JAIK CHOI & ASSOCIATES

Structural Engineering
1215 PORTSIDE WAY
CORONA DEL MAR, CA 92625
(949)706-7789 Fax (424)239-2666
email:jcse@msn.com

Structural Calculations for

Seismic Restraint System for
Ground Supported Flat Bottom Snyder Tanks (S.G.=1.5 & 1.9)

Prepared for

Snyder Industries, Inc.

Design Criterion

1. Codes ; International Building Code 2012 Edition.
   ; California Building Code 2013 Edition. (ASCE 7.10)
   ; AISC 13th Edition.
2. Steel : ASTM A-36 for angles & plates.
3. Cable ; 7x19 Galv. Steel or Type 304 or 316 S.S.
4. Bolts ; Hilti HAS-E Rod Standard or equal
5. Epoxy Adhesive ; Hilti HIT-RE500SD
6. Concrete ; f'c = 4,000 psi @ 28 days for footings.
7. Reinforcing ; ASTM A615-60
8. Soil ; Assumed minimum allowable bearing value = 1,500 psf @ 12" depth

Appendix

1. Tank Data and Calculations for Anchorage types
2. Calculations for Capacity of Connectors
3. Anchor Bolts ICC Report (ESR-2322)

Jaik Choi Associates
Structural Engineering
(949)706-7789, Fax;(424)239-2666
email;jcse@msn.com

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By; J. Choi

SII Vertical Ground Supported Tanks (flat bottom)

A) Design Lateral Loads Calculations

Per 2012 IBC/2013 CBC Code (ASCE 7-10 Sect 15.7.6)

1) Seismic loads **Seismic Design Category "D"**

Design Seismic Coeff. Zip Code **92701** (Santa Ana, CA)

Site Class	**C**	ASCE 7 Table 20.3-1
Input Fa	1.00	ASCE 7 Table 11.4-1
Input Fv	1.50	ASCE 7 Table 11.4-2
Input Ss	**1.40**	2003 NEHRP (USGS Web)
Input S1	**0.50**	2003 NEHRP (USGS Web)
Input I	1.5	ASCE 7-Table 1.5-2
Input R	3.0	ASCE 7-Table 15.4-2

Hc; Height of tank content
Hr;Height of tank roof
Ht; Height of tank top
Dt; Diameter of tank
We; Empty Weight of tank
Wc; Content Weight in tank
Wt; Total Weight of tank
SG; Specific Gravity
Pw; Wind Load

Critical Tank Data (Part # 5380) 16,500 gals.

Max. Hr	20.41	ft.
Max. D	11.83	ft.
We	5600	lbs
Wc	261271	lbs
S.G.	**1.9**	

3.68H/D = 6.35 Tanh(3.68H/D)= **1.00** **manually**
Tc=2*phi*(D/3.68g*tanh(3.68H/D))^.5 = 1.98 sec.

Sms =Fa*Ss =	1.400				
Sm1 =Fv*S1 =	0.750				
Sds =2*Sms/3=	0.933	= Sai	Sloshing p	**25** %	Conservatively
Sd1 =2*Sm1/3=	0.500				
Ts =Sd1/Sds=	0.54	sec.			
Sac=1.5Sd1/Tc=	0.38				
Vi =Sai*I*Wi/R=	0.467	Wi	Wi = We+0.75*Wc	377911	lbs.
Vc =Sac*I*Wc/1.5=	0.378	Wc	Wc = .25*Wc/100	124104	lbs.

Seismic Load = (Vi*Wi+Vc*Wc)/(We+Wc*S.G.) = **0.445** W

Design Load Fp (seis.) = 0.445 W per 2012 IBC/2013 CBC Code governs

2) Wind loads **150 mph** **Exposure "C"**

Desgin loads = Wind = Qz =.00256KzKztKdV^2I ASCE 7 EQ. 27.3-1
Qz = 46.51 psf

Design Wind Coeff.

Input	Kz	0.85	ASCE 7 Table 27.3-1
Input	Kzt	1.00	ASCE 7 Figure 26.8-1
Input	Kd	0.95	ASCE 7 Table 26.6-1
Input	I	1.00	ASCE 7-Table 1.5-2 (RISK III)

Pw = Qz*Tank Dia.*Ht
Mot = Pw*Ht/2
Up or Down Ld./conn. = Mot/Dt
Uplift/conn.= Up Ld.- .5*We

B) Tank Data and Anchorage types

See Section "D" (the Calculations for the Capacity of Anchorages at Concrete)

Jaik Choi Associates
Structural Engineering
(949)706-7789, Fax;(424)239-2666
email;jcse@msn.com

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1) BASE ANCHORAGE

INPUT PARAMETERS | **ANCHORAGE CONN.**

PART NUMBER	TANK SIZE (GAL.)	TANK DIA. (FT.)	Hc (FT.)	Hr (FT.)	Ht (FT.)	We (LBS.)	Wc (LBS.)	**Wind** Pw (LBS.)	CONN. TYPE	**SEIS.** (SG=1.5) (LBS.)	CONN. TYPE	**SEIS.** (SG=1.9) (LBS.)	CONN. TYPE
153--	22	1.46	1.77	1.80	1.90	9	183	129		289		365	
H15401--	30	1.88	1.54	1.58	1.69	15	250	148		398		504	
H15407--	50	1.88	2.75	2.79	2.90	25	417	254		663		839	
5680--	55	1.83	2.96	3.04	3.29	26	458	280		726		919	
155--	65	1.94	3.35	3.42	3.63	28	542	328		855		1082	
5690--	90	2.50	2.60	2.70	2.98	43	750	347		1189		1506	
8010--	110	2.75	2.42	2.59	3.08	33	917	394		1425		1805	
H15402--	120	2.67	2.92	2.99	3.18	40	1000	395		1560		1976	
5700--	120	2.50	3.46	3.55	3.83	50	1000	445		1575		1995	
5710--	150	2.50	4.33	4.43	4.71	58	1250	548		1962		2485	
H15404--	190	3.50	2.71	2.89	3.42	50	1583	557		2450		3104	
H15403--	200	3.01	3.97	4.15	4.68	80	1667	655		2620		3319	
154--	200	3.33	3.52	3.61	3.88	63	1667	601		2595		3287	
8020--	200	2.75	4.50	4.66	5.12	50	1667	655		2575		3262	
5720--	200	3.00	3.96	4.05	4.33	68	1667	604		2602		3296	
5730--	250	3.00	4.94	5.03	5.31	79	2084	741		3243		4108	
5740--	275	3.50	4.00	4.10	4.38	96	2292	713		3582		4537	
H16302--	290	3.50	4.08	4.25	4.75	100	2417	773		3775		4782	
H16301--	300	3.01	5.87	6.05	6.58	100	2500	921		3900		4940	
8030--	300	2.75	7.00	7.17	7.67	85	2500	981		3878		4912	
163--	300	2.92	6.00	6.11	6.43	65	2500	873		3848		4874	
8040--	300	3.83	3.42	3.55	3.92	75	2500	698		3863		4893	
5750--	330	3.50	4.79	4.89	5.17	108	2750	842		4287		5430	
H16303--	330	4.00	3.63	3.80	4.30	90	2750	800		4260		5396	
5760--	360	4.00	4.00	4.10	4.38	116	3000	815		4674		5920	
174--	400	3.75	4.88	4.96	5.19	90	3334	905		5135		6505	
5770--	440	4.00	4.88	4.97	5.25	130	3667	977		5695		7214	
5780--	500	4.00	5.69	5.74	5.90	141	4167	1098		6461		8184	
H18001--	500	3.98	5.41	5.58	6.07	125	4167	1124		6438		8155	
180--	550	4.00	5.79	5.89	6.18	110	4584	1150		7041		8918	
167--	550	5.33	3.04	3.20	3.67	90	4584	910		7011		8880	
182--	550	5.33	3.13	3.31	3.83	100	4584	949		7026		8899	
8060--	550	5.33	3.00	3.14	3.54	100	4584	878		7026	4-2A	8899	4-2A
H17001--	700	3.98	7.53	7.71	8.26	180	5834	1529		9021		11426	
H17002--	710	5.00	5.00	5.17	5.67	170	5917	1319		9131		11566	4-2B
181--	850	4.00	8.88	9.04	9.50	205	7084	1767		10933		13849	
H18301--	1000	4.98	6.64	6.81	7.33	200	8334	1698		12801	4-2B	16215	
183--	1100	5.33	6.56	6.73	7.25	200	9167	1797		14051		17798	
171--	1100	7.15	3.00	3.35	4.38	160	9167	1457		13991		17722	
H171--	1100	7.15	3.38	3.61	4.28	160	9167	1423		13991		17722	4-2C
H18302--	1200	4.98	8.26	8.43	8.95	300	10001	2073		15451		19572	
H18304--	1300	6.01	6.29	6.50	7.13	290	10834	1993		16686		21136	
H18401--	1400	5.00	10.00	10.17	10.67	360	11668	2481		18041	4-2C	22852	
177--	1500	7.15	4.38	4.72	5.75	220	12501	1912		19082		24170	
H177--	1500	7.15	4.76	4.99	5.66	220	12501	1882		19082		24170	
184--	1550	5.33	9.38	9.55	10.07	305	12918	2496		19834		25123	
178--	1650	7.15	4.54	4.98	6.29	270	13751	2092		21032		26640	
H178--	1650	7.15	5.13	5.36	6.03	270	13751	2005		21032		26640	
H17801--	1900	6.01	9.01	9.22	9.85	460	15835	2753		24442		30960	
8300--	1900	5.33	11.31	11.48	12.00	460	15835	2975		24442		30960	4-2D

Jaik Choi Associates
Structural Engineering
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5050--	2000	7.50	6.04	6.27	6.96	340	16668	2428		25512		32315	
H50501--	2000	7.97	5.64	5.95	6.87	420	16668	2547		25632		32467	
8130--	2000	7.50	6.04	6.27	6.96	340	16668	2428		25512	4-2D	32315	4-4C
5090--	2500	7.50	7.66	7.89	8.57	450	20835	2990		31928		40442	
8140--	2500	7.50	7.66	7.89	8.57	410	20835	2990		31868		40366	
H50901--	2500	7.97	6.78	7.09	8.01	550	20835	2969		32078		40632	
8390--	2650	8.50	6.61	6.95	7.96	550	22085	3147	4-2A	33953		43007	
5130--	3000	7.50	9.25	9.48	10.17	575	25002	3548	4-2C	38366		48596	
H51301--	3000	7.97	7.92	8.23	9.15	600	25002	3392	4-2C	38403		48644	
8160--	3000	7.50	9.25	9.48	10.17	615	25002	3548	4-2C	38426		48672	
7410--	3000	8.50	7.29	7.46	7.96	560	25002	3147	4-2A	38343		48568	
8170--	3200	7.17	10.50	10.75	11.50	704	26669	3835	4-4D	41059	4-4D	52008	4-4D
8190--	3650	8.50	9.05	9.39	10.40	780	30419	4112		46799		59278	
5190--	3900	7.50	12.21	12.44	13.12	900	32503	4577		50104		63465	
H74201--	4000	10.03	6.79	7.17	8.31	850	33336	3877		51279		64953	
7360--	4100	8.50	9.98	10.15	10.64	850	34169	4207		52529		66537	
5210--	4400	7.50	13.84	14.07	14.75	1100	36670	5145		56654		71762	
8200--	4400	10.00	7.17	7.43	8.21	775	36670	3819		56167		71145	
7420--	4500	8.50	11.08	11.25	11.75	1050	37503	4645		57830		73251	
H70004--	4500	11.87	5.52	5.96	7.28	900	37503	4019		57605		72966	4-6D
H70001--	4600	10.03	8.01	8.39	9.53	1250	38336	4446		59380		75214	
8210--	4650	8.50	11.40	11.74	12.75	1277	38753	5041		60045	4-4D4	76057	
5480--	4900	7.50	15.48	15.71	16.40	1450	40837	5721		63430		80345	
H74202--	5000	8.50	11.54	11.88	12.88	1150	41670	5092		64230		81358	
7000--	5500	10.00	9.83	10.09	10.88	1150	45837	5061		70481		89275	4-6D4
5250--	5600	11.83	7.05	7.36	8.30	1150	46670	4567		71731	4-6D	90859	
7430--	6000	8.50	14.88	15.05	15.54	1650	50004	6144		77481		98143	
H71401--	6000	10.03	10.45	10.83	11.97	1500	50004	5584		77256		97858	
8220--	6200	10.00	10.50	10.76	11.54	1350	51671	5367		79531		100740	
7140--	6500	10.00	11.59	11.85	12.64	1450	54171	5879		83432		105680	
H53001--	6600	10.03	11.56	11.94	13.08	1900	55004	6102		85357	4-6D4	108118	
H53005--	6600	11.87	8.20	8.64	9.96	1650	55004	5499		84982		107643	
5300--	7000	11.83	8.79	9.13	10.13	1400	58338	5574		89607	4-6D4(B7)	113502	
7440--	7500	8.50	18.67	18.84	19.33	2450	62505	7642		97433		123415	4-6D4(B7)
H53003--	8000	10.03	13.78	14.16	15.30	2200	66672	7138		103308		130857	
H53203--	8000	11.87	9.59	11.55	11.90	1800	66672	6570		102708		130097	
7400--	8500	10.00	15.00	15.26	16.04	2400	70839	7461		109859		139154	
5360--	8750	11.83	10.46	10.79	11.79	1800	72923	6487		112084	4-6E4(B7)	141973	8-4D4
7450--	9500	10.00	16.76	17.02	17.80	2800	79173	8279		122960		155749	
5330--	10500	11.83	12.69	13.00	13.94	2500	87507	7670		135011		171013	
H53303--	10500	11.87	12.93	13.30	14.39	2600	87507	7945		135161	8-4D4	171203	8-6D
5350--	12500	11.83	15.12	15.45	16.45	3100	104175	9051		160913		203823	
H53503--	13000	11.87	16.18	16.55	17.64	3600	108342	9739		167913		212690	8-6D4
5370--	15000	11.83	18.13	18.46	19.46	4400	125010	10708		194115		245879	
H53703--	15000	11.87	18.58	19.07	20.52	4850	125010	11329		194790		246734	8-6D4(B7)
5380--	16500	11.83	20.07	20.41	21.41	5600	137511	11781	4-4D	214667	8-6D4	271911	8-6E4(B7)

Jaik Choi Associates
Structural Engineering
(949)706-7789, Fax;(424)239-2666
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2) CABLE ANCHORAGE

Safety Factor (S.F.) = 2 / R.F./ A.F. = 2.0

R.F. = 0.75 (Reduction factor due to possible elastic stretch)
A.F. = 1.33 (Adjust factor due to duration of loads)

CABLE SIZE	BREAK STRENGTH	LOOP STRENGTH W/S.F.= 2.0
0.25	6400	6400
0.375	12000	12000
0.5	21600	21600
0.625	33600	33600
0.75	48000	48000

CABLE IS 7 X 19 304 SERIES SS

Mot = Vseis.*Cg
Up or Down Ld./conn. = Mot/Ds
Uplift/conn.= Up Ld.- .5*Wef
Wef = 50% of Wt effect. for holdown

INPUT PARAMETERS **CABLE CONN.**

PART NUMBER	TANK SIZE (GAL.)	TANK DIA. (FT.)	Hr (FT.)	Wt (LBS.)	No. of Anchor WIND	SG1.5	Sg1.9	**WIND** UPLIFT (LBS.)	CABLE SIZE	**SEIS.** (SG=1.5) (LBS.)	CONN. TYPE	**SEIS.** (SG=1.9) (LBS.)	CONN. TYPE
153--	22	1.46	1.80	192	4	4	4	79	1/4"	7	1/4"	9	1/4"
H15401--	30	1.88	1.58	265	4	4	4	59		-25		-32	
H15407--	50	1.88	2.79	442	4	4	4	183		53	1/4"	67	1/4"
5680--	55	1.83	3.04	484	4	4	4	239		87	1/4"	110	1/4"
155--	65	1.94	3.42	570	4	4	4	292		121	1/4"	154	1/4"
5690--	90	2.50	2.70	793	4	4	4	185		-12		-15	
8010--	110	2.75	2.58	950	4	4	4	204		-59		-75	
H15402--	120	2.67	2.98	1040	4	4	4	215		-3		-4	
5700--	120	2.50	3.55	1050	4	4	4	316		104	1/4"	131	1/4"
5710--	150	2.50	4.43	1308	4	4	4	487		283	1/4"	358	1/4"
H15404--	190	3.50	2.89	1633	4	4	4	247		-163		-206	
H15403--	200	3.01	4.14	1747	4	4	4	469		146	1/4"	185	1/4"
154--	200	3.33	3.61	1730	4	4	4	319		-23		-29	
8020--	200	2.75	4.65	1717	4	4	4	585		324	1/4"	411	1/4"
5720--	200	3.00	4.05	1735	4	4	4	402		131	1/4"	165	1/4"
5730--	250	3.00	5.03	2162	4	4	4	616		398	1/4"	505	1/4"
5740--	275	3.50	4.09	2388	4	4	4	398		35	1/4"	45	1/4"
H16302--	290	3.50	4.25	2517	4	4	4	475		76	1/4"	96	1/4"
H16301--	300	3.01	6.04	2600	4	4	4	957		765	1/4"	969	1/4"
8030--	300	2.75	7.17	2585	4	4	4	1326		1279	1/4"	1620	1/4"
163--	300	2.92	6.11	2565	4	4	4	929		828	1/4"	1049	1/4"
8040--	300	3.83	3.54	2575	4	4	4	320		-172		-218	
5750--	330	3.50	4.89	2858	4	4	4	568		260	1/4"	329	1/4"
H16303--	330	4.00	3.81	2840	4	4	4	385		-163		-206	
5760--	360	4.00	4.09	3116	4	4	4	388		-106		-134	
174--	400	3.75	4.95	3424	4	4	4	581		224	1/4"	283	1/4"
5770--	440	4.00	4.97	3797	4	4	4	576		150	1/4"	190	1/4"
5780--	500	4.00	5.74	4308	4	4	4	739		446	1/4"	566	1/4"
H18001--	500	3.98	5.57	4292	4	4	4	794		394	1/4"	499	1/4"
180--	550	4.00	5.89	4694	4	4	4	833		545	1/4"	691	1/4"
167--	550	5.33	3.20	4674	4	4	4	268		-817		-1034	
182--	550	5.33	3.30	4684	4	4	4	291		-789		-1000	
8060--	550	5.33	3.14	4684	4	4	4	241		-836		-1059	
H17001--	700	3.98	7.71	6014	4	4	4	1497		1631	1/4"	2066	1/4"
H17002--	710	5.00	5.17	6087	4	4	4	663		-183		-232	
181--	850	4.00	9.03	7289	4	4	4	1996		2755	1/4"	3490	1/4"
H18301--	1000	4.98	6.81	8534	4	4	4	1150		692	1/4"	877	1/4"
183--	1100	5.33	6.73	9367	4	4	4	1122		432	1/4"	548	1/4"
171--	1100	7.15	3.34	9327	4	4	4	366		-2044		-2590	

Jaik Choi Associates
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H171--	1100	7.15	3.61	9327	4	4	4	346		-1927		-2441	
H18302--	1200	4.98	8.44	10301	4	4	4	1713		1960	1/4"	2483	1/4"
H18304--	1300	6.01	6.50	11124	4	4	4	1037		-159		-201	
H18401--	1400	5.00	10.17	12028	4	4	4	2468		3650	1/4"	4623	1/4"
177--	1500	7.15	4.72	12721	4	4	4	659		-1969		-2494	
H177--	1500	7.15	4.98	12721	4	4	4	635		-1815		-2299	
184--	1550	5.33	9.55	13223	4	4	4	2206		2944	1/4"	3729	1/4"
178--	1650	7.15	4.98	14021	4	4	4	785		-2000		-2534	
H178--	1650	7.15	5.36	14021	4	4	4	711		-1752		-2219	
H17801--	1900	6.01	9.22	16295	4	4	4	2026		2228	1/4"	2822	1/4"
8300--	1900	5.33	11.48	16295	4	4	4	3119		5596	1/4"	7088	3/8"
5050--	2000	7.50	6.27	17008	4	4	4	957		-1635		-2071	
H50501--	2000	7.97	5.95	17088	4	4	4	888		-2153		-2727	
8130--	2000	7.50	6.27	17008	4	4	4	957		-1635		-2071	
5090--	2500	7.50	7.89	21285	4	4	4	1483		-513		-650	
8140--	2500	7.50	7.89	21245	4	4	4	1503		-512		-649	
H50901--	2500	7.97	7.09	21385	4	4	4	1217		-1674		-2120	
8390--	2650	8.50	6.94	22635	4	4	4	1199		-2324		-2943	
5130--	3000	7.50	9.48	25577	4	4	4	2118		1192	1/4"	1510	1/4"
H51301--	3000	7.97	8.22	25602	4	4	4	1647		-793		-1005	
8160--	3000	7.50	9.48	25617	4	4	4	2098		1194	1/4"	1513	1/4"
7410--	3000	8.50	7.46	25562	4	4	4	1194		-2103		-2663	
8170--	3200	7.17	10.75	27373	4	4	4	2724		3424	1/4"	4338	1/4"
8190--	3650	8.50	9.38	31199	4	4	4	2125		-216		-273	
5190--	3900	7.50	12.44	33403	4	4	4	3553		5954	1/4"	7542	3/8"
H74201--	4000	10.03	7.17	34186	4	4	4	1181		-4668		-5913	
7360--	4100	8.50	10.14	35019	4	4	4	2208		802	1/4"	1016	1/4"
5210--	4400	7.50	14.07	37770	4	4	4	4510		9471	3/8"	11996	3/8"
8200--	4400	10.00	7.43	37445	4	4	4	1180		-4762		-6032	
7420--	4500	8.50	11.25	38553	4	4	4	2686		2563	1/4"	3246	1/4"
H70004--	4500	11.87	5.96	38403	4	4	4	783		-7969		-10095	
H70001--	4600	10.03	8.39	39586	4	4	4	1487		-3800		-4813	
8210--	4650	8.50	11.74	40030	4	4	4	3142	1/4" dia.	3431	1/4"	4345	1/4"
5480--	4900	7.50	15.71	42287	4	4	4	5530	3/8" dia.	13688	1/2"	17338	1/2"
H74202--	5000	8.50	11.88	42820	4	4	4	3283	1/4" dia.	3905	1/4"	4946	1/4"
7000--	5500	10.00	10.09	46987	4	4	4	2178		-1806		-2288	
5250--	5600	11.83	7.37	47820	4	4	4	1027		-7995		-10128	
7430--	6000	8.50	15.04	51654	4	4	4	4791		11116	3/8"	14080	1/2"
H71401--	6000	10.03	10.83	51504	4	4	4	2582		-764		-968	
8220--	6200	10.00	10.76	53021	4	4	4	2422		-853		-1081	
7140--	6500	10.00	11.85	55621	4	4	4	2991		1127	1/4"	1428	1/4"
H53001--	6600	10.03	11.94	56904	4	4	4	3029		1256	1/4"	1591	1/4"
H53005--	6600	11.87	8.64	56654	4	4	4	1482		-7490		-9488	
5300--	7000	11.83	9.13	59738	4	4	4	1686	1/4" dia.	-7024		-8897	
7440--	7500	8.50	18.83	64955	4	4	4	7465	3/8" dia.	23639	5/8"	29942	5/8"
H53003--	8000	10.03	14.16	68872	4	4	4	4344	1/4" dia.	6605	3/8"	8366	3/8"
H53203--	8000	11.87	11.55	68472	4	4	4	2393		-3454		-4374	
7400--	8500	10.00	15.26	73239	4	4	4	4783		9814	3/8"	12432	1/2"
5360--	8750	11.83	10.79	74723	4	4	4	2333	1/4" dia.	-5288		-6698	
7450--	9500	10.00	17.02	81973	4	4	4	5968	3/8" dia.	15797	1/2"	20010	1/2"
5330--	10500	11.83	13.00	90007	4	4	4	3269	1/4" dia.	-761		-964	
H53303--	10500	11.87	13.29	90107	4	4	4	3516	1/4" dia.	-139		-176	
5350--	12500	11.83	15.45	107275	4	4	4	4743	1/4" dia.	6503	3/8"	8238	3/8"
H53503--	13000	11.87	16.55	111942	4	4	4	5437	3/8" dia.	10082	3/8"	12771	1/2"
5370--	15000	11.83	18.46	129410	4	4	4	6607		18828	1/2"	23849	5/8"
H53703--	15000	11.87	19.06	129860	4	4	4	7367		20855	1/2"	26417	5/8"
5380--	16500	11.83	20.41	143111	4	4	4	7860	3/8" dia.	28690	5/8"	36341	3/4"

Jaik Choi Associates
Structural Engineering
(949)706-7789, Fax:(424)239-2666
email; jcse@msn.com

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C) FOUNDATION DESIGN **Seismic Design Category "D"**

SII Vertical Ground Supported Tank (flat bottom)

Desgin loads = Vs = 0.445 W

Design Parameter

Allow. Bearing "Fb"=	1500 psf x 1.33 =	1995	psf
Passive Pressure "Pp"=	250 psf x 1.33 =	332.5	psf
Friction Coeff. = u =	0.4		

Hc; Height of tank content
Ht; Height of tank top
We; Empty Weight of tank
Wc; Content Weight in tank
Wt; Total Weight of tank
Wf; Footing Weight
SG; Specific Gravity
Fd; Footing Diameter
Fe; Footing Edge Distance
Ft; Footing Thickness
Mf; Moment in the footing
Mot; Overturning Moment
Mr; Resisting Moment
F.S.; Factor of Safety for Overturning
SL; Sliding resistance
Fa; Soil bearing value (Direct)
Fb; Soil bearing value (Overturing)
Fs; Soil bearing value (Total)
b; Soil reaction resultant location
Sf; Section Modulus of footing
As; Area of reinforcing steel required

1) Overturning

Mot = Vs*Hc/2
Total Dl.(TD) = W + Wt. Ftg.
Mresist (Mr) = TD*.5*Fw
Factor of Safety "F.S."=Mr/Mot = **> 1.5**

2) Sliding of Foundation

Load = Fp = Vs
Resist = u*Total Dl.+ Passive Pressure
SL > Vs

3) Soil Bearing

Result @ (Mr-Mot)/TD="b"
Fa = (Wt + Wf) / (.785*Fd^2)
Fb = (Wt + Wf)*(.5*Fd-b)/Sf
Fs = (Fa + Fb) psf < 1995 O.K.

