



**WEAVER GENERAL CONSTRUCTION COMPANY**  
 3679 S. Huron St., Suite 404  
 Englewood, CO 80110  
 Phone: (303) 789-4111 FAX: (303) 789-4310

**SUBMITTAL TRANSMITTAL**

September 27, 2010

**WGC Submittal No: 03300-002**

**PROJECT:** **Harold Thompson Regional WRF**  
 Birdsall Rd.  
 Fountain, CO 80817  
 Job No. 2908

**ENGINEER:** **GMS, Inc.**  
 611 No. Weber St., #300  
 Colorado Springs, CO 80903  
 719-475-2935 Roger Sams

**OWNER:** **Lower Fountain Metropolitan  
 Sewage Disposal District**  
 901 S. Santa Fe Ave.  
 Fountain, CO 80817  
 719-382-5303 James Heckman

**CONTRACTOR:** **Baker Concrete Construction**  
 1904 Jasper Street  
 Aurora, CO 80011  
 937-536-9000 Nick Dewald

**SUBJECT:** Epoxy - Hilti HY 150

**SPEC SECTION:** 03300 - Cast-In-Place Concrete

**PREVIOUS SUBMISSION DATES:** None

**DEVIATIONS FROM SPEC:** \_\_\_ YES  X  NO

**CONTRACTOR'S STAMP:** This submittal has been reviewed by Weaver General Construction and approved with respect to the means, methods, techniques, & safety precautions & programs incidental thereto. Weaver General Construction also warrants that this submittal complies with contracted documents and comprises on deviations thereto:

**Contractor's Stamp:**

Date: 9/27/10  
 Reviewed by: H.C. Myers  
 ( X ) Reviewed Without Comments  
 ( ) Reviewed With Comments

**Engineer's Stamp:**

**ENGINEER'S  
 COMMENTS:** \_\_\_\_\_



# Letter of Transmittal/Submittal

FROM: **Baker Concrete Construction**  
 1904 Jasper Street  
 Aurora, CO 80011  
 303.367.8111  
 Nick Dewald 937.536.9000

TO: **Bruce Herman**  
 Weaver General Construction Co.  
 3679 South Huron St., Suite 404  
 Englewood, CO 80110

DATE	09/23/10	JOB NUMBER	9921
ATTENTION	Bruce Herman		
RE:	Harold Thompson Regional WRF		
TR#	9921-002	SM#	03300-002

We are sending you: **ATTACHED** via **EMAIL** the following: **SPECIFICATION**

COPIES	DATE	PAGES	Description
1	9/23/2010	5	Epoxy - Hilti HY 150

THESE ARE TRANSMITTED as noted below:



REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
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COPY TO \_\_\_\_\_ SIGNED: \_\_\_\_\_  
 Baker Concrete Construction, Inc.

If enclosures are not as noted, kindly notify us at once

## 4.2.4 HIT HY 150 MAX Adhesive Anchor

- 4.2.4.1 Product Description
- 4.2.4.2 Material Specifications
- 4.2.4.3 Technical Data
- 4.2.4.4 Installation Instructions
- 4.2.4.5 Ordering Information



HY 150 MAX  
Foil Pack

### Listings/Approvals

**ICC-ES (International Code Council)**  
ESR-1967

**COLA (City of Los Angeles) (pending)**

**NSF/ANSI Standard 61**

Certification for use of HIT HY 150 MAX  
in potable water

**Metro-Dade County (Pending)**

### 4.2.4.1 Product Description

Hilti HIT HY 150 MAX is a hybrid adhesive mortar combining urethane methacrylate resin, hardener, cement and water. The components are kept separate from the hardener and water by means of a dual-cylinder foil cartridge attached to a manifold. It is formulated for fast curing and installation in a wide range of solid and hollow base material temperatures from 14°F (-10°C) up to 104°F (40°C).

