



...eine starke Verbindung

PRESATIEVERKLARING
DoP Nr. MKT-121 - nl

1. Unieke identificatiecode van het producttype: **MKT Zwaarlastanker SZ**
2. Type-, partij- of serienummer, dan wel een ander identificatiemiddel voor het bouwproduct, zoals voorgeschreven in artikel 11, lid 4:

ETA-02/0030, Bijlage A2
Chargennummer: zie verpakking

3. Beoogde gebruiken van het bouwproduct, overeenkomstig de toepasselijke geharmoniseerde technische specificatie, zoals door de fabrikant bepaald:

Producttype	spreadanker met gecontroleerd draaimoment (huls anker)
Voor toepassing in	gescheurd en ongescheurd beton C20/25 - C50/60 (EN 206)
Optie	1
Belasting	Statisch of quasi-statisch; seismisch, prestatie categorie C1 + C2: inbegrepen maten: SZ-B & SZ-S (M8, M10, M12, M16, M16L, M20)
Materiaal	<u>staal verzinkt:</u> alleen in droge binnenruimtes inbegrepen maten: SZ-B (M6, M8, M10, M12, M16, M16L, M20); SZ-S (M6, M8, M10, M12, M16, M16L, M20); SZ-SK (M6, M8, M10, M12) <u>roestvrij staal (markering A4):</u> voor binnen- en buitenbereiken zonder bijzonder agressieve omstandigheden inbegrepen maten: SZ-B (M8, M10, M12, M16); SZ-S (M8, M10, M12, M16); SZ-SK (M8, M10, M12)
Temperatuurbereik (in voorkomende gevallen)	--

4. Naam, geregistreerde handelsnaam of geregistreerd handelsmerk en contactadres van de fabrikant, zoals voorgeschreven in artikel 11, lid 5:

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

5. Indien van toepassing, naam en contactadres van de gemachtigde wiens mandaat de in artikel 12, lid 2, vermelde taken bestrijkt: --
6. Het systeem of de systemen voor de beoordeling en verificatie van de prestatiebestendigheid van het bouwproduct, vermeld in bijlage V: **System 1**
7. Indien de prestatieverklaring betrekking heeft op een bouwproduct dat onder een geharmoniseerde norm valt: --

8. Indien de prestatieverklaring betrekking heeft op een bouwproduct waarvoor een Europese technische beoordeling is afgegeven:

Deutsches Institut für Bautechnik, Berlin

heeft het volgende afgegeven:

ETA-02/0030

op basis van

ETAG 001-2

De aangemelde instantie voor productcertificering 1343-CPR heeft het volgende uitgevoerd volgens systeem 1:

- i) de bepaling van het producttype op grond van typeonderzoek (inclusief bemonstering), typeberekening, getabelleerde waarden of een beschrijvende documentatie van het product;
- ii) de initiële inspectie van de productie-installatie en van de productiecontrole in de fabriek;
- iii) permanente bewaking, beoordeling en evaluatie van de productiecontrole in de fabriek

en heeft het volgende afgegeven: het certificaat van prestatiebestendigheid 1343-CPR-M 550-9

9. Aangegeven prestatie:

Essentiële kenmerken	Beoordelingsmethode	Prestaties		Geharmoniseerde technische specificaties
		staal, verzinkt	roestvrij staal A4	
Karakteristieke trekweerstand	ETAG 001, bijlage C CEN/TS 1992-4	bijlage C1, C2	bijlage C1, C3	ETAG 001
Karakteristieke afschuifweerstand	ETAG 001, bijlage C CEN/TS 1992-4	bijlage C4	bijlage C5	
Karakteristieke weerstand bij seismische inwerking	TR 045	bijlage C6	bijlage C7	
Verschuiving in gebruikstoestand	ETAG 001, bijlage C CEN/TS 1992-4	bijlage C9, C10	bijlage C9, C10	
Karakteristieke weerstand onder brand exposure	ETAG 001, bijlage C CEN/TS 1992-4	bijlage C8	bijlage C8	

