

Allgemeine bauaufsichtliche Zulassung

Zulassungsstelle für Bauprodukte und Bauarten

Bautechnisches Prüfampt

Eine vom Bund und den Ländern
gemeinsam getragene Anstalt des öffentlichen Rechts

Mitglied der EOTA, der UEAtc und der WFTAO

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Applicant:

Hermes Befestigungstechnik GmbH

Johannes-Kepler-Straße 10-12

74354 Besigheim-Ottmarsheim

Subject of approval:

Hermes Royal Thermo-Anker

The subject of approval mentioned above is herewith generally approved in the field of construction. This *allgemeine bauaufsichtliche Zulassung* ('national technical approval') comprises eight pages and ten annexes.

This *allgemeine bauaufsichtliche Zulassung* ('national technical approval') replaces the *allgemeine bauaufsichtliche Zulassung* ('national technical approval') Z-21.3-1984 of 29 April 2013. The subject of approval was first issued on 29 April 2013.

DIBt

I GENERAL PROVISIONS

- 1 With the *allgemeine bauaufsichtliche Zulassung* ('national technical approval') the fitness for use and the applicability of the subject of approval according to the *Landesbauordnungen* ('Building Regulations of the Land') has been verified.
- 2 If, in the *allgemeine bauaufsichtliche Zulassung* ('national technical approval') requirements are made concerning the special expertise and experience of persons entrusted with the manufacture of construction products and types of construction according to the relevant regulations of the Land following section 17, sub-section 5 *Musterbauordnung* ('Model Building Code'), it is to be noted that this expertise and experience can also be proven by equivalent verifications from other Member States of the European Union. If necessary, this also applies to verifications presented within the framework of the Agreement on the European Economic Area (EEA) or other bilateral agreements.
- 3 The *allgemeine bauaufsichtliche Zulassung* ('national technical approval') does not replace the permits, approvals and certificates prescribed by law for carrying out building projects.
- 4 The *allgemeine bauaufsichtliche Zulassung* ('national technical approval') will be granted without prejudice to the rights of third parties, in particular private property rights.
- 5 Notwithstanding further regulations in the "Specific Provisions" manufacturers and distributors of the subject of approval shall make copies of the *allgemeine bauaufsichtliche Zulassung* ('national technical approval') available to the user and point out that the *allgemeine bauaufsichtliche Zulassung* ('national technical approval') has to be available at the place of use. Upon request copies of the *allgemeine bauaufsichtliche Zulassung* ('national technical approval') shall be placed at the disposal of the authorities involved.
- 6 The *allgemeine bauaufsichtliche Zulassung* ('national technical approval') may be reproduced in full only. Publication in the form of extracts requires the consent of *Deutsches Institut für Bautechnik*. Texts and drawings of advertising brochures may not be in contradiction to the *allgemeine bauaufsichtliche Zulassung* ('national technical approval'). Translations of the *allgemeine bauaufsichtliche Zulassung* ('national technical approval') have to contain the note "Translation of the German original, not checked by *Deutsches Institut für Bautechnik*".
- 7 The *allgemeine bauaufsichtliche Zulassung* ('national technical approval') is granted until revoked. The provisions of the *allgemeine bauaufsichtliche Zulassung* ('national technical approval') can subsequently be supplemented and amended in particular, if this is required by new technical findings.

II SPECIFIC PROVISIONS

1 Subject of approval and field of application

1.1 Subject of approval

The Hermes Royal Thermo-Anker is a bonded anchor, which consists of an anchor rod, the injection mortar Hilti HIT-MM Plus and a sieve sleeve.

The anchor rod consists of a thermal separating component made of fiberglass reinforced plastic, a hexagonal basic component and a mounting for fittings and fastening screws made of galvanized steel or stainless steel A2 or A4. It is placed into a drilled hole filled with injection mortar and is anchored via the bond between steel element, injection mortar and masonry.

The installed Thermo-Anker is shown in Annex 1.

1.2 Intended use

The anchor may be used for anchorages subject to static or quasi-static loading when there are no requirements relating to fire resistance that have to be met by the entire structure including the anchor.

The anchor may only be used for anchorages in masonry according to DIN 1053-1 or according to DIN EN 1996-1-1 together with DIN EN 1996-1-1/NA. Admissible base materials are:

- Solid clay bricks Mz according to DIN 105-1, DIN V 105-1:2002-06 or DIN 105-100:2012-01, compressive strength class ≥ 12 ,
- Solid calcium silicate bricks KS according to DIN 106-1, DIN V 106-1:2003-02 or DIN V 106:2005-10, compressive strength class ≥ 12 ,
- Autoclaved aerated concrete bricks PB according to DIN 4165 or DIN V 4165-100:2005-10, compressive strength class ≥ 2 ,
- Hollow clay bricks Hlz according to DIN 105-1, DIN V 105-1:2002-06 or DIN 105-100:2012-01, compressive strength class ≥ 12 , geometry of the brick according to Annex 5,
- Hollow calcium silicate bricks KSL according to DIN 106-1, DIN V 106-1:2003-02 or DIN V 106:2005-10, compressive strength class ≥ 20 , geometry of the brick according to Annex 5,
- Hollow normal weight concrete bricks Hbn according to DIN 18153, DIN V 18153:2003-10 or DIN V 18151-100:2005-10, compressive strength class ≥ 10 , geometry of the brick according to Annex 5,
- Hollow pumice concrete masonry blocks, compressive strength class ≥ 4 , geometry of the brick according to Annex 5.

The masonry mortar must at least meet the requirements for general purpose masonry mortar of mortar group II, for thin layer or lightweight masonry mortar in accordance with DIN 1053 1: 1996-11, Annex A.3 or DIN V 18580: 2007-03.

The anchor may be used in temperature range from -40 °C to $+80\text{ °C}$ (maximum long-term temperature $+50\text{ °C}$ and maximum short-term temperature $+80\text{ °C}$).

The anchor made of galvanized steel and stainless steel A2 may only be used in structures subject to dry internal conditions.

The anchor made of stainless steel A4 may be used for constructions according to the corrosion resistance class III of the *Allgemeine bauaufsichtliche Zulassung "Erzeugnisse, Verbindungsmittel und Bauteile aus nichtrostenden Stählen" Nr. Z-30.3-6* ('national technical approval Products, connecting elements and components made of stainless steel' No. Z-30.3-6).

2 Provisions for the construction product

2.1 Properties and composition

The dimensions and the material of the Thermo-Anker shall comply with the specifications given in the annexes.

