Deutsches Institut für Bautechnik

Public-law institution jointly founded by the federal states and the Federation

European Technical Assessment Body for construction products

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

European Technical Assessment ETA-07/0219 of 6 June 2025

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 frame anchor HRD
Product family to which the construction product belongs	Plastic anchor for redundant non-structural systems in concrete and masonry
Manufacturer	Hilti Aktiengesellschaft Feldkircherstrasse 100 9494 SCHAAN FÜRSTENTUM LIECHTENSTEIN
Manufacturing plant	Hilti plants
This European Technical Assessment contains	25 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 330284-00-0604 edition 12/2020
This version replaces	ETA-07/0219 issued on 28 June 2018

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Specific part

1 Technical description of the product

The Hilti frame anchor HRD in the sizes HRD 8 and HRD 10 is a plastic anchor consisting of a plastic sleeve made of polyamide and an accompanying specific screw of electro galvanised steel, hot-dip galvanised steel or stainless steel.

The plastic sleeve is expanded by screwing in the specific screw 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	see Annex C 2

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 2
Resistance in any load direction without lever arm (base material group b, c, d)	see Annexes C 3 – C 11
Edge distance and spacing (base material group a)	see Annex B 4 and B 5
Edge distance and spacing (base material group b, c, d)	see Annex B 6
Displacements under short-term and long-term loading	see Annex C 11
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 6 June 2025 by Deutsches Institut für Bautechnik

Dipl.- Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Ziegler

Installed condition

Figure A1:

Intended use with different embedment depth in concrete [including thin skins (weather resistant skins of external wall panels)], solid brick, hollow brick and uncracked autoclaved aerated concrete

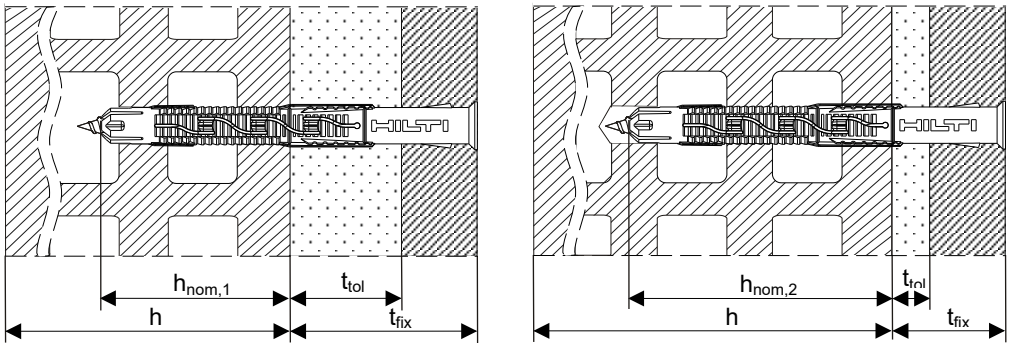
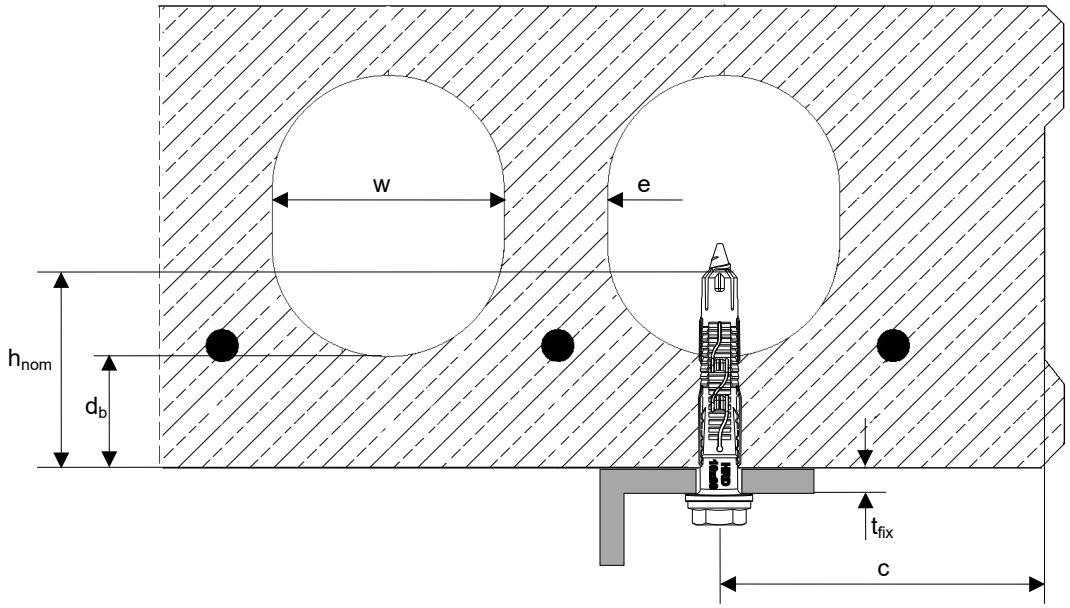


Figure A2:

Intended use in precast prestressed hollow core slabs (w/e ≤ 4,2)



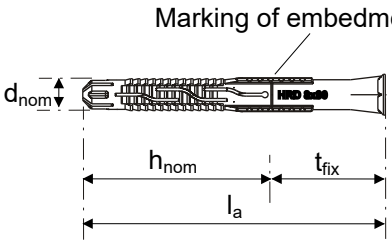
h_{nom}	=	overall plastic anchor embedment depth in the base material	c	=	edge distance
h	=	thickness of member	d_b	=	bottom flange thickness ≥ 25 mm
t_{fix}	=	thickness of fixture	w	=	core width
t_{tol}	=	thickness of non-load-bearing layer	e	=	web thickness