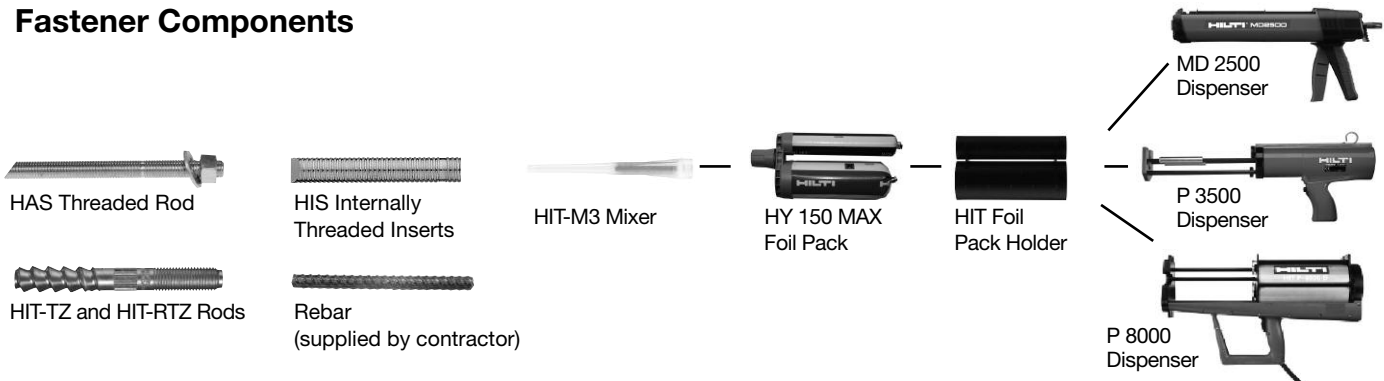
The system consists of adhesive cartridges, a mixing nozzle, a HIT dispenser and either a threaded rod, rebar, HIS internally threaded inserts or other fastening element. HY 150 MAX is designed for fastenings into solid base materials such as concrete, stone, and grout-filled block and is also suitable for fastening into base materials containing voids and holes such as hollow block, lightweight hollow block, brick with holes, and clay tile.

The Hilti HIT-TZ is an innovative threaded rod installed with HIT HY 150 MAX hybrid adhesive. With the combination of HIT HY 150 MAX 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.

### Product Features of HIT HY 150 MAX

- Average 20% higher load capacities than HIT HY 150
- New innovative mixer helix for reduced dispensing forces
- May be used for oversized holes up to 1/4" larger than rod size
- Fast connector mixer saves time and reduces waste
- May be used in solid and hollow base materials
- Quick cure saves time
- Complete system available, including HAS-E, HIS, HIT-TZ
- Contains no styrene, virtually odorless
- Extended temperature range
- Full range of approvals

### Fastener Components



## HIT HY 150 MAX Adhesive Anchor 4.2.4

### Guide Specifications

#### Master Format Section:

03250 (Concrete accessories)

#### Related Sections:

03200 (Concrete Reinforcing)

05050 (Metal Fabrication)

05120 (Structural Steel)

**Injectable adhesive:** Shall be used for installation of all reinforcing steel dowels or threaded rods and inserts into new or existing solid concrete or masonry. For hollow base materials an injectable adhesive shall be used with a cylindrical mesh screen tube per the adhesive manufacturer's specifications.

**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 recommended by manufacturer shall be used. Manufacturer's installation instructions shall be followed. Injection adhesives 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. Injection adhesive shall be HIT HY 150 MAX, as furnished by Hilti.

**Anchor Rods:** Shall be furnished with chamfered ends so that either end will accept a nut and washer. Alternatively, anchor rods shall be furnished with a 45 degree chisel point on one end to allow for easy installation into the adhesive-filled hole. Anchor rods shall be manufactured to meet the following requirements:

1. ISO 898 Class 5.8;
2. ASTM A 193, Grade B7 (high strength carbon steel anchor);
3. AISI 304 or AISI 316 stainless steel, meeting the requirements of ASTM F 593 (condition CW). Special order of HAS or HIT rods may vary from standard product.