Design for Specific gravity (SG) = 1.5

INPUT PARAMETERS **FOUNDATION SIZES**

PART NUMBER	TANK SIZE (GAL.)	TANK DIA. (FT.)	Hc (FT.)	Ht (FT.)	We (LBS.)	Wc (LBS.)	Wt (LBS.)	Fe (FT.)	Fd (FT.)	Ft (FT.)	b (FT.)	Wf (LBS.)
153--	22	1.46	1.77	1.90	9	275	284	1.00	3.46	1.00	0.42	1410
H15401--	30	1.88	1.54	1.69	15	375	390	1.00	3.88	1.00	1.80	1773
H15407--	50	1.88	2.75	2.90	25	625	650	1.00	3.88	1.00	1.66	1773
5680--	55	1.83	2.96	3.29	26	688	713	1.00	3.83	1.00	1.59	1727
155--	65	1.94	3.35	3.63	28	813	841	1.00	3.94	1.00	1.60	1828
5690--	90	2.50	2.60	2.98	43	1125	1168	1.00	4.50	1.00	1.91	2384
8010--	110	2.75	2.42	3.08	33	1375	1408	1.00	4.75	1.00	2.03	2657
H15402--	120	2.67	2.92	3.18	40	1500	1540	1.00	4.67	1.00	1.92	2568
5700--	120	2.50	3.46	3.83	50	1500	1550	1.00	4.50	1.00	1.77	2384
5710--	150	2.50	4.33	4.71	58	1875	1933	1.00	4.50	1.00	1.62	2384
H15404--	190	3.50	2.71	3.42	50	2375	2425	1.00	5.50	1.00	2.33	3562
H15403--	200	3.01	3.97	4.68	80	2500	2580	1.00	5.01	1.00	1.89	2956
154--	200	3.33	3.52	3.88	63	2500	2563	1.00	5.33	1.00	2.13	3345
8020--	200	2.75	4.50	5.12	50	2500	2550	1.00	4.75	1.00	1.67	2657

5720--	200	3.00	3.96	4.33	68	2500	2568	1.00	5.00	1.00	1.88	2944
5730--	250	3.00	4.94	5.31	79	3125	3204	1.00	5.00	1.00	1.70	2944
5740--	275	3.50	4.00	4.38	96	3438	3534	1.00	5.50	1.00	2.09	3562
H16302--	290	3.50	4.08	4.75	100	3625	3725	1.00	5.50	1.00	2.06	3562
H16301--	300	3.01	5.87	6.58	100	3750	3850	1.00	5.01	1.00	1.51	2956
8030--	300	2.75	7.00	7.67	85	3750	3835	1.00	4.75	1.00	1.19	2657
163--	300	2.92	6.00	6.43	65	3750	3815	1.00	4.92	1.00	1.44	2850
8040--	300	3.83	3.42	3.92	75	3750	3825	1.00	5.83	1.00	2.33	4002
5750--	330	3.50	4.79	5.17	108	4125	4233	1.00	5.50	1.00	1.93	3562
H16303--	330	4.00	3.63	4.30	90	4125	4215	1.00	6.00	1.00	2.38	4239
5760--	360	4.00	4.00	4.38	116	4500	4616	1.00	6.00	1.00	2.30	4239
174--	400	3.75	4.88	5.19	90	5000	5090	1.00	5.75	1.00	2.01	3893
5770--	440	4.00	4.88	5.25	130	5500	5630	1.00	6.00	1.00	2.13	4239
5780--	500	4.00	5.69	5.90	141	6251	6391	1.00	6.00	1.00	1.97	4239
H18001--	500	3.98	5.41	6.07	125	6251	6376	1.00	5.98	1.00	2.00	4211
180--	550	4.00	5.79	6.18	110	6876	6986	1.00	6.00	1.00	1.92	4239
167--	550	5.33	3.04	3.67	90	6876	6966	1.00	7.33	1.00	3.08	6327
182--	550	5.33	3.13	3.83	100	6876	6976	1.00	7.33	1.00	3.07	6327
8060--	550	5.33	3.00	3.54	100	6876	6976	1.00	7.33	1.00	3.08	6327
H17001--	700	3.98	7.53	8.26	180	8751	8931	1.00	5.98	1.00	1.55	4211
H17002--	710	5.00	5.00	5.67	170	8876	9046	1.00	7.00	1.00	2.55	5770
181--	850	4.00	8.88	9.50	205	10626	10831	1.00	6.00	1.00	1.26	4239
H18301--	1000	4.98	6.64	7.33	200	12501	12701	1.00	6.98	1.00	2.17	5737
183--	1100	5.33	6.56	7.25	200	13751	13951	1.00	7.33	1.00	2.36	6327
171--	1100	7.15	3.00	4.38	160	13751	13911	1.00	9.15	1.00	3.92	9858
H171--	1100	7.15	3.38	4.28	160	13751	13911	1.00	9.15	1.00	3.87	9858
H18302--	1200	4.98	8.26	8.95	300	15001	15301	1.00	6.98	1.00	1.83	5737
H18304--	1300	6.01	6.29	7.13	290	16251	16541	1.00	8.01	1.00	2.74	7555
H18401--	1400	5.00	10.00	10.67	360	17501	17861	1.33	7.66	1.00	1.91	6909
177--	1500	7.15	4.38	5.75	220	18752	18972	1.00	9.15	1.00	3.64	9858
H177--	1500	7.15	4.76	5.66	220	18752	18972	1.00	9.15	1.00	3.59	9858
184--	1550	5.33	9.38	10.07	305	19377	19682	1.00	7.33	1.00	1.75	6327
178--	1650	7.15	4.54	6.29	270	20627	20897	1.00	9.15	1.00	3.59	9858
H178--	1650	7.15	5.13	6.03	270	20627	20897	1.00	9.15	1.00	3.50	9858
H17801--	1900	6.01	9.01	9.85	460	23752	24212	1.00	8.01	1.00	2.14	7555
8300--	1900	5.33	11.31	12.00	460	23752	24212	1.50	8.33	1.00	1.95	8171
5050--	2000	7.50	6.04	6.96	340	25002	25342	1.00	9.50	1.00	3.49	10627
H50501--	2000	7.97	5.64	6.87	420	25002	25422	1.00	9.97	1.00	3.82	11704
8130--	2000	7.50	6.04	6.96	340	25002	25342	1.00	9.50	1.00	3.49	10627
5090--	2500	7.50	7.66	8.57	450	31253	31703	1.00	9.50	1.00	3.14	10627
8140--	2500	7.50	7.66	8.57	410	31253	31663	1.00	9.50	1.00	3.14	10627
H50901--	2500	7.97	6.78	8.01	550	31253	31803	1.00	9.97	1.00	3.56	11704
8390--	2650	8.50	6.61	7.96	550	33128	33678	1.00	10.50	1.00	3.87	12982
5130--	3000	7.50	9.25	10.17	575	37503	38078	1.00	9.50	1.00	2.79	10627
H51301--	3000	7.97	7.92	9.15	600	37503	38103	1.00	9.97	1.00	3.30	11704
8160--	3000	7.50	9.25	10.17	615	37503	38118	1.00	9.50	1.00	2.79	10627
7410--	3000	8.50	7.29	7.96	560	37503	38063	1.00	10.50	1.00	3.71	12982
8170--	3200	7.17	10.50	11.50	704	40003	40707	1.33	9.83	1.00	2.74	11378
8190--	3650	8.50	9.05	10.40	780	45629	46409	1.00	10.50	1.00	3.33	12982
5190--	3900	7.50	12.21	13.12	900	48754	49654	1.75	11.00	1.00	3.04	14248
H74201--	4000	10.03	6.79	8.31	850	50004	50854	1.00	12.03	1.00	4.55	17041
7360--	4100	8.50	9.98	10.64	850	51254	52104	1.33	11.16	1.00	3.50	14665
5210--	4400	7.50	13.84	14.75	1100	55004	56104	2.33	12.16	1.00	3.39	17411

8200--	4400	10.00	7.17	8.21	775	55004	55779	1.50	13.00	1.00	5.00	19900
7420--	4500	8.50	11.08	11.75	1050	56255	57305	1.50	11.50	1.00	3.46	15572
H70004--	4500	11.87	5.52	7.28	900	56255	57155	1.50	14.87	1.00	6.29	26037
H70001--	4600	10.03	8.01	9.53	1250	57505	58755	1.50	13.03	1.00	4.85	19992
8210--	4650	8.50	11.40	12.75	1277	58130	59407	2.00	12.50	1.00	3.97	18398
5480--	4900	7.50	15.48	16.40	1450	61255	62705	2.50	12.50	1.00	3.24	18398
H74202--	5000	8.50	11.54	12.88	1150	62505	63655	2.00	12.50	1.00	3.91	18398
7000--	5500	10.00	9.83	10.88	1150	68756	69906	2.00	14.00	1.00	5.02	23079
5250--	5600	11.83	7.05	8.30	1150	70006	71156	1.50	14.83	1.00	5.94	25897
7430--	6000	8.50	14.88	15.54	1650	75006	76656	2.50	13.50	1.33	3.91	28542
H71401--	6000	10.03	10.45	11.97	1500	75006	76506	2.00	14.03	1.33	4.94	30827
8220--	6200	10.00	10.50	11.54	1350	77506	78856	2.00	14.00	1.33	4.89	30695
7140--	6500	10.00	11.59	12.64	1450	81257	82707	2.00	14.00	1.33	4.69	30695
H53001--	6600	10.03	11.56	13.08	1900	82507	84407	2.00	14.03	1.33	4.70	30827
H53005--	6600	11.87	8.20	9.96	1650	82507	84157	1.50	14.87	1.33	5.72	34629
5300--	7000	11.83	8.79	10.13	1400	87507	88907	1.50	14.83	1.33	5.58	34443
7440--	7500	8.50	18.67	19.33	2450	93758	96208	3.50	15.50	1.33	4.34	37625
H53003--	8000	10.03	13.78	15.30	2200	100008	102208	3.00	16.03	1.33	5.39	40242
H53203--	8000	11.87	9.59	11.90	1800	100008	101808	2.00	15.87	1.33	5.97	39443
7400--	8500	10.00	15.00	16.04	2400	106259	108659	3.50	17.00	1.33	5.73	45260
5360--	8750	11.83	10.46	11.79	1800	109384	111184	2.00	15.83	1.33	5.76	39244
7450--	9500	10.00	16.76	17.80	2800	118760	121560	3.50	17.00	1.33	5.35	45260
5330--	10500	11.83	12.69	13.94	2500	131261	133761	3.00	17.83	1.33	6.43	49787
H53303--	10500	11.87	12.93	14.39	2600	131261	133861	3.00	17.87	1.33	6.41	50011
5350--	12500	11.83	15.12	16.45	3100	156263	159363	3.50	18.83	1.33	6.48	55528
H53503--	13000	11.87	16.18	17.64	3600	162513	166113	4.00	19.87	1.33	6.88	61831
5370--	15000	11.83	18.13	19.46	4400	187515	191915	4.50	20.83	1.33	7.00	67950
H53703--	15000	11.87	18.58	20.52	4850	187515	192365	4.50	20.87	1.33	6.95	68211
5380--	16500	11.83	20.07	21.41	5600	206267	211867	5.00	21.83	1.50	7.24	84170

RESULTS **SOIL BEARING & FOOTING REINFORCING**

PART NUMBER	Vs (LBS.)	SL (LBS.) > Vs	Mot (ft-k)	Mr (ft-k)	F.S. > 1.5	Fa psf	Fb psf	Fs psf	Mf ft.-k	As in2	Reinf. Size	in. o.c.
153--	126	936	0.2	3	9	180	546	726	0.31	0.02	# 4 @	16
H15401--	173	1155	0.3	4	13.67	183	54	237	0.11	0.01	# 4 @	16
H15407--	289	1259	0.7	5	6.85	205	120	325	0.15	0.01	# 4 @	16
5680--	317	1262	0.8	5	5.94	212	143	355	0.16	0.01	# 4 @	16
155--	374	1361	1.0	5	5.26	219	167	386	0.18	0.01	# 4 @	16
5690--	519	1757	1.2	8	6.69	223	134	357	0.17	0.01	# 4 @	16
8010--	626	1980	1.4	10	6.98	230	132	361	0.17	0.01	# 4 @	16
H15402--	685	1992	1.7	10	5.69	240	169	408	0.19	0.01	# 4 @	16
5700--	689	1910	1.9	9	4.70	248	210	458	0.21	0.01	# 4 @	16
5710--	860	2063	2.7	10	3.57	272	304	576	0.27	0.01	# 4 @	16
H15404--	1079	2805	2.5	16	6.48	252	156	408	0.19	0.01	# 4 @	16
H15403--	1148	2588	3.4	14	4.05	281	277	558	0.26	0.01	# 4 @	16
154--	1140	2761	3.1	16	5.00	265	212	477	0.23	0.01	# 4 @	16
8020--	1134	2437	3.7	12	3.35	294	350	644	0.30	0.01	# 4 @	16
5720--	1142	2578	3.4	14	4.05	281	277	558	0.26	0.01	# 4 @	16
5730--	1425	2832	4.9	15	3.11	313	403	716	0.33	0.02	# 4 @	16
5740--	1572	3249	4.7	20	4.14	299	289	587	0.28	0.01	# 4 @	16

Jaik Choi Associates
Structural Engineering
(949)706-7789, Fax:(424)239-2666
email; jcse@msn.com

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Date; 2/12/14
By; J. Choi

H16302--	1657	3325	5.0	20	3.98	307	308	615	0.29	0.01	# 4 @	16
H16301--	1712	3096	6.7	17	2.53	345	546	891	0.41	0.02	# 4 @	16
8030--	1706	2951	7.7	15	2.01	367	730	1096	0.50	0.02	# 4 @	16
163--	1697	3033	6.8	16	2.42	351	580	931	0.43	0.02	# 4 @	16
8040--	1701	3566	4.6	23	4.95	293	237	530	0.25	0.01	# 4 @	16
5750--	1883	3528	6.4	21	3.35	328	391	720	0.34	0.02	# 4 @	16
H16303--	1875	3830	5.3	25	4.81	299	249	548	0.26	0.01	# 4 @	16
5760--	2053	3990	6.2	27	4.31	313	290	604	0.29	0.01	# 4 @	16
174--	2264	4023	7.8	26	3.32	346	417	763	0.36	0.02	# 4 @	16
5770--	2504	4396	8.6	30	3.44	349	406	755	0.36	0.02	# 4 @	16
5780--	2842	4700	10.9	32	2.92	376	515	892	0.42	0.02	# 4 @	16
H18001--	2835	4681	10.5	32	3.01	377	500	877	0.41	0.02	# 4 @	16
180--	3107	4938	12.1	34	2.78	397	571	968	0.45	0.02	# 4 @	16
167--	3098	5864	7.8	49	6.24	315	202	517	0.25	0.01	# 4 @	16
182--	3102	5868	8.0	49	6.13	315	206	521	0.25	0.01	# 4 @	16
8060--	3102	5868	7.8	49	6.29	315	201	516	0.25	0.01	# 4 @	16
H17001--	3972	5703	18.9	39	2.08	468	901	1370	0.63	0.03	# 4 @	16
H17002--	4023	6449	14.1	52	3.68	385	418	803	0.38	0.02	# 4 @	16
181--	4817	6476	26.2	45	1.73	533	1236	1769	0.82	0.04	# 4 @	16
H18301--	5649	7896	24.4	64	2.64	482	731	1213	0.57	0.03	# 4 @	16
183--	6205	8658	26.6	74	2.80	481	687	1168	0.55	0.03	# 4 @	16
171--	6187	10191	15.5	109	7.03	362	206	567	0.28	0.01	# 4 @	16
H171--	6187	10191	16.6	109	6.53	362	221	583	0.28	0.01	# 4 @	16
H18302--	6805	8936	34.9	73	2.10	550	1046	1596	0.75	0.04	# 4 @	16
H18304--	7357	10236	30.5	97	3.16	478	604	1083	0.52	0.03	# 4 @	16
H18401--	7944	10480	47.7	95	1.99	538	1080	1618	1.32	0.07	# 4 @	16
177--	8437	12215	26.9	132	4.90	439	358	797	0.39	0.02	# 4 @	16
H177--	8437	12215	28.5	132	4.62	439	379	818	0.40	0.02	# 4 @	16
184--	8753	10950	49.8	95	1.91	617	1288	1905	0.89	0.04	# 4 @	16
178--	9294	12985	30.4	141	4.63	468	404	872	0.42	0.02	# 4 @	16
H178--	9294	12985	33.1	141	4.25	468	441	908	0.44	0.02	# 4 @	16
H17801--	10768	13304	59.3	127	2.15	631	1175	1806	0.85	0.04	# 4 @	16
8300--	10768	13575	71.7	135	1.88	594	1263	1857	1.92	0.10	# 4 @	16
5050--	11271	15097	45.3	171	3.77	508	538	1046	0.50	0.03	# 4 @	16
H50501--	11306	15595	43.2	185	4.29	476	444	920	0.45	0.02	# 4 @	16
8130--	11271	15097	45.3	171	3.77	508	538	1046	0.50	0.03	# 4 @	16
5090--	14099	17641	68.1	201	2.95	597	809	1407	0.67	0.03	# 4 @	16
8140--	14082	17625	68.0	201	2.95	597	808	1405	0.67	0.03	# 4 @	16
H50901--	14144	18147	62.1	217	3.49	558	638	1196	0.58	0.03	# 4 @	16
8390--	14978	19447	64.5	245	3.80	539	567	1106	0.54	0.03	# 4 @	16
5130--	16935	20191	95.3	231	2.43	687	1132	1819	0.87	0.04	# 4 @	16
H51301--	16946	20667	84.1	248	2.95	638	864	1502	0.72	0.04	# 4 @	16
8160--	16953	20207	95.4	232	2.43	688	1133	1821	0.87	0.04	# 4 @	16
7410--	16928	21202	78.6	268	3.41	590	692	1282	0.62	0.03	# 4 @	16
8170--	18104	21568	113.2	256	2.26	687	1213	1900	1.58	0.08	# 4 @	16
8190--	20640	24540	114.0	312	2.73	686	1003	1690	0.81	0.04	# 4 @	16
5190--	22083	26382	156.9	351	2.24	673	1201	1873	2.67	0.13	# 4 @	16
H74201--	22617	28056	99.4	408	4.11	598	582	1179	0.57	0.03	# 4 @	16
7360--	23173	27541	138.8	373	2.68	683	1017	1700	1.43	0.07	# 4 @	16
5210--	24952	30314	197.6	447	2.26	633	1120	1753	4.37	0.22	# 4 @	11
8200--	24807	31242	113.7	492	4.32	570	527	1098	1.19	0.06	# 4 @	16
7420--	25486	30009	166.7	419	2.51	702	1116	1818	1.94	0.10	# 4 @	16
H70004--	25419	34386	95.6	619	6.47	479	296	775	0.85	0.04	# 4 @	16

Jaik Choi Associates
Structural Engineering
(949)706-7789, Fax:(424)239-2666
email; jcse@msn.com

Snyder Industries

Lincoln, NE

Sheet No. of
Job No. 14-948
Date; 2/12/14
By; J. Choi

H70001--	26131	32471	130.8	513	3.92	591	602	1193	1.29	0.06	# 4 @	16
8210--	26421	32055	177.0	486	2.75	634	923	1558	2.92	0.15	# 4 @	16
5480--	27887	33374	243.7	507	2.08	661	1271	1932	5.51	0.28	# 4 @	9
H74202--	28310	33754	191.7	513	2.68	669	1000	1669	3.12	0.16	# 4 @	15
7000--	31090	38239	183.9	651	3.54	604	683	1287	2.44	0.12	# 4 @	16
5250--	31646	39928	143.2	720	5.03	562	447	1009	1.10	0.06	# 4 @	16
7430--	34092	44323	299.0	710	2.37	735	1238	1973	5.69	0.20	# 4 @	12
H71401--	34025	45266	223.0	753	3.38	695	823	1517	2.88	0.10	# 4 @	16
8220--	35071	46148	230.8	767	3.32	712	857	1569	2.97	0.10	# 4 @	16
7140--	36783	47688	262.1	794	3.03	737	973	1710	3.23	0.11	# 4 @	16
H53001--	37539	48426	266.9	808	3.03	746	984	1730	3.27	0.11	# 4 @	16
H53005--	37428	49986	203.2	883	4.35	684	630	1314	1.43	0.05	# 4 @	16
5300--	39541	51805	226.4	915	4.04	714	707	1421	1.55	0.05	# 4 @	16
7440--	42787	56110	456.3	1037	2.27	710	1248	1958	10.84	0.37	# 5 @	10
H53003--	45456	59645	373.6	1142	3.06	706	924	1630	6.82	0.23	# 4 @	10
H53203--	45278	59139	277.3	1121	4.04	714	707	1421	2.72	0.09	# 4 @	16
7400--	48325	64393	426.7	1308	3.07	678	885	1563	8.83	0.30	# 4 @	8
5360--	49448	62803	324.4	1191	3.67	765	833	1598	3.05	0.10	# 4 @	16
7450--	54062	69554	524.9	1418	2.70	735	1088	1824	10.26	0.35	# 5 @	11
5330--	59489	76383	456.6	1636	3.58	735	820	1556	6.59	0.23	# 4 @	11
H53303--	59533	76519	464.1	1643	3.54	733	828	1562	6.61	0.23	# 4 @	11
5350--	70875	89087	630.1	2023	3.21	772	961	1733	9.89	0.34	# 5 @	11
H53503--	73877	94481	695.9	2265	3.25	735	904	1639	12.14	0.42	# 5 @	9
5370--	85352	107409	887.2	2706	3.05	763	1000	1763	16.39	0.56	# 5 @	7
H53703--	85553	107700	908.6	2719	2.99	762	1018	1780	16.54	0.57	# 5 @	7
5380--	94226	123383	1086.9	3231	2.97	791	1064	1856	21.16	0.62	# 5 @	6

Design for Specific gravity (SG) = 1.9

INPUT PARAMETERS **FOUNDATION SIZES**

PART NUMBER	TANK SIZE (GAL.)	TANK DIA. (FT.)	Hc (FT.)	Ht (FT.)	We (LBS.)	Wc (LBS.)	Wt (LBS.)	Fe (FT.)	Fd (FT.)	Ft (FT.)	b (FT.)	Wf (LBS.)
153--	22	1.46	1.77	1.90	9	348	357	1.00	3.46	1.00	1.56	1410
H15401--	30	1.88	1.54	1.69	15	475	490	1.00	3.88	1.00	1.77	1773
H15407--	50	1.88	2.75	2.90	25	792	817	1.00	3.88	1.00	1.61	1773
5680--	55	1.83	2.96	3.29	26	871	896	1.00	3.83	1.00	1.54	1727
155--	65	1.94	3.35	3.63	28	1029	1057	1.00	3.94	1.00	1.53	1828
5690--	90	2.50	2.60	2.98	43	1425	1468	1.00	4.50	1.00	1.86	2384
8010--	110	2.75	2.42	3.08	33	1742	1775	1.00	4.75	1.00	1.98	2657
H15402--	120	2.67	2.92	3.18	40	1900	1940	1.00	4.67	1.00	1.86	2568
5700--	120	2.50	3.46	3.83	50	1900	1950	1.00	4.50	1.00	1.70	2384
5710--	150	2.50	4.33	4.71	58	2375	2433	1.00	4.50	1.00	1.54	2384
H15404--	190	3.50	2.71	3.42	50	3009	3059	1.00	5.50	1.00	2.27	3562
H15403--	200	3.01	3.97	4.68	80	3167	3247	1.00	5.01	1.00	1.81	2956
154--	200	3.33	3.52	3.88	63	3167	3230	1.00	5.33	1.00	2.06	3345
8020--	200	2.75	4.50	5.12	50	3167	3217	1.00	4.75	1.00	1.58	2657
5720--	200	3.00	3.96	4.33	68	3167	3235	1.00	5.00	1.00	1.81	2944
5730--	250	3.00	4.94	5.31	79	3959	4037	1.00	5.00	1.00	1.61	2944
5740--	275	3.50	4.00	4.38	96	4355	4451	1.00	5.50	1.00	2.01	3562
H16302--	290	3.50	4.08	4.75	100	4592	4692	1.00	5.50	1.00	1.98	3562

