

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

**ETA-13/0009**  
**of 31 January 2018**

English translation prepared by DIBt - Original version in German language

### General Part

Technical Assessment Body issuing the  
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

STR Carbon

Product family  
to which the construction product belongs

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

Manufacturer

DAW SE  
Roßdörfer Straße 50  
64372 Ober-Ramstadt  
DEUTSCHLAND

Manufacturing plant

DAW Herstellwerk 10183

This European Technical Assessment  
contains

19 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

This version replaces

ETA-13/0009 issued on 30 January 2013

**European Technical Assessment**

**ETA-13/0009**

English translation prepared by DIBt

**Page 2 of 19 | 31 January 2018**

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## Specific part

### 1 Technical description of the product

The screwed-in anchor STR Carbon with a plate consists of a plastic part made of virgin polyethylene, an accompanying specific screw made of stainless steel or galvanised steel and an anchor cap made of polystyrene (for mounting the anchor on the surface of the insulating material) or an insulation cover made of polystyrene or mineral wool (for deep mounting of the anchor in the insulating material).

For mounting on the surface the anchor may additionally be combined with the anchor plates SBL 140 plus, VT 90 or VT 2G, made of polyamide.

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 verification 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 2
Plate stiffness	See Annex C 2
Displacements	See Annex C 3

#### 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 European Assessment Document**

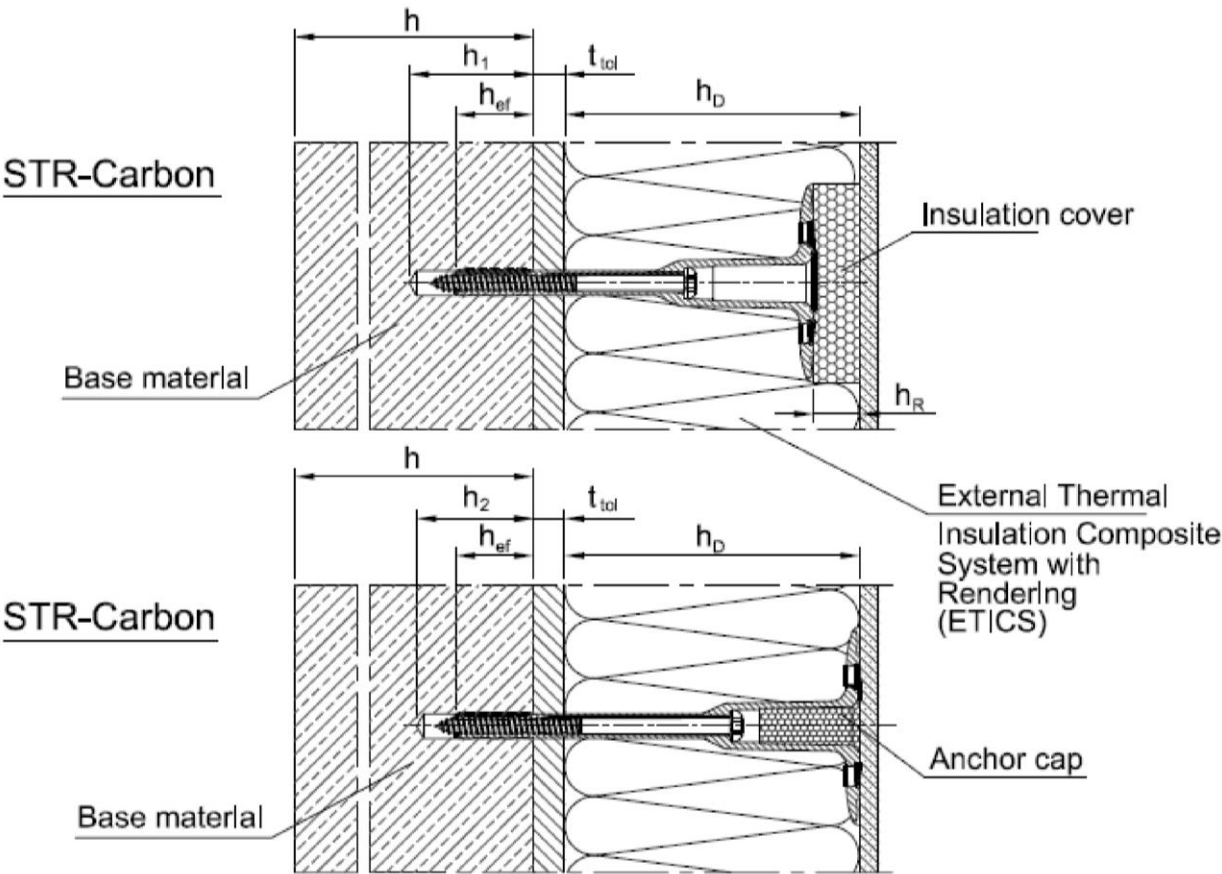
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 31 January 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow  
Head of Department

*beglaubigt:*  
Ziegler

**STR Carbon**



**Intended use**

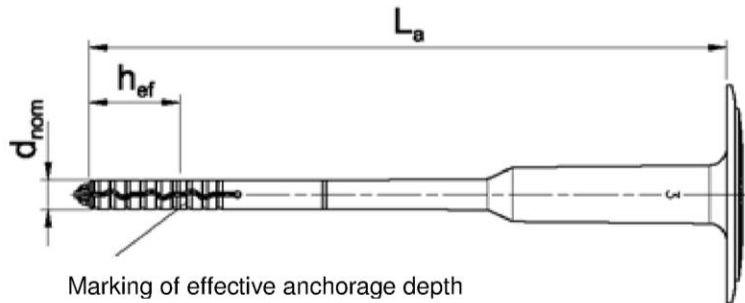
- Anchorage of ETICS in concrete and masonry
- Anchorage of ETICS in autoclaved aerated concrete

Legend:

