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and types of construction

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European Technical Assessment

ETA-07/0288
of 17 October 2017

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

Hilti ETICS screwed-in anchor D 8-FV

Product family
to which the construction product belongs

Screwed-in plastic anchor for fixing of external thermal
insulation composite systems with rendering in concrete
and masonry

Manufacturer

Hilti Aktiengesellschaft
Business Unit Anchors
9494 Schaan
FÜRSTENTUM LIECHTENSTEIN

Manufacturing plant

Hilti Werke

This European Technical Assessment
contains

15 pages including 3 annexes which form an integral part
of this assessment

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

EAD 330196-01-0604

European Technical Assessment

ETA-07/0288

English translation prepared by DIBt

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Specific part

1 Technical description of the product

The Hilti ETICS screwed-in anchor D 8-FV with a helix consists of a plastic part made of virgin polyamide and an accompanying specific screw of galvanised steel.

An illustration and the description of the product are given in Annex A.

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

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

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchor of at least 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.

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

3.1 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Characteristic tension resistance	See Annex C 1
Edge distances and spacing	See Annex B 3
Displacements	See Annex C 2

3.2 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Point thermal transmittance	See Annex C 2

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

In accordance with EAD No. 330196-01-0604, the applicable European legal act is: [97/463/EC].

The system to be applied is: 2+

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

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

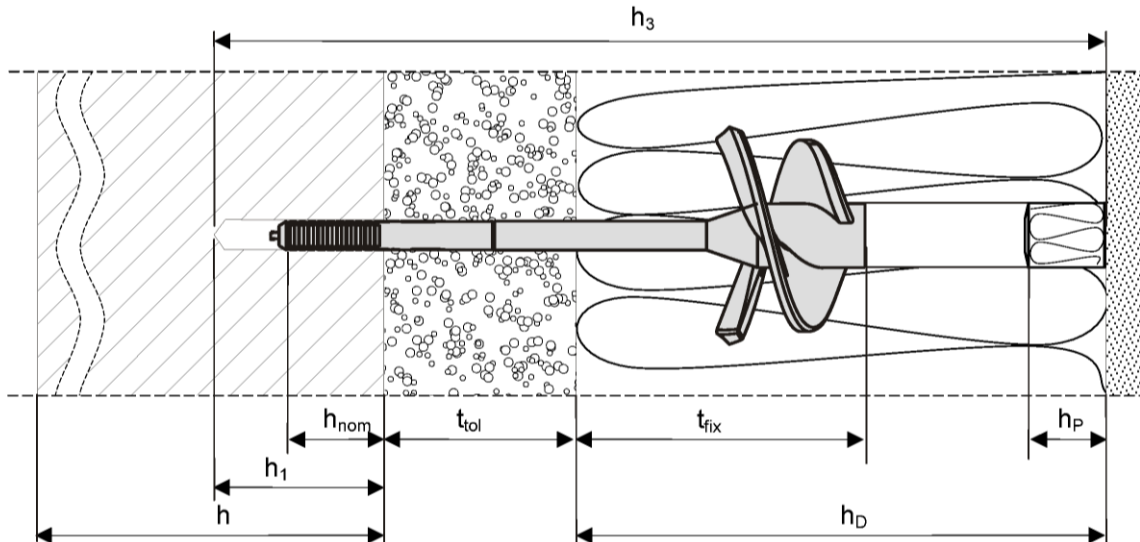
Issued in Berlin on 17 October 2017 by Deutsches Institut für Bautechnik

Dr.-Ing. Lars Eckfeldt
p. p. Head of Department

beglaubigt:
Ziegler

HILTI ETICS screwed-in anchor D 8-FV

Intended use: Fixing of external thermal insulation composite systems in concrete, masonry, lightweight aggregate concrete and autoclaved aerated concrete



Legend:

