

European Technical Approval ETA-03/0005

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung <i>Trade name</i>	Hilti SX-FV
Zulassungsinhaber <i>Holder of approval</i>	Hilti Aktiengesellschaft Business Unit Direktmontage 9494 Schaan FÜRSTENTUM LIECHTENSTEIN
Zulassungsgegenstand und Verwendungszweck <i>Generic type and use of construction product</i>	Dübel zur Befestigung von außenseitigen Wärmedämm- Verbundsystemen mit Putzschicht in Beton und Mauerwerk <i>Anchor for fixing of External Thermal Insulation Composite Systems with rendering for use in concrete and masonry</i>
Geltungsdauer: <i>Validity:</i>	vom <i>from</i> 29 February 2008 bis <i>to</i> 28 February 2013
verlängert <i>extended</i>	vom <i>from</i> 1 March 2013 bis <i>to</i> 1 March 2018
Herstellwerk <i>Manufacturing plant</i>	Hilti Werke

Diese Zulassung umfasst
This Approval contains

17 Seiten einschließlich 8 Anhänge
17 pages including 8 annexes

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.
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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 product and intended use

1.1 Definition of the construction product

The Hilti anchor SX-FV for ETICS consists of a slotted sleeve made of stainless steel and a fixing element made of polyethylene.

The anchor may be combined with additional slip-on plates T 90, HDT 90 or HDT 140.

The anchor is set while the hole is being drilled into the base material. The anchorage is caused by friction between the slotted sleeve and the drill hole wall.

The installed anchor is shown in Annex 1.

1.2 Intended use

The anchor is intended to be used for anchorages for which requirements for safety in use in the sense of the Essential Requirement 4 of Council Directive 89/106/EEC shall be fulfilled and failure of anchorages made with these products would cause low risk to human life. The anchor is to be used only as multiple fixing for the anchorage of bonded thermal insulation composite systems (ETICS) according to ETAG 004 in concrete and masonry. The base material shall consist of reinforced or unreinforced normal weight concrete of strength class C12/15 at minimum and C50/60 at maximum according to EN 206-1:2000-12 or of masonry walls according to Annex 6.

The anchor may only be used for transmission of wind suction loads and shall not be used for the transmission of dead loads of the thermal insulation composite system. The dead loads have to be transmitted by the bonding of the thermal insulation composite system.

The anchor may be used in industrial or marine atmosphere too, if these conditions are not particularly aggressive.

The provisions made in this European Technical Approval are based on an assumed working life of the anchor of 25 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 product and methods of verification

2.1 Characteristics of product

The anchor corresponds to the drawings and information given in Annex 2. The characteristic material values, dimensions and tolerances of the anchor not indicated in Annex 2 shall correspond to the respective values laid down in the technical documentation⁷ of this European Technical Approval.

The characteristic values for the design of the anchorages are given in Annex 5.

Each anchor is to be marked with the identifying mark of the producer, the type and the total length of the anchor.

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.

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

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.

2.2 Methods of verification

The assessment of the fitness of the anchor for the intended use with regard to the requirements of safety in use in the sense of the Essential Requirement N°4 of Council Directive 89/106/EEC of has been made

- according to ETAG 014 "Guideline for European Technical Approval of Plastic anchors for fixing of thermal insulation composite systems with rendering" and
- on the basis of the following tests carried out under different conditions:
 1. Centric tension tests for determination of the characteristic resistance in different base materials (solid and vertically perforated clay bricks and calcium silicate bricks, solid and hollow lightweight concrete bricks and blocks made of concrete).
 2. Centric tension tests with different setting conditions (high strength concrete, low strength concrete, setting in wet base material, minimum installation temperature, extended setting time +5 sec, pre-drilled hole in concrete, maximum cutting diameter of drill bits).
 3. Centric tension tests after relaxation (1 h, 500 h).
 4. Centric tension tests of the anchorage after repeated loading.
 5. Centric tension tests of the plastic part at -20 °C, 20 °C, 60 °C.
 6. Effects of pigmentation of plastics stained additionally or stained differently.
 7. Centric tension tests of the plastic part after repeated loading.

and also in compliance with

- the EOTA Technical Report TR 025 "Determination of point thermal transmittance of plastic anchors for the anchorage of external thermal insulation composite systems (ETICS)" and
- the EOTA Technical Report TR 026 "Evaluation of plate stiffness from plastic anchors for fixing of external thermal insulation composite systems with rendering (ETICS)".

