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ICC EVALUATION SERVICE

ICC-ES Evaluation Report

ESR-4144

Reissued August 2020

This report is subject to renewal August 2022.

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DIVISION: 04 00 00—MASONRY
Section: 04 05 19.16—Masonry Anchors

REPORT HOLDER:

HILTI, INC.

EVALUATION SUBJECT:

HILTI HIT-HY 270 ADHESIVE ANCHOR SYSTEM IN UNREINFORCED MASONRY

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018, 2015, 2012, 2009 and 2006 *International Building Code*® (IBC)
- 2018, 2015, 2012 and 2009 *International Residential Code*® (IRC)
- 2018, 2015, 2012 and 2009 *International Existing Building Code*® (IEBC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

For evaluation for compliance with codes adopted by the Los Angeles Department of Building Safety (LADBS), see ESR-4144 LABC, LARC and LAEBC supplement.

Property evaluated:

Structural

2.0 USES

The Hilti HIT-HY 270 Adhesive Anchor System is used to anchor threaded steel rods or deformed steel reinforcement bars in unreinforced brick masonry. Anchors installed in unreinforced masonry with the HIT-HY 270 adhesive system are designed to resist short-term loads imposed by earthquake or wind, as noted in Section 4.0 of this report. The anchor system is an alternative to anchors described in Section 8.1.3 (2016 or 2013 editions) or Section 2.1.4 (2011, 2008 or 2005 editions) of TMS 402/ ACI 530/ ASCE 5, respectively, as applicable. The anchors are an alternative to bolts described in Section A107.4 and Section A113.1 of the IEBC. The anchor system may also be used where an engineered design is submitted in accordance with Section R301.1.3 of the IRC.

3.0 DESCRIPTION

3.1 General:

The Hilti HIT-HY 270 Adhesive Anchor System consists of steel threaded rods or reinforcing bars, plastic mesh screen tube(s), the adhesive, and installation equipment as described in this report.

3.2 Materials:

3.2.1 Hilti HIT-HY 270 Adhesive: The Hilti HIT-HY 270 adhesive is an injectable hybrid adhesive mortar consisting of urethane methacrylate resin, hardener, cement and water. The resin and cement are separated from the hardener and water by means of a dual-cylinder foil pack attached to a manifold. An injection nozzle with an internal mixing element is attached to the manifold, and the adhesive components are dispensed through the injection nozzle to ensure proper mixing of the separate adhesive components. The injection nozzle may be replaced to permit multiple uses of the foil packs. Available foil pack sizes include total mixed volumes of 11.1 ounces (330 mL) and 16.9 ounces (500 mL).

The adhesive expiration date is printed on the manifold of each foil pack (month/year). The shelf life, as indicated by the expiration date, is for an unopened foil pack stored in a cool, dry, dark environment at temperatures between 41°F and 77°F (5°C and 25°C). Gel and curing times for the Hilti HIT-HY 270 adhesive and the respective masonry temperature during installation and cure are shown in Table 1.

3.2.2 Threaded Steel Rods and Reinforcing Bars: The threaded steel rods are $^3/_4$ inch (19.1 mm) in diameter, and must comply with the minimum mechanical properties of ASTM A307. Alternatively, the $^3/_4$-inch threaded rods may be used in a prebent $22^1/_2$-degree configuration. Threaded rods are supplied with nuts conforming to ASTM A563, Grade A, hex style, and with washers conforming to ANSI B 18.22.1, type A, Plain. The steel reinforcing bars are No. 4, No. 5, or No. 6 deformed bars complying with ASTM A615, A706, A767, or A996, Grade 60.

3.2.3 Plastic Mesh Screen Tubes: The mesh screen tubes are plastic with a black driving collar at the open end. They are available in diameters and lengths as described in Section 4.1. Different lengths can be achieved by assembling multiple screen tubes together, as depicted in Figure 3.

3.3 Unreinforced Masonry:

The existing unreinforced masonry walls must have a minimum nominal thickness of 13 inches (330 mm) [three wythes of brick]. The average in-place mortar shear strength of the building's unreinforced masonry determined in accordance with Section A106.2.3 (2018 IEBC) or A106.3.3 (2015, 2012 and 2009 IEBC), as applicable, must be no less than 50 psi (345 kPa) net.

4.0 DESIGN AND INSTALLATION

4.1 General:

Two types of anchor assemblies are available: Configuration A (shear anchor or rebar dowel) and Configuration B ($22^1/_2$-degree combination anchor).

4.1.1 Configuration A, Threaded Rods or Steel Reinforcing Bars in Shear (Shear Anchor or Rebar Dowel): Configuration A is the anchor assembly resisting shear loads only. Configuration A consists of a $^3/_4$-inch-diameter (19.1 mm), ASTM A307 threaded rod or a No. 4, No. 5 or No. 6 reinforcing bar and a 1-inch-diameter-by-8-inch-long (26 mm by 200 mm) plastic-mesh screen tube (HIT-SC 26x200). Figure 1 shows details of an installed shear-resisting assembly.

4.1.2 Configuration B, Bent Threaded Rods in Shear and Tension ($22^1/_2$-degree Combination Anchor): Configuration B is the anchor assembly resisting a combination of tension and shear loads. Configuration B consists of a $^3/_4$-inch-diameter (19.1 mm), ASTM A307 threaded rod prebent at an angle of $22^1/_2$ degrees and a 1-inch-diameter-by-13-inch-long (26 mm by 325 mm) plastic-mesh screen tube obtained by combining 1-inch-diameter-by-8-inch-long (26 mm by 200 mm) and 1-inch-diameter-by-5-inch-long (26 mm by 125 mm) plastic-mesh screen tubes (HIT-SC 26x200 and HIT-SC 26x125). The anchor must be embedded a minimum of 13 inches (330 mm) at a downward angle of $22^1/_2$ degrees to the horizontal. Figure 2 shows details of an installed shear- and tension-resisting assembly.

4.2 Design:

The Hilti HIT-HY 270 adhesive anchors are intended to resist only short-term loads imposed by wind or earthquake. The anchors must be approved by a registered design professional and installed under special inspection in accordance with Section 4.5 of this report. The edge distance and vertical and horizontal spacing for the two types of anchor assemblies described in Section 4.1 must comply with Table 2.

Conditions of acceptance for threaded rods and reinforcing bars in unreinforced brick masonry are as follows:

4.2.1 Configuration A, Threaded Rods or Steel Reinforcing Bars in Shear (Shear Anchor or Rebar Dowel):

a. Installation of assemblies using threaded rods or reinforcing bars intended to resist shear loads only must comply with Sections 4.1 and 4.3, and Figure 3 of this report.

b. The allowable shear load for the $^3/_4$-inch-diameter (19.1 mm) threaded rod is 1,000 pounds (4450 N), as shown in Table 3. The allowable shear loads for the No. 4, No. 5, and No. 6 reinforcing bars are 500, 750, and 1,000 pounds (2225, 3338, and 4450 N), respectively, as shown in Table 3. No adjustment for wind or earthquake loading is permitted.

c. The allowable shear loads noted above are applicable only to anchors installed in walls where in-place shear tests indicate a minimum mortar strength of 50 psi (345 kPa) net in accordance with Section A106.2.3 (2018 IEBC) or A106.3.3 (2015, 2012 and 2009 IEBC), as applicable.

4.2.2 Configuration B, Bent Threaded Rods in Shear and Tension ($22^1/_2$-degree Combination Anchor):

a. Installation of assemblies using prebent threaded rods intended to resist a combination of tension and shear loads must comply with Sections 4.1 and 4.3, and Figure 3 of this report.

b. The maximum allowable tension load for the $^3/_4$-inch-diameter (19.1 mm) prebent threaded rod (Configuration B) is 1,200 pounds (5340 N), as shown in Table 3. No adjustment for wind or earthquake loading is permitted.

c. The maximum allowable shear load for the $^3/_4$-inch-diameter (19.1 mm) prebent threaded rod (Configuration B) is 1,000 pounds (4,450 N), as shown in Table 3. No adjustment for wind or earthquake loading is permitted.

d. The maximum allowable load for the bent rod anchors subjected to combined tension and shear loads is determined by the following equation:

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

where:

P_s = Applied tension load

P_t = Allowable tension load

V_s = Applied shear load

V_t = Allowable shear load

e. The allowable tension and shear values as determined above are applicable only to anchors installed in walls where in-place shear tests indicate minimum mortar strength of 50 psi (345 kPa) net in accordance with Section A106.2.3 (2018 IEBC) or A106.3.3 (2015, 2012 and 2009 IEBC), as applicable

4.3 Installation:

4.3.1 General: 1-inch-diameter (25.4 mm) holes must be drilled using standard carbide-tipped masonry drill bits complying with ANSI Specification B212.15-1994. Holes must be drilled using a rotary drill or a rotary hammer drill set on “rotation only”. Impact tools are not permitted. Assembly installation must be in accordance with Section 4.3.2 or 4.3.3, and Figure 3 of this report. The adhesive must be allowed to cure for the full curing time listed in Table 1 before anchors are loaded. Cure time refers to that period of cure after which hardware may be placed and nuts tightened. Design loads may not be applied until the full curing time has transpired. Installation must not occur when masonry temperatures are below 41 °F (5 °C). The Hilti HIT HY 270 Adhesive Anchor System is intended to resist only short-term loads imposed by wind or earthquake. The anchors must be approved by the registered professional and installed under special inspection in accordance with Section 4.5 of this report. The edge distance, and vertical and horizontal spacing for all anchor configurations described in Sections 4.3.2 and 4.3.3 of this report, must comply with Table 2.

4.3.2 Configuration A: Holes for threaded rods or reinforcing bars intended to resist shear only must be drilled perpendicular to the wall to a minimum embedment depth of 8 inches (203 mm). The holes must be cleaned with a wire brush and compressed air to remove debris. The Hilti HIT-HY 270 adhesive must be injected into the supplied plastic mesh screen tube that is then inserted into the predrilled hole. The threaded rod or reinforcing bar must be inserted and pushed into the screen tube in a rotating manner to force the adhesive into the hole. Figure 1 illustrates an anchor installed in this configuration. Figure 3 illustrates the Manufacturer’s Published Installation Instructions (MPII), also referred to as Instruction for Use (IFU).

4.3.3 Configuration B: Holes for installation of assemblies using prebent threaded rods intended to resist shear and tension must be drilled at a $22^{1}/_{2}$-degree angle to within 1 inch (25.4 mm) of the opposing surface. The holes must be cleaned with a wire brush and compressed air to remove debris. The Hilti HIT-HY 270 adhesive must be injected into the supplied plastic mesh screen tube that is then inserted into the predrilled hole. The prebent threaded rod must be inserted and pushed into the screen tube in a rotating manner to force the adhesive into the hole. Figure 2 illustrates an anchor installed in this configuration. Figure 3 illustrates the MPII, also referred to as IFU.

4.4 Field Tests:

a. Tests for in-place mortar shear strength of the building must be done in accordance with Section A106.2.3 (2018 IEBC) or A106.3.3 (2015, 2012 and 2009 IEBC), as applicable. In-place mortar shear strength testing must indicate a minimum mortar strength of 50 psi (345 kPa).

b. Anchors resisting tension forces or a combination of tension and shear forces must be tested in accordance with Section A107.4 of the IEBC. The test report must include:

   1. Test location(s)
   2. Brick/mortar condition
   3. Bolt movement/elongation
   4. Embedment depth and masonry wall thickness
   5. Applied load, loading procedure, load increments, and rate of loading.

4.5 Special Inspection:

4.5.1 IBC and IRC: Continuous special inspection must be performed in accordance with Sections 1704 and 1705 of the IBC.

4.5.2 IEBC: Periodic inspection, direct-tension tests, and calibrated torque wrench tests must be performed in accordance with Section A107.4 of the IEBC. In lieu of testing and periodic inspection, the IEBC permits continuous special inspection during installation of bolts resisting shear forces only.

5.0 CONDITIONS OF USE

The Hilti HIT-HY 270 Adhesive Anchoring System for Unreinforced Masonry described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Use and installation must be as set forth in this evaluation report and the Manufacturer's Published Installation Instructions (MPII) illustrated in Figure 3 of this report. In case of conflict, this report governs.

5.2 Calculations and details must be submitted to the code official for approval.

5.3 Special inspection must be in accordance with Section 4.5 of this evaluation report.

5.4 Use of the anchor system must be approved by the registered design professional.

5.5 The existing mortar shall have a minimum in-place shear strength of 50 psi (345 kPa) in accordance with Section 3.3 of this report prior to installation of the adhesive anchors.

5.6 Anchors must be limited to resisting transient wind or seismic loads only.

5.7 Anchors are installed in holes predrilled with a carbide-tipped masonry drill bit complying with ANSI B212.15-1994. Impact tools must not be used for drilling holes or for tightening steel anchors or nuts.

5.8 The adhesive is not used after the expiration date stamped on the cartridge.

5.9 The Hilti HIT-HY 270 adhesive is manufactured by Hilti GmbH in Kaufering, Germany, under a quality control program with inspections by ICC-ES.

5.10 The Hilti HIT-SC screens are manufactured by Herbert Kaut GmbH & Co. KG in Sigmaringen, Germany, under a quality-control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Adhesive Anchors in Unreinforced Masonry Elements (AC60), dated December 2009 (editorially revised October 2018); and quality-control documentation.

7.0 IDENTIFICATION

7.1 Hilti HIT-HY 270 adhesive cartridges are identified by a label displaying the product name, company name (Hilti, Inc.), lot number, expiration date, a description of the product, the ICC-ES evaluation report number (ESR-4144), and installation instructions. The Hilti HIT-SC screens are identified by a label displaying the product name, name of the manufacturer (Hilti, Inc.), lot number, a description of the product, and installation instructions. Threaded rods, nuts, washers, and deformed reinforcing bars are standard elements and must conform to applicable national or international specifications.

7.2 The report holder's contact information is the following:

HILTI, INC.
7250 DALLAS PARKWAY, SUITE 1000
PLANO, TEXAS 75024
(800) 879-8000
www.us.hilti.com
HiltiTechEng@us.hilti.com

TABLE 1—HILTI'S GEL AND CURING TIMES FOR HILTI HIT-HY 270 ADHESIVE

MINIMUM BASE MATERIAL TEMPERATURE[1]		GEL TIME[2]	CURING TIME[3]
°F	°C		
41	5	10 minutes	4 hours
42-50	6-10	7 minutes	2.5 hours
51-68	11-20	4 minutes	1.5 hours
69-86	21-30	2 minutes	30 minutes
87-104	31-40	1 minute	20 minutes

For **SI:** °C = $^5/_9$ (°F – 32).

[1]The temperatures listed above refer to the base-material temperature, not ambient air temperature.
[2]The anchors may be adjusted during the gel time following installation.
[3]Anchors must not be disturbed between gel time and curing time. The anchors may be loaded after the full curing time has elapsed.

TABLE 2—SPACING AND EDGE DISTANCE REQUIREMENTS FOR HILTI HIT-HY 270 ADHESIVE INSTALLED IN UNREINFORCED BRICK MASONRY

ANCHOR ASSEMBLY	MINIMUM VERTICAL SPACING (inches)	MINIMUM HORIZONTAL SPACING (inches)	MINIMUM EDGE DISTANCE (inches)
Configuration A, Threaded Rods or Reinforcing Bars in Shear (see Figure 1)	16	16	16
Configuration B, Bent Threaded Rods in Shear and Tension ($22^1/_2$° Combination Anchor) (see Figure 2)	16	16	16

For **SI:** 1 inch = 25.4 mm.

TABLE 3—ALLOWABLE TENSION AND SHEAR LOADS FOR THREADED RODS AND REINFORCING BARS FOR HILTI HIT-HY 270 ADHESIVE INSTALLED IN UNREINFORCED BRICK MASONRY[1,2]

CONFIGURATION A – SHEAR ANCHOR OR REBAR DOWEL (FIGURE 1)				
Threaded Rod Dia. (inch) or Rebar Size	Minimum Embedment (inches)	Minimum Wall Thickness (inches)	Allowable Tension Load (pounds)	Allowable Shear Load (pounds)
$^3/_4$	8	13	-	1,000
No. 4	8	13	-	500
No. 5	8	13	-	750
No. 6	8	13	-	1,000
CONFIGURATION B – $22^1/_2$° COMBINATION ANCHOR (FIGURE 2)				
Threaded Rod Dia. (inch)	**Minimum Embedment**	**Minimum Wall Thickness (inches)**	**Allowable Tension Load[3] (pounds)**	**Allowable Shear Load (pounds)**
$^3/_4$	Within 1 inch of opposite wall surface	13	1,200	1,000

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 foot-pound = 1.356 N-m, 1 psi = 6.89 Pa.

[1]Allowable load values are applicable only to anchors where in-place shear tests indicate minimum mortar strength of 50 psi, net.
[2]No increase for short-term loading is permitted, such as loading induced by wind or earthquake.
[3]Anchors must be tested in accordance with Section 4.4 for use with the IEBC.