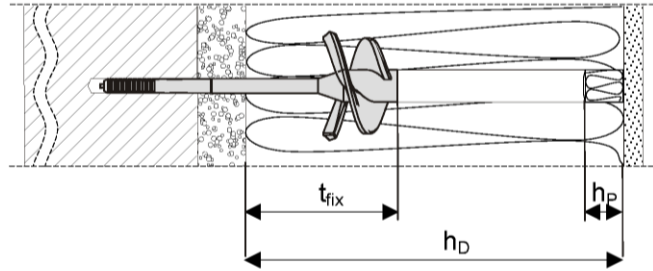
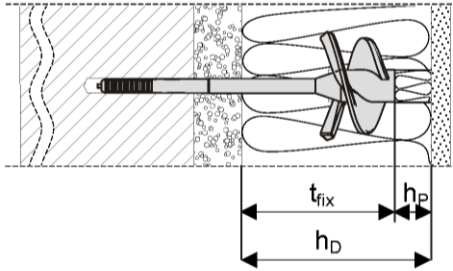
- h = thickness of member (wall)
- h_1 = depth of drilled hole to the deepest point
- h_3 = total length of bore hole from insulation surface to the deepest point
- h_{nom} = overall plastic anchor embedment depth in the base material
- h_D = insulation thickness
- h_P = thickness of plug
- t_{fix} = thickness of fixture
- t_{tol} = thickness of equalizing layer for compensation of tolerances or non-load-bearing layer

HILTI ETICS screwed-in anchor D 8-FV

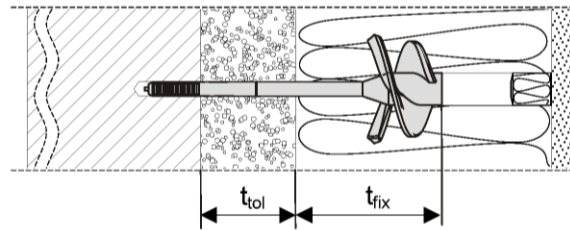
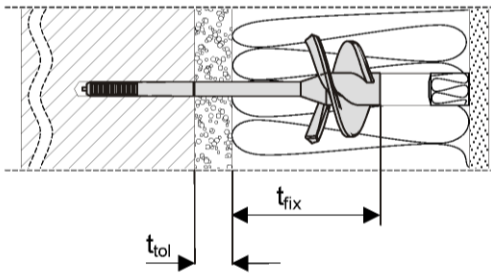
Product description
Installed condition

Annex A 1

Use in different insulation material thickness



Use in different thickness of equalizing or non-loadbearing layer



Legende:

h_D = thickness of insulation material

h_P = thickness of plug

t_{fix} = thickness of fixture

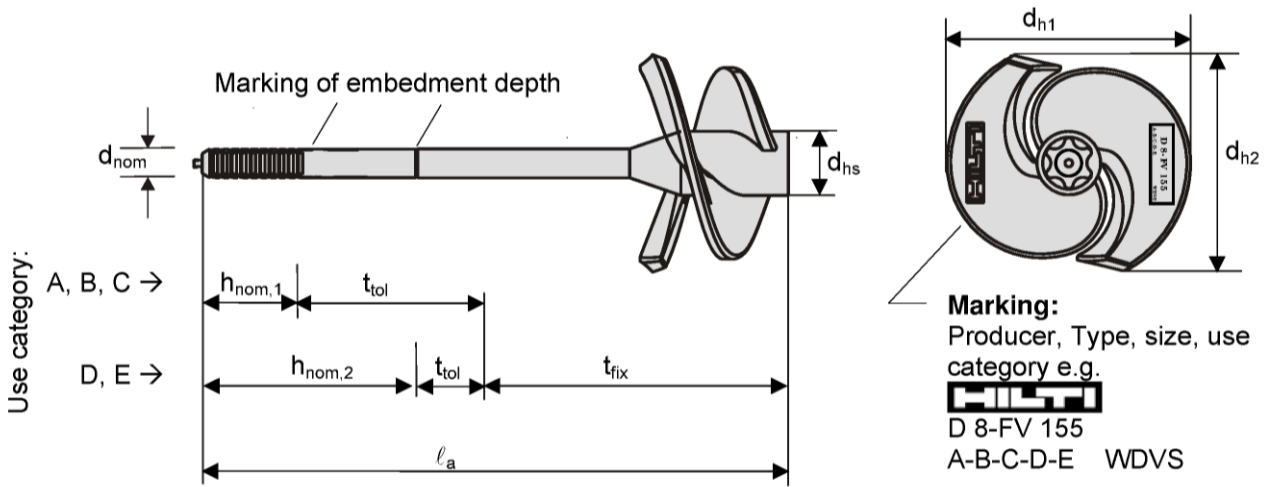
t_{tol} = thickness of equalizing layer for compensation of tolerances of on-loadbearing layer

