



Attached are page(s) from the 2011 Hilti North American Product Technical Guide. For complete details on this product, including data development, product specifications, general suitability, installation, corrosion, and spacing & edge distance guidelines, please refer to the Technical Guide, or contact Hilti.

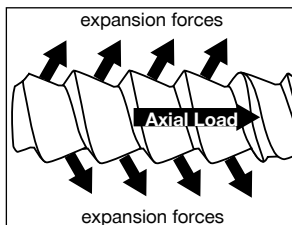
HIT-TZ with HIT-HY 150 MAX or HIT-ICE 3.2.5

3.2.5.1 Product Description

Please refer to Section 3.2.6 for HIT-HY 150 MAX or Section 3.2.8 for HIT-ICE Adhesive product specific information. The Hilti HIT-TZ is an innovative threaded rod installed with HIT-HY 150 MAX hybrid adhesive or HIT-ICE. With the combination of HIT-HY 150 MAX or HIT-ICE and the innovative design of the HIT-TZ rod, anchoring into uncleaned holes, wet holes (including standing water) and/or Hilti matched tolerance diamond-cored holes does not adversely affect tensile capacity. Use HIT-ICE in base material temperatures $\leq 40^{\circ}\text{F}$ (5°C).

How It Works

When an axial load is applied, the innovative HIT-TZ creates expansion forces which supplement the bonding power of HIT- HY 150 MAX or HIT-ICE and the concrete. This compensates for unfavorable hole conditions.



No more:

- removing water or drying holes
- roughening diamond cored holes.

Product Features of HIT-TZ Threaded Rods

- Full tensile capacity with installation in drilled holes without any hole cleaning procedures
- Develops the tensile strength of HAS-E (ISO898, Class 5.8) threaded rods and HAS-SS (F 593 and A 193, B8, Class 1 for stainless steel in Canada only) at 20% shallower embedment
- Full tensile capacity in Hilti matched tolerance diamond-cored holes
- Develops full tensile capacity when installed in wet holes (with standing water)

3.2.5.1 Product Description

3.2.5.2 Material Specifications

3.2.5.3 Technical Data

3.2.5.4 Installation Instructions

3.2.5.5 Ordering Information

Listings/Approvals

City of Los Angeles

RR 25652

NSF/ANSI Std 61

Certification for use of HIT-HY 150 MAX in potable water



Independent Code Evaluation

LEED®: Credit 4.1-Low Emitting Materials (For HY 150 MAX)

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

3.2.5 HIT-TZ with HIT-HY 150 MAX or HIT-ICE

Guide Specifications

Master Format Section:

Previous 2004 Format

03250 03 16 00 (Concrete Anchors)

Related Sections:

03200 03 20 00 (Concrete Reinforcing)

05050 05 50 00 (Metal Fabrications)

05120 05 10 00 (Structural Metal Framing)

Anchor Rods Shall be furnished with a helical cone shaped thread on the embedded end and standard threads on the exposed end. Anchor rods shall be manufactured to meet the following requirements:

1. ASTM A 510 with chemical composition of AISI 1038; 2. AISI 316 stainless steel, meeting the requirements of ASTM A 493.

Nuts and Washers Shall be furnished to meet the requirements of the above anchor rod specifications.

Injectable adhesive shall be used for installation of all threaded anchor rods into existing concrete. Adhesive shall be furnished in containers which keep component A and component B separate. Containers shall be designed to accept static mixing nozzle which thoroughly blends component A and component B and allows injection directly into drilled hole. Only injection tools and static mixing nozzles as supplied by manufacturer shall be used. Manufacturer's instructions shall be followed. Injection adhesive shall be formulated to include resin and hardener to provide optimal curing speed as well as high strength and stiffness. Typical curing time at 68°F shall be 30 minutes for HIT-HY 150 MAX and 1 hour for HIT-ICE. Injection adhesive shall be HIT-HY 150 MAX or HIT-ICE, as furnished by Hilti.

