



Attached are page(s) from the 2014 Hilti North American Product Tech Guide. For complete details on this product, including data development, product specifications, general suitability, installation, corrosion, and spacing and edge distance guidelines, please refer to the Technical Guide, or contact Hilti.

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HIT-HY 70 Hybrid for Masonry Construction 3.2.7

3.2.7.1 Product description

The Hilti HIT-HY 70 Adhesive Anchor System is used to anchor building components to grouted and ungrouted concrete block walls, solid and hollow brick walls and unreinforced multiple wythe brick walls referred to as unreinforced masonry or URM.

HIT-HY 70 is an injectable two-component hybrid adhesive mortar. The two components are separated by means of a dual-cylinder foil pack attached to a manifold. An injection nozzle with an internal mixing element is attached to the manifold, and the adhesive components are dispensed through the injection nozzle to ensure their proper mixing. The injection nozzle may be replaced to permit interruptions in the use of the cartridges. Only injection tools and static mixing nozzles as recommended by the manufacturer's printed installation instructions may be used.

The Hilti HIT-HY 70 Adhesive Anchor Systems consists of steel all thread rods, steel internally threaded inserts, combi inserts, reinforcing bars, plastic-mesh screen tubes for installation only in unreinforced masonry (URM), hollow concrete block, and hollow brick walls, and the HIT-HY 70 Adhesive.

For clay tile, terracotta, and masonry applications that are not specifically addressed in this Technical Guide, please contact Hilti Technical Services.

Guide specifications

Master Format Section:

Previous 2004 Format

03250 03 16 00 Concrete anchors

Related Sections:

03200 03 20 00 Concrete reinforcing

05050 05 50 00 Metal fabrications

05120 05 10 00 Structural metal framing

Urethane Methacrylate injectable adhesive is used for installation of post-installed reinforcing steel, anchor rods and inserts into existing masonry and brick construction. Hilti HIT-HY 70 is dispensed through side-by-side packs and mixed as the adhesive is dispensed through a static mixing nozzle

Plastic mesh screen tubes shall be used in conjunction with the injectable adhesive when reinforcing steel or anchors are post-installed in unreinforced masonry (URM), ungrouted concrete block, brick with holes or other masonry construction with voids. The screen tubes are manufactured with a mesh size, length and diameter matched the anchor or reinforcing steel.

HIT-HY 70 adhesive, HIT-SC screen tubes, HAS threaded rods, HIT-IC inserts and HIS-N insert shall be furnished by Hilti.

Installation shall be performed in accordance with the manufacturer's published installation instructions.

3.2.7.1 Product description

3.2.7.2 Material specifications

3.2.7.3 Technical data

3.2.7.4 Installation instructions

3.2.7.5 Ordering information

Listings/Approvals

ICC-ES (International Code Council)
ESR-2682

ICC-ES (International Code Council)
ESR-3342 URM

City of Los Angeles

Research Report No. 25947 URM only



LEED® Credit 4.1-Low Emitting Materials

The Leadership in Energy and Environmental Design (LEED®) Green Building Rating system™ is the nationally accepted benchmark for the design, construction and operation of high performance green buildings.

3.2.7 HIT-HY 70 Hybrid for Masonry Construction

3.2.7.2 Material specifications

Table 1 - Properties of fully-cured HIT-HY 70 adhesive

Compressive strength	ASTM D695/DIN 53454	7,252-10,153 psi	50-70 MPa
Modulus of elasticity (Compression test)	ASTM D790/DIN 53452	246,568 psi	1,700 MPa
Water absorption	ASTM D570/DIN 53495	3-8 %	
Electrical resistance	VDE/DIN 0303T3	4.2 x 10 ¹¹ ohm/in.	1.065 x 10 ¹² ohm/cm

HAS-E carbon steel threaded rod specifications

Carbon steel rods conform to ISO 898 class 5.8 with a minimum tensile strength of 72.5 ksi (500 MPa) and a minimum yield strength of 58 ksi (400 MPa).

HAS-E nuts conform to SAE J995 Grade 5.

HAS-E washers conform to ASTM F884, HV, and ANSI B18.22.1 Type A plain.

HAS-E rod, nut and washer has an electroplated zinc coating conforming to ASTM B633, SC1.

HAS Super high strength threaded rod specifications

Carbon steel rods manufactured from ASTM A193, Grade B7, with a minimum tensile strength of 125 ksi (862 MPa) and a minimum yield strength of 105 ksi (724 MPa).

HAS Super nuts conform to SAE J995 Grade 5.

HAS Super washers conform to ASTM F884, HV, and ANSI B18.22.1 Type A plain.

HAS Super rods, nuts and washers, except the 7/8-in. diameter, have an electroplated zinc coating conforming to ASTM B633, SC1.

7/8-in. HAS Super rods, nuts and washers are hot-dip galvanized in accordance with ASTM A153.

HAS-R 304 stainless steel threaded rod specifications

3/8-, 1/2- and 5/8-in. rods manufactured from AISI Type 304 stainless steel conforming to ASTM F593 Condition CW with a minimum tensile strength of 100 ksi (689 MPa) and a minimum yield strength of 65 ksi (448 MPa).

3/4-, 1- and 1 1/4-in. rods are manufactured from AISI Type 304 stainless steel conforming to ASTM F593 Condition CW with a minimum tensile strength of 85 ksi (586 MPa) and a minimum yield strength of 45 ksi (310 MPa).

AISI Type 304 stainless steel nuts conform to ASTM F594.

AISI Type 304 stainless steel washers conform to ASTM A240 and ANSI B18.22.1 Type A plain.

HAS-R 316 stainless steel threaded rod specifications

3/8-, 1/2- and 5/8-in. rods manufactured from AISI Type 316 stainless steel with a minimum tensile strength of 100 ksi (689 MPa) and a minimum yield strength of 65 ksi (448 MPa).

3/4-, 1- and 1 1/4-in. rods are manufactured from AISI Type 316 stainless steel conforming to ASTM F593 Condition CW or cold worked.

AISI Type 316 stainless steel nuts conform to ASTM F594.

AISI Type 316 stainless steel washers conform to ASTM A240 and ANSI B18.22.1 Type A plain.

HIS-N internally threaded insert specifications

3/8-in. HIS-N is manufactured from 11MnPb30+C carbon steel conforming to DIN 10277-3 with a minimum tensile strength of 71.1 ksi (490 MPa) and a minimum yield strength of 59.5 ksi (410 MPa).

