CALDYN
CALIFORNIA DYNAMICS CORP.
5572 ALHAMBRA AVENUE,
LOS ANGELES, CA 90032
PH (323) 223 3882 FX (323) 223 7941
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"CALL US - TO SET THINGS RIGHT"

JOB NAME: OCDH PHARMACY DISTRIBUTION SHELL

CLIENT NAME: BAY CITY ELECTRIC WORKS

DATE:	PRP. BY.:	CALDYN JOB #:
	SS	

SEISMIC CALCULATION WORKSHEET

BUILDING CODE: CBC-2019

SEISMIC DESIGN		BLDG. ELEVATION / EQUIP. LOCATION	
S_{ds} =	0.485		
I_p =	1	h =	100 ft
a_p =	1	**z =	0 ft
R_p =	2.5	** Assume worst case location.	
Ω_o =	2.0		

a_p, R_p, Ω_o per ASCE 7-16

☐ 100 ft. RF
☐
☒ 0 ft. GF or below ground

LOAD COMBINATION
LRFD
(0.9 DL + 1.00 E)

EQUIPMENT TAG: GENSET PACKAGE

ANCHORAGE TO CONCRETE

SHT. NUMBER: 1 OF 1

F_p calculated as per ASCE 7-16 (chapter 13)

$$F_p = \frac{0.4 a_p S_{DS} W_p}{\left(\frac{R_p}{I_p}\right)}\left(1 + 2\frac{z}{h}\right) \quad (13.3\text{-}1)$$

F_p is not required to be taken as greater than

$$F_p = 1.6 S_{DS} I_p W_p \quad (13.3\text{-}2)$$

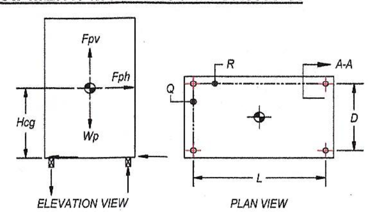
and F_p shall not be taken as less than

$$F_p = 0.3 S_{DS} I_p W_p \quad (13.3\text{-}3)$$

where

F_p = seismic design force
S_{DS} = spectral acceleration, short period, as determined from Section 11.4.4
a_p = component amplification factor that varies from 1.00 to 2.50 (select appropriate value from Table 13.5-1 or 13.6-1)
I_p = component importance factor that varies from 1.00 to 1.50 (see Section 13.1.3)
W_p = component operating weight

EQUIPMENT/ MOUNTING LOCATIONS:



W_p =	max. operating weight	=	83820 lbs.
L =	mounting length	=	330 in.
D =	mounting width	=	135 in.
H_{cg} =	Vertical c.o.g.	≈	56 in.
R =	Anchor qty. along length	=	7
Q =	Anchor qty. along width	=	2
N =	Min. anchor qty.	=	14

NOTES/ REMARKS:

REGISTERED PROFESSIONAL ENGINEER
AMIRSOLAIMANY SAID
NO. C037835
CIVIL
STATE OF CALIFORNIA

APPLIED SEISMIC FORCE/ CALCULATIONS:

F_p / W_p = (0.4 x a_p x S_{ds} x (1 + (2 x (z / h))) / (R_p / I_p) = 0.08

F_p / W_p = 0.15g ; $F_{p,min} / W_p$ = 0.3 x S_{ds} x I_p = 0.15 ; $F_{p,max} / W_p$ = 1.6 x S_{ds} x I_p = 0.78

F_{ph} = Applied Lateral Seismic Force = 2.0 x 0.15g x W_p .... = **25146 lbs.** *WORST CASE

F_{pv} = Vertical component of seismic force = 1.0 x 0.2 x S_{ds} x W_p .... = **8131 lbs.** *WORST CASE

CALCULATE PULLOUT LOAD DUE TO OVERTURNING (WORST CASE)

CASE 1: SEISMIC LOAD APPLIED ALONG X-X DIRECTION

M_{OTX} = Overturning moment = (F_{ph} x H_{cg}) + (F_{pv} x (D / 2)) .... = 1957019 lb.-in.

M_{RX} = Resisting moment = (0.9 x W_p x (D / 2)) .... = 5092065 lb.-in.

T_{netx} = Pullout load/ mtg. pt. = (M_{OTX} - M_{RX}) / (R x D) .... = -3318 lbs.

CASE 2: SEISMIC LOAD APPLIED ALONG Y-Y DIRECTION

M_{OTY} = Overturning moment = (F_{ph} x H_{cg}) + (F_{pv} x (L / 2)) .... = 2749791 lb.-in.

M_{RY} = Resisting moment = (0.9 x W_p x (L / 2)) .... = 12447270 lb.-in.

