



DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
OFFICE OF STATEWIDE HOSPITAL PLANNING AND DEVELOPMENT

APPLICATION FOR HCAI SPECIAL SEISMIC
CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0387

HCAI Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Johnson Controls

Manufacturer's Technical Representative: Tyler Williams

Mailing Address: 8575 Largo Lakes Blvd., Largo, FL 33773

Telephone: (727) 560-9400 Email: tyler.j.williams@jci.com

Product Information

Product Name: TCL, TVL, & TSS VAV Terminal Units

Product Model Number(s): See Attachment

Product Category: Air Conditioning Units

Product Sub-Category: Variable Air Volume Units

General Description: VAV terminal units containing coils, fans, motors, dampers, electric heat, and controls.

Mounting Description: Suspended Rigid

Tested Seismic Enhancements: Seismic enhancements made to the test units and/or modifications required to address anomalies during the tests shall be incorporated into the production units.

Applicant Information

Applicant Company Name: Manwill Engineering LLC

Contact Person: Derek Manwill

Mailing Address: PO Box 1194, Bend, OR 97709

Telephone: (541) 241-2102 Email: derek@manwillse.com

Title: President



**DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
OFFICE OF STATEWIDE HOSPITAL PLANNING AND DEVELOPMENT**

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

Company Name: MANWILL ENGINEERING LLC

Name: Derek Manwill

California License Number: S6266

Mailing Address: PO Box 1194, Bend, OR 97709

Telephone: (541) 241-2102

Email: derek@manwillse.com

Certification Method

☐ GR-63-Core

☒ ICC-ES AC156

☐ IEEE 344

☐ IEEE 693

☐ NEBS 3

☐ Other (Please Specify): _____

Testing Laboratory

Company Name: DYNAMIC CERTIFICATION LABORATORY (DCL)

Contact Person: Josh Sailer

Mailing Address: 1315 Greg St., Ste 109, Sparks NV 89431

Telephone: (775) 358-5085

Email: josh@shaketest.com

BY: Timothy J. Piland

DATE: 09/15/2025



DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
OFFICE OF STATEWIDE HOSPITAL PLANNING AND DEVELOPMENT

Seismic Parameters

Certified Response Spectral Acceleration Factors: (F_p/W_p)

Horizontal (A Flx-H), $g =$ 4.00 (A Rig-H), $g =$ 3.00

Vertical (A Flx-V), $g =$ 1.68 (A Rig-V), $g =$ 0.68

SDS (Design spectral response acceleration at short period, g) = 2.50

H_f (Force amplification height factor) = 1 @ $z/h = 0$; 3.5 @ $z/h = 1$

R_u (Structure ductility reduction factor) = 1 @ $z/h = 0$; 1.3 @ $z/h = 1$

I_p (Importance factor) = 1.5

z/h (Height ratio factor) = 0 and 1

HCAI Approval (For Office Use Only) - Approval Expires on 09/15/2031

Date: 9/15/2025

Name: Timothy Piland

Title: Senior Structural Engineer

Condition of Approval (if applicable): _____

OSP-0387

BY: Timothy J. Piland

DATE: 09/15/2025

**JOHNSON CONTROLS
TCL, TVL, & TSS VAV Terminal Units**

TABLE 1

Mounting: Suspended Rigid.	S _{DS} (g)	H _f / R _μ	A _{flx-h}	A _{rig-h}	A _{flx-v}	A _{rig-v}	I _p
	2.50	3.5 / 1.3	4.00	3.00	1.68	0.68	1.5
	2.50	1.0 / 1.0					

Product Construction: Single or double wall, 20GA or 22GA galvanized carbon steel casing, NEMA 1 carbon steel electrical enclosure, galvanized carbon steel round or rectangular inlet & damper, 1/2" foam or fiberglass insulation.

Subcomponents: Available subcomponents are listed in Table 2.

Model Number	Dimensions (in)			Max. Wt. (lb)	Description / Notes	Basis
	Depth	Width	Height			
Johnson Controls TCL / Enviro-Tec CFL - Series Flow, Fan-Powered-Low-Height VAV Terminals						
TCL 0406 / CFL 0406	47.5	25.0	11.0	78	UUT: single wall	UUT 16
TCL 0606 / CFL 0606	43.7	25.0	11.0	78		INTERP
TCL 0806 / CFL 0806	43.7	25.0	11.0	78		INTERP
TCL 0608 / CFL 0608	43.7	32.0	11.0	105		INTERP
TCL 0808 / CFL 0808	43.7	32.0	11.0	105		INTERP
TCL 1008 / CFL 1008	43.7	32.0	11.0	105		INTERP
TCL 1011 / CFL 1011	47.7	36.0	12.0	113		INTERP
TCL 1211 / CFL 1211	47.7	36.0	12.0	113		INTERP
TCL 1019 / CFL 1019	47.5	50.0	11.0	150		INTERP
TCL 1219 / CFL 1219	47.5	50.0	11.0	150		INTERP
TCL 1319 / CFL 1319	47.5	50.0	11.0	150	UUT: single wall	UUT 20
Johnson Controls TVL / Enviro-Tec VFL - Parallel Flow, Fan-Powered, Low-Height VAV Terminals						
TVL 0405 / VFL 0405	34.0	36.0	10.6	63		EXTRAP
TVL 0505 / VFL 0505	34.0	36.0	10.6	63		EXTRAP
TVL 0605 / VFL 0605	30.0	36.0	10.6	63	UUT: single wall	UUT 18
TVL 0805 / VFL 0805	30.0	36.0	10.6	63		INTERP
TVL 1009 / VFL 1009	42.5	43.0	10.6	86		INTERP
TVL 1209 / VFL 1209	42.5	43.0	10.6	86		INTERP
TVL 1215 / VFL 1215	46.5	47.0	12.0	113		INTERP
TVL 1415 / VFL 1415	46.5	47.0	12.0	113	UUT: single wall	UUT 21

TABLE 1 continues on the next page.