1/2-, 5/8- and 3/4-in. HIS-N is manufactured from 11MnPb30+C carbon steel conforming to DIN 10277-3 with a minimum tensile strength of 66.7 ksi (460 MPa) and a minimum yield strength of 54.4 ksi (375 MPa).

HIS-RN is manufactured from X5CrNiMo 17122 K700 stainless steel conforming to DIN EN 10088-3 with a minimum tensile strength of 101.5 ksi (700 MPa) and a minimum yield strength of 50.8 ksi (350 MPa).

HIT-HY 70 Hybrid for Masonry Construction 3.2.7

3.2.7.3 Technical data

Table 2 - HIT-HY 70 allowable adhesive bond tension loads for threaded rods and reinforcing bars in the face of grout-filled concrete masonry walls^{1, 2, 3, 4, 5, 6, 7, 8}

Nominal anchor diameter	Rebar size	Effective embedment in. (mm) ¹¹	Tension _{cr} lb (kN)	Spacing ⁹			Edge distance ¹⁰		
				Critical s _{cr} in. (mm)	Minimum s _{min} in. (mm)	Load reduction factor @ s _{min} ⁶	Critical c _{cr} in. (mm)	Minimum c _{min} in. (mm)	Load reduction factor @ c _{min} ¹²
3/8	3	3-3/8 (86)	1,240 (5.5)	13.5 (342.9)	4 (102)	0.70	12 (304.8)	4 (102)	0.80
1/2	4	4-1/2 (115)	2,035 (9.0)	18 (457.2)		0.70	20 (508)		0.76
5/8	5	5-5/8 (143)	2,840 (12.6)	22.5 (571.5)		0.50	20 (508)		0.71
3/4	6	6-3/4 (172)	3,810 (16.9)	27 (685.8)		0.50	20 (508)		0.66

Table 3 - HIT-HY 70 allowable adhesive bond shear loads for threaded rods and reinforcing bars in the face of grout-filled concrete masonry walls^{1, 2, 3, 4, 5, 6, 7, 8}

Nominal anchor diameter	Rebar size	Effective embedment in. (mm) ¹¹	Shear lb (kN)	Spacing ⁹			Edge distance ¹⁰			
				Critical s _{cr} in. (mm)	Minimum s _{min} in. (mm)	Load reduction factor @ s _{min} ⁶	Critical c _{cr} in. (mm)	Minimum c _{min} in. (mm)	Load reduction factor @ c _{min} ¹²	
									Load perpendicular to edge	Load parallel to edge
3/8	3	3-3/8 (86)	850 (3.8)	13.5 (342.9)	4 (102)	1.00	12 (304.8)	4 (102)	0.88	1.00
1/2	4	4-1/2 (115)	1,495 (6.7)	18 (457.2)		1.00	12 (304.8)		0.49	1.00
5/8	5	5-5/8 (143)	2,615 (11.6)	22.5 (571.5)		0.50	20 (508)		0.40	0.78
3/4	6	6-3/4 (172)	4,090 (18.2)	27 (685.8)		0.50	20 (508)		0.26	0.60

- All values are for anchors installed in fully grouted concrete masonry with minimum masonry prism strength of 1,500 psi. Concrete masonry units shall be lightweight, medium-weight or heavy-weight conforming to ASTM C90. Allowable loads are calculated using a safety factor of 5.
- Anchors may be installed in any location in the face of the masonry wall including cell, web, and mortar joints. Anchors are limited to one per masonry cell.
- Linear interpolation of load values between minimum spacing (s_{min}) and critical spacing (s_{cr}) and between minimum edge distance (c_{min}) and critical edge distance (c_{cr}) is permitted.
- Concrete masonry thickness must be equal to or greater than 1.5 times the anchor embedment depth. EXCEPTION: the 5/8-inch- and the 3/4-inch diameter anchors (No. 5 and No. 6 bars) may be installed in minimum nominally 8-inch thick concrete masonry.
- When using the basic load combinations in accordance with IBC Section 1605.3.1, tabulated allowable loads must not be increased for seismic or wind loading. When using the alternative basic load combinations in IBC Section 1605.3.2 that include seismic or wind loads, tabulated allowable loads may be increased by 33-1/3 percent, or the alternative basic load combinations may be reduced by a factor of 0.75.
- Allowable loads must be the lesser of the adjusted masonry or bond tabulated values and the steel values given in table 4.
- Tabulated allowable loads shall be adjusted for increased base material temperatures in accordance with figure 12.
- For combined loading: $(T_{\text{applied}}/T_{\text{allowable}})^n + (V_{\text{applied}}/V_{\text{allowable}})^n \leq 1$ where n=5/3 for 3/8- and 1/2-inch diameters (No. 3 and No. 4 rebar) and n=1 for 5/8- and 3/4-inch diameters (No. 5 and No. 6 rebar).
- 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.
- 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.
- Embedment depth is measured from the outside face of the concrete masonry unit.
- Load reduction factors are multiplicative, both spacing and edge distance load reduction factors must be considered. Load values for anchors installed at less than s_{cr} and c_{cr} must be multiplied by the appropriate load reduction factor based on actual edge distance (c) and spacing (s).

3.2.7 HIT-HY 70 Hybrid for Masonry Construction

Table 4 - HIT-HY 70 allowable tension and shear values for threaded rods based on steel strength^{1, 2, 3}

Nominal anchor diameter	Tension, lb (kN)					Shear, lb (kN)				
	ASTM A36	ASTM A307	ASTM A193 B7	ISO 898 Class 5.8	ASTM F593 CW 304/316	ASTM A36	ASTM A307	ASTM A193 B7	ISO 898 Class 5.8	ASTM F593 CW 304/316
1/4	940 (4.2)	972 (4.3)	2,025 (9.0)	1,175 (5.2)	1,620 (7.2)	485 (2.2)	500 (2.2)	1,040 (4.6)	605 (2.7)	835 (3.7)
5/16	1,470 (6.5)	1,520 (6.8)	3,160 (14.1)	1,835 (8.2)	2,530 (11.3)	756 (3.4)	780 (3.5)	1,630 (7.3)	945 (4.2)	1,300 (5.8)
3/8	2,115 (9.4)	2,185 (9.7)	4,555 (20.3)	2,640 (11.7)	3,645 (16.2)	1,090 (4.8)	1,125 (5.0)	2,345 (10.4)	1,360 (6.1)	1,875 (8.3)
1/2	3,755 (16.7)	3,885 (17.3)	8,100 (36.0)	4,700 (20.9)	6,480 (28.8)	1,935 (8.6)	2,000 (8.9)	4,170 (18.6)	2,420 (10.8)	3,335 (14.8)
5/8	5,870 (26.1)	6,075 (27.0)	12,655 (56.3)	7,340 (32.7)	10,125 (45.0)	3,025 (13.5)	3,130 (13.9)	6,520 (29.0)	3,780 (16.8)	5,215 (23.2)
3/4	8,455 (37.6)	8,750 (38.9)	18,225 (81.1)	10,570 (47.0)	14,580 (64.9)	4,355 (19.4)	4,506 (20.0)	9,388 (41.8)	5,445 (24.2)	7,510 (33.4)

1 Allowable load used in the design must be the lesser of bond values and tabulated steel values.

2 The allowable tension and shear values for threaded rods to resist short term loads, such as wind or seismic, must be calculated in accordance with the appropriate IBC Sections.

