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Issued: 05/2010

Expires: 05/2012

Revised: 05/18/2011

DIVISION: 07—THERMAL AND MOISTURE PROTECTION

Section: 07410—Metal Roof and Wall Panels

REPORT HOLDER:

**PRESSTEK LTD.
P. O. DRAWER 403
RADFORD, VA 24143**

EVALUATION SUBJECT:

RADVA T-G Panels

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2006 International Building Code® (IBC)
- 2007 North American Specification for the Design of Cold-Formed Steel Structural Members(AISI)
- 2001 North American Specification for the Design of Cold-Formed Steel Structural Members(AISI)

1.2 Property Evaluated

- Structural

2.0 USES

The “RADVA T-G Panel” is an insulated structural composite panel core that is used as an interior or exterior wall panel, floor panel or roof panel, in Type V construction. Wall panels may be used either as load bearing or non-load bearing. The system is applicable for residential and commercial buildings. The use of this panel to resist in-plane loads is not within the scope of this report.

3.0 DESCRIPTION

3.1 General

RADVA T-G Panels are marketed under the trade name “RADVA T-G Panel” and are insulated structural composites. RADVA T-G Panels are manufactured with expandable polystyrene and light gauge galvanized steel to create a structural composite panel. The light gauge

steel load carrying members are located flush with each face of the panel. The light gauge steel load carrying members are separated and bonded to by Expanded Polystyrene (EPS) insulation that provides a thermal break between the wall faces. Panels are manufactured by applying a thermosetting adhesive coating to the steel and then subjecting the framing member to a low-pressure molding.

3.1.1 Framing: Framing members are light gauge galvanized steel members that are embedded at both faces. The framing members are roll formed from 24, 20, 18, or 16 gage steel plates. Each light gauge steel member is roll formed into the shapes shown in Figure 1. Vertical steel members are spaced at 16 inches or 24 inches max (406 mm or 610 mm) on center.

3.1.2 Tracks: The top and bottom tracks are a minimum 20 gauge galvanized steel members.

3.1.3 Upper Header: The upper header is a metal or wood element with a minimum size of nominal 2 inches (1 ½” (38 mm)) by nominal 4 inches (3 ½” (89 mm)) thick panel) or nominal 2 inches (1 ½” (38 mm)) by nominal 6 inches (5 ½” (140 mm)) thick panel). The metal or wood member depth shall match the EPS core thickness.

3.1.4 Panel: Each panel is manufactured in 48 inch (1219 mm) widths and lengths of 8 ft (2438 mm), 9 ft (2743 mm), 10 ft (3048 mm), or 12 ft (3658 mm). In addition, custom widths and lengths can be formed. Panels are manufactured in 3 ½ inch (89mm) and 5 ½ inch (140 mm) thickness. Each panel is installed with a tongue and groove fastening system that creates a wire chase opening, reference Figures 2 through 6.

3.1.5 Connector/Shear Plate: The minimum connector/shear plate dimensions are No. 20 gauge [0.0359 inch (0.91 mm)] and 3-inch-by-5-inch (76 mm-by127 mm).

3.1.6 Self-tapping Screws: The screw size is No. 8 by ½-inch-long (12.7 mm), self-tapping. The screw steel shall be AISI 1018 or equivalent, Screws shall be quenched in liquid and tempered by reheating to a minimum of 650°F. Hardness shall meet the Rockwell C44 hardness value.



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3.2 Materials

3.2.1 Expanded Polystyrene: Expanded polystyrene panels or boards shall be manufactured in accordance with ASTM C578. The flame-spread index and smoke density index shall be less than 25 and 450, respectively. The nominal density is 1.3 pounds per cubic foot (pcf) or (20.8 grams/liter). Expanded polystyrene (EPS) density varies with panel thickness, see Table 1.

Table 1. EPS Panel Density

Thickness		Density			
		Minimum		Maximum	
(inches)	(mm)	(pcf) ^a	(g/l) ^b	(pcf)	(g/l)
3.5	89	1.3	20.8	1.7	27.2
5.5	140	0.9	14.4	1.3	20.8

^apounds per cubic foot ^bgrams per liter

3.2.2 Panel Steel: All steel members shall be manufactured in accordance with ASTM A653 SS, Grade 37, and coated with ASTM A924 G60 galvanizing. The steel thicknesses noted in this evaluation report refer to the minimum uncoated base-metal thickness. Design is based on AISI uncoated values, reference Table 2. The members are roll formed to the shapes shown in Figure 1.

Table 2 Light Gauge Metal Coil Thickness (inches)

Gauge	Uncoated			Coated (Galvanized)	
	Minimum	Nominal	AISI Design	Abs min	Nominal
24	0.0209	0.0239	0.0220	0.0236	0.0276
22	0.0269	0.0299	0.0283	0.0296	0.0336
20	0.0329	0.0359	0.0346	0.0356	0.0396
18	0.0428	0.0478	0.0451	0.0466	0.0516
16	0.0538	0.0598	0.0566	0.0575	0.0635

3.2.3 Thermosetting Adhesive: The thermosetting neoprene/phenol adhesive is applied to the steel prior to molding the panel.

4.0 DESIGN AND INSTALLATION

4.1 Design

4.1.1 Design loads are to be determined in accordance with the applicable code, the manufacturer's design manual, and design loads are not to exceed the panel loads in tables 3 through 8 of this report.

4.1.2 Contributions to design load values from any bracing elements, such as, siding, structural sheathing (OSB or Plywood), and sheetrock are outside the scope of this report.

4.1.3 Loads tabulated in load tables may be used for shorter spans or shorter heights. Extrapolation of panel heights is outside the scope of this report.

4.1.4 Where loading conditions result in simultaneously applied loads, the sum of the ratios of imposed loads to allowable loads shall not exceed one for Allowable Stress Design. If the design is based on LRFD the sum of the factored force ratios shall not exceed one.

4.2 Installation

RADVA T-G Panels shall be installed in accordance with the manufacturer's installation instructions, this report, and IBC section 2603.

4.2.1 Panel to Panel Connection: The RADVA T-G Panels are connected to each other by shear plate connectors. Each wall panel has a steel channel along the vertical edges of the outside and inside facings, which butts to the edge of the next panel. A minimum of 3 equally spaced connector/shear plates shall be attached with three self-tapping screws to each framing member in accordance with Figure 3 shall be provided. The connector/shear plate shall be applied on both outside and inside faces.

4.2.2 Corners: Corners are joined in accordance with the details shown in Figure 4. Panels with steel members spaced at 16 inches on center and 24 inches on center are shown in Figure 2 and Figure 5, respectively.

4.2.3 Exterior and Interior Wall Panels: Each exterior and interior wall panel shall be attached to top and bottom tracks with self tapping screws. Three self tapping screws shall be provided at the intersection of each vertical stud and the track on both the inside and outside face. A second top track or wood upper header is permitted to be installed above the first, Figure 7, and shall be specified by the licensed design professional.