Hilti frame anchor HRD	**Annex A1**
Product description Installed condition	

Anchor types, marking and identification

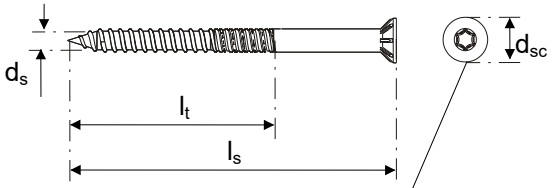
HRD 8

Anchor sleeve



Marking:
Producer, type, size
e.g. HILTI HRD 8x80

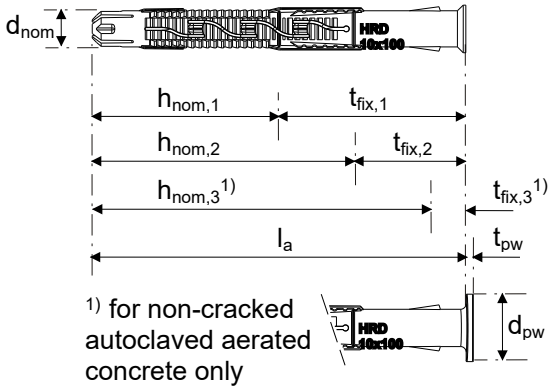
Special screw



Marking:
HDS-U

HRD 10

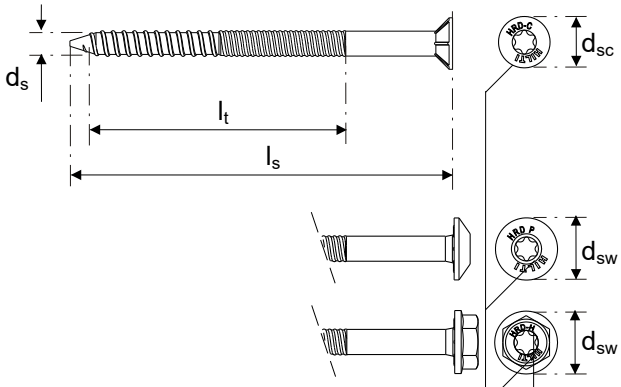
Anchor sleeve



1) for non-cracked autoclaved aerated concrete only

Marking:
Producer, Type, Size
e.g. HILTI HRD 10x100

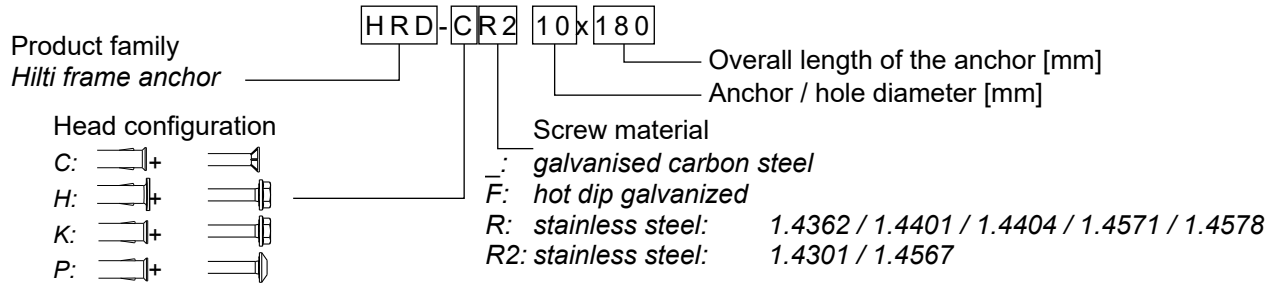
Special screw



Marking:
"HRD"-Type
"HDS"-Type
e.g. HRD-C, HDS-P, …

Inner drive optional

Naming



Hilti frame anchor HRD	**Annex A2**
Product description Anchor types, marking, identification	

Table A1: Dimensions

					HRD 8	HRD 10
Plastic sleeve	Sleeve diameter		d_{nom}	[mm]	8	10
	Length of sleeve	min	l_a	[mm]	60	60
		max	l_a	[mm]	140	310
	Diameter of plastic washer		d_{pw}	[mm]	-	17,5
	Thickness of plastic washer		t_{pw}	[mm]	-	2
Special screw	Screw diameter		d_s	[mm]	6	7
	Length of screw		l_s	[mm]	l_a + 5	l_a + 5
	Length of thread		l_t	[mm]	53	70
	Head diameter	Countersunk screw	d_{sc}	[mm]	11	14
		Hexhead screw	d_{sw}	[mm]	-	17,5

Table A2: Materials

	HRD 8	HRD 10
Plastic sleeve	Polyamide, PA6, colour red	
Special screw	Steel, electro galvanised ≥ 5 µm according to EN ISO 4042:2022, blue passivated, coated f_{yk} = 480 N/mm², f_{uk} = 600 N/mm²	
	-	Steel, hot-dip galvanized, ≥ 65 µm according to EN ISO 10684:2004 + AC:2009, coated f_{yk} = 480 N/mm², f_{uk} = 600 N/mm²
	Stainless steel A2 (material number 1.4301 / 1.4567) according to EN 10088-1:2014 of corrosion resistance class CRC II according to EN 1993-1-4:2006 + A1:2015; coated f_{yk} = 450 N/mm², f_{uk} = 580 N/mm²	f_{yk} = 480 N/mm², f_{uk} = 630 N/mm²
	Stainless steel A4 or Duplex stainless steel (material number 1.4362 / 1.4401 / 1.4404 / 1.4571 / 1.4578) according to EN 10088-1:2014 of corrosion resistance class CRC III according to EN 1993-1-4:2006 + A1:2015; coated f_{yk} = 450 N/mm², f_{uk} = 580 N/mm²	f_{yk} = 480 N/mm², f_{uk} = 630 N/mm²

Hilti frame anchor HRD

Product description
Dimensions, materials

Annex A3

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Specifications of intended use

Anchorages subject to:

- Static and quasi-static loads
- Redundant non-structural systems

Base materials:

- Reinforced or unreinforced compacted normal weight concrete without fibres with strength classes ≥ C12/15 (base material group a), according to EN 206:2013 + A1:2016, Annex C2.
- Precast prestressed hollow core slabs with strength classes ≥ C35/55 (base material group a) according to EN 206:2013 + A1:2016, Annex C2.
- Solid brick masonry (base material group b) according to Annex C3.
  Note: The characteristic resistance is also valid for larger brick sizes and higher compressive strength of the masonry unit.
- Hollow brick masonry (base material group c) according to Annex C4 to C7.
- Autoclaved aerated concrete (base material group d) according to Annex C8.
- Mortar strength class of the masonry ≥ M2,5 according to EN 998-2:2016.
- For other base materials of the base material groups a, b, c or d the characteristic resistance of the anchor may be determined by job site tests according to TR 051:2018-04.

Temperature range:

- -40°C to 80°C (max. short term temperature + 80°C and max. long term temperature +50°C)

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions: Special screw made of zinc coated steel or stainless steel (Hilti frame anchor HRD, HRD-F, HRD-R und HRD-R2).
- The special screw made of zinc coated steel or stainless steel A2 (Hilti frame anchor HRD, HRD-F, HRD-R2) 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: Special screw made of stainless steel A4 or Duplex stainless steel of corrosion resistance class CRC III (Hilti frame anchor HRD-R).
  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.

Installation:

- Hole drilling by the drill modes according to Annex B8
- 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 -10°C to +40°C
- Exposure to UV due to solar radiation of anchor not protected ≤ 6 weeks
- No ingress of water in the bore hole < 0°C.

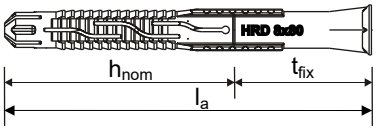
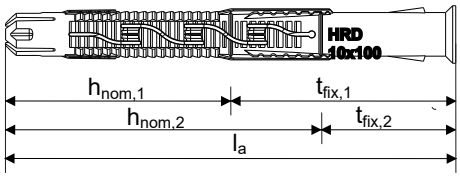
Hilti frame anchor HRD	**Annex B1**
Intended use Specifications	

Table B1: Installation parameters

				HRD 8	HRD 10
Drill hole diameter		d_0 =	[mm]	8	10
Cutting diameter of drill bit		$d_{cut} \leq$	[mm]	8,45	10,45
Depth of drilled hole to deepest point		$h_{1,1} \geq$	[mm]	60	60
		$h_{1,2} \geq$	[mm]	-	80
		$h_{1,3} \geq$	[mm]	-	100 [1)]
Overall plastic anchor embedment depth in base material		$h_{nom,1} \geq$	[mm]	50	50
		$h_{nom,2} \geq$	[mm]	-	70
		$h_{nom,3} \geq$	[mm]	-	90 [1)]
Diameter of clearance hole in the fixture	Countersunk screw	$d_f \leq$	[mm]	8,5	11
	Hexhead screw	$d_f \leq$	[mm]	-	12

