



European Technical Approval ETA-09/0342

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung
Trade name

MKT Schwerlastanker SLZ
MKT Highload Anchor SLZ

Zulassungsinhaber
Holder of approval

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

Zulassungsgegenstand
und Verwendungszweck
*Generic type and use
of construction product*

Kraftkontrolliert spreizender Dübel aus galvanisch verzinktem Stahl in
der Größe 14/M10 zur Verankerung im Beton
*Torque controlled expansion anchor made of galvanised steel
of size 14/M10 for use in concrete*

Geltungsdauer:
Validity: vom
from
bis
to

14 May 2013
14 May 2018

Herstellwerk
Manufacturing plant

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

Diese Zulassung umfasst
This Approval contains

15 Seiten einschließlich 8 Anhänge
15 pages including 8 annexes

Diese Zulassung ersetzt
This Approval replaces

ETA-09/0342 mit Geltungsdauer vom 24.11.2009 bis 24.11.2014
ETA-09/0342 with validity from 24.11.2009 to 24.11.2014

I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:
 - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products¹, modified by Council Directive 93/68/EEC² and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council³;
 - *Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998⁴, as amended by Article 2 of the law of 8 November 2011⁵;*
 - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC⁶;
 - Guideline for European technical approval of "Metal anchors for use in concrete - Part 2: Torque controlled expansion anchors", ETAG 001-02.
- 2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.
- 3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.
- 4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.
- 5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.
- 6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

¹ Official Journal of the European Communities L 40, 11 February 1989, p. 12
² Official Journal of the European Communities L 220, 30 August 1993, p. 1
³ Official Journal of the European Union L 284, 31 October 2003, p. 25
⁴ *Bundesgesetzblatt Teil I 1998*, p. 812
⁵ *Bundesgesetzblatt Teil I 2011*, p. 2178
⁶ Official Journal of the European Communities L 17, 20 January 1994, p. 34

II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

1 Definition of the construction and intended use

1.1 Definition of the product

The MKT Highload Anchor SLZ of size 14/M10 is an anchor made of galvanised steel which is placed into a drilled hole and anchored by torque-controlled expansion.

An illustration of the product and intended use is given in Annex 1.

1.2 Intended use

The anchor is intended to be used for anchorages for which requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 of Council Directive 89/106 EEC shall be fulfilled and failure of anchorages made with these products would cause risk to human life and/or lead to considerable economic consequences. The anchor is to be used only for anchorages subject to static or quasi-static loading in reinforced or unreinforced normal weight concrete of strength classes C20/25 at minimum and C50/60 at most according to EN 206:2000-12.

The anchor may be anchored in cracked or non-cracked concrete.

The anchor may only be used in structures subject to dry internal conditions.

The provisions made in this European technical approval are based on an assumed working life of the anchor of 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.

2 Characteristics of the product and methods of verification

2.1 Characteristics of the product

The anchor corresponds to the drawings and provisions given in Annexes 2 and 3. The characteristic material values, dimensions and tolerances of the anchor not given in Annexes 2 and 3 shall correspond to the respective values laid down in the technical documentation⁷ of this European technical approval.

The characteristic values for the design of anchorages are given in Annexes 5 to 8.

Each anchor is marked with the identifying mark of the Manufacturing plant, the trade name, outer diameter of the anchor and the maximum thickness of fixture according to Annex 2. In addition, the minimum anchorage depth is marked on the distance sleeve.

The anchor shall only be packaged and supplied as a complete unit.

⁷ The technical documentation of this European technical approval is deposited at the Deutsches Institut für Bautechnik and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure, is handed over to the approved bodies.

2.2 Methods of verification

The assessment of fitness of the anchor for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Essential Requirements 1 and 4 has been made in accordance with the "Guideline for European technical approval of Metal Anchors for Use in Concrete", Part 1 "Anchors in general" and Part 2 "Torque-controlled expansion anchors", on the basis of Option 1.

