

PROCEDURE FOR
INSTALLATION OF CONCRETE ANCHORS
FOR
LIGO VACUUM EQUIPMENT

Hanford, Washington

PREPARED BY:

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INSTALLATION MANAGER:

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PROJECT MANAGER:

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JAN 06 1998

Information contained in this specification and its attachments is proprietary in nature and shall be kept confidential. It shall be used only as required to respond to the specification requirements, and shall not be disclosed to any other party.

4	REL. 30/Dec/97	R.E.B. 1/5/98	ATTACH. A REVISED FOR RIGHT ARM EQUIPMENT, RE-RELEASED FOR CONSTR. DEO # 0587
3	R.O.C. 9/30/97	R.E.B. 9/30/97	ATT. A REVISED RE-RELEASED FOR CONSTR. DEO # 0551
2	REL. 55/SEP. 97	R.E.B. 9/5/97	RE-RELEASED FOR CONSTRUCTION DEO # 0548
1	REL. 21/1/97	R.E.B. 7/1/97	RELEASED FOR CONSTRUCTION PER DEO # 0537
0	-	-	ISSUED PER DEO 138 FOR 2DR

REV LTR.	BY-DATE	APPD. DATE	DESCRIPTION OF CHANGE
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PROCESS SYSTEMS INTERNATIONAL, INC.				PROCEDURE		
INITIAL APPROVALS	PREPARED	DATE	APPROVED	DATE	Number	Rev.
	R.O.C.	4/26/96	R.E.B.	4/26/96	V049-1-101 LIGO-E970139-04-V	4

Title:

CONCRETE ANCHOR INSTALLATION SPECIFICATION

- 4.2 Critical equipment shall be aligned per specifications V049-2-021 section 8.3 and V049-2-174 prior to drilling the anchor bolt hole. Critical equipment anchor bolt requirements are detailed in attachment A of this specification.
- 4.3 Locate and install anchor bolts in accordance with the this specification and the installation drawings. The hole location tolerance is +/- 1/16 in of position marked on concrete floor. Holes shall be plumb to within 1° of vertical. Embedment depths shown in this specification are minimum depths for the equipment listed. Drill holes using approved equipment to ensure full design bond strength and to maintain project cleanliness requirements. A Hilti PMH bit may be used to core drill holes for the HVA adhesive anchors. Rebar cutting is permitted.
- 4.4 Dwg. V049-4-243 shows the threaded rod installation.

Attachment "A" to this specification gives the locations of Hilti Standard HAS rod and Super HAS rod. For the Standard rod, both the locking nut and the leveling nut shown on Dwg. V049-4-243 shall conform to compatible nut material ASTM A563, Grade A. For the Super HAS rod, both the locking nut and the leveling nut shall conform to compatible nut material ASTM A563, Grade DH. Washer material shall conform to ASTM F436.

- 4.5 Adhere to curing time required by Hilti before loading or disturbing anchors.
- 4.6 Prior to placing grout, tighten nuts to the following torque:

3/4" – 175 ft. lbs.

1" rod - Super HAS rod – 100 ft. lbs.
Standard HAS rod – 100 ft. lbs.

A wrench on the leveling nut shall be used to react the torque.

- 4.7 After grout has cured, tighten nuts for 1" rod as follows:

Super HAS rod – 400 ft. lbs.

Standard HAS rod – 250 ft. lbs.

SPECIFICATION

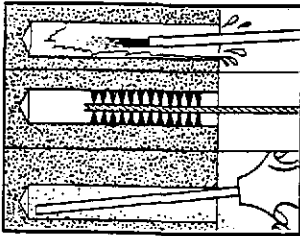
Number:	A V0491-101	Rev.	4
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Title:

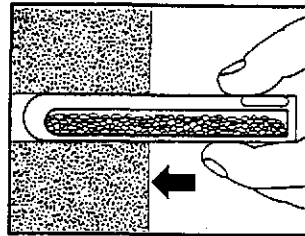
CONCRETE ANCHOR INSTALLATION SPECIFICATION

4.8 Step by step instructions:

Installation Instructions for HAS Rod



1. Set the drill depth gauge and hammer drill the hole to the required hole depth. **IMPORTANT:** Clean out dust and fragments; preferably using a jet of water, wire brush, and compressed air. The hole may be damp but the standing water should be blown out.



2. Insert appropriate diameter HEA adhesive capsule(s) into pre-drilled hole in base material. At minimum embedment depth, HAS rods and HFA inserts require one adhesive capsule equal in diameter to the nominal thread diameter.

Note: 1 1/4" HEA Capsules should be placed with the metal end cap into the hole.

