APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0531

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Neptronic

Manufacturer's Technical Representative: Christian Soumis

Mailing Address: 400 Bd Lebeau, Saint-Laurent, QC H4N1R6

Telephone: (800) 361-2308 Email: soumis@neptronic.com

Product Information

Product Name: Air Conditioning Units

Product Type: Humidification Systems

Product Model Number: See Product Table Attached

General Description: SKS4 are steam to steam humidifiers, SKG4 are gas fired humidifiers, SKD-MS and MF SAM are steam grid distributors, MS are steam grid distributors, and SKE4 are electric humidifiers.

Mounting Description: Rigid Floor & Rigid Wall Mounted, Isolated Wall Mounted, Air Handler Mounted & Ceiling Suspended

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: The VMC Group

Contact Person: John Giuliano

Mailing Address: 113 Main Street, Bloomingdale, NJ 07403

Telephone: (973) 838-1780 Email: john.giuliano@thevmcgroup.com

Title: President

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

Company Name: THE VMC GROUP

Name: Kenneth Tarlow California License Number: S2851

Mailing Address: 980 9th Street, 16th Floor, Sacramento, CA 95814

Telephone: (832) 627-2214 Email: ken.tarlow@thevmcgroup.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: Kelly Leplace

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

Telephone: (775) 358-5085 Email: kelly@shaketest.com

Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) =	1.44 (Rig Bse/Wll); 4.50 (Iso Wll); 1.50 (Duct) [All Sds=2.0 Roof]; 1.125 (Rig Bse/Wll); 1.88 (Iso Wll); 1.13 (Duct) [for Sds=2.5 Gnd]
S_{DS} (Design spectral response acceleration at short period, g) =	2.0 (@ z/h=1.0) [all units]; 2.5 (@ z/h=0.0) [except noted AHU mount unit]
a_p (Amplification factor) =	1 (Rigid Base/Wall); 2.5 (Isolated Wall); 2.5 (Duct)
R_p (Response modification factor) =	2.5 (Rigid Base/Wall); 2.0 (Isolated Wall); 6 (Duct)
Ω_0 (System overstrength factor) =	2.0
I_p (Importance factor) =	1.5
z/h (Height ratio factor) =	1 and 0
Natural frequencies (Hz) =	See Attachment
Overall dimensions and weight =	See Attachment

OSHPD Approval (For Office Use Only) - Approval Expires on 12/31/2025

Date:	9/3/2021		
Name:	Mohammad Karim	Title:	Supervisor, Health Facilities
Special Seismic Certification Valid Up to: S_{DS} (g) =	See Above	z/h =	See Above
Condition of Approval (if applicable):			

Table 1a - Product Line Matrix - Base Mounted Units

Product	Material	Model	Shake Tested Model Nomenclature	Max Rating	Max Package Dimensions [in]			Max Weight [lbs]	Mounting Configuration	UUT
					Length	Width	Height			
SKE4W (Outdoor)	Carbon Steel	SKE4-N02W	SKE402W	2kW	14.0	25.8	31.0	130.0	Rigid Base Mounting	UUT-01
		SKE4-N02W	N/A	2kW	14.8	26.6	31.1	130.0		Interpolated
		SKE4-N03W	N/A	3.7kW						Interpolated
		SKE4-N04W	N/A	4kW						Interpolated
		SKE4-N06W	N/A	6kW						Interpolated
		SKE4-N08W	N/A	8kW	17.3	29.8	41.1	175.0		Interpolated
		SKE4-N10W	N/A	10kW						Interpolated
		SKE4-N14W	N/A	13.5kW						Interpolated
		SKE4-N15W	N/A	15kW						Interpolated
		SKE4-N16W	N/A	16kW						Interpolated
		SKE4-N20W	N/A	20kW						Interpolated
		SKE4-N22W	N/A	22kW						Interpolated
		SKE4-N25W	N/A	25kW						Interpolated
		SKE4-N30W	N/A	30kW						Interpolated
		SKE4-N32W	N/A	32kW						Interpolated
		SKE4-N20 LW	N/A	20kW		40.8		285.0		Interpolated
		SKE4-N36W	N/A	36kW						Interpolated
		SKE4-N40W	N/A	40kW						Interpolated
		SKE4-N44W	N/A	44kW						Interpolated
		SKE4-N50W	N/A	50kW						Interpolated
		SKE4-N52W	N/A	52kW						Interpolated
		SKE4-N60W	N/A	60kW						Interpolated
		SKE4-N63W	N/A	63kW						Interpolated
		SKE4-N30 XW	N/A	30kW	29.8	40.5	55.7	590.0		Interpolated
		SKE4-N40 XW	N/A	40kW						Interpolated
		SKE4-N66W	N/A	66kW						Interpolated
		SKE4-N70W	N/A	70kW						Interpolated
		SKE4-N74W	N/A	74kW						Interpolated
		SKE4-N80W	N/A	80kW						Interpolated
		SKE4-N82W	N/A	82kW						Interpolated
		SKE4-N90W	N/A	90kW						Interpolated
		SKE4-N100W	N/A	100kW	29.8	40.5	55.7	590.0		Interpolated
		SKE4-N90W	SKE490W	90kW	28.6	38.0	55.8	590.0		UUT-02

Table 1a - Product Line Matrix - Base Mounted Units (Continued)

Product	Material	Model	Shake Tested Model Nomenclature	Max Rating	Max Package Dimensions [in]			Max Weight [lbs]	Mounting Configuration	UUT
					Length	Width	Height			
SKS4	Carbon Steel	SKS4-050-SLP	N/A	50lbs/hr at 15PSI	45.7	22.3	30.1	482.0	Rigid Base Mounting	Extrapolated
		SKS4-100-SLP	SKS-100-SLPA	100lbs/hr at 15PSI	45.8	19.7	31.0	498.0		UUT-05
		SKS4-100-SLP	N/A	100lbs/hr at 15PSI	45.7	22.3	30.1	487.0		Interpolated
		SKS4-130-SLP	N/A	130lbs/hr at 15PSI				484.0		Interpolated
		SKS4-190-SLP	N/A	190lbs/hr at 15PSI		25.3	33.3	578.0		Interpolated
		SKS4-290-SLP	N/A	290lbs/hr at 15PSI				616.0		Interpolated
		SKS4-390-SLP	N/A	390lbs/hr at 15PSI		30.0	31.2	828.0		Interpolated
		SKS4-500-SLP	N/A	500lbs/hr at 15PSI				822.0		Interpolated
		SKS4-690-SLP	N/A	690lbs/hr at 15PSI	58.7	33.3	38.2	1,102.0		Interpolated
		SKS4-950-SLP	N/A	950lbs/hr at 15PSI				1,168.0		Interpolated
		SKS4-1250-SLP	N/A	1250 lbs/hr at 15PSI			46.2	1,574.0		Interpolated
		SKS4-1250-SLP	SKS-1250-SLPA	1250 lbs/hr at 15PSI	58.8	30.0	47.8	1,540.0		UUT-06
SKG4	Carbon Steel	SKG4-N1101	SKG3110-1NAW	165,000 BTU/h	33.1	25.5	73.5	540.0	Rigid Base Mounting	UUT-15
		SKG4-N1101	SKG3110	165,000 BTU/h	30.0	30.0	74.7	540.0		Interpolated
		SKG4-N1551	N/A	215,000 BTU/h						Interpolated
		SKG4-N1801	N/A	240,000 BTU/h						Interpolated
		SKG4-N2101	N/A	249,000 BTU/h						Interpolated
		SKG4-N2652	N/A	380,000 BTU/h		55.6		1,280.0		Interpolated
		SKG4-N3102	N/A	430,000 BTU/h						Interpolated
		SKG4-N3502	N/A	464,000 BTU/h						Interpolated
		SKG4-N4052	N/A	498,000 BTU/h						Interpolated
		SKG4-N5053	N/A	704,000 BTU/h		81.5		1,800.0		Interpolated
		SKG4-N5603	N/A	713,000 BTU/h						Interpolated
		SKG4-N6103	N/A	747,000 BTU/h						Interpolated
		SKG4-N7104	N/A	953,000 BTU/h	52.9	55.6		1,820.0		Interpolated
		SKG4-N7654	N/A	962,000 BTU/h						Interpolated
		SKG4-N8104	N/A	996,000 BTU/h						Interpolated
		SKG4-N8104	SKG3810-1NAW	996,000 BTU/h	63.5	51.5	73.5	1,820.0		UUT-16