3.2.5.2 Material Specifications

Material	Mechanical Properties			
	f_y ksi (MPa)		min. f_u ksi (MPa)	
Carbon steel HIT-TZ Rod meets requirements of ASTM A 510 with chemical composition of AISI 1038	70	(480)	87	(600)
Stainless Steel HIT-RTZ Rod meets requirements of AISI 316 conforming to ASTM F593	70	(480)	87	(600)
HIT-TZ Standard Nut material meets the requirements of ASTM A 563, Grade A conforming to ANSI B18.2.2				
HIT-TZ Carbon Steel Washers meet the requirements of ASTM F 844				
HIT-RTZ Stainless Steel Nut material meets the requirements of ASTM F594 conforming to ANSI B18.2.2				
HIT-RTZ Stainless Steel Washers meet the requirements of AISI 316 conforming to ASTM A 240				

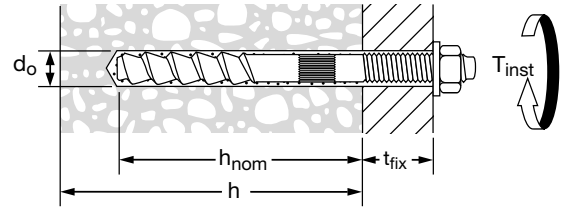
HIT-TZ with HIT-HY 150 MAX or HIT-ICE 3.2.5

3.2.5.3 Technical Data

HIT-HY 150 MAX/HIT-ICE Installation Specification

Table for HIT-TZ Rods

HIT-TZ Rod Size		in.	3/8	1/2	5/8	3/4
Details		(mm)	(9.5)	(12.7)	(15.9)	(19.1)
d_{bit}	bit diameter ¹	in.	7/16	9/16	11/16	13/16
h_{nom}	std. depth of embed. ²	in. (mm)	2-7/8 (73)	3-1/2 (89)	4 (102)	5-1/4 (133)
ℓ	length of anchor	in. (mm)	4-1/2 (114)	5-11/16 (144)	7-1/16 (180)	10-1/2 (267)
T_{inst}	HIT-TZ installation torque	ft-lb (Nm)	18 (24)	30 (40)	75 (100)	150 (200)
T_{inst}	HIT-RTZ installation torque	ft-lb (Nm)	15 (20)	20 (28)	50 (65)	105 (140)
h	min. base material thickness	in. (mm)	3-3/4 (95)	5-1/4 (133)	6 (153)	7-7/8 (200)
t_{fix}	Maximum thickness fastened	in. (mm)	1 (25)	1-1/2 (37)	2-1/4 (56)	4-1/16 (103)



Combined Shear and Tension Loading

$$\left(\frac{N_d}{N_{rec}} \right)^{5/3} + \left(\frac{V_d}{V_{rec}} \right)^{5/3} \leq 1.0 \text{ (Ref. Section 3.1.8.3)}$$

- For Hilti matched tolerance carbide tipped drill bits. For Hilti diamond core bits, refer to the Hilti Catalog.
- For uncleaned holes in floor applications, add 3/8" (10 mm) to drilled hole depth (typical).

Allowable and Ultimate Bond/Concrete Capacity of HIT-TZ and HIT-RTZ Rods in Normal Weight Concrete with HIT-HY 150 MAX/HIT-ICE¹

Anchor Dia. in (mm)	Embed. Depth in (mm)	Allowable Bond/Concrete Capacity				Ultimate Bond/Concrete Capacity			
		Tensile		Shear		Tensile		Shear	
		$f'_c = 2000$ psi (13.8 MPa) lb (kN)	$f'_c = 4000$ psi (27.6 MPa) lb (kN)	$f'_c = 2000$ psi (13.8 MPa) lb (kN)	$f'_c = 4000$ psi (27.6 MPa) lb (kN)	$f'_c = 2000$ psi (13.8 MPa) lb (kN)	$f'_c = 4000$ psi (27.6 MPa) lb (kN)	$f'_c = 2000$ psi (13.8 MPa) lb (kN)	$f'_c = 4000$ psi (27.6 MPa) lb (kN)
3/8 (9.5)	2-7/8 (73)	1800 (8.0)	2255 (10.0)	1710 (7.6)	2415 (10.7)	7200 (32.0)	9020 (40.1)	6840 (30.4)	9660 (43.0)
1/2 (12.7)	3-1/2 (12.1)	2720 (12.1)	3020 (13.4)	2600 (11.6)	3680 (16.4)	10880 (48.4)	12080 (53.7)	10400 (46.3)	14720 (65.5)
5/8 (15.9)	4 (102)	3850 (17.1)	5750 (25.6)	3490 (15.5)	4935 (22.0)	15400 (68.5)	23000 (102.3)	13960 (62.1)	19740 (87.8)
3/4 (19.1)	5-1/4 (133)	5405 (24.0)	7275 (32.4)	5850 (26.0)	8275 (36.8)	21620 (96.2)	29100 (129.4)	23400 (104.1)	33100 (147.2)

- Influence factors for spacing and/or edge distance are applied to the allowable concrete/bond values above, and then compared to the allowable steel values below. The lesser of the values is to be used for the design.