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4.2.4 Roof and Floor Panels: Each roof and floor panel shall have an in-plane boundary element field-installed across the width of the top and bottom of the panel similar to the top and bottom tracks of exterior and interior wall panels. The boundary element shall be designed by a licensed design professional and approved by the Building Official.

4.2.5 Cladding Attachment

4.2.5.1 Exterior Walls: Exterior wall panels shall be protected with a water-resistive barrier in accordance with IBC chapter 14. The exterior wall panels shall be protected with a code approved exterior wall covering. The exterior wall coverings shall be approved by the Building Official and installed in accordance with the applicable codes and the manufacturer's recommendations. Thermal barriers are required in accordance with section 5.3 of this report.

4.2.5.2 Interior Walls: The interior wall panels shall be covered with an approved interior wall covering. Installation methods shall be approved by the Building Official and in accordance with the IBC. Thermal barriers are required in accordance with section 5.3 of this report.

4.2.5.3 Roof: The roof covering, flashing, and underlayment, shall be installed in accordance with IBC chapter 15 and approved by the Building Official. Thermal barriers are required in accordance with section 5.3 of this report. The minimum roof slope shall be 2 percent to allow proper drainage.

4.2.5.4 Floor: The floor panels shall be covered with an approved floor covering. Installation methods shall be approved by the Building Official and in accordance with the IBC. Thermal barriers are required in accordance with section 5.3 of this report.

5.0 CONDITIONS OF USE

The RADVA T-G Manufactured Panel Building System described shall be fabricated, identified and installed in accordance with this report, the manufacturer's instructions, 2006 International Building Code (IBC), and are subject to the following conditions:

5.1 Structural calculations shall be performed by a licensed design professional of the panels to resist in-

plane shear, panel connections, top and bottom plates connections, upper header size, demand of the panel, and supporting structure must be submitted to the building official for review and approval.

5.2 RADVA T-G Panels are recognized for Type V construction in accordance with section 602.5 of the 2006 IBC.

5.3 Except as provided for in the 2006 IBC section 2603.4.1 and section 2603.9, RADVA T-G Panels shall be separated from the interior of a building by ½ inch gypsum wallboard or other approved material in accordance with IBC 2603.4.

5.4 RADVA T & G Panels used in a class A, B, and C roof assembly shall have justification submitted to the building official in accordance with the 2006 IBC section 1505.1.

5.5 Thermal barrier exceptions in IBC section 2603.4.1.1 through 2603.4.1.13. Do not apply to foam plastic insulation used as an interior wall or ceiling finish in plenums.

5.6 In areas where the probability of termite infestation is very heavy in accordance with IBC Figure 2603.8 installation is limited in accordance with IBC section 2603.8.

5.7 Field-cutting of the panel, panel alteration, and the use with hot-asphalt or hot-coal roof coverings are outside the scope of this report.

5.8 RADVA T & G Panels are fabricated at PRESSTK LTD facilities under a quality control program that meets the minimum requirements for IAPMO ES Listee's Quality Assurance System.

5.9 The flame spread index and smoke development index are outside the scope of this report.



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6.0 EVIDENCE SUBMITTED

Test results are from laboratories in compliance with ISO/IEC 17025. Test data was submitted in accordance with:

- Standard Test Methods of Conduction Strength Tests of Panels for Building Construction, ASTM E72.

The load tables in this report were developed based on calculations to resist yielding, local buckling, and lateral buckling in accordance with the 2007 North American

Specification for the Design of Cold-Formed Steel Structural Members (AISI), 2001 North American Specification for the Design of Cold-Formed Steel Structural Members (AISI), 2006 International Building Code (IBC), and verified with ASTM E72 test data.

7.0 IDENTIFICATION

RADVA T & G Panels are identified by a label that notes the manufacturer's name, product name, and IAPMO ES's Mark of Conformity and the evaluation report number (ER 128).