3 Allowable steel loads are based on tension and shear stresses equal to $0.33 \times F_u$ and $0.17 \times F_u$, respectively.

Table 5 - HIT-HY 70 allowable adhesive bond loads for threaded rods and reinforcing bars in the top of grout-filled concrete masonry walls^{1, 2, 3, 4, 5, 6}

Nominal anchor diameter or rebar size	Effective embedment in. (mm)	Edge distance in. (mm) ^{7, 8}	Minimum end distance in. (mm)	Tension lb (kN)	Shear load, lb (kN) ⁹	
					Load parallel to edge of masonry wall	Load perpendicular to edge of masonry wall
1/2	4-1/2 (114)	1-3/4 (44.5)	8 (203)	1,165 (5.2)	815 (3.6)	345 (1.5)
		4 (101.6)		1,625 (7.2)	1,445 (6.4)	505 (2.3)
5/8	5-5/8 (143)	1-3/4 (44.5)		1,165 (5.2)	1,190 (5.3)	385 (1.7)
		4 (101.6)		1,590 (7.1)	1,825 (8.1)	655 (2.9)
No. 4	4-1/2 (114)	1-3/4		865 (4.0)	630 (2.8)	245 (1.1)
No. 5	5-5/8 (143)			980 (4.4)	755 (3.4)	295 (1.3)

1 All values are for anchors installed in fully grouted concrete masonry with minimum masonry prism strength of 1,500 psi. Concrete masonry units shall be lightweight, medium-weight or heavy-weight conforming to ASTM C90. Allowable loads are calculated using a safety factor of 5.

2 When using the basic load combinations in accordance with IBC Section 1605.3.1 or the alternative basic load combinations in IBC Section 1605.3.2. Tabulated allowable loads must not be increased for seismic or wind loading.

3 One anchor shall be permitted to be installed in each concrete block.

4 Anchors are not permitted to be installed in a head joint, flange or web of the concrete masonry unit.

5 Allowable loads must be the lesser of the adjusted masonry or bond tabulated values and the steel values given in table 4.

6 Tabulated allowable loads shall be adjusted for increased base material temperatures in accordance with figure 12.

7 For combined loading: $(T_{\text{applied}} / T_{\text{allowable}}) + (V_{\text{applied}} / V_{\text{allowable}}) \leq 1$

8 The tabulated edge distance is measured from the anchor centerline to the edge of the concrete block. See figure 2.

9 Linear interpolation of load values between the two tabulated edge distances is permitted.

Figure 1 - HIT-HY 70 specifications for HAS threaded rod in grout-filled masonry walls

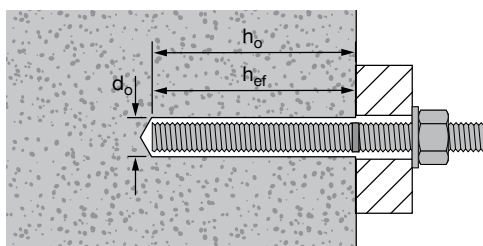
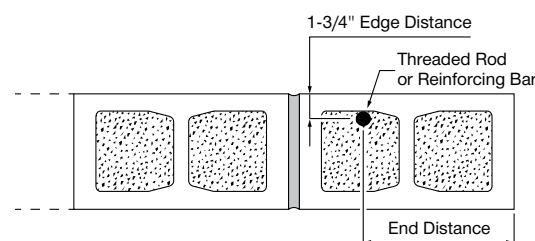


Figure 2 — Edge and end distances for threaded rods and reinforcing bars installed in the top of grout-filled CMU



HIT-HY 70 Hybrid for Masonry Construction 3.2.7

Table 6 - HIT-HY 70 allowable adhesive bond tension loads for HIS-N inserts in the face of grout-filled concrete masonry walls^{1, 2, 3, 4, 5, 6, 7, 8}

Thread size	Effective embedment in. (mm) ¹¹	Tension lb (kN)	Spacing ⁹			Edge distance ¹⁰		
			Critical s_{cr} in. (mm)	Minimum s_{min} in. (mm)	Load reduction factor @ s_{min} ⁶	Critical c_{cr} in. (mm)	Minimum c_{min} in. (mm)	Load reduction factor @ c_{min} ¹²
3/8-16 UNC	4-3/8 (111)	2,075 (9.2)	17 (431.8)	4 (102)	0.55	12 (304.8)	4 (102)	0.82
1/2-13 UNC	5 (127)	2,710 (12.1)	20 (508)		0.55	20 (508)		0.63

Table 7 - HIT-HY 70 allowable adhesive bond shear loads for HIS-N inserts in the face of grout-filled concrete masonry walls^{1, 2, 3, 4, 5, 6, 7, 8}

Thread size	Effective embedment in. (mm) ¹¹	Shear lb (kN)	Spacing ⁹			Edge distance ¹⁰			
			Critical s_{cr} in. (mm)	Minimum s_{min} in. (mm)	Load reduction factor @ s_{min} ⁶	Critical c_{cr} in. (mm)	Minimum, c_{min} in. (mm)	Load reduction factor @ c_{min} ¹²	
								Load perpendicular to edge	Load parallel to edge
3/8-16 UNC	4-3/8 (111)	1,100 (4.9)	17 (431.8)	4 (102)	0.74	12 (304.8)	4 (102)	0.72	1.00
1/2-13 UNC	5 (127)	2,065 (9.2)	20 (508)		0.71	20 (508)		0.40	0.87

