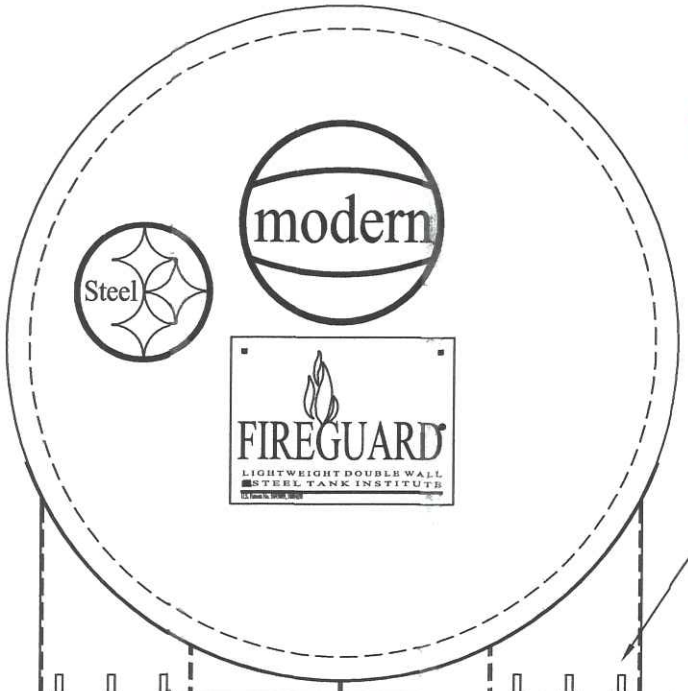
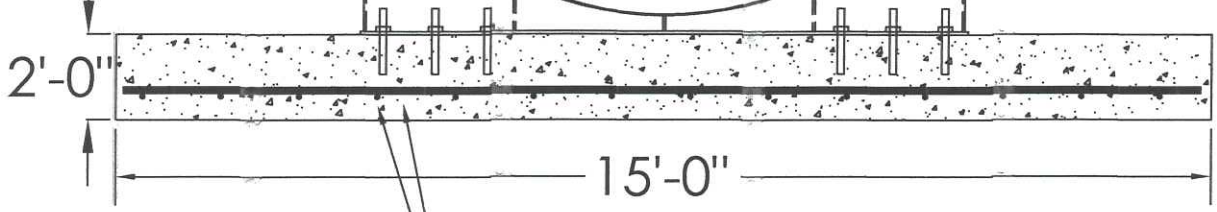
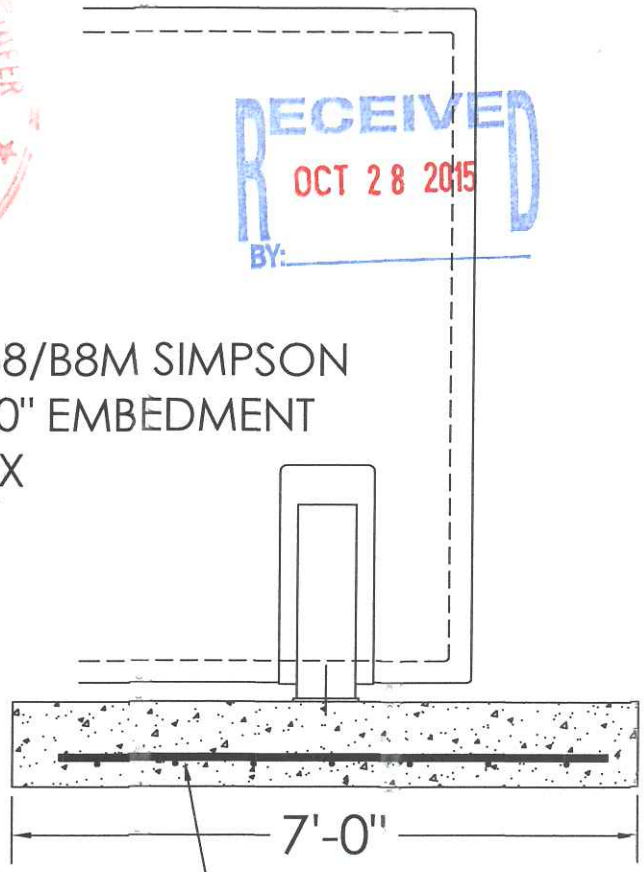


REGISTERED PROFESSIONAL ENGINEER
MARK T. CHIN
No. 2515
exp 3/31/16
STRUCTURAL
STATE OF CALIFORNIA

RECEIVED
OCT 28 2015
BY:

1" A193 GR. B8/B8M SIMPSON SET-XP WITH 10" EMBEDMENT TYPICAL OF SIX PER SADDLE





#5 REBAR ON 12" CENTERS BOTH WAYS

2500 psi CONCRETE

NOTE: THIS FOOTING IS DESIGNED FOR MODERN WELDING FIREGUARD TANKS ONLY
AND IS NOT DESIGNED TO WORK WITH ANY OTHER MANUFACTURER'S PRODUCT.