3 Evaluation of Conformity of the Product and CE marking

3.1 Attestation of Conformity System

According to the communication of the European Commission⁸ the system 2 (ii) (allocated to system 2+) of attestation of conformity applies.

These systems of attestation of conformity are defined as follows:

System 2+: Declaration of conformity of the product by the manufacturer on the basis of:

(a) Tasks for the manufacturer:

- (1) initial type-testing of the product;
- (2) factory production control;
- (3) testing of samples taken at the factory in accordance with a prescribed test plan.

⁸

Letter of the European Commission of 22/07/2002 to EOTA

- (b) Tasks for the approved body:
- (4) certification of factory production control on the basis of:
- initial inspection of factory and of factory production control;
 - continuous surveillance, assessment and approval of factory production control.

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 raw materials stated in the technical documentation of this European Technical Approval.

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 Bautechnik.⁹

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 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 factory production control stating the conformity with the factory production control 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.

⁹ The control plan is a confidential part of the documentation of the European Technical Approval, but not published together with the ETA and only handed over to the approved body involved in the procedure of attestation of conformity. See section 3.2.2.

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 number of the EC certificate for the factory production control;
- the last two digits of the year in which the CE-marking was affixed;
- number of the European Technical Approval;
- Type of anchor;
- use categories A, B and C according to ETAG 014.

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 ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

4.2 Design of anchorages

4.2.1 General

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

- The design of anchorages is carried out in compliance with ETAG 014 "Guideline for European Technical Approval of Plastic Anchors for Fixing of External Thermal Insulation Composite Systems with Rendering" under the responsibility of an engineer experienced in anchorages.
- Verifiable calculation notes and drawings shall be prepared taking account of the loads to be anchored, the nature and strength of the base materials, the thickness of insulation and the dimensions of the anchorage members as well as of the relevant tolerances.
- The anchor shall only be used for the transmission of wind suction loads. All other loads such as dead load and restraints shall be transmitted by the adhesion of the relevant external thermal insulation composite system.
- The required anchor type shall be determined. The required anchor type depends on minimum anchorage depth given in Annex 5, on thickness of equalising layers and renderings and on insulation thickness. Allocation tables for Anchor type and Special drill are given in Annex 4.

Proof of direct local application of load on the base material has been delivered.

Verification of stability of the external thermal insulation composite system including application of loads on the anchor and on the additional plate is not subject of this European Technical Approval.

4.2.2 Resistance

The characteristic values of the tension resistance of the anchor are given in Annex 5, Table 5 and 6. If there is a difference in the characteristic values of the base material according to Table 7 or a similar base material of category B and C is supposed to be used; job-site tests according to 4.4 shall be carried out and the characteristic tension resistance shall be determined.

4.2.3 Characteristic values, spacing and dimensions of anchorage member

The minimum spacing and dimensions of anchorage member according to Annex 7 shall be observed.

4.2.4 Displacement behaviour

When loaded to the design value of resistance in normal weight concrete; masonry made of clay bricks, solid calcium silicate bricks, lightweight concrete solid bricks, vertically perforated clay bricks, calcium silicate perforated bricks and lightweight concrete hollow blocks a displacement up to approximately 0.5 mm in load direction is expected.

4.2.5 Point thermal transmittance according EOTA Technical Report TR 025

The point thermal transmittance (CHI-value) of the anchor according EOTA Technical Report TR 025 "Determination of point thermal transmittance of plastic anchors for the anchorage of external thermal insulation composite systems (ETICS)" for the use categories A, B and C is given in the following table.

