	Static & quasi static tension and shear loads or the combination of tension and shear loads
4.	Name, registered trade name or registered trademark and contact address of the manufacturer as required pursuant to Article 11(5)	Leviat GmbH, Liebigstraße 14, 40764 Langenfeld, Germany
5.	Where applicable, name and contact address of the authorized representative whose mandate covers the tasks specified in Article 12(2)	-
6.	System or systems of assessment and verification of constancy of performance of the construction product as set out in Annex V	System 1
7.	In case of the declaration of performance concerning a construction product covered by a harmonised standard	-
8.	In case of the declaration of performance concerning a construction product for which a European Technical Assessment has been issued	Deutsches Institut für Bautechnik (DIBt) issued ETA-13/0222 on the basis of EAD 330012-00-0601, the notified body 2323 performed under system 1 (i) Determination of the product type on the basis of type testing (including sample-testing), type calculation, tabulated values or descriptive documentation of the product; (ii) Initial inspection of the manufacturing plant and of factory production control; (iii) Continuous surveillance, assessment and evaluation of factory production control and issued certificate 2323-CPR-0014.

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9.	Declared performance			
	Essential Characteristics		Performance	Harmonized Technical Specification
	Characteristic resistance for tension	EN 1992-4-1:2019 and EN 1992-4-2:2019	ETA-13/0222, Annexes C1 and C4	EAD 330012-00-0601
	Characteristic resistance for shear		ETA-13/0222, Annexes C2 and C5	
	Displacement for serviceability limit state		ETA-13/0222, Annexes C2, C3, C4 and C5	
	Characteristic resistance for fire		ETA-13/0222, Annex C6	
	Where pursuant to Article 37 or 38 in the Specific Technical Documentation has been used, the requirements with which the product complies		Not applicable	
10.	The performance of the product identified in points 1 and 2 is in conformity with the declared performance in point 9.			
This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4.				

Langenfeld, 24.03.2025

Signed for and on behalf of the manufacturer by

Stephan Bauerdick
(Operations Director | Central Operations)

Dr. Ing. Dirk Albartus
(Prokurist)

H-901-03/25-E

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Deutsches Institut für Bautechnik DIBt

Table C1: **Characteristic values for tension loads** (T-FIXX)

Thread		d	[mm]	M10	M12	M16	M20
Steel failure, fixing anchor and screw (min. steel strength 4.6) made of galvanised steel							
Characteristic resistance		$N_{Rk,s}$	[kN]	17,5	29,2	47,4	61,4
Partial factor		γ_{Ms} [1]	[-]	1,74			
Steel failure, fixing anchor and screw (min. steel strength A4-50) made of stainless steel							
Characteristic resistance		$N_{Rk,s}$	[kN]	24,9	42,2	69,7	90,3
Partial factor		γ_{Ms} [1]	[-]	2,79	2,86	2,79	
Steel failure, fixing anchor and screw (min. steel strength A4-70) made of stainless steel							
Characteristic resistance		$N_{Rk,s}$	[kN]	24,9	43,5	69,7	90,3
Partial factor		γ_{Ms} [1]	[-]	2,79			
Pull-out failure							
Fixing anchor electrolytically galvanised							
Char. resistance in cr. concrete	C20/25	$N_{Rk,p}$	[kN]	17,1	28,3	46,3	56,6
Char. resistance in uncr. concrete	C20/25	$N_{Rk,p}$	[kN]	24,0	39,6	64,8	79,2
Fixing anchor in stainless steel							
Char. resistance in cr. concrete	C20/25	$N_{Rk,p}$	[kN]	13,8	27,5	38,9	47,0
Char. resistance in uncr. concrete	C20/25	$N_{Rk,p}$	[kN]	19,3	38,5	54,5	65,7
Increasing factors for $N_{Rk,p}$ = $N_{Rk,p(C20/25)}$ • Ψc in cracked and uncracked concrete	C25/30	Ψ_c	[-]	1,25			
	C30/37	Ψ_c	[-]	1,50			
	C35/45	Ψ_c	[-]	1,75			
	C40/50	Ψ_c	[-]	2,00			
	C45/55	Ψ_c	[-]	2,25			
	C50/60	Ψ_c	[-]	2,50			
Partial factor		γ_{Mp} [1]	[-]	1,50			
Concrete cone failure				**M10**	**M12**	**M16**	**M20**
Effective anchorage depth		h_{ef}	[mm]	.x50: 43,7 .x65 [2]: 58,7 .x75 [3]: 68,7	.x50: 42,5 .x70: 62,5 .x85 [3]: 87,5 .x115 [2]: 107,5	.x60: 51,3 .x80 [2]: 71,3 .x100 [3]: 91,3 .x110 [2]: 101,3 .x125 [3]: 116,3	.x70: 61,2 .x100: 91,2 .x125 [2]: 116,2 .x145 [3]: 136,2
				L ≥ 50: h_{ef} [4]	L ≥ 50: h_{ef} [4]	L ≥ 60: h_{ef} [4]	L ≥ 70: h_{ef} [4]
Factor to take into account the influence of load transfer mechanisms in cracked and uncracked concrete		k_1	[-]	8,9			
			[-]	12,7			
Characteristic spacing		$s_{cr,N}$	[mm]	3,0 • h_{ef}			
Characteristic edge distance		$c_{cr,N}$	[mm]	1,5 • h_{ef}			
Partial factor		γ_{Mc} [1]	[-]	1,50			
Splitting							
Characteristic resistance		$N^0_{Rk,sp}$	[kN]	$N^0_{Rk,sp}$ = min {$N^0_{Rk,c}$; $N_{Rk,p}$} [5]			
Minimum thickness of concrete member		h ≥	[mm]	2,0 • h_{ef}			
Characteristic spacing		$s_{cr,sp}$	[mm]	3,0 • h_{ef}			
Characteristic edge distance		$c_{cr,sp}$	[mm]	1,5 • h_{ef}			
Partial factor		γ_{Msp} [1]	[-]	1,50			

