



OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION

APPLICATION FOR OSHPD SPECIAL SEISMIC
CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP – 0242 – 10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Trane

Manufacturer's Technical Representative: Dean Risley

Mailing Address: 3600 Pammel Creek Road, La Crosse WI 54601

Telephone: 608-787-4100

Email: dean.risley@trane.com

Product Information

Product Name: PV (Custom Class A)

Product Type: Custom Air Conditioning Units OSP-0242-10

Product Model Number: N/A

(List all unique product identification numbers and/or part numbers)

General Description: Custom sized air conditioning units that can be made in multiple sizes and configurations.

All modifications made to the tested units before and during the tests shall be incorporated into the certified units.

Mounting Description: Rigid Base Mounted

Applicant Information

Applicant Company Name: The VMC Group

Contact Person: John P. Giuliano

Mailing Address: 113 Main Street, Bloomingdale NJ 07403

Telephone: 973-838-1780

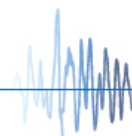
Email: john.giuliano@thevmcgroup.com

I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2016.

Signature of Applicant:  Date: 11/1/17

Title: President Company Name: The VMC Group

"Access to Safe, Quality Healthcare Environments that Meet California's Diverse and Dynamic Needs"





OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION

California Licensed Structural Engineer Responsible for the Engineering and Test Report(s)

Company Name: The VMC Group
Name: Kenneth Tarlow California License Number: SE2851
Mailing Address: 113 Main Street, Bloomingdale NJ 07403
Telephone: 973-838-1780 Email: ken.tarlow@thvmcgroup.com

Supports and Attachments Preapproval

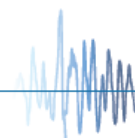
- ☐ Supports and attachments are preapproved under OPM-
(Separate application for OSHPD Preapproval of Manufacturer's Certification (OPM) of Supports and attachments is required)
- ☒ Supports and attachments are not preapproved

Certification Method

- ☒ Testing in accordance with: ☒ ICC-ES AC156
☐ Other (Please Specify): OSP-0242-10
BY: Timothy J. Piland

Testing Laboratory

Company Name: UC Berkeley / Clark / ETL / Curtiss-Wright (QualTech)
Contact Name: Clement Barthes / JR Antenucci / Brady Richard / Timothy Geers
Mailing Address: Richmond CA / Jefferson Hills PA / Dallas TX / Cincinnati OH
Telephone: 510-665-3414 / 417-387-1001 / 972-247-9657 / 513-528-7900 Email: clementbarthes@berkeley.edu / jrantenucci@clarktesting.com / n/a / tgeers@curtisswright.com





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FACILITIES DEVELOPMENT DIVISION**

Seismic Parameters

Design in accordance with ASCE 7-10 Chapter 13: ☒ Yes ☐ No

Design Basis of Equipment or Components (F_p/W_p) = 4.16

S_{DS} (Design spectral response acceleration at short period, g) = 1.85

a_p (In-structure equipment or component amplification factor) = 2.5

R_p (Equipment or component response modification factor) = 2.0 (Internally Isolated)

Ω_0 (System overstrength factor) = 2

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = 1

Equipment or Component Natural Frequencies (Hz) = See attached Matrix

Overall dimensions and weight (or range thereof) = See attached Matrix

Equipment or Components @ grade designed in accordance with ASCE 7-10 Chapter 15: ☐ Yes ☒ No

Design Basis of Equipment or Components (V/W) = _____

S_{DS} (Design spectral response acceleration at short period, g) = _____

S_{D1} (Design spectral response acceleration at 1 second period, g) = _____

R (Response modification coefficient) = _____

Ω_0 (System overstrength factor) = BY: Timothy J. Piland

C_d (Deflection amplification factor) = _____

I_p (Importance factor) = 1.5

Height to Center of Gravity above base = _____

Equipment or Component Natural Frequencies (Hz) = _____

Overall dimensions and weight (or range thereof) = _____

Tank(s) designed in accordance with ASME BPVC, 2015: ☐ Yes ☒ No

List of Attachments Supporting Special Seismic Certification

☒ Test Report(s) ☒ Drawings ☐ Calculations ☒ Manufacturer's Catalog

☐ Other(s) (Please Specify): _____

OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2022

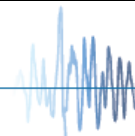
Signature: Timothy J. Piland Date: July 23, 2018

Print Name: Timothy J. Piland Title: SSE

Special Seismic Certification Valid Up to : S_{DS} (g) = 1.85 z/h = 1

Condition of Approval (if applicable): _____

"Access to Safe, Quality Healthcare Environments that Meet California's Diverse and Dynamic Needs"



Trane PV Custom AHU Product Matrix

Table 1 - Unit Sizes

Max Weight / Area [lbs/sq.ft.]		Overall Unit Width [ft]*																								UUT
		4'	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'	32'	34'	36'	38'	40'	42'	44'	46'	48'	50'	
Overall Unit Height [ft]*	3'	X	X	X	X	X	X																			Extrapolated
	4'	X	X	X	X	X	X	X																		Extrapolated
	5'	X	X	X	X	X	X	X	X	X																Extrapolated
	6'	X	X	X	X	X	X	X	X	X	X	X														Extrapolated
	7'	X	X	X	X	X	X	X	X	X	X	X	X													Extrapolated
	8'	X	X	1	X	X	X	X	X	X	X	X	X	X	X											1 (82.3 lb/sq.ft.)
	9'		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X									Interpolated
	10'		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						Interpolated
	11'		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Interpolated
	12'		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Interpolated
12' 6"			X	X	X	2,3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	2 (70.5 lb/sq.ft.) 3 (94 lb/sq.ft.)	

* Max. floor loading is 94 lbs/sq.ft.

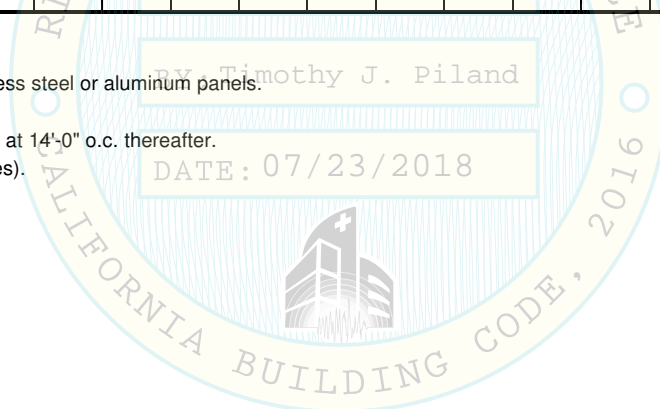
Unit height and width can vary between sizes shown in table.

Unit casings made from 2", 3" or 4" thick panels with optional steel, stainless steel or aluminum panels.

Unit length up to 90 feet.

Double interior septum wall required for units greater than 14'-0" wide and at 14'-0" o.c. thereafter.

This OSP is good for in-line configurations only; (No T Shapes or L Shapes).



Trane PV Custom AHU Subcomponent Matrix

Table 2A - Hydronic Coils

		Fin Length [in]																				UUT	MFR	
		12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126			
* Fin Height [in]	12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1	Trane and Heatcraft	
	15	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Interpolated		
	18	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Interpolated		
	21	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Interpolated		
	24	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Interpolated		
	27	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Interpolated		
	30	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Interpolated		
	33	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Interpolated		
	36	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		Interpolated
	39	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		Interpolated
	42	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		Interpolated
	45	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		Interpolated
	48	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	Interpolated		
	51	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	3		

Trane and Heatcraft manufactured one of each 12x12 and 51x126.

* Single Coil Size (51" x 126" Max.)

** Multi-Coil Stacked Configuration With Intermediate Supports max 3 coils stacked at 45 x 126 each coil

Table 2B - Hydronic Coil Components

Item	Available	UUT1 Trane	UUT1 Heatcraft	UUT3 Trane	UUT3 Heatcraft
Tube Rows	1 - 10	1	1	10	10
Tube Diameter	1/2" - 5/8"	0.625"	0.625"	0.625"	0.625"
Tube Wall Thickness	0.020" - 0.035"	0.035"	0.035"	0.020"	0.020"
Tube Material	Copper	Copper	Copper	Copper	Copper
Fin Material	Copper, Alum	Copper	Copper	Aluminum	Aluminum
Fin Thickness	0.006" - 0.008"	0.006"	0.006"	0.008"	0.008"
Fins Per Foot	80 - 144	120	120	100	120
Casing Material	Galv CS, St	Galvanized CS	Galvanized CS	Stainless Steel	Stainless Steel

Max Unsupported Tube Length=48".

