... eine starke Verbindung

PRESTANDADEKLARATION
DoP Nr. MKT-122 - sv

1. Produkttypens unika identifikationskod: **MKT Schwerlastanker SZ**

2. Typ-, parti- eller serienummer eller någon annan beteckning som möjliggör identifiering av byggprodukter i enlighet med artikel 11.4:

ETA-02/0030, Appendix A2
Partinummer: se förpackning

3. Byggproduktens avsedda användning eller användningar i enlighet med den tillämpliga, harmoniserade tekniska specifikationen, såsom förutsett av tillverkaren:

Typ av produkt	Vridmoment expander (Sleeve typ)
För användning i	sprucken och osprucken betong C20/25 - C50/60 (EN 206)
Option	1
Belastning	Statisk eller kvasistatiska: alla storlekar seismisk, Kategori C1 + C2: - storlekar: SZ-B + SZ-S (12/M8, 15/M10, 18/M12, 24/M16, 24/M16L, 28/M20); SZ-SK (12/M8, 15/M10, 18/M12)
Material	Galvaniserat stål: endast i torra utrymmen - storlekar: SZ-B (10/M6, 12/M8, 15/M10, 18/M12, 24/M16, 24/M16L, 28/M20) SZ-S (10/M6, 12/M8, 15/M10, 18/M12, 24/M16, 24/M16L, 28/M20) SZ-SK (10/M6, 12/M8,15/M10, 18/M12) Rostfritt stål (Prägling A4): inomhus och utomhus förutom särskilt aggressiva förhållanden - storlekar: SZ-B (12/M8, 15/M10, 18/M12, 24/M16) SZ-S (12/M8, 15/M10, 18/M12, 24/M16) SZ-SK (12/M8,15/M10, 18/M12)
Temperatur område (möjligen)	--

4. Tillverkarens namn, registrerade företagsnamn eller registrerade varumärke samt kontaktadress enligt vad som krävs i artikel 11.5:

MKT Metall-Kunststoff-Technik GmbH & Co. KG
Auf dem Immel 2
D - 67685 Weilerbach

5. I tillämpliga fall namn och kontaktadress för tillverkarens representant vars mandat omfattar de uppgifter som anges i artikel 12.2: --

6. Systemet eller systemen för bedömning och fortlöpande kontroll av byggproduktens prestanda enligt bilaga V: **System 1**

7. För det fall att prestandadeklarationen avser en byggprodukt som omfattas av en harmoniserad standard:
--

8. För det fall att prestandadeklarationen avser en byggprodukt för vilken en europeisk teknisk bedömning har utfärdats:

Deutsches Institut für Bautechnik, Berlin

har utfärdat

ETA-02/0030

på grundval av

EAD 330232-00-0601

Det anmälda produktcertifieringsorganet 1343-CPR har utförts enligt System 1:

i) bestämning av produkttypen på grundval av typprovning (inkl. stickprov), typberäkning, tabellerade värden eller beskrivande dokumentation av produkten;
ii) inledande inspektion av tillverkningsanläggningen och tillverkningskontrollen i fabrik;
iii) fortlöpande övervakning, bedömning och utvärdering av tillverkningskontrollen i fabrik.

och följande visas: Intyg om kontinuitet för produktens prestanda 1343-CPR-M 550-9

9. Angiven prestanda:

Väsentliga egenskaper	**Design metod**	**Prestanda**		**Harmoniserad teknisk specifikation**
		Galvaniserat stål	**Rostfritt stål A4**	
Karakteristisk motstånd mot dragbelastningar	FprEN 1992-4:2016 und TR 055	Appendix C1, C2	Appendix C1, C3	EAD 330232-00-0601
Karakteristisk resistens mot skjuvlaster	FprEN 1992-4:2016 und TR 055	Appendix C4	Appendix C5	
Karakteristiskt resistans seismiska händelser	FprEN 1992-4:2016 und TR 055	Appendix C6	Appendix C7	
Skift i bruk	FprEN 1992-4:2016 und TR 055	Appendix C9	Appendix C10	
Karakteristiskt motstånd under brandexponering	FprEN 1992-4:2016 und TR 055	Appendix C8	Appendix C8	

När den specifika tekniska dokumentationen har använts enligt artikel 37 eller 38, de krav med vilka produkten överensstämmer: --

10. Prestandan för den produkt som anges i punkterna 1 och 2 överensstämmer med den prestanda som anges i punkt 9.

Denna prestandadeklaration utfärdas på eget ansvar av den tillverkare som anges under punkt 4.