FOUNDATION NOTES:

MEETS 2013 CBC
MEETS 2012 IBC
SEISMIC Ss = 310%
110 MPH WIND, EXPOSURE C
OCCUPANCY CATEGORY: 3
ALLOWABLE SOIL BEARING = 1000 PSF
f'c = 2500 PSI
Fy = 40 KSI

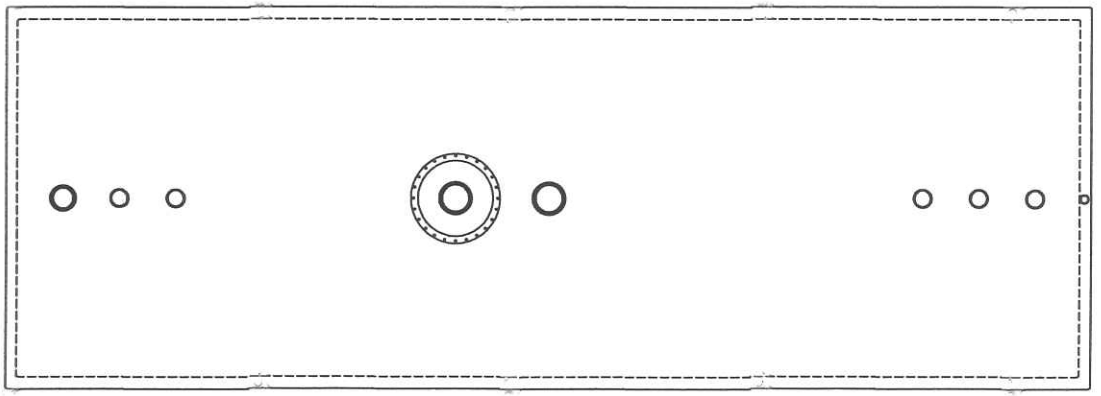
modern welding company of california, in
4141 N. BRAWLEY AVE FRESNO, CA 93722
PH. 559-275-9353 FAX 559-275-4381

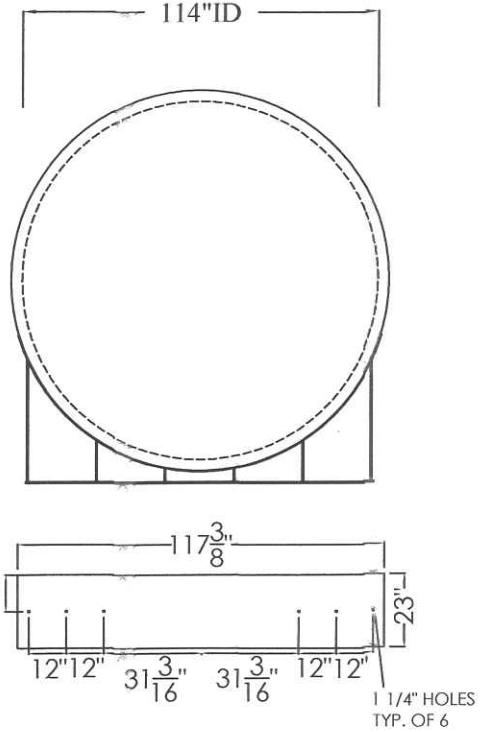
TANK FOOTINGS
15,000 GALLON MODERN FIREGUARD

