DECLARATION OF PERFORMANCE

CONF-DOP_BA-08-22
No. H03-13/0401

1.	Unique identification code of the product-type	**DEMU Bolt anchor and Plate anchor**
2.	Type, batch or serial number or any other element allowing identification of the construction product as required pursuant to Article 11(4)	**DEMU Bolt anchor, type 1988** **- See ETA-13/0401, Annexes A6, A7 and A8;** **DEMU Bolt anchor, type 1985** **- See ETA-13/0401, Annexes A6, A7 and A8;** **DEMU Plate anchor, type 1980-P** **- See ETA-13/0401, Annexes A6, A7 and A8**
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	M12×55, M12×100, M12×150, M16×75, M16×140, M16×220, M20×90, M20×150, M20×180, M20×270, M24×110, M24×200, M24×320, M30×160, M30×240, M30×380, M36×300, M36×420, M42×300, M42×460
	For use in	Cracked and non-cracked concrete C20/25 to C90/105 according EN 206:2013+A1:2016
	Base material / base material strength	• Sleeve in electroplated steel for dry internal conditions, insignificant corrosion exposure • Sleeve in hot-dipped galvanised steel for low corrosion exposure • Sleeve in stainless steel (A4-50 and A4-80) for medium corrosion exposure • Sleeve and bolt in stainless steel (A4-80) for strong and very strong 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 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-13/0401 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 factoryproduction control; (iii) Continuous surveillance, assessment and evaluation of

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<table>
<tr><td></td><td colspan="4">factory production control and issued certificate 2323-CPR-0013.</td></tr>
<tr><td rowspan="8">9.</td><td colspan="4">Declared performance</td></tr>
<tr><td>Essential Characteristics</td><td>Design Method</td><td>Performance</td><td>Harmonized Technical Specification</td></tr>
<tr><td>Characteristic resistance for tension</td><td rowspan="5">EN 1992-4-1 and
EN 1992-4-2</td><td>ETA-13/0401, Annexes C1 and C2</td><td rowspan="5">EAD 330012-00-0601</td></tr>
<tr><td>Characteristic resistance for shear</td><td>ETA-13/0401, Annexes C3 and C4</td></tr>
<tr><td>Displacement for serviceability limit state</td><td>ETA-13/0401, Annexes C2 and C4</td></tr>
<tr><td>Characteristic resistance for fire</td><td>ETA-13/0401, Annex C5</td></tr>
<tr><td colspan="2">Where pursuant to Article 37 or 38 in the Specific Technical Documentation has been used, the requirements with which the product complies</td><td>-</td></tr>
<tr><td>10.</td><td colspan="4">The performance of the product identified in points 1 and 2 is in conformity with the declared performance in point 9.</td></tr>
<tr><td colspan="5">This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 4.</td></tr>
</table>

Langenfeld, 04.08.2022

Signed for and on behalf of the manufacturer by

Chris Oberli
(Managing Director | Europe Central)

Dr. Ing. Dirk Albartus
(Prokurist))

H-902-08/22-E

DECLARATION OF PERFORMANCE

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Deutsches Institut für Bautechnik DIBt

Table C1a: **Characteristic values for tension loads**

Thread size		d	[mm]	M12	M16	M20	M24	M30	M36	M42
Steel failure, bolt / plate anchor (material 1 or 2) and screw (min. steel strength 4.6) made of electroplated / hot-dipped galvanised steel										
Characteristic resistance		$N_{Rk,s}$	[kN]	33,7	62,8	98,0	141,2	224,4	326,8	448,4 [2]
Partial factor		γ_{Ms} [1]	[-]	2,00						
Steel failure, bolt / plate anchor (material 1 or 2) and screw (min. steel strength 5.6) made of electroplated / hot-dipped galvanised steel										
Characteristic resistance		$N_{Rk,s}$	[kN]	42,2	78,5	122,5	176,5	280,5	408,5	560,5 [2]
Partial factor		γ_{Ms} [1]	[-]	2,00						
Steel failure, bolt / plate anchor (material 1 or 2) and screw (min. steel strength 8.8) made of electroplated / hot-dipped galvanised steel										
Characteristic resistance		$N_{Rk,s}$	[kN]	45,8	93,1	139,6	219,5	335,0	490,5	588,1 [2]
Partial factor		γ_{Ms} [1]	[-]	1,58						
Steel failure, bolt anchor (material 3: A4-50) and screw (min. steel strength A4-50) made of stainless steel										
Characteristic resistance		$N_{Rk,s}$	[kN]	42,2	81,0	110,3	4)			
Partial factor		γ_{Ms} [1]	[-]	2,86	3,09					
Steel failure, bolt anchor (material 3: A4-50) and screw (min. steel strength A4-70) made of stainless steel										
Characteristic resistance		$N_{Rk,s}$	[kN]	46,4	81,0	110,3	4)			
Partial factor		γ_{Ms} [1]	[-]	3,09						
Steel failure, bolt / plate anchor (material 4: A4-80) and screw (min. steel strength A4-80) made of stainless steel										
Characteristic resistance		$N_{Rk,s}$	[kN]	59,0	125,6	180,1	282,4	448,8	4)	
Partial factor		γ_{Ms} [1]	[-]	1,48	1,60	1,48	1,60			
Pull-out failure										
Characteristic resistance in cracked concrete	C20/25	$N_{Rk,p}$	[kN]	25,1	44,7	69,8	100,5	168,9	240,3	341,0
				218,5 [3]	338,9 [3]	483 [3]	880,4 [3]	1225,5 [3]	4)	
Characteristic resistance in uncracked concrete	C20/25	$N_{Rk,p}$	[kN]	35,2	62,5	97,7	140,7	236,4	336,4	477,4
				305,9 [3]	474,5 [3]	676,2 [3]	1232,5 [3]	1715,6 [3]	4)	
Increasing factors for $N_{Rk,p} = N_{Rk,p(C20/25)} * \Psi c$ 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						

