



OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION

APPLICATION FOR OSHPD SPECIAL SEISMIC
CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY
APPLICATION #: OSP - 0075

OSHPD Special Seismic Certification Preapproval (OSP)

Type: [] New [X] Renewal

Manufacturer Information

Manufacturer: Nortek Air Solutions, LLC
Manufacturer's Technical Representative: Preston Harris
Mailing Address: 19855 SW 124th Ave., Tualatin, OR 97062
Telephone: (503) 403-4431 Email: Preston.Harris@nortek.com

Product Information

Product Name: Huntair Custom Air Conditioning Units
Product Type: Custom Air Conditioning Units
Product Model Number: Huntair Custom Air Conditioning Units
General Description: Custom air conditioners, sheet metal construction. Seismic enhancements made to the test units & modifications required to address the anomalies observed during testing shall be incorporated into the production units
Mounting Description: Rigid base mounted.

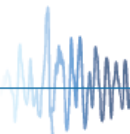
Applicant Information

Applicant Company Name: Structural Integrity Associates, Inc. dba TRU Compliance
Contact Person: Andrew Coughlin, SE
Mailing Address: 5215 Hellyer Ave, Suite 210, San Jose, CA 94608
Telephone: (844) 878-0200 Email: acoughlin@structint.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: [Signature] Date: 5/28/2018
Title: Director, TRU Compliance Company Name: Structural Integrity Associates, Inc.

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: Structural Integrity Associates, Inc. dba TRU Compliance

Name: Andrew Coughlin, SE California License Number: S6082

Mailing Address: 5215 Hellyer Ave, Suite 210, San Jose, CA 94608

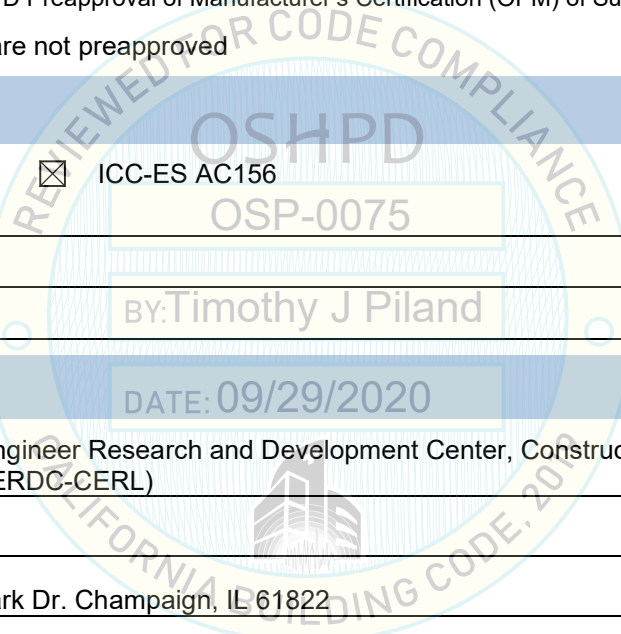
Telephone: (844) 878-0200 Email: acoughlin@structint.com

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): _____



Testing Laboratory

Company Name: U.S. Army Engineer Research and Development Center, Construction Engineering Research Laboratory (ERDC-CERL)

Contact Name: Jim Wilcoski

Mailing Address: 2902 Newmark Dr. Champaign, IL 61822

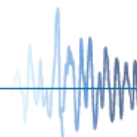
Telephone: (217) 373-6763 Email: james.wilcoski@usace.army.mil

Company Name: Clark Dynamic Test Laboratory, Inc.

Contact Name: Devon Lohr

Mailing Address: 1801 Route 51, Jefferson Hills, PA 15025

Telephone: (412) 387-1026 Email: dlohr@clarktesting.com





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Company Name: Environmental Testing Laboratory

Contact Name: Jeremy Lange

Mailing Address: 11034 Indian Trail, Dallas, TX 75229-3513

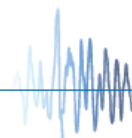
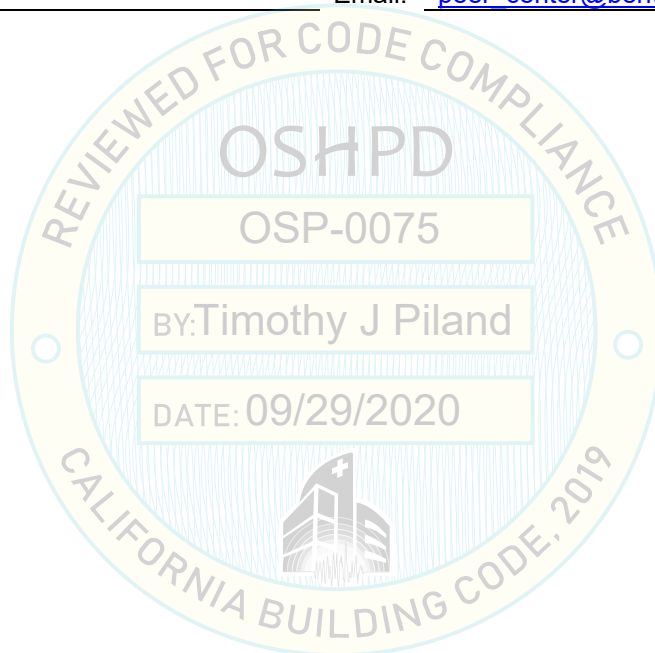
Telephone: (972) 247-9657 Email: jeremy@etldallas.com

Company Name: Pacific Earthquake Engineering Research Center (PEER)

Contact Name: Amarnath Kasalanati, PhD

Mailing Address: 1301 South 46th St., Bldg. 420, Richmond, CA 94804

Telephone: (510) 642-6475 Email: peer_center@berkeley.edu





OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION

Seismic Parameters

Design in accordance with ASCE 7-10 Chapter 13: [X] Yes [] No

Design Basis of Equipment or Components (Fp/Wp) = 1.50

Sds (Design spectral response acceleration at short period, g) = 2.00

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

Rp (Equipment or component response modification factor) = 6.0

Omega_0 (System overstrength factor) = 2

Ip (Importance factor) = 1.5

z/h (Height factor ratio) = 1

Equipment or Component Natural Frequencies (Hz) = See Attachment

Overall dimensions and weight (or range thereof) = See Attachment

Equipment or Components @ grade designed in accordance with ASCE 7-10 Chapter 15: [] Yes [X] No

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

Sds (Design spectral response acceleration at short period, g) =

Sd1 (Design spectral response acceleration at 1 second period, g) =

R (Response modification coefficient) =

Omega_0 (System overstrength factor) =

Cd (Deflection amplification factor) =

Ip (Importance factor) =

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 [X] No

List of Attachments Supporting Special Seismic Certification

[X] Test Report(s) [X] Drawings [] Calculations [] Manufacturer's Catalog

[X] Other(s) (Please Specify): Product and Subcomponent Matrices, UUT Summaries

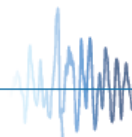
OSHPD Approval (For Office Use Only) - Approval Expires on December 31, 2025

Signature: [Signature] Date: September 29, 2020

Print Name: Timothy J. Piland Title: SSE

Special Seismic Certification Valid Up to: Sds (g) = 2.00 z/h = 1

Condition of Approval (if applicable):



SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX



1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC	TABLE 1
Model Line: Huntair Custom Air Handling Units	

Certified Product Construction Summary:
Galvanized carbon steel, stainless steel, or aluminum. See Table 2 and line drawings for certified product construction. Cross bracing as indicated in certified drawings.

Certified Options Summary:
See Tables 2 through 12 for certified options

Mounting Configuration:
Base mounted - rigid
Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
Huntair CSU Series Custom Air Handling Units up to 240"W x 158"H and Aspect Ratio ¹ (H/W) ≤ 1.1	CSU - 4 Walls	No Limit	24	24	-	Lower Range	Extrap.
		...	...	...	...		Extrap.
		96	240	144	11600	UUT: 73 psf, Aluminum	3a
		130	204	135	14762	UUT: 80 psf, Galv. Carbon Stl	8
		108	144	144	9050	UUT: 84 psf, Galv. Carbon Stl	2a
		138	244	160	24400	UUT: 104 psf, Galv. Carbon Stl	4
		96	96	96	7450	UUT: 116 psf, Galv. Carbon Stl	1a
		96	96	96	7450	UUT: 116 psf, Galv. Carbon Stl	1b
	...	...	...	...		Extrap.	
	No Limit	244	160	-	Upper Range, < 116 psf	Extrap.	
	CSU - 3 Walls (Inlet, Outlet, or Sidewall Removed)	No Limit	24	24	-	Lower Range	Extrap.
		...	...	...	...		Extrap.
		139	134	146	8150	UUT: 64 psf, Galv. Carbon Stl	5
		108	144	144	9050	UUT: 84 psf, Galv. Carbon Stl	2b
		...	...	...	...		Extrap.
		No Limit	240	146	-	Upper Range, < 84 psf	Extrap.

Additional Notes:
¹For bracing requirements, see OSHPD Brace Detail sheet in line drawings at end of OSP.

SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX



1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC					TABLE 1		
Model Line: Huntair Custom Air Handling Units							
Certified Product Construction Summary: Galvanized carbon steel, stainless steel, or aluminum. See Table 2 and line drawings for certified product construction. Cross bracing as indicated in certified drawings.							
Certified Options Summary: See Tables 2 through 12 for certified options							
Mounting Configuration: Base mounted - rigid Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.							
Building Code: CBC 2019		Seismic Certification Limits: $S_{DS} = 2.0g$ $z/h = 1.0$			$I_p = 1.5$		
Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
Huntair CSU Series Custom Air Handling Units up to 240"W x 158"H and Aspect Ratio ¹ (H/W) ≤ 1.1	CSU - 2 Walls (Inlet and Outlet Wall Removed)	No Limit	24	24	-	Lower Range	Extrap.
		...	...	...	...		Extrap.
		108	144	144	9050	UUT: 84 psf, Galv. Carbon Stl	2c
		108	144	144	9050	UUT: 84 psf, Galv. Carbon Stl	2d
		...	...	...	...		Extrap.
		No Limit	240	144	-	Upper Range, < 84 psf	Extrap.
Huntair CSU Series Custom Air Handling Units up to 76"W x 152"H and Aspect Ratio ¹ 1.1 < (H/W) ≤ 2.0	CSU - 4 Walls	No Limit	24	48	-	Lower Range	Extrap.
		...	...	...	...		Extrap.
		144	76	152	1880	UUT: 25 psf, Galv. Carbon Stl	6b
		144	76	152	2350	UUT: 31 psf, Galv. Carbon Stl	6a
		...	...	...	...		Extrap.
		No Limit	76	152	-	Upper Range, < 31 psf	Extrap.
Additional Notes: ¹ For bracing requirements, see OSHPD Brace Detail sheet in line drawings at end of OSP.							

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC	Table Description: Unit Construction	TABLE 2
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Component Type	Manufacturer	Model	Description	Notes	UUT		
Walls/Roof	Nortek Air Solutions, LLC	2" Thickness	Carbon Steel	16 ga. Skin	1 ¹ , 6 ¹		
		3" Thickness		16 ga. skin	Interp.		
		4" Thickness		16 ga. Skin	2 ¹ , 4, 5		
		2" Thickness	Stainless Steel	16 ga. skin	Interp.		
		3" Thickness		16 ga. skin	Interp.		
		4" Thickness		16 ga. Skin	4		
		2" Thickness	Aluminum	0.080" skin	Interp.		
		3" Thickness		0.080" skin	Interp.		
		4" Thickness		0.080" skin	3a		
Liner	Nortek Air Solutions, LLC	Solid	Carbon Steel	16 ga.	Extrap.		
				20 ga.	1 ¹ , 2 ¹ , 4, 5, 6 ¹		
			Stainless Steel	16 ga.	Interp.		
		Perforated			Aluminum	20 ga.	4
					Aluminum	0.063"	3a
					Carbon Steel	0.040"	3a
					Carbon Steel	20 ga.	Extrap.
			Stainless Steel	22 ga.	4		
			Aluminum	0.040"	4		

Additional Notes:
¹Subcomponent was tested in all UUT configurations as seen in the UUT Summaries.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC	Table Description: Unit Construction	TABLE 2
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Component Type	Manufacturer	Model	Description	Notes	UUT
Blankoff	Nortek Air Solutions, LLC	Solid	Carbon Steel	16 ga.	1 ¹ , 2 ¹ , 4, 5, 6 ¹
			Stainless Steel	16 ga.	Interp.
			Aluminum	0.080"	3a
Weather Hood	Nortek Air Solutions	Weather Hood	Carbon Steel	16ga. 62"(W) x 32"(H) x 26"(D)	6 ¹
Base	Nortek Air Solutions, LLC	6" Height	Carbon Steel	Channel	1 ¹ , 2 ¹
		4" Height	Carbon Steel	Structural Tubing, Lower Range	Extrap.
		6" Height	Carbon Steel	Structural Tubing	5, 6 ¹
		8" Height	Carbon Steel	Structural Tubing	8
		12" Height	Carbon Steel	Structural Tubing, Upper Range	Interp.
		4" Height	Stainless Steel	Structural Tubing, Lower Range	Interp.
		12" Height	Stainless Steel	Structural Tubing, Upper Range	4
		4" Height	Aluminum	Structural Tubing, Lower Range	Interp.
		6" Height	Aluminum	Structural Tubing, Upper Range	3a
Base Skin	Nortek Air Solutions, LLC	Galv. Carbon Steel Skin, Treadplate or Hot Rolled Pickled and Oiled	Galvanized Carbon Steel	0.25" thick	Extrap.
				0.188" thick	Extrap.
				12 ga.	4
		Stainless Steel Skin, Treadplate	Stainless Steel	16 ga., UUT: Hot Rolled Pickled and Oiled	1 ¹ , 2 ¹ , 6 ¹
				12 ga.	Interp.
				14 ga.	Interp.
		16 ga.	5		

Additional Notes:
¹Subcomponent was tested in all UUT configurations as seen in the UUT Summaries.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC	Table Description: Dampers and Louvers	TABLE 3
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019	Seismic Certification Limits: $S_{DS} = 2.0g$ $z/h = 1.0$	$I_p = 1.5$
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Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Damper: HD6 (Huntair)	HD6	8	8	6	2	Galv Carbon Steel or Aluminum Frame, Aluminum Blades		Extrap.
		...	...	...	...			Extrap.
		8	48	30	120	Galv. Carbon Steel Frame Aluminum Blades	Actuator: Belimo AS-120-S	1 ¹
		...	...	...	...			Interp.
		8	100	120	1000	Aluminum Frame and Blades	Actuator: Belimo 24V Mo. AF24-MFT	3a
Damper: CD (Ruskin)	CD 50	5	8	6	2			Extrap.
		...	...	...	...			Extrap.
		5	60	36	105		Actuator: Belimo AS-120-S	2 ¹
		...	...	...	...	Aluminum Frame and Blades		Interp.
		5	60	120	350		Actuator: Belimo AFBUP-S	8
		...	...	...	...			Interp.
		8	100	120	585		(2) Actuator: Siemens 24V MO. GCA131.1P and 120V Mo. GCA226.1U	3a
Damper: SD (Ruskin)	SD 50	5	8	5	2			Extrap.
		...	...	...	...			Extrap.
		5	33	57	78	Aluminum Frame and Blades	Actuator: Honeywell MS4120	4
		...	...	...	...			Interp.
		5	120	96	480		Actuator: Honeywell MS4120	4

Additional Notes:
¹Subcomponent was tested in all UUT configurations as seen in the UUT Summaries.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC	Table Description: Dampers and Louvers	TABLE 3
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Damper: AMS (Ruskin)	AMS 050	15	6	6	3	Galv. Carbon Steel Sleeve and Aluminum Blades		Extrap.
		...	...	...	...			Extrap.
		15	24	36	60		Actuator: Belimo AF120	4
		...	...	...	...			Interp.
		15	48	96	320		Actuator: Belimo AF120	4
Damper: Tamco 1000 (Tamco)	Tamco 1000	4	8	6	2	Aluminum Frame and Blades		Extrap.
		...	...	...	...			Extrap.
		4	60	30	60		Actuator: Belimo AMB24	6 ¹
		...	...	...	...			Interp.
		4	36	120	150		Actuator: Belimo AMB24	6 ¹
Louver: HL (Huntair)	HL	6	26	60	35	Galv. Carbon Steel Frame and Blades		1 ¹
		...	...	...	...			Interp.
		4	60	120	290			8
Louver: ELF (Ruskin)	ELF	6	40	36	60	Aluminum Frame and Blades		2 ¹
		...	...	...	...			Interp.
		6	60	120	200			8
Louver: AML (Ruskin)	AML	3	12	20	8	Aluminum Frame and Blades		Extrap.
		...	...	...	...			Extrap.
		6	36	60	180			4
		...	...	...	...			Interp.
		3	100	120	1000			4

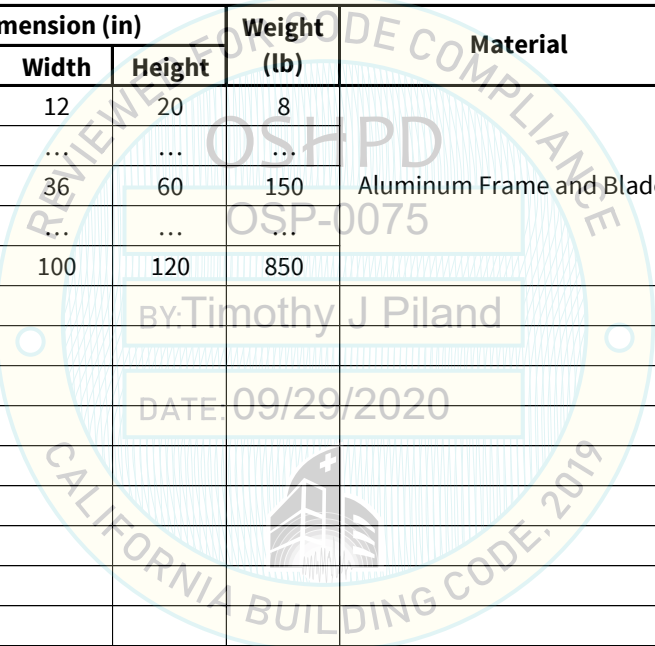
Additional Notes:
¹Subcomponent was tested in all UUT configurations as seen in the UUT Summaries.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC		Table Description: Dampers and Louvers				TABLE 3		
Model Line: Huntair Custom Air Handling Units		Building Code: CBC 2019						
		Seismic Certification Limits: $S_{DS} = 2.0g$ $z/h = 1.0$				$I_p = 1.5$		
Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Louver: EME (Ruskin)	EME	3	12	20	8	Aluminum Frame and Blades		Extrap.
		...	...	...	...			Extrap.
		6	36	60	150		UUT: Tested as AML	4
		...	...	...	...			Interp.
		3	100	120	850		UUT: Tested as AML	4



SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC	Table Description: Fanwall	TABLE 4
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Fanwall: Welded or Riveted (Huntair)	10" Fan Wheel	24	20	20	133	Carbon steel frame, aluminum fan wheels, vertical or horizontal flow, stacked up to 131" high		Extrap.
		...	...	...	...			Extrap.
		32	24	20	173		UUT2: welded construction, vertical flow; UUT3a: riveted, multi. stack and adjacent cell, horiz. flow	2 ¹ ,3a
		...	...	...	...			Interp.
	12" Fan Wheel	44	36	44	356			Interp.
		24	20	20	140			Interp.
		...	...	...	...			Interp.
		44	36	44	364			Interp.
	14" Fan Wheel	24	24	20	140			Interp.
		...	...	...	...			Interp.
		44	36	44	365			Interp.
		32	28	20	204			Interp.
	16" Fan Wheel	...	...	...	...			Interp.
		48	44	44	367			Interp.
		...	...	...	...			Interp.
		32	28	20	207			Interp.
18" Fan Wheel	...	...	...	...		Interp.		
	...	...	...	...		Interp.		
	48	44	44	367		Interp.		

Additional Notes:
¹Subcomponent was tested in all UUT configurations as seen in the UUT Summaries.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC	Table Description: Fanwall	TABLE 4
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Fanwall: Welded or Riveted (Huntair)	20" Fan Wheel	...	...	...	...	Carbon steel frame, aluminum fan wheels, vertical or horizontal flow, stacked up to 131" high	Interp.
		32	28	20	210		Interp.	
		...	...	...	...		Interp.
	22" Fan Wheel	48	44	44	367		Interp.	
		32	36	20	244		Interp.	
		...	...	...	...		Interp.
		32	44	44	367	UUT2: welded construction, vertical flow; UUT3a: riveted, mult. stack and adjacent cell, horiz. flow	2 ¹ ,3a	
Fanwall Gen II (Huntair)	10" Fan Wheel	16	22	24	54	Interp.		
		...	...	...	...	Interp.	
		24	22	27	82	2 wide x 5 high Gen II multi stack without extended coplanar	7	
		...	...	...	...	Bolted aluminum extrusion frame, aluminum and polymer fan wheels, stacked up to 144" high, horizontal flow, with or without extended coplanar	Interp.
	12" Fan Wheel	42	30	30	157	Interp.		
		16	25	24	57	Interp.		
		...	...	...	...	Interp.	
		23	32	32	125	2 wide x 4 high Gen II multi stack and adjacent cell	4	
		...	...	...	...	Interp.	
		42	32	32	166	Interp.		

Additional Notes:
¹Subcomponent was tested in all UUT configurations as seen in the UUT Summaries.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX



1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC Model Line: Huntair Custom Air Handling Units		Table Description: Fanwall				TABLE 4			
Building Code: CBC 2019		Seismic Certification Limits: $S_{DS} = 2.0g$ $z/h = 1.0$				$I_p = 1.5$			
Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT	
		Depth	Width	Height					
Fanwall Gen II (Huntair)	14" Fan Wheel	17	25	24	57	Bolted aluminum extrusion frame, aluminum and polymer fan wheels, stacked up to 144" high, horizontal flow, with or without extended coplanar		Interp.	
		...	...	...	...			Interp.
		42	34	34	173			Interp.	
	16" Fan Wheel	18	28	28	66			Interp.	
		...	...	...	...			Interp.
		48	38	38	195			Interp.	
	18" Fan Wheel	21	31	28	74			Interp.	
		...	...	...	...			Interp.
		48	40	40	199			Interp.	
	20" Fan Wheel	21	31	28	74			Interp.	
		...	...	...	...			Interp.
		50	42	42	199			Interp.	
	22" Fan Wheel	22	34	34	83			Interp.	
		...	...	...	...			Interp.
		38	40	44	165			2 wide x 4 high Gen II multi stack and adjacent cell	4
		...	...	...	...			Interp.
		33	44	44	175			2 wide x 4 high Gen II multi stack and adjacent cell	4
		...	...	...	...			Interp.
51	34	34	199		2 wide x 4 high Gen II fan cells with and without extended coplanar	7			

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC	Table Description: Heat Transfer Coils	TABLE 5
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Water Coils (Nortek Air Solutions)	5WC 1 - 2 Row	4	24	24	57	copper or aluminum fins; copper tubes	0.625" ϕ tube, 1 row, 0.006" (Cu) or 0.008" (Al) fins, 6 FPI	Extrap.
		...	...	...	...			Extrap.
		4	40	85.5	230	copper or aluminum (UUT) fins; copper tubes	0.625" ϕ tube, 1 row, 0.006" (Cu) or 0.008" (Al, UUT) fins, 7 FPI, stacked 2 high	1a
		...	...	...	...			Interp.
		7	127	40.5	540	copper or aluminum (UUT) fins; copper tubes	0.625" ϕ tube, 2 row, 0.006" (Cu) or 0.008" (Al, UUT) fins, 14 FPI, stacked 3 high	2 ²
	5WC 3 - 12 Row	6.5	24	24	143	copper or aluminum fins; copper tubes	0.625" ϕ tube, 3 row, 0.006" (Cu) or 0.008" (Al) fins, 14 FPI	Interp.
		...	...	...	...			Interp.
		17.5	83	40.5	1435	copper (UUT) or aluminum fins; copper tubes	0.625" ϕ tube, 12 row, 0.006" (Cu, UUT) or 0.008" (Al) fins, 6 FPI, stacked 2 high	1a
	5WC ¹ 3 - 10 Row	...	...	...	...			Interp.
		15	184	63	3594	copper or aluminum (UUT) fins; copper tubes	0.625" ϕ tube, 10 row, 0.006" (Cu) or 0.008" (Al, UUT) fins, 12 FPI, stacked 2 high	8
		...	...	...	...			Interp.

