Deutsches Institut für Bautechnik

Member of EOTA
www.eota.eu

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-19/0182 of 5 October 2023

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	SHARK HAMMER
Product family to which the construction product belongs	Plastic anchor for multiple use in concrete and masonry for non-structural applications
Manufacturer	Adolf Würth GmbH & Co. KG Reinhold-Würth-Straße 12-17 74653 Künzelsau DEUTSCHLAND
Manufacturing plant	Plant 2
This European Technical Assessment contains	16 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	330284-00-0604 edition 12/2020
This version replaces	ETA-19/0182 issued on 20 January 2020

The European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction shall be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25(3) of Regulation (EU) No 305/2011.

Specific part

1 Technical description of the product

The nailed-in anchor SHARK HAMMER is a plastic anchor consisting of a plastic sleeve made of polyamide and an accompanying specific nail of galvanised steel or of stainless steel.

The plastic sleeve is expanded by hammering the specific nail which presses the sleeve against the wall of the drilled hole.

The product description is 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 anchors of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

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

3.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	No performance assessed

3.2 Mechanical resistance and stability (BWR 4)

Essential characteristic	Performance
Resistance to steel failure under tension loading	See Annex C 1
Resistance to steel failure under shear loading	See Annex C 1
Resistance to pull-out or concrete failure under tension loading (base material group a)	See Annex C 1
Resistance in any load direction without lever arm (base material group b, c)	See Annexes C 2 – C 4
Edge distance and spacing (base material group a)	See Annex B 3
Edge distance and spacing (base material group b, c)	See Annex B 4
Displacements under short-term and long-term loading	See Annex C 1
Durability	See Annex B 1

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

In accordance with European Assessment Document EAD 330284-00-0604 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.

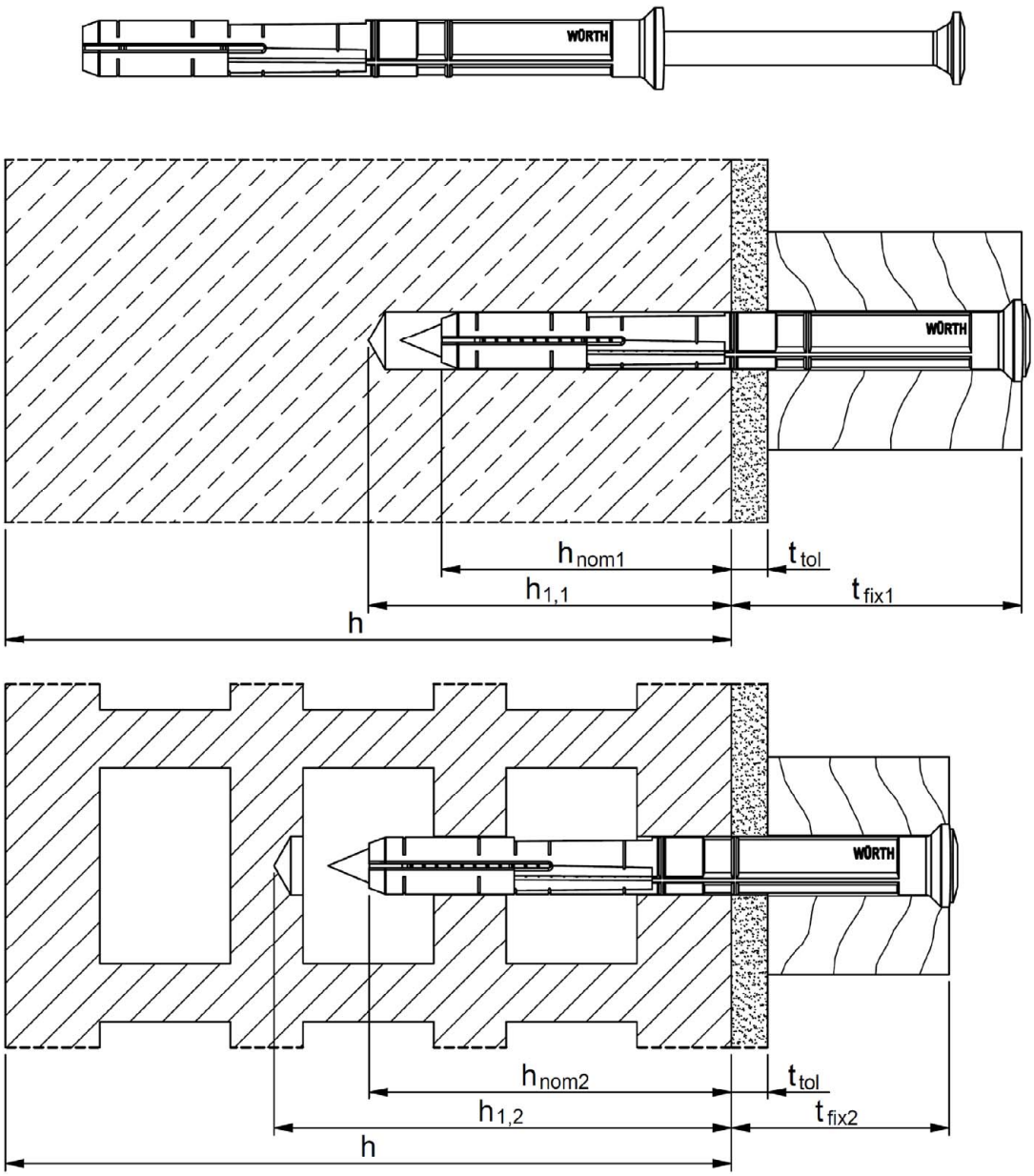
Issued in Berlin on 5 October 2023 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Aksünger