[1] in absence of other national regulations
[2] only available in GV (material 1 according to Annex A7)
[3] only valid for plate anchor 1980-P
[4] no performance assessed

DEMU Bolt anchor and Plate anchor	Annex C1
Performances Characteristic values for tension loads	

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Table C1b: **Characteristic values for tension loads in cracked and uncracked concrete**

Thread size	d	[mm]	M12	M16	M20	M24	M30	M36	M42
Effective anchorage depth	h_{ef} [1]	[mm]	x55: 49,0	x75: 67,0	x90: 79,0	x110: 97,0	x160: 143,0	x300: 279,0	x300: 276,0
			x100: 94,0	x140: 132,0	x150: 139,0	x200: 187,0	x240: 223,0	x420: 399,0	x460: 436,0
			x150: 144,0	x220: 212,0	x180: 169,0	x320: 307,0	x380: 363,0		
					x270: 259,0				
			x ≥55: h_{ef}[3]	x ≥75: h_{ef}[3]	x ≥90: hef[3]	x ≥110: hef[3]	x ≥160: hef[3]	x ≥300: hef[3]	x ≥300: hef[3]
Concrete cone failure									
Factor to take into account the influence of load transfer mechanisms	k_1	[-]	8,9						
		[-]	12,7						
Characteristic Resistance	$N^0_{Rk,sp}$	[mm]	$N^0_{Rk,sp} = \min \{N^0_{Rk,c}; N_{Rk,p}\}$[4]						
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} [2]	[-]	1,50						
Splitting									
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} [2]	[-]	1,50						

1) for bolt anchor type 1985 the values have to be decreased by 2,0 mm, for plate anchor type 1980-P the values have to be decreased by the plate thickness m
2) in absence of other national regulations
3) hef = L - k + 2 [mm] for bolt anchor type 1988, hef = L - k [mm] for bolt anchor type 1985, hef = L - k - m + 2 [mm] for plate anchor type 1980-P, m in accordance with Annex A5 Table A4
4) $N^0_{Rk,c}$ according to EN 1992-4:2018

Table C2: **Displacements under tension loads in cracked and uncracked concrete**

Thread size	d	[mm]	M12	M16	M20	M24	M30	M36	M42
Displacements δ_{N0} to 0.7 mm for short term loading under following tension loads [1]	N	[kN]	14,0	20,0	29,0	40,0	63,0	83,0	113,0

1) for long term tension loading the displacements $\delta_{N\infty}$ can be increased to 1,8 mm

DEMU Bolt anchor and Plate anchor	Annex C2
Performances Characteristic values for tension loads, displacements under tension loads	

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Deutsches Institut für Bautechnik DIBt