Additional Notes:
¹Upgraded coil support per description in UUT8

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC	Table Description: Heat Transfer Coils	TABLE 5
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Water Coils (Nortek Air Solutions)	5WC ¹ 3 - 10 Row	...	...	...	...			Interp.
		15	184	48	5624	copper (UUT) or aluminum fins; copper tubes	0.625" ϕ tube, 10 row, 0.006" (Cu, UUT) or 0.008" (Al) fins, 12 FPI, stacked 2 high	8
DX Coils (Nortek Air Solutions)	DX Evaporator Coil	5	24	24	33	0.025" copper tube, 0.006" aluminum fin, 16ga galv. carbon steel casing	0.5" ϕ tube, 8 fins per inch, 1 row	Extrap.
		...	...	...	...			Extrap.
		8.5	56	45	521	0.025" copper tube, 0.006" aluminum fin, 16ga galv. carbon steel casing	0.5" ϕ tube, 14 fins per inch, 6 row	4
		...	...	...	...			Interp.
		8.5	150	45	1308	0.025" copper tube, 0.006" aluminum fin, 16ga galv. carbon steel casing	0.5" ϕ tube, 14 fins per inch, 6 row	4

Additional Notes:
¹Upgraded coil support per description in UUT8

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

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Manufacturer: Nortek Air Solutions, LLC	Table Description: Heat Transfer Coils	TABLE 5
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
DX Coils (Heatcraft/Modine)	DX Evaporator Coil	5	24	24	33	0.025" copper tube, 0.006" aluminum fin, 16ga galv. carbon steel casing	0.5"φ tube, 8 fins per inch, 1 row	Extrap.
		...	...	...	...	...	...	Extrap.
		8.5	56	45	521	0.025" copper tube, 0.006" aluminum fin, 16ga galv. carbon steel casing	0.5"φ tube, 14 fins per inch, 6 row	4
		...	...	...	...	...	...	Interp.
		8.5	150	45	1308	0.025" copper tube, 0.006" aluminum fin, 16ga galv. carbon steel casing	0.5"φ tube, 14 fins per inch, 6 row	4

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

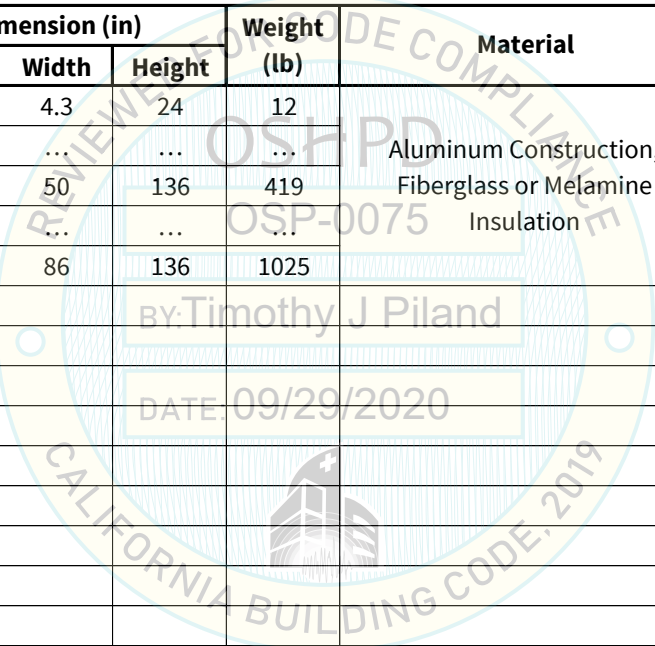
1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC	Table Description: Sound Trap	TABLE 6
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Huntair	Sound Trap	24	4.3	24	12	Aluminum Construction, Fiberglass or Melamine Insulation		Extrap.
		...	...	...	...			Extrap.
		24	50	136	419		Standard	5
		...	...	...	...			Interp.
		72	86	136	1025		Low Frequency	5



SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC	Table Description: Enclosure	TABLE 7
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Huntair	Control & VFD Enclosures	12	20	24	30	Carbon Steel	NEMA 1/12/3R/4X ¹	Extrap.
		...	...	...	...		Extrap.	
		16	28	42	176		NEMA 1/12/3R/4X ¹ , (UUT: NEMA 12)	2a
		...	...	...	...		Interp.	
		10	28	40	143		NEMA 1/12/3R/4X ¹ , (UUT: NEMA 1)	4
		...	...	...	...		Interp.	
		12	36	48	216		NEMA 1/12/3R/4X ¹ , (UUT: NEMA 3R)	1b
		...	...	...	...		Interp.	
		20	56	72	470		NEMA 1/12/3R/4X ¹ , (UUT: NEMA 1)	1a
		...	...	...	...		Interp.	
	16	56	90	530	NEMA 1/12/3R/4X ¹ , (UUT: NEMA 1)		4	
	Power Distribution & MSP Enclosures	6	6	8	30		NEMA 1/12/3R/4X ¹	Extrap.
		...	...	...	...		Extrap.	
		10	16	16	30		NEMA 1/12/3R/4X ¹ , (UUT: NEMA 4X)	2b
...		...	...	...	Interp.			
12	22	34	105	NEMA 1/12/3R/4X ¹ , (UUT: NEMA 1)	8			
Hoffman	Power Distribution & MSP Enclosures	6	24	24	50	Aluminum	UUT: NEMA 3R	3a
Saginaw	Electrical Control Cabinet	16	30	48	190	Carbon Steel	UUT: NEMA 1	8

Additional Notes:
¹No physical difference between NEMA 1, NEMA 12, and NEMA 3R. NEMA 4X is powder coated.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

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Manufacturer: Nortek Air Solutions, LLC	Table Description: Actuator, Fan Motors	TABLE 8
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Component Type	Manufacturer	Model	Description	Notes	UUT	
Actuator	Belimo	AMB24			6 ¹	
		AS-120-S			1 ¹ ,2 ¹	
		AF24-MFT	24V		3a	
		AF120	120V		4	
		AFBUP-S	120V		8	
	Honeywell	MS4120F	2 position, 120V		4	
	Siemens	GCA156.1U				Extrap.
		GCA131.1P	24V			3a
GCA226.1U		120V			3a	
Fan Motor	Siemens	1 HP	230/460 Volts	UUT: 55 lbs	2 ¹ ,3a,7	
		...			Interp.	
		10HP	460 Volts	UUT: 144 lbs	7	
		...			Interp.	
		15 HP	230/460 Volts	UUT: 218 lbs	2 ¹	
		...			Interp.	
	Baldor	20 HP	230/460 Volts	UUT: 291 lbs	3a	
		1 HP	230/460 Volts	UUT: 45 lbs	7	
		...			Interp.	
		12 HP	230/460 Volts	UUT: 169 lbs	7	

Additional Notes:
¹Subcomponent was tested in all UUT configurations as seen in the UUT Summaries.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC	Table Description: Actuator, Fan Motors	TABLE 8
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Component Type	Manufacturer	Model	Description	Notes	UUT
Fan Motor	Toshiba	1 HP	230/460 Volts	UUT: 63 lbs	4,7
		...			Interp.
		12 HP	230/460 Volts	UUT: 202 lbs	7
		...			Interp.
		15 HP	230/460 Volts	UUT: 320 lbs	4
	Novatorque Motor (Permanent Magnet)	2 HP	460 Volts, permanent magnet motor	UUT: 72 lbs	7
		...			Interp.
		6 HP	230/460 Volts, permanent magnet motor	UUT: 74 lbs	7
	Nortek Air Solutions	2.5-3640-380-480V3Ph	460V, 3 Phase, 60 Hz	UUT: 2.5 kW	4
		...			Interp.
6.0-1860-380-480V3Ph		460V, 3 Phase, 60 Hz	UUT: 6 kW	4	
Fan Wheel/Motor Combo	Nortek Air Solutions	HPF-P200-ECMi Size 12			4
		...	Polymer, Aluminum		Interp.
		HPF-P200-ECMi Size 22			4

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

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Manufacturer: Nortek Air Solutions, LLC	Table Description: Filters	TABLE 9
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019	Seismic Certification Limits: $S_{DS} = 2.0 g$ $z/h = 1.0$	$I_p = 1.5$
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Component Type	Manufacturer	Model	Description	Notes	UUT
Final Filter	AAF	VariCel DH and SH	12" depth	Efficiency: MERV 11	5
	Camfil	Durafil, RIGA-FLO, S-FLO	12" depth and 22" depth	Efficiency: MERV 11	1b,3a
Pre Filter	AAF	PerfectPleat Ultra	2" depth and 4" depth	Efficiency: MERV 8	5
	Camfil	30-30, Aeropleat	4" depth and 2" depth	Efficiency: MERV 8	1b,3a
HEPA Filter	Camfil	Absolute XH, Filtra 2000	12" Depth		2 ¹
	AAF	AstroCel, Varisorb	12" Depth		2 ¹ ,3a

Additional Notes:
¹Subcomponent was tested in all UUT configurations as seen in the UUT Summaries.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX



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Manufacturer: Nortek Air Solutions, LLC		Table Description: Filter Frames & Racks		TABLE 10
Model Line: Huntair Custom Air Handling Units				

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Filter Frames & Racks (Camfil, AAF, Huntair, Farr)	Rack - Type 8	2.69	12	12	2	Galvanized Carbon Steel		Extrap.
		...	...	...	...			Extrap.
		2.69	84	84	50			1b
		...	...	...	...			Interp.
		2.69	60.25	132	55			6a
		...	...	...	...			Interp.
		2.69	108	108	80			5
		...	...	...	...			Interp.
		2.69	228	120	175			3a
	Frame - HEPA	3.75	132	120	150			2 ¹

Additional Notes:
¹Subcomponent was tested in all UUT configurations as seen in the UUT Summaries.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1801166-CR-001-R6



Manufacturer:	Nortek Air Solutions, LLC	Table Description:	Humidifier Grid
Model Line:	Huntair Custom Air Handling Units	TABLE 11	

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Model Line (Manufacturer)	Model	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Ultra-Sorb (DriSteem)	LV	5	12	12	23	Header/Tube: Stainless, Enclosure: Stainless Steel		Extrap.
		...	...	...	...			Extrap.
		5	43	49	122			6a ²
		...	...	...	...			Interp.
		5	123	129	534			5 ²
Vapac	Vapasorb	5	24	24	50	Header/Tube: Stainless		1 ¹

Additional Notes:
¹Subcomponent was tested in all UUT configurations as seen in the UUT Summaries.
²Humidifier Systems require independent structural support or adjacent upstream cable brace, see UUT-5 & 6a summaries.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC	Table Description: Electrical	TABLE 12
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019	Seismic Certification Limits: $S_{DS} = 2.0g$ $z/h = 1.0$	$I_p = 1.5$
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Component Type	Manufacturer	Model	Description	Notes	UUT
Disconnect Switch and Circuit Breaker	Siemens	CFS361J5	30A	Eaton R4H3030FJ	Extrap.
		CFS362J	60A	Eaton R9J3060FJ	3a
		CFS363J	100A	Eaton R9K3100FJ	Interp.
		CFS364J	200A	Eaton R9L3200FJ	1b, 2a
		CFS365J	400A	Eaton R9M3400FJ	1a
Fuse Holder and Fuse	Bussmann	LPJ-1SP	1A		Extrap.
		LPJ-5SP	5A	Bussmann Fuse Type LPJ, full range	Extrap.
		LPJ-10SP	10A	Bussmann Fuse Type DFJ, full range	Extrap.
		LP-CC-15	15A	Bussman Fuse Type LP-CC, full range	Extrap.
		CCP-3-30CC, J60030-3CR	30A	Bussmann Fuse Type KTK, full range	1b
		J60060-3CR, CCP-3-60CF	60A	Bussmann Fuse Type FNQ, full range	Interp.
		LPJ-100SP	100A	Bussmann Fuse Type FNM, full range	Interp.
		LPJ-200SP	200A	Bussmann Fuse Type GMA, full range	Interp.
J60400-3CR	400A		1a		
Distribution Block	Marathon	132580	175A	Bussmann PDBFS220, PDB321-3	1b
		1403404	310A	Bussmann PDBFS303, PDB323-3	Interp.
		1453579	380A	Bussmann PDBFS330	Interp.
		1453587	665A	Bussmann PDBFS500	1a
Contactor	Siemens	3RT10151AK61	7A	Eaton XTCE007B10A	1a
		3RT10231AK60	9A	Eaton XTCE009B10A	Interp.
		3RT10241AK60	12A	Eaton XTCE012B10A	Interp.
		3RT10251AK60	17A	Eaton XTCE018C10A - 18A	Interp.
		3RT10361AK60	50A	Eaton XTCE050D00A	Interp.

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SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

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Manufacturer: Nortek Air Solutions, LLC	Table Description: Electrical	TABLE 12
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019	Seismic Certification Limits: $S_{DS} = 2.0 g$ $z/h = 1.0$	$I_p = 1.5$
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Component Type	Manufacturer	Model	Description	Notes	UUT
Contactor	Siemens	3RT10451AK60	80A	Eaton XTCE080F00A	1a
		3RT10461AK60	95A	Eaton XTCE095F00	Interp.
		3RT10546AF36	115A	Eaton XTCE115G00A	Interp.
		3RT10556AF36	150A	Eaton XTCE150G00A	1a
		3RT10646AF36	225A	Eaton XTCE185H22A - 185A	Extrap.
		3RT10656AF36	265A	Eaton XTCS250L22A - 250A	Extrap.
MSP	Siemens	3RV10210JA10	0.7 to 1.0A	Eaton XTPR001BC1 - 0.63 to 1.0A	1a
		3RV10211AA10	1.1 to 1.6A	Eaton XTPR1P6BC1 - 1.0 to 1.6A	Interp.
		3RV10211CA10	1.8 to 2.5A	Eaton XTPR2P5BC1 - 1.6 to 2.5A	Interp.
		3RV10211FA10	3.5 to 5.0A	Eaton XTPR004BC1 - 2.5 to 4.0A	Interp.
		3RV10211HA10	5.5 to 8.0A	Eaton XTPR010BC1 - 6.3 to 10A	2a
		3RV10211KA10	9.0 to 12.5A	Eaton XTPR012BC1 - 8 to 12.5A	1a
		3RV10214AA10	11 to 16A	Eaton XTPR016BC1 - 10 to 16A	1a, 3a
		3RV10314BA10	14 to 20A	Eaton XTPR025DC1 - 16 to 25A	Interp.
		3RV10314EA10	22 to 32A	Eaton XTPR032DC1 - 25 to 32A	Interp.
		3RV10414HA10	36 to 45A	Eaton XTPR050DC1 - 40 to 50A	Interp.
		3RV10414JA10	45 to 50A	Eaton XTPR063DC1 - 55 to 65A	1a
		Power Supply	Siemens	6EP1332-1SH42	2.5A	Eaton PSG60E	Extrap.
6EP1332-1SH51	4A			Eaton PSG120E	1b, 8
6EP1334-3BA00	10A			Eaton PSG240E	4
IDEC	PS5R-VE24		0.5 lbs, 3.75A		8

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

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Manufacturer: Nortek Air Solutions, LLC Model Line: Huntair Custom Air Handling Units		Table Description: Electrical			TABLE 12	
Building Code: CBC 2019		Seismic Certification Limits: $S_{DS} = 2.0g$ $z/h = 1.0$			$I_p = 1.5$	
Component Type	Manufacturer	Model	Description	Notes	UUT	
Transformer	Micron	B075LP7JK	75VA Pri 120x240 vac Sec: 24 vac	Eaton C0075E1B	Extrap.	
		B050LP7RB	50VA Pri 120x240 vac Sec: 24 vac	Eaton C0050E1BFB	Extrap.	
		B150LP7JKF	150VA Pri 120x240 vac Sec: 24 vac	Eaton C0150E1B	2a	
		B250BTZ13RBF	250VA Pri 480x240 vac Sec: 120 vac	Eaton C0250E2AFB	Interp.	
		B500BTZ13RBF	500VA Pri 480x240 vac Sec: 120 vac	Eaton C0500E2AFB	1b	
		B750BTZ13RBF	750VA Pri 480x240 vac Sec: 120 vac	Eaton C0750E2AFB	1a	
		B1K0-0500-3F	1000VA Pri 480x240 vac Sec: 120 vac	Eaton C1000E2AFB	Interp.	
		B2K0-0502-3H	2000VA Pri 480x240 vac Sec: 120 vac	Eaton C2000K2AFB	Interp.	
		B3K0-0503-3H	3000VA Pri 480x240 vac Sec: 120 vac	Eaton C3000K2A	1a	
Reactor	TCI	KDRA3H	7.6A		4	
		KDRA4H	11A		Interp.	
		KDRA5H	14A		Interp.	
		KDRB2H	21A		Interp.	
		KDRC3H	27A		Interp.	
		KDRF4H	52A		Interp.	
		KDRF2H	77A		Interp.	
		KDRI2H	125A		Interp.	
		KDRG3H	156A		1b	
Terminal Block	Pheonix	Typ QTC 2.5	15A	Also Typ QTC 2.5-PE grounding term	Extrap.	
		Typ ST 4	30A		2b	
		Typ ST 4-PE	30A - Grounding Terminals		4	

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC	Table Description: Electrical	TABLE 12
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Component Type	Manufacturer	Model	Description	Notes	UUT	
VFD	ABB	ACH550 Series	208V/230V/460V, 1 HP, 18 lbs	UUT: 1 HP, 18 lbs	1a	
			208V/230V/460V, 3 HP, 18 lbs		Interp.	
			208V/230V/460V, 5 HP, 18 lbs		Interp.	
			208V/230V/460V, 7.5 HP, 18 lbs		Interp.	
			208V/230V/460V, 10 HP, 25 lbs		Interp.	
			208V/230V/460V, 15 HP, 25 lbs		Interp.	
			208V/230V/460V, 20 HP, 41 lbs		Interp.	
			208V/230V/460V, 25 HP, 41 lbs		Interp.	
			208V/230V/460V, 30 HP, 41 lbs		Interp.	
			208V/230V/460V, 35 HP, 58 lbs		Interp.	
			208V/230V/460V, 40 HP, 58 lbs		Interp.	
			208V/230V/460V, 50 HP, 58 lbs		Interp.	
			208V/230V/460V, 60 HP, 58 lbs		Interp.	
			208V/230V/460V, 75 HP, 58 lbs		Interp.	
			208V/230V/460V, 100 HP, 190 lbs		Interp.	
		208V/230V/460V, 125 HP, 190 lbs		Interp.		
		208V/230V/460V, 150 HP, 190 lbs	UUT: 150 HP, 190 lbs	1a		
		ACS320 Series	208V/230V/460V	UUT: 1 HP, 3.5 lbs	1b	
			208V/230V/460V, 3 HP, 3.5 lbs		Interp.	
			208V/230V/460V, 5 HP, 3.5 lbs		Interp.	
			208V/230V/460V, 7.5 HP, 7 lbs		Interp.	
			208V/230V/460V, 10 HP, 7 lbs		Interp.	
				208V/230V/460V, 15 HP, 7 lbs		Interp.

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SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

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Manufacturer: Nortek Air Solutions, LLC	Table Description: Electrical	TABLE 12
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0 g$ $z/h = 1.0$ $I_p = 1.5$

Component Type	Manufacturer	Model	Description	Notes	UUT
VFD	ABB	ACS320 Series	208V/230V/460V	UUT: 20 HP, 11 lbs	1b
			208V/230V/460V, 25 HP, 11 lbs		Interp.
			208V/230V/460V, 30 HP, 11 lbs		Interp.
		ACS355 Series	480V, 0.5 HP, 2.6 lbs		Extrap.
			480V, 0.75 HP, 2.6 lbs		Extrap.
			480V, 1 HP, 3.0 lbs		Extrap.
			480V, 1.5 HP, 3.0 lbs		Extrap.
			480V	UUT: 2 HP, 3.0 lbs	7
			480V, 3 HP, 3.0 lbs		Interp.
			480V, 4 HP, 3.0 lbs		Interp.
		480V, 5 HP, 3.0 lbs		Interp.	
		480V, 7.5 HP, 6.9 lbs		Interp.	
		480V, 10 HP, 6.9 lbs		Interp.	
		480V	UUT: 15 HP, 11.5 lbs	7	
	Danfoss	FC101 Series	208V/230V/460V	UUT: 1 HP	4
			208V/230V/460V	UUT: 15 HP	4
		VLT Series	208V/230V/460V	UUT: 5 HP	4
			208V/230V/460V	UUT: 15HP	4
	Yaskawa	E7 Series	208V/230V/460V, 3 HP, 9 lbs		Interp.
			208V/230V/460V, 5 HP, 9 lbs		Interp.

Additional Notes:
¹Subcomponent was tested in all UUT configurations as seen in the UUT Summaries.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC	Table Description: Electrical	TABLE 12
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Component Type	Manufacturer	Model	Description	Notes	UUT
VFD	Yaskawa	E7 Series	208V/230V/460V, 7.5 HP, 9 lbs		Interp.
			208V/230V/460V, 10 HP, 13 lbs		Interp.
			208V/230V/460V, 15 HP, 13 lbs		Interp.
			208V/230V/460V, 20 HP, 13 lbs		Interp.
			208V/230V/460V, 25 HP, 22 lbs		Interp.
			208V/230V/460V, 30 HP, 22 lbs		Interp.
			208V/230V/460V, 40 HP, 53 lbs		Interp.
			208V/230V/460V, 50 HP, 53 lbs		Interp.
			208V/230V/460V, 60 HP, 88 lbs		Interp.
			208V/230V/460V, 75 HP, 88 lbs		Interp.
		208V/230V/460V, 100 HP, 88 lbs		Interp.	
		208V/230V/460V, 125 HP, 194 lbs		Interp.	
		208V/230V/460V	UUT: 150 HP, 196 lbs	1a	
		208V/230V/460V	UUT: 1 HP, 3 lbs	1b	
		208V/230V/460V, 3 HP, 4.2 lbs		Interp.	
		208V/230V/460V, 5 HP, 4.2 lbs		Interp.	
		208V/230V/460V, 7.5 HP, 5.7 lbs		Interp.	
		208V/230V/460V	UUT: 10 HP, 9 lbs	1b	
		208V/230V/460V, 15 HP, 9 lbs		Interp.	
		208V/230V/460V	UUT: 20 HP, 12 lbs	1b	
208V/230V/460V, 25 HP, 12 lbs		Interp.			

Additional Notes:
¹Subcomponent was tested in all UUT configurations as seen in the UUT Summaries.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

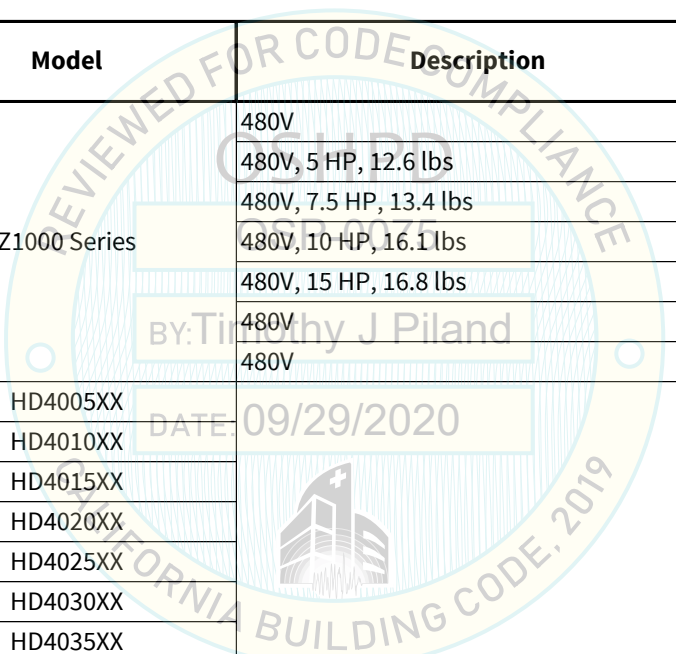
1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC	Table Description: Electrical	TABLE 12
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Component Type	Manufacturer	Model	Description	Notes	UUT
VFD	Yaskawa	Z1000 Series	480V	UUT: 3 HP, 11.9 lbs	7
			480V, 5 HP, 12.6 lbs		Interp.
			480V, 7.5 HP, 13.4 lbs		Interp.
			480V, 10 HP, 16.1 lbs		Interp.
			480V, 15 HP, 16.8 lbs		Interp.
			480V	UUT: 20 HP, 18.5 lbs	7
	480V	UUT: 25 HP 28.7 lbs	7		
	Nortek Air Solutions	HD4005XX	0.5 HP, 9.5 lbs	Extrap.	
		HD4010XX	UUT: 1 HP, 9.5 lbs, 10" model	7	
		HD4015XX	1.5 HP, 9.5 lbs	Interp.	
		HD4020XX	2 HP, 9.5 lbs	Interp.	
		HD4025XX	2.5 HP, 9.5 lbs	Interp.	
		HD4030XX	3 HP, 9.5 lbs	Interp.	
		HD4035XX	3.5 HP, 9.5 lbs	Interp.	
		HD4040XX	4 HP, 9.5 lbs	Interp.	
		HD4045XX	4.5 HP, 9.5 lbs	Interp.	
		HD4050XX	5 HP, 9.5 lbs	Interp.	
		HD4055XX	5.5 HP, 9.5 lbs	Interp.	
		HD4060XX	6 HP, 9.5 lbs	Interp.	
		HD4065XX	6.5 HP, 9.5 lbs	Interp.	
HD4070XX		7 HP, 9.5 lbs	Interp.		
HD4075XX	7.5 HP, 9.5 lbs	Interp.			
HD4080XX	8 HP, 9.5 lbs	Interp.			



SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC	Table Description: Electrical	TABLE 12
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Component Type	Manufacturer	Model	Description	Notes	UUT
VFD	Nortek Air Solutions	HD4085XX	480V, XX denotes 10" or 25" pressure setting (firmware only)	8.5 HP, 9.5 lbs	Interp.
		HD4090XX		9 HP, 9.5 lbs	Interp.
		HD4095XX		9.5 HP, 9.5 lbs	Interp.
		HD4100XX		UUT: 10 HP, 9.5 lbs, 25" model	7
PLC Controls	Siemens	Circuit Breaker			1b
		Power Supply			1b
		Controller			1b
		Touch Screen	4" min to 19" maximum		1b
		Expansion Module			4
Communication Module			4		
Thermostat	Pfennenberg	ETR201	Thermostat, 120-240V	SKT011419N0	2 ¹ ,3a,4,7
Transducer/Display	Dwyer	MS2-W103-LCD-BC	XDCR, DP, Adjustable 0-10",15"	No Eaton equivalent	1b
Cool Fan (4" to 6")	Rittal	120 to 240V			4
	U.S. Toyo	120 to 240V			1 ¹ ,2 ¹ ,3a
Plasma BAR	Plasma Air	PB-018	1.1 lbs		8
		...			Interp.
		PB-096	6.0 lbs		8
		PB-CP	Control Panel, 4.0 lbs		8
UV Lights	UV Resources	RLM Xstream-33			4
		...			Interp.
		RLM Xstream-61			4

Additional Notes:
¹Subcomponent was tested in all UUT configurations as seen in the UUT Summaries.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1801166-CR-001-R6



Manufacturer: Nortek Air Solutions, LLC	Table Description: Electrical	TABLE 12
Model Line: Huntair Custom Air Handling Units		

Building Code: CBC 2019 **Seismic Certification Limits:** $S_{DS} = 2.0g$ $z/h = 1.0$ $I_p = 1.5$

Component Type	Manufacturer	Model	Description	Notes	UUT
UV Lights	UV Resources	DEF-220			4
		...			Interp.
		DEF-340			4
Pressure Gauge	Dwyer	Photohelic A3000 Series	Gage Photohelic 0-0.1wc, 4 lbs		8
		Magnehelic 2000 Series	Gage Magnahelic 0-1.0wc, 1 lbs		6a, 6b
		Magesense MS2 Series	Diff. Press. Transmitter 1-28wc, 0.5 lbs		4
HMI Screen	Niagara	Horyzon-C10	4.4 lbs		8
Expander	Niagara	IO-R-16	0.625 lbs		8
		IO-R-34	1.25 lbs		8
Controller	Niagara	JACE-8000	1.25 lbs		8
Air Flow Measurement System	Paragon Controls Incorporated	OAFE-1550			6 ¹
Contact Switch	Phoenix	FL SWITCH SFN 5TX-24VAC	1 lbs		8

Additional Notes:
¹Subcomponent was tested in all UUT configurations as seen in the UUT Summaries.

UNIT UNDER TEST (UUT) SUMMARY SHEET



1801166-CR-001-R6

Manufacturer:		Nortek Air Solutions, LLC				
Model Line:		Huntair Custom Air Handling Units				
UUT	Unit Description	Report Number	Testing Laboratory	S _{DS}	z/h	I _p
1a	Air Handling Cabinet: CSU-10K	HuntAir9293	Clark Testing	2.0	1.0	1.5
1b	Air Handling Cabinet: CSU-10K	HuntAir9293	Clark Testing	2.0	1.0	1.5
2a	Air Handling Cabinet: CSU-20K	HuntAir9293	Clark Testing	2.0	1.0	1.5
2b	Air Handling Cabinet: CSU-20K (Inlet Wall Removed w/ Cable Bracing)	HuntAir9293	Clark Testing	2.0	1.0	1.5
2c	Air Handling Cabinet: CSU-20K (Inlet & Outlet Wall Removed w/ Cable Bracing)	HuntAir9293	Clark Testing	2.0	1.0	1.5
2d	Air Handling Cabinet: CSU-20K (Inlet & Outlet Wall Removed w/o Cable Bracing)	HuntAir9293	Clark Testing	2.0	1.0	1.5
3a	Air Handling Cabinet: CSU-40K	HuntAir9293	Clark Testing	2.0	1.0	1.5
4	Air Handling Cabinet: CSU-20K	1700754-TR-001 R2	CERL	2.0	1.0	1.5
				2.5	0.0	
5	Air Handling Cabinet: CSU-15K (Side Wall Removed)	1700754-TR-001 R2	CERL	2.0	1.0	1.5
				2.5	0.0	
6a	Air Handling Cabinet: CSU-15K	1700754-TR-001 R2	CERL	2.0	1.0	1.5
				2.5	0.0	
6b	Air Handling Cabinet: CSU-15K (Filter Rack & Humidifier Removed w/ Cable Bracing)	1700754-TR-001 R2	CERL	2.0	1.0	1.5
				2.5	0.0	
7	FWT	13379 Rev.1	Environmental Testing Laboratory, Inc.	2.0	1.0	1.5
				3.2	0.0	
8	Air Handling Cabinet: CSU-20K	1801166-TR-001 R0	Pacific Earthquake Engineering Research Center (PEER)	2.0	1.0	1.5
				2.5	0.0	

Notes:

UNIT UNDER TEST (UUT) SUMMARY SHEET



1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC	UUT 1a
Model Line: Huntair Custom Air Handling Units	
Model Number: CSU-10K	
Serial Number: 2097-01	

Product Construction Summary:
Wall/Roof: Standard 2" Panels, 16 ga. galv. carbon steel exterior with 20 ga. galv. carbon steel liner; **Base:** Carbon steel channel base, 16 ga. galv. carbon steel skin with 20 ga. galv. carbon steel liner and 20 ga. carbon steel subfloor; **Door:** (2) 2" thick, 18.5(W) x 61.5(H) with thermal break window, 12.5(W) x 61.5(H) no window.

Options/Subcomponent Summary:
Heat Transfer Coil: Heat Transfer Coil (HT1): Huntair, 7 FPI, 1 row, aluminum, staggered mounting - qty. 2 (40"x8"x85.5"); Heat Transfer Coil (HT2): Huntair, 6 FPI, 12 rows, copper, stacked mounting - qty. 2 (83"x17.5"x40.5"); **Humidifier:** Mfg. Vapac (8"x24"x24"); **Electrical Control Panel:** NEMA1 (20"x56"x78"), ABB ACH550 150 HP VFD, Yaskawa E7 150 HP VFD; **Damper:** Huntair HD6 (8"x48"x30"); **Louver:** Huntair HL (6"x26"x60"); **Actuator:** Belimo AS-120-S; **Cool Fan:** U.S. Toyo 120V-240V; Disconnect Switch & Circuit Breaker; Fuse Holder & Fuse; Distribution Block; Contactor; MSP; Transformer; VFD

UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
7450	96.25	96	96	15.2	10.7	20.5

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 2019	ICC-ES AC156 (2015)	2.0	1.0	1.5	3.2	2.4	1.33	0.53	

Test Mounting Details:
 (4) walls in place with 2-heat transfer coils



All test units contain an integrated structural base frame. This unit was mounted directly to the seismic table using twelve (12) 1/2"-13 Grade 5 hex head bolts (3 bolts per side) with flat washers and lock washers
 Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
 Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET



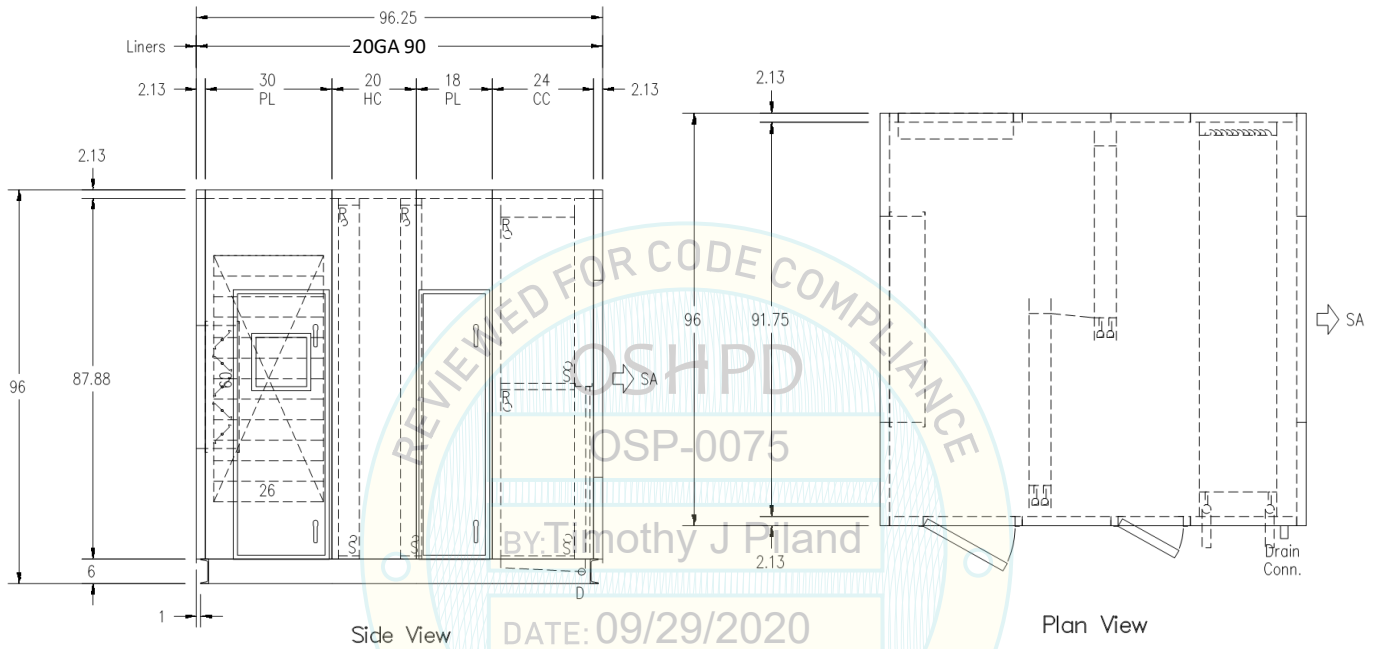
1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC
Model Line: Huntair Custom Air Handling Units
Model Number: CSU-10K

Serial Number: 2097-01

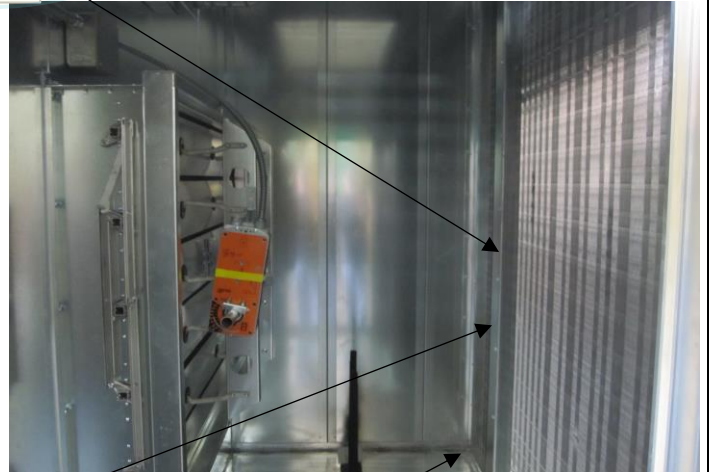
UUT 1a

Unit Drawings



Coil Support Details

(7) 0.188" Rivets at bottom of each coil, (6) 0.188 Rivets at top of each coil, (2) 2-16ga. C-channel stiffeners each side of coil (8-total), (3) #14x1" screws at 7-5/8" o.c. max spacing along each c-channel stiffener.



UNIT UNDER TEST (UUT) SUMMARY SHEET



1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC	UUT 1b
Model Line: Huntair Custom Air Handling Units	
Model Number: CSU-10K	
Serial Number: 2097-01	

Product Construction Summary:
Wall/Roof: Standard 2" Panels, 16 ga. galv. carbon steel exterior with 20 ga. galv. carbon steel liner; **Base:** Carbon steel channel base, 16 ga. galv. carbon steel skin with 20 ga. galv. carbon steel liner and 20 ga. carbon steel subfloor; **Door:** (2) 2" thick, 18.5(W) x 61.5(H) with thermal break window, 12.5(W) x 61.5(H) no window.

Options/Subcomponent Summary:
Filter Rack: Type 8, 4" pre-filter, 12" final filter (12"x92"x88"); **Humidifier:** Mfg. Vapac (8"x24"x24"); **Electrical Control Panel:** NEMA3R (12"x36"x48"), PLC, ABB ACH320 1,20 HP VFD's, Yaskawa V1000 1,10,20 HP VFD's; **Damper:** Huntair HD6 (8"x48"x30"); **Louver:** Huntair HL (6"x26"x60"); **Actuator:** Belimo AS-120-S; **Cool Fan:** U.S. Toyo 120V-240V; Disconnect Switch & Circuit Breaker; Fuse Holder & Fuse; Distribution Block; Power Supply; Transformer; Reactor; Transducer/Display; PLC Controls

UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
7450	96.25	96	96	15.2	10.7	20.5

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 2019	ICC-ES AC156 (2015)	2.0	1.0	1.5	3.2	2.4	1.33	0.53

Test Mounting Details:
 (4) walls in place, coils removed and replaced with filter rack



All test units contain an integrated structural base frame. This unit was mounted directly to the seismic table using twelve (12) 1/2"-13 Grade 5 hex head bolts (3 bolts per side) with flat washers and lock washers
 Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
 Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

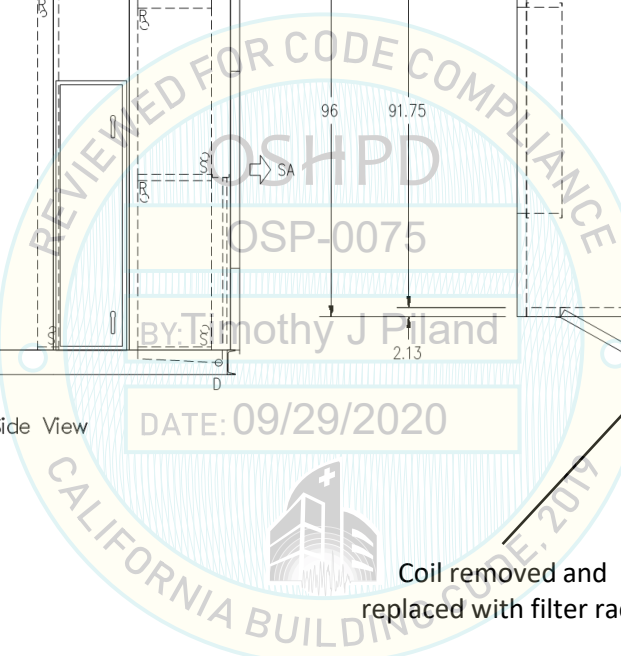
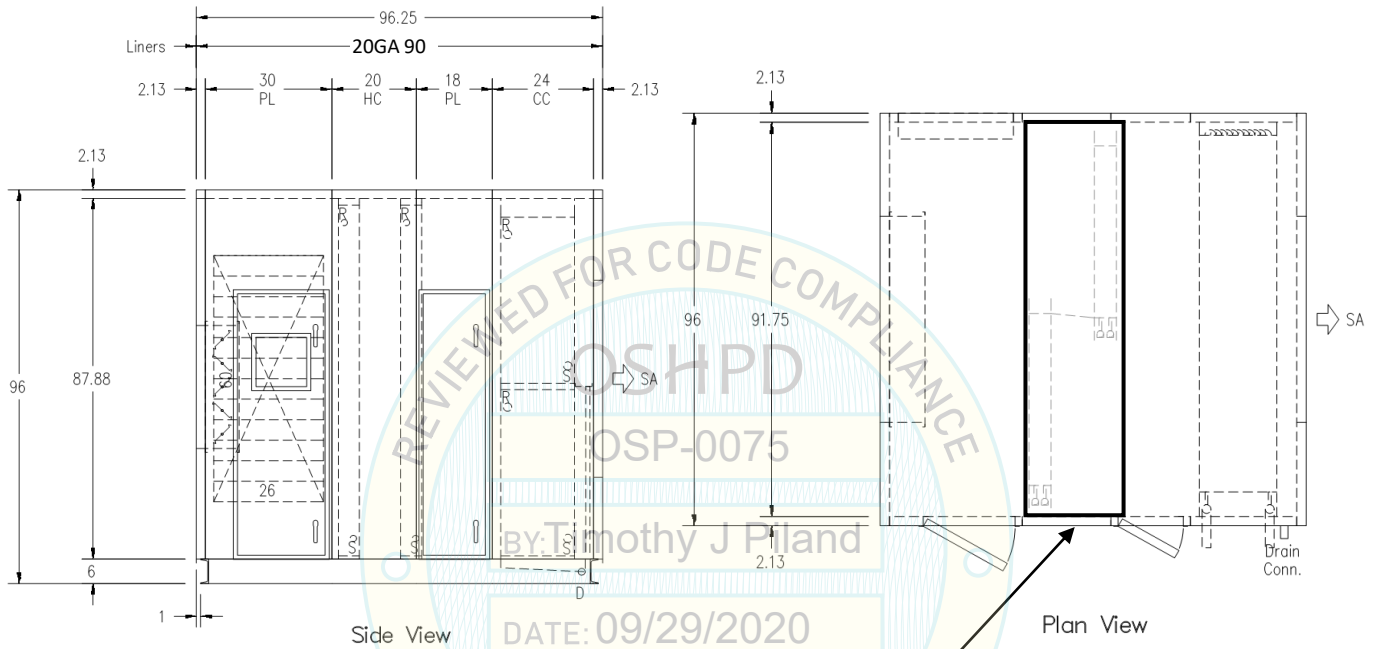


1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC
Model Line: Huntair Custom Air Handling Units
Model Number: CSU-10K **Serial Number:** 2097-01

UUT 1b

Unit Drawings



Coil removed and replaced with filter rack

UNIT UNDER TEST (UUT) SUMMARY SHEET



1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC	UUT 2a
Model Line: Huntair Custom Air Handling Units	
Model Number: CSU-20K	
Serial Number: 2097-02	

Product Construction Summary:
Wall/Roof: Standard 4" Panels, 16 ga. galv. carbon steel exterior with 20 ga. galv. carbon steel liner and 16 ga. galv. carbon steel blankoff with sloped roof; **Base:** Carbon steel channel base, 16 ga. galv. carbon steel skin with 20 ga. galv. carbon steel liner and 20 ga. carbon steel subfloor; **Door:** (2) 2" thick, 18.5(W) x 61.5(H) with thermal break window, 30.5(W) x 24.5(H) no window.

Options/Subcomponent Summary:
Fanwall: 3 fans, vertical upflow (2 up, 1 down), 10" and 22" wheels, welded cells, 1 HP and 15 HP Siemens motors (38.5"x131"x136"); **Heat Transfer Coil:** Heat Transfer Coil (HT3): Huntair, 14 FPI, 2 row, aluminum, stacked mounting - qty. 3 (127"x7"x40.5"); **Filter Rack:** HEPA filter and filter rack (12"x140"x140"); **Electrical Control Panel:** NEMA12 (16"x28"x42"); **VFD:** Danfoss VLT 100 HP, recessed panel construction; **Damper:** Ruskin CD50 (5"x60"x36"); **Louver:** Ruskin ELF (6"x40"x36"); **Actuator:** Belimo AS-120-S; **Cool Fan:** U.S. Toyo 120V-240V; HEPA Filter; Disconnect Switch & Circuit Breaker; MSP; Transformer

UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
9050	108	144	144.25	4.0	6.6	20.6

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 2019	ICC-ES AC156 (2015)	2.0	1.0	1.5	3.2	2.4	1.33	0.53

Test Mounting Details:
 (4) walls in place



All test units contain an integrated structural base frame. This unit was mounted directly to the table using fourteen (14) 1/2" - 13 grade 5 hex head bolts (7 bolts on both exterior sides) with flat washer and lock washers. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

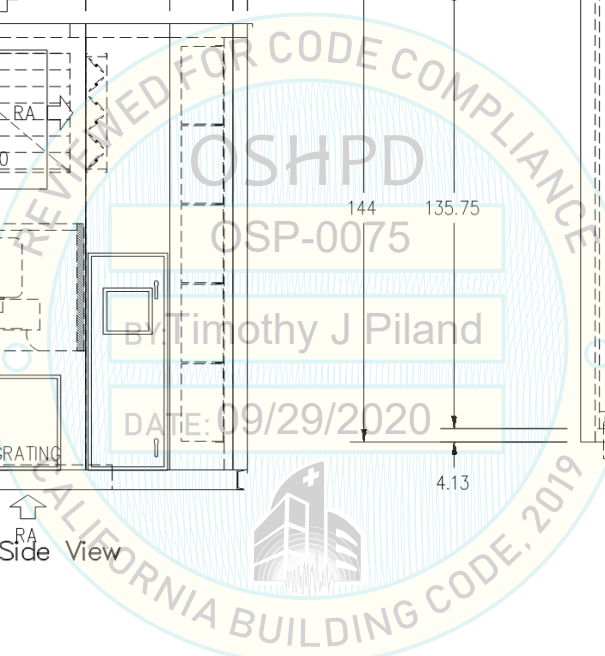
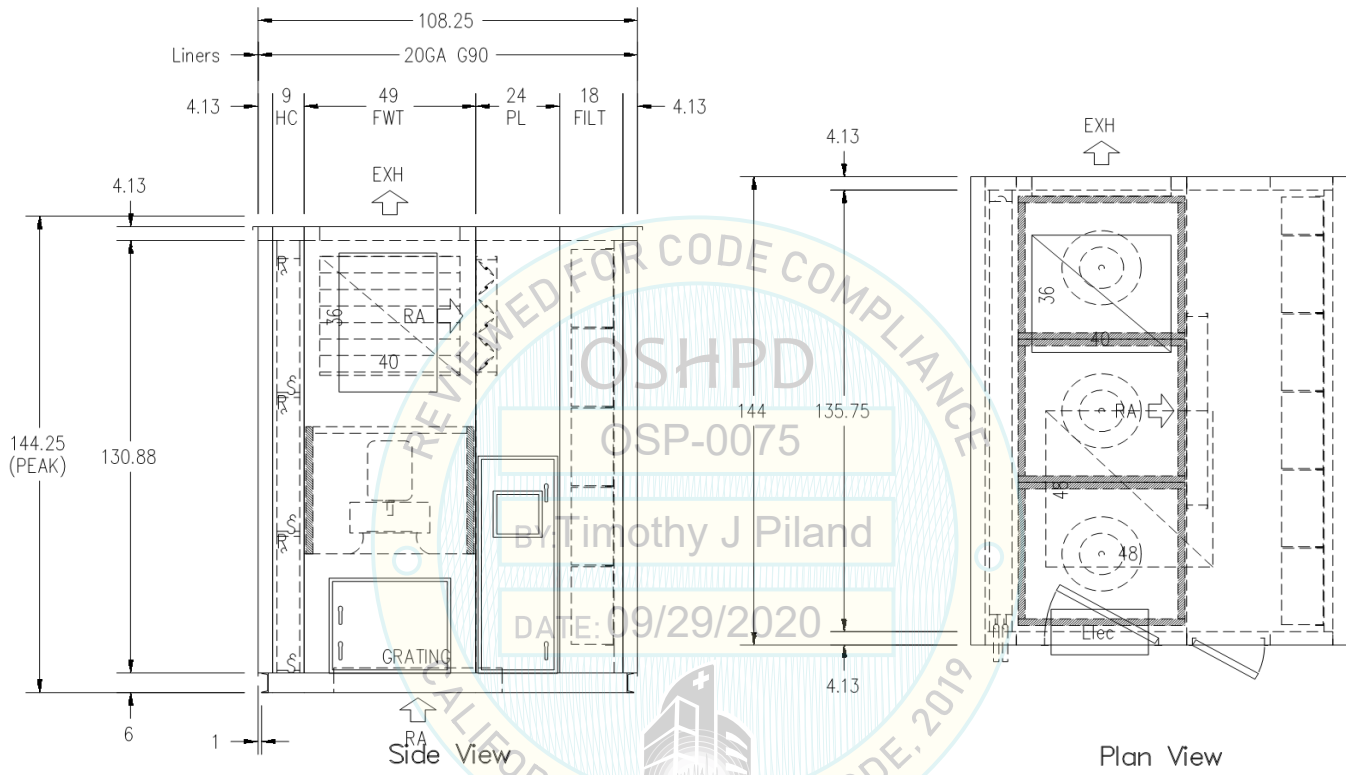
UNIT UNDER TEST (UUT) SUMMARY SHEET



1801166-CR-001-R6

Manufacturer:	Nortek Air Solutions, LLC	UUT 2a
Model Line:	Huntair Custom Air Handling Units	
Model Number:	CSU-20K	
		Serial Number: 2097-02

Unit Drawings



UNIT UNDER TEST (UUT) SUMMARY SHEET



1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC	UUT 2b
Model Line: Huntair Custom Air Handling Units	
Model Number: CSU-20K	
Serial Number: 2097-02	

Product Construction Summary:
Wall/Roof: Standard 4" Panels, 16 ga. galv. carbon steel exterior with 20 ga. galv. carbon steel liner and 16 ga. galv. carbon steel blankoff with sloped roof; **Base:** Carbon steel channel base, 16 ga. galv. carbon steel skin with 20 ga. galv. carbon steel liner and 20 ga. carbon steel subfloor; **Door:** (2) 2" thick, 18.5(W) x 61.5(H) with thermal break window, 30.5(W) x 24.5(H) no window; **Cable Bracing:** 3/8" galvanized steel cables with 1/4" A36 brackets.

