APPLICATION FOR HCAI SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0219

HCAI Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Loren Cook Company

Manufacturer's Technical Representative: Bradley Skidmore, P.E.

Mailing Address: 2015 East Dale St., Springfield, MO 65808

Telephone: (417) 869-6474 Email: bskidmore@lorencook.com

Product Information

Product Name: Air Handling Units

Product Type: Fans

Product Model Number: See Attachment A for a complete listing of models included in this application.

General Description: Square or Circular, Floor or Ceiling mounted inline fans.

Mounting Description: Base mounted on spring isolators or Ceiling suspended - isolated

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 St, 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: CLARK TESTING LABORATORY, INC.

Contact Person: Robert Francis

Mailing Address: 1801 Route 51, Jefferson Hills PA 15025

Telephone: (412) 387-1001 Email: rfrancis@clarktesting.com

Company Name: ENVIRONMENTAL TESTING LABORATORIES, INC. (ETL)

Contact Person: Paul E. Little

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

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

Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = Base Isolated=4.5g (roof), 1.71 (grade); Ceiling Isolated=3.6 (roof), 1.5 (grade)

S_{DS} (Design spectral response acceleration at short period, g) = Base Isolated= 2.0g (z/h=1); 2.28 (z/h=0); Ceiling Isolated= 2.0 (z/h=1); 2.5 (z/h=0)

a_p (Amplification factor) = 2.5

R_p (Response modification factor) = Base Isolated= 2.0; Ceiling Isolated= 2.5

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

HCAI Approval (For Office Use Only) - Approval Expires on 10/03/2028

Date: 10/3/2022

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 - Certified Inline Fans - Isolated Base Mounted

Model Line	Model Number	Dimensions [in]			Weight [lb]	UUT
		Length	Width	Height		
SQN-D [Direct Drive]	SQND 70	14.0	12.0	25.6	86	UUT-15
	SQND 90	17.0	14.0	29.6	90	Interpolated
	SQND 100	22.0	14.0	29.6	100	Interpolated
	SQND 120	22.0	18.4	29.6	105	Interpolated
	SQND 135	22.3	20.8	38.4	165	Interpolated
	SQND 150	23.9	23.0	43.1	160	Interpolated
	SQND 165	27.3	25.3	52.7	130	UUT-6
	SQND 402	50.3	72.4	72.4	805	UUT-16
SQN-HP [Belt Drive]	SQNHP 135	22.3	20.8	33.3	135	UUT-4
	SQNHP 150	23.9	23.0	35.8	150	Interpolated
	SQNHP 165	27.0	25.3	40.1	175	Interpolated
	SQNHP 180	30.0	27.6	42.4	200	Interpolated
	SQNHP 195	32.3	29.9	44.9	225	Interpolated
	SQNHP 210	35.0	31.3	46.3	250	Interpolated
	SQNHP 225	37.3	33.5	48.8	300	Interpolated
	SQNHP 245	38.0	36.0	53.3	350	Interpolated
	SQNHP 270	41.5	39.7	56.9	400	Interpolated
	SQNHP 300	42.0	44.0	61.3	450	Interpolated
	SQNHP 330	45.8	48.4	65.7	500	Interpolated
	SQNHP 365	46.0	50.0	67.3	550	Interpolated
	SQNHP 402	50.3	55.1	72.4	800	Interpolated
SQN-B [Belt Drive]	SQNB 60	22.0	14.0	26.5	100	Interpolated
	SQNB 70	22.0	14.0	26.5	100	Interpolated
	SQNB 80	22.0	14.0	26.5	100	Interpolated
	SQNB 100	22.0	14.0	26.5	100	Interpolated
	SQNB 120	22.0	18.4	30.9	110	Interpolated
	SQNB 135	22.3	20.8	33.3	125	Interpolated
	SQNB 150	23.9	23.0	35.8	150	Interpolated
	SQNB 165	27.0	25.3	40.1	175	Interpolated
	SQNB 180	30.0	27.6	42.4	200	Interpolated
	SQNB 195	32.3	29.9	44.9	225	Interpolated
	SQNB 210	35.0	31.3	46.3	250	Interpolated
	SQNB 225	37.3	33.5	48.8	300	Interpolated
	SQNB 245	38.0	36.0	53.3	350	Interpolated
	SQNB 270	41.5	39.7	56.9	400	Interpolated
	SQNB 300	42.0	44.0	61.3	450	Interpolated
	SQNB 330	45.8	48.4	65.7	500	Interpolated
	SQNB 365	46.0	50.0	67.3	550	Interpolated
	SQNB 402	50.3	55.1	72.4	735	UUT-5