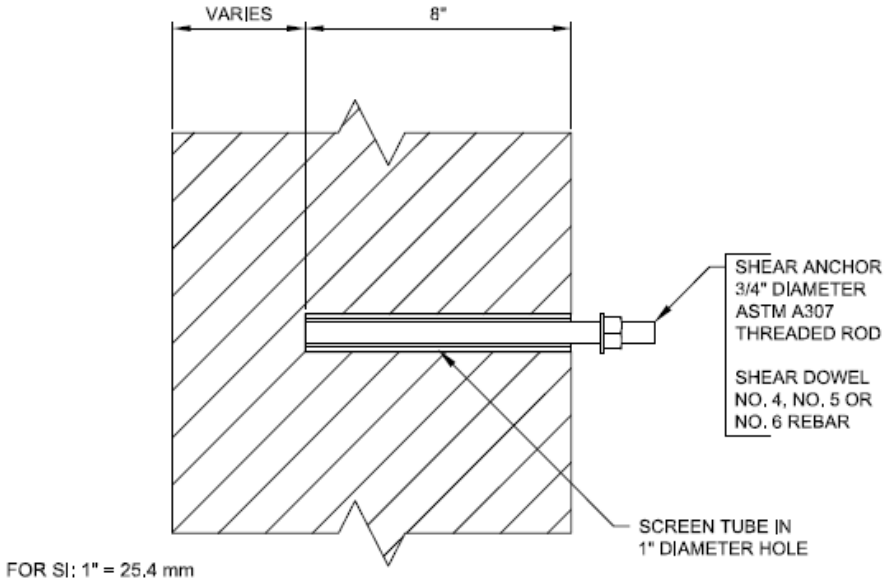


FIGURE 1—HILTI HIT-HY 270 ADHESIVE SHEAR ANCHOR OR DOWEL (CONFIGURATON A)

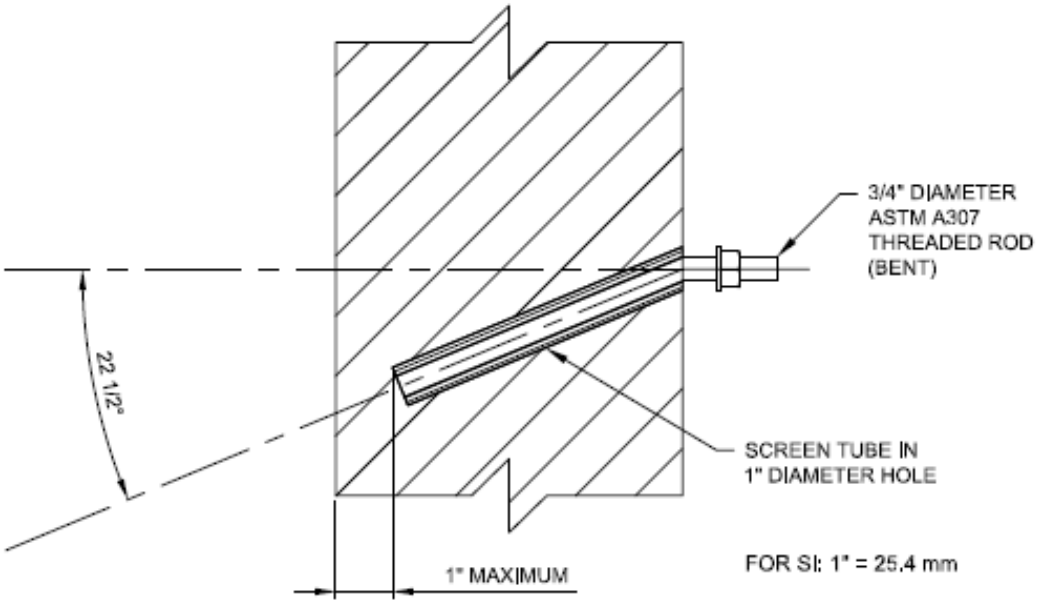
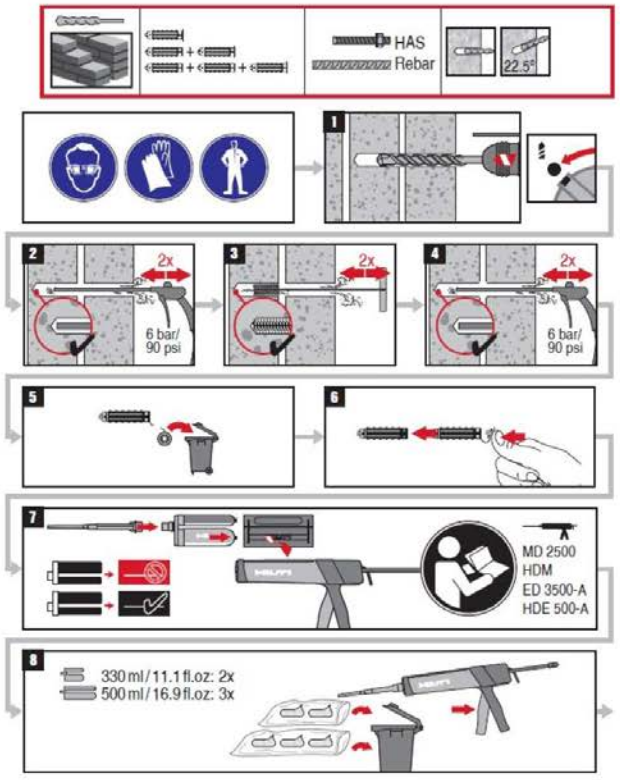


FIGURE 2—HILTI HIT-HY 270 ADHESIVE $22^1/_2°$ COMBINATION ANCHOR (CONFIGURATION B)



[°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

HAS

HAS	HIT-SC	d_0 [inch]	h_0 [inch]	h_{ef} [inch]	HIT-RB	d_t [inch]
¾	26x200 26x125 26x200	1	8¼ 13¼	8 13	1	13/16

Rebar

Rebar	HIT-SC	d_0 [inch]	h_0 [inch]	h_{ef} [inch]	HIT-RB
#4 #5 #6	26x200	1	8¼	8	1

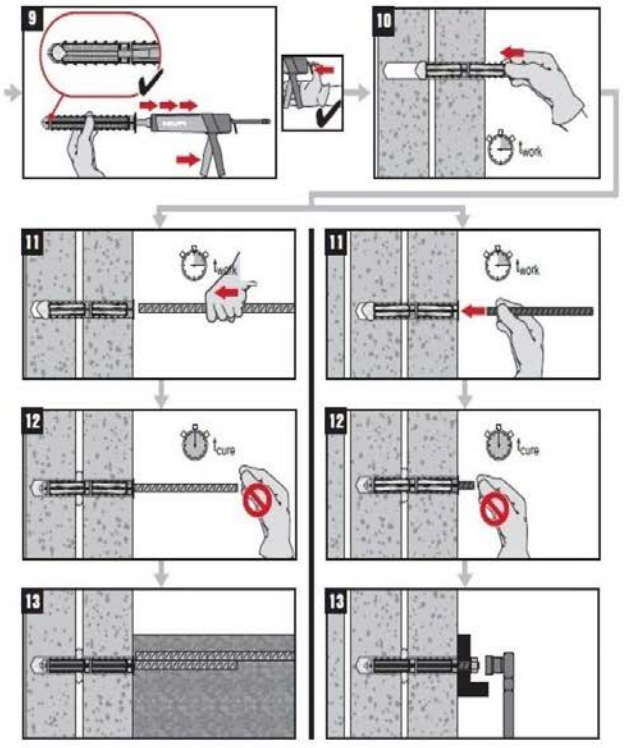


FIGURE 3—HILTI HIT-HY 270 ADHESIVE MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS (MPII)

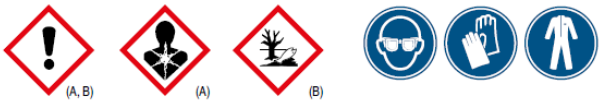
Hilti HIT-HY 270

Adhesive anchoring system for rebar and anchor fastenings.

For use in hollow and solid masonry of clay brick, concrete block and multi wythe wall.

Hilti HIT-HY 270

Contains: methacrylates, dibenzoyl peroxide, boric acid



Danger

H315	Causes skin irritation.(A)
H317	May cause an allergic skin reaction.(A,B)
H319	Causes serious eye irritation.(A)
H360	May damage fertility or the unborn child.(A)
H400	Very toxic to aquatic life (B)
H412	Harmful to aquatic life with long lasting effects.(A)
P262	Do not get in eyes, on skin, or on clothing.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P333+P313	If skin irritation or rash occurs: Get medical advice/attention.
P337+P313	If eye irritation persists: Get medical advice/attention.

Disposal considerations

Empty packs:

► Leave the mixer attached and dispose of via the local Green Dot recovery system or EAK waste material code: 150102 plastic packaging

Full or partially emptied packs:

► Must be disposed of as special waste in accordance with official regulations.

EAK waste material code: 08 04 09* waste adhesives and sealants containing organic solvents or other dangerous substances. or EAK waste material code: 20 01 27* paint, inks, adhesives and resins containing dangerous substances.

Warranty: Refer to standard Hilti terms and conditions of sale for warranty information.

Failure to observe these installation instructions, use of non-Hilti anchors, poor or questionable base material conditions, or unique applications may affect the reliability or performance of the fastenings.

Content:	11.1 fl.oz. / 330 ml	16.9 fl. oz / 500 ml
Weight:	20.8 oz / 590 g	28.9 oz / 820 g

Hilti HIT-HY 270

Product Information

- Always keep these instructions together with the product even when given to other persons.
- Check expiration date: See imprint on foil pack manifold (month/year). Do not use expired product.
- Foil pack temperature during usage: between 41 °F and 104 °F / +5 °C and 40 °C.
- Base material temperature at time of installation: between 23 °F and 104 °F / –5 °C and 40 °C.
  Exception in hollow, solid and multi-wythe solid clay brick: between 41°F and 104°F / +5°C and 40°C.
- Conditions for transport and storage: Keep in a cool, dry and dark place between 41 °F and 77 °F / 5°C and 25°C.
- For any application not covered by this document / beyond values specified, please contact Hilti.
- Partly used foil packs must remain in the cassette and has to be used within 4 weeks. Leave the mixer attached on the foil pack manifold and store within the cassette under the recommended storage conditions. If reused, attach a new mixer and discard the initial quantity of anchor adhesive.

NOTICE

⚠ **Improper handling may cause mortar splashes.**
- Always wear safety glasses, gloves and protective clothes during installation.
- Never start dispensing without a mixer properly screwed on.
- Attach a new mixer prior to dispensing a new foil pack (ensure snug fit).
- Use only the type of mixer (HIT-RE-M) supplied with the adhesive. Do not modify the mixer in any way.
- Never use damaged foil packs and/or damaged or unclean foil pack holders (cassettes).

⚠ **Poor load values / potential failure of fastening points due to inadequate borehole cleaning.**
- The boreholes must be free of debris, dust, water, ice, oil, grease and other contaminants prior to adhesive injection.
- For blowing out the borehole – blow out with oil free air until return air stream is free of noticeable dust.
- For brushing the borehole – only use specified wire brush. The brush must resist insertion into the borehole – if not the brush is too small and must be replaced.

⚠ **Borehole filling in solid masonry:** Ensure that boreholes are filled from the back of the borehole without forming air voids. If necessary use the accessories / extensions to reach the back of the borehole.

⚠ **Borehole filling in hollow masonry:** Use a mesh sleeve. Fill the mesh sleeve with mortar from the centering cap until mortar escapes at the centering cap (filling control).

⚠ **Multi-Wythe Solid Brick application: HIT-SC sieve sleeves / sieve sleeve combinations have to be filled outside the bore hole:** Push the mixer to the bottom of the last mesh sleeve (use mixer extension if necessary).Inject the anchor adhesive starting at the bottom of the last mesh sleeve while slowly withdrawing the mixing nozzle towards the centering cap, step by step, after each pull of the trigger. HIT-SC sieve sleeves have to be filled completely without forming air voids until anchor adhesive escapes at the centering cap (filling control).

⚠ **Not adhering to these setting instructions can result in failure of fastening points!**

FIGURE 3—HILTI HIT-HY 270 ADHESIVE MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS (MPII) (Continued)

ICC EVALUATION SERVICE

ICC-ES Evaluation Report

ESR-4144 LABC, LARC, and LAEBC Supplement

Reissued August 2020

This report is subject to renewal August 2022.

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DIVISION: 04 00 00—MASONRY
Section: 04 05 19.16—Masonry Anchors

REPORT HOLDER:

HILTI, INC.

EVALUATION SUBJECT:

HILTI HIT-HY 270 ADHESIVE ANCHOR SYSTEM IN UNREINFORCED MASONRY

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the Hilti HIT-HY 270 Adhesive Anchor System in unreinforced masonry, described in ICC-ES evaluation report ESR-4144, has also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2020 *City of Los Angeles Building Code* (LABC)
- 2020 *City of Los Angeles Residential Code* (LARC)
- 2020 *City of Los Angeles Existing Building Code* (LAEBC)

2.0 CONCLUSIONS

The Hilti HIT-HY 270 Adhesive Anchor System in unreinforced masonry, described in Sections 2.0 through 7.0 of the evaluation report ESR-4144, complies with the LABC Chapters 21 and 88, LAEBC Appendix A Chapter A1, and the LARC, and is subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The Hilti HIT-HY 270 Adhesive Anchor System in unreinforced masonry described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the r evaluation report ESR-4144.
- The design, installation, conditions of use and identification of the anchors are in accordance with the 2018 *International Building Code*® (2018 IBC) and the 2018 *International Existing Building Code*® (2018 IEBC) provisions noted in the evaluation report ESR-4144.
- The design, installation, testing and inspection are in accordance with additional requirements of LABC Chapters 16, 17, 21, 88, and LAEBC Appendix Chapter A1, as applicable, including LABC Sections 1704, 1705, 2107, and LAEBC Sections A106, A107, and A108.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 and additional requirements noted in this supplement must be submitted.
- The allowable load values listed in the evaluation report and tables are for the connection of the adhesive anchors to the unreinforced masonry. The connection between the adhesive anchors and the connected members must be checked for capacity (which may govern).

This supplement expires concurrently with the evaluation report, reissued August 2020.

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DIVISION: 04 00 00—MASONRY
Section: 04 05 19.16—Masonry Anchors

REPORT HOLDER:

HILTI, INC.

EVALUATION SUBJECT:

HILTI HIT-HY 270 ADHESIVE ANCHOR SYSTEM

1.0 EVALUATION SCOPE

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†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

For evaluation for compliance with codes adopted by the Los Angeles Department of Building Safety (LADBS), see ESR-4143 LABC and LARC Supplement.

Property evaluated:

Structural

2.0 USES

The Hilti HIT-HY 270 Adhesive Anchor System is used to anchor building components to hollow (ungrouted) and fully grouted concrete masonry walls, and hollow (ungrouted) brick masonry walls. Threaded rods, steel reinforcing bars, and internally threaded inserts installed with Hilti HIT-HY 270 can resist static, wind, and earthquake loads, as noted in Section 4.0 of this evaluation report. The anchor system is an alternative to Section 8.1.3 (2016 or 2013 editions) or Section 2.1.4 (2011, 2008 or 2005 editions) of TMS 402/ ACI 530/ ASCE 5, as applicable, as referenced in Section 2107 of the IBC. The anchor system may also be used where an engineered design is submitted in accordance with Section R301.1.3 of the IRC.

3.0 DESCRIPTION

3.1 General:

The Hilti HIT-HY 270 Adhesive Anchor System is comprised of the following components:

- Hilti HIT-HY 270 adhesive
- All-threaded steel rods, steel reinforcing bars, or Hilti HIS steel internally threaded inserts (grout-filled concrete masonry)
- All-threaded rods, bolts, cap screws, studs, Hilti HIT-IC internally threaded inserts, and Hilti HIT-SC plastic-mesh screen tubes (hollow concrete masonry and hollow brick masonry)

3.2 Materials:

3.2.1 Hilti HIT-HY 270 Adhesive: The Hilti HIT-HY 270 is an injectable hybrid adhesive mortar consisting of urethane methacrylate resin, hardener, cement and water. The resin and cement are separated from the hardener and water by means of a dual-cylinder foil pack attached to a manifold. An injection nozzle with an internal mixing element is attached to the manifold, and the adhesive components are dispensed through the injection nozzle to ensure their proper mixing. The injection nozzle may be replaced to permit interruptions in the use of the cartridges. Available cartridge sizes include total mixed volumes of 11.1 ounces (330 mL) and 16.9 ounces (500 mL).

The adhesive expiration date is printed on the manifold of each foil pack (month/year). The shelf life, as indicated by the expiration date, is for an unopened foil pack stored in a cool, dry, dark environment at temperatures between 41°F and 77°F (5°C and 25°C). Gel and curing times for the Hilti HIT-HY 270 adhesive, and the respective masonry temperature during installation and cure, are shown in Tables 1A and 1B.

3.2.2 Hole Cleaning Equipment:

3.2.2.1 Standard Equipment: Standard hole cleaning equipment, comprised of steel wire brushes and air nozzles is described in Figure 5 of this report.

3.2.2.2 Hilti Safe-Set™ System: When the Hilti TE-CD or TE-YD hollow carbide drill with a carbide drilling head conforming to ANSI B212.15 is used in conjunction with a Hilti vacuum with a minimum value for the maximum

volumetric flow rate of 129 CFM (61 ℓ/s), the Hilti TE-CD or TE-YD drill bit will remove drilling dust, automatically cleaning the hole.

3.2.3 Threaded Steel Rods (For Use in Fully Grouted Concrete Masonry and with Plastic Mesh Screen Tubes in Hollow Masonry): Threaded rods, having diameters described in Tables 3A through 10 of this report, must be clean, continuously threaded rods (all-thread). Carbon steel threaded rods must be in accordance with ASTM A36, ASTM A307, ASTM A193 Grade B7, ISO 898 Class 5.8. Stainless steel threaded rods must conform to ASTM F593 (AISI 304 or 316), Condition CW. Threaded steel rods must be straight and free of indentations or other defects along their lengths. The ends may be stamped with identifying marks and the embedded end may be blunt cut or cut on the bias (chisel point).

3.2.4 Steel Reinforcing Bars (For Use in Fully Grouted Concrete Masonry): Steel reinforcing bars are deformed reinforcing bars (rebar) having diameters described in Tables 3A, 3B, 5B, 5D, and 11 of this report, and must comply with ASTM A615, Grade 60. The embedded portions of reinforcing bars must be straight, and free of mill scale, rust, mud, oil, and other coatings that impair the bond with the adhesive

3.2.5 HIT-SC Screen Tubes: The Hilti HIT-SC plastic-mesh screen tubes are used in hollow masonry as described in Sections 3.4, 3.5, and 5.6 of this report. The screens consist of a removable cap, a collar, and a plastic mesh tube.

3.2.6 HIT-IC Inserts (For Use With Plastic Mesh Screens in Hollow Masonry): Hilti HIT-IC are steel internally threaded inserts conforming to DIN 10277-3 and are available in $^5/_{16}$-, $^3/_8$-, and $^1/_2$-inch (7.9, 9.5, and 12.7 mm) internal thread diameters. Common threaded rods as per Section 3.2.3, or bolts, cap screws, and studs conforming to SAE J995, ASTM A563 C, C3, D, DH, DH3 Heavy Hex, and ASTM F594, can be used with internally threaded inserts.

3.2.7 HIS-N and HIS-RN Inserts (For Use in Fully Grouted Concrete Masonry): Hilti HIS-(R)N steel inserts have a profile on the external surface and are internally threaded. Inserts are available in $^3/_8$- and $^1/_2$-inch (9.5 and 12.7 mm) internal thread diameters. HIS-(R)N inserts are produced from carbon steel and furnished either with a 0.005-millimeter-thick (5 mm) zinc electroplated coating complying with ASTM B633 SC 1 or a hot-dipped galvanized coating complying with ASTM A153, Class C or D. The stainless steel HIS-RN inserts conform to DIN 10088-3. Common threaded rods as per Section 3.2.3, or bolts, cap screws, and studs conforming to SAE J995, ASTM A563 C, C3, D, DH, DH3 Heavy Hex, and ASTM F594 can be used with internally threaded inserts.

3.3 Fully Grouted Concrete Masonry: Fully grouted concrete masonry must comply with Chapter 21 of the IBC. The compressive strength of masonry, f'_m, at 28 days must be a minimum of 1,500 psi (10.3 MPa). Fully grouted masonry systems must be constructed from the following materials:

3.3.1 Concrete Masonry Units (CMUs): CMUs must be minimum Grade N, Type 1, light-, medium-, or normal-weight conforming to ASTM C90. The minimum nominal size of the CMUs must be 8 inches wide by 8 inches high by 16 inches long.