The material properties, dimensions and tolerances of the anchor not given in this *allgemeine bauaufsichtliche Zulassung* shall comply with the information deposited at *Deutsches Institut für Bautechnik*, the certification body and the external surveillance body.

2.2 Packaging, storage and marking

2.2.1 Packaging and storage

Anchor rod and sieve sleeve are packed separately from the injection mortar.

The two components of the injection mortar are supplied unmixed in foil packs according to Annex 2. The injection mortar shall be protected against sun radiation and heat and shall be stored according to the manufacturer's installation instructions in dry conditions at temperatures of at least +5 °C to not more than +25 °C. A short-term storage up to +40 °C is allowed.

2.2.2 Marking

The packaging, enclosed instructions or delivery note of the anchor shall be marked by the manufacturer with the conformity mark (Ü-mark) according to the *Übereinstimmungszeichen-Verordnungen der Länder* ('Regulations on the conformity mark of the states of the Federal Republic of Germany'). In addition, the manufacturing mark, the approval number and the complete anchor designation shall be declared. The marking may only be carried out if the requirements according to Section 2.3 "*Übereinstimmungsnachweis*" ('Verification of conformity') have been met.

The Hermes Royal Thermo-Anker is designated by the product name.

Each anchor rod is embossed on the separating component with the product name according to Annex 2. Each anchor rod made of stainless steel A4 is additionally provided with a clearly visible, permanent color marking or an additional puncture as a marking.

The foil pack with the injection mortar shall be marked in accordance with the *Verordnung über gefährliche Arbeitsstoffe* ('Regulation on hazardous materials') and marked with the words "Hilti HIT-MM Plus" as well as information about the shelf life, hazard code and processing. The installation instructions supplied with the injection system shall contain the information on safety measures for dealing with hazardous materials.

2.3 Übereinstimmungsnachweis ('Verification of conformity')

2.3.1 General

Each manufacturing plant shall confirm that the anchor complies with the provisions of this *allgemeine bauaufsichtliche Zulassung* by means of a certificate of conformity based on the factory production control and a regular external surveillance, including initial testing of the anchor in accordance with the following provisions.

The manufacturer of the anchor shall organize a recognised certification body and a recognised inspection body to issue a certificate of conformity and for the external surveillance, including product testing that has to be carried out.

The manufacturer shall state by marking the products with the conformity mark (Ü-mark) with reference to the intended use, that the certificate of conformity is issued.

The certification body shall send a copy of the issued certificate of conformity to *Deutsches Institut für Bautechnik*.

2.3.2 Factory production control

Each manufacturing plant shall set up and carry out a factory production control. Factory production control is a continuous surveillance of production by the manufacturer who thus ensures that the manufactured construction product is in conformity with the provisions of this *allgemeine bauaufsichtliche Zulassung*. The factory production control shall include at least the actions laid down in the control plan.

Extent, type and frequency of the factory production control shall be in accordance with the control plan which is deposited by *Deutsches Institut für Bautechnik* and by the external surveillance body.

The results of factory production control shall be recorded and evaluated. The records shall include at least the following information:

- Designation of the construction product respectively the raw material and its components
- Type of control or test
- Date of manufacture and test of the construction product respectively of the raw material or components
- Results of control and tests and, if applicable, a comparison with requirements
- A signature of the person responsible for factory production control.

The records shall be deposited for at least five years and presented to the recognised external surveillance body. On request, they shall be submitted to *Deutsches Institut für Bautechnik* and to the *zuständige oberste Bauaufsichtsbehörde* ('responsible building authority').

If the test results are unsatisfactory, the manufacturer shall immediately take the action necessary to eliminate the deficiency. Construction products which do not meet requirements shall be treated in such a way that confusion with conforming products is excluded. Once the deficiency has been eliminated, the original test shall be repeated immediately, provided that this is technically possible and also required to verify the elimination of the deficiency.

2.3.3 External surveillance

In each production plant, external surveillance shall be carried out regularly, but at least once a year, to check the factory production control.

During external surveillance, initial testing of the anchor shall be carried out and random samples taken. Sampling and testing are done on responsibility of the recognised surveillance body.

Extent, type and frequency of the external surveillance shall be in accordance with the control plan which is deposited by *Deutsches Institut für Bautechnik* and by the external surveillance body.

The results of certification and external surveillance shall be deposited for at least five years. On request, they shall be submitted to *Deutsches Institut für Bautechnik* and the responsible building authority by the certification body respectively by the surveillance body.

3 Provisions for design

3.1 Design (concept)

Verifiable calculation notes and design drawings are prepared taking into account the relevant masonry in the region of the anchorage (type and strength of the base material), the loads to be transmitted and their transmission to the supports of the structure. The position of the anchor is indicated on the design drawings.

3.2 Design (dimensioning)

The anchorages are designed under the responsibility of an engineer experienced in anchorages and masonry work

The fastening screw must be specified by the planning engineer regarding material, length of the screw taking into account the thickness of the fixture, the required screw-in depth and possible tolerances, unless it is supplied by the manufacturer for the respective application.

3.2.1 Required verifications

Design under tension loading:

$$N_{Sk} \cdot \gamma_F = N_{Sd} \leq N_{Rd}$$

Design under shear loading:

$$V_{Sk} \cdot \gamma_F = V_{Sd} \leq V_{Rd}$$

Design under combined tension and shear loading:

$$(N_{Sd} / N_{Rd} + V_{Sd} / V_{Rd}) \leq 1,0$$

with: V_{Sk} Characteristic value of action in transverse direction in kN

N_{Sk} Characteristic value of action in tension direction in kN

γ_F Partial safety factor of action

V_{Sd} Design value of action in transverse direction in kN

N_{Sd} Design value of action in tension direction in kN

V_{Rd} Design value of resistance in transverse direction according to following Sections

N_{Rd} Design value of resistance in tension direction according to following Sections

The system must not be used under tension loading only.

The load resultant must have an angle of more than 10 ° with respect to a centric tension loading.

3.2.2 Load-bearing capacity of the Thermo-Anker

V_{Rd} Minimum design value of load-bearing capacity of the Thermo-Anker under shear loading according to Annex 6, Table 7 and Annex 7, Table 10

N_{Rd} Minimum design value of load-bearing capacity of the Thermo-Anker under tension loading according to Annex 6, Table 7

3.2.3 Load bearing capacity of the anchor in solid masonry

V_{Rd} Minimum design value of load-bearing capacity of the Thermo-Anker under shear loading according to Annex 6, Table 8

For edge distances $c < c_{cr}$ additional $V_{Rd,c}$ according to Section 3.2.4 is taken into account.