Table 1A - Certified Inline Fans - Isolated Base Mounted, Continued

Model Line	Model Number	Dimensions [in]			Weight [lb]	UUT
		Length	Width	Height		
QMX [Belt Drive]	QMX 90	19.9	15.9	31.3	240	UUT-10
	QMX 120	24.0	20.1	36.5	309	Interpolated
	QMX 135	27.0	22.3	39.4	418	Interpolated
	QMX 150	30.0	24.4	42.1	485	Interpolated
	QMX 165	33.0	26.5	43.8	557	Interpolated
	QMX 180	35.0	28.6	46.3	618	Interpolated
	QMX 202	37.5	31.8	49.9	803	Interpolated
	QMX 225	41.0	34.9	55.9	937	Interpolated
	QMX 245	44.5	37.8	59.0	1,089	Interpolated
	QMX 270	47.0	41.3	62.9	1,230	Interpolated
	QMX 300	54.0	45.5	68.1	1,455	Interpolated
	QMX 330	58.5	49.8	74.8	1,750	Interpolated
	QMX 365	64.0	54.8	80.3	2,260	Interpolated
	QMX 402	68.5	59.9	88.3	2,785	Interpolated
	QMX 445	74.0	66.1	94.9	3,465	Interpolated
	QMX 490	80.5	72.4	103.3	4,180	Interpolated
	QMX 540	87.0	79.4	110.9	4,950	Interpolated
	QMX 600	95.5	87.9	122.1	6,070	Interpolated
QMX-HP [Belt Drive]	QMXHP 90	19.8	15.9	30.0	180	Interpolated
	QMXHP 120	24.0	20.1	36.5	352	Interpolated
	QMXHP 135	27.0	22.3	39.4	431	Interpolated
	QMXHP 150	30.0	24.4	42.1	511	Interpolated
	QMXHP 165	33.0	26.5	43.8	667	Interpolated
	QMXHP 180	35.0	28.6	46.3	723	Interpolated
	QMXHP 202	37.5	31.8	49.9	860	Interpolated
	QMXHP 225	41.0	34.9	55.9	1,023	Interpolated
	QMXHP 245	44.5	37.8	59.0	1,050	Interpolated
	QMXHP 270	47.0	41.3	62.9	1,085	UUT 11
	QMXHP 300	54.0	45.5	68.1	1,610	Interpolated
	QMXHP 330	58.5	49.8	74.8	1,885	Interpolated
	QMXHP 365	64.0	54.8	80.3	2,500	Interpolated
	QMXHP 402	68.5	59.9	88.3	3,045	Interpolated
	QMXHP 445	74.0	66.1	94.9	3,605	Interpolated
	QMXHP 490	80.5	72.4	103.3	4,490	Interpolated
	QMXHP 540	87.0	79.4	110.9	5,090	Interpolated
	QMXHP 600	95.5	87.9	122.1	7,385	Interpolated
QMX-XP [Belt Drive]	QMXXP 90	19.9	15.9	30.0	271	Interpolated
	QMXXP 120	24.0	20.1	36.5	385	Interpolated
	QMXXP 135	27.0	22.3	39.4	453	Interpolated
	QMXXP 150	30.0	24.4	42.1	526	Interpolated
	QMXXP 165	33.0	26.5	43.8	687	Interpolated
	QMXXP 180	35.0	28.6	46.3	791	Interpolated
	QMXXP 202	37.5	31.8	49.9	911	Interpolated
	QMXXP 225	41.0	34.9	55.9	1,133	Interpolated
	QMXXP 245	44.5	37.8	59.0	1,210	Interpolated
	QMXXP 270	47.0	41.3	62.9	1,370	Interpolated
	QMXXP 300	54.0	45.5	68.1	2,280	Interpolated
	QMXXP 330	58.5	49.8	74.8	2,795	Interpolated
	QMXXP 365	64.0	54.8	80.3	3,288	Interpolated
	QMXXP 402	68.5	59.9	88.3	4,042	Interpolated
	QMXXP 445	74.0	66.1	94.9	4,780	Interpolated
	QMXXP 490	80.5	72.4	103.3	5,530	Interpolated
	QMXXP 540	87.0	79.4	110.9	6,090	Interpolated
	QMXXP 600	95.5	87.9	122.1	7,385	UUT-13

Table 1B-Certified Inline Fans-Isolated&Braced Ceiling Suspended

Model Line	Model Number	Dimensions [in]			Weight [lb]	UUT
		Length	Width	Height		
SQN-D [Direct Drive]	SQND 70	14.0	12.0	25.6	50	UUT-14
	SQND 90	17.0	14.0	29.6	90	Interpolated
	SQND 100	22.0	14.0	29.6	100	Interpolated
	SQND 120	22.0	18.4	29.6	105	Interpolated
	SQND 135	22.3	20.8	38.4	165	Interpolated
	SQND 150	23.9	23.0	43.1	160	Interpolated
	SQND 165	27.0	25.4	52.7	130	UUT-3
SQN-B [Belt Drive]	SQNB 60	22.0	14.0	26.5	100	UUT-1
	SQNB 70	22.0	14.0	26.5	100	Interpolated
	SQNB 80	22.0	14.0	26.5	100	Interpolated
	SQNB 100	22.0	14.0	26.5	100	Interpolated
	SQNB 120	22.0	18.4	30.9	110	Interpolated
	SQNB 135	22.3	20.8	33.3	125	Interpolated
	SQNB 150	23.9	23.0	35.8	150	Interpolated
	SQNB 165	27.0	25.3	40.1	175	Interpolated
	SQNB 180	30.0	27.6	42.4	200	Interpolated
	SQNB 195	32.3	29.9	44.9	225	Interpolated
	SQNB 210	35.0	31.3	46.3	250	Interpolated
	SQNB 225	37.3	33.5	48.8	300	Interpolated
	SQNB 245	38.0	36.0	53.3	350	Interpolated
	SQNB 270	41.5	39.7	56.9	400	Interpolated
	SQNB 300	42.0	44.0	61.3	450	Interpolated
	SQNB 330	45.8	48.4	65.7	500	Interpolated
	SQNB 365	46.0	50.0	67.3	550	Interpolated
	SQNB 402	50.3	55.1	72.4	805	Interpolated
SQN-HP [Belt Drive]	SQNHP 135	22.3	20.8	33.3	135	Interpolated
	SQNHP 150	23.9	23.0	35.8	150	Interpolated
	SQNHP 165	27.0	25.3	40.1	175	Interpolated
	SQNHP 180	30.0	27.6	42.4	200	Interpolated
	SQNHP 195	32.3	29.9	44.9	225	Interpolated
	SQNHP 210	35.0	31.3	46.3	250	Interpolated
	SQNHP 225	37.3	33.5	48.8	300	Interpolated
	SQNHP 245	38.0	36.0	53.3	350	Interpolated
	SQNHP 270	41.5	39.7	56.9	400	Interpolated
	SQNHP 300	42.0	44.0	61.3	450	Interpolated
	SQNHP 330	45.8	48.4	65.7	500	Interpolated
	SQNHP 365	46.0	50.0	67.3	550	Interpolated
	SQNHP 402	50.3	55.1	72.4	800	UUT-2

