



HILTI, INC.

HIT-HY 100 ADHESIVE ANCHORS FOR MASONRY

CSI Section: 04 05 19.16 Masonry Anchors

1.0 RECOGNITION

Hilti HIT-HY 100 adhesive anchors for masonry recognized in this report have been evaluated for anchoring building components to uncracked fully-grouted concrete masonry unit (CMU) construction. The structural performance properties of the HIT-HY 100 complies with the intent of the provisions of the following codes and regulations:

- 2015, 2012, 2009, and 2006 International Building Code® (IBC)
- 2015, 2012, 2009, and 2006 International Residential Code® (IRC)
- 2015, 2012 and 2009 International Existing Building Code® (IEBC)

2.0 LIMITATIONS

Use of the Hilti HIT-HY 100 recognized in this report is subject to the following limitations:

2.1 Hilti HIT-HY 100 shall be installed in accordance with the manufacturer's published installation instructions and this report. Where conflicts between this report and the published instructions occur, the more restrictive shall prevail.

2.2 Hilti HIT-HY 100 is recognized for use to resist short-term and long-term loads, including wind and seismic loads in accordance with Section 3.2.2 of this report.

2.3 Anchors shall be installed in uncracked fully-grouted CMU construction in holes predrilled with carbide-tipped drill bits complying with ANSI B212.15-1994.

2.4 Special inspection in accordance with Section 3.4 of this report shall be provided for all anchor installations.

2.5 Prior to installation, calculations and details demonstrating compliance with this report shall be submitted to the building official. Calculations and details shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

2.6 Since an IAPMO Uniform ES Evaluation Criteria for evaluating data to determine the performance of adhesive anchors subjected to fatigue or shock loading is unavailable at this time, the use of these anchors under these conditions is outside the scope of this report.

2.7 Hilti HIT-HY 100 may be used to resist tension and shear forces in wall installations only if consideration is given to the effects of elevated temperature conditions on anchor performance. [Figure 1](#) of this report describes load reduction factors for elevated temperatures.

2.8 Anchors are not permitted to support fire-resistive construction. Where not otherwise prohibited in the IBC, IRC, or IEBC, Hilti HIT-HY 100 is permitted for installation in fire-resistive construction provided at least one of the following conditions is fulfilled:

- Anchors are used to resist wind or seismic forces only.
- Anchors that support gravity load-bearing structural elements are within a fire-resistive envelope or a fire resistive membrane, are protected by approved fire-resistive materials, or have been evaluated for resistance to fire exposure in accordance with recognized standards.
- Anchors are used to support nonstructural elements.

2.9 Use of zinc-plated carbon steel threaded rods is limited to dry, interior locations. Installations exposed to severe, moderate or negligible exterior weathering conditions, as defined in [Figure 1](#) of [ASTM C62](#) (IBC or IRC), are permitted where stainless steel or zinc-coated anchors are used. Zinc coating shall be either hot-dipped in accordance with [ASTM A153](#) with a Class C or D coating weight or mechanically deposited in accordance with [ASTM B695](#) with a Class 65 coating having a minimum thickness of 2.1 mils (0.533 mm).

2.10 Adhesive anchors are not permitted for overhead installations.

2.11 Hilti HIT-HY 100 shall be installed in masonry having internal base material temperatures between 14°F (-10°C) and 104°F (40°C) at the time of anchor installation. Installation of anchors in base material having internal temperatures outside of this range is outside the scope of this report.

2.12 Since an IAPMO Uniform ES Evaluation Criteria for evaluating the performance of adhesive anchors in cracked masonry is unavailable at this time, the use of the anchors is limited to installation in uncracked masonry. Cracking occurs when $f_i > f_c$ due to service loads or deformations.

2.13 When anchors are located where the internal masonry temperature may exceed 70°F (21°C) in service, allowable loads in this report shall be adjusted for in-service temperatures in accordance with [Figure 1](#) of this report. Use of Hilti HIT-HY 100 in base materials having interior temperatures exceeding 180°F (82°C) in service is outside the scope of this report.



2.14 Steel anchoring materials in contact with preservative-treated and fire-retardant-treated wood shall be zinc-coated steel or stainless steel. Coating weights for zinc-coated steel shall be in accordance with [ASTM A153](#) Class C or D.

2.15 Hilti HIT-HY 100 is manufactured and packaged into cartridges by Hilti GmbH, in Kaufering, Germany.

3.0 PRODUCT USE

3.1 General: Hilti HIT-HY 100 adhesive anchor system is used for anchoring building components to fully-grouted CMU construction. Threaded steel rods installed with HIT-HY 100 adhesive resist dead, live, seismic, and wind loads, as noted in Section 3.2 of this evaluation report. The anchor system is an alternative to Section 8.1.3, 2013 edition, or Section 2.1.4, 2011, 2008 or 2005 editions, of [TMS 402/ACI 530/ASCE 5](#) as referenced in Section 2107.1 of the IBC. Anchors may also be used where an engineered design is submitted in accordance with Section R301.1.3 of the IRC. Anchors may be used under the IEBC subject to provisions corresponding to classification of the work.