HILTI ETICS screwed-in anchor D 8-FV

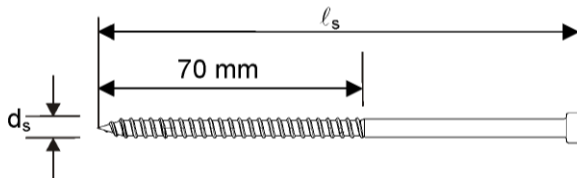
Product description
Installed condition

Annex A 2

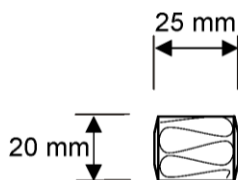
Anchor sleeve



Special screw



Plug



Note: PU-Foam with specifications in accordance to table A4 can be used alternatively

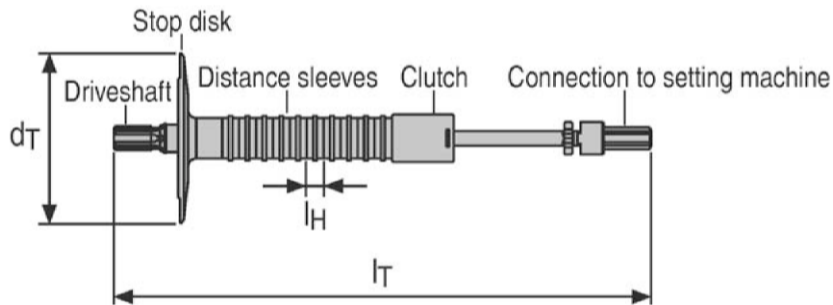
HILTI ETICS screwed-in anchor D 8-FV

Product description
Marking and dimensions of anchor sleeve, special screw and plug

Annex A 3

Setting tools

Setting tool D8-SW 1 or setting tool D8-SW 2



Setting tool HTH-SW 1 or setting tool HTH-SW 2

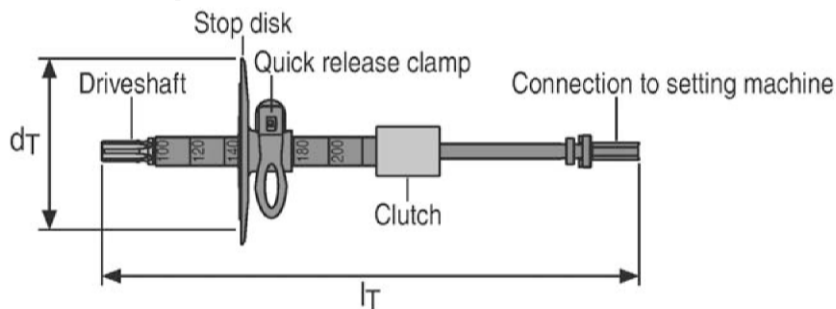


Table A1 Dimensions of setting tool D8-FV SW 1 und D8-FV SW 2

Setting tool type		D8-SW 1	D8-SW 2
Diameter of stop disk	d_T [mm]	100	
Length of the tool	l_T [mm]	310	477
Length of distance sleeve (insulation thickness increment)	l_H [mm]	10	
Applicable insulation thicknesses	$h_{D,min}$ [mm]	100 ¹⁾	200
	$h_{D,max}$ [mm]	200	360

¹⁾ this value applies for $t_{fix} = 80$ mm, for $t_{fix} = 110$ mm: $h_{D,min} = 130$ mm

Table A2 Dimensions of setting tool HTH-SW 1 und HTH-SW 2

Setting tool type		HTH-SW 1	HTH-SW 2
Diameter of stop disk	d_T [mm]	100	
Length of the tool	l_T [mm]	310	477
Applicable insulation thicknesses	$h_{D,min}$ [mm]	100 ¹⁾	200
	Increment [mm]	10	
	$h_{D,max}$ [mm]	200	360

¹⁾ this value applies for $t_{fix} = 80$ mm, for $t_{fix} = 110$ mm: $h_{D,min} = 130$ mm

HILTI ETICS screwed-in anchor D 8-FV	Annex A 4
Product description Setting tools	

Table A3 Anchor types and dimensions

Anchor type		D 8-FV 125	D 8-FV 155	D 8-FV 215
Plastic sleeve	Anchor sleeve diameter d_{nom} [mm]	8		
	Length of anchor sleeve l_a [mm]	125	155	215
	Diameter of helix center d_{hs} [mm]	17		
	Diameter 1 of helix d_{h1} [mm]	65		
	Diameter 2 of helix d_{h2} [mm]	58		
Special screw	Screw diameter d_s [mm]	5		
	Screw length l_s [mm]	98	128	188