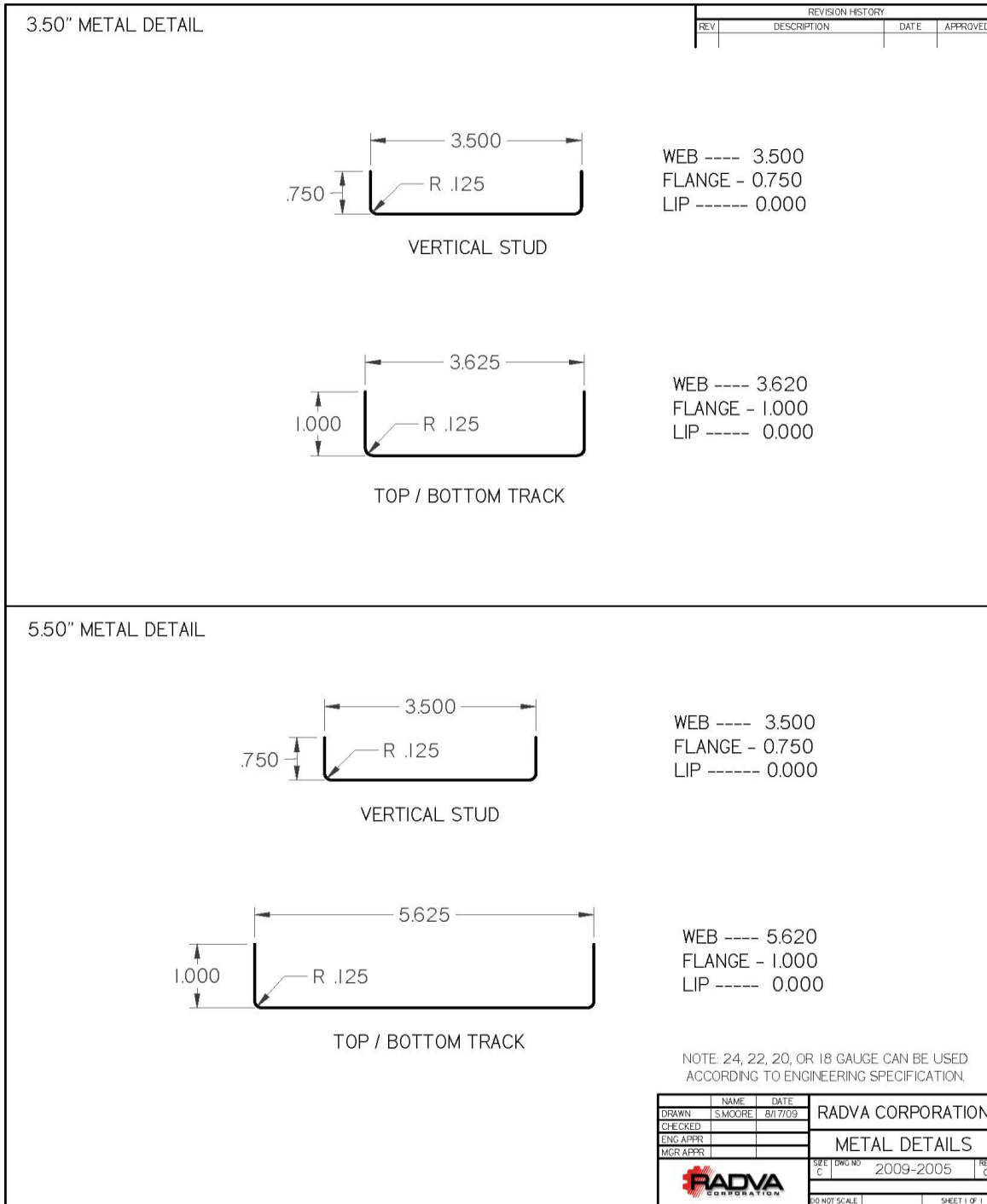
IAPMO #0128

A handwritten signature in black ink, appearing to read 'Amir H. ...'.

Director of Evaluation Services

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Figure 1 C Shape: Flange, Web and Bend Details

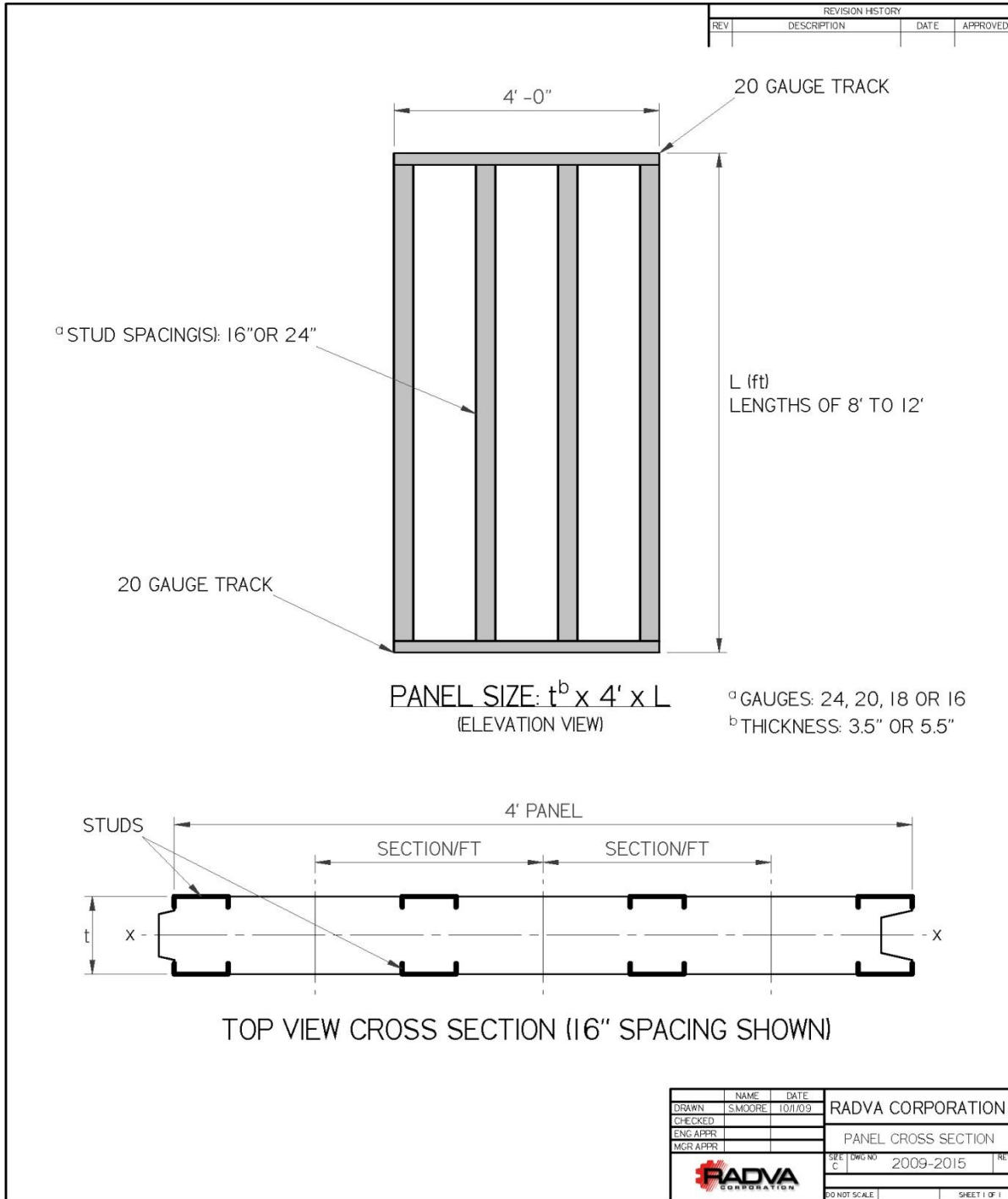


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Figure 2 Typical RADVA T-G Insulated Structural Panel (Wall Panel shown)