1) All units shake tested to S_{DS}=2.0 @ z/h=1.0 and S_{DS}=2.5 @ z/h=0.0.

Table 1b - Product Line Matrix - Wall Mounted Units

Product	Material	Model	Shake Tested Model Nomenclature	Max Rating	Max Package Dimensions [in]			Max Weight [lbs]	Mounting Configuration	UUT
					Length	Width	Height			
SKE4 (Indoor with mounted SDU Blower)	Carbon Steel	SKE4-N02 with SDU4-1	N/A	2kW	14.0	19.4	30.0	100.0	Rigid / Isolated Wall Mounting	Extrapolated
		SKE4-N03 with SDU4-1	N/A	3.7kW						Extrapolated
		SKE4-N04 with SDU4-1	N/A	4kW						Extrapolated
		SKE4-N06 with SDU4-1	SKE-406M-480-3 w/ SDU4-1	6kW	13.8	19.4	29.5	102.0	Rigid Wall Mounting	UUT-03A
		SKE4-N06 with SDU4-1	SKE-406M-480-3 w/ SDU4-1	6kW	13.8	19.4	29.5	102.0	Isolated Wall Mounting	UUT-03B
		SKE4-N06 with SDU4-1	N/A	6kW	15.2	22.2	39.8	165.0	Rigid / Isolated Wall Mounting	Interpolated
		SKE4-N08 with SDU4-2	N/A	8kW						Interpolated
		SKE4-N10 with SDU4-2	N/A	10kW						Interpolated
		SKE4-N14 with SDU4-2	N/A	13.5kW						Interpolated
		SKE4-N15 with SDU4-3	N/A	15kW			43.4	175.0		Interpolated
		SKE4-N16 with SDU4-3	N/A	16kW						Interpolated
		SKE4-N20 with SDU4-3	N/A	20kW						Interpolated
		SKE4-N22 with SDU4-3	N/A	22kW						Interpolated
		SKE4-N25 with SDU4-3	N/A	25kW						Interpolated
		SKE4-N30 with SDU4-3	N/A	30kW						Interpolated
		SKE4-N32 with SDU4-3	N/A	32kW						Interpolated

Table 1b - Product Line Matrix - Wall Mounted Units (Continued)

Product	Material	Model	Shake Tested Model Nomenclature	Max Rating	Max Package Dimensions [in]			Max Weight [lbs]	Mounting Configuration	UUT
					Length	Width	Height			
SKE4 (Indoor without mounted SDU Blower)	Carbon Steel	SKE4-N02	N/A	2kW	14.0	19.4	23.0	85.0	Rigid / Isolated Wall Mounting	Extrapolated
		SKE4-N03	N/A	3.7kW						Extrapolated
		SKE4-N04	N/A	4kW						Extrapolated
		SKE4-N06	N/A	6kW						Extrapolated
		SKE4-N08	N/A	8kW	15.2	22.2	32.0	145.0		Interpolated
		SKE4-N10	N/A	10kW						Interpolated
		SKE4-N14	N/A	13.5kW						Interpolated
		SKE4-N15	N/A	15kW						Interpolated
		SKE4-N16	N/A	16kW						Interpolated
		SKE4-N20	N/A	20kW						Interpolated
		SKE4-N22	N/A	22kW						Interpolated
		SKE4-N25	N/A	25kW						Interpolated
		SKE4-N30	N/A	30kW						Interpolated
		SKE4-N32	N/A	32kW						Interpolated
		SKE4-N20 L	N/A	20kW		33.2		210.0		Interpolated
		SKE4-N36	N/A	36kW						Interpolated
		SKE4-N40	N/A	40kW						Interpolated
		SKE4-N44	N/A	44kW						Interpolated
		SKE4-N50	N/A	50kW						Interpolated
		SKE4-N52	N/A	52kW						Interpolated
		SKE4-N60	N/A	60kW						Interpolated
		SKE4-N63	N/A	63kW						Extrapolated
		SKE4-N60	SKE-460M-480-3	60kW	15.0	33.2	32.0	210.0	Rigid Wall Mounting	UUT-04A
		SKE4-N60	SKE-460M-480-3	60kW	15.0	33.2	32.0	210.0	Isolated Wall Mounting	UUT-04B

1) All units shake tested to S_{DS}=2.0 @ z/h=1.0 and S_{DS}=2.5 @ z/h=0.0.