N_{Rd} Minimum design value of load-bearing capacity of the Thermo-Anker under tension loading according to Annex 6, Table 8

The spacing must comply with at least the spacing s_{min} according to Annex 4, Table 4.

3.2.4 Anchors in solid masonry influenced by edge distance ($c_{min} \leq c \leq c_{cr}$)

If the edge distance c is smaller than the characteristic edge distance c_{cr} according to Annex 4, Table 4 then additionally the design value of load-bearing capacity of the Thermo-Anker for anchors in masonry under shear loading must be calculated according to following Equation:

$$V_{Rd,c} = k \cdot 0,006 \cdot f_b^{0,5} \cdot c^{1,5} / \gamma_M \leq V_{Rd} \quad [\text{kN}]$$

- mit: $V_{Rd,c}$ design value of load-bearing capacity of the Thermo-Anker under shear loading in kN
- k factor for load direction
 - = 0,25 load direction toward the free edge
 - = 0,45 load direction parallel to the free edge
- f_b strength class of the masonry in N/mm²
- c edge distance in mm
 - $c_{min} \leq c \leq c_{cr}$
- γ_M partial safety factor for masonry according to Annex 6, Table 8
- V_{Rd} Minimum design value of load-bearing capacity of the Thermo-Anker under shear loading (according to Annex 6, Table 7, Table 8 or Annex 7, Table 10)

For anchors influenced by edge distance ($c_{min} \leq c \leq c_{cr}$) under shear loading the spacing shall comply with at least the characteristic spacing s_{cr} according to Annex 4, Table 4.

3.2.5 Load bearing capacity of the anchor in hollow masonry

- V_{Rd} Design value of load-bearing capacity of the Thermo-Anker under shear loading according to Annex 6, Table 9
 - For edge distances $c < c_{cr}$ additional $V_{Rd,c}$ toward the free edge according to Annex 6, Table 9 is taken into account.
- N_{Rd} Design value of load-bearing capacity of the Thermo-Anker under tension loading according to Annex 6, Table 9

The spacing shall comply with at least the spacing s_{min} according to Annex 4, Table 4. For double anchor groups with anchors one above the other under shear loading towards the free edge the edge distance c_{cr} is decisive. The edge distances and spacing as well as the related load-bearing capacity of hollow bricks Hlz, KSL and Hbn are given in Annex 8.

3.2.6 Consideration of masonry joints

The design values of load-bearing capacity N_{Rd} and V_{Rd} may only be applied if the joints of the masonry are filled with mortar.

If the joints of the masonry are not filled with mortar then the design values of load-bearing capacity N_{Rd} and V_{Rd} may only be applied if the minimum edge distance c_{min} according to Annex 4, Table 4 and 5 is kept. If this minimum edge distance is not kept then the design values of load-bearing capacity N_{Rd} and V_{Rd} must multiply by the factor 0,75.

If the joints of the masonry are not visible then the design values of load-bearing capacity N_{Rd} and V_{Rd} must multiply by the factor 0,75.

4 Provisions for installation

4.1 Installation of the anchor

The fitness for use of the anchor can only be assumed if the following installation conditions are observed:

- Anchor Installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site,
- Installation only as supplied by the manufacturer, components of the anchor may not be exchanged,
- Installation in accordance with the manufacturer's instructions and the design drawings with the installation tools given in the technical documentation of this *allgemeine bauaufsichtliche Zulassung*,
- The drill holes shall be drilled perpendicular to the surface of the anchorage ground with a hard metal hammer drill,
- Aborted drill holes shall be filled with mortar,
- The drill hole shall be cleaned and the anchor shall be installed according to the manufacturer's installation instructions (Annex 9 and 10),
- Installation parameters (Annex 4) are kept,
- Effective anchorage depth is kept,
- Edge distances and spacing according to Annex 4, Table 4 are kept,
- Curing time until load application according to Annex 4, Table 6 is kept.

4.2 Checking the installation

During the installation of the anchors the contractor entrusted with anchorages or the construction supervisor assigned by him or a competent representative of the construction supervisor have to be present on the job site. He has to ensure the proper installation.

During installation of anchors records about proof of base material (kind of masonry, compressive strength class, mortar group), temperature of base material and proper installation of anchors shall be kept by the construction supervisor or his competent representative.

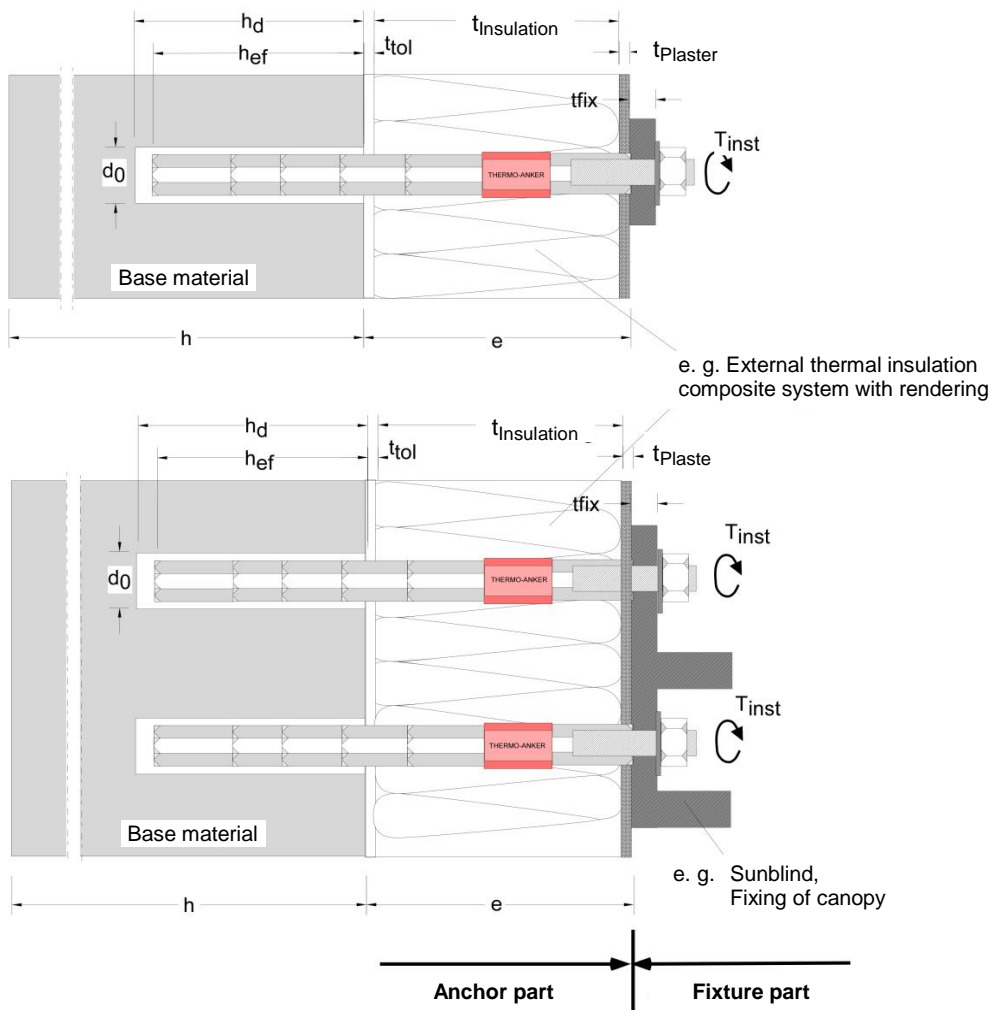
The records must be available on the job site during construction period and they shall be presented on request for inspection. These records, as well as the delivery notes, shall be deposited by the company for at least five years after completion of the construction work.