Deutsches Institut für Bautechnik DIBt

Plastic anchor SHARK HAMMER



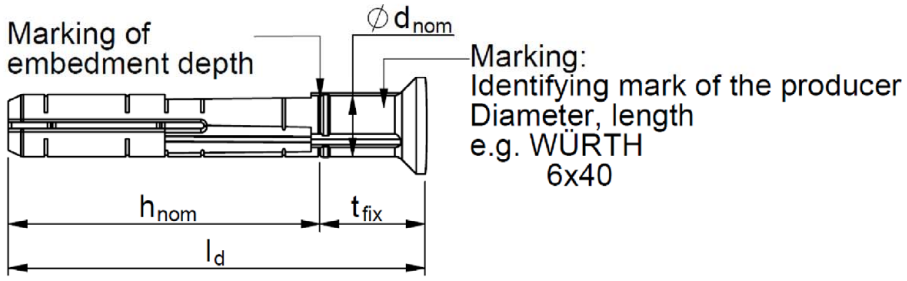
Legend:

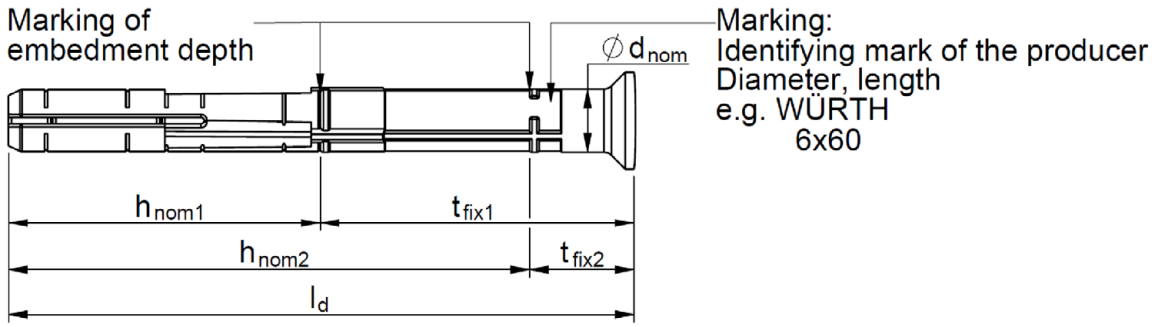
h_{nom1}:	Overall plastic anchor embedment depth in the base material concrete
h_{nom2}:	Overall plastic anchor embedment depth in the base material masonry
$h_{1,1}$:	Depth of drilled hole to deepest point in the base material concrete
$h_{1,2}$:	Depth of drilled hole to deepest point in the base material masonry
h:	Thickness of member
t_{fix1}, t_{fix2}:	Thickness of fixture and non-load bearing layer
t_{tol}:	Thickness of non-load bearing layer