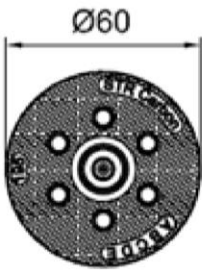
- $h_D$  = thickness of insulation material
- $h_{ef}$  = effective anchorage depth
- $h$  = thickness of member (wall)
- $h_{1,2}$  = depth of drilled hole to deepest point
- $h_R$  = thickness of insulation cover
- $t_{tol}$  = thickness of equalizing layer or non-load-bearing coating

STR Carbon	Annex A 1
Product description Installed condition	

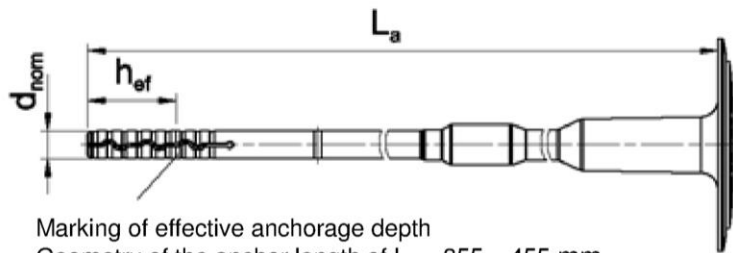
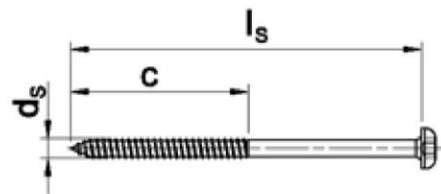
Components for deep mounting in use category A, B, C, D



Marking of effective anchorage depth

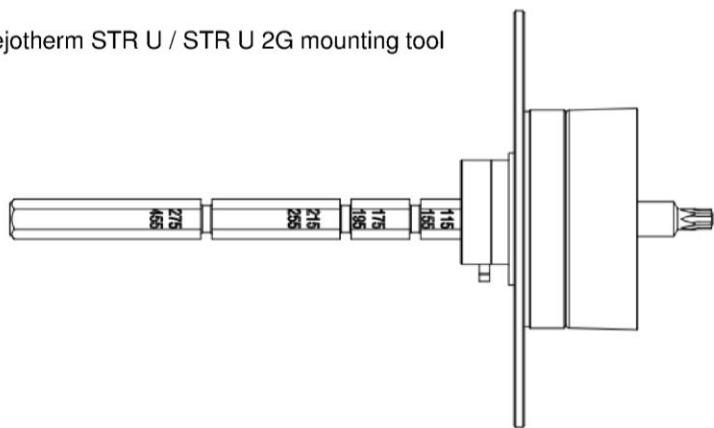


Marking:  
Identifying mark (STR Carbon)  
Length of anchor (e.g. 195)  
Use category (A,B,C,D,E)

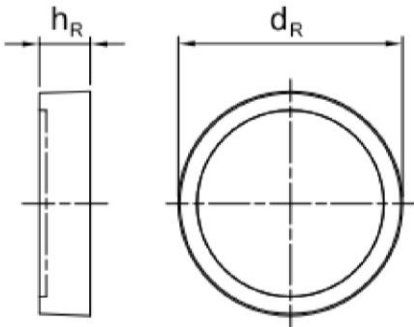


Marking of effective anchorage depth  
Geometry of the anchor length of  $L_a = 355 - 455$  mm

ejothem STR U / STR U 2G mounting tool



Insulation cover

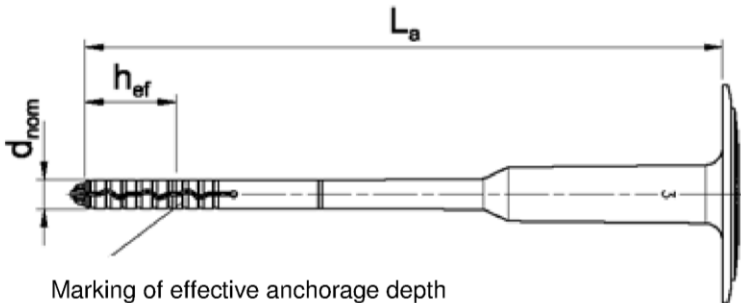


STR Carbon

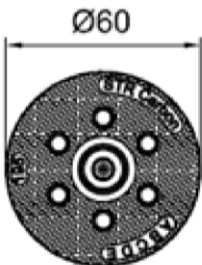
**Product description**  
Components for deep mounting, use category A,B,C,D

Annex A 2

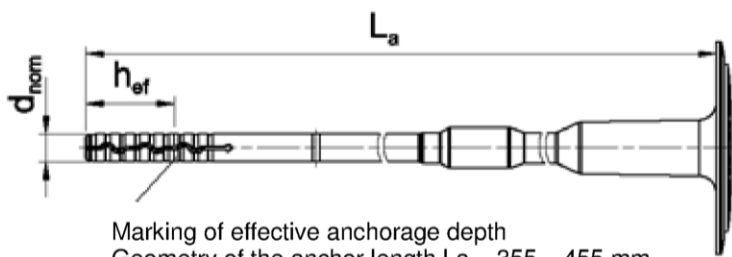
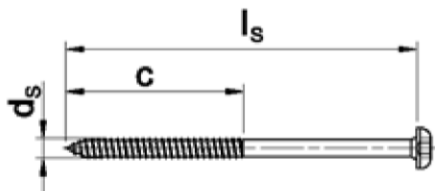
Components for mounting on the surface in use category A, B, C, D



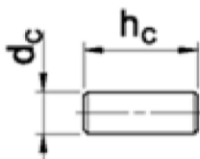
Marking of effective anchorage depth



Marking:  
Identifying mark (STR Carbon)  
Length of anchor (e.g. 195)  
Use category (A,B,C,D,E)



Marking of effective anchorage depth  
Geometry of the anchor length  $L_a = 355 - 455$  mm



Insulation cap (to look up the anchor in case of mounting on the surface)



ejotherm STR U / STR 2G  
mounting tool

Table A1: Dimensions

		Measures in mm											
Anchor Type	Colour	Anchor sleeve				Accompanying specific screw				Anchor cap		Insulation cover	
		$d_{nom}$	$h_{ef}$	min $L_a$	max $L_a$	$d_s$	c	min $l_s$	max $l_s$	$h_c$	$d_c$	$h_R$	$d_R$
STR Carbon	grey	8	25	115	455	5,5	60	78	418	23	15	15	66