3.3.2 Grout: Grout must comply with 2018 and 2015 IBC Section 2103.3, 2012 IBC Section 2103.13, and 2009 IBC Section 2103.12, or 2018 IRC Section R606.2.12, 2015 IRC Section R606.2.11, 2012 and 2009 IRC Section R609.1.1, as applicable. Alternatively, the grout must have a minimum compressive strength, when tested in accordance with ASTM C1019, equal to its specified strength, but not less than 2,000 psi (13.8 MPa).

3.3.3 Mortar: Mortar must be Type N (minimum) in accordance with IBC Section 2103, or 2018 IRC Section R606.2.8, 2015 IRC Section R606.2.7, or 2012 and 2009 IRC Section R607, as applicable.

3.4 Hollow (Ungrouted) Concrete Masonry: Hollow concrete masonry must comply with Chapter 21 of the IBC. The compressive strength of masonry, f'_m, at 28 days must be a minimum of 1,500 psi (10.3 MPa). Hollow concrete masonry walls must be constructed from the following materials:

3.4.1 Concrete Masonry Units (CMUs): CMUs must be minimum Grade N, Type 1, light-, medium-, or normal-weight conforming to ASTM C90. The minimum nominal size of the CMUs must be 8 inches wide by 8 inches high by 16 inches long.

3.4.2 Mortar: Mortar must be Type N (minimum) in accordance with IBC Section 2103, or 2018 IRC Section R606.2.8, 2015 IRC Section R606.2.7 or 2012 and 2009 IRC Section R607, as applicable.

3.5 Hollow Brick Masonry: Hollow brick masonry must comply with Chapter 21 of the IBC. The compressive strength of masonry, f'_m, at 28 days must be a minimum of 3,000 psi (20.7 MPa). Hollow brick masonry walls must be a minimum of two-wythes in thickness, and constructed from the following materials:

3.5.1 Brick Masonry Units: Hollow brick masonry must be constructed using hollow bricks conforming to ASTM C652, Grade SW. The minimum nominal size of the brick masonry units must be $3^5/_8$ inches (92 mm) wide by $2^1/_4$ inches (57 mm) high by $7^5/_8$ inches (194 mm) long.

3.5.2 Mortar: Mortar must be Type N (minimum) in accordance with IBC Section 2103, or 2018 Section R606.2.8, 2015 Section R606.2.7 or 2012 and 2009 IRC Section R607, as applicable.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: Anchors described in this report are assigned allowable tension and shear load values based on allowable stress design (ASD), as an alternative to Section 8.1.3 (2018 or 2013 editions) or Section 2.1.4 (2011, 2008 or 2005 editions) of TMS 402/ ACI 530/ ASCE 5, as applicable, as referenced in Section 2107 of the IBC. For use under the IRC, an engineered design in accordance with Section R301.1.3 must be submitted to the code official. The allowable tension and shear values reported herein must be adjusted in accordance with Figure 1 for in-service base-material temperatures in excess of 70°F (21°C). Anchors installed or cured at temperatures below 23°F (-5°C) are outside the scope of this report. Allowable tension and shear loads based on steel strength for threaded rods are described in Table 10, and for reinforcing bars are described in Table 11.

Allowable stress design tension and shear load values in Tables 3A, 3B, 5A, 5B, 5C and 5D may be used for resistance to short-term loads such as wind and seismic, in accordance with Section 5.5 and Table 2 of this report. Use of the values in the remaining tables for seismic loads is beyond the scope of this report. Use of the values in the remaining tables may be used for short-term loading due to wind forces; however, the allowable loads must not be increased.

4.1.2 Combined Loading: Allowable loads for anchors installed in masonry and subjected to combined tension and shear forces must be determined by the following formula:

$$\left(\frac{P_s}{P_t}\right)^n + \left(\frac{V_s}{V_t}\right)^n \le 1.0$$

where:

P_s = Applied service tension load (lbf or kN).

P_t = Allowable service tension load (lbf or kN).

V_s = Applied service shear load (lbf or kN).

V_t = Allowable service shear load (lbf or kN).

n = $^5/_3$ for the $^3/_8$- and $^1/_2$-inch-diameter steel threaded rods, No. 3 and No. 4 reinforcing bars, and $^3/_8$- and $^1/_2$-inch-diameter Hilti HIS steel internally threaded inserts installed in the face of grout filled concrete masonry.

n = 1 for the $^5/_8$- and $^3/_4$-inch-diameter steel threaded rods and No. 5 and No. 6 reinforcing bars installed in the face of grout filled concrete masonry, and all diameters of threaded rod and reinforcing bar installed in the top of grout filled concrete masonry, and all threaded rods and inserts in hollow (ungrouted) concrete masonry, and brick masonry.

4.1.3 Design of Threaded Rods and Reinforcing Bars Installed in the Face of Fully Grouted CMU Walls: Allowable tension and shear load values for $^3/_8$-, $^1/_2$-, $^1/_2$-, and $^3/_4$-inch-diameter (9.5, 12.7, 15.9, and 19.1 mm) steel threaded rods and No. 3, 4, 5, and 6 reinforcing bars installed in the face of grout-filled CMU walls are reported in Tables 3A and 3B. The allowable tension and shear loads are for anchors installed in any location in the face of the grout-filled CMU walls (cell, web, joints), and resisting static, wind, or earthquake loads. Critical and minimum spacing and edge distances, with appropriate reduction factors, are given in Tables 3A and 3B and shown in Figure 2.

4.1.4 Design of Threaded Rods and Reinforcing Bars Installed in the Top or Side of Fully Grouted CMU Walls: Allowable tension and shear load values for $^1/_2$-, $^5/_8$- and $^3/_4$-inch-diameter (12.7 mm, 15.9 mm, and 19.1 mm) steel threaded rods and No. 4 and No. 5 reinforcing bars installed in the top or side of grout-filled CMU walls and resisting static, wind, or earthquake loads are reported in Table 5A through Table 5D. Minimum edge and end distances are noted in Table 5A through Table 5D and shown in Figures 3 and 4.

4.1.5 Design of HIS-N and HIS-RN Inserts Installed in the Face of Fully Grouted CMU Walls: Allowable tension and shear load values for $^3/_8$-inch and $^5/_8$-inch (9.5 and 12.7 mm) HIS-N and HIS-RN internally threaded inserts installed in the face of fully grouted CMU walls are reported in Tables 4A and 4B. The allowable tension and shear loads are for HIS-(R)N inserts installed in any location in the face of the fully grouted CMU walls (cell, web, joints), and resisting static and wind load applications only. Use of these anchors to resist earthquake loads is outside the scope of this report. Critical and minimum spacing and edge distances, with appropriate reduction factors, are also given in Tables 4A and 4B.

4.1.6 Design of Anchors in Hollow Concrete Masonry Walls: Allowable tension and shear load values for $^1/_4$-, $^5/_{16}$-, $^3/_8$-, $^1/_2$-inch-diameter (6.4, 7.9, 9.5, 12.7 mm) steel threaded rods and $^5/_{16}$-inch, $^3/_8$-inch, and $^1/_2$-inch (7.9, 9.5, 12.7 mm) HIT-IC internally threaded inserts installed with Hilti HIT-SC plastic screens through the face of hollow concrete masonry walls are reported in Tables 6 and 7. The allowable tension and shear loads are for anchors resisting static and wind load applications only. Use of these anchors to resist earthquake loads is outside the scope of this report. Critical and minimum spacing and edge distances are also given in Tables 6 and 7.

4.1.7 Design of Anchors in Hollow Brick Masonry Walls: Allowable tension and shear load values for $^1/_4$-, $^5/_{16}$-, $^3/_8$-, $^1/_2$-inch-diameter (6.4, 7.9, 9.5, 12.7 mm) steel threaded rods and $^5/_{16}$-inch, $^3/_8$-inch, and $^1/_2$-inch (7.9, 9.5, 12.7 mm) HIT-IC internally threaded inserts installed with Hilti HIT-SC plastic screens through the face of hollow brick masonry walls are reported in Tables 8A, 8B and 9. The allowable tension and shear loads are for anchors resisting static and wind load applications only. Use of these anchors to resist earthquake loads is outside the scope of this report. Critical and minimum spacing and edge distances are also given in Tables 8A, 8B, and 9.

4.2 Installation: Installation parameters are illustrated in Figure 5. Installation of the Hilti HIT-HY 270 Adhesive Anchor System must conform to the manufacturer's printed installation instruction (MPII) included in each unit package as provided in Figure 5 of this report. Anchor locations must comply with this report and the plans and specifications approved by the code official.

4.3 Special Inspection

Periodic special inspections are required in accordance with IBC Sections 1704 and 1705, and are also applicable for installations under the IRC.

The approved special inspector must be on the jobsite initially during anchor installation to verify anchor type, anchor dimensions, adhesive identification and expiration date, masonry type, masonry compressive strength, hole dimensions, hole cleaning procedures, anchor spacing, edge distances, masonry wall thickness, anchor embedment, tightening torque, base-material temperature, and adherence to the manufacturer's printed installation instructions (MPII).

The special inspector must verify the initial installations of each type and size of adhesive anchor by construction personnel on the site.

Subsequent installations of the same anchor type and size by the same construction personnel are permitted to be performed in the absence of the special inspector. Any change in the anchor product being installed or the personnel performing the installation requires an initial inspection. For ongoing installations over an extended period, the special inspector must make regular inspections to confirm correct handling and installation of the product.

5.0 CONDITIONS OF USE

The Hilti HIT-HY 270 Adhesive Anchor System described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The Hilti HIT-HY 270 Adhesive Anchor System must be installed in accordance with the manufacturer's printed installation instructions (MPII) and this report. In case of conflict, this report governs.

5.2 Anchor sizes, dimensions, and minimum embedment depths must be as set forth in this report.

5.3 Prior to installation, calculations and details demonstrating compliance with this report must be submitted to the code official for approval. The calculations must be prepared by a registered design professional when required by the statutes of the jurisdiction in which the project is to be constructed.

5.4 Anchors resisting static, seismic or wind loads in masonry must be designed in accordance with Section 4.0 of this report.

5.5 Grout-filled concrete masonry under the IBC or the IRC (Tables 3A, 3B, 5A, 5B, 5C, and 5D): The adhesive

anchors described in Sections 4.1.3 and 4.1.4 of this evaluation report are capable of resisting seismic and wind loads. When using the basic load combinations in accordance with IBC Section 1605.3.1, allowable loads must not be increased for seismic or wind loading. When using the alternative basic load combinations in 2009 IBC Section 1605.3.2 that include seismic or wind loads, the allowable loads may be increased in accordance with Table 2, or the alternative basic load combinations may be decreased by the factors in Table 2, as applicable. For the 2018, 2015 and 2012 IBC, the allowable loads or load combinations must not be adjusted.

5.6 HIS-N and HIS-RN inserts (Tables 4A and 4B), hollow concrete masonry (Tables 6 and 7), and hollow brick masonry (Tables 8A, 8B, and 9) under the IBC or the IRC: Use of the adhesive anchors described in Sections 4.1.5, 4.1.6, and 4.1.7 for resistance to seismic loads is beyond the scope of this report. The allowable loads or load combinations for these anchors must not be adjusted for applications subjected to wind loads.

5.7 Since an ICC-ES acceptance criteria for evaluating data to determine the performance of adhesive anchors subjected to fatigue or shock loading is unavailable at this time, the use of these anchors under these conditions is beyond the scope of this report.

5.8 The Hilti HIT-HY 270 Adhesive Anchor Systems may be used to resist tension and shear forces in wall installations only if consideration is given to the effects of elevated temperature conditions on anchor performance. Figure 1 describes load reduction factors for elevated temperatures.

5.9 Anchors are not permitted to support fire-resistive construction. Where not otherwise prohibited by the code, anchors are permitted for installation in fire-resistive construction provided that at least one of the following conditions is fulfilled:

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

5.10 Since an ICC-ES acceptance criteria for evaluating the performance of adhesive anchors in cracked masonry is unavailable at this time, the use of anchors is limited to installation in uncracked masonry. Cracking occurs when $f_t > f_r$, due to service loads or deformations.

5.11 Use of Hilti HIT-HY 270 Adhesive Anchor System in conjunction with uncoated or zinc electroplated carbon steel threaded rods or steel reinforcing bars must be limited to interior exposure. Use of stainless steel (AISI 304 or 316) anchors or hot dipped galvanized anchors with a zinc coating conforming to ASTM A153, Class C or D, is permitted for exterior or damp environments.

5.12 The Hilti HIT-HY 270 Adhesive Anchor System may be installed in base materials having interior temperatures between 23°F (-5°C) and 104°F (40°C) at the time of installation. Installation of HIT-HY 270 adhesive in base materials having temperatures beyond this range is outside the scope of this report.

5.13 When anchors are located where the base-material temperature may exceed 70°F (21°C), allowable tension and shear loads indicated in this report must be adjusted for in-service temperatures in accordance with Figure 1. The use of HIT-HY 270 adhesive in base materials having interior temperatures exceeding 180°F (82°C) during their service life is outside the scope of this report.

5.14 Steel anchoring materials in contact with preservative-treated wood or fire-retardant-treated wood must be stainless steel or hot-dipped galvanized in accordance with ASTM A153 Class C or D.

5.15 Special inspection in accordance with Section 4.3 of this report must be provided for all anchor installations.

5.16 The Hilti HIT-HY 270 Adhesive Anchor Systems must be installed in holes created using a carbide-tipped masonry drill bit manufactured within the range of the maximum and minimum dimensions of ANSI B212.15.

5.17 The Hilti HIT-HY 270 adhesive is manufactured by Hilti GmbH at their facilities in Kaufering, Germany, under a quality control program with inspections by ICC-ES.

5.18 The Hilti HIT-SC plastic screens are manufactured by Hilti Kunststofftechnik GmbH, Nersingen, Germany, with quality control inspections by ICC-ES.

5.19 The Hilti HIT-IC inserts are manufactured by Hilti (China) Ltd., Guangdong, China, with quality control inspections by ICC-ES.

5.20 The Hilti HIS-N and HIS-RN inserts are manufactured by Hilti (China) Ltd., Guangdong, China, with quality control inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Adhesive Anchors in Masonry Elements (AC58), dated March 2018, including tests on the effects of edge distance (Test Series 4 and 5), end distance (Test Series 5), spacing (Test Series 8 and 9) on tension performance; the effects of end distance (Test Series 14), spacing and edge distance (Test Series 13 and 14) on shear performance; for installations in grout-filled CMU, hollow concrete, and/or hollow brick masonry walls; the effects of oblique tension loading (Test Series 15); and suitability tests (Test Series 17 through 21) for installations in grout-filled CMU walls.

6.2 A quality-control manual.

7.0 IDENTIFICATION

7.1 The Hilti HIT-HY 270 adhesive cartridges are identified by a label displaying the product name, name of the manufacturer (Hilti, Inc.), lot number, expiration date, description of the product, and evaluation report number (ICC-ES ESR-4143).

7.2 The Hilti HIT-SC plastic screens are identified by a packaging label displaying the product name, name of the manufacturer (Hilti Inc.), description of the product, and evaluation report number (ICC-ES ESR-4143).

7.3 The Hilti HIS-N and HIS-RN inserts are identified by a packaging label displaying the product name, name of the manufacturer (Hilti Inc.), description of the product, and evaluation report number (ICC-ES ESR-4143).

7.4 The Hilti HIT-IC inserts are identified by a packaging label displaying the product name, name of the manufacturer (Hilti Inc.), description of the product, and evaluation report number (ICC-ES ESR-4143).

7.5 Threaded rods, reinforcing bars, nuts, washers, bolts, cap screws, and studs are standard elements, and must conform to applicable national or international specifications and this report.

7.6 The report holder's contact information is the following:

HILTI, INC.
7250 DALLAS PARKWAY, SUITE 1000
PLANO, TEXAS 75024
(800) 879-8000
www.us.hilti.com

TABLE 1A—HILTI, INC., GEL AND CURE TIMES FOR HIT-HY 270 ADHESIVE IN CONCRETE MASONRY

Base-Material Temperature		Approximate Gel Time[1]	Approximate Curing Time
°F	°C		
23 – 32	-5 – 0	10 Minutes	6 hours
33 – 41	1 – 5	10 Minutes	4 hours
42 – 50	6 – 10	7 Minutes	2.5 hours
51 – 68	11 – 20	4 Minutes	1.5 hours
69 – 86	21 – 30	2 Minutes	30 minutes
87 – 104	31 – 40	1 Minutes	20 minutes

For **SI**: t °C = 5/9 · (t °F – 32 °F)

TABLE 1B—HILTI, INC., GEL AND CURE TIMES FOR HIT-HY 270 ADHESIVE IN CLAY MASONRY

Base-Material Temperature		Approximate Gel Time[1]	Approximate Curing Time
°F	°C		
41	5	10 Minutes	4 hours
42 – 50	6 – 10	7 Minutes	2.5 hours
51 – 68	11 – 20	4 Minutes	1.5 hours
69 – 86	21 – 30	2 Minutes	30 minutes
87 – 104	31 – 40	1 Minutes	20 minutes

For **SI**: t °C = 5/9 · (t °F – 32 °F)

TABLE 2—ALTERNATIVE BASIC LOAD COMBINATION ADJUSTMENT FACTORS[1,2,3]

Steel Type	Modification Factors			
	Reductions for Alternate Basic Load Combinations		Increase Factor for Allowable Loads for Short-term Loading Conditions	
	Tension	Shear	Tension	Shear
Standard threaded rods and inserts	0.75	0.75	1.33	1.33
High-strength rods	0.75	1	1.33	1
Stainless rods and inserts	0.75	0.87	1.33	1.14
Steel reinforcing bars	0.75	0.75	1.33	1.33

[1] When using the basic load combinations in accordance with IBC Section 1605.3.1, allowable loads must not be increased for wind or seismic loading.
[2] When using the alternative basic load combinations in the 2009 IBC Section 1605.3.2 that include wind or seismic loads, the allowable loads for anchors may be increased by the tabulated factors found in the right half of the table. Alternatively, the alternate basic load combinations may be reduced by multiplying them by the reduction factors found in the left half of the table. For example, for stainless steel rods in shear, the alternate basic loads for wind or seismic may be multiplied by 0.87 for shear loading or divided by 1.14 (1/1.14 = 0.87), as applicable. For the 2018, 2015, 2012 IBC, the allowable loads or load combinations must not be adjusted.
[3] The above modification factors are applicable under the 2009 IBC only, for Tables 3A, 3B, 5A, 5B, 5C, and 5D of this report for seismic loads, and Tables 3A, 3B, 4A, 4B, 5A, 5B, 5C, 5D, 6, 7, 8A, 8B, 9, 10, and 11 of this report for wind loads.