Options/Subcomponent Summary:
Fanwall: 3 fans, vertical upflow (2 up, 1 down), 10" and 22" wheels, welded cells, 1 HP and 15 HP Siemens motors (38.5"x131"x136"); **Heat Transfer Coil:** Heat Transfer Coil (HT3): Huntair, 14 FPI, 2 row, aluminum, stacked mounting - qty. 3 (127"x7"x40.5"); **Filter Rack:** HEPA filter and filter rack (12"x140"x140"); **MSP Enclosure:** NEMA4X (10"x16"x16"); **VFD:** Danfoss VLT 100 HP, recessed panel construction; **Damper:** Ruskin CD50 (5"x60"x36"); **Louver:** Ruskin ELF (6"x40"x36"); **Actuator:** Belimo AS-120-S; **Cool Fan:** U.S. Toyo 120V-240V; HEPA Filter; Terminal Block

UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
9050	108	144	144.25	4.0	6.6	20.6

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 2019	ICC-ES AC156 (2015)	2.0	1.0	1.5	3.2	2.4	1.33	0.53	

Test Mounting Details:
 Inlet wall removed; cable bracing at coil



All test units contain an integrated structural base frame. This unit was mounted directly to the table using fourteen (14) 1/2" - 13 grade 5 hex head bolts (7 bolts on both exterior sides) with flat washer and lock washers. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

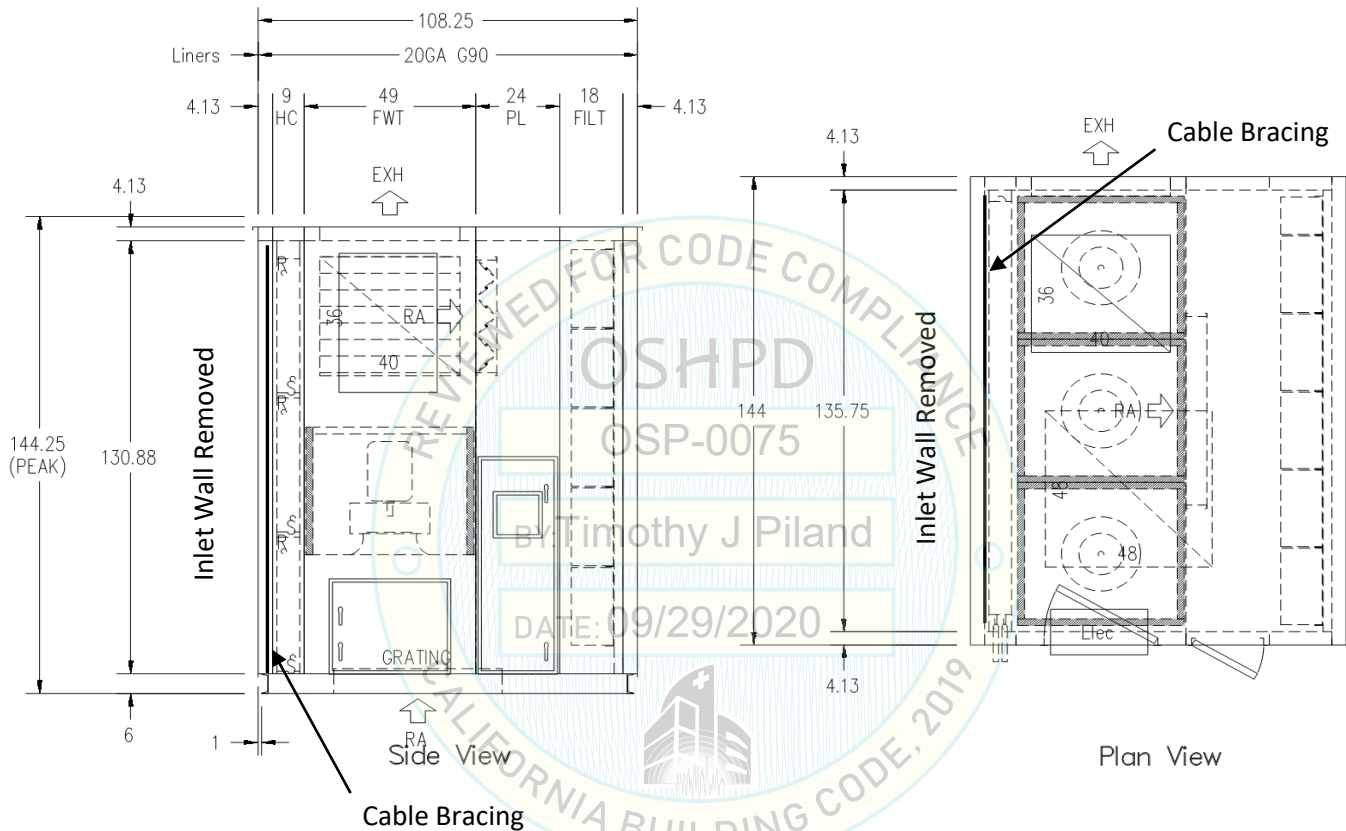


1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC
Model Line: Huntair Custom Air Handling Units
Model Number: CSU-20K
Serial Number: 2097-02

UUT 2b

Unit Drawings



UNIT UNDER TEST (UUT) SUMMARY SHEET



1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC	UUT 2c
Model Line: Huntair Custom Air Handling Units	
Model Number: CSU-20K	
Serial Number: 2097-02	

Product Construction Summary:
Wall/Roof: Standard 4" Panels, 16 ga. galv. carbon steel exterior with 20 ga. galv. carbon steel liner and 16 ga. galv. carbon steel blankoff with sloped roof; **Base:** Carbon steel channel base, 16 ga. galv. carbon steel skin with 20 ga. galv. carbon steel liner and 20 ga. carbon steel subfloor; **Door:** (2) 2" thick, 18.5(W) x 61.5(H) with thermal break window, 30.5(W) x 24.5(H) no window; **Cable Bracing:** 3/8" galvanized steel cables with 1/4" A36 brackets.

Options/Subcomponent Summary:
Fanwall: 3 fans, vertical upflow (2 up, 1 down), 10" and 22" wheels, welded cells, 1 HP and 15 HP Siemens motors (38.5"x131"x136"); **Heat Transfer Coil:** Heat Transfer Coil (HT3): Huntair, 14 FPI, 2 row, aluminum, stacked mounting - qty. 3 (127"x7"x40.5"); **Filter Rack:** HEPA filter and filter rack (12"x140"x140"); **VFD:** Danfoss VLT 100 HP, recessed panel construction; **Damper:** Ruskin CD50 (5"x60"x36"); **Louver:** Ruskin ELF (6"x40"x36"); **Actuator:** Belimo AS-120-S; **Cool Fan:** U.S. Toyo 120V-240V; HEPA Filter

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
9050	108	144	144.25	4.0	6.6	20.6

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 2019	ICC-ES AC156 (2015)	2.0	1.0	1.5	3.2	2.4	1.33	0.53

Test Mounting Details:
 Inlet and outlet walls removed; cable bracing at coil



All test units contain an integrated structural base frame. This unit was mounted directly to the table using fourteen (14) 1/2" - 13 grade 5 hex head bolts (7 bolts on both exterior sides) with flat washer and lock washers. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

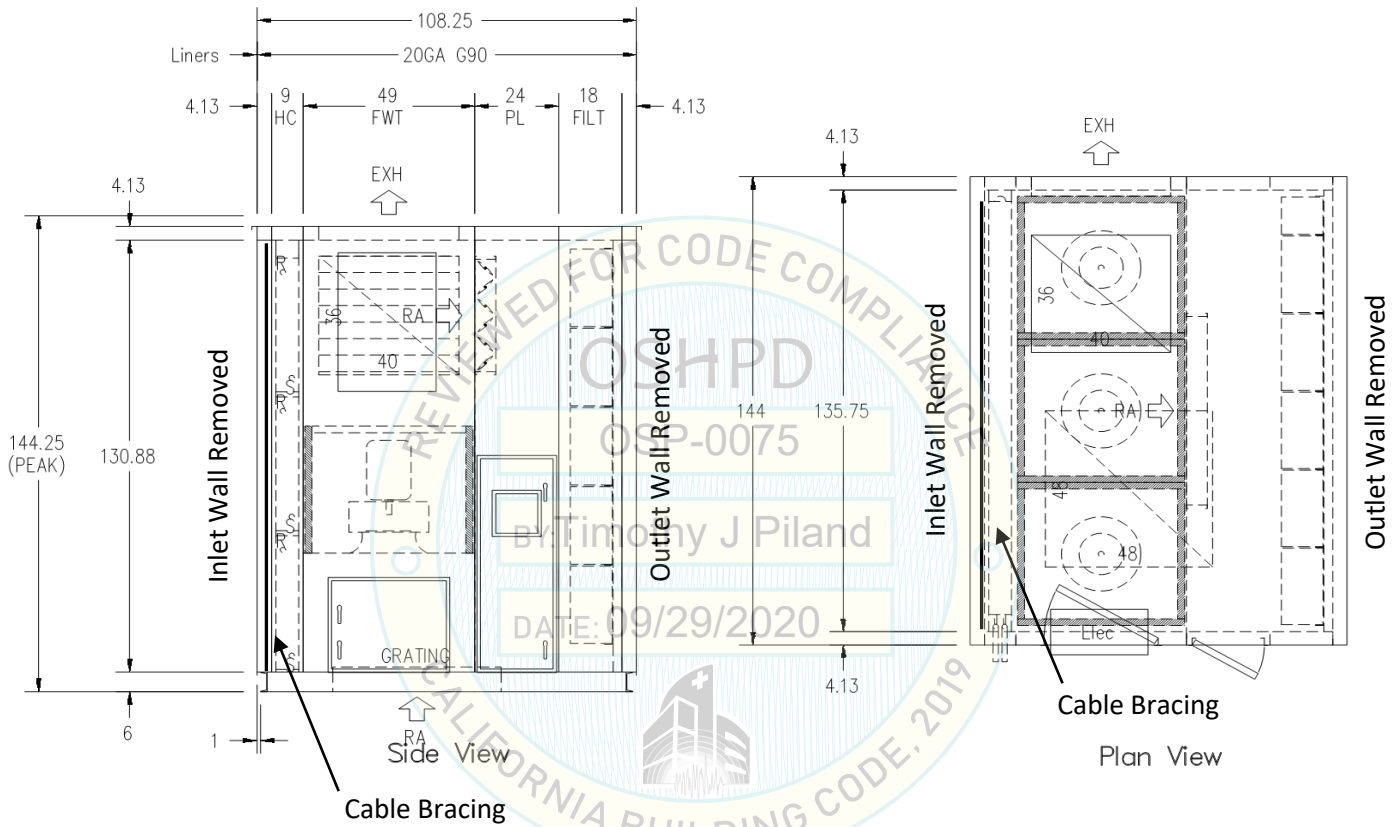


1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC
Model Line: Huntair Custom Air Handling Units
Model Number: CSU-20K
Serial Number: 2097-02

UUT 2c

Unit Drawings



UNIT UNDER TEST (UUT) SUMMARY SHEET



1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC	UUT 2d
Model Line: Huntair Custom Air Handling Units	
Model Number: CSU-20K	
Serial Number: 2097-02	

Product Construction Summary:
Wall/Roof: Standard 4" Panels, 16 ga. galv. carbon steel exterior with 20 ga. galv. carbon steel liner and 16 ga. galv. carbon steel blankoff with sloped roof; **Base:** Carbon steel channel base, 16 ga. galv. carbon steel skin with 20 ga. galv. carbon steel liner and 20 ga. carbon steel subfloor; **Door:** (2) 2" thick, 18.5(W) x 61.5(H) with thermal break window, 30.5(W) x 24.5(H) no window.

Options/Subcomponent Summary:
Fanwall: 3 fans, vertical upflow (2 up, 1 down), 10" and 22" wheels, welded cells, 1 HP and 15 HP Siemens motors (38.5"x131"x136"); **Heat Transfer Coil:** Heat Transfer Coil (HT3): Huntair, 14 FPI, 2 row, aluminum, stacked mounting - qty. 3 (127"x7"x40.5"); **Filter Rack:** HEPA filter and filter rack (12"x140"x140"); **VFD:** Danfoss VLT 100 HP, recessed panel construction; **Damper:** Ruskin CD50 (5"x60"x36"); **Louver:** Ruskin ELF (6"x40"x36"); **Actuator:** Belimo AS-120-S; **Cool Fan:** U.S. Toyo 120V-240V; HEPA Filter

UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
9050	108	144	144.25	4.0	6.6	20.6

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 2019	ICC-ES AC156 (2015)	2.0	1.0	1.5	3.2	2.4	1.33	0.53

Test Mounting Details:
 Inlet and outlet walls removed; no cable bracing



All test units contain an integrated structural base frame. This unit was mounted directly to the table using fourteen (14) 1/2" - 13 grade 5 hex head bolts (7 bolts on both exterior sides) with flat washer and lock washers. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

NORTEK
AIR SOLUTIONS

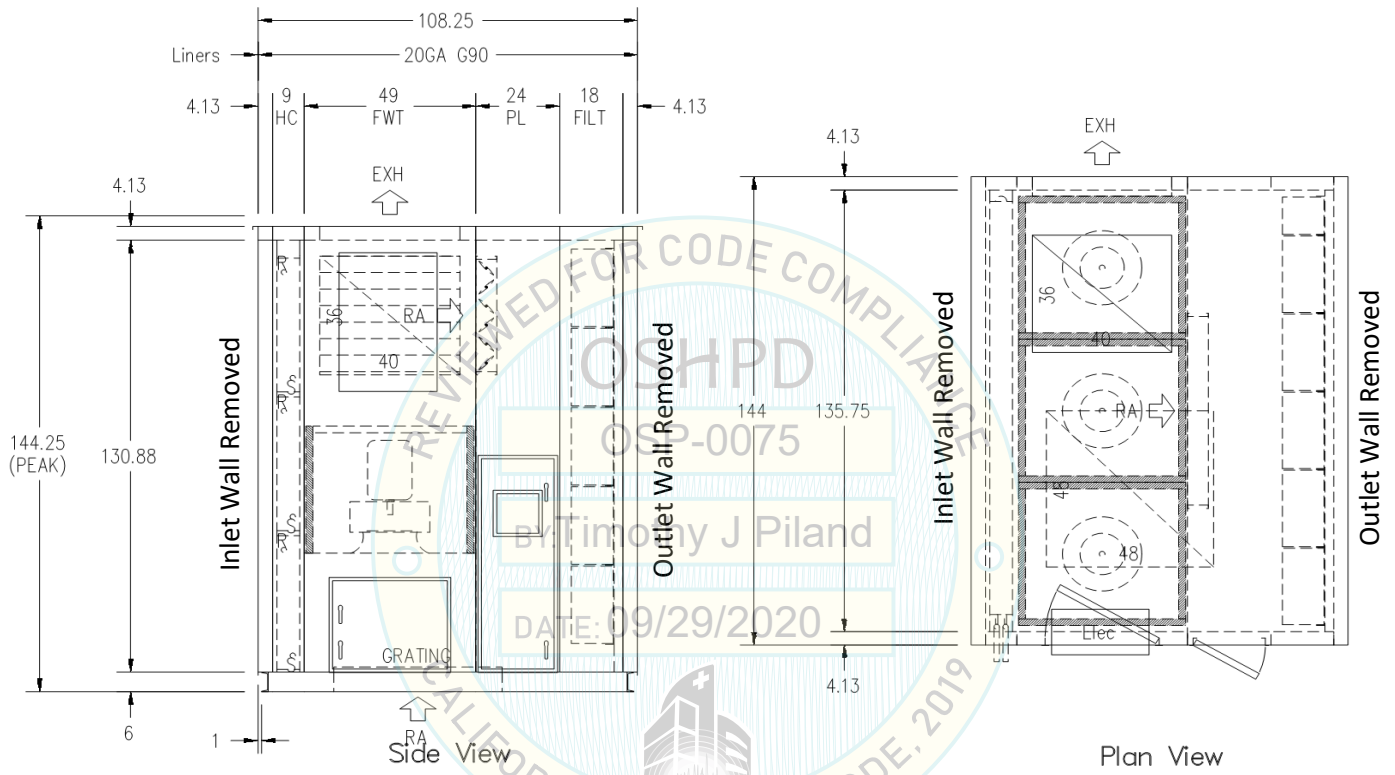


1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC
Model Line: Huntair Custom Air Handling Units
Model Number: CSU-20K
Serial Number: 2097-02

UUT 2d

Unit Drawings



UNIT UNDER TEST (UUT) SUMMARY SHEET



1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC	UUT 3a
Model Line: Huntair Custom Air Handling Units	
Model Number: CSU-40K	
Serial Number: 2097-03	

Product Construction Summary:
Wall/Roof: Standard 4" Panels, 0.080" aluminum exterior with 0.063" solid aluminum liner, 0.080" solid aluminum blankoff;
Base: 6" Aluminum structural tubing, 0.125" aluminum floor liner with 0.063" aluminum base liner; **Door:** 2" thick, 12.5(W) x 61.5(H) no window.

Options/Subcomponent Summary:
Fanwall: 29 fans, 10" and 22" carbon steel wheels, horizontal standard 5 cell(W) x 7 cell(H), welded/riveted cells, back draft dampers, 1 HP and 20 HP Siemens motors (34"x212"x131"); **Filter Rack:** 4" pre-filter, 12" final filter, type 8 (12"x236"x140");
Enclosure: NEMA3R (6"x24"x24") Terminal blocks; **Damper:** Ruskin CD50 (8"x100"x120"), Huntair HD6 (8"x100"x120");
Actuator: Belimo AF24-MFT, Seimens GCA131.1P, Seimens GCA226.1U; **Cool Fan:** U.S. Toyo 120V-240V; HEPA Filter; Disconnect Switch & Circuit Breaker; MSP

UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
11600	96	240	144	4.7	3.9	14.1

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 2019	ICC-ES AC156 (2015)	2.0	1.0	1.5	3.2	2.4	1.33	0.53

Test Mounting Details:
 (4) walls in place



All test units contain an integrated structural base frame. This unit was mounted directly to the seismic table using sixteen (16) 1/2" - 13 grade 5 hex head bolts (8 bolts per both exterior sides) with flat washers and lock washers. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET



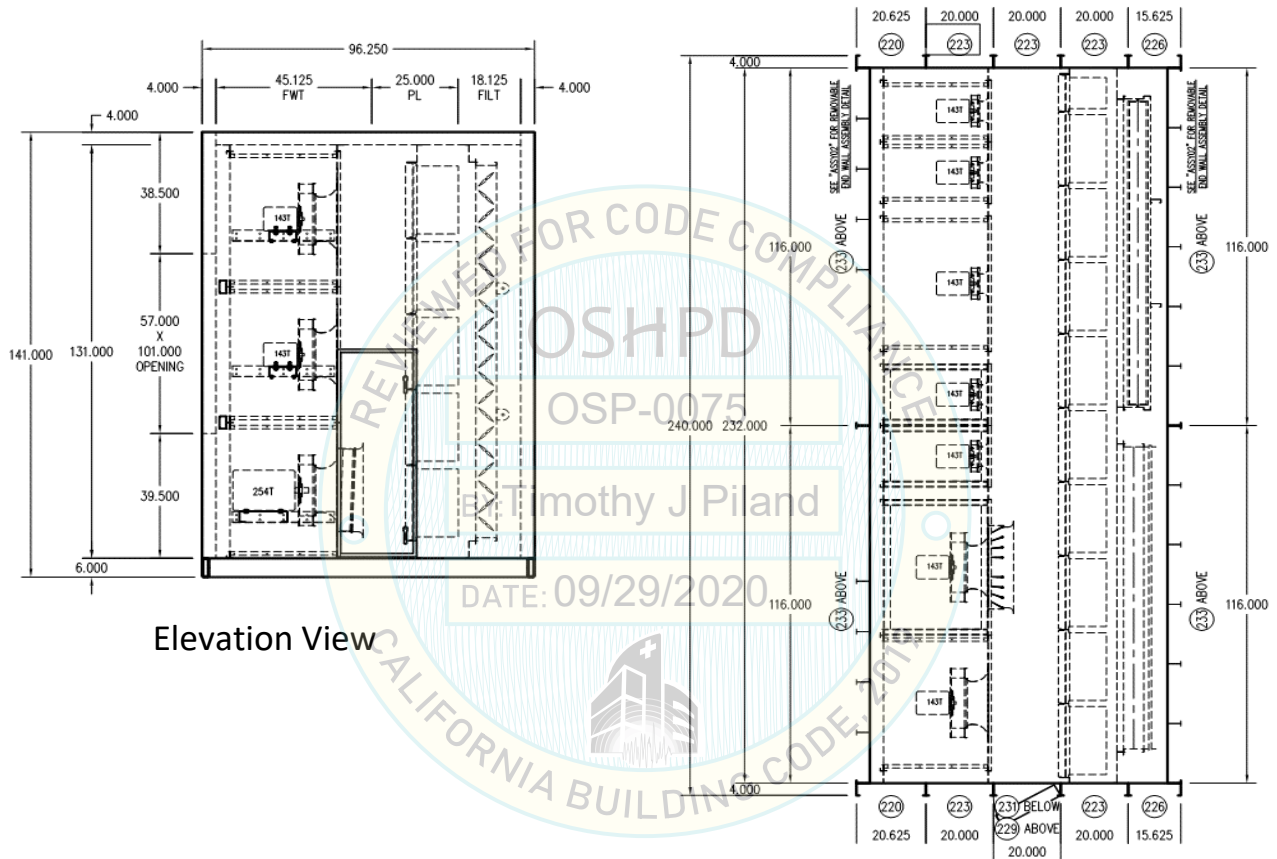
1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC
Model Line: Huntair Custom Air Handling Units
Model Number: CSU-40K

Serial Number: 2097-03

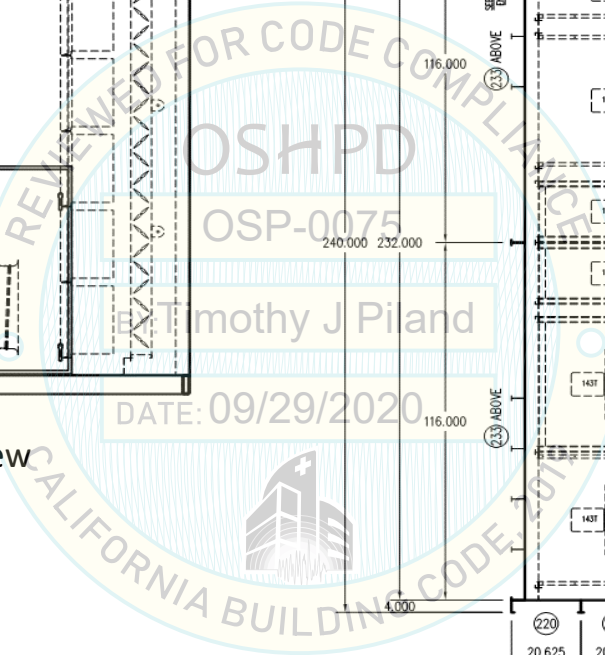
UUT 3a

Unit Drawings



Elevation View

Plan View



UNIT UNDER TEST (UUT) SUMMARY SHEET



1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC	UUT 4
Model Line: Huntair Custom Air Handling Units	
Model Number: CSU-20K STM/DX	
Serial Number: 0120-01	

Product Construction Summary:
Wall: 4" Panels 4 Variations - (A) 16 ga. stainless steel wall with 0.040" aluminum perforated liner, (B) 16 ga. galv carbon steel wall with 20 ga. galv. carbon steel solid liner, (C) 16 ga. stainless steel wall with 20 ga. stainless steel solid liner, (D) 16 ga. galv. carbon steel wall with 22 ga. stainless steel perforated liner, **Roof:** inner - 16 ga. stainless steel, outer - 16 ga. galv. carbon steel, sloped roof. **Base:** 12" tall stainless structural tubing, 12 ga. galv. carbon steel skin with 16 ga. galv. carbon steel liner and 16 ga. carbon steel subfloor.