H16301--	300	3.01	5.87	6.58	100	4750	4850	1.00	5.01	1.00	1.42	2956
8030--	300	2.75	7.00	7.67	85	4750	4835	1.00	4.75	1.00	1.08	2657
163--	300	2.92	6.00	6.43	65	4750	4815	1.00	4.92	1.00	1.34	2850
8040--	300	3.83	3.42	3.92	75	4750	4825	1.00	5.83	1.00	2.26	4002
5750--	330	3.50	4.79	5.17	108	5225	5333	1.00	5.50	1.00	1.84	3562
H16303--	330	4.00	3.63	4.30	90	5225	5315	1.00	6.00	1.00	2.30	4239
5760--	360	4.00	4.00	4.38	116	5700	5816	1.00	6.00	1.00	2.23	4239
174--	400	3.75	4.88	5.19	90	6334	6424	1.00	5.75	1.00	1.92	3893
5770--	440	4.00	4.88	5.25	130	6967	7097	1.00	6.00	1.00	2.04	4239
5780--	500	4.00	5.69	5.90	141	7917	8058	1.00	6.00	1.00	1.88	4239
H18001--	500	3.98	5.41	6.07	125	7917	8042	1.00	5.98	1.00	1.91	4211
180--	550	4.00	5.79	6.18	110	8709	8819	1.00	6.00	1.00	1.83	4239
167--	550	5.33	3.04	3.67	90	8709	8799	1.00	7.33	1.00	3.01	6327
182--	550	5.33	3.13	3.83	100	8709	8809	1.00	7.33	1.00	3.00	6327
8060--	550	5.33	3.00	3.54	100	8709	8809	1.00	7.33	1.00	3.02	6327
H17001--	700	3.98	7.53	8.26	180	11084	11264	1.00	5.98	1.00	1.45	4211
H17002--	710	5.00	5.00	5.67	170	11243	11413	1.00	7.00	1.00	2.47	5770
181--	850	4.00	8.88	9.50	205	13459	13664	1.33	6.66	1.00	1.58	5223
H18301--	1000	4.98	6.64	7.33	200	15835	16035	1.00	6.98	1.00	2.07	5737
183--	1100	5.33	6.56	7.25	200	17418	17618	1.00	7.33	1.00	2.26	6327
171--	1100	7.15	3.00	4.38	160	17418	17578	1.00	9.15	1.00	3.86	9858
H171--	1100	7.15	3.38	4.28	160	17418	17578	1.00	9.15	1.00	3.81	9858
H18302--	1200	4.98	8.26	8.95	300	19002	19302	1.00	6.98	1.00	1.73	5737
H18304--	1300	6.01	6.29	7.13	290	20585	20875	1.00	8.01	1.00	2.65	7555
H18401--	1400	5.00	10.00	10.67	360	22168	22528	1.50	8.00	1.00	2.00	7536
177--	1500	7.15	4.38	5.75	220	23752	23972	1.00	9.15	1.00	3.57	9858
H177--	1500	7.15	4.76	5.66	220	23752	23972	1.00	9.15	1.00	3.51	9858
184--	1550	5.33	9.38	10.07	305	24544	24849	1.50	8.33	1.00	2.26	8171
178--	1650	7.15	4.54	6.29	270	26127	26397	1.00	9.15	1.00	3.52	9858
H178--	1650	7.15	5.13	6.03	270	26127	26397	1.00	9.15	1.00	3.42	9858
H17801--	1900	6.01	9.01	9.85	460	30086	30546	1.50	9.01	1.00	2.64	9559
8300--	1900	5.33	11.31	12.00	460	30086	30546	2.00	9.33	1.00	2.45	10250
5050--	2000	7.50	6.04	6.96	340	31669	32009	1.00	9.50	1.00	3.41	10627
H50501--	2000	7.97	5.64	6.87	420	31669	32089	1.00	9.97	1.00	3.74	11704
8130--	2000	7.50	6.04	6.96	340	31669	32009	1.00	9.50	1.00	3.41	10627
5090--	2500	7.50	7.66	8.57	450	39587	40037	1.00	9.50	1.00	3.05	10627
8140--	2500	7.50	7.66	8.57	410	39587	39997	1.00	9.50	1.00	3.05	10627
H50901--	2500	7.97	6.78	8.01	550	39587	40137	1.00	9.97	1.00	3.47	11704
8390--	2650	8.50	6.61	7.96	550	41962	42512	1.00	10.50	1.00	3.78	12982
5130--	3000	7.50	9.25	10.17	575	47504	48079	1.50	10.50	1.00	3.28	12982
H51301--	3000	7.97	7.92	9.15	600	47504	48104	1.00	9.97	1.00	3.21	11704
8160--	3000	7.50	9.25	10.17	615	47504	48119	1.50	10.50	1.00	3.28	12982
7410--	3000	8.50	7.29	7.96	560	47504	48064	1.00	10.50	1.00	3.62	12982
8170--	3200	7.17	10.50	11.50	704	50671	51375	2.00	11.17	1.00	3.42	14692
8190--	3650	8.50	9.05	10.40	780	57796	58576	1.50	11.50	1.00	3.81	15572
5190--	3900	7.50	12.21	13.12	900	61755	62655	2.25	12.00	1.00	3.51	16956
H74201--	4000	10.03	6.79	8.31	850	63338	64188	1.00	12.03	1.00	4.47	17041
7360--	4100	8.50	9.98	10.64	850	64922	65772	1.50	11.50	1.00	3.60	15572
5210--	4400	7.50	13.84	14.75	1100	69672	70772	2.75	13.00	1.00	3.75	19900
8200--	4400	10.00	7.17	8.21	775	69672	70447	1.00	12.00	1.00	4.36	16956
7420--	4500	8.50	11.08	11.75	1050	71256	72306	2.00	12.50	1.00	3.93	18398
H70004--	4500	11.87	5.52	7.28	900	71256	72156	1.00	13.87	1.00	5.66	22652
H70001--	4600	10.03	8.01	9.53	1250	72839	74089	1.50	13.03	1.00	4.76	19992

8210--	4650	8.50	11.40	12.75	1277	73631	74908	2.00	12.50	1.00	3.86	18398
5480--	4900	7.50	15.48	16.40	1450	77590	79040	3.00	13.50	1.00	3.69	21460
H74202--	5000	8.50	11.54	12.88	1150	79173	80323	2.25	13.00	1.00	4.09	19900
7000--	5500	10.00	9.83	10.88	1150	87090	88240	2.00	14.00	1.00	4.91	23079
5250--	5600	11.83	7.05	8.30	1150	88674	89824	1.00	13.83	1.00	5.31	22522
7430--	6000	8.50	14.88	15.54	1650	95008	96658	3.33	15.16	1.33	4.74	35992
H71401--	6000	10.03	10.45	11.97	1500	95008	96508	2.00	14.03	1.33	4.81	30827
8220--	6200	10.00	10.50	11.54	1350	98175	99525	2.00	14.00	1.33	4.76	30695
7140--	6500	10.00	11.59	12.64	1450	102925	104375	2.25	14.50	1.33	4.84	32927
H53001--	6600	10.03	11.56	13.08	1900	104508	106408	2.50	15.03	1.33	5.14	35378
H53005--	6600	11.87	8.20	9.96	1650	104508	106158	1.50	14.87	1.33	5.61	34629
5300--	7000	11.83	8.79	10.13	1400	110842	112242	1.50	14.83	1.33	5.47	34443
7440--	7500	8.50	18.67	19.33	2450	118760	121210	4.25	17.00	1.33	5.05	45260
H53003--	8000	10.03	13.78	15.30	2200	126677	128877	3.33	16.69	1.33	5.61	43624
H53203--	8000	11.87	9.59	11.90	1800	126677	128477	2.00	15.87	1.33	5.85	39443
7400--	8500	10.00	15.00	16.04	2400	134594	136994	3.50	17.00	1.33	5.55	45260
5360--	8750	11.83	10.46	11.79	1800	138553	140353	2.00	15.83	1.33	5.64	39244
7450--	9500	10.00	16.76	17.80	2800	150429	153229	4.00	18.00	1.33	5.76	50741
5330--	10500	11.83	12.69	13.94	2500	166263	168763	3.00	17.83	1.33	6.28	49787
H53303--	10500	11.87	12.93	14.39	2600	166263	168863	3.00	17.87	1.33	6.26	50011
5350--	12500	11.83	15.12	16.45	3100	197933	201033	4.00	19.83	1.33	6.89	61583
H53503--	13000	11.87	16.18	17.64	3600	205850	209450	4.25	20.37	1.33	6.99	64982
5370--	15000	11.83	18.13	19.46	4400	237519	241919	5.00	21.83	1.33	7.38	74631
H53703--	15000	11.87	18.58	20.52	4850	237519	242369	5.00	21.87	1.33	7.33	74905
5380--	16500	11.83	20.07	21.41	5600	261271	266871	5.75	23.33	1.50	7.89	96135

RESULTS **SOIL BEARING & FOOTING REINFORCING**

PART NUMBER	Vs (LBS.)	SL (LBS.) > Vs	Mot (ft-k)	Mr (ft-k)	F.S. > 1.5	Fa psf	Fb psf	Fs psf	Mf ft.-k	As in2	Reinf. Size	in. o.c.
153--	159	965	0.3	3	10.20	188	74	262	0.12	0.01	# 4 @	16
H15401--	218	1195	0.4	4	11.38	191	67	259	0.12	0.01	# 4 @	16
H15407--	363	1325	0.9	5	5.82	219	150	370	0.17	0.01	# 4 @	16
5680--	399	1335	1.0	5	5.08	228	179	407	0.19	0.01	# 4 @	16
155--	470	1448	1.3	6	4.52	237	209	446	0.21	0.01	# 4 @	16
5690--	653	1877	1.5	9	5.77	242	168	410	0.19	0.01	# 4 @	16
8010--	789	2127	1.7	11	6.03	250	166	416	0.20	0.01	# 4 @	16
H15402--	863	2152	2.1	11	4.96	263	212	476	0.22	0.01	# 4 @	16
5700--	867	2070	2.4	10	4.12	273	265	537	0.25	0.01	# 4 @	16
5710--	1082	2263	3.4	11	3.16	303	383	686	0.31	0.02	# 4 @	16
H15404--	1360	3059	3.2	18	5.68	279	196	475	0.23	0.01	# 4 @	16
H15403--	1444	2855	4.3	16	3.60	315	349	664	0.31	0.02	# 4 @	16
154--	1436	3028	4.0	18	4.42	295	267	562	0.26	0.01	# 4 @	16
8020--	1431	2704	4.6	14	3.00	332	442	774	0.36	0.02	# 4 @	16
5720--	1439	2845	4.3	15	3.60	315	349	664	0.31	0.02	# 4 @	16
5730--	1795	3166	6.2	17	2.80	356	508	863	0.40	0.02	# 4 @	16
5740--	1979	3616	5.9	22	3.71	337	364	701	0.33	0.02	# 4 @	16
H16302--	2087	3712	6.3	23	3.58	348	388	736	0.34	0.02	# 4 @	16
H16301--	2157	3496	8.5	20	2.30	396	688	1084	0.50	0.02	# 4 @	16
8030--	2150	3351	9.7	18	1.84	423	920	1343	0.61	0.03	# 4 @	16
163--	2142	3433	8.6	19	2.20	403	733	1136	0.52	0.03	# 4 @	16

Jaik Choi Associates
Structural Engineering
(949)706-7789, Fax:(424)239-2666
email; jcse@msn.com

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8040--	2146	3966	5.8	26	4.42	331	299	630	0.30	0.01	# 4 @	16
5750--	2372	3968	8.1	24	3.04	375	493	868	0.40	0.02	# 4 @	16
H16303--	2364	4270	6.7	29	4.31	338	314	652	0.31	0.02	# 4 @	16
5760--	2587	4470	7.8	30	3.89	356	366	722	0.34	0.02	# 4 @	16
174--	2857	4556	9.8	30	3.02	398	527	924	0.43	0.02	# 4 @	16
5770--	3156	4982	10.9	34	3.13	401	512	913	0.43	0.02	# 4 @	16
5780--	3584	5366	13.8	37	2.68	435	650	1085	0.51	0.03	# 4 @	16
H18001--	3577	5348	13.3	37	2.76	436	631	1068	0.50	0.03	# 4 @	16
180--	3922	5671	15.3	39	2.56	462	720	1182	0.55	0.03	# 4 @	16
167--	3913	6597	9.9	55	5.62	359	255	614	0.30	0.01	# 4 @	16
182--	3918	6601	10.0	55	5.52	359	260	619	0.30	0.01	# 4 @	16
8060--	3918	6601	9.8	55	5.66	359	253	612	0.29	0.01	# 4 @	16
H17001--	5010	6636	23.9	46	1.94	551	1137	1688	0.78	0.04	# 4 @	16
H17002--	5076	7395	17.8	60	3.39	447	528	974	0.46	0.02	# 4 @	16
181--	6077	8052	33.1	63	1.90	542	1140	1682	1.35	0.07	# 4 @	16
H18301--	7131	9229	30.8	76	2.47	569	923	1492	0.70	0.04	# 4 @	16
183--	7835	10125	33.5	88	2.62	568	867	1435	0.68	0.03	# 4 @	16
171--	7818	11657	19.5	126	6.42	417	260	677	0.33	0.02	# 4 @	16
H171--	7818	11657	21.0	126	5.97	417	280	697	0.34	0.02	# 4 @	16
H18302--	8584	10536	44.0	87	1.98	655	1319	1974	0.92	0.05	# 4 @	16
H18304--	9284	11970	38.5	114	2.96	564	763	1327	0.63	0.03	# 4 @	16
H18401--	10019	12623	60.1	120	2.00	598	1196	1794	1.85	0.09	# 4 @	16
177--	10661	14215	34.0	155	4.55	515	452	967	0.47	0.02	# 4 @	16
H177--	10661	14215	36.0	155	4.30	515	479	994	0.48	0.02	# 4 @	16
184--	11051	13829	62.9	138	2.19	606	1108	1714	1.78	0.09	# 4 @	16
178--	11740	15185	38.4	166	4.32	552	510	1062	0.51	0.03	# 4 @	16
H178--	11740	15185	41.9	166	3.96	552	556	1108	0.53	0.03	# 4 @	16
H17801--	13585	16714	74.8	181	2.42	629	1041	1671	1.75	0.09	# 4 @	16
8300--	13585	17015	90.4	190	2.11	597	1134	1731	3.14	0.16	# 4 @	15
5050--	14236	17763	57.2	203	3.54	602	680	1282	0.62	0.03	# 4 @	16
H50501--	14271	18262	54.5	218	4.00	561	560	1122	0.54	0.03	# 4 @	16
8130--	14236	17763	57.2	203	3.54	602	680	1282	0.62	0.03	# 4 @	16
5090--	17806	20974	86.0	241	2.80	715	1022	1737	0.83	0.04	# 4 @	16
8140--	17788	20958	85.9	240	2.80	715	1021	1735	0.83	0.04	# 4 @	16
H50901--	17850	21480	78.4	258	3.30	664	805	1470	0.71	0.04	# 4 @	16
8390--	18907	22981	81.4	291	3.58	641	716	1357	0.66	0.03	# 4 @	16
5130--	21383	25208	120.3	321	2.67	706	1058	1764	1.87	0.09	# 4 @	16
H51301--	21394	24667	106.1	298	2.81	766	1091	1857	0.89	0.04	# 4 @	16
8160--	21400	25224	120.4	321	2.66	706	1059	1765	1.87	0.09	# 4 @	16
7410--	21376	25202	99.3	320	3.23	705	874	1579	0.76	0.04	# 4 @	16
8170--	22848	27260	142.8	369	2.58	675	1044	1718	3.19	0.16	# 4 @	15
8190--	26051	30518	143.9	426	2.96	714	964	1678	1.79	0.09	# 4 @	16
5190--	27865	32740	198.0	478	2.41	704	1167	1871	4.37	0.22	# 4 @	11
H74201--	28547	33390	125.5	489	3.89	715	734	1449	0.70	0.04	# 4 @	16
7360--	29251	33396	175.2	468	2.67	784	1173	1957	2.09	0.10	# 4 @	16
5210--	31475	37239	249.3	589	2.36	683	1156	1839	6.34	0.32	# 5 @	12
8200--	31331	35857	143.7	524	3.65	773	847	1620	0.79	0.04	# 4 @	16
7420--	32157	37215	210.3	567	2.70	739	1097	1836	3.44	0.17	# 4 @	14
H70004--	32091	38958	120.7	657	5.45	628	461	1088	0.53	0.03	# 4 @	16
H70001--	32950	38605	164.9	613	3.72	706	759	1465	1.58	0.08	# 4 @	16
8210--	33315	38255	223.2	583	2.61	761	1164	1925	3.60	0.18	# 4 @	13
5480--	35152	41207	307.2	678	2.21	702	1272	1974	8.04	0.40	# 5 @	9
H74202--	35723	41059	241.8	651	2.69	755	1121	1877	4.42	0.22	# 4 @	11

Jaik Choi Associates
Structural Engineering
(949)706-7789, Fax:(424)239-2666
email; jcse@msn.com

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7000--	39244	45573	232.1	779	3.36	724	862	1585	3.01	0.15	# 4 @	16
5250--	39948	45970	180.8	777	4.30	748	696	1444	0.71	0.04	# 4 @	16
7430--	42988	55580	377.0	1005	2.67	735	1102	1837	9.29	0.32	# 5 @	12
H71401--	42921	53266	281.3	893	3.17	824	1038	1862	3.53	0.12	# 4 @	16
8220--	44263	54415	291.2	912	3.13	846	1081	1927	3.65	0.13	# 4 @	16
7140--	46420	57331	330.7	995	3.01	832	1105	1937	4.61	0.16	# 4 @	15
H53001--	47324	59213	336.5	1066	3.17	800	1009	1809	5.30	0.18	# 4 @	13
H53005--	47213	58787	256.4	1047	4.08	811	794	1605	1.75	0.06	# 4 @	16
5300--	49919	61139	285.8	1088	3.81	850	893	1742	1.89	0.06	# 4 @	16
7440--	53907	69414	574.9	1415	2.46	734	1192	1926	15.60	0.53	# 5 @	7
H53003--	57317	71775	471.1	1440	3.06	789	1032	1821	9.34	0.32	# 5 @	12
H53203--	57139	69806	350.0	1332	3.81	849	892	1741	3.33	0.11	# 4 @	16
7400--	60927	75728	538.0	1549	2.88	803	1115	1919	10.81	0.37	# 5 @	10
5360--	62421	74470	409.5	1422	3.47	913	1051	1964	3.75	0.13	# 4 @	16
7450--	68147	84580	661.7	1836	2.77	802	1156	1958	14.29	0.49	# 5 @	8
5330--	75056	90384	576.1	1948	3.38	876	1035	1911	8.08	0.28	# 5 @	13
H53303--	75100	90520	585.4	1956	3.34	873	1045	1918	8.10	0.28	# 5 @	13
5350--	89407	108343	794.8	2604	3.28	851	1038	1889	14.00	0.48	# 5 @	8
H53503--	93151	113159	877.5	2795	3.19	843	1057	1900	15.83	0.54	# 5 @	7
5370--	107591	130249	1118.4	3455	3.09	846	1095	1941	22.18	0.76	# 6 @	7
H53703--	107791	130545	1144.7	3469	3.03	845	1115	1960	22.37	0.77	# 6 @	7
5380--	118688	150512	1369.1	4234	3.09	850	1098	1948	29.22	0.86	# 6 @	6

Jaik Choi Associates
Structural Engineering
(949)706-7789, Fax;(424)239-2666
email; jcse@msn.com

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D) Structural Calculations for the Capacity of Anchorage at Concrete

Seismic **Design Category "D"** **V= 0.445 W**

1) Unity for Comb. Loading (Shear + Tension) **Bolts= ASTM A 36**

Shear/bolt = V/Nb
Tension/bolt = Moment/anc. Spacing = V*Hp/2/Sa
Unity = 1.33 = V/Nb/S + .5*V*Hp/Sa/T/Nb
V = 1.33*Nb*T*S/ (T + .5*S*Hp/Sa) for 1 or 2 bolts
V = 1.33*Nb*T*S/ (T + S*Hp/Sa) for 4 bolts

T= Tension capacity of bolt
S= Shear capacity of bolt
Sa= Anc. spacing or .8*(bolt dist. from edge)
Sb= Anc. spacing btwn stiffners
Hp= Height of back plate
Nb= Number of bolts per conn.

2) Load reduction factors due to anchor bolt spacing

=.7 + .3*(Sa - .5Ed)/Ed

				Bolt Spacing (inches)				
Bolt Size	Ed (Embed.)	1.5 Ed	.5Ed	5	6.5	8	6.5+8	6.5+6.5+8
1/2"	6	9.00	3.00	0.800	0.875	0.950	0.831	0.727
5/8"	7.5	11.25	3.75	0.750	0.810	0.870	0.705	0.571
3/4"	6.75	10.13	3.38	0.772	0.839	0.906	0.760	0.637
1"	9	13.50	4.50	0.717	0.767	0.817	0.626	0.480
1" L	12	18.00	6.00	0.675	0.713	0.750	0.534	0.381

3) Allowable tension and shear values in normal wt. Concrete (ICC #ESR2322)

ASTM A36	**2,000 psi conc.**				**4,000 psi conc.**			
	Tension		Shear		Tension		Shear	
Bolt Size	Concrete	Steel	Concrete	Steel	Concrete	Steel	Concrete	Steel
1/2"	4775	3755	6080	1935	5380	3755	8600	1935
5/8"	7320	5870	9505	3025	7515	5870	13440	3025
3/4"	8670	8455	8390	4355	10755	8455	11865	4355
1"	13845	15030	14915	7745	17365	15030	21095	7745
1" L	17935	15030	24325	7745	17935	15030	34405	7745

ASTM A193-B7	**2,000 psi conc.**				**4,000 psi conc.**			
	Tension		Shear		Tension		Shear	
Bolt Size	Concrete	Steel	Concrete	Steel	Concrete	Steel	Concrete	Steel
1/2"	4775	8100	6080	4170	5380	8100	8600	4170
5/8"	7320	12655	9505	6520	7515	12655	13440	6520
3/4"	8670	18225	8390	9390	10755	18225	11865	9390
1"	13845	32400	14915	16690	17365	32400	21095	16690
1" L	17935	32400	24325	16690	17935	32400	34405	16690

ASTM 304SS	**2,000 psi conc.**				**4,000 psi conc.**			
	Tension		Shear		Tension		Shear	
Bolt Size	Concrete	Steel	Concrete	Steel	Concrete	Steel	Concrete	Steel
1/2"	4775	6480	6080	3335	5380	6480	8600	3335
5/8"	7320	10125	9505	5215	7515	10125	13440	5215
3/4"	8670	12390	8390	6385	10755	12390	11865	6385
1"	13845	22030	14915	11350	17365	22030	21095	11350
1" L.	17935	22030	24325	11350	17935	22030	34405	11350

4) Stiffness Plate thickness based on allowable bearing & shear stresses

Allowable bearing stress =Fbrg = 1.2 * Fu = 1.2*58*1.33 = 92.57 ksi

Jaik Choi Associates
Structural Engineering
(949)706-7789, Fax;(424)239-2666
email; jcse@msn.com

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Allowable shearing stress = Fv = 0.4 * Fy = 0.4*36*1.33 = 19.15 ksi
Edge distance of bolt= 1.75 inches Effect. For shear = 1.75"-1.25"/2 = 1.125 inches

1/4" Plate thick.		
Cable Size	Allow.shear	Allow. Brg.
0.25	10.77	5.79
0.375	10.77	8.68
0.5	10.77	11.57
0.625	10.77	14.46

3/8" Plate thick.		
Cable Size	Allow.shear	Allow. Brg.
0.25	16.16	8.68
0.375	16.16	13.02
0.5	16.16	17.36
0.625	16.16	21.70

5) Maximum plate thickness based on allow. conc. bearing stresses f'c= 2,000 4,000 psi
Allowable concrete bearing stress = .6*fc'*1.33 = **Fc=** 1600 3200 psi

Conn. Type	**2 bolts**	**4 bolts**	**6 bolts**	**Fc (psi)**
Max. pl. thk.	0.667	0.514	0.408	for 1600
Max. pl. thk.	0.943	0.727	0.578	for 3200

Base plate length to calculate plate thickness (Pl. thk.)

Conn. Type	**2 bolts**	**4 bolts**	**6 bolts**	
Angle length ("L")	8	10	16	inches
Min. edge dist.	6	8	8	inches

6) Allowable total tank weight (Wt) **=Max. Vs/ 0.445**

For f'c = 2,000 psi Concrete

Conn. Type	# of Anchors	Sa	Hp	Tension (lbs)	Shear (lbs)	Max. Vs (kips)	Tank Wt. (kips)	Pl. thk. (inch)
4-2A	(4) 2- 1/2" dia.	3	3.5	3755	1935	3.96	8.89	0.267
4-2B	(4) 2- 5/8" dia.	3	3.5	5490	3025	6.09	13.69	0.331
4-2C	(4) 2- 3/4" dia.	3	3.5	6695	4355	8.40	18.87	0.389
4-2D	(4) 2- 1" dia.	3	3.5	9922	7745	14.16	31.81	0.505
4-4A	(4) 4- 1/2" dia.	8	4	3755	1935	8.19	18.40	0.106
4-4B	(4) 4- 5/8" dia.	8	4	5158	3025	12.44	27.97	0.131
4-4C	(4) 4- 3/4" dia.	8	6	6586	4355	15.49	34.81	0.179
4-4D	(4) 4- 1" dia.	8	6	8669	7745	24.67	55.45	0.226
4-6A	(4) 6- 1/2" dia.	8	4	3473	1935	12.08	27.14	0.165
4-6B	(4) 6- 5/8" dia.	8	4	4178	3025	17.72	39.83	0.199
4-6C	(4) 6- 3/4" dia.	8	6	5525	4355	21.84	49.09	0.271
4-6D	(4) 6- 1" dia.	8	6	6646	7745	32.98	74.12	0.333
8-4A	(8) 4- 1/2" dia.	8	4	3755	1935	19.76	44.41	0.106
8-4B	(8) 4- 5/8" dia.	8	4	5158	3025	30.04	67.51	0.131
8-4C	(8) 4- 3/4" dia.	8	6	6586	4355	37.39	84.03	0.179
8-4D	(8) 4- 1" dia.	8	6	8669	7745	59.56	133.85	0.226
8-6B	(8) 6- 5/8" dia.	8	4	4178	3025	42.79	96.16	0.199
8-6C	(8) 6- 3/4" dia.	8	6	5525	4355	52.72	118.49	0.271
8-6D	(8) 6- 1" dia.	8	6	6646	7745	79.61	178.92	0.333
8-6E	(8) 6- 1" L.dia.	8	6	6829	7745	80.62	181.18	0.335

For f'c = 4,000 psi Concrete

Conn. Type	# of Anchors	Sa	Hp	Tension	Shear	Max. Vs	Tank Wt.	Pl. thk.