Table 1c - Product Line Matrix - Duct Mounted Units

Product	Material	Model	Shake Tested Model Nomenclature	Max Rating	Max Package Dimensions[3] [in]			Max Weight[3] [lbs]	Mounting Configuration	UUT
					Length	Width	Height			
SKD - MS-SD	Stainless Steel	12X12 - 36X36	N/A	12X12 - 36X36	8.8	38.0	42.0	40.1	Duct Mounting (Flange)	Extrapolated
MS-SD		12X12-36X36	N/A	12X12-36X36	8.5	38.0	42.0	42.0		Extrapolated
MS-SD		36X36	MS-SD 36x36	36X36	8.5	38.0	42.0	42.0		UUT-07
MS-SD		36X36	N/A	36X36	8.5	38.0	42.0	42.0		Interpolated
SKD - MS-HD		12X12-36X36	N/A	12X12-36X36	12.5	38.0	44.1	84.0		Interpolated
MS-HD		12X12-36X36	N/A	12X12-36X36	13.5	38.0	44.5	84.0		Interpolated
MS-HD		36X36	N/A	36X36	13.5	38.0	44.5	84.0		Interpolated
MS-HD		36X36	MS-HD 36x36	36X36	13.5	38.0	44.5	84.0		UUT-08
MS-SD	Stainless Steel	12X12 - 60X60	N/A	12X12 - 60X60	6.4	62.0	56.2	31.0	Duct Mounting	Extrapolated
SKD - MS-SD		12X12-60X60	N/A	12X12-60X60	5.4	56.8	55.6	31.0		Extrapolated
MS-SD		60X60	MS-SD 60x60	60X60	6.4	62.0	65.0	31.0		UUT-11
MS-SD		60X60	N/A	60X60	6.4	62.0	65.0	31.0		Interpolated
MS-HD		12X12 - 60X60	N/A	12X12 - 60X60	11.5	61.5	54.0	100.0		Interpolated
SKD - MS-HD		12X12-60X60	N/A	12X12-60X60	10.5	55.5	54.0	100.0		Interpolated
MS-HD		60X60	N/A	60X60	11.5	61.5	54.0	100.0		Interpolated
MS-HD		60X60	MS-HD 60x60	60X60	11.5	61.5	54.0	100.0		UUT-12
MS-SD	Stainless Steel	12X12 - 120X120	N/A	12X12 - 120X120	120.0	7.4	116.0	120.0	AHU Mounting[2]	Extrapolated
SKD - MS-SD		12X12 - 120X120	N/A	12X12 - 120X120	116.8	9.0	115.6	139.0		Extrapolated
SKD - MS-SD		120X120	SKD-MS-SD	120X120	120.0	9.0	122.0	139.0		UUT-13
SKD - MS-SD		120X120	N/A	120X120	120.0	9.0	122.0	139.0		Interpolated
MS-HD		12X12 - 120X120	N/A	12X12 - 120X120	120.0	11.5	116.0	275.0		Interpolated
SKD - MS-HD		12X12 - 120X120	N/A	12X12 - 120X120	116.0	12.0	116.0	275.0		Interpolated
SKD- MS-HD		120X120	N/A	120X120	120.0	12.0	122.0	275.0		Interpolated
SKD- MS-HD		120X120	SKD-MS-HD	120X120	120.0	12.0	122.0	275.0		UUT-14
SKD - J	Stainless Steel	12X12 (single tube 0.5")	SKD-J 12x12 (Single Tube)	12X12	3.5	15.9	4.0	2.0	Duct Mounting	UUT-09
SKD - J		12X12 (single tube 0.5")	N/A	12X12	3.5	15.9	4.0	2.0		Interpolated
SKD - J		36X36 (double tube 0.5")	N/A	36X36	17.8	45.5	4.0	16.0		Interpolated
SKD - J		36X36 (double tube 0.5")	SKD-J 36x36 (Double Tube)	36X36	17.8	45.5	4.0	16.0		UUT-10
MF SAM	Stainless Steel	36x36	N/A	36x36	5.0	36.0	5.0	3.0	Duct Mounting	Interpolated
MF SAM		36x36	MF SAM 36	36x36	5.0	36.0	5.0	3.0		UUT-17

Note:

1) HD grids are bolted construction and SD grids are welded construction

2) AHU Mounted grids were tested to S_{DS}=2.0 @ z/h=1.0 only. All other units shake tested to S_{DS}=2.0 @ z/h=1.0 and S_{DS}=2.5 @ z/h=0.0.

3) UUT Dimensions and Weights include the duct used during testing.

Table 2 - Certified Sub-Components

Component	Part Number	Description	MFR	Material	Max Weight [lbs]	UUT
Heater Element	SE5991	2.5 kW / 240 V	CCI Thermal Technologies	Incoloy	1.00	Extrapolated
	SE5992	3 kW / 240 V			1.00	Extrapolated
	SE5980	1.2 kW / 400 V			1.00	Extrapolated
	SE5935	2 kW / 600 V			1.01	UUT-03
	SE5996	4 kW / 208 V			1.20	Interpolated
	SE5961	8.33 kW / 600 V			2.70	Interpolated
	SE5960	5.33 kW / 208 V			2.79	Interpolated
	SE5945	6 kW / 575 V			2.80	Interpolated
	SE5944	6 kW / 480 V			2.80	Interpolated
	SE5982	5 kW / 400 V			2.80	Interpolated
	SE5966	2.67 kW / 600 V			2.80	Interpolated
	SE5941	4 kW / 480 V			2.82	Interpolated
	SE5938	6 kW / 240 V			2.88	Interpolated
	SE5983	7.3 kW / 400 V			2.88	Interpolated
	SE5946	4.4 kW / 208 V			2.90	Interpolated
	SE5949	6.6 kW / 208 V			2.90	Interpolated
	SE5979	6 kW / 440 V			2.90	Interpolated
	SE5989	7.3 kW / 600 V			2.90	Interpolated
	SE5987	7.3 kW / 440 V			2.90	Interpolated
	SE5967	10 kW / 440 V			2.91	Interpolated
	SE5955	10 kW / 400 V			2.92	Interpolated
	SE5956	10 kW / 440 V			2.95	Interpolated
	SE5959	3.3 kW / 208 V			3.00	Interpolated
	SE5963	10 kW / 575 V			3.00	Interpolated
	SE5988	10 kW / 400 V			3.00	Interpolated
	SE5962	10 kW / 480 V			3.00	UUT-04
	SE5990	1.4 kW / 120 V	Zoppas Industries	Incoloy	1.00	Extrapolated
	SE5925	1.35 kW / 575 V			1.00	UUT-01
	SE5994	2.5 kW / 208 V			1.00	Interpolated
	SE5924	1.35 kW / 208 V			1.01	Interpolated
	SE5934	2 kW / 480 V			1.01	Interpolated
	SE5932	2 kW / 240 V			1.03	Interpolated
	SE5933	2 kW / 208 V			1.04	Interpolated
	SE5923	1.35 kW / 480 V			1.18	Interpolated
	SE5993	4 kW / 240 V			1.40	Interpolated
	SE5957	3.3 kW / 600 V			2.70	Interpolated
	SE5981	2.5 kW / 400 V			2.76	Interpolated
	SE5958	3.3 kW / 480 V			2.76	Interpolated
	SE5940	4 kW / 208 V			2.77	Interpolated
	SE5943	6 kW / 208 V			2.80	Interpolated
	SE5948	4.4 kW / 575 V			2.80	Interpolated
	SE5947	4.4 kW / 480 V			2.80	Interpolated
	SE5942	4 kW / 575 V			2.84	Interpolated
	SE5937	4 kW / 240 V			2.87	Interpolated
	SE5950	6.6 kW / 480 V			2.90	Interpolated
	SE5985	10.5 kW / 480 V			2.90	Interpolated
	SE5939	10 kW / 575 V			2.92	Interpolated
	SE5952	10 kW / 480 V			2.92	Interpolated
	SE5951	6.6 kW / 575 V			2.95	Interpolated
	SE5965	10.5 kW / 400 V			2.90	Interpolated
	SE5968	11.1 kW / 400 V			3.92	Interpolated
	SE5969	11.1 kW / 480 V			3.92	Interpolated
	SE5970	11.1 kW / 600 V			3.92	Interpolated
	SE5984	6 kW / 400 V			3.92	UUT-02

Table 2 - Certified Sub-Components (Cont.)

