COASTLINE
POWER SOLUTIONS

ENGINEERING STRUCTURAL CALCULATIONS
For
Gillette 98" Frame Gensets

March 12, 2025

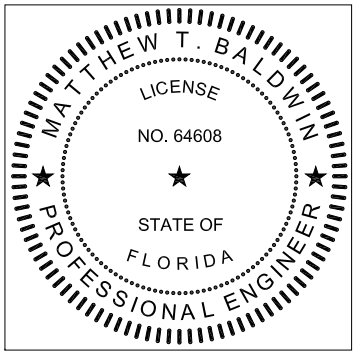
98" Frame Genset Models:

PR-800
SP-960
SPJD-1000
SPD-1000

Location: Florida

Designed in compliance with: **2023 Florida Building Code, 8th Edition**
ASCE 7 - 22 Minimum Design Loads for Buildings and Other Structures
2020 Aluminum Association Design Manual
ANSI/AISC 360-22 - Specification for Structural Steel Buildings

Anchoring: 1/2" Bolt/Anchors - Minimum (6) per side (12) total



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Project Information

Project Name/Model #	- Gillette 98" Frame Gensets
Project Number	-
Project Description	- Sound Attenuated Generator Enclosure
Project Location	- Florida
Customer	-
Mounting Location	- Ground

Enclosure Materials

Roof Beam	- 14 Gage Truss - CRS
Roof Panels	- 0.080 Aluminum Panel - 5052-H34
Wall Panels	- 0.080 Aluminum Panel - 5052-H34
Base Frame/Skid	- Aluminum Formed Steel 'C' Channel

Components

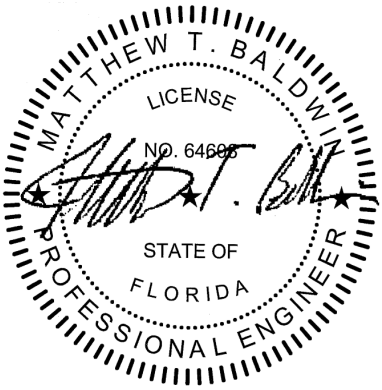
GenSet Manufacturer	- Gillette		
GenSet Size and Model	- SPR-800, SP-960, SPJD-1000, SPD-1000	Supported by -	Base
Base	- Aluminum Formed Steel 'C' Channel		

Fasteners/Hardware

		Bolt Size	Washer	Nut	Grade/Finish
Roof to Walls	-	5/16" - 18 Bolts	5/16" Washer	Nut Clip	Grade 18-8/SS
Wall to Wall	-	5/16" - 18 Bolts	5/16" Washer	Nut Clip	Grade 18-8/SS
Walls to Base	-	5/16" - 18 Bolts	5/16" Washer	Nut Clip	Grade 18-8/SS
Base to Slab/Tank	-	1/2" Set Bolt Anchors	Flat Washers	Hex Nuts	Grade 5/Galv.

Specification Requirements

Wind Speed	-	200	mph
Exposure Category	-	D	
Risk Category	-	III	
Ground Snow Load (P_g Fig 7.1)	-	0	psf
Ice Thickness (t Fig 10-2 to10-6)	-	0.25	in
and Concurrent Wind Gust (V_c)	-	30	mph
Seismic Site Class		B	



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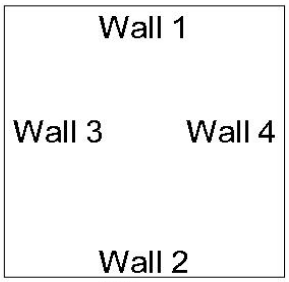
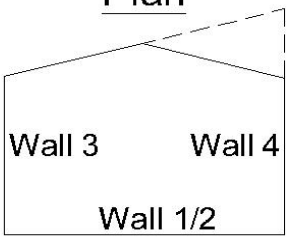
Enclosure Dimensions & Component Weights

Gillette 98" Frame Gensets

Roof Style- Flat



Plan



Elevation

Enclosure Dimensions (ft)

Wall	Length (ft)		Height (ft)
1	4.02	x	5.36
2	4.02	x	5.36
3	11.18	x	5.36
4	11.18	x	5.36

