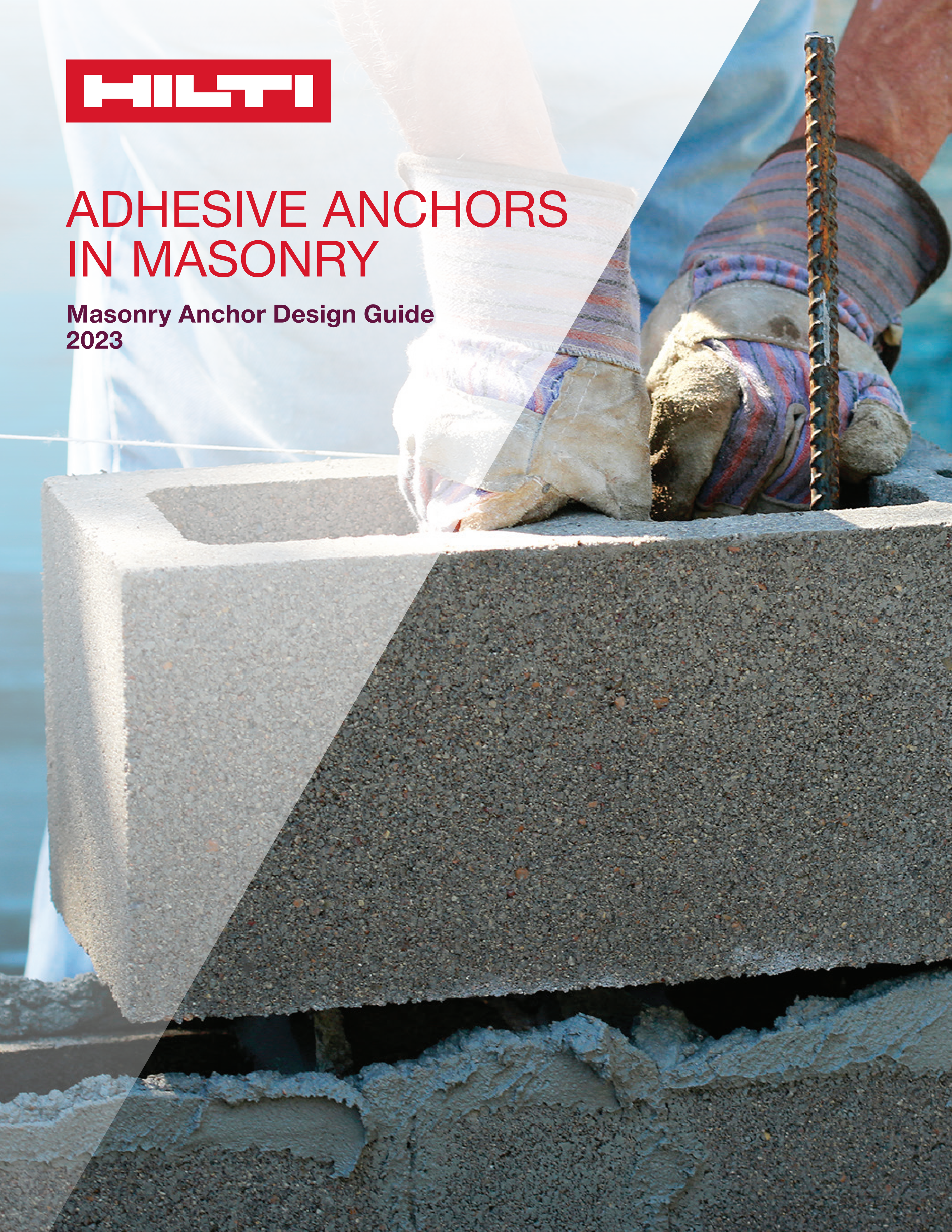
HILTI

ADHESIVE ANCHORS IN MASONRY

Masonry Anchor Design Guide 2023



1.0 WHAT IS CHANGING?

For many years, post-installed adhesive and mechanical anchors have been utilized for fastenings into masonry base materials. While the relevant model design codes (i.e., ACI and CSA) for post-installed anchors into concrete base materials have evolved, the relevant model design codes for post-installed anchors into masonry base materials have remained unchanged for decades. In recent years, testing and evaluation criteria for post-installed mechanical and adhesive anchors in masonry base materials have been based on three International Code Council Evaluation Services (ICC-ES) Acceptance Criteria: AC01 for Expansion Anchors in Masonry Elements, AC106 for Predrilled Fasteners (Screw Anchors) in Masonry Elements, and AC58 for Adhesive Anchors in Masonry Elements. In 2020, these three criteria were considerably revised with a compliance date of April 15th, 2023, assigned to adhesive anchors and February 16th, 2024, assigned to mechanical anchors. Some of the changes include but are not limited to:

- The consolidation of AC106 into AC01 to create one Acceptance Criteria for all mechanical anchors installed into masonry base materials.
- The clarification of the types of masonry systems included in AC01 and AC58 such as: fully grouted concrete masonry units (CMU), partially grouted CMU, ungrouted CMU, and clay brick.
- The adoption and adaptation of ACI 318's Concrete Capacity Design (CCD) method for the design of post-installed anchors into masonry base materials.
- The inclusion of cracked masonry testing and evaluation.

The Masonry Anchor Design Guide is intended to present these industry changes to post-installation of adhesive and mechanical anchors into masonry base materials in a simplified and easy-to-understand format. The guide will start with discussion on common masonry definitions as well as the updated clarification of the types of masonry systems. The design of post-installed anchors into masonry base materials will closely mirror the design of post-installed anchors into concrete base materials per ACI 318 Chapter 17. The guide will discuss the similarities and the differences between concrete and masonry design. Additionally, common design considerations and design examples will be shown to demonstrate the overall design process.

Following the discussion on the changes to the testing and evaluation criteria, the Masonry Anchor Design Guide will provide technical data for the various Hilti adhesive post-installed anchors approved for anchoring into masonry base materials, which can be utilized for design. Technical data for mechanical anchors (e.g., KB-TZ2, KH-EZ) will continue to be found in Hilti North America's Anchor Product Technical Guide (Anchor PTG) under the ASD design method until the compliance date of AC01. Additionally, Hilt's PROFIS Engineering software can be utilized for post-installed masonry design.

2.0 WHAT IS MASONRY?

Masonry is a heterogeneous building material usually consisting of concrete masonry units (CMU) or clay brick bonded together using joint mortar. The primary application for masonry is the construction of walls, which are built by placing masonry components in horizontal rows (courses) and/or vertical rows (wythes). The horizontal mortar joint between two courses of masonry units is referred to as the bed joint. The vertical mortar joint between two masonry units in the same course and wythe is referred to as the head joint. The head joint in CMU construction employing closed-ended units (e.g., hollow concrete block) is referred to as a hollow head joint. The head joint in CMU construction employing open-ended units (Including lintel or bond beam) will allow grout to be placed in the head joint area and is referred to as a solid head joint.

Masonry components can be manufactured in a wide variety of shapes, sizes, materials, and both hollow and solid configurations. These variations require that the selection of an anchoring system be carefully matched to the application and type of masonry material being used. As a base material, masonry typically has a much lower strength than concrete. The behavior of the masonry components, as well as the geometry of their cavities and webs, has a considerable influence on the load capacity of the fastening.

When drilling holes for anchors in masonry with hollow cavities, care must be taken to avoid spalling on the inside of the face shell. This could greatly affect the performance of "toggle" type mechanical anchors whose length must be matched to the face shell thickness. To reduce the potential for spalling, unless otherwise specified, holes should be drilled with hammer drills set in rotation only mode (i.e., hammering action of the drill turned off).

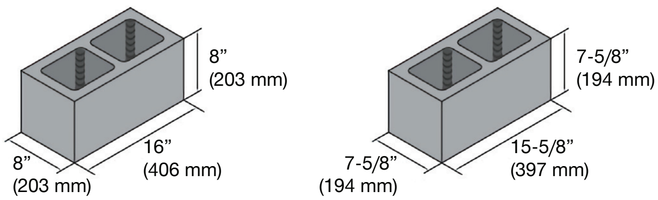
CONCRETE BLOCK

Concrete block is the term commonly used to refer to concrete masonry units (CMU) made from Portland cement, water, and mineral aggregates. CMU blocks are manufactured in a variety of shapes and sizes using light, medium, and normal weight aggregates. Both hollow and solid load bearing CMUs are manufactured in accordance with ASTM C90.

CMU sizes generally refer to the nominal width of the unit (e.g., 6", 8", 10", etc.). Actual dimensions are nominal dimensions reduced by the thickness of the mortar joint.

Nominal width of unit in. (mm)	Minimum face-shell thickness in. (mm)	Minimum web thickness in. (mm)
3 (76) and 4 (102)	3/4 (19)	3/4 (19)
6 (152)	1 (25)	3/4 (19)
8 (203) and greater	1-1/4 (32)	3/4 (19)

Adapted from ASTM C90 - 22 Table 1.
1 Average of measurements on three units when measured as described in Test Methods C140.



Nominal size (usually fictitious) | **Modular size** (actual)

CMU construction can be reinforced whereby reinforcing bars are placed vertically in cells filled with grout to create a composite section analogous to reinforced concrete. If all cells, both unreinforced and reinforced are filled with grout, the CMU construction is referred to as fully grouted CMU. If only the reinforced cells are grouted, the CMU construction is referred to as partially grouted. If none of the cells are grouted, the CMU construction is referred to as ungrouted or hollow. Horizontal reinforcement may be placed in a wall via a bond beam or lintel, which is always grouted. Ladder reinforcement may also be placed in the mortar bed between courses.

Grout typically conforms to ASTM C476 and has a minimum compressive strength of 2,000 psi. Concrete masonry units have a compressive strength which may range from 1,250 psi to over 4,800 psi, although the maximum specified compressive strength of the assembled masonry will generally not exceed 3,000 psi. Both post-installed adhesive and mechanical anchors may be used in grouted CMU. If voids are present or suspected, mechanical anchors should not be used, and adhesive anchors should only be installed in conjunction with a screen tube to prevent uncontrolled flow of the bonding material. In hollow masonry, anchor strength is generally assumed to be based on the face shell thickness, which can be variable.

In the past, Hilti has provided technical data for 8” wide nominal CMU blocks. With the new criteria, Hilti has additional embedment depths which permit installation in wider walls, such as 10” or 12” nominal grouted CMU.

CLAY BRICK

Clay brick is the most extensively used type of masonry unit throughout the world. Bricks are prismatic masonry units made from a suitable mixture of soil, clay, and a stabilizing agent (emulsified asphalt). They are shaped by molding, pressing, or extruding and are fired at elevated temperature to meet the strength and durability requirements of ASTM C62 (solid brick) and ASTM C652 and ASTM C216 (hollow brick).

Depending upon the grade, clay masonry bricks can have a compressive strength ranging from 1,250 psi to over 25,000 psi. Grouted multi-wythe masonry construction typically consists of two wythes, each one-unit masonry in thickness, separated by a space (collar joint) 1/2” to 4-1/2” wide, generally filled with grout. The wythes are connected with wall ties. This space may also be reinforced with vertical reinforcing bars. Solid clay brick masonry consists of abutting wythes interlaced with header courses. In general, adhesive anchors are recommended for use in clay brick. In older unreinforced masonry construction (URM) or where the condition of the masonry is unknown, it is advisable to use a screen tube to prevent unrestricted flow of the bonding material into voids. URM construction is not currently covered under the recent changes to AC01 and AC58.

MORTAR

Mortar is used to provide uniform bearing between masonry units and to bond individual units into a composite assemblage that will withstand the imposed loading conditions. Mortar consists of a mixture of cementitious material, aggregate, and water proportionally combined in accordance with ASTM C270. Cement/lime mortar or masonry mortar (each in four types) are typically used under this standard.

Since mortar plays a significant role in the structural integrity of a masonry wall, it is important to understand how post-installed anchors interact with the structure. Within a masonry structure, there are designated joint locations, and the proximity of a post-installed anchor to one of these locations must be considered in the design of the anchorage. Product specific guidelines are provided within this technical guide.

GROUT

ACI defines grout as "a mixture of cementitious material and water, with or without aggregate, proportioned to produce a pourable consistency without segregation of the constituents." The terms "grout" and "mortar" are frequently used interchangeably but are not the same. Grout need not contain aggregate (mortar contains fine aggregate), is supplied in a pourable consistency (mortar is not), and fills voids (mortar only bonds elements together).

In summary, grout is used to fill spaces or cavities and provide continuity between building elements. In some applications, grout will act in a structural capacity, such as in unreinforced masonry construction.

Grout, with respect to post-installed anchorages, is specified by the design official. When post-installed anchors are tested for the development of design values, the grout is specified according to applicable ASTM standards. Design engineers are encouraged to become familiar with the characteristics of the grout used in performance testing to better understand the applicability of the design loads published in this guide.

3.0 ANCHOR DESIGN IN MASONRY

The Strength Design method for anchor design in concrete has been incorporated into several model codes such as IBC and ACI 318. The method assigns specific strength reduction factors to each of several possible failure modes, provides predictions for the strength associated with each failure mode, and compares the controlling design strength with factored loads. The Strength Design method is a more accurate estimate of anchor resistance as compared to the Allowable Stress Design (ASD) method. The Strength Design method is state-of-the-art, and Hilti recommends its use where applicable.

Anchor design in masonry base materials is adopting the framework of the Strength Design method from ACI 318 Chapter 17 with only a few modifications specific to masonry base materials. Anchor design for mechanical anchors (e.g., KB-TZ2, KH-EZ, etc.) will continue to be found in Hilti's Anchor PTG under the ASD design method until the compliance date of AC01. For full discussion on the adhesive anchor design provisions for masonry, please reference ICC-ES AC58 Section 3.0. The similarities and differences between anchor design in masonry and anchoring design in concrete will be discussed in the following sections.

FULLY GROUTED CMU CONSTRUCTION

Based on Section 3.3 of ICC-ES AC58, the tension failure modes for adhesive anchors in fully grouted CMU construction are steel failure, masonry breakout failure, and bond failure. The shear failure modes for adhesive anchors in fully grouted CMU construction are steel failure, masonry breakout failure, pryout failure, and masonry crushing failure.

The corresponding equations and variables are provided below. For further discussion and commentary, please refer to ACI 318-19 section/equation references provided below parenthetically (e.g., 17.6.1.2). Additionally, some design values will be provided in the technical data of this guide or can be located in the applicable third-party evaluation report (i.e., ICC-ES ESR or IAPMO UES ER).

Tension — Nominal Strengths

Steel Strength

$$N_{sa} = A_{se,N}\, f_{uta} \qquad (17.6.1.2)$$

where:

$A_{se,N}$ = Effective cross-sectional area of an anchor in tension, in.^{2}

f_{uta} = Minimum ultimate tensile strength of anchor, psi

Masonry Breakout

$$N_{mbg} = \frac{A_{Nm}}{A_{Nmo}} \psi_{ec,N,m}\, \psi_{ed,N,m}\, \psi_{c,N,m}\, N_{b,m}$$

where:

A_{Nm} = Projected masonry failure area of a single anchor or group of anchors in tension, in.^{2} (17.6.2.1.1)

A_{Nmo} = Projected masonry failure area of a single anchor in tension if not limited by edge distance or spacing, in.^{2} (17.6.2.1.4)

= $9h_{ef}^2$

where:

h_{ef} = Effective embedment depth of the anchor element, in.

$\psi_{ec,N,m}$ = Breakout eccentricity factor (17.6.2.3)

$$= \frac{1}{\left(1 + \frac{e'_N}{1.5h_{ef}}\right)} \leq 1.0$$

$\psi_{ed,N,m}$ = Breakout edge effect factor (17.6.2.4)

= 1.0 if $c_{a,min} \geq 1.5h_{ef}$

$$= 0.7 + 0.3\frac{c_{a,min}}{1.5h_{ef}} \text{ if } c_{a,min} < 1.5h_{ef}$$

where:

$c_{a,min}$ = minimum distance from center of an anchor shaft to the edge of masonry, in.

$\psi_{c,N,m}$ = Breakout cracking factor (17.6.2.5)

= 1.0 if k_m is taken from third-party evaluation report

$N_{b,m}$ = Basic single anchor breakout strength in tension, lb

$= k_m \sqrt{f'_m}\, h_{ef}^{1.5}$

where:

k_m = Effectiveness factor for breakout strength in masonry taken from third-party evaluation report

f'_m = Masonry compressive strength, psi

Bond Strength

$$N_{mag} = \frac{A_{Na}}{A_{Nao}} \psi_{ec,Na} \psi_{ed,Na} N_{ba,m}$$

where:

A_{Na} = Projected influence area of single adhesive anchor or group of adhesive anchors, in.^{2} (17.6.5.1.1)

A_{Nao} = Projected influence area of a single adhesive anchor if not limited by edge distance or spacing, in.^{2} (17.6.5.1.2)

$= (2c_{Na})^2$

where:

c_{Na} = projected distance from center of an anchor shaft on one side of the anchor required to develop the full bond strength of a single adhesive anchor, in.

$$= 10 d_a \sqrt{\frac{\tau_{uncr}}{1,100}}$$

where:

d_a = Nominal outside diameter of post-installed anchor, in.

τ_{uncr} = Characteristic bond stress capacity in uncracked masonry taken from third-party evaluation report, psi

$\psi_{ec,Na}$ = Bond eccentricity factor (17.6.5.3)

$$= \frac{1}{\left(1 + \frac{e'_N}{c_{Na}}\right)} \leq 1.0$$

$\psi_{ed,Na}$ = Bond edge effect factor (17.6.5.4)

= 1.0 if $c_{a,min} \geq c_{Na}$

$= 0.7 + 0.3 \frac{c_{a,min}}{c_{Na}}$ if $c_{a,min} < c_{Na}$

$N_{ba,m}$ = Basic single anchor bond strength, lb

$= \tau_{(cr,uncr),m} \pi d_a h_{ef}$

where:

$\tau_{(cr,uncr),m}$ = Characteristic bond stress capacity in cracked or uncracked masonry, respectively, psi.

Where analysis indicates cracking at service load levels, use $\tau_{cr,m}$. Where analysis indicates no cracking at service load levels, use $\tau_{uncr,m}$.

SUSTAINED LOADS AND OVERHEAD USE

For adhesive anchors only, sustained loading is calculated by multiplying the value of ΦN_n or N_r by 0.55 and comparing the value to the tension dead load contribution (and any sustained live loads or other loads) of the factored load. Edge, spacing, and masonry thickness influences do not need to be accounted for when evaluating sustained loads.

Shear — Nominal Strengths

Steel Strength

$$V_{sa} = 0.6 A_{se,V} f_{uta} \qquad (17.7.1.2b)$$

where:

$A_{se,V}$ = Effective cross-sectional area of an anchor in shear, in.^{2}

f_{uta} = Minimum ultimate tensile strength of anchor, psi

Masonry Breakout

$$V_{mbg} = \frac{A_{Vm}}{A_{Vmo}} \psi_{ec,V,m} \psi_{ed,V,m} \psi_{m,V} V_{b,m}$$

where:

A_{Vm} = Projected masonry failure area of a single anchor or group of anchors in shear, in.^{2}. (17.7.2.1.1)

A_{Vmo} = Projected masonry failure area of a single anchor in shear if not limited by edge distance or spacing, in.^{2} (17.7.2.1.3)

$= 4.5(c_{a1})^2$

where:

c_{a1} = Distance from the center of an anchor shaft to the edge of masonry in one direction, in.

$\psi_{ec,V,m}$ = Breakout eccentricity factor (17.7.2.3)

$$= \frac{1}{\left(1 + \frac{e'_V}{1.5 c_{a1}}\right)} \leq 1.0$$

$\psi_{ed,V,m}$ = Breakout edge effect factor (17.7.2.4)

= 1.0 if $c_{a2} \geq 1.5 c_{a1}$

$= 0.7 + 0.3 \frac{c_{a2}}{1.5 c_{a1}}$ if $c_{a2} < 1.5 c_{a1}$

where:

c_{a2} = distance from center of an anchor shaft to the edge of masonry in the direction perpendicular to c_{a1}, in.

$\psi_{m,V}$ = Breakout cracking factor (17.7.2.5)
= 1.0 where analysis indicates cracking at service load levels
= 1.4 where analysis indicates no cracking at service load levels

$\psi_{h,V}$ = Breakout thickness factor (17.7.2.6)
= 1.0 if $h_a \geq 1.5c_{a1}$
= $\sqrt{\frac{1.5c_{a1}}{h_a}}$ if $h_a < 1.5c_{a1}$

where:

h_a = thickness of member in which an anchor is located, measured parallel to anchor axis, in.

$V_{b,m}$ = Basic single anchor breakout strength in shear, lb (17.7.2.2)
= MIN [$V_{b,m1}$; $V_{b,m2}$]

$$V_{b,m1} = \left[(7)\left(\frac{\ell_e}{d_a}\right)^{0.2}\sqrt{d_a}\right]\left(\sqrt{f'_m}\right)(c_{a1})^{1.5}$$

$$V_{b,m2} = 9\sqrt{f'_m}\,(c_{a1})^{1.5}$$

where:

ℓ_e = MIN [$8d_a$; h_{ef}] for anchors with a constant stiffness over the full length of embedded section

Masonry Pryout

$V_{mpg} = k_{mp}$MIN [N_{mbg} ; N_{mag}]

where:

k_{mp} = 1.0 for $h_{ef} < 2.5$ in.
k_{mp} = 2.0 for $h_{ef} \geq 2.5$ in.
N_{mbg} = Nominal masonry breakout strength in tension, lb
N_{mag} = Nominal bond strength in tension, lb

Masonry Crushing

$$V_{mc} = 1750 \times \sqrt[4]{f'_m A_{se,V}}$$

Masonry crushing failure is based on an equation that has been used by The Masonry Society (TMS) 402 anchor design provisions for cast-in anchors. Masonry is often a softer material compared to concrete. When exposed to high shear loading, the steel anchor may crush and sink into the block of the masonry. Thus, this failure mode is unique to anchor design in masonry.

Compared to anchor design in concrete, there are a couple notable differences unique to the design process for masonry. The effectiveness factor for breakout strength in masonry (k_m) will be lower than what is typically used for concrete (k_c) to account for the inhomogeneity of masonry materials in breakout. Breakout cones for CMU construction can be greatly influenced by the presence of hollow head joints, which is the vertical mortar joint between two closed-ended CMU blocks in the same course and wythe. In addition to the ends and edges of walls, the nearest hollow head joint on a horizontal projection from the anchor shall be treated as an edge for design purposes. The minimum distance from the nearest adjacent hollow head joint shall be 2 inches as measured from the centerline of the hollow head joint in CMU construction. Please see design considerations section for helpful illustrations on understanding edge distances to hollow head joints and projected breakout failure areas.

The design example provided later in the guide will be based on fully grouted CMU construction.

UNGROUTED CMU CONSTRUCTION

Based on Section 3.4 of ICC-ES AC58, the tension failure modes for adhesive anchors in ungrouted CMU construction are steel failure and pullout failure. The shear failure modes for adhesive anchors in ungrouted CMU construction are steel failure, anchorage failure, and masonry crushing failure. The corresponding equations are provided below:

Tension — Nominal Strengths

Nominal Strength	Equation
Steel Strength	$N_{sa} = A_{se,N} f_{uta}$
Pullout Strength	$N_{k,ug}$

Notes: N_{sa} discussed on page 4.
$N_{k,ug}$ shall be taken from 3rd party evaluation report such as ICC-ES ESR or IAPMO UES ER.

Shear — Nominal Strengths

Nominal Strength	Equation
Steel Strength	$V_{sa} = 0.6A_{se,V} f_{uta}$
Anchorage Strength	$V_{s,ug}$
Masonry Crushing	$V_{mc,ug} = 1750 \times \sqrt[4]{f'_m A_{se,V}}$

Notes: V_{sa} and $V_{mc,ug}$ discussed on pages 5-6.
$V_{s,ug}$ shall be taken from 3rd party evaluation report such as ICC-ES ESR or IAPMO UES ER.

PARTIALLY GROUTED CMU CONSTRUCTION

Based on Section 3.5 of ICC-ES AC58, the tension and shear failure modes for adhesive anchors located in the grouted cells of a partially grouted CMU construction will follow the same design provisions as fully grouted CMU construction based on Section 3.3 of ICC-ES AC58. However, the design in partially grouted CMU shall consider that the distance to the ungrouted cells is to be considered an edge for the purposes of design. The tension and shear failure modes for adhesive anchors located in the ungrouted cells of a partially grouted CMU construction will follow the same design provisions as ungrouted CMU construction based on Section 3.4 of ICC-ES AC58. If the location of grouted cells is unknown, follow the same design provisions as ungrouted CMU construction based on Section 3.4 of ICC-ES AC58.

CLAY BRICK CONSTRUCTION

Based on Section 3.6 of ICC-ES AC58, the tension failure modes for adhesive anchors in clay brick construction are steel failure and pullout failure. The shear failure modes for adhesive anchors in clay brick construction are steel failure, anchorage failure, and brick crushing failure. The corresponding equations are provided below:

Tension — Nominal Strengths

Nominal Strength	Equation
Steel Strength	$N_{sa} = A_{se,N} f_{uta}$
Pullout Strength	$N_{k,br}$

Notes: N_{sa} discussed on page 4.
$N_{k,br}$ shall be taken from 3rd party evaluation report such as ICC-ES ESR or IAPMO UES ER.

Shear — Nominal Strengths

Nominal Strength	Equation
Steel Strength	$V_{sa} = 0.6A_{se,V} f_{uta}$
Anchorage Strength	$V_{s,br}$
Brick Crushing	$V_{mc,br} = 1750 \times \sqrt[4]{f'_m A_{se,V}}$

Notes: V_{sa} and $V_{mc,br}$ discussed on pages 5-6.
$V_{s,br}$ shall be taken from 3rd party evaluation report such as ICC-ES ESR or IAPMO UES ER.

4.0 INFLUENCE OF HOLLOW HEAD JOINTS ON CMU DESIGN

For CMU construction with hollow head joints, in addition to the ends and edges of walls, the nearest head joint on a horizontal projection from the anchor shall be treated as an edge for design purposes. The minimum distance from the nearest adjacent head joint shall be 2 inches (50.8 mm) as measured from the centerline of the head joint in CMU construction with hollow head joints.

The following illustrations will demonstrate how to locate the nearest adjacent head joint and how treating it as an edge will affect calculating tension breakout cones for single anchor, two anchor, and four anchor configurations. Additionally, the illustrations will demonstrate anchors installed in the face of the same CMU block, in the face of different CMU blocks (horizontally or vertically adjacent), and in the bed joints.

The following illustrations, based on the masonry anchor design provisions of ICC-ES AC58, are intended for illustration purposes only.

Face of CMU — Single Anchor and Horizontal Groups

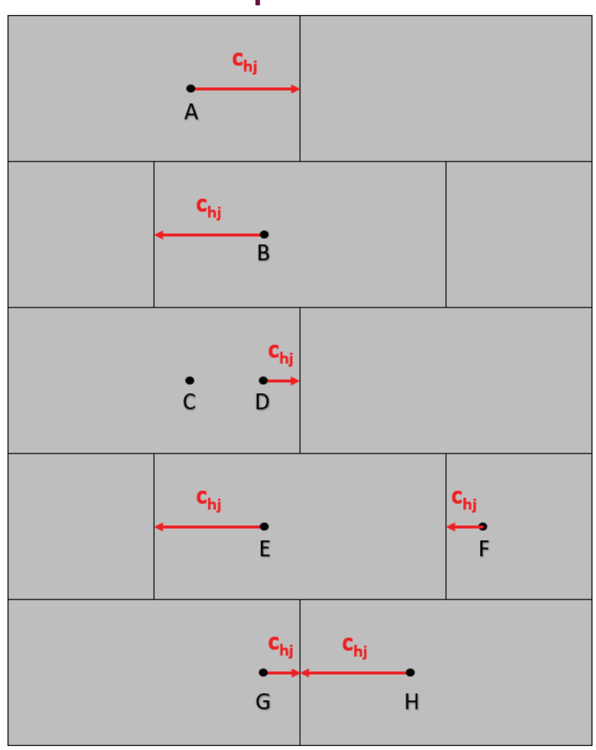


Figure 1 — Examples of Nearest Adjacent Head Joint for Single Anchor and Horizontal Groups

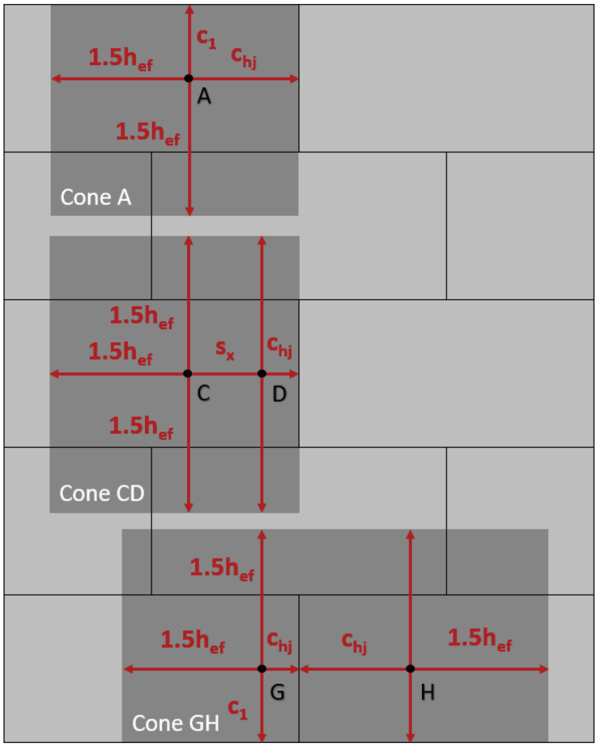


Figure 2 — Examples of Breakout Cones for Single Anchor and Horizontal Groups

Anchors A and B in Figure 1 represent single anchor installations. They illustrate which head joint would be considered the nearest adjacent head joint edge (C_{hj}) for the respective anchor. Cone A in Figure 2 illustrates the tension breakout cone for Anchor A considering the influence of the nearest adjacent head joint edge as well as the top of wall edge.