3.2 Design

3.2.1 General: Anchor capacities in this report are allowable load values for use in allowable stress design as set forth in Section 2107 of the IBC. For use under the IRC, an engineered design in accordance with IRC Section R301.1.3 shall be submitted to the code official for approval. For use under the IEBC, the anchor design shall comply with specific requirements for the classification of the work.

Allowable tension and shear loads noted in this report shall be adjusted for in-service base-material temperatures in accordance with [Figure 1](#) of this report for anchors installed and cured in base materials having a temperature of 14°F (-10°C) and above. Anchors installed or cured at temperatures below 14°F (-10°C) or above 104°F (40°C) are outside the scope of this report.

Allowable loads in [Tables 3, 4, or 5](#) of this report for anchors subjected to combined tension and shear forces shall be determined by the following equation:

$$\left(\frac{P_s}{P_t}\right) + \left(\frac{V_s}{V_t}\right) \leq 1.0$$

where:

- P_s = Applied tension load.
- P_t = Allowable tension load.
- V_s = Applied shear load.
- V_t = Allowable shear load.

Allowable loads in [Table 7](#) of this report for anchors subjected to combined tension and shear forces shall be determined in accordance with AISC 360 Section J3.7.

3.2.2 Design of Anchors in Grout-filled CMU Walls

3.2.2.1 General: For installations in fully grouted CMU construction, anchors are permitted to resist dead, live, wind, and seismic load applications. When using the basic load combinations in accordance with IBC Section 1605.3.1, allowable loads are not permitted to be increased for seismic or wind loading. When using the alternative basic load combinations in 2006 and 2009 IBC Section 1605.3.2 that include seismic or wind loads, the allowable tension and shear loads for anchors are permitted to be increased by 33-1/3 percent, or the alternative basic load combinations may be reduced by a factor of 0.75. When using the alternative basic load combinations in 2015 and 2012 IBC Section 1605.3.2 that include seismic or wind loads, no adjustments are permitted.

3.2.2.2 Threaded Steel Rod Installed in the Vertical Face of Fully-Grouted CMU Walls (Resisting Dead, Live, Wind, and Seismic Load Applications): [Table 3](#) and [Table 4](#) specify allowable tension and shear values for 3/8-, 1/2-, 5/8-, and 3/4-inch (9.5, 12.7, 15.9, and 19.1 mm)-diameter threaded rod installed in the face of the fully-grouted CMU wall construction (face shell, web and bed joint, as shown in [Figure 2](#) of this report), for anchors designed to resist dead, live, wind, and seismic load applications. Edge and end distances, spacing requirements and allowable load reduction factors are noted in [Table 3](#) and [Table 4](#) of this report. The allowable load shall be the lesser of bond values given in [Table 3](#) and [Table 4](#) and steel rod values given in [Table 7](#) of this report.

3.3 Installation:

3.3.1 Installation General: Anchors shall be installed in accordance with the manufacturer’s printed installation instructions (MPII) and the requirements of this report. Where conflicts between this report and the MPII occur, the more restrictive shall prevail. Anchors shall not be installed until the base material has reached its minimum specified compressive strength set forth in Section 4.2.5 of this report. Drilled hole diameter, embedment depth, spacing, edge distance and base material shall comply with the requirements in this report. Anchor locations shall comply with approved construction documents.

Anchors installed or cured in masonry at temperatures below 14°F (-10°C) or above 104°F (40°C) are outside the scope of this report. The gel and cure times are shown in [Table 1](#) of this report. After installation into the hole, the anchor shall be undisturbed during the gel time and shall be allowed to fully cure before building components are attached.

3.3.2 Installation in Fully-Grouted CMU walls: Anchor holes shall be drilled into the CMU wall to a predetermined depth, using an electro-pneumatic rotary hammer drill, in “rotation plus hammer” mode, having a carbide-tipped drill



bit conforming to [ANSI B212.15-1994](#). Anchor holes shall be cleaned of dust and debris by blowing using oil-free compressed air (2 x blowing with 90 psi (620 kPa) at 3.5 cfm (0.1 m³/min)), brushing with a Hilti HIT-RB wire brush (2 x brushing) and again blowing with oil-free compressed air (2 x blowing with 90 psi (620 kPa) at 3.5 cfm (0.1 m³/min)) to achieve a relatively dust-free wall surface. During installation, the holes may be dry or damp, but shall not contain any water at the time of anchor installation.

