

YDEEVNEDEKLARATION
DoP Nr. MKT-321 - dk

1. Varetypens unikke identifikationskode: **MKT Injektionssystem VMU plus**
2. Type-, parti- eller serienummer eller en anden form for angivelse, ved hjælp af hvilken byggevaren kan identificeres som krævet i henhold til artikel 11, stk. 4:

ETA-11/0415, Annex A2, A3
Batch nummer: se pakning

3. Byggevarens tilsigtede anvendelse eller anvendelser i overensstemmelse med den gældende harmoniserede tekniske specifikation som påtænkt af fabrikanten:

Produkttype	Ekspansionsfrit forankringssystem VMU plus
For anvendelse i	Revnet og ikke revnet beton C20/25 - C50/60 (EN 206)
Option	1
Belastning	Statisk eller kvasi-statisk, jordskælv Kategori C1
Materiale	<p><u>Stål varmgalvaniseret:</u> Kun i tørre indeområder Størrelse: M8, M10, M12, M16, M20, M24, M27, M30</p> <p><u>Stål galvaniseret:</u> Kun i tørre indeområder Størrelse: M8, M10, M12, M16, M20, M24, M27, M30</p> <p><u>Rustfri Stål (stemplet A4):</u> Til inde- og udeområder uden særlige aggressive påvirkninger Størrelse: M8, M10, M12, M16, M20, M24, M27, M30</p> <p><u>Højkorrosionsbestandig Stål (stemplet HCR):</u> Til inde- og udeområder med særlige aggressive påvirkninger Størrelse: M8, M10, M12, M16, M20, M24, M27, M30</p> <p><u>Armeringsstål (B500 B):</u> Størrelse: Ø8, Ø10, Ø12, Ø14, Ø16, Ø20, Ø25, Ø28, Ø32</p>
Temperaturområde	Temperaturområde I: -40 °C til +40 °C Temperaturområde II: -40 °C til +80 °C Temperaturområde III: -40 °C til +120 °C

4. Fabrikantens navn, registrerede firmabetegnelse eller registrerede varemærke og kontaktadresse som krævet i henhold til artikel 11, stk. 5:

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

5. I givet fald navn og kontaktadresse på den bemyndigede repræsentant, hvis mandat omfatter opgaverne i artikel 12, stk. 2: --

6. Systemet eller systemerne til vurdering og kontrol af konstansen af byggevarens ydeevne, jf. bilag V:

System 1

7. Hvis ydeevnedeklarationen vedrører en byggevarer, der er omfattet af en harmoniseret standard:

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8. Hvis ydeevnedeklarationen vedrører en byggevarer, for hvilken der er udstedt en europæisk teknisk vurdering:

Deutsches Institut für Bautechnik, Berlin

og udstedte:

ETA-11/0415

på grundlag af,

ETAG 001-5

Det notificerede produktcertificeringsorgan 1343-CPR udførte kontrollen efter system 1:

- i) bestemmelse af varetypen på grundlag af typeprøvning (herunder stikprøveudtagning), typeberegning, tabelværdier eller deskriptiv dokumentation for byggevaren
- ii) indledende inspektion af fabriksanlæg og fabrikkens egen produktionskontrol
- iii) kontinuerlig overvågning, vurdering og evaluering af fabrikkens egen produktionskontrol

og udstedte: **Attest for byggevarens ydeevnes konstan 1343-CPR-M 550-10**

9. Deklareret ydeevne:

Karakteristiske kendetegn	Beregningsmetode	Ydeevne		Harmoniserede tekniske specifikationer
		Gevindstang	Armeringsstål	
Karakteristisk modstand ved trækbelastning	TR 029, CEN/TS 1992-4	Annex C1, C2	Annex C5, C6	ETAG 001
Karakteristisk modstand ved tværbelastning	TR 029, CEN/TS 1992-4	Annex C3	Annex C7	
Karakteristisk modstand ved jordskælv C1	TR 045	Annex C4	Annex C8	
Forskydning i anvendelsestilstand	TR 029, CEN/TS 1992-4	Annex C9	Annex C10	

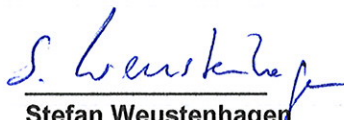
Hvis der er anvendt specifik teknisk dokumentation i medfør af artikel 37 eller 38, de krav varen opfylder:

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10. Ydeevnen for den byggevarer, der er anført i punkt 1 og 2, er i overensstemmelse med den deklarerede ydeevne i punkt 9.

