Deutsches Institut für Bautechnik

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Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-06/0122 of 29 May 2018

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Trutek TSC
Product family to which the construction product belongs	Bonded fastener for use in concrete
Manufacturer	TRUTEK Fasteners Polska Sp z o.o Al. Krakowska 55, Sekocin Nowy 05-090 RASZYN POLEN
Manufacturing plant	Trutek Plant 1
This European Technical Assessment contains	14 pages including 3 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 330499-00-0601

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Specific Part

1 Technical description of the product

The Trutek TSC is a bonded anchor consisting of a glass capsule TSC and a threaded anchor rod with hexagon nut and washer. The anchor rod (including nut and washer) is made of zinc-plated steel, hot-dip galvanised steel, stainless steel or made of high corrosion resistant steel.

The glass capsule is placed into the hole and the anchor rod is driven by machine with simultaneous hammering and turning. The anchor rod is anchored via the bond between anchor rod, chemical mortar and concrete.

The product description is given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchor of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance to tension load (static and quasi-static loading)	See Annex C 1
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C 2
Displacements (static and quasi-static loading)	See Annex C 1 and C 2
Characteristic resistance and displacements for seismic performance categories C1 and C2	No performance assessed

3.2 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Content, emission and/or release of dangerous substances	No performance assessed

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with the European Assessment Document EAD 330499-00-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 29 May 2018 by Deutsches Institut für Bautechnik

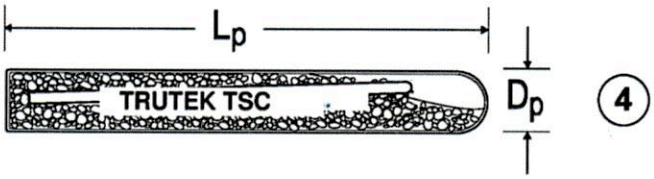
BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Baderschneider

Deutsches Institut für Bautechnik DIBt

Product and Installed condition

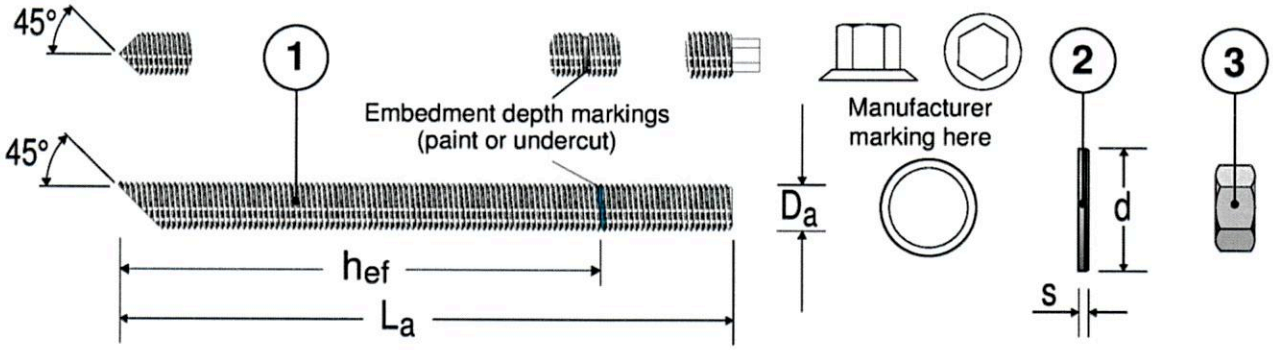
Mortar Capsule TSC:



Marking capsule

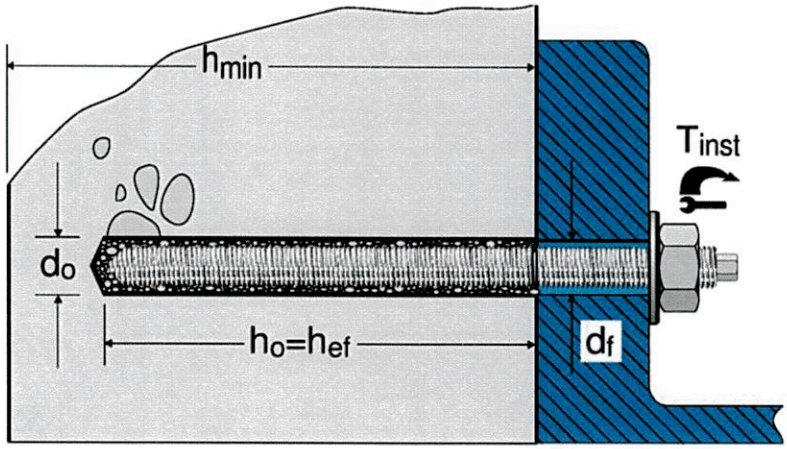
Manufacturer:	Trutek
Capsule type:	TSC
Capsule size:	M..