				(lbs)	(lbs)	(kips)	(kips)	(inch)
4-2A4	(4) 2- 1/2" dia.	3	3.5	3755	1935	3.96	8.89	0.267
4-2B4	(4) 2- 5/8" dia.	3	3.5	5870	3025	6.19	13.90	0.334
4-2C4	(4) 2- 3/4" dia.	3	3.5	8455	4355	8.91	20.02	0.401
4-2D4	(4) 2- 1" dia.	3	3.5	12445	7745	15.11	33.97	0.522
4-4A4	(4) 4- 1/2" dia.	8	4	3755	1935	8.19	18.40	0.106
4-4B4	(4) 4- 5/8" dia.	8	4	5870	3025	12.80	28.76	0.133
4-4C4	(4) 4- 3/4" dia.	8	6	8455	4355	16.71	37.56	0.186
4-4D4	(4) 4- 1" dia.	8	6	10872	7745	26.86	60.35	0.235
4-6A4	(4) 6- 1/2" dia.	8	4	3755	1935	12.28	27.59	0.166
4-6B4	(4) 6- 5/8" dia.	8	4	5870	3025	19.19	43.14	0.207
4-6C4	(4) 6- 3/4" dia.	8	6	8455	4355	25.07	56.34	0.187
4-6D4	(4) 6- 1" dia.	8	6	10872	7745	40.28	90.53	0.368
4-6E4	(4) 6- 1" L.dia.	8	6	9584	7745	38.48	86.48	0.360
8-4A4	(8) 4- 1/2" dia.	8	4	3755	1935	19.76	44.41	0.106
8-4B4	(8) 4- 5/8" dia.	8	4	5870	3025	30.89	69.42	0.133
8-4C4	(8) 4- 3/4" dia.	8	6	8455	4355	40.34	90.67	0.186
8-4D4	(8) 4- 1" dia.	8	6	10872	7745	64.83	145.70	0.235
8-6A4	(8) 6- 1/2" dia.	8	4	3755	1935	29.64	66.61	0.166
8-6B4	(8) 6- 5/8" dia.	8	4	5870	3025	46.33	104.13	0.207
8-6C4	(8) 6- 3/4" dia.	8	6	8455	4355	60.52	136.00	0.290
8-6D4	(8) 6- 1" dia.	8	6	10872	7745	97.24	218.55	0.368
8-6E4	(8) 6- 1" L.dia.	8	6	9584	7745	92.90	208.77	0.360

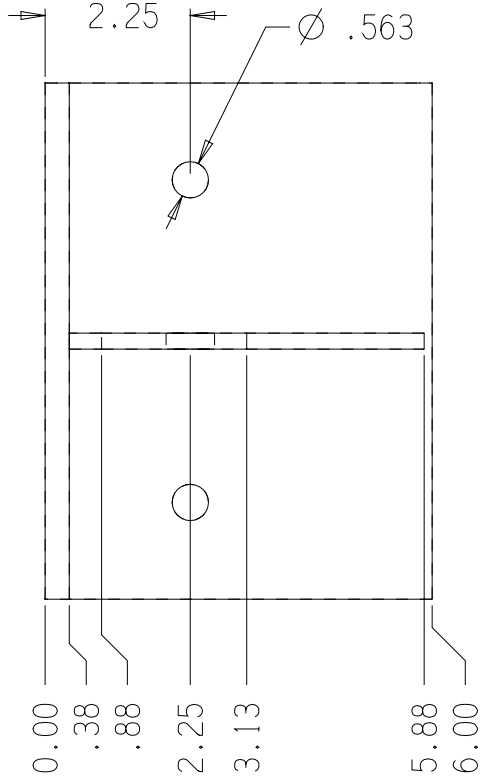
ASTM A 193- Grade B7 **(4,000 psi)**

Conn. Type	# of Anchors	Sa	Hp	Tension (lbs)	Shear (lbs)	Max. Vs (kips)	Tank Wt. (kips)	Pl. thk. (inch)
4-6D4(B7)	(4) 6- 1" dia.	8	6	10872	13208	55.15	123.95	0.431
4-6E4(B7)	(4) 6- 1" L.dia.	8	6	9584	13099	51.62	116.01	0.417
8-4A4(B7)	(8) 4- 1/2" dia.	8	4	5380	4170	38.60	89.34	0.148
8-4B4(B7)	(8) 4- 5/8" dia.	8	4	5296	6520	51.83	119.97	0.172
8-4C4(B7)	(8) 4- 3/4" dia.	8	6	8170	9390	64.76	149.92	0.235
8-4D4(B7)	(8) 4- 1" dia.	8	6	10872	13208	88.76	205.45	0.275
8-6A4(B7)	(8) 6- 1/2" dia.	6	4	5380	4170	52.96	122.60	0.342
8-6B4(B7)	(8) 6- 5/8" dia.	8	4	5296	6520	77.74	179.96	0.269
8-6D4(B7)	(8) 6- 1" dia.	8	6	10872	9023	107.13	248.00	0.386
8-6E4(B7)	(8) 6- 1"L.dia.	8	6	9584	13099	124.61	288.44	0.417

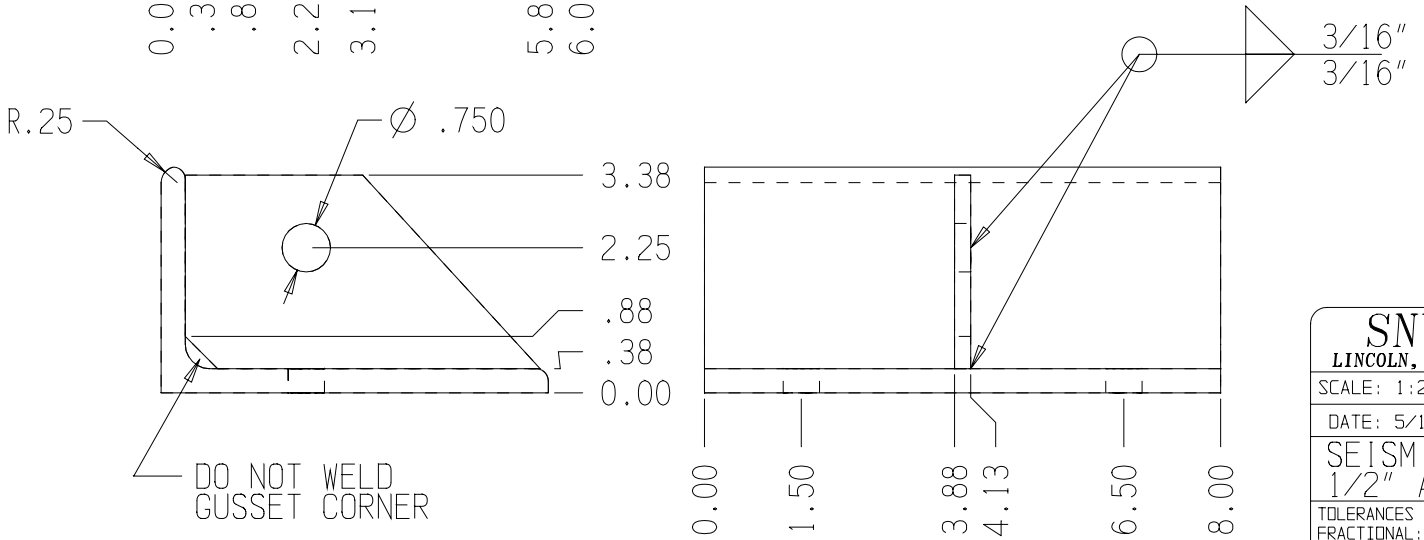
AISI 304 SS- Condition CW **(4,000 psi)**

Conn. Type	# of Anchors	Sa	Hp	Tension (lbs)	Shear (lbs)	Max. Vs (kips)	Tank Wt. (kips)	Pl. thk. (inch)
8-4A4(SS)	(8) 4- 1/2" dia.	8	4	5380	3335	32.70	75.68	0.136
8-4B4(SS)	(8) 4- 5/8" dia.	8	4	5296	5215	44.88	103.88	0.160
8-4C4(SS)	(8) 4- 3/4" dia.	8	6	8170	6385	51.70	119.67	0.210
8-4D4(SS)	(8) 4- 1" dia.	8	6	10872	13208	88.76	205.45	0.275
8-6A4(SS)	(8) 6- 1/2" dia.	8	4	5380	3335	49.04	113.53	0.213
8-6B4(SS)	(8) 6- 5/8" dia.	8	4	5296	5215	67.32	155.82	0.250

8-6C4(SS)	(8) 6- 3/4" dia.	8	6	8170	6385	77.55	179.51	0.329
8-6D4(SS)	(8) 6- 1" dia.	8	6	10872	10126	114.84	265.84	0.400
8-6E4(SS)	(8) 6- 1" L.dia.	8	6	9584	13099	124.61	288.44	0.417



NOTES:
1. MATERIAL: ASTM A-36. L3-1/2 X 6 X 3/8" STRUCTURAL ANGLE.
2. WELDS TO BE 3/16" FILLET BOTH SIDES.
3. DEBUR ALL EDGES. HEAVILY DEBUR HOLE ON VERTICAL PLATE (A SMALL RADIUS IS PREFERRED).
4. HOT DIP GALVANIZE THE PART PER ASTM A-123-89. ALTERNATE FINISH TO BE BLACK ENAMEL PAINT FINISH PER SII PAINTING STANDARDS DATED 7/13/98. HOT DIP GALVANIZED IS THE PREFERRED FINISH.



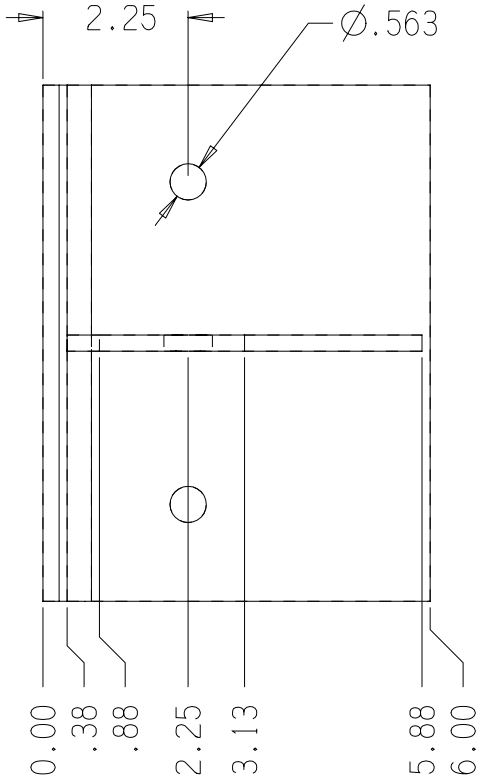
SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

SCALE: 1:2	SII P/N: 33900405	DRAWN BY: D.A.D.
DATE: 5/18/04		REVISION: B

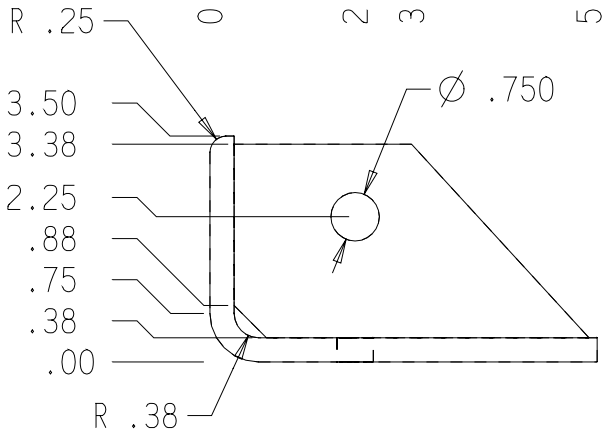
SEISMIC ANCHOR PLATE - 2 BOLT VERSION
1/2" ANCHOR TYPE

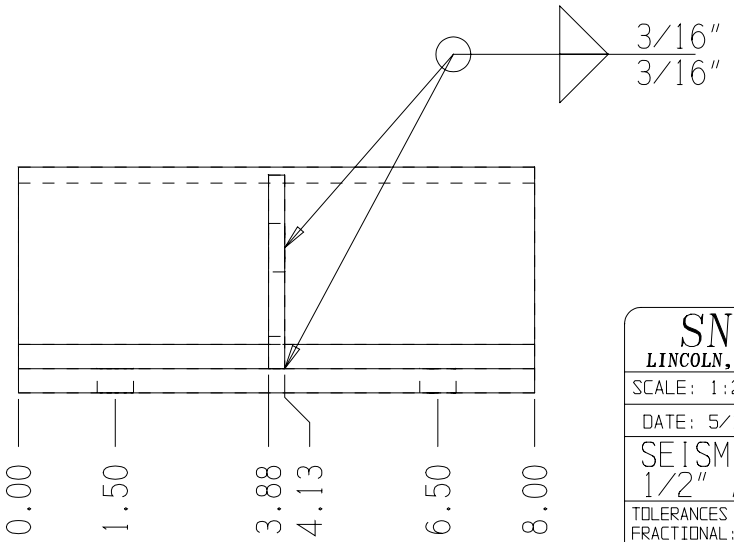
TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL: ±1/32"; ANGULAR: ±1°
DECIMAL: .X = ±0.100"; .XX = ±0.030"; .XXX = ±0.010"

DRAWING NUMBER
B-2465 GS



NOTES:
1. MATERIAL: 316 STAINLESS STEEL PLATE.
2. DEBURR ALL EDGES
3. CHAMFER OR RADIUS THE 3/4" HOLE ON THE VERTICAL PLATE 1/32".
4. NO BURRS OR SHARP EDGES ALLOWED ON THE FRONT FACE (3.5" X 8.0" AREA) OF THE WELDMENT.





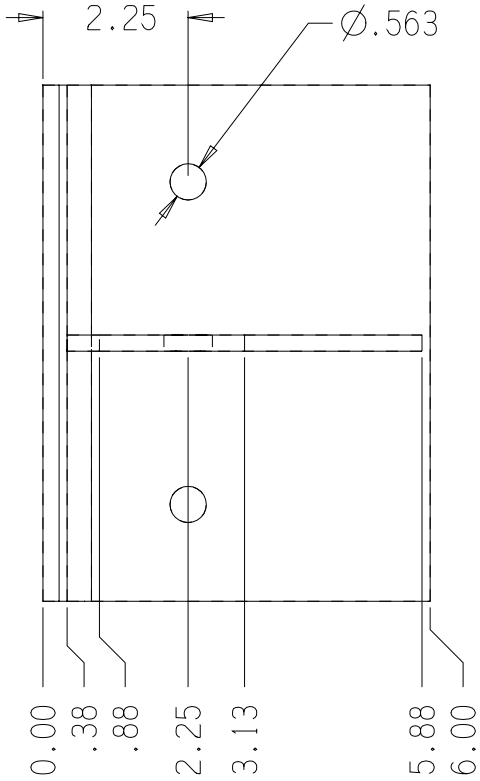
SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

SCALE: 1:2	SII P/N: 33900410	DRAWN BY: N.L.E.
DATE: 5/15/06		REVISION: B

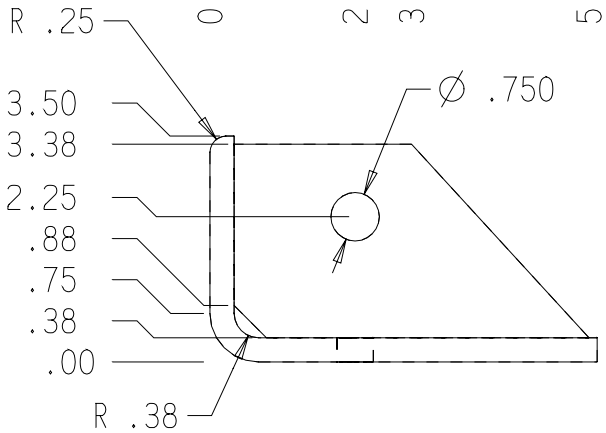
SEISMIC ANCHOR PLATE - 2 BOLT VERSION
1/2" ANCHOR TYPE, 304SS

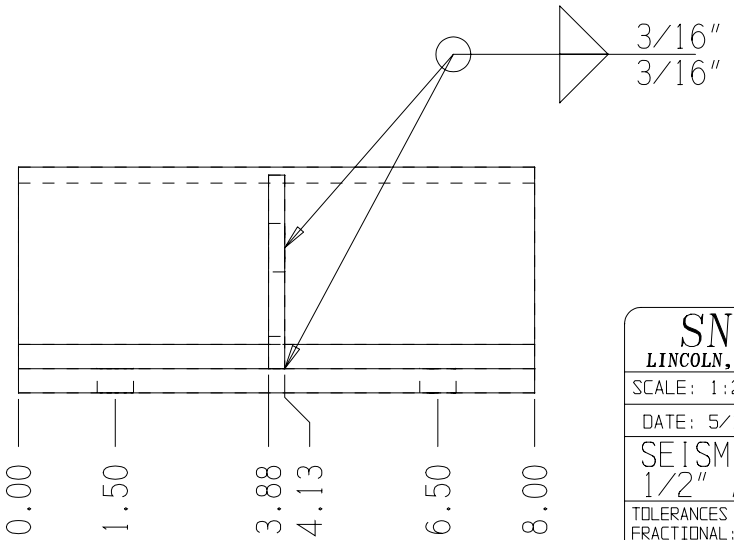
TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL: ±1/32"; ANGULAR: ±1°
DECIMAL: .X = ±0.100"; .XX = ±0.030"; .XXX = ±0.010"

DRAWING NUMBER
B-2465 304SS



NOTES:
1. MATERIAL: 316 STAINLESS STEEL PLATE.
2. DEBURR ALL EDGES
3. CHAMFER OR RADIUS THE 3/4" HOLE ON THE VERTICAL PLATE 1/32".
4. NO BURRS OR SHARP EDGES ALLOWED ON THE FRONT FACE (3.5" X 8.0" AREA) OF THE WELDMENT.





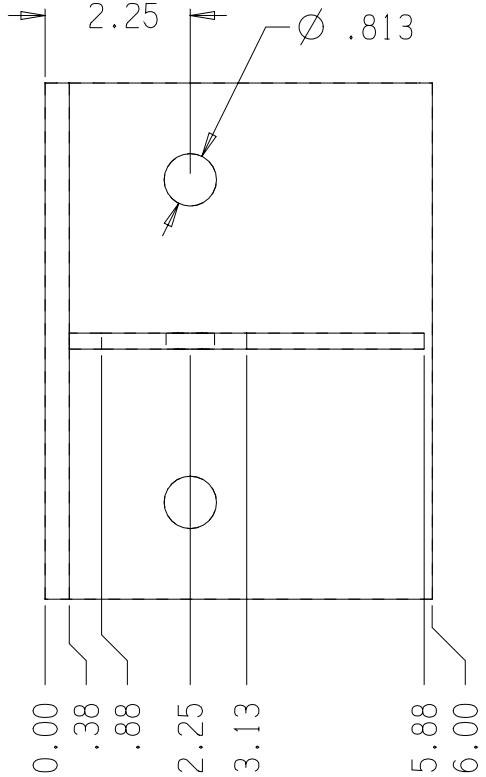
SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

SCALE: 1:2	SII P/N: 33900415	DRAWN BY: N.L.E.
DATE: 5/15/06		REVISION: B

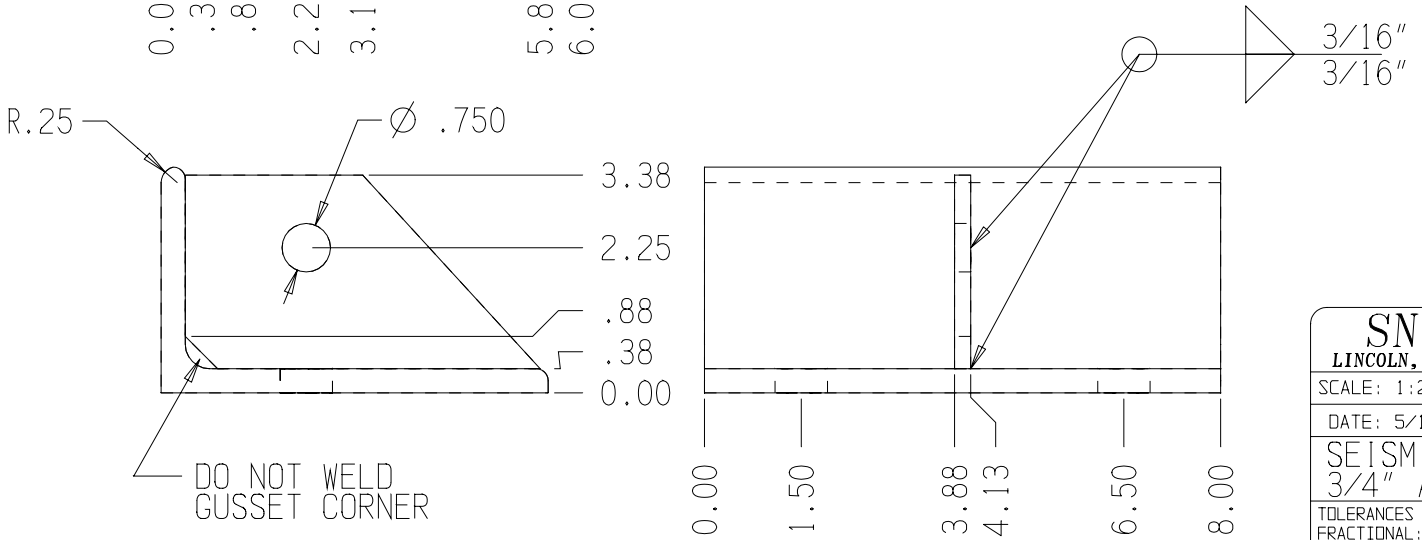
SEISMIC ANCHOR PLATE - 2 BOLT VERSION
1/2" ANCHOR TYPE, 316SS

TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL: ±1/32"; ANGULAR: ±1°
DECIMAL: .X = ±0.100"; .XX = ±0.030"; .XXX = ±0.010"

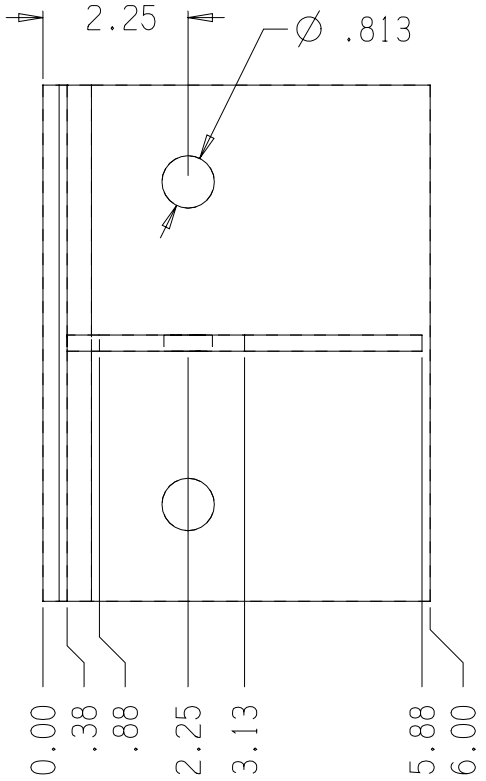
DRAWING NUMBER
B-2465 316SS



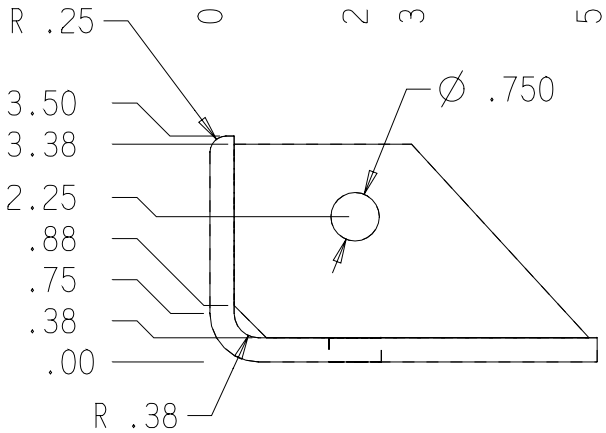
NOTES:
1. MATERIAL: ASTM A-36. L3-1/2 X 6 X 3/8" STRUCTURAL ANGLE.
2. WELDS TO BE 3/16" FILLET BOTH SIDES.
3. DEBUR ALL EDGES. HEAVILY DEBUR HOLE ON VERTICAL PLATE (A SMALL RADIUS IS PREFERRED).
4. HOT DIP GALVANIZE THE PART PER ASTM A-123-89. ALTERNATE FINISH TO BE BLACK ENAMEL PAINT FINISH PER SII PAINTING STANDARDS DATED 7/13/98. HOT DIP GALVANIZED IS THE PREFERRED FINISH.