Indien overeenkomstig artikel 37 of 38 een specifieke technische documentatie is gebruikt, de eisen waaraan het product voldoet: --

10. De prestaties van het in de punten 1 en 2 omschreven product zijn conform de in punt 9 aangegeven prestaties. Deze prestatieverklaring wordt verstrekt onder de exclusieve verantwoordelijkheid van de in punt 4 vermelde fabrikant: Ondertekend voor en namens de fabrikant door:


Stefan Weustenhagen

(CEO)

Weilerbach, 28.10.2015

i.v. 

Dipl.-Ing. Detlef Bigalke

(Director of Product Development)



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	$\gamma_2 = \gamma_{inst}$	[-]	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	[-]	$\left(\frac{f_{ck,cube}}{25}\right)^{0,5}$							
Concrete cone failure										
Effective anchorage depth	h_{ef}	[mm]	50	60	71	80	100	115	125	
Factor acc. to CEN/TS 1992-4	k_{cr}	[-]	7,2							

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	$\gamma_2 = \gamma_{inst}$	[-]	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	[-]	$\left(\frac{f_{ck,cube}}{25}\right)^{0,5}$			
Concrete cone failure						
Effective anchorage depth	h_{ef}	[mm]	60	71	80	100
Factor acc. to CEN/TS 1992-4	k_{cr}	[-]	7,2			

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 non-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	$\gamma_2 = \gamma_{inst}$	[-]	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 non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	1) ¹⁾	20	30	1) ¹⁾	1) ¹⁾	1) ¹⁾	1) ¹⁾
Splitting failure (The higher resistance of Case 1 and Case 2 may be applied.)									
Case 1									
Characteristic resistance in concrete C20/25	$N^0_{Rk,sp}$	[kN]	12 ²⁾	16 ²⁾	25 ²⁾	30 ²⁾	40 ²⁾	70	50 ²⁾
Spacing	$S_{cr,sp}$	[mm]	3 h_{ef}						
Edge distance	$C_{cr,sp}$	[mm]	1,5 h_{ef}						
Case 2 (acc. to ETAG 001, Annex C, equation (5.3))									
Spacing	$S_{cr,sp}$	[mm]	5 h_{ef}					3 h_{ef}	5 h_{ef}
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	[-]	$\left(\frac{f_{ck,cube}}{25}\right)^{0,5}$						
Concrete cone failure									
Effective Anchorage depth	h_{ef}	[mm]	50	60	71	80	100	115	125
Factor acc. to CEN/TS 1992-4	k_{ucr}	[-]	10,1						

¹⁾ Pull-out is not decisive.

²⁾ For the proof against splitting failure, $N^0_{Rk,c}$ has to be replaced by $N^0_{Rk,sp}$.

Highload Anchor SZ

Performance

Characteristic values for **tension load in non-cracked concrete**, under static or quasi-static action, **steel zinc plated**

Annex C2

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

Anchor size			12/M8	15/M10	18/M12	24/M16
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	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 non-cracked concrete C20/25	$N_{Rk,p}$	[kN]	16	25	35	1)
Increasing factor for $N_{Rk,p}$	ψ_C	[-]	$\left(\frac{f_{ck,cube}}{25}\right)^{0,5}$			
Splitting failure						
Spacing	$S_{cr,sp}$	[mm]	360	470	530	600
Edge distance	$C_{cr,sp}$	[mm]	180	235	265	300
Concrete cone failure						
Effective anchorage depth	h_{ef}	[mm]	60	71	80	100
Factor acc. to CEN/TS 1992-4	k_{ucr}	[-]	10,1			

1) Pull-out is not decisive.