**Mesh Screen Tube:** Shall be formed into a cylindrical shape, with one end closed to prevent extrusion of adhesive through that end. Screen tube shall be manufactured with a mesh size, length and diameter as specified by the adhesive manufacturer. Mesh shall be manufactured from:

1. Low carbon steel with zinc electroplating or
2. AISI 304 stainless steel or
3. plastic. Anchor rods and screens shall be the Hilti HIT system as manufactured by Hilti.

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

**SUBMITTED**

**BAKER CONCRETE CONSTRUCTION**

**September 23, 2010**

Baker Concrete Construction reviewed, approved, and hereby submits the attached in accordance with the Contract Documents. Note to Subcontractor/Material Supplier: Subcontractor remains responsible for confirmation and correlation of dimensions at the jobsite, fabrication processes and construction techniques; coordination of the work with work of other trades and satisfactory performance of the work.

## 4.2.4 HIT HY 150 MAX Adhesive Anchor

### 4.2.4.2 Material Specifications

#### Material Properties for Cured Adhesive

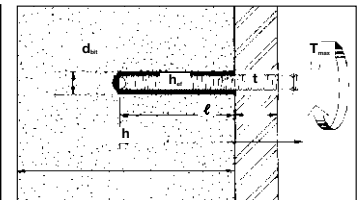
Compressive Strength ASTM C 579	> 50 MPa	>7252 psi
Flexural Strength ASTM C 580	> 20 MPa	> 2900 psi
Modulus of Elasticity ASTM C 307	> 3500 MPa	> 5.07 x 10 <sup>5</sup> psi
Water Absorption ASTM D 570	< 2%	< 2%
Electrical Resistance DIN/VDE 0303T3	~ 2 x 10 <sup>11</sup> OHM/cm	~ 5.1 x 10 <sup>11</sup> OHM/in.

Material	Mechanical Properties			
	f <sub>t</sub> ksi (MPa)	f <sub>t</sub> ksi (MPa)	min. f <sub>t</sub> ksi (MPa)	min. f <sub>t</sub> ksi (MPa)
Standard HAS-E rod material meets the requirements of ISO 898 Class 5.8	58 (400)	72.5 (500)		
High Strength or 'Super HAS' rod material meets the requirements of ASTM A 193, Grade B7	105 (724)	125 (862)		
HIS-R Insert X5CrNiMo17122 K700 Stainless Steel conforming to DIN 17440	50.8 (350)	101.5 (700)		
HIS & HIT-I Insert 11SMnPb30+C Carbon Steel conforming to DIN 10277-3	54.4 (375)	66.7 (460)		
Stainless HAS Rod material meets the requirements of ASTM F 593 (AISI 304/316) Condition CW 3/8" to 5/8"	65 (448)	100 (689)		
Stainless HAS Rod material meets the requirements of ASTM F 593 (AISI 304/316) Condition CW 3/4" to 1-1/4"	45 (310)	85 (586)		
HIT-A Rod material ASTM A 36, 9SMNPB36K &/or 9SMN36K conforming to DIN 1651. Mechanical properties meet or exceed values for ASTM A 36	36 (248)	58 (400)		
HAS Super & HAS-E Standard Nut material meets the requirements of ASTM A 563, Grade DH				
HAS Stainless Steel Nut material meets the requirements of ASTM F 594				
HAS & HIT Standard and Stainless Steel Washers meet dimensional requirements of ANSI B18.22.1 Type A Plain				
HAS Stainless Steel Washers meet the requirements of AISI 304 or AISI 316 conforming to ASTM A 240				
HAS Super & HAS-E Standard Washers meet the requirements of ASTM F 436				
All HAS Super Rods (except 7/8"), HIT & HAS-E Standard, HIS inserts, Nuts & Washers are zinc plated to ASTM B 633 SC 1				
7/8" HAS Super Rods hot-dip galvanized in accordance with ASTM A 153				
HIT and HAS-E Nut material meets dimensional requirements of ASTM A 563, Grade A				
Note: Special Order threaded rods may vary from standard materials.				