Base Dimensions

Width (Wall 1/2 Side)	=	48	in
Length (Wall 3/4 Side)	=	98	in
Height	=	7	in

Roof/Eave Information

Roof Pitch Angle -	*(θ)*	=	0.0	Degrees
Eave/Roof Height -	*h*	=	5.943	

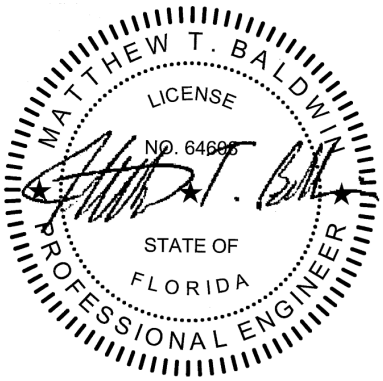
Structure Areas

Walls 1/2 Area -	*(w1)*	=	23.9	ft^2	=	3,440	in^2
Walls 3/4 Area -	*(w3)*	=	66.4	ft^2	=	9,568	in^2
Roof Area -	*(R)*	=	44.9	ft^2	=	6,472	in^2

Base Side 1/2	*(T1)*	=	336.0 in2
Base Side 3/4	*(T3)*	=	686.0 in2

Component Weights (lightest setup for worst case)

Genset	=	0	lbs	(Varies, so will use zero to be conservative/most uplift to resist)
Enclosure	=	200	lbs	(Based on Aluminum to be conserative/most uplift to resist)
Base	=	150	lbs	(Based on Aluminum to be conserative/most uplift to resist)



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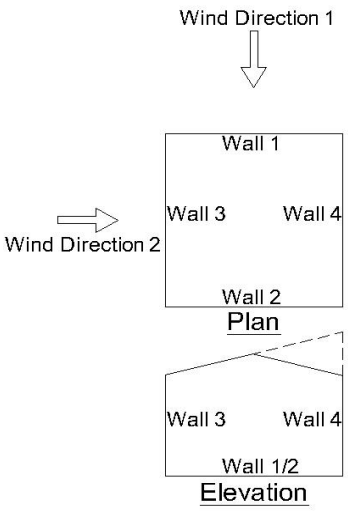
MWFRS Net Pressures

Gillette 98" Frame Gensets

Wind

Analytical Procedure method and Load Combinations from ASCE 7 are utilized in these calculations.

Enclosure Classification	-	Enclosed	
Exposure Category	-	D	
Basic Wind Speed	(V)	200	mph
Importance Factor (Wind)	(I_w)	1.15	
Wind Directionality Factors	(K_d)	0.85	
Internal Pressure Coefficients	(GC_{pi})	± 0.18	
Velocity Pressure Exposure Coefficient	(K_z)	1.03	
Roof Mean Height Above Ground Level	(z)	6.53	ft
Velocity Pressure	(q)	103.12	psf



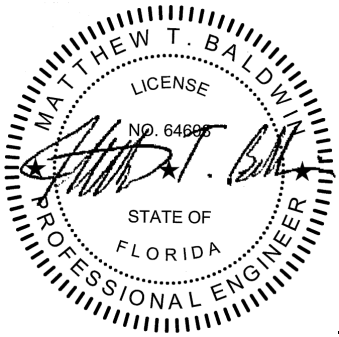
Wind Direction 1

		Enclosure							
		Wall #			Roof				
		1	2	3&4	Parallel to Ridge				
					$(C_p)1$ (Distance From Windward Edge)				$(C_p)2$
		Windward	Leeward	Side	0 to 3.0	3.0 to 5.9	5.9 to 11.2		
Background Response Factor	(Q)	0.97	0.97	0.97	0.97				
Gust Effect Factors	(G)	0.91	0.91	0.91	0.91				
External Pressure Coefficients	(C_p)	0.80	-0.261	-0.70	-0.91	-0.89	-0.51		-0.18
Net Pressures with + (GC_{pi}) - psf	(Net_{p+})	56.7	-43.1	-84.1	-104.1	-102.1	-66.8		-35.5
Net Pressures with - (GC_{pi}) - psf	(Net_{p-})	93.9	-6.0	-47.0	-67.0	-65.0	-29.7		1.6

Wind Direction 2

		Enclosure								
		Wall #			Roof - Normal To Ridge					
		3	4	1&2						
					$(C_p)1$ (Distance From Windward Edge)				$(C_p)2$	
		Windward	Leeward	Side	0 to 3.0	> 3.0				
Background Response Factor	(Q)	0.97	0.97	0.97	0.97					
Gust Effect Factors	(G)	0.91	0.91	0.91	0.91					
External Pressure Coefficients	(C_p)	0.80	-0.5	-0.70	-1.04	-0.70			-0.18	
Net Pressures with + (GC_{pi}) - psf	(Net_{p+})	56.3	-65.4	-84.4	-115.9	-84.1			-35.4	
Net Pressures with - (GC_{pi}) - psf	(Net_{p-})	93.5	-28.3	-47.3	-78.8	-47.0			1.7	

Plus and minus signs signify pressures acting toward or away from the surfaces, respectively.