Table 3 - SDDP - Direct Drive Plenum Fan Array Components

	HP	1	1.5	2	3	5	7.5	10	15	20	UUT	Fan/Motor MFR
	Weight [lbs]	40	50	55	72	95	146	158	255	286		
Size	22	X	X	X	X	X	X	X	X	X	3	Trane / Baldor
Weight [lbs]	377											
Size	25	X	X	X	X	X	X	X	X	X	2	
Weight [lbs]	433											

Fans shall be constructed of Carbon Steel Housings and Wheels, with 208-230/460 Motors.

Table 4 - Housed Fan Components - Belt Drive

	HP	200	UUT	Fan/Motor MFR
	Weight [lbs]	2,460		
Size	5	X	5	Twin City / Baldor
Weight [lbs]	3,649			

Fan shall be constructed of Carbon Steel Housing and Wheel, with a 208-230/460 Motor.

Trane PV Custom AHU Subcomponent Matrix

Table 5A - Plenum Fan Components - Belt Drive, with 208-230/460 Motors - CARBON STEEL MATRIX ONLY

Plenum Fan	HP	25	30	40	50	60	75	100	125	150	200	UUT	Fan/Motor MFR
	Weight [lbs]	492	417	578	634	782	832	1,169	1,672	1,662	2,460		
Size	60	X	X	X	X	X	X	X	4	X	5	4	Twin City / Baldor
Weight [lbs]	2,200											5	

Two different large fan assemblies and wheels were tested.

Table 5B - Plenum Fan Components - Belt Drive

Plenum Fan	HP	3	UUT	Fan/Motor MFR
	Weight [lbs]	72		
Size	12	X	1	Twin City / Baldor
Weight [lbs]	83			

Fan shall be constructed of Carbon Steel Housing and Aluminum Wheel, with 208-230/460 Motors.

Table 6A - Plenum Fan Components - Direct Drive

Plenum Fan	HP	5	UUT	Fan/Motor MFR
	Weight [lbs]	95		
Size	12	X	1	Twin City / Baldor
Weight [lbs]	83			

Fan shall be constructed of Carbon Steel Housings and Aluminum Wheel, with 208-230/460 Motors.

Table 6B - Plenum Fan Components - Direct Drive

Plenum Fan	HP	125	UUT	Fan/Motor MFR
	Weight [lbs]	1,672		
Size	60	X	4	Twin City / Baldor
Weight [lbs]	2,200			

Fan shall be constructed of Carbon Steel Housing and Carbon Steel Wheel, with 208-230/460 Motors.

Table 7 - Variable Frequency Drives

Model	Weight [lbs]	UUT	MFR
TR200 Large*	420	3	Trane
TR200 Medium*	145	Interpolated	Trane
TR200 Small*	35	1	Trane
ACH 550 Medium**	121	1	ABB

Trane VFD is Galvanized Carbon Steel with plastic front cover

Table 8 - Electrical Control Panel

Height [in]	Width [in]	Weight [lbs]	UUT	MFR
36	30	100	3	Trane

All Panels are Galvanized Carbon Steel.
208/230/460VAC

Trane PV Custom AHU Subcomponent Matrix

Table 9 - Starter Panel Components

Item	Weight [lbs]	Dimensions [in]	UUT	MFR	Part Numbers
Gasketed NEMA 3R/12 Enclosure			1	Hoffman	NF,CH, LP & SSLP
Non-Automatic Circuit Breaker Switch With Flange Mounted Disconnect Handle			1	Square D	Class 9422, CGJ, CFA & CKA
Type 4X "Hand-Off-Auto" Switch			1		Class 9001, K & SK
Magnetic NEMA Size Starter With 3 Phase			1		Class 8502 & 8538(combo)
Overload Panel			1		MOTORLOGIC
N.O. And N.C. Auxiliary Contacts			1		Class 9999, Type R & TC
120 Volt Control Transformer With Primary			1		Class 9070, Type TF
Dual Element Motor Fusing			1	Ferraz Shawmut	TR & TRS Class RK5
And Secondary Fusing			1		ATDR Class CC
Control Terminal Strip			1,2,3	Entrelec	Entrelec Type M4/6
Ground Lugs			1,2,3	NSI	OT #1/0 - 14
Stranded Copper, THHN Wiring			1,2,3	Southwire	#12- 500Kcmil
Misc Relay Panel	6	12x12x8	2	Idec	RH
TRAQ VCM	8	9x6x4	2	Trane	495100930001
120V Load Center	10	10x12x8	1	Square D	Class 1130, QO
TCACS Panel	12	12x7x7	2	Trane	NF,CH, LP & SSLP
3Ph MMS OL	12	20x20x5	2	ABB	ABB MS325, 450 & 490
3Ph Motor Term	15	20x20x5	2	Square D	Class 9080, Type LBA
1kva xfr	22	9x7x6	1		Class7400, S1
Switching Electrical Panel	75	36x30x12	3	Hoffman	NF,CH,LP & SSLP
7.5kva xfr	125	15x10x12	1	Square D	Class7400, S1

Table 10 - Heavy Duty Safety Switches (Disconnects)

Amps	Height [in]	Width [in]	Weight [lbs]	UUT	MFR
30	15	21	18	2	Square D
60	18	21	20	Interpolated	
70	17	46	52	Interpolated	
100	80	46	52	Interpolated	
200	19	46	55	Interpolated	
225	17	46	55	Interpolated	
400	34	51	181	Interpolated	
600	34	51	250	2	

Table 11 - MP 581 Controller with Expansion Modules

Height [in]	Width [in]	Weight [lbs]	UUT	MFR
24	24	30	1	Trane

Trane PV Custom AHU Subcomponent Matrix

Table 12 - Other Components

Description	UUT	MFR
Fixed Blade Horizontal Louver	2	Ruskin
Fixed Blade Vertical Louver	2	
Moveable Blade Horizontal Damper	1,2	
Moveable Blade Vertical Damper	2	
Traq Damper with VCM	2	Trane
Moveable Blade Backdraft Damper	3	Ruskin
Sound Attenuator	3	VibroAcoustics
Filter Rack - Type 8	3	AAF
Filter Frames - HEPA	1	
Filter Media - Cartridge Type	3	
Filter Media - HEPA Type	1	
TCACS Air Cleaning System	1,2	Trane
Fixed Blade Air Mixer (Blender)	1	Blender Products
Humidifier Grids	1	DriSteem
J-Box - Motor	1	Hoffman
Light - Fluorescent	1	Lithonia, RAB
Light Switch	1	Leviton
GFCI Receptacle	1	Square D
Lighting Transformer	1	
Temperature Sensors	1	ACI
Humidity Sensors	1	
Airflow Sensors	1	Dwyer
Airflow Measuring Devices	1	
Pressure Switches	1	Kele AFS
Damper Actuators	1,2	Belimo
Access Doors	1,2,3	ITM4

Table 13 - CDQ Wheels

Height [in]	Width [in]	Weight [lbs]	UUT	MFR
21	21	90	1	Trane
24	24	110	Interpolated	
26	26	130	Interpolated	
29	29	150	Interpolated	
36	36	220	Interpolated	
43	43	290	Interpolated	
48	48	330	Interpolated	
54	54	410	Interpolated	
69	69	790	Interpolated	
77	77	1,020	Interpolated	
85	85	1,370	Interpolated	
96	96	1,730	Interpolated	
106	106	2,000	Interpolated	
122	122	2,740	3	



UNIT UNDER TEST (UUT) SUMMARY SHEET

UUT-01

Q1132.0, Q1132-01-01-01

Model Line	Model Number	Manufacturer
PV Custom Air Handling Unit (Custom Class A)	AHU Cabinet (All 4 Walls) Model Number (TCPAID001V2M1702F0)	Trane

Product Construction Summary

Carbon Steel Base Frame, Aluminum Panels, Stainless Steel Panels, and Galvanized Carbon Steel Panels.
0.048" Thick Galvanized Carbon Steel Outer Wall.
0.036" Thick Galvanized Carbon Steel, 0.036" Thick Stainless Steel and 0.05" Thick Aluminum Inner Wall.
6" High Base Rail

Options / Subcomponent Summary

Plenum Fan (Belt): Twin City ; Plenum Fan (Direct): Twin City ; Controller (MP581): Trane ; Damper (CD50): Ruskin ; Damper (CD60): Ruskin ; Heating Coil: Trane ; Heating Coil: Heatcraft ; VFD: Trane ; VFD: ABB ; CDQ Wheel: Trane; Filter: AAF ; TCACS: Trane ; Humidifier: DriSteam ; Blender: Blender Products

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
5269	96	96	96	19.71	21.9	10.58

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS} (g)	z/h	I_p	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2016	ICC-ES AC156	1.85	1	1.5	2.96	2.22		
		2.28	0	1.5			1.53	0.61

Test Mounting Details

Rigid Base Mount. Qty (12) 5/8" dia SAE Grade 8 bolts.