**JOHNSON CONTROLS
TCL, TVL, & TSS VAV Terminal Units**

TABLE 1 (CONTINUED)

Model Number	Dimensions (in)			Max. Wt. (lb)	Description / Notes	Basis	
	Depth	Width	Height				
Johnson Controls TSS / Enviro-Tec SDR - Single-Duct VAV Terminals							
TSS 04 / SDR 04	21.5	16.0	10.0	23	UUT: double wall	UUT 37	
TSS 05 / SDR 05	21.5	16.0	10.0	25		INTERP	
TSS 06 / SDR 06	17.5	16.0	10.0	24		INTERP	
TSS 08 / SDR 08	17.5	18.0	10.0	26		INTERP	
TSS 10 / SDR 10	19.5	20.0	12.5	32		INTERP	
TSS 12 / SDR 12	19.5	22.0	15.0	36		INTERP	
TSS 14 / SDR 14	24.0	26.0	17.5	44		INTERP	
TSS 16 / SDR 16	24.0	30.0	17.5	54		UUT: double wall	UUT 38
TSS 19 / SDR 19	29.0	36.0	17.5	62		INTERP	
TSS 22 / SDR 22	29.0	40.0	17.5	65		INTERP	
Johnson Controls TSSWC / Enviro-Tec SDRWC - Single-Duct, Water Coil VAV Terminals							
TSSWC 04 / SDRWC 04	26.0	16.0	10.0	38	UUT: double wall, 4 row coil	UUT 35	
TSSWC 05 / SDRWC 05	26.0	16.0	10.0	38		INTERP	
TSSWC 06 / SDRWC 06	22.0	16.0	10.0	38		INTERP	
TSSWC 08 / SDRWC 08	22.0	18.0	10.0	39		INTERP	
TSSWC 10 / SDRWC 10	24.0	20.0	12.5	50		INTERP	
TSSWC 12 / SDRWC 12	24.0	22.0	15.0	58		INTERP	
TSSWC 14 / SDRWC 14	28.0	26.0	17.5	74		INTERP	
TSSWC 16 / SDRWC 16	28.0	30.0	17.5	92		UUT: double wall, 4 row coil	UUT 36
TSSWC 19 / SDRWC 19	23.5	36.0	17.5	102		INTERP	
TSSWC 22 / SDRWC 22	23.5	40.0	17.5	109		INTERP	
Johnson Controls TSSEH / Enviro-Tec SDREH - Single-Duct, Electric Heater VAV Terminals							
TSSEH 04 / SDREH 04	51.5	18.0	10.0	60	UUT: double wall	UUT 39	
TSSEH 05 / SDREH 05	51.5	18.0	10.0	79		INTERP	
TSSEH 06 / SDREH 06	47.5	18.0	10.0	77		INTERP	
TSSEH 08 / SDREH 08	47.5	20.0	10.0	87		INTERP	
TSSEH 10 / SDREH 10	47.5	22.0	12.5	96		INTERP	
TSSEH 12 / SDREH 12	47.5	24.0	15.0	110		INTERP	
TSSEH 14 / SDREH 14	47.5	28.0	17.5	122		INTERP	
TSSEH 16 / SDREH 16	47.5	32.0	17.5	122		UUT: double wall	UUT 40
TSSEH 19 / SDREH 19	46.0	38.0	17.5	128		INTERP	
TSSEH 22 / SDREH 22	46.0	42.0	17.5	128		UUT: double wall	UUT 41
Johnson Controls TSSSA / Enviro-Tec SDRSA - Single-Duct, Sound Attenuator VAV Terminals							
TSSSA 16 / SDRSA 16	56.5	30.0	17.5	90		INTERP	
TSSSA 19 / SDRSA 19	58.0	36.0	17.5	120		INTERP	
TSSSA 22 / SDRSA 22	58.0	40.0	17.5	127		INTERP	
Johnson Controls TSSSAWC / Enviro-Tec SDRSAWC - Single-Duct, Sound Attenuator, Water Coil VAV Terminals							
TSSSAWC 16 / SDRSAWC 16	61.0	30.0	17.5	141	UUT: double wall, 4 row coil	UUT 42	
TSSSAWC 19 / SDRSAWC 19	63.0	36.0	17.5	160		INTERP	
TSSSAWC 22 / SDRSAWC 22	63.0	40.0	17.5	196	UUT: double wall, 4 row coil	UUT 43	

End of TABLE 1. Notes, information, and seismic parameters are shown at the beginning of the table.

JOHNSON CONTROLS
TCL, TVL, & TSS VAV Terminal Units

TABLE 2 - SUBCOMPONENTS

Mounting: Mounted within unit.	S _{DS} (g)			H _f / R _μ	A _{flx-h}	A _{rig-h}	A _{flx-v}	A _{rig-v}	I _p
	2.50			3.5 / 1.3	4.00	3.00	1.68	0.68	
	2.50			1.0 / 1.0					
Construction/Options: Model number uniquely identifies manufacturer, materials, and configuration of subcomponents.									
Model Number	Dimensions (in)			Max. Wt. (lb)	Description / Notes	Basis			
	Depth	Width	Height						
Type: Coils - Mfr: Johnson Controls - Material: AL fin, galv. CS casing									
01-20554	4.4	10.0	10.0	12	Size 4, 1-4 Row	EXTRAP			
01-20554	4.4	10.0	10.0	12	Size 4, 4 Row	UUT 35			
01-20570	4.4	12.0	10.0	13	Size 8, 1-4 Row	INTERP			
01-20587	4.4	14.0	12.5	18	Size 10, 1-4 Row	INTERP			
01-20602	4.4	16.0	15.0	22	Size 12, 1-4 Row	INTERP			
01-20618	4.4	20.0	17.5	30	Size 14, 1-4 Row	INTERP			
01-20634	4.4	24.0	17.5	34	Size 16, 1-4 Row	INTERP			
01-20634	4.4	24.0	17.5	34	Size 16, 4 Row	UUT 36,42			
01-20651	4.4	30.0	17.5	40	Size 19, 1-4 Row	INTERP			
01-20666	4.4	34.0	17.5	44	Size 22, 1-4 Row	INTERP			
01-20666	4.4	34.0	17.5	44	Size 22, 4 Row	UUT 43			
Note: Corrugated 0.045" fins, 10 fins per inch. 0.5" diameter, 0.016" thick tubes.									
Type: Direct Drive Fan Blowers - Mfr: Morrison - Material: SS Shaft, CS Wheel									
9-4R	14.9	6.8	15.4	11.6		UUT 16			
10-4R	16.7	6.9	17.4	13.4		UUT 20			
Type: Direct Drive Fan Blowers - Mfr: Beckett - Material: SS Shaft, CS Wheel									
63600-14	9.3	9.5	9.6	8		UUT 18			
63615-02	9.8	9.8	10.7	9		UUT 21			
Type: Direct Drive Motors - Mfr: Fasco									
1/12-hp	3.3	5.1	5.1	6.8	277V	EXTRAP			
1/10-hp	3.3	5.1	5.1	9	277V	EXTRAP			
1/8-hp	3.3	5.1	5.1	9	277V	UUT 18			
1/6-hp	4.1	5.6	5.6	11	277V	UUT 16			
1/5-hp	4.3	5.6	5.6	11.1	277V	INTERP			
1/4-hp	4.3	5.6	5.6	11.1	277V	UUT20			
1/3-hp	4.6	5.6	5.6	12.8	277V	INTERP			
1/2-hp	4.8	5.6	5.6	15.1	277V	UUT 21			
Type: Electric Heaters - Mfr: Environmental Technologies - Material: SS frame, galv. CS plates									
04-06	9.0	9.9	10.0	54		UUT 39			
08-10	11.0	9.9	10.0	64		INTERP			
12	15.0	12.3	12.5	74		INTERP			
14-16	19.0	14.9	15.0	93		UUT 40			
19	27.5	14.9	15.0	114		INTERP			
22	31.5	14.9	15.0	120		UUT 41			