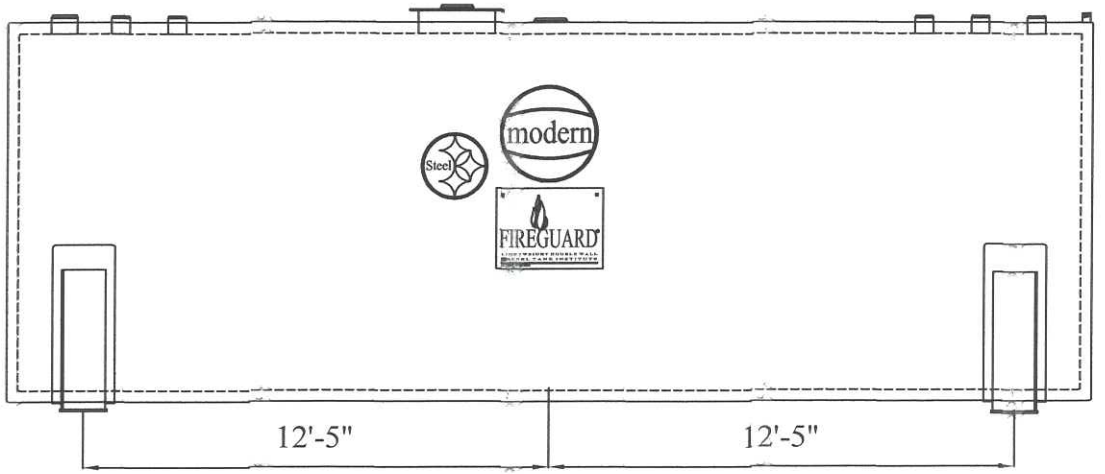
DWN. BY	JC	DATE 10/22/15	SCALE: NONE
CHK. BY		JOB NO.	DWG. NO.
APR. BY		P.O. NO.	SHT. NO. 1 OF 1

MEETS 2013 CBC
MEETS 2012 IBC

INNER TANK: PER U.L.
OUTER TANK: PER U.L.







REGISTERED PROFESSIONAL ENGINEER
MARK T. CHAN
No. 2515
Exp 3/31/16
STRUCTURAL
STATE OF CALIFORNIA

SIZE	O.D.	LENGTH	WEIGHT
15,000	121"	28'-11"	39,000#

NO. REQD.: ONE (1) | ITEM NO.: FG15000

modern welding company of california, inc.
4141 N. BRAWLEY AVE FRESNO, CA 93722
PH. 559-278-9353 FAX 559-275-4381

U.L. 2085 FIREGUARD 15,000 GALLON ABOVEGROUND TANK

DWN. BY	JC	DATE 10/12/15	SCALE: NONE
CHK. BY		JOB NO.	DWG. NO.
APR. BY		P.O. NO.	SHT. NO. 1 OF 1

15,000 GALLON TANK FOUNDATION

FILE NO: 15000-110C-3.100-3-1.6-2.5-40 DATE: 10/19/2015
DESIGNED BY: MARK T. CHIN JOB NO: 115-115

2013 CBC (2012 IBC) 110 MPH WIND, EXPOSURE C SEISMIC Ss = 310%
OCCUPANCY CATEGORY: 3 SUBSTANTIAL HAZ f'c = 2500 PSI
ALLOW. SOIL BEARING = 1600 PSF REBAR Fy = 40 KSI

WT. TANK = 39.0 K OUT.DIAM. = 121 IN
WT. CONTENTS = 125.1 K S.G. = 1.00 O.A.LENGTH = 28 FT 11 IN
HT.TO C.G.= 64.5 IN
TOTAL WT.(W) = 164.1 K

WIND: qz = 28.8 G = 0.85 Cf = 0.5 PSF I = 1.15
F = qz * G * Cf * Af = 12.2 PSF * DIA * LGTH = 3.6 K
Mot = F * HT. TO C.G. / 12 = 19.2 FT-K

SEISMIC: Sds = 2.067 I = 1.25
V = 0.3 * Sds * W * I = 127.2 K * 0.7 = 89.0 K
Mot = V * HT.TO C.G. / 12 = 478.5 FT-K (SEISMIC CONTROLS)