All units were filled with contents and maintained structural integrity and functionality



UNIT UNDER TEST (UUT) SUMMARY SHEET

UUT-02A

PEER STI 2011-14, UUT2A

Model Line	Model Number	Manufacturer
PV Custom Air Handling Unit (Custom Class A)	AHU Cabinet (All 4 Walls) Model Number (TCPAID000V3M3700F0)	Trane

Product Construction Summary

Carbon Steel Base Frame, Galvanized Carbon Steel Panels.
0.048" Thick Galvanized Carbon Steel Outer Wall.
0.036" Thick Galvanized Carbon Steel Inner Wall.
8" High Base Rail

Options / Subcomponent Summary

Plenum Fan Array: Trane ; Traq Damper: Trane ; VFD: Trane ; TCACS: Trane ; Louvers: Ruskin

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
12340	96	168	150	7	5.5	4.3

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS} (g)	z/h	I_p	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2016	ICC-ES AC156	1.85	1	1.5	2.96	2.22		
		2.28	0	1.5			1.53	0.61

Test Mounting Details

UUT 2 base rail is bolted to (6) 3" x 3" x 0.375" angle clips using (12) 5/8" dia SAE Grade 8 bolts. Angle clips are attached to fixture using (12) 5/8" dia SAE Grade 8 bolts.



All units were filled with contents and maintained structural integrity and functionality



UNIT UNDER TEST (UUT) SUMMARY SHEET

UUT-02B

PEER STI 2011-14, UUT2B

Model Line	Model Number	Manufacturer
PV Custom Air Handling Unit (Custom Class A)	AHU Cabinet (Endwall Removed) Model Number (TCPAID000V3M3700F0)	Trane

Product Construction Summary

Carbon Steel Base Frame, Galvanized Carbon Steel Panels.
0.048" Thick Galvanized Carbon Steel Outer Wall.
0.036" Thick Galvanized Carbon Steel Inner Wall.
8" High Base Rail

Options / Subcomponent Summary

Plenum Fan Array: Trane ; Traq Damper: Trane ; VFD: Trane ; TCACS: Trane ; Louvers: Ruskin

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
11820	96	168	150	7	5.5	4.3

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS} (g)	z/h	I_p	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2016	ICC-ES AC156	1.85	1	1.5	2.96	2.22		
		2.28	0	1.5			1.53	0.61

Test Mounting Details

UUT 2 base rail is bolted to (6) 3" x 3" x 0.375" angle clips using (12) 5/8" dia SAE Grade 8 bolts. Angle clips are attached to fixture using (12) 5/8" dia SAE Grade 8 bolts.



All units were filled with contents and maintained structural integrity and functionality



UNIT UNDER TEST (UUT) SUMMARY SHEET

UUT-02C

PEER STI 2011-14, UUT2C

Model Line	Model Number	Manufacturer
PV Custom Air Handling Unit (Custom Class A)	AHU Cabinet (Endwall & Sidewall Removed) Model Number (TCPAID000V3M3700F0)	Trane

Product Construction Summary

Carbon Steel Base Frame, Galvanized Carbon Steel Panels.
0.048" Thick Galvanized Carbon Steel Outer Wall.
0.036" Thick Galvanized Carbon Steel Inner Wall.
8" High Base Rail

Options / Subcomponent Summary

Plenum Fan Array: Trane ; Traq Damper: Trane ; VFD: Trane ; TCACS: Trane ; Louvers: Ruskin

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
11030	96	168	150	7	5.5	4.3

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS} (g)	z/h	I_p	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2016	ICC-ES AC156	1.85	1	1.5	2.96	2.22		
		2.28	0	1.5			1.53	0.61

Test Mounting Details

UUT 2 base rail is bolted to (6) 3" x 3" x 0.375" angle clips using (12) 5/8" dia SAE Grade 8 bolts. Angle clips are attached to fixture using (12) 5/8" dia SAE Grade 8 bolts.



All units were filled with contents and maintained structural integrity and functionality



UNIT UNDER TEST (UUT) SUMMARY SHEET

UUT-03A

PEER STI 2011-14, UUT3A

Model Line	Model Number	Manufacturer
PV Custom Air Handling Unit (Custom Class A)	AHU Cabinet (All 4 Walls) Model Number (TCPAID044V4M1720F0)	Trane

Product Construction Summary

Carbon Steel Base Frame, Galvanized Carbon Steel Panels
0.048" Thick Galvanized Carbon Steel Outer Wall.
0.036" Thick Galvanized Carbon Steel Inner Wall.
8" High Base Rail

Options / Subcomponent Summary

Plenum Fan Array: Trane ; Backdraft Damper: Ruskin ; Cooling Coil: Trane ; Cooling Coil: Heatcraft ; VFD: Trane ; CDQ Wheel: Trane ; Filter: AAF ; Sound Attenuator: Vibro-Acoustics ; Control Panel: Trane

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
16450	144	168	150	5.7	5.9	8.3

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS} (g)	z/h	I_p	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2016	ICC-ES AC156	1.85	1	1.5	2.96	2.22		
		2.28	0	1.5			1.53	0.61

Test Mounting Details

UUT 3 base rails are bolted to (8) 3" x 3" x 0.375" angle clips using (16) 5/8" dia SAE Grade 8 bolts. Angle clips are attached to fixture using (16) 5/8" dia SAE Grade 8 bolts.



All units were filled with contents and maintained structural integrity and functionality



UNIT UNDER TEST (UUT) SUMMARY SHEET

UUT-03B

PEER STI 2011-14, UUT3B

Model Line	Model Number	Manufacturer
PV Custom Air Handling Unit (Custom Class A)	AHU Cabinet (Inlet Wall Removed) Model Number (TCPAID044V4M1720F0)	Trane

Product Construction Summary

Carbon Steel Base Frame, Galvanized Carbon Steel Panels
0.048" Thick Galvanized Carbon Steel Outer Wall.
0.036" Thick Galvanized Carbon Steel Inner Wall.
8" High Base Rail

Options / Subcomponent Summary

Plenum Fan Array: Trane ; Backdraft Damper: Ruskin ; Cooling Coil: Trane ; Cooling Coil: Heatcraft ; VFD: Trane ; CDQ Wheel: Trane ; Filter: AAF ; Sound Attenuator: Vibro-Acoustics ; Control Panel: Trane

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
15660	144	168	150	5.7	5.9	8.3

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS} (g)	z/h	I_p	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2016	ICC-ES AC156	1.85	1	1.5	2.96	2.22		
		2.28	0	1.5			1.53	0.61

Test Mounting Details

UUT 3 base rails are bolted to (8) 3" x 3" x 0.375" angle clips using (16) 5/8" dia SAE Grade 8 bolts. Angle clips are attached to fixture using (16) 5/8" dia SAE Grade 8 bolts.