Anchors C and D in Figure 1 represent a two-anchor configuration. They illustrate which head joint would be considered the nearest adjacent head joint edge when installed in the same CMU block. Cone CD in Figure 2 illustrates the tension breakout cone for Anchors C and D considering the influence of the nearest adjacent head joint edge.

Anchors E and F in Figure 1 represent a two-anchor configuration. They illustrate which head joint would be considered the nearest adjacent head joint edge when two anchors are installed in different horizontally adjacent CMU blocks and do not share the nearest adjacent head joint edge.

Anchors G and H in Figure 1 represent a two-anchor configuration. They illustrate which head joint would be considered the nearest adjacent head joint edge when two anchors are installed in different horizontally adjacent CMU blocks and do share the nearest adjacent head joint edge. Cone GH in Figure 2 illustrates the tension breakout cone for Anchors G and H considering the influence of the nearest adjacent head joint edge as well as the bottom of wall edge.

Face of CMU — Vertical Groups

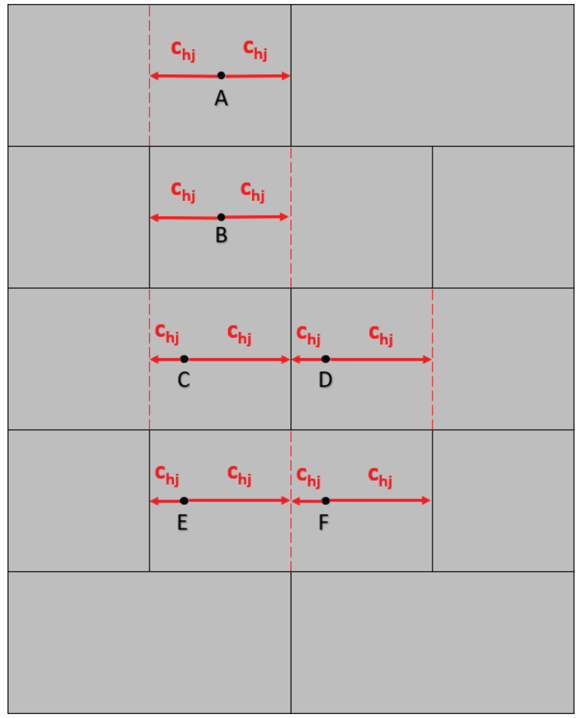


Figure 3 — Examples of Nearest Adjacent Head Joint for Vertical Groups

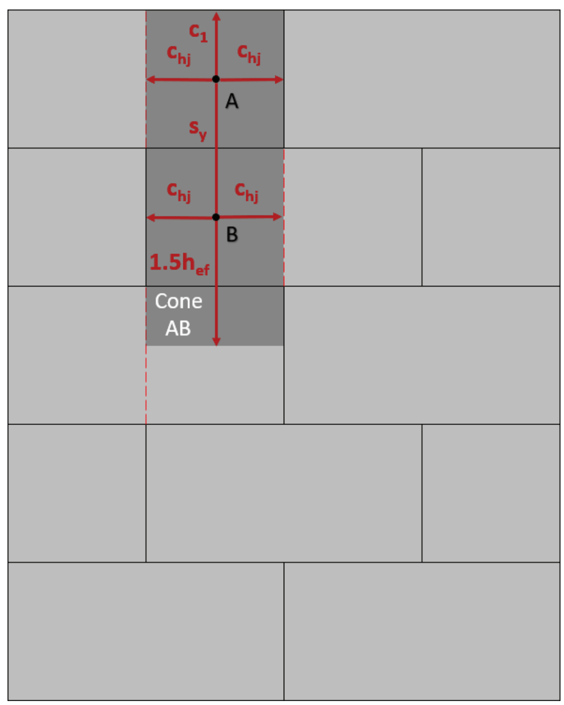


Figure 4 — Examples of Breakout Cones for Vertical Groups

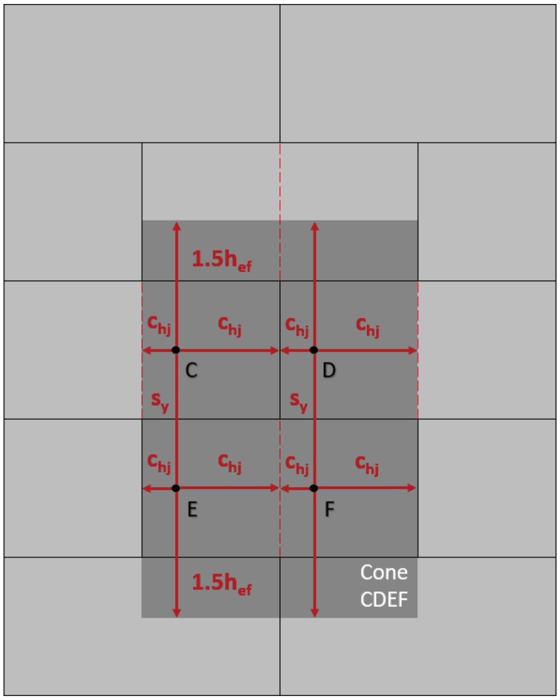


Figure 4 — Examples of Breakout Cones for Vertical Groups (Continued)

Anchors A and B in Figure 3 represent a two-anchor configuration. They illustrate which head joints would be considered the nearest adjacent head joint edges when installed in different vertically adjacent CMU blocks. Both head joints will extend vertically (dashed lines) and be treated as assumed head joint edges. Cone AB in Figure 4 illustrates the tension breakout cone for Anchors A and B considering the influence of the nearest adjacent head joint edges.

Anchors C through F in Figure 3 represent a four-anchor configuration. They illustrate which head joints would be considered the nearest adjacent head joint edges when installed in different vertically and horizontally adjacent CMU blocks. All head joints will extend vertically (dashed lines) and be treated as assumed head joint edges. Cone CDEF in Figure 4 illustrates the tension breakout cone for Anchors C through F considering the influence of the nearest adjacent head joint edges.

Bed Joint Installation

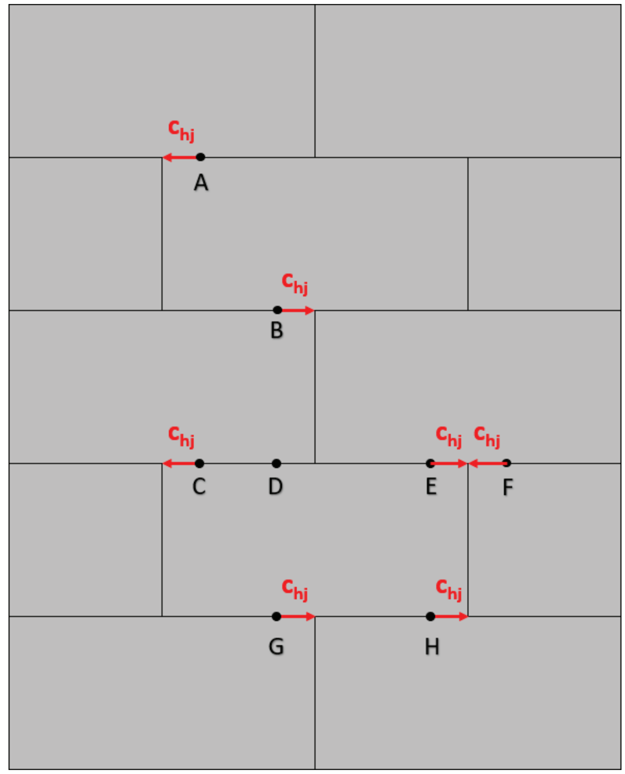


Figure 5 —Examples of Nearest Adjacent Head Joint for Bed Joint Installation

Anchors A and B in Figure 5 represent single anchor installations. They illustrate which head joint would be considered the nearest adjacent head joint edge (c_{hj}) for the respective anchor.

Anchors C and D in Figure 5 represent a two-anchor configuration. They illustrate which head joint would be considered the nearest adjacent head joint edge when installed in the bed joint between two head joints.

Anchors E and F in Figure 5 represent a two-anchor configuration. They illustrate which head joint would be considered the nearest adjacent head joint edge when installed in the bed joint with a head joint between them.

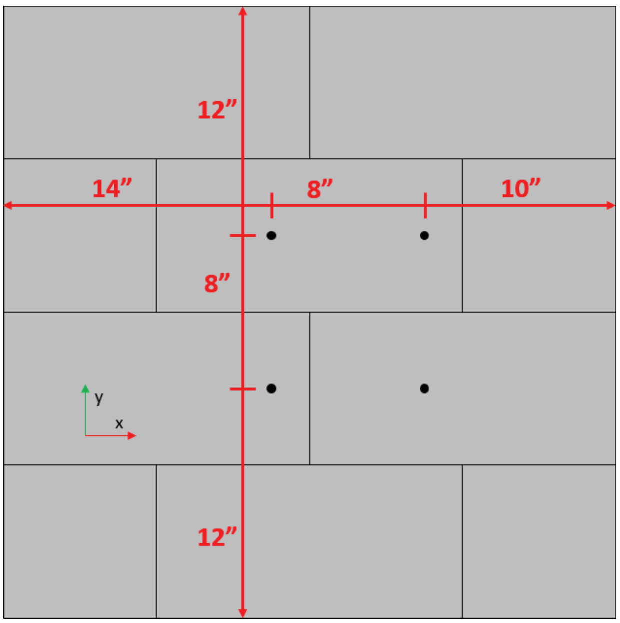
Anchors G and H in Figure 5 represent a two-anchor configuration. They illustrate which head joints would be considered the nearest adjacent head joint edges when installed in different horizontally adjacent CMU blocks.

The same process utilized for calculating tension breakout cones in face of CMU installations can be used for anchors in bed joint installations.

5.0 DESIGN EXAMPLE — FULLY GROUTED CMU CONSTRUCTION

The following design example, based on the masonry anchor design provisions of ICC-ES AC58, is intended for illustration purposes only.

PARAMETERS



Anchor Element

- Hilti HIT-HY 200-R V3 Adhesive Anchor
- HAS-V-36 Threaded Rod (ASTM F1554)
  d_{anchor} = .500 inches | h_{ef} = 5.00 inches

Masonry Parameters

- Uncracked, Fully Grouted CMU Construction
- Dry Masonry Conditions | Seismic Category A
- Temperature Range A Conditions
- f'_m = 1,500 psi | h = 8.00 inches (nominal)

Design Loads

- N_{ua} = 1,000 lbs
- $V_{ua,x}$ = 1,000 lbs

TENSION FAILURE MODES

Steel Failure — Nominal Strength

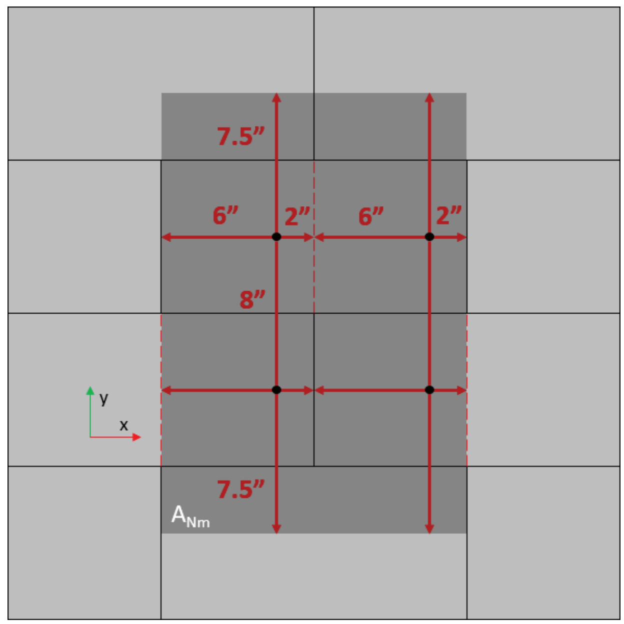
$$N_{sa} = A_{se,N} f_{uta}$$

$$N_{sa} = (0.1419 \text{ in.}^2)(58{,}000 \text{ psi})$$

$$\mathbf{N_{sa} = 8{,}230 \text{ lbs}}$$

Masonry Breakout Failure — Nominal Strength

$$N_{mbg} = \frac{A_{Nm}}{A_{Nmo}} \psi_{ec,N,m} \psi_{ed,N,m} \psi_{c,N,m} N_{b,m}$$



$$A_{Nm} = (1.5h_{ef} + 8 \text{ in.} + 1.5h_{ef})(6 \text{ in.} + 2 \text{ in.} + 6 \text{ in.} + 2 \text{ in.})$$

$$A_{Nm} = (7.5 \text{ in.} + 8 \text{ in.} + 7.5 \text{ in.})(16 \text{ in.})$$

$$A_{Nm} = 368 \text{ in.}^2$$

$$A_{Nmo} = 9 \times (h_{ef})^2$$

$$A_{Nmo} = 9 \times (5 \text{ in.})^2$$

$$A_{Nmo} = 225 \text{ in.}^2$$

$\psi_{ec,N,m}$ = 1.0 (No Eccentricity Present)

$$\psi_{ed,N,m} = 0.7 + 0.3\left(\frac{c_{a,min}}{1.5h_{ef}}\right)$$

$$\psi_{ed,N,m} = 0.7 + 0.3\left(\frac{2\text{ in.}}{7.5\text{ in.}}\right)$$

$$\psi_{ed,N,m} = 0.78$$

$\psi_{c,N,m}$ = 1.0 (Found in ESR)

$$N_{b,m} = k_{m,uncr}\sqrt{f'_m}(h_{ef})^{1.5}$$

$$N_{b,m} = (17)(\sqrt{1{,}500\text{ psi}})(5\text{ in.})^{1.5}$$

$$N_{b,m} = 7{,}361\text{ lbs}$$

$$N_{mbg} = \frac{368\text{ in.}^2}{225\text{ in.}^2}(1.0)(0.78)(1.0)(7{,}361\text{ lbs})$$

$$\mathbf{N_{mbg} = 9{,}735\text{ lbs}}$$

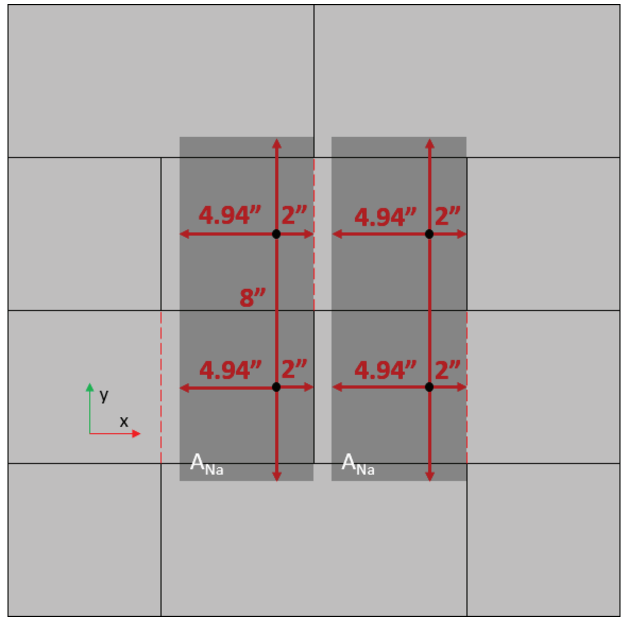
Bond Failure — Nominal Strength

$$N_{mag} = \frac{A_{Na}}{A_{Nao}}\psi_{ec,Na}\psi_{ed,Na}N_{ba,m}$$

$$c_{Na} = 10d_a\sqrt{\frac{\tau_{uncr,m}}{1{,}100\text{ psi}}}$$

$$c_{Na} = 10(0.5\text{ in.})\sqrt{\frac{1{,}074\text{ psi}}{1{,}100\text{ psi}}}$$

$$c_{Na} = 4.94\text{ in.}$$



$$A_{Na} = (c_{Na} + 8\text{ in.} + c_{Na})(c_{Na} + 2\text{ in.} + c_{Na} + 2\text{in.})$$

$$A_{Na} = (2(4.94\text{ in.}) + 8\text{ in.})(2(4.94\text{ in.}) + 4\text{ in.})$$

$$A_{Na} = 248\text{ in.}^2$$

$$A_{Nao} = (2c_{Na})^2$$

$$A_{Nao} = (2(4.94\text{ in.}))^2$$

$$A_{Nao} = 98\text{ in.}^2$$

$\psi_{ec,Na}$ = 1.0 (No Eccentricity Present)

$$\psi_{ed,Na} = 0.7 + 0.3\left(\frac{c_{a,min}}{c_{Na}}\right)$$

$$\psi_{ed,Na} = 0.7 + 0.3\left(\frac{2\text{ in.}}{4.94\text{ in.}}\right)$$

$$\psi_{ed,Na} = 0.82$$

$$N_{ba,m} = \tau_{uncr,m}\pi d_a h_{ef}$$

$$N_{ba,m} = (1{,}074\text{ psi})(\pi)(0.5\text{ in.})(5\text{ in.})$$

$$N_{ba,m} = 8{,}435\text{ lbs}$$

$$N_{mag} = \frac{A_{Na}}{A_{Nao}} \psi_{ec,Na} \psi_{ed,Na} N_{ba,m}$$

$$N_{mag} = \frac{248 \text{ in.}^2}{98 \text{ in.}^2} (1.0)(0.82)(8{,}435 \text{ lbs})$$

$$\mathbf{N_{mag} = 17{,}503 \text{ lbs}}$$

Controlling Design Strength

$$\frac{N_{ua}}{\phi_{steel} N_{sa}} = \frac{(250 \text{ lbs})}{(0.75)(8{,}230 \text{ lbs})} = 4.05\%$$

$$\frac{N_{ua}}{\phi_{masonry} N_{mbg}} = \frac{(1{,}000 \text{ lbs})}{(0.65)(9{,}735 \text{ lbs})} = \mathbf{15.80\%}$$

$$\frac{N_{ua}}{\phi_{bond} N_{mag}} = \frac{(1{,}000 \text{ lbs})}{(0.65)(17{,}503 \text{ lbs})} = 8.79\%$$

SHEAR FAILURE MODES

Steel Failure — Nominal Strength

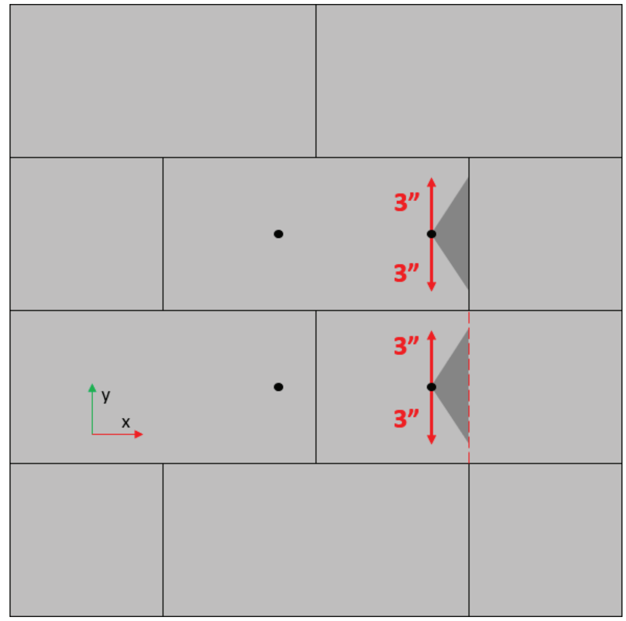
$$V_{sa} = 0.60 \, A_{se,V} \, f_{uta}$$

$$V_{sa} = (0.60)(0.1419 \text{ in.}^2)(58{,}000 \text{ psi})$$

$$\mathbf{V_{sa} = 4{,}938 \text{ lbs}}$$

Masonry Breakout Failure — Nominal Strength

$$V_{mbg} = \frac{A_{Vm}}{A_{Vmo}} \psi_{ec,V,m} \psi_{ed,V,m} \psi_{m,V} \psi_{h,V,m} \psi_{parallel,V,m} V_{b,m}$$



$$A_{vm} = (2(1.5c_{a1} + 1.5c_{a1}))(\text{MIN}[h \,;\, 1.5c_{a1})$$

$$A_{Vm} = (2(6 \text{ in.}))(\text{MIN}[7.625 \text{ in.} \,;\, 3 \text{ in.}])$$

$$A_{Vm} = 36 \text{ in.}^2$$

$$A_{Vmo} = 4.5 \text{ X } (c_{a1})^2$$

$$A_{Vmo} = 4.5 \times (2 \text{ in.})^2$$

$$A_{Vmo} = 18 \text{ in.}^2$$

$$\psi_{ec,v,m} = 1.0 \text{ (No Eccentricity Present)}$$

$$\psi_{ed,v,m} = 1.0 \text{ (Since } c_{a2} \geq 1.5c_{a1})$$

$$\psi_{m,V} = 1.4 \text{ (Uncracked Masonry)}$$

$$\psi_{h,V,m} = 1.0 \text{ (Since } h_a \geq 1.5c_{a1})$$

$$\psi_{parallel,V,m} = 1.0$$

(Since Shear Load is Perpendicular to Hollow Head Joint Edge)

$$V_{b,m} = MIN\,[V_{b,m1}\,;\,V_{b,m2}]$$

$$V_{b,m1} = \left[(7)\left(\frac{MIN[8d_a\,;\,h_{ef}]}{d_a}\right)^{0.2}\sqrt{d_a}\right]\sqrt{f'_m}\,(c_{a1})^{1.5}$$

$$V_{b,m1} = \left[(7)\left(\frac{4\text{ in.}}{0.5\text{ in.}}\right)^{0.2}\sqrt{0.5\text{ in.}}\right]\sqrt{1{,}500\text{ psi}}\,(2\text{ in.})^{1.5}$$

$$V_{b,m1} = 822\text{ lbs}$$

$$V_{b,m2} = 9\sqrt{f'_m}\,(c_{a1})^{1.5} = 9\sqrt{1{,}500\text{ psi}}\,(2\text{ in.})^{1.5}$$

$$V_{b,m2} = 986\text{ lbs}$$

$$V_{b,m} = MIN[822\text{ lbs}\,;\,986\text{ lbs}] = 822\text{ lbs}$$

$$V_{mbg} = \frac{A_{Vm}}{A_{Vmo}}\,\Psi_{ec,V,m}\,\Psi_{ed,V,m}\,\Psi_{m,V}\,\Psi_{h,V,m}\,\Psi_{parallel,V,m}\,V_{b,m}$$

$$V_{mbg} = \frac{36\text{ in.}^2}{18\text{ in.}^2}\,(1.0)(1.0)(1.4)(1.0)(1.0)(822\text{ lbs})$$

$$\mathbf{V_{mbg} = 2{,}302\text{ lbs}}$$

Masonry Pryout Failure — Nominal Strength

$$V_{mpg} = k_{cp}\,(MIN\,N_{mbg}\,;\,N_{mag}])$$

$$V_{mpg} = (2.0)\,(MIN\,[9{,}735\text{ lbs}\,;\,17{,}503\text{ lbs}])$$

$$\mathbf{V_{mpg} = 19{,}470\text{ lbs}}$$

Masonry Crushing Failure — Nominal Strength

$$V_{mc} = (1750)\,(\sqrt[4]{f'_m A_{se,V}})$$

$$V_{mc} = (1750)\,(\sqrt[4]{(1{,}500\text{ psi})(0.1419\text{ in.}^2)})$$

$$\mathbf{V_{mc} = 6{,}684\text{ lbs}}$$

Shear Utilization Percentage

$$\frac{V_{ua}}{\phi_{steel}V_{sa}} = \frac{(250\text{ lbs})}{(0.65)\,(4{,}938\text{ lbs})} = 7.79\ \%$$

$$\frac{V_{ua}}{\phi_{masonry}V_{mbg}} = \frac{(1000\text{ lbs})}{(0.70)(2{,}302\text{ lbs})} = \mathbf{62.06\%}$$

$$\frac{V_{ua}}{\phi_{masonry}V_{mpg}} = \frac{(1000\text{ lbs})}{(0.70)(19{,}470\text{ lbs})} = 7.73\%$$

$$\frac{V_{ua}}{\phi_{crushing}V_{mc}} = \frac{(250\text{ lbs})}{(0.50)(6{,}684\text{ lbs})} = 7.48\%$$

TENSION AND SHEAR INTERACTION

Tri-Linear Equation

$$\left(\frac{N_{ua}}{\phi N_n}\right) + \left(\frac{V_{ua}}{\phi V_n}\right) \le 1.2$$

$$\left(\frac{1{,}000\text{ lbs}}{6{,}328\text{ lbs}}\right) + \left(\frac{1{,}000\text{ lbs}}{1{,}611\text{ lbs}}\right) \le 1.2$$

$$\mathbf{0.78} \le 1.2$$

Parabolic Equation

$$\left(\frac{N_{ua}}{\phi N_n}\right)^{5/3} + \left(\frac{V_{ua}}{\phi V_n}\right)^{5/3} \le 1.2$$

$$\left(\frac{1{,}000\text{ lbs}}{6{,}328\text{ lbs}}\right)^{5/3} + \left(\frac{1{,}000\text{ lbs}}{1{,}611\text{ lbs}}\right)^{5/3} \le 1.2$$

$$\mathbf{0.50} \le 1.0$$

6.0 PROFIS ENGINEERING TIPS

Hilti's PROFIS Engineering Suite software is a user-friendly, cloud-based application that helps make designing post-installed anchor connections easier. Anchor design in masonry base materials has been available in the software for the past few years. The software will be updated with the new design provisions from ICC-ES AC58 to help users transition to these new industry standards. With that in mind, this guide will provide tips and tricks for modeling certain masonry conditions within the software. The following PROFIS models are intended for illustration purposes only.

For CMU construction, the software defaults to assuming closed-ended units with hollow head joints. For designing with open-ended units with solid head joints, there is an option available to select that will allow the software to analyze the head joint as completely filled with grout or mortar. The option is located in the geometry parameters in the base material design tab. Choosing this option will toggle the influence of hollow head joints on CMU design as discussed in Section 4.0.

When selecting "Grout-filled CMU" as a base material, the software defaults to assuming fully grouted CMU construction. For designing anchors located in the grouted cells of a partially grouted CMU construction, there is an indirect method to influence the software to analyze partially grouted CMU construction. For designing anchors located in the ungrouted cells or when the location of the grouted cells is unknown, select "Hollow CMU" as the base material.

For partially grouted CMU construction with the grouted cells filled and reinforced vertically (i.e., grouted cells on different courses), reduce the edge distances in the x-direction to the appropriate nearest adjacent hollow head joint as well as either the nearest ungrouted cell (for single anchor configurations) or the opposite nearest adjacent head joint (for multi-anchor configurations installed in different vertically adjacent CMU blocks). See Figure 6 and 7. The software will analyze the influence areas accordingly if the correct application edge distances in the y-direction are modeled in the software.