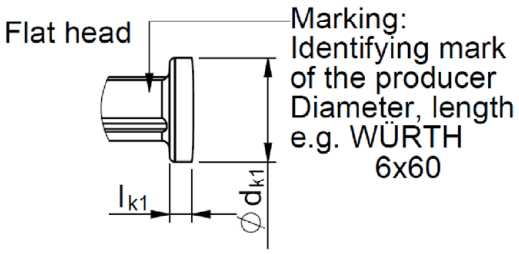
SHARK HAMMER	Annex A 1
Product description Product and installed condition	

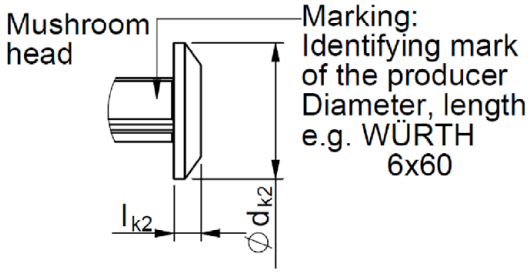
Deutsches Institut für Bautechnik DIBt

Plastic sleeve

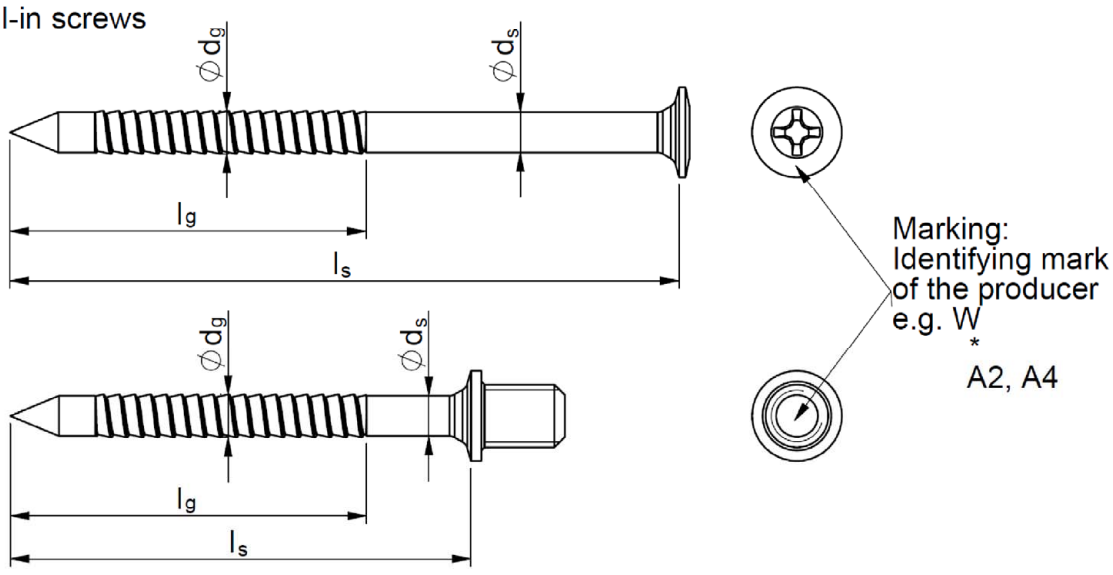








Nail-in screws



SHARK HAMMER	Annex A 2
Product description Plastic sleeve and nail-in screws	

Deutsches Institut für Bautechnik DIBt

Table A 1.1: Anchor dimensions

Anchor type			**SHARK HAMMER**		
			6	**8**	
Overall plastic anchor embedment depth[1)]	$h_{nom} \geq$	[mm]	30	40	50
Plastic sleeve					
Plastic sleeve diameter	$\varnothing\ d_{nom} =$	[mm]	6	8	
Length of plastic sleeve	$l_d \geq$	[mm]	40	45	60
Flat collar diameter	$\varnothing\ d_{k1} =$	[mm]	10	12,8	
	$\varnothing\ d_{k2} =$	[mm]	13	17	
Thickness of flat collar	$l_{k1} =$	[mm]	2,1	2,5	
	$l_{k2} =$	[mm]	2,6	3,0	
Nail-in screw					
Diameter thread	$\varnothing\ d_g =$	[mm]	4,1	5,1	
Diameter shank	$\varnothing\ d_s =$	[mm]	3,85	4,75	
Length of screw	$l_s =$	[mm]	t_{fix} + 33	t_{fix} + 45	t_{fix} + 55
Length of thread	$l_g =$	[mm]	33	44	