TABLE 2 - SUBCOMPONENTS continues on the next page.

JOHNSON CONTROLS
TCL, TVL, & TSS VAV Terminal Units

TABLE 2 - SUBCOMPONENTS (CONTINUED)

Model Number	Dimensions (in)			Max. Wt. (lb)	Description / Notes	Basis
	Depth	Width	Height			
Type: VAV Controllers - Mfr: Johnson Controls						
MS-VMA1610	2.5	7.2	7.2	1.9		UUT 37,38
MS-VMA1615	2.5	7.2	7.2	1.9		UUT 39
MS-VMA1620	2.5	7.2	7.2	1.9		16,18,20,21
MS-VMA1630	2.5	7.2	7.2	1.9		UUT 41
Type: Fanspeed Controllers - Mfr: Johnson Controls						
66-004-1000	2.0	4.0	2.0	0.4		UUT 16
66-005-1000	2.0	4.0	2.0	0.4		UUT 20
66-006-1000	2.0	4.0	2.0	0.4		UUT 18
66-007-1000	2.0	4.0	2.0	0.4		UUT 21
Type: Flowstar Airflow Sensors - Mfr: Johnson Controls						
B00-04-275	1.0	4.0	4.0	<1		See UUTs
B00-16/22-276	1.0	16.0	16.0	<1		36,38,40-43
Type: Airflow Switch - Mfr: Cleveland Controls						
DFS-221-198	2.8	4.4	6.1	1.2		UUT 39-41
Type: Disconnect Switch - Mfr: ABB						
OT80F3/B	2.9	2.1	3.6	0.6	3P 80A 600V	UUT 40,41
Type: Contactor - Mfr: Hartland						
HCC-1NQ04GG111	2.0	3.3	2.4	0.5	1P 50A 24VAC 9VA 1HP	UUT 40,41
Type: Transformers - Mfr: Hartland						
HCT-01DOBB06111	2.2	2.6	3.0	2.1	120/24VAC 50VA	35-38,42,43
HCT-03DOBB06111	2.2	2.6	3.0	2.1	277/24VAC 50VA	See UUTs

End of TABLE 2 - SUBCOMPONENTS. Notes, information, and seismic parameters are shown at the beginning of the table.

ATTACHMENT 3: UNIT UNDER TEST SUMMARIES

SPECIAL SEISMIC CERTIFICATION

UUT 16

Manufacturer: Johnson Controls
Model number: TCL 0406 / CFL 0406
Unit function: VAV Terminal Unit
Serial number: N/A

Dimensions (in)			Weight	Res. Freq. (Hz)		
Depth	Width	Height	(lb)	F-B	S-S	V
47.5	25.0	11.0	78	N/A	N/A	N/A

Code & criteria: 2024 IBC, 2025 CBC, ICC-ES AC156

Test laboratory: Dynamic Certification Laboratories

Report: 90300-1009 (dated 12-15-11), tested on 3-29-11

S _{DS} (g)	H _f / R _μ	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
2.50	3.5 / 1.3	4.00	3.00	1.68	0.68
2.50	1.0 / 1.0				

Importance Factor, I_p = 1.5: Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Mounting: Suspended rigid with (4) vertical 3/8-in threaded rods and (4) diagonal 3/16-in steel cables at approximately 45-degree angles from X/Y/Z. Threaded rods spaced 46-in by 26-in in plan. Steel cables attach to 2"x2"x14GA 45-degree bracket. Threaded rod clamps the 45-degree bracket and 90-degree and flat brackets, both 6"x3"x12GA, in each corner with standard nuts and washers plus 3"x3"x1/4" plate washer on top. Flat and 90-degree brackets each attach to the unit with (4) #12 screws. See mounting detail at end of UUT summaries.

Construction: Single wall 20GA galvanized carbon steel casing, NEMA 1 carbon steel electrical enclosure, galvanized carbon steel round inlet & damper, 1/2" foam insulation.

Subcomponents: Morrison - Direct Drive Fan Blowers (9-4R), Fasco - Direct Drive Motors (1/6-hp), Johnson Controls - VAV Controllers (MS-VMA1620), Johnson Controls - Fanspeed Controllers (66-004-1000), Johnson Controls - Flowstar Airflow Sensors (B00-04-275), Hartland - Transformers (HCT-03DOBB06111).

Testing notes: N/A



ATTACHMENT 3: UNIT UNDER TEST SUMMARIES

SPECIAL SEISMIC CERTIFICATION

UUT 18

Manufacturer: Johnson Controls
Model number: TVL 0605 / VFL 0605
Unit function: VAV Terminal Unit
Serial number: N/A

Dimensions (in)			Weight (lb)	Res. Freq. (Hz)		
Depth	Width	Height		F-B	S-S	V
30.0	36.0	10.6	63	N/A	N/A	N/A

Code & criteria: 2024 IBC, 2025 CBC, ICC-ES AC156

Test laboratory: Dynamic Certification Laboratories

Report: 90300-1009 (dated 12-15-11), tested on 3-30-11

S _{DS} (g)	H _f / R _μ	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
2.50	3.5 / 1.3	4.00	3.00	1.68	0.68
2.50	1.0 / 1.0				