A clean, static-mixing nozzle shall be attached to the HIT-HY 100 adhesive cartridge. The dual cartridge is self-opening; the adhesive is dispensed through an injection nozzle. Prior to injection of the adhesive into the anchor hole, an initial amount of adhesive, depending on the size of the foil pack, shall be dispensed through the nozzle. Adhesive from the first two (11.1 fl. oz. / 330 ml foil pack) or the first three (16.9 fl. oz. / 500 ml foil pack) or four for an adhesive temperature < 41°F / 5°C “trigger pulls” shall be discarded to ensure that only properly mixed adhesives are used. If a new mixer is installed onto a previously-opened foil pack, the first trigger pulls shall also be discarded as described above. For each new foil pack a new mixer shall be used.

Adhesive shall be injected into the hole, starting at the bottom (use extension for deep holes), slowly withdraw the mixer with each trigger pull, until the hole is approximately two-thirds full. Anchor rods shall be free of oil, scale, and rust, and shall be inserted into the hole to the required embedment depth. As a minimum, the adhesive shall be flush with the CMU wall surface after insertion of the anchor.

For installations of anchors in the face or top of the fully-grouted CMU construction (face shell, web and bed joint), anchor location shall comply with the critical and minimum edge and end distances and the critical and minimum spacing noted in [Tables 3, 4, and 5](#) of this report and shown in [Figures 2 and 3](#) of this report.

Threaded rods shall not be bent after installation except as set forth in Section 26.6.3.1 of [ACI 318-14](#) and Section 7.3.2 of [ACI 318-11, -08, and -05](#), with the additional condition that the rods be bent cold, and heating of threaded rods to facilitate field bending is not permitted.

3.4 Special Inspection

3.4.1 IBC and IRC: For the IBC and IRC, adhesive anchors shall be installed with special inspection in accordance with Sections 1704 and 1705 of the IBC. A statement of special inspections complying with Section 1704.3 of the 2015 or 2012 IBC or Section 1705 of the 2006 and 2009 IBC shall be prepared and submitted. An approved special inspector shall furnish the building official and the registered design professional in responsible charge with an inspection report that includes the following:

1. Anchor description, including the adhesive product name and expiration date, anchor steel type, grade, and cleanliness condition, nominal anchor diameter and length.
2. Drilled hole description, including verification of drill bit compliance with [ANSI B212.15-1994](#), hole diameter, location, depth and cleanliness.
3. Installation description including verification of masonry compressive strength, verification of anchor installation location (spacing and edge distance), installation temperature, gel time and cure time, and general installation requirements in accordance with the manufacturer’s published installation instructions and this report.

3.4.2 IEBC: Adhesive anchors shall be installed with periodic inspection, and direct-tension tests and torque tests shall be done in accordance with Sections A107.4 and A107.5 (2015 IEBC) or Section A107.4 (2012, 2009, and 2006 IEBC), as applicable. A statement of special inspections complying with Section 1704.3 of the IBC indicating the schedule for the periodic inspections shall be prepared and submitted. The inspection report shall contain the information specified in Section 3.4.1 of this report. In lieu of testing and periodic special inspection, the IEBC permits continuous special inspection during installation of bolts resisting shear forces only.

4.0 PRODUCT DESCRIPTION

4.1 Product information: Hilti HIT-HY 100 adhesive system is comprised of the following components:

- HIT-HY 100 adhesive packaged in foil packs
 - Adhesive mixing and dispensing equipment
 - Equipment for hole cleaning and adhesive injection
- HIT-HY 100 adhesive is used with continuously threaded steel rods. Installation information and parameters are included with each adhesive unit package.

4.2 Material information

4.2.1 HIT-HY 100 adhesive: HIT-HY 100 adhesive is an injectable hybrid adhesive combining resin, hardener, cement and water. The resin and cement are kept separate from the hardener and water by means of a dual-cylinder foil pack attached to a manifold. The two components combine and react when dispensed through a static mixing nozzle attached to the manifold. The shelf life, as indicated by the expiration date, applies to unopened foil packs that are stored at temperatures between 41°F and 77°F (5°C and 25°C). HIT-HY 100 is available in 11.1 ounce (330 mL) and 16.9 ounce (500 mL) foil packs.

4.2.2 Dispensing Equipment: Hilti HIT-HY 100 adhesive shall be dispensed with manual or electric dispensers provided by Hilti.

4.2.3 Equipment for Hole Preparation: Hole cleaning equipment consists of hole-cleaning brushes and air nozzles.



Brushes shall be Hilti HIT-RB hole cleaning brushes. Air nozzles shall be equipped with an extension capable of reaching the bottom of the drilled hole.

4.2.4. Threaded Steel Rods: Threaded anchor rods, having diameters from 3/8 inch to 3/4 inch (9.5 mm to 19.1 mm), shall be carbon steel or stainless steel with steel design information for common grades of threaded rod provided in [Table 6 of this report](#). Threaded rods shall be clean, straight and free of indentations or other defects along their lengths.