Denne ydeevnedeklaration udstedes på eneansvar af den fabrikant, der er anført i punkt 4.

Underskrevet for fabrikanten og på dennes vegne af:


Stefan Weustenhagen

(CEO)

Weilerbach, 13.11.2015

i.V.


Dipl.-Ing. Detlef Bigalke

(Chef for Produktudvikling)



Table C1: Characteristic values for **threaded rods** under **tension loads** in **cracked concrete**

Threaded rod				M8	M10	M12	M16	M20	M24	M27	M30
Steel failure											
Characteristic tension resistance		$N_{Rk,s}$	[kN]	$A_s \cdot f_{uk}$							
Combined pull-out and concrete cone failure											
Characteristic bond resistance in cracked concrete C20/25											
Temperature range I: 40 °C/24 °C	dry and wet concrete	$\tau_{Rk,cr}$	[N/mm ²]	4,0	5,0	5,5	5,5	5,5	5,5	6,5	6,5
	flooded bore hole	$\tau_{Rk,cr}$	[N/mm ²]	4,0	4,0	5,5	5,5	not admissible			
Temperature range II: 80 °C/50 °C	dry and wet concrete	$\tau_{Rk,cr}$	[N/mm ²]	2,5	3,5	4,0	4,0	4,0	4,0	4,5	4,5
	flooded bore hole	$\tau_{Rk,cr}$	[N/mm ²]	2,5	3,0	4,0	4,0	not admissible			
Temperature range III: 120 °C/72 °C	dry and wet concrete	$\tau_{Rk,cr}$	[N/mm ²]	2,0	2,5	3,0	3,0	3,0	3,0	3,5	3,5
	flooded bore hole	$\tau_{Rk,cr}$	[N/mm ²]	2,0	2,5	3,0	3,0	not admissible			
Increasing factor for $\tau_{Rk,cr}$		ψ_c	C25/30	1,02							
			C30/37	1,04							
			C35/45	1,07							
			C40/50	1,08							
			C45/55	1,09							
			C50/60	1,10							
Factor according to CEN/TS 1992-4-5		k_8	[-]	7,2							
Concrete cone failure											
Factor according to CEN/TS 1992-4-5		k_{cr}	[-]	7,2							
Edge distance		$c_{cr,N}$	[mm]	1,5 h_{ef}							
Axial distance		$s_{cr,N}$	[mm]	3,0 h_{ef}							
Installation safety factor (dry and wet concrete)		$\gamma_2 = \gamma_{inst}$	[-]	1,0	1,2						
Installation safety factor (flooded bore hole)		$\gamma_2 = \gamma_{inst}$	[-]	1,4				not admissible			

Injection sytem VMU plus for concrete

Performance

Characteristic values for **threaded rods** under **tension loads** in **cracked concrete**

Annex C1

Table C2: Characteristic values for threaded rods under tension loads in non-cracked concrete