In addition to the specific clauses relating to dangerous substances contained in this European technical approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

3 Evaluation and attestation of conformity and CE marking

3.1 System of attestation of conformity

According to the decision 96/582/EG of the European Commission⁸ the system 2(i) (referred to as system 1) of attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 1: Certification of the conformity of the product by an approved certification body on the basis of:

- (a) Tasks for the manufacturer:
 - (1) factory production control;
 - (2) further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan;
- (b) Tasks for the approved body:
 - (3) initial type-testing of the product;
 - (4) initial inspection of factory and of factory production control;
 - (5) continuous surveillance, assessment and approval of factory production control.

Note: Approved bodies are also referred to as "notified bodies".

3.2 Responsibilities

3.2.1 Tasks of the manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European technical approval.

The manufacturer may only use initial / raw / constituent materials stated in the technical documentation of this European technical approval.

⁸ Official Journal of the European Communities L 254 of 08.10.1996.

The factory production control shall be in accordance with the control plan which is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited at Deutsches Institut für Bautechnik⁹.

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

3.2.1.2 Other tasks of manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of anchors in order to undertake the actions laid down in section 3.2.2. For this purpose, the control plan referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European technical approval.

3.2.2 Tasks of approved bodies

The approved body shall perform the

- initial type-testing of the product ,
- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control,

in accordance with the provisions laid down in the control plan.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the product stating the conformity with the provisions of this European technical approval.

In cases where the provisions of the European technical approval and its control plan are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform Deutsches Institut für Bautechnik without delay.

3.3 CE marking

The CE marking shall be affixed on each packaging of the anchor. The letters "CE" shall be followed by the identification number of the approved certification body, where relevant, and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacturer),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate of conformity for the product,
- the number of the European technical approval,
- the number of the guideline for European technical approval,
- use category (ETAG 001-1 Option 1),
- size.

⁹

The control plan is a confidential part of the documentation of the European technical approval, but not published together with the European technical approval and only handed over to the approved body involved in the procedure of attestation of conformity.
See section 3.2.2.

4 Assumptions under which the fitness of the product for the intended use was favourably assessed

4.1 Manufacturing

The European technical approval is issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the European technical approval and consequently the validity of the CE marking on the basis of the European technical approval and if so whether further assessment or alterations to the European technical approval shall be necessary.

4.2 Design of anchorages

The fitness of the anchor for the intended use is given under the following conditions:

The anchorages are designed either in accordance with

- ETAG 001 "Guideline for European technical approval of Metal Anchors for use in concrete", Annex C, method A

or in accordance with

- CEN/TS 1992-4:2009, design method A

under the responsibility of an engineer experienced in anchorages and concrete work.

Verifiable calculation notes and drawings are 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, in cracked or non-cracked concrete, etc.).

4.3 Installation of anchors

The fitness for use of the anchor can only be assumed if the anchor is installed as follows:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site,
- Use of the anchor only as supplied by the manufacturer without exchanging the components of an anchor,
- Anchor installation in accordance with the manufacturer's specifications and drawings and using the appropriate tools,
- Checks before placing the anchor to ensure that the strength class of the concrete in which the anchor is to be placed is in the range given and is not lower than that of the concrete to which the characteristic loads apply,
- Check of concrete being well compacted, e.g. without significant voids,
- Edge distances and spacing not less than the specified values without minus tolerances,
- Positioning of the drill holes without damaging the reinforcement,
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted drill hole is filled with high strength mortar and if under shear or oblique tension load it is not in the direction of load application,
- Cleaning of the hole of drilling dust,
- Anchor installation such that the effective anchorage depth is complied with. This compliance is ensured when the embedment mark of the anchor does not exceed the concrete surface,

- Application of the torque moment given in Annex 3 using a calibrated torque wrench.

5 Indications to the manufacturer

The manufacturer is responsible to ensure that the information on the specific conditions according to 1 and 2 including Annexes referred to as well as sections 4.2 and 4.3 is given to those who are concerned. This information may be made by reproduction of the respective parts of the European technical approval. In addition all installation data shall be shown clearly on the package and/or on an enclosed instruction sheet, preferably using illustration(s).