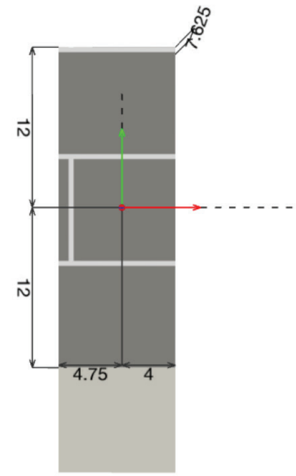


Figure 6 — Example of Single Anchor in Vertically Partially Grouted CMU Construction

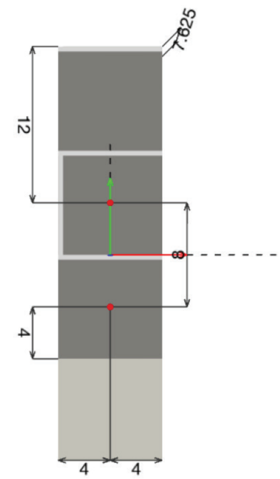


Figure 7 — Example of Two Anchors in Vertically Partially Grouted CMU Construction

For partially grouted CMU construction with the grouted cells filled and reinforced horizontally (i.e., grouted cells on the same course), reduce the edge distances in the y-direction to only model the course with grouted cells. See Figure 8. The software will treat the top edge of the course and bottom edge of the course as the edge distances, which will align with treating the nearest adjacent ungrouted cells as edges. The software will analyze the influence areas accordingly if the correct application edge distances in the x-direction are modeled in the software.

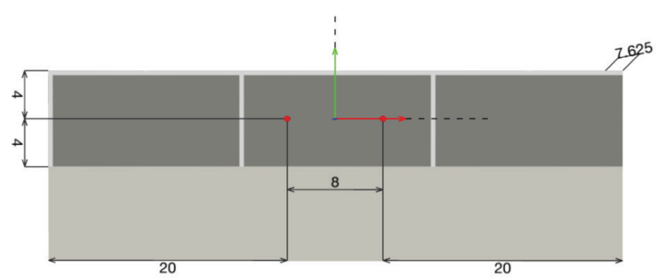
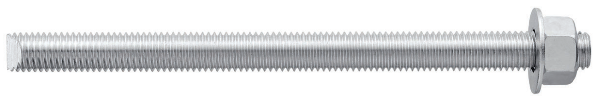


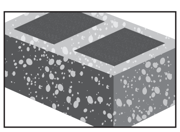
Figure 8 — Example of Two Anchors in Horizontally Partially Grouted CMU Construction

7.0 HIT-HY 200 A/R V3 ADHESIVE FOR MASONRY CONSTRUCTION

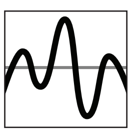
PRODUCT DESCRIPTION

HIT-HY 200 A/R V3 with Threaded Rod, Rebar, and HIS-(R)N Inserts

Anchor System		Features and Benefits
	Hilti HIT-HY 200-R V3 Cartridge	• Two products with equal performance data • Injectable two-component hybrid adhesive mortar • For use in grouted concrete masonry block walls • ICC-ES evaluated for cracked and uncracked grout-filled concrete masonry • No hole cleaning requirement when installed with SafeSet™ hollow drill bit technology • User can select product gel time suitability based on temperature of the base material and jobsite time requirements
	Hilti HIT-HY 200-A V3 Cartridge	
	Hilti HAS Threaded Rod	
	Rebar	
	Hilti HIS-N/RN	



Grout-filled concrete masonry



Seismic Design categories A-F

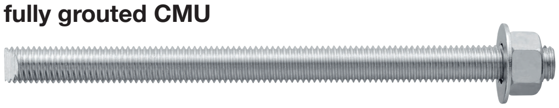
Hollow drill bit

PROFIS Engineering

Approvals/Listings	
ICC-ES (International Code Council)	ESR-4878 in grout-filled CMU per ICC-ES AC58
NSF/ANSI Std 61	Cetification for use in potable water
City of Los Angeles	2020 LABC Supplement (within ESR-4878)
Florida Building Code	2020 Florida Building Code Supplement (within ESR-4878) w/ HVHZ
U.S. Green Building Council	LEED® Credit 4.1-Low Emitting Materials

DESIGN DATA IN GROUT-FILLED CMU

HIT-HY 200 V3 adhesive with Hilti HAS threaded rods, deformed reinforcing bars (rebar) and Hilti HIS-N and HIS-RN in fully grouted CMU



Hilti HAS Threaded Rods

Hilti HIS-N and HIS-RN

Deformed Reinforcing Bars (Rebar)

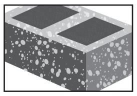
Permissible Base Materials		Permissible drilling method		
	Grout-filled concrete masonry			Hammer drilling with carbide tipped drill bit
				Hilti TE-CD or TE-YD hollow drill bit (for diameters 1/2" – 3/4")

Figure 1 — Hilti HIT-HY 200 V3 with HAS threaded rod and reinforcing bars in grout-filled concrete masonry walls

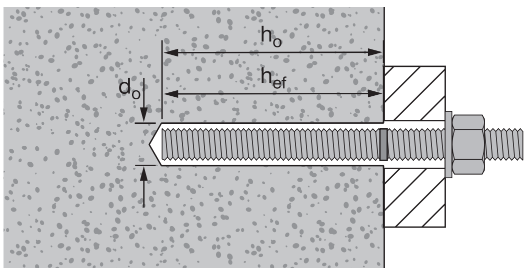


Figure 2 — Hilti HIT-HY 200 V3 with HIS-N and HIS-RN in grout-filled concrete masonry walls

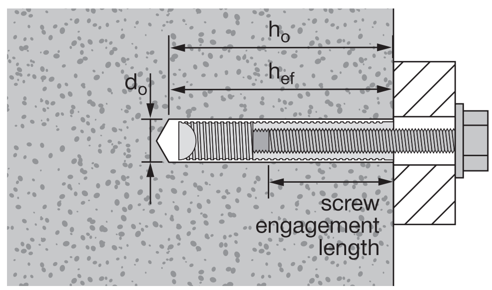


Figure 3 — Installation with (2) washers

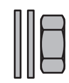
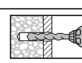
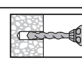


Table 1— Hilti HIT-HY 200 V3 Installation Information for Threaded Rod, Rebar, and Hilti HIS-(R)N Anchors — Fully Grouted CMU Construction, Face and Top of Wall

Installation information		Symbol	Units	Nominal Anchor Diameter / Rebar Size			
				3/8" or #3	1/2" or #4	5/8" or #5	3/4" or #6
Drill Bit Diameter — Threaded Rod		d_o	in.	7/16	9/16	3/4	7/8
Drill Bit Diameter — Rebar		d_o	in.	1/2	5/8	3/4	7/8
Drill Bit Diameter — HIS-(R)N		d_o	in.	11/16	7/8	N/A	N/A
Minimum Embedment Depth — Threaded Rod & Rebar		$h_{ef,min}$	in.	2-3/8	2-3/4	3-1/8	3-1/2
			(mm)	(60)	(70)	(79)	(89)
Minimum Embedment Depth — HIS-(R)N		$h_{ef,min}$	in.	4-3/8	5	N/A	N/A
			(mm)	(111)	(127)	-	-
Maximum Embedment Depth		$h_{ef,max}$	in.	7-1/2	10	10	10
			(mm)	(191)	(254)	(254)	(254)
Diameter of Fixture Hole — Threaded Rod[2]	Through-set		in.	1/2	5/8	13/16[1]	15/16[1]
	Preset		in.	7/16	9/16	11/16	13/16
Maximum Installation Torque		T_{inst}	ft-lb	13	30	60	100
Minimum Masonry Thickness[3]		h_{min}	in.	7-5/8			
			(mm)	(203)			
Face of Wall	Minimum Edge Distance[4]	$c_{min,face}$	in.	4	4	4	4
			(mm)	(102)	(102)	(102)	(102)
	Minimum Anchor Spacing	$s_{min,face}$	in.	4	4	4	4
			(mm)	(102)	(102)	(102)	(102)
Top of Wall	Minimum Edge Distance[4]	$c_{min,top}$	in.	N/A	1-3/4 [5]	1-3/4	2-3/4 [6]
			(mm)		(44)	(44)	(70)
	Minimum Anchor Spacing	$s_{min,top}$	in.	N/A	3 [5]	3	3 [6]
			(mm)		(76)	(76)	(76)

1 Install using (2) washers. See Figure 3.
2 The preset fixture hole diameter is applicable for inserted bolts installed in preset HIS-(R)N anchors only.
3 Maximum embedment for installation into the face of 7-5/8" CMU wall is 6-3/4". Maximum embedment for installation into the face of 9-5/8" CMU wall is 8".
4 The minimum distance from the center of an anchor to the centerline of a head joint (vertical mortar joint) is 2".
5 1/2" HIS-(R)N is not applicable for top of wall applications.
6 #6 rebar is not applicable for top of wall applications.

Table 2 — Hilti HIT-HY 200 V3 adhesive design strength with masonry / bond failure for threaded rod in the face of uncracked fully grouted CMU walls [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of pryout or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	2-3/8 (60)	1,565 (7.0)	1,720 (7.7)	1,720 (7.7)	1,720 (7.7)	1,685 (7.5)	1,855 (8.3)	1,855 (8.3)	1,855 (8.3)
	4-1/2 (114)	3,265 (14.5)	3,265 (14.5)	3,265 (14.5)	3,265 (14.5)	2,875 (12.8)	3,085 (13.7)	3,265 (14.5)	3,415 (15.2)
	6-3/4 (171)	4,895 (21.8)	4,895 (21.8)	4,895 (21.8)	4,895 (21.8)	2,875 (12.8)	3,085 (13.7)	3,265 (14.5)	3,415 (15.2)
	7-1/2 (191)	5,440 (24.2)	5,440 (24.2)	5,440 (24.2)	5,440 (24.2)	2,875 (12.8)	3,085 (13.7)	3,265 (14.5)	3,415 (15.2)
1/2	2-3/4 (70)	1,950 (8.7)	2,255 (10.0)	2,520 (11.2)	2,760 (12.3)	3,340 (14.9)	3,590 (16.0)	3,795 (16.9)	3,975 (17.7)
	4-1/2 (114)	4,085 (18.2)	4,715 (21.0)	4,935 (22.0)	4,935 (22.0)	3,340 (14.9)	3,590 (16.0)	3,795 (16.9)	3,975 (17.7)
	6-3/4 (171)	7,400 (32.9)	7,400 (32.9)	7,400 (32.9)	7,400 (32.9)	3,340 (14.9)	3,590 (16.0)	3,795 (16.9)	3,975 (17.7)
	10 (254)	10,965 (48.8)	10,965 (48.8)	10,965 (48.8)	10,965 (48.8)	3,340 (14.9)	3,590 (16.0)	3,795 (16.9)	3,975 (17.7)
5/8	3-1/8 (79)	2,365 (10.5)	2,730 (12.1)	3,050 (13.6)	3,345 (14.9)	3,755 (16.7)	4,035 (17.9)	4,265 (19.0)	4,465 (19.9)
	4-1/2 (114)	4,085 (18.2)	4,715 (21.0)	5,150 (22.9)	5,150 (22.9)	3,755 (16.7)	4,035 (17.9)	4,265 (19.0)	4,465 (19.9)
	6-3/4 (171)	7,505 (33.4)	7,730 (34.4)	7,730 (34.4)	7,730 (34.4)	3,755 (16.7)	4,035 (17.9)	4,265 (19.0)	4,465 (19.9)
	10 (254)	11,450 (50.9)	11,450 (50.9)	11,450 (50.9)	11,450 (50.9)	3,755 (16.7)	4,035 (17.9)	4,265 (19.0)	4,465 (19.9)
3/4	3-1/2 (89)	2,800 (12.5)	3,235 (14.4)	3,620 (16.1)	3,965 (17.6)	4,140 (18.4)	4,450 (19.8)	4,705 (20.9)	4,925 (21.9)
	4-1/2 (114)	4,085 (18.2)	4,715 (21.0)	5,275 (23.5)	5,780 (25.7)	4,140 (18.4)	4,450 (19.8)	4,705 (20.9)	4,925 (21.9)
	6-3/4 (171)	7,505 (33.4)	8,665 (38.5)	9,130 (40.6)	9,130 (40.6)	4,140 (18.4)	4,450 (19.8)	4,705 (20.9)	4,925 (21.9)
	10 (254)	13,525 (60.2)	13,525 (60.2)	13,525 (60.2)	13,525 (60.2)	4,140 (18.4)	4,450 (19.8)	4,705 (20.9)	4,925 (21.9)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor with no influence from nearby edges, hollow head joints, or additional anchors. For designs with the influence of nearby edges, hollow head joints, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.82.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by α_{sat}
3/8-in diameter - α_{sat} = 1.00
1/2-in diameter - α_{sat} = 0.93
5/8-in diameter - α_{sat} = 0.79
3/4-in diameter - α_{sat} = 0.65
7 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 3 — Hilti HIT-HY 200 V3 adhesive design strength with masonry / bond failure for threaded rod in the face of cracked fully grouted CMU walls[1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of pryout or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	2-3/8 (60)	1,105 (4.9)	1,275 (5.7)	1,275 (5.7)	1,275 (5.7)	1,190 (5.3)	1,370 (6.1)	1,370 (6.1)	1,370 (6.1)
	4-1/2 (114)	2,410 (10.7)	2,410 (10.7)	2,410 (10.7)	2,410 (10.7)	2,875 (12.8)	3,085 (13.7)	3,265 (14.5)	3,415 (15.2)
	6-3/4 (171)	3,620 (16.1)	3,620 (16.1)	3,620 (16.1)	3,620 (16.1)	2,875 (12.8)	3,085 (13.7)	3,265 (14.5)	3,415 (15.2)
	7-1/2 (191)	4,020 (17.9)	4,020 (17.9)	4,020 (17.9)	4,020 (17.9)	2,875 (12.8)	3,085 (13.7)	3,265 (14.5)	3,415 (15.2)
1/2	2-3/4 (70)	1,380 (6.1)	1,590 (7.1)	1,780 (7.9)	1,950 (8.7)	2,965 (13.2)	3,425 (15.2)	3,795 (16.9)	3,975 (17.7)
	4-1/2 (114)	2,885 (12.8)	3,330 (14.8)	3,635 (16.2)	3,635 (16.2)	3,340 (14.9)	3,590 (16.0)	3,795 (16.9)	3,975 (17.7)
	6-3/4 (171)	5,300 (23.6)	5,450 (24.2)	5,450 (24.2)	5,450 (24.2)	3,340 (14.9)	3,590 (16.0)	3,795 (16.9)	3,975 (17.7)
	10 (254)	8,075 (35.9)	8,075 (35.9)	8,075 (35.9)	8,075 (35.9)	3,340 (14.9)	3,590 (16.0)	3,795 (16.9)	3,975 (17.7)
5/8	3-1/8 (79)	1,670 (7.4)	1,925 (8.6)	2,155 (9.6)	2,290 (10.2)	3,595 (16.0)	4,035 (17.9)	4,265 (19.0)	4,465 (19.9)
	4-1/2 (114)	2,885 (12.8)	3,295 (14.7)	3,295 (14.7)	3,295 (14.7)	3,755 (16.7)	4,035 (17.9)	4,265 (19.0)	4,465 (19.9)
	6-3/4 (171)	4,945 (22.0)	4,945 (22.0)	4,945 (22.0)	4,945 (22.0)	3,755 (16.7)	4,035 (17.9)	4,265 (19.0)	4,465 (19.9)
	10 (254)	7,325 (32.6)	7,325 (32.6)	7,325 (32.6)	7,325 (32.6)	3,755 (16.7)	4,035 (17.9)	4,265 (19.0)	4,465 (19.9)
3/4	3-1/2 (89)	1,980 (8.8)	2,285 (10.2)	2,555 (11.4)	2,795 (12.4)	4,140 (18.4)	4,450 (19.8)	4,705 (20.9)	4,925 (21.9)
	4-1/2 (114)	2,885 (12.8)	3,330 (14.8)	3,620 (16.1)	3,620 (16.1)	4,140 (18.4)	4,450 (19.8)	4,705 (20.9)	4,925 (21.9)
	6-3/4 (171)	5,300 (23.6)	5,425 (24.1)	5,425 (24.1)	5,425 (24.1)	4,140 (18.4)	4,450 (19.8)	4,705 (20.9)	4,925 (21.9)
	10 (254)	8,040 (35.8)	8,040 (35.8)	8,040 (35.8)	8,040 (35.8)	4,140 (18.4)	4,450 (19.8)	4,705 (20.9)	4,925 (21.9)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor with no influence from nearby edges, hollow head joints, or additional anchors. For designs with the influence of nearby edges, hollow head joints, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using designequations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.82.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by α_{sat}
3/8-in diameter - α_{sat} = 1.00
1/2-in diameter - α_{sat} = 0.93
5/8-in diameter - α_{sat} = 0.79
3/4-in diameter - α_{sat} = 0.65
7 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by: 0.75.
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 4 — Hilti HIT-HY 200 V3 adhesive design strength with masonry / bond failure for threaded rod in the face of uncracked fully grouted CMU walls and installed 2-in from centerline of hollow head joint [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	2-3/8 (60)	1,010 (4.5)	1,120 (5.0)	1,120 (5.0)	1,120 (5.0)	1,085 (4.8)	1,210 (5.4)	1,210 (5.4)	1,210 (5.4)
	4-1/2 (114)	2,025 (9.0)	2,125 (9.5)	2,125 (9.5)	2,125 (9.5)	1,205 (5.4)	1,390 (6.2)	1,555 (6.9)	1,700 (7.6)
	6-3/4 (171)	3,185 (14.2)	3,185 (14.2)	3,185 (14.2)	3,185 (14.2)	1,205 (5.4)	1,390 (6.2)	1,555 (6.9)	1,700 (7.6)
	7-1/2 (191)	3,540 (15.7)	3,540 (15.7)	3,540 (15.7)	3,540 (15.7)	1,205 (5.4)	1,390 (6.2)	1,555 (6.9)	1,700 (7.6)
1/2	2-3/4 (70)	1,170 (5.2)	1,350 (6.0)	1,510 (6.7)	1,650 (7.3)	1,290 (5.7)	1,490 (6.6)	1,665 (7.4)	1,825 (8.1)
	4-1/2 (114)	2,025 (9.0)	2,335 (10.4)	2,610 (11.6)	2,730 (12.1)	1,390 (6.2)	1,605 (7.1)	1,795 (8.0)	1,965 (8.7)
	6-3/4 (171)	3,335 (14.8)	3,850 (17.1)	4,100 (18.2)	4,100 (18.2)	1,390 (6.2)	1,605 (7.1)	1,795 (8.0)	1,965 (8.7)
	10 (254)	5,585 (24.8)	6,070 (27.0)	6,070 (27.0)	6,070 (27.0)	1,390 (6.2)	1,605 (7.1)	1,795 (8.0)	1,965 (8.7)
5/8	3-1/8 (79)	1,340 (6.0)	1,545 (6.9)	1,725 (7.7)	1,880 (8.4)	1,415 (6.3)	1,635 (7.3)	1,825 (8.1)	2,000 (8.9)
	4-1/2 (114)	2,025 (9.0)	2,335 (10.4)	2,610 (11.6)	2,710 (12.1)	1,520 (6.8)	1,755 (7.8)	1,965 (8.7)	2,150 (9.6)
	6-3/4 (171)	3,335 (14.8)	3,850 (17.1)	4,065 (18.1)	4,065 (18.1)	1,555 (6.9)	1,795 (8.0)	2,005 (8.9)	2,195 (9.8)
	10 (254)	5,585 (24.8)	6,020 (26.8)	6,020 (26.8)	6,020 (26.8)	1,555 (6.9)	1,795 (8.0)	2,005 (8.9)	2,195 (9.8)
3/4	3-1/2 (89)	1,515 (6.7)	1,750 (7.8)	1,955 (8.7)	2,140 (9.5)	1,530 (6.8)	1,765 (7.9)	1,975 (8.8)	2,160 (9.6)
	4-1/2 (114)	2,025 (9.0)	2,335 (10.4)	2,610 (11.6)	2,860 (12.7)	1,605 (7.1)	1,855 (8.3)	2,075 (9.2)	2,270 (10.1)
	6-3/4 (171)	3,335 (14.8)	3,850 (17.1)	4,305 (19.1)	4,525 (20.1)	1,665 (7.4)	1,925 (8.6)	2,150 (9.6)	2,360 (10.5)
	10 (254)	5,585 (24.8)	6,450 (28.7)	6,705 (29.8)	6,705 (29.8)	1,665 (7.4)	1,925 (8.6)	2,150 (9.6)	2,360 (10.5)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor located 2-in from centerline of a hollow head joint with no additional influence from nearby edges or additional anchors. For designs with the influence of nearby edges, different distances to a hollow head joint, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.82.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by α_{sat}
3/8-in diameter - α_{sat} = 1.00
1/2-in diameter - α_{sat} = 0.93
5/8-in diameter - α_{sat} = 0.79
3/4-in diameter - α_{sat} = 0.65
7 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 5 — Hilti HIT-HY 200 V3 adhesive design strength with masonry / bond failure for threaded rod in the face of cracked fully grouted CMU walls and installed 2-in from centerline of hollow head joint [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	2-3/8 (60)	710 (3.2)	820 (3.6)	830 (3.7)	830 (3.7)	765 (3.4)	885 (3.9)	895 (4.0)	895 (4.0)
	4-1/2 (114)	1,430 (6.4)	1,570 (7.0)	1,570 (7.0)	1,570 (7.0)	860 (3.8)	995 (4.4)	1,110 (4.9)	1,215 (5.4)
	6-3/4 (171)	2,355 (10.5)	2,355 (10.5)	2,355 (10.5)	2,355 (10.5)	860 (3.8)	995 (4.4)	1,110 (4.9)	1,215 (5.4)
	7-1/2 (191)	2,620 (11.7)	2,620 (11.7)	2,620 (11.7)	2,620 (11.7)	860 (3.8)	995 (4.4)	1,110 (4.9)	1,215 (5.4)
1/2	2-3/4 (70)	825 (3.7)	950 (4.2)	1,065 (4.7)	1,165 (5.2)	920 (4.1)	1,065 (4.7)	1,190 (5.3)	1,300 (5.8)
	4-1/2 (114)	1,430 (6.4)	1,650 (7.3)	1,845 (8.2)	2,010 (8.9)	995 (4.4)	1,145 (5.1)	1,280 (5.7)	1,405 (6.2)
	6-3/4 (171)	2,355 (10.5)	2,720 (12.1)	3,020 (13.4)	3,020 (13.4)	995 (4.4)	1,145 (5.1)	1,280 (5.7)	1,405 (6.2)
	10 (254)	3,940 (17.5)	4,470 (19.9)	4,470 (19.9)	4,470 (19.9)	995 (4.4)	1,145 (5.1)	1,280 (5.7)	1,405 (6.2)
5/8	3-1/8 (79)	945 (4.2)	1,090 (4.8)	1,205 (5.4)	1,205 (5.4)	1,010 (4.5)	1,165 (5.2)	1,305 (5.8)	1,430 (6.4)
	4-1/2 (114)	1,430 (6.4)	1,650 (7.3)	1,735 (7.7)	1,735 (7.7)	1,085 (4.8)	1,255 (5.6)	1,405 (6.2)	1,535 (6.8)
	6-3/4 (171)	2,355 (10.5)	2,600 (11.6)	2,600 (11.6)	2,600 (11.6)	1,110 (4.9)	1,280 (5.7)	1,435 (6.4)	1,570 (7.0)
	10 (254)	3,855 (17.1)	3,855 (17.1)	3,855 (17.1)	3,855 (17.1)	1,110 (4.9)	1,280 (5.7)	1,435 (6.4)	1,570 (7.0)
3/4	3-1/2 (89)	1,070 (4.8)	1,235 (5.5)	1,380 (6.1)	1,395 (6.2)	1,090 (4.8)	1,260 (5.6)	1,410 (6.3)	1,545 (6.9)
	4-1/2 (114)	1,430 (6.4)	1,650 (7.3)	1,795 (8.0)	1,795 (8.0)	1,150 (5.1)	1,325 (5.9)	1,480 (6.6)	1,625 (7.2)
	6-3/4 (171)	2,355 (10.5)	2,690 (12.0)	2,690 (12.0)	2,690 (12.0)	1,190 (5.3)	1,375 (6.1)	1,535 (6.8)	1,685 (7.5)
	10 (254)	3,940 (17.5)	3,985 (17.7)	3,985 (17.7)	3,985 (17.7)	1,190 (5.3)	1,375 (6.1)	1,535 (6.8)	1,685 (7.5)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.

2 Tabular values are for a single anchor located 2-in from centerline of a hollow head joint with no additional influence from nearby edges or additional anchors. For designs with the influence of nearby edges, different distances to a hollow head joint, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.

3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.

4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.

5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.82.

6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by α_{sat}
3/8-in diameter - α_{sat} = 1.00
1/2-in diameter - α_{sat} = 0.93
5/8-in diameter - α_{sat} = 0.79
3/4-in diameter - α_{sat} = 0.65

7 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by: 0.75.

8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 6 — Hilti HIT-HY 200 V3 adhesive design strength with masonry / bond failure for threaded rod in the top of uncracked fully grouted CMU walls and installed at minimum edge distance parallel with masonry course [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
1/2	2-3/4 (70)	445 (2.0)	445 (2.0)	445 (2.0)	445 (2.0)	960 (4.3)	960 (4.3)	960 (4.3)	960 (4.3)
	4-1/2 (114)	730 (3.2)	730 (3.2)	730 (3.2)	730 (3.2)	1,320 (5.9)	1,520 (6.8)	1,575 (7.0)	1,575 (7.0)
	6-3/4 (171)	1,095 (4.9)	1,095 (4.9)	1,095 (4.9)	1,095 (4.9)	1,320 (5.9)	1,520 (6.8)	1,700 (7.6)	1,865 (8.3)
	10 (254)	1,625 (7.2)	1,625 (7.2)	1,625 (7.2)	1,625 (7.2)	1,320 (5.9)	1,520 (6.8)	1,700 (7.6)	1,865 (8.3)
5/8	3-1/8 (79)	580 (2.6)	580 (2.6)	580 (2.6)	580 (2.6)	1,250 (5.6)	1,250 (5.6)	1,250 (5.6)	1,250 (5.6)
	4-1/2 (114)	835 (3.7)	835 (3.7)	835 (3.7)	835 (3.7)	1,445 (6.4)	1,665 (7.4)	1,805 (8.0)	1,805 (8.0)
	6-3/4 (171)	1,255 (5.6)	1,255 (5.6)	1,255 (5.6)	1,255 (5.6)	1,475 (6.6)	1,700 (7.6)	1,905 (8.5)	2,085 (9.3)
	10 (254)	1,860 (8.3)	1,860 (8.3)	1,860 (8.3)	1,860 (8.3)	1,475 (6.6)	1,700 (7.6)	1,905 (8.5)	2,085 (9.3)
3/4	3-1/2 (89)	735 (3.3)	735 (3.3)	735 (3.3)	735 (3.3)	1,580 (7.0)	1,580 (7.0)	1,580 (7.0)	1,580 (7.0)
	4-1/2 (114)	945 (4.2)	945 (4.2)	945 (4.2)	945 (4.2)	2,035 (9.1)	2,035 (9.1)	2,035 (9.1)	2,035 (9.1)
	6-3/4 (171)	1,415 (6.3)	1,415 (6.3)	1,415 (6.3)	1,415 (6.3)	3,050 (13.6)	3,050 (13.6)	3,050 (13.6)	3,050 (13.6)
	10 (254)	2,095 (9.3)	2,095 (9.3)	2,095 (9.3)	2,095 (9.3)	3,115 (13.9)	3,600 (16.0)	4,020 (17.9)	4,405 (19.6)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.

2 Tabular values are for a single anchor located at minimum edge of 1-3/4-in (2-3/4-in for 3/4-in diameter) from edge parallel with masonry course with no additional influence from nearby edges or additional anchors. For designs with the additional influence of nearby edges, a different edge distance, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.

3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.

4 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.82.

5 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by α_{sat}
1/2-in diameter - α_{sat} = 0.93
5/8-in diameter - α_{sat} = 0.79
3/4-in diameter - α_{sat} = 0.65

6 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by: 0.75.