Options/Subcomponent Summary:
Louver: AML6 Louver (6"x36"x60"), AML3 Louver (3"x100"x120"), **Damper:** SD50 Smoke Damper (5"x33"x57"), SD50 Smoke Damper (5"x96"x120"), AMS050 Damper (15"x48"x96"), AMS050 Damper (15"x24"x36"), **Fan Motor:** 22" P200 ECMI 6kW, 12" P200 ECMI 3.4kW, 22" P200 Toshiba 15hp motor, **UV Lights:** UVR UV Lights, **Coils:** Huntair DX Coil (8.5"x 150"x45"), Huntair DX Coil (8.5"x56"x45"), Luvata DX Coil (8.5"x 150"x45"), Luvata DX Coil (8.5"x56"x45"), **Fanwall:** 2(w) x 4(h) Gen II 22" Fan Wall, 2(w) x 4(h) Gen II 12" Fan Wall, 2(w) x 4(h) Gen II 22" Fan Wall, Fan wheels constructed of aluminum and polymer; **Electrical Cabinet:** Nema 1 (16"x56"x90"), Nema 1 (10"x28"x40") **VFD:** Danfoss 1hp and 15hp FC101 VFD; **Actuator:** Belimo AF120, Honeywell MS4120F; **Cool Fan:** Rittal 120V-240V; **Power Supply ; Reactor ; Terminal Block ; VFD ; PLC Controls ; Pressure Gauge:** Dwyer Magnesense MS2 Series

UUT Properties

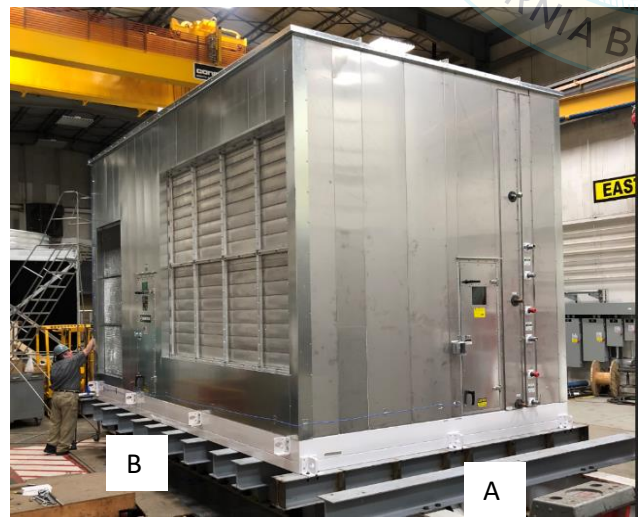
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
24400	138	244	160	7.3	6.0	13.1

UUT Highest Passed Seismic Run Information

CBC 2019, IBC 2018	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 2019	ICC-ES AC156 (2015)	2.0	1.0	1.5	3.2	2.4	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:

(4) walls in place



All test units contain an integrated structural base frame. This unit was mounted to a I beam fixture using twelve (12) 5/8" SAE grade 8 hex head bolts with flat washers and lock washers. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

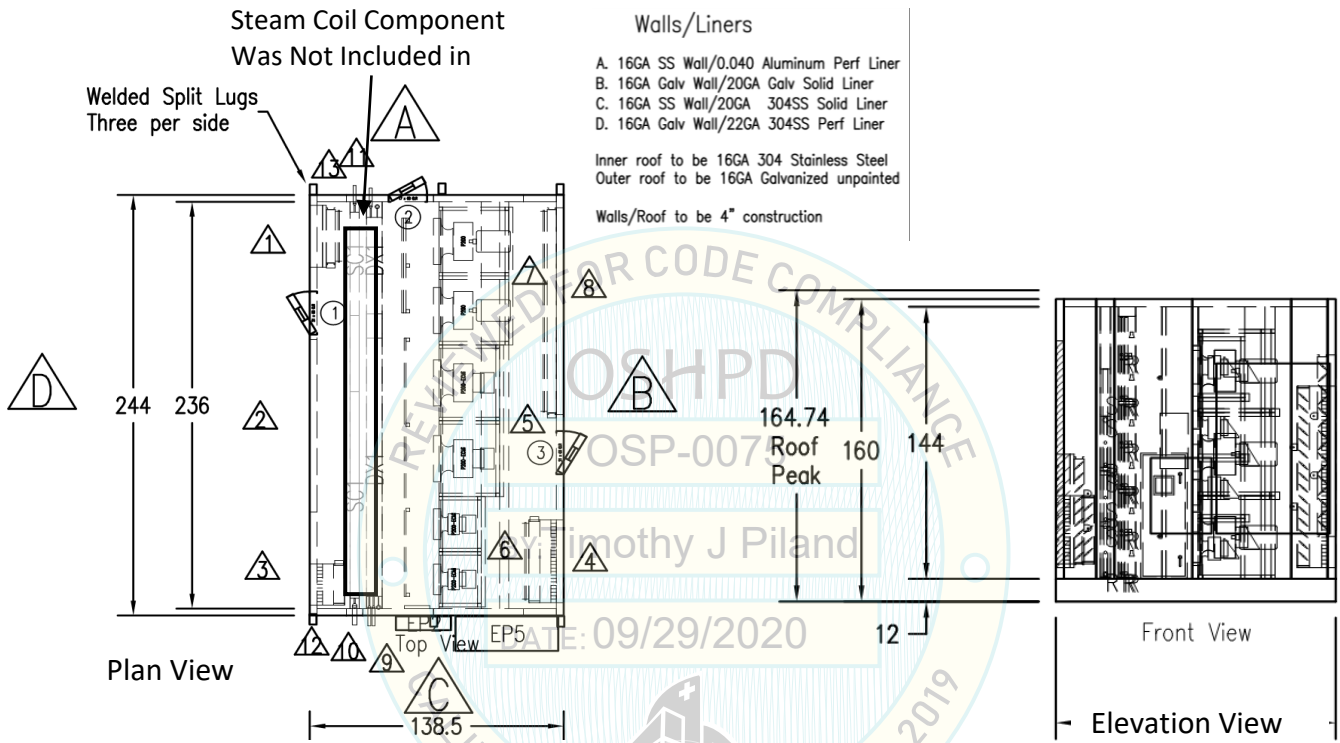


1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC
Model Line: Huntair Custom Air Handling Units
Model Number: CSU-20K STM/DX
Serial Number: 0120-01

UUT 4

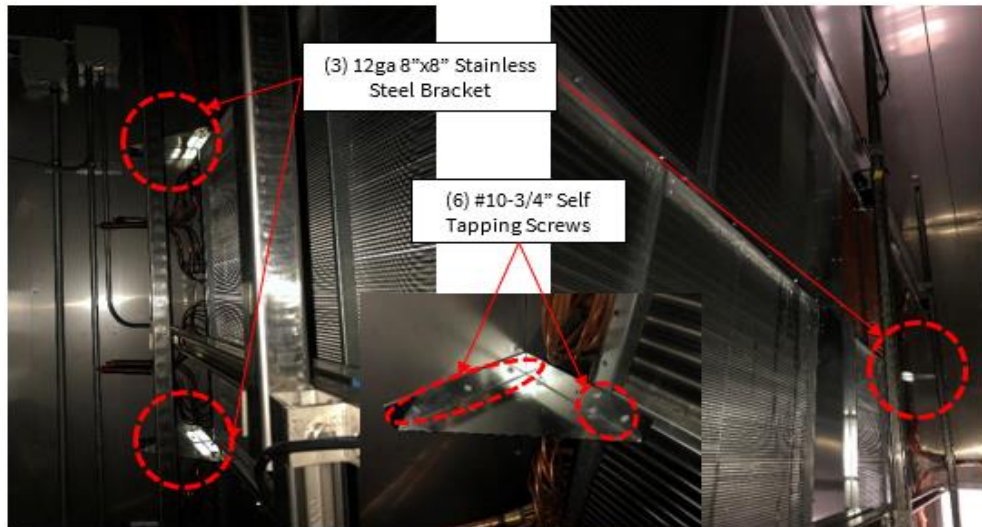
Unit Drawings



Note: Steam coil is not certified.

Seismic Upgrades Implemented:

The seismic upgrade for UUT4 consisted of mounting (3) 12 ga. 8"x8" stainless steel brackets to the wall and coil rack using (6) #10-3/4" self tapping screws. (2) were mounted to the rear of the unit, and (1) mounted to the front of the unit above the door.



UNIT UNDER TEST (UUT) SUMMARY SHEET



1801166-CR-001-R6

Manufacturer:	Nortek Air Solutions, LLC	UUT 5
Model Line:	Huntair Custom Air Handling Units	
Model Number:	CSU-15K	
	Serial Number:	0120-02

Product Construction Summary:

Wall/Roof: Standard 4" Panels, 16 ga. galv. carbon steel exterior with 20 ga. galv carbon liner; **Base:** carbon steel structural tubing, 16 ga. stainless steel base skin with 20 ga. galv. carbon steel liner and 20 ga. carbon steel subfloor; **Door:** (2) 4" thick, 21"(W) x 64"(H) no window, 2" thick, 20"(W) x 134.5"(H); **Cable Bracing:** 3/8" stainless steel cable with 12 GA stainless steel gusset.

Options/Subcomponent Summary:

Sound Trap: 24"x50"x136", 72"x86"x136"; **Filter Frame:** Type 8; **Pre Filter:** PerfectPleat Ultra AAF; **Final Filter:** VariCel DH & SH AAF; **Humidifier Grid:** DriSteem Ultra Sorb LV (120"x120")

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
8,150	139	134	146	6.4	7.7	22.1

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 2019	ICC-ES AC156 (2015)	2.0	1.0	1.5	3.2	2.4	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:

(3) walls with inlet/outlet wall removed, open wall braced with cable



All test units contain an integrated structural base frame. This unit was mounted to a I beam fixture using six (6) 5/8" SAE grade 8 hex head bolts with flat washers and lock washers. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

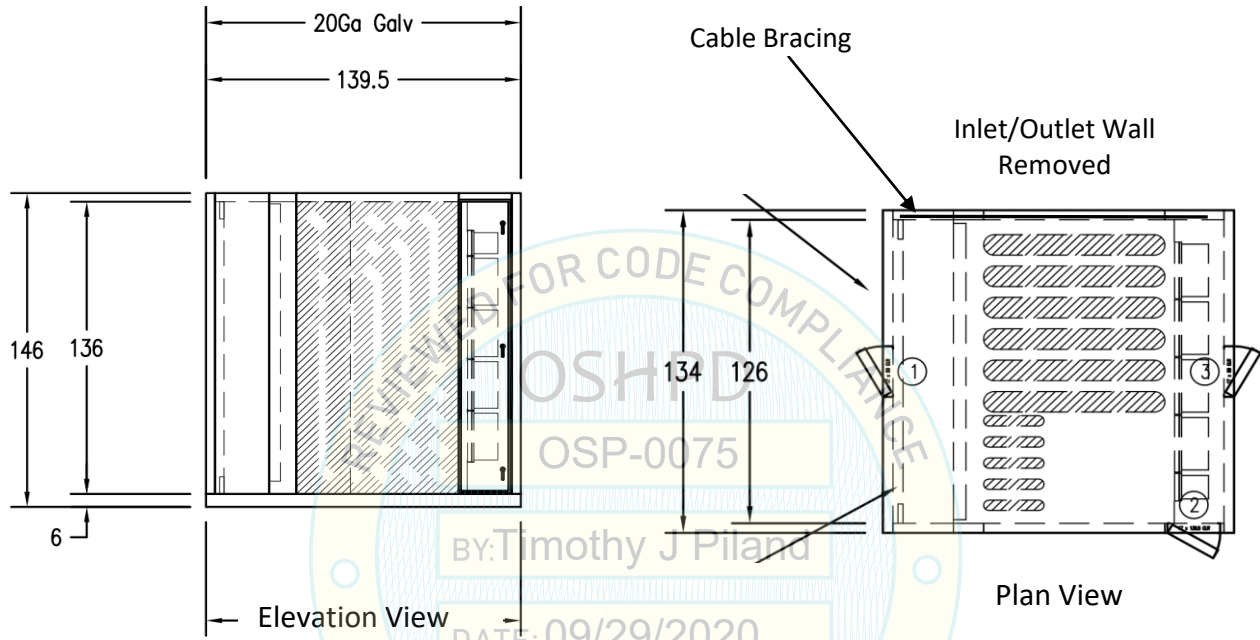


1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC
Model Line: Huntair Custom Air Handling Units
Model Number: CSU-15K
Serial Number: 0120-02

UUT 5

Unit Drawings



BY: Timothy J Piland
DATE: 09/29/2020

UNIT UNDER TEST (UUT) SUMMARY SHEET



1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC
Model Line: Huntair Custom Air Handling Units
Model Number: CSU-15K
Serial Number: 0120-02

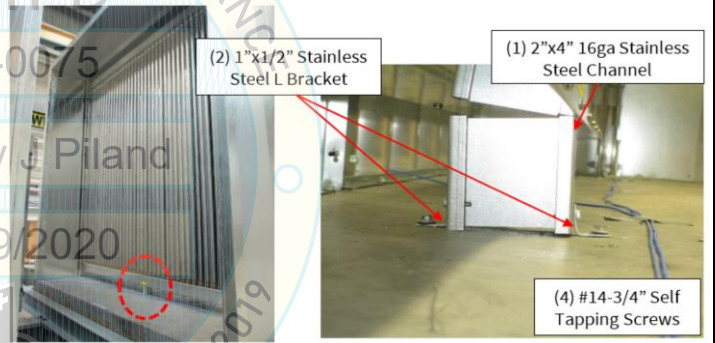
UUT 5

Seismic Upgrades Implemented:

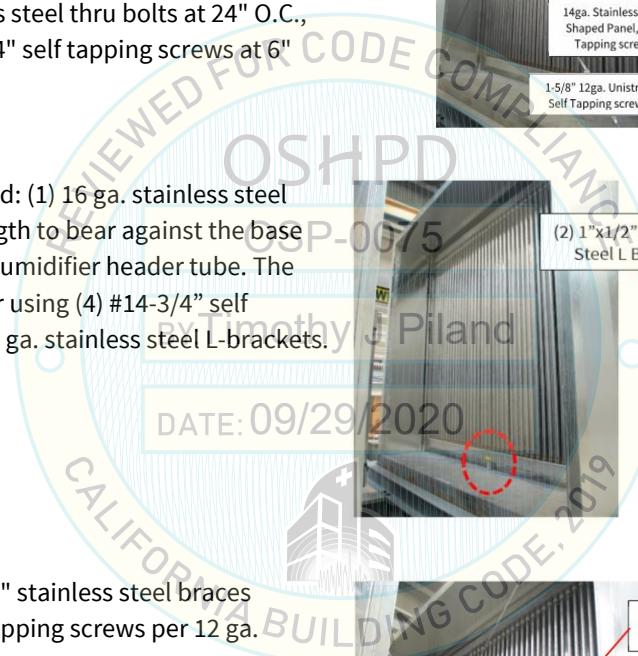
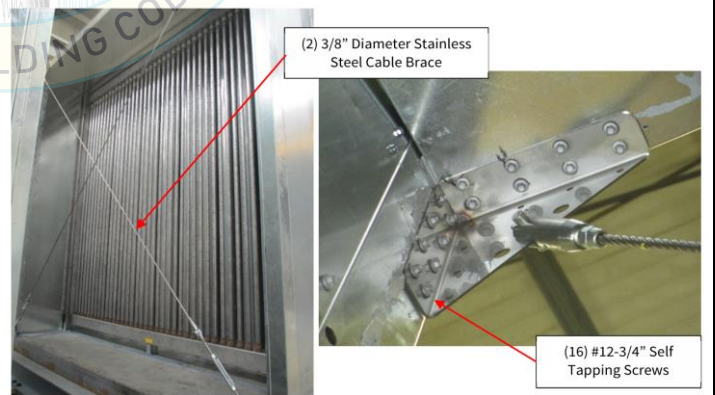
Attachment of the the humidifier grid: 1-5/8" 12ga unistrut member was attached to the ceiling with #12-3/4" self tapping screws at 8" O.C. The unistrut member was attached to the vertical humidifier supports via 3/8"f stainless steel thru bolts. (2) 3"x3" L-shaped blankoffs were added to the vertical unistrut supports and wall panels. Blankoffs were attached to the vertical unistrut via 3/8"f stainless steel thru bolts at 24" O.C., and to the wall panel with #12-3/4" self tapping screws at 6" O.C.



Bearing Support of Humidifier Grid: (1) 16 ga. stainless steel 2"x4" channel that was cut to length to bear against the base structure and the bottom of the humidifier header tube. The channel was mounted to the floor using (4) #14-3/4" self tapping screws and (2) 1"x1/2" 12 ga. stainless steel L-brackets.



Additional Lateral Bracing: (2) 3/8" stainless steel braces fastened with (16) #12-3/4" self tapping screws per 12 ga. stainless steel mounting bracket.



UNIT UNDER TEST (UUT) SUMMARY SHEET



1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC	UUT 6a
Model Line: Huntair Custom Air Handling Units	
Model Number: CSU-15K	
Serial Number: 0120-03	

Product Construction Summary:
Wall/Roof: Standard 2" Panels, 16 ga. galv. carbon steel exterior with 20 ga. galv. carbon steel liner; **Base:** carbon steel structural tubing, 16 ga. galv. carbon steel base skin with 20 ga. galv. carbon steel liner and 20 ga. carbon steel subfloor; **Door:** (2) 2" thick, 21"(W) x 64"(H) no window, **Weatherhood:** 62"(W) x 32"(H) x 26"(D) 16 ga. galv. carbon steel construction

Options/Subcomponent Summary:
Filter Frame: Type 8 (60.25"x132"), **Pre filter ; Pressure Gage:** Dwyer Magnehelic 2000 Series; **Damper:** Tamco 1000 (4"x36"x120"), Tamco 1000 Damper (4"x60"x30"); **Humidifier Grid:** DriSteem LV Ultra-Sorb (40"x40"); **Air Flow Measurement System:** Paragon Controls Incorporated OAFE-1550; **Actuator:** Belimo AMB24

UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
2350	144	76	152	11.0	6.4	28.7

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 2019	ICC-ES AC156 (2015)	2.0	1.0	1.5	3.2	2.4	1.67	0.67	
		2.5	0.0	1.5					

Test Mounting Details:
 (4) Walls in place, no internal bracing



All test units contain an integrated structural base frame. This unit was mounted to a I beam fixture using six (6) 5/8" SAE grade 8 hex head bolts with flat washers and lock washers. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

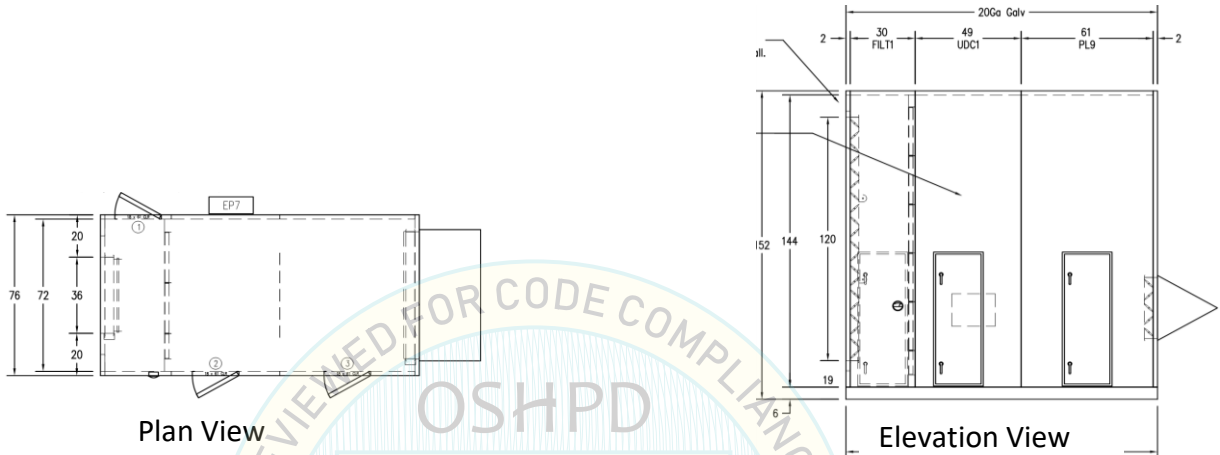


1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC
Model Line: Huntair Custom Air Handling Units
Model Number: CSU-15K
Serial Number: 0120-03

UUT 6a

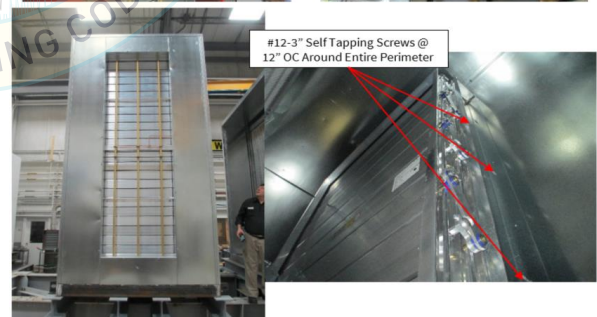
Unit Drawings



Modifications Made Due to Damage During Shipping:
 UUT 6 was damaged during shipping. It was discovered that during the fabrication of this unit, the fasteners did not extend into the cabinet panel structure.

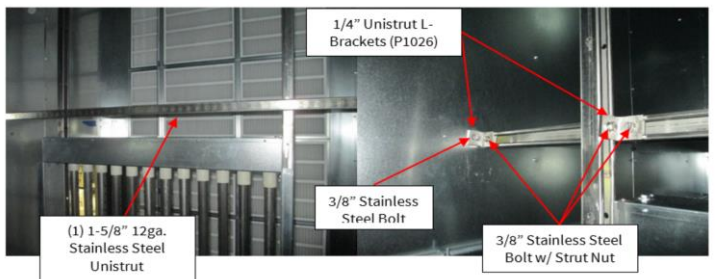


Implemented repair: #12-3" self tapping screws @ 12" OC were fastened from the outside of the unit, attaching the flange of the structural channel along the entire perimeter of the OAFE-1550 casing. The original fasteners were then removed. Modification is already a part of the fabrication process.



Seismic Upgrades Implemented:

The seismic upgrade for UUT6A consisted of mounting a 1-5/8" stainless steel 12 ga. Unistrut (P1000) cut to the width of the unit and mounted to the wall and vertical Unistrut support of the humidifier. The wall and Unistrut interface connection consisted of a 3/8" stainless steel bolt and 1/4" stainless steel Unistrut L-bracket (P1026), while the Unistrut to Unistrut connection consisted of a 3/8" stainless steel bolt, strut nut, and 1/4" Unistrut L-bracket (P1026).



UNIT UNDER TEST (UUT) SUMMARY SHEET



1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC	UUT 6b
Model Line: Huntair Custom Air Handling Units	
Model Number: CSU-15K	
Serial Number: 0120-03	

Product Construction Summary:
Wall/Roof: Standard 2" Panels, 16 ga. galv. carbon steel exterior with 20 ga. galv. carbon steel liner; **Base:** carbon steel structural tubing, 16 ga. galv. carbon steel base skin with 20 ga. galv. carbon steel liner and 20 ga. carbon steel subfloor; **Door:** (2) 2" thick, 21"(W) x 64"(H) no window; **Weatherhood:** 62"(W) x 32"(H) x 26"(D) 16 ga. galv. carbon steel construction; **Cable Bracing:** Center of unit braced with 1/4" galvanized steel cables attached with 12 GA stainless steel brackets. Brackets welded with 1/8" fillet weld.

Options/Subcomponent Summary:
Pressure Gage: Dwyer Magnehelic 2000 Series; **Damper:** Tamco 1000 (4"x36"x120"), Tamco 1000 (4"x60"x30"); **Air Flow Measurement System:** Paragon Controls Incorporated OAFE-1550; **Actuator:** Belimo AMB24

UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1880	144	76	152	11.4	5.5	30.3

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 2019	ICC-ES AC156 (2015)	2.0	1.0	1.5	3.2	2.4	1.67	0.67	
		2.5	0.0	1.5					

Test Mounting Details:
 Humidifier removed, filter wall removed, cable bracing added



All test units contain an integrated structural base frame. This unit was mounted to a I beam fixture using six (6) 5/8" SAE grade 8 hex head bolts with flat washers and lock washers. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

NORTEK
AIR SOLUTIONS

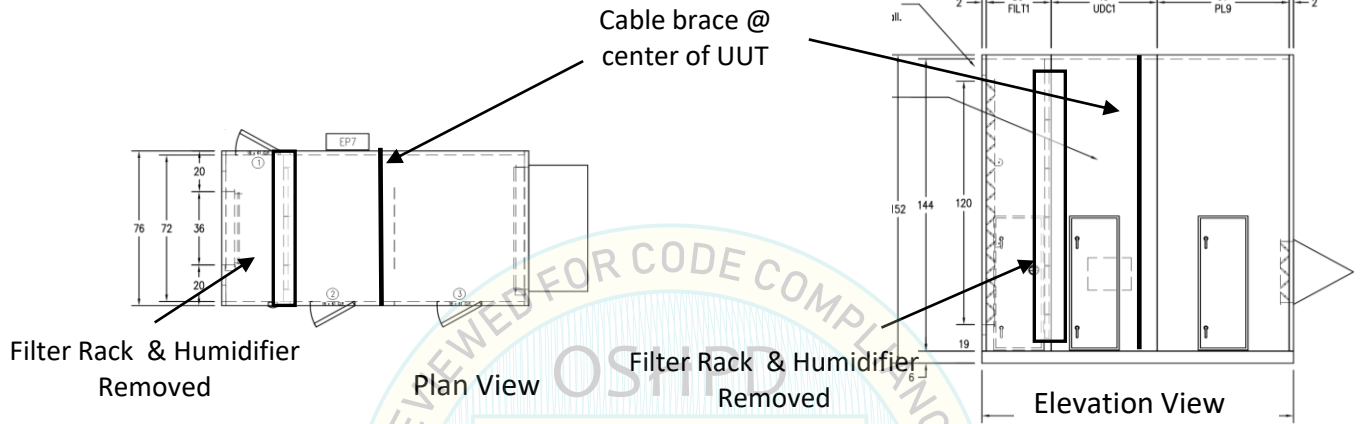


1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC	UUT 6b
Model Line: Huntair Custom Air Handling Units	
Model Number: CSU-15K	

Serial Number: 0120-03

Unit Drawings



Modifications Made Due to Damage During Shipping:

To match the factory construction, the orientation of the fasteners were reversed from the previous modification. (Previous modification shown on the right)



Modified repair: #12-2" self tapping screws were drilled from the inside of the unit around the entire perimeter of the OAFE-1550 casing at 12" OC. The previous fasteners were removed.



UNIT UNDER TEST (UUT) SUMMARY SHEET



1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC	UUT 7
Model Line: Fanwall	
Model Number: FWT	
Serial Number: 2101-005	

Product Construction Summary:
Fan cells are constructed of 2x2 aluminum extruded members. Wheels are constructed of aluminum. (10) 28Dx22Wx27H fan cells with 10" wheel (2W x 5H configuration) without extended coplanar. (4) 34Dx34Wx34H fan cells with 22" wheel without extended coplanar and (4) 51Dx34Wx34H fan cells with 22" wheel with extended coplanar (overall 2W x 4H configuration). Coplanar and extended coplanar panel construction: 0.040" aluminum and 22 ga. stainless steel sheet – solid and perforated. **Cable Bracing:** 3/8" galvanized steel cables with 1/4" A36 brackets.