Component	Part Number	Description	MFR	Material	Max Weight [lbs]	UUT
Foam Sensor	SW FOAMSM-ASSY	Foam Sensor	Neptronic	Teflon	0.44	UUT-01, UUT-03
	SW FOAMMED-ASSY				0.55	Interpolated
	SW FOAMLG-ASSY				0.56	Interpolated
	SWSKE4FOAMSM				0.44	Interpolated
	SWSKE4FOAMMD				0.55	Interpolated
	SWSKE4FOAMLG				0.56	UUT-02, UUT-04
Transformer	DP10-4702	50VA	Marcus Transformer	Copper & Steel	2.30	Extrapolated
	SP3240	50VA			2.30	Extrapolated
	DP10-1002	50VA			2.30	Extrapolated
	DP10-2102	50VA			2.30	Extrapolated
	DP10-3002	50VA			2.30	Extrapolated
	DP10-8102	50VA			2.30	Extrapolated
	SP3308	100VA			2.80	UUT-01
	SP3310	100VA			2.80	UUT-16
	SP3321	100VA			2.80	Interpolated
	SP3365	100VA			2.80	UUT-15
	SP3374	100VA			2.80	Interpolated
	SP3312	100VA			2.80	Interpolated
	SP3375	100VA			2.80	Interpolated
	SP3349	100VA			2.80	Interpolated
	SP3382	100VA			2.82	Interpolated
	SP3373	100VA			2.83	Interpolated
	SP3380	100VA			2.90	UUT-05, UUT-06
	SP3323	100VA			2.90	Interpolated
	SP3305	100VA			2.90	Interpolated
	SP3329	100VA			2.90	Interpolated
	SP3381	150VA			5.67	Interpolated
	SP3383	150VA			5.70	Interpolated
	SP3384	150VA			5.70	Interpolated
	SP3386	150VA			5.80	Interpolated
	SP3385	150VA			5.84	Interpolated
	SP3388	200VA			6.50	UUT-02
	SP3371	200VA			6.50	Interpolated
	SP3376	200VA			6.50	Interpolated
	SP3387	200VA			7.32	Interpolated
	SP3351	350VA			11.10	Interpolated
	SP3352	350VA			11.10	Interpolated
	SP3353	350VA			11.30	Interpolated
	SP3370	350VA			11.35	UUT-15
	DP10-2011	50VA	TransfabTMS	Copper & Steel	2.30	UUT-02
	DP10-9011	50VA			2.30	Interpolated
	SP3341	100VA			2.90	UUT-01, UUT-03, UUT-04, UUT-16
Disconnect Switch	DP13-3004	40A	ABB	Steel & Plastic	0.50	UUT-01, UUT-03
	DP13-3005	63A			0.60	Interpolated
	DP13-3006	100A			0.88	UUT-04
	DP13-3007	160A			2.65	Interpolated
	DP13-3008	200A			3.95	UUT-02

Table 2 - Certified Sub-Components (Cont.)

Component	Part Number	Description	MFR	Material	Max Weight [lbs]	UUT
Water Level Sensor	SWSKE4LEVASM	Water Level Sensor A	Neptronic	Electronic PCB	3.00	UUT-01, UUT-03, UUT-15
	SWPROBSM-ASSY	Water Level Sensor STD			3.00	Interpolated
	SWSKE4LEVBSM	Water Level Sensor B			3.00	Interpolated
	SWSKE4LEVCSM	Water Level Sensor C			3.00	Interpolated
	SWSKE4LEVDSM	Water Level Sensor D			3.00	Interpolated
	SWPROBMD-ASSY	Water Level Sensor STD			3.20	Interpolated
	SWPROBLAR-ASSY	Water Level Sensor STD			3.20	Interpolated
	SWSKE4LEVAMD	Water Level Sensor A			3.20	UUT-04
	SWSKE4LEVALG	Water Level Sensor A			3.20	Interpolated
	SWSKE4LEVBMD	Water Level Sensor B			3.20	Interpolated
	SWSKE4LEVBLG	Water Level Sensor B			3.20	Interpolated
	SWSKE4LEVCMD	Water Level Sensor C			3.20	Interpolated
	SWSKE4LEVCLG	Water Level Sensor C			3.20	Interpolated
	SWSKE4LEVDMD	Water Level Sensor D			3.20	Interpolated
	SWSKE4LEVDLG	Water Level Sensor D			3.20	UUT-02, UUT-06
	SWGWATLEV-SUB	Water Level Sensor STD			3.20	UUT-05
	SWGWATLEV-ASSY	Water Level Sensor STD			3.20	UUT-16
Contactor	SP3114	SDU Blower	Honeywell	Steel & Plastic	0.35	UUT-03
	SP3029	25A / 600V / 2P	TE Connectivity (Tyco)		0.50	UUT-15
	SP3080	32A / 600VAC	Lovato Electric		0.70	UUT-03
	SP3100	50A / 600V / 3P			0.90	UUT-04
	SP3084	90A			3.43	UUT-02
Display	SW SK300DISPLAY	Alphanumeric Display	Neptronic	Plastic	1.00	UUT-01, UUT-03, UUT-05
	SWSKE4DISPLAYA				1.50	Interpolated
	SWSKE4DISPLAYB				1.50	UUT-04
	SWSKE4DISPLAYC				1.50	Interpolated
	SWSKE4DISPLAYD				1.50	UUT-02, UUT-06
	NWSKGAZDISPLAYSS	Display Board	Neptronic	Plastic	1.50	UUT-15, UUT-16
	NWSKGDISPLAYA				1.50	Extrapolated
	NWSKGDISPLAYB				1.50	Extrapolated
	NWSKGASMAINSS	Control PCB	Neptronic	Plastic	3.00	UUT-15, UUT-16
	NWSGAZSLAVESS				3.00	UUT-16
	NWSGAZSLAVEWSS				3.00	Interpolated
	NWSKGAZCONNECTS S				3.00	Interpolated
	NWSKGMAINA				3.00	Interpolated
	NWSKGMAINB				3.00	Interpolated
	NWSKGMAINC				3.00	Interpolated
	NWSKGMAIND				3.00	Interpolated
	NWSKGSLAVEA				3.00	Interpolated
	NWSKGSLAVEB				3.00	Interpolated
	NWSKGSLAVEC				3.00	Interpolated
	NWSKGSLAVED				3.00	Interpolated
	NWSKE4MAIND				4.20	UUT-01, UUT-03, UUT-05
	NWSKE4MAINC				4.30	Interpolated
	NWSKE4MAINB				4.40	Interpolated
	NWSKE4MAINA				4.50	UUT-02, UUT-04, UUT-06
Flow Switch	SPSPA1-01	Main Printed Circuit Board	Huba Control	Plastic	0.10	UUT-03

Table 2 - Certified Sub-Components (Cont.)

