

**EVALUATION REPORT OF
VARCO PRUDEN BUILDINGS
'VEE RIB WALL PANEL'**

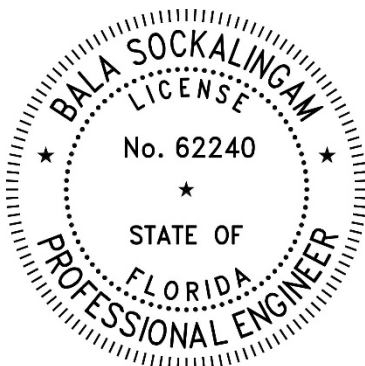
**FLORIDA BUILDING CODE 8TH EDITION (2023)
FLORIDA PRODUCT APPROVAL
FL 12762.2-R6
PANEL WALLS
SIDING**

**Prepared For:
Varco Pruden Buildings
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**This report consists of
Evaluation Report (2 Pages including cover)
Design Procedure (5 Pages)
Installation Details (2 Pages)**

**Report No. C2708-5
Date: 8.12.2023**



This item has been digitally signed and sealed by Bala Sockalingam, PE, on the date indicated.

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Manufacturer:	Varco Pruden Buildings
Product Name:	Vee Rib
Panel Description:	36" wide coverage with (4) 1-3/16" deep inverted ribs
Materials:	Min. 26 ga., 50 ksi steel. Galvanized coated steel (ASTM A653) or Galvalume coated steel (ASTM A792) as per FBC 2023 Section 1405.2
Support Description:	Min. 16 ga., 55 ksi steel section
Design Pressures:	The allowable uniform loads shown on Page 5 of the Design Procedure were determined in accordance with FBC 2023 Section 1404.5 and 2210.1 and AISI S100-16(2020) w/S2-20. Panel fasteners, supports, frames and support connections must be designed to resist all loads.
Panel Attachment:	#12-14 x 1-1/4" long corrosion resistant self-drilling screws with washer.
At all supports	12" o.c. across panel width
Sidelap Attachment:	¼"-14 x 7/8" long corrosion resistant self-drilling screws with washer at max. 36" o.c. Fasteners are equally spaced between supports.
Code Compliance:	The product described herein has demonstrated compliance with FBC 2023 Section 1404.5.
Product Limitations:	Design wind loads shall be determined for each project in accordance with FBC 2023 Section 1609 or ASCE 7-22 using allowable stress design. The maximum support spacing listed herein shall not be exceeded. The design pressure for reduced support spacing may be computed using rational analysis prepared by a Florida Professional Engineer or based on Varco load span table. This evaluation report is not applicable in High Velocity Hurricane Zone.

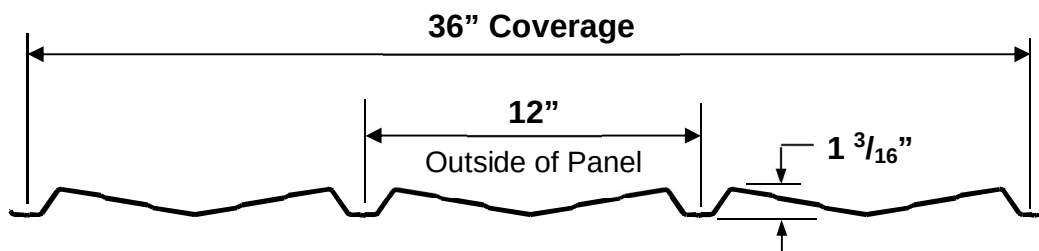
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VEE RIB WALL PANEL

A. PANEL MATERIAL (MS 05-01)

Panels are rolled using ASTM A 653 or A 792 material, Grade 50. For complete material specifications and material weights, refer to Material Specifications Documents MS-05-01.

B. PANEL GEOMETRY (DP 25.2)



C. PANEL PROPERTIES (DP 25.2)

Panel Section Properties (per foot width of panel)					Effective Section Properties (per foot width of panel)			
					Outside of Panel In Compression		Inside of Panel In Compression	
Gauge	Base ² Metal Thick.	Panel Yield Strength	Panel Weight ³	I _x FULL	I _{xe} (+) DEFL.	S _{xe} (+) STRENGTH	I _{xe} (-) DEFL.	S _{xe} (-) STRENGTH
	(in.)	(ksi)	(psf)	(in. ⁴)	(in. ⁴)	(in. ³)	(in. ⁴)	(in. ³)
26	0.018	50	0.91	0.0283	0.025	0.041	0.027	0.041
24	0.023	50	1.16	0.0367	0.035	0.058	0.036	0.055
22	0.029	50	1.45	0.0433	0.047	0.075	0.047	0.073

Notes:

1. Panel properties are determined in accordance with AISI Specification Section B.
2. The design base metal thickness is exclusive of Galvanized / Galvalume coatings and paint finishes.
3. Weights for 26, 24 and 22 ga. wall panels are based on AZ55 Galvalume thickness with a material blank width of 42¾ inches. (ref. MS-05-01)

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D. PANEL DESIGN (DP 10.1)

Panels are designed in accordance with the “North American Specification for the Design of Cold-Formed Steel Structural Members”, AISI Standard S100. Panel design limit states and other design considerations have been summarized below.