Determination of maximum thickness of insulation  $h_D$  for STR Carbon:

$$\begin{aligned} h_D &= L_a - t_{tol} - h_{ef} \quad (L_a = \text{e.g. } 115; t_{tol} = 10) \\ \text{e.g. } h_D &= 115 - 10 - 25 \\ h_{Dmax.} &= 80 \end{aligned}$$

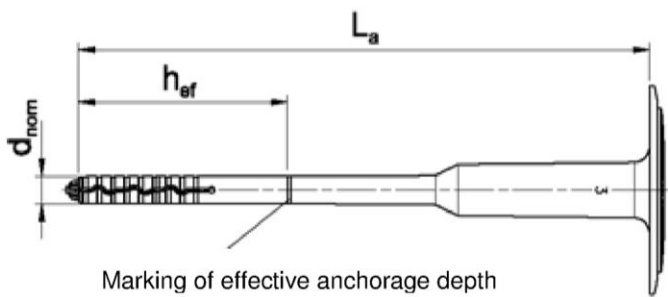
STR Carbon

Product description

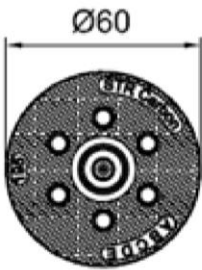
Components for mounting on the surface, use category A,B,C,D, dimensions

Annex A 3

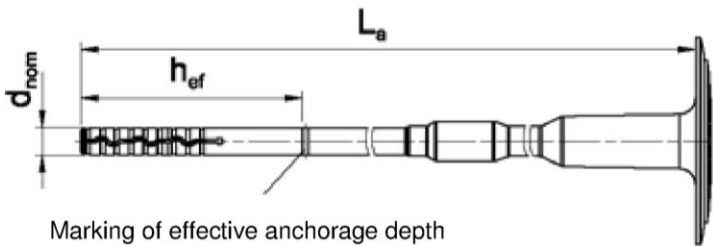
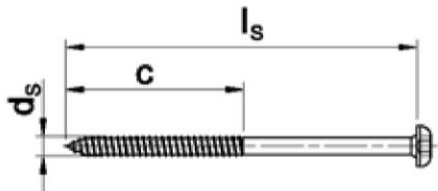
Components for deep mounting in use category E



Marking of effective anchorage depth

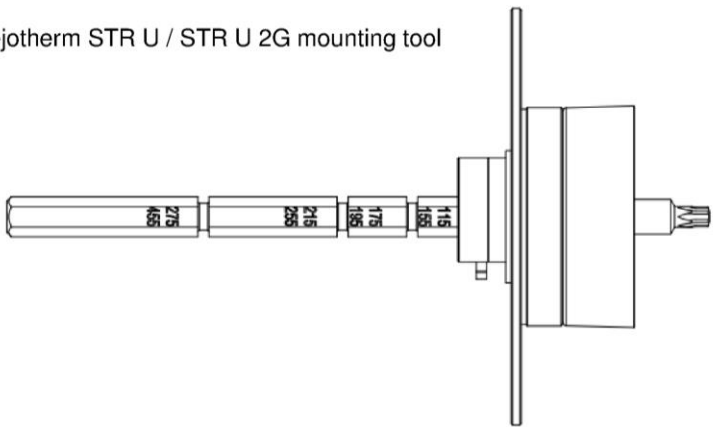


Marking:  
Identifying mark (STR Carbon)  
Length of anchor (e.g. 195)  
Use category (A,B,C,D,E)

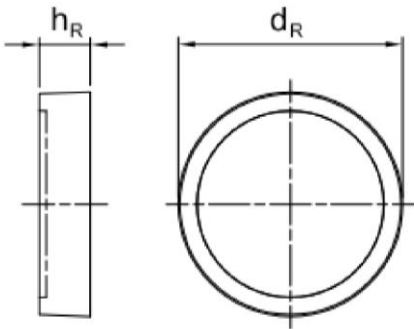


Marking of effective anchorage depth  
Geometry from the anchor length  $L_a = 355 - 455$  mm

ejotherm STR U / STR U 2G mounting tool



Insulation cover



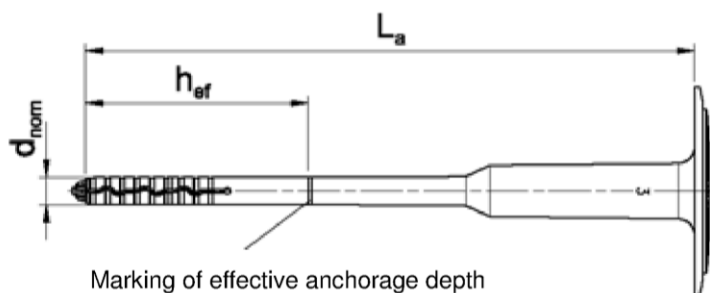
STR Carbon

Product description  
Components for deep mounting, use category E

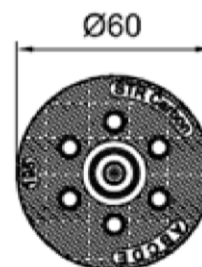
Annex A 4



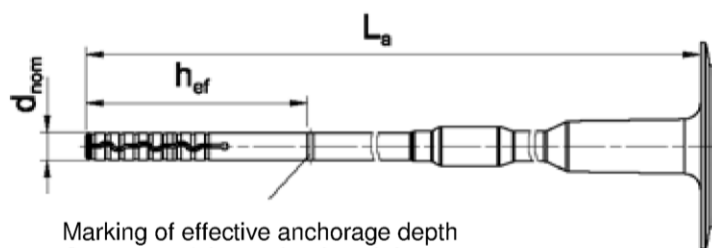
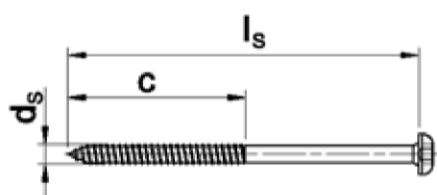
# Components for mounting on the surface in use category E