Component	Part Number	Description	MFR	Material	Max Weight [lbs]	UUT
Cooling Fan	SP3001	SKE XL Outside Fan	EBM Papst	Plastic	1.20	UUT-02
Thermostat	TR024-EXT1	SKE XL Outside Control Thermostat	Neptronic	Plastic	0.30	UUT-02
Power Relay	SP3113	N/A	Carlo Gavazzi	Plastic	0.50	UUT-02
Limit Switch	SP3035	High Temperature Switch 220F	Neptronic	Plastic & Steel	0.03	UUT-01, UUT-02, UUT-03, UUT-04, UUT-05, UUT-06, UUT-15, UUT-16
Igniter	SPG2006	Ignitor Hot Surface	Neptronic	Ceramic	0.20	UUT-15, UUT-16
	SPG2018-230	Igniter Hot Surface			0.30	UUT-15
	SPG2019	Igniter Hot Surface		Steel & Ceramic	0.50	UUT-16
	SPG2050	Spark Igniter			0.50	UUT-16
Blower	SPG2017-120	120V	Ametek	Alumnium	4.90	UUT-15, UUT-16
Electronic Controller	SPG2001	Hot Surface Ignition Control	Fenwal	Plastic	0.50	UUT-15, UUT-16
	SPG2051	Spark Ignition Control			0.50	UUT-15, UUT-16
Water Inlet Valves	SPG6007	2 Outlet 90 Degrees	Ametek	Plastic	0.30	UUT-15, UUT-16
	SPG4104	2 Outlet 180 Degrees			0.40	Interpolated
	SPG6008	3 Outlet			0.50	UUT-01, UUT-02, UUT-03, UUT-04, UUT-05, UUT-06
Drain Pump	SPG4101	24VAC	Hanning	Plastic	1.20	UUT-01, UUT-02, UUT-03, UUT-04, UUT-15, UUT-16
Solid State Relay	SP3102	50A	Crydom	Steel & Plastic	0.17	UUT-01
	SP3103	90A			0.17	UUT-03
	SP3105	125A	Carlo Gavazzi		0.17	UUT-15
SDU Blower	SP3011	SDU I 120V	EBM papst	Steel	2.30	UUT-03
	SP3012	SDU I 240V	EBM papst		2.30	Interpolated
	SP3009	SDU II or III	EBM papst		4.10	UUT-16
	SP3014	SDU III	Jin Yih Shyang Ent. Co. LTD		10.70	UUT-16
Gas Valve	SPG2010	24VAC	Honeywell	Aluminum	1.50	UUT-15, UUT-16

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-01

30353-1701a; UUT-1

Model Line	Model Number	Manufacturer
SKE4	SKE 402W	Neptronic

Product Construction Summary

Powder Coated Carbon Steel Enclosure

Options / Subcomponent Summary

Heater Element: Zoppas Industries; Transformer: Marcus Transformer & Transfab TMS; Water Level Sensor: Neptronic; Dsiplay: Neptronic; Limit Switch: Neptronic; Water Inlet Valves: Ametek; Solid State Relay: Crydom; Drain: Hanning; Disconnect Switch: ABB

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
130	14.0	25.8	31.0	>33.3	>33.3	>33.3

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	2.50	0.00	1.50	2.50	1.00	1.67	0.67
	ICC-ES AC156	2.00	1.00	1.50	3.20	3.00	1.33	0.53

Test Mounting Details

UUT-1 was mounted directly to the shake table using eight (8) 1/4" grade 5 bolts.

All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-02

30353-1701a; UUT-2

Model Line	Model Number	Manufacturer
SKE4	SKE 490W	Neptronic

Product Construction Summary

Powder Coated Carbon Steel Enclosure

Options / Subcomponent Summary

Heater Element: Zoppas Industries; Transformer: Marcus Transformer & Transfab TMS; Water Level Sensor: Neptronic; Dsiplay: Neptronic; Limit Switch: Neptronic; Water Inlet Valves: Ametek; Solid State Relay: Crydom; Drain: Hanning; Disconnect Switch: ABB; Cooling Fan: EBM papst; Thermostat: Neptronic; Power Relay: Carlo Gavazzi; Contactor: Lovato Electric

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
590	28.6	38.0	55.8	15.0	15.0	>33.3

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	2.50	0.00	1.50	2.50	1.00	1.67	0.67
	ICC-ES AC156	2.00	1.00	1.50	3.20	3.00	1.33	0.53

Test Mounting Details

UUT-2 was mounted directly to the shake table using eight (8) 3/8" grade 5 bolts.

All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-03A

30353-1701b; UUT-3A

Model Line	Model Number	Manufacturer
SKE4	SKE-406M-480-3	Neptronic

Product Construction Summary

Powder Coated Carbon Steel Enclosure

Options / Subcomponent Summary

Heater Elements: CCI Thermal Technologies; Foam Sensor: Neptronic; Transformer: Transfab TMS; Disconnect Switch: ABB; Water Level Sensor: Neptronic: Contactor: Honeywell; Display: Neptronic; Limit Switch: Neptronic; Drain Pump: Hanning; Flow Switch: Huba Control; Cooling Fan: EBM papst; Solid State Relay: Crydom

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
102	13.80	19.40	29.50	N/A	N/A	N/A

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	2.50	0.00	1.50	2.50	1.00	1.67	0.67
	ICC-ES AC156	2.00	1.00	1.50	3.20	3.00	1.33	0.53

Test Mounting Details

UUT-3A was attached to the wall fixture using two (2) manufacturer supplied brackets. These brackets were attached to the unit using three (3) 1/4" grade 8 bolts. The brackets were attached to the wall fixture using (4) 1/4" grade 8 bolts.

All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-03B

30353-1701b; UUT-3B

Model Line	Model Number	Manufacturer
SKE4	SKE-406M-480-3	Neptronic

Product Construction Summary

Powder Coated Carbon Steel Enclosure

Options / Subcomponent Summary

Heater Elements: CCI Thermal Technologies; Foam Sensor: Neptronic; Transformer: Transfab TMS; Disconnect Switch: ABB; Water Level Sensor: Neptronic: Contactor: Honeywell; Display: Neptronic; Limit Switch: Neptronic; Drain Pump: Hanning; Flow Switch: Huba Control; Cooling Fan: EBM papst; Solid State Relay: Crydom

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
102	13.80	19.40	29.50	N/A	N/A	N/A

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	2.50	0.00	1.50	2.50	1.00	1.67	0.67
	ICC-ES AC156	2.00	1.00	1.50	3.20	3.00	1.33	0.53

Test Mounting Details

UUT-3B was attached to the wall fixture using two (2) manufacturer supplied brackets. These brackets were attached to the unit using three (3) 1/4" grade 8 bolts. The brackets were attached to the wall fixture using (4) 1/4" grade 8 bolts. The wall fixture was mounted to the table with (4) MSSH-1E-400 spring isolators.