Anchor rod



Marking anchor rod **z.B. B16A**

Manufacturer	B		
Size	8, 10, 12, 16, 20, 24		
Material			
Galvanised property class 5.8	A	Stainless steel 1.4401, property class 70	C
Galvanised property class 8.8	B	Stainless steel 1.4404, property class 70	K
Hot dipped galvanised property class 5.8	H	Stainless steel 1.4529, property class 70	E
Hot dipped galvanised property class 8.8	I	Stainless steel 1.4565, property class 70	R
		Stainless steel 1.4571, property class 70	D
		Stainless steel 1.4401, property class 80	M
		Stainless steel 1.4404, property class 80	P
		Stainless steel 1.4571, property class 80	O



Trutek TSC	Annex A 1
Product description Product and installed condition	

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Table A1: Materials

Part	Description	Material			
1	Threaded rod	Carbon steel property class 5.8 or 8.8 EN ISO 898-1:2013		Stainless steel 1.4401, 1.4404 or 1.4571 property class A4-70 or A4-80 EN ISO 3506-1:2009 A_5 > 8% fracture elongation	High Corrosion resistant steel 1.4529 or 1.4565 property class 70 EN ISO 3506-1:2009 A_5 > 8% fracture elongation
		Galvanised steel ≥ 5µm acc. to EN ISO 4042:1999 A_5 > 8% fracture elongation	Hot dip galvanised steel EN ISO 10684:2004+AC:2009 A_5 > 8% fracture elongation		
2	Washer	Carbon steel		Stainless steel 1.4401, 1.4404 or 1.4571	High Corrosion resistant steel 1.4529 or 1.4565
		Galvanised steel ≥ 5µm acc. to EN ISO 4042:1999	Hot dip galvanised steel 10684:2004+AC:2009		
		EN ISO 887:2006 oder EN ISO 7089:2000 bis EN ISO 7094:2000			
3	Hexagon nut	Carbon steel property class 5 to 8 EN ISO 898-2:2012		Stainless steel 1.4401, 1.4404 or 1.4571 property class A4-70 or A4-80 EN ISO 3506-2:2009	High Corrosion resistant steel 1.4529 or 1.4565 property class 70 EN ISO 3506-2:2009
		Galvanised steel ≥ 5µm acc. to EN ISO 4042:1999	Hot dip galvanised steel 10684:2004+AC:2009		
		EN ISO 4032:2012 oder EN ISO 4034:2012			
4	Glass capsule	Glass Quartz Resin Hardener			

Table A2: Dimensions

Part	Description			M8	M10	M12	M16	M20	M24
1	Threaded rod	D_a L_a ≥	[mm]	M8 95	M10 100	M12 120	M16 140	M20 190	M24 235
2	Washer	s d	[mm]	1,6 16	2,1 21	2,5 24	3,0 30	3,0 37	4,0 44
3	Hexagon nut	SW	[mm]	13	17	19	24	30	36
4	Glass capsule	D_p L_p	[mm]	9 80	11 80	13 95	17 95	22 175	24 210

Trutek TSC

Product description
Materials
Dimensions

Annex A 2

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Specifications of intended use

Anchorages subject to:

- Static and quasi-static loads: all sizes.

Base materials:

- Reinforced or unreinforced normal weight concrete without fibers according to EN 206:2013.
- Strength classes C20/25 to C50/60 according to EN 206-1:2013.
- Non-cracked concrete.

Temperature Range:

- I: - 40 °C to +40 °C (max long term temperature +24 °C and max short term temperature +40 °C)
- II: - 40°C to +80°C (max long term temperature +50 °C and max short term temperature +80 °C)

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions
  (zinc coated steel, stainless steel or high corrosion resistant steel).
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist
  (stainless steel or high corrosion resistant steel).
- Structures subject to external atmospheric exposure and to permanently damp internal condition, if other particular aggressive conditions exist
  (high corrosion resistant steel).
  Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e. g. position of the anchor relative to reinforcement or to supports, etc.).
- Anchorages are designed in accordance with FprEN 1992-4:2016 and TR 055.