Threaded rod				M8	M10	M12	M16	M20	M24	M27	M30
Steel failure											
Characteristic tension resistance		$N_{Rk,s}$	[kN]	$A_s \cdot f_{uk}$							
Combined pull-out and concrete cone failure											
Characteristic bond resistance in non-cracked concrete C20/25											
Temperature range I: 40 °C/24 °C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm ²]	10	12	12	12	12	11	10	9
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm ²]	7,5	8,5	8,5	8,5	not admissible			
Temperature range II: 80 °C/50 °C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm ²]	7,5	9	9	9	9	8,5	7,5	6,5
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm ²]	5,5	6,5	6,5	6,5	not admissible			
Temperature range III: 120 °C/72 °C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm ²]	5,5	6,5	6,5	6,5	6,5	6,5	5,5	5,0
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm ²]	4,0	5,0	5,0	5,0	not admissible			
Increasing factor for $\tau_{Rk,ucr}$		ψ_c	C25/30	1,02							
			C30/37	1,04							
			C35/45	1,07							
			C40/50	1,08							
			C45/55	1,09							
			C50/60	1,10							
Factor according to CEN/TS 1992-4-5		k_8	[-]	10,1							
Concrete cone failure											
Factor according to CEN/TS 1992-4-5		k_{ucr}	[-]	10,1							
Edge distance		$c_{cr,N}$	[mm]	$1,5 h_{ef}$							
Axial distance		$s_{cr,N}$	[mm]	$3,0 h_{ef}$							
Splitting failure											
Edge distance for		$c_{cr,sp}$	[mm]	$1,0 \cdot h_{ef} \leq 2 \cdot h_{ef} \left(2,5 - \frac{h}{h_{ef}} \right) \leq 2,4 \cdot h_{ef}$							
Axial distance		$s_{cr,sp}$	[mm]	$2 c_{cr,sp}$							
Installation safety factor (dry and wet concrete)		$\gamma_2 = \gamma_{inst}$	[-]	1,0	1,2						
Installation safety factor (flooded bore hole)		$\gamma_2 = \gamma_{inst}$	[-]	1,4					not admissible		

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Performance

Characteristic values for **threaded rods** under **tension loads** in **non-cracked concrete**

Annex C2

Table C3: Characteristic values for **threaded rods** under **shear loads** in **cracked and non-cracked concrete**

Threaded rod			M8	M10	M12	M16	M20	M24	M27	M30
Steel failure without lever arm										
Characteristic shear resistance	$V_{Rk,s}$	[kN]	$0,5 \cdot A_s \cdot f_{uk}$							
Ductility factor according to CEN/TS 1992-4-5	k_2	[-]	0,8							
Steel failure with lever arm										
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	$1,2 \cdot W_{el} \cdot f_{uk}$							
Concrete pry-out failure										
Factor k acc. to TR 029 or k_3 acc. to CEN/TS 1992-4-5	$k_{(3)}$	[-]	2,0							
Concrete edge failure										
Effective length of anchor	l_f	[mm]	$l_f = \min(h_{ef}; 8 d_{nom})$							
Outside diameter of anchor	d_{nom}	[mm]	8	10	12	16	20	24	27	30
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0							

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Performance
Characteristic value for **threaded rods** under **shear loads**

Annex C3

Table C4: Characteristic values for **threaded rods** under **seismic action**, category **C1**

Threaded rod				M8	M10	M12	M16	M20	M24	M27	M30	
Tension load												
Steel failure												
Characteristic tension resistance	$N_{Rk,s,seis}$	[kN]	$A_s \cdot f_{uk}$									
Combined pull-out and concrete cone failure												
Characteristic bond resistance in concrete C20/25 to C50/60												
Temperature range I: 40 °C/24 °C	dry and wet concrete	$\tau_{Rk,seis}$	[N/mm ²]	2,5	3,1	3,7	3,7	3,7	3,8	4,5	4,5	
	flooded bore hole	$\tau_{Rk,seis}$	[N/mm ²]	2,5	2,5	3,7	3,7	not admissible				
Temperature range II: 80 °C/50 °C	dry and wet concrete	$\tau_{Rk,seis}$	[N/mm ²]	1,6	2,2	2,7	2,7	2,7	2,8	3,1	3,1	
	flooded bore hole	$\tau_{Rk,seis}$	[N/mm ²]	1,6	1,9	2,7	2,7	not admissible				
Temperature range III: 120 °C/72 °C	dry and wet concrete	$\tau_{Rk,seis}$	[N/mm ²]	1,3	1,6	2,0	2,0	2,0	2,1	2,4	2,4	
	flooded bore hole	$\tau_{Rk,seis}$	[N/mm ²]	1,3	1,6	2,0	2,0	not admissible				
Increasing factor for $\tau_{Rk,seis}$	ψ_c	[-]	1,0									
Installation safety factor (dry and wet concrete)	$\gamma_2 = \gamma_{inst}$	[-]	1,0	1,2								
Installation safety factor (flooded bore hole)	$\gamma_2 = \gamma_{inst}$	[-]	1,4						not admissible			
Shear load												
Steel failure without lever arm												
Characteristic shear resistance	$V_{Rk,s,seis}$	[kN]	$0,35 \cdot A_s \cdot f_{uk}$									
Steel failure with lever arm												
Characteristic bending moment	$M^0_{Rk,s,seis}$	[Nm]	No Performance Determined (NPD)									