All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-04A

30353-1701b; UUT-4A

Model Line	Model Number	Manufacturer
SKE4	SKE-460M-480-3	Neptronic

Product Construction Summary

Powder Coated Carbon Steel Enclosure

Options / Subcomponent Summary

Heater Elements: Zoppas Industries; Foam Sensor: Neptronic; Transformer: Transfab TMS; Disconnect Switch: ABB; Water Level Sensor: Neptronic: Contactor: Lovato Electric; Display: Neptronic; Limit Switch: Neptronic; Drain Pump: Hanning;

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
210	15.00	33.20	32.00	N/A	N/A	N/A

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	2.50	0.00	1.50	2.50	1.00	1.67	0.67
	ICC-ES AC156	2.00	1.00	1.50	3.20	3.00	1.33	0.53

Test Mounting Details

UUT-4A was attached to the wall fixture using two (2) manufacturer supplied brackets. These brackets were attached to the unit using three (6) 1/4" grade 8 bolts. The brackets were attached to the wall fixture using (4) 1/4" grade 8 bolts.

All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-04B

30353-1701b; UUT-4B

Model Line	Model Number	Manufacturer
SKE4	SKE-460M-480-3	Neptronic

Product Construction Summary

Powder Coated Carbon Steel Enclosure

Options / Subcomponent Summary

Heater Elements: Zoppas Industries; Foam Sensor: Neptronic; Transformer: Transfab TMS; Disconnect Switch: ABB; Water Level Sensor: Neptronic: Contactor: Lovato Electric; Display: Neptronic; Limit Switch: Neptronic; Drain Pump: Hanning;

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
210	15.00	33.20	32.00	N/A	N/A	N/A

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	2.50	0.00	1.50	2.50	1.00	1.67	0.67
	ICC-ES AC156	2.00	1.00	1.50	3.20	3.00	1.33	0.53

Test Mounting Details

UUT-4B was attached to the wall fixture using two (2) manufacturer supplied brackets. These brackets were attached to the unit using three (6) 1/4" grade 8 bolts. The brackets were attached to the wall fixture using (4) 1/4" grade 8 bolts. The wall fixture was mounted to the table with (4) MSSH-1E-400 spring isolators.

All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-05

30353-1701c; UUT-5

Model Line	Model Number	Manufacturer
SKS4	SKS-100-SLPA	Neptronic

Product Construction Summary

Powder Coated Carbon Steel Enclosure on Carbon Steel Seismic Legs

Options / Subcomponent Summary

Display: Neptronic; Limit Switch: Neptronic; Transformer: Marcus; Water Inlet Valve: T&P

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
498	45.8	19.7	31.0	20.3	>33.3	>33.3

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	2.50	0.00	1.50	2.50	1.00	1.67	0.67
	ICC-ES AC156	2.00	1.00	1.50	3.20	3.00	1.33	0.53

Test Mounting Details

UUT-5 was mounted to the shake table using twelve (12) 3/8" grade 5 bolts.

All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-06

30353-1701c; UUT-6

Model Line	Model Number	Manufacturer
SKS4	SKS-1250-SLPA	Neptronic

Product Construction Summary

Powder Coated Carbon Steel Enclsoure on Carbon Steel Seismic Legs

Options / Subcomponent Summary

Display: Neptronic; Limit Switch: Neptronic; Transformer: Marcus; Water Inlet Valve: T&P

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
1,540	58.8	30.0	47.8	13.5	10.5	30.5

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	2.50	0.00	1.50	2.50	1.00	1.67	0.67
	ICC-ES AC156	2.00	1.00	1.50	3.20	3.00	1.33	0.53

Test Mounting Details

UUT-6 was mounted to the shake table using twelve (12) 3/8" grade 5 bolts.

All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-07

30353-1701g; UUT-7

Model Line	Model Number	Manufacturer
MS	MS-SD 36x36	Neptronic

Product Construction Summary

Stainless Steel Tubes and Stainless Steel Header with Welded Construction

Options / Subcomponent Summary

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
42	8.5	38.0	42.0	N/A	N/A	N/A

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	2.50	0.00	1.50	2.50	1.00	1.67	0.67
	ICC-ES AC156	2.00	1.00	1.50	3.20	3.00	1.33	0.53

Test Mounting Details

The UUT was attached to (2) 36" square, 16 gauge carbon steel ducts. The UUT was secured to the duct flanges using (28) #10 screws on each side. Each end of the duct had a 2" wide, 1/4" thick carbon steel angle fastened to the top and bottom of the duct with (6) 3/8" grade 5 bolts and washers per angle. The duct was suspended with (4) 1/2" ASTM A307 Grade B threaded rods with two nuts above and below the angle through holes. Each threaded rod was stiffened with a 24" length of 1" carbon steel angle, and (3) rod stiffening clips per channel. The duct was laterally braced with (4) Mason SCBH-2 seismic sway braces and 1/4" steel cable, set at 45 degrees.

All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-08

30353-1701g; UUT-8

Model Line	Model Number	Manufacturer
MS	MS-HD 36x36	Neptronic

Product Construction Summary

Stainless Steel Tubes and Stainless Steel Header with Bolted Construction

Options / Subcomponent Summary

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
84	13.5	38.0	44.5	N/A	N/A	N/A

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	2.50	0.00	1.50	2.50	1.00	1.67	0.67
	ICC-ES AC156	2.00	1.00	1.50	3.20	3.00	1.33	0.53

Test Mounting Details

The UUT was attached to (2) 36" square, 16 gauge carbon steel ducts. The UUT was secured to the duct flanges using (28) #10 screws on each side. Each end of the duct had a 2" wide, 1/4" thick carbon steel angle fastened to the top and bottom of the duct with (6) 3/8" grade 5 bolts and washers per angle. The duct was suspended with (4) 1/2" ASTM A307 Grade B threaded rods with two nuts above and below the angle through holes. Each threaded rod was stiffened with a 24" length of 1" carbon steel angle, and (3) rod stiffening clips per channel. The duct was laterally braced with (4) Mason SCBH-2 seismic sway braces and 1/4" steel cable, set at 45 degrees.

All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-09

30353-1701f; UUT-9

Model Line	Model Number	Manufacturer
SKD-J	SKD-J 12x12 (Single Tube)	Neptronic

Product Construction Summary

Stainless Steel Tubes with Welded Construction

Options / Subcomponent Summary

UUT Properties

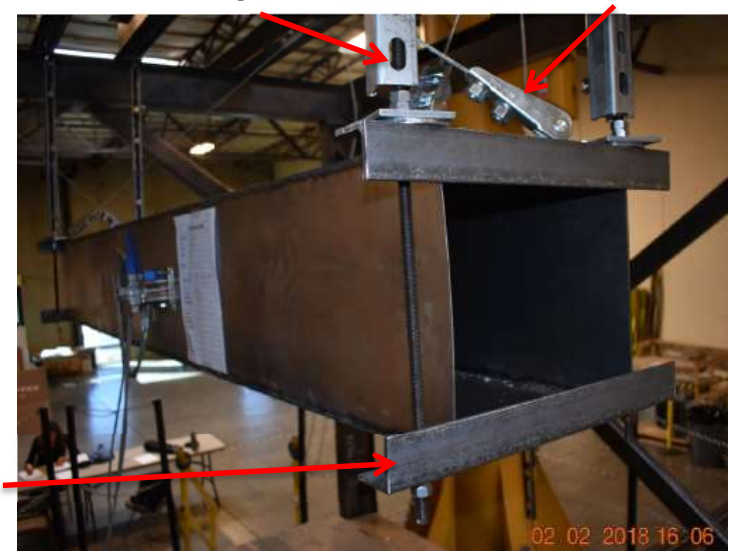
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
2	3.5	15.9	4.0	N/A	N/A	N/A