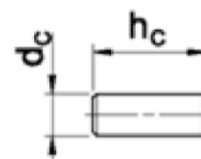
Marking of effective anchorage depth



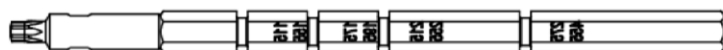
Marking:  
Identifying mark (STR Carbon)  
Length of anchor (e.g. 195)  
Use category (A,B,C,D,E)



Marking of effective anchorage depth  
Geometry of the anchor length  $L_a = 355 - 455$  mm



Insulation cap (to look up the anchor in case of mounting on the surface)



ejotherm STR U / STR 2G  
mounting tool

Table A2: Dimensions

Measures in mm

Anchor Type	Colour	Anchor sleeve				Accompanying specific screw				Anchor cap		Insulation cover	
		$d_{nom}$	$h_{ef}$	min $L_a$	max $L_a$	$d_s$	$c$	min $l_s$	max $l_s$	$h_c$	$d_c$	$h_R$	$d_R$
STR Carbon	grey	8	65	115	455	5,5	60	78	418	23	15	15	66

Determination of maximum thickness of insulation  $h_D$  for STR Carbon:

$$h_D = L_a - t_{tol} - h_{ef} \quad (L_a = \text{e.g. } 155; t_{tol} = 10)$$

$$\text{e.g. } h_D = 155 - 10 - 65$$

$$h_{Dmax.} = 80$$

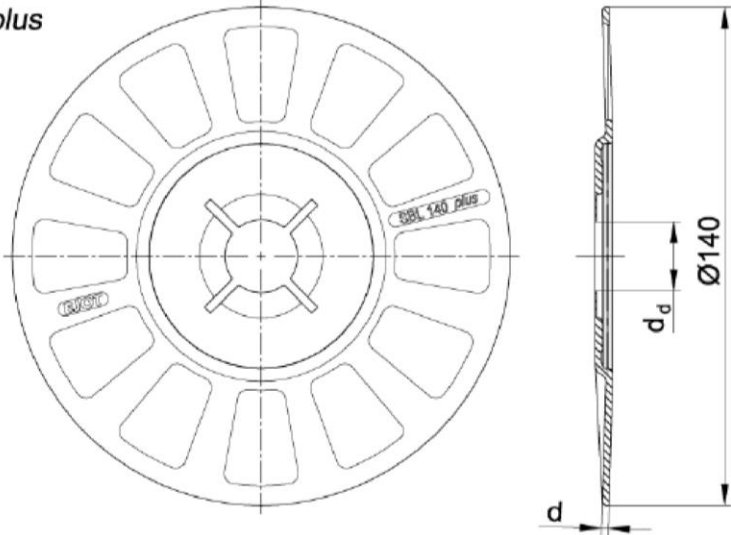
STR Carbon

Product description

Components for mounting on the surface, use category E, dimensions

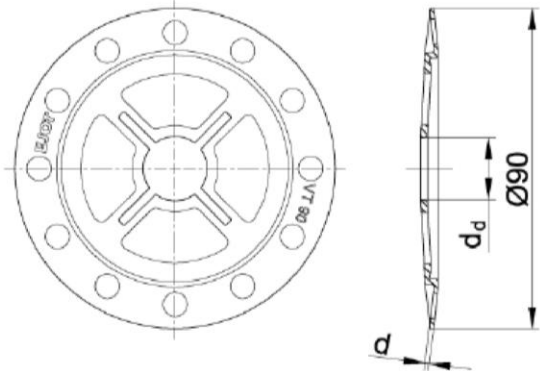
Annex A 5

SBL 140 plus



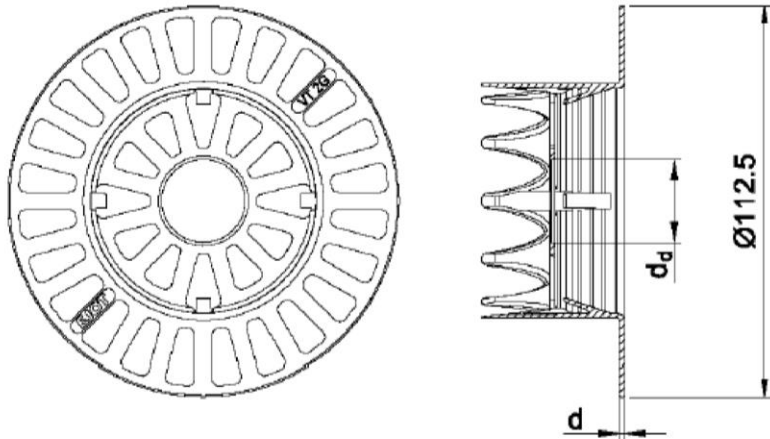
SBL 140 plus	
colour	nature
d <sub>d</sub> [mm]	20,0
d [mm]	2,0

VT 90



VT 90	
colour	nature
d <sub>d</sub> [mm]	18,5
d [mm]	1,2

VT 2G



VT 2G	
colour	nature, grey
d <sub>d</sub> [mm]	29,0
d [mm]	1,5

STR Carbon

**Product description**  
Anchor plates in combination with STR Carbon

**Annex A 6**

**Tabelle A3: Materials**

Name	Materials
Anchor sleeve	virgin polyethylene (PE-HD), colour: grey
Insulation cover	Polystyrene PS 20
	Mineral wool type HD
Insulation cap	Polystyrene PS 30
Specific screw	Steel, electrocalvanized $\geq 5 \mu\text{m}$ according EN ISO 4042:1999, blue passivated
	Stainless steel according ISO 3506:2009 material number 1.4401 or 1.4571 material number 1.4301 or 1.4567

**Tabelle A4: anchor plate, diameter, and materials**

anchor plate	$\varnothing D$ [mm]	$\varnothing d_d$ [mm]	d [mm]	material
VT 90	90	18,5	1,2	PA 6, PA GF 50
SBL 140 plus	140	20,0	2,0	PA GF 50
VT 2G	112	29,0	1,5	PA GF 50

**STR Carbon**

**Product description**  
Materials, anchor plates

**Annex A 7**

## Specifications 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 are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings.
- Fasteners are only to be used for multiple fixings of thermal insulation composite systems.