### 4.2.4.3 Technical Data

#### HY 150 MAX Installation Specification Table for HAS Rods

HAS Rod Size		in.	3/8	1/2	5/8	3/4	7/8	1	1-1/4	
Details		(mm)	(9.5)	(12.7)	(15.9)	(19.1)	(22.2)	(25.4)	(31.8)	
d <sub>bit</sub> bit diameter <sup>1</sup>		in.	7/16	9/16	11/16	13/16	1	1-1/8	1-3/8	
h <sub>ef</sub> = h <sub>nom</sub> standard embedment <sup>2</sup>		in.	3-3/8	4-1/2	5-5/8	6-3/4	7-7/8	9	11-1/4	
		(mm)	(86)	(114)	(143)	(172)	(200)	(229)	(286)	
T <sub>max</sub> max. tightening torque	All Hilti	h <sub>ef</sub> ≥ h <sub>nom</sub>	ft lb (Nm)	18 (24)	30 (41)	75 (102)	150 (203)	175 (237)	235 (319)	400 (540)
	Threaded Rods	h <sub>ef</sub> < h <sub>nom</sub>	ft lb (Nm)	15 (20)	20 (27)	50 (68)	105 (142)	125 (169)	165 (224)	280 (375)
h minimum base material thickness <sup>3</sup>	h <sub>ef</sub> = h <sub>nom</sub>		in.	5-3/8	6-1/2	7-5/8	8-3/4	9-7/8	11-1/4	14-1/4
			(mm)	(136)	(165)	(195)	(222)	(250)	(286)	(362)
		h <sub>ef</sub> ≠ h <sub>nom</sub>	in.	1.0 h <sub>ef</sub> + 2	1.0 h <sub>ef</sub> + 2	1.0 h <sub>ef</sub> + 2	1.0 h <sub>ef</sub> + 2	1.0 h <sub>ef</sub> + 2	1.0 h <sub>ef</sub> + 2-1/4	1.0 h <sub>ef</sub> + 3
		(mm)	(51)	(51)	(51)	(51)	(51)	(51)	(57)	(76)



1 Use Hilti matched tolerance carbide tipped drill bits.

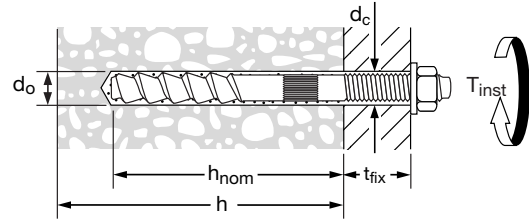
2 Data available for varying embedment depths, see load tables.

3 Minimum base material thickness given to avoid back side blowout during drilling process. Ability of base material to withstand loads applied (e.g. bending of concrete slab) should be determined by design engineer.

# HIT HY 150 MAX Adhesive Anchor 4.2.4

**HIT HY 150 MAX Installation Specification Table for HIT-TZ Rods**

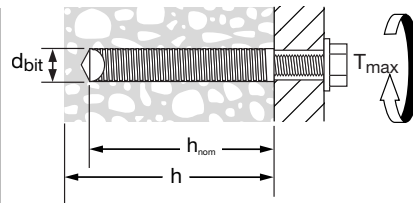
HIT-TZ Rod		in.	3/8	1/2	5/8	3/4
<b>Details</b>		(mm)	(9.5)	(12.7)	(15.9)	(19.1)
<b>d<sub>bit</sub></b>	bit diameter	in.	7/16	9/16	11/16	13/16
<b>h<sub>nom</sub></b>	standard depth of embedment <sup>1</sup>	in.	2-7/8	3-1/2	4	5-1/4
		(mm)	(73)	(89)	(102)	(133)
<b>l</b>	length of anchor	in.	4-1/2	5-11/16	7-1/16	8-9/16
		(mm)	(114.3)	(144.5)	(179.4)	(217.5)
<b>T<sub>max</sub></b>	max. tightening torque	ft lb	18	30	75	150
		(Nm)	(24)	(40)	(100)	(200)
<b>h</b>	min. base material thickness	in.	3-3/4	5-1/4	6	7-7/8
		(mm)	(95)	(133)	(152)	(200)
<b>h<sub>fix</sub></b>	max. thickness fastened	in.	1	1-1/2	2-1/4	2-1/4
		(mm)	(25.4)	(38.1)	(57.2)	(57.2)