Table 4.1: Point thermal transmittance

Anchor type	Insulation thickness h_D [mm]	Point thermal transmittance χ [W/K]
Hilti SX-FV	60 - 180	0.001

4.2.6 Plate stiffness according EOTA Technical Report TR 026

The plate stiffness of the anchor according EOTA Technical Report TR 026 "Evaluation of plate stiffness from plastic anchors for fixing of external thermal insulation composite systems with rendering (ETICS)" is given in the following table.

Table 4.2: Plate stiffness

Anchor type	Diameter of the anchor plate [mm]	Load resistance of the anchor plate [kN]	Plate stiffness [kN/mm]
Hilti SX-FV	60	1.73	0.7

4.3 Installation of anchor

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

- Anchor installation carried out by appropriately qualified personnel under the supervision of the person responsible for technical matters on site.
- Use of the anchor only as supplied by the manufacturer without exchanging any component of the anchor.
- Anchor installation in accordance with the manufacturer's specifications and drawings using the tools indicated in this European Technical Approval.
- Checks before placing the anchor, to ensure that the characteristic values of the base material in which the anchor is to be placed, is identical with the values, which the characteristic loads apply for.
- Placing drill holes without damaging the reinforcement
- Temperature during installation of the anchor ≥ -10 °C.
- Exposure to UV due to solar radiation of the anchor not protected by rendering ≤ 6 weeks.

4.4 Job site tests

4.4.1 General

The characteristic tension resistance of the anchor may be determined by means of job site pull-out tests carried out on the material actually used, if a characteristic resistance of the base material does not exist (for example masonry made of other solid masonry units, hollow or perforated bricks, hollow blocks).

The characteristic resistance of the anchor shall be determined by carrying out at least 15 centric tension load pull-out tests on site. These tests are also possible under the same conditions in a laboratory.

Execution and evaluation of the tests as well as the issue of the test report and the determination of the characteristic resistance should be under the responsibility of approved testing laboratories or the supervision of the person responsible for the execution of the works on site.

Number and position of the anchors to be tested shall be adapted to the relevant special conditions of the site and, for example, to be increased in the case of hidden and larger areas, such that reliable information about the characteristic resistance of the anchor in the base material in question can be derived. The tests shall take into account the most unfavourable conditions of the practical execution.

4.4.2 Assembly

The anchor to be tested shall be installed (e.g. drilling tool to be used, drill bit) and the spacing and the edge distances shall be in the same way as planned for the fixing of the external thermal insulation composite system.

4.4.3 Execution of test

The test rig used for the pull-out tests shall provide a continuous slow increase of the load, controlled by a calibrated load cell. The load shall apply perpendicular to the surface of the base material and shall be transmitted to the anchor via a hinge. The reaction forces shall be transmitted into the base material at a distance of at least 15 cm from the anchor. The load shall be increased continuously in a way, that the ultimate load is reached after about 1 minute. The load is measured when the ultimate load (N_1) is achieved.

4.4.4 Test report

The test report shall include all information necessary to assess the resistance of the tested anchor. It shall be included in the construction dossier.

The minimum data required are:

- Construction site, owner of building; date and location of the tests, air temperature; type of member (ETICS) to be fixed
- Masonry (type of brick, strength class, all dimensions of bricks, mortar group); Visual assessment of masonry (flush joints, joint clearance, regularity)
- Type of anchor according to Annex 2 Table 1
- Test rig; results of tests including the indication of value N_1
- Tests carried out or supervised by; signature

4.4.5 Evaluation of test results

The characteristic resistance N_{RK1} is obtained from the measured values of N_1 as follows

- $N_{RK1} = 0.6 \cdot N_1 \leq N_{RK}$ according to Annex 5, Table 5 and 6
- N_1 = the mean value of the five smallest measured values at the ultimate load

5 Indications for the manufacturer

5.1 Responsibility of the manufacturer

It is in the responsibility of the manufacturer to ensure that the information on the specific conditions according to 1 and 2 including Annexes referred to 4 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 packaging and/or on an enclosed instruction sheet, preferably using illustrations.