### Installation:

- Hole drilling by the drill modes according to Annex C1.
- Anchor installation carried out by appropriately qualified personnel and 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  $\leq 6$  weeks

STR Carbon

Intended use  
Specifications

Annex B 1

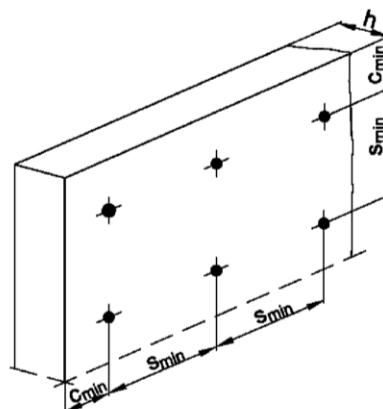
**Table B1: Installation parameters**

Anchor type		STR Carbon	
Use category		A B C D	E
Drill hole diameter	$d_0$ [mm]	8	8
Cutting diameter of drill bit	$d_{cut}$ [mm] $\leq$	8,45	8,45
Depth of drilled hole to deepest point			
- deep mounting	$h_1$ [mm] $\geq$	50	90
- mounting on the surface	$h_2$ [mm] $\geq$	35	75
Effective anchorage depth	$h_{ef}$ [mm] $\geq$	25	65

**Table B2: Anchor distances and dimensions of members**

Anchor type		STR Carbon	
Use category		A B C D	E
Minimum allowable spacing	$s_{min} \geq$ [mm]	100	100
Minimum allowable edge distance	$c_{min} \geq$ [mm]	100	100
Minimum thickness of member			
- deep mounting	$h \geq$ [mm]	100	120
		40 (only thin skins of concrete)	
- mounting on the surface	$h \geq$ [mm]	100	120
		40 (only thin skins of concrete)	

Scheme of distance and spacing



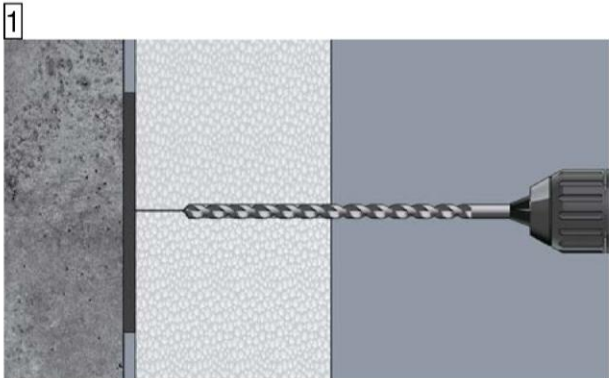
**STR Carbon**

**Intended use**

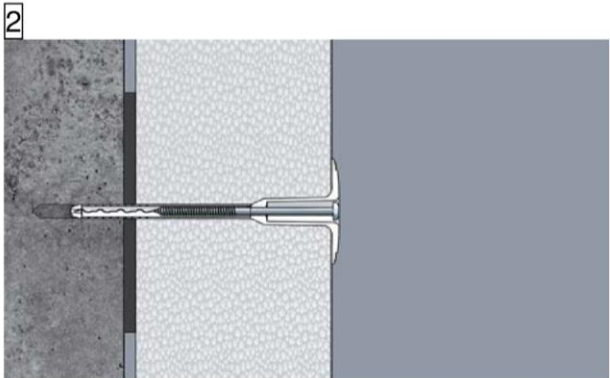
Installations parameters, anchor distances and dimensions of members

**Annex B 2**

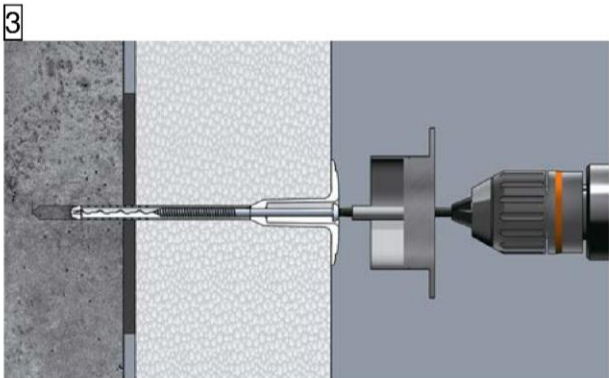




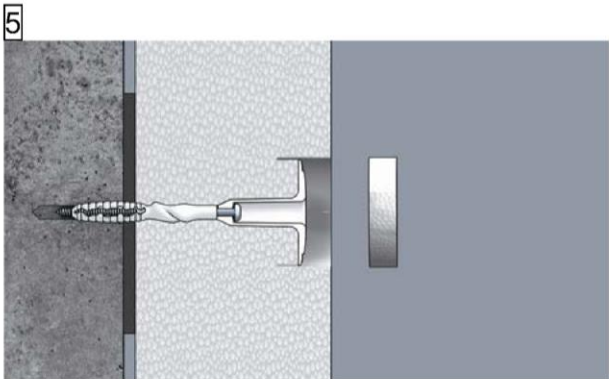
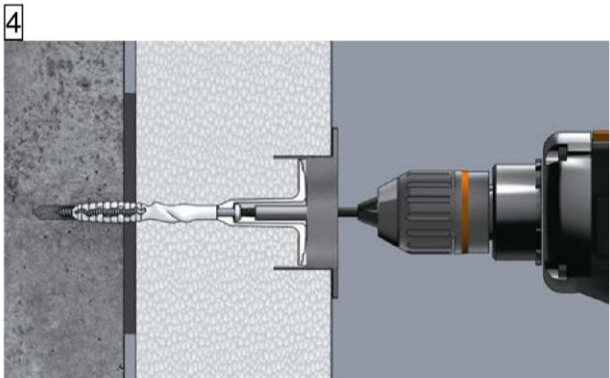
Drill the hole