7 Tabular shear values are for shear force parallel to the edge parallel with the masonry course. For shear force perpendicular to the edge parallel with the masonry course, multiply design strength values in shear by the following reduction factors:
1/2-in and 5/8-in. diameter = 0.50
3/4-in diameter = 0.46

8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 7 — Hilti HIT-HY 200 V3 adhesive design strength with masonry / bond failure for threaded rod in the top of cracked fully grouted CMU walls and installed at minimum edge distance parallel with masonry course [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦNn				Shear (lesser of breakout, pryout, or crushing) — ΦVn			
		f′m = 1500 psi (10.3 MPa) lb (kN)	f′m = 2000 psi (13.8 MPa) lb (kN)	f′m = 2500 psi (17.2 MPa) lb (kN)	f′m = 3000 psi (20.7 MPa) lb (kN)	f′m = 1500 psi (10.3 MPa) lb (kN)	f′m = 2000 psi (13.8 MPa) lb (kN)	f′m = 2500 psi (17.2 MPa) lb (kN)	f′m = 3000 psi (20.7 MPa) lb (kN)
1/2	2-3/4 (70)	330 (1.5)	330 (1.5)	330 (1.5)	330 (1.5)	710 (3.2)	710 (3.2)	710 (3.2)	710 (3.2)
	4-1/2 (114)	540 (2.4)	540 (2.4)	540 (2.4)	540 (2.4)	940 (4.2)	1,085 (4.8)	1,165 (5.2)	1,165 (5.2)
	6-3/4 (171)	810 (3.6)	810 (3.6)	810 (3.6)	810 (3.6)	940 (4.2)	1,085 (4.8)	1,215 (5.4)	1,330 (5.9)
	10 (254)	1,200 (5.3)	1,200 (5.3)	1,200 (5.3)	1,200 (5.3)	940 (4.2)	1,085 (4.8)	1,215 (5.4)	1,330 (5.9)
5/8	3-1/8 (79)	430 (1.9)	430 (1.9)	430 (1.9)	430 (1.9)	920 (4.1)	920 (4.1)	920 (4.1)	920 (4.1)
	4-1/2 (114)	615 (2.7)	615 (2.7)	615 (2.7)	615 (2.7)	1,030 (4.6)	1,190 (5.3)	1,330 (5.9)	1,330 (5.9)
	6-3/4 (171)	925 (4.1)	925 (4.1)	925 (4.1)	925 (4.1)	1,055 (4.7)	1,215 (5.4)	1,360 (6.0)	1,490 (6.6)
	10 (254)	1,370 (6.1)	1,370 (6.1)	1,370 (6.1)	1,370 (6.1)	1,055 (4.7)	1,215 (5.4)	1,360 (6.0)	1,490 (6.6)
3/4	3-1/2 (89)	470 (2.1)	470 (2.1)	470 (2.1)	470 (2.1)	1,010 (4.5)	1,010 (4.5)	1,010 (4.5)	1,010 (4.5)
	4-1/2 (114)	605 (2.7)	605 (2.7)	605 (2.7)	605 (2.7)	1,300 (5.8)	1,300 (5.8)	1,300 (5.8)	1,300 (5.8)
	6-3/4 (171)	905 (4.0)	905 (4.0)	905 (4.0)	905 (4.0)	1,950 (8.7)	1,950 (8.7)	1,950 (8.7)	1,950 (8.7)
	10 (254)	1,340 (6.0)	1,340 (6.0)	1,340 (6.0)	1,340 (6.0)	2,225 (9.9)	2,570 (11.4)	2,875 (12.8)	2,890 (12.9)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.

2 Tabular values are for a single anchor located at minimum edge of 1-3/4-in (2-3/4-in for 3/4-in diameter) from edge parallel with masonry course with no additional influence from nearby edges or additional anchors. For designs with the additional influence of nearby edges, a different edge distance, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.

3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.

4 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.82.

5 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by α_{sat}
1/2-in diameter - α_{sat} = 0.93
5/8-in diameter - α_{sat} = 0.79
3/4-in diameter - α_{sat} = 0.65

6 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by: 0.75.

7 Tabular shear values are for shear force parallel to the edge parallel with the masonry course. For shear force perpendicular to the edge parallel with the masonry course, multiply design strength values in shear by the following reduction factors:
1/2-in and 5/8-in. diameter = 0.50
3/4-in diameter = 0.46

8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 8 — Hilti HIT-HY 200 V3 adhesive design strength with masonry / bond failure for rebar in the face of uncracked fully grouted CMU walls [1,2,3,4,5,6,7,8]

Rebar Size	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of pryout or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
#3	2-3/8 (60)	1,265 (5.6)	1,265 (5.6)	1,265 (5.6)	1,265 (5.6)	1,365 (6.1)	1,365 (6.1)	1,365 (6.1)	1,365 (6.1)
	4-1/2 (114)	2,400 (10.7)	2,400 (10.7)	2,400 (10.7)	2,400 (10.7)	3,135 (13.9)	3,370 (15.0)	3,565 (15.9)	3,730 (16.6)
	6-3/4 (171)	3,600 (16.0)	3,600 (16.0)	3,600 (16.0)	3,600 (16.0)	3,135 (13.9)	3,370 (15.0)	3,565 (15.9)	3,730 (16.6)
	7-1/2 (191)	3,995 (17.8)	3,995 (17.8)	3,995 (17.8)	3,995 (17.8)	3,135 (13.9)	3,370 (15.0)	3,565 (15.9)	3,730 (16.6)
#4	2-3/4 (70)	1,950 (8.7)	2,255 (10.0)	2,520 (11.2)	2,525 (11.2)	3,640 (16.2)	3,915 (17.4)	4,140 (18.4)	4,330 (19.3)
	4-1/2 (114)	4,085 (18.2)	4,130 (18.4)	4,130 (18.4)	4,130 (18.4)	3,640 (16.2)	3,915 (17.4)	4,140 (18.4)	4,330 (19.3)
	6-3/4 (171)	6,195 (27.6)	6,195 (27.6)	6,195 (27.6)	6,195 (27.6)	3,640 (16.2)	3,915 (17.4)	4,140 (18.4)	4,330 (19.3)
	10 (254)	9,180 (40.8)	9,180 (40.8)	9,180 (40.8)	9,180 (40.8)	3,640 (16.2)	3,915 (17.4)	4,140 (18.4)	4,330 (19.3)
#5	3-1/8 (79)	2,365 (10.5)	2,730 (12.1)	3,050 (13.6)	3,340 (14.9)	4,065 (18.1)	4,365 (19.4)	4,615 (20.5)	4,830 (21.5)
	4-1/2 (114)	4,085 (18.2)	4,715 (21.0)	4,815 (21.4)	4,815 (21.4)	4,065 (18.1)	4,365 (19.4)	4,615 (20.5)	4,830 (21.5)
	6-3/4 (171)	7,220 (32.1)	7,220 (32.1)	7,220 (32.1)	7,220 (32.1)	4,065 (18.1)	4,365 (19.4)	4,615 (20.5)	4,830 (21.5)
	10 (254)	10,695 (47.6)	10,695 (47.6)	10,695 (47.6)	10,695 (47.6)	4,065 (18.1)	4,365 (19.4)	4,615 (20.5)	4,830 (21.5)
#6	3-1/2 (89)	2,800 (12.5)	3,235 (14.4)	3,620 (16.1)	3,965 (17.6)	4,435 (19.7)	4,765 (21.2)	5,040 (22.4)	5,275 (23.5)
	4-1/2 (114)	4,085 (18.2)	4,715 (21.0)	5,140 (22.9)	5,140 (22.9)	4,435 (19.7)	4,765 (21.2)	5,040 (22.4)	5,275 (23.5)
	6-3/4 (171)	7,505 (33.4)	7,710 (34.3)	7,710 (34.3)	7,710 (34.3)	4,435 (19.7)	4,765 (21.2)	5,040 (22.4)	5,275 (23.5)
	10 (254)	11,425 (50.8)	11,425 (50.8)	11,425 (50.8)	11,425 (50.8)	4,435 (19.7)	4,765 (21.2)	5,040 (22.4)	5,275 (23.5)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.

2 Tabular values are for a single anchor with no influence from nearby edges, hollow head joints, or additional anchors. For designs with the influence of nearby edges, hollow head joints, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.

3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.

4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.

5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.82.

6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by α_{sat}
#3 rebar - α_{sat} = 1.00
#4 rebar - α_{sat} = 0.93
#5 rebar - α_{sat} = 0.79
#6 rebar - α_{sat} = 0.65

7 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.

8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 9 — Hilti HIT-HY 200 V3 adhesive design strength with masonry / bond failure for rebar in the face of cracked fully grouted CMU walls [1,2,3,4,5,6,7,8]

Rebar Size	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of pryout or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
#3	2-3/8 (60)	1,105 (4.9)	1,120 (5.0)	1,120 (5.0)	1,120 (5.0)	1,190 (5.3)	1,210 (5.4)	1,210 (5.4)	1,210 (5.4)
	4-1/2 (114)	2,125 (9.5)	2,125 (9.5)	2,125 (9.5)	2,125 (9.5)	3,135 (13.9)	3,370 (15.0)	3,565 (15.9)	3,730 (16.6)
	6-3/4 (171)	3,190 (14.2)	3,190 (14.2)	3,190 (14.2)	3,190 (14.2)	3,135 (13.9)	3,370 (15.0)	3,565 (15.9)	3,730 (16.6)
	7-1/2 (191)	3,545 (15.8)	3,545 (15.8)	3,545 (15.8)	3,545 (15.8)	3,135 (13.9)	3,370 (15.0)	3,565 (15.9)	3,730 (16.6)
#4	2-3/4 (70)	1,380 (6.1)	1,590 (7.1)	1,770 (7.9)	1,770 (7.9)	2,965 (13.2)	3,425 (15.2)	3,815 (17.0)	3,815 (17.0)
	4-1/2 (114)	2,885 (12.8)	2,900 (12.9)	2,900 (12.9)	2,900 (12.9)	3,640 (16.2)	3,915 (17.4)	4,140 (18.4)	4,330 (19.3)
	6-3/4 (171)	4,350 (19.3)	4,350 (19.3)	4,350 (19.3)	4,350 (19.3)	3,640 (16.2)	3,915 (17.4)	4,140 (18.4)	4,330 (19.3)
	10 (254)	6,445 (28.7)	6,445 (28.7)	6,445 (28.7)	6,445 (28.7)	3,640 (16.2)	3,915 (17.4)	4,140 (18.4)	4,330 (19.3)
#5	3-1/8 (79)	1,670 (7.4)	1,715 (7.6)	1,715 (7.6)	1,715 (7.6)	3,595 (16.0)	3,695 (16.4)	3,695 (16.4)	3,695 (16.4)
	4-1/2 (114)	2,470 (11.0)	2,470 (11.0)	2,470 (11.0)	2,470 (11.0)	4,065 (18.1)	4,365 (19.4)	4,615 (20.5)	4,830 (21.5)
	6-3/4 (171)	3,705 (16.5)	3,705 (16.5)	3,705 (16.5)	3,705 (16.5)	4,065 (18.1)	4,365 (19.4)	4,615 (20.5)	4,830 (21.5)
	10 (254)	5,490 (24.4)	5,490 (24.4)	5,490 (24.4)	5,490 (24.4)	4,065 (18.1)	4,365 (19.4)	4,615 (20.5)	4,830 (21.5)
#6	3-1/2 (89)	1,980 (8.8)	2,285 (10.2)	2,555 (11.4)	2,795 (12.4)	4,260 (18.9)	4,765 (21.2)	5,040 (22.4)	5,275 (23.5)
	4-1/2 (114)	2,885 (12.8)	3,330 (14.8)	3,725 (16.6)	4,080 (18.1)	4,435 (19.7)	4,765 (21.2)	5,040 (22.4)	5,275 (23.5)
	6-3/4 (171)	5,300 (23.6)	6,115 (27.2)	6,840 (30.4)	7,490 (33.3)	4,435 (19.7)	4,765 (21.2)	5,040 (22.4)	5,275 (23.5)
	10 (254)	9,555 (42.5)	11,030 (49.1)	11,425 (50.8)	11,425 (50.8)	4,435 (19.7)	4,765 (21.2)	5,040 (22.4)	5,275 (23.5)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.

2 Tabular values are for a single anchor with no influence from nearby edges, hollow head joints, or additional anchors. For designs with the influence of nearby edges, hollow head joints, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.

3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.

4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.

5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.82.

6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by α_{sat}
#3 rebar - α_{sat} = 1.00
#4 rebar - α_{sat} = 0.93
#5 rebar - α_{sat} = 0.79
#6 rebar - α_{sat} = 0.65

7 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by: 0.75.

8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 10 — Hilti HIT-HY 200 V3 adhesive design strength with masonry / bond failure for rebar in the face of uncracked fully grouted CMU walls and installed 2-in from centerline of hollow head joint [1,2,3,4,5,6,7,8]

Rebar Size	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) - ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
#3	2-3/8 (60)	900 (4.0)	900 (4.0)	900 (4.0)	900 (4.0)	965 (4.3)	965 (4.3)	965 (4.3)	965 (4.3)
	4-1/2 (114)	1,700 (7.6)	1,700 (7.6)	1,700 (7.6)	1,700 (7.6)	1,205 (5.4)	1,390 (6.2)	1,555 (6.9)	1,700 (7.6)
	6-3/4 (171)	2,550 (11.3)	2,550 (11.3)	2,550 (11.3)	2,550 (11.3)	1,205 (5.4)	1,390 (6.2)	1,555 (6.9)	1,700 (7.6)
	7-1/2 (191)	2,835 (12.6)	2,835 (12.6)	2,835 (12.6)	2,835 (12.6)	1,205 (5.4)	1,390 (6.2)	1,555 (6.9)	1,700 (7.6)
#4	2-3/4 (70)	1,170 (5.2)	1,350 (6.0)	1,450 (6.4)	1,450 (6.4)	1,290 (5.7)	1,490 (6.6)	1,665 (7.4)	1,825 (8.1)
	4-1/2 (114)	2,025 (9.0)	2,335 (10.4)	2,375 (10.6)	2,375 (10.6)	1,390 (6.2)	1,605 (7.1)	1,795 (8.0)	1,965 (8.7)
	6-3/4 (171)	3,335 (14.8)	3,560 (15.8)	3,560 (15.8)	3,560 (15.8)	1,390 (6.2)	1,605 (7.1)	1,795 (8.0)	1,965 (8.7)
	10 (254)	5,275 (23.5)	5,275 (23.5)	5,275 (23.5)	5,275 (23.5)	1,390 (6.2)	1,605 (7.1)	1,795 (8.0)	1,965 (8.7)
#5	3-1/8 (79)	1,340 (6.0)	1,545 (6.9)	1,725 (7.7)	1,780 (7.9)	1,415 (6.3)	1,635 (7.3)	1,825 (8.1)	2,000 (8.9)
	4-1/2 (114)	2,025 (9.0)	2,335 (10.4)	2,565 (11.4)	2,565 (11.4)	1,520 (6.8)	1,755 (7.8)	1,965 (8.7)	2,150 (9.6)
	6-3/4 (171)	3,335 (14.8)	3,845 (17.1)	3,845 (17.1)	3,845 (17.1)	1,555 (6.9)	1,795 (8.0)	2,005 (8.9)	2,195 (9.8)
	10 (254)	5,585 (24.8)	5,695 (25.3)	5,695 (25.3)	5,695 (25.3)	1,555 (6.9)	1,795 (8.0)	2,005 (8.9)	2,195 (9.8)
#6	3-1/2 (89)	1,515 (6.7)	1,750 (7.8)	1,955 (8.7)	2,040 (9.1)	1,530 (6.8)	1,765 (7.9)	1,975 (8.8)	2,160 (9.6)
	4-1/2 (114)	2,025 (9.0)	2,335 (10.4)	2,610 (11.6)	2,620 (11.7)	1,605 (7.1)	1,855 (8.3)	2,075 (9.2)	2,270 (10.1)
	6-3/4 (171)	3,335 (14.8)	3,850 (17.1)	3,930 (17.5)	3,930 (17.5)	1,665 (7.4)	1,925 (8.6)	2,150 (9.6)	2,360 (10.5)
	10 (254)	5,585 (24.8)	5,825 (25.9)	5,825 (25.9)	5,825 (25.9)	1,665 (7.4)	1,925 (8.6)	2,150 (9.6)	2,360 (10.5)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor located 2-in from centerline of a hollow head joint with no additional influence from nearby edges or additional anchors. For designs with the influence of nearby edges, different distances to a hollow head joint, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.82.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by α_{sat}
#3 rebar - α_{sat} = 1.00
#4 rebar - α_{sat} = 0.93
#5 rebar - α_{sat} = 0.79
#6 rebar - α_{sat} = 0.65
7 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 11 — Hilti HIT-HY 200 V3 adhesive design strength with masonry / bond failure for rebar in the face of cracked fully grouted CMU walls and installed 2-in from centerline of hollow head joint [1,2,3,4,5,6,7,8]

Rebar Size	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) - ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
#3	2-3/8 (60)	710 (3.2)	795 (3.5)	795 (3.5)	795 (3.5)	765 (3.4)	855 (3.8)	855 (3.8)	855 (3.8)
	4-1/2 (114)	1,430 (6.4)	1,510 (6.7)	1,510 (6.7)	1,510 (6.7)	860 (3.8)	995 (4.4)	1,110 (4.9)	1,215 (5.4)
	6-3/4 (171)	2,260 (10.1)	2,260 (10.1)	2,260 (10.1)	2,260 (10.1)	860 (3.8)	995 (4.4)	1,110 (4.9)	1,215 (5.4)
	7-1/2 (191)	2,515 (11.2)	2,515 (11.2)	2,515 (11.2)	2,515 (11.2)	860 (3.8)	995 (4.4)	1,110 (4.9)	1,215 (5.4)
#4	2-3/4 (70)	825 (3.7)	950 (4.2)	1,020 (4.5)	1,020 (4.5)	920 (4.1)	1,065 (4.7)	1,190 (5.3)	1,300 (5.8)
	4-1/2 (114)	1,430 (6.4)	1,650 (7.3)	1,665 (7.4)	1,665 (7.4)	995 (4.4)	1,145 (5.1)	1,280 (5.7)	1,405 (6.2)
	6-3/4 (171)	2,355 (10.5)	2,500 (11.1)	2,500 (11.1)	2,500 (11.1)	995 (4.4)	1,145 (5.1)	1,280 (5.7)	1,405 (6.2)
	10 (254)	3,700 (16.5)	3,700 (16.5)	3,700 (16.5)	3,700 (16.5)	995 (4.4)	1,145 (5.1)	1,280 (5.7)	1,405 (6.2)
#5	3-1/8 (79)	915 (4.1)	915 (4.1)	915 (4.1)	915 (4.1)	1,010 (4.5)	1,165 (5.2)	1,305 (5.8)	1,430 (6.4)
	4-1/2 (114)	1,315 (5.8)	1,315 (5.8)	1,315 (5.8)	1,315 (5.8)	1,085 (4.8)	1,255 (5.6)	1,405 (6.2)	1,535 (6.8)
	6-3/4 (171)	1,975 (8.8)	1,975 (8.8)	1,975 (8.8)	1,975 (8.8)	1,110 (4.9)	1,280 (5.7)	1,435 (6.4)	1,570 (7.0)
	10 (254)	2,925 (13.0)	2,925 (13.0)	2,925 (13.0)	2,925 (13.0)	1,110 (4.9)	1,280 (5.7)	1,435 (6.4)	1,570 (7.0)
#6	3-1/2 (89)	1,070 (4.8)	1,235 (5.5)	1,380 (6.1)	1,510 (6.7)	1,090 (4.8)	1,260 (5.6)	1,410 (6.3)	1,545 (6.9)
	4-1/2 (114)	1,430 (6.4)	1,650 (7.3)	1,845 (8.2)	2,020 (9.0)	1,150 (5.1)	1,325 (5.9)	1,480 (6.6)	1,625 (7.2)
	6-3/4 (171)	2,355 (10.5)	2,720 (12.1)	3,040 (13.5)	3,330 (14.8)	1,190 (5.3)	1,375 (6.1)	1,535 (6.8)	1,685 (7.5)
	10 (254)	3,940 (17.5)	4,550 (20.2)	5,090 (22.6)	5,575 (24.8)	1,190 (5.3)	1,375 (6.1)	1,535 (6.8)	1,685 (7.5)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.

2 Tabular values are for a single anchor located 2-in from centerline of a hollow head joint with no additional influence from nearby edges or additional anchors. For designs with the influence of nearby edges, different distances to a hollow head joint, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.

3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.

4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.

5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.82.

6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by α_{sat}
#3 rebar - α_{sat} = 1.00
#4 rebar - α_{sat} = 0.93
#5 rebar - α_{sat} = 0.79
#6 rebar - α_{sat} = 0.65

7 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by: 0.75.

8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 12— Hilti HIT-HY 200 V3 adhesive design strength with masonry / bond failure for rebar in the top of uncracked fully grouted CMU walls and installed at minimum edge distance parallel with masonry course [1,2,3,4,5,6,7,8]

Rebar Size	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) - ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
#4	2-3/4 (70)	670 (3.0)	670 (3.0)	670 (3.0)	670 (3.0)	1,225 (5.4)	1,410 (6.3)	1,445 (6.4)	1,445 (6.4)
	4-1/2 (114)	1,100 (4.9)	1,100 (4.9)	1,100 (4.9)	1,100 (4.9)	1,320 (5.9)	1,520 (6.8)	1,700 (7.6)	1,865 (8.3)
	6-3/4 (171)	1,650 (7.3)	1,650 (7.3)	1,650 (7.3)	1,650 (7.3)	1,320 (5.9)	1,520 (6.8)	1,700 (7.6)	1,865 (8.3)
	10 (254)	2,440 (10.9)	2,440 (10.9)	2,440 (10.9)	2,440 (10.9)	1,320 (5.9)	1,520 (6.8)	1,700 (7.6)	1,865 (8.3)
#5	3-1/8 (79)	790 (3.5)	790 (3.5)	790 (3.5)	790 (3.5)	1,340 (6.0)	1,550 (6.9)	1,705 (7.6)	1,705 (7.6)
	4-1/2 (114)	1,140 (5.1)	1,140 (5.1)	1,140 (5.1)	1,140 (5.1)	1,445 (6.4)	1,665 (7.4)	1,865 (8.3)	2,040 (9.1)
	6-3/4 (171)	1,710 (7.6)	1,710 (7.6)	1,710 (7.6)	1,710 (7.6)	1,475 (6.6)	1,700 (7.6)	1,905 (8.5)	2,085 (9.3)
	10 (254)	2,530 (11.3)	2,530 (11.3)	2,530 (11.3)	2,530 (11.3)	1,475 (6.6)	1,700 (7.6)	1,905 (8.5)	2,085 (9.3)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor located at minimum edge of 1-3/4-in (2-3/4-in for 3/4-in diameter) from edge parallel with masonry course with no additional influence from nearby edges or additional anchors. For designs with the additional influence of nearby edges, a different edge distance, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.82.
5 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by α_{sat}
#4 rebar - α_{sat} = 0.93
#5 rebar - α_{sat} = 0.79
6 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by: 0.75.
7 Tabular shear values are for shear force parallel to the edge parallel with the masonry course. For shear force perpendicular to the edge parallel with the masonry course, multiply design strength values by 0.50.
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 13 — Hilti HIT-HY 200 V3 adhesive design strength with masonry / bond failure for rebar in the top of cracked fully grouted CMU walls and installed at minimum edge distance parallel with masonry course [1,2,3,4,5,6,7,8]

Rebar Size	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) - ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
#4	2-3/4 (70)	470 (2.1)	470 (2.1)	470 (2.1)	470 (2.1)	875 (3.9)	1,010 (4.5)	1,015 (4.5)	1,015 (4.5)
	4-1/2 (114)	770 (3.4)	770 (3.4)	770 (3.4)	770 (3.4)	940 (4.2)	1,085 (4.8)	1,215 (5.4)	1,330 (5.9)
	6-3/4 (171)	1,155 (5.1)	1,155 (5.1)	1,155 (5.1)	1,155 (5.1)	940 (4.2)	1,085 (4.8)	1,215 (5.4)	1,330 (5.9)
	10 (254)	1,715 (7.6)	1,715 (7.6)	1,715 (7.6)	1,715 (7.6)	940 (4.2)	1,085 (4.8)	1,215 (5.4)	1,330 (5.9)
#5	3-1/8 (79)	405 (1.8)	405 (1.8)	405 (1.8)	405 (1.8)	875 (3.9)	875 (3.9)	875 (3.9)	875 (3.9)
	4-1/2 (114)	585 (2.6)	585 (2.6)	585 (2.6)	585 (2.6)	1,030 (4.6)	1,190 (5.3)	1,260 (5.6)	1,260 (5.6)
	6-3/4 (171)	875 (3.9)	875 (3.9)	875 (3.9)	875 (3.9)	1,055 (4.7)	1,215 (5.4)	1,360 (6.0)	1,490 (6.6)
	10 (254)	1,300 (5.8)	1,300 (5.8)	1,300 (5.8)	1,300 (5.8)	1,055 (4.7)	1,215 (5.4)	1,360 (6.0)	1,490 (6.6)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor located at minimum edge of 1-3/4-in (2-3/4-in for 3/4-in diameter) from edge parallel with masonry course with no additional influence from nearby edges or additional anchors. For designs with the additional influence of nearby edges, a different edge distance, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.82.
5 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by α_{sat}
#4 rebar - α_{sat} = 0.93
#5 rebar - α_{sat} = 0.79
6 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by: 0.75.
7 Tabular shear values are for shear force parallel to the edge parallel with the masonry course. For shear force perpendicular to the edge parallel with the masonry course, multiply design strength values by 0.50.
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 14 — Hilti HIT-HY 200 V3 adhesive design strength with masonry / bond failure for HIS-(R)N in the face of uncracked fully grouted CMU walls [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) - ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	4-3/8 (111)	2,285 (10.2)	2,285 (10.2)	2,285 (10.2)	2,285 (10.2)	3,535 (15.7)	3,800 (16.9)	4,020 (17.9)	4,205 (18.7)
1/2	5 (127)	4,785 (21.3)	5,525 (24.6)	5,855 (26.0)	5,855 (26.0)	3,825 (17.0)	4,110 (18.3)	4,345 (19.3)	4,545 (20.2)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor with no influence from nearby edges, hollow head joints, or additional anchors. For designs with the influence of nearby edges, hollow head joints, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.82.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by α_{sat}
3/8-in and 1/2-in diameter - α_{sat} = 0.65
7 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 15 —Hilti HIT-HY 200 V3 adhesive design strength with masonry / bond failure for HIS-(R)N in the face of cracked fully grouted CMU walls [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) - ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	4-3/8 (111)	1,705 (7.6)	1,705 (7.6)	1,705 (7.6)	1,705 (7.6)	3,535 (15.7)	3,670 (16.3)	3,670 (16.3)	3,670 (16.3)
1/2	5 (127)	3,375 (15.0)	3,900 (17.3)	4,360 (19.4)	4,775 (21.2)	3,825 (17.0)	4,110 (18.3)	4,345 (19.3)	4,545 (20.2)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor with no influence from nearby edges, hollow head joints, or additional anchors. For designs with the influence of nearby edges, hollow head joints, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.82.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by α_{sat}
3/8-in and 1/2-in diameter - α_{sat} = 0.65
7 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by α_{seis}
3/8-in diameter - α_{seis} = 0.58
1/2-in diameter - α_{seis} = 0.75
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 16 — Hilti HIT-HY 200 V3 adhesive design strength with masonry / bond failure for HIS-(R)N in the face of uncracked fully grouted CMU walls and installed 2-in from centerline of hollow head joint [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) - ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	4-3/8 (111)	1,395 (6.2)	1,395 (6.2)	1,395 (6.2)	1,395 (6.2)	1,520 (6.8)	1,755 (7.8)	1,965 (8.7)	2,150 (9.6)
1/2	5 (127)	2,295 (10.2)	2,650 (11.8)	2,935 (13.1)	2,935 (13.1)	1,665 (7.4)	1,925 (8.6)	2,150 (9.6)	2,360 (10.5)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.

2 Tabular values are for a single anchor located 2-in from centerline of a hollow head joint with no additional influence from nearby edges or additional anchors. For designs with the influence of nearby edges, different distances to a hollow head joint, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.

3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.

4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.

5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.82.

6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by α_{sat}
3/8-in and 1/2-in diameter - α_{sat} = 0.65

7 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.

8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 17 — Hilti HIT-HY 200 V3 adhesive design strength with masonry / bond failure for HIS-(R)N in the face of cracked fully grouted CMU walls and installed 2-in from centerline of hollow head joint [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) - ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	4-3/8 (111)	1,040 (4.6)	1,040 (4.6)	1,040 (4.6)	1,040 (4.6)	1,085 (4.8)	1,255 (5.6)	1,405 (6.2)	1,535 (6.8)
1/2	5 (127)	1,620 (7.2)	1,870 (8.3)	2,090 (9.3)	2,290 (10.2)	1,190 (5.3)	1,375 (6.1)	1,535 (6.8)	1,685 (7.5)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.

2 Tabular values are for a single anchor located 2-in from centerline of a hollow head joint with no additional influence from nearby edges or additional anchors. For designs with the influence of nearby edges, different distances to a hollow head joint, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.

3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.

4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.

5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.82.

6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by α_{sat}
3/8-in and 1/2-in diameter - α_{sat} = 0.65

7 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by α_{seis}
3/8-in diameter - α_{seis} = 0.58
1/2-in diameter - α_{seis} = 0.75

8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

INSTALLATION INSTRUCTIONS

Installation Instructions For Use (IFU) are included with each product package. They can also be viewed or downloaded online at www.hilti.com. 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.

MATERIAL SPECIFICATIONS

Figure 3 — Hilti HIT-HY 200 A/R V3 adhesive cure time and working time (approx.)