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	2.50	0.00	1.50	2.50	1.00	1.67	0.67
	ICC-ES AC156	2.00	1.00	1.50	3.20	3.00	1.33	0.53

Test Mounting Details

The UUT was attached to a 12" square, 16 gauge carbon steel duct. The UUT was secured to the duct using (1) 3/8" grade 5 bolt on one end of the duct and (6) 1/4" TEK screws on the other side of the duct. Each end of the duct had a 2" wide, 1/4" thick carbon steel angle fastened to top and bottom of the duct with (2) 3/8" grade 5 bolts. The duct was suspended with (4) lengths of 1/2" ASTM A307 Grade B threaded rod with two nuts above and below the through holes. Each threaded rod was stiffened with a 24" length of 12 gauge unistrut and 3 rod stiffening clips per angle. The duct was laterally braced with (4) Mason SCBH-2 seismic sway braces and 3/16" cable set at 45 degrees.



All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-10

30353-1701f; UUT-10

Model Line	Model Number	Manufacturer
SKD-J	SKD-J 36x36 (Double Tube)	Neptronic

Product Construction Summary

Stainless Steel Tubes with Welded Construction

Options / Subcomponent Summary

UUT Properties

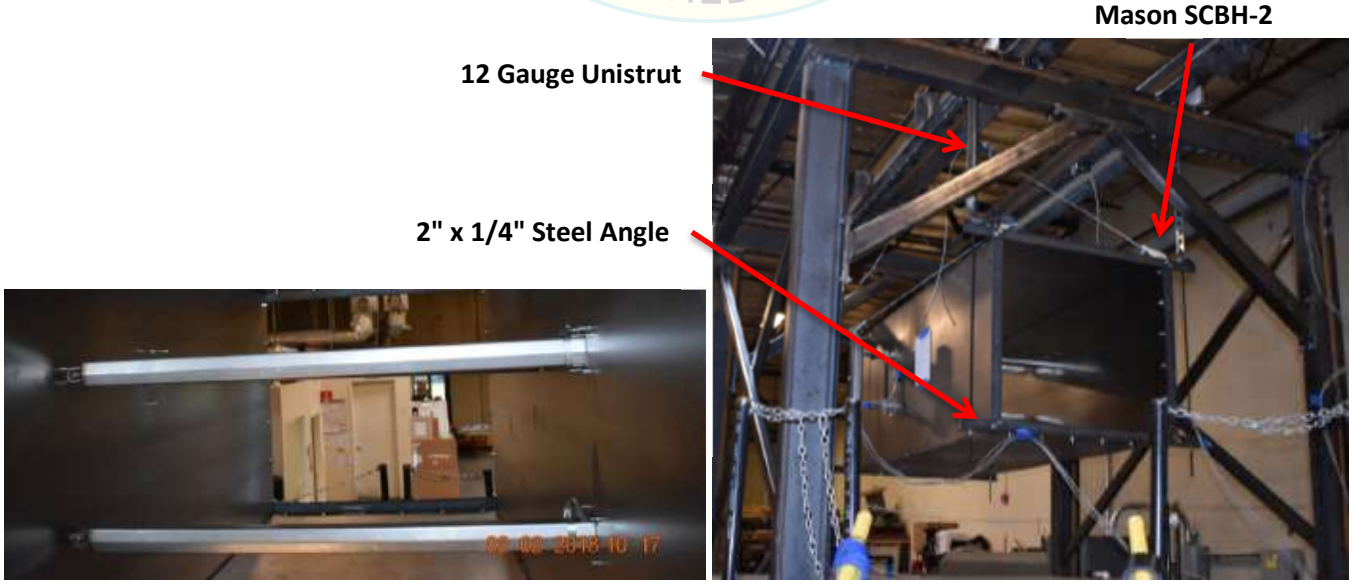
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
16	17.8	44.5	4.0	N/A	N/A	N/A

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	2.50	0.00	1.50	2.50	1.00	1.67	0.67
	ICC-ES AC156	2.00	1.00	1.50	3.20	3.00	1.33	0.53

Test Mounting Details

The UUT was attached to a 36" square, 16 gauge carbon steel duct. The UUT was secured to the duct using (2) 3/8" grade 5 bolt on one end of the duct and (8) 3/8" grade 5 bolts on the other side of the duct. Each end of the duct had a 2" wide, 1/4" thick carbon steel angle fastened to top and bottom of the duct with (6) 3/8" grade 5 bolts and to the sides with (5) 3/8" grade 5 bolts. The duct was suspended with (4) lengths of 1/2" ASTM A307 Grade B threaded rod with two nuts above and below the through holes. Each threaed rods was stiffened with a 20" length of 12 gauge unistrut and 3 rod stiffening clips per angle. The duct was laterally braced with (4) Mason SCBH-2 seismic sway braces and 1/4" cable set at 45 degrees.



All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-11

30353-1701g; UUT-11

Model Line	Model Number	Manufacturer
MS	MS-SD 60x60	Neptronic

Product Construction Summary

Stainless Steel Tubes and Stainless Steel Header with Welded Construction

Options / Subcomponent Summary

UUT Properties

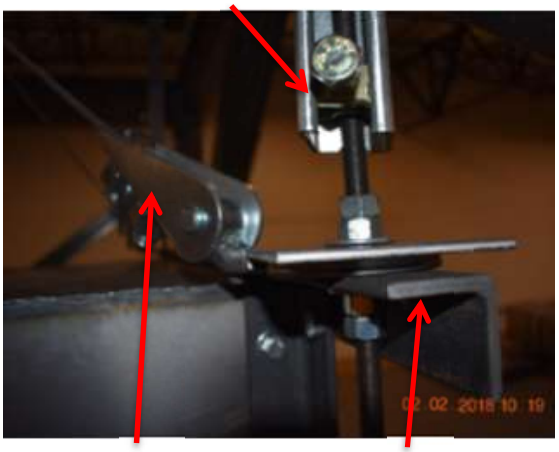
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
31	6.4	62.0	65.0	N/A	N/A	N/A

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	2.50	0.00	1.50	2.50	1.00	1.67	0.67
	ICC-ES AC156	2.00	1.00	1.50	3.20	3.00	1.33	0.53

Test Mounting Details

The UUT was attached to a 60" square, 16 gauge carbon steel duct. The UUT was secured to the duct using (8) 3/8" grade 5 bolts on the bottom and (4) 3/8" grade 5 bolts on the top. Each end of the duct had a 2" wide, 1/4" thick carbon steel angle fastened to the top and bottom of the duct with (6) 3/8" grade 5 bolts and washers per angle. The duct was suspended with (4) 1/2" ASTM A307 Grade B threaded rods with two nuts above and below the angle through holes. Each threaded rod was stiffened with a 18" length of 12 gauge unistrut, and (3) rod stiffening clips per section. The duct was laterally braced with (4) Mason SCBH-2 seismic sway braces and 3/8" steel cable, set at 45 degrees.