Table1B:Certified Inline Fans:Isolated&Braced Ceiling Suspended,Continued

Model Line	Model Number	Dimensions [in]			Weight [lb]	UUT
		Length	Width	Height		
QMX-HP [Belt Drive]	QMXHP 90	19.8	15.9	30.0	180	UUT 7
	QMXHP 120	24.0	20.1	36.5	352	Interpolated
	QMXHP 135	27.0	22.3	39.4	431	Interpolated
	QMXHP 150	30.0	24.4	42.1	511	Interpolated
	QMXHP 165	33.0	26.5	43.8	667	Interpolated
	QMXHP 180	35.0	28.6	46.3	723	Interpolated
	QMXHP 202	37.5	31.8	49.9	860	Interpolated
	QMXHP 225	41.0	34.9	55.9	1,023	Interpolated
	QMXHP 245	44.5	37.8	59.0	1,050	Interpolated
	QMXHP 270	47.0	41.3	62.9	1,085	Interpolated
	QMXHP 300	54.0	45.5	68.1	1,610	Interpolated
	QMXHP 330	58.5	49.8	74.8	1,885	Interpolated
	QMXHP 365	64.0	54.8	80.3	2,500	Interpolated
	QMXHP 402	68.5	59.9	88.3	3,045	Interpolated
	QMXHP 445	74.0	66.1	94.9	3,605	Interpolated
	QMXHP 490	80.5	72.4	103.3	4,490	Interpolated
	QMXHP 540	87.0	79.4	110.9	5,090	Interpolated
	QMXHP 600	95.5	87.9	122.1	6,070	Interpolated
QMX-XP [Belt Drive]	QMXXP 90	19.9	15.9	30.0	271	Interpolated
	QMXXP 120	24.0	20.1	36.5	385	Interpolated
	QMXXP 135	27.0	22.3	39.4	453	Interpolated
	QMXXP 150	30.0	24.4	42.1	526	Interpolated
	QMXXP 165	33.0	26.5	43.8	687	Interpolated
	QMXXP 180	35.0	28.6	46.3	791	Interpolated
	QMXXP 202	37.5	31.8	49.9	911	Interpolated
	QMXXP 225	41.0	34.9	55.9	1,133	Interpolated
	QMXXP 245	44.5	37.8	59.0	1,210	Interpolated
	QMXXP 270	47.0	41.3	62.9	1,370	UUT 8
	QMXXP 300	54.0	45.5	68.1	2,280	Interpolated
	QMXXP 330	58.5	49.8	74.8	2,795	Interpolated
	QMXXP 365	64.0	54.8	80.3	3,288	Interpolated
	QMXXP 402	68.5	59.9	88.3	4,042	Interpolated
	QMXXP 445	74.0	66.1	94.9	4,780	Interpolated
	QMXXP 490	80.5	72.4	103.3	5,530	Interpolated
	QMXXP 540	87.0	79.4	110.9	6,070	Interpolated
	QMXXP 600	95.5	87.9	122.1	6,070	Interpolated
QMX [Belt Drive]	QMX 90	19.9	15.9	31.3	240	Interpolated
	QMX 120	24.0	20.1	36.5	309	Interpolated
	QMX 135	27.0	22.3	39.4	418	Interpolated
	QMX 150	30.0	24.4	42.1	485	Interpolated
	QMX 165	33.0	26.5	43.8	557	Interpolated
	QMX 180	35.0	28.6	46.3	618	Interpolated
	QMX 202	37.5	31.8	49.9	803	Interpolated
	QMX 225	41.0	34.9	55.9	937	Interpolated
	QMX 245	44.5	37.8	59.0	1,089	Interpolated
	QMX 270	47.0	41.3	62.9	1,230	Interpolated
	QMX 300	54.0	45.5	68.1	1,455	Interpolated
	QMX 330	58.5	49.8	74.8	1,750	Interpolated
	QMX 365	64.0	54.8	80.3	2,260	Interpolated
	QMX 402	68.5	59.9	88.3	2,785	Interpolated
	QMX 445	74.0	66.1	94.9	3,465	Interpolated
	QMX 490	80.5	72.4	103.3	4,180	Interpolated
	QMX 540	87.0	79.4	110.9	4,950	Interpolated
	QMX 600	95.5	87.9	122.1	6,070	UUT-9

Table 2A- Certified Fan Motors - Isolated Base Mounted

Component Type	Model	MFR	HP	Voltage	Weight [lb]	UUT
Fan Motors	56 T	Baldor	0.75	208-230/460V	25	Extrapolated
	143 T		1		35	Extrapolated
	145 T		1.5		41	Extrapolated
	145 T		2		45	Extrapolated
	182 T		3		73	UUT-10
	184 T		5		107	Interpolated
	213 T		7.5		170	Interpolated
	215 T		10	230/460V	191	UUT-16
	254 T		15		275	Interpolated
	256 T		20		309	Interpolated
	284 T		25		425	UUT-11
	286 T		30		437	Interpolated
	324 T		40		570	Interpolated
	326 T		50		640	Interpolated
	364 T		60		912	Interpolated
	365 T		75		955	Interpolated
	404 T		100		1,205	UUT-13

Table 2B - Certified Fan Motors - Isolated & Braced Ceiling Suspended

Component Type	Model	MFR	HP	Voltage	Weight [lb]	UUT
Fan Motors	56 T	Baldor	0.75	208-230/460V	25	UUT-1
	143 T		1		35	Interpolated
	145 T		1.5		41	Interpolated
	145 T		2		45	Interpolated
	182 T		3		73	UUT-7
	184 T		5		107	Interpolated
	213 T		7.5		170	Interpolated
	215 T		10	230/460V	191	Interpolated
	254 T		15		275	Interpolated
	256 T		20		309	Interpolated
	284 T		25		425	UUT-8
	286 T		30		437	Interpolated
	324 T		40		570	Interpolated
	326 T		50		640	Interpolated
	364 T		60		912	Interpolated
	365 T		75		955	Interpolated
	404 T		100		1,205	UUT-9

Table 3A- Certified Fan Wheel - Isolated Base Mounted

Component Type	Model Size [in]	MFR	Material	Weight [lb]	UUT
Centrifugal [Backward Inclined]	10.0	Loren Cook	Aluminum	2.8	UUT-15
	12.0			4	Interpolated
	13.5			4.7	Interpolated
	15.0			6	Interpolated
	16.5			8	Interpolated
	18.0			10	Interpolated
	19.5			11	Interpolated
	21.0			13	Interpolated
	22.5			16	Interpolated
	24.5			18	Interpolated
	27.0			23	Interpolated
	30.0			33	Interpolated
	33.0			38	Interpolated
	36.5			44	Interpolated
	40.3			63	UUT-16