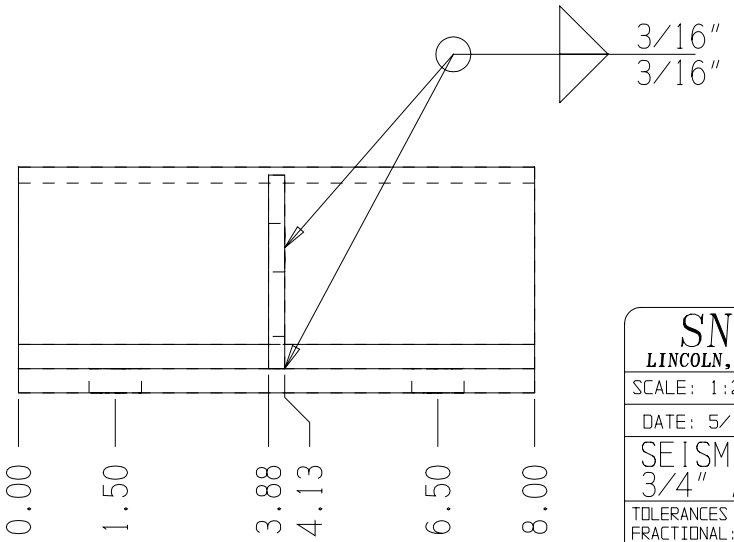


SNYDER INDUSTRIES INC.		
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247		
SCALE: 1:2	SII P/N: 33900406	DRAWN BY: D.A.D.
DATE: 5/18/04		REVISION: A
SEISMIC ANCHOR PLATE - 2 BOLT VERSION 3/4" ANCHOR TYPE		
TOLERANCES UNLESS OTHERWISE SPECIFIED: FRACTIONAL: ±1/32"; ANGULAR: ±1° DECIMAL: .X = ±0.100"; .XX = ±0.030"; .XXX = ±0.010"		DRAWING NUMBER B-2466 GS



NOTES:
1. MATERIAL: 316 STAINLESS STEEL PLATE.
2. DEBURR ALL EDGES
3. CHAMFER OR RADIUS THE 3/4" HOLE ON THE VERTICAL PLATE 1/32".
4. NO BURRS OR SHARP EDGES ALLOWED ON THE FRONT FACE (3.5" X 8.0" AREA) OF THE WELDMENT.





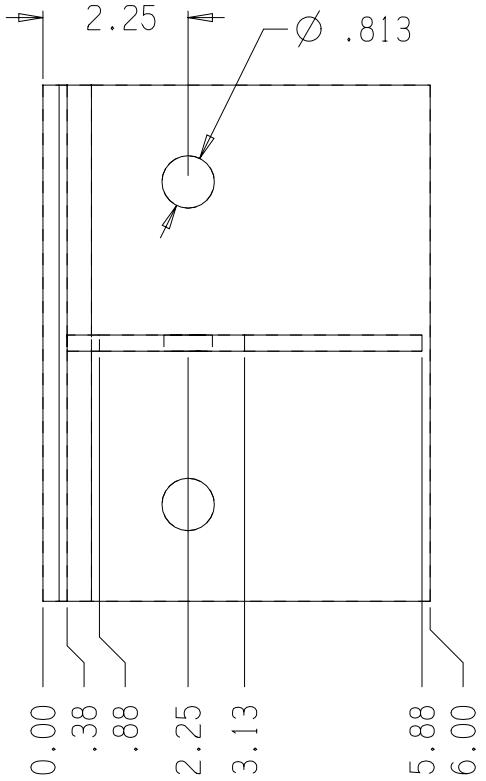
SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

SCALE: 1:2	SII P/N: 33900411	DRAWN BY: N.L.E.
DATE: 5/15/06		REVISION A

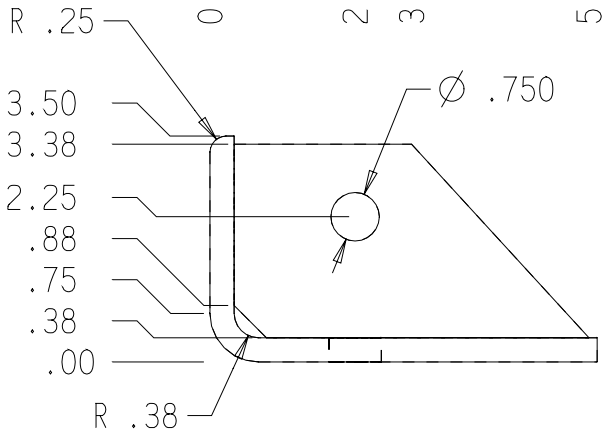
SEISMIC ANCHOR PLATE - 2 BOLT VERSION
3/4" ANCHOR TYPE, 304SS

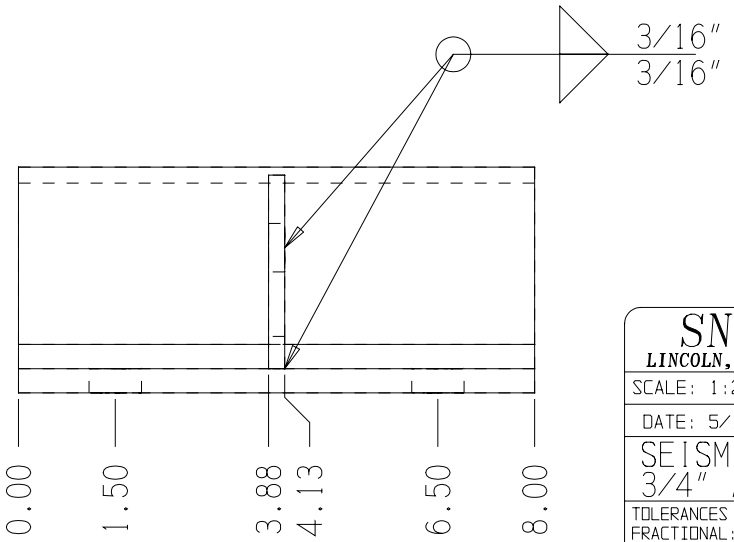
TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL: ±1/32"; ANGULAR: ±1°
DECIMAL: .X = ±0.100"; .XX = ±0.030"; .XXX = ±0.010"

DRAWING NUMBER
B-2466 304SS



NOTES:
1. MATERIAL: 316 STAINLESS STEEL PLATE.
2. DEBURR ALL EDGES
3. CHAMFER OR RADIUS THE 3/4" HOLE ON THE VERTICAL PLATE 1/32".
4. NO BURRS OR SHARP EDGES ALLOWED ON THE FRONT FACE (3.5" X 8.0" AREA) OF THE WELDMENT.





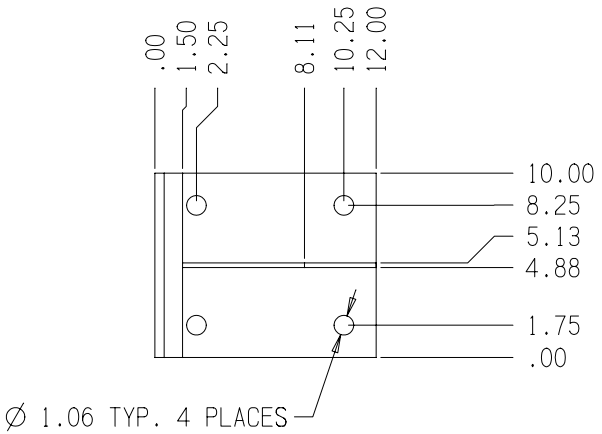
SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

SCALE: 1:2	SII P/N: 33900416	DRAWN BY: N.L.E.
DATE: 5/15/06		REVISION: A

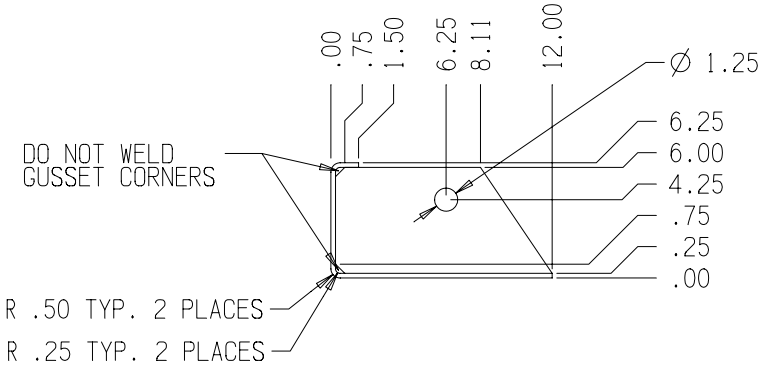
SEISMIC ANCHOR PLATE - 2 BOLT VERSION
3/4" ANCHOR TYPE, 316SS

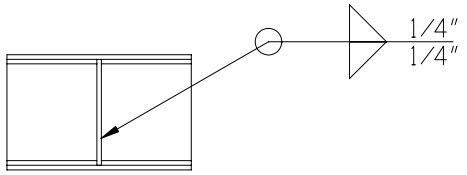
TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL: ±1/32"; ANGULAR: ±1°
DECIMAL: .X = ±0.100"; .XX = ±0.030"; .XXX = ±0.010"

DRAWING NUMBER
B-2466 316SS



NOTES:
1. MATERIAL ASTM A-36 OR EQUAL. PLATE 1/4" THICK.
2. HOT DIP GALVANIZE THE PART PER ASTM A-123-89.
3. PART SHOWN IS MADE WITH A BENT PLATE. BEND MUST BE PERPENDICULAR TO THE PLATE GRAIN.
4. DEBUR ALL EDGES.
5. CHAMFER OR RADIUS THE 1-1/4" HOLE ON THE VERTICAL PLATE 1/32".
6. NO BURS OR SHARP EDGES ALLOWED ON THE FRONT FACE (6.5" X 10" AREA) OF THE WELDMENT.
7. INSPECT THE POST GALVANIZED PART FOR DRIPS AND OTHER IRREGULARITIES THAT WOULD INTERFER WITH THE HOLES OR CAUSE IRREGULAR SURFACES ON THE FRONT FACE OF THE WELDMENT. GRIND/SAND THESE AREAS SMOOTH. TOUCH UP WITH BRIGHT (ALUMINIZED) COLD GALVANIZED PAINT IF NECESSARY.



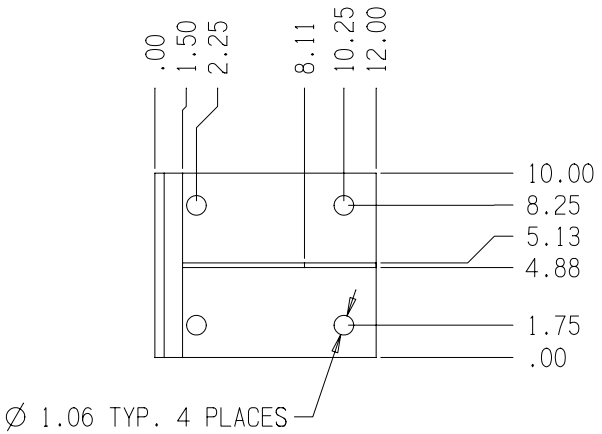


SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

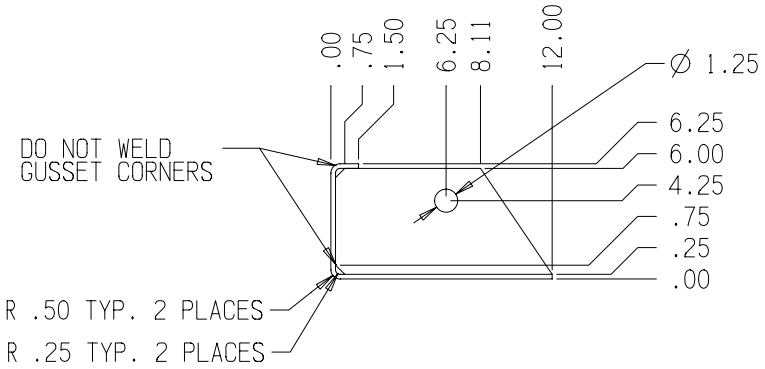
SCALE: NTS	SII P/N:	DRAWN BY: D.A.D.
DATE: 4/24/05	33900407	REVISED

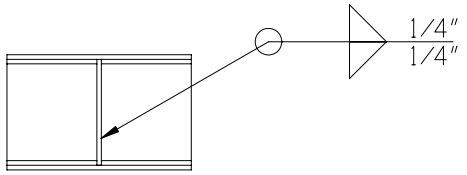
GALVANIZED STEEL SEISMIC ANCHOR PLATE
4 BOLT VERSION

TOLERANCES UNLESS OTHERWISE SPECIFIED: FRACTIONAL: ±1/32"; ANGULAR: ±1° DECIMAL: .X = ±0.100"; .XX = ±0.030"; .XXX = ±0.010"	DRAWING NUMBER B-2467B - GS



NOTES:
1. MATERIAL: 304SS PLATE 1/4" THICK.
2. PART SHOWN IS MADE WITH A BENT PLATE. BEND MUST BE PERPENDICULAR TO THE PLATE GRAIN.
3. DEBUR ALL EDGES.
4. CHAMFER OR RADIUS THE 1-1/4" HOLE ON THE VERTICAL PLATE 1/32".
5. NO BURS OR SHARP EDGES ALLOWED ON THE FRONT FACE (6.25" X 10" AREA) OF THE WELDMENT.





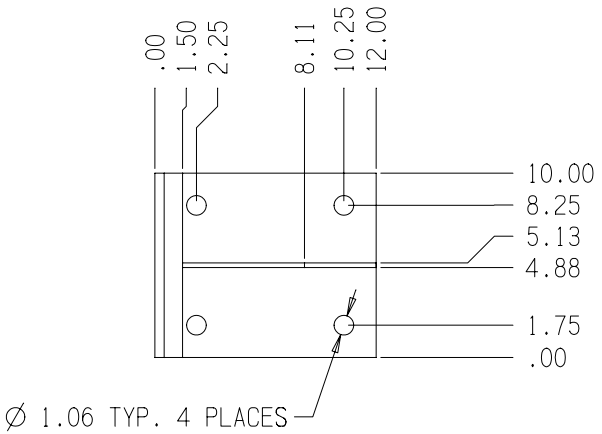
SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

SCALE: NTS	SII P/N: 33900412	DRAWN BY: D.A.D.
DATE: 4/24/05		REVISION: B

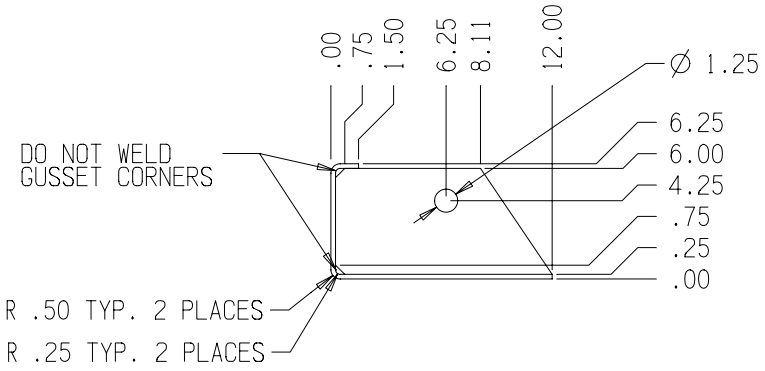
SEISMIC ANCHOR PLATE - 4 BOLT VERSION - 304SS

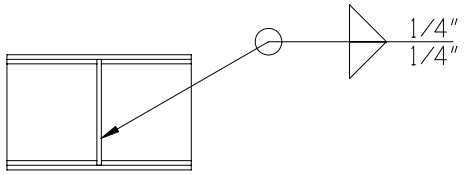
TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL: ±1/32"; ANGULAR: ±1°
DECIMAL: .X = ±0.100"; .XX = ±0.030"; .XXX = ±0.010"

DRAWING NUMBER
B-2467 SS304



NOTES:
1. MATERIAL: 316SS PLATE 1/4" THICK.
2. PART SHOWN IS MADE WITH A BENT PLATE. BEND MUST BE PERPENDICULAR TO THE PLATE GRAIN.
3. DEBUR ALL EDGES.
4. CHAMFER OR RADIUS THE 1-1/4" HOLE ON THE VERTICAL PLATE 1/32".
5. NO BURS OR SHARP EDGES ALLOWED ON THE FRONT FACE (6.25" X 10" AREA) OF THE WELDMENT.





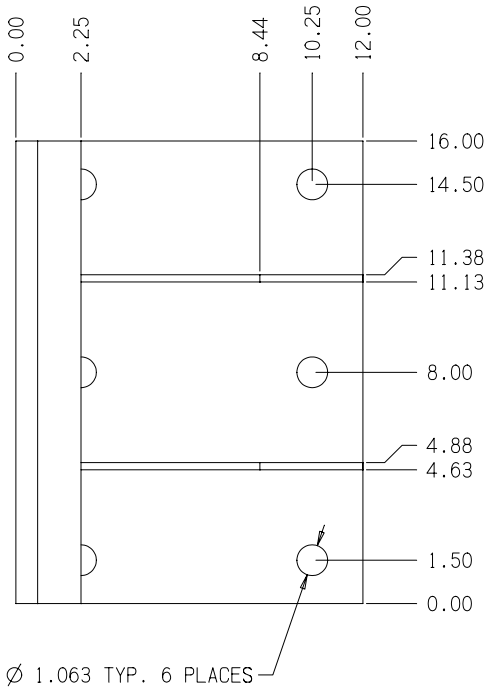
SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

SCALE: NTS	SII P/N: 33900417	DRAWN BY: D.A.D.
DATE: 4/24/05		REVISION: B

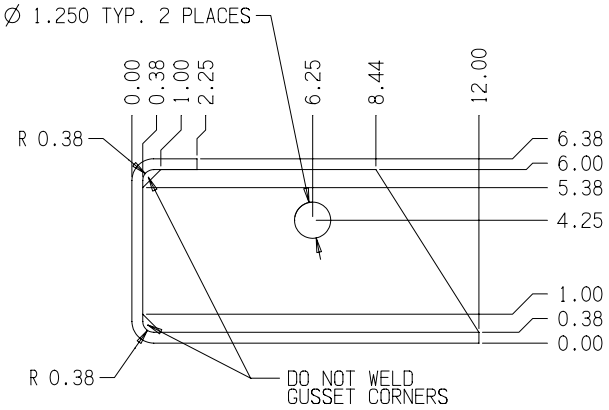
SEISMIC ANCHOR PLATE - 4 BOLT VERSION - 316SS

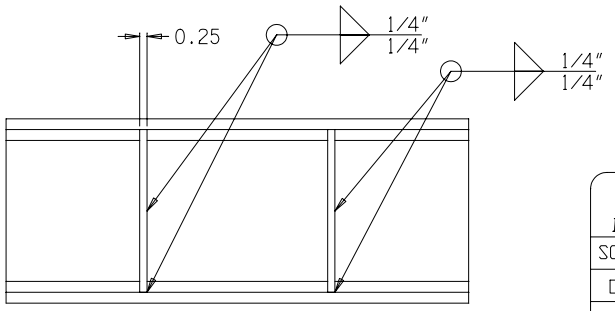
TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL: ±1/32"; ANGULAR: ±1°
DECIMAL: .X = ±0.100"; .XX = ±0.030"; .XXX = ±0.010"

DRAWING NUMBER
B-2467 SS316



NOTES:
1. MATERIAL ASTM A-36 OR EQUAL. PLATE 1/4 AND 3/8" THICK.
2. HOT DIP GALVANIZE THE PART PER ASTM A-123-89.
3. PART SHOWN IS MADE WITH A BENT PLATE. BEND MUST BE PERPENDICULAR TO THE PLATE GRAIN.
4. DEBUR ALL EDGES.
5. CHAMFER OR RADIUS THE 1-1/4" HOLE ON THE VERTICAL PLATE 1/32".
6. NO BURS OR SHARP EDGES ALLOWED ON THE FRONT FACE (6.375" X 16" AREA) OF THE WELDMENT.
7. INSPECT THE POST GALVANIZED PART FOR DRIPS AND OTHER IRREGULARITIES THAT WOULD INTERFER WITH THE HOLES OR CAUSE IRREGULAR SURFACES ON THE FRONT FACE OF THE WELDMENT. GRIND/SAND THESE AREAS SMOOTH. TOUCH UP WITH BRIGHT (ALUMINIZED) COLD GALVANIZED PAINT IF NECESSARY.





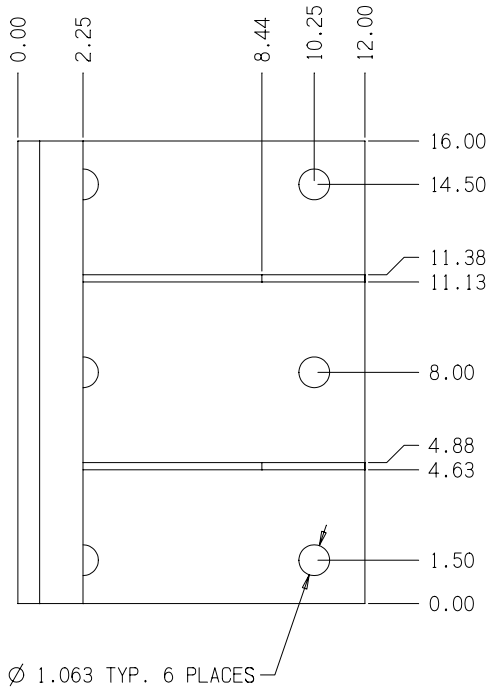
SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

SCALE: NTS	SII P/N: 33900408	DRAWN BY: N.L.E.
DATE: 4/22/05		REVISED: 12/14/06

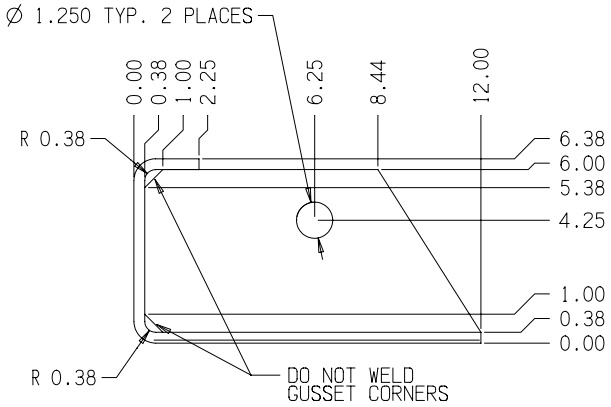
GALVANIZED STEEL SEISMIC ANCHOR PLATE - 6 BOLT STANDARD VERSION

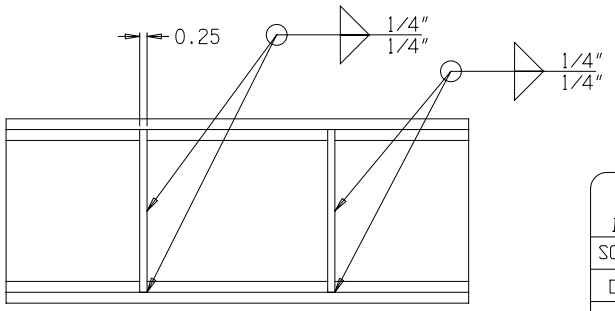
TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL: ±1/32"; ANGULAR: ±1°
DECIMAL: .X = ±0.100"; .XX = ±0.030"; .XXX = ±0.010"

DRAWING NUMBER
B-2468B



NOTES:
1. MATERIAL: 304SS PLATE 1/4" AND 3/8" THICK.
2. PART SHOWN IS MADE WITH A BENT PLATE. BEND MUST BE PERPENDICULAR TO THE PLATE GRAIN.
3. DEBUR ALL EDGES.
4. CHAMFER OR RADIUS THE 1-1/4" HOLE ON THE VERTICAL PLATE 1/32".
5. NO BURS OR SHARP EDGES ALLOWED ON THE FRONT FACE (6.375" X 16" AREA) OF THE WELDMENT.





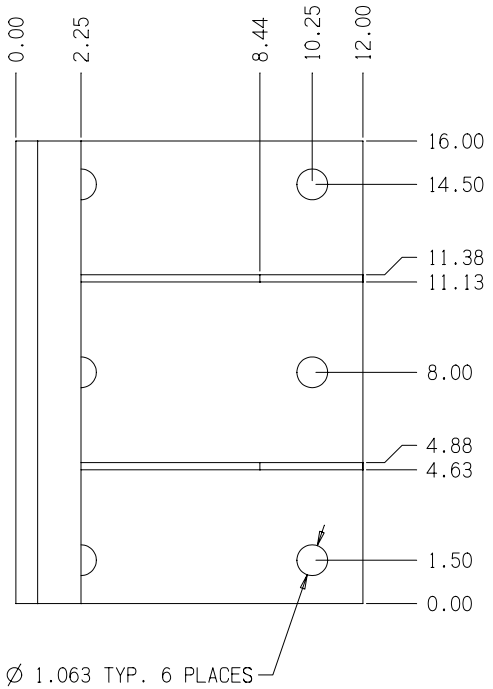
SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

SCALE: NTS	SII P/N: 33900413	DRAWN BY: N.L.E.
DATE: 4/22/05		REVISED

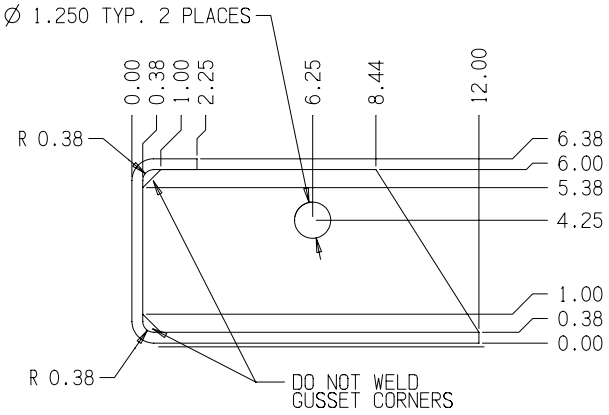
SEISMIC ANCHOR PLATE - 6 BOLT STANDARD VERSION - 304SS

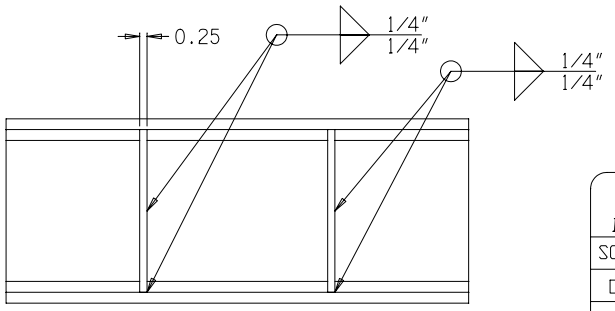
TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL: ±1/32"; ANGULAR: ±1°
DECIMAL: .X = ±0.100"; .XX = ±0.030"; .XXX = ±0.010"

DRAWING NUMBER
B-2468A SS304



NOTES:
1. MATERIAL: 316SS PLATE 1/4" AND 3/8" THICK.
2. PART SHOWN IS MADE WITH A BENT PLATE. BEND MUST BE PERPENDICULAR TO THE PLATE GRAIN.
3. DEBUR ALL EDGES.
4. CHAMFER OR RADIUS THE 1-1/4" HOLE ON THE VERTICAL PLATE 1/32".
5. NO BURS OR SHARP EDGES ALLOWED ON THE FRONT FACE (6.375" X 16" AREA) OF THE WELDMENT.