1) for uncracked autoclaved aerated concrete only

Table B2: Relation of h_{nom}, l_a and t_{fix} for use in concrete and masonry

		HRD 8 x l_a	HRD 10 x l_a	
Base material group "a, b, c"		$h_{nom} \geq 50$ [1)]	$h_{nom,1} \geq 50$ [1)]	$h_{nom,2} \geq 70$ [1)]
HRD 8  **HRD 10** 	l_a	t_{fix}	$t_{fix,1}$	$t_{fix,2}$
	[mm]	[mm]	[mm]	[mm]
	60	≤ 10	≤ 10	---
	80	≤ 30	≤ 30	≤ 10
	100	≤ 50	≤ 50	≤ 30
	120	≤ 70	≤ 70	≤ 50
	140	≤ 90	≤ 90	≤ 70
	160	-	≤ 110	≤ 90
	180	-	≤ 130	≤ 110
	200	-	≤ 150	≤ 130
	230	-	≤ 180	≤ 160
	270	-	≤ 220	≤ 200
	310	-	≤ 260	≤ 240

1) In hollow masonry the influence of h_{nom} > 50 mm (HRD 8) or $h_{nom,1}$ > 50 mm or $h_{nom,2}$ > 70 mm (HRD 10) has to be checked by job-site testing according Annex B1

Hilti frame anchor HRD

Intended use
Installation parameters, Relations of h_{nom}, l_a and t_{fix}

Annex B2

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Table B3: Relation of h_{nom}, l_a and t_{fix} for use in autoclaved aerated concrete

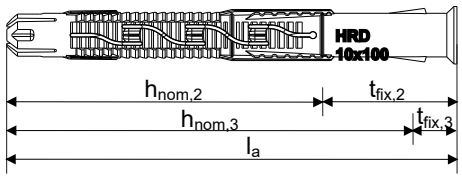
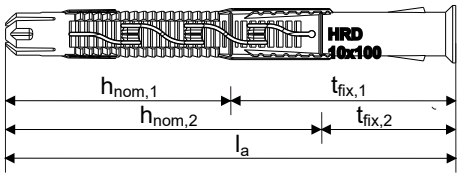
		HRD 8 x l_a	HRD 10 x l_a	
Base material group "d"			$h_{nom,2} \geq 70$	$h_{nom,3} \geq 90$
	l_a		$t_{fix,2}$	$t_{fix,3}$
HRD 10	[mm]		[mm]	[mm]
	60	-	-	-
	80	-	≤ 10	-
	100	-	≤ 30	≤ 10
	120	-	≤ 50	≤ 30
	140	-	≤ 70	≤ 50
	160	-	≤ 90	≤ 70
	180	-	≤ 110	≤ 90
	200	-	≤ 130	≤ 110
	230	-	≤ 160	≤ 140
	270	-	≤ 200	≤ 180
	310	-	≤ 240	≤ 220

Table B4: Relation of h_{nom}, l_a and t_{fix} for use in thin skins (weather resistant skins of external wall panels) and precast prestressed hollow core slabs

		HRD 8 x l_a	HRD 10 x l_a	
Base material group "a"			$h_{nom,1} \geq 50$	
	l_a		$t_{fix,min}$	$t_{fix,max}$
HRD 10	[mm]		[mm]	[mm]
	60	-	2	10
	80	-	22	30
	100	-	42	50
	120	-	62	70
	140	-	82	90
	160	-	102	110
	180	-	122	130
	200	-	142	150
	230	-	172	180
	270	-	212	220
	310	-	252	260

Hilti frame anchor HRD

Intended use
Relations of h_{nom}, l_a and t_{fix}

Annex B3

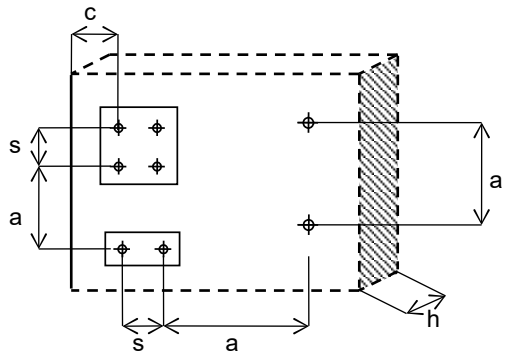
Table B5: Minimum thickness of member, edge distance and anchor spacing in concrete and thin skins (base material group "a")

				HRD 8	HRD 10	
Overall plasic anchor embedment depth in the base material		$h_{nom} \geq$	[mm]	50	50	70
Minimum thickness of member	concrete	h_{min}	[mm]	100	100	120
	thin skin	h_{min}	[mm]	-	40	-
Minimum spacing	≥ C16/20	s_{min}	[mm]	100	50 if c ≥ 100 [1]	
	C12/15	s_{min}	[mm]	140	70 if c ≥ 140 [1]	
Minimum edge distance	≥ C16/20	c_{min}	[mm]	50	50 if s ≥ 150 [1]	
	C12/15	c_{min}	[mm]	70	70 if s ≥ 210 [1]	
Characteristic edge distance	≥ C16/20	$c_{cr,N}$	[mm]	100	100	
	C12/15	$c_{cr,N}$	[mm]	140	140	
Characteristic spacing [2]	≥ C16/20	$s_{cr,N}$	[mm]	62	80	125
	C12/15	$s_{cr,N}$	[mm]	68	90	135

1) Linear interpolation allowed

2) Fixing points with a spacing a ≤ s_{cr} are considered as a group with a maximum characteristic resistance $N_{Rk,p}$ according to Table C2. For a spacing a > s_{cr} the anchors are considered as single anchors, each with a characteristic resistance $N_{Rk,p}$ according to Table C2