TABLE 3A—ALLOWABLE ADHESIVE BOND TENSION LOADS FOR THREADED RODS AND REINFORCING BARS IN THE FACE OF GROUT-FILLED CONCRETE MASONRY UNITS (POUNDS)[1,2,7,8,9,11,12,13]

Anchor Diameter (inches), or Rebar Size	Embedment (inches)[3]	Load @ c_{cr} and s_{cr}	Spacing[4]			Edge Distance[5]		
			Critical, s_{cr} (inches)	Minimum, s_{min} (inches)	Load Reduction Factor at s_{min}[6]	Critical, c_{cr} (inches)	Minimum, c_{min} (inches)	Load Reduction Factor at c_{min}[6]
$^3/_8$ or No. 3	$3^3/_8$	1240	13.5	4	0.70	12	4	0.80
$^1/_2$ or No. 4	$4^1/_2$	2035	18	4	0.70	20	4	0.76
$^5/_8$ or No. 5	$5^5/_8$	2840	22.5	4	0.50	20	4	0.71
$^3/_4$ or No. 6	$6^3/_4$	3810	27	4	0.50	20	4	0.66

TABLE 3B—ALLOWABLE ADHESIVE BOND SHEAR LOADS FOR THREADED RODS AND REINFORCING BARS IN THE FACE OF GROUT-FILLED CONCRETE MASONRY UNITS (POUNDS)[1,2,7,8,9,10,11,12,13]

Anchor Diameter (inches)	Embedment (inches)[3]	Load @ c_{cr} and s_{cr}	Spacing[4]			Edge Distance[5]			
			Critical, s_{cr} (inches)	Minimum, s_{min} (inches)	Load Reduction Factor at s_{min}[6]	Critical, c_{cr} (inches)	Minimum, c_{min} (inches)	Load Reduction Factor at c_{min}[6]	
								Load Perpendicular to Edge	Load Parallel to Edge
$^3/_8$ or No. 3	$3^3/_8$	850	13.5	4	1.00	12	4	0.88	1.00
$^1/_2$ or No. 4	$4^1/_2$	1495	18	4	1.00	12	4	0.49	1.00
$^5/_8$ or No. 5	$5^5/_8$	2615	22.5	4	0.50	20	4	0.40	0.78
$^3/_4$ or No. 6	$6^3/_4$	4090	27	4	0.50	20	4	0.26	0.60

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.89 kPa.

The following footnotes apply to both Tables 3A and 3B:

[1] All values are for anchors installed in fully grouted concrete masonry with minimum masonry strength of 1500 psi. Concrete masonry units must be light-, medium-, or normal-weight conforming to ASTM C90. Allowable loads have been calculated using a safety factor of 5.

[2] Anchors may be installed in any location in the face of the masonry wall (cell, web, joints). Anchors are limited to one per masonry cell.

[3] Embedment depth is measured from the outside face of the concrete masonry unit.

[4] The critical spacing, s_{cr}, is the anchor spacing where full load values in the table may be used. The minimum spacing, s_{min}, is the minimum anchor spacing for which values are available and installation is recommended. Spacing is measured from the center of one anchor to the center of an adjacent anchor.

[5] The critical edge distance, c_{cr}, is the edge distance where full load values in the table may be used. The minimum edge distance, c_{min}, is the minimum edge distance for which values are available and installation is permitted. Edge distance is measured from the center of the anchor to the closest edge (See Figure 2).

[6] Load reduction factors are multiplicative; both spacing and edge distance load reduction factors must be considered.

[7] Load values for anchors installed at less than s_{cr} and c_{cr} must be multiplied by the appropriate load reduction factor based on actual edge distance (c) or spacing (s).

[8] Linear interpolation of load values between minimum spacing (s_{min}) and critical spacing (s_{cr}) and between minimum edge distance (c_{min}) and critical edge distance (c_{cr}) is permitted.

[9] Concrete masonry thickness must be equal to or greater than 1.5 times the anchor embedment depth. EXCEPTION: the $^5/_8$-inch- and the $^3/_4$-inch-diameter anchors and No.5 and No. 6 reinforcing bars may be installed in minimum nominally 8-inch-thick concrete masonry.

[10] When using the basic load combinations in accordance with IBC Section 1605.3.1, tabulated allowable loads must not be increased for seismic or wind loading. When using the alternative basic load combinations in the 2009 IBC Section 1605.3.2 that include seismic or wind loads, tabulated allowable loads may be increased, or the alternative basic load combinations may be reduced according to Table 2. For the 2018, 2015 and 2012 IBC, the allowable loads or load combinations must not be adjusted.

[11] Allowable loads must be the lesser of the adjusted masonry or bond values tabulated above and the steel values given in Table 10.

[12] Tabulated allowable bond loads must be adjusted for increased base material temperatures in accordance with Figure 1, as applicable.

[13] For combined loading, see Section 4.1.2.

TABLE 4A—ALLOWABLE ADHESIVE BOND TENSION LOADS FOR HIS-N AND HIS-RN INSERTS IN THE FACE OF GROUT-FILLED CONCRETE MASONRY UNITS (POUNDS)[1,2,7,8,9,10,11,12, 13]

Anchor Diameter (inches)	Embedment (inches)[3]	Load @ c_{cr} and s_{cr}	Spacing[4]			Edge Distance[5]		
			Critical, s_{cr} (inches)	Minimum, s_{min} (inches)	Load Reduction Factor @ s_{min}[6]	Critical, c_{cr} (inches)	Minimum, c_{min} (inches)	Load Reduction Factor @ c_{min}[6]
3/8	4 1/4	2075	17	4	0.55	12	4	0.82
1/2	5	2710	20	4	0.55	20	4	0.63

TABLE 4B—ALLOWABLE ADHESVE BOND SHEAR LOADS FOR HIS-N AND HIS-RN INSERTS IN THE FACE OF GROUT-FILLED CONCRETE MASONRY UNITS (POUNDS)[1,2,7,8,9,10,11,12, 13]

Anchor Diameter (inches)	Embedment (inches)[3]	Load @ c_{cr} and s_{cr}	Spacing[4]			Edge Distance[5]			
			Critical, s_{cr} (inches)	Minimum, s_{min} (inches)	Load Reduction Factor @ s_{min}[6]	Critical, c_{cr} (inches)	Minimum, c_{min} (inches)	Load Reduction Factor @ c_{min}[6]	
								Load Perpendicular to Edge	Load Parallel to Edge
3/8	4 1/4	1100	17	4	0.74	12	4	0.72	1.00
1/2	5	2065	20	4	0.71	20	4	0.40	0.87

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.89 kPa.

The following footnotes apply to both Tables 4A and 4B:

1 All values are for anchors installed in fully grouted concrete masonry walls with minimum masonry strength of 1500 psi. Concrete masonry units must be light-, medium-, or normal-weight conforming to ASTM C90. Allowable loads have been calculated using a safety factor of 5.

2 Anchors may be installed in any location in the face of the masonry wall (cell, web, joints). Anchors are limited to one per masonry cell.

3 Embedment depth is measured from the outside face of the concrete masonry unit.

4 The critical spacing, s_{cr}, is the anchor spacing where full load values in the table may be used. The minimum spacing, s_{min}, is the minimum anchor spacing for which values are available and installation is recommended. Spacing is measured from the center of one anchor to the center of an adjacent anchor.

5 The critical edge distance, c_{cr}, is the edge distance where full load values in the table may be used. The minimum edge distance, c_{min}, is the minimum edge distance for which values are available and installation is permitted. Edge distance is measured from the center of the anchor to the closest edge (See Figure 2).

6 Load reduction factors are multiplicative; both spacing and edge distance load reduction factors must be considered.

7 Load values for anchors installed at less than s_{cr} and c_{cr} must be multiplied by the appropriate load reduction factor based on actual edge distance (c) or spacing (s).

8 Linear interpolation of load values between minimum spacing (s_{min}) and critical spacing (s_{cr}) and between minimum edge distance (c_{min}) and critical edge distance (c_{cr}) is permitted.

9 Concrete masonry thickness must be equal to or greater than 1.5 times the anchor embedment depth.

10 Anchors are not recognized for resisting earthquake forces. When using the basic load combinations in accordance with IBC Section 1605.3.1, or the alternative basic load combinations in IBC Section 1605.3.2, tabulated allowable loads must not be increased for wind loading.

11 Allowable loads must be the lesser of the adjusted masonry or bond values tabulated above and the steel values given in Table 10.

12 Tabulated allowable bond loads must be adjusted for increased base material temperatures in accordance with Figure 1, as applicable.

13 For combined loading, see Section 4.1.2.

TABLE 5A—ALLOWABLE ADHESIVE BOND TENSION AND SHEAR LOADS FOR THREADED RODS IN THE TOP OF GROUT-FILLED MASONRY UNITS (POUNDS)[1,2,3,4,8]

Anchor Diameter (inches)	Embedment (inches)	Edge Distance[5,6] (inches)	Minimum End Distance (inches)	Spacing		Tension Load[7]		Shear Load[7]		
				Critical, s_{cr} (inches)	Minimum, s_{min} (inches)	@ s_{cr}	Reduction Factor @ s_{min}	Load Parallel to Edge of Masonry Wall	Load Perpendicular to Edge of Masonry Wall	Reduction Factor @ s_{min}
1/2	4 1/2	1 3/4	8	16	3	1,165	0.57	815	345	0.5
		4				1,625	0.50	1,445	505	0.5
5/8	5 5/8	1 3/4				1,165	0.58	1,190	385	0.5
		4				1,590	0.50	1,825	655	0.5
3/4	6 3/4	2 3/4				1,020	0.74	1,405	425	0.59

TABLE 5B—ALLOWABLE ADHESIVE BOND TENSION AND SHEAR LOADS FOR REINFORCING BARS IN THE TOP OF GROUT-FILLED MASONRY UNITS (POUNDS)[1,2,3,4,8]

Reinforcing Bar Size	Embedment (inches)	Edge Distance[5,6] (inches)	Minimum End Distance (inches)	Minimum, s_{min} (inches)	Tension Load[7]	Shear Load[7]	
						Load Parallel to Edge of Masonry Wall	Load Perpendicular to Edge of Masonry Wall
No. 4	4 1/2	1 3/4	8	16	865	635	245
No. 5	5 5/8	1 3/4			980	755	295

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.89 kPa.

The following footnotes apply to both Tables 5A and 5B:

[1] All values are for anchors installed in fully grouted concrete masonry with minimum masonry strength of 1500 psi. Concrete masonry units must be light-, medium-, or normal-weight conforming to ASTM C90. Allowable loads have been calculated using a safety factor of 5.

[2] When using the basic load combinations in accordance with IBC Section 1605.3.1, tabulated allowable loads must not be increased for seismic or wind loading. When using the alternative basic load combinations in the 2009 IBC Section 1605.3.2 that include seismic or wind loads, tabulated allowable loads may be increased, or the alternative basic load combinations may be reduced according to Table 2. For the 2018, 2015 and 2012 IBC, the allowable loads or load combinations must not be adjusted.

[3] One anchor must be permitted to be installed in each cell of the CMU block. Refer to Figure 3 for an illustration of the anchor location for which the tabulated values are applicable.

[4] The tabulated edge distance is measured from the anchor centerline to the edge of the CMU block as depicted in Figure 3.

[5] Anchors must be installed into the grouted cell. Anchors are not permitted to be installed in a head joint, flange or web of the concrete masonry unit.

[6] Linear interpolation of load values between the two tabulated edge distances is permitted, as applicable.

[7] Allowable loads must be the lesser of the adjusted masonry or bond values tabulated above and the steel values given in Tables 10 and 11.

[8] Tabulated allowable bond loads must be adjusted for increased base material temperatures in accordance with Figure 1, as applicable.

TABLE 5C—ALLOWABLE ADHESIVE BOND TENSION AND SHEAR LOADS FOR THREADED RODS IN THE SIDE OF GROUT-FILLED MASONRY UNITS (POUNDS)[1,2,3,4,7]

Anchor Diameter	Embedment (inches)	Edge Distance[5] (inches)	Minimum End Distance (inches)	Tension Load[6]	Shear Load[6]	
					Load Parallel to Edge of Masonry Wall	Load Perpendicular to Edge of Masonry Wall
1/2	4 1/2	1 3/4	8	990	885	255
5/8	5 5/8	1 3/4		1,200	1,220	330
3/4	5 5/8	2 3/4		1,200	1,770	530

TABLE 5D—ALLOWABLE ADHESIVE BOND TENSION AND SHEAR LOADS FOR REINFORCING BARS IN THE SIDE OF GROUT-FILLED MASONRY UNITS (POUNDS)[1,2,3,4,7]

Reinforcing Bar Size	Embedment (inches)	Edge Distance[5] (inches)	Minimum End Distance (inches)	Tension Load[6]	Shear Load[6]	
					Load Parallel to Edge of Masonry Wall	Load Perpendicular to Edge of Masonry Wall
No. 4	4 1/2	1 3/4	8	1,055	835	255
No. 5	5 5/8	1 3/4		1,160	990	275

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.89 kPa.

The following footnotes apply to both Tables 5C and 5D:

[1] All values are for anchors installed in fully grouted concrete masonry with minimum masonry strength of 1500 psi. Concrete masonry units must be light-, medium-, or normal-weight conforming to ASTM C90. Allowable loads have been calculated using a safety factor of 5.

[2] When using the basic load combinations in accordance with IBC Section 1605.3.1, tabulated allowable loads must not be increased for seismic or wind loading. When using the alternative basic load combinations in the 2009 IBC Section 1605.3.2 that include seismic or wind loads, tabulated allowable loads may be increased, or the alternative basic load combinations may be reduced according to Table 2. For the 2018, 2015 and 2012 IBC, the allowable loads or load combinations must not be adjusted.

[3] Refer to Figure 4 for an illustration of the anchor location for which the tabulated values are applicable.

[4] The tabulated edge distance is measured from the anchor centerline to the edge of the CMU block as depicted in Figure 4.

[5] Anchors must be installed into the grouted cell. Anchors are not permitted to be installed in a flange, or bed joint of the concrete masonry unit.

[6] Allowable loads must be the lesser of the adjusted masonry or bond values tabulated above and the steel values given in Tables 10 and 11.

[7] Tabulated allowable bond loads must be adjusted for increased base material temperatures in accordance with Figure 1, as applicable.

TABLE 6—ALLOWABLE ADHESIVE BOND TENSION AND SHEAR LOADS FOR THREADED RODS IN THE FACE OF HOLLOW CONCRETE MASONRY UNITS (POUNDS)[1,3,7,9]

Anchor Diameter (inches)	Embedment (inches)[2]	Tension Load		Critical and Minimum Edge Distance for Tension, c_{cr} and c_{min} (inches)	Shear Load at c_{cr}		Edge Distances for Shear[6]		
		Installation in the Cell[4, 5, 8]	Installation in Bed Joint[5, 8]		Installation in the Cell[4,5,8]	Installation in Bed Joint[5,8]	Critical, c_{cr} (inches)	Minimum, c_{min} (inches)	Load Reduction Factor
$^1/_4$	2	220	300	4	355	385	4	4	1.00
$^5/_{16}$	2	390	300	4	630	435	12	4	0.73
$^3/_8$	2	390	300	4	645	550	12	4	0.73
$^1/_2$	2	390	300	4	670	755	12	4	0.73

TABLE 7—ALLOWABLE ADHESIVE BOND TENSION AND SHEAR LOADS FOR HIT-IC INSERTS IN THE FACE OF HOLLOW CONCRETE MASONRY UNITS (POUNDS)[1,3,7,9]

Anchor Diameter (inches)	Embedment (inches)[2]	Tension Load[4,5,8]	Critical and Minimum Edge Distance for Tension, c_{cr} and c_{min} (inches)	Shear Load at c_{cr}[4,5,8]	Edge Distances for Shear[6]		
					Critical, c_{cr} (inches)	Minimum, c_{min} (inches)	Load Reduction Factor
$^5/_{16}$	2	415	4	605	12	4	0.80
$^3/_8$	2	480[5]	4	620	12	4	0.78
$^1/_2$	2	495[5]	4	620	12	4	0.75

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.89 kPa.

The following footnotes apply to both Tables 6 and 7:

1 All values are for anchors installed in hollow concrete masonry with minimum masonry strength of 1500 psi. Concrete masonry units must be light-, medium, normal-weight conforming to ASTM C90. Allowable loads have been calculated using a safety factor of 5.

2 Tabulated embedment depth is limited by the length of the plastic HIT-SC screens.

3 Anchors must be installed in the face of the hollow CMU masonry wall. A maximum of two anchors may be installed in a single cell of the hollow CMU block.

4 Tabulated values are for one anchor installed in the cell of the hollow CMU. Installation in other locations of the hollow CMU (mortar joints, flange, or cell web) is not permitted.

5 The minimum spacing, s_{min}, for which values are available and installation is permitted is 4 inches. Two anchors installed in adjacent cells may be spaced as close as 4 inches apart with no reduction in tension or shear capacity. Two anchors installed in the same cell can be spaced as close as 4 inches apart with no reduction in shear capacity. For two anchors installed in the same cell spaced as close as 4 inches apart, the $^3/_8$-inch and ½-inch diameter HIT-IC inserts require a 20% reduction in the tension capacity, and the $^5/_{16}$-inch diameter HIT-IC insert requires no reduction in tension capacity.

6 The critical edge distance, c_{cr}, is the edge distance where full load values in the table may be used. The minimum edge distance, c_{min}, is the minimum edge distance for which values are available and installation is permitted. Edge distance is measured from the center of the anchor to the closest edge.

7 Anchors are not recognized for resisting earthquake forces. When using the basic load combinations in accordance with IBC Section 1605.3.1, or the alternative basic load combinations in IBC Section 1605.3.2, tabulated allowable loads must not be increased for wind loading.

8 Allowable loads must be the lesser of the adjusted masonry or bond values tabulated above and the steel values given in Table 10.

9 Tabulated allowable bond loads must be adjusted for increased base material temperatures in accordance with Figure 1, as applicable.

TABLE 8A—ALLOWABLE ADHESIVE BOND TENSION LOADS FOR THREADED RODS IN THE FACE OF HOLLOW BRICK MASONRY (POUNDS)[1,3,4,8,9,10]

Anchor Diameter (inches	Embedment (inches)[2]	Load @ c_{cr} and s_{cr}[8]	Spacing[5]			Edge Distance[6]		
			Critical, s_{cr} (inches)	Minimum, s_{min} (inches)	Load Reduction Factor at s_{min}[7]	Critical, c_{cr} (inches)	Minimum, c_{min} (inches)	Load Reduction Factor at c_{min}[7]
1/4	3 1/8	530	8	4	0.88	6 3/8	4	0.93
5/16	3 1/8	735	8	4	0.82	6 3/8	4	0.80
3/8	3 1/8	905	8	4	0.54	6 3/8	4	0.83
1/2	3 1/8	905	8	4	0.50	6 3/8	4	1.0

TABLE 8B—ALLOWABLE ADHESIVE BOND SHEAR LOADS FOR THREADED RODS IN THE FACE OF HOLLOW BRICK MASONRY (POUNDS)[1,3,4,8,9,10]

Anchor Diameter (inches	Embedment (inches)[2]	Load @ c_{cr} and s_{cr}[8]	Spacing[5]			Edge Distance[6]		
			Critical, s_{cr} (inches)	Minimum, s_{min} (inches)	Load Reduction Factor at s_{min}[7]	Critical, c_{cr} (inches)	Minimum, c_{min} (inches)	Load Reduction Factor at c_{min}[7]
1/4	3 1/8	370	8	4	0.84	8	4	0.86
5/16	3 1/8	595	8	4	0.81	8	4	0.93
3/8	3 1/8	1045	8	4	0.59	12	4	0.54
1/2	3 1/8	1685	8	4	0.50	12	4	0.36

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.89 kPa.