Allowable¹ & Ultimate² Steel Strengths for HIT-TZ & HIT-RTZ Rods

Rod Diameter in (mm)	Allowable Steel Strength		Ultimate Steel Strength		
	Tensile lb (kN)	Shear lb (kN)	Yield lb (kN)	Tensile lb (kN)	Shear lb (kN)
3/8 (9.5)	3170 (14.1)	1635 (7.3)	5690 (25.3)	7210 (32.1)	4325 (19.2)
1/2 (12.7)	5636 (25.0)	2900 (12.9)	10105 (44.9)	12810 (56.9)	7685 (34.2)
5/8 (15.9)	8805 (39.1)	4535 (20.1)	15795 (70.2)	20020 (89.0)	12010 (53.4)
3/4 (19.1)	12685 (56.4)	6535 (29.1)	22750 (101.2)	28825 (128.2)	17295 (76.9)

- Allowable Steel strength as defined in AISC Manual of Steel Construction (ASD):
Tensile = $0.33 \times F_u \times \text{Nominal Area}$; Shear = $0.17 \times F_u \times \text{Nominal Area}$
- Ultimate Steel strength as defined in AISC Manual of Steel Construction (LRFD):
Yield = $F_y \times \text{Tensile Stress Area}$; Tensile = $0.75 \times F_u \times \text{Nominal Area}$; Shear = $0.45 \times F_u \times \text{Nominal Area}$

3.2.5 HIT-TZ with HIT-HY 150 MAX or HIT-ICE

Anchor Spacing and Edge Distance Guidelines in Concrete for HIT-TZ and HIT-RTZ Threaded Rods

Load Adjustment Factors for 3/8" and 1/2" Diameter Anchors									
Anchor Diameter	3/8" diameter				1/2" diameter				
	Spacing	Edge Distance			Spacing	Edge Distance			
Adjustment Factor	Tension or Shear f_A	Tension f_{RN}	Shear (⊥ toward edge) f_{RV1}	Shear (to or away from edge) f_{RV2}	Tension or Shear f_A	Tension f_{RN}	Shear (⊥ toward edge) f_{RV1}	Shear (to or away from edge) f_{RV2}	
Embedment Depth, in	2-7/8	2-7/8	2-7/8	2-7/8	3-1/2	3-1/2	3-1/2	3-1/2	
Spacing (s)/Edge Distance (c), in.	2	0.77	0.63	0.25	0.53				
	2-7/16	0.79	0.68	0.35	0.59	0.77	0.63	0.25	0.53
	3	0.81	0.74	0.46	0.67	0.79	0.68	0.35	0.59
	3-3/8	0.83	0.78	0.55	0.72	0.80	0.71	0.42	0.63
	4	0.86	0.84	0.68	0.80	0.83	0.77	0.53	0.70
	4-3/8	0.87	0.88	0.76	0.85	0.84	0.80	0.59	0.75
	5	0.90	0.95	0.90	0.94	0.86	0.85	0.71	0.82
	5-1/4	0.91	1.98	0.95	0.97	0.87	0.88	0.75	0.84
	5-7/16	0.92	1.00	1.00	1.00	0.88	0.89	0.79	0.87
	6	0.95				0.90	0.94	0.88	0.93
	6-11/16	0.98				0.92	1.00	1.00	1.00
	7	0.99				0.94			
	7-3/16	1.00				0.94			
	8-1/2					0.99			
8-3/4					1.00				

Anchor Spacing and Edge Distance Guidelines in Concrete for HIT-TZ and HIT-RTZ Threaded Rods