HIT-HY 200-A					
		HAS / HIS-N / Rebar		HIT-Z [1]	
[°C]	[°F]	t_{work}	t_{cure}	t_{work}	t_{cure}
-10...-5	14...23	1.5 h	7 h	–	–
-4...0	24...32	50 min	4 h	–	–
1...5	33...41	25 min	2 h	–	–
6...10	42...50	15 min	1.25 h	15 min	1.25 h
11...20	51...68	7 min	45 min	7 min	45 min
21...30	69...86	4 min	30 min	4 min	30 min
31...40	87...104	3 min	30 min	3 min	30 min

HIT-HY 200-R					
		HAS / HIS-N / Rebar		HIT-Z [1]	
[°C]	[°F]	t_{work}	t_{cure}	t_{work}	t_{cure}
-10...-5	14...23	3 h	20 h	–	–
-4...0	24...32	2 h	8 h	–	–
1...5	33...41	1 h	4 h	–	–
6...10	42...50	40 min	2.5 h	40 min	2.5 h
11...20	51...68	15 min	1.5 h	15 min	1.5 h
21...30	69...86	9 min	1 h	9 min	1 h
31...40	87...104	6 min	1 h	6 min	1 h

1 It is permitted to install Hilti HIT-HY 200 V3 with HIT-Z anchor rod down to 14° F (-10° C) provided the drilled hole has the drilling dust fully removed. This can be done with Hilti TE-CD or TE-YD hollow drill bit or with cleaning procedures used with standard threaded rod.

Resistance of cured Hilti HIT-HY 200 A/R V3 to chemicals

Chemical		Behavior
Acetic acid	10%	+
Acetone		●
Ammonia	5%	+
Benzyl alcohol		–
Hydrochloric acid	10%	●
Chlorinated lime	10%	+
Citric acid	10%	+
Concrete plasticizer		+
De-icing salt (Calcium chloride)		+
Demineralized water		+
Diesel fuel		+
Drilling dust suspension pH 13.2		+
Ethanol	96%	–
Ethylacetate		–
Formic acid	10%	+
Formwork oil		+
Gasoline		+
Glycole		●
Hydrogen peroxide	10%	●
Lactic acid	10%	+
Maschinery oil		+
Methylethylketon		●
Nitric acid	10%	●
Phosphoric acid	10%	+
Potassium Hydroxide pH 13.2		+
Sea water		+
Sewage sludge		+
Sodium carbonate 10%	10%	+
Sodium hypochlorite 2%	2%	+
Sulphuric acid	10%	+
	30%	+
Toluene		●
Xylene		●

Key: – non-resistant
+ resistant
● limited resistance

Samples of the HIT-HY 200 A/R V3 adhesive were immersed in the various chemical compounds for up to one year. At the end of the test period, the samples were analyzed. Any samples showing no visible damage and having less than a 25% reduction in bending (flexural) strength were classified as "Resistant." Samples that had slight damage, such as small cracks, chips, etc. or reduction in bending strength of 25% or more were classified as "Limited Resistance" (i.e. exposed for 48 hours or less until chemical is cleaned up). Samples that were heavily damaged or destroyed were classified as "Non-Resistant."

Note: In actual use, the majority of the adhesive is encased in the base material, leaving very little surface area exposed.

HIT-HY 200-A V3

HIT-HY 200-R V3

HIT-HY 200-A V3 (accelerated working time)

Description	Package contents	Qty
HIT-HY 200-A V3 (11.1 fl oz/330 ml)	Includes (1) foil pack with (1) mixer and 3/8 filler tube per pack	1
HIT-HY 200-A V3 Master Carton (11.1 fl oz/330 ml)	Includes (1) master carton containing (25) foil packs with (1) mixer and 3/8 filler tube per pack	25
HIT-HY 200-A V3 Combo (11.1 fl oz/330 ml)	Includes (1) master carton containing (25) foil packs with (1) mixer and 3/8 filler tube per pack and (1) HDM 500 Manual Dispenser	25
HIT-HY 200-A V3 Master Carton (16.9 fl oz/500 ml)	Includes (1) master carton containing (20) foil packs with (1) mixer and 3/8 filler tube per pack	20
HIT-HY 200-A V3 Combo (16.9 fl oz/500 ml)	Includes (2) master cartons containing (20) foil packs each with (1) mixer and 3/8 filler tube per pack and (1) HDM 500 Manual Dispenser	40
HIT-RE-M Static Mixer	For use with HIT-HY 200-A V3 cartridges	1

HIT-HY 200-R V3 (regular working time)

Description	Package contents	Qty
HIT-HY 200-R V3 (11.1 fl oz/330 ml)	Includes (1) foil pack with (1) mixer and 3/8 filler tube per pack	1
HIT-HY 200-R V3 Master Carton (11.1 fl oz/330 ml)	Includes (1) master carton containing (25) foil packs with (1) mixer and 3/8 filler tube per pack	25
HIT-HY 200-R V3 Combo (11.1 fl oz/330 ml)	Includes (1) master carton containing (25) foil packs with (1) mixer and 3/8 filler tube per pack and (1) HDM 500 manual dispenser	25
HIT-HY 200-R V3 Master Carton (16.9 fl oz/500 ml)	Includes (1) master carton containing (20) foil packs with (1) mixer and 3/8 filler tube per pack	20
HIT-HY 200-R V3 Combo (16.9 fl oz/500 ml)	Includes (2) master cartons containing (20) foil packs each with (1) mixer and 3/8 filler tube per pack and (1) HDM 500 manual dispenser	40
HIT-RE-M Static Mixer	For use with HIT-HY 200-R V3 cartridges	1

TE-CD Hollow Drill Bits

Order Description	Working length (in.)
Hollow Drill Bit TE-CD 1/2-13	8
Hollow Drill Bit TE-CD 9/16-14	9-1/2
Hollow Drill Bit TE-CD 5/8-14	9-1/2
Hollow Drill Bit TE-CD 3/4-14	9-1/2
Hollow Drill Bit TE-CD 16-A (Replacement collar)	

TE-YD Hollow Drill Bits

Order Description	Working Length (in.)
Hollow Drill Bit TE-YD 3/4-24	15-1/2
Hollow Drill Bit TE-YD 7/8-24	15-1/2
Hollow Drill Bit TE-YD 1-24	15-1/2
Hollow Drill Bit TE-YD 1 1/8-24	15-1/2
Hollow Drill Bit TE-YD 25-A (Replacement collar)	

For ordering information on anchor rods and inserts, dispensers, hole cleaning equipment and other accessories, see section 3.2.9.

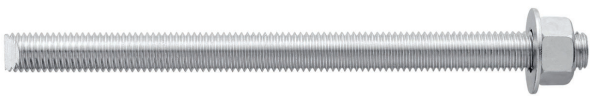
7.1 HIT-HY 270 ADHESIVE FOR MASONRY CONSTRUCTION

PRODUCT DESCRIPTION

HIT-HY 270 with Threaded Rod, Rebar, and HIS-N/RN Inserts

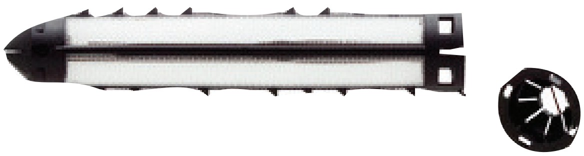
Anchor System

Hilti HIT-HY 270 Cartridge



Hilti HAS Threaded Rods

Rebar



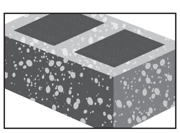
Mesh sleeve HIT-SC

Hilti HIS-N/RN

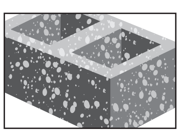
Features and Benefits

- Injectable two-component hybrid adhesive mortar
- For use in grouted and ungrouted concrete masonry block walls, solid and hollow brick walls[1] and unreinforced multi-wythe brick walls referred to as unreinforced masonry or URM[1]
- ICC-ES evaluated for grout-filled and ungrouted concrete masonry
- ICC-ES evaluated for unreinforced masonry (URM)[1]
- No hole cleaning requirement when installed with SafeSet™ hollow drill bit technology[2]

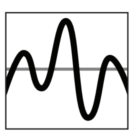
1 This document does not cover solid and hollow brick base materials, such as multi wythe brick walls. For brick base material technical data, refer to the 2022 Anchor Technical Guide.
2 SafeSet hollow drill bit is not applicable for brick base materials.



Grout-filled concrete masonry



Ungrouted concrete masonry



Seismic Design categories A-F

SAFESET

Hollow drill bit

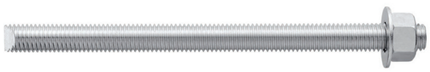
PROFIS Engineering

Approvals/Listings	
ICC-ES (International Code Council)	ESR-4143 in hollow and grout-filled CMU per ICC-ES AC58 ESR-4144 in unreinforced masonry per ICC-ES AC60
European Technical Approval	ETA-13/1036
City of Los Angeles	2020 LABC Supplement (within ESR-4143 and ESR-4144)
Florida Building Code	2020 FBC Supplement (within ESR-4143) w/ HVHZ
U.S. Green Building Council	LEED® Credit 4.1-Low Emitting Materials

ICC ES EOTA CITY LA DBS DEPARTMENT OF BUILDING AND SAFETY

DESIGN DATA IN MASONRY

HIT-HY 270 adhesive with Hilti HAS threaded rods, deformed reinforcing bars (rebar), and Hilti HIS-N and HIS-RN in fully grouted CMU



Hilti HAS Threaded Rods

Deformed Reinforcing Bars (Rebar)

Hilti HIS-N and HIS-RN

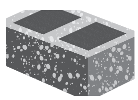
Permissible Base Materials		Grout-filled concrete masonry	**Permissible drilling method**	 	Hammer drilling with carbide tipped drill bit Hilti TE-CD or TE-YD hollow drill bit (for diameters 1/2" - 3/4")

Figure 1 — Hilti HIT-HY 270 with HAS threaded rod and reinforcing bars in grout-filled concrete masonry walls

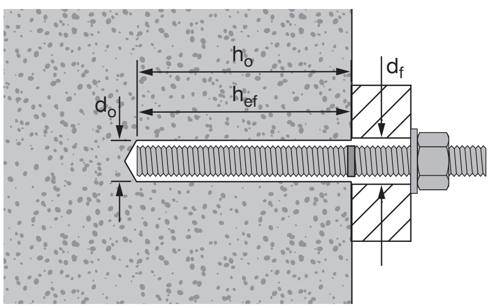


Figure 2 — Hilti HIT-HY 270 specifications for HIS-N and HIS-RN inserts in grout-filled concrete masonry walls

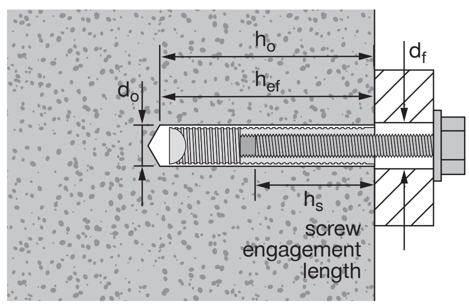


Figure 3 — Installation with (2) washers

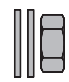
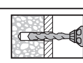
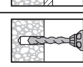


Table 1 — Hilti HIT-HY 270 Installation Information for Threaded Rod, Rebar, and Hilti HIS-(R)N Anchors — Fully Grouted CMU Construction, Face and Top of Wall

Installation information		Symbol	Units	Nominal Anchor Diameter / Rebar Size			
				3/8" or #3	1/2" or #4	5/8" or #5	3/4" or #6
Drill Bit Diameter — Threaded Rod		d_o	in.	7/16	9/16	3/4	7/8
Drill Bit Diameter — Rebar		d_o	in.	1/2	5/8	3/4	7/8
Drill Bit Diameter — HIS-(R)N		d_o	in.	11/16	7/8	N/A	N/A
Minimum Embedment Depth — Threaded Rod & Rebar		$h_{ef,min}$	in. (mm)	2-3/8 (60)	2-3/4 (70)	3-1/8 (79)	3-1/2 (89)
Minimum Embedment Depth — HIS-(R)N		$h_{ef,min}$	in. (mm)	4-3/8 (111)	5 (127)	N/A -	N/A -
Maximum Embedment Depth		$h_{ef,max}$	in. (mm)	7-1/2 (191)	10 (254)	10 (254)	10 (254)
Diameter of Fixture Hole — Threaded Rod[2]	Through-set		in.	1/2	5/8	13/16[1]	15/16[1]
	Preset		in.	7/16	9/16	11/16	13/16
Maximum Installation Torque		T_{inst}	ft-lb	6	7.5	7.5	10
Minimum Masonry Thickness[3]		h_{min}	in. (mm)	7-5/8 (203)			
Face of Wall	Minimum Edge Distance[4]	$c_{min,face}$	in. (mm)	4 (102)	4 (102)	4 (102)	4 (102)
	Minimum Anchor Spacing	$s_{min,face}$	in. (mm)	4 (102)	4 (102)	4 (102)	4 (102)
Top of Wall	Minimum Edge Distance[4]	$c_{min,top}$	in. (mm)	N/A	1-3/4 [5] (44)	1-3/4 (44)	2-3/4 [6] (70)
	Minimum Anchor Spacing	$s_{min,top}$	in. (mm)	N/A	3 [5] (76)	3 (76)	3 [6] (76)

1 Install using (2) washers. See Figure 3.
2 The preset fixture hole diameter is applicable for inserted bolts installed in preset HIS-(R)N anchors only.
3 Maximum embedment for installation into the face of 7-5/8" CMU wall is 6-3/4". Maximum embedment for installation into the face of 9-5/8" CMU wall is 8".
4 The minimum distance from the center of an anchor to the centerline of a head joint (vertical mortar joint) is 2".
5 1/2" HIS-(R)N is not applicable for top of wall applications.
6 #6 rebar is not applicable for top of wall applications.

Table 2 — Hilti HIT-HY 270 adhesive design strength with masonry / bond failure for threaded rod in the face of uncracked fully grouted CMU walls [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of pryout or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	2-3/8 (60)	800 (3.6)	800 (3.6)	800 (3.6)	800 (3.6)	860 (3.8)	860 (3.8)	860 (3.8)	860 (3.8)
	4-1/2 (114)	1,515 (6.7)	1,515 (6.7)	1,515 (6.7)	1,515 (6.7)	2,875 (12.8)	3,085 (13.7)	3,265 (14.5)	3,265 (14.5)
	6-3/4 (171)	2,275 (10.1)	2,275 (10.1)	2,275 (10.1)	2,275 (10.1)	2,875 (12.8)	3,085 (13.7)	3,265 (14.5)	3,415 (15.2)
	7-1/2 (191)	2,525 (11.2)	2,525 (11.2)	2,525 (11.2)	2,525 (11.2)	2,875 (12.8)	3,085 (13.7)	3,265 (14.5)	3,415 (15.2)
1/2	2-3/4 (70)	1,035 (4.6)	1,035 (4.6)	1,035 (4.6)	1,035 (4.6)	2,630 (11.7)	2,630 (11.7)	2,630 (11.7)	2,630 (11.7)
	4-1/2 (114)	1,690 (7.5)	1,690 (7.5)	1,690 (7.5)	1,690 (7.5)	3,340 (14.9)	3,590 (16.0)	3,795 (16.9)	3,975 (17.7)
	6-3/4 (171)	2,535 (11.3)	2,535 (11.3)	2,535 (11.3)	2,535 (11.3)	3,340 (14.9)	3,590 (16.0)	3,795 (16.9)	3,975 (17.7)
	10 (254)	3,760 (16.7)	3,760 (16.7)	3,760 (16.7)	3,760 (16.7)	3,340 (14.9)	3,590 (16.0)	3,795 (16.9)	3,975 (17.7)
5/8	3-1/8 (79)	1,500 (6.7)	1,500 (6.7)	1,500 (6.7)	1,500 (6.7)	3,755 (16.7)	3,825 (17.0)	3,825 (17.0)	3,825 (17.0)
	4-1/2 (114)	2,165 (9.6)	2,165 (9.6)	2,165 (9.6)	2,165 (9.6)	3,755 (16.7)	4,035 (17.9)	4,265 (19.0)	4,465 (19.9)
	6-3/4 (171)	3,245 (14.4)	3,245 (14.4)	3,245 (14.4)	3,245 (14.4)	3,755 (16.7)	4,035 (17.9)	4,265 (19.0)	4,465 (19.9)
	10 (254)	4,805 (21.4)	4,805 (21.4)	4,805 (21.4)	4,805 (21.4)	3,755 (16.7)	4,035 (17.9)	4,265 (19.0)	4,465 (19.9)
3/4	3-1/2 (89)	905 (4.0)	905 (4.0)	905 (4.0)	905 (4.0)	2,310 (10.3)	2,310 (10.3)	2,310 (10.3)	2,310 (10.3)
	4-1/2 (114)	1,165 (5.2)	1,165 (5.2)	1,165 (5.2)	1,165 (5.2)	2,970 (13.2)	2,970 (13.2)	2,970 (13.2)	2,970 (13.2)
	6-3/4 (171)	1,750 (7.8)	1,750 (7.8)	1,750 (7.8)	1,750 (7.8)	4,140 (18.4)	4,450 (19.8)	4,455 (19.8)	4,455 (19.8)
	10 (254)	2,590 (11.5)	2,590 (11.5)	2,590 (11.5)	2,590 (11.5)	4,140 (18.4)	4,450 (19.8)	4,705 (20.9)	4,925 (21.9)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor with no influence from nearby edges, hollow head joints, or additional anchors. For designs with the influence of nearby edges, hollow head joints, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.91.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat},
3/8-in and 1/2-in diameter - α_{sat} = 1.00
5/8-in and 3/4-in diameter - α_{sat} = 0.93
7 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0 and multiply design strength values in tension and shear by 0.80.

Table 3 —Hilti HIT-HY 270 adhesive design strength with masonry / bond failure for threaded rod in the face of cracked fully grouted CMU walls[1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of pryout or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	2-3/8 (60)	610 (2.7)	610 (2.7)	610 (2.7)	610 (2.7)	655 (2.9)	655 (2.9)	655 (2.9)	655 (2.9)
	4-1/2 (114)	1,155 (5.1)	1,155 (5.1)	1,155 (5.1)	1,155 (5.1)	2,485 (11.1)	2,485 (11.1)	2,485 (11.1)	2,485 (11.1)
	6-3/4 (171)	1,730 (7.7)	1,730 (7.7)	1,730 (7.7)	1,730 (7.7)	2,875 (12.8)	3,085 (13.7)	3,265 (14.5)	3,415 (15.2)
	7-1/2 (191)	1,925 (8.6)	1,925 (8.6)	1,925 (8.6)	1,925 (8.6)	2,875 (12.8)	3,085 (13.7)	3,265 (14.5)	3,415 (15.2)
1/2	2-3/4 (70)	715 (3.2)	715 (3.2)	715 (3.2)	715 (3.2)	1,815 (8.1)	1,815 (8.1)	1,815 (8.1)	1,815 (8.1)
	4-1/2 (114)	1,165 (5.2)	1,165 (5.2)	1,165 (5.2)	1,165 (5.2)	2,970 (13.2)	2,970 (13.2)	2,970 (13.2)	2,970 (13.2)
	6-3/4 (171)	1,750 (7.8)	1,750 (7.8)	1,750 (7.8)	1,750 (7.8)	3,340 (14.9)	3,590 (16.0)	3,795 (16.9)	3,975 (17.7)
	10 (254)	2,590 (11.5)	2,590 (11.5)	2,590 (11.5)	2,590 (11.5)	3,340 (14.9)	3,590 (16.0)	3,795 (16.9)	3,975 (17.7)
5/8	3-1/8 (79)	825 (3.7)	825 (3.7)	825 (3.7)	825 (3.7)	2,105 (9.4)	2,105 (9.4)	2,105 (9.4)	2,105 (9.4)
	4-1/2 (114)	1,190 (5.3)	1,190 (5.3)	1,190 (5.3)	1,190 (5.3)	3,030 (13.5)	3,030 (13.5)	3,030 (13.5)	3,030 (13.5)
	6-3/4 (171)	1,785 (7.9)	1,785 (7.9)	1,785 (7.9)	1,785 (7.9)	3,755 (16.7)	4,035 (17.9)	4,265 (19.0)	4,465 (19.9)
	10 (254)	2,645 (11.8)	2,645 (11.8)	2,645 (11.8)	2,645 (11.8)	3,755 (16.7)	4,035 (17.9)	4,265 (19.0)	4,465 (19.9)
3/4	3-1/2 (89)	660 (2.9)	660 (2.9)	660 (2.9)	660 (2.9)	1,675 (7.5)	1,675 (7.5)	1,675 (7.5)	1,675 (7.5)
	4-1/2 (114)	845 (3.8)	845 (3.8)	845 (3.8)	845 (3.8)	2,150 (9.6)	2,150 (9.6)	2,150 (9.6)	2,150 (9.6)
	6-3/4 (171)	1,270 (5.6)	1,270 (5.6)	1,270 (5.6)	1,270 (5.6)	3,230 (14.4)	3,230 (14.4)	3,230 (14.4)	3,230 (14.4)
	10 (254)	1,880 (8.4)	1,880 (8.4)	1,880 (8.4)	1,880 (8.4)	4,140 (18.4)	4,450 (19.8)	4,705 (20.9)	4,785 (21.3)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor with no influence from nearby edges, hollow head joints, or additional anchors. For designs with the influence of nearby edges, hollow head joints, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.91.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat},
3/8-in and 1/2-in diameter - α_{sat} = 1.00
5/8-in and 3/4-in diameter - α_{sat} = 0.93
7 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by the following reduction factors:
3/8-in diameter = 0.74
1/2-in diameter = 0.65
5/8-in diameter = 0.66
3/4-in diameter = 0.74
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0 and multiply design strength values in tension and shear by 0.80.

Table 4 — Hilti HIT-HY 270 adhesive design strength with masonry / bond failure for threaded rod in the face of uncracked fully grouted CMU walls and installed 2-in from centerline of hollow head joint [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	2-3/8 (60)	655 (2.9)	655 (2.9)	655 (2.9)	655 (2.9)	705 (3.1)	705 (3.1)	705 (3.1)	705 (3.1)
	4-1/2 (114)	1,245 (5.5)	1,245 (5.5)	1,245 (5.5)	1,245 (5.5)	1,205 (5.4)	1,390 (6.2)	1,555 (6.9)	1,700 (7.6)
	6-3/4 (171)	1,865 (8.3)	1,865 (8.3)	1,865 (8.3)	1,865 (8.3)	1,205 (5.4)	1,390 (6.2)	1,555 (6.9)	1,700 (7.6)
	7-1/2 (191)	2,070 (9.2)	2,070 (9.2)	2,070 (9.2)	2,070 (9.2)	1,205 (5.4)	1,390 (6.2)	1,555 (6.9)	1,700 (7.6)
1/2	2-3/4 (70)	710 (3.2)	710 (3.2)	710 (3.2)	710 (3.2)	1,290 (5.7)	1,490 (6.6)	1,665 (7.4)	1,810 (8.1)
	4-1/2 (114)	1,165 (5.2)	1,165 (5.2)	1,165 (5.2)	1,165 (5.2)	1,390 (6.2)	1,605 (7.1)	1,795 (8.0)	1,965 (8.7)
	6-3/4 (171)	1,745 (7.8)	1,745 (7.8)	1,745 (7.8)	1,745 (7.8)	1,390 (6.2)	1,605 (7.1)	1,795 (8.0)	1,965 (8.7)
	10 (254)	2,585 (11.5)	2,585 (11.5)	2,585 (11.5)	2,585 (11.5)	1,390 (6.2)	1,605 (7.1)	1,795 (8.0)	1,965 (8.7)
5/8	3-1/8 (79)	915 (4.1)	915 (4.1)	915 (4.1)	915 (4.1)	1,415 (6.3)	1,635 (7.3)	1,825 (8.1)	2,000 (8.9)
	4-1/2 (114)	1,315 (5.8)	1,315 (5.8)	1,315 (5.8)	1,315 (5.8)	1,520 (6.8)	1,755 (7.8)	1,965 (8.7)	2,150 (9.6)
	6-3/4 (171)	1,975 (8.8)	1,975 (8.8)	1,975 (8.8)	1,975 (8.8)	1,555 (6.9)	1,795 (8.0)	2,005 (8.9)	2,195 (9.8)
	10 (254)	2,925 (13.0)	2,925 (13.0)	2,925 (13.0)	2,925 (13.0)	1,555 (6.9)	1,795 (8.0)	2,005 (8.9)	2,195 (9.8)
3/4	3-1/2 (89)	620 (2.8)	620 (2.8)	620 (2.8)	620 (2.8)	1,530 (6.8)	1,575 (7.0)	1,575 (7.0)	1,575 (7.0)
	4-1/2 (114)	795 (3.5)	795 (3.5)	795 (3.5)	795 (3.5)	1,605 (7.1)	1,855 (8.3)	2,025 (9.0)	2,025 (9.0)
	6-3/4 (171)	1,190 (5.3)	1,190 (5.3)	1,190 (5.3)	1,190 (5.3)	1,665 (7.4)	1,925 (8.6)	2,150 (9.6)	2,360 (10.5)
	10 (254)	1,765 (7.9)	1,765 (7.9)	1,765 (7.9)	1,765 (7.9)	1,665 (7.4)	1,925 (8.6)	2,150 (9.6)	2,360 (10.5)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor located 2-in from centerline of a hollow head joint with no additional influence from nearby edges or additional anchors. For designs with the influence of nearby edges, different distances to a hollow head joint, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.91.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat},
3/8-in and 1/2-in diameter - α_{sat} = 1.00
5/8-in and 3/4-in diameter - α_{sat} = 0.93
7 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0 and multiply design strength values in tension and shear by 0.80.

Table 5 —Hilti HIT-HY 270 adhesive design strength with masonry / bond failure for threaded rod in the face of cracked fully grouted CMU walls and installed 2-in from centerline of hollow head joint [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	2-3/8 (60)	500 (2.2)	500 (2.2)	500 (2.2)	500 (2.2)	540 (2.4)	540 (2.4)	540 (2.4)	540 (2.4)
	4-1/2 (114)	945 (4.2)	945 (4.2)	945 (4.2)	945 (4.2)	860 (3.8)	995 (4.4)	1,110 (4.9)	1,215 (5.4)
	6-3/4 (171)	1,420 (6.3)	1,420 (6.3)	1,420 (6.3)	1,420 (6.3)	860 (3.8)	995 (4.4)	1,110 (4.9)	1,215 (5.4)
	7-1/2 (191)	1,575 (7.0)	1,575 (7.0)	1,575 (7.0)	1,575 (7.0)	860 (3.8)	995 (4.4)	1,110 (4.9)	1,215 (5.4)
1/2	2-3/4 (70)	490 (2.2)	490 (2.2)	490 (2.2)	490 (2.2)	920 (4.1)	1,065 (4.7)	1,190 (5.3)	1,250 (5.6)
	4-1/2 (114)	805 (3.6)	805 (3.6)	805 (3.6)	805 (3.6)	995 (4.4)	1,145 (5.1)	1,280 (5.7)	1,405 (6.2)
	6-3/4 (171)	1,205 (5.4)	1,205 (5.4)	1,205 (5.4)	1,205 (5.4)	995 (4.4)	1,145 (5.1)	1,280 (5.7)	1,405 (6.2)
	10 (254)	1,785 (7.9)	1,785 (7.9)	1,785 (7.9)	1,785 (7.9)	995 (4.4)	1,145 (5.1)	1,280 (5.7)	1,405 (6.2)
5/8	3-1/8 (79)	505 (2.2)	505 (2.2)	505 (2.2)	505 (2.2)	1,010 (4.5)	1,165 (5.2)	1,280 (5.7)	1,280 (5.7)
	4-1/2 (114)	725 (3.2)	725 (3.2)	725 (3.2)	725 (3.2)	1,085 (4.8)	1,255 (5.6)	1,405 (6.2)	1,535 (6.8)
	6-3/4 (171)	1,090 (4.8)	1,090 (4.8)	1,090 (4.8)	1,090 (4.8)	1,110 (4.9)	1,280 (5.7)	1,435 (6.4)	1,570 (7.0)
	10 (254)	1,610 (7.2)	1,610 (7.2)	1,610 (7.2)	1,610 (7.2)	1,110 (4.9)	1,280 (5.7)	1,435 (6.4)	1,570 (7.0)
3/4	3-1/2 (89)	450 (2.0)	450 (2.0)	450 (2.0)	450 (2.0)	1,090 (4.8)	1,140 (5.1)	1,140 (5.1)	1,140 (5.1)
	4-1/2 (114)	575 (2.6)	575 (2.6)	575 (2.6)	575 (2.6)	1,150 (5.1)	1,325 (5.9)	1,465 (6.5)	1,465 (6.5)
	6-3/4 (171)	865 (3.8)	865 (3.8)	865 (3.8)	865 (3.8)	1,190 (5.3)	1,375 (6.1)	1,535 (6.8)	1,685 (7.5)
	10 (254)	1,280 (5.7)	1,280 (5.7)	1,280 (5.7)	1,280 (5.7)	1,190 (5.3)	1,375 (6.1)	1,535 (6.8)	1,685 (7.5)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor located 2-in from centerline of a hollow head joint with no additional influence from nearby edges or additional anchors. For designs with the influence of nearby edges, different distances to a hollow head joint, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.91.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat},
3/8-in and 1/2-in diameter - α_{sat} = 1.00
5/8-in and 3/4-in diameter - α_{sat} = 0.93
7 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by the following reduction factors:
3/8-in diameter = 0.74
1/2-in diameter = 0.65
5/8-in diameter = 0.66
3/4-in diameter = 0.74
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0 and multiply design strength values in tension and shear by 0.80.