Options/Subcomponent Summary:
Motor 480V: (2) Novatorque 2HP, (2) Novatorque 6HP, (2) Baldor 1HP, (2) Baldor 12HP, (4) Toshiba 1HP, (2) Toshiba 12 HP, (2) Siemens 1HP, (2) Siemens 10HP; **VFD 460V:** Nortek Air Solutions (4) HD4010xx-1.0HP, (2) HD4100xx-10HP. ABB, Inc. (2) ACS355-03U-04A14/2.0HP, (2) ACS355-03U-23A1-4/15HP. Yaskawa, Inc. (2) CIMR-ZU4A0005FAA/3HP, (1) CIMRZU4A00027FAA/20HP, (1) CIMRZU4A00034FAA/25HP; Back draft damper

UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
7155	60	130	150	3.6	3.9	22.9

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 2019	ICC-ES AC156 (2015)	2.0	1.0	1.5	3.2	2.4	2.13	0.85
		3.2	0.0	1.5				

Test Mounting Details:
Single Cross Bracing, no inlet or outlet wall.



FANWALL sections mounted within air handling section constructed of 2" galvanized steel panels with 6" tube sections. FANWALL sections mounted at base using floor rigid CES Group standard mounting details with gage metal blank off panels to air handling walls. Air handling section mounted to shake table with (4) 5/8" diameter grade 8 bolts.
Unit maintained structural integrity and remained functional per manufacturer requirement.
Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET



1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC

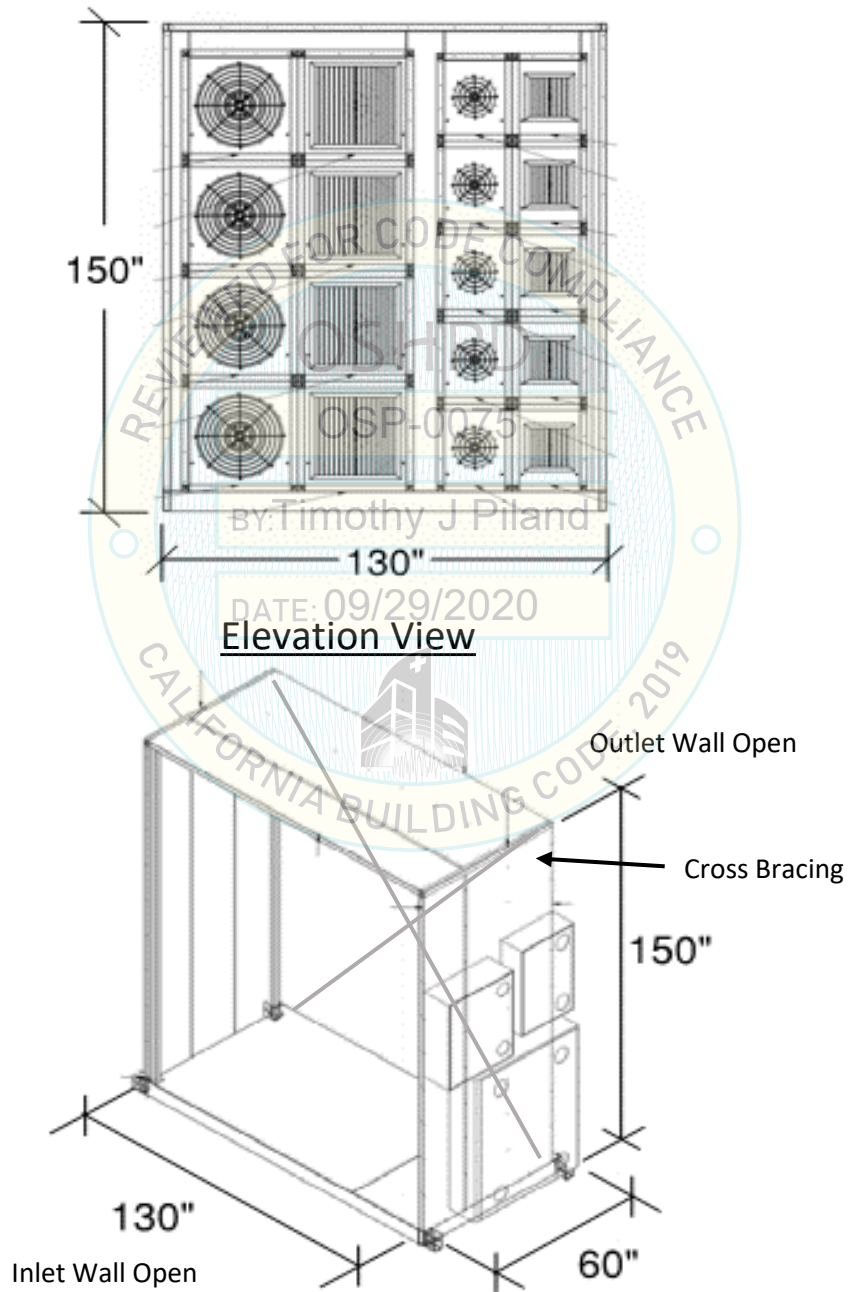
Model Line: Fanwall

Model Number: FWT

Serial Number: 2101-005

UUT 7

Unit Drawings



Isometric View

UNIT UNDER TEST (UUT) SUMMARY SHEET



1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC	UUT 8
Model Line: Huntair Custom Air Handling Units	
Model Number: CSU-20K CHW	
Serial Number: 000139-006	

Product Construction Summary:
Wall/Roof: Standard 4" Panels, 16 ga. galv. carbon steel exterior with 20 ga. galv. carbon steel liner; **Base:** 8" carbon steel structural tubing, 16 ga. galv. carbon steel base skin with 20 ga. galv. carbon steel liner; **Door:** (1) 4" thick, 24"(W) x 64"(H) no window

Options/Subcomponent Summary:
Chilled Water Coil: 12 FPI, 10 row, copper, stacked mounting - qty. 1 (48"Hx184"Wx15"D); 12 FPI, 10 row, aluminum, stacked mounting - qty. 1 (63"Hx184"Wx15"D); **Damper:** Ruskin CD 50 (60"x120"); **Louvers:** Huntair (60"Wx120"H), Ruskin ELF6375DX (60"Wx120"H); **Pressure Gage:** Dwyer Photohelic 3001; **Electrical Panel:** NEMA1; **Actuator:** AFBUP-S

UUT Properties						
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
14,762	130	204	135	7.46	9.75	10.97

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 2019	ICC-ES AC156 (2015)	2.0	1.0	1.5	3.2	2.4	1.67	0.67	
		2.5	0.0	1.5					

Test Mounting Details:
 (4) Walls in place, no Internal Bracing



All test units contain an integrated structural base frame. This unit was mounted to a I beam fixture using fourteen (14) 5/8" SAE grade 8 hex head bolts with flat washers and lock washers. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

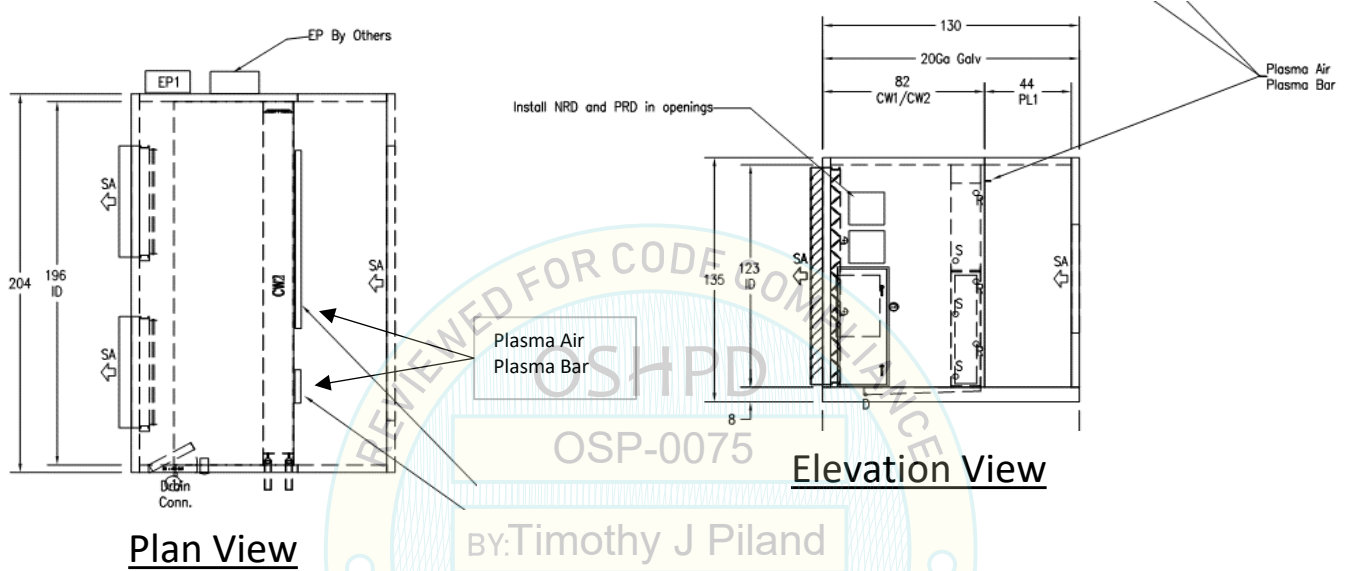


1801166-CR-001-R6

Manufacturer: Nortek Air Solutions, LLC
Model Line: Huntair Custom Air Handling Units
Model Number: CSU-20K CHW
Serial Number: 000139-006

UUT 8

Unit Drawings



Seismic Upgrades Implemented (required for large coils as defined in table 5):

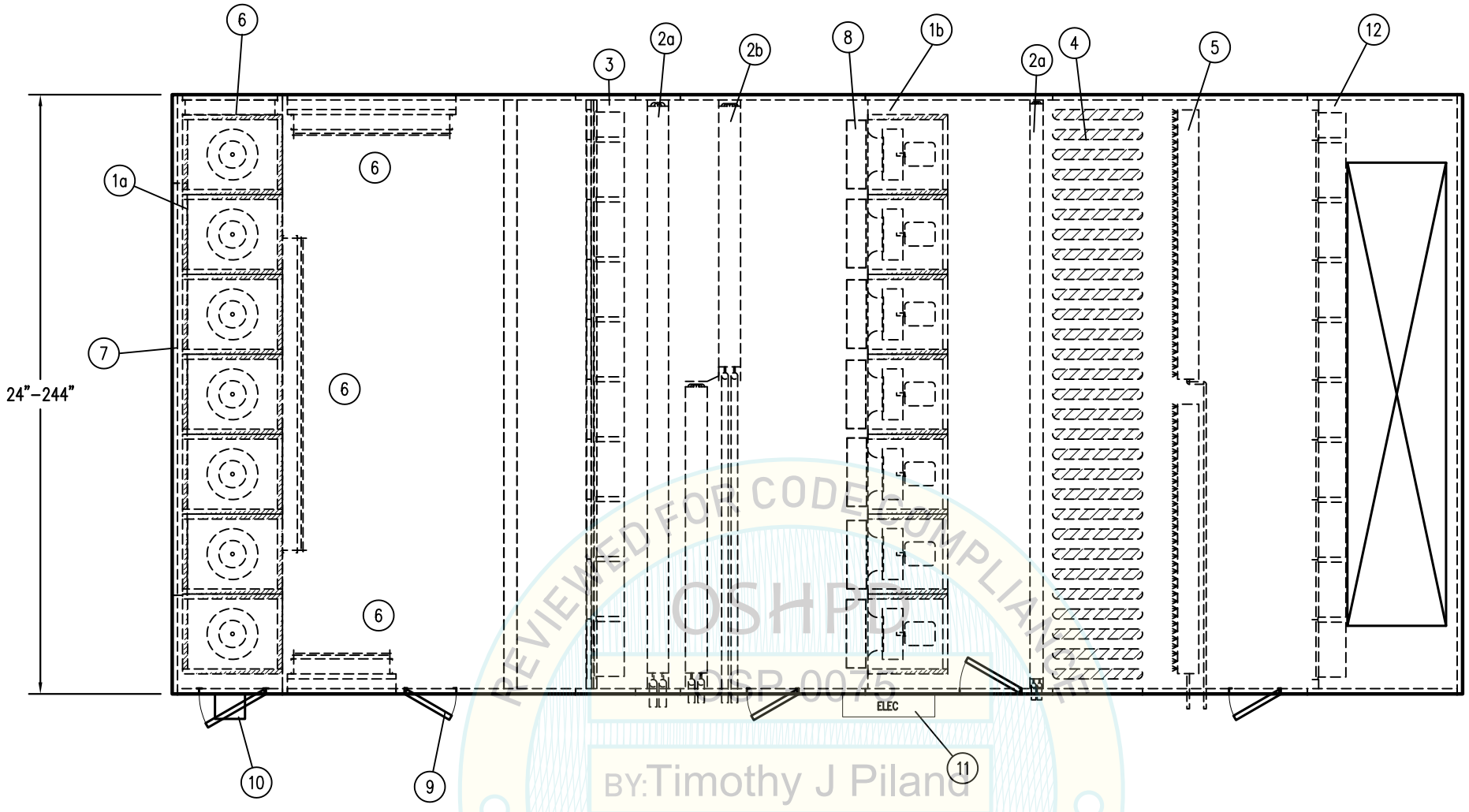
(1) 1/4"-14 screws top and bottom of coil at 10" o.c. max spacing, (2) 2-12ga. c-channel stiffeners¹ each side of coil, (3) 1/4"-14 screws at 10" o.c. max spacing along each c-channel stiffener.



Notes:

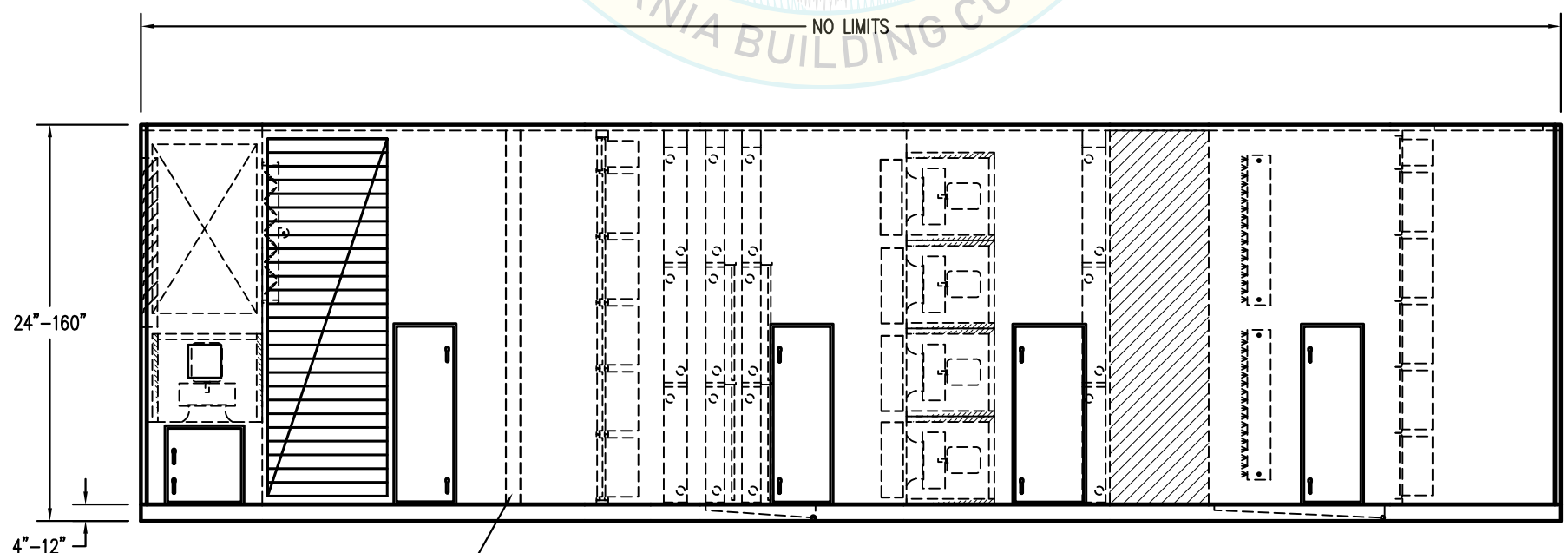
¹Stainless steel c-channels tested, stiffener channels may also be constructed of carbon steel.

- ①a FANWALL (Vertical)
- ①b FANWALL (Horizontal)
- ②a Heat Transfer Coils (Stacked)
- ②b Heat Transfer Coils (Staggered)
- ③ Pre/Final Filters
- ④ Sound Trap
- ⑤ Humidifier
- ⑥ Damper
- ⑦ Louver
- ⑧ Back-draft Damper
- ⑨ Access Doors
- ⑩ Electrical Panel (MSP)
- ⑪ Control Panel (VFD/PLC)
- ⑫ HEPA Filters



BY: Timothy J Piland
 DATE: 09/29/2020

Plan View



Side View

Construction Notes:

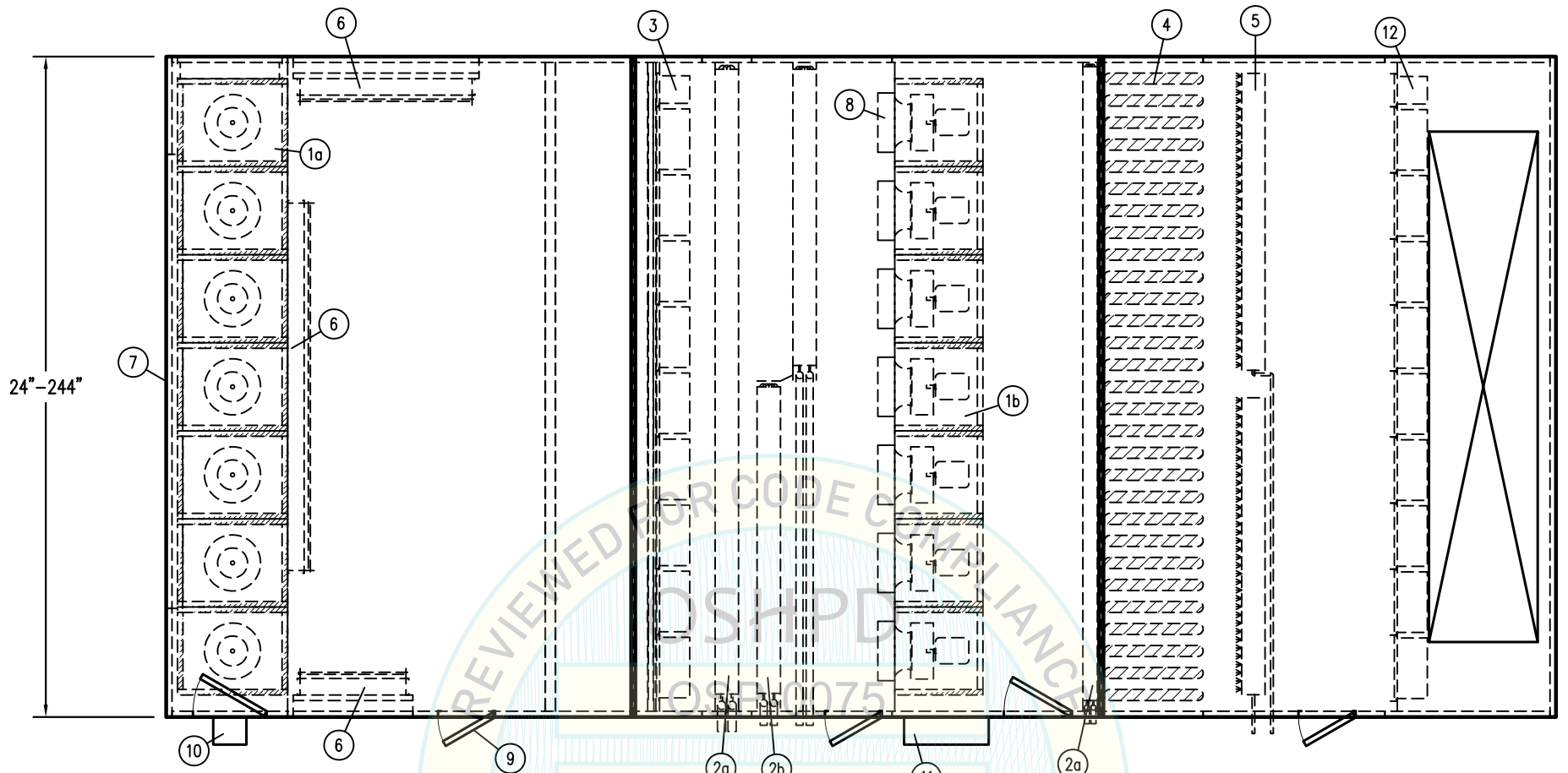
1. All dimensions inches unless stated otherwise
2. Insulation thickness/panel size: 2", 3", and 4"
3. Cabinet Material: Aluminum, Galvanized Steel, Stainless Steel
4. Base can be structural channel or tube (4" to 12" height)
5. Interior seismic bracing to be implemented per restrictions detailed on sheet "OSHPD BRACE DETAILS".
6. Base frame must be anchored around entire perimeter.
7. All splits shall maintain structural continuity between sections.
8. All transverse base members to be designed for tributary dead load & full capacity of seismic braced frame elements.

TOLERANCES UNLESS OTHERWISE SPECIFIED

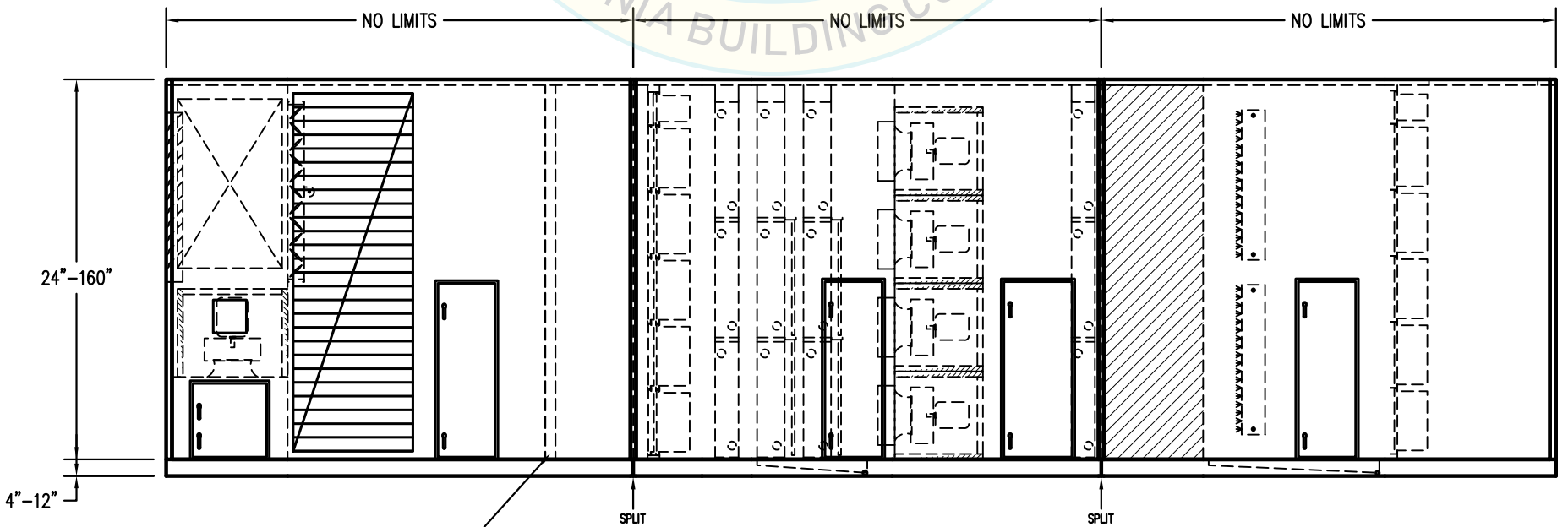
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- ①a FANWALL (Vertical)
- ①b FANWALL (Horizontal)
- ②a Heat Transfer Coils (Stacked)
- ②b Heat Transfer Coils (Staggered)
- ③ Pre/Final Filters
- ④ Sound Trap
- ⑤ Humidifier
- ⑥ Damper
- ⑦ Louver
- ⑧ Back-draft Damper
- ⑨ Access Doors
- ⑩ Electrical Panel (MSP)
- ⑪ Control Panel (VFD/PLC)
- ⑫ HEPA Filters



BY: Timothy J Piland
 Plan View
 DATE: 09/29/2020



Side View

Construction Notes:

1. All dimensions inches unless stated otherwise
2. Insulation thickness/panel size: 2", 3", and 4"
3. Cabinet Material: Aluminum, Galvanized Steel
4. Base can be structural channel or tube (4" to 12" height)
5. Interior seismic bracing to be implemented per restrictions detailed on sheet "OSHPD BRACE DETAILS".
6. Base frame must be anchored around entire perimeter.
7. All splits shall maintain structural continuity between sections.
8. All transverse base members to be designed for tributary dead load & full capacity of seismic braced frame elements.