Scheme of distances and spacing



Hilti frame anchor HRD

Intended Use
Minimum spacing and edge distance in concrete

Annex B4

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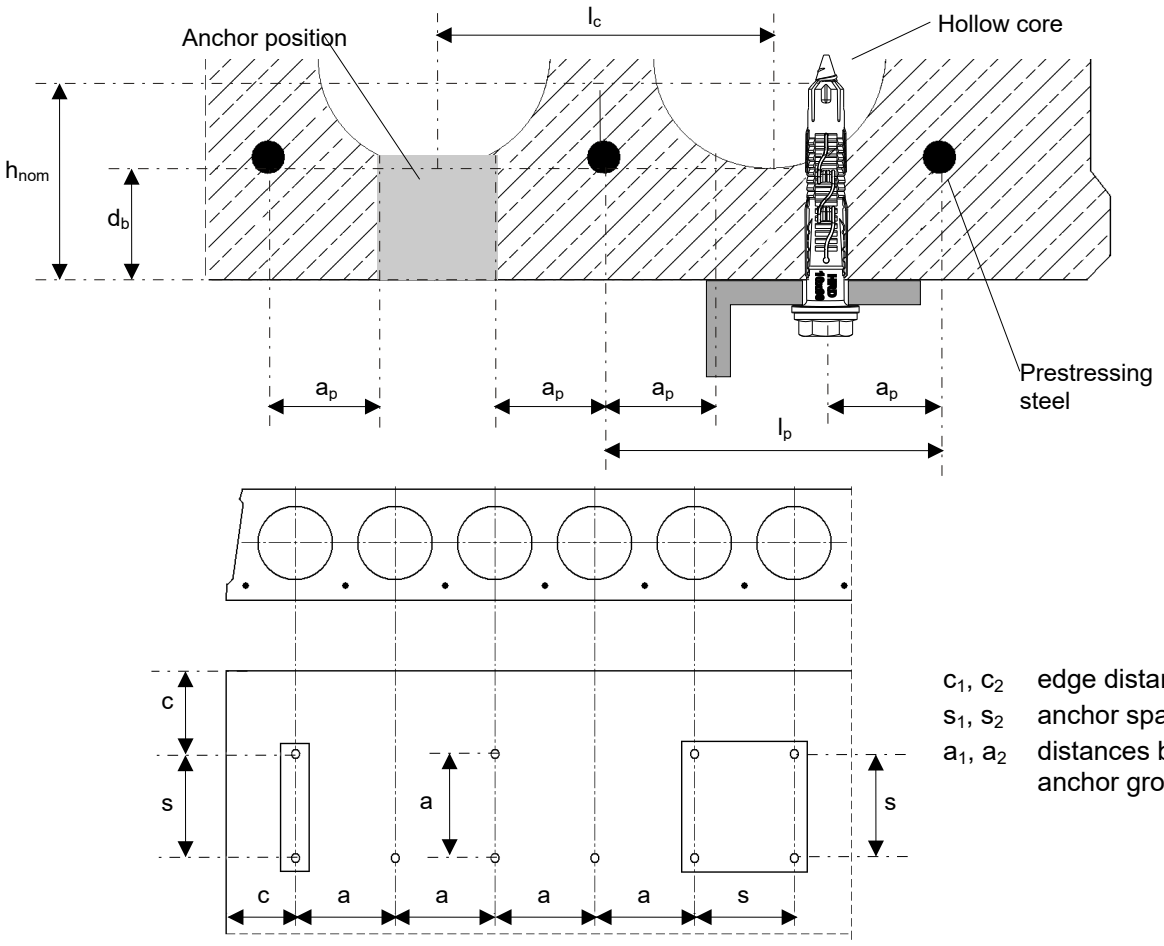
Table B6: Anchor positions, minimum spacing and edge distance of anchors and distance between anchor groups in precast prestressed hollow core slabs

			HRD 8	HRD 10
Overall plasic anchor embedment depth in the base material	$h_{nom} \geq$	[mm]	-	50
Bottom flange thickness	$d_b \geq$	[mm]	-	25
Core distance	$l_c \geq$	[mm]	-	100
Prestressing steel distance	$l_p \geq$	[mm]	-	100
Distance between anchor position and prestressing steel	$a_p \geq$	[mm]	-	50
Minimum edge distance	$c_{min} \geq$	[mm]	-	100
Minimum anchor spacing	$s_{min} \geq$	[mm]	-	100
Minimum distance between anchor groups	$a_{min} \geq$	[mm]	-	100

Schemes of distances and spacing



c_1, c_2 edge distances
s_1, s_2 anchor spacings
a_1, a_2 distances between anchor groups

Hilti frame anchor HRD

Intended Use
Minimum spacing and edge distance in precast prestressed hollow core slabs

Annex B5

Table B7: Minimum thickness of member, edge distance and anchor spacing in solid and hollow masonry (base material group "b, c")

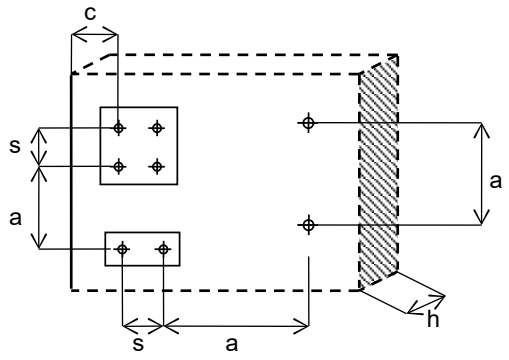
				HRD 8	HRD 10
Minimum thickness of member		h_{min}	[mm]	see Table C4, Table C5	see Table C4, Table C6
Minimum edge distance		c_{min}	[mm]	100 (60)[1]	100
Minimum spacing (single anchor)		a_{min}	[mm]	250	250
Minimum spacing (anchor group)	perpendicular to free edge	s_{min1}	[mm]	200 (120 [1)])	100
	parallel to free edge	s_{min2}	[mm]	400 (240 [1)])	100

1) only for brick “Doppio Uni” and “Mattone”

Table B8: Minimum thickness of member, edge distance and spacing in uncracked autoclaved aerated concrete (base material group "d")

				HRD 8	HRD 10
Minimum thickness of member	**for $f_{cm,dec} \geq 2$ N/mm²**	h_{min}	[mm]	-	200
	for $f_{cm,dec} \geq 4$ N/mm²	h_{min}	[mm]	-	240
	for $f_{cm,dec} \geq 6$ N/mm²	h_{min}	[mm]	-	240
Minimum edge distance		c_{min}	[mm]	-	100
Minimum spacing (single anchor)		a_{min}	[mm]	-	250
Minimum spacing (anchor group)	perpendicular to free edge	s_{min1}	[mm]	-	100
	parallel to free edge	s_{min2}	[mm]	-	100

Scheme of distances and spacing



Hilti frame anchor HRD

Intended Use
Minimum spacing and edge distance in masonry and autoclaved aerated concrete