T_{nety} = Pullout load/ mtg. pt. = (M_{OTY} - M_{ry}) / (Q x L) .... = -14694 lbs.

T_{net} = -3318 lbs. <<<---Tension demand T_{anch} = 1.0 x T_{net} = 0 lbs.

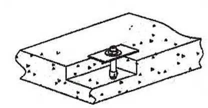
CALCULATE SHEAR LOAD (WORST CASE)

V_{net} = Shear load/ anchor = F_{ph} / N = 1797 lbs. V_{anch} = 1.0 x V_{net} = 1797 lbs.

ANCHORAGE REQUIREMENTS (PER ICC ESR-3814):

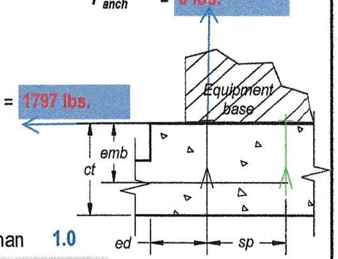
(14) 7/8"Ø HILTI HIT RE 500 V3 HAS R 316 STNLS STL

emb =	min. Eff. Embedment	=	3 1/2 in.
ed =	min. edge distance	=	5 in.
ct =	concrete thickness	=	6 in.
$f'c$ =	Concrete strength	=	4000 psi NORMAL Weight Concrete
T_{cap} =	Tension capacity	=	4577 lbs. LRFD
V_{cap} =	Shear capacity	=	2869 lbs. LRFD



T_{anch} = 0 lbs.

V_{anch} = 1797 lbs.



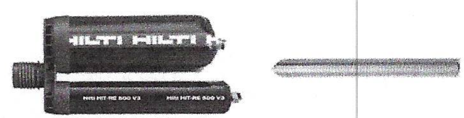
CHECK ANCHORAGE: (T_{anch} / T_{cap})$^{5/3}$ + (V_{anch} / V_{cap})$^{5/3}$ must be less than 1.0

((0 lbs. / 4577 lbs.)$^{5/3}$ + (1797 lbs. / 2869 lbs.)$^{5/3}$) = 0.46 < 1.0 **PASS** www.hilti.com

Company:		Page:	1
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Concrete -STNDRD	Date:	4/27/2023
Fastening point:			

Specifier's comments:

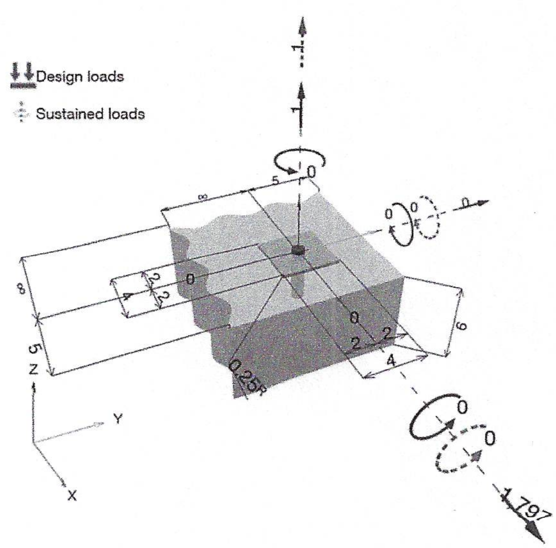
1 Input data



Anchor type and diameter:	**HIT-RE 500 V3 + HAS-R 304/316 SS 7/8**
Item number:	2045013 HAS-R 316 SS 7/8"x10" (element) / 2123401 HIT-RE 500 V3 (adhesive)
Effective embedment depth:	$h_{ef,opti}$ = 3.500 in. ($h_{ef,limit}$ = 4.000 in.)
Material:	ASTM F 593
Evaluation Service Report:	ESR-3814
Issued I Valid:	1/1/2023 | 1/1/2025
Proof:	Design Method ACI 318-14 / Chem
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.250 in.
Anchor plate^R :	l_x x l_y x t = 4.000 in. x 4.000 in. x 0.250 in.; (Recommended plate thickness: not calculated)
Profile:	no profile
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 6.000 in., Temp. short/long: 32/110 °F
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition B, shear: condition B; no supplemental splitting reinforcement present edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d)) Shear load: yes (17.2.3.5.3 (c))

^{R} - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



2 Proof I Utilization (Governing Cases)

		Design values [lb]		Utilization	
Loading	Proof	Load	Capacity	β_N / β_V [%]	Status
Tension	Sustained Tension Load Bond Strength	1	4,577	1 / -	OK
Shear	Concrete edge failure in direction x+	1,797	2,869	- / 63	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	0.000	0.626	5/3	46	OK

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!