The minimum data required are:

- Type of anchor according to Annex 2, Table 1,
- Base material for the intended use,
- Maximum thickness of equalising layers / renderings and of thermal insulation
- Minimum effective anchorage depth depending on base material,
- Information on the installation procedure,
- Identification of the manufacturing batch.

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

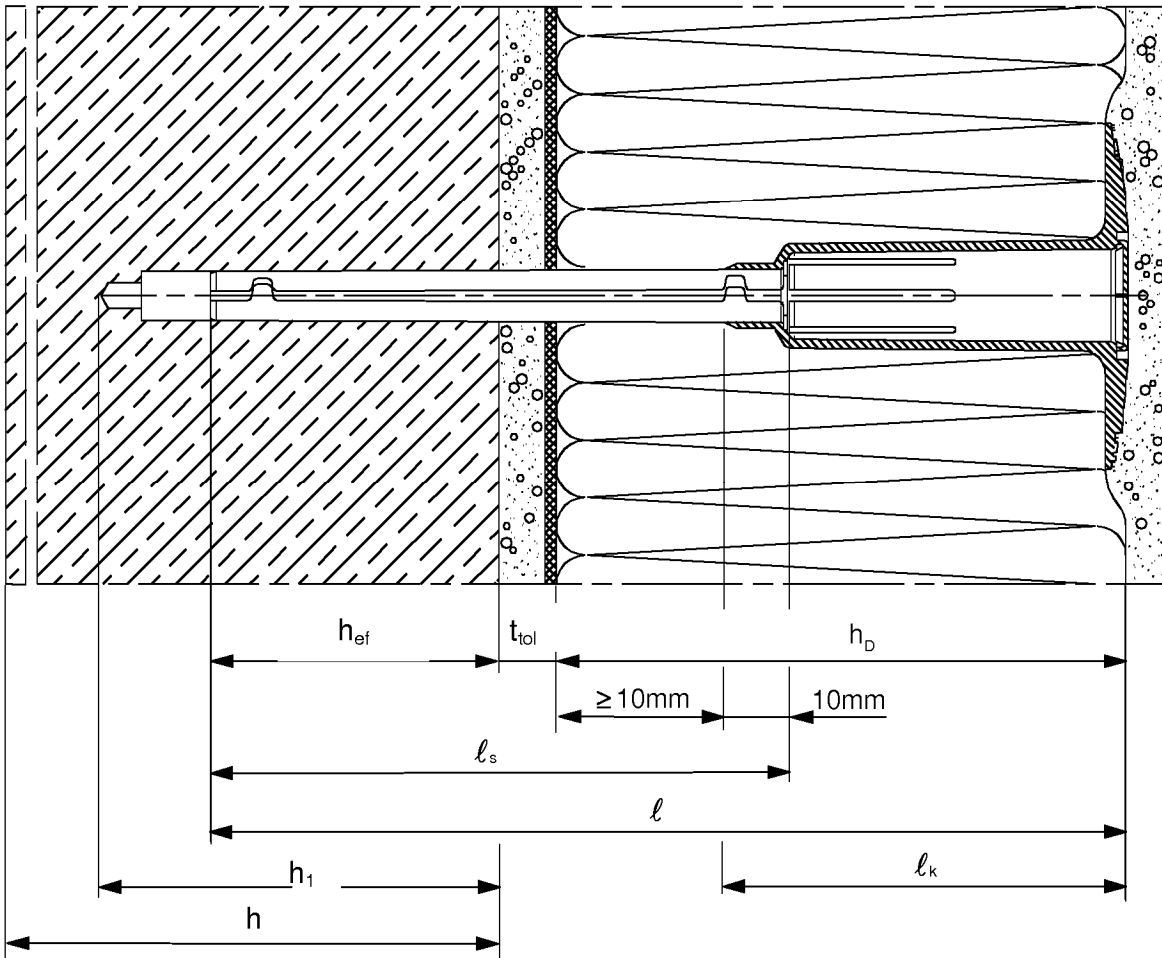
5.2 Recommendations on packaging, transport and storage

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

The anchor shall be stored under normal climatic conditions in its original light-proof packaging. Before installation, it shall not be extremely dried nor frozen.