4.2.5 Fully-Grouted CMU Construction: Compressive strength of masonry, f'_m , at 28 days shall be a minimum of 1,500 psi (10.3 MPa). Fully grouted CMU walls shall be constructed from the following materials:

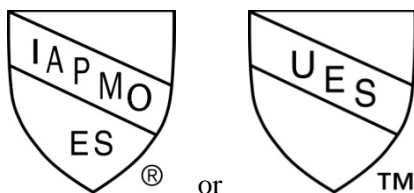
4.2.5.1 Concrete Masonry Units (CMU): CMU shall be closed-end minimum lightweight, medium-weight, or normal-weight concrete masonry conforming to [ASTM C90](#). Minimum allowable nominal size of CMU shall be 8 inches (203 mm) wide by 8 inches (203 mm) high by 16 inches (406 mm) long (i.e., 8x8x16) for threaded rod installed with HIT-HY 100 adhesive in the face or top of the masonry wall construction. [Tables 3, 4, and 5](#), and [Figures 2 and 3](#) of this report provide more details.

4.2.5.2 Grout: Grout shall comply with IBC Section [2103](#) or IRC Section R606 (2015 IRC) or R609 (2012, 2009, and 2006 IRC), as applicable. Alternatively, the grout shall have a minimum compressive strength equal to its specified strength, but not less than 2,000 psi (13.8 MPa) when tested in accordance with [ASTM C1019](#).

4.2.5.3 Mortar: Mortar shall be Type N (minimum) in accordance with IBC Section 2103 or IRC Section R606 (2015 IRC) or R607 (2012, 2009, or 2006 IRC), as applicable. Mortar shall have a minimum compressive strength of 1,500 psi (10.3 MPa).

5.0 IDENTIFICATION

Hilti HIT-HY 100 is identified by the foil pack and packaging bearing the company name (Hilti), the product name (HIT-HY 100), the batch number, the expiration date, and evaluation report number (ER-547). The identification includes the IAPMO Uniform Evaluation Service Mark of Conformity. Either Mark of Conformity may be used as shown below:



IAPMO UES ER-547

6.0 SUBSTANTIATING DATA

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Adhesive Anchors in Masonry Elements (AC58), approved November 2015 including the following test series: effects of edge distance on tension performance (Test Series 4 and 5); effects of spacing on tension performance (Test Series 8 and 9); effects of edge distance on shear performance (Test Series 13 and 14); sustained load / creep (Test Series 17); in-service temperature testing (Test Series 18); dampness (Test Series 19) freeze/thaw (Test Series 20); and seismic investigations in fully-grouted CMU construction (Test Series 21).

6.2 A quality control manual.

7.0 CONTACT INFORMATION

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8.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research carried out by IAPMO Uniform Evaluation Service on Hilti HIT-HY 100 to assess conformance to the codes shown in Section 1.0 of this report and serves as documentation of the product certification. Products are manufactured at locations noted in Section 2.15 of this report under a quality control program with periodic inspection under the supervision of IAPMO UES.

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For additional information about this evaluation report please visit www.uniform-es.org or email us at info@uniform-es.org



TABLE 1 - HIT-HY 100 GEL (WORKING) AND CURE TIMES


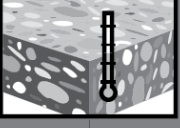


				
°C		°F	 t _{work}	 t _{cure}
-10...-5		14...22	3 h	12 h
-4...0		23...31	40 min	4 h
1...5		32...40	20 min	2 h
6...10		41...50	8 min	60 min
11...20		51...68	8 min	60 min
21...30		69...86	5 min	30 min
31...40		87...104	2 min	30 min

TABLE 2 – ALTERNATIVE BASIC LOAD COMBINATION ADJUSTMENT FACTORS^{1,2,3}

Steel type	Modification factors			
	Reductions for alternative basic load combinations		Increase factor for allowable loads for short-term loading conditions	
	Tension	Shear	Tension	Shear
Standard threaded rods	0.75	0.75	1.33	1.33
High-strength rods	0.75	1.00	1.33	1.00
Stainless rods	0.75	0.87	1.33	1.14

¹ When using the basic load combinations in accordance with IBC Section 1605.3.1, allowable loads shall not be increased for wind or seismic loading.

² When using the alternative basic load combinations in the 2009 or 2006 IBC Section 1605.3.2 that include wind or seismic loads, the allowable loads for anchors may be increased by the tabulated factors found in the right half of the table. Alternatively, the alternate basic load combinations may be reduced by multiplying them by the reduction factors found in the left half of the table. For example, for stainless steel rods in shear, the alternate basic loads for wind or seismic may be multiplied by 0.87 for shear loading or divided by 1.14 (1/1.14 = 0.87), as applicable. For the 2015 and 2012 IBC, the allowable loads or load combinations shall not be adjusted.

³ The above modification factors are applicable under the 2009 or 2006 IBC only, for [Tables 3, 4, 5,](#) and [7](#) of this report for seismic and wind loads.