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Performance

Characteristic values for **threaded rods** under **seismic action**, category **C1**

Annex C4

Table C5: Characteristic values for rebar under tension loads in cracked concrete

Rebar			Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32	
Steel failure												
Characteristic tension resistance	$N_{Rk,s}$	[kN]	$A_s \cdot f_{uk}^{1)}$									
Combined pull-out and concrete cone failure												
Characteristic bond resistance in cracked concrete C20/25												
Temperature range I: 40°C/24°C	dry and wet concrete	$\tau_{Rk,cr}$	[N/mm ²]	4,0	5,0	5,5	5,5	5,5	5,5	5,5	6,5	6,5
	flooded bore hole	$\tau_{Rk,cr}$	[N/mm ²]	4,0	4,0	5,5	5,5	5,5	not admissible			
Temperature range II: 80°C/50°C	dry and wet concrete	$\tau_{Rk,cr}$	[N/mm ²]	2,5	3,5	4,0	4,0	4,0	4,0	4,0	4,5	4,5
	flooded bore hole	$\tau_{Rk,cr}$	[N/mm ²]	2,5	3,0	4,0	4,0	4,0	not admissible			
Temperature range III: 120°C/72°C	dry and wet concrete	$\tau_{Rk,cr}$	[N/mm ²]	2,0	2,5	3,0	3,0	3,0	3,0	3,0	3,5	3,5
	flooded bore hole	$\tau_{Rk,cr}$	[N/mm ²]	2,0	2,5	3,0	3,0	3,0	not admissible			
Increasing factors for $\tau_{Rk,cr}$		ψ_c	C25/30	1,02								
			C30/37	1,04								
			C35/45	1,07								
			C40/50	1,08								
			C45/55	1,09								
			C50/60	1,10								
Factor acc. to CEN/TS 1992-4-5		k_8	[-]	7,2								
Concrete cone failure												
Factor acc. to CEN/TS 1992-4-5		k_{cr}	[-]	7,2								
Edge distance		$c_{cr,N}$	[mm]	1,5 h_{ef}								
Axial distance		$s_{cr,N}$	[mm]	3,0 h_{ef}								
Installation safety factor (dry and wet concrete)		$\gamma_2 = \gamma_{inst}$	[-]	1,0	1,2							
Installation safety factor (flooded bore hole)		$\gamma_2 = \gamma_{inst}$	[-]	1,4					not admissible			

¹⁾ $f_{uk} = f_{tk} = k \cdot f_{yk}$

Injection sytem VMU plus for concrete

Performance

Characteristic values for rebar under tension loads in cracked concrete

Annex C5

Table C6: Characteristic values for rebar under tension loads in non-cracked concrete