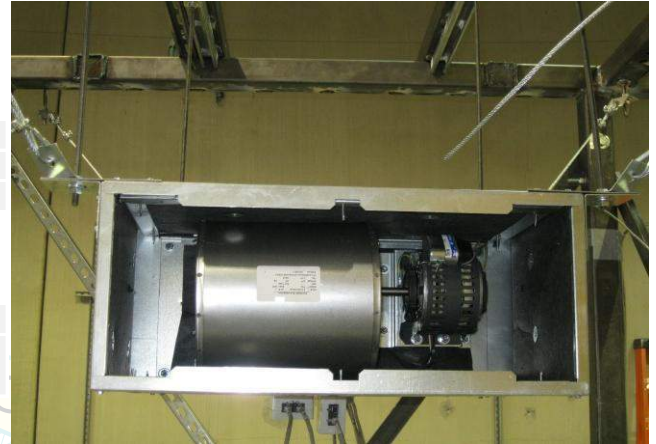
Importance Factor, I_p = 1.5: Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Mounting: Suspended rigid with (4) vertical 3/8-in threaded rods and (4) diagonal 3/16-in steel cables at approximately 45-degree angles from X/Y/Z. Threaded rods spaced 33-in by 37-in in plan. Steel cables attach to 2"x2"x14GA 45-degree bracket. Threaded rod clamps the 45-degree bracket and 90-degree and flat brackets, both 6"x3"x12GA, in each corner with standard nuts and washers plus 3"x3"x1/4" plate washer on top. Flat and 90-degree brackets each attach to the unit with (4) #12 screws. See mounting detail at end of UUT summaries.

Construction: Single wall 20GA galvanized carbon steel casing, NEMA 1 carbon steel electrical enclosure, galvanized carbon steel round inlet & damper, 1/2" foam insulation.

Subcomponents: Beckett - Direct Drive Fan Blowers (63600-14), Fasco - Direct Drive Motors (1/8-hp), Johnson Controls - VAV Controllers (MS-VMA1620), Johnson Controls - Fanspeed Controllers (66-006-1000), Johnson Controls - Flowstar Airflow Sensors (B00-04-275), Hartland - Transformers (HCT-03DOBB06111).

Testing notes: N/A



ATTACHMENT 3: UNIT UNDER TEST SUMMARIES

SPECIAL SEISMIC CERTIFICATION

UUT 20

Manufacturer: Johnson Controls
Model number: TCL 1319 / CFL 1319
Unit function: VAV Terminal Unit
Serial number: N/A

Dimensions (in)			Weight	Res. Freq. (Hz)		
Depth	Width	Height	(lb)	F-B	S-S	V
47.5	50.0	11.0	150	N/A	N/A	N/A

Code & criteria: 2024 IBC, 2025 CBC, ICC-ES AC156

Test laboratory: Dynamic Certification Laboratories

Report: 90300-1009 (dated 12-15-11), tested on 4-5-11

S _{DS} (g)	H _f / R _μ	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
2.50	3.5 / 1.3	4.00	3.00	1.68	0.68
2.50	1.0 / 1.0				

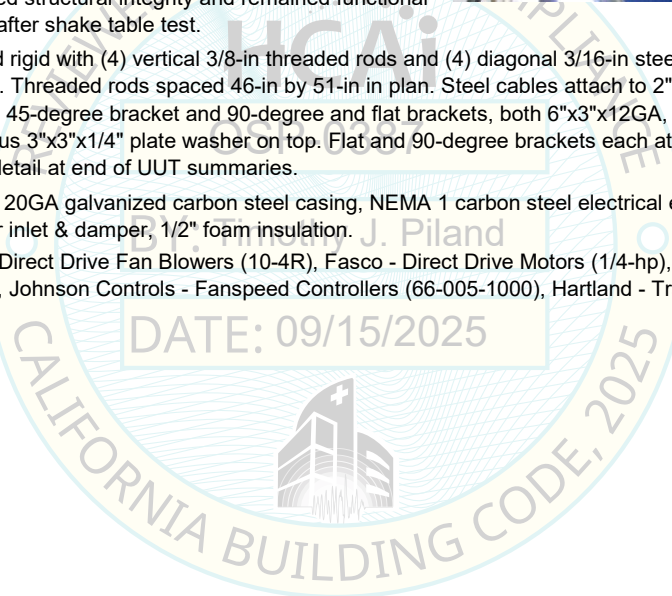
Importance Factor, I_p = 1.5: Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Mounting: Suspended rigid with (4) vertical 3/8-in threaded rods and (4) diagonal 3/16-in steel cables at approximately 45-degree angles from X/Y/Z. Threaded rods spaced 46-in by 51-in in plan. Steel cables attach to 2"x2"x14GA 45-degree bracket. Threaded rod clamps the 45-degree bracket and 90-degree and flat brackets, both 6"x3"x12GA, in each corner with standard nuts and washers plus 3"x3"x1/4" plate washer on top. Flat and 90-degree brackets each attach to the unit with (4) #12 screws. See mounting detail at end of UUT summaries.

Construction: Single wall 20GA galvanized carbon steel casing, NEMA 1 carbon steel electrical enclosure, galvanized carbon steel rectangular inlet & damper, 1/2" foam insulation.

Subcomponents: Morrison - Direct Drive Fan Blowers (10-4R), Fasco - Direct Drive Motors (1/4-hp), Johnson Controls - VAV Controllers (MS-VMA1620), Johnson Controls - Fanspeed Controllers (66-005-1000), Hartland - Transformers (HCT-03DOBB06111).

Testing notes: N/A



ATTACHMENT 3: UNIT UNDER TEST SUMMARIES

SPECIAL SEISMIC CERTIFICATION

UUT 21

Manufacturer: Johnson Controls
Model number: TVL 1415 / VFL 1415
Unit function: VAV Terminal Unit
Serial number: N/A

Dimensions (in)			Weight	Res. Freq. (Hz)		
Depth	Width	Height	(lb)	F-B	S-S	V
46.5	47.0	12.0	113	N/A	N/A	N/A

Code & criteria: 2024 IBC, 2025 CBC, ICC-ES AC156

Test laboratory: Dynamic Certification Laboratories

Report: 90300-1009 (dated 12-15-11), tested on 4-6-11

S _{DS} (g)	H _f / R _μ	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
2.50	3.5 / 1.3	4.00	3.00	1.68	0.68
2.50	1.0 / 1.0				