TABLE 3 – ALLOWABLE TENSION LOADS FOR THREADED RODS INSTALLED WITH HIT-HY 100 ADHESIVE IN THE FACE OF FULLY-GROUTED CMU CONSTRUCTION ^{1, 2, 3, 4, 5, 6, 7, 8}

Nominal anchor diameter d_a in.	Embedment depth ⁹ h_{ef} in. (mm)	Allowable service tension load P_t lb (kN)	Spacing			Edge distance		
			Critical spacing ^{10,11} S_{cr} in. (mm)	Minimum spacing ^{10,11} S_{min} in. (mm)	Load ¹⁰ reduction factor at S_{min}	Critical edge dist. ^{10,11} C_{cr} in. (mm)	Minimum edge distance ^{10,11} C_{min} in. (mm)	Load reduction factor at ¹⁰ C_{min}
3/8	3-3/8 (86)	950 (4.2)	8 (203)	4 (102)	0.70	20 (508)	4 (102)	0.93
1/2	4-1/2 (114)	1,265 (5.6)	8 (203)	4 (102)	0.70	20 (508)	4 (102)	0.83
5/8	5-5/8 (143)	1,850 (8.2)	8 (203)	4 (102)	0.70	20 (508)	4 (102)	0.74
3/4	6-3/4 (171)	2,440 (10.9)	8 (203)	4 (102)	0.70	20 (508)	4 (102)	0.65

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

TABLE 4 – ALLOWABLE SHEAR LOADS FOR THREADED RODS INSTALLED WITH HIT-HY 100 ADHESIVE IN THE FACE OF FULLY-GROUTED CMU CONSTRUCTION ^{1, 2, 3, 4, 5, 6, 7, 8}

Nominal anchor diameter d_a in.	Embedment depth ⁹ h_{ef} in. (mm)	Allowable service shear load V_t lb (kN)	Spacing			Edge distance		
			Critical spacing ^{10, 11} S_{cr} in. (mm)	Minimum spacing ^{10, 11} S_{min} in. (mm)	Load reduction factor ¹⁰ at S_{min}	Critical edge dist. ^{10, 11} C_{cr} in. (mm)	Minimum edge dist. ^{10, 11} C_{min} in. (mm)	Load reduction factor ¹⁰ at C_{min}
3/8	3-3/8 (86)	1,135 (5.0)	8 (203)	4 (102)	0.70	20 (508)	4 (102)	1.00
1/2	4-1/2 (114)	1,870 (8.3)	8 (203)	4 (102)	0.70	20 (508)	4 (102)	0.93
5/8	5-5/8 (143)	2,590 (11.5)	8 (203)	4 (102)	0.70	20 (508)	4 (102)	0.82
3/4	6-3/4 (171)	2,785 (12.4)	8 (203)	4 (102)	0.70	20 (508)	4 (102)	0.79

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

The following footnotes apply to both [Tables 3](#) and [4](#):

¹ Anchors may be installed in any location in the face of the masonry wall (cell, bed joint, or web) as shown in [Figure 2](#) of this report, except anchors shall not be installed in or within 1 inch of a head joint.

² Anchors are limited to one per masonry cell. Anchors in adjacent cells may be spaced apart as close as 4 inches as shown in Table 3 or 4.

³ Allowable load values are for use in fully-grouted CMU construction complying with Section 4.2.4 of this report.

⁴ Concrete masonry thickness shall be minimum nominally 8-inch thick.

⁵ The tabulated allowable loads have been calculated based on a safety factor of 5.0 or greater.

⁶ Allowable loads shall be the lesser of the adjusted masonry or bond values tabulated above and the steel values given in [Table 7](#) of this report.

⁷ Allowable loads shall be adjusted for increased base material temperatures in accordance with [Figure 1](#) of this report, as applicable.

⁸ When using the basic load combinations in accordance with IBC Section 1605.3.1, tabulated allowable loads shall not be increased for seismic or wind loading. When using the alternative basic load combinations in the 2009 or 2006 IBC Section 1605.3.2 that include seismic or wind loads, tabulated allowable loads may be adjusted in accordance with Section 3.2.2.1 and [Table 2](#) of this report.

⁹ Embedment depth is measured from the outside face of the masonry wall.

¹⁰ Load values for anchors installed at less than critical spacing (S_{cr}) and critical edge distance (C_{cr}) shall be multiplied by the appropriate load reduction factor based on actual edge distance (c) or spacing (s). Linear interpolation of load values between minimum spacing (S_{min}) and S_{cr} and between minimum edge distance (C_{min}) and C_{cr} is permitted. Load reduction factors are multiplicative; both spacing and edge distance load reduction factors shall be considered.

¹¹ [Figure 2](#) of this report illustrates the critical and minimum edge distances.