All units were filled with contents and maintained structural integrity and functionality



UNIT UNDER TEST (UUT) SUMMARY SHEET

UUT-03C

PEER STI 2011-14, UUT3C

Model Line	Model Number	Manufacturer
PV Custom Air Handling Unit (Custom Class A)	AHU Cabinet (Inlet & Outlet Walls Removed) Model Number (TCPAID044V4M1720F0)	Trane

Product Construction Summary

Carbon Steel Base Frame, Galvanized Carbon Steel Panels
0.048" Thick Galvanized Carbon Steel Outer Wall.
0.036" Thick Galvanized Carbon Steel Inner Wall.
8" High Base Rail

Options / Subcomponent Summary

Plenum Fan Array: Trane ; Backdraft Damper: Ruskin ; Cooling Coil: Trane ; Cooling Coil: Heatcraft ; VFD: Trane ; CDQ Wheel: Trane ; Filter: AAF ; Sound Attenuator: Vibro-Acoustics ; Control Panel: Trane

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
14850	144	168	150	5.7	5.9	8.3

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS} (g)	z/h	I_p	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2016	ICC-ES AC156	1.85	1	1.5	2.96	2.22		
		2.28	0	1.5			1.53	0.61

Test Mounting Details

UUT 3 base rails are bolted to (8) 3" x 3" x 0.375" angle clips using (16) 5/8" dia SAE Grade 8 bolts. Angle clips are attached to fixture using (16) 5/8" dia SAE Grade 8 bolts.



All units were filled with contents and maintained structural integrity and functionality



UNIT UNDER TEST (UUT) SUMMARY SHEET

UUT-03D

PEER STI 2011-14, UUT3D

Model Line	Model Number	Manufacturer
PV Custom Air Handling Unit (Custom Class A)	AHU Cabinet (Inlet, Outlet and 1 Sidewall Removed) Model Number (TCPAID044V4M1720F0)	Trane

Product Construction Summary

Carbon Steel Base Frame, Galvanized Carbon Steel Panels
0.048" Thick Galvanized Carbon Steel Outer Wall.
0.036" Thick Galvanized Carbon Steel Inner Wall.
8" High Base Rail

Options / Subcomponent Summary

Plenum Fan Array: Trane ; Backdraft Damper: Ruskin ; Cooling Coil: Trane ; Cooling Coil: Heatcraft ; VFD: Trane ; CDQ Wheel: Trane ; Filter: AAF ; Sound Attenuator: Vibro-Acoustics ; Control Panel: Trane

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
14080	144	168	150	5.7	5.9	8.3

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS} (g)	z/h	I_p	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2016	ICC-ES AC156	1.85	1	1.5	2.96	2.22		
		2.28	0	1.5			1.53	0.61

Test Mounting Details

UUT 3 base rails are bolted to (8) 3" x 3" x 0.375" angle clips using (16) 5/8" dia SAE Grade 8 bolts. Angle clips are attached to fixture using (16) 5/8" dia SAE Grade 8 bolts.



All units were filled with contents and maintained structural integrity and functionality



UNIT UNDER TEST (UUT) SUMMARY SHEET

UUT-04A

Q1132.0, Q1132-03-01-01

Model Line	Model Number	Manufacturer
PV Custom Air Handling Unit (Custom Class A)	Twin City EPFN 600	Trane

Product Construction Summary

Carbon Steel Base Frame, Carbon Steel Housing, Carbon Steel Wheel

Options / Subcomponent Summary

Direct Drive Plenum Fan: Twin City

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
9171	144	144	48	3.23	2.66	2.68

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS} (g)	z/h	I_p	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2016	ICC-ES AC156	1.85	1	1.5	2.96	2.22		
		2.28	0	1.5			1.53	0.61

Test Mounting Details

Qty (6) VMC M2SS-2E Spring Isolators, Qty (12) 5/8" dia SAE Grade 8 bolts, Base Mounted.



All units were filled with contents and maintained structural integrity and functionality



UNIT UNDER TEST (UUT) SUMMARY SHEET

UUT-04B

Q1132.0, Q1132-02-01-01

Model Line	Model Number	Manufacturer
PV Custom Air Handling Unit (Custom Class A)	Twin City EPFN 600	Trane

Product Construction Summary

Carbon Steel Base Frame, Carbon Steel Housing, Carbon Steel Wheel

Options / Subcomponent Summary

Belt Drive Plenum Fan: Twin City

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
9171	144	144	48	3.41	2.79	4.32

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS} (g)	z/h	I_p	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2016	ICC-ES AC156	1.85	1	1.5	2.96	2.22		
		2.28	0	1.5			1.53	0.61

Test Mounting Details

Qty (6) VMC M2SS-2E Spring Isolators, Qty (12) 5/8" dia SAE Grade 8 bolts, Base Mounted.



All units were filled with contents and maintained structural integrity and functionality



UNIT UNDER TEST (UUT) SUMMARY SHEET

UUT-05

EL:8975, PV TYPE EPF-SW FAN

Model Line	Model Number	Manufacturer
PV Custom Air Handling Unit (Custom Class A)	Trane PV Fan type EPF-SW	Trane

Product Construction Summary

Carbon Steel Housing, Carbon Steel Wheel

Options / Subcomponent Summary

Belt Drive Housed Fan: Twin City

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
6015	112	135	117	3	2.4	4.1

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS} (g)	z/h	I_p	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2016	ICC-ES AC156	1.85	1	1.5	2.96	2.22		
		2.28	0	1.5			1.53	0.61

Test Mounting Details

Qty (6) VMC AMSR-2D Spring Isolators, Qty (36) 1" Long Welds, Base Mounted.



All units were filled with contents and maintained structural integrity and functionality



UNIT UNDER TEST (UUT) SUMMARY SHEET

UUT-06

EL:8975, PV TYPE BAE-DW FAN

Model Line	Model Number	Manufacturer
PV Custom Air Handling Unit (Custom Class A)	Trane PV Fan type BAE-DW	Trane

Product Construction Summary

Carbon Steel Housing, Carbon Steel Wheel

Options / Subcomponent Summary

Belt Drive Plenum Fan: Twin City

UUT Properties

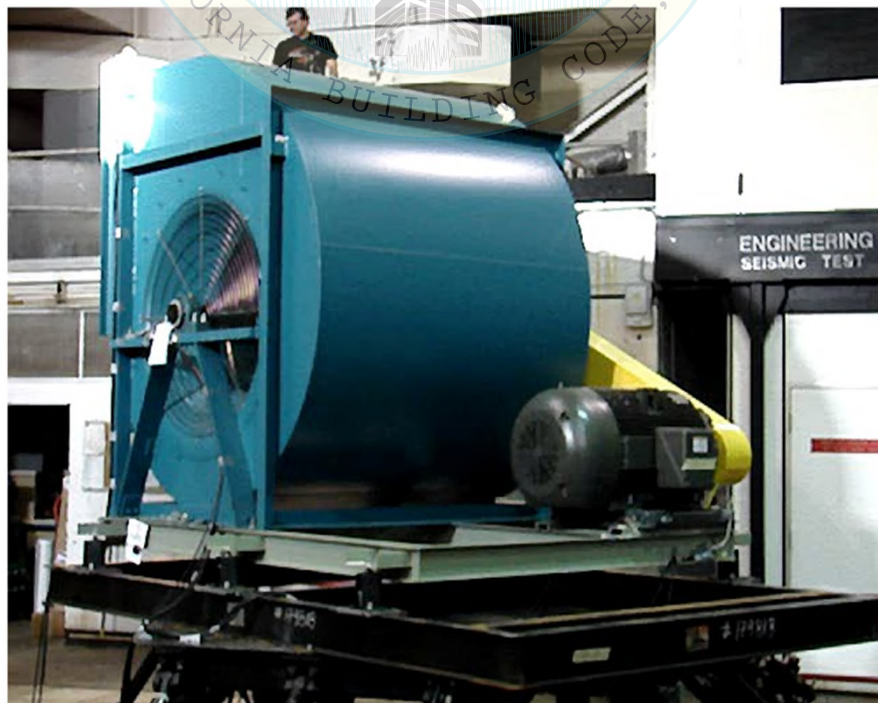
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
7250	72	125	93	2	2.6	4