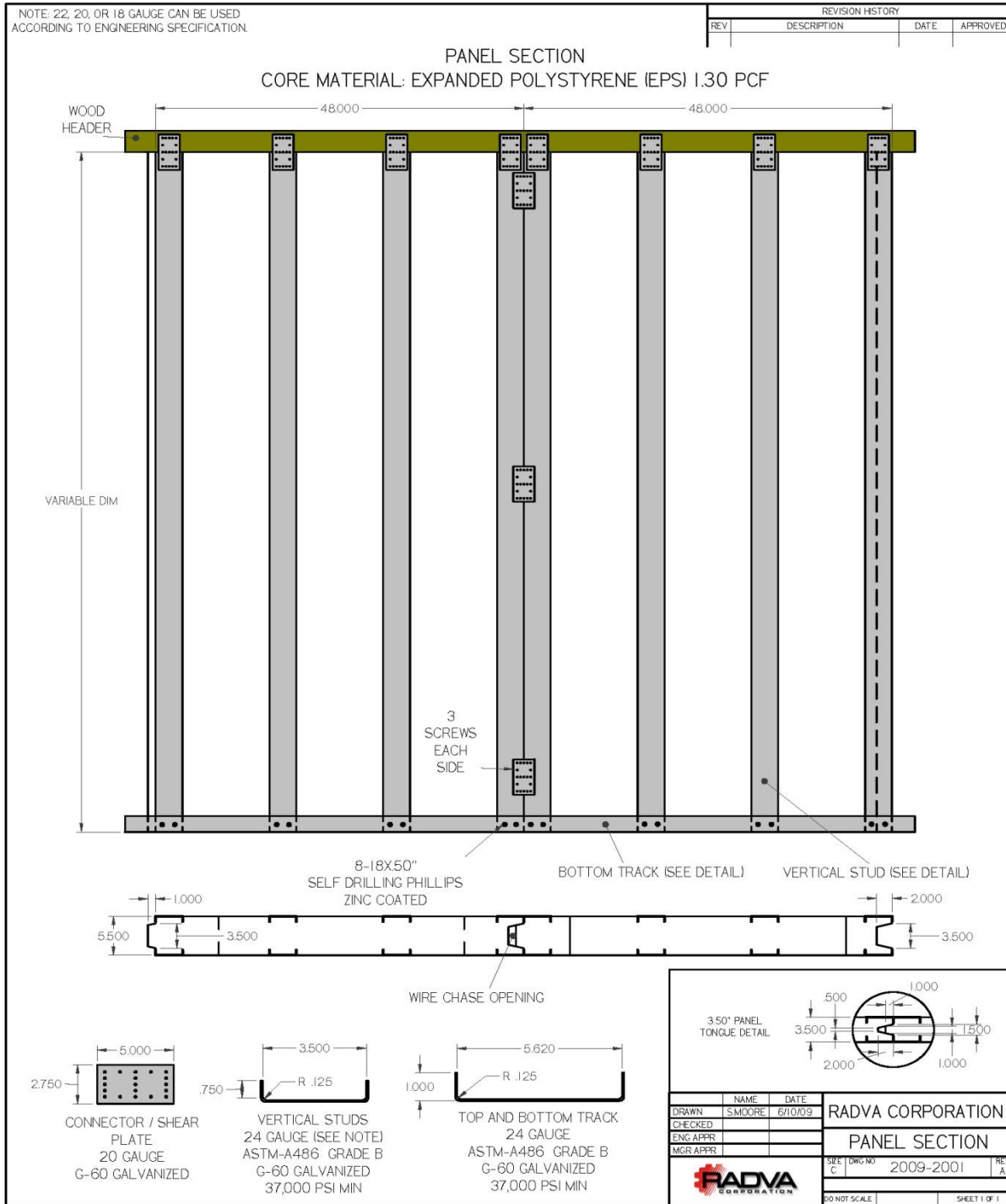


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Figure 3 RADVA T-G Panel: Fastening system for two adjacent panels

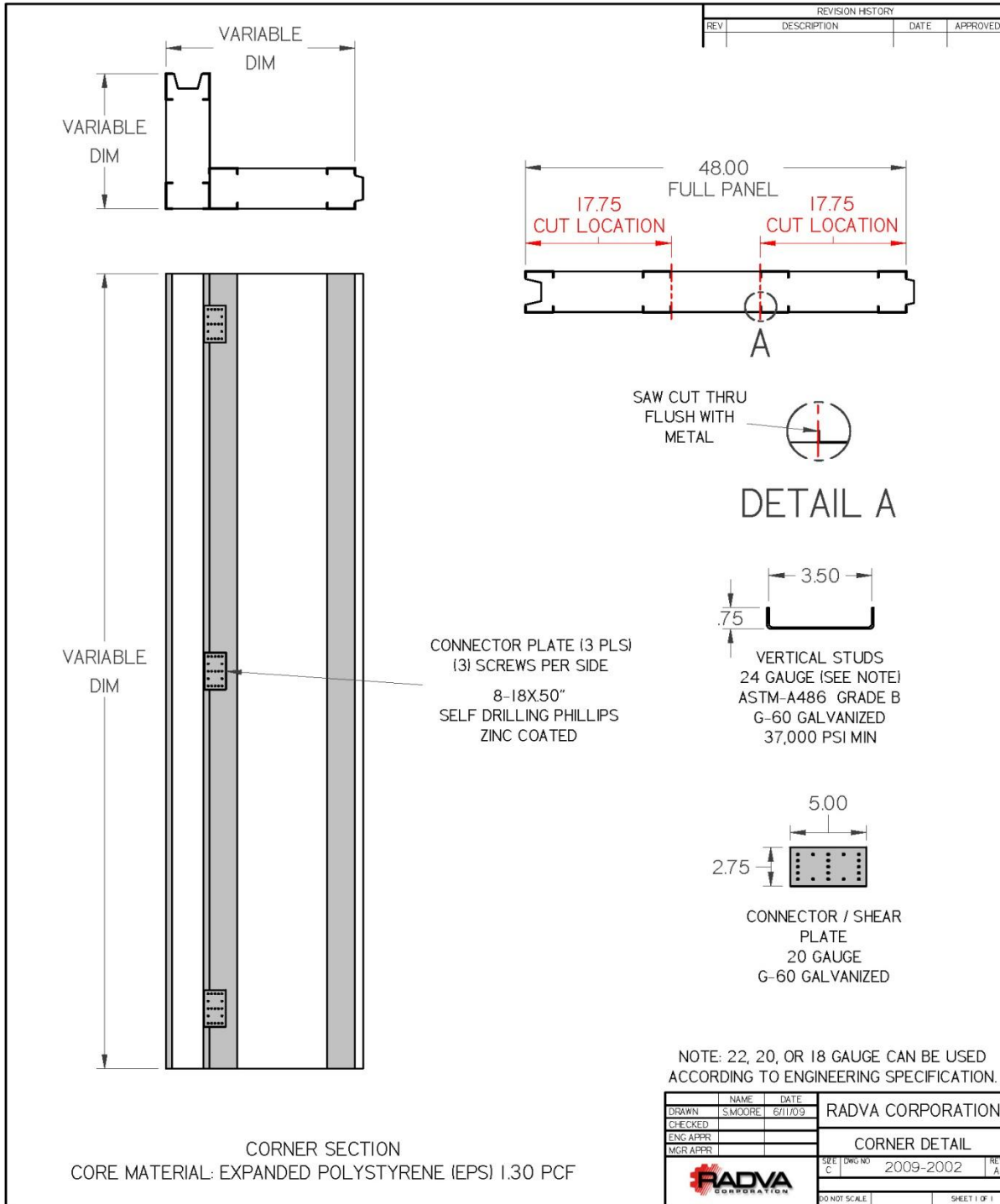


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Figure 4 RADVA T-G Panel: Wall Panel Corner Fastening Details