Table 3A- Certified Fan Wheel - Isolated Base Mounted, Continued

Component Type	Model Size [in]	MFR	Material	Weight [lb]	UUT
Centrifugal HP [Backward Inclined]	13.5	Loren Cook	Aluminum	3.7	UUT-4
	15.0			4	Interpolated
	16.5			4.7	Interpolated
	18.0			6	Interpolated
	19.5			7	Interpolated
	21.0			8	Interpolated
	22.5			11	Interpolated
	24.5			13	Interpolated
	27.0			16	Interpolated
	30.0			25	Interpolated
	33.0			28	Interpolated
	36.5			33	Interpolated
	40.3			50	Interpolated
QMX [Single Thickness Blade]	9.0	Loren Cook	Carbon Steel	11	UUT-10
	12.0			17	Interpolated
	13.5			23	Interpolated
	15.0			31	Interpolated
	16.5			37	Interpolated
	18.0			47	Interpolated
	20.2			74	Interpolated
	22.5			90	Interpolated
	24.5			110	Interpolated
	27.0			148	Interpolated
	30.0			156	Interpolated
	33.0			228	Interpolated
	36.5			288	Interpolated
	40.2			358	Interpolated
	44.5			536	Interpolated
	49.0			645	Interpolated
	54.0			777	Interpolated
	60.0			1,130	Interpolated
QMX-HP/XP [Airfoil Blade]	9.0	Loren Cook	Carbon Steel	11	Interpolated
	12.0			19	Interpolated
	13.5			24	Interpolated
	15.0			33	Interpolated
	16.5			43	Interpolated
	18.0			50	Interpolated
	20.2			75	Interpolated
	22.5			99	Interpolated
	24.5			117	Interpolated
	27.0			146	UUT-11
	30.0			156	Interpolated
	33.0			239	Interpolated
	36.5			304	Interpolated
	40.2			361	Interpolated
	44.5			528	Interpolated
	49.0			651	Interpolated
	54.0			783	Interpolated
	60.0			1,155	UUT-13

Table 3B- Certified Fan Wheel - Isolated & Braced Ceiling Suspended

Component Type	Model Size [in]	MFR	Material	Weight [lb]	UUT
Centrifugal [Backward Inclined]	10.0	Loren Cook	Aluminum	2.8	UUT-1, UUT-14
	12.0			4	Interpolated
	13.5			4.7	Interpolated
	15.0			6	Interpolated
	16.5			8	UUT-3
	18.0			10	Interpolated
	19.5			11	Interpolated
	21.0			13	Interpolated
	22.5			16	Interpolated
	24.5			18	Interpolated
	27.0			23	Interpolated
	30.0			33	Interpolated
	33.0			38	Interpolated
	36.5			44	Interpolated
	40.3			63	Interpolated
Centrifugal HP [Backward Inclined]	13.5	Loren Cook	Aluminum	3.7	Interpolated
	15.0			4	Interpolated
	16.5			4.7	Interpolated
	18.0			6	Interpolated
	19.5			7	Interpolated
	21.0			8	Interpolated
	22.5			11	Interpolated
	24.5			13	Interpolated
	27.0			16	Interpolated
	30.0			25	Interpolated
	33.0			28	Interpolated
	36.5			33	Interpolated
	40.3			50	UUT-2

Table 3B-Certified Fan Wheel-Isolated&Braced Ceiling Suspended,Con

Component Type	Model Size [in]	MFR	Material	Weight [lb]	UUT
QMX-HP/XP [Airfoil Blade]	9.0	Loren Cook	Carbon Steel	11	UUT-7
	12.0			19	Interpolated
	13.5			24	Interpolated
	15.0			33	Interpolated
	16.5			43	Interpolated
	18.0			50	Interpolated
	20.2			75	Interpolated
	22.5			99	Interpolated
	24.5			117	Interpolated
	27.0			146	UUT-8
	30.0			156	Interpolated
	33.0			239	Interpolated
	36.5			304	Interpolated
	40.2			361	Interpolated
	44.5			528	Interpolated
	49.0			651	Interpolated
	54.0			783	Interpolated
	60.0			1,155	Interpolated
QMX [Single Thickness Blade]	9.0	Loren Cook	Carbon Steel	11	Interpolated
	12.0			17	Interpolated
	13.5			23	Interpolated
	15.0			31	Interpolated
	16.5			37	Interpolated
	18.0			47	Interpolated
	20.2			74	Interpolated
	22.5			90	Interpolated
	24.5			110	Interpolated
	27.0			148	Interpolated
	30.0			156	Interpolated
	33.0			228	Interpolated
	36.5			288	Interpolated
	40.2			358	Interpolated
	44.5			536	Interpolated
	49.0			645	Interpolated
	54.0			777	Interpolated
	60.0			1,130	UUT-9

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-1

Test Report: EL:9580

Model Line	Model Number	Manufacturer
SQN	60 SQN-B	Loren Cook Company

Product Construction Summary

18 Gauge Galvanized Carbon Steel Housing; Aluminum Fan Wheel

Options / Subcomponent Summary

Baldor 3/4 HP Belt Drive Motor; Motor Cover/Belt Guard; Universal Mounting Feet; Access Doors

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
100	22.0	14.0	26.5	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2022	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67
		-	-	-	-	-	-	-

Test Mounting Details

UUT-1 was ceiling suspended, using (4) Caldyn HH30 ET80 spring isolators, with 3/8" ASTM A307 Grade A steel threaded rods connected to the UUT through (2) 1/4" carbon steel angle brackets using (1) 5/16" Grade 2 bolt and bolted together with (2) 3/8" Grade 5 bolts. The UUT was diagonally braced with (4) 1/4" diameter carbon steel cables.

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

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-2

Test Report: EL:9580

Model Line	Model Number	Manufacturer
SQN	402 SQN-HP	Loren Cook Company

Product Construction Summary

18 Gauge Galvanized Carbon Steel Housing; Aluminum Fan Wheel

Options / Subcomponent Summary

TECO-Westinghouse 15 HP Belt Drive Motor; Motor Cover/Belt Guard; Universal Mounting Feet; Access Doors