UUT Highest Passed Seismic Run Information

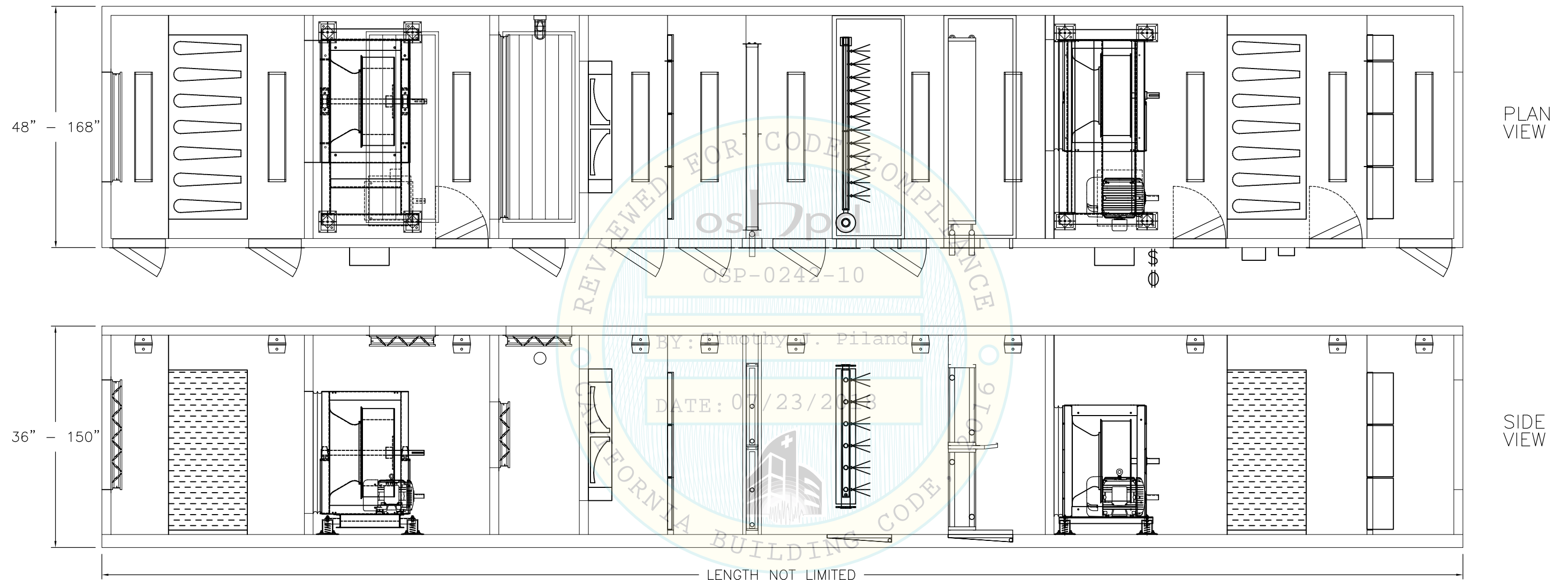
Building Code	Test Criteria	S_{DS} (g)	z/h	I_p	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2016	ICC-ES AC156	1.85	1	1.5	2.96	2.22		
		2.28	0	1.5			1.53	0.61

Test Mounting Details

Qty (6) VMC AMSR-2D Spring Isolators, Qty (36) 1" Long Welds, Base Mounted.



All units were filled with contents and maintained structural integrity and functionality

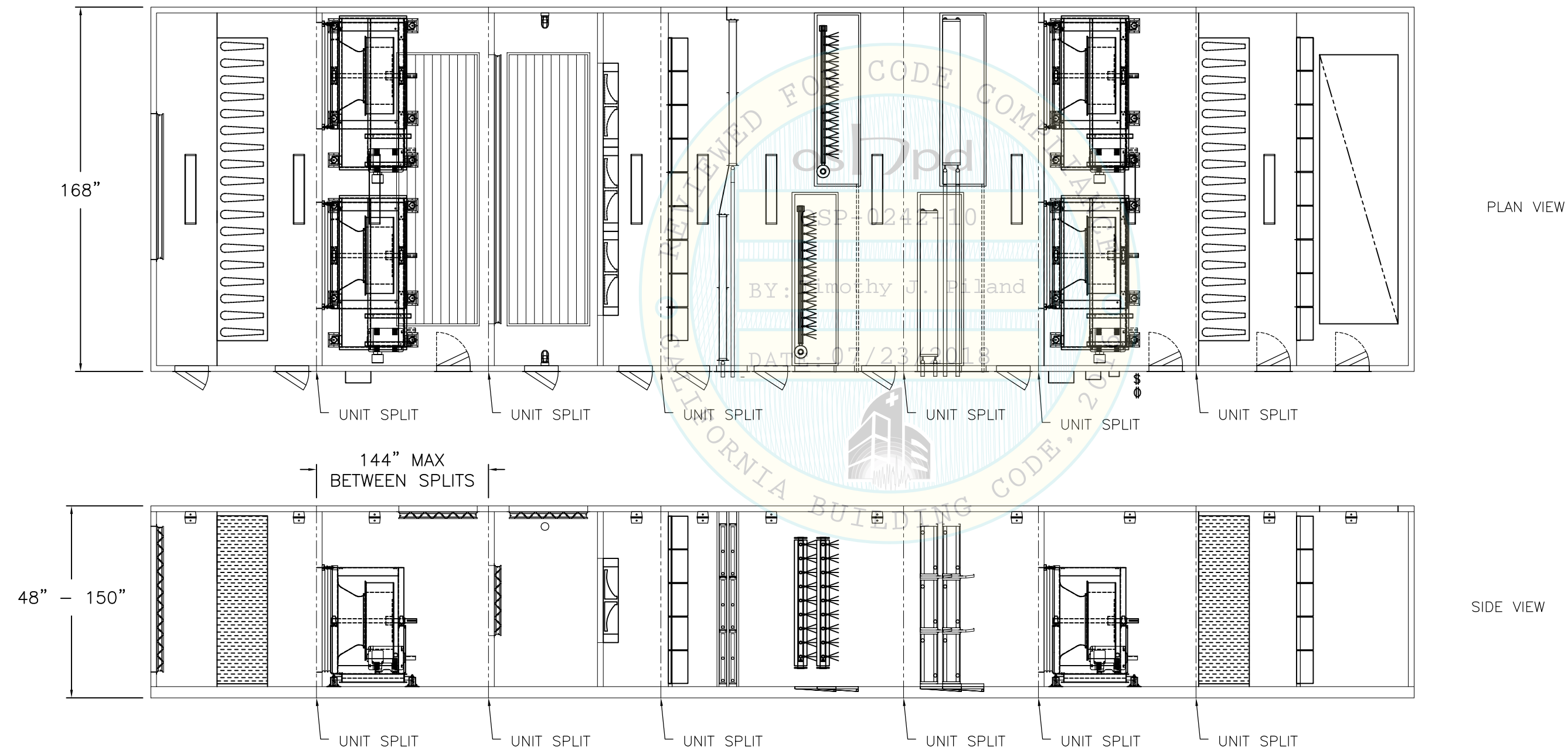


NOTES:

1. WALL AND ROOF MAY BE 2", 3", OR 4" THICK FOAM-INSULATED PANEL WITH MIN 16 GA STEEL EXTERIOR, MIN 20 GA STEEL INTERIOR. OPTIONAL ALUMINUM AND STAINLESS STEEL INTERIOR. UNIT BASE HEIGHT MAY BE 6" OR 8" WITH MIN 14 GA STEEL FLOOR.
2. THIRD LAYER PERFORATED LINER WITH FIBERGLASS INSULATION ALLOWED.
3. ANY APPROVED COMPONENTS MAY BE USED IN THIS CONFIGURATION, IN ANY ORDER IN DIRECTION OF AIRFLOW.
4. INTERNAL SEISMIC BRACING REQUIRED PER SHEETS "INTERNAL BRACING REQUIREMENTS".
5. UNIT MAY SHIP IN ANY NUMBER OF PIECES AS REQUIRED BY SHIPPING OR JOB SPECIFIC REQUIREMENTS.
6. STRUCTURAL CONTINUITY MUST BE MAINTAINED AT ALL SHIPPING SPLITS.
7. DOUBLE SIDE BY SIDE SEISMIC ROD BRACES ARE REQUIRED @144" O.C.