Annex B6

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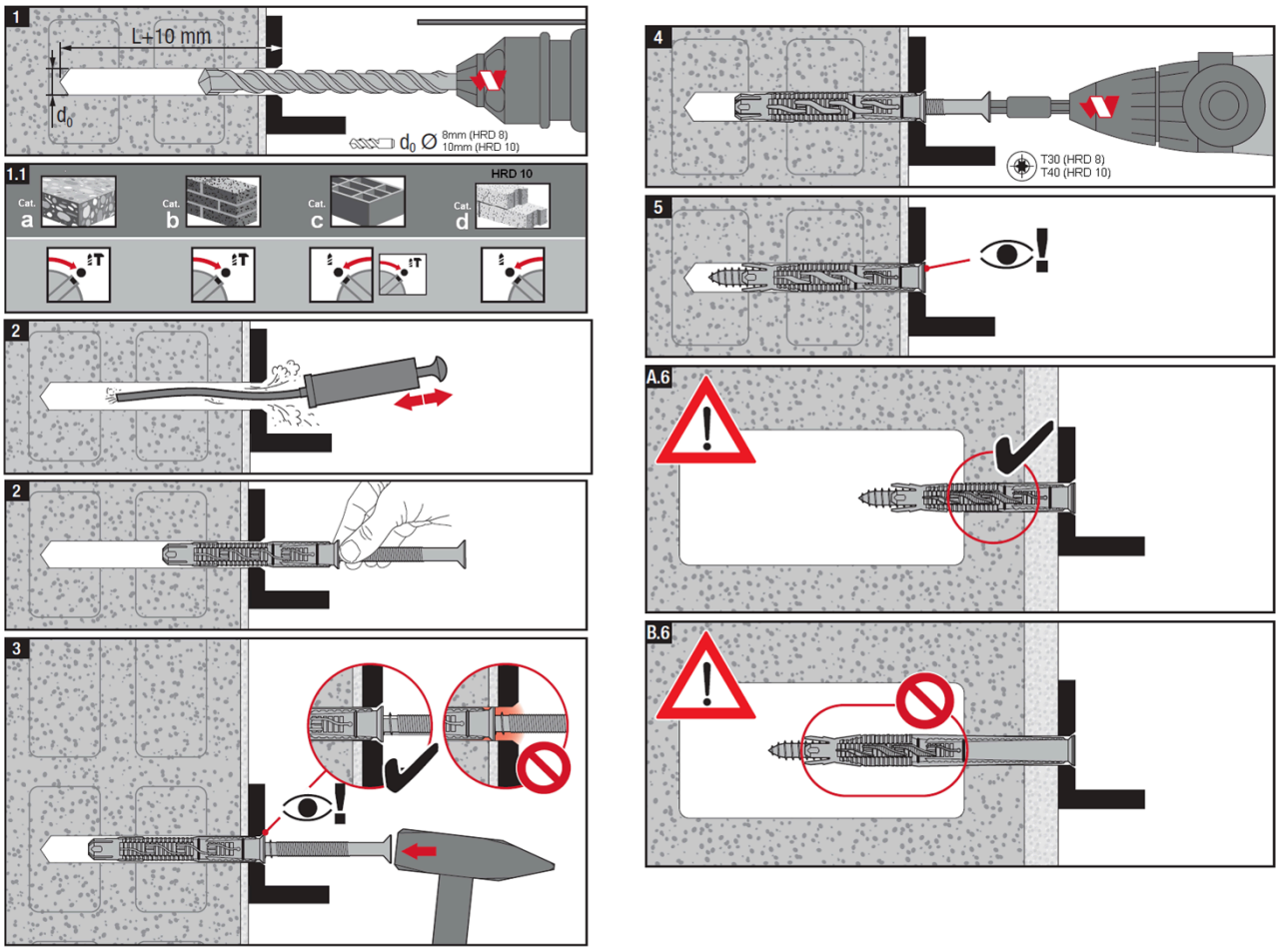
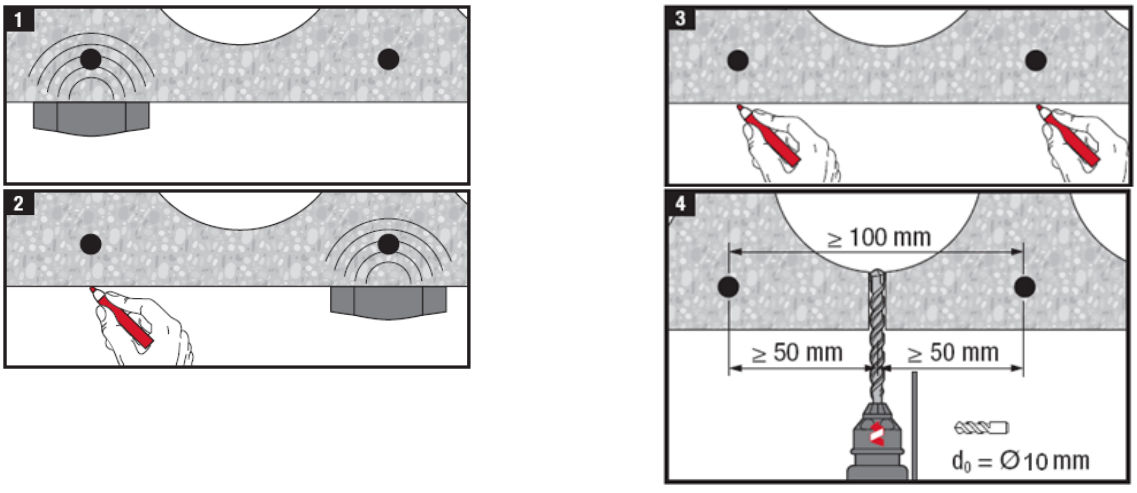
Installation instruction



Additional preparation in case of application in precast prestressed hollow core slabs

After drilling follow the main instruction above



Hilti frame anchor HRD	**Annex B7**
Intended Use Installation instruction	

Table C1: Characteristic resistance of the screw

			HRD 8	HRD 10
Galvanised steel				
Characteristic tension resistance	$N_{Rk,s}$	[kN]	10,9	17,5
Partial safety factor for tension	γ_{Ms} 1)	[-]	1,50	1,50
Characteristic shear resistance	$V_{Rk,s}$	[kN]	6,9	10,6
Characteristic bending resistance	$M_{Rk,s}$	[Nm]	11,1	21,3
Partial safety factor for shear and bending	γ_{Ms} 1)	[-]	1,25	1,25
Hot-dip galvanized steel				
Characteristic tension resistance	$N_{Rk,s}$	[kN]	-	16,7
Partial safety factor for tension	γ_{Ms} 1)	[-]	-	1,50
Characteristic shear resistance	$V_{Rk,s}$	[kN]	-	10,1
Characteristic bending resistance	$M_{Rk,s}$	[Nm]	-	19,9
Partial safety factor for shear and bending	γ_{Ms} 1)	[-]	-	1,25
Stainless steel				
Characteristic tension resistance	$N_{Rk,s}$	[kN]	10,5	18,4
Partial safety factor for tension	γ_{Ms} 1)	[-]	1,54	1,58
Characteristic shear resistance	$V_{Rk,s}$	[kN]	6,6	11,1
Characteristic bending resistance	$M_{Rk,s}$	[Nm]	10,8	22,3
Partial safety factor for shear and bending	γ_{Ms} 1)	[-]	1,28	1,31

1) In absence of other national regulations

Hilti frame anchor HRD	**Annex C1**
Performances Characteristic resistance of the screw	

Table C2: Characteristic resistance for pull-out failure (plastic sleeve) for use in concrete (base material group "a")

				HRD 8	HRD 10	
Embedment depth		$h_{nom} \geq$	[mm]	50	50	70
Pull-out failure in <u>standard concrete slabs</u>						
Characteristic resistance	≥ C16/20	$N_{Rk,p}$	[kN]	3,0	4,5	8,5
	C12/15	$N_{Rk,p}$	[kN]	2,0	3,0	6,0
Partial safety factor		γ_{Mc} 1)	[-]	1,8		
Pull-out failure in <u>thin skins (weather resistant skins of external wall panels)</u>, with h = 40mm to 100mm						
Characteristic resistance	≥ C16/20	$N_{Rk,p}$	[kN]	-	3,5	-
	C12/15	$N_{Rk,p}$	[kN]	-	2,5	-
Partial safety factor		γ_{Mc} 1)	[-]	1,8		
Pull-out failure in <u>precast prestressed hollow core slabs</u>, with concrete strength ≥ C35/45						
Characteristic resistance	$d_b \geq$ 25mm	$N_{Rk,p}$	[kN]	-	0,6	-
	$d_b \geq$ 30mm	$N_{Rk,p}$	[kN]	-	1,5	-
	$d_b \geq$ 35mm	$N_{Rk,p}$	[kN]	-	2,5	-
	$d_b \geq$ 40mm	$N_{Rk,p}$	[kN]	-	3,5	-
Partial safety factor		γ_{Mc} 1)	[-]	1,8		

1) In absence of other national regulations

Table C3: Values under fire exposure in concrete C20/25 to C50/60 in any load direction, no permanent centric tension and shear load without lever arm, fastening of façade systems