Andreas Kummerow
p. p. Head of Department

beglaubigt:
Bürger



Anchorage of external thermal insulation composite systems in masonry and concrete

- l = total length of the anchor
- l_s = length of slotted sleeve
- l_k = length of fixing element
- h_1 = depth of the drill hole
- h_{ef} = effective anchorage depth
- h_D = thickness of thermal insulation
- h = thickness of member
- t_{tol} = thickness of equalisation layer or non-load bearing coating

Hilti SX-FV

Intended use

Annex 1

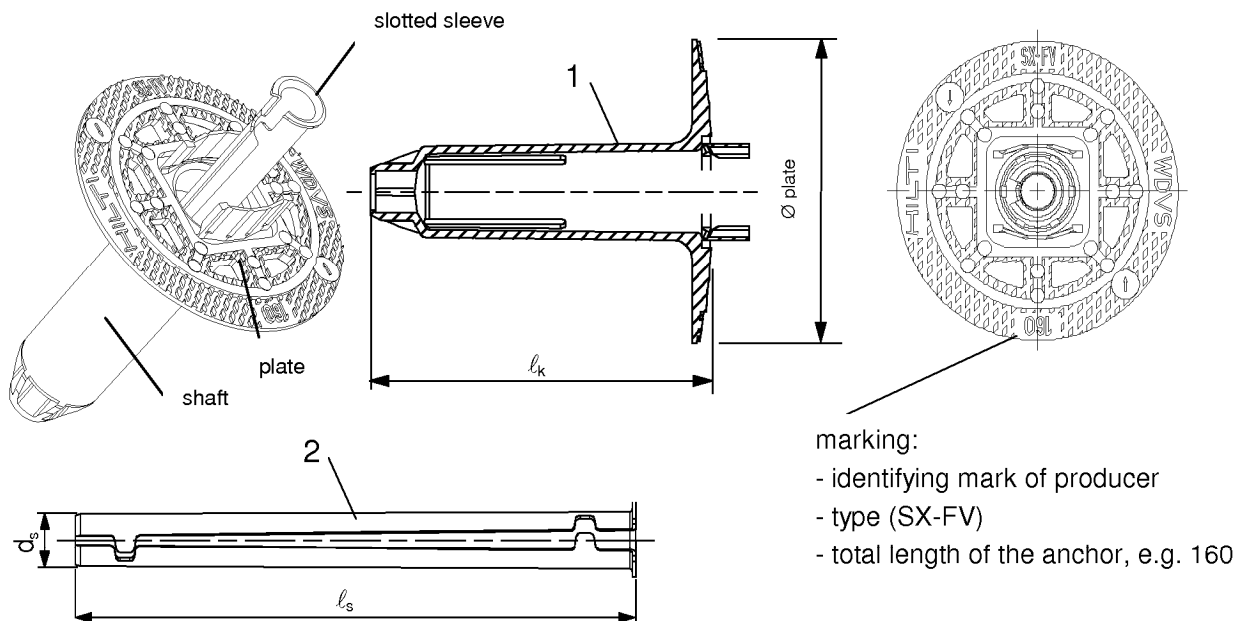


Table 1 Types and dimensions of anchors [mm]

Type of anchor	l	d _s	l _s	Fixing element		
				l _k	Ø plate	colour
SX-FV U 140/100	140	8.5	100	50	60	orange
SX-FV U 160/120	160	8.5	100	70	60	orange
SX-FV U 180/140	180	8.5	100	90	60	orange
SX-FV U 200/160	200	8.5	100	110	60	orange
SX-FV U 220/180	220	8.5	100	130	60	orange
SX-FV S 120/90	120	8.5	80	50	60	grey or beige
SX-FV S 140/110	140	8.5	80	70	60	grey or beige
SX-FV S 160/130	160	8.5	80	90	60	grey or beige
SX-FV S 180/150	180	8.5	80	110	60	grey or beige
SX-FV S 200/170	200	8.5	80	130	60	grey or beige