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Snow

Importance Factor (Snow)	(I_s)	1.1	
Exposure Factor	(C_e)	0.8	
Thermal Factor	(C_t)	1.2	
Slope Factor	(C_s)	1.0	
Flat Roof Snow Load	(p_s)	0	psf

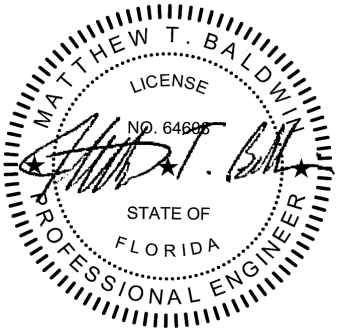
Seismic

Importance Factor (Seismic)	(I_{sm})	1.25		
Mapped Acceleration Parameter	(S_s)	0.14	Figures 22-1 Thru 22-14	
Mapped Acceleration Parameter	(S_1)	0.07	Figures 22-1 Thru 22-14	
Site Coefficient	(F_a)	1		
Site Coefficient	(F_v)	1		
MCE Spectral Resp. Accel. Short Per.	(S_{MS})	0.140		
MCE Spectral Resp. Accel. 1-s Period	(S_{M1})	0.07		
Design Spectral Accel. Short Period	(S_{DS})	0.093		
Design Spectral Accel. 1-s Period	(S_{D1})	0.04667		
Fundamental Period of Structure	(T_a)	0.070	sec	
Long Period Transistion Period	(T_L)	8	sec	Figure 22-15 Thru 22-20
Seismic Design Category	-	A		
Total Effective Seismic Weight	(W_{eff})	811	lbs	
Response Modification Coeficient	(R)	2	Table 12.2-1	
System Overstrength Factor	(Ω_o)	2.5	Table 12.2-1	
Deflection Amplification Factor	(C_d)	2	Table 12.2-1	
Seismic Response Coefficient	(C_s)	0.058		

Resultant Seismic Forces

Horizontal Seismic Load Effect	-	(E_h)	
Force at Base of Base	=	0.0	kips
Force at Top of Base	=	0.0	kips
Force at Top/Bottom of Enclosure	=	0.002	kips
Force on Silencer	=	0	kips

Vertical Seismic Load Effect (E_v) = 0 (Factor, Used With Deadweight in Load Combinations)



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Structural Calculations - Roof

Gillette 98" Frame Gensets

Critical Loads & Pressures

Wind Pressures

Downforce	1.708	psf	=	0.01 psi
Uplift	-115.9	psf	=	-0.81 psi

Snow Pressure

0 psf = 0.000 psi

Seismic Load

Horizontal	=	2 lbs
Vertical Factor	=	0

Roof Live Load

Downforce 20.0 psf = 0.1389 psi or 300 lbs Concentrated Load

Pressures & loads are the numerical maximums to be analyzed for shear, bending tension, and compression.

Section Properties

14 Gage Truss - CRS

Cross Sectional Area	(A)	= 0.36	in^2
Moment of Inertia - x	(I_x)	= 0.320	in^4
Moment of Inertia - y	(I_y)	= N/A	in^4
Section Modulus - x	(S_x)	= 0.360	in^3
Section Modulus - y	(S_y)	= N/A	in^3
Radius of Gyration - x	(r_x)	= 0.940	in
Radius of Gyration - y	(r_y)	= N/A	in

Weight	(ω)	= 0.090	lbs/in
Modulus of Elasticity	(E)	= 2.90E+04	ksi
Safety Factor	(Ω)	= 1.95	
Plastic Section Mod. - x	(Z_x)	= 0.18	
Plastic Section Mod. - y	(Z_y)	= 0.18	
Tensile Ultimate Strength	(F_{tu})	= 58	ksi
Tensile Yield Strength	(F_{ty})	= 36	ksi
Compressive Yield Strength	(F_{cy})	= 22	ksi
Shear Ultimate Strength	(F_{su})	= 36	ksi

Roof Frame Calculations

Member Designed for Forces Acting on the Strong Axis

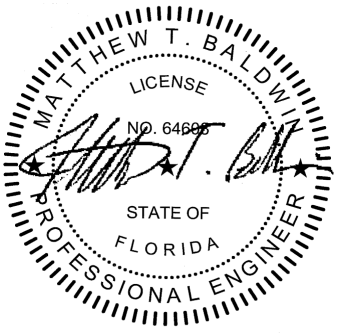
Interior Beam Critical Member Dimensions

