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DECLARATION OF PERFORMANCE
DEMU Fixing anchor T-FIXX®

CONF-DOP_T-FIXX 02/17-E
No. H03-13/0222

1.	Unique identification code of the product-type	**DEMU Fixing anchor T-FIXX**
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 A3**
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	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
	For use in	Cracked and non-cracked concrete C20/25 to C90/105 according EN 206:2013
	Base material / base material strength	• Electroplated steel for dry internal conditions • Stainless steel for medium corrosion exposure
	Loading	Static & quasi static tension and shear loads or the combination of tension and shear loads
4.	Name, registered trade name or registered trade mark and contact address of the manufacturer as required pursuant to Article 11(5)	HALFEN 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, Version September 2015, 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.

9.	Declared performance			
	Essential Characteristics	Design Method	Performance	Harmonized Technical Specification
	Characteristic resistance for tension	CEN/TS 1992-4-1 and CEN/TS 1992-4-2	ETA-13/0222, Annex C1	EAD 330012-00-0601, Version September 2015
	Characteristic resistance for shear		ETA-13/0222, Annex C2	
	Displacement for serviceability limit state		ETA-13/0222, Annexes C1 and C2	
	Characteristic resistance for fire		ETA-13/0222, Annex C3	
	Where pursuant to Article 37 or 38 in the Specific Technical Documentation has been used, the requirements with which the product complies		-	
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, 06.02.2017

Signed for and on behalf of the manufacturer by

Richard Wachter
(Managing Director)

ppa. Dr.-Ing. Dirk Albartus
(Manager Engineering)

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Deutsches Institut für Bautechnik DIBt

Table C1: Characteristic values for tension loads

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 safety 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 safety 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 safety factor		γ_{Ms} [1]	[-]	2.79			
Pull-out failure							
Fixing anchor electrolytically galvanised							
Charact. resistance in cracked concrete	C20/25	$N_{Rk,p}$	[kN]	17.1	28.3	46.3	56.6
Charact. resistance in uncracked concrete	C20/25	$N_{Rk,p}$	[kN]	24.0	39.6	64.8	79.2
Fixing anchor in stainless steel							
Charact. resistance in cracked concrete	C20/25	$N_{Rk,p}$	[kN]	13.8	27.5	38.9	47.0
Charact. resistance in uncracked concrete	C20/25	$N_{Rk,p}$	[kN]	19.3	38.5	54.5	65.7
Increasing factors for $N_{Rk,p}$ in cracked and uncracked concrete	C25/30	Ψ_c	[-]	1.20			
	C30/37	Ψ_c	[-]	1.48			
	C35/45	Ψ_c	[-]	1.80			
	C40/50	Ψ_c	[-]	2.00			
	C45/55	Ψ_c	[-]	2.20			
	C50/60	Ψ_c	[-]	2.40			
Partial safety factor		γ_{Mp} [1]	[-]	1.50			
Concrete cone failure							
Effective anchorage depth		h_{ef}	[mm]	M10x50: 43.7 M10x65[2]: 58.7 M10x75[3]: 68.7 -	M12x50: 42.5 M12x70: 62.5 M12x95[3]: 87.5 M12x115[2]: 107.5 -	M16x60: 51.3 M16x80[2]: 71.3 M16x100[3]: 91.3 M16x110[2]: 101.3 M16x125[3]: 116.3	M20x70: 61.2 M20x100: 91.2 M20x125[2]: 116.2 M20x145[3]: 136.2 -
Factor to take into account the influence of load transfer mechanisms in cracked and uncracked concrete		k_{cr}	[-]	8.5			
		k_{ucr}	[-]	11.9			
Characteristic spacing		$s_{cr,N}$	[mm]	$3.0 \cdot h_{ef}$			
Characteristic edge distance		$c_{cr,N}$	[mm]	$1.5 \cdot h_{ef}$			
Partial safety factor		γ_{Mc} [1]	[-]	1.50			
Splitting							
Minimum thickness of concrete member		$h \geq$	[mm]	$2.0 \cdot h_{ef}$			
Characteristic spacing		$s_{cr,sp}$	[mm]	$6.0 \cdot h_{ef}$			
Characteristic edge distance		$c_{cr,sp}$	[mm]	$3.0 \cdot h_{ef}$			
Partial safety factor		γ_{Msp} [1]	[-]	1.50			