(The following footnotes apply to both Tables 8A and 8B)

[1] All values are for anchors installed in hollow brick masonry with minimum masonry strength of 3000 psi. Hollow brick units must be in conformance with ASTM C652. Allowable loads have been calculated using a safety factor of 5.
[2] Tabulated embedment depth is limited by the length of the plastic HIT-SC screens.
[3] Anchors must be installed in the face of the hollow brick masonry wall.
[4] Tabulated values are for the anchor installed in the center of the hollow brick, mortar joints, flanges, or cell web (all wall face locations permitted).
[5] The critical spacing, s_{cr}, is the anchor spacing where full load values in the table may be used. The minimum spacing, s_{min}, is the minimum anchor spacing for which values are available and installation is recommended. Spacing is measured from the center of one anchor to the center of an adjacent anchor.
[6] The critical edge distance, c_{cr}, is the edge distance where full load values in the table may be used. The minimum edge distance, c_{min}, is the minimum edge distance for which values are available and installation is permitted. Edge distance is measured from the center of the anchor to the closest edge.
[7] Load values for anchors installed at less than s_{cr} and c_{cr} must be multiplied by the appropriate load reduction factor based on actual edge distance (c) or spacing (s)
[8] Anchors are not recognized for resisting earthquake forces. When using the basic load combinations in accordance with IBC Section 1605.3.1, or the alternative basic load combinations in IBC Section 1605.3.2, tabulated allowable loads must not be increased for wind loading.
[9] Allowable loads must be the lesser of the adjusted masonry or bond values tabulated above and the steel values given in Table 10.
[10] Tabulated allowable bond loads must be adjusted for increased base material temperatures in accordance with Figure 1, as applicable.

TABLE 9—ALLOWABLE ADHESIVE BOND TENSION AND SHEAR LOADS FOR HIT-IC INSERTS IN THE FACE OF HOLLOW BRICK MASONRY (POUNDS)[1,3,4,7,9]

Anchor Diameter (inches)	Embedment (inches)[2]	Tension Load[5,8]	Critical and Minimum Edge Distance for Tension, c_{cr} and c_{min} (inches)	Shear Load @ c_{cr}[5,8]	Edge Distance for Shear[6]		
					Critical, c_{cr} (inches)	Minimum, c_{min} (inches)	Load Reduction Factor
5/16	3 1/8	880	6 3/8	655	8	8	1.00
3/8	3 1/8	880	6 3/8	1235	12	8	0.66
1/2	3 1/8	990	6 3/8	1895	12	8	0.44

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 psi = 6.89 kPa.

[1] All values are for anchors installed in hollow brick masonry with minimum masonry strength of 3000 psi. Hollow brick units must be in conformance with ASTM C652. Allowable loads have been calculated using a safety factor of 5.
[2] Tabulated embedment depth is limited by the length of the plastic HIT-SC screens.
[3] Anchors must be installed in the face of the hollow brick masonry wall.
[4] Tabulated values are for one anchor installed in the center of the hollow brick, mortar joints, flanges, or cell web (all wall face locations permitted).
[5] One anchor must be permitted to be installed in each brick. Two anchors installed in adjacent bricks may be spaced as close as 8 inches apart with no load reduction.
[6] The critical edge distance, c_{cr}, is the edge distance where full load values in the table may be used. The minimum edge distance, c_{min}, is the minimum edge distance for which values are available and installation is permitted. Edge distance is measured from the center of the anchor to the closest edge.
[7] Anchors are not recognized for resisting earthquake forces. When using the basic load combinations in accordance with IBC Section 1605.3.1, or the alternative basic load combinations in IBC Section 1605.3.2, tabulated allowable loads must not be increased for wind loading.
[8] Allowable loads must be the lesser of the adjusted masonry or bond values tabulated above and the steel values given in Table 10.
[9] Tabulated allowable bond loads must be adjusted for increased base material temperatures in accordance with Figure 1, as applicable.

TABLE 10—ALLOWABLE TENSION AND SHEAR LOADS BASED ON STEEL STRENGTH FOR THREADED RODS (pounds)[1,2,3]

Anchor Diameter (inches)	Tension					Shear				
	ISO 898 Class 5.8	ASTM A36	ASTM A307	ASTM A193 B7	ASTM F593 CW (316/304)	ISO 898 Class 5.8	ASTM A36	ASTM A307	ASTM A193 B7	ASTM F593 CW (316/304)
1/4	1,175	940	970	2,025	1,620	605	485	500	1,040	835
5/16	1,835	1,470	1,520	3,160	2,530	945	755	780	1,630	1,300
3/8	2,640	2,115	2,185	4,555	3,645	1,360	1,090	1,125	2,345	1,875
1/2	4,700	3,755	3,885	8,100	6,480	2,420	1,935	2,000	4,170	3,335
5/8	7,340	5,870	6,075	12,655	10,125	3,780	3,025	3,130	6,520	5,215
3/4	10,570	8,455	8,750	18,225	12,390	5,445	4,355	4,505	9,390	6,385

TABLE 11—ALLOWABLE TENSION AND SHEAR LOADS BASED ON STEEL STRENGTH FOR REINFORCING BARS (pounds)[1,2,3]

Rebar Size	Tension	Shear
	ASTM A615, Grade 60	ASTM A615, Grade 60
No. 3	3,270	1,685
No. 4	5,940	3,060
No. 5	9,205	4,745
No. 6	13,070	6,730

(The following footnotes apply to both Tables 10 and 11)

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

[2] Allowable tension and shear loads for threaded rods to resist short term loads, such as wind or seismic, must be calculated in accordance with Section 4.1 as applicable.

[3] Allowable steel loads are based on allowable tension and shear stresses equal to 0.33 x F_u and 0.17 x F_u, respectively.

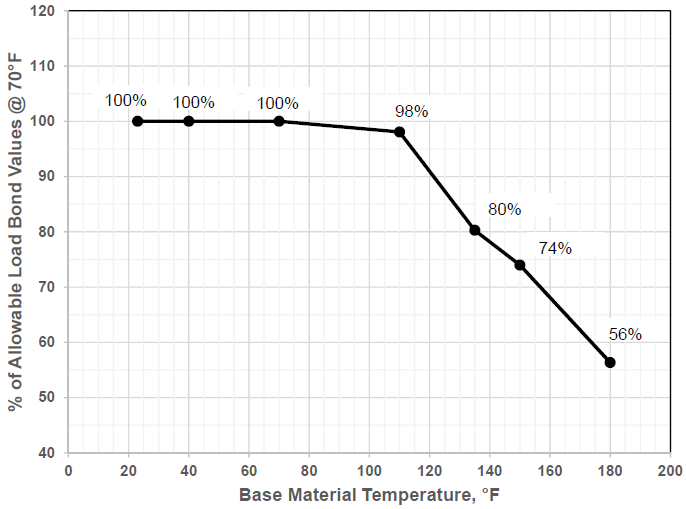


FIGURE 1—INFLUENCE OF BASE MATERIAL TEMPERATURE ON ALLOWABLE TENSION AND SHEAR LOADS FOR HILTI HIT-HY 270 ADHESIVE

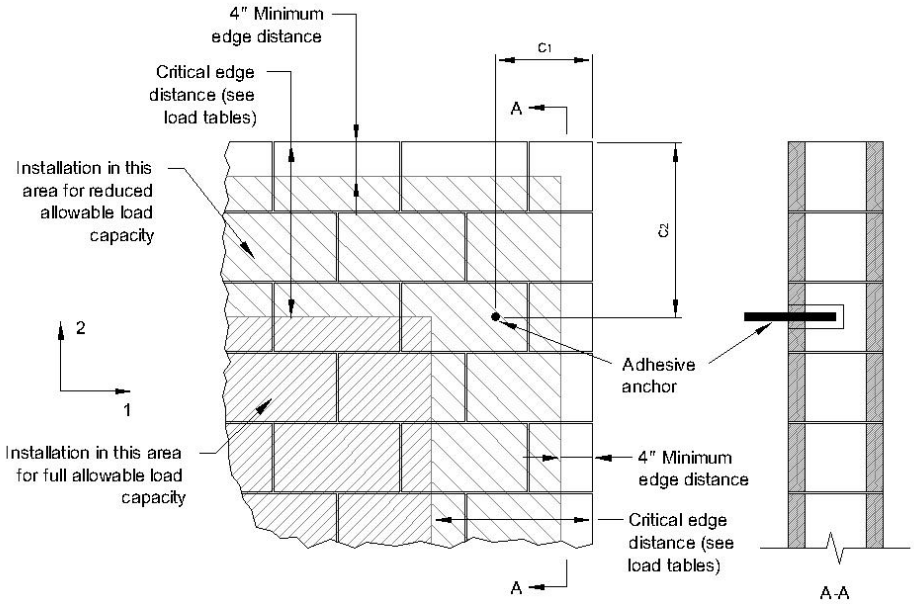


FIGURE 2—ALLOWABLE ANCHOR INSTALLATION LOCATIONS IN THE FACE OF GROUT-FILLED CONCRETE MASONRY (ASTM C90)

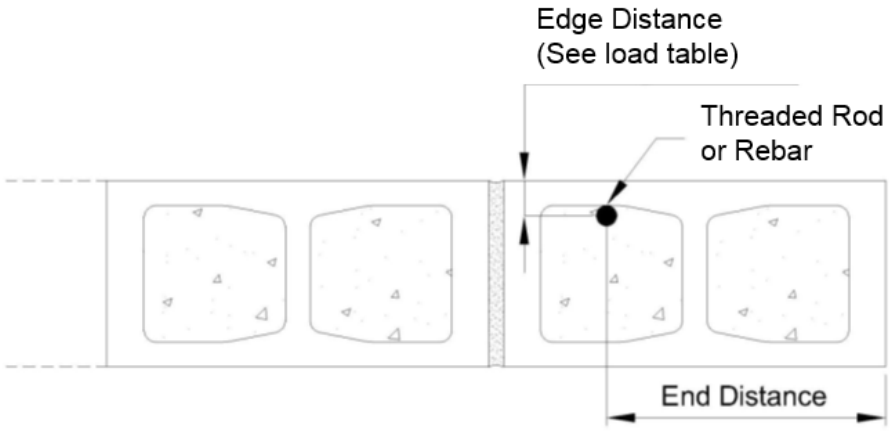


FIGURE 3—EDGE AND END DISTANCES FOR THREADED RODS INSTALLED IN THE TOP OF GROUT-FILLED CONCRETE MASONRY

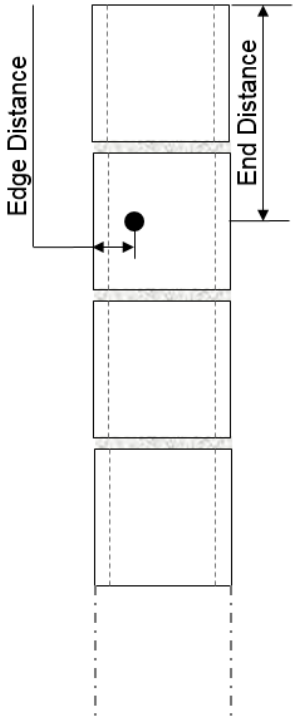


FIGURE 4—EDGE AND END DISTANCES FOR THREADED RODS INSTALLED IN THE SIDE OF GROUT-FILLED CONCRETE MASONRY

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

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

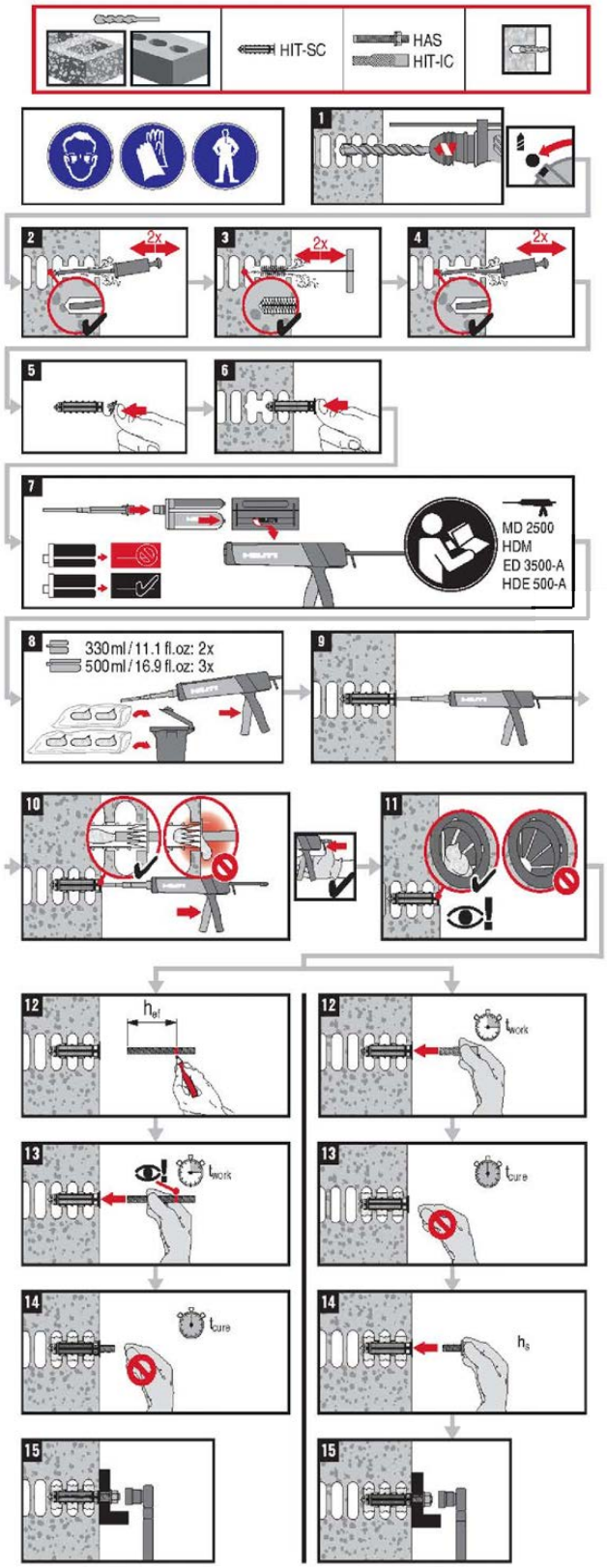


FIGURE 5—MANUFACTURERS PRINTED INSTALLATION INSTRUCTIONS

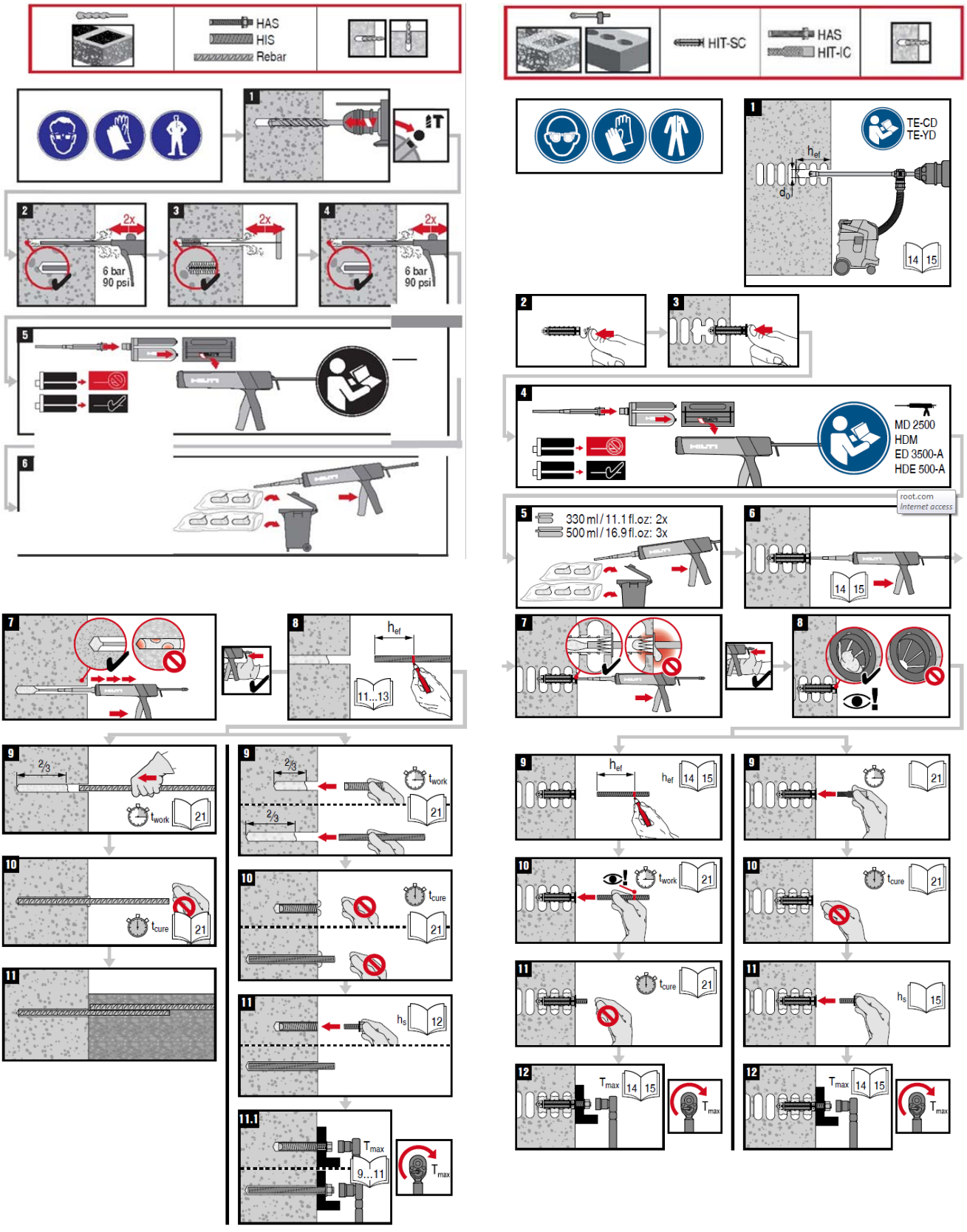


FIGURE 5—MANUFACTURERS PRINTED INSTALLATION INSTRUCTIONS (CONTINUED)

Adhesive anchoring system for rebar and anchor fastenings.