Table 2 Materials

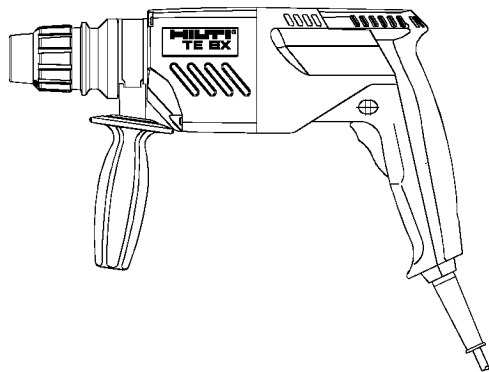
Part	Designation	Material
1	Fixing element	PE-HD (High-Density-Polyethylene) Colours: orange and grey or beige
2	Slotted sleeve	Stainless steel, cold formed

Hilti SX-FV

Anchor types, dimensions and materials

Annex 2

Special hammer drill



Hammer drill TE-SX

Special drill



Collar

Designation
for example SX-D8 / 100-25

Table 3 Installation characteristics

		Types of anchors SX-FV	
		U-Types	S-Types
		SX-FV U 140/100 SX-FV U 160/120 SX-FV U 180/140 SX-FV U 200/160 SX-FV U 220/180	SX-FV S 120/90 SX-FV S 140/110 SX-FV S 160/130 SX-FV S 180/150 SX-FV S 200/170
Nominal drill diameter	[mm]	8.5	8.5
Effective anchorage depth	$h_{ef} \geq$ [mm]	40	30
Depth of the drill hole	$h_1 \geq$ [mm]	59	49
Length of the slotted sleeve	$l_s =$ [mm]	100	80

Alternative installation method in concrete:

1. Pre-drilling of the hole with a standard Hilti drill TE-CX8. Depth of drill hole according to Table 3.
Hammer drills for pre-drilling: TE-SX or other suitable hammer drills.
2. Installation of SX-FV with special hammer drill TE-SX and special drill according to Table 4

Hilti SX-FV

Setting tools and installation characteristics

Annex 3

Table 4 Allocation of anchor type to special drill and hammer drill

Type of anchor	Minimum Insulation thickness h_D [mm]	Special drill	Special hammer drill
SX-FV U 140/100	60	SX-D8/100-25	TE-SX
SX-FV U 160/120	80	SX-D8/100-25	
SX-FV U 180/140	100	SX-D8/100-31	
SX-FV U 200/160	120	SX-D8/100-31	
SX-FV U 220/180	140	SX-D8/100-31	
SX-FV S 120/90	60	SX-D8/80-23	
SX-FV S 140/110	80	SX-D8/80-23	
SX-FV S 160/130	100	SX-D8/80-29	
SX-FV S 180/150	120	SX-D8/80-29	
SX-FV S 200/170	140	SX-D8/80-29	

Hilti SX-FV

Allocation table
Anchor type – special drill
Anchor type – Minimum insulation thickness

Annex 4

**Table 5 SX-FV U – installation parameters, characteristic tensile resistance;
Allocation of anchor type to maximum insulation thickness**

Total length of anchor $\ell = h_D + t_{tol} + h_{ef}$

Base material, specification and conditions according to Table 7	Concrete and solid bricks, vertically perforated bricks and lightweight concrete blocks				
Effective anchorage depth h_{ef}	$h_{ef} \geq 40$ mm				
U-Type anchors SX-FV	Maximum insulation thickness h_D [mm] dependent on t_{tol} [mm]				Characteristic tension resistance N_{Rk} [N]
	$t_{tol} \leq 10$	$t_{tol} \leq 20$	$t_{tol} \leq 30$	$t_{tol} \leq 40$	
SX-FV U 140/100	90	80	70	60	600
SX-FV U 160/120	110	100	90	80	
SX-FV U 180/140	130	120	110	100	
SX-FV U 200/160	150	140	130	120	
SX-FV U 220/180	170	160	150	140	
Partial safety factor for anchor resistance				γ_M	2.0 ¹⁾