Undertecknat för tillverkaren av:

Stefan Weustenhagen
(Verkställande direktör)
Weilerbach, 22.08.2017

i.V.

Dipl.-Ing. Detlef Bigalke
(Produktutveckling direktör)

Table C1: Characteristic values for **tension load, cracked concrete** under static or quasi-static action**, steel zinc plated**

Anchor size			**10/M6**	**12/M8**	**15/M10**	**18/M12**	**24/M16**	**24/M16L**	**28/M20**
Installation safety factor	γ_{inst}	[-]	1,0						
Steel failure									
Characteristic resistance	$N_{Rk,s}$	[kN]	16	29	46	67	126	126	196
Partial safety factor	γ_{Ms}	[-]	1,5						
Pull-out failure									
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p}$	[kN]	5	12	16	1)	1)	1)	1)
Increasing factor for $N_{Rk,p}$	ψ_C	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,5}$						
Concrete cone failure									
Effective anchorage depth	h_{ef}	[mm]	50	60	71	80	100	115	125
Factor for k_1	$k_{cr,N}$	[-]	7,7						

1) Pull-out is not decisive.

Table C2: Characteristic values for **tension load**, **cracked concrete** under static or quasi-static action**, stainless steel A4**

Anchor size			**12/M8**	**15/M10**	**18/M12**	**24/M16**
Installation safety factor	γ_{inst}	[-]	1,0			
Steel failure						
SZ-B						
Characteristic resistance	$N_{Rk,s}$	[kN]	26	41	60	110
Partial safety factor	γ_{Ms}	[-]	1,5			
SZ-S and SZ-SK						
Characteristic resistance	$N_{Rk,s}$	[kN]	26	41	60	110
Partial safety factor	γ_{Ms}	[-]	1,87			
Pull-out failure						
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p}$	[kN]	9	16	1)	1)
Increasing factor for $N_{Rk,p}$	ψ_C	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,5}$			
Concrete cone failure						
Effective anchorage depth	h_{ef}	[mm]	60	71	80	100
Factor for k_1	$k_{cr,N}$	[-]	7,7			

1) Pull-out is not decisive.

Highload Anchor SZ

Performance
Characteristic values for **tension load** in **cracked concrete** under static or quasi-static action

Annex C1

Table C3: Characteristic values for **tension load in uncracked concrete**, under static or quasi-static action, **steel zinc plated**

Anchor size			**10/M6**	**12/M8**	**15/M10**	**18/M12**	**24/M16**	**24/M16L**	**28/M20**
Installation safety factor	γ_{inst}	[-]	1,0						
Steel failure									
Characteristic resistance	$N_{Rk,s}$	[kN]	16	29	46	67	126	126	196
Partial safety factor	γ_{Ms}	[-]	1,5						
Pull-out failure									
Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p}$	[kN]	1)	20	1)	1)	1)	1)	1)
Splitting failure (The higher resistance of case 1 and case 2 may be applied.)									
Case 1									
Characteristic resistance in uncracked concrete C20/25	$N^0_{Rk,sp}$	[kN]	12	16	25	30	40	70	50
Edge distance	$c_{cr,sp}$	[mm]	1,5 h_{ef}						
Case 2									
Characteristic resistance in uncracked concrete C20/25	$N^0_{Rk,sp}$	[kN]	17,4	20,0	29,4	35,2	49,2	60,7	68,8
Edge distance	$c_{cr,sp}$	[mm]	2,5 h_{ef}					1,5 h_{ef}	2,5 h_{ef}
Increasing factor for $N_{Rk,p}$ and $N^0_{Rk,sp}$	ψ_C	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,5}$						
Concrete cone failure									
Effective Anchorage depth	h_{ef}	[mm]	50	60	71	80	100	115	125
Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}						
Factor for k_1	$k_{ucr,N}$	[-]	11,0						

1) Pull-out is not decisive.