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Table 6 — Hilti HIT-HY 270 adhesive design strength with masonry / bond failure for threaded rod in the top of uncracked fully grouted CMU walls and installed at minimum edge distance parallel with masonry course [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
1/2	2-3/4 (70)	405 (1.8)	405 (1.8)	405 (1.8)	405 (1.8)	1,030 (4.6)	1,030 (4.6)	1,030 (4.6)	1,030 (4.6)
	4-1/2 (114)	660 (2.9)	660 (2.9)	660 (2.9)	660 (2.9)	1,320 (5.9)	1,520 (6.8)	1,685 (7.5)	1,685 (7.5)
	6-3/4 (171)	995 (4.4)	995 (4.4)	995 (4.4)	995 (4.4)	1,320 (5.9)	1,520 (6.8)	1,700 (7.6)	1,865 (8.3)
	10 (254)	1,470 (6.5)	1,470 (6.5)	1,470 (6.5)	1,470 (6.5)	1,320 (5.9)	1,520 (6.8)	1,700 (7.6)	1,865 (8.3)
5/8	3-1/8 (79)	505 (2.2)	505 (2.2)	505 (2.2)	505 (2.2)	1,285 (5.7)	1,285 (5.7)	1,285 (5.7)	1,285 (5.7)
	4-1/2 (114)	725 (3.2)	725 (3.2)	725 (3.2)	725 (3.2)	1,445 (6.4)	1,665 (7.4)	1,845 (8.2)	1,845 (8.2)
	6-3/4 (171)	1,090 (4.8)	1,090 (4.8)	1,090 (4.8)	1,090 (4.8)	1,475 (6.6)	1,700 (7.6)	1,905 (8.5)	2,085 (9.3)
	10 (254)	1,610 (7.2)	1,610 (7.2)	1,610 (7.2)	1,610 (7.2)	1,475 (6.6)	1,700 (7.6)	1,905 (8.5)	2,085 (9.3)
3/4	3-1/2 (89)	810 (3.6)	810 (3.6)	810 (3.6)	810 (3.6)	2,055 (9.1)	2,055 (9.1)	2,055 (9.1)	2,055 (9.1)
	4-1/2 (114)	1,040 (4.6)	1,040 (4.6)	1,040 (4.6)	1,040 (4.6)	2,645 (11.8)	2,645 (11.8)	2,645 (11.8)	2,645 (11.8)
	6-3/4 (171)	1,560 (6.9)	1,560 (6.9)	1,560 (6.9)	1,560 (6.9)	3,115 (13.9)	3,600 (16.0)	3,965 (17.6)	3,965 (17.6)
	10 (254)	2,310 (10.3)	2,310 (10.3)	2,310 (10.3)	2,310 (10.3)	3,115 (13.9)	3,600 (16.0)	4,020 (17.9)	4,405 (19.6)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor located at minimum edge of 1-3/4-in (2-3/4-in for 3/4-in diameter) from edge parallel with masonry course with no additional influence from nearby edges or additional anchors. For designs with the additional influence of nearby edges, a different edge distance, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.91.
5 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat},
1/2-in diameter - α_{sat} = 1.00
5/8-in and 3/4-in diameter - α_{sat} = 0.93
6 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.
7 Tabular shear values are for shear force parallel to the edge parallel with the masonry course. For shear force perpendicular to the edge parallel with the masonry course, multiply design strength values in shear by the following reduction factors:
1/2-in and 5/8-in. diameter = 0.50
3/4-in diameter = 0.46
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0 and multiply design strength values in tension and shear by 0.80.

Table 7 — Hilti HIT-HY 270 adhesive design strength with masonry / bond failure for threaded rod in the top of cracked fully grouted CMU walls and installed at minimum edge distance parallel with masonry course [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
1/2	2-3/4 (70)	280 (1.2)	280 (1.2)	280 (1.2)	280 (1.2)	710 (3.2)	710 (3.2)	710 (3.2)	710 (3.2)
	4-1/2 (114)	455 (2.0)	455 (2.0)	455 (2.0)	455 (2.0)	940 (4.2)	1,085 (4.8)	1,160 (5.2)	1,160 (5.2)
	6-3/4 (171)	685 (3.0)	685 (3.0)	685 (3.0)	685 (3.0)	940 (4.2)	1,085 (4.8)	1,215 (5.4)	1,330 (5.9)
	10 (254)	1,015 (4.5)	1,015 (4.5)	1,015 (4.5)	1,015 (4.5)	940 (4.2)	1,085 (4.8)	1,215 (5.4)	1,330 (5.9)
5/8	3-1/8 (79)	275 (1.2)	275 (1.2)	275 (1.2)	275 (1.2)	705 (3.1)	705 (3.1)	705 (3.1)	705 (3.1)
	4-1/2 (114)	400 (1.8)	400 (1.8)	400 (1.8)	400 (1.8)	1,015 (4.5)	1,015 (4.5)	1,015 (4.5)	1,015 (4.5)
	6-3/4 (171)	600 (2.7)	600 (2.7)	600 (2.7)	600 (2.7)	1,055 (4.7)	1,215 (5.4)	1,360 (6.0)	1,490 (6.6)
	10 (254)	890 (4.0)	890 (4.0)	890 (4.0)	890 (4.0)	1,055 (4.7)	1,215 (5.4)	1,360 (6.0)	1,490 (6.6)
3/4	3-1/2 (89)	585 (2.6)	585 (2.6)	585 (2.6)	585 (2.6)	1,490 (6.6)	1,490 (6.6)	1,490 (6.6)	1,490 (6.6)
	4-1/2 (114)	755 (3.4)	755 (3.4)	755 (3.4)	755 (3.4)	1,915 (8.5)	1,915 (8.5)	1,915 (8.5)	1,915 (8.5)
	6-3/4 (171)	1,130 (5.0)	1,130 (5.0)	1,130 (5.0)	1,130 (5.0)	2,225 (9.9)	2,570 (11.4)	2,875 (12.8)	2,875 (12.8)
	10 (254)	1,675 (7.5)	1,675 (7.5)	1,675 (7.5)	1,675 (7.5)	2,225 (9.9)	2,570 (11.4)	2,875 (12.8)	3,145 (14.0)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor located at minimum edge of 1-3/4-in (2-3/4-in for 3/4-in diameter) from edge parallel with masonry course with no additional influence from nearby edges or additional anchors. For designs with the additional influence of nearby edges, a different edge distance, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.91.
5 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sa}t,
1/2-in diameter - α_{sat} = 1.00
5/8-in and 3/4-in diameter - α_{sat} = 0.93
6 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by the following reduction factors:
1/2-in diameter = 0.65
5/8-in diameter = 0.66
3/4-in diameter = 0.74
7 Tabular shear values are for shear force parallel to the edge parallel with the masonry course. For shear force perpendicular to the edge parallel with the masonry course, multiply design strength values in shear by the following reduction factors:
1/2-in and 5/8-in. diameter = 0.50
3/4-in diameter = 0.46
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0 and multiply design strength values in tension and shear by 0.80.

Table 8 — Hilti HIT-HY 270 adhesive design strength with masonry / bond failure for rebar in the face of uncracked fully grouted CMU walls [1,2,3,4,5,6,7,8]

Rebar Size	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of pryout or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
#3	2-3/8 (60)	975 (4.3)	975 (4.3)	975 (4.3)	975 (4.3)	1,050 (4.7)	1,050 (4.7)	1,050 (4.7)	1,050 (4.7)
	4-1/2 (114)	1,845 (8.2)	1,845 (8.2)	1,845 (8.2)	1,845 (8.2)	3,135 (13.9)	3,370 (15.0)	3,565 (15.9)	3,730 (16.6)
	6-3/4 (171)	2,765 (12.3)	2,765 (12.3)	2,765 (12.3)	2,765 (12.3)	3,135 (13.9)	3,370 (15.0)	3,565 (15.9)	3,730 (16.6)
	7-1/2 (191)	3,075 (13.7)	3,075 (13.7)	3,075 (13.7)	3,075 (13.7)	3,135 (13.9)	3,370 (15.0)	3,565 (15.9)	3,730 (16.6)
#4	2-3/4 (70)	1,035 (4.6)	1,035 (4.6)	1,035 (4.6)	1,035 (4.6)	2,630 (11.7)	2,630 (11.7)	2,630 (11.7)	2,630 (11.7)
	4-1/2 (114)	1,690 (7.5)	1,690 (7.5)	1,690 (7.5)	1,690 (7.5)	3,640 (16.2)	3,915 (17.4)	4,140 (18.4)	4,305 (19.1)
	6-3/4 (171)	2,535 (11.3)	2,535 (11.3)	2,535 (11.3)	2,535 (11.3)	3,640 (16.2)	3,915 (17.4)	4,140 (18.4)	4,330 (19.3)
	10 (254)	3,760 (16.7)	3,760 (16.7)	3,760 (16.7)	3,760 (16.7)	3,640 (16.2)	3,915 (17.4)	4,140 (18.4)	4,330 (19.3)
#5	3-1/8 (79)	1,570 (7.0)	1,570 (7.0)	1,570 (7.0)	1,570 (7.0)	3,995 (17.8)	3,995 (17.8)	3,995 (17.8)	3,995 (17.8)
	4-1/2 (114)	2,260 (10.1)	2,260 (10.1)	2,260 (10.1)	2,260 (10.1)	4,065 (18.1)	4,365 (19.4)	4,615 (20.5)	4,830 (21.5)
	6-3/4 (171)	3,390 (15.1)	3,390 (15.1)	3,390 (15.1)	3,390 (15.1)	4,065 (18.1)	4,365 (19.4)	4,615 (20.5)	4,830 (21.5)
	10 (254)	5,020 (22.3)	5,020 (22.3)	5,020 (22.3)	5,020 (22.3)	4,065 (18.1)	4,365 (19.4)	4,615 (20.5)	4,830 (21.5)
#6	3-1/2 (89)	1,815 (8.1)	1,815 (8.1)	1,815 (8.1)	1,815 (8.1)	4,435 (19.7)	4,620 (20.6)	4,620 (20.6)	4,620 (20.6)
	4-1/2 (114)	2,335 (10.4)	2,335 (10.4)	2,335 (10.4)	2,335 (10.4)	4,435 (19.7)	4,765 (21.2)	5,040 (22.4)	5,275 (23.5)
	6-3/4 (171)	3,500 (15.6)	3,500 (15.6)	3,500 (15.6)	3,500 (15.6)	4,435 (19.7)	4,765 (21.2)	5,040 (22.4)	5,275 (23.5)
	10 (254)	5,185 (23.1)	5,185 (23.1)	5,185 (23.1)	5,185 (23.1)	4,435 (19.7)	4,765 (21.2)	5,040 (22.4)	5,275 (23.5)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor with no influence from nearby edges, hollow head joints, or additional anchors. For designs with the influence of nearby edges, hollow head joints, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.91.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat},
#3 and #4 rebar - α_{sat} = 1.00
#5 and #6 rebar - α_{sat} = 0.93
7 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 9 — Hilti HIT-HY 270 adhesive design strength with masonry / bond failure for rebar in the face of cracked fully grouted CMU walls [1,2,3,4,5,6,7,8]

Rebar Size	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of pryout or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
#3	2-3/8 (60)	620 (2.8)	620 (2.8)	620 (2.8)	620 (2.8)	665 (3.0)	665 (3.0)	665 (3.0)	665 (3.0)
	4-1/2 (114)	1,170 (5.2)	1,170 (5.2)	1,170 (5.2)	1,170 (5.2)	2,525 (11.2)	2,525 (11.2)	2,525 (11.2)	2,525 (11.2)
	6-3/4 (171)	1,755 (7.8)	1,755 (7.8)	1,755 (7.8)	1,755 (7.8)	3,135 (13.9)	3,370 (15.0)	3,565 (15.9)	3,730 (16.6)
	7-1/2 (191)	1,955 (8.7)	1,955 (8.7)	1,955 (8.7)	1,955 (8.7)	3,135 (13.9)	3,370 (15.0)	3,565 (15.9)	3,730 (16.6)
#4	2-3/4 (70)	485 (2.2)	485 (2.2)	485 (2.2)	485 (2.2)	1,240 (5.5)	1,240 (5.5)	1,240 (5.5)	1,240 (5.5)
	4-1/2 (114)	795 (3.5)	795 (3.5)	795 (3.5)	795 (3.5)	2,030 (9.0)	2,030 (9.0)	2,030 (9.0)	2,030 (9.0)
	6-3/4 (171)	1,195 (5.3)	1,195 (5.3)	1,195 (5.3)	1,195 (5.3)	3,045 (13.5)	3,045 (13.5)	3,045 (13.5)	3,045 (13.5)
	10 (254)	1,770 (7.9)	1,770 (7.9)	1,770 (7.9)	1,770 (7.9)	3,640 (16.2)	3,915 (17.4)	4,140 (18.4)	4,330 (19.3)
#5	3-1/8 (79)	930 (4.1)	930 (4.1)	930 (4.1)	930 (4.1)	2,360 (10.5)	2,360 (10.5)	2,360 (10.5)	2,360 (10.5)
	4-1/2 (114)	1,335 (5.9)	1,335 (5.9)	1,335 (5.9)	1,335 (5.9)	3,400 (15.1)	3,400 (15.1)	3,400 (15.1)	3,400 (15.1)
	6-3/4 (171)	2,005 (8.9)	2,005 (8.9)	2,005 (8.9)	2,005 (8.9)	4,065 (18.1)	4,365 (19.4)	4,615 (20.5)	4,830 (21.5)
	10 (254)	2,970 (13.2)	2,970 (13.2)	2,970 (13.2)	2,970 (13.2)	4,065 (18.1)	4,365 (19.4)	4,615 (20.5)	4,830 (21.5)
#6	3-1/2 (89)	770 (3.4)	770 (3.4)	770 (3.4)	770 (3.4)	1,965 (8.7)	1,965 (8.7)	1,965 (8.7)	1,965 (8.7)
	4-1/2 (114)	990 (4.4)	990 (4.4)	990 (4.4)	990 (4.4)	2,525 (11.2)	2,525 (11.2)	2,525 (11.2)	2,525 (11.2)
	6-3/4 (171)	1,485 (6.6)	1,485 (6.6)	1,485 (6.6)	1,485 (6.6)	3,785 (16.8)	3,785 (16.8)	3,785 (16.8)	3,785 (16.8)
	10 (254)	2,205 (9.8)	2,205 (9.8)	2,205 (9.8)	2,205 (9.8)	4,435 (19.7)	4,765 (21.2)	5,040 (22.4)	5,275 (23.5)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor with no influence from nearby edges, hollow head joints, or additional anchors. For designs with the influence of nearby edges, hollow head joints, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.91.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat},
#3 and #4 rebar - α_{sat} = 1.00
#5 and #6 rebar - α_{sat} = 0.93
7 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by the following reduction factors:
#3 rebar = 0.67
#4 rebar = 0.74
#5 rebar = 0.74
#6 rebar = 0.53
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 10 — Hilti HIT-HY 270 adhesive design strength with masonry / bond failure for rebar in the face of uncracked fully grouted CMU walls and installed 2-in from centerline of hollow head joint [1,2,3,4,5,6,7,8]

Rebar Size	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
#3	2-3/8 (60)	750 (3.3)	750 (3.3)	750 (3.3)	750 (3.3)	805 (3.6)	805 (3.6)	805 (3.6)	805 (3.6)
	4-1/2 (114)	1,415 (6.3)	1,415 (6.3)	1,415 (6.3)	1,415 (6.3)	1,205 (5.4)	1,390 (6.2)	1,555 (6.9)	1,700 (7.6)
	6-3/4 (171)	2,125 (9.5)	2,125 (9.5)	2,125 (9.5)	2,125 (9.5)	1,205 (5.4)	1,390 (6.2)	1,555 (6.9)	1,700 (7.6)
	7-1/2 (191)	2,360 (10.5)	2,360 (10.5)	2,360 (10.5)	2,360 (10.5)	1,205 (5.4)	1,390 (6.2)	1,555 (6.9)	1,700 (7.6)
#4	2-3/4 (70)	710 (3.2)	710 (3.2)	710 (3.2)	710 (3.2)	1,290 (5.7)	1,490 (6.6)	1,665 (7.4)	1,810 (8.1)
	4-1/2 (114)	1,165 (5.2)	1,165 (5.2)	1,165 (5.2)	1,165 (5.2)	1,390 (6.2)	1,605 (7.1)	1,795 (8.0)	1,965 (8.7)
	6-3/4 (171)	1,745 (7.8)	1,745 (7.8)	1,745 (7.8)	1,745 (7.8)	1,390 (6.2)	1,605 (7.1)	1,795 (8.0)	1,965 (8.7)
	10 (254)	2,585 (11.5)	2,585 (11.5)	2,585 (11.5)	2,585 (11.5)	1,390 (6.2)	1,605 (7.1)	1,795 (8.0)	1,965 (8.7)
#5	3-1/8 (79)	945 (4.2)	945 (4.2)	945 (4.2)	945 (4.2)	1,415 (6.3)	1,635 (7.3)	1,825 (8.1)	2,000 (8.9)
	4-1/2 (114)	1,360 (6.0)	1,360 (6.0)	1,360 (6.0)	1,360 (6.0)	1,520 (6.8)	1,755 (7.8)	1,965 (8.7)	2,150 (9.6)
	6-3/4 (171)	2,045 (9.1)	2,045 (9.1)	2,045 (9.1)	2,045 (9.1)	1,555 (6.9)	1,795 (8.0)	2,005 (8.9)	2,195 (9.8)
	10 (254)	3,025 (13.5)	3,025 (13.5)	3,025 (13.5)	3,025 (13.5)	1,555 (6.9)	1,795 (8.0)	2,005 (8.9)	2,195 (9.8)
#6	3-1/2 (89)	1,040 (4.6)	1,040 (4.6)	1,040 (4.6)	1,040 (4.6)	1,530 (6.8)	1,765 (7.9)	1,975 (8.8)	2,160 (9.6)
	4-1/2 (114)	1,340 (6.0)	1,340 (6.0)	1,340 (6.0)	1,340 (6.0)	1,605 (7.1)	1,855 (8.3)	2,075 (9.2)	2,270 (10.1)
	6-3/4 (171)	2,010 (8.9)	2,010 (8.9)	2,010 (8.9)	2,010 (8.9)	1,665 (7.4)	1,925 (8.6)	2,150 (9.6)	2,360 (10.5)
	10 (254)	2,980 (13.3)	2,980 (13.3)	2,980 (13.3)	2,980 (13.3)	1,665 (7.4)	1,925 (8.6)	2,150 (9.6)	2,360 (10.5)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor located 2-in from centerline of a hollow head joint with no additional influence from nearby edges or additional anchors. For designs with the influence of nearby edges, different distances to a hollow head joint, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.91.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat},
#3 and #4 rebar - α_{sat} = 1.00
#5 and #6 rebar - α_{sat} = 0.93
7 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 11 — Hilti HIT-HY 270 adhesive design strength with masonry / bond failure for rebar in the face of cracked fully grouted CMU walls and installed 2-in from centerline of hollow head joint [1,2,3,4,5,6,7,8]

Rebar Size	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
#3	2-3/8 (60)	475 (2.1)	475 (2.1)	475 (2.1)	475 (2.1)	510 (2.3)	510 (2.3)	510 (2.3)	510 (2.3)
	4-1/2 (114)	900 (4.0)	900 (4.0)	900 (4.0)	900 (4.0)	860 (3.8)	995 (4.4)	1,110 (4.9)	1,215 (5.4)
	6-3/4 (171)	1,350 (6.0)	1,350 (6.0)	1,350 (6.0)	1,350 (6.0)	860 (3.8)	995 (4.4)	1,110 (4.9)	1,215 (5.4)
	7-1/2 (191)	1,500 (6.7)	1,500 (6.7)	1,500 (6.7)	1,500 (6.7)	860 (3.8)	995 (4.4)	1,110 (4.9)	1,215 (5.4)
#4	2-3/4 (70)	335 (1.5)	335 (1.5)	335 (1.5)	335 (1.5)	855 (3.8)	855 (3.8)	855 (3.8)	855 (3.8)
	4-1/2 (114)	550 (2.4)	550 (2.4)	550 (2.4)	550 (2.4)	995 (4.4)	1,145 (5.1)	1,280 (5.7)	1,395 (6.2)
	6-3/4 (171)	825 (3.7)	825 (3.7)	825 (3.7)	825 (3.7)	995 (4.4)	1,145 (5.1)	1,280 (5.7)	1,405 (6.2)
	10 (254)	1,220 (5.4)	1,220 (5.4)	1,220 (5.4)	1,220 (5.4)	995 (4.4)	1,145 (5.1)	1,280 (5.7)	1,405 (6.2)
#5	3-1/8 (79)	560 (2.5)	560 (2.5)	560 (2.5)	560 (2.5)	1,010 (4.5)	1,165 (5.2)	1,305 (5.8)	1,425 (6.3)
	4-1/2 (114)	805 (3.6)	805 (3.6)	805 (3.6)	805 (3.6)	1,085 (4.8)	1,255 (5.6)	1,405 (6.2)	1,535 (6.8)
	6-3/4 (171)	1,210 (5.4)	1,210 (5.4)	1,210 (5.4)	1,210 (5.4)	1,110 (4.9)	1,280 (5.7)	1,435 (6.4)	1,570 (7.0)
	10 (254)	1,790 (8.0)	1,790 (8.0)	1,790 (8.0)	1,790 (8.0)	1,110 (4.9)	1,280 (5.7)	1,435 (6.4)	1,570 (7.0)
#6	3-1/2 (89)	445 (2.0)	445 (2.0)	445 (2.0)	445 (2.0)	1,090 (4.8)	1,130 (5.0)	1,130 (5.0)	1,130 (5.0)
	4-1/2 (114)	570 (2.5)	570 (2.5)	570 (2.5)	570 (2.5)	1,150 (5.1)	1,325 (5.9)	1,450 (6.4)	1,450 (6.4)
	6-3/4 (171)	855 (3.8)	855 (3.8)	855 (3.8)	855 (3.8)	1,190 (5.3)	1,375 (6.1)	1,535 (6.8)	1,685 (7.5)
	10 (254)	1,265 (5.6)	1,265 (5.6)	1,265 (5.6)	1,265 (5.6)	1,190 (5.3)	1,375 (6.1)	1,535 (6.8)	1,685 (7.5)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor located 2-in from centerline of a hollow head joint with no additional influence from nearby edges or additional anchors. For designs with the influence of nearby edges, different distances to a hollow head joint, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.91.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat},
#3 and #4 rebar - α_{sat} = 1.00
#5 and #6 rebar - α_{sat} = 0.93
7 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by the following reduction factors:
#3 rebar = 0.67
#4 rebar = 0.74
#5 rebar = 0.74
#6 rebar = 0.53
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 12 — Hilti HIT-HY 270 adhesive design strength with masonry / bond failure for rebar in the top of uncracked fully grouted CMU walls and installed at minimum edge distance parallel with masonry course [1,2,3,4,5,6,7,8]

Rebar Size	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
#4	2-3/4 (70)	500 (2.2)	500 (2.2)	500 (2.2)	500 (2.2)	1,225 (5.4)	1,280 (5.7)	1,280 (5.7)	1,280 (5.7)
	4-1/2 (114)	820 (3.6)	820 (3.6)	820 (3.6)	820 (3.6)	1,320 (5.9)	1,520 (6.8)	1,700 (7.6)	1,865 (8.3)
	6-3/4 (171)	1,230 (5.5)	1,230 (5.5)	1,230 (5.5)	1,230 (5.5)	1,320 (5.9)	1,520 (6.8)	1,700 (7.6)	1,865 (8.3)
	10 (254)	1,825 (8.1)	1,825 (8.1)	1,825 (8.1)	1,825 (8.1)	1,320 (5.9)	1,520 (6.8)	1,700 (7.6)	1,865 (8.3)
#5	3-1/8 (79)	390 (1.7)	390 (1.7)	390 (1.7)	390 (1.7)	995 (4.4)	995 (4.4)	995 (4.4)	995 (4.4)
	4-1/2 (114)	565 (2.5)	565 (2.5)	565 (2.5)	565 (2.5)	1,435 (6.4)	1,435 (6.4)	1,435 (6.4)	1,435 (6.4)
	6-3/4 (171)	845 (3.8)	845 (3.8)	845 (3.8)	845 (3.8)	1,475 (6.6)	1,700 (7.6)	1,905 (8.5)	2,085 (9.3)
	10 (254)	1,250 (5.6)	1,250 (5.6)	1,250 (5.6)	1,250 (5.6)	1,475 (6.6)	1,700 (7.6)	1,905 (8.5)	2,085 (9.3)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor located 1-3/4-in from edge parallel with masonry course with no additional influence from nearby edges or additional anchors. For designs with the additional influence of nearby edges, a different edge distance, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.91.
5 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat},
#4 rebar - α_{sat} = 1.00
#5 rebar - α_{sat} = 0.93
6 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.
7 Tabular shear values are for shear force parallel to the edge parallel with the masonry course. For shear force perpendicular to the edge parallel with the masonry course, multiply design strength values by 0.50.
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 13 — Hilti HIT-HY 270 adhesive design strength with masonry / bond failure for rebar in the top of cracked fully grouted CMU walls and installed at minimum edge distance parallel with masonry course [1,2,3,4,5,6,7,8]

Rebar Size	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
#4	2-3/4 (70)	235 (1.0)	235 (1.0)	235 (1.0)	235 (1.0)	600 (2.7)	600 (2.7)	600 (2.7)	600 (2.7)
	4-1/2 (114)	385 (1.7)	385 (1.7)	385 (1.7)	385 (1.7)	940 (4.2)	985 (4.4)	985 (4.4)	985 (4.4)
	6-3/4 (171)	580 (2.6)	580 (2.6)	580 (2.6)	580 (2.6)	940 (4.2)	1,085 (4.8)	1,215 (5.4)	1,330 (5.9)
	10 (254)	860 (3.8)	860 (3.8)	860 (3.8)	860 (3.8)	940 (4.2)	1,085 (4.8)	1,215 (5.4)	1,330 (5.9)
#5	3-1/8 (79)	230 (1.0)	230 (1.0)	230 (1.0)	230 (1.0)	590 (2.6)	590 (2.6)	590 (2.6)	590 (2.6)
	4-1/2 (114)	335 (1.5)	335 (1.5)	335 (1.5)	335 (1.5)	845 (3.8)	845 (3.8)	845 (3.8)	845 (3.8)
	6-3/4 (171)	500 (2.2)	500 (2.2)	500 (2.2)	500 (2.2)	1,055 (4.7)	1,215 (5.4)	1,270 (5.6)	1,270 (5.6)
	10 (254)	740 (3.3)	740 (3.3)	740 (3.3)	740 (3.3)	1,055 (4.7)	1,215 (5.4)	1,360 (6.0)	1,490 (6.6)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor located 1-3/4-in from edge parallel with masonry course with no additional influence from nearby edges or additional anchors. For designs with the additional influence of nearby edges, a different edge distance, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.91.
5 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat},
#4 rebar - α_{sat} = 1.00
#5 rebar - α_{sat} = 0.93
6 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by the following reduction factors:
#4 rebar = 0.74
#5 rebar = 0.74
7 Tabular shear values are for shear force parallel to the edge parallel with the masonry course. For shear force perpendicular to the edge parallel with the masonry course, multiply design strength values by 0.50.
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 14 — Hilti HIT-HY 270 adhesive design strength with masonry / bond failure for HIS-(R)N in the face of uncracked fully grouted CMU walls [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of pryout or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	4-3/8 (111)	1,410 (6.3)	1,410 (6.3)	1,410 (6.3)	1,410 (6.3)	3,535 (15.7)	3,585 (15.9)	3,585 (15.9)	3,585 (15.9)
1/2	5 (127)	1,925 (8.6)	1,925 (8.6)	1,925 (8.6)	1,925 (8.6)	3,825 (17.0)	4,110 (18.3)	4,345 (19.3)	4,545 (20.2)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor with no influence from nearby edges, hollow head joints, or additional anchors. For designs with the influence of nearby edges, hollow head joints, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.91.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat},
3/8-in and 1/2-in diameter - α_{sat} = 0.93
7 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 15 — Hilti HIT-HY 270 adhesive design strength with masonry / bond failure for HIS-(R)N in the face of cracked fully grouted CMU walls [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of pryout or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	4-3/8 (111)	670 (3.0)	670 (3.0)	670 (3.0)	670 (3.0)	1,700 (7.6)	1,700 (7.6)	1,700 (7.6)	1,700 (7.6)
1/2	5 (127)	630 (2.8)	630 (2.8)	630 (2.8)	630 (2.8)	1,605 (7.1)	1,605 (7.1)	1,605 (7.1)	1,605 (7.1)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor with no influence from nearby edges, hollow head joints, or additional anchors. For designs with the influence of nearby edges, hollow head joints, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.91.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat},
3/8-in and 1/2-in diameter - α_{sat} = 0.93
7 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by the following reduction factors:
3/8-in diameter = 0.41
1/2-in diameter = 0.49
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 16 — Hilti HIT-HY 270 adhesive design strength with masonry / bond failure for HIS-(R)N in the face of uncracked fully grouted CMU walls and installed 2-in from centerline of hollow head joint [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	4-3/8 (111)	935 (4.2)	935 (4.2)	935 (4.2)	935 (4.2)	1,520 (6.8)	1,755 (7.8)	1,965 (8.7)	2,150 (9.6)
1/2	5 (127)	1,160 (5.2)	1,160 (5.2)	1,160 (5.2)	1,160 (5.2)	1,665 (7.4)	1,925 (8.6)	2,150 (9.6)	2,360 (10.5)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor located 2-in from centerline of a hollow head joint with no additional influence from nearby edges or additional anchors. For designs with the influence of nearby edges, different distances to a hollow head joint, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.91.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat},
3/8-in and 1/2-in diameter - α_{sat} = 0.93
7 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