Table C3a: **Characteristic values for shear loads**

Thread size	d	[mm]	M12	M16	M20	M24	M30	M36	M42
Shear loads without lever arm									
Group factor (EN 1992-4:2019, 7.2.2.3.1)	k_7	[-]	1,0						
Steel failure, bolt anchor (material 1 or 2) and screw (min. steel strength 4.6) made of electroplated / hot-dipped galvanised steel									
Characteristic resistance	$V_{Rk,s}$	[kN]	16,9	31,4	49,0	70,6	112,2	163,4	224,2 [2]
Partial factor	γ_{Ms} [1]	[-]	1,67						
Steel failure, bolt anchor (material 1 or 2) and screw (min. steel strength 5.6) made of electroplated / hot-dipped galvanised steel									
Characteristic resistance	$V_{Rk,s}$	[kN]	21,1	39,3	61,3	88,3	140,3	204,3	280,3 [2]
Partial factor	γ_{Ms} [1]	[-]	1,67						
Steel failure, bolt anchor (material 1 or 2) and screw (min. steel strength 8.8) made of electroplated / hot-dipped galvanised steel									
Characteristic resistance	$V_{Rk,s}$	[kN]	22,9	46,5	69,8	109,7	167,5	245,2	294,1 [2]
Partial factor	γ_{Ms} [1]	[-]	1,32						
Steel failure, bolt anchor (material 3: A4-50) and screw (min. steel strength A4-50) made of stainless steel									
Characteristic resistance	$V_{Rk,s}$	[kN]	21,1	40,5	55,1	3)			
Partial factor	γ_{Ms} [1]	[-]	2,38	2,58					
Steel failure, bolt anchor (material 3: A4-50) and screw (min. steel strength A4-70) made of stainless steel									
Characteristic resistance	$V_{Rk,s}$	[kN]	23,2	40,5	55,1	3)			
Partial factor	γ_{Ms} [1]	[-]	2,58						
Steel failure, bolt anchor (material 4: A4-80) and screw (min. steel strength A4-80) made of stainless steel									
Characteristic resistance	$V_{Rk,s}$	[kN]	29,5	62,8	90,0	141,2	224,4	3)	
Partial factor	γ_{Ms} [1]	[-]	1,23	1,33	1,23	1,33			
Shear loads with lever arm: see Annex C4, Table C3b									
Pry-out failure			**M12**	**M16**	**M20**	**M24**	**M30**	**M36**	**M42**
Factor	k_8	[-]	x55: 1,0 x100: 2,0 x150: 2,0	2,0	2,0	2,0	2,0	2,0	2,0
Partial factor	γ_{Mcp} [1]	[-]	1,50						
Concrete edge failure (without suppl. reinforcement)			**M12**	**M16**	**M20**	**M24**	**M30**	**M36**	**M42**
Effective length of fixing anchor (for shear loads)	l_f	[mm]	x55: 49,0	x75: 67,0	x90: 79,0	x110: 97,0	x160: 143,0	x300: 279,0	x300: 276,0
			x100: 94,0	x140: 132,0	x150: 139,0	x200: 187,0	x240: 223,0	x420: 380,0	x460: 432,0
			x150: 144,0	x220: 212,0	x180: 169,0	x320: 307,0	x380: 320,0		
					x270: 259,0				
			x ≥55: h_{ef}	x ≥75: h_{ef}	x ≥90: h_{ef}	x ≥110: h_{ef}	x ≥160: h_{ef}	x ≥300: h_{ef}	x ≥300: h_{ef}
Effective outside diameter	d_{nom}	[mm]	15,5	21,0	26,0	32,0	40,0	47,5	54,0
Partial factor	γ_{Mce} [1]	[-]	1,50						

[1] in absence of other national regulations
[2] only available in GV (matetrial 1 according to Annex A7)
[3] no performance assessed

DEMU Bolt anchor and Plate anchor	Annex C3
Performances Characteristic values for shear loads	

Table C3b: **Characteristic values for shear loads**

Thread size	d	[mm]	M12	M16	M20	M24	M30	M36	M42
Shear loads with lever arm									
Steel failure, bolt / plate anchor (material 1 or 2) and screw (min. steel strength 4.6) made of electroplated / hot-dipped galvanised steel									
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	52,4	133,2	259,6	449,0	899,6	1581,0	2541,1 [2]
Partial factor	γ_{Ms} [1]	[-]	1,67						
Steel failure, bolt / plate anchor (material 1 or 2) and screw (min. steel strength 5.6) made of electroplated / hot-dipped galvanised steel									
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	65,5	166,5	324,5	561,3	1124,5	1976,3	3176,3 [2]
Partial factor	γ_{Ms} [1]	[-]	1,67						
Steel failure, bolt / plate anchor (material 1 or 2) and screw (min. steel strength 8.8) made of e letroplated / hot-dipped galvanised steel									
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	104,8	266,4	519,3	898,0	1799,2	3162,1	5082,1 [2]
Partial factor	γ_{Ms} [1]	[-]	1,25						
Steel failure, bolt anchor (material 3: A4-50) and screw (min. steel strength A4-50) made of stainless steel									
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	65,5	166,5	324,5	3)			
Partial factor	γ_{Ms} [1]	[-]	2,38						
Steel failure, bolt anchor (material 3: A4-50) and screw (min. steel strength A4-70) made of stainless steel									
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	91,7	383,7	659,4	3)			
Partial factor	γ_{Ms} [1]	[-]	1,56	2,58					
Steel failure, bolt anchor (material 3: A4-50) and screw (min. steel strength A4-80) made of stainless steel									
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	161,6	383,7	659,4	3)			
Partial factor	γ_{Ms} [1]	[-]	2,58						
Steel failure, bolt / plate anchor (material 4: A4-80) and screw (min. steel strength A4-80) made of stainless steel									
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	104,8	266,4	519,3	898,0	1799,2	3)	
Partial factor	γ_{Ms} [1]	[-]	1,33						

