HRD MECHANICAL ANCHOR

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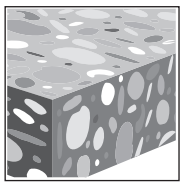
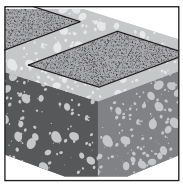
PRODUCT DESCRIPTION

HRD frame anchors

Anchor System	Features and Benefits
 HRD-H 10 (carbon steel) HRD-HR 10 (stainless steel A4)	• Innovative plastic framing screw anchor designed for Ventilated façade brackets • Flexible embedment depth (tech data for 2-in (50 mm) and 2-3/4-in (70 mm) embedment depths) • Available in two different materials for optimum suitability (carbon steel and stainless steel) • Pre-assembled for easy handling and fastening quality



Uncracked concrete



Grout-filled concrete masonry

MATERIAL SPECIFICATIONS

HRD-H screws are manufactured from carbon steel with 5µm zinc plating.
HRD-HR screws are manufactured from A4 stainless steel according to ISO 3506.

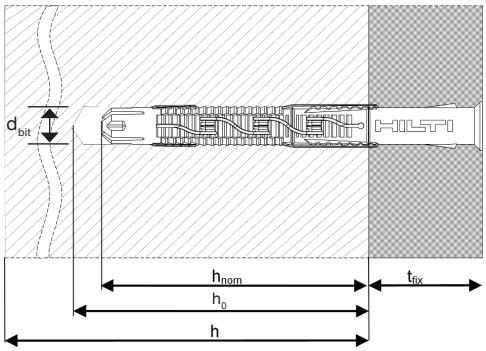
INSTALLATION PARAMETERS

Table 1 — Hilti HRD M10 Setting Information

Setting information		Symbol	Units	Nominal anchor diameter (mm)	
Nominal Drill Bit Diameter		d_{bit}	mm	10	
Nominal Embedment		h_{nom}	in. (mm)	2 (50)	2-3/4 (70)
Minimum Hole Depth		h_0	in. (mm)	2-3/8 (60)	3-1/8 (80)
Concrete	Minimum Concrete Thickness	h_{min}	in. (mm)	4 (100)	4-3/4 (120)
	Minimum Edge Distance	c_{min}	in. (mm)	6 (150)	6 (150)
	Minimum Anchor Spacing	s_{min}	in. (mm)	2 (50)	2 (50)
Grout-filled CMU	Minimum Masonry Thickness [1]	h_{min}	in. (mm)	7-5/8 (194)	7-5/8 (194)
	Minimum Wall Edge Distance	c_{min}	in. (mm)	4 (100)	4 (100)
	Minimum Distance to Vertical Head Joint [2]	$c_{min,HJ}$	in. (mm)	2 (50)	2 (50)
	Minimum Anchor Spacing	s_{min}	in. (mm)	2 (50)	2 (50)

1 Nominal 8 x 8 x 16 CMU block wall.
2 The minimum distance to vertical head joint is measured from the center of an anchor to the centerline of a vertical head joint.

Figure 1 — Hilti HRD specifications



DESIGN DATA IN CONCRETE

Table 2 — Hilti HRD carbon and stainless steel allowable loads in concrete[1]

Nominal anchor diameter mm	Nominal embedment in. (mm)	$f'_c \geq 2{,}500$ psi (17.2 MPa)	
		Tension lb (kN)	Shear lb (kN)
10	2	670	655
	(50)	(3.0)	(2.9)
	2-3/4	1215	655
	(70)	(5.4)	(2.9)

1 Allowable loads calculated with a factor of safety of 4.

Combined tension and shear loading for Table 2

$$\left(\frac{N_d}{N_{rec}}\right)^{5/3} + \left(\frac{V_d}{V_{rec}}\right)^{5/3} \leq 1.0$$

Table 3 - Load Adjustment Factors for Hilti HRD Carbon Steel and Stainless Steel Anchors in Concrete

Load adjustment factors (anchor spacing) f_A				Load adjustment factors (edge distance) f_R							
Tension/Shear				Tension f_{RN}				Shear (toward edge) f_{RV}		Shear (‖ to edge) f_{RV}	
Spacing		Nominal embedment (mm)		Edge distance		Nominal embedment (mm)		Nominal embedment (mm)		Nominal embedment (mm)	
in.	(mm)	50	70	in.	(mm)	50	70	50	70	50	70
2	(51)	0.67	0.62	2	(51)	0.38	0.44	0.18	0.12	0.36	0.23
2-1/2	(64)	0.71	0.65	2-1/2	(64)	0.44	0.49	0.25	0.16	0.44	0.33
3	(76)	0.75	0.68	3	(76)	0.51	0.55	0.33	0.21	0.51	0.43
4	(102)	0.84	0.74	4	(102)	0.68	0.68	0.51	0.33	0.68	0.66
4-3/4	(121)	0.90	0.79	4-3/4	(121)	0.80	0.80	0.66	0.43	0.80	0.80
5	(127)	0.92	0.80	5	(127)	0.85	0.85	0.72	0.46	0.85	0.85
6	(152)	1.00	0.86	6	(152)	1.00	1.00	0.94	0.61	1.00	1.00
7	(178)		0.92	7	(178)			1.00	0.77		
8	(203)		0.98	8	(203)				0.94		
9	(229)		1.00	9	(229)				1.00		