[1)] See Annex A1, A2

Table A 2.1: Materials

Designation	**Material**
Plastic sleeve	Polyamide, colour anthrazit
Nail-in screw	Galvanized steel in accordance with. to EN ISO 4042:2018 Stainless steel A2 of corrosion resistance class CRC II in accordance with EN1993-1-4:2006 +A1:2015 Stainless steel A4 of corrosion resistance class CRC III in accordance with EN1993-1-4:2006 +A1:2015

SHARK HAMMER	Annex A 3
Product description Anchor dimensions, materials	

Deutsches Institut für Bautechnik DIBt

Specifications of intended use

Anchorages subject to:
- Static and quasi-static loads.
- Multiple fixing of non-structural applications.

Base materials:
- Reinforced or unreinforced compacted normal weight concrete without fibres with strength classes ≥ C12/15 (base material group a), in accordance with EN 206:2013 + A1:2016, Annex C1.
- Solid brick masonry (base material group b), according to Annex C 3.
  Note: The characteristic resistance is also valid for larger brick sizes and larger compressive strength of the masonry unit.
- Hollow brick masonry (base material group c), according to Annex C 2, C 4.
- Mortar strength class of the masonry ≥ M2,5 at minimum in accordance with EN 998-2:2010.
- For other base materials of the base material groups a, b and c the characteristic resistance of the anchor may be determined by job site tests in accordance with TR 051:2018-04.

Temperature range:
- a): 24 °C bis + 40 °C (max. long temperature +24 °C and max. short temperature + 40 °C)

Use conditions (Environmental conditions):
- Structures subject to dry internal conditions (zinc coated steel, stainless steel A2 or A4).
- The specific screw made of zinc coated steel or stainless steel A2 may also be used in structures subject to external atmospheric exposure, if the area of the head of the screw is protected against moisture and driving rain after mounting of the fixing unit in this way, that intrusion of moisture into the anchor shaft is prevented. Therefore there shall be an external cladding or a ventilated rainscreen mounted in front of the head of the screw and the head of the screw itself shall be coated with a soft plastic, permanently elastic bitumen-oil-combination coating (e. g. undercoating or body cavity protection for cars).
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist (stainless steel A4 of corrosion resistance class CRC III).
  Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

Design:
- The anchorages are designed in accordance with TR 064:2018-05 under the responsibility of an engineer experienced in anchorages and masonry work.
- Verifiable calculation notes and drawings shall be prepared taking account of the loads to be anchored, the nature and strength of the base materials and the dimensions of the anchorage members as well as of the relevant tolerances. The position of the anchor is indicated on the design drawings.
- Fasteners are only to be used for multiple use for non-structural application, in accordance with TR 064:2018-05.

Installation:
- Hole drilling by the drill modes in accordance with Annex C 2 – C 4.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Installation temperature: ≥ 0 °C. Temperature anchor sleeve: ≥ 0 °C.
- Exposure to UV due to solar radiation of the anchor not protected ≤ 6 weeks.

SHARK HAMMER	Annex B 1
Intended use Specifications	

Deutsches Institut für Bautechnik DIBt

Table B 1.1: Base material: Concrete and solid masonry

Base material	Format	Measurement [mm]	Mean compressive strength [N/mm²]	Bulk density [kg/dm³]	Annex
Concrete (base material group "a")					
Concrete ≥ C12/15					**C 1**
Solid masonry (base material group "b")					
Sand-lime solid brick KS as per EN 771-1:2011+A1:2015	≥ NF	≥ 240x115x71	≥ 10 ≥ 12,5 ≥ 15 ≥ 20	≥ 2,0	**C 3** 771-2-011