Interior Beam Length	(L_i)	= 38.81	in
Load Spanned Width	(W_i)	= 48.88	in

Interior Beam Calculated Forces

Distributed Loads

Weight of Beam	(ω)	= 0.090	lbs/in
Wind Load Downforce	(w_d)	= 0.502	lbs/in
Wind Load Uplift Force	(w_u)	= -34.230	lbs/in



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Shear Forces (Maximum at End)

Beam Weight Shear	(V_b)	=	1.75	lbs
Wind DownForce Shear	(V_{wd})	=	9.7	lbs
Wind Uplift Shear	(V_{wu})	=	-664.3	lbs
Total Shear Downward		=	11.5	lbs
Total Shear Upward		=	662.5	lbs
Design Shear	(V_{bi})	=	662.5	lbs

Stress Forces (Bending)

Beam Weight Moment	(M_b)	=	11	lb·in
Wind Downforce Moment	(M_d)	=	47	lb·in
Wind Uplift Moment	(M_u)	=	-3,223	lb·in
Total Moments Downward		=	59	lb·in
Total Moments Upward		=	3,211	lb·in
Design Moment	(M_T)	=	3,211	lb·in
Design Stress	(σ_{bi})	=	8,921	psi

Interior Beam Design Calculations

Allowable Shear Strength

Slenderness Limit 1	(S_1)	=	-20.08	
Slenderness Limit 2	(S_2)	=	102.40	
Slenderness Ratio	(S)	=	18.0	
Allowable Shear Stress		=	9,856	psi
Allowable Shear Strength	(V_n)	=	3,548	lbs

Conclusion

(V_{bi}) 663 lbs < (V_n) 3,548 lbs **OK**

Allowable Stresses For Tension And Compression (Bending)

Tension

Allowable Tensile Stress (F_t) = 16,000 psi

Compression

Slenderness Limit 1	(S_1)	=	25.0	
Slenderness Limit 2	(S_2)	=	125.0	
Slenderness Ratio	(S)	=	41.3	

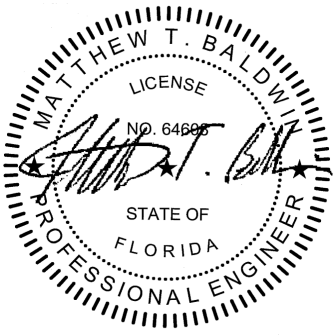
Allowable Compressive Stress (F_c) = 13,121 psi

The Allowable Compressive Stress is the controlling failure design

Therefore, (F_b) = 13,121 psi

Conclusion

(σ_{bi}) 8,921 psi < (F_b) 13,121 psi **OK**



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Entire Roof Uplift Calculations

Roof Area

Area of Roof Subjected to Uplift (R) = 6,472 in^2 (not including discharge hood area)

Roof Uplift Calculated Forces

Roof Weight	(ω_a)	=	102	lbs
Wind Load Uplift Force	(w_{ru})	=	-5,211	lbs
Total Roof Design Uplift	(W_{ru})	=	-5,109	lbs

Mounting Hardware - Roof Frame to Wall Panels

Screws Along Length - 1 Side	=	6	5/16" - 18 Bolts
Screws Along Width - 1 Side	=	3	5/16" - 18 Bolts
Total Mounting Screws	=	18	5/16" - 18 Bolts

Entire Roof Uplift Design Calculations

Grade 18-8/SS Ult. Strength	=	150,000	psi
5/16" Bolt Nominal Diameter	=	0.255	in
5/16" Bolt Effective Area	=	0.051	in^2
5/16" Bolt Threads per Inch	=	18	
Washer Nominal Diameter	=	0.875	in
Wall Panel Tensile Ult. Strength	=	34	ksi
Wall Panel Tensile Yield Strength	=	26	ksi
Safety Factor	=	3	
Wall Panel Nominal Thickness	=	0.0620	in
Maximum Tensile Strength	=	439.2	lbs
Maximum Shear/Bearing Strength	=	408.6	lbs
Max. Tensile Load per Bolt	=	408.6	lbs
Max. Total Screws Tensile Strength (P_{ts})	=	7,354	lbs