- All values are for anchors installed in fully grouted concrete masonry with minimum masonry prism strength of 1,500 psi. Concrete masonry units shall be lightweight, medium-weight or heavy-weight conforming to ASTM C90. Allowable loads are calculated using a safety factor of 5.
- Anchors may be installed in any location in the face of the masonry wall including cell, web, and mortar joints. Anchors are limited to one per masonry cell.
- Linear interpolation of load values between minimum spacing (s_{min}) and critical spacing (s_{cr}) and between minimum edge distance (c_{min}) and critical edge distance (c_{cr}) is permitted.
- Concrete masonry thickness must be equal to or greater than 1.5 times the anchor embedment depth. Exception: 5/8- and 3/4-in. anchors (No. 5 and No. 6 bars) may be installed in minimum nominally 8-inch-thick concrete masonry.
- When using the basic load combinations in accordance with IBC Section 1605.3.1, tabulated allowable loads must not be increased for seismic or wind loading. When using the alternative basic load combinations in IBC Section 1605.3.2 that include seismic or wind loads, tabulated allowable loads may be increased by 33-1/3 percent, or the alternative basic load combinations may be reduced by a factor of 0.75.
- Allowable loads must be the lesser of the adjusted masonry or bond tabulated values and the steel values given in table 4.
- Tabulated allowable loads shall be adjusted for increased base material temperatures in accordance with figure 12.
- For combined loading: $(T_{applied}/T_{allowable})^n + (V_{applied}/V_{allowable})^n \leq 1$ where $n=5/3$ for 3/8- and 1/2-inch diameters (No. 3 and No. 4 rebar) and $n=1$ for 5/8- and 3/4-inch diameter or No. 5 and No. 6 rebar.
- 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.
- 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.
- Embedment depth is measured from the outside face of the concrete masonry unit.
- Load reduction factors are multiplicative, both spacing and edge distance load reduction factors must be considered. Load values for anchors installed at less than s_{cr} and c_{cr} must be multiplied by the appropriate load reduction factor based on actual edge distance (c) and spacing (s).

3.2.7

Figure 3 - HIT-HY 70 specifications for HIS-N inserts in grout-filled masonry walls

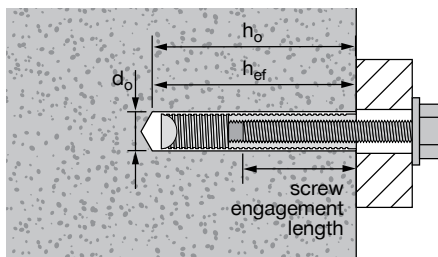
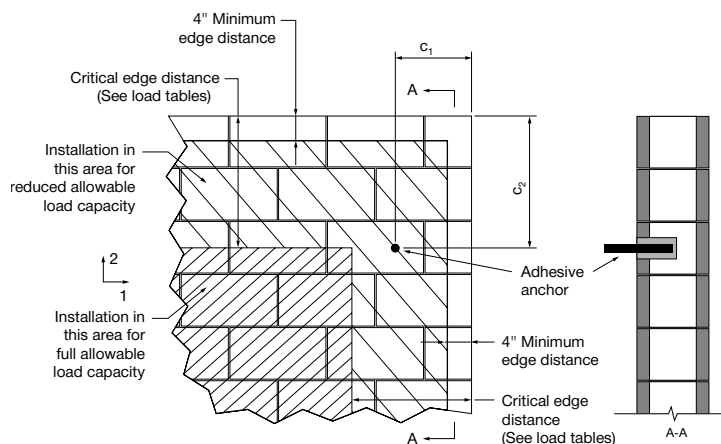


Figure 4 — Allowable anchor installation locations in the face of grout-filled concrete block



3.2.7 HIT-HY 70 Hybrid for Masonry Construction

Table 8 - HIT-HY 70 allowable adhesive bond loads for threaded rods in the face of hollow concrete masonry units^{1, 2, 3, 4}

Nominal anchor diameter	Effective embedment in. (mm) ⁵	Tension lb (kN) ^{6, 7, 8}	Minimum edge distance c_{min} in. (mm) ⁹	Load reduction factor @ c_{min}	Shear lb (kN) ^{6, 7, 8}	Edge distance ⁶		
						Critical c_{cr} in. (mm)	Minimum c_{min} in. (mm)	Load reduction factor @ c_{min}
1/4	2 (51)	220 (1.0)	4 (102)	1.00	355 (1.6)	4 (101.6)	4 (102)	1.00
5/16		390 (1.7)			630 (2.8)	12 (304.8)		0.73
3/8		390 (1.7)			645 (2.8)	12 (304.8)		0.73
1/2		390 (1.7)			670 (3.0)	12 (304.8)		0.73

Table 9 - HIT-HY 70 allowable adhesive bond loads for HIT-IC inserts in the face of hollow concrete masonry units^{1, 2, 3, 4}

Thread size	Effective embedment in. (mm) ⁵	Tension lb (kN) ^{6, 7, 8}	Minimum edge distance c_{min} in. (mm) ⁹	Load reduction factor @ c_{min}	Shear lb (kN) ^{6, 7, 8}	Edge distance ⁶		
						Critical c_{cr} in. (mm)	Minimum c_{min} in. (mm)	Load reduction factor @ c_{min}
#14 Screw	2 (51)	190 (0.8)	4 (102)	1.00	235 (1.0)	4 (101.6)	4 (102)	1.00
5/16-18 UNC		415 (1.8)			605 (2.7)	12 (304.8)		0.80
3/8-16 UNC		480 ⁵ (2.1)			620 (2.8)	12 (304.8)		0.78
1/2-13 UNC		495 ⁵ (2.2)			620 (2.8)	12 (304.8)		0.75

1 All values are for anchors installed in hollow concrete masonry with minimum masonry prism strength of 1,500 psi. Concrete masonry units shall be lightweight, medium-weight or normal-weight conforming to ASTM C90. Allowable loads are calculated using a safety factor of 5.

2 Anchors shall be installed in the face of the ungrouted concrete block wall. A maximum of two anchors for each cell of the hollow ungrouted concrete block is allowed.

3 Anchors are not recognized for resisting earthquake forces. For short-term loading due to wind forces, the allowable loads shall not be increased.

4 Tabulated allowable loads shall be adjusted for increased base material temperatures in accordance with figure 12.

5 Tabulated embedment depth is the length of the plastic HIT-SC screens.

6 Tabulated values are for one anchor installed in the cell of the ungrouted concrete block. Installation in other locations of the the mortars joints, flange or web of the concrete block is not permitted.