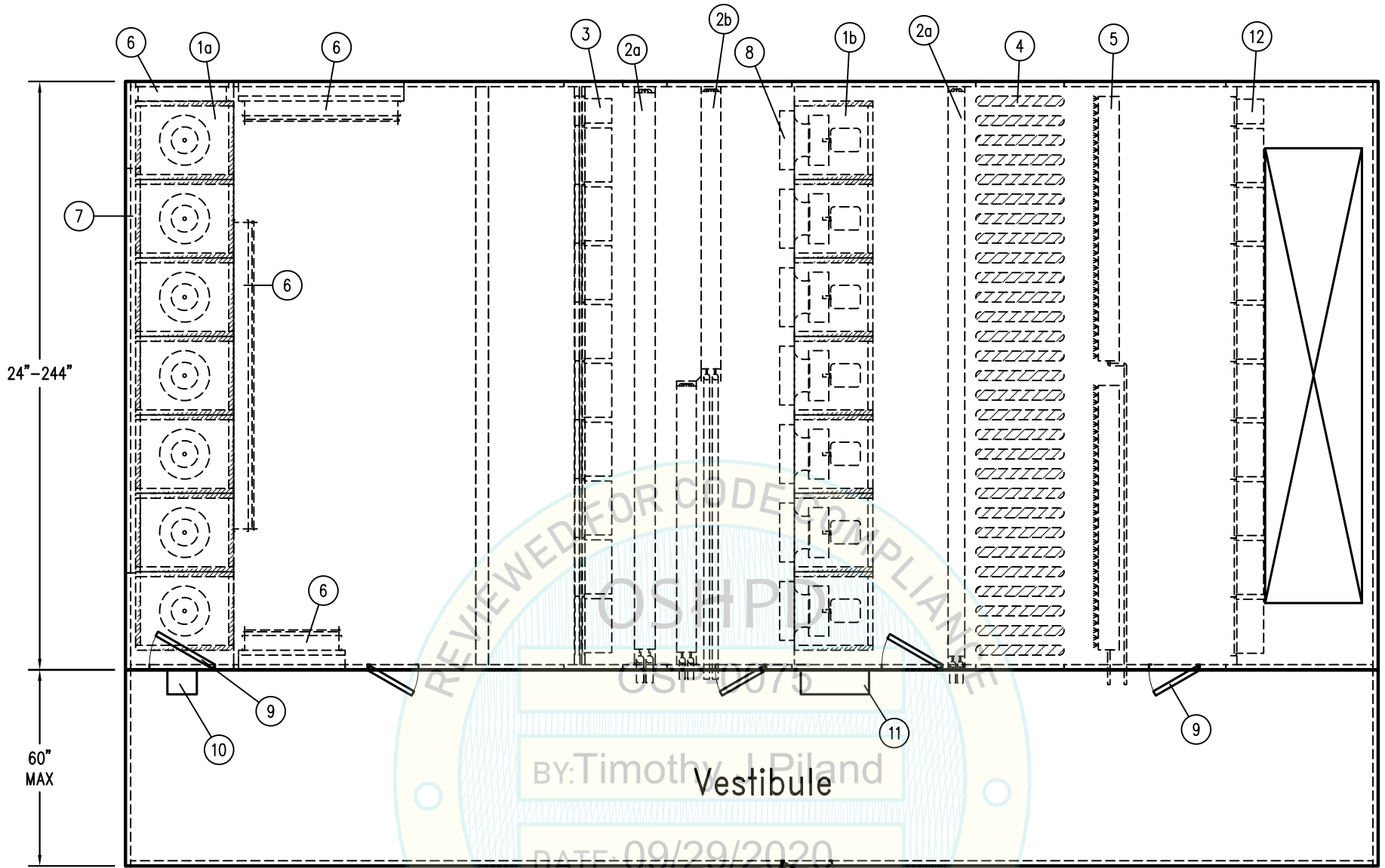
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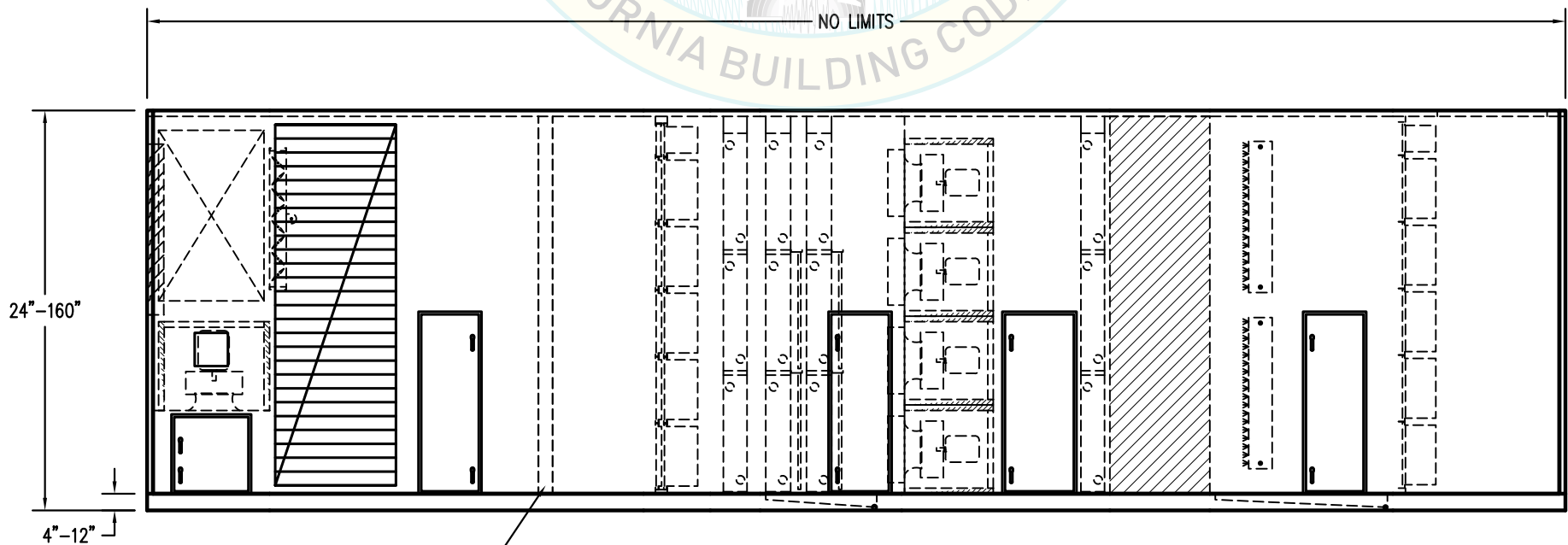
OSHPD Single Tunnel With Splits	 HUNTAIR® a Nortek Air Solutions Brand 19855 SW 124th Ave. TUALATIN, OR 97062 (503) 639-0113 FAX (503) 692-0958
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- 1a) FANWALL (Vertical)
- 1b) FANWALL (Horizontal)
- 2a) Heat Transfer Coils (Stacked)
- 2b) Heat Transfer Coils (Staggered)
- 3) Pre/Final Filters
- 4) Sound Trap
- 5) Humidifier
- 6) Damper
- 7) Louver
- 8) Back-draft Damper
- 9) Access Door
- 10) Electrical Panel (MSP)
- 11) Control Panel (VFD/PLC)
- 12) HEPA Filters



Plan View

NO LIMITS



Side View

For Interior Seismic Brace requirements and spacing, see OSHPD Seismic Brace detail

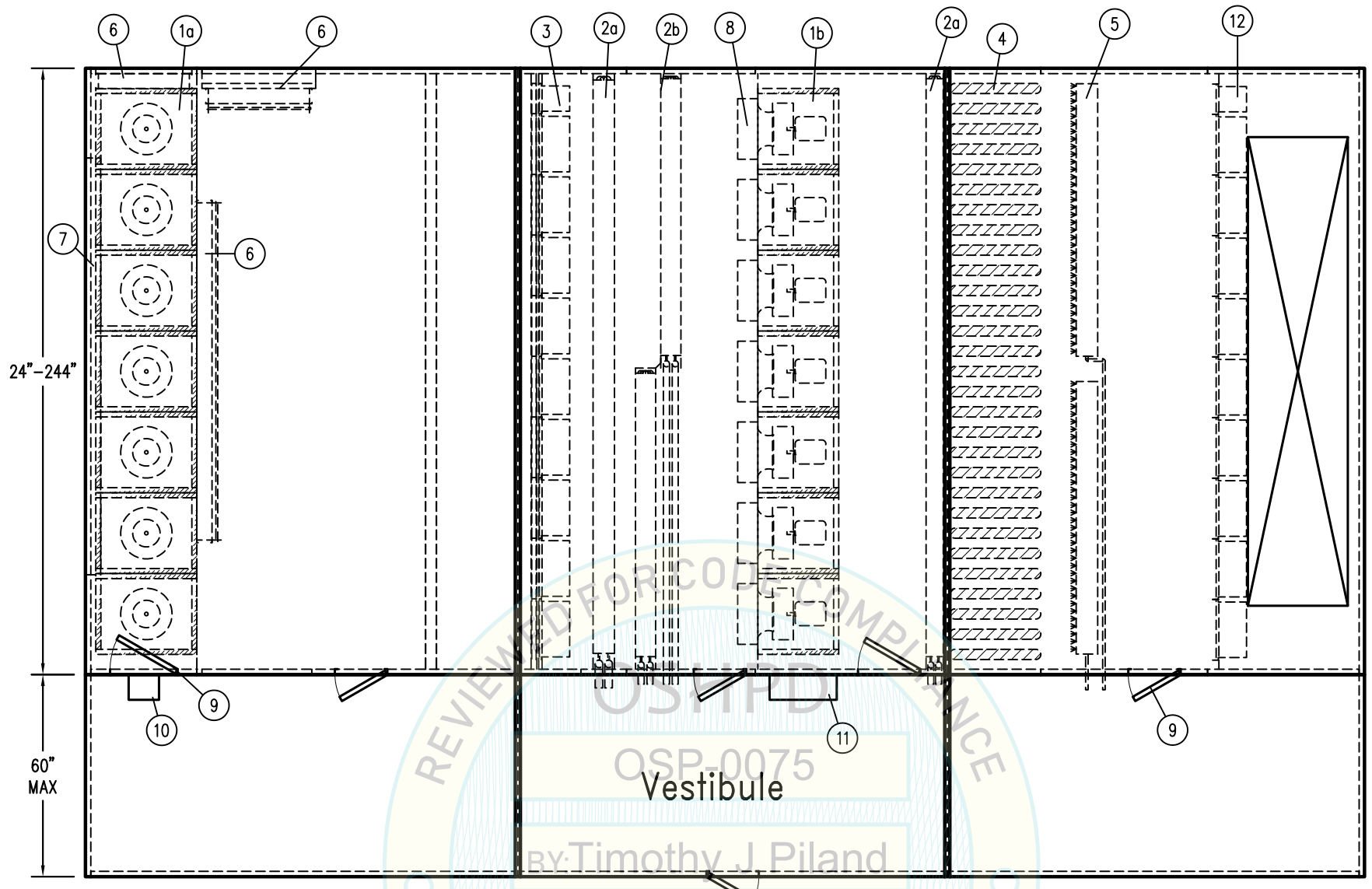
Construction Notes:

1. All dimensions inches unless stated otherwise
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6. Base frame must be anchored around entire perimeter.
7. All splits shall maintain structural continuity between sections.
8. All transverse base members to be designed for tributary dead load & full capacity of seismic braced frame elements

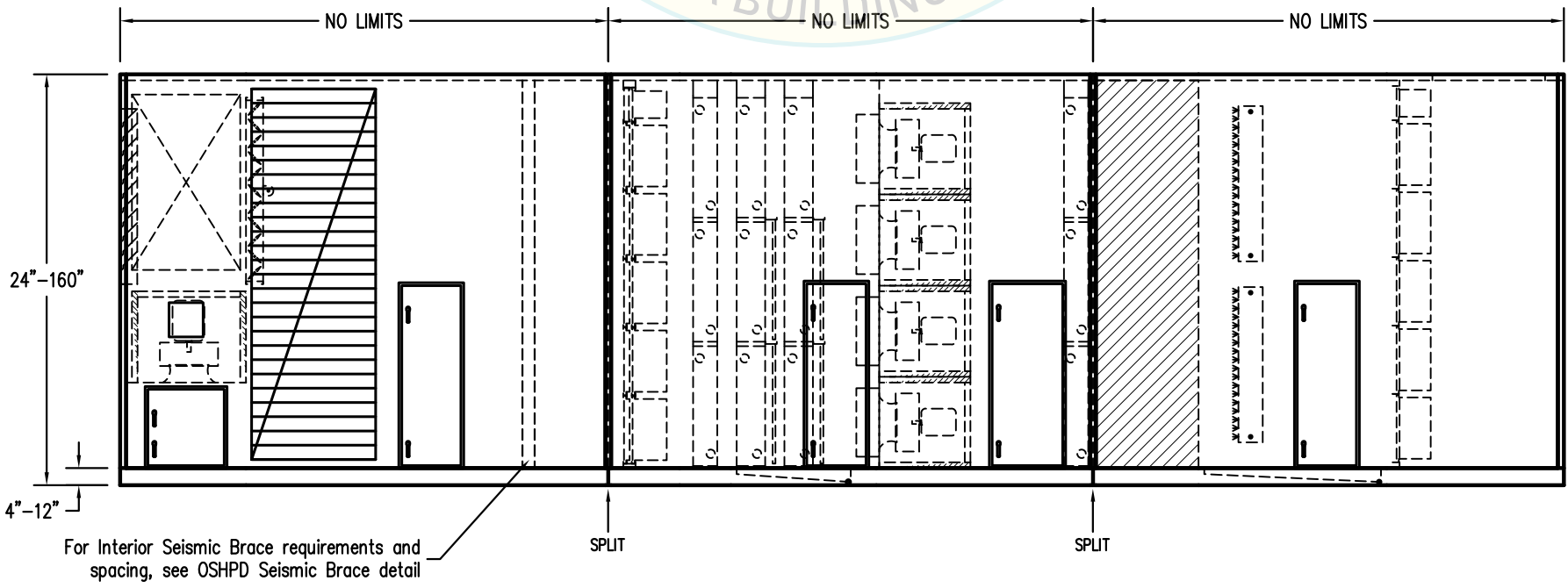
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ANGLES:	±0.5°
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- ①a FANWALL (Vertical) ③ Pre/Final Filters ⑦ Louver ⑪ Control Panel (VFD/PLC)
- ①b FANWALL (Horizontal) ④ Sound Trap ⑧ Back-draft Damper ⑫ HEPA Filters
- ②a Heat Transfer Coils (Stacked) ⑤ Humidifier ⑨ Access Door
- ②b Heat Transfer Coils (Staggered) ⑥ Damper ⑩ Electrical Panel (MSP)



DATE: 09/29/2020
Plan View



Side View

Construction Notes:

1. All dimensions inches unless stated otherwise
2. Insulation thickness/panel size: 2", 3", and 4"
3. Cabinet Material: Aluminum, Galvanized Steel, Stainless Steel.
4. Base can be structural channel or tube (4" to 12" height)
5. Interior seismic bracing to be implemented per restrictions detailed on sheet "OSHPD BRACE DETAILS".
6. Base frame must be anchored around entire perimeter.
7. All splits shall maintain structural continuity between sections.
8. All transverse base members to be designed for tributary dead load & full capacity of seismic braced frame elements.

TOLERANCES UNLESS OTHERWISE SPECIFIED	
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Single Tunnel With Vestibule and Splits

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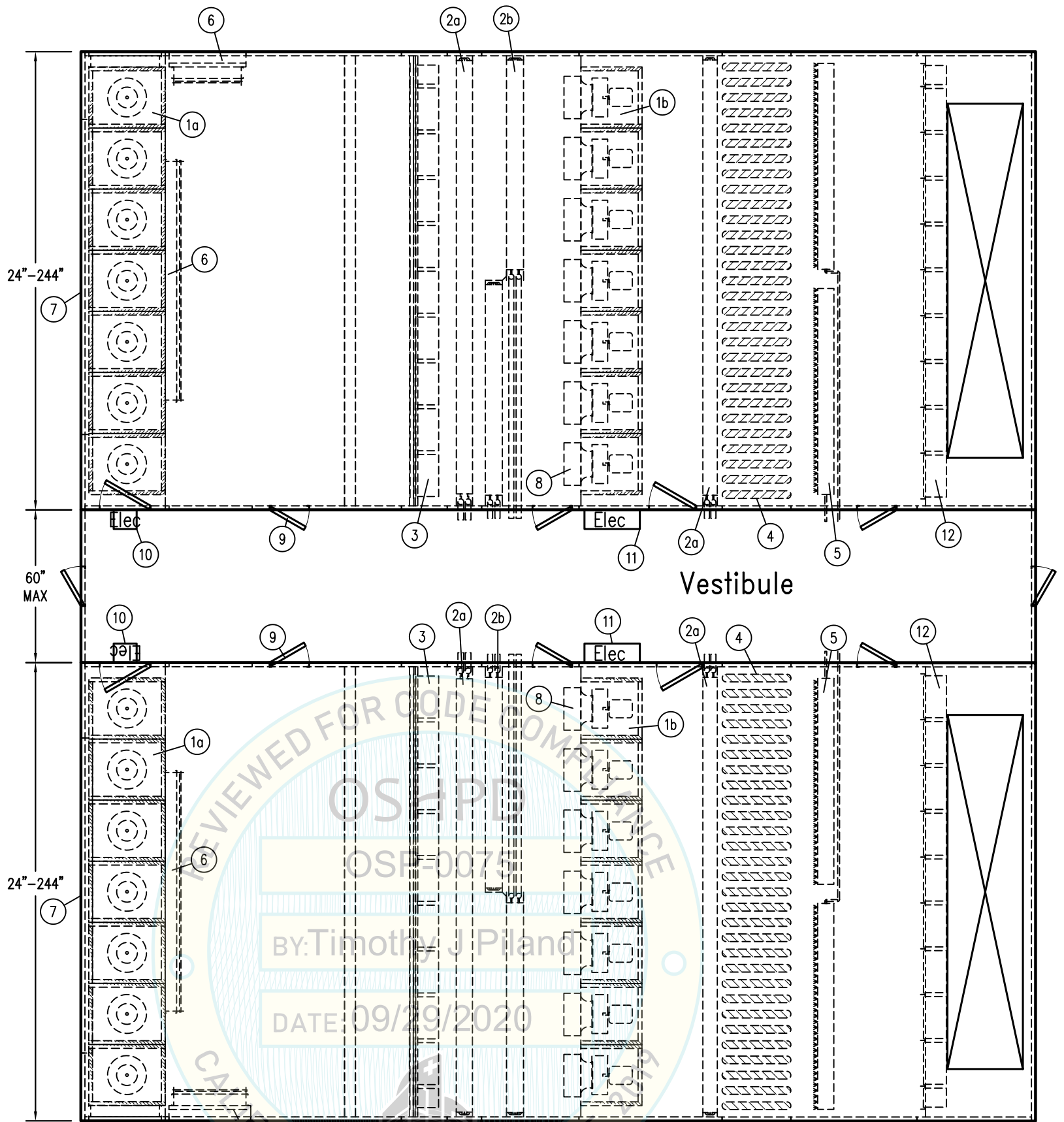
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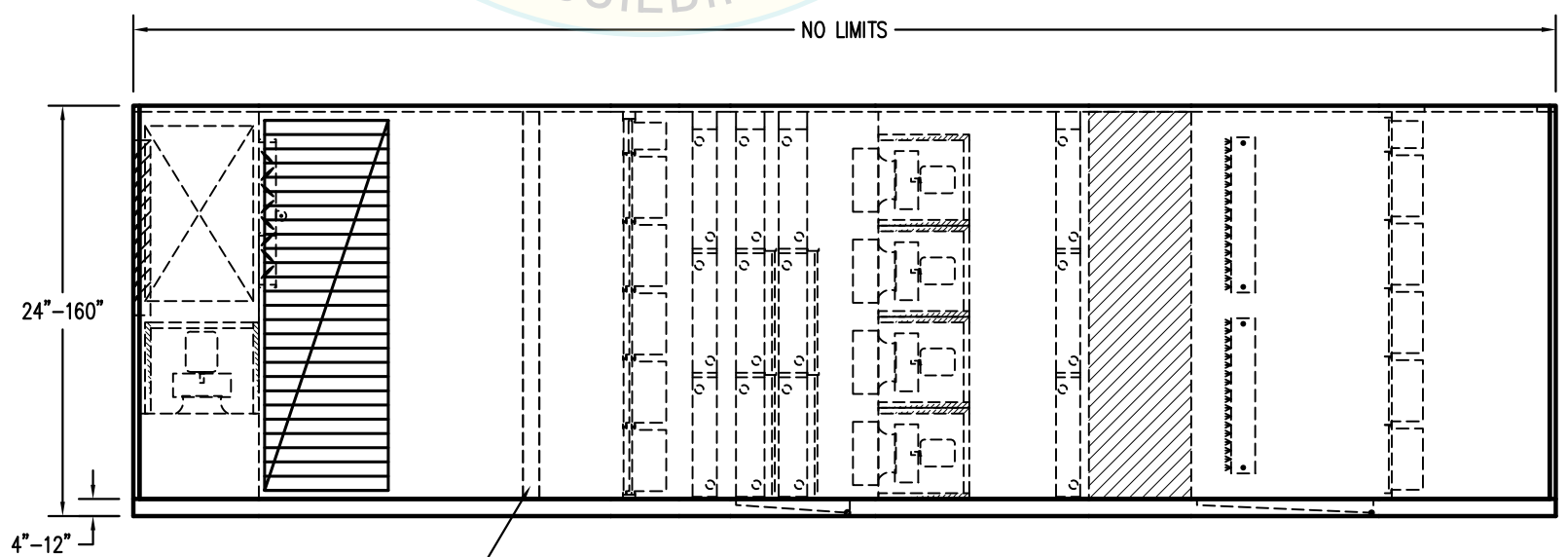
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Plan View



Side View



For Interior Seismic Brace requirements and spacing, see OSHPD Seismic Brace detail

- 1a FANWALL (Vertical)
- 1b FANWALL (Horizontal)
- 2a Heat Transfer Coils (Stacked)
- 2b Heat Transfer Coils (Staggered)
- 3 Pre/Final Filters
- 4 Sound Trap
- 5 Humidifier
- 6 Damper
- 7 Louver
- 8 Back-draft Damper
- 9 Access Doors
- 10 Electrical Panel (MSP)
- 11 Control Panel (VFD/PLC)
- 12 HEPA Filters

Construction Notes:

1. All dimensions inches unless stated otherwise.
2. Insulation thickness/panel size: 2", 3", and 4".
3. Cabinet Material: Aluminum, Galvanized Steel, Stainless Steel.
4. Base can be structural channel or tube (4" to 12" height).
5. Interior seismic bracing to be implemented per restrictions detailed on sheet "OSHPD BRACE DETAILS".
6. Each base frame must be anchored around entire perimeter, including double wall location.
7. All splits shall maintain structural continuity between sections.
8. All transverse base members to be designed for tributary dead load & full capacity of seismic braced frame elements.