Highload Anchor SZ

Performance

Characteristic values for **tension loads** in **non-cracked concrete** under static or quasi-static action, **stainless steel A4**

Annex C3

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
Ductility factor	k_2	[-]	1,0						
Partial safety factor	γ_{Ms}	[-]	1,25						
SZ-S and SZ-SK									
Characteristic resistance	$V_{Rk,s}$	[kN]	18	30	48	73	126	126	150
Ductility factor	k_2	[-]	0,8						
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 acc. to ETAG 001, Annex C or k_3 acc. to CEN/TS 1992-4	$k_{(3)}$	[-]	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

Highload Anchor SZ

Performance
 Characteristic values for **shear load** under static or quasi-static action, **steel zinc plated**

Annex C4

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						
SZ-B						
Characteristic resistance	$V_{Rk,s}$	[kN]	24	37	62	92
Ductility factor	k_2	[-]	1,0			
Partial safety factor	γ_{Ms}	[-]	1,25			
SZ-S and SZ-SK						
Characteristic resistance	$V_{Rk,s}$	[kN]	24	37	62	92
Ductility factor	k_2	[-]	0,8			
Partial safety factor	γ_{Ms}	[-]	1,36			
Steel failure with lever arm						
SZ-B						
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	26	52	92	232
Ductility factor	k_2	[-]	1,0			
Partial safety factor	γ_{Ms}	[-]	1,25			
SZ-S and SZ-SK						
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	26	52	92	232
Ductility factor	k_2	[-]	0,8			
Partial safety factor	γ_{Ms}	[-]	1,56			
Concrete pry-out failure						
Factor k acc. to ETAG 001, Annex C or k_3 acc. to CEN/TS 1992-4	$k_{(3)}$	[-]	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

Highload Anchor SZ

Performance

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

Annex C5

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	$\gamma_2 = \gamma_{inst}$	[-]	1,0					
Steel failure								
Characteristic tension resistance category C1	$N_{Rk,s,seis,C1}$	[kN]	29	46	67	126	126	196
Characteristic tension resistance category C2	$N_{Rk,s,seis,C2}$	[kN]	29	46	67	126	126	196
Partial safety factor	$\gamma_{Ms,seis}$	[-]	1,5					
Pull-out failure								
Characteristic tension resistance category C1	$N_{Rk,p,seis,C1}$	[kN]	12	16	25	36	44,4	50,3
Characteristic tension resistance category C2	$N_{Rk,p,seis,C2}$	[kN]	5,4	16,4	22,6	29,0	41,2	43,6
Increasing factor for $N_{Rk,p,seis}$	ψ_c	[-]	1,0					
Shear load								
Steel failure without lever arm								
SZ-B								
Characteristic shear resistance category C1	$V_{Rk,s,seis,C1}$	[kN]	18,0	27,1	43,4	51,9	51,9	96,4
Characteristic shear resistance category C2	$V_{Rk,s,seis,C2}$	[kN]	12,7	20,5	31,5	50,1	50,1	67,1
SZ-S								
Characteristic shear resistance category C1	$V_{Rk,s,seis,C1}$	[kN]	18,0	27,1	43,4	51,9	51,9	96,4
Characteristic shear resistance category C2	$V_{Rk,s,seis,C2}$	[kN]	12,7	20,5	31,5	69,3	69,3	67,1
Partial safety factor	$\gamma_{Ms,seis}$	[-]	1,25					
Steel failure with lever arm								
Characteristic resistance	$M^0_{Rk,s,seis}$	[Nm]	no performance determined					