The minimum data required are:

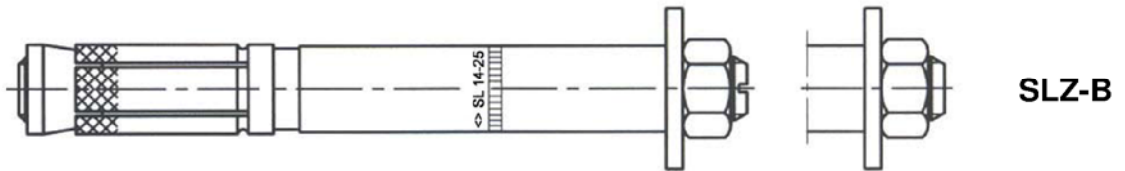
- Diameter of drill bit,
- Thread diameter,
- Maximum thickness of the fixture,
- Minimum effective anchorage depth,
- Minimum hole depth,
- Torque moment,
- Information on the installation procedure, including cleaning of the hole, preferably by means of an illustration,
- Reference to any special installation equipment needed,
- Identification of the manufacturing batch.

All data shall be presented in a clear and explicit form.

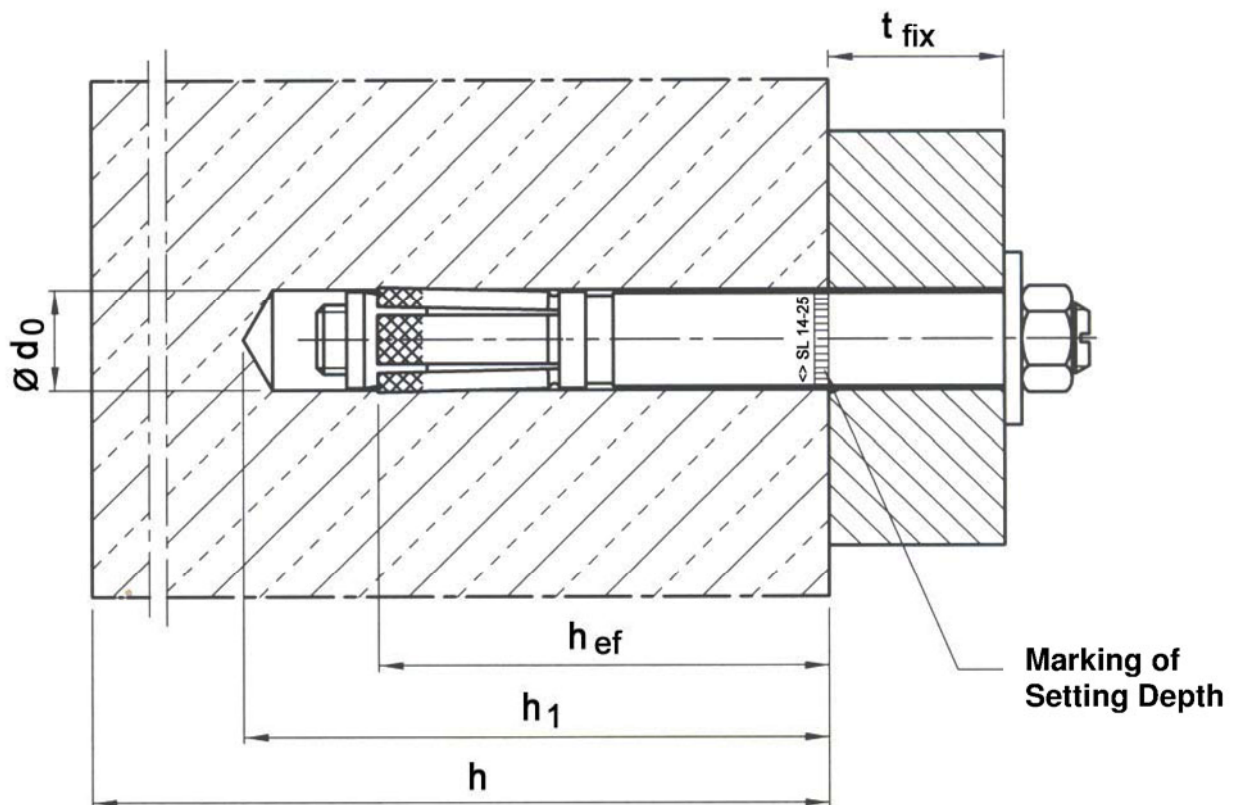
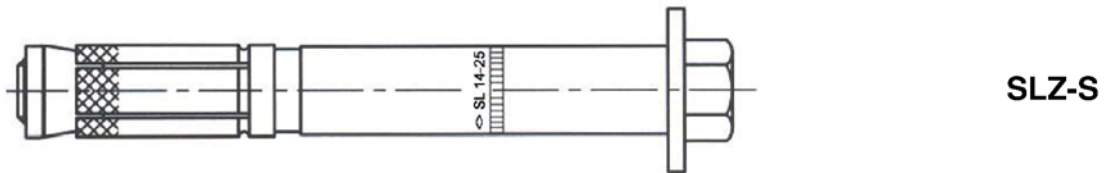
Uwe Bender
Head of Department