Table C4: Characteristic values for **tension load** in **uncracked concrete** under static or quasi-static action, **stainless steel A4**

Anchor size			**12/M8**	**15/M10**	**18/M12**	**24/M16**
Installation safety factor	γ_{inst}	[-]	1,0			
Steel failure						
SZ-B						
Characteristic resistance	$N_{Rk,s}$	[kN]	26	41	60	110
Partial safety factor	γ_{Ms}	[-]	1,5			
SZ-S and SZ-SK						
Characteristic resistance	$N_{Rk,s}$	[kN]	26	41	60	110
Partial safety factor	γ_{Ms}	[-]	1,87			
Pull-out failure						
Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p}$	[kN]	16	25	35	[1]
Splitting failure						
Characteristic resistance in uncracked concrete C20/25	$N^0_{Rk,sp}$	[kN]	16	25	35	49,2
Edge distance	$c_{cr,sp}$	[mm]	180	235	265	300
Increasing factor for $N_{Rk,p}$ and $N^0_{Rk,sp}$	ψ_C	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,5}$			
Concrete cone failure						
Effective anchorage depth	h_{ef}	[mm]	60	71	80	100
Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}			
Factor for k_1	$k_{ucr,N}$	[-]	11,0			

[1] Pull-out is not decisive.

Table C5: Characteristic values of **shear load** under static or quasi-static action, **steel zinc plated**

Anchor size			**10/M6**	**12/M8**	**15/M10**	**18/M12**	**24/M16**	**24/M16L**	**28/M20**
Steel failure without lever arm									
SZ-B									
Characteristic resistance	$V_{Rk,s}$	[kN]	16	25	36	63	91	91	122
Factor	k_7	[-]	1,0						
SZ-S									
Characteristic resistance	$V_{Rk,s}$	[kN]	18	30	48	73	126	126	150
Factor	k_7	[-]	1,0						
SZ-SK									
Characteristic resistance	$V_{Rk,s}$	[kN]	18	30	48	73	126	126	150
Factor	k_7	[-]	1,0						
Partial safety factor	γ_{Ms}	[-]	1,25						
Steel failure with lever arm									
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	12	30	60	105	266	266	519
Partial safety factor	γ_{Ms}	[-]	1,25						
Concrete pry-out failure									
Factor	k_8	[-]	1,8	2,0					
Concrete edge failure									
Effective length of anchor in shear loading	l_f	[mm]	50	60	71	80	100	115	125
Outside diameter of anchor	d_{nom}	[mm]	10	12	15	18	24	24	28

Table C6: Characteristic values for **shear load** under static or quasi-static action, **stainless steel A4**

Anchor size			**12/M8**	**15/M10**	**18/M12**	**24/M16**
Steel failure without lever arm						
Characteristic resistance	$V_{Rk,s}$	[kN]	24	37	62	92
SZ-B						
Factor	k_7	[-]	1,0			
Partial safety factor	γ_{Ms}	[-]	1,25			
SZ-S						
Factor	k_7	[-]	1,0			
Partial safety factor	γ_{Ms}	[-]	1,36			
SZ-SK						
Factor	k_7	[-]	0,8			
Partial safety factor	γ_{Ms}	[-]	1,36			
Steel failure with lever arm						
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	26	52	92	232
SZ-B						
Factor	k_7	[-]	1,0			
Partial safety factor	γ_{Ms}	[-]	1,25			
SZ-S						
Factor	k_7	[-]	1,0			
Partial safety factor	γ_{Ms}	[-]	1,56			
SZ-SK						
Factor	k_7	[-]	0,8			
Partial safety factor	γ_{Ms}	[-]	1,56			
Concrete pry-out failure						
Factor	k_8	[-]	2,0			
Concrete edge failure						
Effective length of anchor in shear loading	l_f	[mm]	60	71	80	100
Outside diameter of anchor	d_{nom}	[mm]	12	15	18	24