DESIGN DATA IN GROUT-FILLED CMU

Table 4 — Hilti HRD Carbon Steel Allowable Tensile Loads in Grout-filled CMU [1,2,3]

Nominal Anchor Diameter mm	Nominal Embedment in. (mm)	Allowable Tension Capacity at s_{cr} and c_{cr} lb (kN)	Spacing [4]			Edge Distance [5]
			Critical Spacing s_{cr} in. (mm)	Minimum Spacing s_{min} in. (mm)	Load Reduction Factor at s_{min} [6]	Minimum Edge Distance c_{min} in. (mm)
10	2 (50)	470 (2.1)	4 (100)	2 (50)	0.65	4 (100)
	2-3/4 (70)	690 (3.1)	4 (100)	2 (50)	0.87	4 (100)

1 Allowable loads are calculated with a factor of safety of 4.
2 All values are for anchors installed in fully grouted concrete masonry with minimum masonry prism strength of 1,500 psi. Concrete masonry units must be minimum lightweight, medium-weight, or normal-weight closed-end or open-end concrete masonry units conforming to ASTM C90.
3 Anchors may be installed in the face of the masonry wall in the cell, web, or horizontal bed joint. Installation in the vertical head joint is not permitted.
4 The critical spacing, s_{cr}, is the anchor spacing where full load values may be used. The minimum spacing, s_{min}, is the minimum anchor spacing for which values are available and installation is recommended. Spacing is measured from the center of one anchor to the center of an adjacent anchor.
5 The critical edge distance, c_{cr}, is the edge distance where full load values may be used. The minimum edge distance, c_{min}, is the minimum edge distance for which values are available and installation is recommended. Edge distance is measured from the center of the anchor to the closest edge.
6 Load reduction factors are multiplicative. Load values for anchors installed at less than s_{cr} must be multiplied by the appropriate load reduction factor based on actual spacing (s).

Table 5 — Hilti HRD Carbon Steel Allowable Shear Loads in Grout-filled CMU [1,2,3]

Nominal Anchor Diameter mm	Nominal Embedment in. (mm)	Allowable Shear Capacity at s_{cr} and c_{cr} lb (kN)	Spacing [4]			Edge Distance [5]
			Critical Spacing s_{cr} in. (mm)	Minimum Spacing s_{min} in. (mm)	Load Reduction Factor at s_{min} [6]	Minimum Edge Distance c_{min} in. (mm)
10	2 (50)	560 (2.5)	4 (100)	2 (50)	0.83	4 (100)
	2-3/4 (70)	560 (2.5)	4 (100)	2 (50)	0.83	4 (100)

1 Allowable loads are calculated with a factor of safety of 4.
2 All values are for anchors installed in fully grouted concrete masonry with minimum masonry prism strength of 1,500 psi. Concrete masonry units must be minimum lightweight, medium-weight, or normal-weight closed-end or open-end concrete masonry units conforming to ASTM C90.
3 Anchors may be installed in the face of the masonry wall in the cell, web, or horizontal bed joint. Installation in the vertical head joint is not permitted.
4 The critical spacing, s_{cr}, is the anchor spacing where full load values may be used. The minimum spacing, s_{min}, is the minimum anchor spacing for which values are available and installation is recommended. Spacing is measured from the center of one anchor to the center of an adjacent anchor.
5 The critical edge distance, c_{cr}, is the edge distance where full load values may be used. The minimum edge distance, c_{min}, is the minimum edge distance for which values are available and installation is recommended. Edge distance is measured from the center of the anchor to the closest edge.
6 Load reduction factors are multiplicative. Load values for anchors installed at less than s_{cr} must be multiplied by the appropriate load reduction factor based on actual spacing (s).

INSTALLATION INSTRUCTIONS

Manufacturer's Printed Installation Instructions (MPII) are included with each product package. They can also be viewed or downloaded at www.hilti.com. Because of the possibility of changes, always verify that downloaded MPII are current when used. Proper installation is critical to achieve full performance. Training is available on request. Contact Hilti Technical Services for applications and conditions not addressed in the MPII.

ORDERING INFORMATION

Description	Length in (mm)	Nominal embed. 1 in (mm)	Max. fixture thickness 1 in (mm)	Nominal embed. 2 in (mm)	Max. fixture thickness 2 in (mm)	Packaging quantity
HRD-H 10x60	2-3/8 (60)	2 (50)	3/8 (10)	-	-	50
HRD-H 10x80	3-1/8 (80)	2 (50)	1-1/8 (30)	2-3/4 (70)	3/8 (10)	50
HRD-HR 10x60	2-3/8 (60)	2 (50)	3/8 (10)	-	-	50
HRD-HR 10x80	3-1/8 (80)	2 (50)	1-1/8 (30)	2-3/4 (70)	3/8 (10)	50

Hilti, Inc.
1-800-879-8000 | en español 1-800-879-5000
www.hilti.com

Hilti (Canada) Corporation
1-800-363-4458
www.hilti.ca

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