			HRD 8	HRD 10
Fire resistance class: R 90	$F_{Rk,fi,90}$ 1)	[kN]	-	0,8

1) partial safety factor $\gamma_{M,fi} = 1,0$

Hilti frame anchor HRD

Performances
Characteristic resistance for pull-out in concrete, values under fire exposure

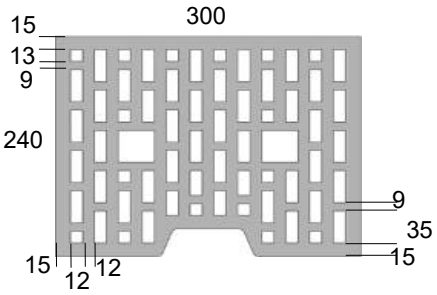
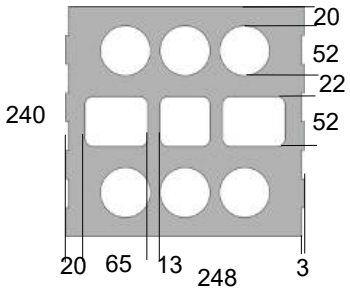
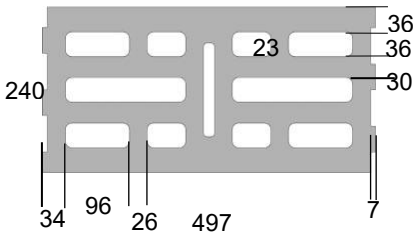
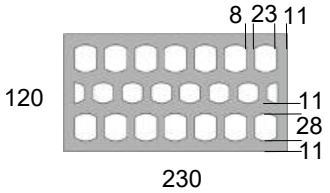
Annex C2

Table C4: Characteristic resistance for use in solid masonry (base material group "b") [1)]

	Mean compressive strength as per EN 771 [N/mm²]	Characteristic resistance F_{Rk} [kN]		
		HRD 8	**HRD 10**	
		$h_{nom} \geq 50$	$h_{nom} \geq 50$	$h_{nom} \geq 70$
Clay brick **Mz 2,0-2DF** EN 771-1:2011+A1:2015 Manufacturer: Augsburger Ziegel LxWxH [mm]: 240x115x113 h_{min} [mm]: 115	≥ 20	1,5	3,0 4,5 [3)]	[4)]
	≥ 10	1,2	2,0 3,0 [3)]	[4)]
Sand-lime solid brick **KS 2,0-2DF** Manufacturer: Werk Derching EN 771-2:2011+A1:2015 LxWxH [mm]: 240x115x113 h_{min} [mm]: 115	≥ 20	2,5	3,0 4,5 [3)]	[4)]
	≥ 10	2,0	2,0 3,0 [3)]	[4)]
Lightweight concrete solid block **Vbl / V** Manufacturer: KLB EN 771-3:2011+A1:2015 LxWxH [mm]: 240x300x115 h_{min} [mm]: 240	≥ 20	-	3,5 5,0 [3)]	[4)]
	≥ 10	-	2,5 3,5 [3)]	[4)]
	≥ 5	0,5	-	-
Partial safety factor	γ_{Mm} [2)] [-]	2,5		

1) Drilling method: hammer drill
2) In absence of other national regulations
3) Valid for edge distance $c \geq 150$ mm, intermediate values can be interpolated
4) Data can be determined by job-site testing, data for $h_{nom} = 50$ mm can be applied

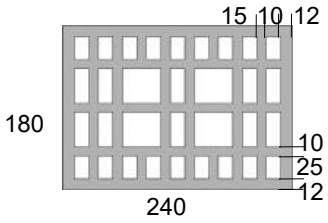
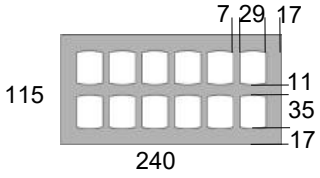
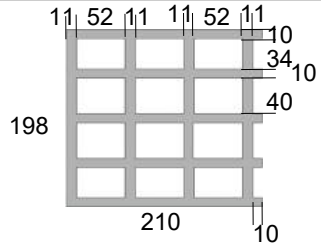
Table C5: Characteristic resistance for use in hollow masonry (base material group "c") for HRD 8

Base material Specifications | Brick dimensions | Drilling methods	Mean compressive strength as per EN 771 [N/mm²]	**Characteristic resistance F_{Rk} [kN]** $h_{nom} \geq 50$ [1]
Vertically perforated clay brick **HLz B 12/1,2** EN 771-1:2011+A1:2015 LxWxH [mm]: 300x240x248 h_{min} [mm]: 240  rotary drilling only	≥ 15	0,5
Vertically perforated sand-lime brick **KSL 12/1,4** EN 771-2:2011+A1:2015 LxWxH [mm]: 240x248x248 h_{min} [mm]: 240  hammer drilling	≥ 15	0,75
Lightweight concrete hollow block **Hbl 2/0,8** EN 771-3:2011+A1:2015 LxWxH [mm]: 497x240x248 h_{min} [mm]: 240  hammer drilling	≥ 2,5	0,3
Ital. Hollow brick **Doppio Uni** EN 771-1:2011+A1:2015 LxWxH [mm]: 230x120x100 h_{min} [mm]: 120  rotary drilling only	≥ 25	0,9
Partial safety factor γ_{Mm} [2]	[-]	2,5

Footnotes see Table C6

Hilti frame anchor HRD	**Annex C4**
Performances Characteristic resistance in hollow masonry for HRD 8	

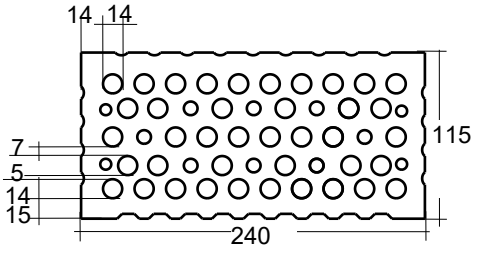
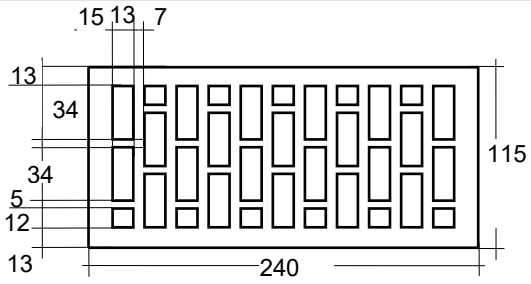
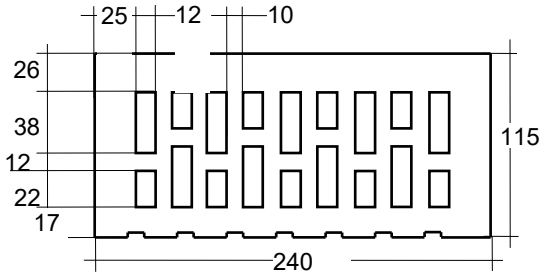
Table C5: Continued