beglaubigt:
Baderschneider

Anchor type SLZ-B with threaded bolt



Anchor type SLZ-S with hexagon head screw



MKT Highload Anchor SLZ

Product and intended use

Annex 1

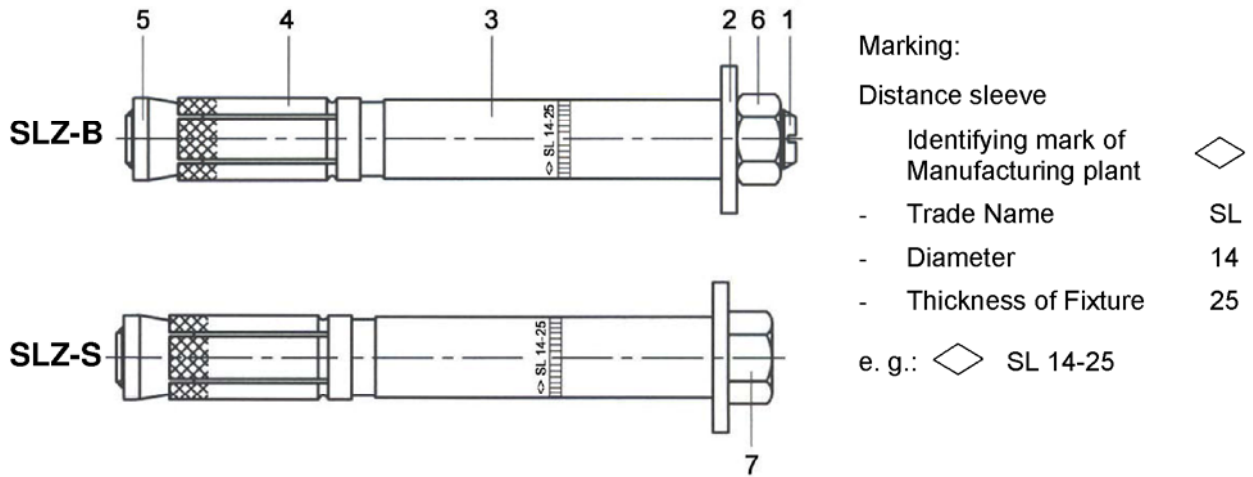


Table 1: Designation of anchor parts and materials

Part	Designation	Materials galvanised $\geq 5 \mu\text{m}$, acc. to EN ISO 4042
1	Threaded bolt	Steel, Strength class 8.8, EN ISO 898-1
2	Washer	Steel, EN 10139
3	Distance sleeve	Precision steel tubes DIN 2394/ 2393
4	Expansion sleeve	Precision steel tubes DIN 2394/ 2393
5	Threaded cone	Steel, Strength class 8, EN ISO 898-2, plastic coated
6	Hexagon nut	Steel, Strength class 8, EN ISO 898-2
7	Hexagon head screw	Steel, Strength class 8.8, EN ISO 898-1