Conclusion

(W_{ru}) 5,109 lbs < (P_{ts}) 7,354 lbs **OK**

Roof Panel Uplift Calculations

Roof Panel Critical Member Dimensions

Critical Panel Length	(L_p)	=	48.90	in
Critical Panel Width	(W_p)	=	48.00	in

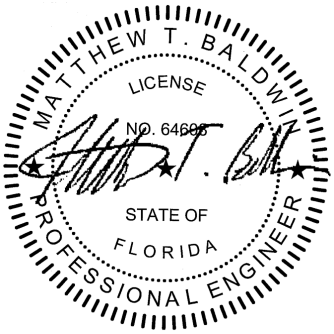
Roof Panel Uplift Calculated Forces

Distributed Loads

Wind Load Uplift Force (w_{pu}) = 1,889.9 lbs

Mounting Hardware - Roof Panel to Roof Frame

Screws Along Length - 1 Side	=	3	5/16" - 18 Bolts	- Grade 18-8/SS
Screws Along Width - 1 Side	=	3	5/16" - 18 Bolts	- Grade 18-8/SS



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Roof Panel Uplift Design Calculations

Grade 18-8/SS Ult. Strength	=	150,000	psi
5/16" Bolt Nominal Diameter	=	0.255	in
5/16" Bolt Effective Area	=	0.051	in^2
5/16" Bolt Threads per Inch	=	18	
Washer Nominal Diameter	=	0.875	in
Roof Panel Tensile Ult. Strength	=	34	ksi
Roof Panel Tensile Yield Strength	=	26	ksi
Safety Factor	=	3	
Roof Panel Nominal Thickness	=	0.0800	in

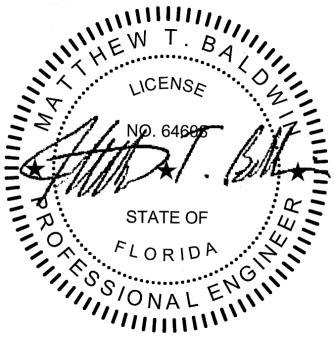
		Roof Frame
Maximum Tensile Strength	=	439.2
Maximum Shear/Bearing Strength	=	408.6
Max. Tensile Load per Screw	=	408.6

(Accounts for screw pull-over and pull-out strengths)

Max. Total Screws Tensile Strength (P_{ts}) = 4,903 lbs

Conclusion

(w_{pu}) 1,890 lbs < (P_{ts}) 4,903 lbs **OK**



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Structural Calculations - Wall Panel

Gillette 98" Frame Gensets

Critical Loads & Pressures

Walls 1 & 2

Maximum Pressures Acting:

Toward	93.9	psf	=	0.6518	psi
Away	-84.4	psf	=	-0.5864	psi

Walls 3 & 4

Maximum Pressures Acting:

Toward	93.5	psf	=	0.6491	psi
Away	-84.1	psf	=	-0.5841	psi

Roof Forces on Critical Panel (From Roof Frame Calculations)

Maximum Downforce	(W_d)	=	1,001	lbs
Wind Load Uplift Force	(w_{pu})	=	1,890	lbs

Pressures and weights are the numerical maximums to be analyzed for shear, tension, and compression.

Critical Wall Panel Dimensions

Critical/Maximum Panel Width	=	45.50	in
Critical/Maximum Panel Height	=	64.00	in

Section Properties

0.080 Aluminum Panel - 5052-H34

Cross Sectional Area	(A)	=	3.79	in^2
Moment of Inertia - x	(I_x)	=	0.052	in^4
Moment of Inertia - y	(I_y)	=	N/A	in^4
Section Modulus - x	(S_x)	=	0.802	in^3
Section Modulus - y	(S_y)	=	N/A	in^3
Radius of Gyration - x	(r_x)	=	0.112	in
Radius of Gyration - y	(r_y)	=	N/a	in
Weight	(ω)	=	0.026	lbs/in^2
Modulus of Elasticity	(E)	=	1.02E+04	ksi
Safety Factor	(Ω)	=	1.67	
Plastic Section Mod. - x	(Z_x)	=	0.13	
Plastic Section Mod. - y	(Z_y)	=	0.13	

Tensile Ultimate Strength	(F_{tu})	=	34	ksi
Tensile Yield Strength	(F_{ty})	=	26	ksi
Compressive Yield Strength	(F_{cy})	=	24	ksi
Shear Ultimate Strength	(F_{su})	=	20	ksi