Limit State / Design Consideration	References
Panel: • Section Properties • Bending Strength • Web Crippling Strength** • Shear Strength • Bending and Shear • Bending and Web Crippling	Section B5. Section F1, F3.1, I6.2., I6.2.1* Section G5 Section G Section H2 (Not a limit state for panel design)
Screw Connections: • Tension, Pullout & Pullover Strength	Design Procedures: DP 3.7
Deflection: • Limits	Design Procedures: DP 6.2

* In accordance with AISI Section I6.1.2, for standing seam roof panel systems under uplift loadings the nominal strength (resistance) shall be determined by testing per AISI test procedure S906 (ASTM E1592). Panel strength (resistance) under gravity loading may be determined by AISI Sections F3 and F4 as referenced above.

** Not required for trapezoidal profile standing seam roof panels

D1. Panel Flexural Strength (DP 25.2) kip-in. / ft. width of panel

Ref. Gage	Outside of Panel in Compression, S_{xe} (+)				Inside of Panel in Compression, S_{xe} (-)			
	Nominal ² Strength M_n	Allowable Strength	Design Strength	Design Resistance	Nominal ² Strength M_n	Allowable Strength	Design Strength	Design Resistance
		ASD	LRFD	LSD		ASD	LRFD	LSD
26	2.03	1.01	1.62	1.52	2.04	1.02	1.63	1.53
24	2.89	1.73	2.60	2.60	2.76	1.65	2.48	2.48
22	3.73	2.24	3.36	3.36	3.66	2.19	3.29	3.29

Notes:

- Tabulated values are for Allowable and Design Bending Strengths (Resistances) where:
 - Allowable Strength = M_n / Ω_b (ASD), kip-in.
 - Design Strength = $\phi_b M_n$ (LRFD & LSD), kip-in.
 - (24ga, 22 ga) $\Omega_b = 1.67$ (ASD); $\phi_b = 0.90$ (LRFD); $\phi_b = 0.90$ (LSD-Canada)
 - (26 ga) $\Omega_b = 2.00$ (ASD); $\phi_b = 0.80$ (LRFD); $\phi_b = 0.75$ (LSD-Canada)
- M_n = Nominal Bending Strength, kip-in per foot of width of panel
- Load reductions or strength (resistance) increases for wind have not been included

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D2. Panel Shear Strength (DP 25.2) kip / ft. width of panel

Ref. Gage	Nominal Strength ² V_n	Allowable Strength	Design Strength	Design Resistance
		ASD	LRFD	LSD
26	1.57	0.98	1.49	1.26
24	2.36	1.47	2.24	1.88
22	3.08	1.93	2.93	2.47

Notes:

- Tabulated values are for Allowable and Design Shear Strengths (Resistances) where:
 - Allowable Strength = V_n / Ω_v (ASD), kips per ft. width of panel
 - Design Strength (Resistance) = $\phi_v V_n$ (LRFD & LSD), kips per ft. width of panel
 - $\Omega_v = 1.6$ (ASD); $\phi_v = 0.95$ (LRFD); $\phi_v = 0.80$ (LSD-Canada)
- V_n = Nominal Bending Strength - kip / ft. width of panel

D3. Panel Web Crippling Strength (DP 25.2) kip / ft. width of panel

Ref. Gage	End – One Flange Loading				Interior – One Flange Loading			
	Nominal ² Strength P_n	Allowable Strength	Design Strength	Design Resistance	Nominal ² Strength P_n	Allowable Strength	Design Strength	Design Resistance
		ASD	LRFD	LSD		ASD	LRFD	LSD
26	0.318	0.187	0.286	0.254	0.481	0.275	0.409	0.361
24	0.483	0.284	0.435	0.386	0.706	0.403	0.600	0.529
22	0.734	0.432	0.661	0.587	1.093	0.624	0.929	0.819

Notes:

- Tabulated values are for Allowable and Design Web Crippling Strengths (Resistances) where:
 - Allowable Strength = P_n / Ω_w (ASD), kips per ft. width of panel
 - Design Strength (Resistance) = $\phi_w P_n$ (LRFD & LSD), kips per ft. width of panel
 - End Loading: $\Omega_w = 1.7$ (ASD); $\phi_w = 0.90$ (LRFD); $\phi_w = 0.80$ (LSD-Canada)
 - Interior Loading: $\Omega_w = 1.75$ (ASD); $\phi_w = 0.85$ (LRFD); $\phi_w = 0.75$ (LSD-Canada)
- P_n = Nominal Web Crippling Strength - kip / ft. width of panel

D4. Panel Connections

Standard panel-to-secondary support connections are made with #12-14 self-drilling structural roof or wall fasteners located a minimum of one foot on center at each rib location.