TRANE CUSTOM AIR HANDLERS			All dimensions are in inches unless otherwise noted. Tolerance for all dimensions are ±1/8" unless otherwise noted. Tolerance for all angular dimensions are ±0°1'0" unless otherwise specified.		REVISION NUMBER	REVISION DESCRIPTION	REVISION DATE	REVISION BY:	CHECKED BY:	APPROVED BY:
					1	Added revision bar and changed notes	10-11-17	Martin	DER	DER
TITLE: SINGLE WIDE, ONE PIECE										
JOB NUMBER:		EQ NUMBER:		TAGGING:						
DRW'G NAME: 07/23/2018		DATE: 10-11-17		DRW'G BY: MARTIN ENGINEER: DEAN		OSP-0242-10				

- NOTES:
- 1. WALL AND ROOF MAY BE 2", 3", OR 4" THICK FOAM-INSULATED PANEL WITH MIN 16 GA STEEL EXTERIOR, MIN 20 GA STEEL INTERIOR. OPTIONAL ALUMINUM AND STAINLESS STEEL INTERIOR. UNIT BASE HEIGHT MAY BE 6" OR 8" WITH MIN 14 GA STEEL FLOOR.
 - 2. THIRD LAYER PERFORATED LINER WITH FIBERGLASS INSULATION ALLOWED.
 - 3. ANY APPROVED COMPONENTS MAY BE USED IN THIS CONFIGURATION, IN ANY ORDER IN DIRECTION OF AIRFLOW.
 - 4. INTERNAL SEISMIC BRACING REQUIRED PER SHEETS "INTERNAL BRACING REQUIREMENTS"
 - 5. UNIT MAY SHIP IN ANY NUMBER OF PIECES AS REQUIRED BY SHIPPING OR JOB SPECIFIC REQUIREMENTS.
 - 6. STRUCTURAL CONTINUITY MUST BE MAINTAINED AT ALL SHIPPING SPLITS.
 - 7. DOUBLE SIDE BY SIDE SEISMIC ROD BRACES ARE REQUIRED @144" O.C.



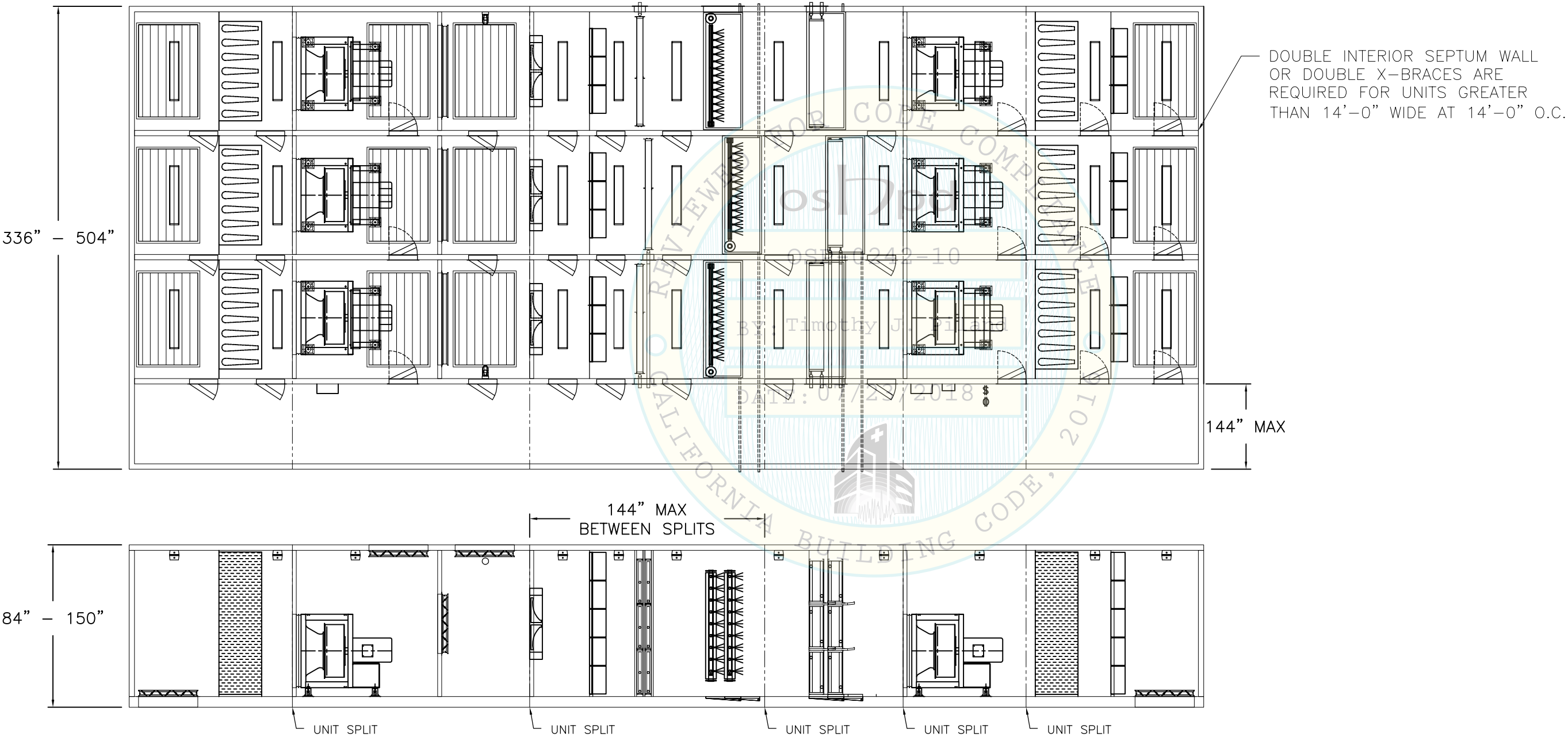
TRANE CUSTOM AIR HANDLERS			All dimensions are in inches unless otherwise noted. Tolerance for all dimensions are ±1/8" unless otherwise noted. Tolerance for all angular dimensions are ±0.1° unless otherwise specified.	REVISION NUMBER	REVISION DESCRIPTION	REVISION DATE	REVISION BY:	CHECKED BY:	APPROVED BY:
				1	Added revision bar and changed notes	10-11-17	Martin		
TITLE: DOUBLE WIDE, SINGLE AIR TUNNEL									
JOB NUMBER:		EQ NUMBER:	TAGGING:						
DRW'G NAME: 07/23/2018		DATE: 10-11-17	DRW'G BY: MARTIN	ENGINEER: DEAN	OSP-0242-10				

- NOTES:
- 1. WALL AND ROOF MAY BE 2", 3", OR 4" THICK FOAM-INSULATED PANEL WITH MIN 16 GA STEEL EXTERIOR, MIN 20 GA STEEL INTERIOR. OPTIONAL ALUMINUM AND STAINLESS STEEL INTERIOR. UNIT BASE HEIGHT MAY BE 6" OR 8" WITH MIN 14 GA STEEL FLOOR.
 - 2. THIRD LAYER PERFORATED LINER WITH FIBERGLASS INSULATION ALLOWED.
 - 3. ANY APPROVED COMPONENTS MAY BE USED IN THIS CONFIGURATION, IN ANY ORDER IN DIRECTION OF AIRFLOW.
 - 4. INTERNAL SEISMIC BRACING REQUIRED PER SHEETS "INTERNAL BRACING REQUIREMENTS"
 - 5. UNIT MAY SHIP IN ANY NUMBER OF PIECES AS REQUIRED BY SHIPPING OR JOB SPECIFIC REQUIREMENTS.
 - 6. STRUCTURAL CONTINUITY MUST BE MAINTAINED AT ALL SHIPPING SPLITS.
 - 7. DOUBLE SIDE BY SIDE SEISMIC ROD BRACES ARE REQUIRED @144" O.C.