TABLE 5 – ALLOWABLE TENSION AND SHEAR LOADS FOR THREADED RODS INSTALLED WITH HIT-HY 100 ADHESIVE IN THE TOP OF FULLY-GROUTED CMU CONSTRUCTION ^{1, 2, 3, 4, 5, 6, 7, 8, 9}

Nominal anchor diameter d_a in.	Embedment depth ¹⁰ h_{ef} in. (mm)		Minimum edge distance c_{min} in. (mm)		Allowable service tension load P_t lb (kN)		Allowable service shear load			
							Load applied perpendicular to edge $V_{t, \perp}$ lb (kN)		Load applied parallel to edge $V_{t, //}$ lb (kN)	
1/2	4-1/2	(114)	1-3/4	(44)	1,095	(4.9)	295	(1.3)	815	(3.6)
5/8	5-5/8	(143)	1-3/4	(44)	1,240	(5.5)	400	(1.8)	965	(4.3)

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

¹ Loads in this table are for threaded rods in the top of fully-grouted CMU construction at a minimum edge distance shown in this table. Anchors shall not be installed in or within 1 inch of a head joint. Capacity of attached sill plate or other material to resist loads in this table shall comply with the applicable code.

² Anchors are limited to one per masonry cell. Anchors in adjacent cells may be spaced apart as close as 4 inches with a load reduction of 30 percent. For anchors in adjacent cells spaced apart between 4 inches (s_{min}) and 8 inches (s_{cr}) use linear interpolation.

³ End distances to end of wall shall be equal to or greater than 2.0 times the anchor embedment depth.

⁴ Allowable load values are for use in fully-grouted CMU construction complying with Section 4.2.4 of this report.

⁵ Concrete masonry thickness shall be minimum nominally 8-inch thick.

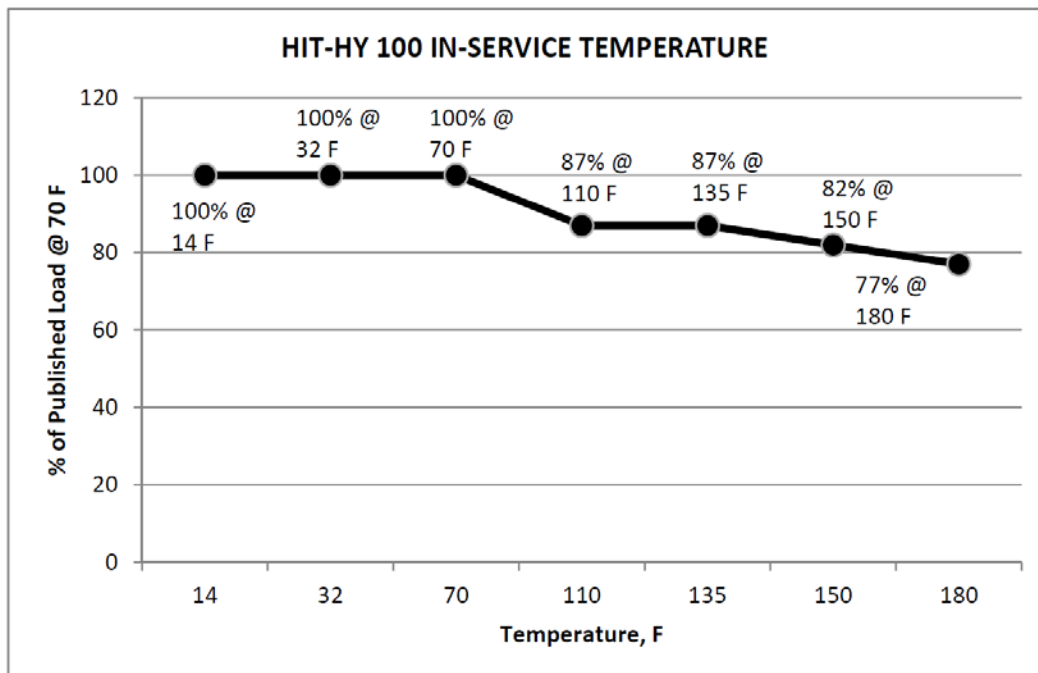
⁶ The tabulated allowable loads have been calculated based on a safety factor of 5.0.

⁷ Allowable loads shall be the lesser of the adjusted masonry or bond values tabulated above and the steel values given in [Table 7](#) of this report.

⁸ Allowable loads shall be adjusted for increased base material temperatures in accordance with [Figure 1](#) of this report, as applicable.

⁹ When using the basic load combinations in accordance with IBC Section 1605.3.1, tabulated allowable loads shall not be increased for seismic or wind loading. When using the alternative basic load combinations in the 2009 or 2006 IBC Section 1605.3.2 that include seismic or wind loads, tabulated allowable loads may be adjusted in accordance with Section 3.2.2.1 and [Table 2](#) of this report.

¹⁰ Embedment depth is measured from the top surface of the masonry wall.