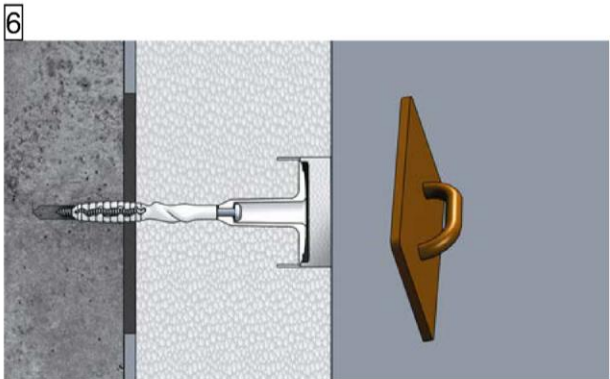
Insert the anchor



Countersunk installation with STR-tool

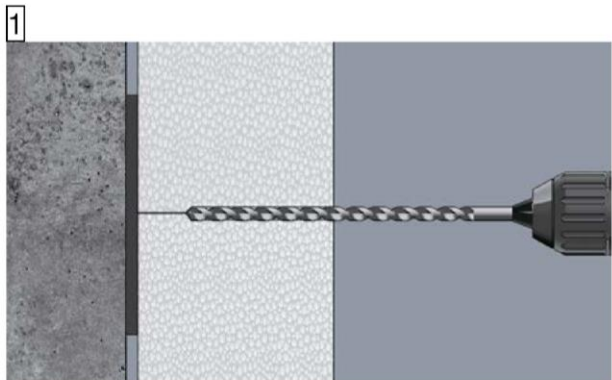


Insert the STR insulation cover with the help of a float

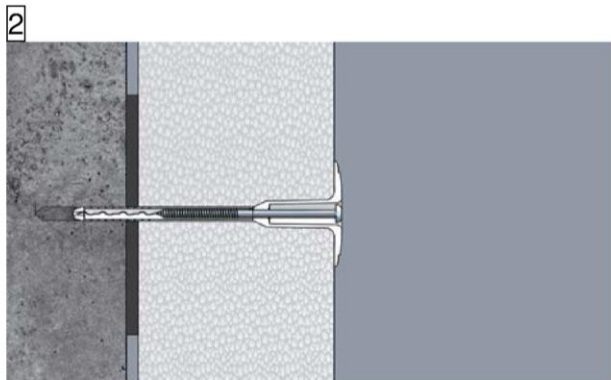


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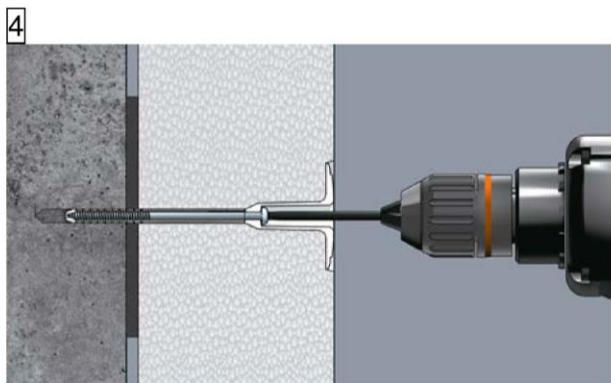
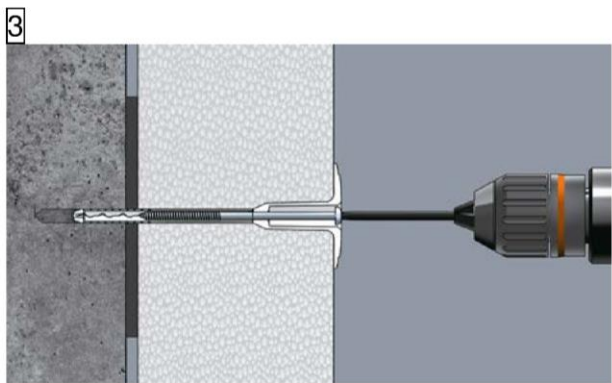
<b>STR Carbon</b>	<b>Annex B 3</b>
<b>Intended use</b> Installation instructions countersunk mounted with STR insulation cover	



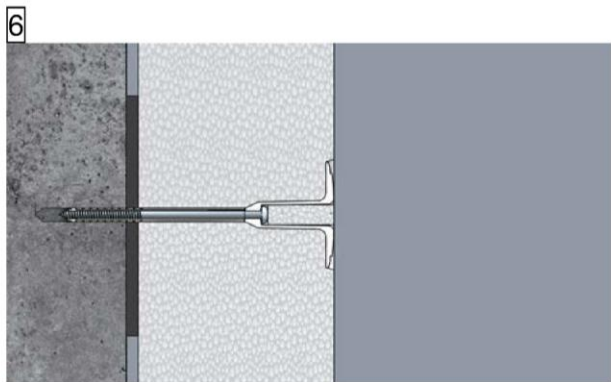
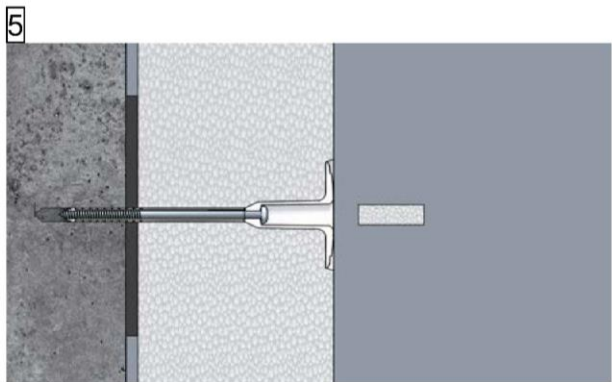
Drill the hole