Table C7: Characteristic values for **seismic action, Category C1 and C2, steel zinc plated**

Anchor size			**12/M8**	**15/M10**	**18/M12**	**24/M16**	**24/M16L**	**28/M20**
Tension load								
Installation safety factor	γ_{inst}	[-]	1,0					
Steel failure								
Characteristic tension resistance category **C1**	$N_{Rk,s,eq,C1}$	[kN]	29	46	67	126	126	196
Characteristic tension resistance category **C2**	$N_{Rk,s,eq,C2}$	[kN]	29	46	67	126	126	196
Partial safety factor	γ_{Ms}	[-]	1,5					
Pull-out failure								
Characteristic tension resistance category **C1**	$N_{Rk,p,eq,C1}$	[kN]	12	16	25	36	44,4	50,3
Characteristic tension resistance category **C2**	$N_{Rk,p,eq,C2}$	[kN]	5,4	16,4	22,6	29,0	41,2	43,6
Shear load								
Steel failure without lever arm								
SZ-B								
Characteristic shear resistance category **C1**	$V_{Rk,s,eq,C1}$	[kN]	18,0	27,1	43,4	51,9	51,9	96,4
Characteristic shear resistance category **C2**	$V_{Rk,s,eq,C2}$	[kN]	12,7	20,5	31,5	50,1	50,1	67,1
SZ-S								
Characteristic shear resistance category **C1**	$V_{Rk,s,eq,C1}$	[kN]	18,0	27,1	43,4	51,9	51,9	96,4
Characteristic shear resistance category **C2**	$V_{Rk,s,eq,C2}$	[kN]	12,7	20,5	31,5	69,3	69,3	67,1
SZ-SK								
Characteristic shear resistance category **C1**	$V_{Rk,s,eq,C1}$	[kN]	25,2	36,5	50,4	-	-	-
Characteristic shear resistance category **C2**	$V_{Rk,s,eq,C2}$	[kN]	19,2	29,3	39,4	-	-	-
Partial safety factor	γ_{Ms}	[-]	1,25					

Table C8: Characteristic values for **seismic action, Category C1 and C2, stainless steel A4**

Anchor size			**12/M8**	**15/M10**	**18/M12**	**24/M16**
Tension load						
Installation safety factor	γ_{inst}	[-]	1,0			
Steel failure						
Characteristic tension resistance, category **C1**	$N_{Rk,s,eq,C1}$	[kN]	26	41	60	110
Characteristic tension resistance, category **C2**	$N_{Rk,s,eq,C2}$	[kN]	26	41	60	110
Partial safety factor **SZ-B**	γ_{Ms}	[-]	1,5			
Partial safety factor **SZ-S and SZ-SK**	γ_{Ms}	[-]	1,87			
Pull-out failure						
Characteristic tension resistance, category **C1**	$N_{Rk,p,eq,C1}$	[kN]	9	16	26	36
Characteristic tension resistance, category **C2**	$N_{Rk,p,eq,C2}$	[kN]	4,8	16,5	24,8	44,5
Shear load						
Steel failure without lever arm						
SZ-B						
Characteristic shear resistance, category **C1**	$V_{Rk,s,eq,C1}$	[kN]	9,6	13,3	25,4	75,4
Characteristic shear resistance, category **C2**	$V_{Rk,s,eq,C2}$	[kN]	9,7	14,0	18,0	32,2
Partial safety factor	γ_{Ms}	[-]	1,25			
SZ-S						
Characteristic shear resistance, category **C1**	$V_{Rk,s,eq,C1}$	[kN]	9,6	13,3	25,4	75,4
Characteristic shear resistance, category **C2**	$V_{Rk,s,eq,C2}$	[kN]	9,7	14,0	18,0	32,2
Partial safety factor	γ_{Ms}	[-]	1,36			
SZ-SK						
Characteristic shear resistance, category **C1**	$V_{Rk,s,eq,C1}$	[kN]	11,5	23,3	31,6	-
Characteristic shear resistance, category **C2**	$V_{Rk,s,eq,C2}$	[kN]	10,8	17,4	15,4	-
Partial safety factor	γ_{Ms}	[-]	1,36			-