Andreas Kummerow
Head of Section

Beglaubigt
Wittstock

Hermes Royal Anker installed condition

Thermal bridge reduction element for transmission of loads of fixtures into the base material masonry.
 Application for components fixed with a distance to the base material on insulated or non-structural base material masonry.



Designations / Legend:

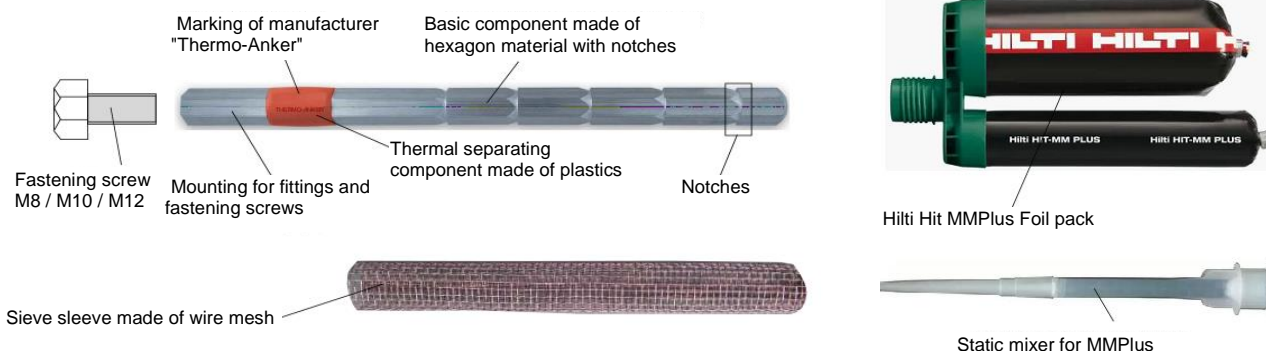
- | | | | |
|-----------|------------------------|------------------|---|
| h_{ef} | = anchorage depth | $t_{insulation}$ | = thickness of insulation |
| h | = thickness of member | t_{tol} | = thickness of levelling layer /e.g. existing plaster |
| h_d | = drill hole depth | $t_{plaster}$ | = thickness of plaster layer |
| t_{fix} | = thickness of fixture | e | = total thickness of non-structural layer |
| d_0 | = drill hole diameter | | = $(t_{tol} + t_{insulation} + t_{plaster})$ |
| | | T_{inst} | = installation torque |

Hermes Royal Thermo-Anker

Product and installed condition

Annex 1

Designations



Dimensions

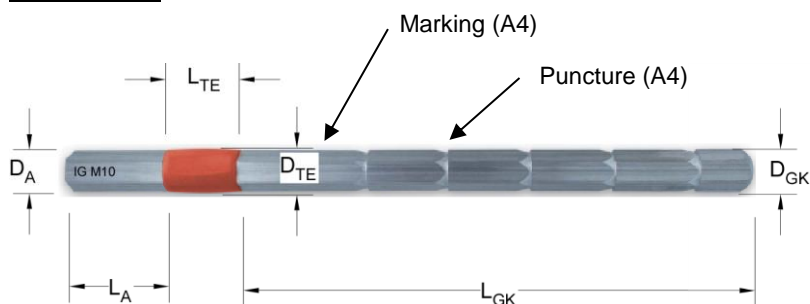


Table 1: Dimensions

Designation	L _{GK} [mm]	Number of Notches	L _{TE} [mm]	L _A [mm]	D _{GK} [mm]	D _{TE} [mm]	D _A [mm]
Hermes Thermo-Anker	198	5	30	42	SW15	18,5	SW15
	258	6					
	278	6					
	298	7					