Load Adjustment Factors for 5/8" and 3/4" Diameter Anchors									
Anchor Diameter	5/8" diameter				3/4" diameter				
	Spacing	Edge Distance			Spacing	Edge Distance			
Adjustment Factor	Tension or Shear f_A	Tension f_{RN}	Shear (⊥ toward edge) f_{RV1}	Shear (to or away from edge) f_{RV2}	Tension or Shear f_A	Tension f_{RN}	Shear (⊥ toward edge) f_{RV1}	Shear (to or away from edge) f_{RV2}	
Embedment Depth, in	4	4	4	4	5-1/4	5-1/4	5-1/4	5-1/4	
Spacing (s)/Edge Distance (c), in.	2-13/16	0.77	0.63	0.25	0.53				
	3	0.78	0.65	0.36	0.55				
	3-11/16	0.80	0.70	0.44	0.62	0.77	0.63	0.25	0.53
	4-5/16	0.82	0.75	0.52	0.68	0.79	0.67	0.33	0.58
	4-1/2	0.82	0.76	0.60	0.70	0.79	0.68	0.35	0.59
	4-3/4	0.83	0.78	0.68	0.72	0.80	0.69	0.38	0.61
	5	0.84	0.80	0.76	0.75	0.80	0.71	0.42	0.63
	5-3/4	0.86	0.86	0.83	0.82	0.82	0.75	0.50	0.69
	6-3/4	0.90	0.93	0.91	0.92	0.84	0.81	0.62	0.76
	7-3/16	0.91	0.97	1.00	0.96	0.86	0.84	0.67	0.79
	7-5/8	0.92	1.00	1.00	1.00	0.87	0.86	0.72	0.82
	8	0.94				0.88	0.88	0.76	0.85
	8-7/16	0.95				0.89	0.91	0.82	0.89
	9	0.97				0.90	0.94	0.88	0.93
	10	1.00				0.92	1.00	1.00	1.00
	11-1/4					0.95			
	12					0.97			
13-1/8					1.00				

NOTE: Tables apply for listed embedments. Reduction factors for other embedment depths must be calculated using equations below.

Spacing Tension/Shear $s_{\min} = 0.7 h_{ef}$, $s_{cr} = 2.5 h_f$ $f_A = 0.128(s/h_{ef}) + 0.68$ for $s_{cr} > s > s_{\min}$	Edge Distance Tension $c_{\min} = 0.7 h_{ef}$, $c_{cr} = 1.9 h_{ef}$ $f_{RN} = 0.308(c/h_{ef}) + 0.414$ for $c_{cr} > c > c_{\min}$	Edge Distance Shear (⊥ toward edge) $c_{\min} = 0.7 h_{ef}$, $c_{cr} = 1.9 h_{ef}$ $f_{RV1} = 0.625(c/h_{ef}) - 0.1875$ for $c_{cr} > c > c_{\min}$	Edge Distance Shear (to or away from edge) $c_{\min} = 0.7 h_{ef}$, $c_{cr} = 1.9 h_{ef}$ $f_{RV2} = 0.392(c/h_{ef}) + 0.256$ for $c_{cr} > c > c_{\min}$
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HIT-TZ with HIT-HY 150 MAX or HIT-ICE 3.2.5

3.2.5.4 Installation Instructions

HIT-TZ and HIT-RTZ Installation Instructions

1a
1. DD EC-1

1b

2
2.

3
3.
Hilti HIT-HY 150 MAX and HIT-ICE

4

5a
t_{work}
-0.5 in.

5b
t_{work}
-1.0 in.

6
t_{cure}
≥ 5°C

7
T_{inst}

Drill hole using a rotohammer or Hilti diamond coring machine.

Push the HIT-TZ in the hole to verify sufficient hole depth (only threads visible). For floor applications pushing the rod compacts the drill dust.

Inject adhesive starting from the bottom of the hole.

Fill the hole 1/2 to 2/3 full. If the hole is full of water, it is suggested to start injecting from the bottom of the hole and fill entirely with adhesive.

Do not adjust the HIT-TZ rod between the gel and cure times. Apply a load only after the appropriate cure time has elapsed.

3.2.5.5 Ordering Information

Description	Threaded Rod Diameter (in.)	Drill Bit Diameter (in.)	Depth of Embedment (in.)	Maximum Fastening Thickness (in.)	Overall Length (in.)	Quantity per Box
HIT-TZ 3/8x2-7/8	3/8	7/16	2-7/8	1	4-1/2	40
HIT-TZ 1/2x3-1/2	1/2	9/16	3-1/2	1-1/2	5-11/16	24
HIT-TZ 5/8x4	5/8	11/16	4	2-1/4	7-1/16	16
HIT-TZ 3/4x5-1/4	3/4	13/16	5-1/4	4-1/16	10-1/2	8