7 The minimum spacing, s_{min} , for which values are available and installation is recommended, is equal to 4 inches. Two anchors installed in adjacent cells may be spaced as close as 4 inches apart without any load reduction. Two anchors installed in the same cell can be spaced as close as 4 inches apart without any load reduction, except for the 3/8- and 1/2-in. diameter HIT-IC inserts, where a 20% reduction needs to be applied to the allowable tension load.

8 Allowable loads must be the lesser of the adjusted masonry or bond tabulated values above and the steel values given in table 4.

9 The critical edge distance, c_{cr} , is the edge distance where full load values in the Table 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.

Figure 5 - HIT-HY 70 specifications for HAS threaded rod in hollow masonry and brick with holes

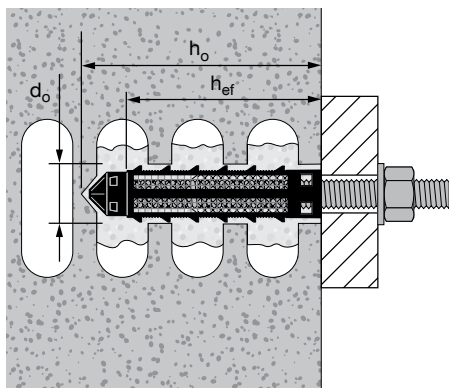
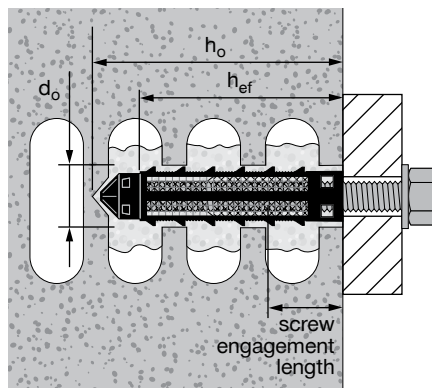


Figure 6 - HIT-HY 70 specifications for HIT-IC in hollow masonry and brick with holes



HIT-HY 70 Hybrid for Masonry Construction 3.2.7

Table 10 - HIT-HY 70 allowable adhesive bond loads for threaded rods in the face of hollow brick^{1, 2, 3, 4, 5}

Nominal anchor diameter	Effective embedment in. (mm) ⁶	Tension lb (kN) ^{7, 8}	Minimum edge distance c_{min} in. (mm) ⁹	Load reduction factor @ c_{min}	Shear lb (kN) ^{7, 8}	Edge distance ⁶		
						Critical c_{cr} in. (mm)	Minimum c_{min} in. (mm)	Load reduction factor @ c_{min}
1/4	3-1/8 (79)	530 (2.4)	8 (203)	1.00	370 (1.6)	12 (304.8)	8 (203)	1.00
5/16		735 (3.3)			595 (2.6)			1.00
3/8		905 (4.0)			1,045 (4.7)			0.76
1/2		905 (4.0)			1,685 (7.5)			0.52

Table 11 - HIT-HY 70 allowable adhesive bond loads for HIT-IC inserts in the face of hollow brick^{1, 2, 3, 4, 5}

Thread size	Effective embedment in. (mm) ⁶	Tension lb (kN) ^{7, 8}	Minimum edge distance c_{min} in. (mm) ⁹	Load reduction factor @ c_{min}	Shear lb (kN) ^{7, 8}	Edge distance ⁶		
						Critical c_{cr} in. (mm)	Minimum c_{min} in. (mm)	Load reduction factor @ c_{min}
#14 Screw	2 (51)	170 (0.8)	8 (203)	1.00	222 (1.0)	12 (304.8)	8 (203)	1.00
5/16-18 UNC	3-1/8 (79)	880 (3.9)			650 (2.9)			1.00
3/8-16 UNC		880 (3.9)			1,290 (5.7)			0.63
1/2-13 UNC		990 (4.4)			1,780 (7.9)			0.47

- All values are for anchors installed in hollow brick masonry with minimum masonry prism strength of 3,000 psi. Hollow brick units shall be conforming to ASTM C652. Allowable loads are calculated using a safety factor of 5.
- Anchors shall be installed in the face of the hollow brick masonry wall.
- Anchors are not recognized for resisting earthquake forces. For short-term loading due to wind forces, the allowable loads shall not be increased.
- Tabulated allowable loads shall be adjusted for increased base material temperatures in accordance with figure 12.
- Tabulated embedment depth is limited by the length of the plastic HIT-SC screens.
- Tabulated values are for one anchor installed in any location of the brick wall including the horizontal and head mortar joints.
- One anchor shall be permitted to be installed in each brick. Two anchors may be spaced as close as the lesser of 2 bricks or 8 in. apart without any load reduction.
- Allowable loads must be the lesser of the adjusted masonry or bond tabulated above and the steel values given in table 4.
- The critical edge distance, c_{cr} , is the edge distance where full load values in the table 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.

Table 12 - HIT-HY 70 allowable adhesive bond loads for threaded rods in multi-wythe solid brick walls^{1, 2, 3, 4, 5, 6}

Nominal anchor diameter	Effective embedment ⁷ in. (mm)		Tension lb (kN)		Shear lb (kN)		Minimum spacing s_{min} in. (mm)	Minimum edge distance c_{min} in. (mm)	
3/8	6	(152)	895	(4.0)	680	(3.0)	16	(406.4)	(406.4)
	10	(254)	1,325	(5.9)	795	(3.5)			
1/2	6	(152)	895	(4.0)	1,075	(4.8)			
	10	(254)	1,455	(6.5)	1,115	(5.0)			
5/8	6	(152)	1,025	(4.6)	1,405	(6.3)			
	10	(254)	1,955	(8.7)	1,445	(6.4)			
3/4	8	(203)	1,575	(7.0)	1,985	(8.8)			
	13	(330)	2,135	(9.5)	1,985	(8.8)			

- All values are based on mortar shear strength of 45 psi or greater. Allowable loads are calculated using a safety factor of 5.
- Anchors must be installed in the face of the multi-wythe URM wall. The wall must have a minimum thickness of 13 inches representing 3 wythes of brick..
- Tabulated values are for maximum one anchor installed in the center of the brick of the multi-wythe URM wall.
- Edge distance, c_{min} , and spacing, s_{min} , are the minimum distances for which values are available and installation is recommended. Edge distance is measured from the center of the anchor to the closest edge. Spacing is measured from the center of one anchor to the center of an adjacent anchor.
- Allowable loads must be the lesser of the adjusted masonry or bond tabulated values and the steel values given in table 4.
- Tabulated allowable loads shall be adjusted for increased base material temperatures in accordance with figure 12.
- Tabulated embedment depth is limited by the length of the plastic HIT-SC screens.