For use in hollow and solid masonry of clay brick, concrete block and multi wythe wall.

Hilti HIT-HY 270

Contains: methacrylates, dibenzoyl peroxide, boric acid

(A, B) (A) (B)

Danger

H315	Causes skin irritation.(A)
H317	May cause an allergic skin reaction.(A,B)
H319	Causes serious eye irritation.(A)
H360	May damage fertility or the unborn child.(A)
H400	Very toxic to aquatic life (B)
H412	Harmful to aquatic life with long lasting effects.(A)
P262	Do not get in eyes, on skin, or on clothing.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P333+P313	If skin irritation or rash occurs: Get medical advice/attention.
P337+P313	If eye irritation persists: Get medical advice/attention.

Disposal considerations

Empty packs:

► Leave the mixer attached and dispose of via the local Green Dot recovery system or EAK waste material code: 150102 plastic packaging

Full or partially emptied packs:

► Must be disposed of as special waste in accordance with official regulations.
EAK waste material code: 08 04 09* waste adhesives and sealants containing organic solvents or other dangerous substances. or EAK waste material code: 20 01 27* paint, inks, adhesives and resins containing dangerous substances.

Warranty: Refer to standard Hilti terms and conditions of sale for warranty information.

Failure to observe these installation instructions, use of non-Hilti anchors, poor or questionable base material conditions, or unique applications may affect the reliability or performance of the fastenings.

Product Information

- Always keep these instructions together with the product even when given to other persons.
- Check expiration date: See imprint on foil pack manifold (month/year). Do not use expired product.
- Foil pack temperature during usage: between 41 °F and 104 °F / +5 °C and 40 °C.
- Base material temperature at time of installation: between 23 °F and 104 °F / –5 °C and 40 °C.
  Exception in hollow, solid and multi-wythe solid clay brick: between 41°F and 104°F / +5°C and 40°C.
- Conditions for transport and storage: Keep in a cool, dry and dark place between 41 °F and 77 °F / 5°C and 25°C.
- For any application not covered by this document / beyond values specified, please contact Hilti.
- Partly used foil packs must remain in the cassette and has to be used within 4 weeks. Leave the mixer attached on the foil pack manifold and store within the cassette under the recommended storage conditions. If reused, attach a new mixer and discard the initial quantity of anchor adhesive.

⚠ NOTICE

⚠ Improper handling may cause mortar splashes.
- Always wear safety glasses, gloves and protective clothes during installation.
- Never start dispensing without a mixer properly screwed on.
- Attach a new mixer prior to dispensing a new foil pack (ensure snug fit).
- Use only the type of mixer (HIT-RE-M) supplied with the adhesive. Do not modify the mixer in any way.
- Never use damaged foil packs and/or damaged or unclean foil pack holders (cassettes).

⚠ Poor load values / potential failure of fastening points due to inadequate borehole cleaning.
- The boreholes must be free of debris, dust, water, ice, oil, grease and other contaminants prior to adhesive injection.
- For blowing out the borehole – blow out with oil free air until return air stream is free of noticeable dust.
- For brushing the borehole – only use specified wire brush. The brush must resist insertion into the borehole – if not the brush is too small and must be replaced.

⚠ Borehole filling in solid masonry: Ensure that boreholes are filled from the back of the borehole without forming air voids. If necessary use the accessories / extensions to reach the back of the borehole.

⚠ Borehole filling in hollow masonry: Use a mesh sleeve. Fill the mesh sleeve with mortar from the centering cap until mortar escapes at the centering cap (filling control).

⚠ Multi-Wythe Solid Brick application: HIT-SC sieve sleeves / sieve sleeve combinations have to be filled outside the bore hole: Push the mixer to the bottom of the last mesh sleeve (use mixer extension if necessary).Inject the anchor adhesive starting at the bottom of the last mesh sleeve while slowly withdrawing the mixing nozzle towards the centering cap, step by step, after each pull of the trigger. HIT-SC sieve sleeves have to be filled completely without forming air voids until anchor adhesive escapes at the centering cap (filling control).

⚠ Not adhering to these setting instructions can result in failure of fastening points!

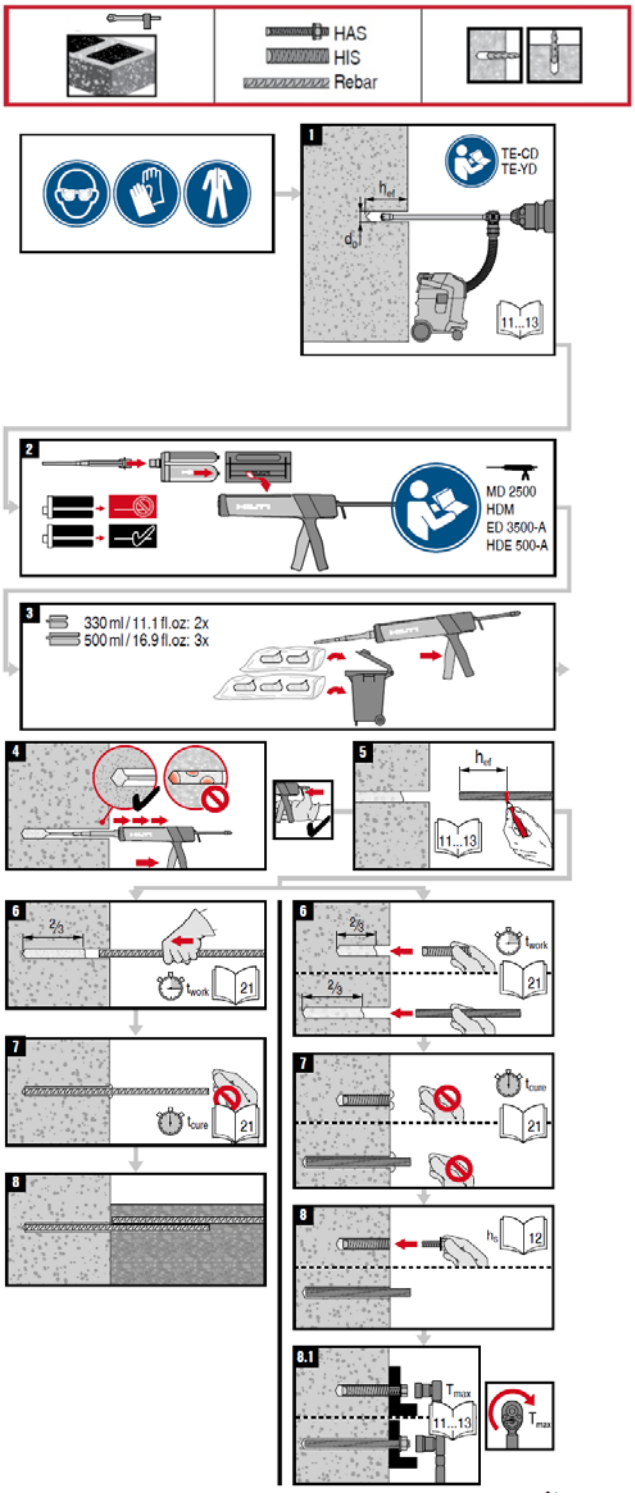
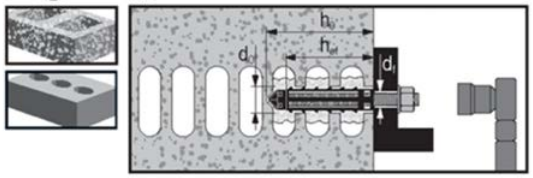


FIGURE 5—MANUFACTURERS PRINTED INSTALLATION INSTRUCTIONS (CONTINUED)

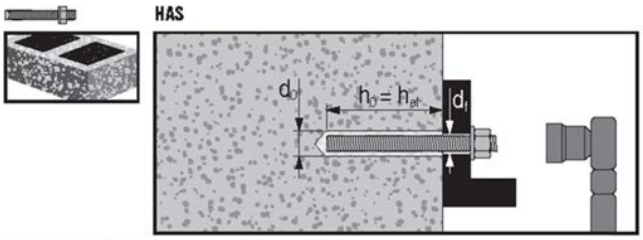
HAS



HAS	HIT-SC	d_0 [inch]	h_0 [inch]	h_{ef} [inch]	HIT-RB	d_f [inch]
¼"	12x50	½	2⅜	2	½	9/32
	12x85		3¾	3⅛		
5/16"	16x50	5/8	2⅜	2	5/8	3/8
	16x85		3¾	3⅛		
⅜"	16x50		2⅜	2		7/16
	16x85		3¾	3⅛		
½"	18x50	11/16	2⅜	2	11/16	9/16
	18x85		3¾	3⅛		

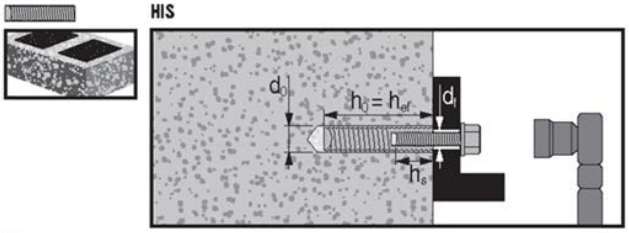
	¼" M6		5/16" M8		⅜" M10		½" M12	
HIT-SC	12x50	12x85	16x50	16x85	16x50	16x85	18x50	18x85
MD 2500 / HDM	2	4	3	5	3	5	3	6
ED 3500-A / HDE 500-A	3	6	4	7	4	7	4	9

HAS



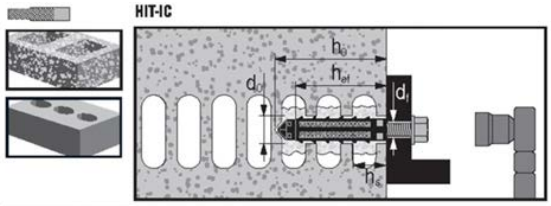
HAS	d_0 [inch]	$h_0 = h_{ef}$ [inch]	HIT-RB	d_f [inch]
⅜	7/16	3⅜	7/16	7/16
½	9/16	4½	9/16	9/16
5/8	¾	5⅝	¾	¾
¾	7/8	6¾	7/8	7/8

HIS



HIS	d_0 [inch]	$h_0 = h_{ef}$ [inch]	HIT-RB	d_f [inch]	h_s [inch]
⅜	11/16	4⅜	11/16	7/16	⅜ – 1
½	7/8	5	7/8	9/16	½ – 1¼

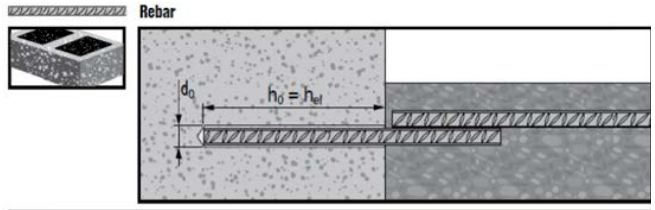
HIT-IC



HIT-IC	HIT-SC	d_0 [inch]	h_0 [inch]	h_{ef} [inch]	HIT-RB	d_f [inch]	h_s [inch]
5/16x2	16x50	5/8	2⅜	2	5/8	⅜	⅜ – 1½
5/16x3⅜16	16x85		3¾	3⅛			⅜ – 3
⅜x2	22x50	7/8	2⅜	2	7/8	7/16	⅜ – 1½
⅜x3⅜16	22x85		3¾	3⅛			⅜ – 3
½x2	22x50		2⅜	2		9/16	⅜ – 1½
½x3⅜16	22x85		3¾	3⅛			⅜ – 3

	5/16x2 M8x50	5/16x3⅜16 M8x80	⅜x2 M10x50	⅜x3⅜16 M10x80	½x2 M12x50	½x3⅜16 M12x80
HIT-SC	16x50	16x85	22x50	22x85	22x50	22x85
MD 2500 / HDM	3	5	5	8	5	8
ED 3500-A / HDE 500-A	4	7	7	10	7	10

Rebar



Rebar	d_0 [inch]	$h_0 = h_{ef}$ [inch]	HIT-RB
#3	½	3⅜	½
#4	5/8	4½	5/8
#5	¾	5⅝	¾
#6	7/8	6¾	7/8

FIGURE 5—MANUFACTURERS PRINTED INSTALLATION INSTRUCTIONS (CONTINUED)

ICC EVALUATION SERVICE®

ICC-ES Evaluation Report

ESR-4143 LABC and LARC Supplement

Reissued January 2022

This report is subject to renewal January 2023.

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DIVISION: 04 00 00—MASONRY
Section: 04 05 19.16—Masonry Anchors

REPORT HOLDER:

HILTI, INC.

EVALUATION SUBJECT:

HILTI HIT-HY 270 ADHESIVE ANCHOR SYSTEM

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the Hilti HIT-HY 270 Adhesive Anchor System, described in ICC-ES evaluation report ESR-4143, has also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2020 *City of Los Angeles Building Code* (LABC)
- 2020 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The Hilti HIT-HY 270 Adhesive Anchor System, described in Sections 2.0 through 7.0 of the evaluation report ESR-4143, complies with the LABC Chapter 21, and the LARC, and is subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The Hilti HIT-HY 270 Adhesive Anchor System described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report ESR-4143.
- The design, installation, conditions of use and identification of the anchors are in accordance with the 2018 *International Building Code*® (2018 IBC) provisions noted in the evaluation report ESR-4143.
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.
- The allowable load values listed in the evaluation report and tables are for the connection of the adhesive anchors to the masonry. The connection between the adhesive anchors and the connected members shall be checked for capacity (which may govern).
- For use in wall anchorage assemblies to flexible diaphragm applications, anchors shall be designed per the requirements of City of Los Angeles Information Bulletin P/BC 2020-071.

This supplement expires concurrently with the evaluation report, reissued January 2022.

ICC EVALUATION SERVICE®

ICC-ES Evaluation Report

ESR-4143 FBC Supplement

Reissued January 2022

This report is subject to renewal January 2023.

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DIVISION: 04 00 00—MASONRY
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REPORT HOLDER:

HILTI, INC.

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HILTI HIT-HY 270 ADHESIVE ANCHOR SYSTEM

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the Hilti HIT-HY 270 Adhesive Anchor System, described in ICC-ES evaluation report ESR-4143, has also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2020 *Florida Building Code—Building*
- 2020 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The Hilti HIT-HY 270 Adhesive Anchor System, described in Sections 2.0 through 7.0 of ICC-ES evaluation report ESR-4143, complies with the *Florida Building Code—Building* and the *Florida Building Code—Residential*, provided the design requirements are determined in accordance with the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable. The installation requirements noted in ICC-ES evaluation report ESR-4143 for the 2018 *International Building Code®* meet the requriements of the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable.

Use of the Hilti HIT-HY 270 Adhesive Anchor System has also been found to be in compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and the *Florida Building Code—Residential*, with the following conditions:

a) Design and installation must meet the requirements of Section 2122.7 of the *Florida Building Code—Building.*

b) For anchorage of wood members, the connections subject to uplift must be designed for no less than 700 pounds (3114 N).

For products falling under Florida Rule 61G20-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official, when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report, reissued January 2022.

HIT-HY 270

Safety information for 2-Component-products

Issue date: 21/01/2022 Revision date: 21/01/2022 Supersedes: 03/12/2018 Version: 3.0

SECTION 1: Kit identification

1.1 Product identifier

Trade name HIT-HY 270

Product code BU Anchor

1.2 Details of the supplier of the Safety information for 2-Component-products

Hilti, Inc.
Legacy Tower, Suite 1000
7250 Dallas Parkway
TX 75024 Plano - USA
T +1 9724035800
1-800-879-8000 toll free - F +1 918 254 0522

SECTION 2: General information

Storage Storage temperature : 5 - 25 °C

A SDS for each of these components is included. Please do not separate any component SDS from this cover page

This Kit should be handled in accordance with good laboratory practices and appropriate personal protective equipment should be used

SECTION 3: Kit contents

Classification of the Product

GHS-US classification

Eye Irrit. 2A	H319 -	Causes serious eye irritation.
Skin Sens. 1	H317 -	May cause an allergic skin reaction.
Repr. 1B	H360 -	May damage fertility or the unborn child.

Label elements

GHS US labelling

Hazard pictograms (GHS US)

GHS07 GHS08

Signal word (GHS US) Danger

Hazardous ingredients methacrylates, dibenzoyl peroxide, boric acid

Hazard statements (GHS US)
May cause an allergic skin reaction.
Causes serious eye irritation.
May damage fertility or the unborn child.

Precautionary statements (GHS US)
Wear eye protection, protective clothing, protective gloves.
Do not get in eyes, on skin, or on clothing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If skin irritation or rash occurs: Get medical advice/attention.
If eye irritation persists: Get medical advice/attention.

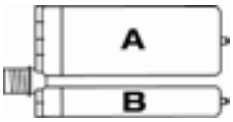
HIT-HY 270

Safety information for 2-Component-products

If on skin: Wash with plenty of water.

Additional information

2-Component-foilpack, contains:
Component A: Urethane methacrylate resin, inorganic filler
Component B: Dibenzoyl peroxide, phlegmatized



Name	General description	Quantity	Unit	GHS-US classification
HIT-HY 270, B		1	pcs (pieces)	Skin Sens. 1, H317
HIT-HY 270, A		1	pcs (pieces)	Eye Irrit. 2A, H319 Skin Sens. 1, H317 Repr. 1B, H360

SECTION 4: General advice

General advice	For professional users only

SECTION 5: Safe handling advice

General measures	Spilled material may present a slipping hazard
Environmental precautions	Prevent entry to sewers and public waters Notify authorities if liquid enters sewers or public waters
Storage conditions	Keep cool. Protect from sunlight.
Precautions for safe handling	Wear personal protective equipment Avoid contact with skin and eyes Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work Provide good ventilation in process area to prevent formation of vapour
Methods for cleaning up	This material and its container must be disposed of in a safe way, and as per local legislation Mechanically recover the product Store away from other materials.
For containment	Collect spillage.
Incompatible materials	Sources of ignition Direct sunlight
Incompatible products	Strong bases Strong acids

SECTION 6: First aid measures

First-aid measures after eye contact	Rinse immediately with plenty of water Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if pain, blinking or redness persists
First-aid measures after ingestion	Rinse mouth Get medical advice/attention. Do not induce vomiting Obtain emergency medical attention
First-aid measures after inhalation	Remove person to fresh air and keep comfortable for breathing. Allow affected person to breathe fresh air Allow the victim to rest
First-aid measures after skin contact	Wash contaminated clothing before reuse.