1 For uncleaned holes in floor applications, add 3/8" (10 mm) to drilled hole depth.

**HIT HY 150 MAX Installation Specification Table for HIS Inserts**

HIS Insert		in.	3/8	1/2	5/8	3/4
<b>Details</b>		(mm)	(9.5)	(12.7)	(15.9)	(19.1)
<b>d<sub>bit</sub></b>	bit diameter	in.	11/16	7/8	1-1/8	1-1/4
<b>h<sub>nom</sub></b>	standard depth of embedment	in.	4 1/4	5	6-5/8	8-1/4
		(mm)	(110)	(127)	(168)	(210)
<b>ℓ<sub>th</sub></b>	usable thread length	in.	1	1-3/16	1-1/2	2
		(mm)	(25)	(30)	(38)	(51)
<b>T<sub>max</sub></b>	max. tightening torque	ft lb	18	35	80	160
		(Nm)	(24)	(47)	(108)	(217)
<b>h</b>	min. base material thickness	in.	6-3/8	7-1/2	10	12-3/8
		(mm)	(162)	(191)	(254)	(314)
Recommended Hilti Rotary Hammer Drill			TE 6, 16, 25, 35	TE 16, 25, 35, 46	TE 46, 56, 76	



**HIT HY 150 MAX Installation Specification Table for Rebar in Concrete**

Rebar Size:		No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10
<b>Details</b>									
<b>d<sub>bit</sub></b>	bit diameter <sup>1, 2</sup>	in.	1/2	5/8	3/4	7/8	1	1-1/8	1-3/8
									1-1/2

1 Rebar diameters may vary. Use smallest drill bit which will accommodate rebar.

2 Use Hilti matched tolerance carbide tipped drill bits.

**HIT HY 150 MAX Installation Specification Table for Metric Rebar in Concrete (Canada Only)**

Rebar Size:		10M	15M	20M	25M	30M	35M
<b>Details</b>							
<b>d<sub>bit</sub></b>	bit diameter <sup>1, 2</sup>	14 mm	3/4"	24mm	1-1/8"	37mm	1-9/16"

1 Rebar diameters may vary. Use smallest drill bit which will accommodate rebar.

2 Use Hilti matched tolerance carbide tipped drill bits.

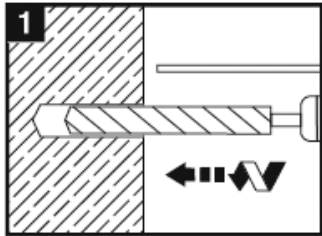
### Combined Shear and Tension Loading

$$\left( \frac{N_d}{N_{rec}} \right)^{5/3} + \left( \frac{V_d}{V_{rec}} \right)^{5/3} \leq 1.0 \quad (\text{Ref. Section 4.1.2.7})$$

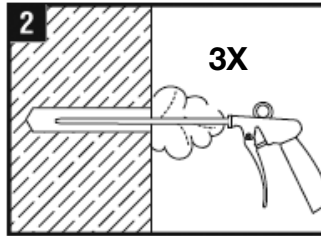
## 4.2.4 HIT HY 150 MAX Adhesive Anchor

### 4.2.4.4 Installation Instructions

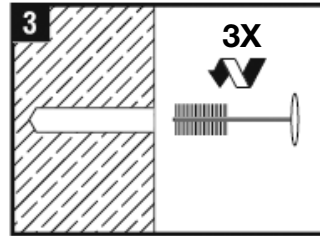
#### HAS Rod, Rebar and Insert Installation Instructions



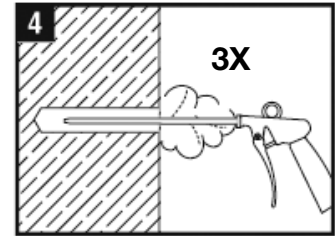
1. Drill anchor hole with a carbide bit.