Recommended Hilti Rotary Hammer Drill

Anchor Size

3/8"
1/2"
5/8"
3/4"
7/8"
1"
1 1/4"

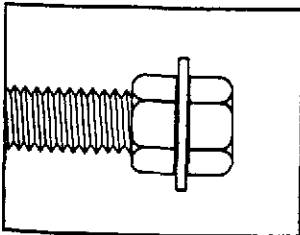
Drill

TE-15, 18M, 24
TE-18M, 24, 54, 74
TE-18M, 24, 54, 74
TE-54, 74
TE-54, 74
TE-74
TE-74

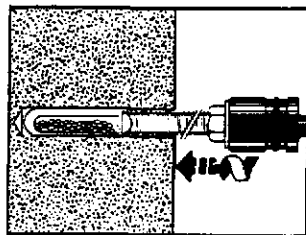
Note:

The TE-74 does not have sufficient power to set 1 1/4" HEA with embedment depths greater than 12". Contact your Field Engineer for details.

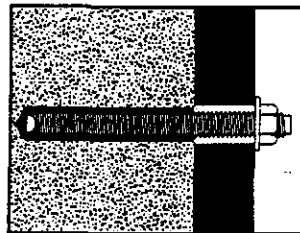
HAS Rod



3. HAS
Thread a nut on the HAS rod. Place a washer on top of the first nut and then thread a second nut down on top of the washer. Tighten the two nuts together "locking" the washer between them. The top nut should be flush with the top of the rod.



4. HAS
Insert square drive shaft into hammer drill. Attach proper impact socket. At the rotary hammer drill setting engage the top nut of the HAS rod assembly with the socket and drive the rod in to the embedment mark.



5. HAS
The set anchor rod may not be disturbed or loaded before the end of the specified curing time.

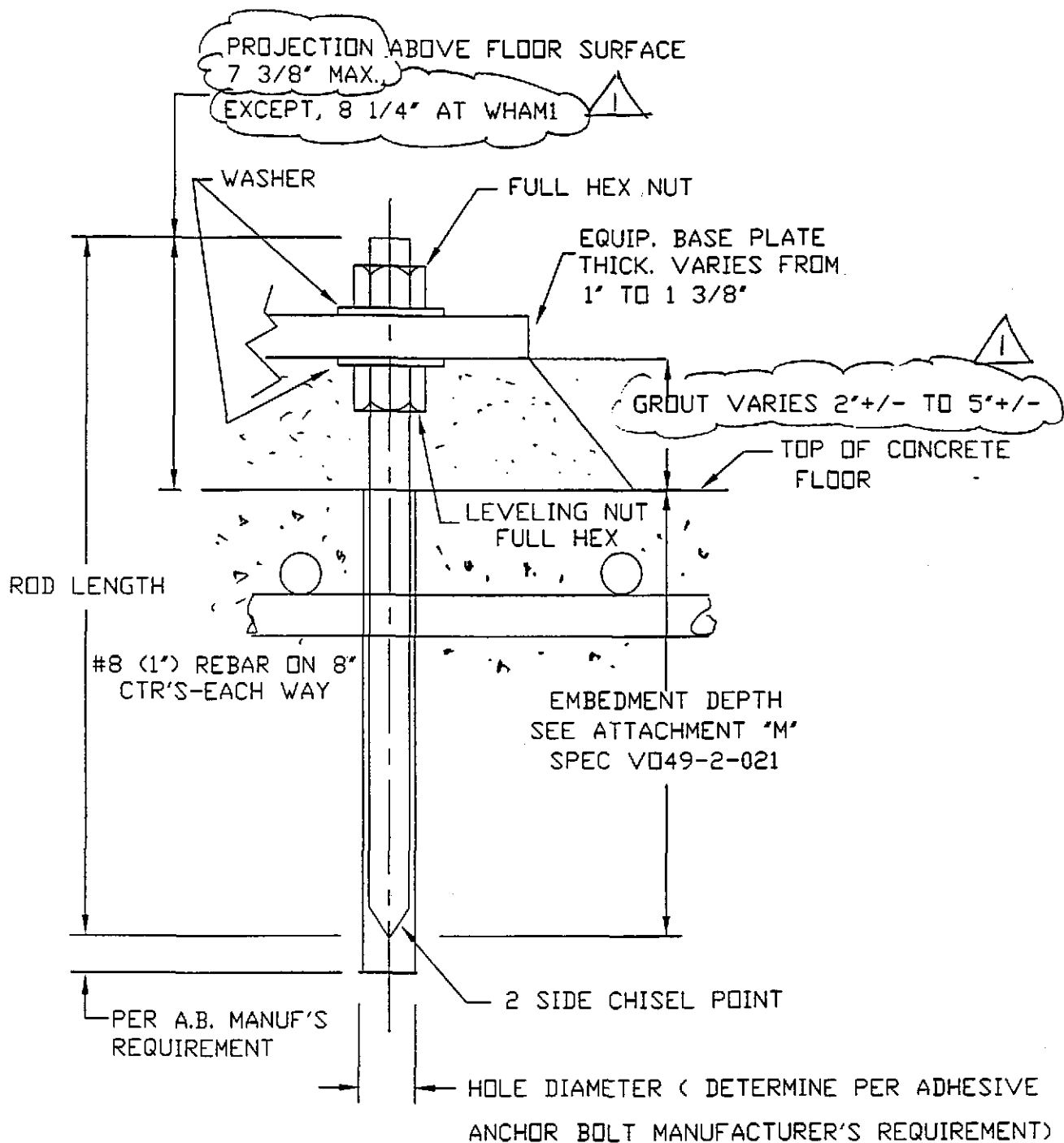
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TYPICAL VACUUM EQUIPMENT
CONCRETE ANCHOR DETAIL