¹⁾ valid in the absence of national regulations

**Table 6 SX-FV S: installation parameters, characteristic tensile resistance;
Allocation of anchor type to maximum insulation thickness**

Total length of anchor $\ell = h_D + t_{tol} + h_{ef}$

Base material, specification and conditions according to Table 7	Concrete and solid bricks				
Effective anchorage depth h_{ef}	$h_{ef} \geq 30$ mm				
S-Type anchors SX-FV	Maximum insulation thickness h_D [mm] dependent on t_{tol} [mm]				Characteristic tension resistance N_{Rk} [N]
	$t_{tol} \leq 10$	$t_{tol} \leq 20$	$t_{tol} \leq 30$	$t_{tol} \leq 40$	
SX-FV S 120/90	80	70	60	-	500
SX-FV S 140/110	100	90	80	-	
SX-FV S 160/130	120	110	100	-	
SX-FV S 180/150	140	130	120	-	
SX-FV S 200/170	160	150	140	-	
Partial safety factor for anchor resistance				γ_M	2.0 ¹⁾

¹⁾ valid in the absence of national regulations

Hilti SX-FV

Installation parameters – Maximum insulation thickness
Characteristic tension resistance

Annex 5

Table 7 Specification of base materials

Comment: The characteristic resistance shall be determined through tests carried out on construction works according to 4.4, if the type of base material for use category B and C (according to ETAG 014) deviates from those listed in Table 7.

Base material	Bulk density class [kg/dm ³]	Minimum compressive strength β [N/mm ²]	Remarks
Concrete C12/15 - C50/60	-	-	EN 206-1
Solid clay bricks, Mz e.g. according to DIN 105-100 / EN 771-1	≥ 1.6	12	Cross sectional reduction due to perforations perpendicular to bed joint up to 15%
Solid calcium silicate (sand-lime) bricks, KS e.g. according to DIN V 106 / EN 771-2	≥ 1.6	12	Cross sectional reduction due to perforations perpendicular to bed joint up to 15%
Lightweight concrete solid bricks and blocks, V e.g. according to DIN V 18152-100 / EN 771-3	≥ 0.5	4.0	Cross sectional reduction of the bed joint due to grip core up to 10%, maximum size of grip core: 110 mm long and 45 mm wide
Vertically perforated clay bricks, Hlz, e.g. according to DIN 105-100 / EN 771-1	≥ 1.2	12	Cross sectional reduction due to perforations perpendicular to bed joint beyond 15% and less than 50%
Vertically perforated calcium silicate (sand-lime) bricks, KSL e.g. according to DIN V 106 / EN 771-2	≥ 1.0	12	Cross sectional reduction due to perforations perpendicular to bed joint beyond 15%
Lightweight concrete hollow blocks Hbl, e.g. according to DIN V 18151-100 / EN 771-3	≥ 0.5	4.0	Geometry according to Table 8

Hilti SX-FV

Specification of base material

Annex 6

Table 8 Shape and designation of suitable hollow lightweight concrete blocks according to DIN V 18151-100

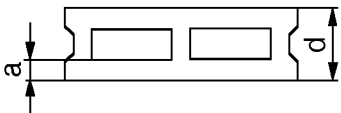
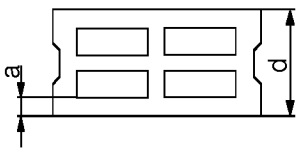
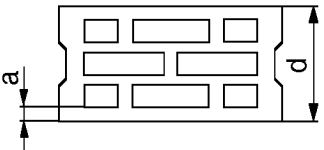
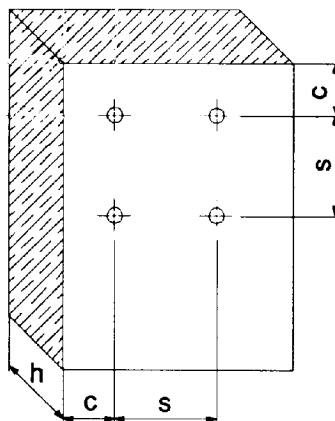
Shape	Block thickness d [mm]	Thickness of outer web a [mm]
 <p>1 K Hbl</p>	175	50
 <p>2 K Hbl</p>	240 300 300	50 50 60
 <p>3 K Hbl (24DF)</p>	365	40