Table C9: Characteristic values under **fire exposure** in cracked and uncracked concrete C20/25 to C50/60

Anchor size				**10/M6**	**12/M8**	**15/M10**	**18/M12**	**24/M16**	**24/M16L**	**28/M20**
Tension load										
Steel failure										
Steel zinc plated										
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	1,0	1,9	4,3	6,3	11,6		18,3
	R60			0,8	1,5	3,2	4,6	8,6		13,5
	R90			0,6	1,0	2,1	3,0	5,0		7,7
	R120			0,4	0,8	1,5	2,0	3,1		4,9
Stainless steel A4										
Characteristic resistance	R30	$N_{Rk,s,fi}$	[kN]	-	6,1	10,2	15,7	29,2	-	-
	R60			-	4,4	7,3	11,1	20,6	-	-
	R90			-	2,6	4,3	6,4	12,0	-	-
	R120			-	1,8	2,8	4,1	7,7	-	-
Shear load										
Steel failure without lever arm										
Steel zinc plated										
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	1,0	1,9	4,3	6,3	11,6		18,3
	R60			0,8	1,5	3,2	4,6	8,6		13,5
	R90			0,6	1,0	2,1	3,0	5,0		7,7
	R120			0,4	0,8	1,5	2,0	3,1		4,9
Stainless steel A4										
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	-	14,3	22,7	32,8	61,0	-	-
	R60			-	11,1	17,6	25,5	47,5	-	-
	R90			-	7,9	12,6	18,3	34,0	-	-
	R120			-	6,3	10,0	14,6	27,2	-	-
Steel failure with lever arm										
Steel zinc plated										
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	0,8	2,0	5,6	9,7	24,8		42,4
	R60			0,6	1,5	4,1	7,2	18,3		29,8
	R90			0,4	1,0	2,7	4,7	11,9		17,1
	R120			0,3	0,8	1,9	3,1	6,6		10,7
Stainless steel A4										
Characteristic resistance	R30	$M^0_{Rk,s,fi}$	[Nm]	-	6,2	13,2	24,4	61,8	-	-
	R60			-	4,5	9,4	17,2	43,6	-	-
	R90			-	2,7	5,6	10,0	25,3	-	-
	R120			-	1,8	3,6	6,4	16,2	-	-

If pull-out is not decisive in equation D.4 and D.5, FprEN 1992-4:2016 $N_{Rk,p}$ must be replaced by $N^0_{Rk,c}$.