For SI: $t\text{ }^{\circ}\text{C} = (\text{ }^{\circ}\text{F} - 32) \div 1.8$

FIGURE 1 – INFLUENCE OF BASE-MATERIAL TEMPERATURE ON ALLOWABLE TENSION AND SHEAR LOADS FOR HIT-HY 100



TABLE 6 – SPECIFICATIONS AND PHYSICAL PROPERTIES OF COMMON CARBON AND STAINLESS STEEL THREADED ROD MATERIALS

Description	Specification	Minimum specified yield strength		Minimum specified ultimate strength		Nut specification
		f_y		f_u		
		ksi	(Mpa)	ksi	(Mpa)	
Standard threaded rod ¹	ASTM A307 Grade A	37.5	(259)	60.0	(414)	SAE J995 Grade 5
	ISO 898-1 Class 5.8	58.0	(400)	72.5	(500)	SAE J995 Grade 5
	ASTM F1554 Gr. 36	36.0	(248)	58.0	(400)	ASTM A194 or ASTM A563
	ASTM F1554 Gr. 55	55.0	(379)	75.0	(517)	
High strength rod ¹	ASTM F1554 Gr. 105	105.0	(724)	125.0	(862)	ASTM A194 or ASTM A563
	ASTM A193 B7	105.0	(724)	125.0	(862)	
Stainless steel rod AISI 304 / 316	3/8-in. to 5/8-in. ASTM F593 CW1	65.0	(448)	100.0	(690)	ASTM F594
	3/4-in. ASTM F593 CW2	45.0	(310)	85.0	(586)	

For SI: 1 inch = 25.4 mm, 1 ksi = 6.89 MPa.

¹ The rods are normally zinc-plated. For exterior use or damp applications, stainless steel or hot-dipped galvanized carbon steel rods with a zinc coating complying with ASTM A153 shall be used.

TABLE 7 – ALLOWABLE TENSION AND SHEAR LOADS FOR THREADED RODS BASED ON STEEL STRENGTH ¹

Nominal anchor diameter in.	ASTM A307 Grade A		ISO 898 Class 5.8		ASTM F1554 Gr. 36 ²		ASTM F1554 Gr. 55 ²		ASTM A193 B7 and ASTM F1554 Gr. 105 ²		AISI 304/316 SS ASTM F 593 CW1 and CW2	
	Tensile lb (kN)	Shear lb (kN)	Tensile lb (kN)	Shear lb (kN)	Tensile lb (kN)	Shear lb (kN)	Tensile lb (kN)	Shear lb (kN)	Tensile lb (kN)	Shear lb (kN)	Tensile lb (kN)	Shear lb (kN)
3/8	2,185 (9.7)	1,125 (5.0)	2,640 (11.7)	1,360 (6.0)	2,115 (9.4)	1,090 (4.8)	2,730 (12.1)	1,410 (6.3)	4,555 (20.3)	2,345 (10.4)	3,645 (16.2)	1,875 (8.3)
1/2	3,885 (17.3)	2,000 (8.9)	4,695 (20.9)	2,420 (10.8)	3,755 (16.7)	1,935 (8.6)	4,860 (21.6)	2,505 (11.1)	8,095 (36.0)	4,170 (18.5)	6,480 (28.8)	3,335 (14.8)
5/8	6,075 (27.0)	3,130 (13.9)	7,340 (32.6)	3,780 (16.8)	5,870 (26.1)	3,025 (13.5)	7,595 (33.8)	3,910 (17.4)	12,655 (56.3)	6,520 (29.0)	10,125 (45.0)	5,215 (23.2)
3/4	8,750 (38.9)	4,505 (20.0)	10,570 (47.0)	5,445 (24.2)	8,455 (37.6)	4,355 (19.4)	10,935 (48.6)	5,635 (25.1)	18,225 (81.1)	9,390 (41.8)	12,390 (55.1)	6,385 (28.4)

For SI: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

¹ Steel strength complies with AISC 360 (ASD):

Tensile = 0.33 x F_u x Nominal Area

Shear = 0.17 x F_u x Nominal Area (threads not excluded from the shear plane)

² 3/8-inch diameter threaded rods are not included in the ASTM F1554 standard. Values are provided in the table for illustration purposes only based on the nominal area of the 3/8-inch diameter rod and ASTM F1554 steel tensile strength.