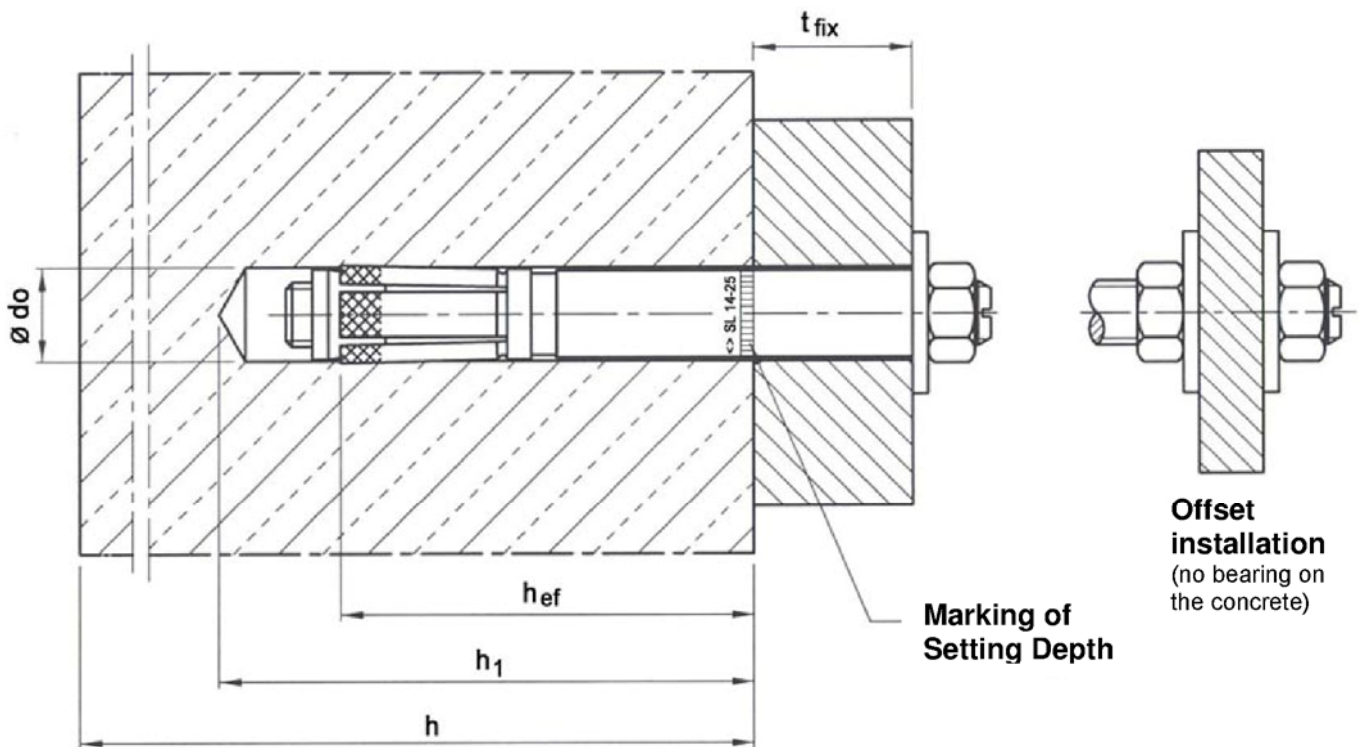
MKT Highload Anchor SLZ

Designation of anchor parts and materials

Annex 2

Table 2: Installation parameters

Anchor size			14/M10
Size of thread			M10
Effective anchorage depth	h_{ef}	[mm]	65
Nominal diameter of drill bit	$d_0 =$	[mm]	14
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	14,5
Depth of drill hole	$h_1 \geq$	[mm]	85
Diameter of clearance hole in the fixture mounted on distance sleeve	$d_f \leq$	[mm]	16
Diameter of clearance hole in the fixture mounted on threaded bolt	$d_f \leq$	[mm]	12
Installation torque	$T_{inst} =$	[Nm]	50
Minimum thickness of member	h_{min}	[mm]	130
Minimum spacing	s_{min}	[mm]	60
	$c \geq$	[mm]	120
Minimum edge distance	c_{min}	[mm]	70
	$s \geq$	[mm]	130