Base material Specifications | Brick dimensions | Drilling methods	Mean compressive strength as per EN 771 [N/mm²]	**Characteristic resistance F_{Rk} [kN]** $h_{nom} \geq 50$ [1)]
Ital. Hollow brick **Mattone** EN 771-1:2011+A1:2015 LxWxH [mm]: 240x180x100 h_{min} [mm]: 180  rotary drilling only	≥ 20	1,5
Span. Ladrillo cara vista **Rojo hydrofugano** EN 771-1:2011+A1:2015 LxWxH [mm]: 240x115x50 h_{min} [mm]: 115  rotary drilling only	≥ 40	0,6
French Hollow brick **Brique Creuse C** EN 771-1:2011+A1:2015 LxWxH [mm]: 210x198x… h_{min} [mm]: 210  rotary drilling only	≥ 6	0,5
Partial safety factor γ_{Mm} [2)]	[-]	2,5

Footnotes see Table C6

Hilti frame anchor HRD	**Annex C5**
Performances Characteristic resistance in hollow masonry for HRD 8	

Table C6: Characteristic resistance for use in hollow masonry (base material group "c") for HRD 10

Base material Specifications | Brick dimensions | Drilling methods	Mean compressive strength as per EN 771 [N/mm²]	**Characteristic resistance F_{Rk} [kN]**	
		$h_{nom} \geq 50$ [1)]	$h_{nom} \geq 70$ [1)]
Vertically perforated clay brick **Hlz 1,2-2DF** Manufacturer: Schlagmann EN 771-1:2011+A1:2015 LxWxH [mm]: 240x115x113 h_{min} [mm]: 115  hammer drilling	≥ 10	1,5	-
	≥ 12,5	2,0	-
	≥ 15	2,0	-
Vertically perforated clay brick **Hlz 1,0-2DF** Manufacturer: Ott Ziegel EN 771-1:2011+A1:2015 LxWxH [mm]: 240x115x113 h_{min} [mm]: 115  hammer drilling	≥ 10	0,4	0,75
	≥ 12,5	0,5	0,9
	≥ 15	0,6	0,9
	≥ 20	0,9	1,5
Vertically perforated clay brick **VHlz 1,6-2DF** Manufacturer: Wienerberger EN 771-1:2011+A1:2015 LxWxH [mm]: 240x115x113 h_{min} [mm]: 115  hammer drilling	≥ 35	2,0	2,5
	≥ 50	3,0	3,5
Partial safety factor γ_{Mm} [2)]	[-]	2,5	

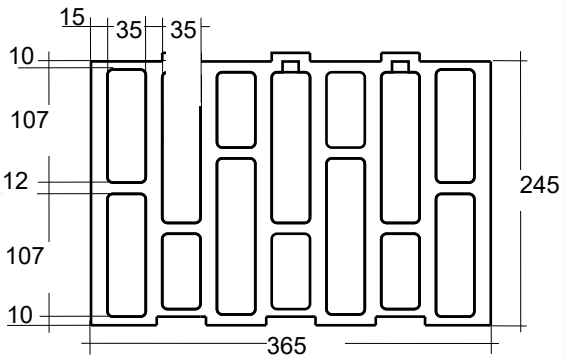
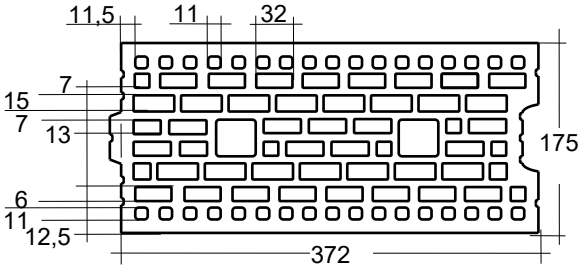
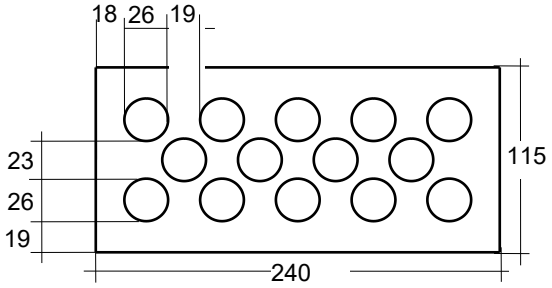
Footnotes see Table C6

Hilti frame anchor HRD

Performances
Characteristic resistance in hollow masonry for HRD 10

Annex C6

Table C6: continued

Base material Specifications | Brick dimensions | Drilling methods	Mean compressive strength as per EN 771 [N/mm²]	**Characteristic resistance F_{Rk} [kN]**	
		$h_{nom} \geq 50$ [1)]	$h_{nom} \geq 70$ [1)]
Vertically perforated clay brick **Poroton T8** Manufacturer: Wienerberger EN 771-1:2011+A1:2015 LxWxH [mm]: 248x365x249 h_{min} [mm]: 365  rotary drilling only	≥ 7,5	0,75	1,5
Vertically perforated clay brick **Hlz 1,0-9DF** Manufacturer: Bergmann EN 771-1:2011+A1:2015 LxWxH [mm]: 372x175x238 h_{min} [mm]: 175  rotary drilling only	≥ 10	1,2	1,5
	≥ 12,5	1,5	1,5
	≥ 15	1,5	2,0
	≥ 20	2,0	2,5
Vertically perforated sand-lime brick **KS L 1,6-2DF** Manufacturer: Werk B'güssbach EN 771-2:2011+A1:2015 LxWxH [mm]: 240x115x113 h_{min} [mm]: 115  hammer drilling	≥ 10	1,5	-
	≥ 12,5	1,5	-
	≥ 15	2,0	-
Partial safety factor γ_{Mm} [2)]	[-]	2,5	

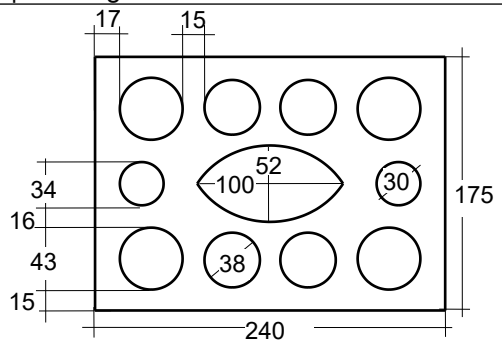
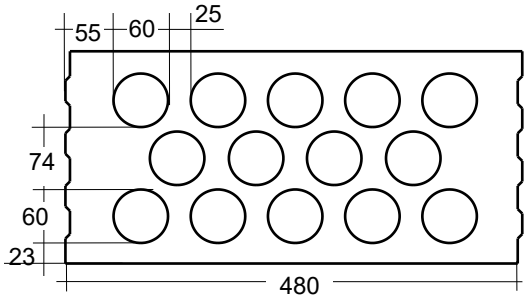
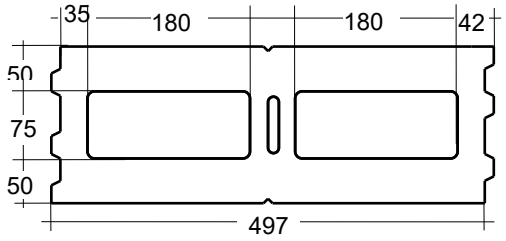
Footnotes see Table C6