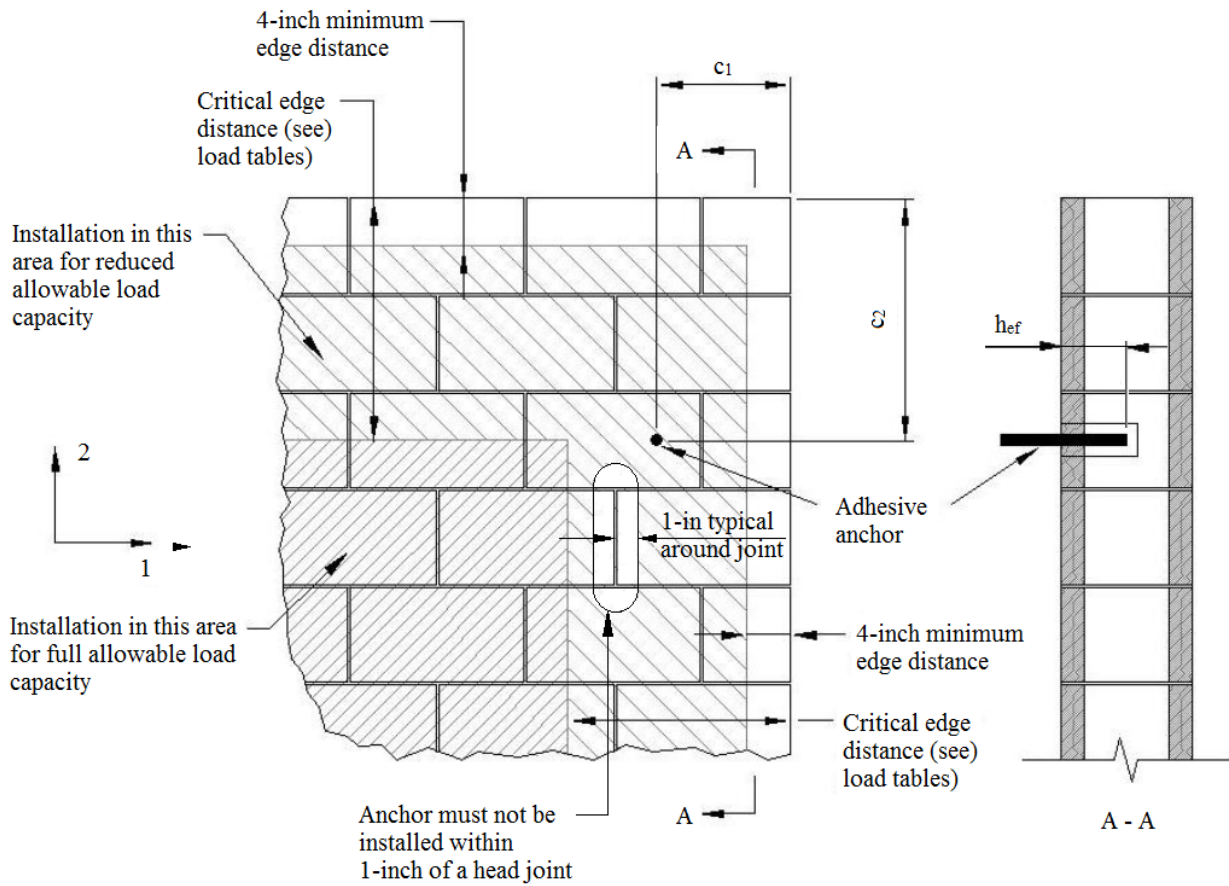


FIGURE 2 – ALLOWABLE ANCHOR INSTALLATION LOCATIONS IN THE FACE OF FULLY GROUTED CMU CONSTRUCTION

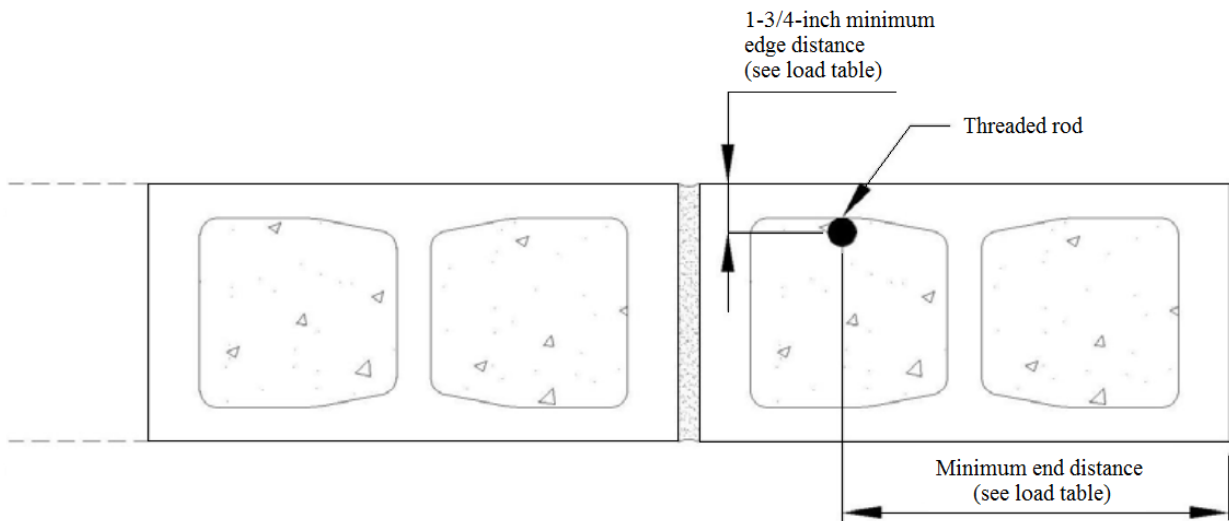


FIGURE 3 – ALLOWABLE ANCHOR INSTALLATION LOCATIONS IN THE TOP OF FULLY-GROUTED CMU CONSTRUCTION