Installation:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Dry or wet concrete: all sizes.
- Hole drilling by hammer drilling.
- cleaning the drill hole:
  removing possibly existing water in the drill hole completely and cleaning the drill hole by at least one blowing operation, by at least 1 x brushing / 1 x blowing / 1 x brushing operation by using the steel brush supplied by the manufacturer; before brushing cleaning the brush and checking whether the brush diameter according to Annex B 2, Table B3 is still sufficient. The steel brush shall produce natural resistance as it enters the anchor hole. If this is not the case a new brush or a brush with a larger diameter must be used.

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Trutek TSC	Annex B 1
Intended Use Specifications	

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Table B1: Installation parameters

Anchor size			M8	M10	M12	M16	M20	M24
Nominal drill hole diameter	d_0	[mm]	10	12	14	18	25	28
Cutting diameter	$d_{cut} \leq$	[mm]	10,5	12,5	14,5	18,5	25,5	28,5
Depth of drill hole	h_0	[mm]	80	90	110	125	170	210
Effective anchorage depth	h_{ef}	[mm]	80	90	110	125	170	210
Diameter of clearance hole in the fixture	d_f	[mm]	9	12	14	18	22	26
Diameter of steel brush	D	[mm]	11	13	16	20	27	30
Maximum torque moment	T_{inst}	[Nm]	10	20	40	80	120	180

Steel brush

Trutek brush, extension and SDS+ connector

Installation procedure

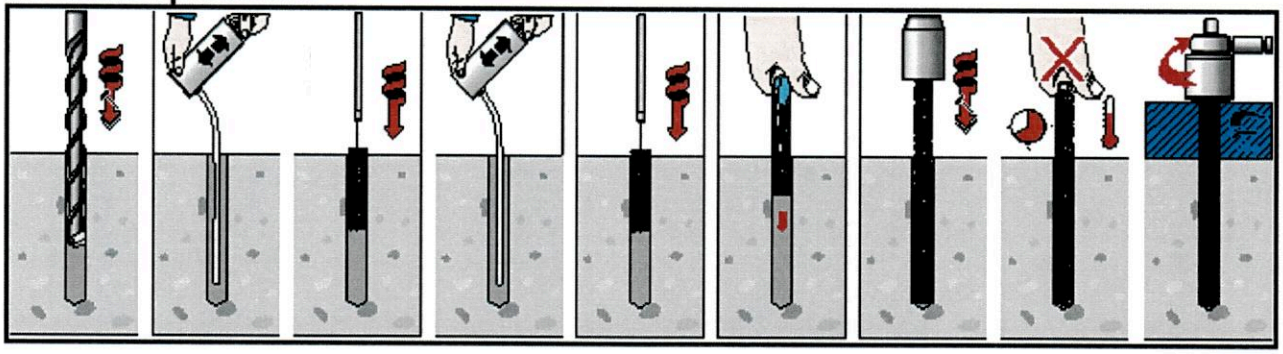

Table B2: Minimum member thickness, edge distance and spacing

Anchor size			M8	M10	M12	M16	M20	M24
Minimum member thickness	h_{min}	[mm]	110	120	140	160	220	260
Minimum edge distance	c_{min}	[mm]	40	45	55	65	85	105
Minimum spacing	s_{min}	[mm]	40	45	55	65	85	105

Table B3: Minimum curing time

Temperature in the concrete member	Minimum curing time in dry concrete	Minimum curing time in wet concrete
≥ 0°C	5 hrs.	10 hrs.
≥ + 5°C	1 hr.	2 hrs.
≥ +20°C	20 min.	40 min.
≥ +30°C	10 min.	20 min.

Trutek TSC

Intended Use
Installations parameters, minimum thickness of concrete member,
Minimum edge distance and spacing, Minimum curing time

Annex B 3

Deutsches Institut für Bautechnik DIBt

Metal parts made of zinc plated or hot dip galvanised steel

Table C1: Design method A, characteristic values for tension loads

Anchor size			M8	M10	M12	M16	M20	M24
Steel failure								
Characteristic resistance **property class 5.8**	$N_{Rk,S}$	[kN]	18	29	42	78	123	177
Characteristic resistance **property class 8.8**	$N_{Rk,S}$	[kN]	29	46	67	126	196	282
Combined pull-out and concrete failure								
Characteristic resistance in non-cracked concrete C20/25 to C50/60								
Temperature range I	$N^0_{Rk,p}$	[kN]	20	30	40	60	90	120
Temperature range II	$N^0_{Rk,p}$	[kN]	20	30	40	50	75	90
Factor for k_1	$k_{ucr,N}$	[-]	11,0					
Concrete cone failure								
Factor for k_1	$k_{ucr,N}$	[-]	11,0					
Characteristic edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}					
Characteristic spacing	$s_{cr,N}$	[mm]	3 h_{ef}					
Splitting[1)]								
Edge distance	$c_{cr,sp}$	[mm]	1,5 h_{ef}	1 h_{ef}				
Spacing	$s_{cr,sp}$	[mm]	3 h_{ef}	2 h_{ef}				
Installation factor	γ_{inst}	[-]	1,2					