Highload Anchor SZ

Performance
Characteristic values for **seismic action, steel zinc plated**

Annex C6

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	$\gamma_2 = \gamma_{inst}$	[-]	1,0			
Steel failure						
Characteristic tension resistance, category C1	$N_{Rk,s,seis,C1}$	[kN]	26	41	60	110
Characteristic tension resistance, category C2	$N_{Rk,s,seis,C2}$	[kN]	26	41	60	110
Partial safety factor SZ-B	$\gamma_{Ms,seis}$	[-]	1,5			
Partial safety factor SZ-S	$\gamma_{Ms,seis}$	[-]	1,87			
Pull-out failure						
Characteristic tension resistance, category C1	$N_{Rk,p,seis,C1}$	[kN]	9	16	26	36
Characteristic tension resistance, category C2	$N_{Rk,p,seis,C2}$	[kN]	4,8	16,5	24,8	44,5
Increasing factor for $N_{Rk,p,seis}$	ψ_c	[-]	1,0			
Shear load						
Steel failure without lever arm						
Characteristic shear resistance, category C1	$V_{Rk,s,seis,C1}$	[kN]	9,6	13,3	25,4	75,4
Characteristic shear resistance, category C2	$V_{Rk,s,seis,C2}$	[kN]	9,7	14,0	18,0	32,2
Partial safety factor SZ-B	$\gamma_{Ms,seis}$	[-]	1,25			
Partial safety factor SZ-S	$\gamma_{Ms,seis}$	[-]	1,36			
Steel failure with lever arm						
Characteristic resistance	$M^0_{Rk,s,seis}$	[Nm]	no performance determined			

Highload Anchor SZ

Performance
Characteristic values for **seismic action, stainless steel A4**

Annex C7

Table C9: Characteristic values for **tension and shear load** under **fire exposure** in cracked and non-cracked 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	-

The characteristic resistances for pull-out failure, concrete cone failure, concrete pry-out and concrete edge failure can be calculated according to TR020 / CEN/TS 1992-4.

Highload Anchor SZ

Performance

Characteristic values for **tension and shear loads** under **fire exposure**

Annex C8

Table C10: Displacements under tension load

Anchor size			10/M6	12/M8	15/M10	18/M12	24/M16	24/M16L	28/M20
Steel, zinc plated									
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 non-cracked 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	$\delta_{N,seis,C2(DLS)}$	[mm]	-	3,3	3,0	5,0	3,0	3,0	4,0
Displacement for ULS	$\delta_{N,seis,C2(ULS)}$	[mm]	-	12,2	11,3	16,0	9,2	9,2	13,8
Stainless steel A4									
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 non-cracked 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	$\delta_{N,seis,C2(DLS)}$	[mm]	-	4,7	4,5	4,3	4,9	-	-
Displacement for ULS	$\delta_{N,seis,C2(ULS)}$	[mm]	-	13,3	12,7	9,7	10,1	-	-

Highload Anchor SZ

Performance
Displacements under **tension load**

Annex C9

Table C11: Displacements under shear load

Anchor size			10/M6	12/M8	15/M10	18/M12	24/M16	24/M16L	28/M20
Steel, zinc plated									
SZ-B									
Shear load in cracked and non-cracked 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	$\delta_{V,seis,C2(DLS)}$	[mm]	-	2,3	3,1	3,0	2,6	2,6	1,6
Displacement for ULS	$\delta_{V,seis,C2(ULS)}$	[mm]	-	4,8	6,4	6,1	6,6	6,6	4,8
SZ-S and SZ-SK									
Shear load in cracked and non-cracked 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 (SZ-S)									
Displacement for DLS	$\delta_{V,seis,C2(DLS)}$	[mm]	-	2,3	3,1	3,0	3,3	3,3	1,6
Displacement for ULS	$\delta_{V,seis,C2(ULS)}$	[mm]	-	4,8	6,4	6,1	8,2	8,2	4,8
Stainless steel A4									
Shear load in cracked and non-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									
Displacement for DLS	$\delta_{V,seis,C2(DLS)}$	[mm]	-	2,8	3,1	2,6	3,3	-	-
Displacement for ULS	$\delta_{V,seis,C2(ULS)}$	[mm]	-	5,6	5,8	5,0	6,9	-	-

Highload Anchor SZ

Performance
Displacements under **shear load**

Annex C10