Table B 2.1: Base material: Hollow or perforated masonry

Base material	Format	Measurement [mm]	Mean compressive strength [N/mm²]	Bulk density [kg/dm³]	Annex
Hollow or perforated masonry (base material group "c")					
Perforated clay brick THERMOPOR Plan TV Aero as per EN 771-1:2011+A1:2015 Otto Staudacher Vertriebs GmbH	≥ 12DF	≥ 247x365x249	≥ 7,5	≥ 0,75	**C 2** 771-1-127
Perforated sand-lime brick KS L as per EN 771-1:2011+A1:2015	≥ 2DF	≥ 240x115x113	≥ 8 ≥ 12,5 ≥ 15 ≥ 20 ≥ 24	≥ 1,4	**C 4** 771-2-012

SHARK HAMMER	Annex B 2
Intended use Concrete, solid masonry and hollow or perforated masonry - format, measurement, mean compressive strength, bulk density, Annex	

Deutsches Institut für Bautechnik DIBt

Table B 3.1: Installation parameters in concrete

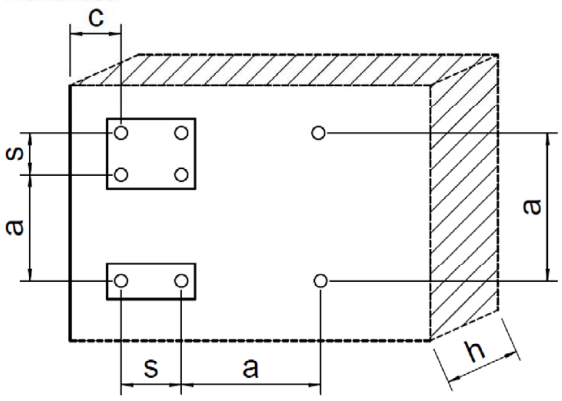
Anchor type			**SHARK HAMMER**	
			6	**8**
Drill hole diameter	d_0 =	[mm]	6	8
Overall plastic anchor embedment depth in the base material [1)]	$h_{nom} \geq$	[mm]	30	40
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	6,4	8,45
Depth of drilled hole to deepest point [1)]	$h_1 \geq$	[mm]	40	50
Drill method		[-]	Hammer drilling	
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	6,5	8,5

[1)] See Annex A1, A2

Table B 4.1: Minimum thickness of member, edge distance and spacing in concrete

		h_{nom} [mm]	h_{min} [mm]	$c_{cr,N}$ [mm]	c_{min} [mm]	$s_{min} = s_{cr}$ [mm]
SHARK HAMMER 6	Concrete ≥ C16/20	30	80	60	60	90
	Concrete C12/15	30	80	84	84	126
SHARK HAMMER 8	Concrete ≥ C16/20	40	80	60	60	120
	Concrete C12/15	40	80	84	84	168

Concrete



$a \geq s_{min} = s_{cr}$

SHARK HAMMER	Annex B 3
Intended use Minimum thickness, edge distances and spacing for use in concrete	

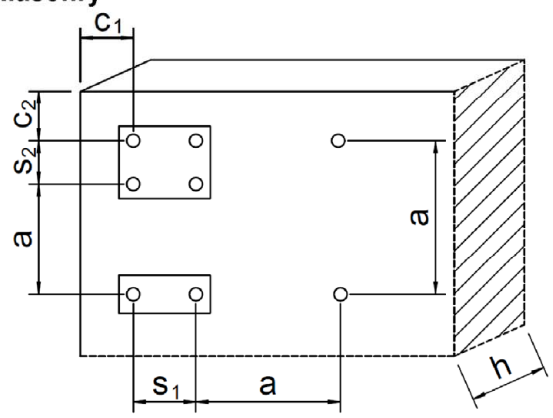
Deutsches Institut für Bautechnik DIBt

Table B 5.1: Minimum thickness of member, edge distance and anchor spacing in masonry

			masonry
SHARK HAMMER			**8**
Minimum thickness of member	h_{min}	[mm]	115 / 175[1)]
Single anchor			
Minimum spacing	a_{min}	[mm]	max.(250; s_{1min}; s_{2min})
Minimum edge distance	c_{min}	[mm]	100
Anchor group			
Spacing perpendicular to free edge	s_{1min}	[mm]	200
Spacing parallel to free edge	s_{2min}	[mm]	400
Minimum edge distance	c_{1min}	[mm]	100
Minimum edge distance	c_{2min}	[mm]	100