Hermes Royal Thermo-Anker

Designations and dimensions

Annex 2

Materials

Table 2: Materials and designations

Designation	Material
Anchor part	
Thermal separating component	GFK-threaded rod made of glass fibre material on basis of Epoxy resin, Colour: Rot
Injection mortar	Methyl acrylate resin, Dipenzoyl peroxide, Additions As foil pack 330ml and 500ml
Static mixer + extension (disposable parts)	Plastics, Colour: white
Steel components made of stainless steel A4 according to DIN EN 10088	
Basic component made of hexagonal material	Material 1.4401, 1.4404, 1.4571, 1.4578 and 1.4439
Mounting for fitting screws	$R_m = 700 \text{ N/mm}^2$, $R_{p0,2} = 350 \text{ N/mm}^2$
Steel components made of stainless steel A2 according to DIN EN 10088	
Basic component made of hexagonal material	Material 1.4301, 1.4305, 1.4541, 1.4567
Mounting for fitting screws	$R_m = 700 \text{ N/mm}^2$, $R_{p0,2} = 350 \text{ N/mm}^2$
Components made of steel according to DIN EN 10087, galvanized $\geq 5\mu\text{m}$ according to DIN EN ISO 4042	
Basic component made of hexagonal material	Material 1.0718, 1.0737 1.0739
Mounting for fitting screws	$R_m = 700 \text{ N/mm}^2$, $R_{p0,2} = 350 \text{ N/mm}^2$
Sieve sleeve	Material 1.0304
Fixture part	
Steel components made of stainless steel A4 according to DIN EN 10088	
Fastening screw M8 / M10 / M12 Threaded rod AS M8 / M10 / M12 according to DIN EN ISO 4026	Material 1.4401, 1.4404, 1.4571, 1.4578 and 1.4439 Strength class 70 according to DIN EN ISO 3506
Hexagon nut DIN EN ISO 4032	
Washer DIN EN ISO 7089 or DIN 440 or DIN 125	Material 1.4401, 1.4404, 1.4571, 1.4578 and 1.4439
Steel components made of stainless steel A2 according to DIN EN 10088	
Fastening screw M8 / M10 / M12 Threaded rod AS M8 / M10 / M12 according to DIN EN ISO 4026	Material 1.4301, 1.4305, 1.4541, 1.4567 $R_m = 700 \text{ N/mm}^2$, $R_{p0,2} = 350 \text{ N/mm}^2$
Hexagon nut DIN EN ISO 4032	
Washer DIN EN ISO 7089 or DIN 440 or DIN 125	Material 1.4301, 1.4305, 1.4541, 1.4567
Components made of steel according to DIN EN 10087, galvanized $\geq 5\mu\text{m}$ according to DIN EN ISO 4042	
Fastening screw M8 / M10 / M12 Threaded rod AS M8 / M10 / M12 according to DIN EN ISO 4026	Material 1.0718, 1.0737 1.0739 $R_m = 700 \text{ N/mm}^2$, $R_{p0,2} = 350 \text{ N/mm}^2$
Hexagon nut DIN EN ISO 4032	
Washer DIN EN ISO 7089 or DIN 440 or DIN 125	Material 1.0718, 1.0737 1.0739

Hermes Royal Thermo-Anker

Material Thermo-Anker

Annex 3

Installation parameter

Table 3: Installation parameter of the Thermo-Anker

Designation	Hexagon bar	Material	t_{fix} [mm]	h_{ef} [mm]	h_d [mm]	d_0 [mm]	d_B ¹⁾ [mm]	Sieve sleeve [mm]	max. T_{inst} [Nm]
Hermes Thermo-Anker	Hexagon profile with SW 15	Solid masonry	30-300	≥ 100	≥ 120	20	22	20x190	5
		Hollow masonry	30-300	≥ 150	≥ 170	20	22	20x190	2

¹⁾ Diameter of the cleaning brush Hilti HIT RD 20

Table 4: Installation parameter in solid masonry

Dimension	Unit	Mz	KS	PB 2	PB 4
Strength class	-	≥12	≥12	≥2	≥4
c_{min}	[mm]	50	50	150	150
s_{min}	[mm]	100	100	300	300
c_{cr}	[mm]	150	150	150	150
s_{cr}	[mm]	300	300	300	300
Drilling method	[-]	Impact or hammer drilling		Rotary drilling	

Table 5: Installation parameter in hollow masonry

Dimension	Unit	Hlz	KSL	Hbn	Pumice concrete
Strength class	-	≥12	≥20	≥10	≥4
Dimension of brick	[mm]	498 x 240 x 249	498 x 115 x 248	370 x 238 x 238	495 x 238 x 238
c_{min}	[mm]	35 / 100 ¹⁾	35 / 100 ¹⁾	35 / 100 ¹⁾	70 / 100 ¹⁾
s_{min}	[mm]	70	70	70	140
c_{cr}	[mm]	100	100	100	100
$s_{cr,II}$	[mm]	498	498	370	495
$s_{cr,T}$	[mm]	249	248	238	238
Drilling method	[-]	Rotary drilling			

¹⁾ Position and load direction according to Annex 7 must be observed

Table 6: Curing and processing time Hilti Hit MMPlus mortar

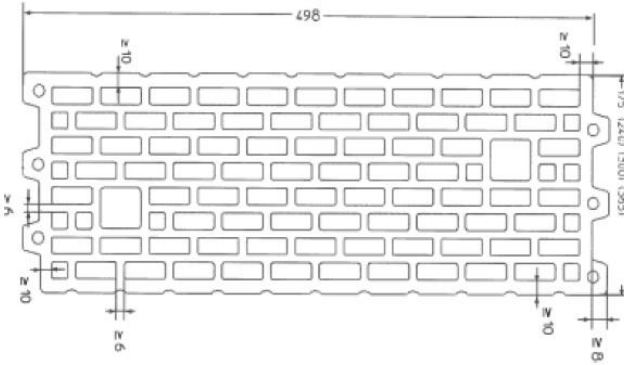
Temperature	Processing time	Curing time
°C	[min]	[h, min]
0 to ≤ 5	10 min	4 h
> 5 to ≤ 10	7 min	2,5 h
>10 to ≤ 20	4 min	1,5 h
>20 to ≤ 30	2 min	45 min
>30 to ≤ 40	1 min	20 min

Hermes Royal Thermo-Anker

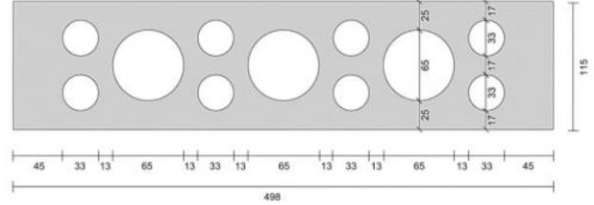
Installation parameter

Annex 4

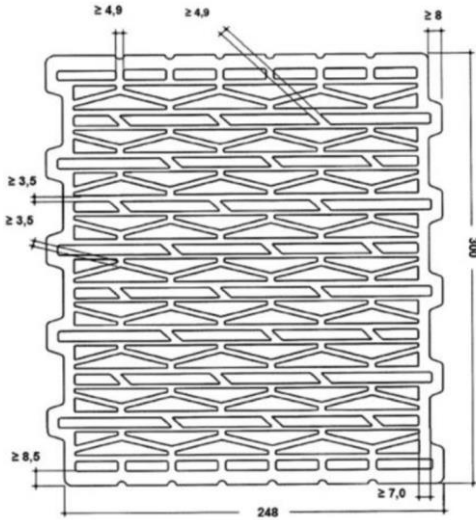
Poroton Planziegel-T L-EB
 Dimensions 498 mm x 240 mm x 249 mm
 Density $\geq 0,75 \text{ g/cm}^3$, Strength class ≥ 12