Figure 7 - HIT-HY 70 specifications for HAS rods in multi-wythe brick wall

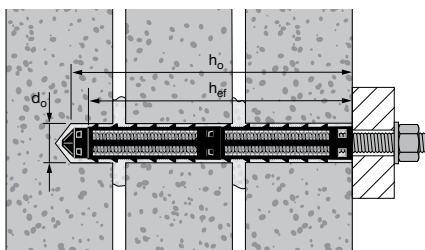
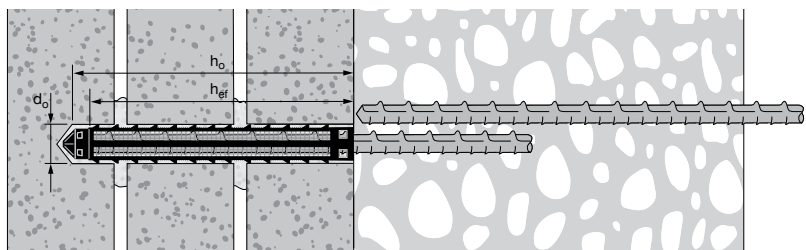


Figure 8 - HIT-HY 70 specifications for rebar in multi-wythe brick wall



3.2.7 HIT-HY 70 Hybrid for Masonry Construction

Table 13 - HIT-HY 70 allowable adhesive bond seismic loads for threaded rods and reinforcing bars in unreinforced brick masonry^{1, 2, 3}

Configuration A — Shear anchor or rebar dowel						
Nominal anchor diameter in.	Bar size	Embedment in. (mm)	Minimum wall thickness in. (mm)	Tension lb (kN)		Shear ⁴ lb (kN)
1/2	4	8 (203)	13 (330)	-	-	500 (2.2)
5/8	5			-	-	750 (3.3)
3/4	6			-	-	1,000 (4.5)
Configuration B — 22 1/2° combination anchor						
Nominal anchor diameter in.		Embedment in.	Minimum wall thickness in. (mm)	Tension lb (kN)		Shear ⁴ lb (kN)
3/4		Within 1 inch of the opposite wall surface	13 (330)	1,200 (5.3)		1,000 (4.5)

1 Allowable load values are applicable only to anchors where in-place shear tests indicate minimum mortar strength of 50 psi.

2 Allowable loads are computed in accordance with ICC-ES AC608 (2010) and IBC.

3 No increase for short-term loading is permitted, such as loading induced by wind or earthquake.

4 Anchors must be tested in accordance with the requirements of IEBC and UCBC.

Figure 9 — Hilti HIT-HY 70 shear anchor or dowel in configuration A

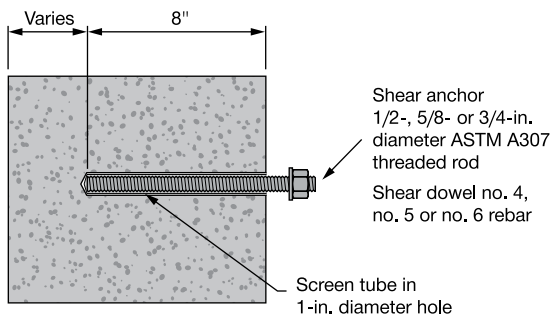


Figure 10 — Hilti HIT-HY 70 with 22-1/2° combination anchor in configuration B

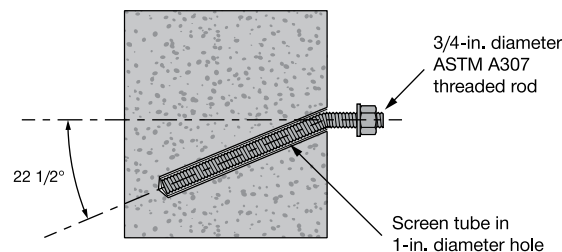


Table 14 - HIT-HY 70 allowable adhesive bond loads for threaded rods in hollow core concrete panels^{1, 4, 5, 6}

Nominal anchor diameter in.	Effective embedment in. (mm) ²	Minimum concrete thickness in. (mm) ³	Tension lb (kN)	Shear lb (kN)
3/8	2 (50.8)	1-3/8 (34.9)	450 (2.0)	560 (2.5)

1 All values are for anchor installed in hollow core concrete with minimum compressive strength of 7,000 psi. Due to variations in materials and dimensional configurations, on-site testing is required to determine the actual performance of the anchor. Allowable loads are calculated using a safety factor of 5.

2 Tabulated embedment depth is limited by the length of the plastic HIT-SC 16x50 mm screens. See figure 11.

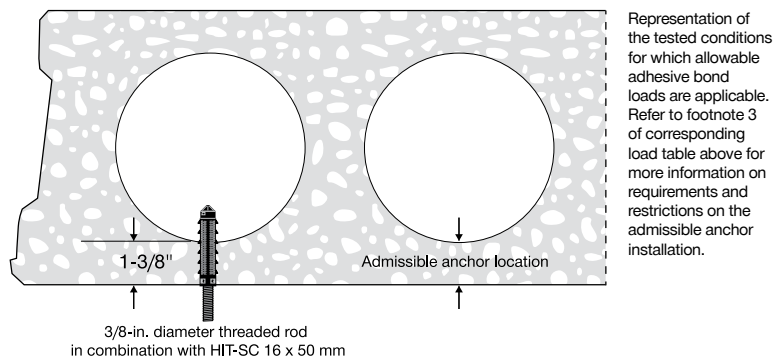
3 The required concrete thickness is the thickness for which values are available and installation is recommended. Anchors shall be installed along the centerline of the hollow core or along the line of minimum thickness. Verify these requirements with the hollow core plank supplier before installation. The required thickness is measured from the inner to the outer side of the hollow core panel. In case of deviation from the outlined requirements, field testing is required. See figure 11.

4 Tabulated allowable loads must be the lesser of the adjusted concrete or bond values tabulated and the steel values in table 4.

5 Tabulated allowable bond loads shall be adjusted for increased base material temperatures in accordance with figure 12.

6 The required adhesive gel and cure times shall be identical to the values adopted for masonry.

Figure 11 - Hilti HIT-HY 70 adhesive installed in hollow core concrete



Representation of the tested conditions for which allowable adhesive bond loads are applicable. Refer to footnote 3 of corresponding load table above for more information on requirements and restrictions on the admissible anchor installation.