All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-12

30353-1701g; UUT-12

Model Line	Model Number	Manufacturer
MS	MS-HD 60x60	Neptronic

Product Construction Summary

Stainless Steel Tubes and Stainless Steel Header with Bolted Construction

Options / Subcomponent Summary

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
100	11.5	61.5	54.0	N/A	N/A	N/A

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	2.50	0.00	1.50	2.50	1.00	1.67	0.67
	ICC-ES AC156	2.00	1.00	1.50	3.20	3.00	1.33	0.53

Test Mounting Details

The UUT was attached to a 60" square, 16 gauge carbon steel duct. The UUT was secured to the duct using (6) 3/8" grade 5 bolts on the bottom and (5) 3/8" grade 5 bolts on the top. Each end of the duct had a 2" wide, 1/4" thick carbon steel angle fastened to the top and bottom of the duct with (6) 3/8" grade 5 bolts and washers per angle. The duct was suspended with (4) 1/2" ASTM A307 Grade B threaded rods with two nuts above and below the angle through holes. Each threaded rod was stiffened with a 18" length of 12 gauge unistrut, and (3) rod stiffening clips per section. The duct was laterally braced with (4) Mason SCBH-2 seismic sway braces and 3/8" steel cable, set at 45 degrees.

12 Gauge Unistrut

Mason SCBH-2 **2" x 1/4" Steel Angle**

All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-13

30894-1801; UUT-13

Model Line	Model Number	Manufacturer
MS	SKD - MS-SD	Neptronic

Product Construction Summary

Stainless Steel Tubes and Stainless Steel Header with Welded Construction

Options / Subcomponent Summary

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
139	120	9	122	6	5.5	17

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	2.00	1.00	1.50	3.20	2.40	1.33	0.53

Test Mounting Details

UUT-13 was attached at the bottom to 1 5/8" 12ga strut with (8) 5/16" diameter Grade 5 bolts with washers. UUT-13 was attached at the top with (9) 5/16" dimaeter Grade 5 bolts into 1 5/8" 12ga strut. UUT-13 was then rigidly mounted into an Alliance AHU-1 air handling box. The box was rigidly mounted to the DCL interface using (12) 3/4" diameter Grade 5 bolts with 3/4" malleable beveled wedge washers. Bolts were spaced 54.5" apart widthwise and 51.5" apart lengthwise. Cross bracing requirements for Alliance AHU-1: Gripple G538 cables and 1/8" gusset plates in the corners.

All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-14

30894-1801; UUT-14

Model Line	Model Number	Manufacturer
MS	SKD - MS-HD	Neptronic

Product Construction Summary

Stainless Steel Tubes and Stainless Steel Header with Bolted Construction

Options / Subcomponent Summary

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
275	120	12	122	6	5.5	17

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	2.00	1.00	1.50	3.20	2.40	1.33	0.53

Test Mounting Details

UUT-14 was attached at the bottom to 1 5/8" 12ga strut with (12) 3/8" diameter ASTM A574 socket head cap screws with washer. UUT-14 was attached at the top with (9) 3/8" diameter ASTM A574 socket head cap screws into 1 5/8" 12ga strut. UUT-13 was then rigidly mounted into an Alliance AHU-1 air handling box. The box was rigidly mounted to the DCL interface using (12) 3/4" diameter Grade 5 bolts with 3/4" malleable beveled wedge washers. Bolts were spaced 54.5" apart widthwise and 51.5" apart lengthwise. Cross bracing requirements for Alliance AHU-1: Gripple G538 cables and 1/8" gusset plates in the corners..

All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-15

30353-1701d; UUT-15

Model Line	Model Number	Manufacturer
SKG4	SKG 3110-1NAW	Neptronic

Product Construction Summary

Powder Coated Carbon Steel Enclosure

Options / Subcomponent Summary

Water Level Sensor: Neptronic; Contactor: TE Connectivity; Transformer: Marcus; Displays: Neptronic; Limit Switch: Neptronic; Ignitor Hot Surface: Neptronic; Hot Surface Ignition Control: Fenwal; 3 Water Outlet Valves: Ametek; Drain Pump: Hanning; Gas Valve: Honeywell; Blower: Ametek

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
540	33.1	25.5	73.5	15	10.3	>33.3

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	2.50	0.00	1.50	2.50	1.00	1.67	0.67
	ICC-ES AC156	2.00	1.00	1.50	3.20	3.00	1.33	0.53

Test Mounting Details

UUT-15 was mounted to the shake table using eight (8) 3/8" grade 8 bolts.

All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-16

30353-1701d; UUT-16

Model Line	Model Number	Manufacturer
SKG4	SKG 3810-1NAW	Neptronic

Product Construction Summary

Powder Coated Carbon Steel Enclosure

Options / Subcomponent Summary

Water Level Sensor: Neptronic; Contactor: TE Connectivity; Transformer: Marcus; Displays: Neptronic; Limit Switch: Neptronic; Ignitor Hot Surface: Neptronic; Spark Igniter: Neptronic; Hot Surface Ignition Control: Fenwal; Spark Ignition Control: Fenwal; 2 Water Outlet Valves: Ametek; Drain Pump: Hanning; Gas Valve: Honeywell; Blower: Ametek

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
1,820	63.5	51.5	73.5	8.5	16.5	>33.3

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	2.50	0.00	1.50	2.50	1.00	1.67	0.67
	ICC-ES AC156	2.00	1.00	1.50	3.20	3.00	1.33	0.53

Test Mounting Details

UUT-16 was mounted to the shake table using twelve (12) 3/8" grade 8 bolts.

All units were filled with contents and maintained structural integrity and functionality after AC-156 test.

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-17

30353-1701f; UUT-17

Model Line	Model Number	Manufacturer
MF SAM	MF SAM 36	Neptronic

Product Construction Summary

Stainless Steel Tubes with Welded Construction

Options / Subcomponent Summary

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
2	5.0	36.0	5.0	N/A	N/A	N/A

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	2.50	0.00	1.50	2.50	1.00	1.67	0.67
	ICC-ES AC156	2.00	1.00	1.50	3.20	3.00	1.33	0.53

Test Mounting Details

The UUT was attached to a 36" square, 16 gauge carbon steel duct. The UUT was secured to the duct using (1) 3/8" grade 5 bolt on one end of the duct and (5) 1/4" TEK screws on the other side of the duct. Each end of the duct had a 2" wide, 1/4" thick carbon steel angle fastened to top and bottom of the duct with (6) 3/8" grade 5 bolts and to the sides with (5) 3/8" grade 5 bolts. The duct was suspended with (4) lengths of 1/2" ASTM A307 Grade B threaded rod with two nuts above and below the through holes. Each threaed rods was stiffened with a 20" length of 12 gauge unistrut and 3 rod stiffening clips per angle. The duct was laterally braced with (4) Mason SCBH-2 seismic sway braces and 1/4" cable set at 45 degrees.

Mason SCBH-2

12 Gauge Unistrut

2" x 1/4" Steel Angle

All units were filled with contents and maintained structural integrity and functionality after AC-156 test.