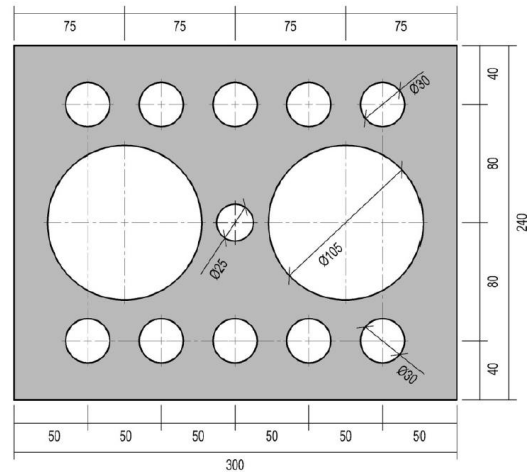
KS L-R(P) 8DF
 Dimensions 498 mm x 115 mm x 248 mm
 Density $\geq 1,50 \text{ g/cm}^3$, Strength class ≥ 20



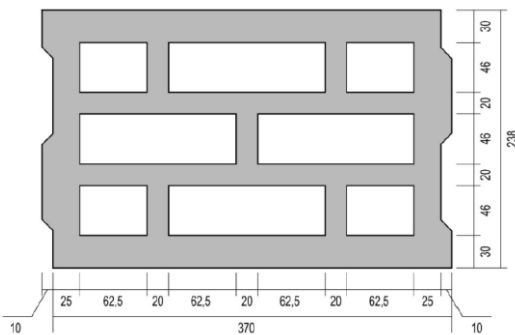
HLz Plan-U9 10DF nach Z-17.1-890
 Dimensions 300 mm x 248 mm x 248 mm
 Density $\geq 0,69 \text{ g/cm}^3$, Strength class ≥ 12



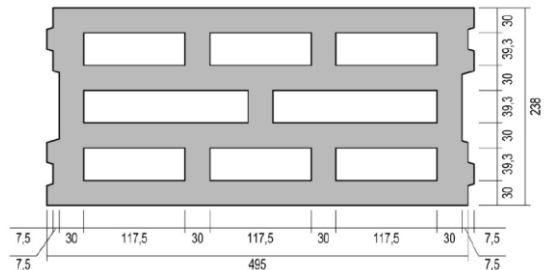
KS L-5DF
 Dimensions 280 mm x 240 mm x 112 mm
 Density $\geq 1,50 \text{ g/cm}^3$, Strength class ≥ 20



Concrete hollow block Hbn 12DF
 Dimensions 370 mm x 238 mm x 238 mm
 Density $\geq 1,16 \text{ g/cm}^3$, Strength class ≥ 10



Pumice concrete
 Dimensions 495 mm x 238 mm x 238 mm
 Density $\geq 0,41 \text{ g/cm}^3$, Strength class ≥ 4



Hermes Royal Thermo-Anker

Admissible base material hollow masonry

Annex 5

Table 7: Characteristic values and design values of load-bearing capacity under tension loading and shear loading without lever arm for the Thermo-Anker

Hermes Thermo-Anker	
N_{Rk} [kN]	1,80
V_{Rk} [kN]	1,40
Partial safety factor γ_M	2,5
N_{Rd} [kN]	0,72
V_{Rd} [kN]	0,56

Table 8: Characteristic values and design values of load-bearing capacity under tension loading and shear loading for anchors in solid masonry with edge distances $c \geq c_{cr}$.

Hermes Thermo-Anker: Anchor in solid masonry					
	Unit	Mz	KS	PB 2	PB 4
Strength class	-	≥ 12	≥ 12	≥ 2	≥ 4
$N_{Rk}^{1)}$	[kN]	2,26	2,50	0,81	2,35
$V_{Rk}^{1)}$	[kN]	7,85	7,67	1,14	3,30
Partial safety factor γ_M		2,5	2,5	2,0	2,0
$N_{Rd}^{1)}$	[kN]	0,90	1,00	0,41	1,18
$V_{Rd}^{1)}$	[kN]	3,14	3,06	0,57	1,65

¹⁾ The values are only valid for the anchorage in masonry. The load-bearing capacity of the Thermo-Anker can be decisive, so that the given load-bearing capacity has to be limited according to Table 7.

Table 9: Characteristic values and design values of load-bearing capacity under tension loading and shear loading for anchors in hollow masonry

Hermes Thermo-Anker: Anchor in hollow masonry					
	Unit	Hlz	KSL	Hbn	Pumice concrete
Strength class	-	≥ 12	≥ 20	≥ 10	≥ 4
N_{Rk}	[kN]	0,35	0,35 ²⁾	0,35	0,60
$V_{Rk}^{1)}$	[kN]	0,60	2,00	2,00	0,8
$V_{Rk,c}$	[kN]	0,30	1,00	1,00	0,4
Partial safety factor γ_M		2,5	2,5	2,5	2,5
N_{Rd}	[kN]	0,14	0,14	0,14	0,24
$V_{Rd}^{1)}$	[kN]	0,24	0,80	0,80	0,32
$V_{Rd,c}$	[kN]	0,12	0,40	0,40	0,16

¹⁾ The values are only valid for the anchorage in masonry. The load-bearing capacity of the Thermo-Anker can be decisive, so that the given load-bearing capacity has to be limited according to Table 7.

²⁾ For anchor groups N_{Rk} may be increased to 0,45 kN per anchor.

Hermes Royal Thermo-Anker	Annex 6
Design values of load-bearing capacity	

Table 10: Design values of load-bearing capacity under shear loading with lever arm and related displacements

Lever arm $l^{1)}$	V_{Rd}	$V_{max} = V_{Rd} / \gamma_F^{2)}$	Related displacement Short-time δ_{V0}	Related displacement Long-time $\delta_{V\infty}$
[mm]	[kN]	[kN]	[mm]	[mm]
≤ 30	0,56	0,40	< 0,1	< 0,1
40	0,56	0,40	< 0,1	0,1
80	0,56	0,40	0,5	0,8
90	0,56	0,40	0,8	1,2
100	0,56	0,40	1,1	1,6
120	0,56	0,40	1,8	2,8
140	0,56	0,40	2,9	4,4
160	0,56	0,40	4,4	6,5
180	0,55	0,40	6,2	9,3
200	0,50	0,36	8,5	12,7
250	0,40	0,29	16,6	24,9
300	0,33	0,24	28,7	43,0

¹⁾ $l = 0,5t_{fix} + e + 10$ mm

²⁾ with $\gamma_F = 1,4$

Table 11: Load-bearing capacity under shear loading $V_{max}(\delta_{V0})$ for a limited maximum displacement δ_{V0} depending on the lever arm