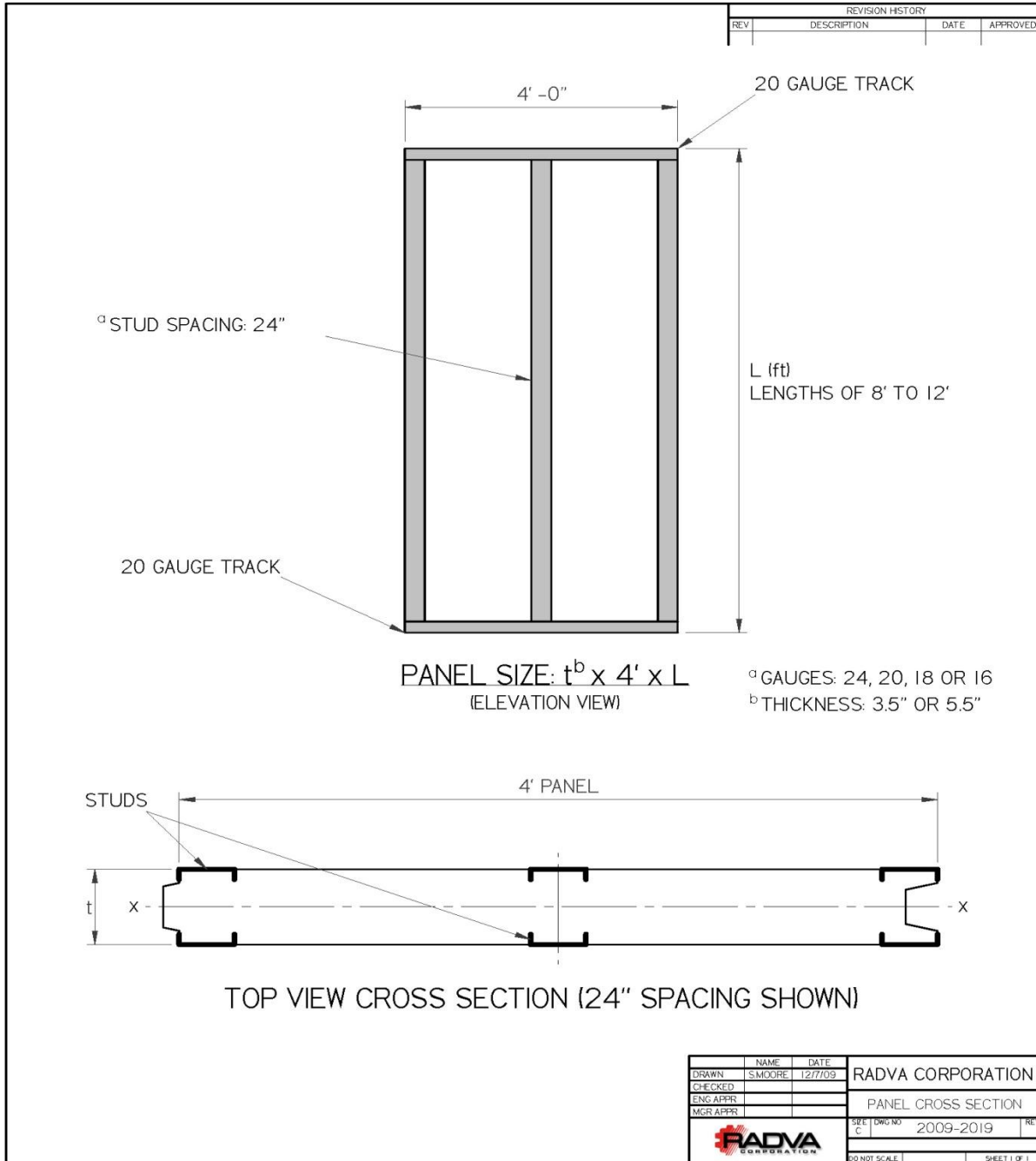


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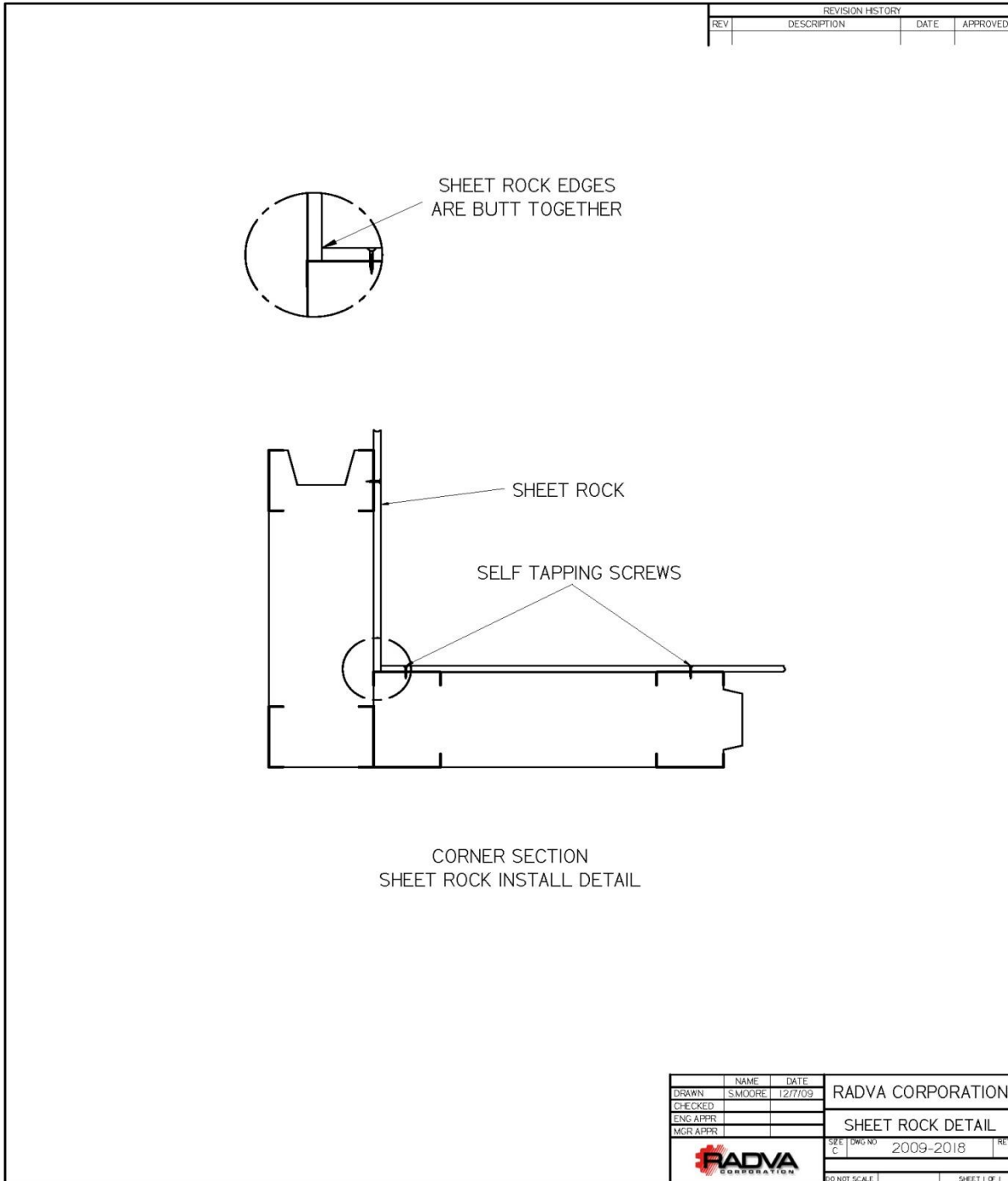
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Figure 5 RADVA T-G Panel: Wall Panel with 24-inch stud spacing