HIT-HY 270

Safety information for 2-Component-products

	Wash with plenty of water/… If skin irritation or rash occurs: Get medical advice/attention.
First-aid measures general	Take off immediately all contaminated clothing. Never give anything by mouth to an unconscious person If you feel unwell, seek medical advice (show the label where possible)
Symptoms/effects after eye contact	May cause severe irritation
Symptoms/effects after skin contact	May cause an allergic skin reaction.

SECTION 7: Fire fighting measures

Firefighting instructions	Use water spray or fog for cooling exposed containers Exercise caution when fighting any chemical fire Prevent fire fighting water from entering the environment
Protection during firefighting	Self-contained breathing apparatus Do not enter fire area without proper protective equipment, including respiratory protection
Hazardous decomposition products in case of fire	Thermal decomposition generates : Carbon dioxide Carbon monoxide

SECTION 8: Other information

No data available

HIT-HY 270, A

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations
Issue date: 01/21/2022 Revision date: 01/21/2022 Supersedes: 12/03/2018 Version: 2.0

SECTION 1: Identification

1.1. Identification

Product form	Mixture
Product name	HIT-HY 270, A
Product code	BU Anchor

1.2. Recommended use and restrictions on use

Recommended use	Composite mortar component for fasteners in the construction industry
Restrictions on use	For professional use only

1.3. Supplier

Supplier
Hilti, Inc.
Legacy Tower, Suite 1000
7250 Dallas Parkway
Plano, TX 75024 - USA
T +1 9724035800
1-800-879-8000 toll free - F +1 918 254 0522

Department issuing data specification sheet
Hilti Entwicklungsgesellschaft mbH
Hiltistraße 6
Kaufering, 86916 - Deutschland
T +49 8191 906876
anchor.hse@hilti.com

1.4. Emergency telephone number

Emergency number

Chem-Trec
Tel.: 1 800 424 9300 (USA, PR, Virgin Islands, Canada)
Tel.: 703 527 3887 (Other countries)

+1 918 8723000
1-800-879-8000 toll free

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Serious eye damage/eye irritation, Category 2A	H319	Causes serious eye irritation.
Skin sensitisation, Category 1	H317	May cause an allergic skin reaction.
Reproductive toxicity, Category 1B	H360	May damage fertility or the unborn child.

Full text of H-statements: see section 16

2.2. GHS Label elements, including precautionary statements

GHS US labelling

Hazard pictograms (GHS US)

Signal word (GHS US) Danger

Hazard statements (GHS US)
H317 - May cause an allergic skin reaction.
H319 - Causes serious eye irritation.
H360 - May damage fertility or the unborn child.

Precautionary statements (GHS US)
P280 - Wear eye protection, protective clothing, protective gloves.
P262 - Do not get in eyes, on skin, or on clothing.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P333+P313 - If skin irritation or rash occurs: Get medical advice/attention.
P337+P313 - If eye irritation persists: Get medical advice/attention.
P302+P352 - If on skin: Wash with plenty of water.

2.3. Other hazards which do not result in classification

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	GHS-US classification
Quartz (SiO2)	(CAS-No.) 14808-60-7	25 – 40	Carc. 1A, H350
2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol	(CAS-No.) 27813-02-1	10 – 25	Eye Irrit. 2A, H319 Skin Sens. 1, H317
Bisphenol-A-diethoxy-methacrylate	(CAS-No.) 24448-20-2	5 – 10	Skin Irrit. 2, H315 Eye Irrit. 2A, H319
Tricyclodecane dimethanol dimethacrylate	(CAS-No.) 43048-08-4	2,5 - 5	Skin Sens. 1B, H317
1,1,1-Trimethylolpropane trimethacrylate	(CAS-No.) 3290-92-4	2,5 - 5	Not classified
1,1'-(p-tolylimino)dipropan-2-ol	(CAS-No.) 38668-48-3	0,1 - 1	Acute Tox. 2 (Oral), H300 Eye Irrit. 2A, H319
boric acid	(CAS-No.) 10043-35-3	0,1 - 1	Repr. 1B, H360
4-tert-butylpyrocatechol	(CAS-No.) 98-29-3	0,1 - 1	Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Dermal), H312 Skin Corr. 1B, H314 Skin Sens. 1, H317

Full text of hazard classes and H-statements : see section 16

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general: Take off immediately all contaminated clothing. Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid measures after inhalation: Remove person to fresh air and keep comfortable for breathing. Allow affected person to breathe fresh air. Allow the victim to rest.

First-aid measures after skin contact: Wash contaminated clothing before reuse. Wash with plenty of water/…. If skin irritation or rash occurs: Get medical advice/attention.

First-aid measures after eye contact: Rinse immediately with plenty of water. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if pain, blinking or redness persists.

First-aid measures after ingestion: Rinse mouth. Get medical advice/attention. Do not induce vomiting. Obtain emergency medical attention.

4.2. Most important symptoms and effects (acute and delayed)

Potential adverse human health effects and symptoms: No additional information available.

Symptoms/effects after skin contact: May cause an allergic skin reaction.

Symptoms/effects after eye contact: May cause severe irritation.

4.3. Immediate medical attention and special treatment, if necessary

No additional information available

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media	Water spray. Carbon dioxide. Dry powder. Foam. Sand.
Unsuitable extinguishing media	Do not use a heavy water stream.

5.2. Specific hazards arising from the chemical

Hazardous decomposition products in case of fire	Thermal decomposition generates : Carbon dioxide. Carbon monoxide.

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions	Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire fighting water from entering the environment.
Protection during firefighting	Self-contained breathing apparatus. Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures: Spilled material may present a slipping hazard.

6.1.1. For non-emergency personnel

Emergency procedures: Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment	Use personal protective equipment as required. Equip cleanup crew with proper protection.
Emergency procedures	Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment	Collect spillage.
Methods for cleaning up	This material and its container must be disposed of in a safe way, and as per local legislation. Mechanically recover the product. Store away from other materials.
Other information	Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection". For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	Wear personal protective equipment. Avoid contact with skin and eyes. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapour.
Handling temperature	5 – 40 °C
Hygiene measures	Do not eat, drink or smoke when using this product. Always wash hands after handling the product. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions	Keep cool. Protect from sunlight.
Incompatible products	Strong bases. Strong acids.
Incompatible materials	Sources of ignition. Direct sunlight.

Storage temperature	5 – 25 °C
Heat and ignition sources	Keep away from heat and direct sunlight.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

HIT-HY 270, A	
USA - ACGIH - Occupational Exposure Limits	
Local name	Boric acid
ACGIH OEL TWA	2 mg/m³ (I - Inhalable particulate matter)
ACGIH OEL STEL	6 mg/m³ (I - Inhalable particulate matter)
Remark (ACGIH)	TLV® Basis: URT irr. Notations: A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH 2021
1,1'-(p-tolylimino)dipropan-2-ol (38668-48-3)	
No additional information available	
Bisphenol-A-diethoxy-methacrylate (24448-20-2)	
No additional information available	
4-tert-butylpyrocatechol (98-29-3)	
No additional information available	
2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol (27813-02-1)	
No additional information available	
Tricyclodecane dimethanol dimethacrylate (43048-08-4)	
No additional information available	
1,1,1-Trimethylolpropane trimethacrylate (3290-92-4)	
No additional information available	
Quartz (SiO2) (14808-60-7)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Silica crystaline - quartz
ACGIH OEL TWA	0.025 mg/m³ (Respirable fraction)
Remark (ACGIH)	TLV® Basis: Pulm fibrosis; lung cancer. Notations: A2 (Suspected Human Carcinogen)
Regulatory reference	ACGIH 2021
USA - OSHA - Occupational Exposure Limits	
Local name	Silica, crystalline quartz, respirable dust
Remark (OSHA)	(3) See Table Z-3.
boric acid (10043-35-3)	
USA - ACGIH - Occupational Exposure Limits	
ACGIH OEL TWA	2 mg/m³ (Inhalable fraction)
ACGIH OEL STEL	6 mg/m³ (Inhalable fraction)

Additional information	The product has a pasty consistency. Exposure limit values for respirable dusts are not relevant for this product.

8.2. Appropriate engineering controls

Appropriate engineering controls	Ensure adequate ventilation.
Environmental exposure controls	Avoid release to the environment.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Safety glasses. Gloves. Protective clothing. Avoid all unnecessary exposure.

Hand protection:

Wear protective gloves. The permeation time is not the maximum wearing time! Generally speaking, it must be reduced. Contact with either mixtures of substances or different substances may shorten the protective function's effective duration.

Type	Material	Permeation	Thickness (mm)	Penetration
Disposable gloves	Nitrile rubber (NBR)	6 (> 480 minutes)	0,12	

Eye protection:

Wear security glasses which protect from splashes

Type	Field of application	Characteristics
Safety glasses	Droplet	clear

Skin and body protection:

Wear suitable protective clothing

Personal protective equipment symbol(s):

Other information:

Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Solid
Appearance	Thixotropic paste.
Colour	light brown
Odour	characteristic
Odour threshold	Not determined
pH	No data available
Melting point	No data available
Freezing point	No data available
Boiling point	No data available
Flash point	> 100 °C DIN EN ISO 1523
Relative evaporation rate (butylacetate=1)	No data available
Flammability (solid, gas)	Non flammable.
Vapour pressure	No data available
Relative vapour density at 20 °C	No data available
Relative density	No data available
Density	1.66 g/cm³ DIN 51757
Solubility	Water: % Not miscible
Partition coefficient n-octanol/water (Log Pow)	No data available
Auto-ignition temperature	Not self-igniting
Decomposition temperature	No data available
Viscosity, kinematic	48192.771 mm²/s
Viscosity, dynamic	80 Pa·s HN-0333
Explosive limits	No data available
Explosive properties	Product is not explosive.
Oxidising properties	No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No additional information available.

10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures.

10.5. Incompatible materials

Strong acids. Strong bases.

10.6. Hazardous decomposition products

fume. Carbon monoxide. Carbon dioxide. Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral) Not classified
Acute toxicity (dermal) Not classified
Acute toxicity (inhalation) Not classified

HIT-HY 270, A	
LD50 oral rat	> 2000 mg/kg
LD50 dermal rat	> 2000 mg/kg

1,1'-(p-tolylimino)dipropan-2-ol (38668-48-3)	
LD50 oral rat	25 mg/kg
LD50 dermal rat	> 2000 mg/kg

4-tert-butylpyrocatechol (98-29-3)	
LD50 oral rat	815 mg/kg bodyweight (Rat; Lethal; ECHA)
LD50 dermal rat	1331 mg/kg bodyweight (Rat;Lethal; ECHA)

2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol (27813-02-1)	
LD50 oral rat	> 5000 mg/kg (Rat; OECD 401: Acute Oral Toxicity; Literature study; >=2000 mg/kg bodyweight; Rat; Experimental value)
LD50 dermal rabbit	≥ 5000 mg/kg bodyweight (Rabbit; Experimental value)

1,1,1-Trimethylolpropane trimethacrylate (3290-92-4)	
LD50 oral rat	> 5000 mg/kg
LD50 dermal rat	> 3000 mg/kg

boric acid (10043-35-3)	
LD50 oral rat	2660 mg/kg (Rat; OECD 401: Acute Oral Toxicity; Literature study; >2600 mg/kg bodyweight; Rat; Experimental value)
LD50 dermal rabbit	> 2000 mg/kg Rabbit; Experimental value; FIFRA (40 CFR)

Skin corrosion/irritation Not classified
Serious eye damage/irritation Causes serious eye irritation.
Respiratory or skin sensitisation May cause an allergic skin reaction.
Germ cell mutagenicity Not classified
Carcinogenicity Not classified

Quartz (SiO2) (14808-60-7)	
IARC group	1 - Carcinogenic to humans

Reproductive toxicity: May damage fertility or the unborn child.

STOT-single exposure: Not classified

STOT-repeated exposure: Not classified

Aspiration hazard: Not classified

Viscosity, kinematic: 48192.771 mm²/s

Potential adverse human health effects and symptoms: No additional information available.

Symptoms/effects after skin contact: May cause an allergic skin reaction.

Symptoms/effects after eye contact: May cause severe irritation.

SECTION 12: Ecological information

12.1. Toxicity

1,1'-(p-tolylimino)dipropan-2-ol (38668-48-3)	
LC50 - Fish [1]	≈ 17 mg/l
LC50 - Other aquatic organisms [1]	245 mg/l
EC50 - Crustacea [1]	28.8 mg/l
NOEC (acute)	57.8 mg/l

4-tert-butylpyrocatechol (98-29-3)	
LC50 - Fish [1]	0.12 mg/l (96 h, Danio rerio, Lethal, ECHA)
ErC50 algae	10.17 mg/l (OECD 201: Alga, Growth Inhibition Test, 72 h, Pseudokirchneriella subcapitata, Static system, Fresh water, Experimental value, GLP)

2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol (27813-02-1)	
LC50 - Fish [1]	493 mg/l (48 h; Leuciscus idus; GLP)
EC50 - Crustacea [1]	> 143 mg/l (48 h; Daphnia magna; GLP)
ErC50 algae	97.2 mg/l (OECD 201: Alga, Growth Inhibition Test, 72 h, Pseudokirchneriella subcapitata, Static system, Fresh water, Experimental value, GLP)
Threshold limit - Algae [1]	> 97.2 mg/l (72 h; Pseudokirchneriella subcapitata; GLP)
Threshold limit - Algae [2]	> 97.2 mg/l (72 h; Pseudokirchneriella subcapitata; GLP)

1,1,1-Trimethylolpropane trimethacrylate (3290-92-4)	
LC50 - Fish [1]	2 mg/l
ErC50 algae	3.88 mg/l
NOEC chronic fish	0.138 mg/l
NOEC chronic crustacea	0.177 mg/l

boric acid (10043-35-3)	
LC50 - Fish [1]	447 mg/l
EC50 - Crustacea [1]	658 – 875 mg/l (48 h; Daphnia magna)
LC50 - Fish [2]	79 ppm (96 h; Salmo gairdneri (Oncorhynchus mykiss); Hard water)
EC50 - Crustacea [2]	19.7 mg/l (336 h; Daphnia magna)
ErC50 algae	290 mg/l
NOEC chronic fish	2.1 mg/l

12.2. Persistence and degradability

HIT-HY 270, A	
Persistence and degradability	Not established.

4-tert-butylpyrocatechol (98-29-3)	
Persistence and degradability	Not readily biodegradable in water.
ThOD	2.4 g O_2/g substance

2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol (27813-02-1)	
Persistence and degradability	Readily biodegradable in water.

Quartz (SiO2) (14808-60-7)	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)

12.3. Bioaccumulative potential

HIT-HY 270, A	
Bioaccumulative potential	Not established.

1,1'-(p-tolylimino)dipropan-2-ol (38668-48-3)	
Partition coefficient n-octanol/water (Log Kow)	2.1

4-tert-butylpyrocatechol (98-29-3)	
Partition coefficient n-octanol/water (Log Pow)	1.98 (Experimental value, OECD 107: Partition Coefficient (n-octanol/water): Shake Flask Method, 25 °C)
Bioaccumulative potential	Low potential for bioaccumulation (Log Kow < 4).

2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol (27813-02-1)	
BCF - Fish [1]	≤ 100
BCF - Fish [2]	3.2 Quantitative structure-activity relationship (QSAR)
Partition coefficient n-octanol/water (Log Pow)	0.97 (OECD 102 method)
Bioaccumulative potential	Low bioaccumulation potential (BCF < 500).

1,1,1-Trimethylolpropane trimethacrylate (3290-92-4)	
BCF - Fish [2]	366 l/kg
Partition coefficient n-octanol/water (Log Pow)	3.53
Partition coefficient n-octanol/water (Log Kow)	4.39

Quartz (SiO2) (14808-60-7)	
Bioaccumulative potential	No bioaccumulation data available.

boric acid (10043-35-3)	
BCF - Fish [2]	< 0.1 (60 days; Oncorhynchus tshawytscha; Fresh weight)
Partition coefficient n-octanol/water (Log Pow)	-1.09 (Experimental value; EU Method A.8: Partition Coefficient; 22 °C)
Bioaccumulative potential	Low bioaccumulation potential (BCF < 500).

12.4. Mobility in soil

4-tert-butylpyrocatechol (98-29-3)	
Surface tension	No data available (test not performed)
Organic Carbon Normalized Adsorption Coefficient (Log Koc)	1.37 (log Koc, OECD 121: Estimation of the Adsorption Coefficient (Koc) on Soil and on Sewage Sludge using High Performance Liquid Chromatography (HPLC), Experimental value, GLP)
Ecology - soil	Highly mobile in soil.

2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol (27813-02-1)	
Organic Carbon Normalized Adsorption Coefficient (Log Koc)	1.9 (log Koc, Calculated value)
Ecology - soil	Highly mobile in soil.

Quartz (SiO2) (14808-60-7)	
Surface tension	No data available in the literature
Ecology - soil	Low potential for mobility in soil.

boric acid (10043-35-3)	
Ecology - soil	No (test)data on mobility of the substance available. May be harmful to plant growth, blooming and fruit formation.

12.5. Other adverse effects

Other information: Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Disposal methods

Regional legislation (waste): Disposal must be done according to official regulations.

Waste treatment methods: Dispose of contents/container in accordance with licensed collector's sorting instructions.

Product/Packaging disposal recommendations: After curing, the product can be disposed of with household waste. . Full or only partially emptied cartridges must be disposed of as special waste in accordance with official regulations. Packaging contaminated by the product : Dispose in a safe manner in accordance with local/national regulations.

Additional information: Clean up even minor leaks or spills if possible without unnecessary risk.

Ecology - waste materials: Avoid release to the environment.

SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / RID

ADR	IMDG	IATA	RID
14.1. UN number			
Not regulated	Not regulated	Not regulated	Not regulated
14.2. UN proper shipping name			
Not regulated	Not regulated	Not regulated	Not regulated
14.3. Transport hazard class(es)			
Not regulated	Not regulated	Not regulated	Not regulated
14.4. Packing group			
Not regulated	Not regulated	Not regulated	Not regulated
14.5. Environmental hazards			
Not regulated	Not regulated	Not regulated	Not regulated
No supplementary information available			

14.6. Special precautions for user

Overland transport

Not regulated

Transport by sea

Not regulated

Air transport
Not regulated

Rail transport
Not regulated

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are present and listed as Active on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

1,1'-(p-tolylimino)dipropan-2-ol	CAS-No. 38668-48-3	0,1 - 1%
Bisphenol-A-diethoxy-methacrylate	CAS-No. 24448-20-2	5 – 10%
4-tert-butylpyrocatechol	CAS-No. 98-29-3	0,1 - 1%
2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol	CAS-No. 27813-02-1	10 – 25%
Tricyclodecane dimethanol dimethacrylate	CAS-No. 43048-08-4	2,5 - 5%
1,1,1-Trimethylolpropane trimethacrylate	CAS-No. 3290-92-4	2,5 - 5%
Quartz (SiO2)	CAS-No. 14808-60-7	25 – 40%
boric acid	CAS-No. 10043-35-3	0,1 - 1%

Tricyclodecane dimethanol dimethacrylate (43048-08-4)	
EPA TSCA Regulatory Flag	P - P - indicates a commenced Premanufacture Notice (PMN) substance. S - S - indicates a substance that is identified in a final Significant New Use Rule.