Lever arm $l^{1)}$ $l^{2)}$	V_{max} at $\delta_{V0} \leq 1$ mm ³⁾ displacement short-time	V_{max} at $\delta_{V0} \leq 2$ mm ³⁾ displacement short-time	V_{max} at $\delta_{V0} \leq 5$ mm ³⁾ displacement short-time	V_{max} at $\delta_{V0} \leq 10$ mm ³⁾ displacement short-time
[mm]	[kN]	[kN]	[kN]	[kN]
≤ 30	0,40	0,40	0,40	0,40
40	0,40	0,40	0,40	0,40
80	0,40	0,40	0,40	0,40
90	0,40	0,40	0,40	0,40
100	0,29	0,40	0,40	0,40
120	0,17	0,34	0,40	0,40
140	0,11	0,22	0,40	0,40
160	0,08	0,15	0,40	0,40
180	0,06	0,11	0,28	0,40
200	0,04	0,08	0,20	0,36
250	0,02	0,04	0,11	0,21
300	0,015	0,03	0,06	0,13

¹⁾ Intermediate values may be linear interpolated

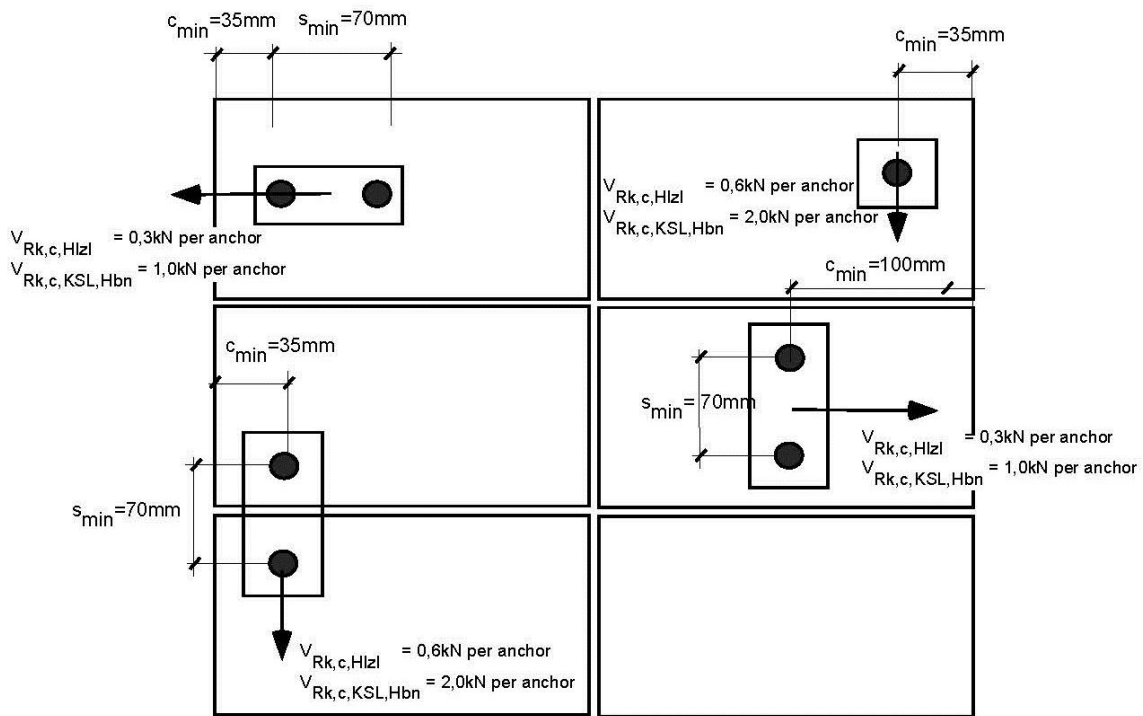
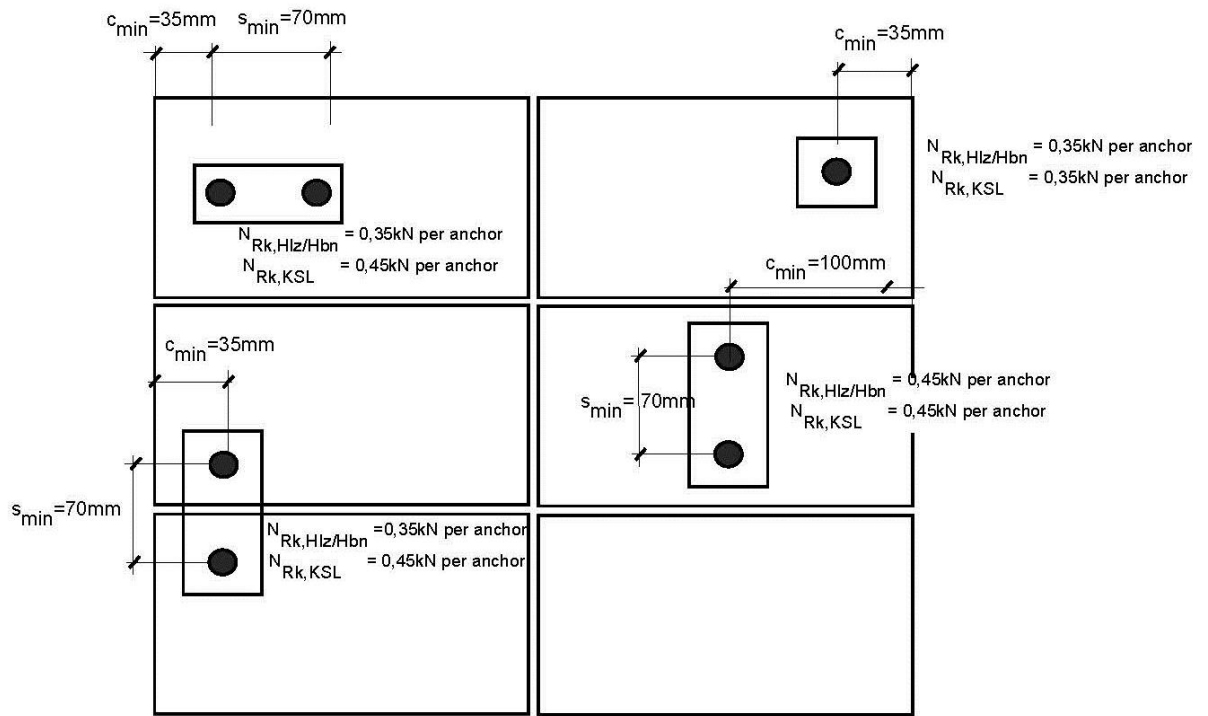
²⁾ $l = 0,5t_{fix} + e + 10$ mm

³⁾ The maximum long-term displacement is 1,5-times of the given short-term displacements.