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Figure 6 RADVA T-G Panel: Corner Detail for Installing Gypsum

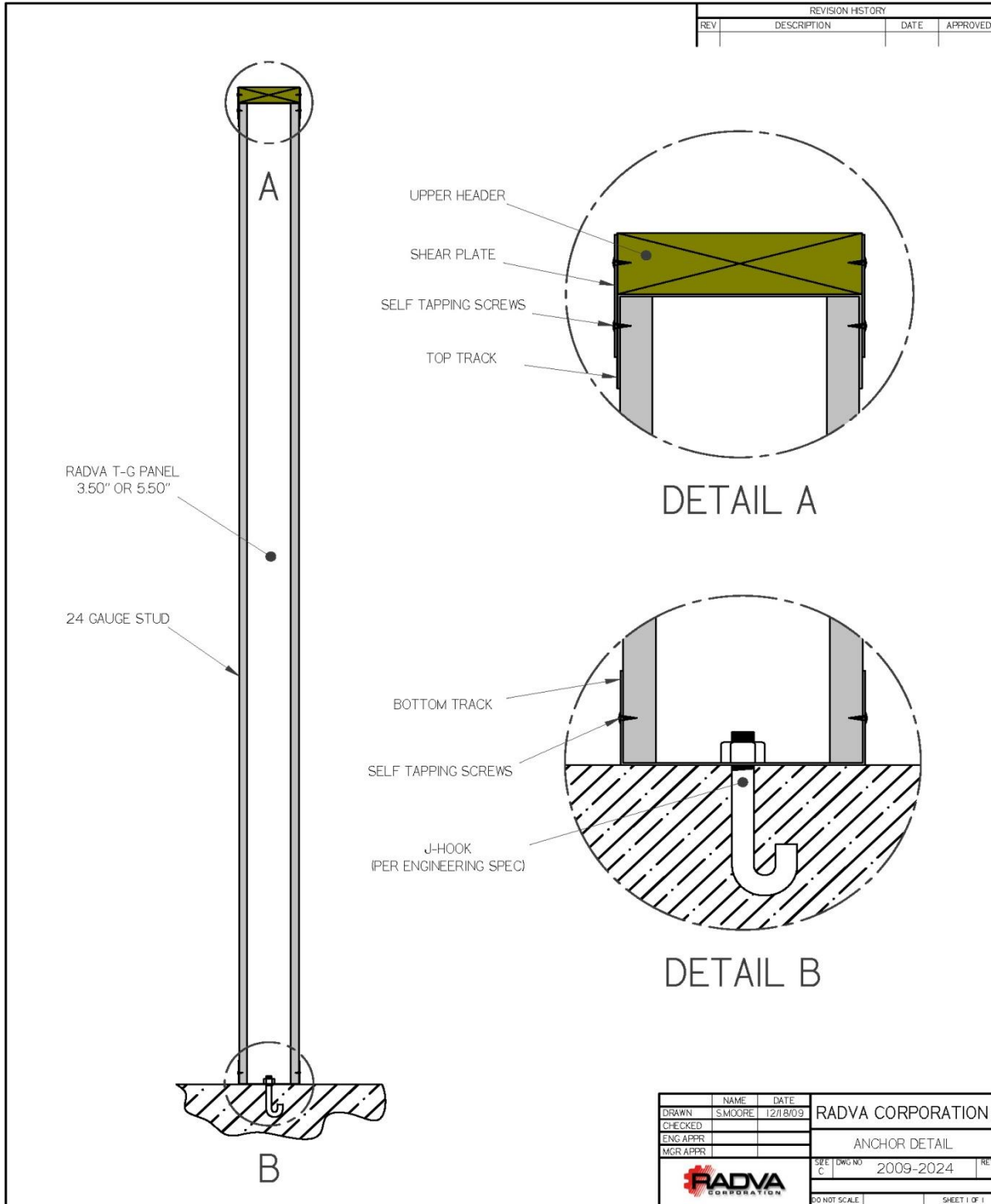


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Figure 7 RADVA T-G Wall Panel Anchoring Details



NAME	DATE	RADVA CORPORATION
DRAWN S. MOORE	12/18/09	
CHECKED		
ENG APPR		
MGR APPR		
ANCHOR DETAIL		
SHEET NO 2009-2024		REV
C		
DO NOT SCALE		SHEET 1 OF 1

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Figure 8 Concentrated Axial Compression Service Wall Load, P (lbs)