TRY FOOTING: 7.00 FT WIDE A = 105.00 FT^2
15.00 FT LONG S = 262.50 FT^3
2.00 FT DEEP d = 20.38 IN

WT. FTG. = .15 * W * L * D = 31.50 K

P / A = [(W / 2) + WT.FTG.] / A = 1.08 KSF

M / S = [Mot / 2] / S = 0.91 KSF

P / A ± M / S = Qmax = 1.99 KSF <= 1.33 (1.60) = 2.13 KSF OK
= Qmin = 0.17 KSF >= 0 (NO UPLIFT) OK

$\bar{Q}u$ = [1.2 * (P / A) + 1.4 * (M / S)] / 0.9 = 2.86 KSF

SADDLE LGTH. = 9.78 FT MOMENT ARM1 (long.) = 2.61 FT
SADDLE WIDTH = 1.92 FT MOMENT ARM2 (lat.) = 2.54 FT

$\bar{M}u$ (long.) = $\bar{Q}u$ * ARM1^2 / 2 = 9.74 FT-K/FT

$\bar{M}u$ (lat.) = $\bar{Q}u$ * ARM2^2 / 2 = 9.24 FT-K/FT

m = fy / (0.85 * f'c) = 18.82

Ru = $\bar{M}u$ * 12 / (b * d^2) = 23 PSI

ρ = [1 - $\sqrt{1 - (2 * m * Ru / fy)}$] / m = 0.0006

As = ρ * b * d = 0.144 IN^2/FT

5 @ 12 IN O.C. = 0.310 IN^2/FT OK

REGISTERED PROFESSIONAL ENGINEER
MARK T. CHIN
No. 2515
EXP 3/31/16
STRUCTURAL
STATE OF CALIFORNIA

USE FOOTING 7'-0" WIDE x 15'-0" LONG x 2'-0" DEEP W/ # 5 @ 12" O.C. EA. WAY

TOP & BOTTOM

SIMPSON Strong-Tie® Anchor Designer™ Software
Version 2.3.5332.51

Company:	Mark T. Chin Engineering	Date:	10/19/2015
Engineer:	Mark T. Chin	Page:	1/4
Project:	115-115		
Address:			
Phone:			
E-mail:			

1.Project information

Customer company: Modern Welding
Customer contact name:
Customer e-mail:
Comment:

Project description: 15,000 gallon tank

Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-11
Units: Imperial units

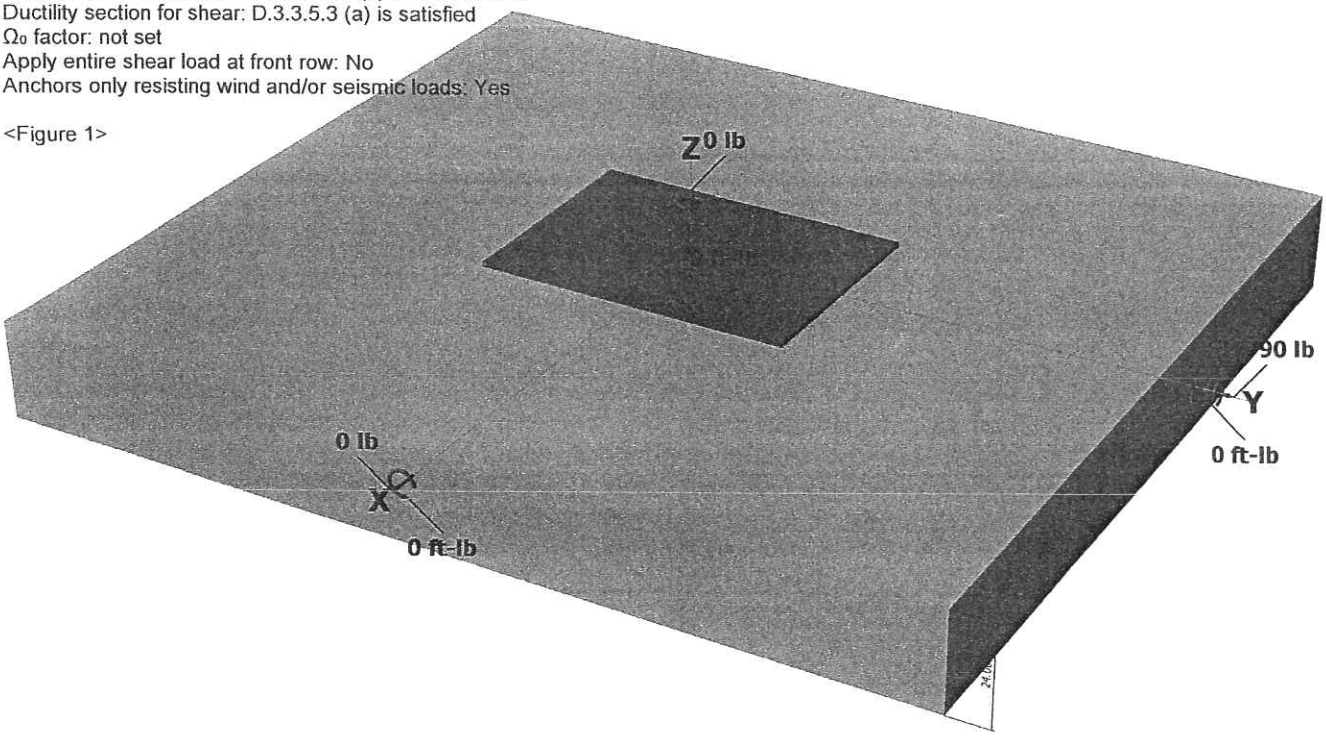
Anchor Information:
Anchor type: Bonded anchor
Material: A193 Grade B8/B8M (304/316SS)
Diameter (inch): 1.000
Effective Embedment depth, h_{ef} (inch): 10.000
Code report: ICC-ES ESR-2508
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 15.00
c_{ac} (inch): 14.43
C_{min} (inch): 1.75
S_{min} (inch): 3.00