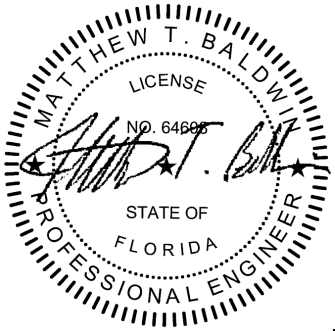
Wall Panel Calculations

Critical Wall Area

Area of Wall Panel	(W)	=	2,912.0	in^2

Mounting Hardware - Roof Frame to Wall Panels

Screws Along Height - 1 Side	=	4	5/16" - 18 Bolts
Screws Along Width - 1 Side	=	8	5/16" - 18 Bolts
Total Mounting Screws	=	24	5/16" - 18 Bolts



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Grade 5 Ultimate Strength	=	150,000	psi
5/16" Bolt Nominal Diameter	=	0.255	in
5/16" Bolt Effective Area	=	0.051	in^2
5/16" Bolt Threads per Inch	=	18	
Washer Nominal Diameter	=	0.875	in
Roof Panel Tensile Ult. Strength	=	34	ksi
Roof Panel Tensile Yield Strength	=	26	ksi
Safety Factor	=	3	
Roof Panel Nominal Thickness	=	0.0800	in

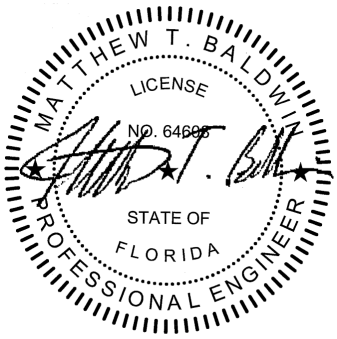
		Roof Frame
Maximum Tensile Strength	=	388.7
Maximum Shear/Bearing Strength	=	300.0
Max. Tensile Load per Bolt	=	300.0

(Accounts for screw pull-over and pull-out strengths)

Max. Total Screws Tensile Strength (P_{ts}) = 6,391 lbs

Conclusion

(w_{pu}) 1,898 lbs < (P_{ts}) 6,391 lbs **OK**



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Structural Calculations - Enclosure to Base

Gillette 98" Frame Gensets

Critical Pressures & Loads

To determine maximum moment forces, pressures are algebraically combined relative to toward or away forces (+ & -) and each wind direction.

Wind Direction 1

To be conservative, roof downforce is neglected.

Net Pressures with + Internal Pressure*(+Gcpi)*

Walls 1 & 2	-	99.9	psf =	0.6935	psi
Wall 3 or 4	-	84.1	psf =	0.5841	psi
Roof Uplift	-	104.1	psf =	0.7230	psi

Net Pressures with - Internal Pressure*(-Gcpi)*

Walls 1 & 2	-	99.9	psf =	0.6935	psi
Wall 3 or 4	-	47.0	psf =	0.3263	psi
Roof Uplift	-	67.0	psf =	0.4651	psi

Wind Direction 2

Net Pressures with + Internal Pressure*(+Gcpi)*

Walls 3 & 4	-	121.7	psf =	0.8453	psi
Wall 1 or 2	-	84.4	psf =	0.5864	psi
Roof Uplift	-	115.9	psf =	0.8052	psi

Net Pressures with - Internal Pressure*(-Gcpi)*

Walls 3 & 4	-	121.7	psf =	0.8453	psi
Wall 1 or 2	-	47.3	psf =	0.3286	psi
Roof Uplift	-	78.8	psf =	0.5474	psi

Seismic

Horizontal Seismic Force (E_h) = 2 lbs

Enclosure Critical Dimensions & Weights

Total Enclosure Weight		(W_t)	=	200	lbs
Walls 1/2 Area	-	*(w1)*	=	3440.5	in^2
Walls 3/4 Area	-	*(w3)*	=	9568.3	in^2
Roof Area	-	*(R)*	=	6471.9	in^2

(Includes all components)

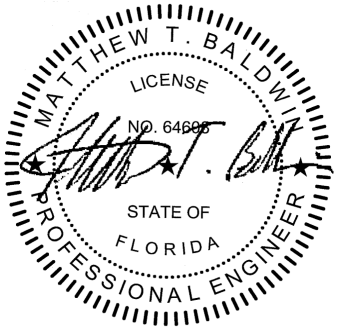
Enclosure Calculated Forces

Maximum Wind Load Forces on Walls

Wind Direction 1

Net Forces with + Internal Pressure*(+Gcpi)*

Walls 1/2	-	=	2,386	lbs
Wall 3 or 4	-	=	5,589	lbs
Roof Uplift	-	=	4,679	lbs



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Net Forces with - Internal Pressure *(-Gcpi)*