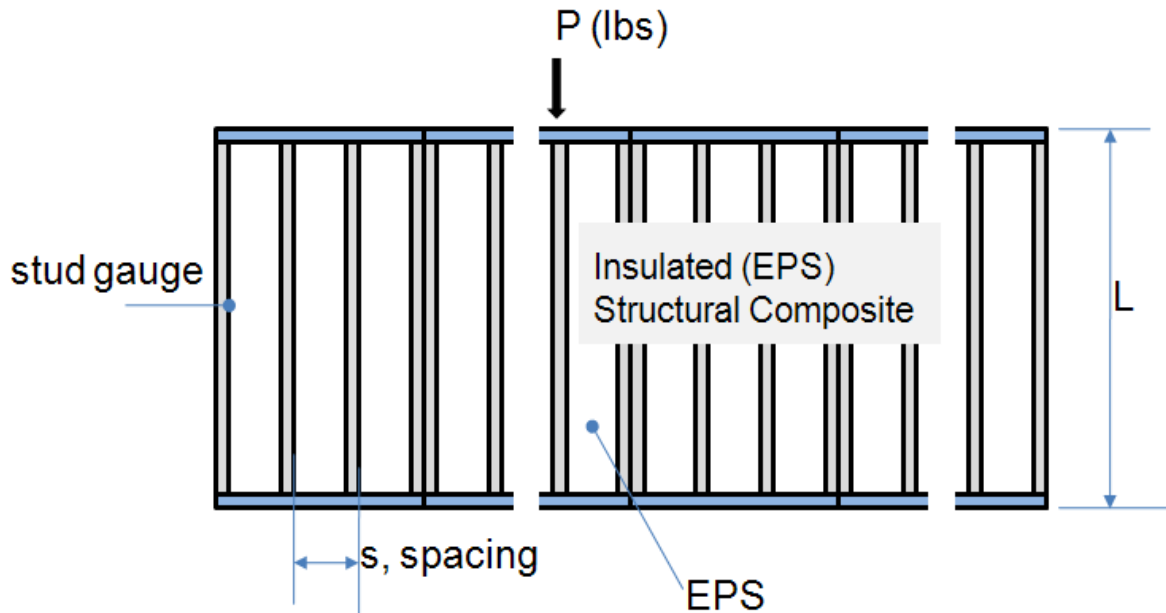
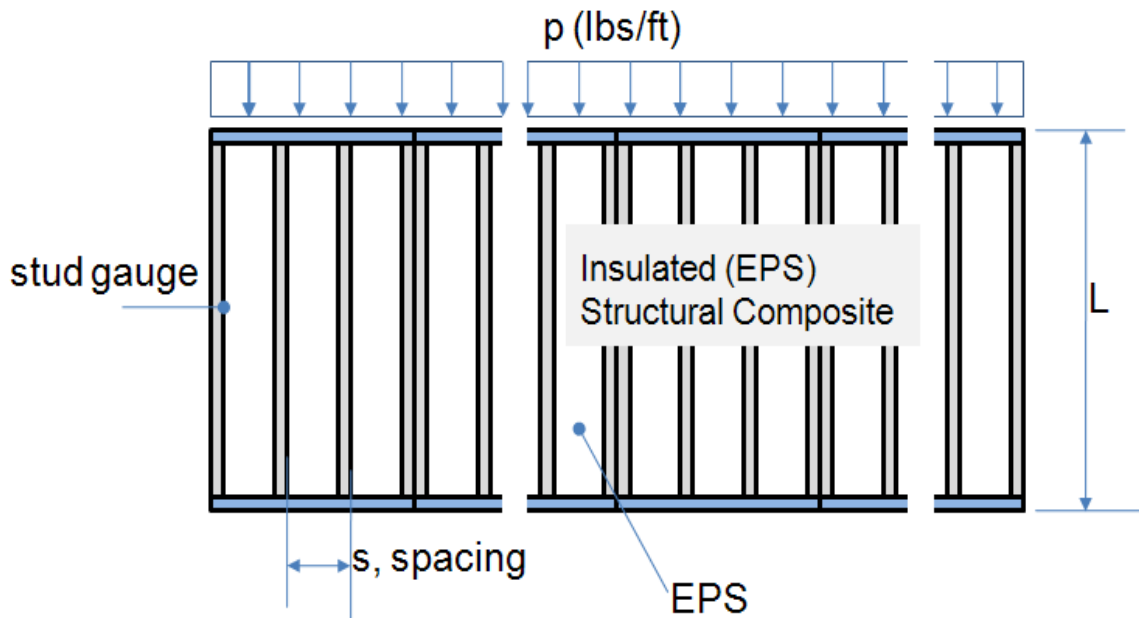


Figure 9 Distributed Axial Compressive Wall Load, p (lbs/ft)



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Table 3. 3.5" Panel, no gypsum, no siding; Axial Concentrated Compressive Load

Length (ft)	gauge	Strength		Allowable
		Nominal	LRFD	ASD
		P_n (lbs)	ϕP_n (lbs)	P_n (lbs)
8	24	3,221	2,415	1,610
9	24	3,221	2,415	1,610
10	24	3,221	2,415	1,610
12	24	3,221	2,415	1,610
8	20	6,092	4,569	3,046
9	20	6,092	4,569	3,046
10	20	6,092	4,569	3,046
12	20	6,092	4,569	3,046
8	18	13,433	10,075	6,717
9	18	12,907	9,680	6,453
10	18	12,204	9,153	6,102
12	18	10,720	8,040	5,360
8	16	16,928	12,696	8,464
9	16	16,095	12,071	8,047
10	16	15,212	11,409	7,606
12	16	13,350	10,013	6,675

Table 4. 5.5" Panel, no gypsum, no siding; Axial Concentrated Compressive Load

Length (ft)	Gauge	Strength		Allowable
		Nominal	LRFD	ASD
		P_n (lbs)	ϕP_n (lbs)	P_n (lbs)
8	24	3,431	2,574	1,716
9	24	3,431	2,574	1,716
10	24	3,431	2,574	1,716
12	24	3,431	2,574	1,716
8	20	9,567	7,176	4,784
9	20	9,567	7,176	4,784
10	20	9,567	7,176	4,784
12	20	9,567	7,176	4,784
8	18	15,241	11,431	7,620
9	18	14,950	11,213	7,475
10	18	14,632	10,974	7,316
12	18	13,922	10,441	6,961
8	16	19,032	14,274	9,516
9	16	18,668	14,001	9,334
10	16	18,269	13,702	9,135
12	16	17,378	13,034	8,689

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Table 5. 3.5" thick panel with track type studs at 16" o.c.; no gypsum or siding.

Gauge	Ht (ft)	Axial Distributed loads (plf) ^a				Transverse Loads (psf) ^b								
		Tested	Calculated			Strength			Calculated Service loads					
			Failure (Nominal)	LRFD (ϕp_n)	Allowable ASD (p_a)	Tested	Failure (Nominal)	LRFD (ϕw_n)	Allowable ASD (w_a)	L/180	L/240	L/360	L/480	L/960
24	8	3005	3,069	2,302	1,535	81	70	56	35	50	37	25	19	9
24	9		3,069	2,302	1,535		55	44	28	38	28	19	14	7
24	10	2960	3,069	2,302	1,535	50	45	36	22	29	22	15	11	6
24	12	2,875	3,069	2,302	1,535	34	31	25	16	19	14	9	7	3
20	8		5,850	4,388	2,925		150	120	75	61	46	30	23	11
20	9		5,850	4,388	2,925		119	95	59	47	36	24	18	9
20	10		5,850	4,388	2,925		96	77	48	38	28	19	14	7
20	12		5,850	4,388	2,925		67	53	33	24	18	12	9	5
18	8		10,177	7,633	5,089		193	155	97	69	52	35	26	13
18	9		9,680	7,260	4,840		153	122	76	55	36	24	18	9
18	10		9,153	6,865	4,577		124	99	62	44	33	22	16	8
18	12		8,040	6,030	4,020		86	69	43	29	22	15	11	5
16	8		12,696	9,522	6,348		240	192	120	76	57	38	29	14
16	9		12,071	9,053	6,036		190	152	95	61	46	30	23	11
16	10		11,409	8,557	5,705		154	123	77	49	37	25	18	9
16	12		10,013	7,510	5,006		107	85	53	33	25	17	13	6

(a) Calculations meet the 2007 AISI, 2001 AISI, and the 2006 IBC. Allowable loads are based on a factor of safety of 2. Values account for local buckling, yielding and lateral buckling.
 (b) Panels were tested to failure and the type of failure was observed and recorded. Allowable loads are based on a factor of safety for flexure of 2 and this accounts for local buckling, lateral torsional buckling, or yielding.