UUT Properties

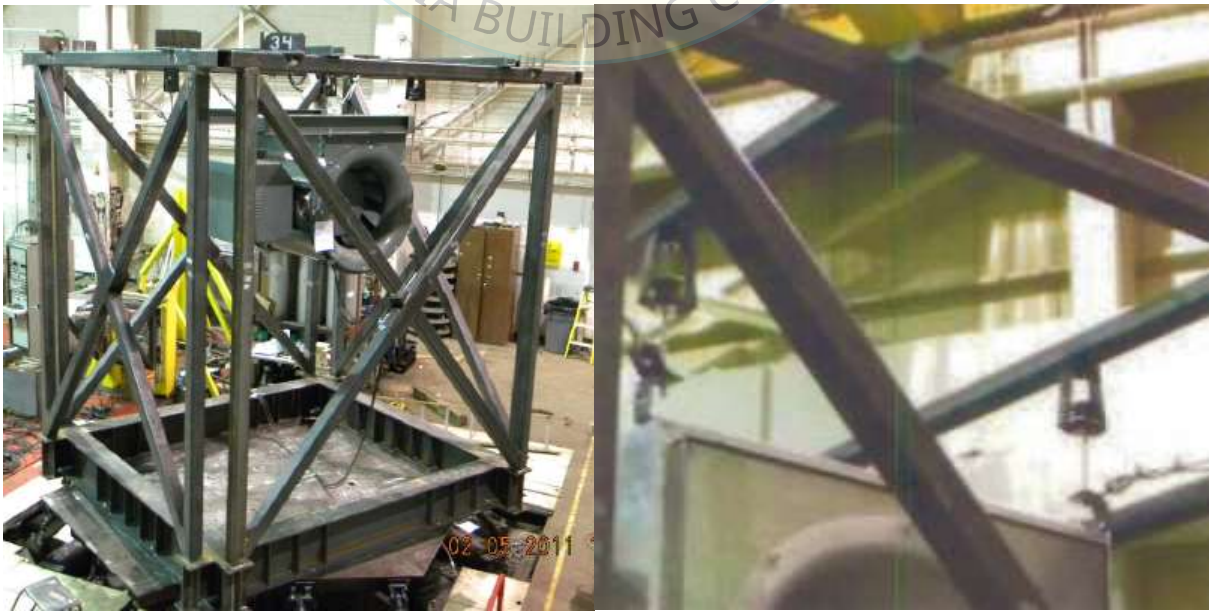
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
800	50.3	55.1	72.4	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2022	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67
		-	-	-	-	-	-	-

Test Mounting Details

UUT-2 was ceiling suspended, using (4) Caldyn HH30 ET347 spring isolators, with 1/2" ASTM A307 Grade A steel threaded rods connected to the UUT through (2) 1/4" carbon steel angle brackets using (2) 5/16" Grade 2 bolt and bolted together with (2) 3/8" Grade 5 bolts. The UUT was diagonally braced with (2) 3/8" diameter carbon steel cables and a single universal mounting foot at each corner.



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

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-3

Test Report: EL:9580

Model Line	Model Number	Manufacturer
SQN	165 SQN-D	Loren Cook Company

Product Construction Summary

18 Gauge Galvanized Carbon Steel Housing; Aluminum Fan Wheel

Options / Subcomponent Summary

A.O. Smith 2 HP Direct Drive Motor; Universal Mounting Feet; Access Doors

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
130	27.0	25.4	52.7	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2022	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67
		-	-	-	-	-	-	-

Test Mounting Details

UUT-3 was ceiling suspended, using (4) Caldyn HH30 ET80 spring isolators, with 3/8" ASTM A307 Grade A steel threaded rods connected to the UUT through (2) 1/4" carbon steel angle brackets using (1) 5/16" Grade 2 bolt and bolted together with (2) 3/8" Grade 5 bolts. The UUT was diagonally braced with (2) 1/4" diameter carbon steel cables at each corner.

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

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-4

Test Report: EL:9580

Model Line	Model Number	Manufacturer
SQN	135 SQN-HP	Loren Cook Company

Product Construction Summary

18 Gauge Galvanized Carbon Steel Housing; Aluminum Fan Wheel

Options / Subcomponent Summary

WEG 1.5 HP Belt Drive Motor; Motor Cover/Belt Guard; Universal Mounting Feet; Access Doors

UUT Properties

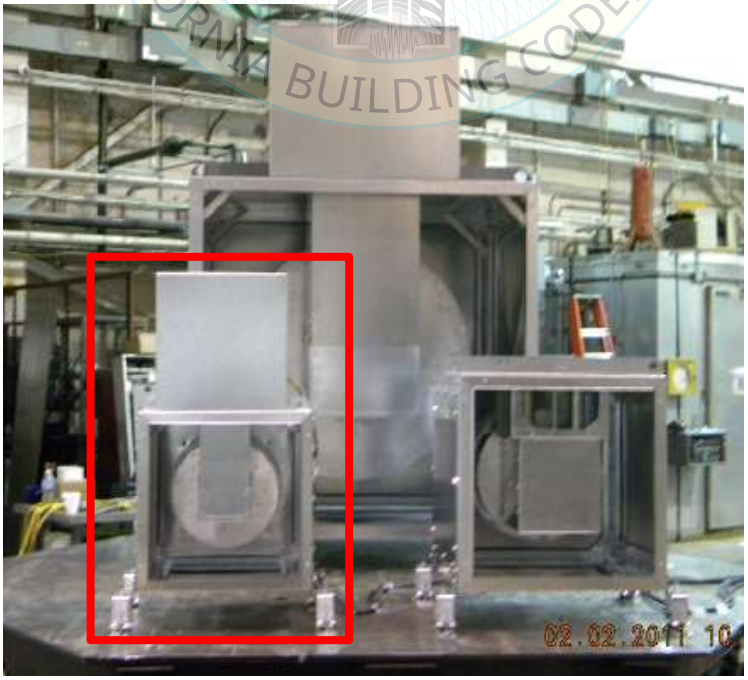
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
135	22.3	20.8	33.3	2.5	3.1	9.0

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2022	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67
		-	-	-	-	-	-	-

Test Mounting Details

UUT-4 was isolated using (4) Caldyn JQAE106K spring isolators. The isolators were connected to the equipment via 1/4" carbon steel angle brackets using (1) 5/16" Grade 2 bolt each, and were connected to the shake table using (2) 1/2" diameter Grade 5 bolts per isolator.



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

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-5

Test Report: EL:9580

Model Line	Model Number	Manufacturer
SQN	402 SQN-B	Loren Cook Company

Product Construction Summary

18 Gauge Galvanized Carbon Steel Housing; Aluminum Fan Wheel

Options / Subcomponent Summary

Baldor 10 HP Belt Drive Motor; Motor Cover/Belt Guard; Universal Mounting Feet; Access Doors