Highload Anchor SZ

Performance
Characteristic values under **fire exposure**

Annex C8

Table C10: Displacements under tension and shear load, **steel zinc plated**

Anchor size			**10/M6**	**12/M8**	**15/M10**	**18/M12**	**24/M16**	**24/M16L**	**28/M20**
Tension load									
Tension load in cracked concrete	N	[kN]	2,4	5,7	7,6	12,3	17,1	21,1	24
Displacement	δ_{N0}	[mm]	0,5	0,5	0,5	0,7	0,8	0,7	0,9
	$\delta_{N\infty}$	[mm]	2,0	2,0	1,3	1,3	1,3	1,3	1,4
Tension load in uncracked concrete	N	[kN]	8,5	9,5	14,3	17,2	24	29,6	34
Displacement	δ_{N0}	[mm]	0,8	1,0	1,1			1,3	0,3
	$\delta_{N\infty}$	[mm]	3,4		1,7			2,3	1,4
Seismic action C2									
Displacement for DLS	$\delta_{N,eq\ (DLS)}$	[mm]	-	3,3	3,0	5,0	3,0	3,0	4,0
Displacement for ULS	$\delta_{N,eq\ (ULS)}$	[mm]	-	12,2	11,3	16,0	9,2	9,2	13,8
Shear load									
SZ-B									
Shear load in cracked and uncracked concrete	V	[kN]	9,1	14	20,7	35,1	52,1	52,1	77
Displacement	δ_{V0}	[mm]	2,5	2,1	2,7	3,0	5,1	5,1	4,3
	$\delta_{V\infty}$	[mm]	3,8	3,1	4,1	4,5	7,6	7,6	6,5
Seismic action C2									
Displacement for DLS	$\delta_{V,eq\ (DLS)}$	[mm]	-	2,3	3,1	3,0	2,6	2,6	1,6
Displacement for ULS	$\delta_{V,eq\ (ULS)}$	[mm]	-	4,8	6,4	6,1	6,6	6,6	4,8
SZ-S									
Shear load in cracked and uncracked concrete	V	[kN]	10,1	17,1	27,5	41,5	72	72	77
Displacement	δ_{V0}	[mm]	2,9	2,5	3,6	3,5	7,0	7,0	4,3
	$\delta_{V\infty}$	[mm]	4,4	3,8	5,4	5,3	10,5	10,5	6,5
Seismic action C2									
Displacement for DLS	$\delta_{V,eq\ (DLS)}$	[mm]	-	2,3	3,1	3,0	3,3	3,3	1,6
Displacement for ULS	$\delta_{V,eq\ (ULS)}$	[mm]	-	4,8	6,4	6,1	8,2	8,2	4,8
SZ-SK									
Shear load in cracked and uncracked concrete	V	[kN]	10,1	17,1	27,5	41,5	72	72	77
Displacement	δ_{V0}	[mm]	2,9	2,5	3,6	3,5	7,0	7,0	4,3
	$\delta_{V\infty}$	[mm]	4,4	3,8	5,4	5,3	10,5	10,5	6,5
Seismic action C2									
Displacement for DLS	$\delta_{V,eq\ (DLS)}$	[mm]	-	3,1	3,9	3,9	-	-	-
Displacement for ULS	$\delta_{V,eq\ (ULS)}$	[mm]	-	10,2	11,8	13,0	-	-	-

Table C11: Displacements under tension and shear load, **stainless steel A4**

Anchor size			**12/M8**	**15/M10**	**18/M12**	**24/M16**
Tension load						
Tension load in cracked concrete	N	[kN]	4,3	7,6	12,1	17,0
Displacement	δ_{N0}	[mm]	0,5	0,5	1,3	0,5
	$\delta_{N\infty}$	[mm]	1,2	1,6	1,8	1,6
Tension load in uncracked concrete	N	[kN]	7,6	11,9	16,7	24,1
Displacement	δ_{N0}	[mm]	0,2	0,3	1,2	1,5
	$\delta_{N\infty}$	[mm]	1,1	-	-	-
Seismic action C2						
Displacement for DLS	$\delta_{N,eq\ (DLS)}$	[mm]	4,7	4,5	4,3	4,9
Displacement for ULS	$\delta_{N,eq\ (ULS)}$	[mm]	13,3	12,7	9,7	10,1
Shear load						
Shear load in cracked concrete	V	[kN]	13,9	21,1	34,7	50,8
Displacement	δ_{V0}	[mm]	3,4	4,9	4,8	6,7
	$\delta_{V\infty}$	[mm]	5,1	7,4	7,1	10,1
Seismic action C2						
SZ-B, SZ-S						
Displacement for DLS	$\delta_{V,eq(DLS)}$	[mm]	2,8	3,1	2,6	3,3
Displacement for ULS	$\delta_{V,eq\ (ULS)}$	[mm]	5,6	5,8	5,0	6,9
SZ-SK						
Displacement for DLS	$\delta_{V,eq(DLS)}$	[mm]	2,5	2,8	2,9	-
Displacement for ULS	$\delta_{V,eq\ (ULS)}$	[mm]	5,8	5,9	6,9	-