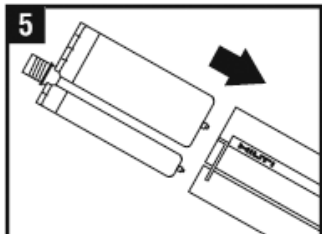
2. Insert air nozzle to bottom of hole and blow out all dust and debris from the hole using compressed air.\*



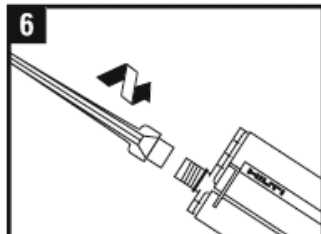
3. Clean hole with wire brush. Proper hole cleaning is essential.



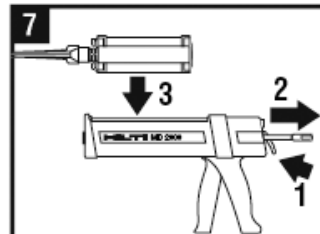
4. Insert air nozzle to bottom of hole and blow out all dust and debris from the hole using compressed air.



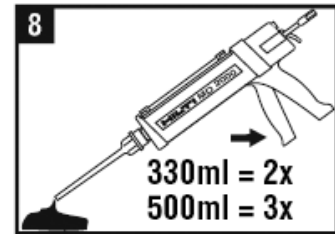
5. Put foil pack into foil pack holder. Remove cap covering threaded projection.



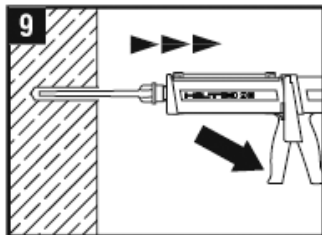
6. Screw on static mixer.



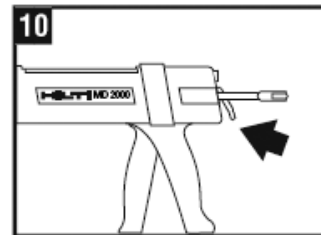
7. Put holder/ foil pack into appropriate dispenser.



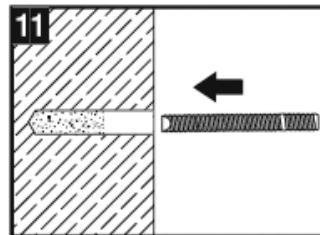
8. Discard first two trigger pulls of adhesive from each foil pack.



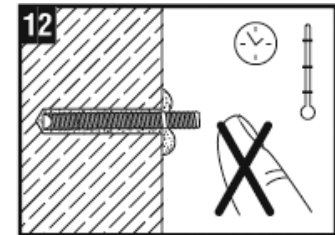
9. Inject adhesive into hole without forming air pockets starting at the bottom until 1/2 to 2/3 full. Use mixer filler tube extensions when needed to reach the hole bottom.



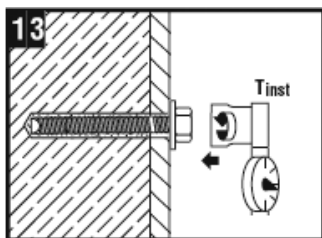
10. After injecting adhesive depressurize the dispenser by pressing the release button.



11. Insert rod, insert or rebar. Twist during installation. Fastener may be adjusted during specified gel time.



12. Do not disturb anchor between specified gel time and cure time.



13. Apply specified torque as required to secure items to be fastened. Do not exceed maximum torque specified.

\* For holes with standing water, holes must be flushed clean with water, brushed with a wire brush and again flushed clean with water or other means removing any debris or slurry in the hole. Standing water must be removed prior to performing the remainder of anchor installation.