UUT Properties

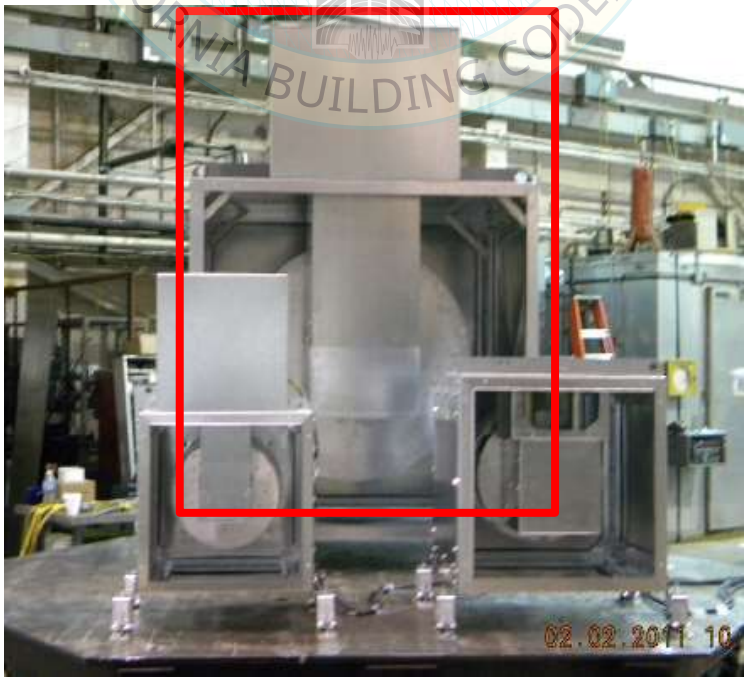
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
735	50.3	55.1	72.4	5.0	2.0	2.2

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2022	ICC-ES AC156	2.28	1.0	1.5	3.65	2.74	1.52	0.61
				-	-	-	-	-

Test Mounting Details

UUT-5 was isolated using (4) Caldyn JQBKS-ET473 spring isolators. The isolators were connected to the equipment via 1/4" carbon steel angle brackets using (2) 5/16" Grade 2 bolt each, and were connected to the shake table using (2) 1/2" diameter Grade 5 bolts per isolator.



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

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-6

Test Report: EL:9580

Model Line	Model Number	Manufacturer
SQN	165 SQN-D	Loren Cook Company

Product Construction Summary

18 Gauge Galvanized Carbon Steel Housing; Aluminum Fan Wheel

Options / Subcomponent Summary

A.O. Smith 2 HP Direct Drive Motor; Universal Mounting Feet; Access Doors

UUT Properties

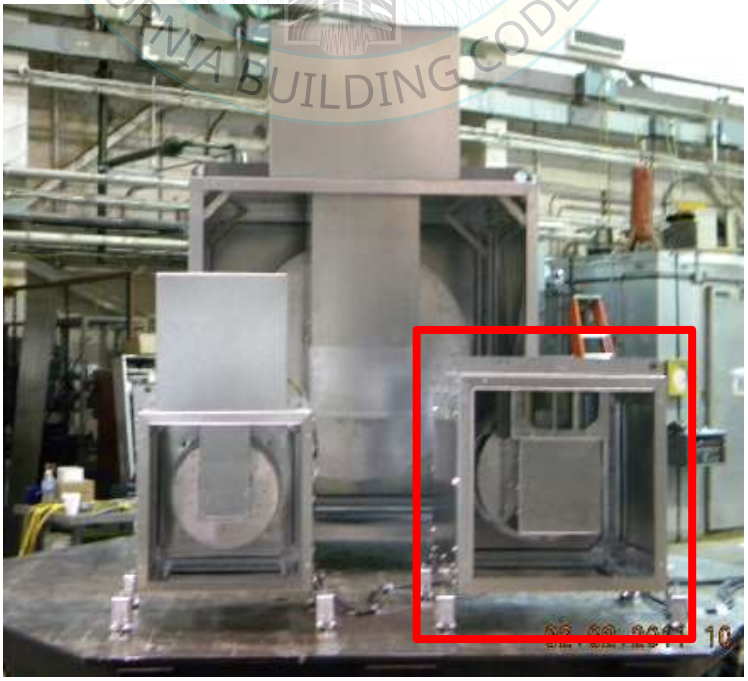
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
130	27.3	25.3	52.7	3.0	3.7	7.0

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2022	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67
		-	-	-	-	-	-	-

Test Mounting Details

UUT-6 was isolated using (4) Caldyn JQAE79K spring isolators. The isolators were connected to the equipment via 1/4" carbon steel angle brackets using (1) 5/16 Grade 2 bolt each, and were connected to the shake table using (2) 1/2" diameter Grade 5 bolts per isolator.



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

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-7

Test Report: EL:9763; UUT-1

Model Line	Model Number	Manufacturer
QMX	90 QMX-HP	Loren Cook Company

Product Construction Summary

Heavy Gauge Carbon Steel Housing and Fan Wheel. Fan Housing Attached to Carbon Steel Base Frame

Options / Subcomponent Summary

Baldor 3 HP Belt Drive Motor in Position "E"; Motor Cover/Belt Guard; Adjustable Motor Base; Inlet/Outlet Collars; Extended Lube Lines

UUT Properties

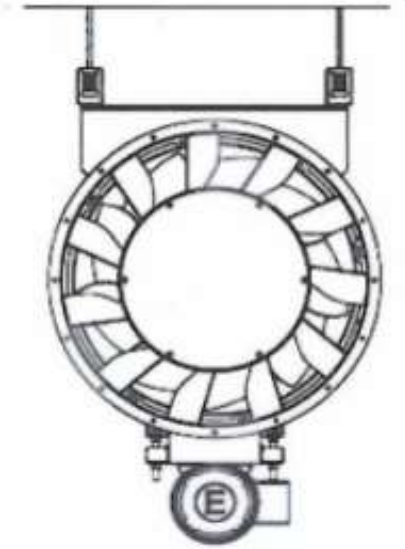
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
180	19.8	15.9	30.0	N/A	N/A	N/A

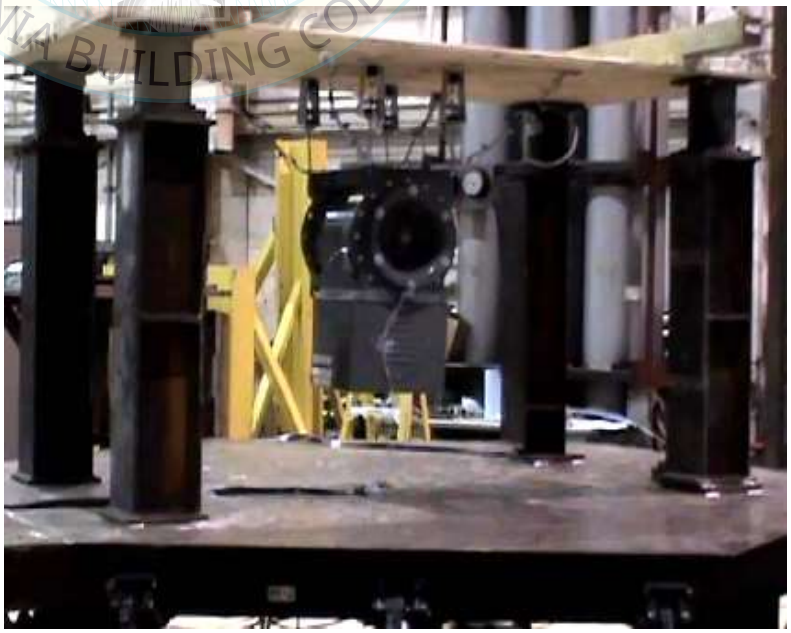
UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2022	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67
		-	-	-	-	-	-	-

Test Mounting Details

UUT-7 was ceiling suspended, using (4) Caldyn HH30 ET129 spring isolators, with 3/8" ASTM A307 Grade A steel threaded rods. The UUT was diagonally braced with (2) 1/4" diameter carbon steel cables at each corner.