Table A4 Material

Element	Material
Anchor sleeve	virgin polyamide, colour orange or black
Screw	Steel, galvanised $\geq 5 \mu\text{m}$, $f_{yk} = 480 \text{ N/mm}^2$, $f_{uk} = 600 \text{ N/mm}^2$
Plug	EPS or mineral wool
PU-Foam	Polyurethane, thermal conductivity $\leq 0,045 \text{ W/(m}\cdot\text{K)}$ Remark: use of foam only in accordance with ETICS supplier

HILTI ETICS screwed-in anchor D 8-FV

Product description

Dimensions of anchor sleeve and special screw, materials

Annex A 5

Specification of intended use

Anchorage subject to:

- 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

Base materials:

- Normal weight concrete (use category A), according to Annex C 1
- Solid masonry (use category B), according to Annex C 1
- Hollow or perforated masonry (use category C), according to Annex C 1
- Lightweight aggregate concrete (use category D), according to Annex C 1
- Autoclaved aerated concrete (use category E), according to Annex C 1
- For other base materials of the use categories A, B, C, D or E the characteristic resistance of the anchor may be determined by job site tests according to EOTA Technical Report TR 051 edition December 2016

Temperature range:

- 0°C to +40°C (max. short term temperature +40°C and max. long term temperature +24°C)

Design:

- The anchorages are designed under the responsibility of an engineer experienced in anchorages and masonry work with the partial safety factors $\gamma_M = 2,0$ and $\gamma_F = 1,5$, if there are no other national regulations.
- Verifiable calculation notes and drawings with anchor positions are prepared taking into account of the loads to be anchored.
- Fasteners are only to be used for multiple fixings of thermal insulation composite systems.

Installation:

- Hole drilling by the drill modes according to Annex C 1
- Anchor installation carried out by appropriate qualified personnel under the supervision of the person responsible for technical matters of the site
- Installation temperature from 0°C to +40°C
- Exposure to UV due to solar radiation of the anchor not protected by rendering ≤ 6 weeks

HILTI ETICS screwed-in anchor D 8-FV

Intended use
Specifications

Anhang B 1

Table B1 Installation parameters for use in concrete and solid masonry (use category A, B)

Anchor type		D 8-FV 125	D 8-FV 155	D 8-FV 215	
Nominal drill bit diameter	$d_0 = [\text{mm}]$	8			
Cutting diameter of drill bit	$d_{\text{cut}} \leq [\text{mm}]$	8,45			
Depth of drilled hole to the deepest point (in base material)	$h_1 \geq [\text{mm}]$	45			
Overall plastic anchor embedment depth in base material	$h_{\text{nom},1} \geq [\text{mm}]$	25			
Thickness of fixture	$t_{\text{fix}} = [\text{mm}]$	80	80	80	110
Thickness of equalizing layer for compensation of tolerances or non-load bearing layer	$t_{\text{tol},\text{min}} = [\text{mm}]$	0	0	50	20
	$t_{\text{tol},\text{max}} = [\text{mm}]$	20	50	110 ¹⁾	80 ¹⁾
Total length of bore hole from insulation surface to the deepest point	$h_3 \geq [\text{mm}]$	h_D+65	h_D+95	h_D+155	h_D+125

¹⁾ If $t_{\text{tol},\text{max}}$ exceeds 50 mm it has to be ensured that the compensation layer or non-load bearing layer t_{tol} has enough capability to carry the dead loads of the ETICS. This can be considered to be given if t_{tol} consists of plaster, old insulation or shells of jacket blocks.

Table B2 Installation parameters for use in thin concrete members (e.g. weather resistant skins) and in hollow masonry (use category C)

Anchor type		D 8-FV 125	D 8-FV 155	D 8-FV 215	
Nominal drill bit diameter	$d_0 = [\text{mm}]$	8			
Cutting diameter of drill bit	$d_{\text{cut}} \leq [\text{mm}]$	8,45			
Depth of drilled hole to the deepest point (in base material)	$h_1 \geq [\text{mm}]$	45			
Overall plastic anchor embedment depth in base material	$h_{\text{nom},1} \geq [\text{mm}]$	25			
Thickness of fixture	$t_{\text{fix}} = [\text{mm}]$	80	80	80	110
Thickness of equalizing layer for compensation of tolerances or non-load bearing layer	$t_{\text{tol},\text{min}} = [\text{mm}]$	0	20 ¹⁾	80 ¹⁾	50 ¹⁾
	$t_{\text{tol},\text{max}} = [\text{mm}]$	20	50	110 ²⁾	80 ²⁾
Total length of bore hole from insulation surface to the deepest point	$h_3 \geq [\text{mm}]$	h_D+65	h_D+95	h_D+155	h_D+125

¹⁾ $t_{\text{tol},\text{min}}$ may be lower if the characteristic resistance is assessed due to job-site tests.