Rebar			Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32		
Steel failure													
Characteristic tension resistance	$N_{Rk,s}$	[kN]	$A_s \cdot f_{uk}^{1)}$										
Combined pull-out and concrete cone failure													
Characteristic bond resistance in non-cracked concrete C20/25													
Temperature range I: 40°C/24°C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm ²]	10	12	12	12	12	12	11	10	8,5	
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm ²]	7,5	8,5	8,5	8,5	8,5	not admissible				
Temperature range II: 80°C/50°C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm ²]	7,5	9	9	9	9	9	8,0	7,0	6,0	
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm ²]	5,5	6,5	6,5	6,5	6,5	not admissible				
Temperature range III: 120°C/72°C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm ²]	5,5	6,5	6,5	6,5	6,5	6,5	6,0	5,0	4,5	
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm ²]	4,0	5,0	5,0	5,0	5,0	not admissible				
Increasing factors for $\tau_{Rk,ucr}$		ψ_c	C25/30	1,02									
			C30/37	1,04									
			C35/45	1,07									
			C40/50	1,08									
			C45/55	1,09									
			C50/60	1,10									
Factor acc. to CEN/TS 1992-4-5	k_8	[-]	10,1										
Concrete cone failure													
Factor acc. to CEN/TS 1992-4-5	k_{ucr}	[-]	10,1										
Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}										
Axial distance	$s_{cr,N}$	[mm]	3,0 h_{ef}										
Splitting failure													
Edge distance for	$c_{cr,sp}$	[mm]	$1,0 \cdot h_{ef} \leq 2 \cdot h_{ef} \left(2,5 - \frac{h}{h_{ef}} \right) \leq 2,4 \cdot h_{ef}$										
Axial distance	$s_{cr,sp}$	[mm]	$2 c_{cr,sp}$										
Installation safety factor (dry and wet concrete)	$\gamma_2 = \gamma_{inst}$	[-]	1,0	1,2									
Installation safety factor (flooded bore hole)	$\gamma_2 = \gamma_{inst}$	[-]	1,4						not admissible				

¹⁾ $f_{uk} = f_{tk} = k \cdot f_{yk}$

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Performance

Characteristic values for rebar under tension loads in non-cracked concrete

Annex C6

Table C7: Characteristic values for **rebar** under **shear loads** in **cracked and non-cracked concrete**

Rebar			Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
Steel failure without lever arm											
Characteristic shear resistance	$V_{Rk,s}$	[kN]	$0,50 \cdot A_s \cdot f_{uk}^{1)}$								
Ductility factor according to CEN/TS 1992-4-5	k_2	[-]	0,8								
Steel failure with lever arm											
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	$1,2 \cdot W_{el} \cdot f_{uk}^{1)}$								
Concrete pry-out failure											
Factor k acc. to TR 029 or k_3 acc. to CEN/TS 1992-4-5	$k_{(3)}$	[-]	2,0								
Concrete edge failure											
Effective length of anchor	l_f	[mm]	$l_f = \min(h_{ef}; 8 d_{nom})$								
Outside diameter of anchor	d_{nom}	[mm]	8	10	12	14	16	20	25	28	32
Installation safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1,0								

¹⁾ $f_{uk} = f_{tk} = k \cdot f_{yk}$

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Performance

Characteristic values for **rebar** under **shear loads** in **cracked and non-cracked concrete**

Annex C7

Table C8: Characteristic values for **rebar** under **seismic action**, category **C1**