Hermes Royal Thermo-Anker

Design value of load-bearing capacity and displacements

Annex 7

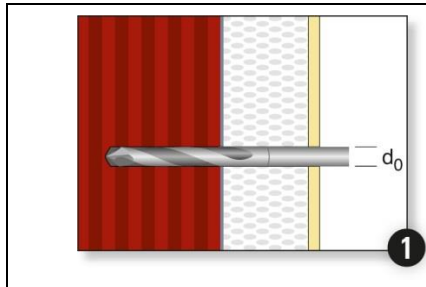


Hermes Royal Thermo-Anker

Edge distance and spacing and related characteristic load-bearing capacity
 in hollow bricks Hlz, KSL und Hbn

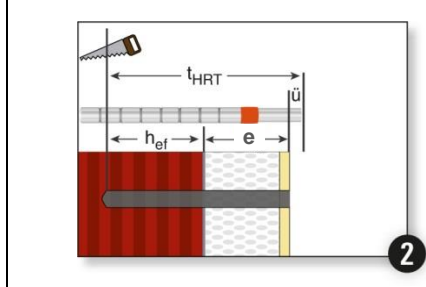
Annex 8

Installation instructions Hermes Royal Thermo-Anker



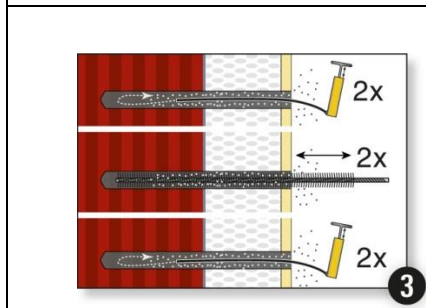
1. Drilling the bore hole

- Marking of the drill holes
- Check the drill hole diameter $d_0 = 20 \text{ mm}$
- Keep the minimum edge distances and spacing according to Annex 4, Table 4 and 5
- Determine the drilling method, see Table 4 and 5, Drilling perpendicular to the surface ($\pm 5^\circ$)



2. Cut to the length of the Thermo-Anker

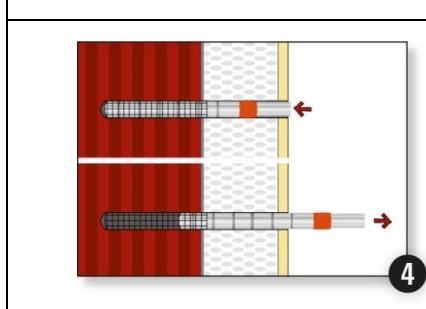
- Before installation the anchor rod has to be cut the specific length:
 $L = e + h_{ef} + 1 \text{ mm} \geq 131 \text{ mm}$
 $\leq 401 \text{ mm}$



3. Cleaning the drill hole

- Before setting the anchor rod the drill hole has to be cleaned by:
 2 x blowing out and following
 2 x brushing and following
 2 x blowing out

Important:
 Cleaning brush and Blow-out tool for Hilti Hit MM Plus according to manufacturer's specifications.



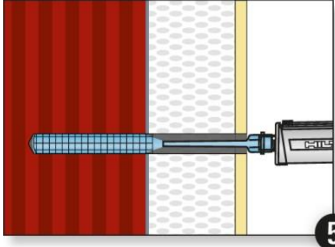
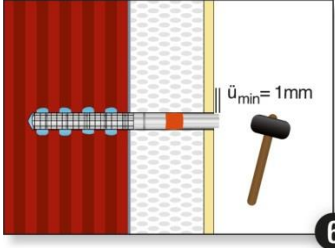
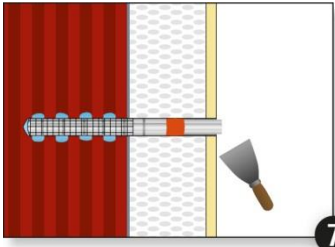
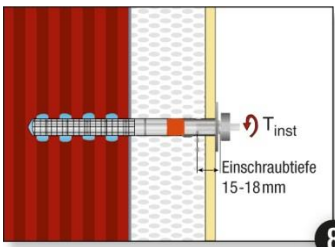
4. Setting the sieve sleeve

- Setting the sieve sleeve into the borehole until the mounting is flush with the plaster surface, for setting use the complete Hermes Royal Anker.
- Pull-out of the Thermo-Anker, so that the sieve sleeve remains in the masonry.

Hermes Royal Thermo-Anker

Installation instruction 1

Annex 9

	<p>5. Injection of the mortar</p> <ul style="list-style-type: none"> Inject Hilti Hit MM-Plus into the sieve sleeve (Observe the packing and installation instructions!). Required mortar quantity corresponds to a drilling hole filling: $V \approx 0,4 \cdot h_0$ [ml] for solid bricks For hollow bricks: the drill hole is sufficiently filled when mortar emerges at the drill hole mouth. <p>Important: Observe the installation instruction and processing time of injection mortar Hilti Hit MM Plus according to the manufacturer's specifications according to Annex 4, Table 6.</p>
	<p>6. Setting the Thermo-Anker</p> <ul style="list-style-type: none"> Setting the complete Hermes Thermo-Anker by slightly turning the anchor and rotating them until the mounting is approximately 1 mm above the surface of the plaster. The anchor is set properly when mortar emerges at the drill hole mouth.
	<p>7. Adjustment</p> <ul style="list-style-type: none"> Within the processing time of the mortar, the complete Thermo-Anker can still be aligned on the fixture. Smooth excess Hilti Hit mortar by a spatula on the outer wall for sealing, Remove excess and keep curing time. <p>Important: Observe the installation instruction and curing time of injection mortar Hilti Hit MM Plus according to the manufacturer's specifications according to Annex 4, Table 6.</p>
	<p>8. Installation the fixture</p> <ul style="list-style-type: none"> Before installation, the mortar must be completely cured (see Table 6). The maximum installation torque T_{inst} is 5Nm for solid bricks and 2Nm for hollow bricks. After the hexagon nut has been tightened, the fixture must not be supported on the surface of the plaster. Preparation of the installation protocol.

Hermes Royal Thermo-Anker

Installation instruction 2

Annex 10