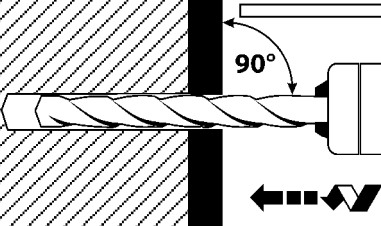
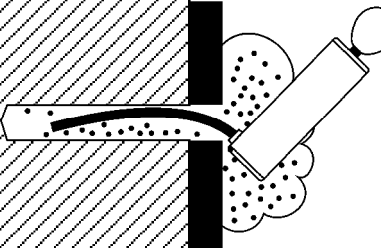
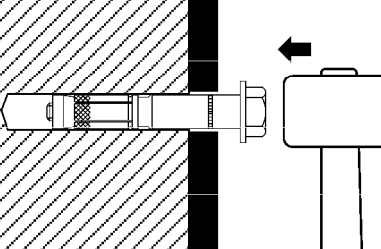
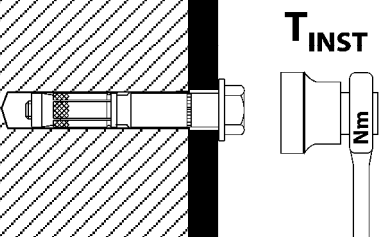


MKT Highload Anchor SLZ

Installation parameters

Annex 3

Installation instructions

1		Drill hole perpendicular to concrete surface.
2		Blow out dust.
3		Drive in anchor.
4		Apply tightening torque T_{inst} by using torque wrench.

**Table 3: Characteristic values for tension loads,
ETAG 001, Annex C**

Anchor size			14/M10
Steel failure			
Characteristic resistance	$N_{Rk,s}$	[kN]	46
Partial safety factor	γ_{Ms}	[-]	1,5
Pull-out failure in cracked concrete C20/25			
Characteristic resistance	$N_{Rk,p}$	[kN]	12
Pull-out failure in non-cracked concrete C20/25			
Characteristic resistance	$N_{Rk,p}$	[kN]	20
Increasing factors for $N_{Rk,p}$	ψ_c	C30/37	[-]
		C40/50	[-]
		C50/60	[-]
Concrete cone failure			
Effective anchorage depth	h_{ef}	[mm]	65
Spacing	$s_{cr,N}$	[mm]	3 h_{ef}
Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}
Splitting failure			
Spacing	$s_{cr,sp}$	[mm]	390
Edge distance	$c_{cr,sp}$	[mm]	195
Partial safety factor	$\gamma_{Mp} = \gamma_{Mc} = \gamma_{Msp}$	[-]	1,5

Table 4: Displacements under tension loads

Anchor size			14/M10
Tension load in cracked concrete	N	[kN]	5,7
Displacement	δ_{N0}	[mm]	0,8
	$\delta_{N\infty}$	[mm]	1,5
Tension load in non-cracked concrete	N	[kN]	9,5
Displacement	δ_{N0}	[mm]	0,3
	$\delta_{N\infty}$	[mm]	1,2

MKT Highload Anchor SLZ

**Characteristic values for tension loads,
ETAG 001, Annex C,
Displacements under tension load**

Annex 5

**Table 5: Characteristic values for shear loads,
ETAG 001, Annex C**

Anchor size			14/M10
Steel failure without lever arm			
Characteristic resistance, fixture mounted on distance sleeve with $t_{fix} \leq 75$ mm	$V_{Rk,s}$	[kN]	32,8
Characteristic resistance, fixture mounted on distance sleeve with $t_{fix} > 75$ mm	$V_{Rk,s}$	[kN]	23,2
Partial safety factor	γ_{Ms}	[-]	1,25
Steel failure with lever arm			
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	60
Partial safety factor	γ_{Ms}	[-]	1,25
Concrete pryout failure			
Factor in equation (5.6) ETAG 001, Annex C, 5.2.3.3	k	[-]	2
Partial safety factor	γ_{Mcp}	[-]	1,5
Concrete edge failure			
Effective length of anchor in shear loading	l_f	[mm]	65
Outside diameter of anchor	d_{nom}	[mm]	14
Partial safety factor	γ_{Mc}	[-]	1,5