TRANE CUSTOM AIR HANDLERS		All dimensions are in inches unless otherwise noted. Tolerance for all dimensions are ±1/8" unless otherwise noted. Tolerance for all angular dimensions are ±0°1'0" unless otherwise specified.		REVISION NUMBER	REVISION DESCRIPTION	REVISION DATE	REVISION BY:	CHECKED BY:	APPROVED BY:
TITLE: DOUBLE WIDE, DUAL AIR TUNNEL				1	Added revision bar and changed notes	10-11-17	Martin	DER	DER
JOB NUMBER:		EQ NUMBER:		TAGGING:					
DRW'G NAME: 07/23/2018		DATE: 10-11-17		DRW'G BY: MARTIN		ENGINEER: DEAN			
						OSP-0242-10			

- NOTES:
- 1. WALL AND ROOF MAY BE 2", 3", OR 4" THICK FOAM-INSULATED PANEL WITH MIN 16 GA STEEL EXTERIOR, MIN 20 GA STEEL INTERIOR. OPTIONAL ALUMINUM AND STAINLESS STEEL INTERIOR. UNIT BASE HEIGHT MAY BE 6" OR 8" WITH MIN 14 GA STEEL FLOOR.
 - 2. THIRD LAYER PERFORATED LINER WITH FIBERGLASS INSULATION ALLOWED.
 - 3. ANY APPROVED COMPONENTS MAY BE USED IN THIS CONFIGURATION, IN ANY ORDER IN DIRECTION OF AIRFLOW.
 - 4. INTERNAL SEISMIC BRACING REQUIRED PER SHEETS "INTERNAL BRACING REQUIREMENTS"
 - 5. UNIT MAY SHIP IN ANY NUMBER OF PIECES AS REQUIRED BY SHIPPING OR JOB SPECIFIC REQUIREMENTS.
 - 6. STRUCTURAL CONTINUITY MUST BE MAINTAINED AT ALL SHIPPING SPLITS.
 - 7. DOUBLE SIDE BY SIDE SEISMIC ROD BRACES ARE REQUIRED @144" O.C.



TRANE CUSTOM
AIR HANDLERS

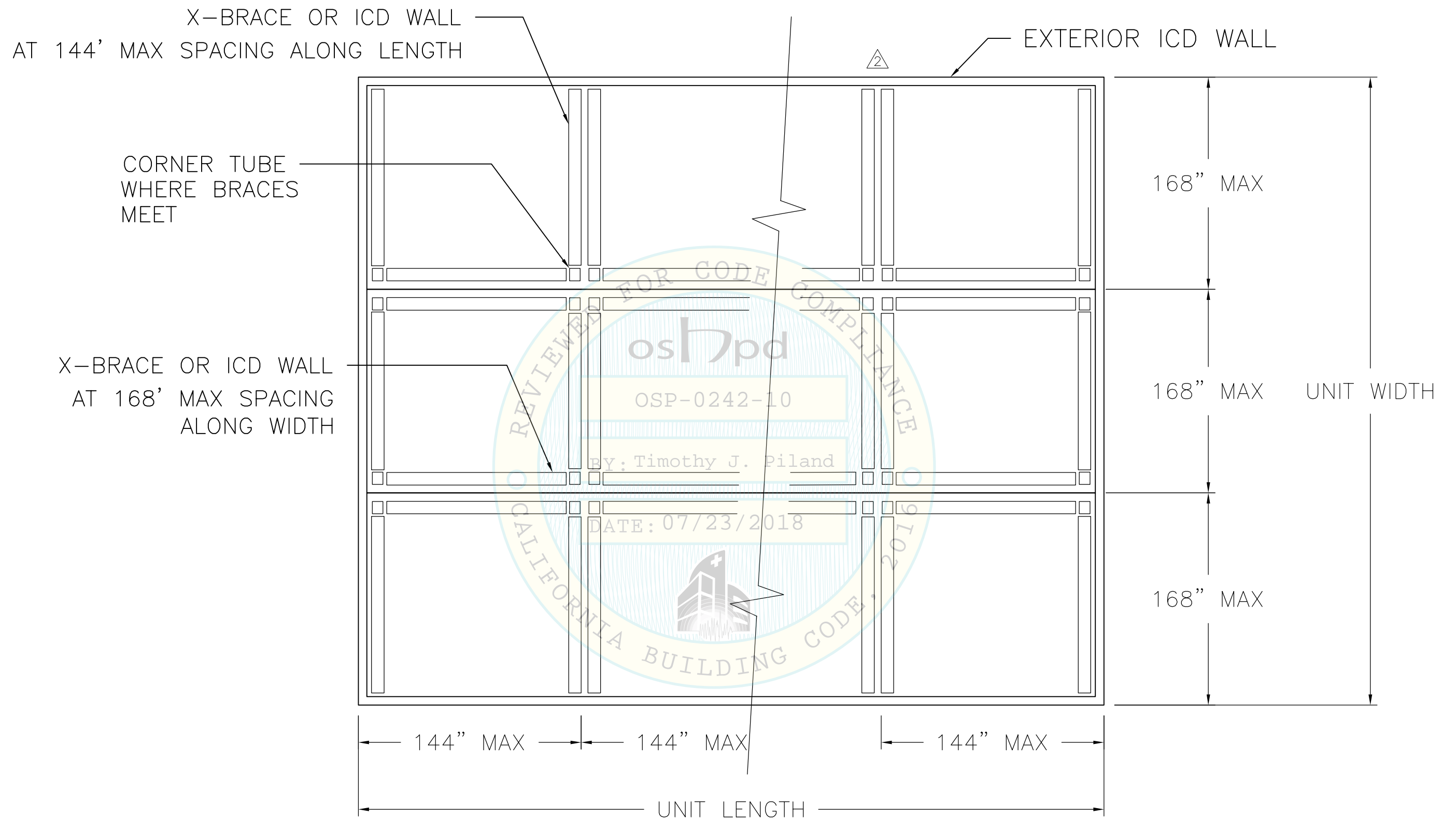
All dimensions are in inches unless otherwise noted.
Tolerance for all dimensions are $\pm 1/8$ " unless otherwise noted.
Tolerance for all angular dimensions are $\pm 0.1^{\circ}$ unless otherwise specified.

REVISION NUMBER	REVISION DESCRIPTION	REVISION DATE	REVISION BY:	CHECKED BY:	APPROVED BY:
1	Added revision bar and changed notes	10-11-17	Martin	DER	DER