Insert the anchor



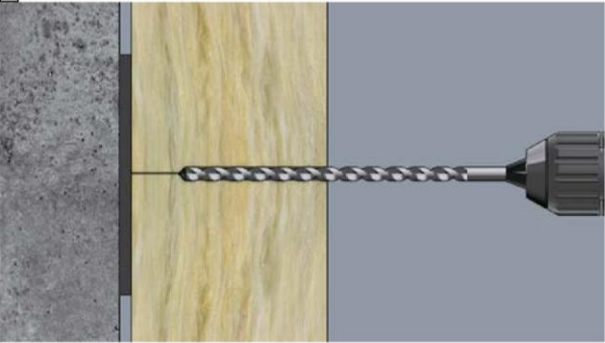
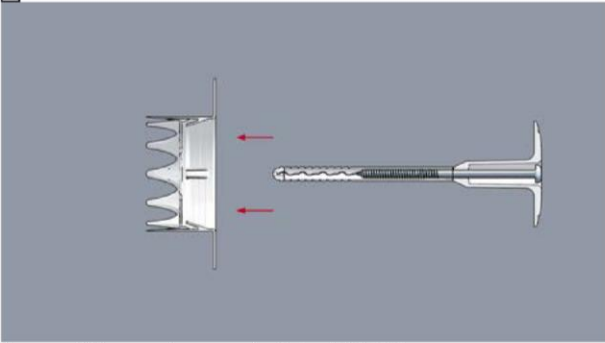
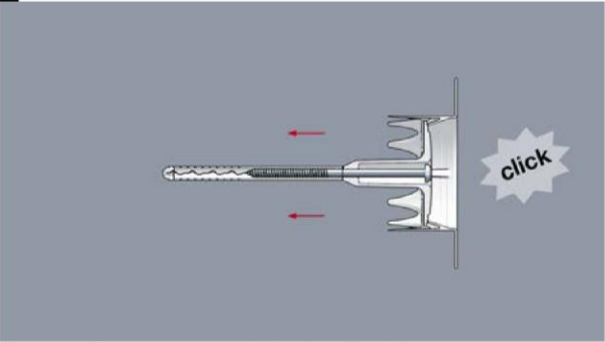
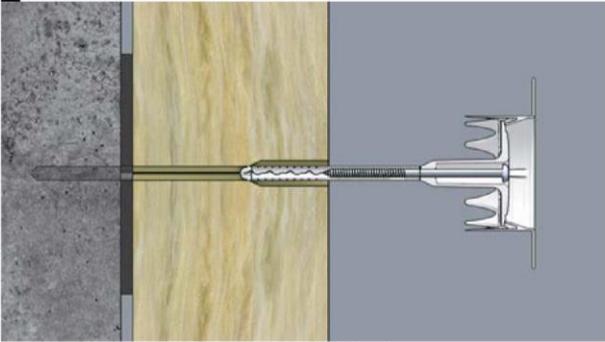
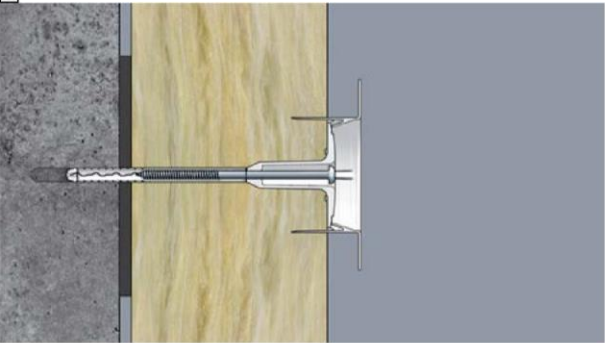
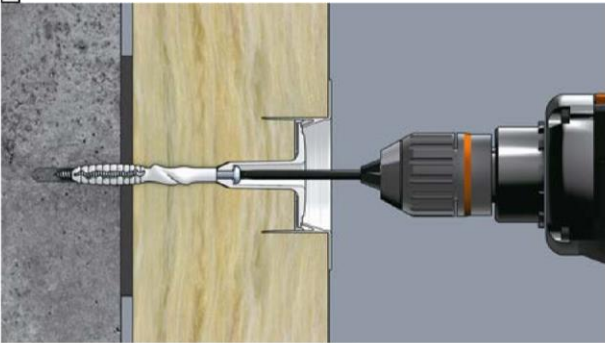
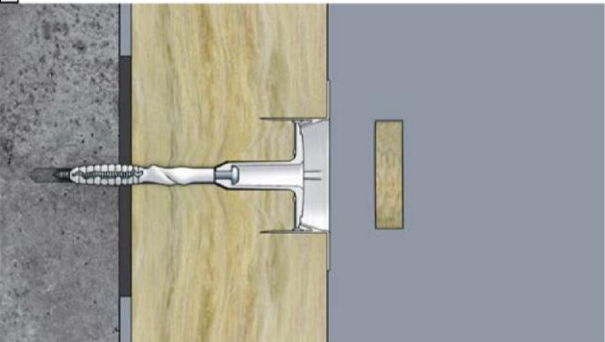
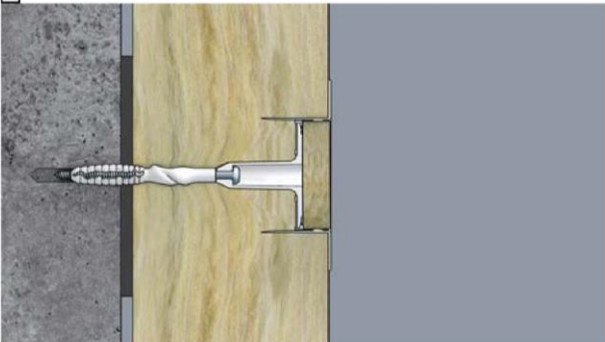
Surface fixed installation with STR-tool or standard bit



Insert the STR insulation cap

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<b>STR Carbon</b>	<b>Annex B 4</b>
<b>Intended use</b> Installation instructions Surface fixed installation with STR insulation cap	