1) h_{min} depends on the brick size (see the following annexes C 2 - C 4)

Masonry



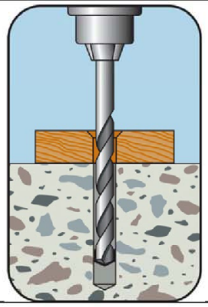
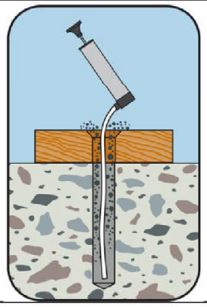
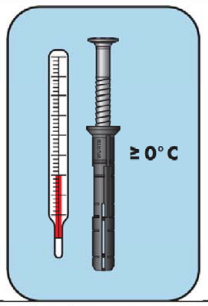
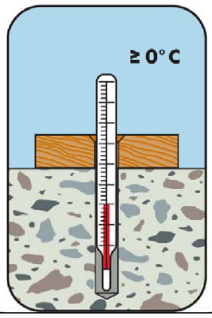
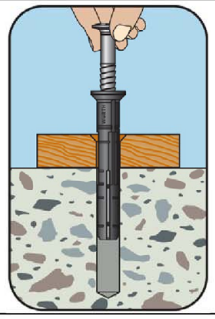
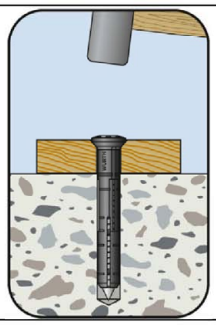
SHARK HAMMER

Intended use
Minimum member thickness, edge distances and spacings for use in masonry

Annex B 4

Deutsches Institut für Bautechnik DIBt

Installation instructions

		
1) Drill the bore hole	2) Clean the drilled bore hole	3) Temperature anchor sleeve ≥ 0 °C
		
4) Temperature anchoring base ≥ 0 °C	5) Set anchor in place	6) Hammer in the nail-in screw until flush

SHARK HAMMER	Annex B 5
Intended use Installation instructions	

Table C 1.1: Characteristic resistance of the screw and for pullout failure for use in concrete (galvanised steel, stainless steel)

Anchor type				**SHARK HAMMER**	
Failure of expansion element (special nail-in screw)				**6**	**8**
Overall plastic anchor embedment depth		h_{nom}	[mm]	30	40
Characteristic tension resistance		$N_{Rk,s}$	[kN]	6,52	9,92
Partial safety factor		γ_{Ms} [1)]	[-]	1,60	1,60
Characteristic shear resistance		$V_{Rk,s}$	[kN]	3,26	4,96
Partial safety factor		γ_{Ms} [1)]	[-]	1,33	1,33
Characteristic bending resistance		$M_{Rk,s}$	[Nm]	3,79	7,12
Partial safety factor		γ_{Ms} [1)]	[-]	1,33	1,33
Pull-out failure (plastic sleeve)					
Concrete ≥ C16/20					
Characteristic resistance	24°C [2)] / 40°C [3)]	$N_{Rk,p}$	[kN]	0,5	0,5
Partial safety factor		γ_{Mc} [1)]	[-]	1,8	1,8
Concrete = C12/15					
Characteristic resistance	24°C [2)] / 40°C [3)]	$N_{Rk,p}$	[kN]	0,3	0,3
Partial safety factor		γ_{Mc} [1)]	[-]	1,8	1,8

1) In absence of other national regulations
2) Maximum long term temperature
3) Maximum short term temperature

Table C 2.1: Displacements[1)] under tension and shear loading in concrete and masonry

SHARK HAMMER 6 **SHARK HAMMER 8**		Tension load			Shear load		
	h_{nom} [mm]	N [2)] [kN]	δ_{N0} [mm]	$\delta_{N\infty}$ [mm]	V [2)] [kN]	δ_{V0} [mm]	$\delta_{V\infty}$ [mm]
Concrete ≥ C12/15	≥ 30[3)]/40[4)]	0,18	0,20	0,40	0,18	0,66	0,99
SHARK HAMMER 8							
Perforated clay brick HLz	≥ 50	0,06	0,02	0,04	0,06	0,41	0,62
Solid sand-lime brick KS	≥ 50	0,19	0,11	0,22	0,19	0,41	0,62
Perforated sand-lime brick KSL	≥ 50	0,16	0,32	0,64	0,16	0,41	0,62