²⁾ If $t_{\text{tol},\text{max}}$ exceeds 50 mm it has to be ensured that the compensation layer or non-load bearing layer t_{tol} has enough capability to carry the dead loads of the ETICS. This can be considered to be given if t_{tol} consists of plaster, old insulation or shells of jacket blocks.

HILTI ETICS screwed-in anchor D 8-FV

Intended use
Installation parameters

Annex B 2

Table B3 Installation parameters for use in lightweight aggregate concrete and autoclaved aerated concrete (use category D, E)

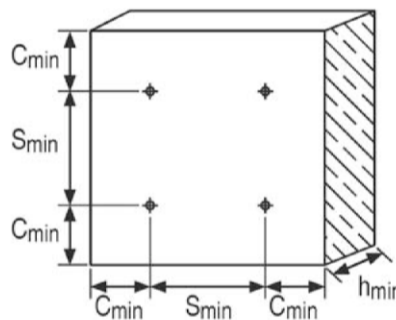
Anchor type		D 8-FV 125	D 8-FV 155	D 8-FV 215		
Nominal drill bit diameter	$d_0 = [\text{mm}]$	-	8			
Cutting diameter of drill bit	$d_{\text{cut}} \leq [\text{mm}]$		8,45			
Depth of drilled hole to the deepest point (in base material)	$h_1 \geq [\text{mm}]$		75			
Overall plastic anchor embedment depth in base material	$h_{\text{nom},1} \geq [\text{mm}]$		55			
Thickness of fixture	$t_{\text{fix}} = [\text{mm}]$		80	80	110	
Thickness of equalizing layer for compensation of tolerances or non-load bearing layer	$t_{\text{tol},\text{min}} = [\text{mm}]$		0			
	$t_{\text{tol},\text{max}} = [\text{mm}]$		20	80 ¹⁾	50	
Total length of bore hole from insulation surface to the deepest point	$h_3 \geq [\text{mm}]$		h_D+95	h_D+155	h_D+125	

¹⁾ If $t_{\text{tol},\text{max}}$ exceeds 50 mm it has to be ensured that the compensation layer or non-load bearing layer t_{tol} has enough capability to carry the dead loads of the ETICS. This can be considered to be given if t_{tol} consists of plaster, old insulation or shells of jacket blocks.

Table B4 Minimum thickness of base material, edge distance and anchor spacing

		D 8-FV
Minimum thickness of the base material	concrete, masonry, lightweight aggregate concrete and autoclaved aerated concrete	h_{min} [mm] 100
	thin concrete members (e.g. weather resistant skins)	h_{min} [mm] 40
Minimum allowable spacing	s_{min} [mm]	100
Minimum allowable edge distance	c_{min} [mm]	100

Scheme of minimum thickness of base material, edge distance and anchor spacing



HILTI ETICS screwed-in anchor D 8-FV

Intended use
Installation parameters, anchor distances and member thickness

Annex B 3

Installation instruction – example of D 8-FV 215 (for the anchors D 8-FV 125 and D 8-FV 155 the different installation parameters in table B1, B2 und B3 shall be considered).

HILTI

D8-FV 215

1 $h_3 = h_p + 155\text{mm}$ $h_D = 100-360\text{mm}$ $h_D = 100-360\text{mm}$

2 $\geq 18\text{ V}$ $n = 370-600\text{ U/min}$

3 $\varnothing 8\text{mm}$

4 h_3 h_D h_D

5 SW1 $h_D = 100-200\text{mm}$ SW2 $h_D = 200-360\text{mm}$

6 $h_D = 0-80\text{mm}$ $h_D = 80-110\text{mm}$ $h_D = 50-110\text{mm}$

7 $n = 370-600\text{ U/min}$

8 90° $+5\text{ kg}$

9 h_D h_D

10 h_D

min. 2mm
mineral wool

click!