HIT-HY 70 Hybrid for Masonry Construction 3.2.7

3.2.7.4 Installation instructions

Installation Instructions For Use (IFU) are included with each product package. They can also be viewed or downloaded online at www.us.hilti.com (US) and www.hilti.ca (Canada). Because of the possibility of changes, always verify that downloaded IFU 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 IFU.

Table 15 - Gel and full-cure time in masonry

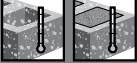



					
[°F]	[°C]		t _{work}		t _{cure}
23–32	-5... 0		10 min		6 h
33–41	1... 5		10 min		4 h
42–50	6... 10		7 min		2.5 h
51–68	11... 20		4 min		1.5 h
69–86	21... 30		2 min		30 min
87–104	31... 40		1 min		20 min

Table 16 - Gel and full-cure time in brick

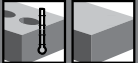



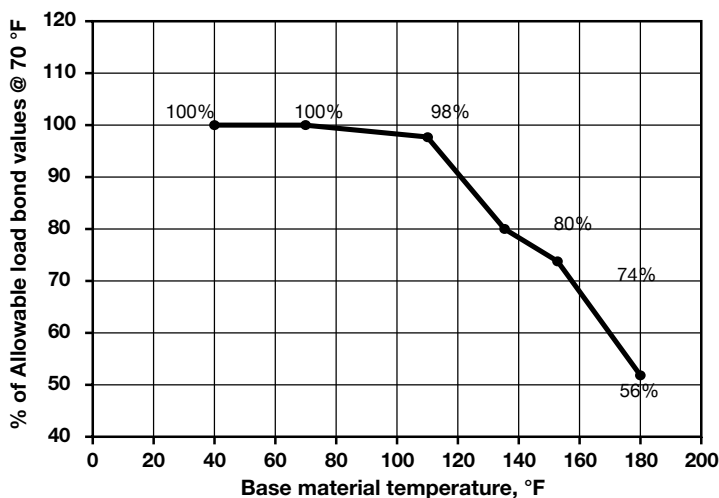
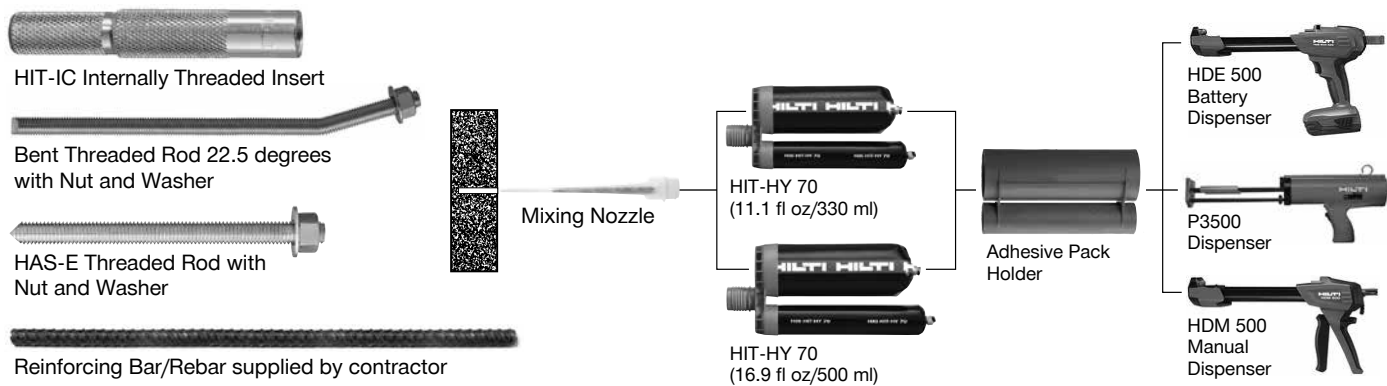
					
[°F]	[°C]		t _{work}		t _{cure}
41	5		10 min		4 h
42–50	6... 10		7 min		2.5 h
51–68	11... 20		4 min		1.5 h
69–86	21... 30		2 min		30 min
87–104	31... 40		1 min		20 min

Figure 12 — Influence of in-service temperature on bond strength



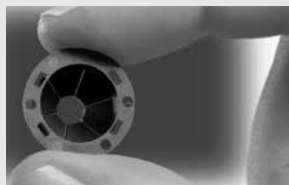
3.2.7 HIT-HY 70 Hybrid for Masonry Construction

3.2.7.5 Ordering information



Description	Package Contents	Qty of Foil Packs
HIT-HY 70 (11.1 fl oz/330 ml)	Includes (1) foil pack with (1) mixer and 3/8-in. filler tube per pack	1
HIT-HY 70 Master Carton (11.1 fl oz/330 ml)	Includes (1) master carton containing (25) foil packs with (1) mixer and 3/8-in. filler tube per pack	25
HIT-HY 70 Combo (11.1 oz/330ml)	Includes (1) master carton containing (20) foil packs with (1) mixer and 3/8-in. filler tube per pack and (1) HDM 500 manual dispenser	25
HIT-HY 70 Master Carton (16.9 fl oz/500 ml)	Includes (1) master carton containing (20) foil packs with (1) mixer and 3/8-in. filler tube per pack	20
HIT-HY 70 Combo (16.9 fl oz/500 ml)	Includes 2 master cartons containing (20) foil packs each with (1) mixer and 3/8-in. filler tube per pack and (1) HDM 500 manual dispenser	40
HIT-RE-M Static Mixer	For use with HIT-HY 70 cartridges	1

Customize the sleeve to the length of your application. Different embedment depths are created with minimal effort.



Step 1: Remove the centering ring of any screen tube within the cell.



Step 2: Pierce the tip of the screen tube with the rod intended to be used to check embedment depth.



Step 3: Combine screen tubes to desired length.