[1] In absence of other national regulations; [2] only stainless steel; [3] only galvanised steel

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

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Performances
Characteristic values for tension loads, displacements under tension loads

Annex C1

Table C3: **Characteristic values for shear loads**						
Thread	d	[mm]	M10	M12	M16	M20
Shear loads without lever arm						
group factor (CEN/TS 1992-4-2, 6.3.3.1)	k_2	[-]	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 safety factor	γ_{Ms} [1]	[-]	1.45			
Steel failure, fixing anchor and screw (min. steel strength A4-50) mede of stainless steel						
Characteristic resistance	$V_{Rk,s}$	[kN]	12.5	21.1	34.8	45.1
Partial safety 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 safety 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 safety 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 safety 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 safety 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 safety 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 safety 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 safety factor	γ_{Ms} [1]	[-]	2.33	1.33	2.33	
Pry-out failure						
Factor	k_3	[-]	M10x50: 1.0 M10x65 [2]: 1.0 M10x75 [3]: 2.0 -	M12x50: 1.0 M12x70: 2.0 M12x95 [3]: 2.0 M12x115 [2]: 2.0 -	M16x60: 1.0 M16x80 [2]: 2.0 M16x100 [3]: 2.0 M16x110 [2]: 2.0 M16x125 [3]: 2.0	M20x70: 1.0 M20x100: 2.0 M20x125 [2]: 2.0 M20x145 [3]: 2.0 -
Partial safety factor	γ_{Mcp} [1]	[-]	1.50			
Concrete edge failure (without suppl. reinforcement)						
Effective length of fixing anchor (for shear loads)	l_f	[mm]	M10x50: 30.0 M10x65 [2]: 45.0 M10x75 [3]: 55.0 -	M12x50: 29.0 M12x70: 49.0 M12x95 [3]: 74.0 M12x115 [2]: 81.4 -	M16x60: 37.0 M16x80 [2]: 57.0 M16x100 [3]: 77.0 M16x110 [2]: 87.0 M16x125 [3]: 102.0	M20x70: 46.0 M20x100: 76.0 M20x125 [2]: 101.0 M20x145 [3]: 121.0 -
Effective outside diameter	d_{nom}	[mm]	13.5	17.0 / 17.2 [4]	21.3	26.9
Partial safety factor	γ_{Mce} [1]	[-]	1.50			
[1] in absence of other national regulations; [2] only stainless steel; [3] only galvanised steel; [4] higher value applies for stainless steel						

Table C4: **Displacements under shear loads**						
Thread	d	[mm]	M10	M12	M16	M20
Shear load	V	[kN]	13	19	24	28
Short time displacements	δ_{V0}	[mm]	2.0	2.0	2.0	3.0
Long time displacements	$\delta_{V\infty}$	[mm]	3.0	3.0	3.0	4.5

DEMU Fixing anchor T-FIXX

Performances
Characteristic values for shear loads, displacements under shear loads

Annex C2

Table C5: **Characteristic values for resistance to fire**

Thread size		d	[mm]	M10	M12	M16	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							
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 safety 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 safety factor		$\gamma_{Ms,fi}$ [1)]	[-]	1.00			
Steal failure for tension and shear load ($F_{Rk,s,fi} = N_{Rk,s,fi} = V_{fik,s,fi}$), 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 safety 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 safety 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 safety factor		$\gamma_{Mp,fi}$ [1)]	[-]	1.00			
Concrete cone failure							
Characteristic resistance	R90	$N_{Rk,c,fi}$	[kN]	$N^0_{Rk,c,fi(90)} = h_{ef}/200 \cdot N^0_{Rk,c} \le N^0_{Rk,c}$			
	R120	$N_{Rk,c,fi}$	[kN]	$N^0_{Rk,c,fi(120)} = 0.8 \cdot h_{ef}/200 \cdot N^0_{Rk,c} \le N^0_{Rk,c}$			
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 safety 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 safety 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 safety factor		$\gamma_{Mc,fi}$ [1)]	[-]	1.00			

[1)] In absence of other national regulations

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Performances
Characteristic values for resistance to fire

Annex C3