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

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-8

Test Report: EL:9763; UUT-2

Model Line	Model Number	Manufacturer
QMX	270 QMX-XP	Loren Cook Company

Product Construction Summary

Heavy Gauge Carbon Steel Housing and Fan Wheel. Fan Housing Attached to Carbon Steel Base Frame

Options / Subcomponent Summary

Baldor 25 HP Belt Drive Motor in Position "C"; Motor Cover/Belt Guard; Adjustable Motor Base; Inlet/Outlet Collars; Extended Lube Lines

UUT Properties

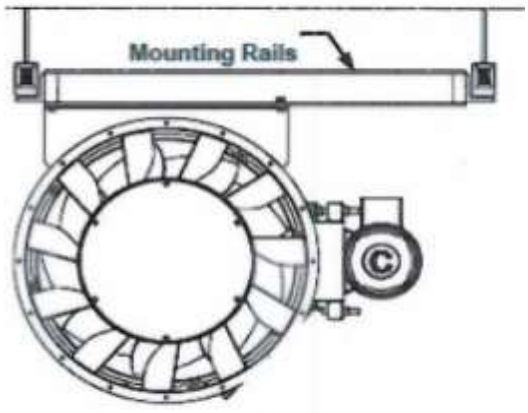
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
1,370	47.0	41.3	62.9	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2022	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67
		-	-	-	-	-	-	-

Test Mounting Details

UUT-8 was ceiling suspended, using (4) Caldyn HH30 ET940 spring isolators, with 3/4" ASTM A307 Grade A steel threaded rods. The UUT was diagonally braced with (2) 3/8" diameter carbon steel cables at each corner.



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

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-9

Test Report: EL:9763; UUT-3

Model Line	Model Number	Manufacturer
QMX	600 QMX	Loren Cook Company

Product Construction Summary

Heavy Gauge Carbon Steel Housing and Fan Wheel. Fan Housing Attached to Carbon Steel Base Frame

Options / Subcomponent Summary

Baldor 100 HP Belt Drive Motor in Position "C"; Motor Cover/Belt Guard; Adjustable Motor Base; Inlet/Outlet Collars; Extended Lube Lines

UUT Properties

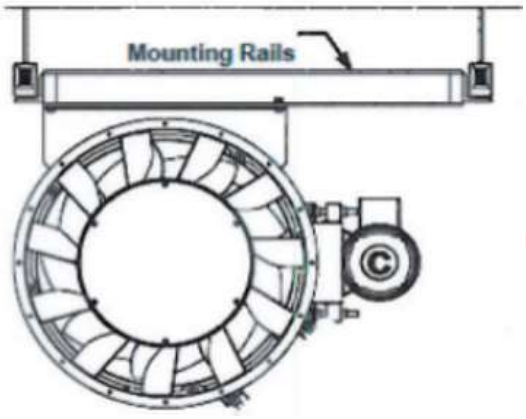
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
6,070	95.5	87.9	122.1	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2022	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67
		-	-	-	-	-	-	-

Test Mounting Details

UUT-9 was ceiling suspended, using (4) Caldyn HH30 ET2060 spring isolators, with 1" ASTM A307 Grade A steel threaded rods connected to the UUT using (4) 1" diameter bolts. The UUT was diagonally braced with (2) 5/8" diameter galvanized steel cables at each corner.



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

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-10

Test Report: EL:9763; UUT-4

Model Line	Model Number	Manufacturer
QMX	90 QMX	Loren Cook Company

Product Construction Summary

Heavy Gauge Carbon Steel Housing and Fan Wheel. Fan Housing Attached to Carbon Steel Base Frame

Options / Subcomponent Summary

Baldor 3 HP Belt Drive Motor in Position "C"; Motor Cover/Belt Guard; Adjustable Motor Base; Inlet/Outlet Collars; Extended Lube Lines

UUT Properties

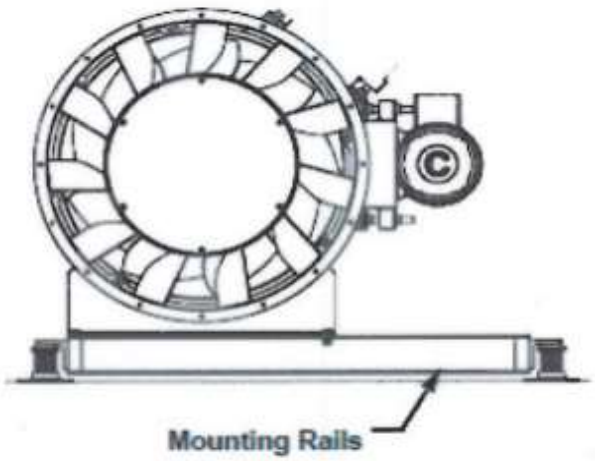
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
240	19.9	15.9	31.3	4.9	7.7	11.4

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2022	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67
		-	-	-	-	-	-	-

Test Mounting Details

UUT-10 was isolated using (4) Caldyn JQAE106K spring isolators. The isolators were connected to the equipment using (1) 1/2" Grade 5 bolt each, and were connected to the shake table using (2) 1/2" diameter Grade 5 bolts per isolator.