TITLE: ULTRA WIDE, SINGLE AIR TUNNEL, SIDE CORRIDOR

JOB NUMBER:	EQ NUMBER:	TAGGING:
DRW'G NAME: 07/23/2018	DATE: 10-11-17	DRW'G BY: MARTIN ENGINEER: DEAN

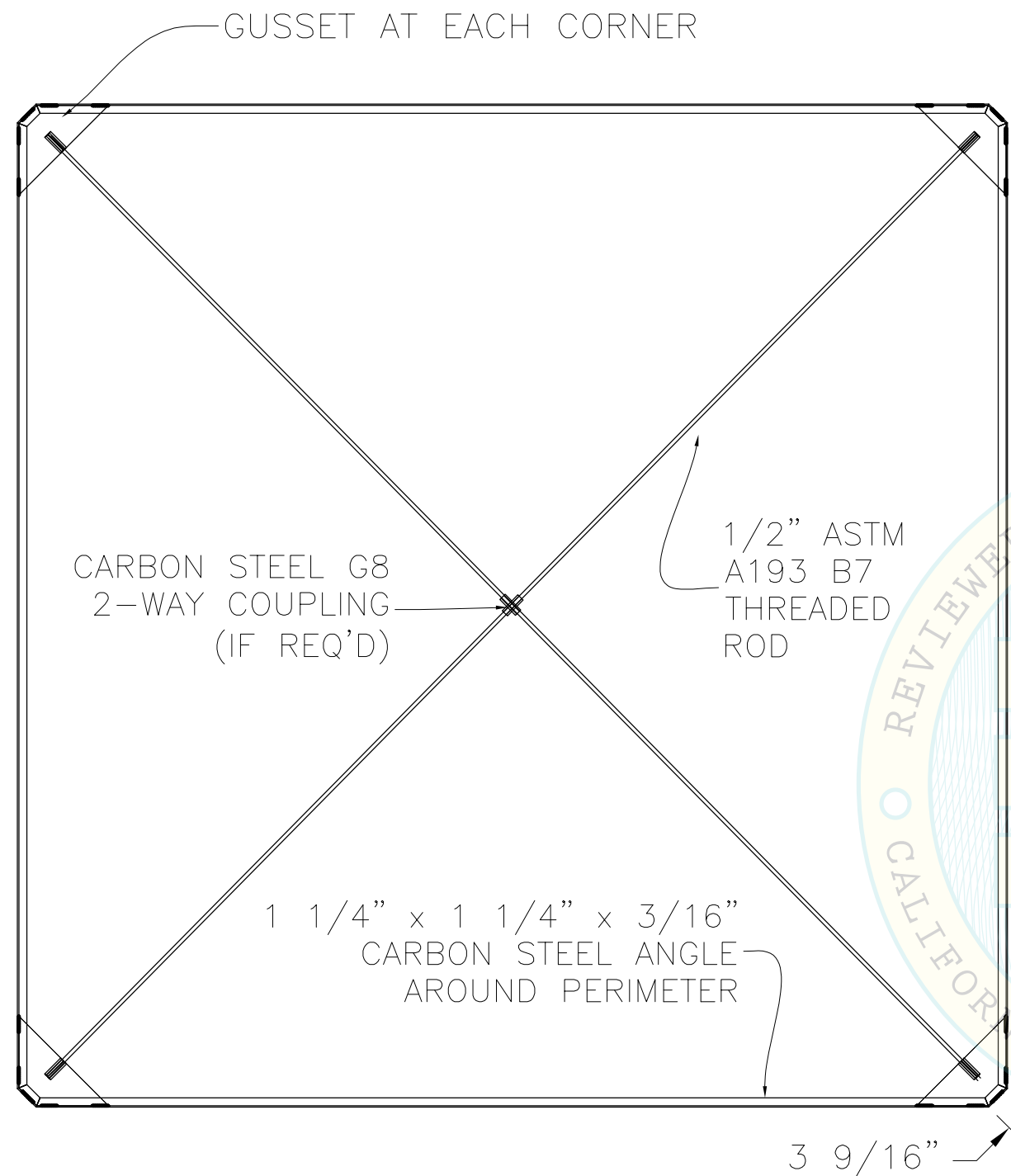
OSP-0242-10



SEE SHEET 2 FOR X-BRACE/ ICD WALL DETAILS

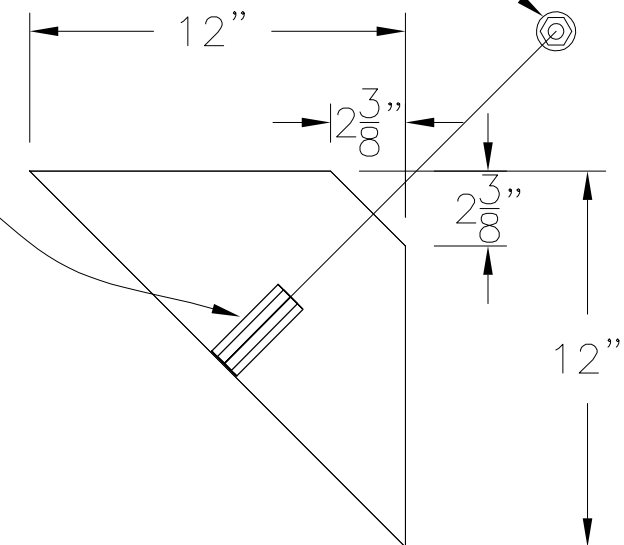
NOTE:
ICD WALLS ARE INTERIOR OR
EXTERIOR STRUCTURAL WALLS
THAT ARE INSULATED

TRANE CUSTOM AIR HANDLERS		All dimensions are in inches unless otherwise noted. Tolerance for all dimensions are $\pm 1/8"$ unless otherwise noted. Tolerance for all angular dimensions are $\pm 0.1^{\circ}$ unless otherwise specified.	REVISION NUMBER	REVISION DESCRIPTION	REVISION DATE	REVISION BY:	CHECKED BY:	APPROVED BY:
			1	Added revision bar and changed notes	10-11-17	Martin	DER	DER
TITLE: INTERNAL BRACING REQUIREMENTS SHEET 1 OF 2			2	ADDED DBL WALL BRACE TO DRAWING	12/21/17	DER	DER	DER
JOB NUMBER:	EQ NUMBER:	TAGGING:						
DRW'G NAME: 07/23/2018	DATE: 10-11-17	DRW'G BY: MARTIN	ENGINEER: DEAN	OSP-0242-10				

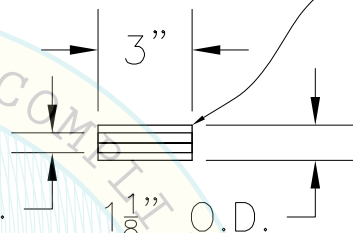


3/16" BEVEL WELD
BOTH SIDES OF SPUD TO BE
WELDED TO PLATE AFTER
FRAMEWORK IS COMPLETE

TOP VIEW OF SPUD W/NUT

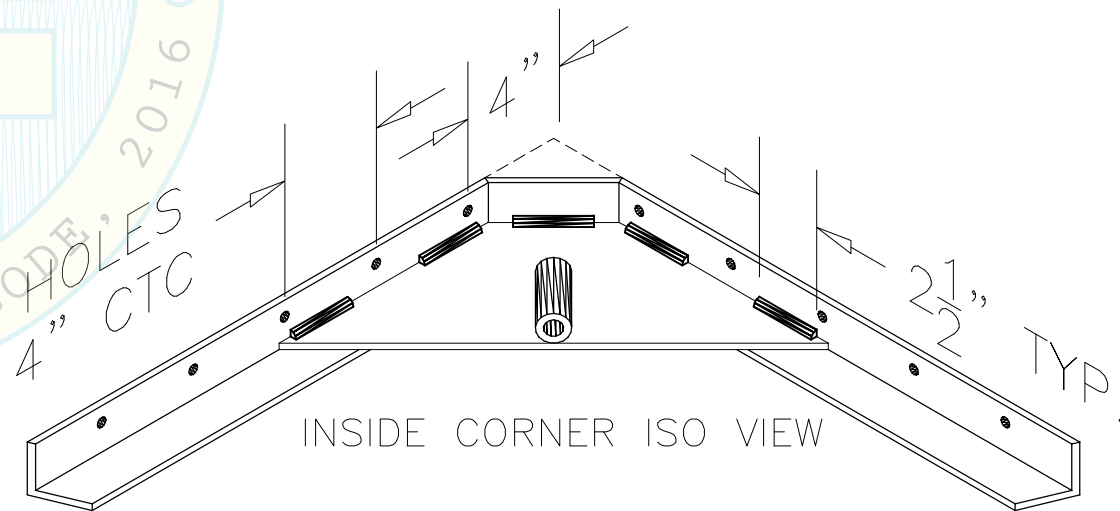


CHAMFER
CORNERS



SPUD DETAIL
CARBON STEEL
TUBING

GUSSET DETAIL
5/16" THICK CARBON
STEEL PLATE
4 REQ'D



3/16" FILLET WELDS, 2-1/2" LONG; AS SHOWN
(MUST BE WELDED)

NOTES:

1. X-BRACES TO BE FULL WIDTH AND HEIGHT OF UNIT
2. X-BRACE PERIMETER ANGLES ATTACHED TO UNIT FRAME WALL, FLOOR AND ROOF WITH 1/4" SELF-DRILLING SCREWS ON 4" CENTERS (MUST USE SCREWS)
3. WHERE TWO BRACES MEET, 2x2x1/8" CARBON STEEL TUBING TO BE INSTALLED AT JOINT BETWEEN BRACES (SEE PAGE 1)

TRANE CUSTOM AIR HANDLERS			<small>All dimensions are in inches unless otherwise noted. Tolerance for all dimensions are ±1/8" unless otherwise noted. Tolerance for all angular dimensions are ±0.1° unless otherwise specified.</small>	REVISION NUMBER	REVISION DESCRIPTION	REVISION DATE	REVISION BY:	CHECKED BY:	APPROVED BY:
				1	Added revision bar	10-11-17	Martin	DER	DER
TITLE: INTERNAL BRACING REQUIREMENTS SHEET 2 OF 2				2	CORRECTED NOTES	12/21/17	DER	DER	DER
JOB NUMBER:	EQ NUMBER:	TAGGING:							
DRW'G NAME: 07/23/2018	DATE: 10-11-17	DRW'G BY: MARTIN	ENGINEER: DEAN		OSP-0242-10				