Walls 1/2	-	=	2,386	lbs
Wall 3 or 4	-	=	3,122	lbs
Roof Uplift	-	=	3,010	lbs

Wind Direction 2

Net Forces with + Internal Pressure *(+Gcpi)*

Walls 3/4	-	=	8,088	lbs
Wall 1 or 2	-	=	2,018	lbs
Roof Uplift	-	=	5,211	lbs

Net Forces with - Internal Pressure *(-Gcpi)*

Walls 3/4	-	=	8,088	lbs
Wall 1 or 2	-	=	1,131	lbs
Roof Uplift	-	=	3,542	lbs

Enclosure Overturn Forces (Includes Seismic)

(Postive forces act upward, negative forces act downward)

Wind Direction 1

Net Forces with + Internal Pressure *(+Gcpi)*

Overturn on Walls 1/2	=	2,874	lbs
Overturn on Walls 3/4	=	6,371	lbs

Net Forces with - Internal Pressure *(-Gcpi)*

Overturn on Walls 1/2	=	2,039	lbs
Overturn on Walls 3/4	=	3,713	lbs

Wind Direction 2

Net Forces with + Internal Pressure *(+Gcpi)*

Overturn on Walls 3/4	=	8,484	lbs
Overturn on Walls 1/2	=	3,042	lbs

Net Forces with - Internal Pressure *(-Gcpi)*

Overturn on Walls 3/4	=	7,650	lbs
Overturn on Walls 1/2	=	1,972	lbs

Design Overturn Force (O_E) = 8,484 lbs Acting On Wall 3/4

Mounting Hardware - Enclosure to Base/Tank or Pad

To be conservative, bolt connections along the adjacent walls are neglected.

No. of Bolt Connections Along Wall 3/4 = 6 5/16" - 18 Bolts - Grade 18-8/S

Enclosure Overturn Design Calculations

Grade 18-8 Ultimate Strength	=	150,000	psi
Grade 8.8 Nom. Tensile Stress	=	112,500	psi (Includes Reduction Factor)
5/16" Bolt Effective Area	=	0.051	in^2
Tensile Strength per Bolt	=	2,873	lbs

Total Bolts Tensile Strength = 17,236 lbs

Conclusion

(O_E) 8,484 lbs < (R_v) 17,236 lbs **OK**

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Structural Calculations - Enclosure With Base/Tank to Pad

Gillette 98" Frame Gensets

Critical Wind Load Pressures

To determine maximum moment forces, pressures are algebraically combined relative to toward or away forces (+ & -) and each wind direction.

Wind Direction 1

To be conservative, roof downforce is neglected.

Net Pressures with + Internal Pressure *(+Gcpi)*

Walls 1 & 2	-	99.9	psf =	0.6935	psi
Wall 3 or 4	-	84.1	psf =	0.5841	psi
Roof Uplift	-	104.1	psf =	0.7230	psi

Net Pressures with - Internal Pressure *(-Gcpi)*

Walls 1 & 2	-	99.9	psf =	0.6935	psi
Wall 3 or 4	-	47.0	psf =	0.3263	psi
Roof Uplift	-	67.0	psf =	0.4651	psi

Wind Direction 2

Net Pressures with + Internal Pressure *(+Gcpi)*

Walls 3 & 4	-	121.7	psf =	0.8453	psi
Wall 1 or 2	-	84.4	psf =	0.5864	psi
Roof Uplift	-	115.9	psf =	0.8052	psi

Net Pressures with - Internal Pressure *(-Gcpi)*

Walls 3 & 4	-	121.7	psf =	0.8453	psi
Wall 1 or 2	-	47.3	psf =	0.3286	psi
Roof Uplift	-	78.8	psf =	0.5474	psi

Seismic

Enclosure Horiz. Seismic Force	(EE_h) =	2	lbs
Base/Tank Horiz. Seismic Force	(EB_h) =	8	lbs

Enclosure With Base/Tank Critical Dimensions & Weights

Total Enclosure Weight	(W_t) =	350	lbs	(Includes all components)
Walls 1/2 Area -	*(w1)* =	3,776	in^2	(Includes Base/Tank Surface Area)
Walls 3/4 Area -	*(w3)* =	10,254	in^2	(Includes Base/Tank Surface Area)
Roof Area -	*(R)* =	6,472	in^2	