Rebar				Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
Tension load												
Steel failure												
Characteristic tension resistance	$N_{Rk,s,seis}$	[kN]	$A_s \cdot f_{uk}^{1)}$									
Combined pull-out and concrete cone failure												
Characteristic bond resistance in concrete C20/25 to C50/60												
Temperature range I: 40 °C/24 °C	dry and wet concrete	$\tau_{Rk,seis}$	[N/mm ²]	2,5	3,1	3,7	3,7	3,7	3,7	3,8	4,5	4,5
	flooded bore hole	$\tau_{Rk,seis}$	[N/mm ²]	2,5	2,5	3,7	3,7	3,7	not admissible			
Temperature range II: 80 °C/50 °C	dry and wet concrete	$\tau_{Rk,seis}$	[N/mm ²]	1,6	2,2	2,7	2,7	2,7	2,7	2,8	3,1	3,1
	flooded bore hole	$\tau_{Rk,seis}$	[N/mm ²]	1,6	1,9	2,7	2,7	2,7	not admissible			
Temperature range III: 120 °C/72 °C	dry and wet concrete	$\tau_{Rk,seis}$	[N/mm ²]	1,3	1,6	2,0	2,0	2,0	2,0	2,1	2,4	2,4
	flooded bore hole	$\tau_{Rk,seis}$	[N/mm ²]	1,3	1,6	2,0	2,0	2,0	not admissible			
Increasing factor for $\tau_{Rk,seis}$		ψ_c	[-]	1,0								
Installation safety factor (dry and wet concrete)		$\gamma_2 = \gamma_{inst}$	[-]	1,0	1,2							
Installation safety factor (flooded bore hole)		$\gamma_2 = \gamma_{inst}$	[-]	1,4					not admissible			
Shear load												
Steel failure without lever arm												
Characteristic shear resistance	$V_{Rk,s,seis}$	[kN]	$0,35 \cdot A_s \cdot f_{uk}^{1)}$									
Steel failure with lever arm												
Characteristic bending moment	$M^0_{Rk,s,seis}$	[Nm]	No Performance Determined (NPD)									

¹⁾ $f_{uk} = f_{tk} = k \cdot f_{yk}$

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Performance

Characteristic values for **rebar** under **seismic action**, category **C1**

Annex C8

Table C9: Displacements under tension loads¹⁾ (threaded rod)

Threaded rod			M8	M10	M12	M16	M20	M24	M27	M30
Non-cracked concrete C20/25										
Temperature range I: 40 °C/24 °C	δ_{N0} -factor	[mm/(N/mm ²)]	0,021	0,023	0,026	0,031	0,036	0,041	0,045	0,049
	$\delta_{N\infty}$ -factor	[mm/(N/mm ²)]	0,030	0,033	0,037	0,045	0,052	0,060	0,065	0,071
Temperature range II: 80 °C/50 °C	δ_{N0} -factor	[mm/(N/mm ²)]	0,050	0,056	0,063	0,075	0,088	0,100	0,110	0,119
	$\delta_{N\infty}$ -factor	[mm/(N/mm ²)]	0,072	0,081	0,090	0,108	0,127	0,145	0,159	0,172
Temperature range III: 120 °C/72 °C	δ_{N0} -factor	[mm/(N/mm ²)]	0,050	0,056	0,063	0,075	0,088	0,100	0,110	0,119
	$\delta_{N\infty}$ -factor	[mm/(N/mm ²)]	0,072	0,081	0,090	0,108	0,127	0,145	0,159	0,172
Cracked concrete C20/25										
Temperature range I: 40 °C/24 °C	δ_{N0} -factor	[mm/(N/mm ²)]	0,090			0,070				
	$\delta_{N\infty}$ -factor	[mm/(N/mm ²)]	0,105			0,105				
Temperature range II: 80 °C/50 °C	δ_{N0} -factor	[mm/(N/mm ²)]	0,219			0,170				
	$\delta_{N\infty}$ -factor	[mm/(N/mm ²)]	0,255			0,245				
Temperature range III: 120 °C/72 °C	δ_{N0} -factor	[mm/(N/mm ²)]	0,219			0,170				
	$\delta_{N\infty}$ -factor	[mm/(N/mm ²)]	0,255			0,245				

¹⁾ Calculation of the displacement

$$\delta_{N0} = \delta_{N0}\text{-Faktor} \cdot \tau; \quad \tau: \text{acting bond stress for tension load}$$

$$\delta_{N\infty} = \delta_{N\infty}\text{-Faktor} \cdot \tau;$$

Table C10: Displacements under shear load¹⁾ (threaded rod)