HILTI ETICS screwed-in anchor D 8-FV

Intended use
Installation instruction

Annex B 4

Table C1 Characteristic resistance to tension loads N_{Rk} in concrete, masonry, lightweight aggregate concrete and autoclaved aerated concrete

Base material	use cat. ⁴⁾	Bulk density class ρ [kg/dm ³]	Compressive strength class f_b [N/mm ²]	Remarks	Drill method	N_{Rk} [kN]
Concrete C12/15 – C50/60 EN 206-1:2000	A	-	-	-	hammer	1,5
Thin concrete members (e.g. weather resistant skins) C16/20 – C50/60 EN 206-1:2000	A	-	-	Thickness of the thin skin 100mm > h ≥ 40mm	hammer	1,5
Clay brick, Mz e.g. according to DIN 105-100:2012-01 / EN 771-1:2011	B	2,0	12	Cross section reduced by perforation vertically to the resting area up to 15%	hammer	1,5
Sand-lime solid brick, KS e.g. according to DIN V 106:2005-10 / EN 771-2:2011	B	2,0	12	Cross section reduced by perforation vertically to the resting area up to 15%	hammer	1,5
Vertically perforated clay brick, Hlz e.g. according to DIN 105-100:2012-01 / EN 771-1:2011	C	1,2	12	Cross section reduced by perforation vertically to the resting area more than 15% up to 50% ¹⁾	rotary only	0,75
Vertically perforated clay brick, Hlz e.g. according to DIN 105-100:2012-01 / EN 771-1:2011	C	0,8	12	Cross section reduced by perforation vertically to the resting area more than 15% up to 50% ²⁾ , net density ≥ 1.5 kg/dm ³	rotary only	0,5
Vertically perforated sand-lime brick, KSL e.g. according to EN 771-2:2011 / DIN V 106:2005-10	C	1,4	12	Cross section reduced by perforation vertically to the resting area more than 15% up to 50% ³⁾	hammer	1,2
Lightweight aggregate concrete, LAC e.g. according to EN 1520:2011 / EN 771-3:2011	D	1,2	4	-	hammer	1,2
Autoclaved aerated concrete, PP e.g. according to EN 771-4:2011	E	0,6	4	-	rotary only	0,9

- 1) The value applies only for outer web thickness ≥ 14 mm
 2) The value applies only for outer web thickness ≥ 9 mm
 3) The value applies only for outer web thickness ≥ 24 mm
 4) Different installation parameters for use categories A, B, C and use categories D, E and thin concrete members to be considered (see Annex B 2 und B 3)
- Otherwise the characteristic resistance shall be determined by job-site pull-out tests

HILTI ETICS screwed-in anchor D 8-FV

Performances
Characteristic resistance to tension loads

Annex C 1

Table C2 Point thermal transmittance according EOTA Technical Report TR 025:2007-06

Anchor type	Insulation thickness h_D [mm]	Point thermal transmittance χ [W/K]	
		Insulation hole closed with plug	Insulation hole closed with PUR- foam
D 8-FV 125 D 8-FV 155 D 8-FV 215	$t_{fix}=80\text{mm}$ $100 \leq h_D \leq 150$ $150 < h_D \leq 360$	0,001 0,001	0,001 0,000
D 8-FV 155 D 8-FV 215	$t_{fix}=110\text{mm}$ $130 \leq h_D \leq 150$ $150 < h_D \leq 360$	0,002 0,001	0,002 0,001

Table C3 Displacements

Base material	Bulk density class ρ [kg/dm ³]	Compressive strength class f_b [N/mm ²]	Tension Force N [kN]	$\delta_m(N)$ [mm]
Concrete, C12/15 – C50/60 (EN 206-1:2000)	-	-	0,50	0,4
Thin concrete members, C16/20 – C50/60 (EN 206-1:2000)	-	-	0,50	0,4
Clay brick, Mz (DIN 105-100:2012-01 / EN 771-1:2011)	2,0	12	0,50	0,4
Sand-lime solid brick, KS (DIN V 106:2005-10 / EN 771-2:2011)	2,0	12	0,50	0,2
Vertically perforated clay brick, Hlz (DIN 105-100:2012-01 / EN 771-1:2011)	1,4	12	0,25	0,2
Vertically perforated clay brick, Hlz net density $\geq 1.5 \text{ kg/dm}^3$ (DIN 105-100:2012-01 / EN 771-1:2011)	0,8	12	0,17	0,1
Vertically perforated sand-lime brick, KSL (EN 771-2:2011)	1,4	12	0,40	0,3
Lightweight aggregate concrete, LAC (EN 1520:2011 / EN 771-3:2011)	1,2	4	0,40	0,1
Autoclaved aerated concrete, PP (EN 771-4:2011)	0,6	4	0,30	0,2

HILTI ETICS screwed-in anchor D 8-FV

Performances
Point thermal transmittance, Displacements

Annex C 2