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Table 6. 3.5" thick panel with track type studs at 24" o.c.; no gypsum or siding.

Gauge	Ht (ft)	Axial Distributed loads (plf) ^a				Transverse Loads (psf) ^b								
		Tested	Failure (Nominal)	Calculated		Strength			Calculated Service loads					
				LRFD (ϕp_n)	Allowable ASD (p_a)	Tested	Calculated (Nominal)	LRFD (ϕw_n)	Allowable (ASD)	L/180	L/240	L/360	L/480	L/960
24	8		2,046	1,535	1,023	60	47	37	23	38	28	19	14	7
24	9		2,046	1,535	1,023		37	30	18	28	21	14	11	5
24	10		2,046	1,535	1,023	34	30	24	15	22	16	11	8	4
24	12		2,046	1,535	1,023	23	21	17	10	13	10	7	5	3
20	8		3,900	2,925	1,463		100	80	50	48	36	24	18	9
20	9		3,900	2,925	1,463		79	63	40	37	27	18	14	7
20	10		3,900	2,925	1,463		64	51	32	28	21	14	11	5
20	12		3,900	2,925	1,463		44	36	22	18	13	9	7	3
18	8		6,785	5,089	2,544		129	103	64	56	42	28	21	11
18	9		6,453	4,840	2,420		102	82	51	43	27	18	14	7
18	10		6,102	4,577	2,288		83	66	41	34	25	17	13	6
18	12		5,360	4,020	2,010		57	46	29	22	16	11	8	4
16	8		8,464	6,348	3,174		160	128	80	63	47	31	24	12
16	9		8,047	6,036	3,018		126	101	63	49	37	25	18	9
16	10		7,606	5,705	2,852		102	82	51	39	29	20	15	7
16	12		6,675	5,006	2,503		71	57	36	26	19	13	10	5

(a) Calculations meet the 2007 AISI, 2001 AISI, and the 2006 IBC. Allowable loads are based on a factor of safety of 2. Values account for local buckling, yielding and lateral buckling.

(b) Panels were tested to failure and the type of failure was observed and recorded.

Allowable loads are based on a factor of safety for flexure of 2 and this accounts for local buckling, lateral torsional buckling, or yielding.

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Table 7. 5.5" thick panel with track type studs at 16" o.c.; no gypsum or siding.

Gauge	Ht (ft)	Axial Distributed loads (plf) ^a				Transverse Loads (psf) ^b								
		Tested	Failure (Nominal)	Calculated		Strength				Calculated Service loads				
				LRFD (ϕp_n)	Allowable ASD (p_a)	Tested	Failure (Nominal)	LRFD (ϕw_n)	Allowable ASD (w_a)	L/180	L/240	L/360	L/480	L/960
24	8	4,115	3,431	2,574	1,716	125	87	69	43	88	66	44	33	17
24	9		3,431	2,574	1,716		68	55	34	70	53	35	26	13
24	10	3,915	3,431	2,574	1,716	66	55	44	28	57	43	28	21	11
24	12	3,925	3,431	2,574	1,716	50	38	31	19	38	29	19	14	7
20	8	7,609	7,176	5,382	3,588		248	199	124	101	76	51	38	19
20	9		7,176	5,382	3,588		196	157	98	82	62	41	31	15
20	10	7,363	7,176	5,382	3,588		159	127	79	68	51	34	25	13
20	12	7,120	7,176	5,382	3,588		110	88	55	47	36	24	18	9
18	8	14,730	11,431	8,573	5,715		320	256	160	110	82	55	41	21
18	9		11,213	8,410	5,606		253	203	127	91	62	41	31	15
18	10	14,230	10,974	8,231	5,487		205	164	103	76	57	38	28	14
18	12	13,994	10,441	7,831	5,221		142	114	71	54	40	27	20	10
16	8		14,274	10,706	7,137		399	319	199	116	87	58	44	22
16	9		14,001	10,501	7,000		315	252	158	97	73	48	36	18
16	10		13,702	10,276	6,851		255	204	128	82	61	41	31	15
16	12		13,034	9,775	6,517		177	142	89	59	45	30	22	11

(a) Calculations meet the 2007 AISI, 2001 AISI, and the 2006 IBC. Allowable loads are based on a factor of safety of 2. Values account for local buckling, yielding and lateral buckling.
 (b) Panels were tested to failure and the type of failure was observed and recorded. Allowable loads are based on a factor of safety for flexure of 2 and this accounts for local buckling, lateral torsional buckling, or yielding.

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Table 8. 5.5" thick panel with studs at 24" o.c.; no gypsum or siding.

Gauge	Ht (ft)	Transverse Loads (psf) ^b																
		Tested				Calculated				Strength					Calculated Service loads			
		Failure	Failure (Nominal)	LRFD (ϕp_n)	Allowable ASD (p_a)	Tested	Failure (Nominal)	LRFD (ϕw_n)	Allowable ASD (w_a)	L/180	L/240	L/360	L/480	L/960				
24	8	3,165	2,288	1,716	858	82	58	46	23	73	55	36	27	14				
24	9		2,288	1,716	858		46	36	18	57	43	28	21	11				
24	10	2,775	2,288	1,716	858	56	37	30	15	45	34	22	17	8				
24	12	2,875	2,288	1,716	858	37	26	21	10	29	22	15	11	5				
20	8		4,784	3,364	1,682		166	132	66	86	65	43	32	16				
20	9		4,784	3,364	1,682		131	105	52	69	52	34	26	13				
20	10		4,784	3,364	1,682		106	85	42	56	42	28	21	10				
20	12		4,784	3,364	1,682		74	59	29	37	28	19	14	7				
18	8		7,620	5,358	2,679		214	171	85	96	72	48	36	18				
18	9		7,475	5,256	2,628		169	135	68	78	52	34	26	13				
18	10		7,316	5,144	2,572		137	109	55	63	48	32	24	12				
18	12		6,961	4,894	2,447		95	76	38	44	33	22	16	8				
16	8		9,516	6,691	3,345		266	213	106	104	78	52	39	19				
16	9		9,334	6,563	3,281		210	168	84	85	64	42	32	16				
16	10		9,135	6,423	3,211		170	136	68	70	52	35	26	13				
16	12		8,689	6,109	3,055		118	95	47	49	37	25	18	9				

(a) Calculations meet the 2007 AISI, 2001 AISI, and the 2006 IBC. Allowable loads are based on a factor of safety of 2. Values account for local buckling, yielding and lateral buckling.
 (b) Panels were tested to failure and the type of failure was observed and recorded. Allowable loads are based on a factor of safety for flexure of 2 and this accounts for local buckling, lateral torsional buckling, or yielding.