Hilti frame anchor HRD

Performances
Characteristic resistance in hollow masonry for HRD 10

Annex C7

Table C6: continued

Base material Specifications | Brick dimensions | Drilling methods	Mean Compressive strength as per EN 771 [N/mm²]	**Characteristic resistance F_{Rk} [kN]**	
		$h_{nom} \geq 50$ [1]	$h_{nom} \geq 70$ [1]
Vertically perforated sand-lime brick **KS L 1,4-3DF** Manufacturer: Werk B'güssbach EN 771-2:2011+A1:2015 LxWxH [mm]: 240x175x113 h_{min} [mm]: 175  hammer drilling	≥ 10	-	2,0
	≥ 12,5	-	2,5
	≥ 15	-	3,0
Vertically perforated sand-lime brick **KS L R 1,6-16DF** Manufacturer: Werk Derching EN 771-2:2011+A1:2015 LxWxH [mm]: 480x240x248 h_{min} [mm]: 240  rotary drilling only	≥ 10	0,9	1,2
	≥ 12,5	1,2	1,5
	≥ 15	1,5	2,0
	≥ 20	2,0	2,5
Lightweight concrete hollow block **Hbl 1,2-9DF** Manufacturer: KBL EN 771-3:2011+A1:2015 LxWxH [mm]: 497x175x238 h_{min} [mm]: 175  rotary drilling only	≥ 2,5	0,5	0,75
	≥ 7,5	1,2	2,0
Partial safety factor γ_{Mm} [2] [-]		2,5	

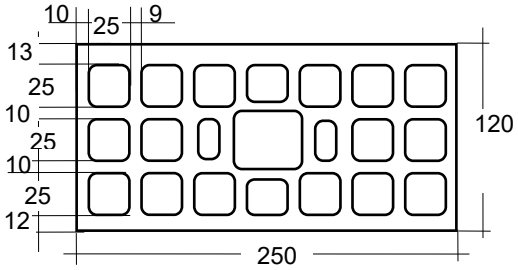
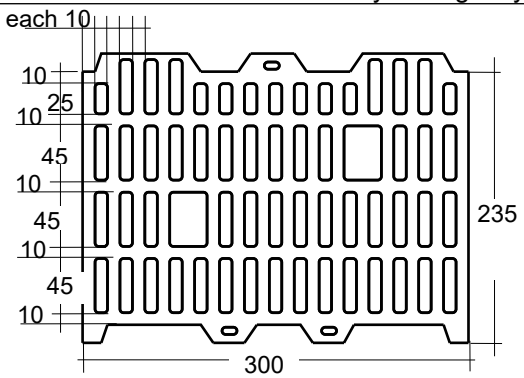
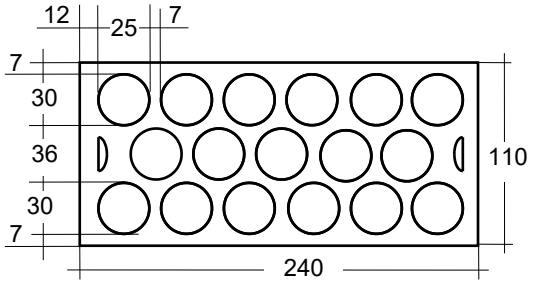
Footnotes see Table C6

Hilti frame anchor HRD

Performances
Characteristic resistance in hollow masonry for HRD 10

Annex C8

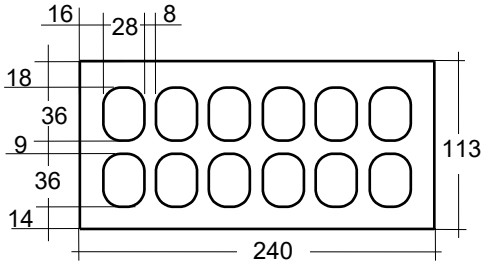
Table C6: continued

Base material Specifications | Brick dimensions | Drilling methods	Mean compressive strength as per EN 771 [N/mm²]	**Characteristic resistance F_{Rk} [kN]**	
		$h_{nom} \geq 50$ [1]	$h_{nom} \geq 70$ [1]
Italian Hollow brick **Doppio Uni** Manufacturer: Danesi EN 771-1:2011+A1:2015 LxWxH [mm]: 250x120x190 h_{min} [mm]: 120  rotary drilling only	≥ 25	-	1,5
Italian Hollow brick **Poroton P700** Manufacturer: Danesi EN 771-1:2011+A1:2015 LxWxH [mm]: 225x300x190 h_{min} [mm]: 300  rotary drilling only	≥ 15	-	0,6
Spanish Hollow brick **Ladrillo perforado** Manufacturer: La Oliva EN 771-1:2011+A1:2015 LxWxH [mm]: 240x110x100 h_{min} [mm]: 110  rotary drilling only	≥ 25	1,5	2,0
Partial safety factor γ_{Mm} [2]	[-]	2,5	

Footnotes see Table C6

Hilti frame anchor HRD	**Annex C9**
Performances Characteristic resistance in hollow masonry for HRD 10	

Table C6: continued

Base material Specifications | Brick dimensions | Drilling methods	Mean compressive strength as per EN 771 [N/mm²]	**Characteristic resistance F_{Rk} [kN]**	
		$h_{nom} \geq 50$ [1]	$h_{nom} \geq 70$ [1]
Spanish Hollow brick **Clinker mediterraneo** Manufacturer: - EN 771-1:2011+A1:2015 LxWxH [mm]: 240x113x50 h_{min} [mm]: 113  hammer drilling	≥ 75	-	1,5
Partial safety factor γ_{Mm} [2]	[-]	2,5	

[1] The influence of $h_{nom} > 50$ mm (HRD 8) or $h_{nom,1} > 50$ mm or $h_{nom,2} > 70$ mm (HRD 10) has to be checked by job-site testing according Annex B1

[2] In absence of other national regulations

Hilti frame anchor HRD

Performances
Characteristic resistance in hollow masonry for HRD 10

Annex C10

Table C7: Characteristic resistance for use in uncracked autoclaved aerated concrete (base material group "d") [1)]

Base material	Mean compressive strenth $f_{cm,decl}$ [N/mm²]	Characteristic resistance F_{Rk} [kN]		
		HRD 8	HRD 10	
		$h_{nom} \geq 50$	$h_{nom,2} \geq 70$	$h_{nom,3} \geq 90$
Uncracked autoclaved aerated concrete, EN 771-4:2011+A1:2015	≥ 2	-	0,9	0,9
	≥ 4	-	2,0	2,0
		-	2,0 [3)]	2,5 [3)]
	≥ 6	-	2,0	2,5
		-	3,5 [3)]	4,5 [3)]
Partial safety factor	γ_{MAAC} [2)] [-]	2,0		

1) Drilling method: rotary drilling only
2) In absence of other national regulations
3) Valid for edge distance c ≥ 150mm, intermediate values can be interpolated

Table C8: Displacements under tension and shear loading in concrete, solid and hollow masonry and uncracked autoclaved aerated concrete (base material group "a, b, c, d")

			HRD 8	HRD 10		
Embedment depth	$h_{nom} \geq$	[mm]	50	50	70	90 [1)]
Displacement under tension load	F=N	[kN]	1,2	1,8	3,3	1,6
	δ_{N0}	[mm]	0,3	0,5	0,9	1,0
	$\delta_{N\infty}$	[mm]	0,6	1,0	1,8	2,0
Displacement under shear load	F=V	[kN]	1,2	1,8	3,3	1,6
	δ_{V0}	[mm]	1,0	1,5	2,8	3,2
	$\delta_{V\infty}$	[mm]	1,5	2,3	4,2	4,8

1) for use in uncracked autoclaved aerated concrete