[1] in absence of other national regulations; [2] only stainless steel; [3] only galvanised steel; [4] h_{ef} = L - Lhd + 2 [mm];
[5] $N^0_{Rk,c}$ according to EN 1992-4:2018

DEMU Fixing anchor T-FIXX and HALFEN Hexagon plate anchor TWS	Annex C1
Performances Characteristic values for tension loads of T-FIXX	

HALFEN

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Table C2: **Displacements under tension loads**

Thread	d	[mm]	M10	M12	M16	M20
Tension load	N	[kN]	7	12	19	25
Short time displacements	δ_{N0}	[mm]	0,3	0,5	0,3	0,2
Long time displacements	$\delta_{N\infty}$	[mm]	0,6	1,0	0,6	0,4

Table C3: **Characteristic values for shear loads** - steel failure

Thread	d	[mm]	**M10**	**M12**	**M16**	**M20**
Shear loads without lever arm						
Group factor (EN 1992-4:2019, 7.2.2.3.1)	k_7	[-]	1,0			
Steel failure, fixing anchor and screw (min. steel strength 4.6) made of galvanised steel						
Characteristic resistance	$V_{Rk,s}$	[kN]	8,8	14,6	23,7	30,7
Partial factor	γ_{Ms} [1)]	[-]	1,45			
Steel failure, fixing anchor and screw (min. steel strength A4-50) made of stainless steel						
Characteristic resistance	$V_{Rk,s}$	[kN]	12,5	21,1	34,8	45,1
Partial factor	γ_{Ms} [1)]	[-]	2,33	2,38	2,33	
Steel failure, fixing anchor and screw (min. steel strength A4-70) made of stainless steel						
Characteristic resistance	$V_{Rk,s}$	[kN]	12,5	21,8	34,8	45,1
Partial factor	γ_{Ms} [1)]	[-]	2,33			
Shear loads with lever arm						
Steel failure, fixing anchor and screw (min. steel strength 4.6) made of galvanised steel						
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	29,9	52,4	133,2	259,6
Partial factor	γ_{Ms} [1)]	[-]	1,67			
Steel failure, fixing anchor and screw (min. steel strength 5.6) made of galvanised steel						
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	37,4	65,5	166,5	324,5
Partial factor	γ_{Ms} [1)]	[-]	1,67			
Steel failure, fixing anchor and screw (min. steel strength 8.8) made of galvanised steel						
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	68,9	104,8	263,8	541,4
Partial factor	γ_{Ms} [1)]	[-]	1,45	1,25	1,45	
Steel failure, fixing anchor and screw (min. steel strength A4-50) made of stainless steel						
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	37,4	65,5	166,5	324,5
Partial factor	γ_{Ms} [1)]	[-]	2,38			
Steel failure, fixing anchor and screw (min. steel strength A4-70) made of stainless steel						
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	52,3	91,7	233,1	454,4
Partial factor	γ_{Ms} [1)]	[-]	1,56			
Steel failure, fixing anchor and screw (min. steel strength A4-80) made of stainless steel						
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	101,3	104,8	388,0	796,2
Partial factor	γ_{Ms} [1)]	[-]	2,33	1,33	2,33	