<div>1</div>  <p>Drill the hole</p>	<div>2</div>  <p>Assemble anchor and plate VT 2G</p>
<div>3</div>  <p>Assemble anchor and plate VT 2G</p>	<div>4</div>  <p>Insert the anchor into the drill hole</p>
<div>5</div>  <p>Drive through VT 2G until plate rests on surface</p>	<div>6</div>  <p>Mounting on the surface with STR tool or standard bit</p>
<div>7</div>  <p>Insert the STR insulation cover</p>	<div>8</div>  <p>installed anchor</p>

<b>STR Carbon</b>	<b>Annex B 5</b>
<b>Intended use</b> Installation instructions Surface fixed installation with VT 2G plate and with STR insulation cover	



**Table C1: Characteristic resistance to tension loads  $N_{Rk}$  in concrete and masonry for a single anchor in kN**

**Anchor type STR Carbon**

Base materials	Bulk density class $\rho$ [kg/dm <sup>3</sup> ]	minimum compressive strength $f_b$ [N/mm <sup>2</sup> ]	General remarks	Drill method	$N_{Rk}$ [kN]
Concrete C12/15 – C50/60 EN 206-1:2000				hammer	1,5
Thin concrete members (e.g. weather resistant skin of external wall panels) C16/20 – C50/60, EN 206-1:2000			Thickness of the thin skin 100 mm > h ≥ 40 mm	hammer	1,5
Clay bricks, Mz DIN 105-100:2012-01 / EN 771-1:2011	≥ 1,8	12	Vertically perforation up to 15 %	hammer	1,5
Sand-lime solid bricks, KS DIN V 106:2005-10 / EN 771-2:2011	≥ 1,8	12	Vertically perforation up to 15 %	hammer	1,5
Lightweight concrete solid blocks, V, DIN 18152-100:2005-10 / EN 771-3:2011	≥ 0,9	4	Proportion of hole up to 10%, maximum extension of hole: length = 110mm; wide = 45mm	rotary	0,6
Vertically perforated clay bricks, Hlz, DIN 105-100:2012-01 / EN 771-1:2011	≥ 1,2	12	Vertically perforation more than 15% and less than 50 %, outer web thickness ≥ 12 mm	rotary	1,2 <sup>1)</sup>
Sand-lime perforated bricks, KSL DIN V 106:2005-10 / EN 771-2:2011	≥ 1,6	12	Vertically perforation more than 15% and less than 50 %, outer web thickness ≥ 20 mm	rotary	1,5 <sup>1)</sup>
Lightweight concrete hollow blocks, Hbl, DIN V 18151-100:2005-10 / EN 771-3:2011	≥ 0,5	2	Vertically perforation more than 15% and less than 50 %, outer web thickness ≥ 30 mm	rotary	0,6 <sup>1)</sup>
Lightweight aggregate concrete LAC 4 – LAC 25 EN 1520:2011 / EN 771-3:2011	≥ 1,8	4	-	hammer	0,9
Autoclaved aerated concrete EN 771-4:2011	≥ 0,4	2	-	rotary	0,75
Vertically perforated clay bricks Hlz 250x380x235 EN 771-1:2011			Outer web thickness ≥ 10,3 mm	rotary	0,75

<sup>1)</sup> The value applies only for the given outer web thickness; otherwise the characteristic resistance shall be determined by job site pull-out tests.

**STR Carbon**

**Performances**  
Characteristic resistance

**Annex C 1**

**Table C2: Point thermal transmittance according EOTA Technical Report TR 025:2016-05**

anchor type	insulation thickness $h_D$ [mm]	point thermal transmittance $\chi$ [W/K]
STR Carbon mounted on the surface with EPS anchor cap	60 – 400 mm	0,002
STR Carbon mounted countersunk with insulation cover	80 – 400 mm	0,001

**Table C3: Plate stiffness according EOTA Technical Report TR 025:2016-05**

anchor type	diameter of the anchor plate [mm]	load resistance of the anchor plate [kN]	plate stiffness [kN/mm]
STR Carbon	60	2,08	0,6

**STR Carbon**

**Performances**

Point thermal transmittance, plate stiffness

**Annex C 2**

**Tabelle C4: Displacements**

Base material	Bulk density class $\rho$ [kg/dm <sup>3</sup> ]	Minimum Compressive Strength $f_b$ [N/mm <sup>2</sup> ]	Tension Load N [kN]	Displacements STR Carbon $\delta(N)$ [kN/mm]
Concrete C16/20 – C50/60 (EN 206-1:2000)			0,5	0,8
Thin concrete members (e.g. weather resistant skin of external wall panels) Concrete C16/20 – C50/60 (EN 206-1:2000)			0,5	0,8
Clay brick, Mz (DIN 105-100:2012-01 / EN 771-1:2011)	$\geq 1,8$	12	0,5	0,8
Sand-lime solid brick, KS (DIN V 106:2005-10 / EN 771-2:2011)	$\geq 1,8$	12	0,5	0,8
Lightweight concrete solid blocks, V (DIN V 18152-100:2005-10 / EN 771-3:2011)	$\geq 0,9$	4	0,2	0,8
Vertically perforated clay brick, HLz (DIN 105-100:2012-01 / EN 771-1:2011)	$\geq 1,2$	12	0,4	0,8
Vertically perforated sand-lime brick, KSL (DIN V 106:2005-10 / EN 771-2:2011)	$\geq 1,6$	12	0,5	0,8
Lightweight concrete hollow block Hbl (DIN 18151-100:2005-10 / EN 771-3:2011)	$\geq 0,5$	2	0,2	0,8
Lightweight aggregate concrete LAC 4 – LAC 25 (EN 1520:2011-06 / EN 771-3:2011)	$\geq 1,8$	4	0,3	0,8
Autoclaved aerated concrete (EN 771-4:2011)	$\geq 0,4$	2	0,25	0,8
Vertically perforated clay brick, HLz 250x380x235 (EN 771-1:2011)			0,25	0,8

**STR Carbon**

**Performances**  
displacements

**Annex C 3**