Table 9 Minimum thickness of base material, edge distance and anchor spacing

		Anchorage in		
		Concrete	Solid clay and sand-lime bricks	Vertically perforated clay and sand-lime bricks, solid and hollow lightweight concrete blocks
Minimum thickness of base material	h_{min} [mm]	100	115	115
Spacing	$s \geq$ [mm]	100	200	250
Edge distance	$c \geq$ [mm]	100	250	250

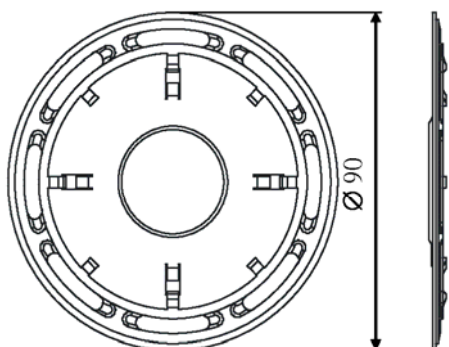


Hilti SX-FV

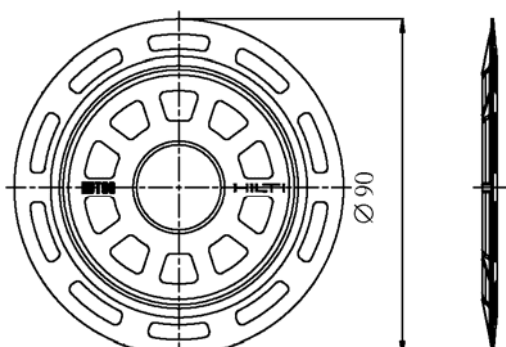
Hollow lightweight concrete blocks Hbl
Minimum thickness of base material, edge distance and spacing

Annex 7

Slip-on plate T 90



Slip-on plate HDT 90



Slip-on plate HDT 140

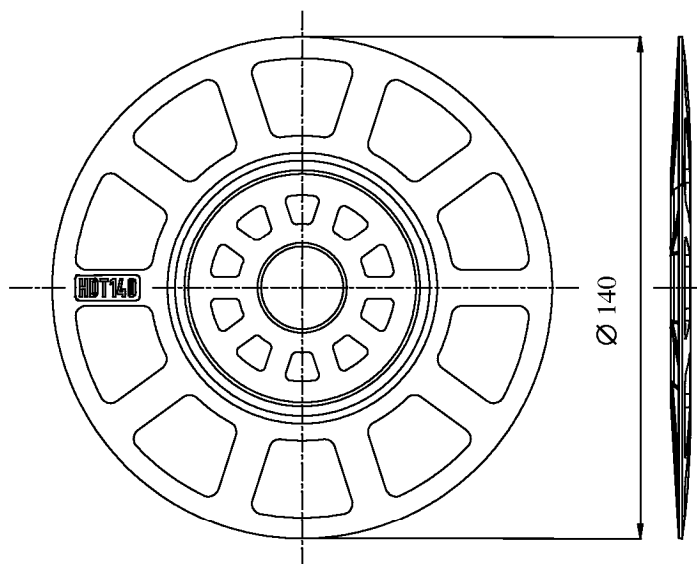


Table 10 Slip-on plates, diameter and materials

Slip-on plate	Outer diameter [mm]	Material
T 90	90	PE-HD (High-Density-Polyethylene) Colours: grey, beige or orange
HDT 90	90	PE-HD (High-Density-Polyethylene) Colours: grey, beige or orange
HDT 140	140	Polyamide, fibre reinforced > 30 % Colours: grey, beige or orange

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Slip-on plates T 90, HDT 90 and HDT 140

Annex 8