[1)] in absence of other national regulations

DEMU Fixing anchor T-FIXX	Annex C2
Performances Displacements under tension loads and characteristic values for shear loads	

Z12117.22 8.06.01-33/19

Table C4: **Characteristic values for shear loads** - concrete failure (T-FIXX)

Pry-out failure			**M10**	**M12**	**M16**	**M20**
Factor	k_8	[-]	.x50: 1,0 .x65[2]: 1,0 .x75[3]: 2,0	.x50: 1,0 .x70: 2,0 .x95[3]: 2,0 .x115[2]: 2,0	.x60: 1,0 .x80[2]: 2,0 .x100[3]: 2,0 .x110[2]: 2,0 .x125[3]: 2,0	.x70: 2,0 .x100: 2,0 .x125[2]: 2,0 .x145[3]: 2,0
			h_{ef} < 60 mm: 1,0; h_{ef} ≥ 60 mm: 2,0			
Partial factor	γ_{Mcp} [1]	[-]	1,50			

Concrete edge failure (without suppl. reinf.)			**M10**	**M12**	**M16**	**M20**
Effective length of fixing anchor (for shear loads)	l_f	[mm]	.x50: 28,2 .x65[2]: 43,2 .x75[3]: 53,2	.x50: 26,5 .x70: 46,5 .x95[3]: 71,5 .x115[2]: 91,5	.x60: 35,3 .x80[2]: 55,3 .x100[3]: 75,3 .x110[2]: 85,3 .x125[3]: 100,3	.x70: 45,2 .x100: 75,2 .x125[2]: 100,2 .x145[3]: 120,2
			L ≥ 50: l_f [5]	L ≥ 50: l_f [5]	L ≥ 60: l_f [5]	L ≥ 70: l_f [5]
Effective outside diameter	d_{nom}	[mm]	13,5	17,0 / 17,2 [4]	21,3	26,9
Partial factor	γ_{Mce} [1]	[-]	1,50			

[1] in absence of other national regulations; [2] only stainless steel; [3] only galvanized steel;
[4] higher value applies for stainless steel; [5] $l_f = h_{ef} - L_{crp}$

Table C5: **Displacements under shear loads** (T-FIXX)

Thread	d	[mm]	M10	M12	M16	M20
Shear load	V	[kN]	13	19	24	28
Short - term displacements	δ_{V0}	[mm]	2,0	2,0	2,0	3,0
Long - term displacements	$\delta_{V\infty}$	[mm]	3,0	3,0	3,0	4,5

DEMU Fixing anchor T-FIXX and HALFEN Hexagon plate anchor TWS	Annex C3
Performances Characteristic values for shear loads and displacements under shear loads of T-FIXX	

Table C6: **Characteristic values for tension loads** (TWS)

Thread		d	[mm]	M12	M16
Steel failure, hexagon plate anchor and screw (min. steel strength 4.6) made of galvanised steel					
Characteristic resistance		$N_{Rk,s}$	[kN]	34,0	63,0
Partial factor		γ_{Ms} [1)]	[-]	2,01	
Steel failure, hexagon plate anchor and screw (min. steel strength 5.6) made of galvanised steel					
Characteristic resistance		$N_{Rk,s}$	[kN]	39,0	63,0
Partial factor		γ_{Ms} [1)]	[-]	2,01	
Pull-out failure					
Characteristic resistance in cracked concrete	C20/25	$N_{Rk,p}$	[kN]	110,3	131,5
Characteristic resistance in uncracked concrete	C20/25	$N_{Rk,p}$	[kN]	154,4	184,1
Increasing factors for $N_{Rk,p} = N_{Rk,p(C20/25)} \cdot \Psi c$ in cracked and uncracked concrete	C25/30	Ψ_c	[-]	1,25	
	C30/37	Ψ_c	[-]	1,50	
	C35/45	Ψ_c	[-]	1,75	
	C40/50	Ψ_c	[-]	2,00	
	C45/55	Ψ_c	[-]	2,25	
	C50/60	Ψ_c	[-]	2,50	
Partial factor		γ_{Mp} [1)]	[-]	1,50	
Concrete cone failure				**M12**	**M16**
Effective anchorage depth		h_{ef}	[mm]	M12x40: 37,0 M12x70: 67,0 $L \geq 40$: h_{ef} [2)]	M16x43: 40,0 M16x80: 77,0 $L \geq 80$: h_{ef} [2)]
Factor to take into account the influence of load transfer mechanisms in cracked and uncracked concrete		k_1	[-]	8,9	
			[-]	12,7	
Characteristic spacing		$s_{cr,N}$	[mm]	$3,0 \cdot h_{ef}$	
Characteristic edge distance		$c_{cr,N}$	[mm]	$1,5 \cdot h_{ef}$	
Partial factor		γ_{Mc} [1)]	[-]	1,50	
Splitting					
Characteristic resistance		$N^0_{Rk,sp}$	[kN]	$N^0_{Rk,sp} = \min\{N^0_{Rk,sp}; N^0_{Rk,sp}\}$	
Minimum thickness of concrete member		$h \geq$	[mm]	$2,0 \cdot h_{ef}$	
Characteristic spacing		$s_{cr,sp}$	[mm]	$3,0 \cdot h_{ef}$	
Characteristic edge distance		$c_{cr,sp}$	[mm]	$1,5 \cdot h_{ef}$	
Partial factor		γ_{Msp} [1)]	[-]	1,50	