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Double Tunnel With Vestibule

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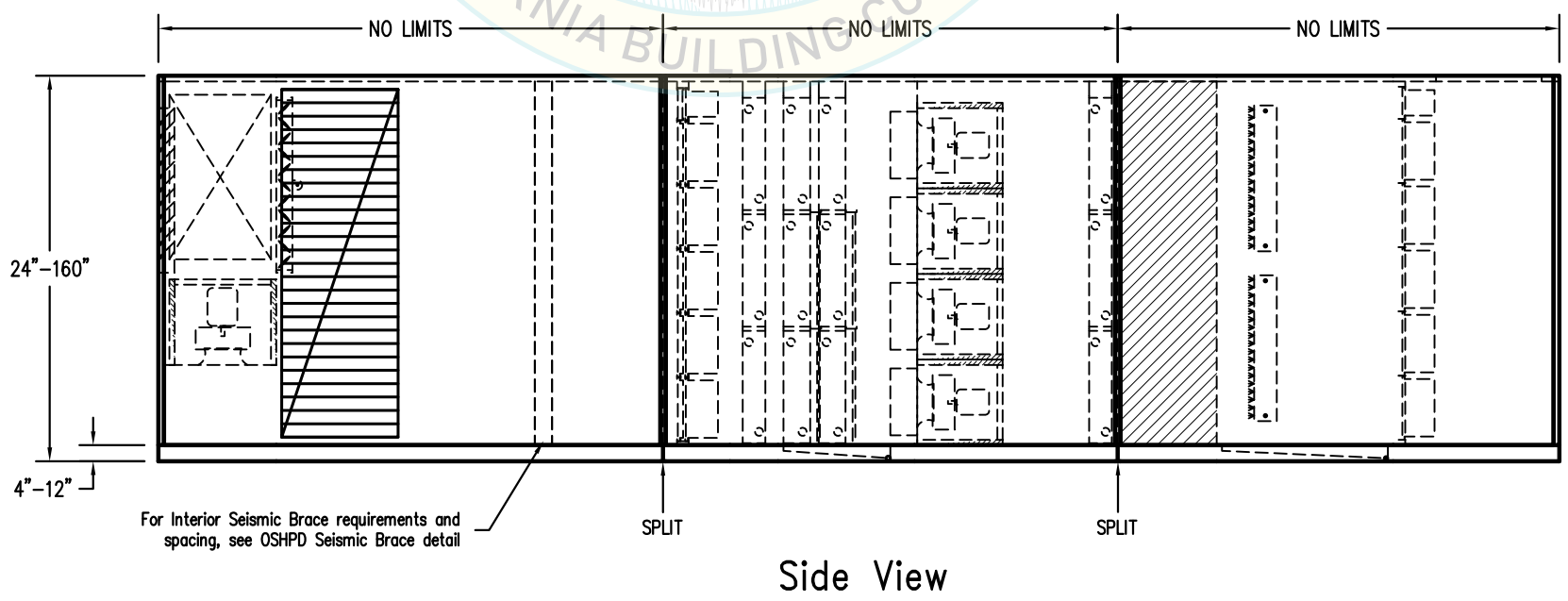
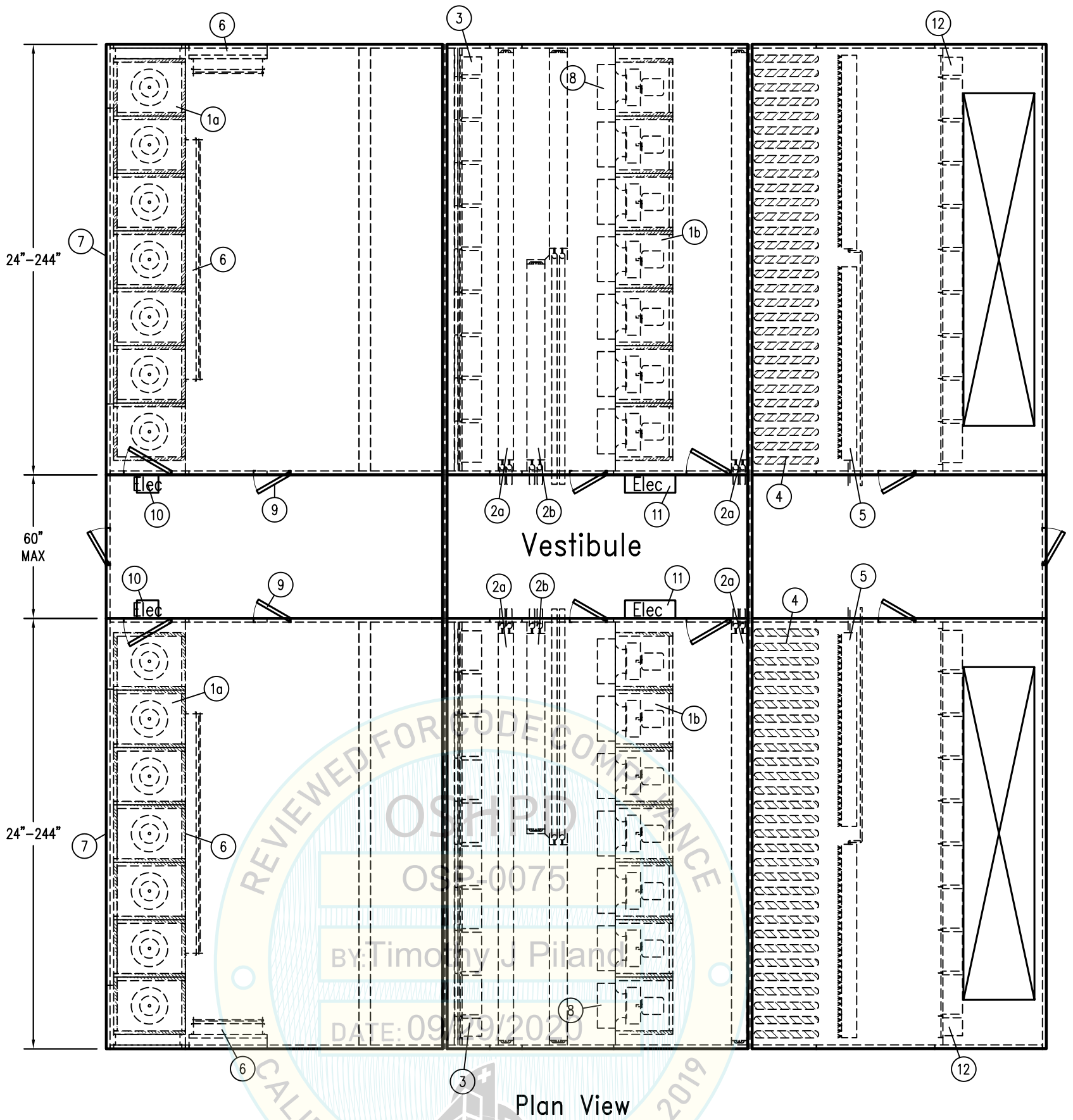
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- ①a FANWALL (Vertical)
- ①b FANWALL (Horizontal)
- ②a Heat Transfer Coils (Stacked)
- ②b Heat Transfer Coils (Staggered)
- ③ Pre/Final Filters
- ④ Sound Trap
- ⑤ Humidifier
- ⑥ Damper
- ⑦ Louver
- ⑧ Back-draft Damper
- ⑨ Access Door
- ⑩ Electrical Panel (MSP)
- ⑪ Control Panel (VFD/PLC)
- ⑫ HEPA Filters

Construction Notes:

1. All dimensions inches unless stated otherwise.
2. Insulation thickness/panel size: 2", 3", and 4".
3. Cabinet Material: Aluminum, Galvanized Steel, Stainless Steel.
4. Base can be structural channel or tube (4" to 12" height).
5. Interior seismic bracing to be implemented per restrictions detailed on sheet "OSHPD BRACE DETAILS".
6. Each base frame must be anchored around entire perimeter, including double wall location.
7. All splits shall maintain structural continuity between sections.
8. All transverse base members to be designed for tributary dead load & full capacity of seismic braced frame elements.

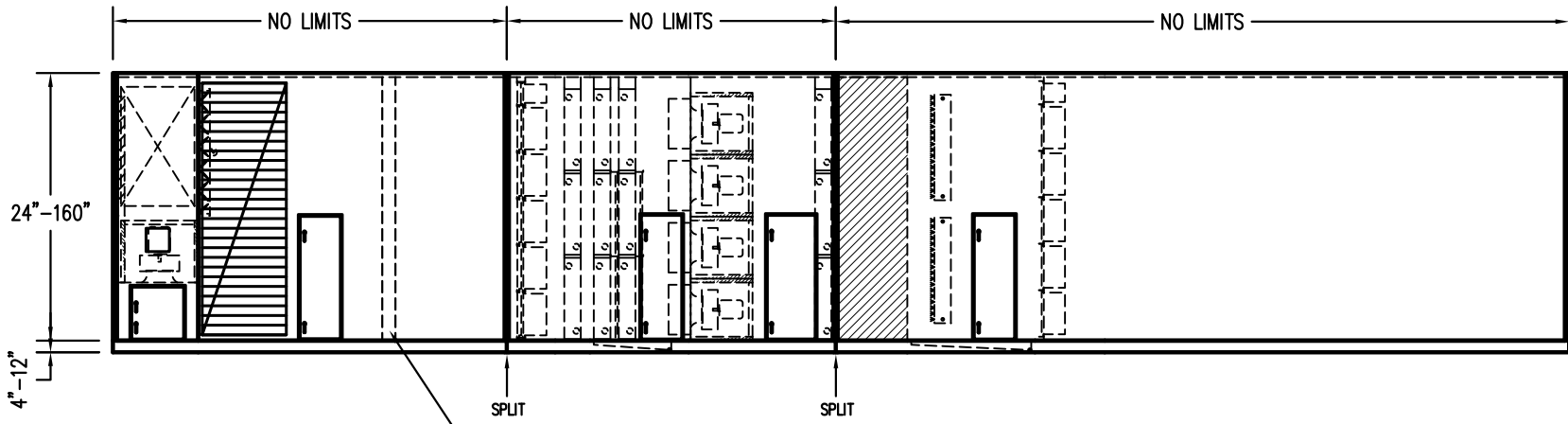
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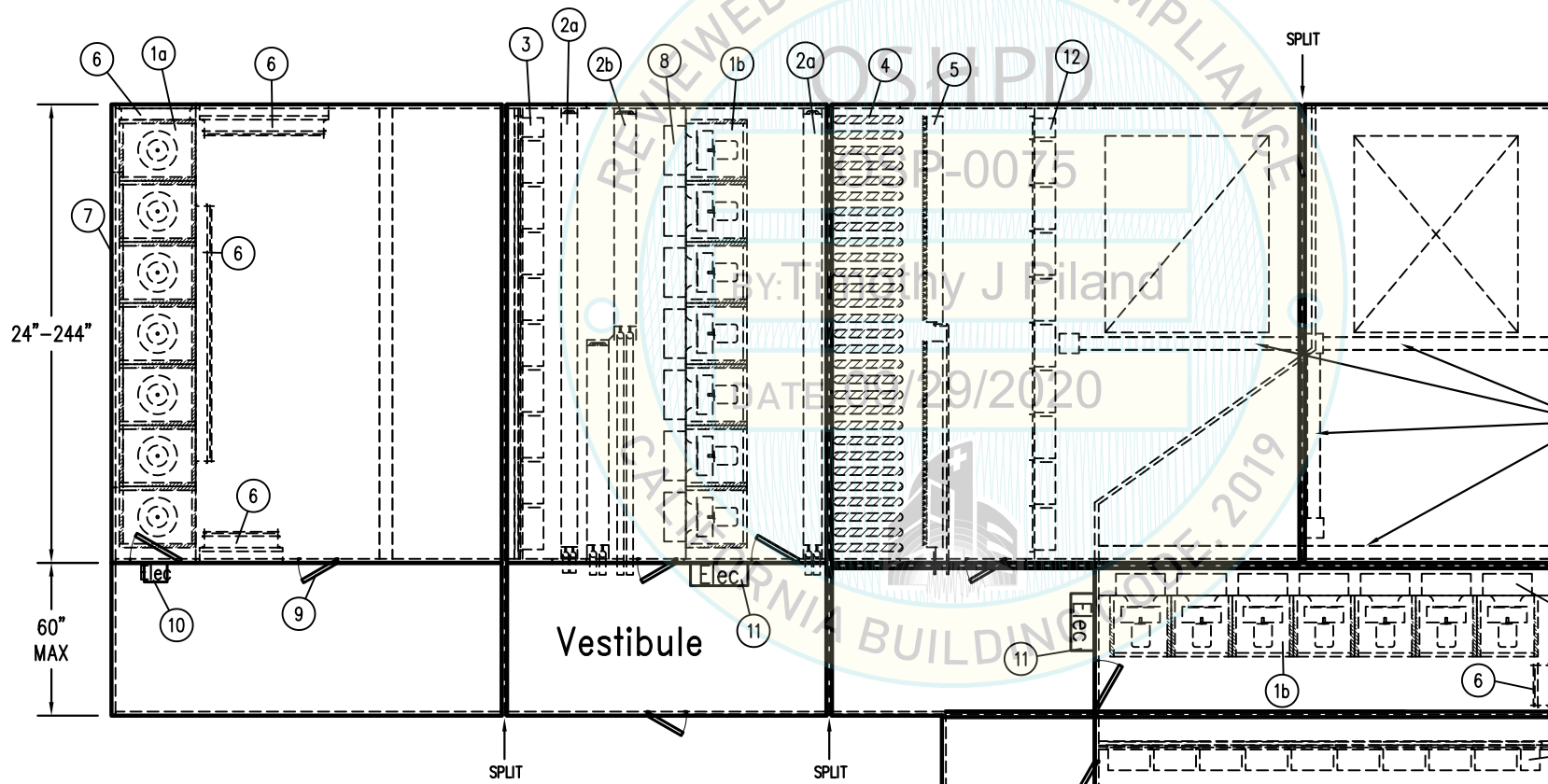
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- 1a) FANWALL (Vertical)
- 1b) FANWALL (Horizontal)
- 2a) Heat Transfer Coils (Stacked)
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- 3) Pre/Final Filters
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- 7) Louver
- 8) Back-draft Damper
- 9) Access Door
- 10) Electrical Panel (MSP)
- 11) Control Panel (VFD/PLC)
- 12) HEPA Filters

Side View



For Interior Seismic Brace requirements and spacing, see OSHPD Seismic Brace detail



Plan View

For Interior Seismic Brace requirements and spacing, see OSHPD Seismic Brace detail

Additional brace required when fanwall not present at split

Provide flexible separation for expansion joint at re-entrant corner

For Interior Seismic Brace requirements and spacing, see OSHPD Seismic Brace detail

Construction Notes:

1. All dimensions inches unless stated otherwise.
2. Insulation thickness/panel size: 2", 3", and 4".
3. Cabinet Material: Aluminum, Galvanized Steel, Stainless Steel
4. Base can be structural channel or tube (4" to 12" height).
5. Interior seismic bracing to be implemented per restrictions detailed on sheet "OSHPD BRACE DETAILS".
6. Each base frame must be anchored around entire perimeter, including double wall location.
7. All splits shall maintain structural continuity between sections.
8. All transverse base members to be designed for tributary dead load & full capacity of seismic braced frame elements.

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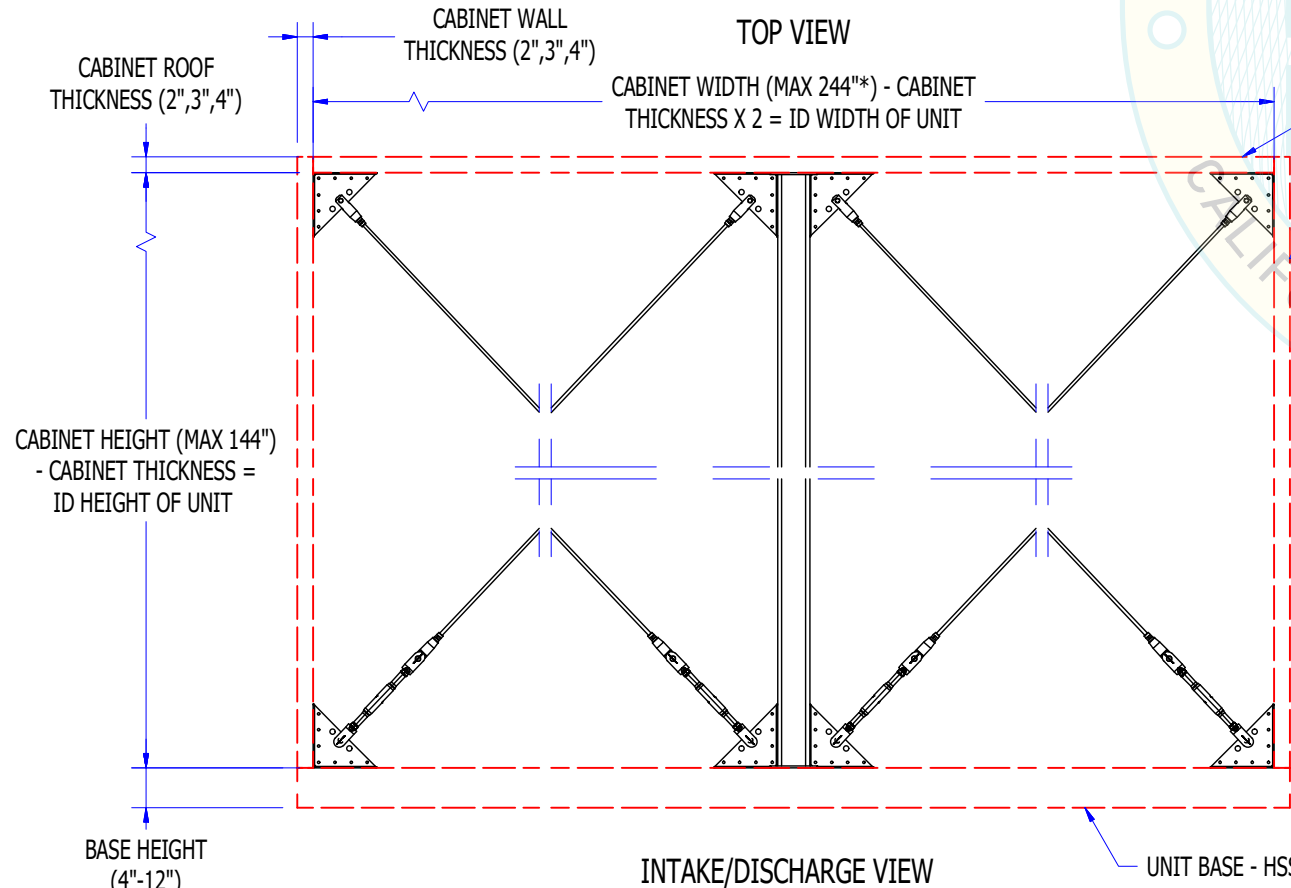
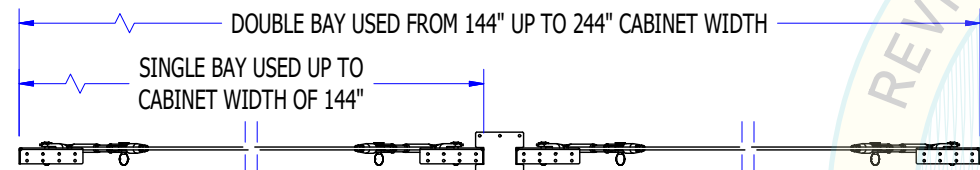
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Transverse Bracing Requirements:

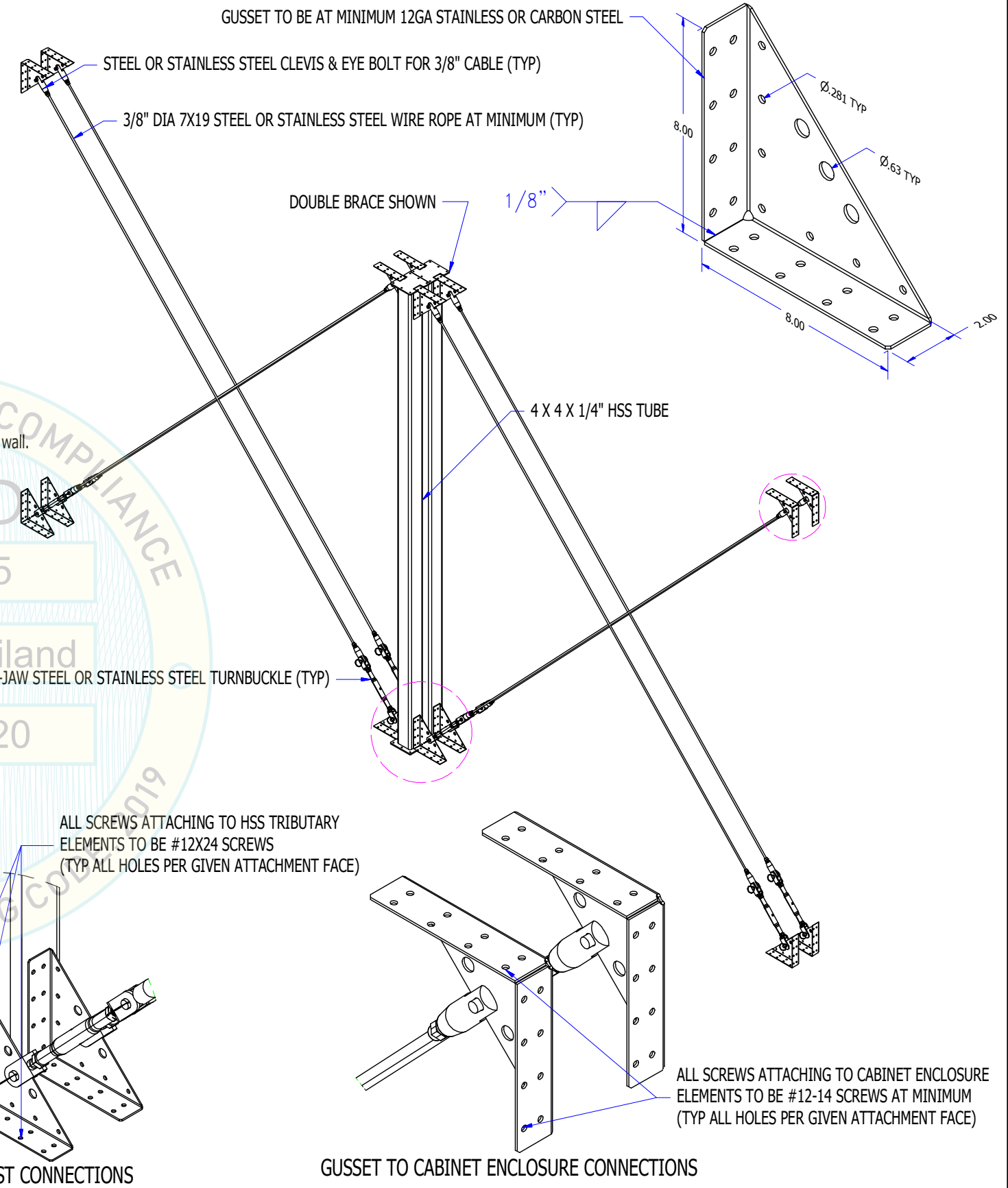
1. Average spacing is calculated as the sum of distances between braces on each side of brace divided by 2.
 - a. Units with aluminum construction cabinets or bases shall have single bracing required at 4'-0" average spacing, or double bracing at 8'-0" average spacing.
2. For Aspect Ratios <= 1.1: Single bracing required at 5'-6" average spacing, or double bracing at 11'-0" average spacing. Bracing Elements for Aspect Ratio <= 1.1:
 - a. Coil wall
 - b. Fanwall
 - c. Cable Brace
 - d. Panel Wall meeting the requirements listed below
3. For Aspect Ratios > 1.1: Single bracing required at 5'-0" average spacing, or double bracing at 10'-0" average spacing. Bracing Elements for Aspect Ratio > 1.1:
 - a. Cable Brace
 - b. Panel Wall meeting the requirements listed below
4. Bracing elements 2.a. through 2.c. and 3.a. must run the full width and height of the cabinet enclosure (excluding vestibule sections).
5. Humidifier Systems require independent structural support or adjacent upstream cable brace (see UUT-2b, 5, and 6a)

Panel Wall Bracing Requirements:

6. If a panel wall is utilized as a bracing element, the following conditions must be met:
 - a. The bracing wall must be of the construction detailed in the OSHPD approved drawing set.
 - b. Height to width ratio of the bracing wall must not exceed 2.0.
 - c. Openings in a bracing wall shall not exceed the lesser of one third of the height of the total bracing wall and one third the width of the total bracing wall.
 - d. Exterior openings are defined to be at an exterior wall of the cabinet enclosure.
 - e. Exterior bracing walls not meeting 6.c. criteria must have the total length of exterior wall be greater than or equal to the total length of the combined exterior openings on the exterior wall.
 - f. Exterior walls running perpendicular to air flow not meeting 6.c. or 6.e. criteria must have a supplementary bracing element placed within 3'-0".
 - g. Exterior walls running parallel to air flow not meeting 6.c. or 6.e. criteria are not allowed.

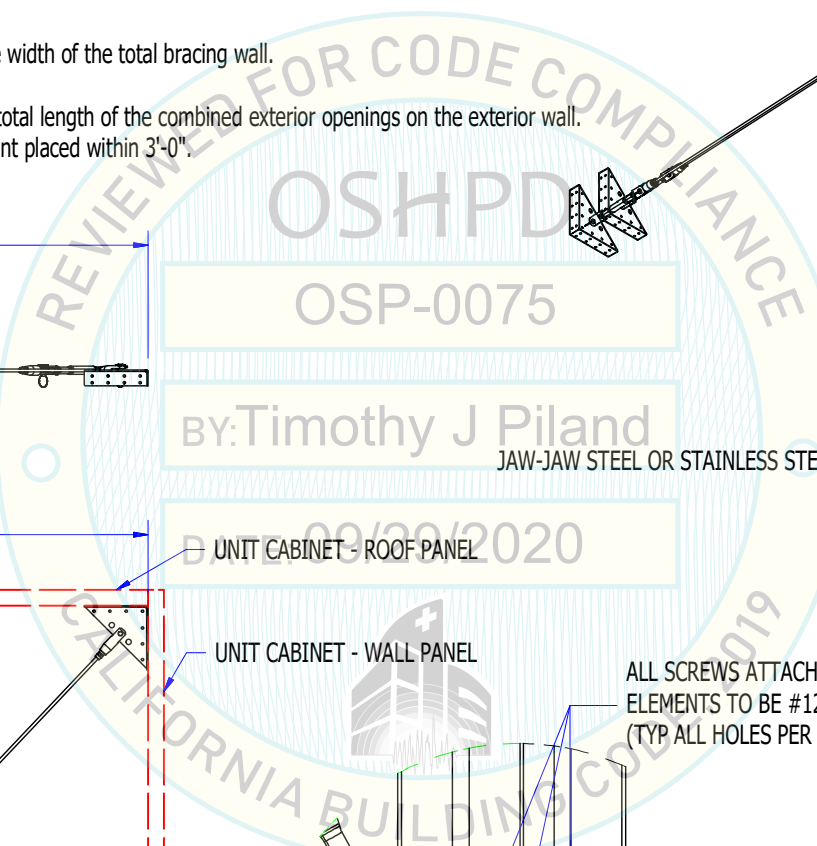


CABINET WIDTH IS DEFINED AS THE DIMENSION FROM EXTERNAL WALL TO OPPOSING EXTERNAL WALL IN THE DIRECTION PERPENDICULAR TO AIR FLOW.
 *IN THE CASE OF DUAL TUNNEL UNITS, THE CABINET WIDTH IS DEFINED AS THE EXTERNAL WALL TO THE CENTER OF THE DOUBLE WALL OR VESTIBULE WALL.



GUSSET TO BASE/POST CONNECTIONS

GUSSET TO CABINET ENCLOSURE CONNECTIONS



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