REF INSTALLATION SPEC V049-2-021

SPEC V049-1-101

REV.	ISSUE DESCRIPTION	ENG.	CHKD	DRWN	DATE	DED#
1	ISSUED FOR CONSTRUCTION		RDC	REC	09/30/97	0551
0	ISSUED FOR CONSTRUCTION		REC	REC	09/05/97	0548



PROCESS SYSTEMS INTERNATIONAL INC.
20 WALKUP DR. WESTBOROUGH, MASSACHUSETTS 01581 USA

CONCRETE ANCHOR DETAIL
LARGE EQUIP. ADHESIVE TYPE
LIGO VACUUM EQUIPMENT

DO NOT SCALE THIS DWG.

CAD FILE V0494243	SIZE A	DWG. NO. V049-4-243	REV. 1
SCALE NONE	SHEET 5 OF 5		

ATTACHMENT "A" TO V049-1-101

REQUIRED CONCRETE ANCHORS FOR VACUUM EQUIPMENT

Component Tag No.	Anchor Diameter	Rod Length	Minimum Embedment Depth	Notes
WBSC1	1"	15 5/8"	8 1/4"	12
WBSC2	1"	15 5/8"	8 1/4"	12
WBSC3	1"	15 5/8"	8 1/4"	12
WBSC4	1"	15 5/8"	8 1/4"	12
WBSC5	1"	14 1/8"	8 "	
WBSC6	1"	14 1/8"	8 1/4"	
WBSC7	1"	19 3/4"	12 3/8"	8
WBSC8	1"	19 3/4"	12 3/8"	8
WBSC9	1"	8 ea -14 1/8"/8 ea -18 1/4"	8 "/12 1/8"	3A, 8
WBSC10	1"	8 ea -15 1/8"/ 8 ea -19 1/4"	8 1/4"/12 3/8"	3, 8
WHAM1	1"	20 ea -16 1/2"/4 ea -20 5/8"	8 1/4"/12 3/8"	4
WHAM2	1"	15 5/8"	8 1/4"	
WHAM3	1"	15 5/8"	8 1/4"	
WHAM4	1"	15 5/8"	8 1/4"	
WHAM5	1"	15 5/8"	8 1/4"	
WHAM6	1"	20 ea -15 5/8"/4 ea -19 3/4"	8 1/4"/12 3/8"	4
WHAM7	1"	20 ea -15 5/8"/4 ea -19 3/4"	8 1/4"/12 3/8"	4
WHAM8	1"	15 5/8"	8 1/4"	
WHAM9	1"	15 5/8"	8 1/4"	
WHAM10	1"	15 5/8"	8 1/4"	
WHAM11	1"	15 5/8"	8 1/4"	
WHAM12	1"	20 ea -15 5/8"/4 ea -19 3/4"	8 1/4"/12 3/8	4
WHAM13	Spare			
WCP1	1"	19 3/4"	12 3/8"	9
WCP2	1"	19 3/4"	12 3/8"	9
WCP3	1"	18 1/4"	12 3/8"	9
WCP4	1"	18 1/4"	12 3/8"	9
WCP5	1"	18 1/4"	12 1/8"	9A
WCP6	1"	18 1/4"	12 1/8"	9A
WCP7	1"	19 1/4"	12 3/8"	9
WCP8	1"	18 1/4"	12 3/8"	9
WGV1	3/4"	14"	6 5/8"	6
WGV2	3/4"	14"	6 5/8"	6
WGV3	3/4"	14"	6 5/8"	6
WGV4	3/4"	14"	6 5/8"	6

ATTACHMENT

Number:

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Rev.

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Title: INSTALLATION OF CONCRETE ANCHORS

Notes:

1. Install Hilti HVA anchors with HEA capsules and HAS standard rods, unless otherwise noted, in accordance with Specification V049-1-101.
2. This note deleted.
3. Use 12 3/8" minimum embedment for base plates at end of arm.
- 3A. Use 12 1/8" minimum embedment for (2) base plates at end of arm.
4. Use 12 3/8" minimum embedment for the four anchors at the end of the arm.
5. These gate valves are supported by others.
6. See Dwg. V049-4-034, for 48" gate valve anchor bolt locations.
7. See Dwg. V049-4-033 for 44" gate valve anchor bolt locations.
8. Use Hilti HAS Super Threaded Rod. Scarify floor.
9. Use Hilti HAS Super Threaded Rod with 12 3/8" embedment for all baseplates. Scarify floor.
- 9A. Use Hilti HAS Super Threaded Rod with 12 1/8" embedment for all baseplates. Scarify floor.
10. No grout pad. Shim if necessary.
11. Scarify floor at baseplates connected to diagonal members.
12. Scarify floor.
13. Use Hilti HAS Super Threaded Rod for baseplates connected to diagonal members. Scarify floor for these baseplates.

ATTACHMENT

Number:

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