Load and Geometry
Load factor source: ACI 318 Section 9.2
Load combination: not set
Seismic design: Yes
Anchors subjected to sustained tension: No
Ductility section for tension: D.3.3.4.3 (a) 3-6 is satisfied
Ductility section for shear: D.3.3.5.3 (a) is satisfied
Ω_0 factor: not set
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: Yes

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 24.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.2
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Do not evaluate concrete breakout in tension: No
Do not evaluate concrete breakout in shear: No
Hole condition: Dry concrete
Inspection: Continuous
Temperature range: 1
Ignore 6do requirement: Not applicable
Build-up grout pad: No

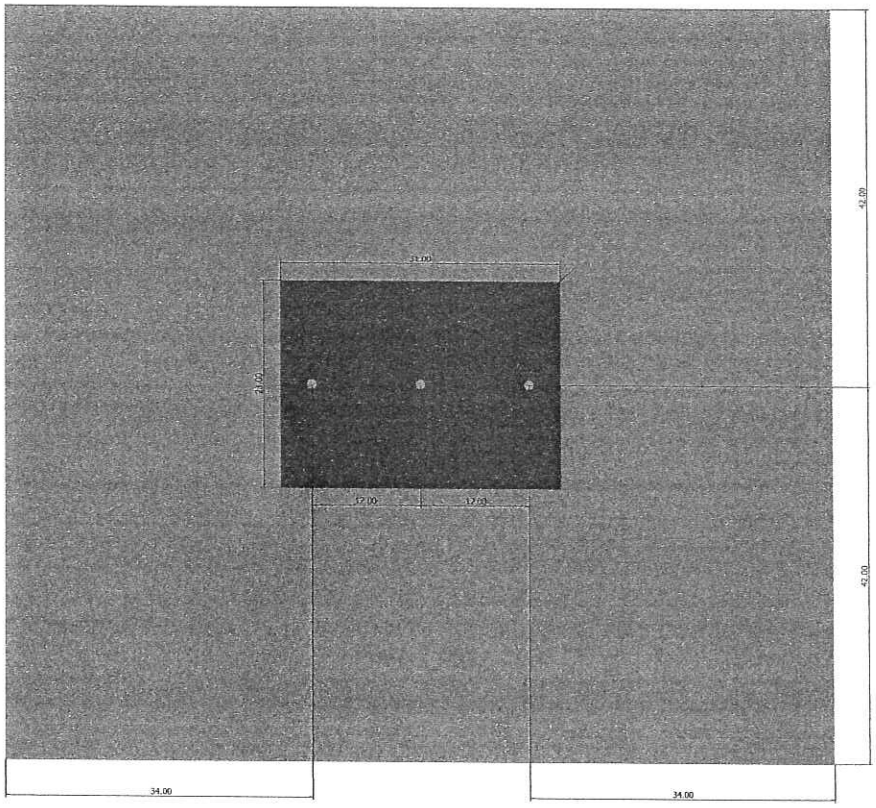
Base Plate
Length x Width x Thickness (inch): 23.00 x 31.00 x 0.50

<Figure 1>



Company:	Mark T. Chin Engineering	Date:	10/19/2015
Engineer:	Mark T. Chin	Page:	2/4
Project:	115-115		
Address:			
Phone:			
E-mail:			