[1)] in absence of other national regulations; [2)] $h_{ef} = L - m$ [mm]; [3)] $N^0_{Rk,c}$ in accordance with EN 1992-4:2018 [mm]

Table C7: **Displacements under tension loads** (TWS)

Thread		[mm]	M12	M16
Tension load	N	[kN]	6	7
Short - term displacements	δ_{N0}	[mm]	0,3	0,1
Long - term displacements	$\delta_{N\infty}$	[mm]	0,5	0,2

DEMU Fixing anchor T-FIXX and HALFEN Hexagon plate anchor TWS	Annex C4
Performances Characteristic values and displacements under tension loads of TWS	

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Table C8: **Characteristic values for shear loads** - steel failure (TWS)

Thread	d	[mm]	**M12**	**M16**
Shear loads without lever arm				
Group factor (EN 1992-4:2019, 7.2.2.3.1)	k_7	[-]	1,0	
Steel failure, hexagon plate anchor and screw (min. steel strength 4.6) made of galvanised steel				
Characteristic resistance	$V_{Rk,s}$	[kN]	20,2	37,7
Partial factor	γ_{Ms} [1]	[-]	1,67	
Steel failure, hexagon plate anchor and screw (min. steel strength 5.6) made of galvanised steel				
Characteristic resistance	$V_{Rk,s}$	[kN]	23,2	37,7
Partial factor	γ_{Ms} [1]	[-]	1,67	
Shear loads with lever arm				
Steel failure, hexagon plate anchor and screw (min. steel strength 4.6) made of galvanised steel				
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	47,1	129,3
Partial factor	γ_{Ms} [1]	[-]	1,67	
Steel failure, hexagon plate anchor and screw (min. steel strength 5.6) made of galvanised steel				
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	58,9	161,6
Partial factor	γ_{Ms} [1]	[-]	1,67	

[1] in absence of other national regulations

Table C9: **Characteristic values for shear loads** - concrete failure (TWS)

Pry-out failure			**M12**	**M16**
Factor	k_8	[-]	M12x40: 1,0 M12x70: 2,0 h_{ef} < 60 mm: 1,0; h_{ef} ≥ 60 mm: 2,0	M16x43: 1,0 M16x80: 2,0
Partial factor	γ_{Mcp} [1]	[-]	1,50	
Concrete edge failure (without supplimentary reinforcement)			**M12**	**M16**
Effective length of hexagon plate anchor (for shear loads)	l_f	[mm]	M12x40: 37,0 M12x70: 67,0 L ≥ 40: l_f [2]	M16x43: 40,0 M16x80: 77,0 L ≥ 43: l_f [2]
Effective outside diameter	d_{nom}	[mm]	17,0	22,0
Partial factor	γ_{Mce} [1]	[-]	1,50	

[1] in absence of other national regulations; [2] $l_f = h_{ef}$

Table C10: **Displacements under shear loads** (TWS)

Thread	d	[mm]	M12	M16
Shear load	V	[kN]	3	3
Short - term displacements	δ_{V0}	[mm]	0,3	0,3
Long - term displacements	$\delta_{V\infty}$	[mm]	0,5	0,4

DEMU Fixing anchor T-FIXX and HALFEN Hexagon plate anchor TWS	Annex C5
Performances Characteristic values and displacements under shear loads of TWS	

Z192827.24 8.06.01-46/24

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Table C11: **Characteristic values for resistance to fire**