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

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-11

Test Report: EL:9763; UUT-5

Model Line	Model Number	Manufacturer
QMX	270 QMX	Loren Cook Company

Product Construction Summary

Heavy Gauge Carbon Steel Housing and Fan Wheel. Fan Housing Attached to Carbon Steel Base Frame

Options / Subcomponent Summary

Baldor 25 HP Belt Drive Motor in Position "A"; Motor Cover/Belt Guard; Adjustable Motor Base; Inlet/Outlet Collars; Extended Lube Lines

UUT Properties

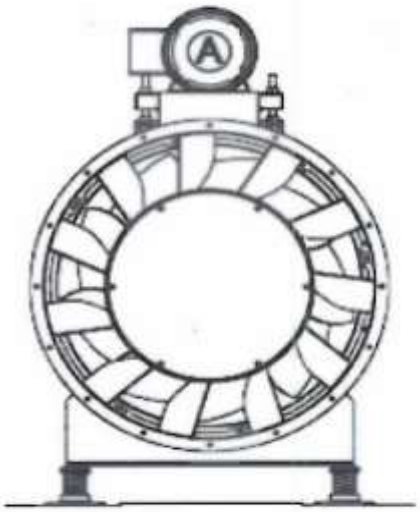
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
1,085	47.0	41.3	62.9	2.7	2.2	5.4

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2022	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67
		-	-	-	-	-	-	-

Test Mounting Details

UUT-11 was isolated using (4) Caldyn JQBET473K spring isolators. The isolators were connected to the equipment using (1) 1/2" Grade 5 bolt each, and were connected to the shake table using (2) 1/2" diameter Grade 5 bolts per isolator.



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

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-13

Test Report: 14273

Model Line	Model Number	Manufacturer
QMX	600 QMX-XP	Loren Cook Company

Product Construction Summary

Heavy Gauge Carbon Steel Housing and Fan Wheel. Fan Housing Attached to a Carbon Steel Base Frame

Options / Subcomponent Summary

Baldor 100 HP Belt Drive Motor in Position "A"; Motor Cover/Belt Guard; Adjustable Motor Base; Inlet/Outlet Collars; Extended Lube Lines

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
7,385	95.5	87.9	122.1	2.6	2.1	5.1

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2022	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	-	-
		3.20	0.0	1.5	-	-	2.13	0.85

Test Mounting Details

UUT-13 was isolated using (4) Mason SSLFH-C-1750 spring isolators. The isolators were connected to the equipment using (1) 1/2" Grade 8 bolt each, and were connected to the shake table using (2) 5/8" diameter Grade 8 bolts per isolator.

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

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-14

Test Report: 14273

Model Line	Model Number	Manufacturer
SQN	70 SQN-D	Loren Cook Company

Product Construction Summary

Galvanized Carbon Steel Housing

Options / Subcomponent Summary

10" Al Backward Inclined Wheel with Carbon Steel Housing; Removable Access Doors; Inlet and Discharge Duct Collars; Universal Mounting Feet; 1/2 HP, 120/208-240VAC EC Motor

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
50	14.0	12.0	25.6	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2022	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	-	-
		3.20	0.0	1.5	-	-	2.13	0.85

Test Mounting Details

UUT-14 was ceiling suspended, using (4) Kinetics SH-1-70 spring isolators, with 3/8" ASTM A307 Grade A steel threaded drop rods. The UUT was diagonally braced with (2) KSWC-2 cable braces at each corner.

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

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-15

Test Report: 14273

Model Line	Model Number	Manufacturer
SQN	70 SQN-D	Loren Cook Company

Product Construction Summary

Galvanized Carbon Steel Housing

Options / Subcomponent Summary

10" Al Backward Inclined Wheel with Carbon Steel Housing; Removable Access Doors; Inlet and Discharge Duct Collars; Universal Mounting Feet; 1/6 HP, 120/208-240VAC EC Motor

UUT Properties

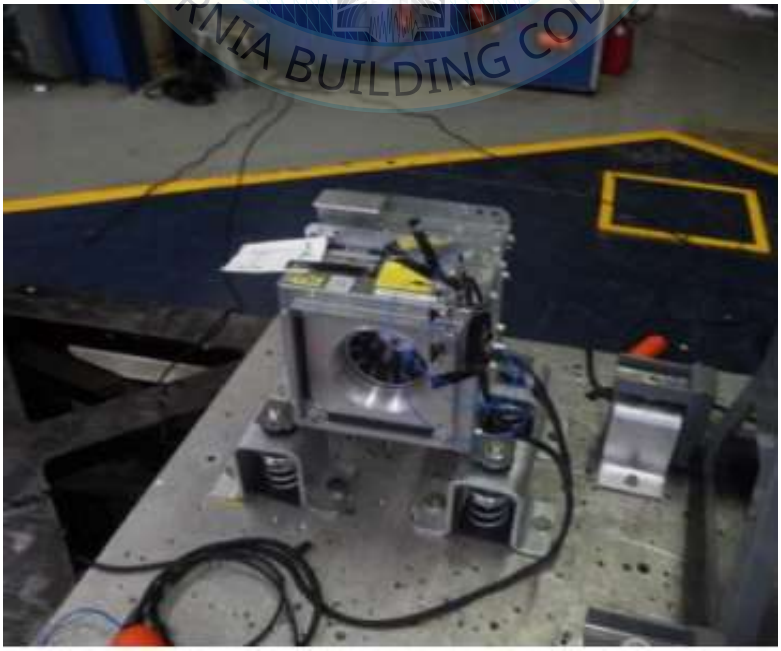
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
86	14.0	12.0	25.6	12.9	12.5	>33.3

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2022	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	-	-
		3.20	0.0	1.5	-	-	2.13	0.85

Test Mounting Details

UUT-15 was isolated using (4) SRS-100 spring isolators. The isolators were connected to the equipment using (1) 5/8" Grade 5 bolt each, and were connected to the shake table using (2) 5/8" diameter Grade 8 bolts per isolator.



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

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-16

Test Report: 14273

Model Line	Model Number	Manufacturer
SQN	402 SQN-D	Loren Cook Company

Product Construction Summary

Galvanized Carbon Steel Housing; Aluminum Fan Wheel

Options / Subcomponent Summary

10 HP Teco Motor; 40.25" Al Backward Inclined Wheel; Removable Access Doors; Universal Mounting Feet; Motor Cover/Belt Guard

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
805	50.3	72.4	72.4	2.4	3.4	9.8

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
CBC 2022	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	-	-
		3.20	0.0	1.5	-	-	2.13	0.85

Test Mounting Details

UUT-16 was isolated using (4) SRS-450 spring isolators. The isolators were connected to the equipment using (1) 5/8" Grade 5 bolt each, and were connected to the shake table using (2) 5/8" diameter Grade 8 bolts per isolator.

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