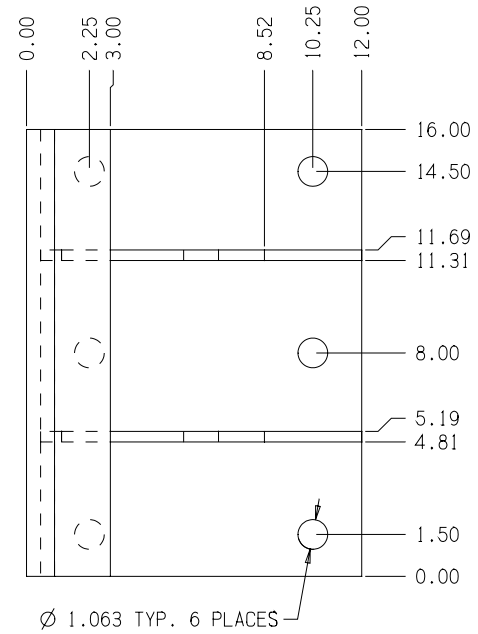
SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

SCALE: NTS	SII P/N: 33900418	DRAWN BY: N.L.E.
DATE: 4/22/05		REVISED

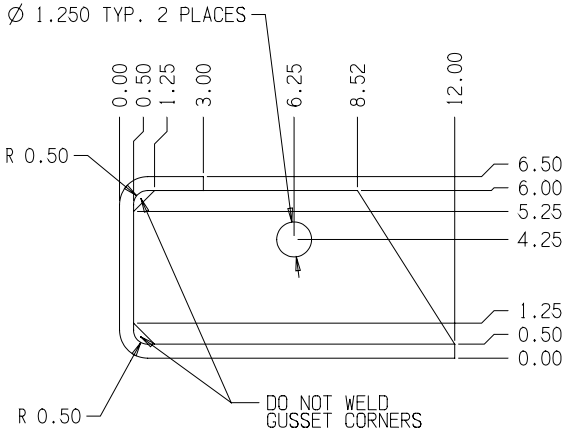
SEISMIC ANCHOR PLATE - 6 BOLT STANDARD VERSION - 316SS

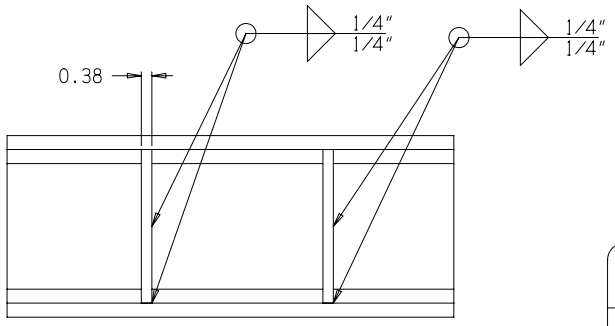
TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL: ±1/32"; ANGULAR: ±1°
DECIMAL: .X = ±0.100"; .XX = ±0.030"; .XXX = ±0.010"

DRAWING NUMBER
B-2468A SS316



NOTES:
1. MATERIAL ASTM A-36 OR EQUAL. PLATE 3/8 AND 1/2" THICK.
2. HOT DIP GALVANIZE THE PART PER ASTM A-123-89.
3. PART SHOWN IS MADE WITH A BENT PLATE. BEND MUST BE PERPENDICULAR TO THE PLATE GRAIN.
4. DEBUR ALL EDGES.
5. CHAMFER OR RADIUS THE 1-1/4" HOLE ON THE VERTICAL PLATE 1/32".
6. NO BURS OR SHARP EDGES ALLOWED ON THE FRONT FACE (6.5" X 16" AREA) OF THE WELDMENT.
7. INSPECT THE POST GALVANIZED PART FOR DRIPS AND OTHER IRREGULARITIES THAT WOULD INTERFER WITH THE HOLES OR CAUSE IRREGULAR SURFACES ON THE FRONT FACE OF THE WELDMENT. GRIND/SAND THESE AREAS SMOOTH. TOUCH UP WITH BRIGHT (ALUMINIZED) COLD GALVANIZED PAINT IF NECESSARY.





SNYDER INDUSTRIES INC.

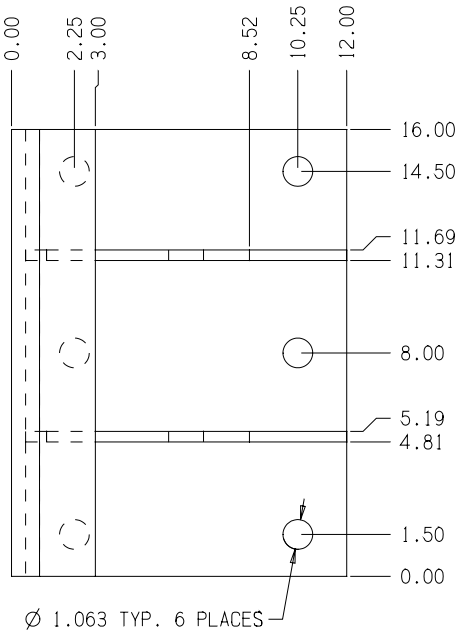
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

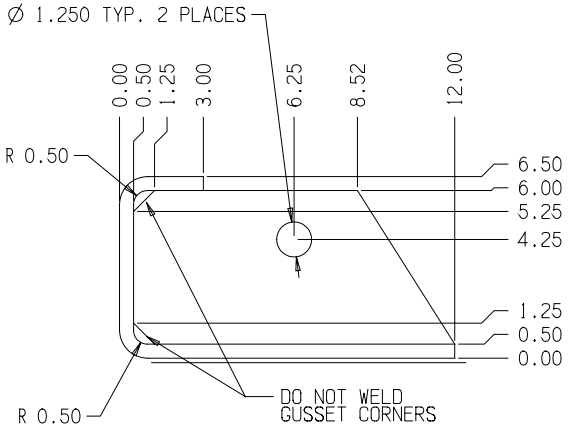
SCALE: NTS	SII P/N: 33900409	DRAWN BY: N.L.E.
DATE: 4/22/05		REVISED

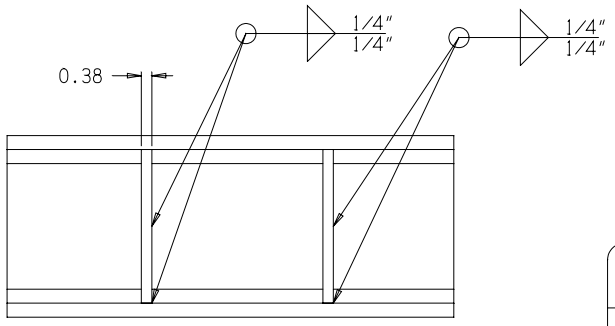
SEISMIC ANCHOR PLATE - 6 BOLT HEAVY VERSION

TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL: ±1/32"; ANGULAR: ±1°
DECIMAL: .X = ±0.100"; .XX = ±0.030"; .XXX = ±0.010"

DRAWING NUMBER
B-2469B







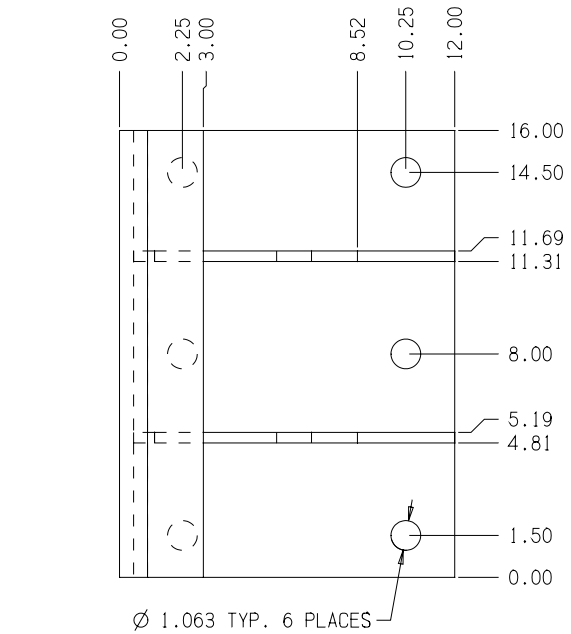
NOTES:
1. MATERIAL: 304SS PLATE 3/8" AND 1/2" THICK.
2. PART SHOWN IS MADE WITH A BENT PLATE. BEND MUST BE PERPENDICULAR TO THE PLATE GRAIN.
3. DEBUR ALL EDGES.
4. CHAMFER OR RADIUS THE 1-1/4" HOLE ON THE VERTICAL PLATE 1/32".
5. NO BURS OR SHARP EDGES ALLOWED ON THE FRONT FACE (6.5" X 16" AREA) OF THE WELDMENT.

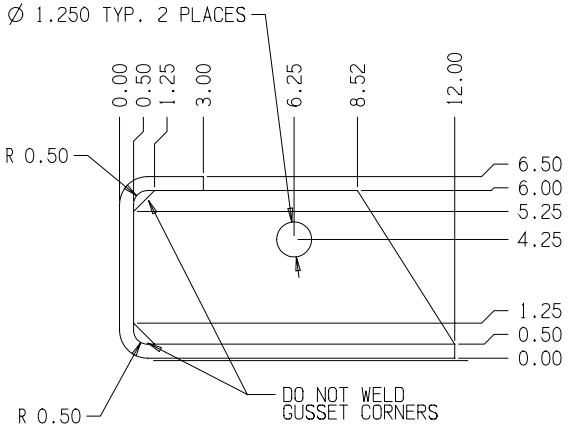
SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

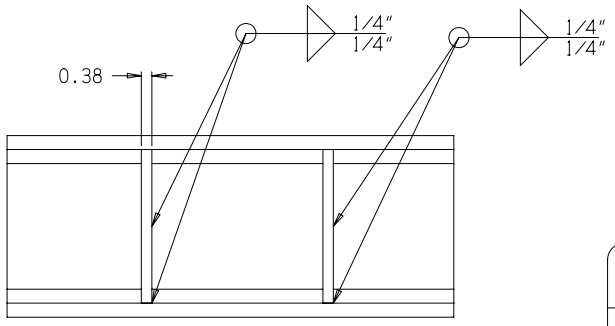
SCALE: NTS	SII P/N: 33900414	DRAWN BY: N.L.E.
DATE: 4/22/05		REVISED

SEISMIC ANCHOR PLATE - 6 BOLT HEAVY VERSION - 304SS

TOLERANCES UNLESS OTHERWISE SPECIFIED: FRACTIONAL: ±1/32"; ANGULAR: ±1° DECIMAL: .X = ±0.100"; .XX = ±0.030"; .XXX = ±0.010"	DRAWING NUMBER B-2469A SS304







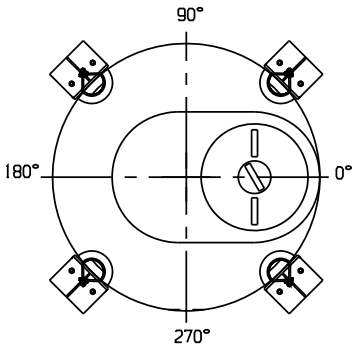
NOTES:
1. MATERIAL: 316SS PLATE 3/8" AND 1/2" THICK.
2. PART SHOWN IS MADE WITH A BENT PLATE. BEND MUST BE PERPENDICULAR TO THE PLATE GRAIN.
3. DEBUR ALL EDGES.
4. CHAMFER OR RADIUS THE 1-1/4" HOLE ON THE VERTICAL PLATE 1/32".
5. NO BURS OR SHARP EDGES ALLOWED ON THE FRONT FACE (6.5" X 16" AREA) OF THE WELDMENT.

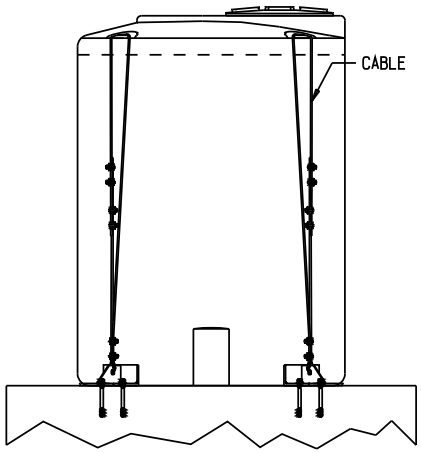
SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

SCALE: NTS	SII P/N: 33900419	DRAWN BY: N.L.E.
DATE: 4/22/05		REVISED

SEISMIC ANCHOR PLATE - 6 BOLT HEAVY VERSION - 316SS

TOLERANCES UNLESS OTHERWISE SPECIFIED: FRACTIONAL: ±1/32"; ANGULAR: ±1° DECIMAL: .X = ±0.100"; .XX = ±0.030"; .XXX = ±0.010"	DRAWING NUMBER B-2469A SS316





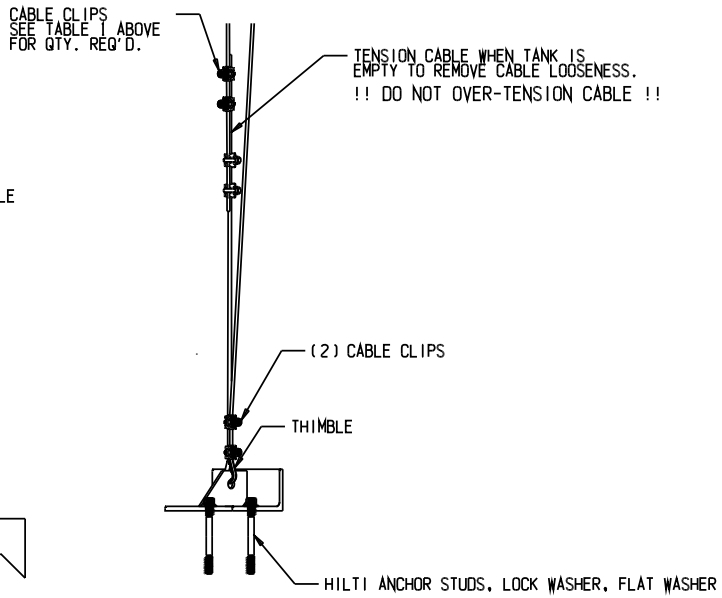


TABLE 1				
CLIP SIZE (INCHES)	ROPE SIZE (INCHES)	MINIMUM # CLIPS REQ'D.	AMOUNT OF ROPE TURN-BACK (INCHES)	*TORQUE IN Ft. Lbs
1/4	1/4	2	4-3/4	15
3/8	3/8	2	6-1/2	45
1/2	1/2	3	11-1/2	65
5/8	5/8	3	12	95
* THE TIGHTENING TORQUE VALUES SHOWN ARE BASED UPON THE THREADS BEING CLEAN, DRY, AND FREE OF LUBRICATION.)				

REVISIONS			
#	DESCRIPTION	DATE	BY
E	CHANGED TO IBC 2012 AND CBC 2013	8/10/2014	DAO

CODES:
- CBC 2013
- IBC 2012
- ASCE 7-10 SECTION 15.7.6
- AISC 13TH EDITION

SEISMIC DESIGN:
- Zip Code = 92701, Site class C - Fa=1.0, Fv=1.5,
- Ss = 1.4, S1 = 0.5, I = 1.5, R = 3.0
- Fp=(Vi*Wi+Vc*Wc/(We+Wc*SG) = 0.445 W

WIND DESIGN:
- IBC/CBC - 150 MPH - EXPOSURE "C"
- Qz = 0.00256KzKztKdV^2I = 46.51 PSF
- (Kz = 0.85, Kzt = 1.0, Kd = 0.95, I = 1.00 (RISK III))

GENERAL:
1. ALL CONSTRUCTION SHALL MEET LOCAL BUILDING CODE REQUIREMENTS AND BE APPROVED BY THE BUILDING OFFICIAL.
2. THESE GUIDELINES HAVE BEEN PROVIDED TO SPECIFY THE RESTRAINT RECOMMENDATIONS FOR SNYDER INDUSTRY BULK STORAGE TANKS.

CONCRETE:
1. CONCRETE SHALL HAVE A MINIMUM DESIGN AS PER DRAWING REFERENCED IN SPECIFICATION CHART BELOW.
2. CONCRETE PAD DESIGN SHOULD BE REVIEWED AND APPROVED BY THE BUILDING OFFICIAL BASED ON SPECIFIC APPLICATION AS OTHER DESIGN PARAMETERS ARE POSSIBLE DEPENDING UPON SITE CONDITIONS.

STRUCTURAL STEEL:
1. ALL STRUCTURAL STEEL COMPONENTS SHALL BE NEW AND OF BASIC OPEN HEARTH PROCESS STEEL CONFORMING TO ALL APPLICABLE REQUIREMENTS OF ASTM A36 (STRUCTURAL STEEL FOR BRIDGES AND BUILDINGS - Fy = 36,000 PSI.).
2. ALL ARC WELDING ELECTRODES SHALL CONFORM TO ASTM A233 FOR STEEL ARC WELDING ELECTRODES. ELECTRODES SHALL BE AS RECOMENDED BY THE MANUFACTURES FOR THE POSITIONS AND OTHER CONDITIONS OF ACTUAL USE. WELDING SHALL CONFORM TO REQUIREMENTS OF AMERICAN WELDING SOCIETY AWS D121.
3. ALL SHARP EDGES AND CORNERS SHALL BE REMOVED ON ALL STRUCTURAL STEEL COMPONENTS.
4. CABLES TO BE 7X19 STRANDED CORE CONSTUCTION SIZED PER CHART. MATERIAL TO BE SPECIFIED BY CUSTOMER ORDER (MINIMUM BREAKING STRENGTH EQUAL TO OR GREATER THAN 304 SS RATING).
5. ANCHOR BOLTS TO BE HILTI ADHESIVE ANCHORS, MODEL HIT-RE 500-SD WITH SIZE, MATERIAL, AND EMBEDMENT AS SPECIFIED PER SPECIFICATION CHART BELOW.

ALL OTHER FASTENER MATERIALS MUST CORRESPOND TO THE TYPE OF ANCHOR SELECTED.

1.5 SPECIFIC GRAVITY									1.9 SPECIFIC GRAVITY								
TANK GAL.	TANK DIA.	ANCHOR	QTY.	ANCHOR BOLT	QTY.	EMBEDMENT	CABLE	FOUNDATION	TANK GAL.	TANK DIA.	ANCHOR	QTY.	ANCHOR BOLT	QTY.	EMBEDMENT	CABLE	FOUNDATION
400	45"	B-2465	4	1/2" HILTI HIT-RE 500-SD	8	6"↧	1/4"	B-3447	400	45"	B-2465	4	1/2" HILTI HIT-RE 500-SD	8	6"↧	1/4"	B-3447
550	48"	B-2465	4	1/2" HILTI HIT-RE 500-SD	8	6"↧	1/4"	B-3447	550	48"	B-2465	4	1/2" HILTI HIT-RE 500-SD	8	6"↧	1/4"	B-3447
550	64"	B-2465	4	1/2" HILTI HIT-RE 500-SD	8	6"↧	1/4"	B-3447	550	64"	B-2465	4	1/2" HILTI HIT-RE 500-SD	8	6"↧	1/4"	B-3447
550	64"	B-2465	4	1/2" HILTI HIT-RE 500-SD	8	6"↧	1/4"	B-3447	550	64"	B-2465	4	1/2" HILTI HIT-RE 500-SD	8	6"↧	1/4"	B-3447
850	48"	B-2466	4	3/4" HILTI HIT-RE 500-SD	8	6-3/4"↧	1/4"	B-3447	850	48"	B-2466	4	3/4" HILTI HIT-RE 500-SD	8	6-3/4"↧	1/4"	B-3447
1100	64"	B-2466	4	3/4" HILTI HIT-RE 500-SD	8	6-3/4"↧	1/4"	B-3447	1100	64"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447
1100	86"	B-2466	4	3/4" HILTI HIT-RE 500-SD	8	6-3/4"↧	1/4"	B-3447	1100	86"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447
1500	86"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447	1500	86"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447
1500	86"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447	1500	86"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447
1550	64"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447	1550	64"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447
1650	86"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447	1650	86"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447
1650	86"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447	1650	86"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447
1900	64"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447	1900	64"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	3/8"	B-3447
2000	90"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447	2000	90"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447
2000	95.61"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447	2000	95.61"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447
2000	90"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447	2000	90"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-3447

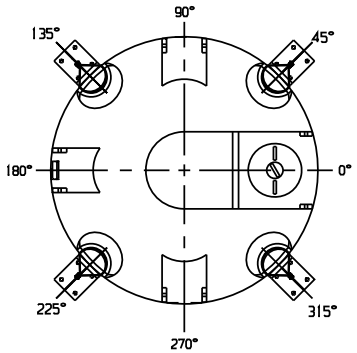
SNYDER INDUSTRIES, INC.
LINCOLN, NE 68504 PHONE: (402)467-5221 FAX: (402)465-1210

SCALE: NTS	APPROVED BY:	DRAWN BY: JrS
DATE: 08/24/04		REVISED: E

S.I.I. TANK SEISMIC RESTRAINT SYSTEM RECOMENDATIONS
FOR S.I.I. 400 – 2000 GALLON VERTICAL STORAGE TANKS

TOLERANCES UNLESS SPECIFIED OTHERWISE
ANGULAR: ± 1°
DECIMAL: .XXX = ± 1/32"

DRAWING NUMBER
B-2494-E



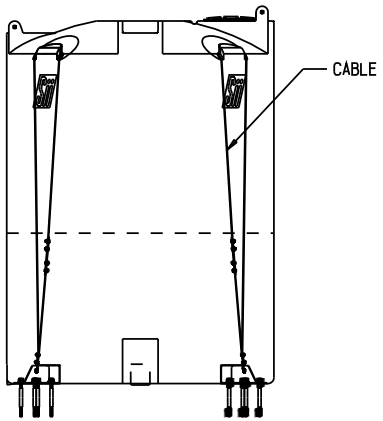
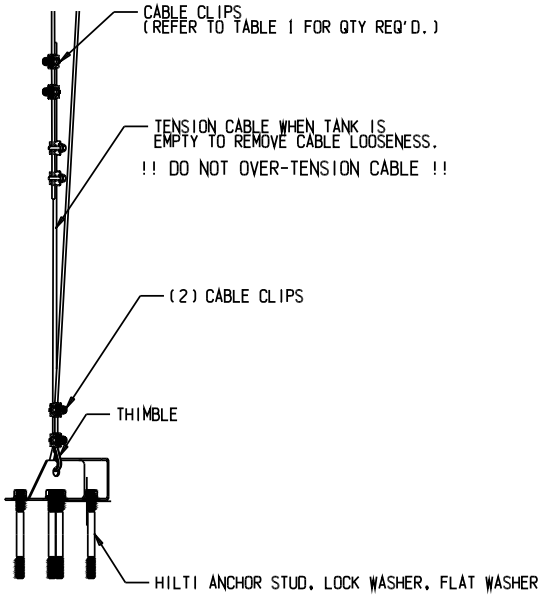


TABLE 1				
CLIP SIZE (INCHES)	ROPE SIZE (INCHES)	MINIMUM # CLIPS REQ'D.	AMOUNT OF ROPE TURN-BACK (INCHES)	*TORQUE IN Ft. Lbs
1/4	1/4	2	4-3/4	15
3/8	3/8	2	6-1/2	45
1/2	1/2	3	11-1/2	65
5/8	5/8	3	12	95
* THE TIGHTENING TORQUE VALUES SHOWN ARE BASED UPON THE THREADS BEING CLEAN, DRY, AND FREE OF LUBRICATION.)				



REVISIONS			
#	DESCRIPTION	DATE	BY
E	CHANGED TO CBC 2013 AND IBC 2012	08/16/2014	DAO

CODES:
- CBC 2013
- IBC 2012
- ASCE 7-10 SECTION 15.7.6
- AISC 13TH EDITION

SEISMIC DESIGN:
- Zip Code = 92701, Site class C - Fa=1.0, Fv=1.5,
- Ss = 1.4, S1 = 0.5, I = 1.5, R = 3.0
- Fp=(Vi*Wi+Vc*Wc/(We+Wc*SG) = 0.445 W

WIND DESIGN:
- IBC/CBC - 150 MPH - EXPOSURE "C"
- Qz = 0.00256KzKztKdV^2I = 46.5I PSF
- (Kz = 0.85, Kzt = 1.0, Kd = 0.95, I = 1.00 (RISK III))

GENERAL:
1. ALL CONSTRUCTION SHALL MEET LOCAL BUILDING CODE REQUIREMENTS AND BE APPROVED BY THE BUILDING OFFICIAL.
2. THESE GUIDELINES HAVE BEEN PROVIDED TO SPECIFY THE RESTRAINT RECOMMENDATIONS FOR SNYDER INDUSTRY BULK STORAGE TANKS.