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a) Pullover Strength (DP 3.7.1.VP)

Screw Pull-Over Strength¹ from Panel or Deck, (lbs / Screw)

Screw Type ⁴	Pullover From ³ :	Nominal Strength P_{nov} , (Lbs.)	Allowable Strength P_{nov} / Ω (ASD)	Design Strength ΦP_{nov} (LRFD)	Design Resistance ΦP_{nov} (LSD)
Wall Structural, Stainless #12 -14 ($d_w = 0.578$) ² Wall Stitch, Stainless 1/4 - 14 ($d_w = 0.578$) ²	26 Ga. Panel ($t_1 = 0.018$ ")	810	270	405	324
	24 Ga. Panel ($t_1 = 0.023$ ")	1035	345	518	414
	22 Ga. Panel ($t_1 = 0.029$ ")	1305	435	653	522

Notes:

1. AISI Section J4.4.2, $\Omega = 3.00$ (ASD), $\phi = 0.50$ (LRFD), $\phi = 0.40$ (LSD)
2. d_w = screw head diameter $\leq 1/2$ " .
3. $F_{u1} = 60$ ksi assumed for VP roof and wall panel material. The above values may be factored by the ratio of F_u for other materials.
4. The above table may be used with other screw types by matching the screw washer diameters, d_w .

b) Pullout Strength (DP 3.7.1.VP)

Screw Pull-Out Strength¹ from Z/C Secondary, (lbs/ Screw)

Secondary ² Properties		#12 – 14 Screws ($d = 0.216$ ")			
F_{u2} (ksi)	Thick. t_2 (in.)	Nominal Strength P_{not}	Allow. Strength (ASD)	Design Strength (LRFD)	Design Resist. (LSD)
70	0.060	771	257	386	308
	0.068	874	291	437	350
	0.073	938	313	469	375
	0.079	1015	338	508	406
	0.088	1131	377	565	452
	0.098	1259	420	630	504
	0.113	1452	484	726	581

Notes:

1. AISI Section J4.4.1, $\Omega = 3.00$ (ASD), $\phi = 0.50$ (LRFD), $\phi = 0.40$ (LSD)
2. The above values may be factored by the ratio of F_u for other materials.

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D5. Panel Deflections (DP 25.2)

For pressure (+) loading producing compression on the panel outside panel deflections are obtained by using $I_{xe}(+)$. For suction (-) loading producing compression on the panel inside, panel deflections are obtained by using $I_{xe}(-)$. Standard BlueScope deflection requirements for panels are listed in Design Procedure DP 6.2

E. PANEL LOAD TABLES (VP PANEL LOAD TABLES REV18)

		Allowable Uniform Load (psf)													
		Span = 2.0'		Span = 3.0'		Span = 4.0'		Span = 5.0'		Span = 6.0'		Span = 7.0'		Span = 7.5'	
Gage	Fy	P	S	P	S	P	S	P	S	P	S	P	S	P	S
26 Ga.	50	134	129	89	80	58	46	37	29	26	19	19	14	16	12
24 Ga.	50	214	129	142	86	81	64	52	41	34	27	25	20	22	17
22 Ga.	50	331	129	182	86	105	64	68	51	44	37	33	28	28	24

Notes:

1. P = Pressure on outside of panel, S = suction on outside of face.
2. Tabulated values are Allowable Strength Design (ASD) format in accordance with the 2012 AISI Specification considering bending, shear, web crippling, combined bending and shear and fastener pullover from panel.
3. Panel allowable loads are limited by L/60 deflection.
4. Standard construction assumes (1) fastener per foot . Values in (parenthesis) are for (2) fasteners per foot.
5. All values shown are for 3 or more spans.
6. Fastener pullover strength is included in load tables. For fastener pullout strength from secondary refer to Section D4.

Document and Revision History

REV. #	DATE	NAME	DESCRIPTION
0	09/20/2017	R. Benton	Original document (Reproduced to match previous submittals using new documents and formats)
2	09/2020	R. Benton	Updating for 2020 FBC release. Separated Panel Rib and Vee Rib into separate docs. Renamed and renumbered to coincide with the actual panel DP