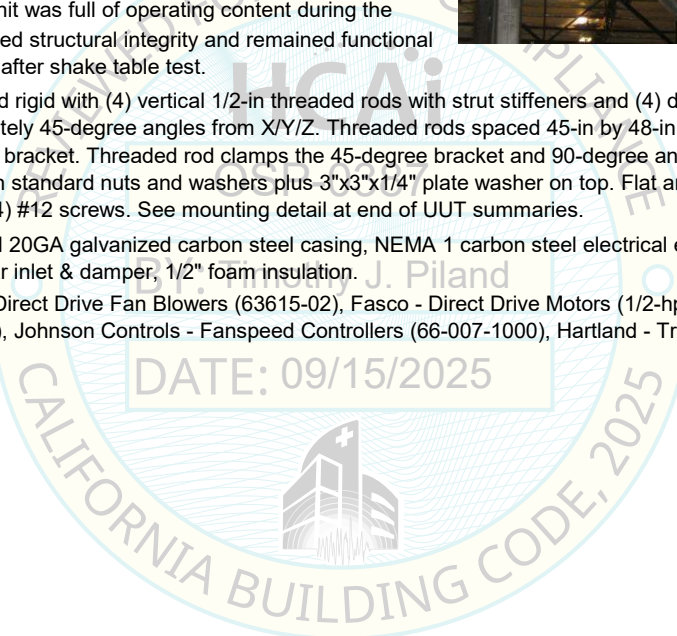
Importance Factor, I_p = 1.5: Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Mounting: Suspended rigid with (4) vertical 1/2-in threaded rods with strut stiffeners and (4) diagonal 3/16-in steel cables at approximately 45-degree angles from X/Y/Z. Threaded rods spaced 45-in by 48-in in plan. Steel cables attach to 2"x2"x14GA 45-degree bracket. Threaded rod clamps the 45-degree bracket and 90-degree and flat brackets, both 6"x3"x12GA, in each corner with standard nuts and washers plus 3"x3"x1/4" plate washer on top. Flat and 90-degree brackets each attach to the unit with (4) #12 screws. See mounting detail at end of UUT summaries.

Construction: Single wall 20GA galvanized carbon steel casing, NEMA 1 carbon steel electrical enclosure, galvanized carbon steel rectangular inlet & damper, 1/2" foam insulation.

Subcomponents: Beckett - Direct Drive Fan Blowers (63615-02), Fasco - Direct Drive Motors (1/2-hp), Johnson Controls - VAV Controllers (MS-VMA1620), Johnson Controls - Fanspeed Controllers (66-007-1000), Hartland - Transformers (HCT-03DOBB06111).

Testing notes: N/A



ATTACHMENT 3: UNIT UNDER TEST SUMMARIES

SPECIAL SEISMIC CERTIFICATION

UUT 35

Manufacturer: Johnson Controls

Model number: TSSWC 04 / SDRWC 04

Unit function: VAV Terminal Unit

Serial number: N/A

Dimensions (in)			Weight (lb)	Res. Freq. (Hz)		
Depth	Width	Height		F-B	S-S	V
26.0	16.0	10.0	38	N/A	N/A	N/A

Code & criteria: 2024 IBC, 2025 CBC, ICC-ES AC156

Test laboratory: Dynamic Certification Laboratories

Report: 13001-1301 (dated 4-9-13), tested on 3-26-13

S _{DS} (g)	H _f / R _μ	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
2.50	3.5 / 1.3	4.00	3.00	1.68	0.68
2.50	1.0 / 1.0				

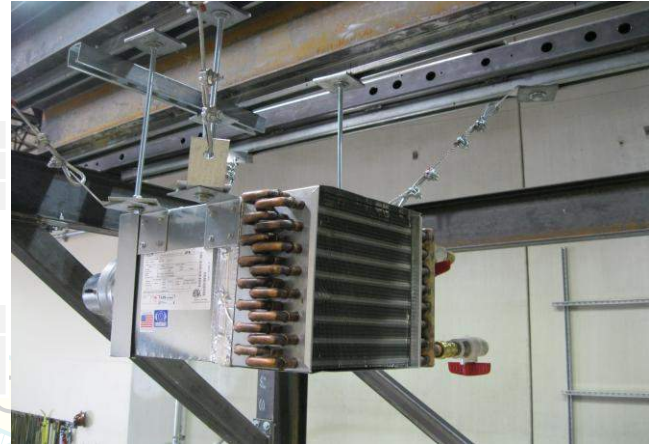
Importance Factor, I_p = 1.5: Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Mounting: Suspended rigid with (4) vertical 3/8-in threaded rods and (4) diagonal 3/16-in steel cables at approximately 45-degree angles from X/Y/Z. Threaded rods spaced 18-in by 10-in in plan. Steel cables attach to 2"x2"x14GA 45-degree bracket. Threaded rod clamps the 45-degree bracket and 90-degree and flat brackets, both 6"x3"x12GA, in each corner with standard nuts and washers plus 3"x3"x1/4" plate washer on top. Flat and 90-degree brackets each attach to the unit with (4) #14 screws. See mounting detail at end of UUT summaries.

Construction: Double wall 22GA galvanized carbon steel casing, NEMA 1 carbon steel electrical enclosure, galvanized carbon steel round inlet & damper, 1/2" fiberglass insulation.

Subcomponents: Johnson Controls - Coils (01-20554), Johnson Controls - Flowstar Airflow Sensors (B00-04-275), Hartland - Transformers (HCT-01DOBB06111).

Testing notes: N/A



DATE: 09/15/2025

ATTACHMENT 3: UNIT UNDER TEST SUMMARIES

SPECIAL SEISMIC CERTIFICATION

UUT 36

Manufacturer: Johnson Controls
Model number: TSSWC 16 / SDRWC 16
Unit function: VAV Terminal Unit
Serial number: N/A

Dimensions (in)			Weight	Res. Freq. (Hz)		
Depth	Width	Height	(lb)	F-B	S-S	V
28.0	30.0	17.5	92	N/A	N/A	N/A

Code & criteria: 2024 IBC, 2025 CBC, ICC-ES AC156

Test laboratory: Dynamic Certification Laboratories

Report: 13001-1301 (dated 4-9-13), tested on 3-25-13

S _{DS} (g)	H _f / R _μ	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
2.50	3.5 / 1.3	4.00	3.00	1.68	0.68
2.50	1.0 / 1.0				

Importance Factor, I_p = 1.5: Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Mounting: Suspended rigid with (4) vertical 3/8-in threaded rods and (4) diagonal 3/16-in steel cables at approximately 45-degree angles from X/Y/Z. Threaded rods spaced 18-in by 10-in in plan. Steel cables attach to 2"x2"x14GA 45-degree bracket. Threaded rod clamps the 45-degree bracket and 90-degree and flat brackets, both 6"x3"x12GA, in each corner with standard nuts and washers plus 3"x3"x1/4" plate washer on top. Flat and 90-degree brackets each attach to the unit with (4) #14 screws. See mounting detail at end of UUT summaries.