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

Table C2: Displacements under tension loads

Anchor size			M8	M10	M12	M16	M20	M24
Tension load	N	[kN]	8	12	16	20	30	38
Displacement	δ_{N0}	[mm]	0,1	0,2	0,2	0,2	0,5	0,4
	$\delta_{N\infty}$	[mm]	0,5					

Trutek TSC

Performance
Characteristic values for tension loads
Displacements

Annex C 1

Deutsches Institut für Bautechnik DIBt

Metal parts made of stainless steel 1.4401, 1.4404 or 1.4571

Table C3: Design method A, characteristic values for tension loads

Anchor size			M8	M10	M12	M16	M20	M24
Steel failure								
Characteristic resistance **strength class A4-70**	$N_{Rk,S}$	[kN]	26	40	59	110	172	247
Characteristic resistance **strength class A4-80**	$N_{Rk,S}$	[kN]	29	46	67	126	196	282
Combined pull-out and concrete failure								
Characteristic resistance in non-cracked concrete C20/25 to C50/60								
Temperature range I	$N^0_{Rk,p}$	[kN]	20	30	40	60	90	120
Temperature range II	$N^0_{Rk,p}$	[kN]	20	30	40	50	75	90
Factor for k_1	$k_{ucr,N}$	[-]	11,0					
Concrete cone failure								
Factor for k_1	$k_{ucr,N}$	[-]	11,0					
Characteristic edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}					
Characteristic spacing	$s_{cr,N}$	[mm]	3 h_{ef}					
Splitting[1)]								
Edge distance	$c_{cr,sp}$	[mm]	1,5 h_{ef}	1 h_{ef}				
Spacing	$s_{cr,sp}$	[mm]	3 h_{ef}	2 h_{ef}				
Installation factor	γ_{inst}	[-]	1,2					

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

Table C4: Displacements under tension loads

Anchor size			M8	M10	M12	M16	M20	M24
Tension load	N	[kN]	8	12	16	20	30	38
Displacement	δ_{N0}	[mm]	0,1	0,2	0,2	0,2	0,5	0,4
	$\delta_{N\infty}$	[mm]	0,5					

Trutek TSC

Performance
Characteristic values for tension loads
Displacements

Annex C 2

Deutsches Institut für Bautechnik DIBt

Metal parts made of high corrosion resistant steel 1.4529 or 1.4565

Table C5: Design method A, characteristic values for tension loads

Anchor size			M8	M10	M12	M16	M20	M24
Steel failure								
Characteristic resistance **strength class 70**	$N_{Rk,S}$	[kN]	26	40	59	110	172	247
Combined pull-out and concrete failure								
Characteristic resistance in non-cracked concrete C20/25 to C50/60								
Temperature range I	$N^0_{Rk,p}$	[kN]	20	30	40	60	90	120
Temperature range II	$N^0_{Rk,p}$	[kN]	20	30	40	50	75	90
Factor for k_1	$k_{ucr,N}$	[-]	11,0					
Concrete cone failure								
Factor for k_1	$k_{ucr,N}$	[-]	11,0					
Characteristic edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}					
Characteristic spacing	$s_{cr,N}$	[mm]	3 h_{ef}					
Splitting[1)]								
Edge distance	$c_{cr,sp}$	[mm]	1,5 h_{ef}	1 h_{ef}				
Spacing	$s_{cr,sp}$	[mm]	3 h_{ef}	2 h_{ef}				
Installation factor	γ_{inst}	[-]	1,2					

[1)] For the proof against splitting failure, $N^0_{Rk,c}$ has to be replaced by $N^0_{Rk,p}$.