Table 6: Displacements under shear loads

Anchor size			14/M10
Shear load	V	[kN]	13,2
Displacement	δ_{V0}	[mm]	2,2
	$\delta_{V\infty}$	[mm]	3,3

MKT Highload Anchor SLZ

**Characteristic values for shear loads,
ETAG 001, Annex C,
Displacement under shear loads**

Annex 6

**Table 7: Characteristic values for tension loads,
CEN/TS 1992-4**

Anchor size			14/M10	
Steel failure				
Characteristic resistance	$N_{RK,s}$	[kN]	46	
Partial safety factor	γ_{Ms}	[-]	1,5	
Pull-out failure in cracked concrete C20/25				
Characteristic resistance	$N_{RK,p}$	[kN]	12	
Pull-out failure in cracked concrete C20/25				
Characteristic resistance	$N_{RK,p}$	[kN]	20	
Increasing factors for $N_{RK,p}$	ψ_c	C30/37	[-]	1,22
		C40/50	[-]	1,41
		C50/60	[-]	1,55
Concrete cone failure				
Effective anchorage depth	h_{ef}	[mm]	65	
Factor for cracked concrete	k_{cr}	[-]	7,2	
Factor for non-cracked concrete	k_{ucr}	[-]	10,1	
Spacing	$s_{cr,N}$	[mm]	3 h_{ef}	
Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}	
Splitting failure				
Spacing	$s_{cr,sp}$	[mm]	390	
Edge distance	$c_{cr,sp}$	[mm]	195	
Partial safety factor	$\gamma_{Msp} = \gamma_{Msp} = \gamma_{Msp}$	[-]	1,5	

Table 8: Displacements under tension loads

Anchor size			14/M10
Tension load in cracked concrete	N	[kN]	5,7
Displacement	δ_{N0}	[mm]	0,8
	$\delta_{N\infty}$	[mm]	1,5
Tension load in non-cracked concrete	N	[kN]	9,5
Displacement	δ_{N0}	[mm]	0,3
	$\delta_{N\infty}$	[mm]	1,2

MKT Highload Anchor SLZ

**Characteristic values for tension loads,
CEN/TS 1992-4,
Displacements under tension loads**

Annex 7

**Table 9: Characteristic values for shear loads,
CEN/TS 1992-4**

Anchor size			14/M10
Steel failure without lever arm			
Characteristic resistance, fixture mounted on distance sleeve with $t_{fix} \leq 75\text{mm}$	$V_{Rk,s}$	[kN]	32,8
Characteristic resistance, fixture mounted on distance sleeve with $t_{fix} > 75\text{mm}$	$V_{Rk,s}$	[kN]	23,2
Factor of ductility	k_2	[-]	1,0
Partial safety factor	γ_{Ms}	[-]	1,25
Steel failure with lever arm			
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	60
Partial safety factor	γ_{Ms}	[-]	1,25
Concrete pryout failure			
Factor in equation (16) CEN/TS 1992-4-4, 6.2.2.3	k_3	[-]	2,0
Partial safety factor	γ_{Mcp}	[-]	1,5
Concrete edge failure			
Effective length of anchor in shear loading	l_f	[mm]	65
Outside diameter of anchor	d_{nom}	[mm]	14
Partial safety factor	γ_{Mc}	[-]	1,5

Table 10: Displacements under shear loads

Anchor size			14/M10
Shear load	V	[kN]	13,2
Displacement	δ_{V0}	[mm]	2,2
	$\delta_{V\infty}$	[mm]	3,3

MKT Highload Anchor SLZ

**Characteristic values for shear loads,
CEN/TS 1992-4,
Displacements under shear loads**

Annex 8