Construction: Double wall 22GA galvanized carbon steel casing, NEMA 1 carbon steel electrical enclosure, galvanized carbon steel round inlet & damper, 1/2" fiberglass insulation.

Subcomponents: Johnson Controls - Coils (01-20634), Johnson Controls - Flowstar Airflow Sensors (B00-16/22-276), Hartland - Transformers (HCT-01DOBB06111).

Testing notes: N/A



DATE: 09/15/2025

ATTACHMENT 3: UNIT UNDER TEST SUMMARIES

SPECIAL SEISMIC CERTIFICATION

UUT 37

Manufacturer: Johnson Controls
Model number: TSS 04 / SDR 04
Unit function: VAV Terminal Unit
Serial number: N/A

Dimensions (in)			Weight	Res. Freq. (Hz)		
Depth	Width	Height	(lb)	F-B	S-S	V
21.5	16.0	10.0	23	N/A	N/A	N/A

Code & criteria: 2024 IBC, 2025 CBC, ICC-ES AC156

Test laboratory: Dynamic Certification Laboratories

Report: 13001-1301 (dated 4-9-13), tested on 3-26-13

S _{DS} (g)	H _f / R _μ	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
2.50	3.5 / 1.3	4.00	3.00	1.68	0.68
2.50	1.0 / 1.0				

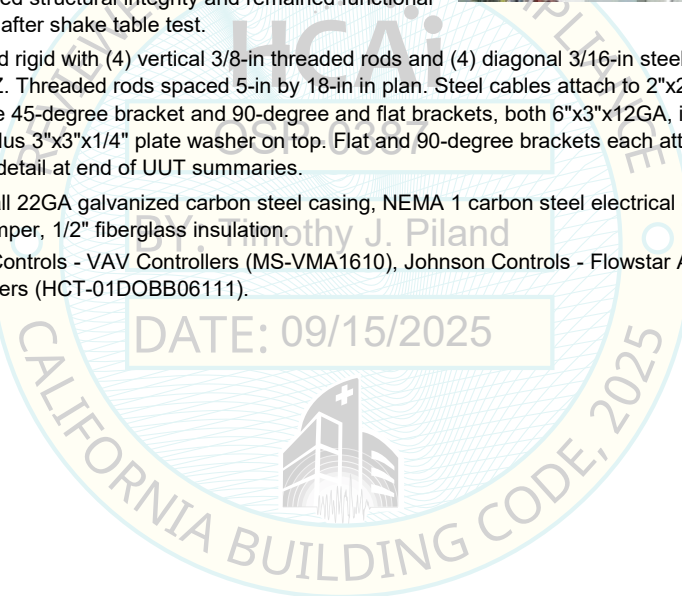
Importance Factor, I_p = 1.5: Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Mounting: Suspended rigid with (4) vertical 3/8-in threaded rods and (4) diagonal 3/16-in steel cables at approximately 45-degree angles from X/Y/Z. Threaded rods spaced 5-in by 18-in in plan. Steel cables attach to 2"x2"x14GA 45-degree bracket. Threaded rod clamps the 45-degree bracket and 90-degree and flat brackets, both 6"x3"x12GA, in each corner with standard nuts and washers plus 3"x3"x1/4" plate washer on top. Flat and 90-degree brackets each attach to the unit with (4) #12 screws. See mounting detail at end of UUT summaries.

Construction: Double wall 22GA galvanized carbon steel casing, NEMA 1 carbon steel electrical enclosure, galvanized carbon steel round inlet & damper, 1/2" fiberglass insulation.

Subcomponents: Johnson Controls - VAV Controllers (MS-VMA1610), Johnson Controls - Flowstar Airflow Sensors (B00-04-275), Hartland - Transformers (HCT-01DOBB06111).

Testing notes: N/A



ATTACHMENT 3: UNIT UNDER TEST SUMMARIES

SPECIAL SEISMIC CERTIFICATION

UUT 38

Manufacturer: Johnson Controls
Model number: TSS 16 / SDR 16
Unit function: VAV Terminal Unit
Serial number: N/A

Dimensions (in)			Weight	Res. Freq. (Hz)		
Depth	Width	Height	(lb)	F-B	S-S	V
24.0	30.0	17.5	54	N/A	N/A	N/A

Code & criteria: 2024 IBC, 2025 CBC, ICC-ES AC156

Test laboratory: Dynamic Certification Laboratories

Report: 13001-1301 (dated 4-9-13), tested on 3-26-13

S _{DS} (g)	H _f / R _μ	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
2.50	3.5 / 1.3	4.00	3.00	1.68	0.68
2.50	1.0 / 1.0				

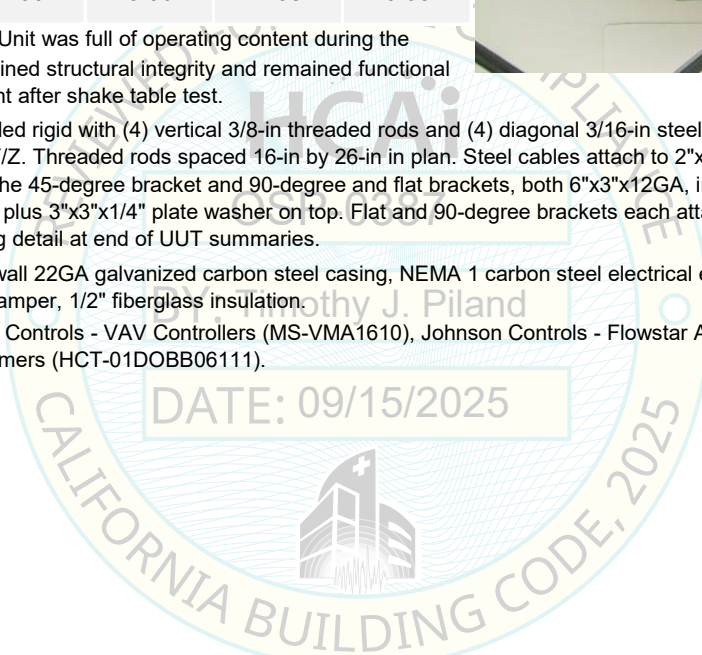
Importance Factor, I_p = 1.5: Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Mounting: Suspended rigid with (4) vertical 3/8-in threaded rods and (4) diagonal 3/16-in steel cables at approximately 45-degree angles from X/Y/Z. Threaded rods spaced 16-in by 26-in in plan. Steel cables attach to 2"x2"x14GA 45-degree bracket. Threaded rod clamps the 45-degree bracket and 90-degree and flat brackets, both 6"x3"x12GA, in each corner with standard nuts and washers plus 3"x3"x1/4" plate washer on top. Flat and 90-degree brackets each attach to the unit with (4) #12 screws. See mounting detail at end of UUT summaries.