Table C6: Displacements under tension loads

Anchor size			M8	M10	M12	M16	M20	M24
Tension load	N	[kN]	8	12	16	20	30	38
Displacement	δ_{N0}	[mm]	0,1	0,2	0,2	0,2	0,5	0,4
	$\delta_{N\infty}$	[mm]	0,5					

Deutsches Institut für Bautechnik DIBt

Metal parts made of zinc plated or hot dip galvanised steel

Table C7: Design method A, characteristic values for shear loads

Anchor size			M8	M10	M12	M16	M20	M24
Steel failure without lever arm								
Characteristic resistance **property class 5.8**	$V^0_{Rk,S}$	[kN]	9	14	21	39	61	88
Characteristic resistance **property class 8.8**	$V^0_{Rk,S}$	[kN]	15	23	33	63	98	141
Ductility factor	k_7	[-]	0,8					
Steel failure with lever arm								
Characteristic bending moment **property class 5.8**	$M^0_{Rk,S}$	[Nm]	19	37	65	166	325	561
Characteristic bending moment **property class 8.8**	$M^0_{Rk,S}$	[Nm]	30	60	105	266	519	898
Pry out failure								
Factor	k_8	[-]	2,0					
Installation factor	γ_{inst}	[-]	1,0					
Concrete edge failure								
Effective length of anchor	ℓ_f	[mm]	80	90	110	125	170	210
Outside diameter of anchor	d_{nom}	[mm]	10	12	14	18	25	28
Installation factor	γ_{inst}	[-]	1,0					

Table C8: Displacements under shear loads

Anchor size			M8	M10	M12	M16	M20	M24
Shear load	V	[kN]	5	8	12	22	35	50
Displacement	δ_{V0}	[mm]	2	3	3	4	5	5
	$\delta_{V\infty}$	[mm]	4	5	5	6	7	7

Trutek TSC

Performance
Characteristic values for shear loads
Displacements

Annex C 4

Deutsches Institut für Bautechnik DIBt

Metal parts made of stainless steel 1.4401, 1.4404 or 1.4571

Table C9: Design method A, characteristic values for shear loads

Anchor size			M8	M10	M12	M16	M20	M24
Steel failure without lever arm								
Characteristic resistance **strength class A4-70**	$V^0_{Rk,S}$	[kN]	13	20	29	55	86	124
Characteristic resistance **strength class A4-80**	$V^0_{Rk,S}$	[kN]	15	23	33	62	98	141
Ductility factor	k_7	[-]	0,8					
Steel failure with lever arm								
Characteristic bending moment **strength class A4-70**	$M^0_{Rk,S}$	[Nm]	26	52	92	233	454	785
Characteristic bending moment **strength class A4-80**	$M^0_{Rk,S}$	[Nm]	30	60	105	266	519	898
Pry out failure								
Factor	k_8	[-]	2,0					
Installation factor	γ_{inst}	[-]	1,0					
Concrete edge failure								
Effective length of anchor	ℓ_f	[mm]	80	90	110	125	170	210
Outside diameter of anchor	d_{nom}	[mm]	10	12	14	18	25	28
Installation factor	γ_{inst}	[-]	1,0					

Table C10: Displacements under shear loads

Anchor size			M8	M10	M12	M16	M20	M24
Shear load	V	[kN]	5	8	12	22	35	50
Displacement	δ_{V0}	[mm]	2	3	3	4	5	5
	$\delta_{V\infty}$	[mm]	4	5	5	6	7	7

Trutek TSC

Performance
Characteristic values for shear loads
Displacements

Annex C 5

Deutsches Institut für Bautechnik DIBt

Metal parts made of high corrosion resistant steel 1.4529 or 1.4565

Table C11: Design method A, characteristic values for shear loads

Anchor size			M8	M10	M12	M16	M20	M24
Steel failure without lever arm								
Characteristic resistance **strength class 70**	$V^0_{Rk,S}$	[kN]	13	20	29	55	86	124
Ductility factor	k_7	[-]	0,8					
Steel failure with lever arm								
Characteristic bending moment **strength class 70**	$M^0_{Rk,S}$	[Nm]	26	52	92	233	454	785
Pry out failure								
Factor	k_8	[-]	2,0					
Installation factor	γ_{inst}	[-]	1,0					
Concrete edge failure								
Effective length of anchor	ℓ_f	[mm]	80	90	110	125	170	210
Outside diameter of anchor	d_{nom}	[mm]	10	12	14	18	25	28
Installation factor	γ_{inst}	[-]	1,0					

Table C12: Displacements under shear loads

Anchor size			M8	M10	M12	M16	M20	M24
Shear load	V	[kN]	5	8	12	22	35	50
Displacement	δ_{V0}	[mm]	2	3	3	4	5	5
	$\delta_{V\infty}$	[mm]	4	5	5	6	7	7