<Figure 2>



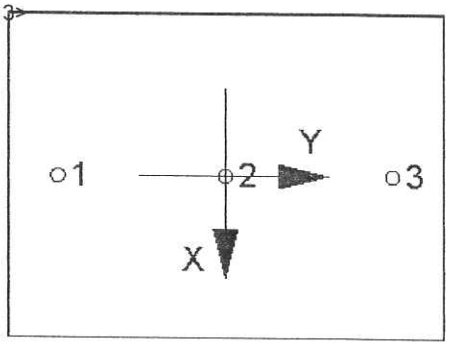
Recommended Anchor
Anchor Name: SET-XP® - SET-XP w/ 1"Ø A193 Gr. B8/B8M (304/316SS)
Code Report Listing: ICC-ES ESR-2508

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	0.0	0.0	10596.7	10596.7
2	0.0	0.0	10596.7	10596.7
3	0.0	0.0	10596.7	10596.7
Sum	0.0	0.0	31790.0	31790.0

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 0
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



8. Steel Strength of Anchor in Shear (Sec. D.6.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\alpha_{V,seis}$	$\phi_{grout}\alpha_{V,seis}\phi V_{sa}$ (lb)
20725	1.0	0.65	0.83	11181

9. Concrete Breakout Strength of Anchor in Shear (Sec. D.6.2)

Shear perpendicular to edge in y-direction:

$V_{by} = \min|7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5};\ 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. D-33 & Eq. D-34)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
8.00	1.00	1.00	2500	28.00	66673

$\phi V_{cby} = \phi\,(A_{Vc} / A_{Vco})\,\Psi_{ed,V}\,\Psi_{c,V}\,\Psi_{h,V}V_{by}$ (Sec. D.4.1 & Eq. D-30)

A_{Vc} (in²)	A_{Vco} (in²)	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cby} (lb)
2016.00	3528.00	1.000	1.200	1.323	66673	0.70	42336

Shear parallel to edge in y-direction:

$V_{bx} = \min|7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5};\ 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. D-33 & Eq. D-34)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
8.00	1.00	1.00	2500	22.67	48562

$\phi V_{cbgy} = \phi\,(2)(A_{Vc} / A_{Vco})\,\Psi_{ec,V}\,\Psi_{ed,V}\,\Psi_{c,V}\,\Psi_{h,V}V_{bx}$ (Sec. D.4.1 & Eq. D-31)

A_{Vc} (in²)	A_{Vco} (in²)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgy} (lb)
2208.00	2312.00	1.000	1.000	1.200	1.190	48562	0.70	92736

10. Concrete Pryout Strength of Anchor in Shear (Sec. D.6.3)

$\phi V_{cpg} = \phi \min|k_{cp}N_{ag};\ k_{cp}N_{cbg}| = \phi \min|k_{cp}(A_{Na} / A_{Na0})\,\Psi_{ec,Na}\,\Psi_{ed,Na}\,\Psi_{cp,Na}N_{ba};\ k_{cp}(A_{Nc} / A_{Nco})\,\Psi_{ec,N}\,\Psi_{ed,N}\,\Psi_{c,N}\,\Psi_{cp,N}N_b|$ (Eq. D-41)

k_{cp}	A_{Na} (in²)	A_{Na0} (in²)	$\Psi_{ed,Na}$	$\Psi_{ec,Na}$	$\Psi_{cp,Na}$	N_{ba} (lb)	N_a (lb)
2.0	1136.16	565.45	1.000	1.000	1.000	19509	39200

A_{Nc} (in²)	A_{Nco} (in²)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	N_{cb} (lb)	ϕ
1620.00	900.00	1.000	1.000	1.000	1.000	26879	48383	0.70

ϕV_{cpg} (lb)
54880

11. Results

Interaction of Tensile and Shear Forces (Sec. D.7)

Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status
Steel	**10597**	**11181**	**0.95**	**Pass (Governs)**
T Concrete breakout y+	31790	42336	0.75	Pass
|| Concrete breakout x-	31790	92736	0.34	Pass
Pryout	31790	54880	0.58	Pass

SET-XP w/ 1"Ø A193 Gr. B8/B8M (304/316SS) with hef = 10.000 inch meets the selected design criteria.

12. Warnings

- Concrete compressive strength used in concrete breakout strength in tension, adhesive strength in tension and concrete pryout strength in shear for SET-XP adhesive anchor is limit to 2,500 psi per ICC-ES ESR-2508 Section 5.3.

- Per designer input, ductility requirements for shear have been determined to be satisfied – designer to verify.

- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.