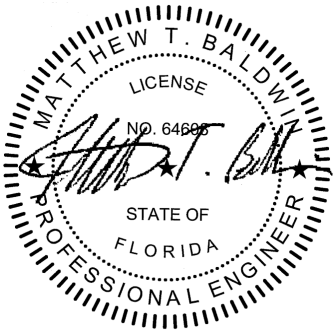
Enclosure With Base/Tank Calculated Forces

Maximum Wind Shear Forces on Walls Including Base/Tank

Wind Direction 1

Net Forces with + Internal Pressure *(+Gcpi)*

Walls 1/2 -	=	2,619	lbs
Wall 3 or 4 -	=	5,989	lbs
Roof Uplift -	=	4,679	lbs



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Net Forces with - Internal Pressure *(-Gcpi)*

Walls 1/2	-	=	2,619	lbs
Wall 3 or 4	-	=	3,346	lbs
Roof Uplift	-	=	3,010	lbs

Wind Direction 2

Net Forces with + Internal Pressure *(+Gcpi)*

Walls 3/4	-	=	8,668	lbs
Wall 1 or 2	-	=	2,215	lbs
Roof Uplift	-	=	5,211	lbs

Net Forces with - Internal Pressure *(-Gcpi)*

Walls 3/4	-	=	8,668	lbs
Wall 1 or 2	-	=	1,241	lbs
Roof Uplift	-	=	3,542	lbs

Enclosure with Base/Tank Maximum Wind Force = 8,668 lbs Acting On Wall 3/4

Coefficient of Friction - Steel to Wet Concrete (μ_s) = 0.45
Frictional Resisting Force (Total Weight x μ_s) = 158

Enclosure with Base/Tank Design Shear (V_{EB}) = 8,511

Enclosure With Base/Tank Overturn Forces (Inlcudes Seismic)

Postive forces act upward

Wind Direction 1

Net Forces with + Internal Pressure *(+Gcpi)*

Overturn on Walls 1/2	=	2,930	lbs
Overturn on Walls 3/4	=	7,031	lbs

Net Forces with - Internal Pressure *(-Gcpi)*

Overturn on Walls 1/2	=	2,096	lbs
Overturn on Walls 3/4	=	4,051	lbs

Wind Direction 2

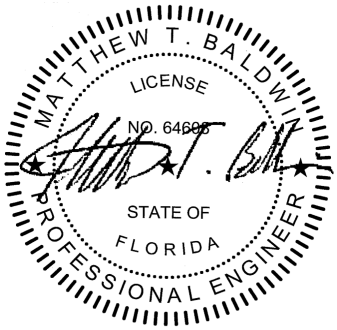
Net Forces with + Internal Pressure *(+Gcpi)*

Overturn on Walls 3/4	=	9,471	lbs
Overturn on Walls 1/2	=	3,078	lbs

Net Forces with - Internal Pressure *(-Gcpi)*

Overturn on Walls 3/4	=	8,637	lbs
Overturn on Walls 1/2	=	1,960	lbs

Design Overturn Force (O_{EB}) = 9,471 lbs Acting On Wall 3/4



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Mounting Hardware - Enclosure With Base/Tank to Pad

No. of Bolt Connections Along Wall 3/4 = 6 Bolts 1/2" Set Bolt Anchors - Grade 5/Galv.

Enclosure With Base/Tank Design Calculations

Mounting Hardware - Shear and Tension

Grade 5	Ultimate Stress	=	120,000	psi
Grade 5	Nom. Shear Stress	=	48,000	psi
Grade 5	Nom. Tensile Stress	=	90,000	psi
1/2" Bolt Nominal Area		=	0.159	in^2
Shear Strength per Bolt		=	3,816	lbs
Tensile Strength per Bolt		=	7,155	lbs
Avail. Tensile Strength per Bolt		=	1,781	lbs (Combined Tension and Shear)

Total Bolts Shear Strength	(R_{vb})	=	22,896	lbs
Total Bolts Tensile Strength	(R_{tb})	=	10,685	lbs

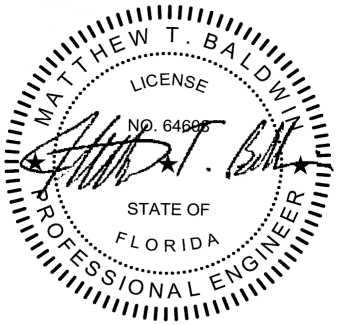
Conclusion

Shear

(V_{EB})	8,511	lbs	<	(R_{tb})	22,896	lbs	**OK**

Tension

(O_{EB})	9,471	lbs	<	(R_{tb})	10,685	lbs	**OK**



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