CONCRETE:
1. CONCRETE SHALL HAVE A MINIMUM DESIGN AS PER DRAWING REFERENCED IN SPECIFICATION CHART BELOW.
2. CONCRETE PAD DESIGN SHOULD BE REVIEWED AND APPROVED BY THE BUILDING OFFICIAL BASED ON SPECIFIC APPLICATION AS OTHER DESIGN PARAMETERS ARE POSSIBLE DEPENDING UPON SITE CONDITIONS.

STRUCTURAL STEEL:
1. ALL STRUCTURAL STEEL COMPONENTS SHALL BE NEW AND OF BASIC OPEN HEARTH PROCESS STEEL CONFORMING TO ALL APPLICABLE REQUIREMENTS OF ASTM A36 (STRUCTURAL STEEL FOR BRIDGES AND BUILDINGS - Fy = 36,000 PSI.).
2. ALL ARC WELDING ELECTRODES SHALL CONFORM TO ASTM A233 FOR STEEL ARC WELDING ELECTRODES. ELECTRODES SHALL BE AS RECOMENDED BY THE MANUFACTURES FOR THE POSITIONS AND OTHER CONDITIONS OF ACTUAL USE. WELDING SHALL CONFORM TO REQUIREMENTS OF AMERICAN WELDING SOCIETY AWS D12.1.
3. ALL SHARP EDGES AND CORNERS SHALL BE REMOVED ON ALL STRUCTURAL STEEL COMPONENTS.
4. CABLES TO BE 7X19 STRANDED CORE CONSTUCTION SIZED PER CHART. MATERIAL TO BE SPECIFIED BY CUSTOMER ORDER (MINIMUM BREAKING STRENGTH EQUAL TO OR GREATER THAN 304 SS RATING).
5. ANCHOR BOLTS TO BE HILTI ADHESIVE ANCHORS, MODEL HIT-RE 500-SD WITH SIZE, MATERIAL, AND EMBEDMENT AS SPECIFIED PER SPECIFICATION CHART BELOW.

ALL OTHER FASTENER MATERIALS MUST CORRESPOND TO THE TYPE OF ANCHOR SELECTED.

1.5 SPECIFIC GRAVITY								
TANK GAL.	TANK DIA.	ANCHOR	QTY.	ANCHOR BOLT	QTY.	EMBEDMENT	CABLE	FOUNDATION
2500	90"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-2509
2500	95.61"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-2509
3000	90"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-2509
3000	95.61"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-2509
3000	90"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-2509
3000	102"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-2509
3900	90"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-2509
4100	102"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-2509
4000	120.41"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-2509
4400	90"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	3/8"	B-2509
4400	120"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	1/4"	B-2509
4500	102"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	1/4"	B-2509
4900	90"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	1/2"	B-2509
5000	102"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	1/4"	B-2509
4600	120.41"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	1/4"	B-2509
4500	142.44"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	1/4"	B-2509
5500	120"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	1/4"	B-2509
5600	142"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	1/4"	B-2509

1.9 SPECIFIC GRAVITY								
TANK GAL.	TANK DIA.	ANCHOR	QTY.	ANCHOR BOLT	QTY.	EMBEDMENT	CABLE	FOUNDATION
2500	90"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-2509
2500	95.61"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-2509
3000	90"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-2509
3000	95.61"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-2509
3000	90"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-2509
3000	102"	B-2467	4	1" HILTI HIT-RE 500-SD	16	9"↧	1/4"	B-2509
3900	90"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	3/8"	B-2509
4100	102"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	1/4"	B-2509
4000	120.41"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	1/4"	B-2509
4400	90"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	3/8"	B-2509
4400	120"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	1/4"	B-2509
4500	102"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	1/4"	B-2509
4900	90"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	1/2"	B-2509
5000	102"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	1/4"	B-2509
4600	120.41"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	1/4"	B-2509
4500	142.44"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	1/4"	B-2509
5500	120"	B-2468	4	1" HILTI HIT-RE 500-SD (ASTM A193)	24	9"↧	1/4"	B-2509
5600	142"	B-2468	4	1" HILTI HIT-RE 500-SD (ASTM A193)	24	9"↧	1/4"	B-2509

SNYDER INDUSTRIES, INC.
LINCOLN, NE 68504 PHONE: (402)467-5221 FAX: (402)465-1210

SCALE: NTS	APPROVED BY:	DRAWN BY: JrS
DATE: 08/31/04		REVISION: E

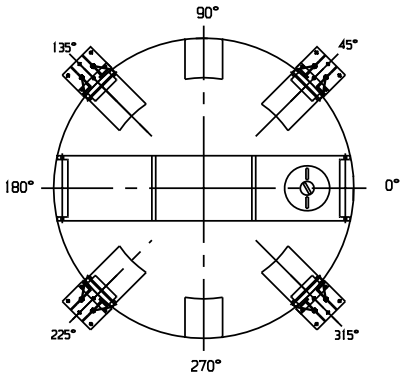
S.I.I. TANK SEISMIC RESTRAINT SYSTEM RECOMENDATIONS FOR S.I.I. 2500 – 5600 GALLON VERTICAL STORAGE TANKS

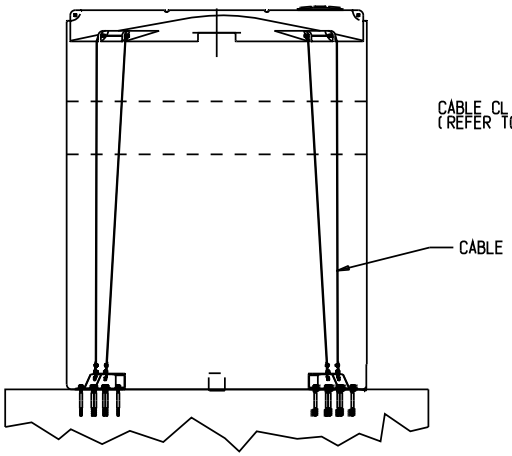
TOLERANCES UNLESS SPECIFIED OTHERWISE
ANGULAR: ± 1°
DECIMAL: .XXX = ± 1/32"

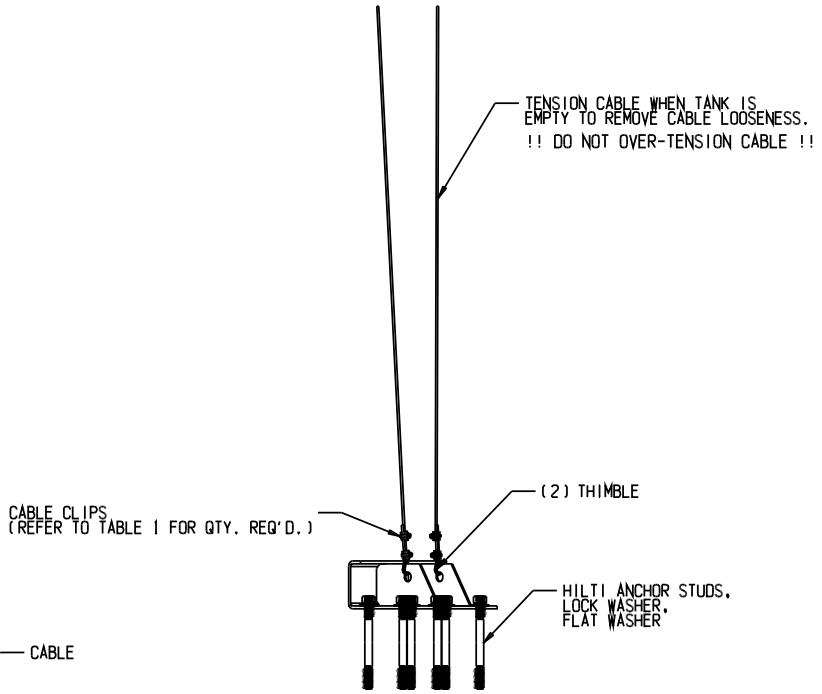
DRAWING NUMBER
B-2495-E

REVISIONS			
#	DESCRIPTION	DATE	BY
E	CHANGED TO CBC 2013 AND IBC 2012	08/16/2014	DAO

TABLE 1				
CLIP SIZE (INCHES)	ROPE SIZE (INCHES)	MINIMUM # CLIPS REQ'D.	AMOUNT OF ROPE TURN-BACK (INCHES)	*TORQUE IN Ft. Lbs
1/4	1/4	2	4-3/4	15
3/8	3/8	2	6-1/2	45
1/2	1/2	3	11-1/2	65
5/8	5/8	3	12	95
* THE TIGHTENING TORQUE VALUES SHOWN ARE BASED UPON THE THREADS BEING CLEAN, DRY, AND FREE OF LUBRICATION.)				







CODES:
- CBC 2013
- IBC 2012
- ASCE 7-10 SECTION 15.7.6
- AISC 13TH EDITION

SEISMIC DESIGN:
Zip Code = 92701, Site class C - Fa=1.0, Fv=1.5,
Ss = 1.4, S1 = 0.5, I = 1.5, R = 3.0
Fp=(Vi*Wi+Vc*Wc/(We+Wc*SG) = 0.445 W

WIND DESIGN:
IBC/CBC - 150 MPH - EXPOSURE "C"
Qz = 0.00256KzKztKdV^2I = 46.51 PSF
(Kz = 0.85, Kzt = 1.0, Kd = 0.95, I = 1.00 (RISK III))

GENERAL:
1. ALL CONSTRUCTION SHALL MEET LOCAL BUILDING CODE REQUIREMENTS AND BE APPROVED BY THE BUILDING OFFICIAL.
2. THESE GUIDELINES HAVE BEEN PROVIDED TO SPECIFY THE RESTRAINT RECOMMENDATIONS FOR SNYDER INDUSTRY BULK STORAGE TANKS.

CONCRETE:
1. CONCRETE SHALL HAVE A MINIMUM DESIGN AS PER DRAWING REFERENCED IN SPECIFICATION CHART BELOW.
2. CONCRETE PAD DESIGN SHOULD BE REVIEWED AND APPROVED BY THE BUILDING OFFICIAL BASED ON SPECIFIC APPLICATION AS OTHER DESIGN PARAMETERS ARE POSSIBLE DEPENDING UPON SITE CONDITIONS.

STRUCTURAL STEEL:
1. ALL STRUCTURAL STEEL COMPONENTS SHALL BE NEW AND OF BASIC OPEN HEARTH PROCESS STEEL CONFORMING TO ALL APPLICABLE REQUIREMENTS OF ASTM A36 (STRUCTURAL STEEL FOR BRIDGES AND BUILDINGS - Fy = 36,000 PSI.).
2. ALL ARC WELDING ELECTRODES SHALL CONFORM TO ASTM A233 FOR STEEL ARC WELDING ELECTRODES. ELECTRODES SHALL BE AS RECOMENDED BY THE MANUFACTURES FOR THE POSITIONS AND OTHER CONDITIONS OF ACTUAL USE. WELDING SHALL CONFORM TO REQUIREMENTS OF AMERICAN WELDING SOCIETY AWS D1.1.
3. ALL SHARP EDGES AND CORNERS SHALL BE REMOVED ON ALL STRUCTURAL STEEL COMPONENTS.
4. CABLES TO BE 7X19 STRANDED CORE CONSTUCTION SIZED PER CHART. MATERIAL TO BE SPECIFIED BY CUSTOMER ORDER (MINIMUM BREAKING STRENGTH EQUAL TO OR GREATER THAN 304 SS RATING).
5. ANCHOR BOLTS TO BE HILTI ADHESIVE ANCHORS, MODEL HIT-RE 500-SD WITH SIZE, MATERIAL, AND EMBEDMENT AS SPECIFIED PER SPECIFICATION CHART BELOW.
   ALL OTHER FASTENER MATERIALS MUST CORRESPOND TO THE TYPE OF ANCHOR SELECTED.

1.5 SPECIFIC GRAVITY								
TANK GAL.	TANK DIA.	ANCHOR	QTY.	ANCHOR BOLT	QTY.	EMBEDMENT	CABLE	CONCRETE
6000	102"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"	3/8"	B-3271
6200	120"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"	1/4"	B-3271
6500	120"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"	1/4"	B-3271
6000	120.41"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"	1/4"	B-3271
7000	142"	B-2468	4	1" HILTI HIT-RE 500-SD (ASTM A193)	24	9"	1/4"	B-3271

1.9 SPECIFIC GRAVITY								
TANK GAL.	TANK DIA.	ANCHOR	QTY.	ANCHOR BOLT	QTY.	EMBEDMENT	CABLE	CONCRETE
6000	102"	B-2469	4	1" HILTI HIT-RE 500-SD (ASTM A193)	24	12"↧	1/2"	B-3271
6200	120"	B-2469	4	1" HILTI HIT-RE 500-SD (ASTM A193)	24	12"↧	1/4"	B-3271
6500	120"	B-2469	4	1" HILTI HIT-RE 500-SD (ASTM A193)	24	12"↧	1/4"	B-3271
6000	120.41"	B-2469	4	1" HILTI HIT-RE 500-SD (ASTM A193)	24	12"↧	1/4"	B-3271
7000	142"	B-2467	8	1" HILTI HIT-RE 500-SD	32	9"↧	1/4"	B-3271

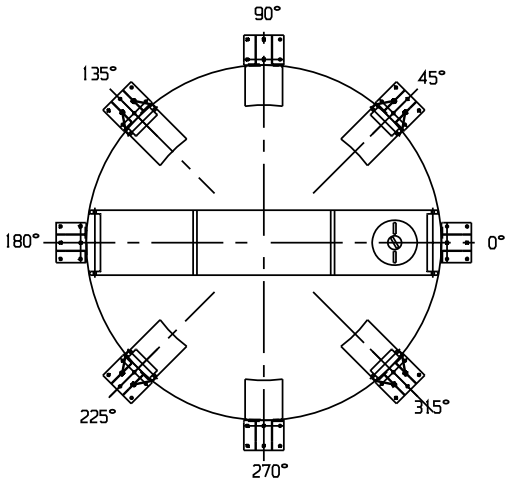
SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE: (402)467-5221 FAX: (402)465-1210

SCALE: NTS	APPROVED BY:	DRAWN BY: JrS
DATE: 08/24/04		REVISION: E

S.I.I. TANK SEISMIC RESTRAINT SYSTEM RECOMENDATIONS
FOR S.I.I. 6,000 – 7,000 GALLON VERTICAL STORAGE TANKS

TOLERANCES UNLESS SPECIFIED OTHERWISE
ANGULAR: ± 1°
DECIMAL: .XXX = ± 1/32"

DRAWING NUMBER
B-2496-E



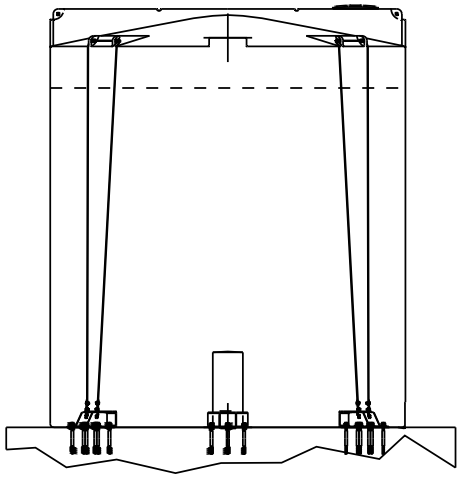
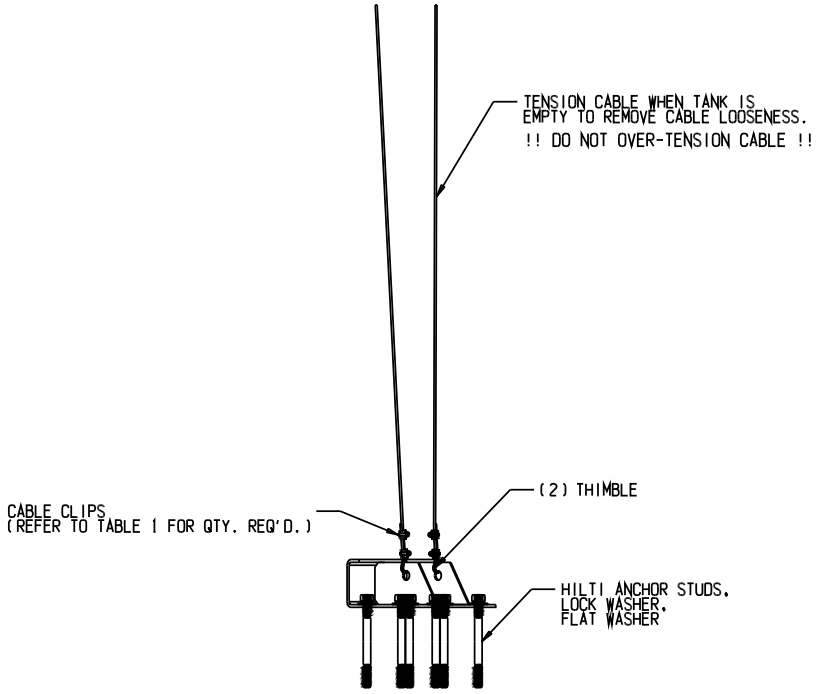


TABLE 1				
CLIP SIZE (INCHES)	ROPE SIZE (INCHES)	MINIMUM # CLIPS REQ.	AMOUNT OF ROPE TURN-BACK (INCHES)	*TORQUE IN Ft. Lbs
1/4	1/4	2	4-3/4	15
3/8	3/8	2	6-1/2	45
1/2	1/2	3	11-1/2	65
5/8	5/8	3	12	95
3/4	3/4	4	18	130
* THE TIGHTENING TORQUE VALUES SHOWN ARE BASED UPON THE THREADS BEING CLEAN, DRY, AND FREE OF LUBRICATION.)				



REVISIONS			
#	DESCRIPTION	DATE	BY
F	CHANGED TO IBC 2012 AND CBC 2013	08/16/14	DAO

CODES:
- CBC 2013
- IBC 2012
- ASCE 7-10 SECTION 15.7.6
- AISC 13TH EDITION

SEISMIC DESIGN:
- Zip Code = 92701, Site class C - Fa=1.0, Fv=1.5,
- Ss = 1.4, S1 = 0.5, I = 1.5, R = 3.0
- Fp=(Vi*Wi+Vc*Wc/(We+Wc*SG) = 0.445 W

WIND DESIGN:
- IBC/CBC - 150 MPH - EXPOSURE "C"
- Qz = 0.00256KzKztKdV^2I = 46.51 PSF
- (Kz = 0.85, Kzt = 1.0, Kd = 0.95, I = 1.00 (RISK III))

GENERAL:
1. ALL CONSTRUCTION SHALL MEET LOCAL BUILDING CODE REQUIREMENTS AND BE APPROVED BY THE BUILDING OFFICIAL.
2. THESE GUIDELINES HAVE BEEN PROVIDED TO SPECIFY THE RESTRAINT RECOMMENDATIONS FOR SNYDER INDUSTRY BULK STORAGE TANKS.

CONCRETE:
1. CONCRETE SHALL HAVE A MINIMUM DESIGN AS PER DRAWING REFERENCED IN SPECIFICATION CHART BELOW.
2. CONCRETE PAD DESIGN SHOULD BE REVIEWED AND APPROVED BY THE BUILDING OFFICIAL BASED ON SPECIFIC APPLICATION AS OTHER DESIGN PARAMETERS ARE POSSIBLE DEPENDING UPON SITE CONDITIONS.

STRUCTURAL STEEL:
1. ALL STRUCTURAL STEEL COMPONENTS SHALL BE NEW AND OF BASIC OPEN HEARTH PROCESS STEEL CONFORMING TO ALL APPLICABLE REQUIREMENTS OF ASTM A36 (STRUCTURAL STEEL FOR BRIDGES AND BUILDINGS - Fy = 36,000 PSI.).
2. ALL ARC WELDING ELECTRODES SHALL CONFORM TO ASTM A233 FOR STEEL ARC WELDING ELECTRODES. ELECTRODES SHALL BE AS RECOMENDED BY THE MANUFACTURES FOR THE POSITIONS AND OTHER CONDITIONS OF ACTUAL USE. WELDING SHALL CONFORM TO REQUIREMENTS OF AMERICAN WELDING SOCIETY AWS D1.2.
3. ALL SHARP EDGES AND CORNERS SHALL BE REMOVED ON ALL STRUCTURAL STEEL COMPONENTS.
4. CABLES TO BE 7X19 STRANDED CORE CONSTUCTION SIZED PER CHART. MATERIAL TO BE SPECIFIED BY CUSTOMER ORDER (MINIMUM BREAKING STRENGTH EQUAL TO OR GREATER THAN 304 SS RATING).
5. ANCHOR BOLTS TO BE HILTI ADHESIVE ANCHORS, MODEL HVA WITH SIZE, MATERIAL, AND EMBEDMENT AS SPECIFIED PER SPECIFICATION CHART BELOW.

ALL OTHER FASTENER MATERIALS MUST CORRESPOND TO THE TYPE OF ANCHOR SELECTED.

1.5 SPECIFIC GRAVITY									1.9 SPECIFIC GRAVITY								
TANK GAL.	TANK DIA.	ANCHOR	QTY.	ANCHOR BOLT	QTY.	EMBEDMENT	CABLE	CONCRETE	TANK GAL.	TANK DIA.	ANCHOR	QTY.	ANCHOR BOLT	QTY.	EMBEDMENT	CABLE	CONCRETE
6600	120.41"	B-2468	4	1" HILTI HIT-RE 500-SD	24	9"↧	1/4"	B-2506	6600	120.41"	B-2469	4	1" HILTI HIT-RE 500-SD (ASTM A193)	24	12"↧	1/4"	B-2506
7500	102"	B-2469	4	1" HILTI HIT-RE 500-SD (ASTM A193)	24	12"↧	5/8"	B-2506	7500	102"	B-2467	8	1" HILTI HIT-RE 500-SD	32	9"↧	5/8"	B-2506
6600	142.44"	B-2468	4	1" HILTI HIT-RE 500-SD (ASTM A193)	24	9"↧	1/4"	B-2506	6600	142.44"	B-2469	4	1" HILTI HIT-RE 500-SD (ASTM A193)	24	12"↧	1/4"	B-2506
8000	120.41"	B-2469	4	1" HILTI HIT-RE 500-SD (ASTM A193)	24	12"↧	3/8"	B-2506	8000	120.41"	B-2467	8	1" HILTI HIT-RE 500-SD	32	9"↧	3/8"	B-2506
8000	142.44	B-2469	4	1" HILTI HIT-RE 500-SD (ASTM A193)	24	12"↧	1/4"	B-2506	8000	142.44"	B-2467	8	1" HILTI HIT-RE 500-SD	32	9"↧	1/4"	B-2506
8500	120"	B-2469	4	1" HILTI HIT-RE 500-SD (ASTM A193)	24	12"↧	3/8"	B-2506	8500	120"	B-2467	8	1" HILTI HIT-RE 500-SD	32	9"↧	1/2"	B-2506
8750	142"	B-2469	4	1" HILTI HIT-RE 500-SD (ASTM 193A)	24	12"↧	1/4"	B-2506	8750	142"	B-2467	8	1" HILTI HIT-RE 500-SD	32	9"↧	1/4"	B-2506
9500	120"	B-2467	8	1" HILTI HIT-RE 500-SD	32	9"↧	1/2"	B-2506	9500	120"	B-2468	8	1" HILTI HIT-RE 500-SD	48	9"↧	1/2"	B-2506
10500	142"	B-2467	8	1" HILTI HIT-RE 500-SD	32	9"↧	1/4"	B-2506	10500	142"	B-2468	8	1" HILTI HIT-RE 500-SD	48	9"↧	1/4"	B-2506
10500	142.44"	B-2468	8	1" HILTI HIT-RE 500-SD	48	9"↧	1/4"	B-2506	10500	142.44"	B-2468	8	1" HILTI HIT-RE 500-SD	48	9"↧	1/4"	B-2506
12500	142"	B-2468	8	1" HILTI HIT-RE 500-SD	48	9"↧	3/8"	B-2506	12500	142"	B-2468	8	1" HILTI HIT-RE 500-SD (ASTM A193)	48	9"↧	3/8"	B-2506
13000	142.44	B-2468	8	1" HILTI HIT-RE 500-SD	48	9"↧	3/8"	B-2506	13000	142.44"	B-2468	8	1" HILTI HIT-RE 500-SD (ASTM A193)	48	9"↧	1/2"	B-2506
15000	142"	B-2468	8	1" HILTI HIT-RE 500-SD	48	9"↧	1/2"	B-2506	15000	142"	B-2469	8	1" HILTI HIT-RE 500-SD (ASTM A193)	48	12"↧	5/8"	B-2506
15000	142.44"	B-2468	8	1" HILTI HIT-RE 500-SD	48	9"↧	1/2"	B-2506	15000	142.44"	B-2469	8	1" HILTI HIT-RE 500-SD (ASTM A193)	48	12"↧	5/8"	B-2506
16500	142	B-2468	8	1" HILTI HIT-RE 500-SD (ASTM A193)	48	9"↧	5/8"	B-2506	16500	142	B-2469	8	1" HILTI HIT-RE 500-SD (ASTM A193)	48	12"↧	3/4"	B-2506

SNYDER INDUSTRIES, INC.
LINCOLN, NE 68504 PHONE: (402)467-5221 FAX: (402)465-1210

SCALE: NTS	APPROVED BY:	DRAWN BY: JrS
DATE: 08/24/04		REVISION: F

S.I.I. TANK SEISMIC RESTRAINT SYSTEM RECOMENDATIONS
FOR S.I.I. 6,600 – 16,500 GALLON VERTICAL STORAGE TANKS

TOLERANCES UNLESS SPECIFIED OTHERWISE
ANGULAR: ± 1°
DECIMAL: .XXX = ± 1/32"