1) Valid for all ranges of temperatures
2) Intermediate values by linear interpolation
3) SHARK HAMMER 6
4) SHARK HAMMER 8

SHARK HAMMER	Annex C 1
Performances Characteristic resistance of the nail-in screw for use in concrete Displacements under tension and shear loading in concrete and masonry	

Base material hollow masonry, perforated clay brick: THERMOPOR Plan TV Aero

Table C 3.1.1: Brick data

Description of brick 771-1-127		**THERMOPOR Plan TV Aero**
Type of brick		Perforated clay brick
Bulk density $\rho \geq$	[kg/dm³]	0,75
Standard		EN 771-1:2011+A1:2015
Producer of brick		Otto Staudacher Vertriebs GmbH
Format (measurement)	[mm]	≥ 12DF (≥ 247x365x250)
Minimum thickness of member h_{min} =	[mm]	365

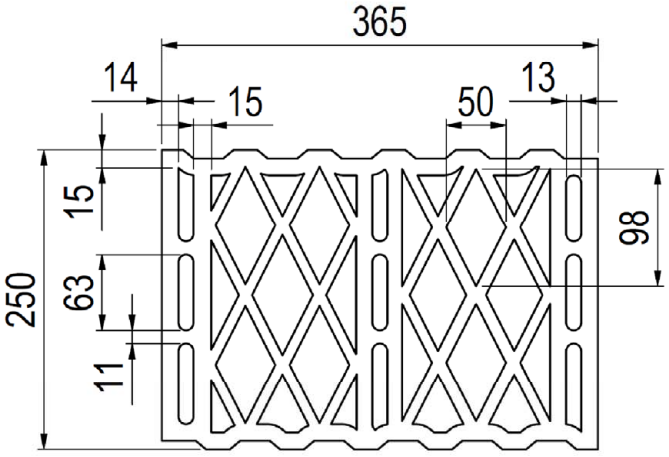


Table C 3.1.2: Installation parameters

Anchor size SHARK HAMMER			**8**
Drill hole diameter	d_0 =	[mm]	8
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45
Depth of drill hole to deepest point	$h_1 \geq$	[mm]	60
Drill method		[-]	Rotary drilling
Overall plastic anchor embedment depth	h_{nom} =	[mm]	50
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	8,5
Minimum edge distance	$c_{min} \geq$	[mm]	100

Table C 3.1.3: Characteristic resistance F_{Rk}[1)] in [kN] for single anchor

SHARK HAMMER 8			**F_{Rk} [kN]**
Mean compressive strength			
THERMOPOR Plan TV Aero, $f_b \geq 7,5$ N/mm²	24°C[3)] / 40°C[4)]	[kN]	0,3
Partial safety factor	γ_{Mm}[2)]	[-]	2,5

1) Characteristic resistance F_{Rk} for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing s_{min} according to Table B 5.1. The specific conditions for the design method have to be considered according to TR 064:2018-05.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature

SHARK HAMMER	Annex C 2
Performances Hollow masonry: perforated clay brick Plan TV Aero, 12DF Brick data, installation parameters, characteristic resistance	

Base material solid masonry, solid sand-lime brick: KS, NF

Table C 3.2.1: Brick data

Description of brick	771-2-011		**KS**
Type of brick			Solid sand-lime brick
Bulk density	$\rho \geq$	[kg/dm³]	2,0
Standard			EN 771-2:2011+A1:2015
Producer of brick			-
Format (measurement)		[mm]	≥ NF (≥ 240x115x71)
Minimum thickness of member	h_{min} =	[mm]	115

Table C 3.2.2: Installation parameters

Anchor size SHARK HAMMER			**8**
Drill hole diameter	d_0 =	[mm]	8
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45
Depth of drill hole to deepest point	$h_1 \geq$	[mm]	60
Drill method		[-]	Hammer drilling
Overall plastic anchor embedment depth	h_{nom} =	[mm]	50
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	8,5
Minimum edge distance	$c_{min} \geq$	[mm]	100