[1] in absence of other national regulations
[2] only available in GV (material 1 according to Annex A7)
[3] No performance assessed

Table C4: **Displacements under shear loads in cracked and uncracked concrete**

Thread size	d	[mm]	M12	M16	M20	M24	M30	M36	M42
Displacements δ_{v0} to 1.5 mm for short term loading under following shear loads [1]	V	[kN]	13,0	23,0	36,0	52,0	82,0	120,0	160,0

[1] for long term shear loading the displacements $\delta_{v\infty}$ can be increased to 2,0 mm

DEMU Bolt anchor and Plate anchor	Annex C4
Performances Characteristic values for shear loads, displacements under shear loads	

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

Thread size		d	[mm]	M12	M16	M20	M24	M30	M36	M42
Steel failure for tension and shear load ($F_{Rk,s,fi} = N_{Rk,s,fi} = V_{Rk,s,fi}$), bolt anchor (material 1 or 2) and screw made of electroplated / hot-dipped galvanised steel										
Characteristic resistance	R30	$F_{Rk,s,fi}$	[kN]	1,5	3,0	4,5	7,1	10,8	15,8	19,0
	R60	$F_{Rk,s,fi}$	[kN]	1,1	2,3	3,4	5,3	8,1	11,9	14,2
	R90	$F_{Rk,s,fi}$	[kN]	1,0	2,0	2,9	4,6	7,0	10,3	12,3
	R120	$F_{Rk,s,fi}$	[kN]	0,7	1,5	2,3	3,5	5,4	7,9	9,5
Partial factor		$\gamma_{Ms,fi}$ [1]	[-]	1,00						
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	2,6	6,7	13,0	22,5	45,0	79,1	127,1
	R60	$M^0_{Rk,s,fi}$	[Nm]	2,0	5,0	9,7	16,8	33,7	59,3	95,3
	R90	$M^0_{Rk,s,fi}$	[Nm]	1,7	4,3	8,4	14,6	29,2	51,4	82,6
	R120	$M^0_{Rk,s,fi}$	[Nm]	1,3	3,3	6,5	11,2	22,5	39,5	63,5
Partial factor		$\gamma_{Ms,fi}$ [1]	[-]	1,00						
Steel failure for tension and shear load ($F_{Rk,s,fi} = N_{Rk,s,fi} = V_{Rk,s,fi}$), bolt anchor (material 3 or 4) and screw made of stainless steel										
Characteristic resistance	R30	$F_{Rk,s,fi}$	[kN]	2,2 / 2,5 [2]	4,5 / 4,6 [2]	6,8	10,6	16,2	3)	3)
	R60	$F_{Rk,s,fi}$	[kN]	1,8 / 2,1 [2]	3,8 / 3,9 [2]	5,6	8,8	13,5		
	R90	$F_{Rk,s,fi}$	[kN]	1,5 / 1,6 [2]	3,0 / 3,1 [2]	4,5	7,1	10,8		
	R120	$F_{Rk,s,fi}$	[kN]	1,2 / 1,3 [2]	2,4 / 2,5 [2]	3,6	5,6	8,6		
Partial factor		$\gamma_{Ms,fi}$ [1]	[-]	1,00						
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	3,9	10,0	19,5	33,7	67,5	3)	3)
	R60	$M^0_{Rk,s,fi}$	[Nm]	3,3	8,3	16,2	28,1	56,2		
	R90	$M^0_{Rk,s,fi}$	[Nm]	2,6	6,7	13,0	22,5	45,0		
	R120	$M^0_{Rk,s,fi}$	[Nm]	2,1	5,3	10,4	18,0	36,0		
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						

[1] in absence of other national regulations
[2] higher value applies for material 3 (according to Annex A7)
[3] no performance assessed

DEMU Bolt anchor and Plate anchor	Annex C5
Performances Characteristic values for resistance to fire	