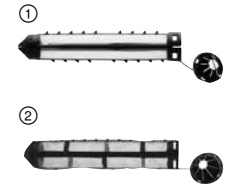
Brick with holes and hollow concrete block

Threaded Rod			Mesh Sleeve		Approximate fastenings per foil pack ¹	
Rod Size 5.8 Grade	Embedment, in.	Qty	Nominal Bit Dia., in.	Mesh Sleeve per Fastening	11.1 fl oz (330 ml)	16.9 fl oz (500 ml)
Plastic Sleeve (for #14 screw)	2	20	1/2	(1) HIT S-12/I	25	40
HAS B 1/4 x 3	2	20	1/2	(1) SC 12x50	25	40
HAS B 1/4 x 4-1/2	3-1/8	20	1/2	(1) SC 12x85	16	26
HAS B 5/16 x 3	2	20	5/8	(1) SC 16x50	16	26
HAS B 5/16 x 4-1/2	3-1/8	20	5/8	(1) SC 16x85	7	12
HAS-E 3/8 x 3	2	10	5/8	(1) SC 16x50	16	26
HAS-E 3/8 x 4-3/8	3-1/8	10	5/8	(1) SC 16x85	7	12
HAS-E 1/2 x 3-1/8	2	10	11/16	(1) SC 18x50	9	15
HAS-E 1/2 x 4-1/2	3-1/8	10	11/16	(1) SC 18x85	4	7

HIT-HY 70 Hybrid for Masonry Construction 3.2.7

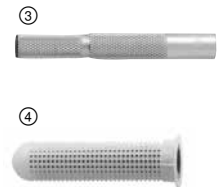
Composite mesh sleeves for hollow masonry and brick material

Description	For use with:	Qty	Actual Dia., in.	Length, in.	Bit Dia.
Mesh sleeve HIT-SC 12x50 ①	1/4 dia. rods	20	0.47	1.97	1/2
Mesh sleeve HIT-SC 12x85 ①	1/4 dia. rods	20	0.47	3.35	1/2
Mesh sleeve HIT-SC 16x50 ①	5/16, 3/8 dia. rods and 5/16 HIT-IC rods	20	0.63	1.97	5/8
Mesh sleeve HIT-SC 16x85 ①	5/16, 3/8 dia. rods and 5/16 HIT-IC rods	20	0.63	3.35	5/8
Mesh sleeve HIT-SC 18x50 ①	1/2 dia. rods	20	0.71	1.97	11/16
Mesh sleeve HIT-SC 18x85 ①	1/2 dia. rods	20	0.71	3.35	11/16
Mesh sleeve HIT-SC 22x50 ①	5/8 dia. rods, 3/8 and 1/2 HIT-IC rods	20	0.87	1.97	7/8
Mesh sleeve HIT-SC 22x85 ①	5/8 dia. rods, 3/8 and 1/2 HIT-IC rods	10	0.87	3.35	7/8
Mesh sleeve HIT-SC 26x125 ②	3/4 dia. rods	20	1.02	4.92	1
Mesh sleeve HIT-SC 26x200 ②	3/4 dia. rods	20	1.02	7.87	1



Internally threaded inserts for hollow masonry and brick material

Description	For use with:	Qty	Bit Dia., in.	Threads per inch
Internally Threaded HIT-IC 5/16 x 2	In hollow material use with HIT-SC 16 x 50	10	5/8	18
Internally Threaded HIT-IC 5/16 x 3-3/16 ③	In hollow material use with HIT-SC 16 x 85	10	5/8	18
Internally Threaded HIT-IC 3/8 x 2	In hollow material use with HIT-SC 22 x 50	10	7/8	16
Internally Threaded HIT-IC 3/8 x 3-3/16 ③	In hollow material use with HIT-SC 22 x 85	10	7/8	16
Internally Threaded HIT-IC 1/2 x 2	In hollow material use with HIT-SC 22 x 50	10	7/8	13
Internally Threaded HIT-IC 1/2 x 3-3/16 ③	In hollow material use with HIT-SC 22 x 85	10	7/8	13
HIT Combi-Insert HIT-S - 12/I ④	Plastic sleeve for #14 screw	20	1/2	-



Multi-wythe brick walls

Threaded Rod			Mesh Sleeve		Approximate fastenings per foil pack ¹	
Rod Size 5.8 Grade	Embedment, in.	Qty	Bit Diameter, in.	Mesh Sleeve per Fastening	11.1 fl oz (330 ml)	16.9 fl oz (500 ml)
HAS-E 3/8 x 5-1/8	4	20	5/8	(2) SC 16x50	15	24
HAS-E 3/8 x 8	6-3/4	10	5/8	(2) SC 16x85	9	14
HAS-E 3/8 x 12	10	10	5/8	(3) SC 16x85	5	9
HAS-E 1/2 x 8	6-3/4	10	11/16	(2) SC 18x85	7	11
HAS-E 1/2 x 12	10	10	11/16	(3) SC 18x85	4	7
HAS-E 5/8 x 8	6-3/4	20	7/8	(2) SC 22x85	4	7
HAS-E 5/8 x 12	10	10	7/8	(3) SC 22x85	2	4
HAS-E 3/4 x 10	8	10	1	(1) SC 26x200	2	4
HAS-E 3/4 x 14	13	10	1	(1) SC 26x200, (1) SC 26x125	1	2
HAS-E 3/4 x 17	15-3/4	10	1	(2) SC 26x200	1	2
HAS-E 3/4 x 19	18	10	1	(2) SC 26x125, (1) SC 26 x 200	1	2
HAS-E 3/4 x 25	23-1/2	10	1	(3) SC 26x200	0	1

3.2.7

Internally threaded inserts

Threaded Rod			Mesh Sleeve		Approximate fastenings per foil pack ¹	
Rod Size 5.8 Grade	Embedment, in.	Qty	Bit Diameter, in.	Mesh Sleeve per Fastening	11.1 fl oz (330 ml)	16.9 fl oz (500 ml)
Internally Threaded HIT-IC 5/16 x 2	2	10	5/8	(1) SC 16x50	16	26
Internally Threaded HIT-IC 5/16 x 3-3/16	3-1/4	10	5/8	(1) SC 16x85	7	12
Internally Threaded HIT-IC 3/8 x 2	2	10	7/8	(1) SC 22x50	9	15
Internally Threaded HIT-IC 3/8 x 3-3/16	3-1/4	10	7/8	(1) SC 22x85	4	7
Internally Threaded HIT-IC 1/2 x 2	2	10	7/8	(1) SC 22x50	9	15
Internally Threaded HIT-IC 1/2 x 3-3/16	3-1/4	10	7/8	(1) SC 22x85	4	7

¹ Assumes use with HDM 500 Manual Dispenser

Cleaning accessories

Hole Diameter	Round Brush Size use with HIT-RBH handle	Qty
1/2	HIT-RB 1/2	1
5/8	HIT-RB 5/8	1
11/16	HIT-RB 11/16	1
7/8	HIT-RB 7/8	1
1	HIT-RB 1	1