15.2. International regulations

CANADA

1,1'-(p-tolylimino)dipropan-2-ol (38668-48-3)
Listed on the Canadian DSL (Domestic Substances List)

4-tert-butylpyrocatechol (98-29-3)
Listed on the Canadian DSL (Domestic Substances List)

2-Propenoic acid, 2-methyl-, monoester with 1,2-propanediol (27813-02-1)
Listed on the Canadian DSL (Domestic Substances List)

Quartz (SiO2) (14808-60-7)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

No additional information available

National regulations

Quartz (SiO2) (14808-60-7)
Listed on IARC (International Agency for Research on Cancer)

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

HIT-HY 270, A

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

SECTION 16: Other information

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date 01/21/2022

Other information None.

Full text of H-statements:

H300	Fatal if swallowed.
H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H350	May cause cancer.
H360	May damage fertility or the unborn child.

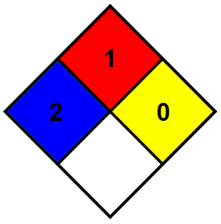
Abbreviations and acronyms:

ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	Acute Toxicity Estimate
BCF	Bioconcentration factor
CLP	Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
DMEL	Derived Minimal Effect level
DNEL	Derived-No Effect Level
EC50	Median effective concentration
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Median lethal concentration
LD50	Median lethal dose
LOAEL	Lowest Observed Adverse Effect Level
NOAEC	No-Observed Adverse Effect Concentration
NOAEL	No-Observed Adverse Effect Level
NOEC	No-Observed Effect Concentration
OECD	Organisation for Economic Co-operation and Development
PBT	Persistent Bioaccumulative Toxic
PNEC	Predicted No-Effect Concentration
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
SDS	Safety Data Sheet
vPvB	Very Persistent and Very Bioaccumulative

NFPA health hazard 2 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

NFPA fire hazard 1 - Materials that must be preheated before ignition can occur.

NFPA reactivity 0 - Material that in themselves are normally stable, even under fire conditions.



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Hazard Rating	
Health	2 Moderate Hazard - Temporary or minor injury may occur
Flammability	1 Slight Hazard - Materials that must be preheated before ignition will occur. Includes liquids, solids and semi solids having a flash point above 200 F. (Class IIIB)
Physical	1 Slight Hazard - Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.
Personal protection	B
	B - Safety glasses, Gloves

Indication of changes:

Section	Changed item	Change	Comments
2.1	GHS-US classification	Removed	
2.2	Hazard statements (GHS US)	Removed	
3	Composition/information on ingredients	Modified	

SDS_US_Hilti

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

HIT-HY 270, B

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations
Issue date: 01/21/2022 Revision date: 01/21/2022 Supersedes: 12/03/2018 Version: 2.1

SECTION 1: Identification

1.1. Identification

Product form	Mixture
Product name	HIT-HY 270, B
Product code	BU Anchor

1.2. Recommended use and restrictions on use

Recommended use	Composite mortar component for fasteners in the construction industry
Restrictions on use	For professional use only

1.3. Supplier

Supplier
Hilti, Inc.
Legacy Tower, Suite 1000
7250 Dallas Parkway
Plano, TX 75024 - USA
T +1 9724035800
1-800-879-8000 toll free - F +1 918 254 0522

Department issuing data specification sheet
Hilti Entwicklungsgesellschaft mbH
Hiltistraße 6
Kaufering, 86916 - Deutschland
T +49 8191 906876
anchor.hse@hilti.com

1.4. Emergency telephone number

Emergency number

Chem-Trec
Tel.: 1 800 424 9300 (USA, PR, Virgin Islands, Canada)
Tel.: 703 527 3887 (Other countries)

+1 918 8723000
1-800-879-8000 toll free

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Skin sensitisation, Category 1	H317	May cause an allergic skin reaction.

Full text of H-statements: see section 16

2.2. GHS Label elements, including precautionary statements

GHS US labelling

Hazard pictograms (GHS US)

Signal word (GHS US)	Warning
Hazard statements (GHS US)	H317 - May cause an allergic skin reaction.
Precautionary statements (GHS US)	P280 - Wear eye protection, protective clothing, protective gloves. P262 - Do not get in eyes, on skin, or on clothing. P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P333+P313 - If skin irritation or rash occurs: Get medical advice/attention. P337+P313 - If eye irritation persists: Get medical advice/attention. P302+P352 - If on skin: Wash with plenty of water.

2.3. Other hazards which do not result in classification

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	GHS-US classification
Quartz (SiO2)	(CAS-No.) 14808-60-7	40 – 60	Carc. 1A, H350
dibenzoyl peroxide	(CAS-No.) 94-36-0	5 – 10	Org. Perox. B, H241 Eye Irrit. 2A, H319 Skin Sens. 1, H317

Full text of hazard classes and H-statements : see section 16

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general: Take off immediately all contaminated clothing. Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid measures after inhalation: Remove person to fresh air and keep comfortable for breathing. Allow affected person to breathe fresh air. Allow the victim to rest.

First-aid measures after skin contact: Wash contaminated clothing before reuse. Wash with plenty of water/…. If skin irritation or rash occurs: Get medical advice/attention.

First-aid measures after eye contact: Rinse immediately with plenty of water. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if pain, blinking or redness persists.

First-aid measures after ingestion: Rinse mouth. Get medical advice/attention. Do not induce vomiting. Obtain emergency medical attention.

4.2. Most important symptoms and effects (acute and delayed)

Potential adverse human health effects and symptoms: No additional information available.

Symptoms/effects after skin contact: May cause an allergic skin reaction.

Symptoms/effects after eye contact: May cause severe irritation.

4.3. Immediate medical attention and special treatment, if necessary

No additional information available

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media: Water spray. Carbon dioxide. Dry powder. Foam. Sand.

Unsuitable extinguishing media: Do not use a heavy water stream.

5.2. Specific hazards arising from the chemical

Hazardous decomposition products in case of fire: Thermal decomposition generates : Carbon dioxide. Carbon monoxide.

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions: Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire fighting water from entering the environment.

Protection during firefighting	Self-contained breathing apparatus. Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures: Spilled material may present a slipping hazard.

6.1.1. For non-emergency personnel

Emergency procedures: Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment: Use personal protective equipment as required. Equip cleanup crew with proper protection.

Emergency procedures: Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

For containment: Collect spillage.

Methods for cleaning up: This material and its container must be disposed of in a safe way, and as per local legislation. Mechanically recover the product. Store away from other materials.

Other information: Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection". For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling: Wear personal protective equipment. Avoid contact with skin and eyes. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapour.

Hygiene measures: Do not eat, drink or smoke when using this product. Always wash hands after handling the product. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Keep cool. Protect from sunlight.

Incompatible products: Strong bases. Strong acids.

Incompatible materials: Sources of ignition. Direct sunlight.

Storage temperature: 5 – 25 °C

Heat and ignition sources: Keep away from heat and direct sunlight.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

HIT-HY 270, B	
USA - ACGIH - Occupational Exposure Limits	
Local name	Benzoyl peroxide
ACGIH OEL TWA	5 mg/m³
Remark (ACGIH)	TLV® Basis: URT & skin irr. Notations: A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH 2021

USA - OSHA - Occupational Exposure Limits	
Local name	Benzoyl peroxide
OSHA PEL TWA [1]	5 mg/m³
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1

Quartz (SiO2) (14808-60-7)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Silica crystaline - quartz
ACGIH OEL TWA	0.025 mg/m³ (Respirable fraction)
Remark (ACGIH)	TLV® Basis: Pulm fibrosis; lung cancer. Notations: A2 (Suspected Human Carcinogen)
Regulatory reference	ACGIH 2021
USA - OSHA - Occupational Exposure Limits	
Local name	Silica, crystalline quartz, respirable dust
Remark (OSHA)	(3) See Table Z-3.

dibenzoyl peroxide (94-36-0)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Benzoyl peroxide
ACGIH OEL TWA	5 mg/m³
Remark (ACGIH)	TLV® Basis: URT & skin irr. Notations: A4 (Not classifiable as a Human Carcinogen)
Regulatory reference	ACGIH 2020
USA - OSHA - Occupational Exposure Limits	
Local name	Benzoyl peroxide
OSHA PEL TWA [1]	5 mg/m³
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1

Additional information: The product has a pasty consistency. Exposure limit values for respirable dusts are not relevant for this product.

8.2. Appropriate engineering controls

Appropriate engineering controls: Ensure adequate ventilation.

Environmental exposure controls: Avoid release to the environment.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Safety glasses. Gloves. Protective clothing. Avoid all unnecessary exposure.

Hand protection:

Wear protective gloves. The permeation time is not the maximum wearing time! Generally speaking, it must be reduced. Contact with either mixtures of substances or different substances may shorten the protective function's effective duration.

Type	Material	Permeation	Thickness (mm)	Penetration
Disposable gloves	Nitrile rubber (NBR)	6 (> 480 minutes)	0,12	

Eye protection:

Wear security glasses which protect from splashes

Type	Field of application	Characteristics
Safety glasses	Droplet	clear

Skin and body protection:

Wear suitable protective clothing

Personal protective equipment symbol(s):

Other information:

Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Solid
Appearance	Thixotropic paste.
Colour	white
Odour	characteristic
Odour threshold	Not determined
pH	≈ 6
Melting point	No data available
Freezing point	No data available
Boiling point	No data available
Flash point	No data available
Relative evaporation rate (butylacetate=1)	No data available
Flammability (solid, gas)	Non flammable.
Vapour pressure	No data available
Relative vapour density at 20 °C	No data available
Relative density	No data available
Density	1.7 g/cm³ DIN 51757
Solubility	Water: % Not miscible
Partition coefficient n-octanol/water (Log Pow)	No data available
Auto-ignition temperature	Not self-igniting
Decomposition temperature	No data available
Viscosity, kinematic	52941.176 mm²/s
Viscosity, dynamic	90 Pa·s HN-0333
Explosive limits	No data available
Explosive properties	Product is not explosive.
Oxidising properties	No data available

9.2. Other information

SADT	65 °C

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No additional information available.

10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures.

10.5. Incompatible materials

Strong acids. Strong bases.

10.6. Hazardous decomposition products

fume. Carbon monoxide. Carbon dioxide. Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	Not classified
Acute toxicity (dermal)	Not classified
Acute toxicity (inhalation)	Not classified
Skin corrosion/irritation	Not classified pH: ≈ 6
Serious eye damage/irritation	Not classified pH: ≈ 6
Respiratory or skin sensitisation	May cause an allergic skin reaction.
Germ cell mutagenicity	Not classified
Carcinogenicity	Not classified

Quartz (SiO2) (14808-60-7)	
IARC group	1 - Carcinogenic to humans

dibenzoyl peroxide (94-36-0)	
IARC group	3 - Not classifiable

Reproductive toxicity	Not classified
STOT-single exposure	Not classified
STOT-repeated exposure	Not classified
Aspiration hazard	Not classified
Viscosity, kinematic	52941.176 mm²/s
Potential adverse human health effects and symptoms	No additional information available.
Symptoms/effects after skin contact	May cause an allergic skin reaction.
Symptoms/effects after eye contact	May cause severe irritation.

SECTION 12: Ecological information

12.1. Toxicity

dibenzoyl peroxide (94-36-0)	
EC50 - Crustacea [1]	0.11 mg/l (OECD 202: Daphnia sp. Acute Immobilisation Test, 48 h, Daphnia magna, Static system, Fresh water, Experimental value, GLP)
LC50 - Fish [2]	0.0602 mg/l (96h; Oncorhynchus mykiss; ECHA)
ErC50 algae	0.0711 mg/l (OECD 201: Alga, Growth Inhibition Test, 72 h, Pseudokirchneriella subcapitata, Static system, Fresh water, Experimental value, GLP)
NOEC (acute)	0.0316 mg/l (96h; Oncorhynchus mykiss; ECHA)
NOEC chronic fish	0.001 mg/l

12.2. Persistence and degradability

HIT-HY 270, B	
Persistence and degradability	Not established.

Quartz (SiO2) (14808-60-7)	
Persistence and degradability	Biodegradability: not applicable.
Chemical oxygen demand (COD)	Not applicable (inorganic)
ThOD	Not applicable (inorganic)

dibenzoyl peroxide (94-36-0)	
Persistence and degradability	Readily biodegradable in water. Not established. May cause long-term adverse effects in the environment.

12.3. Bioaccumulative potential

HIT-HY 270, B	
Bioaccumulative potential	Not established.

Quartz (SiO2) (14808-60-7)	
Bioaccumulative potential	No bioaccumulation data available.

dibenzoyl peroxide (94-36-0)	
Partition coefficient n-octanol/water (Log Pow)	3.71
Bioaccumulative potential	Low bioaccumulation potential (Log Kow < 4).

12.4. Mobility in soil

Quartz (SiO2) (14808-60-7)	
Surface tension	No data available in the literature
Ecology - soil	Low potential for mobility in soil.

dibenzoyl peroxide (94-36-0)	
Surface tension	No data available (test not performed)
Organic Carbon Normalized Adsorption Coefficient (Log Koc)	3.8 (log Koc, OECD 121: Estimation of the Adsorption Coefficient (Koc) on Soil and on Sewage Sludge using High Performance Liquid Chromatography (HPLC), Experimental value)
Ecology - soil	Low potential for mobility in soil.

12.5. Other adverse effects

Other information: Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Disposal methods

Regional legislation (waste): Disposal must be done according to official regulations.

Waste treatment methods: Dispose of contents/container in accordance with licensed collector's sorting instructions.

Product/Packaging disposal recommendations: After curing, the product can be disposed of with household waste. . Full or only partially emptied cartridges must be disposed of as special waste in accordance with official regulations. Packaging contaminated by the product : Dispose in a safe manner in accordance with local/national regulations.

Additional information: Clean up even minor leaks or spills if possible without unnecessary risk.

Ecology - waste materials: Avoid release to the environment.

SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / RID

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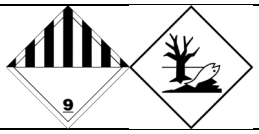
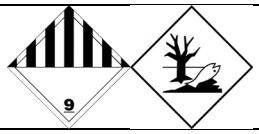
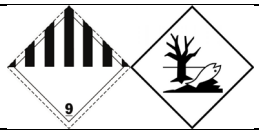
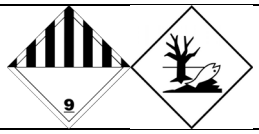
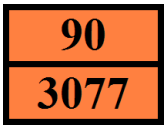
ADR	IMDG	IATA	RID
14.1. UN number			
UN 3077	UN 3077	UN 3077	UN 3077
14.2. UN proper shipping name			
ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (dibenzoyl peroxide)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (dibenzoyl peroxide)	Environmentally hazardous substance, solid, n.o.s. (dibenzoyl peroxide)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (dibenzoyl peroxide)
Transport document description			
UN 3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (dibenzoyl peroxide), 9, III, (-)	UN 3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (dibenzoyl peroxide), 9, III, MARINE POLLUTANT	UN 3077 Environmentally hazardous substance, solid, n.o.s. (dibenzoyl peroxide), 9, III	UN 3077 ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (dibenzoyl peroxide), 9, III
14.3. Transport hazard class(es)			
9	9	9	9
			
14.4. Packing group			
III	III	III	III
14.5. Environmental hazards			
Dangerous for the environment: Yes	Dangerous for the environment: Yes Marine pollutant: Yes	Dangerous for the environment: Yes	Dangerous for the environment: Yes
not restricted according ADR Special Provision SP375, IATA-DGR Special Provision A197 and IMDG-Code 2.10.2.7			

14.6. Special precautions for user

Overland transport

Classification code (ADR)	M7
Special provisions (ADR)	274, 335, 375, 601
Limited quantities (ADR)	5kg
Packing instructions (ADR)	P002, IBC08, LP02, R001
Mixed packing provisions (ADR)	MP10
Transport category (ADR)	3
Orange plates	
Tunnel restriction code (ADR)	-

Transport by sea

Special provisions (IMDG)	274, 335, 966, 967, 969
Limited quantities (IMDG)	5 kg
Packing instructions (IMDG)	LP02, P002
EmS-No. (Fire)	F-A
EmS-No. (Spillage)	S-F
Stowage category (IMDG)	A
Stowage and handling (IMDG)	SW23

Air transport

PCA packing instructions (IATA)	956
PCA max net quantity (IATA)	400kg
CAO packing instructions (IATA)	956
Special provisions (IATA)	A97, A158, A179, A197, A215

Rail transport

Special provisions (RID)	274, 335, 375, 601
Limited quantities (RID)	5kg
Packing instructions (RID)	P002, IBC08, LP02, R001

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are present and listed as Active on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

Quartz (SiO2)	CAS-No. 14808-60-7	40 – 60%
dibenzoyl peroxide	CAS-No. 94-36-0	5 – 10%

Chemical(s) subject to the reporting requirements of Section 313 or Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and 40 CFR Part 372.

dibenzoyl peroxide	CAS-No. 94-36-0	5 – 10%

15.2. International regulations

CANADA

Quartz (SiO2) (14808-60-7)
Listed on the Canadian DSL (Domestic Substances List)

dibenzoyl peroxide (94-36-0)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

No additional information available

National regulations

Quartz (SiO2) (14808-60-7)
Listed on IARC (International Agency for Research on Cancer)

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

SECTION 16: Other information

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date	01/21/2022
Other information	None.

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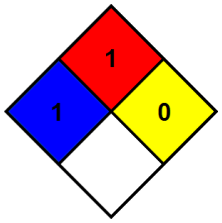
Full text of H-statements:

H241	Heating may cause a fire or explosion.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H350	May cause cancer.

Abbreviations and acronyms:

ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	Acute Toxicity Estimate
BCF	Bioconcentration factor
CLP	Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
DMEL	Derived Minimal Effect level
DNEL	Derived-No Effect Level
EC50	Median effective concentration
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Median lethal concentration
LD50	Median lethal dose
LOAEL	Lowest Observed Adverse Effect Level
NOAEC	No-Observed Adverse Effect Concentration
NOAEL	No-Observed Adverse Effect Level
NOEC	No-Observed Effect Concentration
OECD	Organisation for Economic Co-operation and Development
PBT	Persistent Bioaccumulative Toxic
PNEC	Predicted No-Effect Concentration
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
SDS	Safety Data Sheet
vPvB	Very Persistent and Very Bioaccumulative

NFPA health hazard	1 - Materials that, under emergency conditions, can cause significant irritation.
NFPA fire hazard	1 - Materials that must be preheated before ignition can occur.
NFPA reactivity	0 - Material that in themselves are normally stable, even under fire conditions.



SDS_US_Hilti

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.