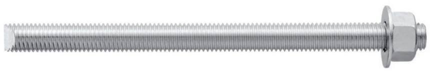
Table 17 — Hilti HIT-HY 270 adhesive design strength with masonry / bond failure for HIS-(R)N in the face of cracked fully grouted CMU walls and installed 2-in from centerline of hollow head joint [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of breakout, pryout, or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	4-3/8 (111)	440 (2.0)	440 (2.0)	440 (2.0)	440 (2.0)	1,085 (4.8)	1,120 (5.0)	1,120 (5.0)	1,120 (5.0)
1/2	5 (127)	380 (1.7)	380 (1.7)	380 (1.7)	380 (1.7)	970 (4.3)	970 (4.3)	970 (4.3)	970 (4.3)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor located 2-in from centerline of a hollow head joint with no additional influence from nearby edges or additional anchors. For designs with the influence of nearby edges, different distances to a hollow head joint, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values by 0.91.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat},
3/8-in and 1/2-in diameter - α_{sat} = 0.93
7 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by the following reduction factors:
3/8-in diameter = 0.41
1/2-in diameter = 0.49
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

DESIGN DATA IN UNGROUTED CMU

HIT-HY 270 adhesive with Hilti HAS threaded rods and Hilti HIT-IC inserts in ungrouted CMU



Hilti HAS Threaded Rods

Hilti HIT-IC Inserts

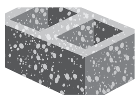
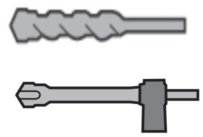
Permissible Base Materials			Permissible drilling method		
		Ungrouted Concrete Masonry			Rotary only drilling with carbide tipped drill bit Hilti TE-CD or TE-YD hollow drill bit

Figure 3 — Hilti HIT-HY 270 with HAS threaded rod and HIT-IC internally threaded inserts in hollow concrete masonry walls

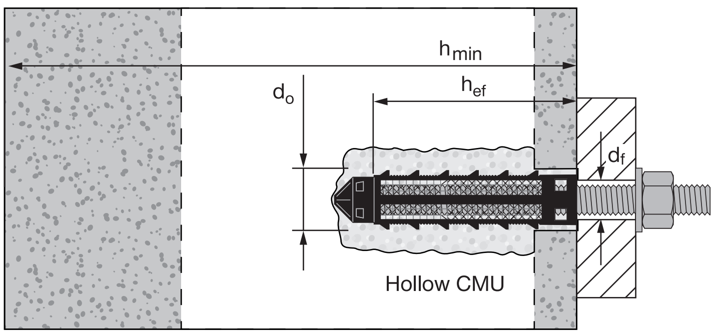


Table 18 — Hilti HIT-HY 270 Installation Information for Threaded Rod and Hilti HIT-IC — Ungrouted CMU Construction, Face of Wall

Design Information		Symbol	Units	Nominal Anchor Diameter 1/4”	5/16”	3/8”	1/2”
Drill Bit Diameter — Threaded Rod		d_o	in.	1/2	5/8	5/8	11/16
Drill Bit Diameter — HIT-IC		d_o	in.	N/A	5/8	7/8	7/8
Minimum Embedment Depth — Threaded Rod & HIT-IC		$h_{ef,min}$	in. (mm)	2 (51)	2 (51)	2 (51)	2 (51)
Fixture Hole Diameter		d_f	in.	9/32	3/8	7/16	9/16
Maximum Installation Torque		T_{inst}	ft-lb	2.2	2.2	3	4.5
Minimum Masonry Thickness		h_{min}	in. (mm)	7-5/8 (203)			
Critical Edge Distance (Tension)		$c_{cr,N}$	in. (mm)	4 (102)	4 (102)	4 (102)	4 (102)
Minimum Edge Distance (Tension)[1]		$c_{min,N}$	in. (mm)	2 (51)	2 (51)	2 (51)	2 (51)
Multiplier at Minimum Edge Distance (Tension)		-	-	0.80			
Threaded Rod	Critical Edge Distance (Shear)	$c_{cr,V}$	in. (mm)	3 (76)	3-3/4 (95)	4-1/2 (114)	6 (152)
	Minimum Edge Distance (Shear)[1]	$c_{min,V}$	in. (mm)	1-1/2 (38)	1-7/8 (48)	2-1/4 (57)	3 (76)
HIT-IC	Critical Edge Distance (Shear)	$c_{cr,V}$	in. (mm)	N/A	5.16 (131)	6.36 (162)	7.56 (192)
	Minimum Edge Distance (Shear)[1]	$c_{min,V}$	in. (mm)	N/A	2-5/8 (67)	3-1/4 (83)	3-7/8 (98)
Multiplier at Minimum Edge Distance (Shear)		-	-	0.50			
Minimum Anchor Spacing		s_{min}	in. (mm)	8 (203)			

1 The minimum distance from the center of an anchor to the centerline of a head joint (vertical mortar joint) is 2”.

Table 19 — Hilti HIT-HY 270 design strength with CMU failure modes for threaded rods not near an edge in uncracked, ungrouted CMU [1,2,3,4,5,6,7]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension ΦN_n	Shear ΦV_n
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)
1/4	2 (51)	215 (1.0)	275 (1.2)
5/16	2 (51)	355 (1.6)	450 (2.0)
3/8	2 (51)	350 (1.6)	450 (2.0)
1/2	2 (51)	360 (1.6)	455 (2.0)

1 Tabular values are for a single anchor with no influence from nearby edges or additional anchors. For designs with the influence of nearby edges or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
2 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
3 LFRD load capacities based on evaluation in accordance with AC58
4 Data is for Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C).
5 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat}, 1/4-in, 5/16-in, 3/8-in and 1/2-in diameter - α_{sat} = 1.00
6 Tabular values are for static loads only. Seismic design is not permitted.
7 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0 and multiply design strength values in tension and shear by 0.90.

Table 20 —Hilti HIT-HY 270 design strength with CMU failure modes for threaded rods not near an edge in cracked, ungrouted CMU [1,2,3,4,5,6,7]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension ΦN_n	Shear ΦV_n
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)
1/4	2 (51)	105 (0.5)	135 (0.6)
5/16	2 (51)	175 (0.8)	225 (1.0)
3/8	2 (51)	175 (0.8)	225 (1.0)
1/2	2 (51)	180 (0.8)	225 (1.0)

1 Tabular values are for a single anchor with no influence from nearby edges or additional anchors. For designs with the influence of nearby edges or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
2 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
3 LFRD load capacities based on evaluation in accordance with AC58
4 Data is for Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C).
5 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat}, 1/4-in, 5/16-in, 3/8-in and 1/2-in diameter - α_{sat} = 1.00
6 Tabular values are for static loads only. Seismic design is not permitted.
7 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0 and multiply design strength values in tension and shear by 0.90.

Table 21 — Hilti HIT-HY 270 design strength with CMU failure modes for HIT-IC inserts not near an edge in uncracked, ungrouted CMU [1,2,3,4,5,6,7]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension ΦN_n	Shear ΦV_n
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)
5/16	2 (51)	430 (1.9)	465 (2.1)
3/8	2 (51)	360 (1.6)	460 (2.0)
1/2	2 (51)	365 (1.6)	465 (2.1)

1 Tabular values are for a single anchor with no influence from nearby edges or additional anchors. For designs with the influence of nearby edges or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
2 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
3 LFRD load capacities based on evaluation in accordance with AC58.
4 Data is for Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C).
5 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat}, 5/16-in, 3/8-in and 1/2-in diameter - α_{sat} = 1.00
6 Tabular values are for static loads only. Seismic design is not permitted.
7 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0 and multiply design strength values in tension and shear by 0.90.

Table 22 —Hilti HIT-HY 270 design strength with CMU failure modes for HIT-IC inserts not near an edge in cracked, ungrouted CMU [1,2,3,4,5,6,7]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension ΦN_n	Shear ΦV_n
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)
5/16	2 (51)	220 (1.0)	235 (1.0)
3/8	2 (51)	180 (0.8)	230 (1.0)
1/2	2 (51)	180 (0.8)	230 (1.0)

1 Tabular values are for a single anchor with no influence from nearby edges or additional anchors. For designs with the influence of nearby edges or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
2 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
3 LFRD load capacities based on evaluation in accordance with AC58.
4 Data is for Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C).
5 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by: α_{sat}, 5/16-in, 3/8-in and 1/2-in diameter - α_{sat} = 1.00
6 Tabular values are for static loads only. Seismic design is not permitted.
7 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0 and multiply design strength values in tension and shear by 0.90.

INSTALLATION INSTRUCTIONS

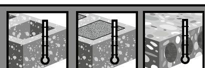
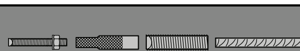
Installation Instructions For Use (IFU) are included with each product package. They can also be viewed or downloaded online at www.hilti.com (US), or www.hilti.ca (Canada). Because of the possibility of changes, always verify that downloaded IFU are current when used. Proper installation is critical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

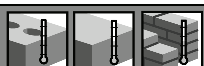
MATERIAL SPECIFICATIONS

Table 23 — Properties of fully-cured HIT-HY 270 adhesive

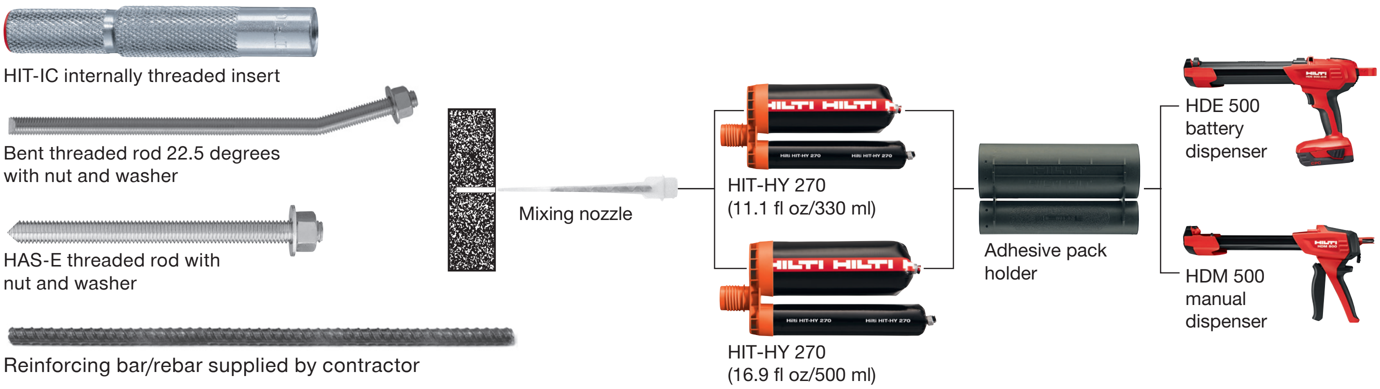
Compressive strength	ASTM D695/DIN 53454	7,252-10,153 psi	50-70 MPa
Modulus of elasticity (Compression test)	ASTM D790/DIN 53452	246,568 psi	1,700 MPa
Water absorption	ASTM D570/DIN 53495	3 - 8%	
Electrical resistance	VDE/DIN 0303T3	4.2 x 10'' ohm/in.	1.065 x 1012 ohm/cm

HILTI HIT-HY 270 CURE TIMES

			
[°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

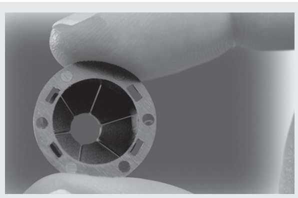
			
[°F]	[°C]	t_{work}	t_{cure}
41	5	10 min	4 h
42 – 50	6 ... 10	7 min	2.5 h
51 – 68	11 ... 20	4 min	1.5 h
69 – 86	21 ... 30	2 min	30 min
87 – 104	31 ... 40	1 min	20 min

ORDERING INFORMATION

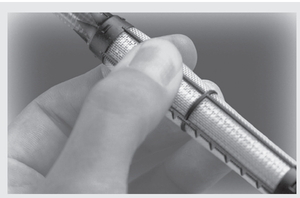


Description	Package Contents	Qty of Foil Packs
HIT-HY 270 (11.1OZ/330ML)	Includes (1) foil pack with (1) mixer and 3/8-in. filler tuber per pack	1
HIT-HY 270 (11.1OZ/330ML) 1 MC	Includes (1) master carton containing (25) foil packs with (1) mixer and 3/8-in. filler tuber per pack	25
HIT-HY 270 (16.9OZ/500ML) 1 MC	Includes (1) master carton containing (20) foil packs with (1) mixer and 3/8-in. filler tuber per pack	20
HIT-HY 270/500ML (2MC)+ HDM 500	Includes (2) master cartons containing (20) foil packs each with (1) mixer and 3/8-in. filler tuber per pack and (1) HDM 500 manual dispenser	40
HIT-HY 270/500ML (2MC)+ HDE 500 Kit	Includes (2) master cartons containing (20) foil packs each with (1) mixer and 3/8-in. filler tuber per pack and (1) HDM 500 manual dispenser	40
HY 270 TE 30-C AVR SafeSet Pack	Includes TE 30-C AVR, VC 150 6-X, (40) HIT-HY 270 500/1, HDE 500-A22, C 4/36 LI-ION, (1) B 22/2.6 Li-ion, HIT-CB 500, TE-CD bits: (1) 1/2"-13", (1) 9/16"-14", (1) 5/8"-14", (1) 3/4"-14", & bag small	40
HY 270 TE 6-A22 SafeSet Pack	Includes TE 6-A22, VC 150 6-X, (40) HIT-HY 270 500/1, HDE 500-A22, C 4/36 LI-ION, (2) B 22/5.2 Li-ion, HIT-CB 500, TE-CD bits: (1) 1/2"-13", (1) 9/16"-14", (1) 5/8"-14", (1) 3/4"-14", & bag small	40
HY 270 TE 30-A36 SafeSet Pack	Includes TE 30-A36, VC 150 6-X, (40) HIT-HY 270 500/1, HDE 500-A22, C 4/36-350 LI-ION, (2) B 36/6.0 Li-ion, HIT-CB 500, TE-CD bits: (1) 1/2"-13", (1) 9/16"-14", (1) 5/8"-14", (1) 3/4"-14", & bag small	40
HIT-RE-M Static Mixer	For use with HIT-HY 270 cartridges	1

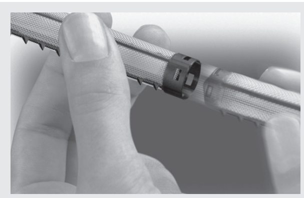
Customize the sleeve to the length of your application. Different embedment depths are created with minimal effort.



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.



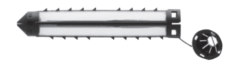
Step 3: Combine screen tubes to desired length.

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

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

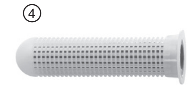
①


②


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 3 x 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	-

③


④


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

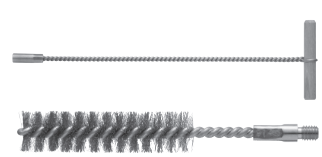
Internally threaded inserts

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 3-3/16	3-1/4	10	7/8	(1) SC 22x85	4	7

1 Assumes use with HDM 500 Manual Dispenser

Cleaning accessories

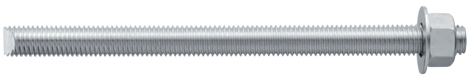
Hole Diameter	Round Brush Size use with HIT-RBH handle	Qty
1/2	HIT-RB 1/2	1
5/8	HIT-RB 5/8	1
11/16	HIT-RB 11/16	1
7/8	HIT-RB 7/8	1
1	HIT-RB 1	1

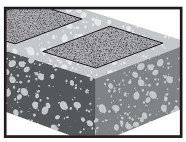


7.2 HIT-HY 100 ADHESIVE ANCHOR

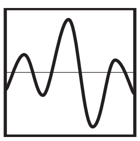
PRODUCT DESCRIPTION

HIT-HY 100 with Threaded Rod, Rebar, and HIS-N/RN Inserts

Mortar system	Features and Benefits
 Hilti HIT-HY 100 Cartridge  Hilti HAS Threaded Rods	• IAPMO approved for grout-filled concrete masonry • Anchoring light structural steel connections (e.g. steel columns, beams) • Anchoring secondary steel elements • Easier and more accurate dispensing with battery dispenser



Grout-filled concrete masonry



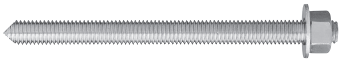
Seismic Design Categories A-F

PROFIS Engineering

Approvals/Listings	
IAPMO-UES (International Association of Plumbing and Mechanical Officials Uniform Evaluation Service)	ER-547 (for grout-filled CMU per ICC-ES AC58)
NSF/ANSI Std 61	Certification for use in potable water
City of Los Angeles	2020 LABC Supplement in ER-547
Florida Building Code	2020 FBC Supplement in ER-547 w/ HVHZ
U.S. Green Building Council	LEED® Credit 4.1-Low Emitting Materials

DESIGN DATA IN MASONRY

Hilti HIT-HY 100 adhesive in grout-filled CMU with Hilti HAS threaded rod



HAS

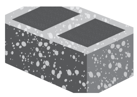
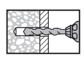
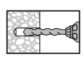
Permissible Base Materials		Grout-filled concrete masonry	**Permissible drilling method**		Rotary only drilling with carbide tipped drill bit

Table 1— Hilti HIT-HY 100 Installation Information for Threaded Rod Anchors — Fully Grouted CMU Construction, Face and Top of Wall

Installation information		Symbol	Units	Nominal Rod Diameter (in.)			
				3/8	1/2	5/8	3/4
Nominal Drill Bit Diameter		d_o	in.	7/16	9/16	3/4	7/8
Effective Embedment	Minimum	$h_{ef,min}$	in. (mm)	2-3/8 (60)	2-3/4 (70)	3-1/8 (79)	3-1/2 (89)
	Maximum	$h_{ef,max}$	in. (mm)	7-1/2 (191)	10 (254)	10 (254)	10 (254)
Diameter of Fixture Hole	Through-set		in.	1/2	5/8	13/16[1]	15/16[1]
	Preset		in.	7/16	9/16	11/16	13/16
Maximum Installation Torque		T_{inst}	ft-lb	6	7.5	7.5	10
Minimum Masonry Thickness[2]		h_{min}	in. (mm)	7-5/8 (194)			
Face of Wall	Minimum Edge Distance[3]	$c_{min,face}$	in. (mm)	4 (102)	4 (102)	4 (102)	4 (102)
	Minimum Anchor Spacing	$s_{min,face}$	in. (mm)	4 (102)	4 (102)	4 (102)	4 (102)
Top of Wall	Minimum Edge Distance[3]	$c_{min,top}$	in. (mm)	N/A	1-3/4 (44)	1-3/4 (44)	2-3/4 (70)
	Minimum Anchor Spacing	$s_{min,top}$	in. (mm)	N/A	3 (76)	3 (76)	3 (76)

1 Install using (2) washers. See Figure 2.
2 Maximum embedment for installation into the face of 7-5/8” CMU wall is 6-3/4”. Maximum embedment for installation into the face of 9-5/8” CMU wall is 8”.
3 The minimum distance from the center of an anchor to the centerline of a head joint (vertical mortar joint) is 2”.

Figure 1 —
Hilti HIT-HY 100 with HAS threaded rod in grout-filled concrete masonry walls