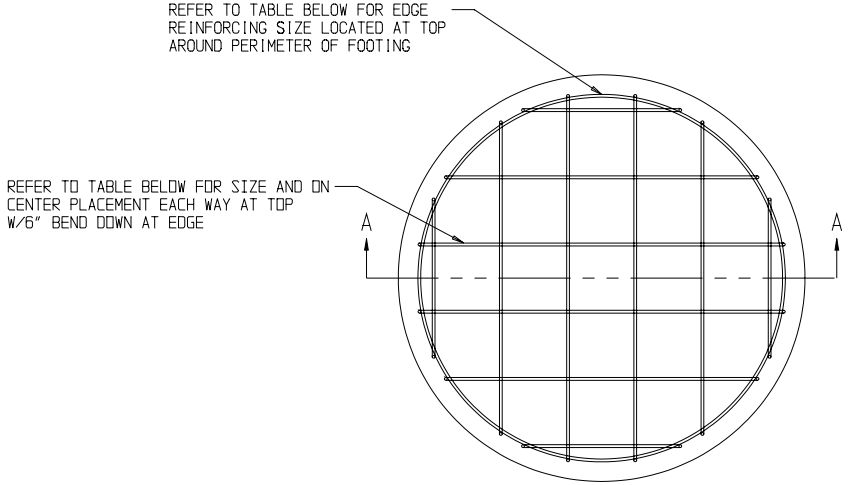
DRAWING NUMBER
B-2497-F

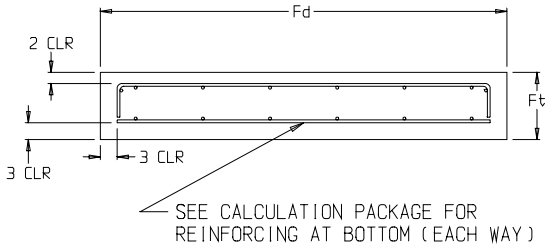
NOTES:

1. REFER TO CALCULATION PACKAGE FOR ADDITIONAL INFORMATION.
   PAD DIAMETER (Fd) AND PAD THICKNESS (Ft) PER CALCULATION PACKAGE.
2. ALL CONSTRUCTION TECHNIQUES SHALL CONFORM TO CBC 2007 AND IBC 2006.
3. CONCRETE SHALL OBTAIN A MINIMUM ULTIMATE 28 DAY COMPRESSIVE STRENGTH OF Fc = 2000 PSI U.N.O. (SEE CHART BELOW).
4. REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A615 GRADE 60, Fy = 60,000 PSI.
5. MINIMUM COVER FOR REINFORCING BARS SHALL BE 2" ON THE TOP, 3" ON THE SIDES AND BOTTOM OF THE PAD AS SHOWN.
6. PAD IS ASSUMED TO BE PLACED ON A COMPACTED LEVEL SURFACE WITH AN ALLOWABLE SOIL BEARING VALUE OF 1000 PSF. THIS IS THE MAXIMUM ASSUMED SOIL BEARING ALLOWED WITHOUT SITE INSPECTION. IF SITE INSPECTION IS AVAILABLE, PAD DIMENSIONS COULD BE DECREASED. PLEASE CONSULT WITH LOCAL CIVIL ENGINEER FOR REVIEW.
7. BOTTOM OF SLAB FOUNDATION SHALL BE 12" BELOW FINISHED GRADE OR EXISTING CONCRETE.
8. ANY PAD SHAPE BUILT (SQUARE OR HEXAGON) THAT WOULD ENCOMPASS THIS ROUND PAD DESIGN AND BUILT USING THE SAME THICKNESS, REINFORCEMENT CRITERIA (ADJUSTED FOR SHAPE AND SIZE), AND DESIGN SPECIFICATIONS WOULD BE CONSIDERED ACCEPTABLE UNDER THESE CALCULATIONS AND CRITERIA.

PART No.	TANK SZ.	TANK Ø	Hc	Ht	Fd		Ft	REBAR SZ.	SPACING O.C.	CONCRETE PSI
					1.5	1.9				
174--	400	3.75	4.88	5.19	5.75	5.75	1.00	#4	16"	2000
180--	550	4.00	5.79	6.18	6.00	6.00	1.00	#4	16"	2000
167--	550	5.33	3.04	3.67	7.33	7.33	1.00	#4	16"	2000
182--	550	5.33	3.13	3.83	7.33	7.33	1.00	#4	16"	2000
181--	850	4.00	8.88	9.50	6.66	7.34	1.00	#4	16"	2000
183--	1100	5.33	6.56	7.25	7.41	9.17	1.00	#4	16"	2000
171--	1100	7.15	3.00	4.38	9.23	10.99	1.00	#4	16"	2000
H171--	1100	7.15	3.38	4.28	9.23	10.99	1.00	#4	16"	2000
177--	1500	7.15	4.38	5.75	10.99	10.99	1.00	#4	16"	2000
H177--	1500	7.15	4.76	5.66	10.99	10.99	1.00	#4	16"	2000
184--	1550	5.33	9.38	10.07	9.17	9.17	1.00	#4	16"	2000
178--	1650	7.15	4.54	6.29	10.99	10.99	1.00	#4	16"	2000
H178--	1650	7.15	5.13	6.03	10.99	10.99	1.00	#4	16"	2000
8300--	1900	5.33	11.31	12.00	9.83	10.33	1.00	#4	13"	2000
5050--	2000	7.50	6.04	6.96	11.34	11.34	1.00	#4	16"	2000
H50501--	2000	7.97	5.64	6.87	11.81	11.81	1.00	#4	16"	2000
8130--	2000	7.50	6.04	6.96	11.34	11.34	1.00	#4	16"	2000

Hc = HEIGHT OF TANK CONTENTS
Ht = HEIGHT OF TANK TOP
Fd = FOOTING (PAD) DIAMETER
Ft = FOOTING (PAD) THICKNESS





SECTION VIEW A-A

SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

SCALE: NTS	APPROVED BY:	DRAWN BY: JrS
DATE: 09/07/04		REVISION: A

SEISMIC CABLE RESTRAINT SYSTEM 2000 PSI FOUNDATION DESIGN FOR 400 - 2,000 GALLON TANKS

TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL: ±1/32"; ANGULAR: ±1°
DECIMAL: .X = ±0.100"; .XX = ±0.060"; .XXX = ±0.003"

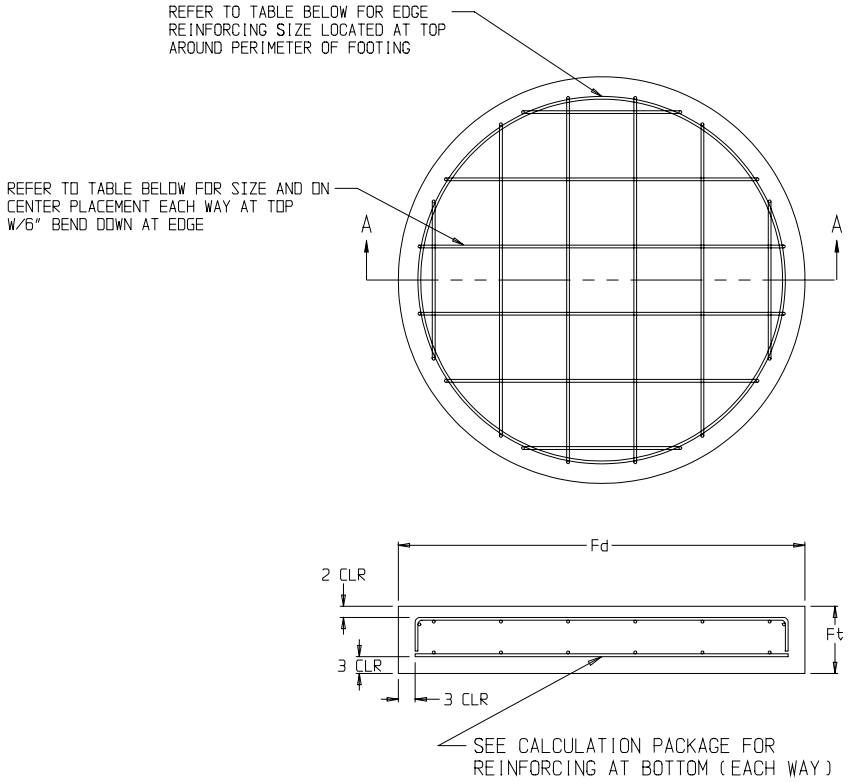
DRAWING NUMBER
B-3447

NOTES:

1. REFER TO CALCULATION PACKAGE FOR ADDITIONAL INFORMATION. PAD DIAMETER (Fd) AND PAD THICKNESS (Ft) PER CALCULATION PACKAGE.
2. ALL CONSTRUCTION TECHNIQUES SHALL CONFORM TO CBC 2007 AND IBC 2006.
3. CONCRETE SHALL OBTAIN A MINIMUM ULTIMATE 28 DAY COMPRESSIVE STRENGTH OF Fc = 4000 PSI OR 2000 PSI U.N.O. (SEE CHART BELOW).
4. REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A615 GRADE 60, Fy = 60,000 PSI.
5. MINIMUM COVER FOR REINFORCING BARS SHALL BE 2" ON THE TOP, 3" ON THE SIDES AND BOTTOM OF THE PAD AS SHOWN.
6. PAD IS ASSUMED TO BE PLACED ON A COMPACTED LEVEL SURFACE WITH AN ALLOWABLE SOIL BEARING VALUE OF 1000 PSF. THIS IS THE MAXIMUM ASSUMED SOIL BEARING ALLOWED WITHOUT SITE INSPECTION. IF SITE INSPECTION IS AVAILABLE, PAD DIMENSIONS COULD BE DECREASED. PLEASE CONSULT WITH LOCAL CIVIL ENGINEER FOR REVIEW.
7. BOTTOM OF SLAB FOUNDATION SHALL BE 12" BELOW FINISHED GRADE OR EXISTING CONCRETE.
8. ANY PAD SHAPE BUILT (SQUARE OR HEXAGON) THAT WOULD ENCOMPASS THIS ROUND PAD DESIGN AND BUILT USING THE SAME THICKNESS, REINFORCEMENT CRITERIA (ADJUSTED FOR SHAPE AND SIZE), AND DESIGN SPECIFICATIONS WOULD BE CONSIDERED ACCEPTABLE UNDER THESE CALCULATIONS AND CRITERIA.

PART No.	TANK SZ.	TANK Ø	Hc	Ht	Fd		Ft	REBAR SZ.		SPACING O.C.		CONCRETE PSI	
					1.5	1.9		1.5	1.9	1.5	1.9	1.5	1.9
5090--	2500	7.50	7.66	8.57	11.34	11.34	1.00	#4	#4	16"	16"	2000	2000
8140--	2500	7.50	7.66	8.57	11.34	11.34	1.00	#4	#4	16"	16"	2000	2000
H50901--	2500	7.97	6.78	8.01	11.81	11.81	1.00	#4	#4	16"	16"	2000	2000
5130--	3000	7.50	9.25	10.17	11.34	11.84	1.00	#4	#4	16"	16"	2000	4000
H51301--	3000	7.97	7.92	9.15	11.81	11.81	1.00	#4	#4	16"	16"	2000	4000
8160--	3000	7.50	9.25	10.17	11.34	11.84	1.00	#4	#4	16"	16"	2000	4000
7410--	3000	8.50	7.29	7.96	12.34	12.34	1.00	#4	#4	16"	16"	2000	4000
5190--	3900	7.50	12.21	13.12	12.84	13.66	1.00	#4	#4	11"	8"	4000	4000
7360--	4100	8.50	9.98	10.64	12.34	13.50	1.00	#4	#4	16"	12"	4000	4000
H74201--	4000	10.03	6.79	8.31	13.87	13.87	1.00	#4	#4	16"	16"	4000	4000
5210--	4400	7.50	13.84	14.75	13.50	14.84	1.00	#4	#5	9"	9"	2000	4000
8200--	4400	10.00	7.17	8.21	13.84	13.84	1.00	#4	#4	16"	16"	2000	4000
7420--	4500	8.50	11.08	11.75	13.00	14.16	1.00	#4	#4	15"	9"	2000	4000
5480--	4900	7.50	15.48	16.40	14.50	15.84	1.00	#4	#5	6"	7"	4000	4000
H74202--	5000	8.50	11.54	12.88	13.84	15.50	1.00	#4	#4	11"	7"	4000	4000
H70001--	4600	10.03	8.01	9.53	13.87	13.87	1.00	#4	#4	16"	16"	2000	4000
H70004--	4500	11.87	5.52	7.28	15.71	15.71	1.00	#4	#4	16"	16"	2000	4000
7000--	5500	10.00	9.83	10.28	14.00	15.34	1.00	#4	#4	16"	11"	4000	4000
5250--	5600	11.83	7.05	8.30	15.67	15.67	1.00	#4	#4	16"	16"	4000	4000

Hc = HEIGHT OF TANK CONTENTS
Ht = HEIGHT OF TANK TOP
Fd = FOOTING (PAD) DIAMETER
Ft = FOOTING (PAD) THICKNESS



SECTION VIEW A-A

SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

SCALE: NTS	APPROVED BY:	DRAWN BY: JrS
DATE: 08/31/04		REVISION: A

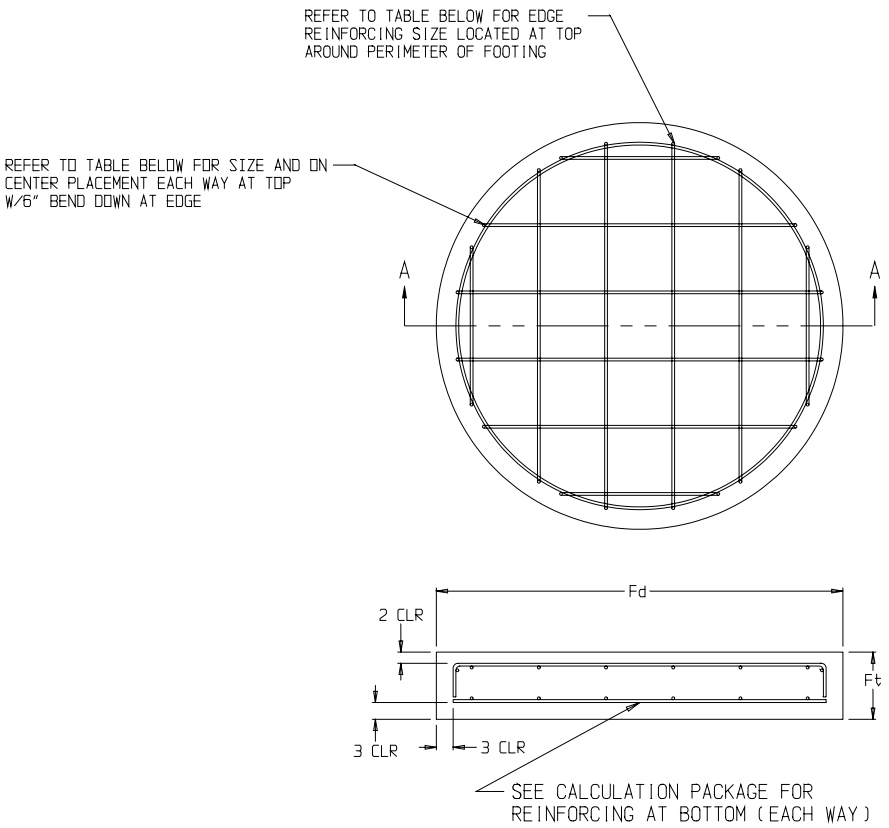
SEISMIC CABLE RESTRAINT SYSTEM FOUNDATION
DESIGN FOR 2,500 - 5,600 GALLON TANKS

TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL: ±1/32"; ANGULAR: ±1°
DECIMAL: .X = ±0.100"; .XX = ±0.060"; .XXX = ±0.003"

DRAWING NUMBER
B-2509

NOTES:

1. REFER TO CALCULATION PACKAGE FOR ADDITIONAL INFORMATION.
   PAD DIAMETER (Fd) AND PAD THICKNESS (Ft) PER CALCULATION PACKAGE.
2. ALL CONSTRUCTION TECHNIQUES SHALL CONFORM TO CBC 2007 AND IBC 2006.
3. CONCRETE SHALL OBTAIN A MINIMUM ULTIMATE 28 DAY COMPRESSIVE STRENGTH OF Fc = 4000 PSI U.N.O.(SEE CHART BELOW).
4. REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A615 GRADE 60, Fy = 60,000 PSI.
5. MINIMUM COVER FOR REINFORCING BARS SHALL BE 2" ON THE TOP, 3" ON THE SIDES AND BOTTOM OF THE PAD AS SHOWN.
6. PAD IS ASSUMED TO BE PLACED ON A COMPACTED LEVEL SURFACE WITH AN ALLOWABLE SOIL BEARING VALUE OF 1000 PSF. THIS IS THE MAXIMUM ASSUMED SOIL BEARING ALLOWED WITHOUT SITE INSPECTION. IF SITE INSPECTION IS AVAILABLE, PAD DIMENSIONS COULD BE DECREASED. PLEASE CONSULT WITH LOCAL CIVIL ENGINEER FOR REVIEW.
7. BOTTOM OF SLAB FOUNDATION SHALL BE 12" BELOW FINISHED GRADE OR EXISTING CONCRETE.
8. ANY PAD SHAPE BUILT (SQUARE OR HEXAGON) THAT WOULD ENCOMPASS THIS ROUND PAD DESIGN AND BUILT USING THE SAME THICKNESS, REINFORCEMENT CRITERIA (ADJUSTED FOR SHAPE AND SIZE), AND DESIGN SPECIFICATIONS WOULD BE CONSIDERED ACCEPTABLE UNDER THESE CALCULATIONS AND CRITERIA.



SECTION VIEW A-A

Hc = HEIGHT OF TANK CONTENTS
Ht = HEIGHT OF TANK TOP
Fd = FOOTING (PAD) DIAMETER
Ft = FOOTING (PAD) THICKNESS

PART No.	TANK SZ.	TANK Ø	Hc	Ht	Fd		Ft	REBAR SZ.		SPACING O.C.		CONCRETE PSI
					1.5	1.9		1.5	1.9	1.5	1.9	
7430--	6000	8.50	15.04	13.08	15.84	17.16	1.33	#4	#5	8"	9"	4000
8220--	6200	10.00	10.76	19.33	15.00	16.34	1.33	#4	#4	16"	11"	4000
7140--	6500	10.00	11.85	9.96	15.34	17.00	1.33	#4	#4	15"	9"	4000
H71401--	6000	10.03	10.83	15.30	14.69	16.19	1.33	#4	#4	16"	12"	4000
5300--	7000	11.83	9.13	16.04	15.67	16.75	1.33	#4	#4	16"	16"	4000

SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

SCALE: NTS	APPROVED BY:	DRAWN BY: JrS
DATE: 08/31/04		REVISION: A

SEISMIC CABLE RESTRAINT SYSTEM FOUNDATION
DESIGN FOR 6,000 - 7,000 GALLON TANKS

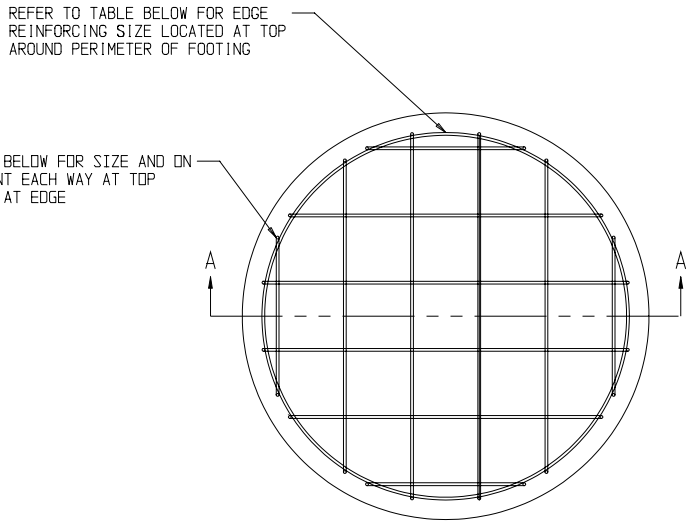
TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL: ±1/32"; ANGULAR: ±1°
DECIMAL: .X = ±0.100"; .XX = ±0.060"; .XXX = ±0.003"

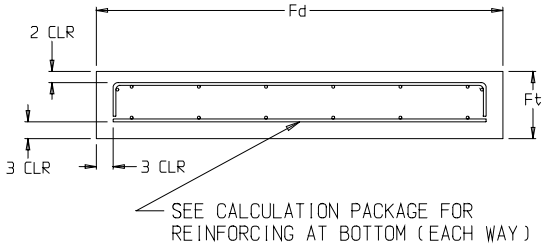
DRAWING NUMBER
B-3271

NOTES:

1. REFER TO CALCULATION PACKAGE FOR ADDITIONAL INFORMATION. PAD DIAMETER (Fd) AND PAD THICKNESS (Ft) PER CALCULATION PACKAGE.
2. ALL CONSTRUCTION TECHNIQUES SHALL CONFORM TO CBC 2007 AND IBC 2006.
3. CONCRETE SHALL OBTAIN A MINIMUM ULTIMATE 28 DAY COMPRESSIVE STRENGTH OF Fc = 4000 PSI OR 2000 PSI U.N.O. (SEE CHART BELOW).
4. REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A615 GRADE 60, Fy = 60,000 PSI.
5. MINIMUM COVER FOR REINFORCING BARS SHALL BE 2" ON THE TOP, 3" ON THE SIDES AND BOTTOM OF THE PAD AS SHOWN.
6. PAD IS ASSUMED TO BE PLACED ON A COMPACTED LEVEL SURFACE WITH AN ALLOWABLE SOIL BEARING VALUE OF 1000 PSF. THIS IS THE MAXIMUM ASSUMED SOIL BEARING ALLOWED WITHOUT SITE INSPECTION. IF SITE INSPECTION IS AVAILABLE, PAD DIMENSIONS COULD BE DECREASED. PLEASE CONSULT WITH LOCAL CIVIL ENGINEER FOR REVIEW.
7. BOTTOM OF SLAB FOUNDATION SHALL BE 12" BELOW FINISHED GRADE OR EXISTING CONCRETE.
8. ANY PAD SHAPE BUILT (SQUARE OR HEXAGON) THAT WOULD ENCOMPASS THIS ROUND PAD DESIGN AND BUILT USING THE SAME THICKNESS, REINFORCEMENT CRITERIA (ADJUSTED FOR SHAPE AND SIZE), AND DESIGN SPECIFICATIONS WOULD BE CONSIDERED ACCEPTABLE UNDER THESE CALCULATIONS AND CRITERIA.

Hc = HEIGHT OF TANK CONTENTS
Ht = HEIGHT OF TANK TOP
Fd = FOOTING (PAD) DIAMETER
Ft = FOOTING (PAD) THICKNESS





SECTION VIEW A-A

PART No.	TANK SZ.	TANK Ø	Hc	Ht	Fd		Ft	REBAR SZ.		SPACING O.C.		CONCRETE PSI	
					1.5	1.9		1.5	1.9	1.5	1.9	1.5	1.9
H53001--	6600	10.03	11.56	13.08	15.53	17.03	1.33	#4	#4	14"	9"	4000	4000
7440--	7500	8.50	18.67	19.33	18.16	19.50	1.33	#5	#5	8"	6"	4000	4000
H53005--	6600	11.87	8.20	9.96	15.71	16.79	1.33	#4	#4	16"	16"	4000	4000
H53003--	8000	10.03	13.78	15.30	17.53	19.03	1.33	#4	#5	8"	9"	4000	4000
H53203--	8000	11.87	9.59	11.90	16.79	17.53	1.33	#4	#4	16"	12"	4000	4000
74000--	8500	10.00	15.00	16.04	18.00	19.50	1.33	#4	#5	7"	7"	4000	2000
5360--	8750	11.83	10.46	11.79	17.33	18.83	1.33	#4	#4	15"	9"	4000	2000
7450--	9500	10.00	16.76	17.80	19.34	21.00	1.33	#5	#5	8"	6"	4000	4000
5330--	10500	11.83	12.69	13.94	18.83	20.49	1.33	#4	#5	8"	9"	4000	4000
H53303--	10500	11.87	12.93	14.39	18.87	20.53	1.33	#4	#5	8"	9"	4000	4000
5350--	12500	11.83	15.12	16.45	20.83	22.83	1.33	#5	#5	8"	6"	4000	4000
H53503--	13000	11.87	16.18	17.64	21.87	23.53	1.33	#5	#5	7"	5"	4000	4000
5370--	15000	11.83	18.13	19.46	23.17	25.17	1.33	#5	#6	5"	5"	4000	4000
H53703--	15000	11.87	18.58	20.52	23.53	25.37	1.33	#5	#6	5"	5"	4000	4000
5380--	16500	11.83	20.07	21.41	24.83	27.17	1.50	#5	#6	5"	5"	4000	4000

SNYDER INDUSTRIES INC.
LINCOLN, NE 68504 PHONE:(402) 467-5221 FAX:(402) 467-3247

SCALE: NTS	APPROVED BY:	DRAWN BY: JrS
DATE: 08/31/04		REVISION: A

SEISMIC CABLE RESTRAINT SYSTEM FOUNDATION DESIGN FOR 6,600 - 16,500 GALLON TANKS

TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL: ±1/32"; ANGULAR: ±1°
DECIMAL: .X = ±0.100"; .XX = ±0.060"; .XXX = ±0.003"

DRAWING NUMBER
B-2506