Table C 3.2.3: Characteristic resistance F_{Rk}[1)] in [kN] for single anchor

SHARK HAMMER 8			**F_{Rk} [kN]**
Mean compressive strength			
Solid sand-lime brick KS, $f_b \geq 10$ N/mm²	24°C[3)] / 40°C[4)]	[kN]	0,25
Solid sand-lime brick KS, $f_b \geq 12,5$ N/mm²	24°C[3)] / 40°C[4)]	[kN]	0,3
Solid sand-lime brick KS, $f_b \geq 15$ N/mm²	24°C[3)] / 40°C[4)]	[kN]	0,4
Solid sand-lime brick KS, $f_b \geq 20$ N/mm²	24°C[3)] / 40°C[4)]	[kN]	0,5
Solid sand-lime brick KS, $f_b \geq 25$ N/mm²	24°C[3)] / 40°C[4)]	[kN]	0,6
Partial safety factor	γ_{Mm}[2)]	[-]	2,5

Footnotes see Annex C 2

SHARK HAMMER	Annex C 3
Performances Solid masonry: solid sand-lime brick KS, NF Brick data, installation parameters, characteristic resistance	

Base material hollow masonry: Sand-lime perforated brick KS L, 2DF

Table C 3.3.1: Brick data

Description of brick	771-2-012		**KS L**
Type of brick			Perforated sand-lime brick
Bulk density	$\rho \geq$	[kg/dm³]	1,4
Standard			EN 771-2:2011+A1:2015
Producer of brick			-
Format (measurement)		[mm]	≥ 2DF (≥ 240x115x113)
Minimum thickness of member	h_{min} =	[mm]	115

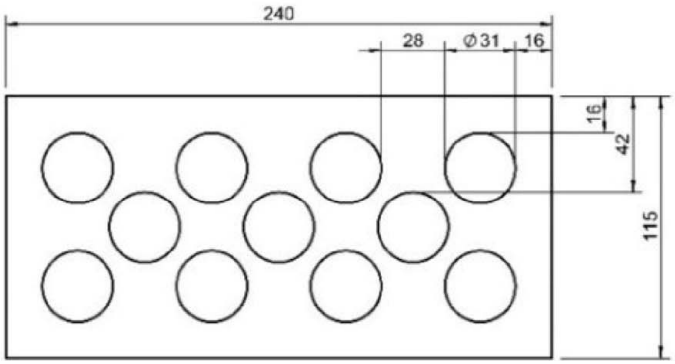


Table C 3.3.2: Installation parameters

Anchor size SHARK HAMMER			**8**
Drill hole diameter	d_0	[mm]	8
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45
Depth of drill hole to deepest point	$h_1 \geq$	[mm]	60
Drill method		[-]	Rotary drilling
Overall plastic anchor embedment depth	h_{nom} =	[mm]	50
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	8,5
Minimum edge distance	$c_{min} \geq$	[mm]	100

Table C 3.3.3: Characteristic resistance F_{Rk}[1)] in [kN] for single anchor

SHARK HAMMER 8			**F_{Rk} [kN]**
Mean compressive strength			
Perforated sand-lime brick KS L, $f_b \geq 7,5$ N/mm²	24°C[3)] / 40°C[4)]	[kN]	0,25
Perforated sand-lime brick KS L, $f_b \geq 10$ N/mm²	24°C[3)] / 40°C[4)]	[kN]	0,3
Perforated sand-lime brick KS L, $f_b \geq 12,5$ N/mm²	24°C[3)] / 40°C[4)]	[kN]	0,4
Perforated sand-lime brick KS L, $f_b \geq 15$ N/mm²	24°C[3)] / 40°C[4)]	[kN]	0,5
Perforated sand-lime brick KS L, $f_b \geq 20$ N/mm²	24°C[3)] / 40°C[4)]	[kN]	0,6
Partial safety factor	γ_{Mm}[2)]	[-]	2,5

Footnotes see Annex C 2

SHARK HAMMER	Annex C 4
Performances Hollow masonry: perforated sand-lime brick KS L, 2DF Brick data, installation parameters, characteristic resistance	