Construction: Double wall 22GA galvanized carbon steel casing, NEMA 1 carbon steel electrical enclosure, galvanized carbon steel round inlet & damper, 1/2" fiberglass insulation.

Subcomponents: Johnson Controls - VAV Controllers (MS-VMA1610), Johnson Controls - Flowstar Airflow Sensors (B00-16/22-276), Hartland - Transformers (HCT-01DOBB06111).

Testing notes: N/A



ATTACHMENT 3: UNIT UNDER TEST SUMMARIES

SPECIAL SEISMIC CERTIFICATION

UUT 39

Manufacturer: Johnson Controls
Model number: TSSEH 04 / SDREH 04
Unit function: VAV Terminal Unit
Serial number: N/A

Dimensions (in)			Weight	Res. Freq. (Hz)		
Depth	Width	Height	(lb)	F-B	S-S	V
51.5	18.0	10.0	60	N/A	N/A	N/A

Code & criteria: 2024 IBC, 2025 CBC, ICC-ES AC156

Test laboratory: Dynamic Certification Laboratories

Report: 13001-1301b (dated 1-15-14), tested on 8-20-13

S _{DS} (g)	H _f / R _μ	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
2.50	3.5 / 1.3	4.00	3.00	1.68	0.68
2.50	1.0 / 1.0				

Importance Factor, I_p = 1.5: Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Mounting: Suspended rigid with (4) vertical 1/2-in threaded rods and (4) diagonal 3/16-in steel cables at approximately 45-degree angles from X/Y/Z. Threaded rods spaced 53-in by 17-in in plan. Steel cables attach to 2"x2"x14GA 45-degree bracket. Threaded rod clamps the 45-degree bracket and 90-degree and flat brackets, both 6"x3"x12GA, in each corner with standard nuts and washers plus 3"x3"x1/4" plate washer on top. Flat and 90-degree brackets each attach to the unit with (4) #12 screws. See mounting detail at end of UUT summaries.

Construction: Double wall 22GA galvanized carbon steel casing, NEMA 1 carbon steel electrical enclosure, galvanized carbon steel round inlet & damper, 1/2" fiberglass insulation.

Subcomponents: Environmental Technologies - Electric Heaters (04-06), Johnson Controls - VAV Controllers (MS-VMA1615), Johnson Controls - Flowstar Airflow Sensors (B00-04-275), Cleveland Controls - Airflow Switch (DFS-221-198), Hartland - Transformers (HCT-03DOBB06111).

Testing notes: N/A



ATTACHMENT 3: UNIT UNDER TEST SUMMARIES

SPECIAL SEISMIC CERTIFICATION

UUT 40

Manufacturer: Johnson Controls
Model number: TSSEH 16 / SDREH 16
Unit function: VAV Terminal Unit
Serial number: N/A

Dimensions (in)			Weight	Res. Freq. (Hz)		
Depth	Width	Height	(lb)	F-B	S-S	V
47.5	32.0	17.5	122	N/A	N/A	N/A

Code & criteria: 2024 IBC, 2025 CBC, ICC-ES AC156

Test laboratory: Dynamic Certification Laboratories

Report: 13001-1301b (dated 1-15-14), tested on 8-16-13

S _{DS} (g)	H _f / R _μ	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
2.50	3.5 / 1.3	4.00	3.00	1.68	0.68
2.50	1.0 / 1.0				

Importance Factor, I_p = 1.5: Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Mounting: Suspended rigid with (4) vertical 1/2-in threaded rods and (4) diagonal 3/16-in steel cables at approximately 45-degree angles from X/Y/Z. Threaded rods spaced 48-in by 31-in in plan. Steel cables attach to 2"x2"x14GA 45-degree bracket. Threaded rod clamps the 45-degree bracket and 90-degree and flat brackets, both 6"x3"x12GA, in each corner with standard nuts and washers plus 3"x3"x1/4" plate washer on top. Flat and 90-degree brackets each attach to the unit with (4) #12 screws. See mounting detail at end of UUT summaries.

Construction: Double wall 22GA galvanized carbon steel casing, NEMA 1 carbon steel electrical enclosure, galvanized carbon steel round inlet & damper, 1/2" fiberglass insulation.

Subcomponents: Environmental Technologies - Electric Heaters (14-16), Johnson Controls - Flowstar Airflow Sensors (B00-16/22-276), Cleveland Controls - Airflow Switch (DFS-221-198), ABB - Disconnect Switch (OT80F3/B), Hartland - Contactor (HCC-1NQ04GG111), Hartland - Transformers (HCT-03DOBB06111).

Testing notes: N/A



UUT 41

Manufacturer: Johnson Controls
Model number: TSSEH 22 / SDREH 22
Unit function: VAV Terminal Unit
Serial number: N/A

Dimensions (in)			Weight (lb)	Res. Freq. (Hz)		
Depth	Width	Height		F-B	S-S	V
46.0	42.0	17.5	128	N/A	N/A	N/A

Code & criteria: 2024 IBC, 2025 CBC, ICC-ES AC156

Test laboratory: Dynamic Certification Laboratories

Report: 13001-1301b (dated 1-15-14), tested on 8-16-13

S _{DS} (g)	H _f / R _μ	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
2.50	3.5 / 1.3	4.00	3.00	1.68	0.68
2.50	1.0 / 1.0				

Importance Factor, I_p = 1.5: Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Mounting: Suspended rigid with (4) vertical 1/2-in threaded rods and (4) diagonal 3/16-in steel cables at approximately 45-degree angles from X/Y/Z. Threaded rods spaced 40-in by 41-in in plan. Steel cables attach to 2"x2"x14GA 45-degree bracket. Threaded rod clamps the 45-degree bracket and 90-degree and flat brackets, both 6"x3"x12GA, in each corner with standard nuts and washers plus 3"x3"x1/4" plate washer on top. Flat and 90-degree brackets each attach to the unit with (4) #12 screws. See mounting detail at end of UUT summaries.