Thread size		d	[mm]	M10	M12[2)]	M16[2)]	M20
Steel failure for tension and shear load ($F_{Rk,s,fi} = N_{Rk,s,fi} = V_{Rk,s,fi}$), fixing anchor and screw made of galvanised steel[2)]							
Characteristic resistance	R30	$F_{Rk,s,fi}$	[kN]	0,8	1,7	2,8	3,6
	R60	$F_{Rk,s,fi}$	[kN]	0,7	1,3	2,1	2,7
	R90	$F_{Rk,s,fi}$	[kN]	0,5	1,1	1,8	2,3
	R120	$F_{Rk,s,fi}$	[kN]	0,4	0,8	1,4	1,8
Partial factor		$\gamma_{Ms,fi}$[1)]	[-]	1,00			
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	1,1	2,6	6,7	13,0
	R60	$M^0_{Rk,s,fi}$	[Nm]	1,0	2,0	5,0	9,7
	R90	$M^0_{Rk,s,fi}$	[Nm]	0,7	1,7	4,3	8,4
	R120	$M^0_{Rk,s,fi}$	[Nm]	0,6	1,3	3,3	6,5
Partial factor		$\gamma_{Ms,fi}$[1)]	[-]	1,00			
Steel failure for tension and shear load ($F_{Rk,s,fi} = N_{Rk,s,fi} = V_{Rk,s,fi}$), fixing anchor and screw made of stainless steel							
Characteristic resistance	R30	$F_{Rk,s,fi}$	[kN]	1,2	2,5	4,2	5,4
	R60	$F_{Rk,s,fi}$	[kN]	1,0	2,1	3,5	4,5
	R90	$F_{Rk,s,fi}$	[kN]	0,8	1,7	2,8	3,6
	R120	$F_{Rk,s,fi}$	[kN]	0,7	1,3	2,2	2,9
Partial factor		$\gamma_{Ms,fi}$[1)]	[-]	1,00			
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	1,9	3,9	10,0	19,5
	R60	$M^0_{Rk,s,fi}$	[Nm]	1,5	3,3	8,3	16,2
	R90	$M^0_{Rk,s,fi}$	[Nm]	1,2	2,6	6,7	13,0
	R120	$M^0_{Rk,s,fi}$	[Nm]	1,0	2,1	5,3	10,4
Partial factor		$\gamma_{Ms,fi}$[1)]	[-]	1,00			
Pull-out failure							
Characteristic resistance	R90	$N_{Rk,p,fi}$	[kN]	$N_{Rk,p,fi(90)} = 0,25 \cdot N_{Rk,p}$			
	R120	$N_{Rk,p,fi}$	[kN]	$N_{Rk,p,fi(120)} = 0,20 \cdot N_{Rk,p}$			
Partial factor		$\gamma_{Mp,fi}$[1)]	[-]	1,00			
Concrete cone failure							
Characteristic resistance	R90	$N_{Rk,c,fi}$	[kN]	$N^0_{Rk,c,fi(90)} = h_{ef}/200 \cdot N^0_{Rk,c} \leq N^0_{Rk,c}$			
	R120	$N_{Rk,c,fi}$	[kN]	$N^0_{Rk,c,fi(120)} = 0,8 \cdot h_{ef}/200 \cdot N^0_{Rk,c} \leq N^0_{Rk,c}$			
Characteristic spacing		$s_{cr,N,fi}$	[mm]	$4,0 \cdot h_{ef}$			
Characteristic edge distance		$c_{cr,N,fi}$	[mm]	$2,0 \cdot h_{ef}$			
Partial factor		$\gamma_{Mc,fi}$[1)]	[-]	1,00			
Concrete pry-out failure							
Characteristic resistance	R90	$V_{Rk,cp,fi}$	[kN]	$V_{Rk,cp,fi(90)} = k_3 \cdot N_{Rk,c,fi(90)}$			
	R120	$V_{Rk,cp,fi}$	[kN]	$V_{Rk,cp,fi(120)} = k_3 \cdot N_{Rk,c,fi(120)}$			
Partial factor		$\gamma_{Mc,fi}$[1)]	[-]	1,00			
Concrete edge failure							
Characteristic resistance	R90	$V_{Rk,c,fi}$	[kN]	$V^0_{Rk,c,fi(90)} = 0,25 \cdot V^0_{Rk,c}$			
	R120	$V_{Rk,c,fi}$	[kN]	$V^0_{Rk,c,fi(120)} = 0,20 \cdot V^0_{Rk,c}$			
Partial factor		$\gamma_{Mc,fi}$[1)]	[-]	1,00			

[1)] in absence of other national regulations; [2)] applies also to Hexagon plate anchors TWS

DEMU Fixing anchor T-FIXX and HALFEN Hexagon plate anchor TWS

Performances
Characteristic values for resistance to fire

Annex C6

Z192827.24 8.06.01-46/24