Threaded rod			M 8	M 10	M 12	M 16	M 20	M24	M 27	M 30
Non-cracked concrete C20/25										
All temperature ranges	δ_{V0} -factor	[mm/(kN)]	0,06	0,06	0,05	0,04	0,04	0,03	0,03	0,03
	$\delta_{V\infty}$ -factor	[mm/(kN)]	0,09	0,08	0,08	0,06	0,06	0,05	0,05	0,05
Cracked concrete C20/25										
All temperature ranges	δ_{V0} -factor	[mm/(kN)]	0,12	0,12	0,11	0,10	0,09	0,08	0,08	0,07
	$\delta_{V\infty}$ -factor	[mm/(kN)]	0,18	0,18	0,17	0,15	0,14	0,13	0,12	0,10

¹⁾ Calculation of the displacement

$$\delta_{V0} = \delta_{V0}\text{-factor} \cdot V; \quad V: \text{acting shear load}$$

$$\delta_{V\infty} = \delta_{V\infty}\text{-factor} \cdot V;$$

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Annex C9

Table C11: Displacements under tension load¹⁾ (rebar)

Rebar			Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
Non-cracked concrete C20/25											
Temperature range I: 40 °C/24 °C	δ _{N0} -factor	[mm/(N/mm ²)]	0,021	0,023	0,026	0,028	0,031	0,036	0,043	0,047	0,052
	δ _{N∞} -factor	[mm/(N/mm ²)]	0,030	0,033	0,037	0,041	0,045	0,052	0,061	0,071	0,075
Temperature range II: 80 °C/50 °C	δ _{N0} -factor	[mm/(N/mm ²)]	0,050	0,056	0,063	0,069	0,075	0,088	0,104	0,113	0,126
	δ _{N∞} -factor	[mm/(N/mm ²)]	0,072	0,081	0,090	0,099	0,108	0,127	0,149	0,163	0,181
Temperature range III: 120 °C/72 °C	δ _{N0} -factor	[mm/(N/mm ²)]	0,050	0,056	0,063	0,069	0,075	0,088	0,104	0,113	0,126
	δ _{N∞} -factor	[mm/(N/mm ²)]	0,072	0,081	0,090	0,099	0,108	0,127	0,149	0,163	0,181
Cracked concrete C20/25											
Temperature range I: 40 °C/24 °C	δ _{N0} -factor	[mm/(N/mm ²)]	0,090				0,070				
	δ _{N∞} -factor	[mm/(N/mm ²)]	0,105				0,105				
Temperature range II: 80 °C/50 °C	δ _{N0} -factor	[mm/(N/mm ²)]	0,219				0,170				
	δ _{N∞} -factor	[mm/(N/mm ²)]	0,255				0,245				
Temperature range III: 120 °C/72 °C	δ _{N0} -factor	[mm/(N/mm ²)]	0,219				0,170				
	δ _{N∞} -factor	[mm/(N/mm ²)]	0,255				0,245				

¹⁾ Calculation of the displacement

$$\delta_{N0} = \delta_{N0}\text{-Faktor} \cdot \tau; \quad \tau: \text{acting bond stress for tension load}$$

$$\delta_{N\infty} = \delta_{N\infty}\text{-Faktor} \cdot \tau;$$

Table C12: Displacements under shear load¹⁾ (rebar)

Rebar			Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
Non-cracked concrete C20/25											
All temperature ranges	δ _{v0} -factor	[mm/(kN)]	0,06	0,05	0,05	0,04	0,04	0,04	0,03	0,03	0,03
	δ _{v∞} -factor	[mm/(kN)]	0,09	0,08	0,08	0,06	0,06	0,05	0,05	0,04	0,04
Cracked concrete C20/25											
All temperature ranges	δ _{v0} -factor	[mm/(kN)]	0,12	0,12	0,11	0,11	0,10	0,09	0,08	0,07	0,06
	δ _{v∞} -factor	[mm/(kN)]	0,18	0,18	0,17	0,16	0,15	0,14	0,12	0,11	0,10

¹⁾ Calculation of the displacement

$$\delta_{v0} = \delta_{v0}\text{-factor} \cdot V; \quad V: \text{acting shear load}$$

$$\delta_{v\infty} = \delta_{v\infty}\text{-factor} \cdot V;$$

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Performance
Displacements (rebar)

Annex C10