Construction: Double wall 22GA galvanized carbon steel casing, NEMA 1 carbon steel electrical enclosure, galvanized carbon steel rectangular inlet & damper, 1/2" fiberglass insulation.

Subcomponents: Environmental Technologies - Electric Heaters (22), Johnson Controls - VAV Controllers (MS-VMA1630), Johnson Controls - Flowstar Airflow Sensors (B00-16/22-276), Cleveland Controls - Airflow Switch (DFS-221-198), ABB - Disconnect Switch (OT80F3/B), Hartland - Contactor (HCC-1NQ04GG111), Hartland - Transformers (HCT-03DOBB06111).

Testing notes: N/A



ATTACHMENT 3: UNIT UNDER TEST SUMMARIES

SPECIAL SEISMIC CERTIFICATION

UUT 42

Manufacturer: Johnson Controls
 Model number: TSSSAWC 16 / SDRSAWC 16
 Unit function: VAV Terminal Unit
 Serial number: N/A

Dimensions (in)			Weight	Res. Freq. (Hz)		
Depth	Width	Height	(lb)	F-B	S-S	V
61.0	30.0	17.5	141	N/A	N/A	N/A

Code & criteria: 2024 IBC, 2025 CBC, ICC-ES AC156

Test laboratory: Dynamic Certification Laboratories

Report: 13001-1301b (dated 1-15-14), tested on 8-15-13

S _{DS} (g)	H _f / R _μ	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
2.50	3.5 / 1.3	4.00	3.00	1.68	0.68
2.50	1.0 / 1.0				

Importance Factor, I_p = 1.5: Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Mounting: Suspended rigid with (4) vertical 1/2-in threaded rods and (4) diagonal 3/16-in steel cables at approximately 45-degree angles from X/Y/Z. Threaded rods spaced 58-in by 31-in in plan. Steel cables attach to 2"x2"x14GA 45-degree bracket. Threaded rod clamps the 45-degree bracket and 90-degree and flat brackets, both 6"x3"x12GA, in each corner with standard nuts and washers plus 3"x3"x1/4" plate washer on top. Flat and 90-degree brackets each attach to the unit with (4) #12 screws. See mounting detail at end of UUT summaries.

Construction: Double wall 22GA galvanized carbon steel casing, NEMA 1 carbon steel electrical enclosure, galvanized carbon steel round inlet & damper, 1/2" fiberglass insulation.

Subcomponents: Johnson Controls - Coils (01-20634), Johnson Controls - Flowstar Airflow Sensors (B00-16/22-276), Hartland - Transformers (HCT-01DOBB06111).

Testing notes: N/A



DATE: 09/15/2025

ATTACHMENT 3: UNIT UNDER TEST SUMMARIES

SPECIAL SEISMIC CERTIFICATION

UUT 43

Manufacturer: Johnson Controls

Model number: TSSSAWC 22 / SDRSAWC 16

Unit function: VAV Terminal Unit

Serial number: N/A

Dimensions (in)			Weight	Res. Freq. (Hz)		
Depth	Width	Height	(lb)	F-B	S-S	V
63.0	40.0	17.5	196	N/A	N/A	N/A

Code & criteria: 2024 IBC, 2025 CBC, ICC-ES AC156

Test laboratory: Dynamic Certification Laboratories

Report: 13001-1301b (dated 1-15-14), tested on 8-19-13

S _{DS} (g)	H _f / R _μ	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
2.50	3.5 / 1.3	4.00	3.00	1.68	0.68
2.50	1.0 / 1.0				

Importance Factor, I_p = 1.5: Unit was full of operating content during the shake table test. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Mounting: Suspended rigid with (4) vertical 1/2-in threaded rods and (4) diagonal 3/16-in steel cables at approximately 45-degree angles from X/Y/Z. Threaded rods spaced 61-in by 39-in in plan. Steel cables attach to 2"x2"x14GA 45-degree bracket. Threaded rod clamps the 45-degree bracket and 90-degree and flat brackets, both 6"x3"x12GA, in each corner with standard nuts and washers plus 3"x3"x1/4" plate washer on top. Flat and 90-degree brackets each attach to the unit with (4) #12 screws. See mounting detail at end of UUT summaries.

Construction: Double wall 22GA galvanized carbon steel casing, NEMA 1 carbon steel electrical enclosure, galvanized carbon steel rectangular inlet & damper, 1/2" fiberglass insulation.

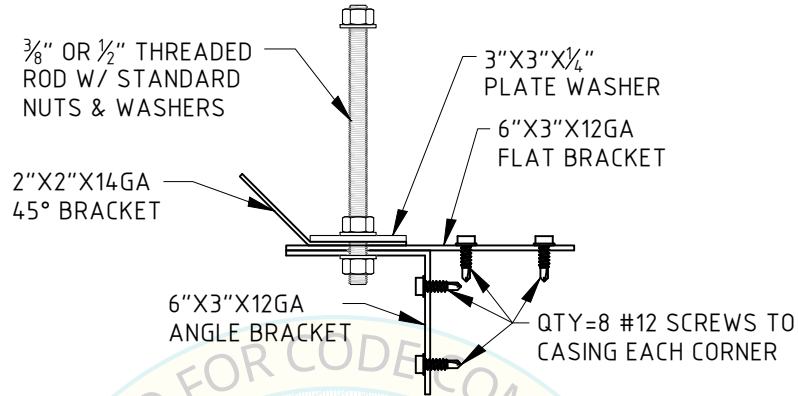
Subcomponents: Johnson Controls - Coils (01-20666), Johnson Controls - Flowstar Airflow Sensors (B00-16/22-276), Hartland - Transformers (HCT-01DOBB06111).

Testing notes: N/A



DATE: 09/15/2025

MOUNTING DETAIL



MOUNTING DETAIL

NOT TO SCALE

Mounting:

Suspended rigid with (4) vertical 3/8-in or 1/2-in threaded rods and (4) diagonal 3/16-in steel cables at approximately 45-degree angles from X/Y/Z. Steel cables attach to 2"x2"x14GA 45-degree bracket. Threaded rod clamps the 45-degree bracket and 90-degree and flat brackets, both 6"x3"x12GA, in each corner with standard nuts and washers plus 3"x3"x1/4" plate washer on top. Flat and 90-degree brackets each attach to the unit with (4) #12 screws.