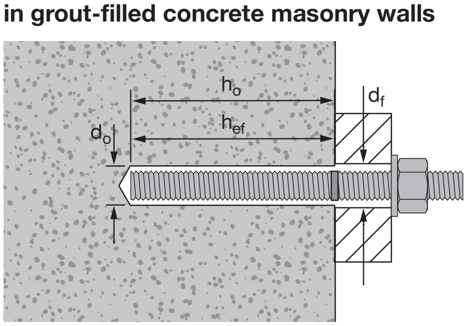


Figure 2 —
Installation with (2) washers

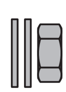


Table 2 — Hilti HIT-HY 100 adhesive design strength with masonry / bond failure for threaded rod in the face of uncracked fully grouted CMU walls [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of pryout or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	2-3/8 (60)	1,045 (4.6)	1,045 (4.6)	1,045 (4.6)	1,045 (4.6)	1,125 (5.0)	1,125 (5.0)	1,125 (5.0)	1,125 (5.0)
	4-1/2 (114)	1,980 (8.8)	1,980 (8.8)	1,980 (8.8)	1,980 (8.8)	2,875 (12.8)	3,085 (13.7)	3,265 (14.5)	3,415 (15.2)
	6-3/4 (171)	2,970 (13.2)	2,970 (13.2)	2,970 (13.2)	2,970 (13.2)	2,875 (12.8)	3,085 (13.7)	3,265 (14.5)	3,415 (15.2)
	7-1/2 (191)	3,300 (14.7)	3,300 (14.7)	3,300 (14.7)	3,300 (14.7)	2,875 (12.8)	3,085 (13.7)	3,265 (14.5)	3,415 (15.2)
1/2	2-3/4 (70)	1,390 (6.2)	1,390 (6.2)	1,390 (6.2)	1,390 (6.2)	3,340 (14.9)	3,540 (15.7)	3,540 (15.7)	3,540 (15.7)
	4-1/2 (114)	2,275 (10.1)	2,275 (10.1)	2,275 (10.1)	2,275 (10.1)	3,340 (14.9)	3,590 (16.0)	3,795 (16.9)	3,975 (17.7)
	6-3/4 (171)	3,410 (15.2)	3,410 (15.2)	3,410 (15.2)	3,410 (15.2)	3,340 (14.9)	3,590 (16.0)	3,795 (16.9)	3,975 (17.7)
	10 (254)	5,055 (22.5)	5,055 (22.5)	5,055 (22.5)	5,055 (22.5)	3,340 (14.9)	3,590 (16.0)	3,795 (16.9)	3,975 (17.7)
5/8	3-1/8 (79)	1,570 (7.0)	1,570 (7.0)	1,570 (7.0)	1,570 (7.0)	3,755 (16.7)	3,995 (17.8)	3,995 (17.8)	3,995 (17.8)
	4-1/2 (114)	2,260 (10.1)	2,260 (10.1)	2,260 (10.1)	2,260 (10.1)	3,755 (16.7)	4,035 (17.9)	4,265 (19.0)	4,465 (19.9)
	6-3/4 (171)	3,390 (15.1)	3,390 (15.1)	3,390 (15.1)	3,390 (15.1)	3,755 (16.7)	4,035 (17.9)	4,265 (19.0)	4,465 (19.9)
	10 (254)	5,020 (22.3)	5,020 (22.3)	5,020 (22.3)	5,020 (22.3)	3,755 (16.7)	4,035 (17.9)	4,265 (19.0)	4,465 (19.9)
3/4	3-1/2 (89)	1,815 (8.1)	1,815 (8.1)	1,815 (8.1)	1,815 (8.1)	4,140 (18.4)	4,450 (19.8)	4,620 (20.6)	4,620 (20.6)
	4-1/2 (114)	2,335 (10.4)	2,335 (10.4)	2,335 (10.4)	2,335 (10.4)	4,140 (18.4)	4,450 (19.8)	4,705 (20.9)	4,925 (21.9)
	6-3/4 (171)	3,500 (15.6)	3,500 (15.6)	3,500 (15.6)	3,500 (15.6)	4,140 (18.4)	4,450 (19.8)	4,705 (20.9)	4,925 (21.9)
	10 (254)	5,185 (23.1)	5,185 (23.1)	5,185 (23.1)	5,185 (23.1)	4,140 (18.4)	4,450 (19.8)	4,705 (20.9)	4,925 (21.9)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor with no influence from nearby edges, hollow head joints, or additional anchors. For designs with the influence of nearby edges, hollow head joints, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values values by 0.91.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by:
3/8-in, 5/8-in, and 3/4-in diameter - α_{sat} = 1.00
1/2-in diameter - α_{sat} = 0.84
7 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 3 — Hilti HIT-HY 100 adhesive design strength with masonry / bond failure for threaded rod in the face of cracked fully grouted CMU walls [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of pryout or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	2-3/8 (60)	590 (2.6)	590 (2.6)	590 (2.6)	590 (2.6)	635 (2.8)	635 (2.8)	635 (2.8)	635 (2.8)
	4-1/2 (114)	1,120 (5.0)	1,120 (5.0)	1,120 (5.0)	1,120 (5.0)	2,410 (10.7)	2,410 (10.7)	2,410 (10.7)	2,410 (10.7)
	6-3/4 (171)	1,680 (7.5)	1,680 (7.5)	1,680 (7.5)	1,680 (7.5)	2,875 (12.8)	3,085 (13.7)	3,265 (14.5)	3,415 (15.2)
	7-1/2 (191)	1,865 (8.3)	1,865 (8.3)	1,865 (8.3)	1,865 (8.3)	2,875 (12.8)	3,085 (13.7)	3,265 (14.5)	3,415 (15.2)
1/2	2-3/4 (70)	595 (2.6)	595 (2.6)	595 (2.6)	595 (2.6)	1,510 (6.7)	1,510 (6.7)	1,510 (6.7)	1,510 (6.7)
	4-1/2 (114)	970 (4.3)	970 (4.3)	970 (4.3)	970 (4.3)	2,475 (11.0)	2,475 (11.0)	2,475 (11.0)	2,475 (11.0)
	6-3/4 (171)	1,460 (6.5)	1,460 (6.5)	1,460 (6.5)	1,460 (6.5)	3,340 (14.9)	3,590 (16.0)	3,710 (16.5)	3,710 (16.5)
	10 (254)	2,160 (9.6)	2,160 (9.6)	2,160 (9.6)	2,160 (9.6)	3,340 (14.9)	3,590 (16.0)	3,795 (16.9)	3,975 (17.7)
5/8	3-1/8 (79)	605 (2.7)	605 (2.7)	605 (2.7)	605 (2.7)	1,545 (6.9)	1,545 (6.9)	1,545 (6.9)	1,545 (6.9)
	4-1/2 (114)	875 (3.9)	875 (3.9)	875 (3.9)	875 (3.9)	2,225 (9.9)	2,225 (9.9)	2,225 (9.9)	2,225 (9.9)
	6-3/4 (171)	1,310 (5.8)	1,310 (5.8)	1,310 (5.8)	1,310 (5.8)	3,340 (14.9)	3,340 (14.9)	3,340 (14.9)	3,340 (14.9)
	10 (254)	1,945 (8.7)	1,945 (8.7)	1,945 (8.7)	1,945 (8.7)	3,755 (16.7)	4,035 (17.9)	4,265 (19.0)	4,465 (19.9)
3/4	3-1/2 (89)	815 (3.6)	815 (3.6)	815 (3.6)	815 (3.6)	2,080 (9.3)	2,080 (9.3)	2,080 (9.3)	2,080 (9.3)
	4-1/2 (114)	1,050 (4.7)	1,050 (4.7)	1,050 (4.7)	1,050 (4.7)	2,670 (11.9)	2,670 (11.9)	2,670 (11.9)	2,670 (11.9)
	6-3/4 (171)	1,575 (7.0)	1,575 (7.0)	1,575 (7.0)	1,575 (7.0)	4,010 (17.8)	4,010 (17.8)	4,010 (17.8)	4,010 (17.8)
	10 (254)	2,335 (10.4)	2,335 (10.4)	2,335 (10.4)	2,335 (10.4)	4,140 (18.4)	4,450 (19.8)	4,705 (20.9)	4,925 (21.9)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor with no influence from nearby edges, hollow head joints, or additional anchors. For designs with the influence of nearby edges, hollow head joints, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values values by 0.91.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by:
3/8-in, 5/8-in, and 3/4-in diameter - α_{sat} = 1.00
1/2-in diameter - α_{sat} = 0.84
7 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by the following reduction factors:
3/8-in diameter = 0.60
1/2-in diameter = 0.75
5/8-in diameter = 0.75
3/4-in diameter = 0.64
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 4 — Hilti HIT-HY 100 adhesive design strength with masonry / bond failure for threaded rod in the face of uncracked fully grouted CMU walls and installed 2-in from centerline of hollow head joint [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of pryout or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	2-3/8 (60)	785 (3.5)	785 (3.5)	785 (3.5)	785 (3.5)	845 (3.8)	845 (3.8)	845 (3.8)	845 (3.8)
	4-1/2 (114)	1,490 (6.6)	1,490 (6.6)	1,490 (6.6)	1,490 (6.6)	1,205 (5.4)	1,390 (6.2)	1,555 (6.9)	1,700 (7.6)
	6-3/4 (171)	2,235 (9.9)	2,235 (9.9)	2,235 (9.9)	2,235 (9.9)	1,205 (5.4)	1,390 (6.2)	1,555 (6.9)	1,700 (7.6)
	7-1/2 (191)	2,480 (11.0)	2,480 (11.0)	2,480 (11.0)	2,480 (11.0)	1,205 (5.4)	1,390 (6.2)	1,555 (6.9)	1,700 (7.6)
1/2	2-3/4 (70)	885 (3.9)	885 (3.9)	885 (3.9)	885 (3.9)	1,290 (5.7)	1,490 (6.6)	1,665 (7.4)	1,825 (8.1)
	4-1/2 (114)	1,445 (6.4)	1,445 (6.4)	1,445 (6.4)	1,445 (6.4)	1,390 (6.2)	1,605 (7.1)	1,795 (8.0)	1,965 (8.7)
	6-3/4 (171)	2,170 (9.7)	2,170 (9.7)	2,170 (9.7)	2,170 (9.7)	1,390 (6.2)	1,605 (7.1)	1,795 (8.0)	1,965 (8.7)
	10 (254)	3,210 (14.3)	3,210 (14.3)	3,210 (14.3)	3,210 (14.3)	1,390 (6.2)	1,605 (7.1)	1,795 (8.0)	1,965 (8.7)
5/8	3-1/8 (79)	945 (4.2)	945 (4.2)	945 (4.2)	945 (4.2)	1,415 (6.3)	1,635 (7.3)	1,825 (8.1)	2,000 (8.9)
	4-1/2 (114)	1,360 (6.0)	1,360 (6.0)	1,360 (6.0)	1,360 (6.0)	1,520 (6.8)	1,755 (7.8)	1,965 (8.7)	2,150 (9.6)
	6-3/4 (171)	2,045 (9.1)	2,045 (9.1)	2,045 (9.1)	2,045 (9.1)	1,555 (6.9)	1,795 (8.0)	2,005 (8.9)	2,195 (9.8)
	10 (254)	3,025 (13.5)	3,025 (13.5)	3,025 (13.5)	3,025 (13.5)	1,555 (6.9)	1,795 (8.0)	2,005 (8.9)	2,195 (9.8)
3/4	3-1/2 (89)	1,040 (4.6)	1,040 (4.6)	1,040 (4.6)	1,040 (4.6)	1,530 (6.8)	1,765 (7.9)	1,975 (8.8)	2,160 (9.6)
	4-1/2 (114)	1,340 (6.0)	1,340 (6.0)	1,340 (6.0)	1,340 (6.0)	1,605 (7.1)	1,855 (8.3)	2,075 (9.2)	2,270 (10.1)
	6-3/4 (171)	2,010 (8.9)	2,010 (8.9)	2,010 (8.9)	2,010 (8.9)	1,665 (7.4)	1,925 (8.6)	2,150 (9.6)	2,360 (10.5)
	10 (254)	2,980 (13.3)	2,980 (13.3)	2,980 (13.3)	2,980 (13.3)	1,665 (7.4)	1,925 (8.6)	2,150 (9.6)	2,360 (10.5)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor located 2-in from centerline of a hollow head joint with no additional influence from nearby edges or additional anchors. For designs with the influence of nearby edges, different distances to a hollow head joint, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.
5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values values by 0.91.
6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by:
3/8-in, 5/8-in, and 3/4-in diameter - α_{sat} = 1.00
1/2-in diameter - α_{sat} = 0.84
7 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 5 — Hilti HIT-HY 100 adhesive design strength with masonry / bond failure for threaded rod in the face of cracked fully grouted CMU walls and installed 2-in from centerline of hollow head joint [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of pryout or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
3/8	2-3/8 (60)	445 (2.0)	445 (2.0)	445 (2.0)	445 (2.0)	480 (2.1)	480 (2.1)	480 (2.1)	480 (2.1)
	4-1/2 (114)	840 (3.7)	840 (3.7)	840 (3.7)	840 (3.7)	860 (3.8)	995 (4.4)	1,110 (4.9)	1,215 (5.4)
	6-3/4 (171)	1,260 (5.6)	1,260 (5.6)	1,260 (5.6)	1,260 (5.6)	860 (3.8)	995 (4.4)	1,110 (4.9)	1,215 (5.4)
	7-1/2 (191)	1,400 (6.2)	1,400 (6.2)	1,400 (6.2)	1,400 (6.2)	860 (3.8)	995 (4.4)	1,110 (4.9)	1,215 (5.4)
1/2	2-3/4 (70)	380 (1.7)	380 (1.7)	380 (1.7)	380 (1.7)	920 (4.1)	960 (4.3)	960 (4.3)	960 (4.3)
	4-1/2 (114)	620 (2.8)	620 (2.8)	620 (2.8)	620 (2.8)	995 (4.4)	1,145 (5.1)	1,280 (5.7)	1,405 (6.2)
	6-3/4 (171)	925 (4.1)	925 (4.1)	925 (4.1)	925 (4.1)	995 (4.4)	1,145 (5.1)	1,280 (5.7)	1,405 (6.2)
	10 (254)	1,375 (6.1)	1,375 (6.1)	1,375 (6.1)	1,375 (6.1)	995 (4.4)	1,145 (5.1)	1,280 (5.7)	1,405 (6.2)
5/8	3-1/8 (79)	365 (1.6)	365 (1.6)	365 (1.6)	365 (1.6)	930 (4.1)	930 (4.1)	930 (4.1)	930 (4.1)
	4-1/2 (114)	525 (2.3)	525 (2.3)	525 (2.3)	525 (2.3)	1,085 (4.8)	1,255 (5.6)	1,340 (6.0)	1,340 (6.0)
	6-3/4 (171)	790 (3.5)	790 (3.5)	790 (3.5)	790 (3.5)	1,110 (4.9)	1,280 (5.7)	1,435 (6.4)	1,570 (7.0)
	10 (254)	1,170 (5.2)	1,170 (5.2)	1,170 (5.2)	1,170 (5.2)	1,110 (4.9)	1,280 (5.7)	1,435 (6.4)	1,570 (7.0)
3/4	3-1/2 (89)	470 (2.1)	470 (2.1)	470 (2.1)	470 (2.1)	1,090 (4.8)	1,195 (5.3)	1,195 (5.3)	1,195 (5.3)
	4-1/2 (114)	605 (2.7)	605 (2.7)	605 (2.7)	605 (2.7)	1,150 (5.1)	1,325 (5.9)	1,480 (6.6)	1,535 (6.8)
	6-3/4 (171)	905 (4.0)	905 (4.0)	905 (4.0)	905 (4.0)	1,190 (5.3)	1,375 (6.1)	1,535 (6.8)	1,685 (7.5)
	10 (254)	1,340 (6.0)	1,340 (6.0)	1,340 (6.0)	1,340 (6.0)	1,190 (5.3)	1,375 (6.1)	1,535 (6.8)	1,685 (7.5)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.

2 Tabular values are for a single anchor located 2-in from centerline of a hollow head joint with no additional influence from nearby edges or additional anchors. For designs with the influence of nearby edges, different distances to a hollow head joint, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.

3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.

4 The maximum embedment for a 8-in CMU block is 6-3/4-in. The maximum embedment for a 10-in CMU block is 8-in. The maximum embedment for a 12-in CMU block is 10-in.

5 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values values by 0.91.

6 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by:
3/8-in, 5/8-in, and 3/4-in diameter - α_{sat} = 1.00
1/2-in diameter - α_{sat} = 0.84

7 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by the following reduction factors:
3/8-in diameter = 0.60
1/2-in diameter = 0.75
5/8-in diameter = 0.75
3/4-in diameter = 0.64

8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 6 — Hilti HIT-HY 100 adhesive design strength with masonry / bond failure for threaded rod in the top of uncracked fully grouted CMU walls and installed at minimum edge distance parallel with masonry course [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of pryout or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
1/2	2-3/4 (70)	675 (3.0)	675 (3.0)	675 (3.0)	675 (3.0)	1,225 (5.4)	1,410 (6.3)	1,580 (7.0)	1,725 (7.7)
	4-1/2 (114)	1,110 (4.9)	1,110 (4.9)	1,110 (4.9)	1,110 (4.9)	1,320 (5.9)	1,520 (6.8)	1,700 (7.6)	1,865 (8.3)
	6-3/4 (171)	1,660 (7.4)	1,660 (7.4)	1,660 (7.4)	1,660 (7.4)	1,320 (5.9)	1,520 (6.8)	1,700 (7.6)	1,865 (8.3)
	10 (254)	2,460 (10.9)	2,460 (10.9)	2,460 (10.9)	2,460 (10.9)	1,320 (5.9)	1,520 (6.8)	1,700 (7.6)	1,865 (8.3)
5/8	3-1/8 (79)	365 (1.6)	365 (1.6)	365 (1.6)	365 (1.6)	925 (4.1)	925 (4.1)	925 (4.1)	925 (4.1)
	4-1/2 (114)	525 (2.3)	525 (2.3)	525 (2.3)	525 (2.3)	1,330 (5.9)	1,330 (5.9)	1,330 (5.9)	1,330 (5.9)
	6-3/4 (171)	785 (3.5)	785 (3.5)	785 (3.5)	785 (3.5)	1,475 (6.6)	1,700 (7.6)	1,905 (8.5)	1,995 (8.9)
	10 (254)	1,160 (5.2)	1,160 (5.2)	1,160 (5.2)	1,160 (5.2)	1,475 (6.6)	1,700 (7.6)	1,905 (8.5)	2,085 (9.3)
3/4	3-1/2 (89)	645 (2.9)	645 (2.9)	645 (2.9)	645 (2.9)	1,640 (7.3)	1,640 (7.3)	1,640 (7.3)	1,640 (7.3)
	4-1/2 (114)	825 (3.7)	825 (3.7)	825 (3.7)	825 (3.7)	2,105 (9.4)	2,105 (9.4)	2,105 (9.4)	2,105 (9.4)
	6-3/4 (171)	1,240 (5.5)	1,240 (5.5)	1,240 (5.5)	1,240 (5.5)	3,115 (13.9)	3,160 (14.1)	3,160 (14.1)	3,160 (14.1)
	10 (254)	1,840 (8.2)	1,840 (8.2)	1,840 (8.2)	1,840 (8.2)	3,115 (13.9)	3,600 (16.0)	4,020 (17.9)	4,405 (19.6)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor located at minimum edge of 1-3/4-in (2-3/4-in for 3/4-in diameter) from edge parallel with masonry course with no additional influence from nearby edges or additional anchors. For designs with the additional influence of nearby edges, a different edge distance, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values values by 0.91.
5 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by:
1/2-in diameter - α_{sat} = 0.84
5/8-in and 3/4-in diameter - α_{sat} = 1.00
6 Tabular values are for static loads only. Seismic design is not permitted for uncracked masonry.
7 Tabular shear values are for shear force parallel to the edge parallel with the masonry course. For shear force perpendicular to the edge parallel with the masonry course, multiply design strength values in shear by the following reduction factors:
1/2-in and 5/8-in. diameter = 0.50
3/4-in diameter = 0.46
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

Table 7 — Hilti HIT-HY 100 adhesive design strength with masonry / bond failure for threaded rod in the top of cracked fully grouted CMU walls and installed at minimum edge distance parallel with masonry course [1,2,3,4,5,6,7,8]

Nominal anchor diameter in.	Effective embedment in. (mm)	Tension (lesser of breakout or bond) — ΦN_n				Shear (lesser of pryout or crushing) — ΦV_n			
		f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)	f'_m = 1500 psi (10.3 MPa) lb (kN)	f'_m = 2000 psi (13.8 MPa) lb (kN)	f'_m = 2500 psi (17.2 MPa) lb (kN)	f'_m = 3000 psi (20.7 MPa) lb (kN)
1/2	2-3/4 (70)	290 (1.3)	290 (1.3)	290 (1.3)	290 (1.3)	735 (3.3)	735 (3.3)	735 (3.3)	735 (3.3)
	4-1/2 (114)	475 (2.1)	475 (2.1)	475 (2.1)	475 (2.1)	940 (4.2)	1,085 (4.8)	1,205 (5.4)	1,205 (5.4)
	6-3/4 (171)	710 (3.2)	710 (3.2)	710 (3.2)	710 (3.2)	940 (4.2)	1,085 (4.8)	1,215 (5.4)	1,330 (5.9)
	10 (254)	1,050 (4.7)	1,050 (4.7)	1,050 (4.7)	1,050 (4.7)	940 (4.2)	1,085 (4.8)	1,215 (5.4)	1,330 (5.9)
5/8	3-1/8 (79)	140 (0.6)	140 (0.6)	140 (0.6)	140 (0.6)	360 (1.6)	360 (1.6)	360 (1.6)	360 (1.6)
	4-1/2 (114)	200 (0.9)	200 (0.9)	200 (0.9)	200 (0.9)	515 (2.3)	515 (2.3)	515 (2.3)	515 (2.3)
	6-3/4 (171)	305 (1.4)	305 (1.4)	305 (1.4)	305 (1.4)	775 (3.4)	775 (3.4)	775 (3.4)	775 (3.4)
	10 (254)	450 (2.0)	450 (2.0)	450 (2.0)	450 (2.0)	1,055 (4.7)	1,145 (5.1)	1,145 (5.1)	1,145 (5.1)
3/4	3-1/2 (89)	290 (1.3)	290 (1.3)	290 (1.3)	290 (1.3)	735 (3.3)	735 (3.3)	735 (3.3)	735 (3.3)
	4-1/2 (114)	370 (1.6)	370 (1.6)	370 (1.6)	370 (1.6)	950 (4.2)	950 (4.2)	950 (4.2)	950 (4.2)
	6-3/4 (171)	560 (2.5)	560 (2.5)	560 (2.5)	560 (2.5)	1,420 (6.3)	1,420 (6.3)	1,420 (6.3)	1,420 (6.3)
	10 (254)	825 (3.7)	825 (3.7)	825 (3.7)	825 (3.7)	2,105 (9.4)	2,105 (9.4)	2,105 (9.4)	2,105 (9.4)

1 Linear interpolation between embedment depths and masonry compressive strengths is not permitted.
2 Tabular values are for a single anchor located at minimum edge of 1-3/4-in (2-3/4-in for 3/4-in diameter) from edge parallel with masonry course with no additional influence from nearby edges or additional anchors. For designs with the additional influence of nearby edges, a different edge distance, or additional anchors, use Hilti PROFIS Engineering Design software or perform anchor calculation using design equations from AC58.
3 Compare masonry tabular values to the steel values in the Appendix. The lesser of the values is to be used for the design.
4 Data is for Temperature Range A: Maximum short term temperature = 130°F (55°C) | Maximum long term temperature = 110°F (43°C).
For Temperature Range B: Maximum short term temperature = 176°F (80°C) | Maximum long term temperature = 110°F (43°C), multiply design strength values values by 0.91.
5 Tabular values are for dry masonry conditions. For water saturated masonry conditions, multiply design strength values by:
1/2-in diameter - α_{sat} = 0.84
5/8-in and 3/4-in diameter - α_{sat} = 1.00
6 Tabular values are for static loads only. For seismic loads, multiply design strength values in tension and shear by the following reduction factors:
1/2-in and 5/8-in diameter = 0.75
3/4-in diameter = 0.64
7 Tabular shear values are for shear force parallel to the edge parallel with the masonry course. For shear force perpendicular to the edge parallel with the masonry course, multiply design strength values in shear by the following reduction factors:
1/2-in and 5/8-in. diameter = 0.50
3/4-in diameter = 0.46
8 Tabular values are for short term loads only. For sustained loads including overhead use, see Section 3.0.

MATERIAL SPECIFICATIONS

Material specifications for Hilti HAS threaded rods, Hilti HIT-Z anchor rods, and Hilti HIS-N inserts are listed in section 3.2.8 (PTG Vol 2 Ed. 17).

Table 8 — Material properties for cured HIT-HY 100 adhesive

Compressive Strength ASTM C579	> 50 MPa	> 7252 psi
Flexural Strength ASTM C 580	> 20 MPa	> 2900 psi
Modulus of Elasticity ASTM C 307	> 3500 MPa	> 5.07 x 10^5 psi
Water Asorption ASTM D 570	< 2%	
Electrical Resistance DIN/VDE 0303T3	~ 2 x 10^{11} OHM/cm	~ 5.1 x 10^{11} OHM/in.

For material specifications for anchor rods and inserts, please refer to section 3.2.8 of the Hilti North American Technical Guide Volume 2: Anchor Fastening Technical Guide

Table 9 — Gel Time [1,2]

Base material temperature		HIT-HY 100
°F	°C	
14	-10	3 h
23	-4	40 min
32	1	20 min
41	6	8 min
51	11	8 min
69	21	5 min
87	31	2 min

Table 10 — Full Cure Time [1,2]

Base material temperature		HIT-HY 100
°F	°C	
14	-10	12 h
23	-4	4 h
32	1	2 h
41	6	60 min
51	11	60 min
69	21	30 min
87	31	30 min

1 Product temperatures must be maintained above 41°F (5°C) prior to installation.
2 Gel times and full cure times are approximate.

Table 11 — Resistance of HIT- HY 100 to chemicals

Chemical		Behavior
Sulphuric acid	conc.	-
	30%	•
	10%	+
Hydrochloric acid	conc.	•
	10%	+
Nitric acid	conc.	-
	10%	•
Phosphoric acid	conc.	+
	10%	+
Acetic acid	conc.	•
	10%	+
Formic acid	conc.	-
	10%	•
Lactic acid	conc.	+
	10%	+
Citric acid	10%	+
Sodium Hydroxide (Caustic soda)	40%	•
	20%	+
	5%	+
Amonia	conc.	•
	5%	+
Soda solution	10%	+
Common salt solution	10%	+
Chlorinated lime solution	10%	+
Sodium hypochlorite	2%	+
Hydrogen peroxide	10%	+
Carbolic acid solution	10%	-
Ethanol		-
Sea water		+
Glycol		+
Acetone		-
Carbon tetrachloride		-
Tolune		+
Petrol/Gasoline		•
Machine Oil		•
Diesel oil		•

Key: - non resistant + resistant • limited resistance

7.3 STEEL DESIGN APPENDIX

Table 1 — Steel design strength for Hilti HAS threaded rods for use with ACI 318 Chapter 17

Nominal anchor diameter in.	HAS-V ASTM A307 Gr. A			HAS-V-36 / HAS-V-36 HDG ASTM F1554 Gr. 36[4,6]			HAS-E-55 / HAS-E-55 HDG ASTM F1554 Gr. 55[4,6]			HAS-B-105 / HAS-B-105 HDG ASTM A193 B7 and ASTM F1554 Gr. 105[4,6]			HAS-R stainless steel ASTM F593 (3/8-in to 1-in)[5]		
	Tensile[1] ΦN_{sa} lb (kN)	Shear[2] ΦV_{sa} lb (kN)	Seismic Shear[3] $\Phi V_{sa,eq}$ lb (kN)	Tensile[1] ΦN_{sa} lb (kN)	Shear[2] ΦV_{sa} lb (kN)	Seismic Shear[3] $\Phi V_{sa,eq}$ lb (kN)	Tensile[1] ΦN_{sa} lb (kN)	Shear[2] ΦV_{sa} lb (kN)	Seismic Shear[3] $\Phi V_{sa,eq}$ lb (kN)	Tensile[1] ΦN_{sa} lb (kN)	Shear[2] ΦV_{sa} lb (kN)	Seismic Shear[3] $\Phi V_{sa,eq}$ lb (kN)	Tensile[1] ΦN_{sa} lb (kN)	Shear[2] ΦV_{sa} lb (kN)	Seismic Shear[3] $\Phi V_{sa,eq}$ lb (kN)
1/4	1,240 (5.5)	685 (3.0)	480 (2.1)	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
5/16	1,995 (8.9)	1,105 (4.9)	775 (3.4)	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
3/8	- -	- -	- -	3,370 (15.0)	1,750 (7.8)	1,050 (4.7)	4,360 (19.4)	2,270 (10.1)	1,590 (7.1)	7,270 (32.3)	3,780 (16.8)	2,645 (11.8)	5,040 (22.4)	2,790 (12.4)	1,955 (8.7)
1/2	- -	- -	- -	6,175 (27.5)	3,210 (14.3)	1,925 (8.6)	7,985 (35.5)	4,150 (18.5)	2,905 (12.9)	13,305 (59.2)	6,920 (30.8)	4,845 (21.6)	9,225 (41.0)	5,110 (22.7)	3,575 (15.9)
5/8	- -	- -	- -	9,835 (43.7)	5,110 (22.7)	3,065 (13.6)	12,715 (56.6)	6,610 (29.4)	4,625 (20.6)	21,190 (94.3)	11,020 (49.0)	7,715 (34.3)	14,690 (65.3)	8,135 (36.2)	5,695 (25.3)
3/4	- -	- -	- -	14,550 (64.7)	7,565 (33.7)	4,540 (20.2)	18,820 (83.7)	9,785 (43.5)	6,850 (30.5)	31,360 (139.5)	16,310 (72.6)	11,415 (50.8)	18,485 (82.2)	10,235 (45.5)	7,165 (31.9)

1 Tensile = $\Phi A_{se,N} f_{uta}$ as noted in ACI 318-19 17.6.1.2.
2 Shear = Φ 0.60 $A_{se,V} f_{uta}$ as noted in ACI 318-19 17.7.1.2b.
3 Seismic Shear = $\alpha_{V,seis} \Phi V_{sa}$: Reduction for seismic shear only. See ACI 318 for additional information on seismic applications.
4 HAS-V, HAS-E, and HAS-B threaded rods are considered ductile steel elements (including HDG rods).
5 HAS-R (CW1 and CW2; 3-8-in to 1-in) threaded rods are considered brittle steel elements.
6 3/8-inch dia. threaded rods are not included in the ASTM F1554 standard. Hilti 3/8-inch dia. HAS-V, HAS-E, and HAS-B (incl. HDG) threaded rods meet the chemical composition and mechanical property requirements of ASTM F1554.

Table 2 — Steel design strength for US rebar for use with ACI 318 Chapter 17

Rebar Size	ASTM A615 Grade 40[4]			ASTM A615 Grade 60[4]			ASTM A706 Grade 60[4]		
	Tensile[1] ΦN_{sa} lb (kN)	Shear[2] ΦV_{sa} lb (kN)	Seismic Shear[3] $\Phi V_{sa,eq}$ lb (kN)	Tensile[1] ΦN_{sa} lb (kN)	Shear[2] ΦV_{sa} lb (kN)	Seismic Shear[3] $\Phi V_{sa,eq}$ lb (kN)	Tensile[1] ΦN_{sa} lb (kN)	Shear[2] ΦV_{sa} lb (kN)	Seismic Shear[3] $\Phi V_{sa,eq}$ lb (kN)
#3	4,290 (19.1)	2,375 (10.6)	1,665 (7.4)	5,720 (25.4)	3,170 (14.1)	2,220 (9.9)	6,600 (29.4)	3,430 (15.3)	2,400 (10.7)
#4	7,800 (34.7)	4,320 (19.2)	3,025 (13.5)	10,400 (46.3)	5,760 (25.6)	4,030 (17.9)	12,000 (53.4)	6,240 (27.8)	4,370 (19.4)
#5	12,090 (53.8)	6,695 (29.8)	4,685 (20.8)	16,120 (71.7)	8,930 (39.7)	6,250 (27.8)	18,600 (82.7)	9,670 (43.0)	6,770 (30.1)
#6	17,160 (76.3)	9,505 (42.3)	6,655 (29.6)	22,880 (101.8)	12,670 (56.4)	8,870 (39.5)	26,400 (117.4)	13,730 (61.1)	9,610 (42.7)

1 Tensile = $\Phi A_{se,N} f_{uta}$ as noted in ACI 318-19 17.6.1.2.
2 Shear = Φ 0.60 $A_{se,V} f_{uta}$ as noted in ACI 318-19 17.7.1.2b.
3 Seismic Shear = $\alpha_{V,seis} \Phi V_{sa}$: Reduction for seismic shear only. See ACI 318 for additional information on seismic applications.
4 ASTM A706 Grade 60 rebar are considered ductile steel elements. ASTM A615 Grade 40 and 60 rebar are considered brittle steel elements.

Table 3 — Steel design strength for steel bolt / cap screw for Hilti HIS-N and HIS-RN internally threaded inserts for use with ACI 318 Chapter 17 [6]

Thread Size	ASTM A193 B7 [4,5]			ASTM A193 Grade B8M Stainless Steel [5]		
	Tensile[1] ΦN_{sa} lb (kN)	Shear[2] ΦV_{sa} lb (kN)	Seismic Shear[3] $\Phi V_{sa,eq}$ lb (kN)	Tensile[1] ΦN_{sa} lb (kN)	Shear[2] ΦV_{sa} lb (kN)	Seismic Shear[3] $\Phi V_{sa,eq}$ lb (kN)
3/8-16 UNC	7,270 (32.3)	3,780 (16.8)	3,555 (15.8)	5,540 (24.6)	3,070 (13.7)	2,885 (12.8)
1/2-13 UNC	10,525 (46.8)	6,920 (30.8)	6,505 (28.9)	10,145 (45.1)	5,620 (25.0)	5,285 (23.5)

1 Tensile $= \Phi A_{se,N}\, f_{uta}$ as noted in ACI 318-19 17.6.1.2.
2 Shear $= \Phi\, 0.60\, A_{se,V}\, f_{uta}$ as noted in ACI 318-19 17.7.1.2b.
3 Seismic Shear $= \alpha_{V,seis}\, \Phi V_{sa}$: Reduction for seismic shear only. See ACI 318 for additional information on seismic applications.
4 ASTM A193 B7 steel bolts are considered ductile steel elements.
5 Hilti HIS-N inserts, HIS-RN inserts, and ASTM A193 Grade B8M stainless steel bolts are considered brittle steel elements.
6 Table values are the lesser of steel failure in the HIS-(R)N insert or inserted steel bolt.

Table 4 — Steel design strength for steel bolt / cap screw for Hilti HIT-IC internally threaded inserts for use with ACI 318 Chapter 17 [6]

Thread Size	ASTM A193 B7 [4,5]		
	Tensile[1] ΦN_{sa} lb (kN)	Shear[2] ΦV_{sa} lb (kN)	Seismic Shear[3] $\Phi V_{sa,eq}$ lb (kN)
5/16-18 UNC	2,740 (12.2)	2,555 (11.4)	1,790 (8.0)
3/8-16 UNC	4,050 (18.0)	3,780 (16.8)	2,645 (11.8)
1/2-13 UNC	9,800 (43.6)	6,920 (30.8)	4,845 (21.6)

1 Tensile $= \Phi A_{se,N}\, f_{uta}$ as noted in ACI 318-19 17.6.1.2.
2 Shear $= \Phi\, 0.60\, A_{se,V}\, f_{uta}$ as noted in ACI 318-19 17.7.1.2b.
3 Seismic Shear $= \alpha_{V,seis}\, \Phi V_{sa}$: Reduction for seismic shear only. See ACI 318 for additional information on seismic applications.
4 ASTM A193 B7 steel bolts are considered ductile steel elements.
5 Hilti HIT-IC inserts are considered brittle steel elements.
6 Table values are the lesser of steel failure in the HIT-IC insert or inserted steel bolt.

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