



OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION

**APPLICATION FOR OSHPD SPECIAL SEISMIC
CERTIFICATION PREAPPROVAL (OSP)**

OFFICE USE ONLY

APPLICATION #: OSP – 0219 – 10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Loren Cook Company

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

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

Telephone: 417.869.6474

Email: bskidmore@lorencook.com

Product Information

Product Name: QMX and SQN Fans

Product Type: Inline Fans

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

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

General Description: Square or Circular, Floor or Ceiling mounted inline fans. Seismic enhancements made to the
test units required to address the anomalies observed during the tests shall be incorporated into the production units.

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

Applicant Information

Applicant Company Name: TRU Compliance, LLC

Contact Person: Matthew J. Tobolski, S.E.

Mailing Address: 960 SW Disk Dr., Suite 104, Bend, OR 97702

Telephone: 844.878.0200

Email: mtobolski@trucompliance.com

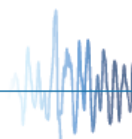
I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2016.

Signature of Applicant:  Date: 2/7/2016

Title: President & CEO Company Name: TRU Compliance, LLC

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

STATE OF CALIFORNIA – HEALTH AND HUMAN SERVICES AGENCY
OSH-FD-759 (REV 12/16/15)



OSHPD

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**OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION**

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

Company Name: TRU Compliance, LLC

Name: Matthew J. Tobolski, S.E. California License Number: S5648

Mailing Address: 960 SW Disk Dr., Suite 104, Bend, OR 97702

Telephone: 844.878.0200 Email: mtobolski@trucompliance.com

Supports and Attachments Preapproval

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

Certification Method

- ☒ Testing in accordance with: ☒ ICC-ES AC156
- ☐ Other (Please Specify): _____
- _____
- _____

Testing Laboratory

Company Name: Clark Testing

Contact Name: Robert Francis

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

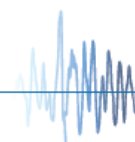
Telephone: 412.387.1001 Email: rfrancis@clarktesting.com

Company Name: Environmental Testing Laboratory (ETL)

Contact Name: Paul E. Little

Mailing Address: 11034 Indian Trail, Dallas, TX 75229

Telephone: 972.247.9657 Email: paul@etldallas.com





OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT FACILITIES DEVELOPMENT DIVISION

Seismic Parameters

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

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

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

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

R_p (Equipment or component 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 factor ratio) = 1.0 and 0.0

Equipment or Component Natural Frequencies (Hz) = See Attachment

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

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

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

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

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

R (Response modification coefficient) = _____

Ω_0 (System overstrength factor) = _____

C_d (Deflection amplification factor) = _____

I_p (Importance factor) = 1.5

Height to Center of Gravity above base = _____

Equipment or Component Natural Frequencies (Hz) = _____

Overall dimensions and weight (or range thereof) = _____

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

List of Attachments Supporting Special Seismic Certification

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

☒ Other(s) (Please Specify): See Attachment

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

Signature: _____

Date: August 3, 2017

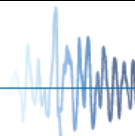
Print Name: Timothy J. Piland

Title: SSE

Special Seismic Certification Valid Up to : S_{DS} (g) = See Above

z/h = See Above

Condition of Approval (if applicable): _____



SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 16037



Manufacturer: Loren Cook Company						TABLE 1.1			
Model Line: SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans									
Certified Product Construction Summary: SQN: 18 ga. Galvanized carbon steel housing. Aluminum Fan wheels. QMX: Heavy gauge carbon steel housing and fan wheel. Note: HP and XP models use a different wheel to create higher pressure.									
Certified Options Summary: SQN: Belt tensioner, Belt Guard, Motor cover, Flex duct connector, flanged inlet/outlet, Belt or direct drive; HP = High Pressure, perfect speed controller QMX: Belt Drive; Horizontal fan position; Top and side motor positions.									
Mounting Configuration: Base mounted - isolated Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.									
Building Code: CBC 2016		Seismic Certification Limits:				$S_{DS} = 2.0 g \quad z/h=1.0$ $S_{DS} = 2.5 g \quad z/h=0.0$		$I_P = 1.5$	
Model Line	Model	Dimensions (in)			Weight (lb.)	F_P/W_P	F_P/W_P	Notes	UUT
		Depth	Width	Height		$S_{DS}=2.0$	$S_{DS}=2.5$		
SQN-B (Belt Drive)	60	22.0	14.0	26.5	100	4.5	1.88		Interp.
	70	22.0	14.0	26.5	100	4.5	1.88		Interp.
	80	22.0	14.0	26.5	100	4.5	1.88		Interp.
	100	22.0	14.0	26.5	100	4.5	1.88		Interp.
	120	22.0	18.4	30.9	110	4.5	1.88		Interp.
	135	22.3	20.8	33.3	125	4.5	1.88		Interp.
	150	23.9	23.0	35.8	150	4.5	1.88		Interp.
	165	27.0	25.3	40.1	175	4.5	1.88		Interp.
	180	30.0	27.6	42.4	200	4.5	1.88		Interp.
	195	32.3	29.9	44.9	225	4.5	1.88		Interp.
	210	35.0	31.3	46.3	250	4.5	1.88		Interp.
	225	37.3	33.5	48.8	300	4.5	1.88		Interp.
	245	38.0	36.0	53.3	350	4.5	1.88		Interp.
	270	41.5	39.7	56.9	400	4.5	1.88		Interp.
	300	42.0	44.0	61.3	450	4.5	1.88		Interp.
	330	45.8	48.4	65.7	500	4.5	1.88		Interp.
	365	46.0	50.0	67.3	550	4.5	1.88		Interp.
	402	50.3	55.1	72.4	805	4.5	1.88		5, 16
QMX	90	19.9	15.9	30	240	4.5	1.88		10
	120	24	20.1	36.5	309	4.5	1.88		Interp.
	135	27.0	22.3	39.4	418	4.5	1.88		Interp.
	150	30.0	24.4	42.1	485	4.5	1.88		Interp.
Note: Certification level is limited to the lower rating of either the Certified Component Matrix, as listed here, or the internal subcomponents, as listed on the Certified Subcomponent Matrices.									

SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 16037



Manufacturer: Loren Cook Company						TABLE 1.1			
Model Line: SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans									
Certified Product Construction Summary: SQN: 18 ga. Galvanized carbon steel housing. Aluminum Fan wheels. QMX: Heavy gauge carbon steel housing and fan wheel. Note: HP and XP models use a different wheel to create higher pressure.									
Certified Options Summary: SQN: Belt tensioner, Belt Guard, Motor cover, Flex duct connector, flanged inlet/outlet, Belt or direct drive; HP = High Pressure, perfect speed controller QMX: Belt Drive; Horizontal fan position; Top and side motor positions.									
Mounting Configuration: Base mounted - isolated Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.									
Building Code: CBC 2016		Seismic Certification Limits:				$S_{DS} = 2.0 g \quad z/h=1.0$ $S_{DS} = 2.5 g \quad z/h=0.0$		$I_p = 1.5$	
Model Line	Model	Dimensions (in)			Weight (lb.)	F_p/W_p	F_p/W_p	Notes	UUT
		Depth	Width	Height		$S_{DS}=2.0$	$S_{DS}=2.5$		
QMX	165	33.0	26.5	43.8	557	4.5	1.88		Interp.
	180	35.0	28.6	46.3	618	4.5	1.88		Interp.
	202	37.5	31.8	49.9	803	4.5	1.88		Interp.
	225	41.0	34.9	55.9	937	4.5	1.88		Interp.
	245	44.5	37.8	59.0	1089	4.5	1.88		Interp.
	270	47.0	41.3	62.9	1230	4.5	1.88		Interp.
	300	54.0	45.5	68.1	1455	4.5	1.88		Interp.
	330	58.5	49.8	74.8	1750	4.5	1.88		Interp.
	365	64.0	54.8	80.3	2260	4.5	1.88		Interp.
	402	68.5	59.9	88.3	2785	4.5	1.88		Interp.
	445	74.0	66.1	94.9	3465	4.5	1.88		Interp.
	490	80.5	72.4	103.3	4180	4.5	1.88		Interp.
	540	87.0	79.4	110.9	4950	4.5	1.88		Interp.
	600	95.5	87.9	122.1	6070	4.5	1.88		Interp.
QMX-HP	90	19.9	15.9	30	180	4.5	1.88		Interp.
	120	24	20.1	36.5	352	4.5	1.88		Interp.
	135	27	22.3	39.4	431	4.5	1.88		Interp.
	150	30	24.4	42.1	511	4.5	1.88		Interp.
	165	33	26.5	43.8	667	4.5	1.88		Interp.
	180	35	28.6	46.3	723	4.5	1.88		Interp.
	202	37.5	31.8	49.9	860	4.5	1.88		Interp.
	225	41	64.9	55.9	1023	4.5	1.88		Interp.
Note: Certification level is limited to the lower rating of either the Certified Component Matrix, as listed here, or the internal subcomponents, as listed on the Certified Subcomponent Matrices.									

SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 16037



Manufacturer: Loren Cook Company						TABLE 1.1			
Model Line: SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans									
Certified Product Construction Summary: SQN: 18 ga. Galvanized carbon steel housing. Aluminum Fan wheels. QMX: Heavy gauge carbon steel housing and fan wheel. Note: HP and XP models use a different wheel to create higher pressure.									
Certified Options Summary: SQN: Belt tensioner, Belt Guard, Motor cover, Flex duct connector, flanged inlet/outlet, Belt or direct drive; HP = High Pressure, perfect speed controller QMX: Belt Drive; Horizontal fan position; Top and side motor positions.									
Mounting Configuration: Base mounted - isolated Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.									
Building Code: CBC 2016		Seismic Certification Limits:				$S_{DS} = 2.0 g \quad z/h=1.0$ $S_{DS} = 2.5 g \quad z/h=0.0$		$I_p = 1.5$	
Model Line	Model	Dimensions (in)			Weight (lb.)	F_p/W_p	F_p/W_p	Notes	UUT
		Depth	Width	Height		$S_{DS}=2.0$	$S_{DS}=2.5$		
QMX-HP	245	44.5	37.8	59	1050	4.5	1.88		Interp.
	270	47	41.3	62.9	1085	4.5	1.88		11
	300	54	45.5	68.1	1610	4.5	1.88		Interp.
	330	58.5	49.8	74.8	1885	4.5	1.88		Interp.
	365	64	54.8	80.3	2500	4.5	1.88		Interp.
	402	68.5	59.9	88.3	3045	4.5	1.88		Interp.
	445	74	66.1	94.9	3605	4.5	1.88		Interp.
	490	80.5	72.4	103.3	4490	4.5	1.88		Interp.
	540	87	79.4	110.9	5090	4.5	1.88		Interp.
	600	95.5	87.9	122.1	7385	4.5	1.88		13
QMX-XP	90	19.9	15.9	30	271	4.5	1.88		Interp.
	120	24	20.1	36.5	385	4.5	1.88		Interp.
	135	27	22.3	39.4	453	4.5	1.88		Interp.
	150	30	24.4	42.1	526	4.5	1.88		Interp.
	165	33	26.5	43.8	687	4.5	1.88		Interp.
	180	35	28.6	46.3	791	4.5	1.88		Interp.
	202	37.5	31.8	49.9	911	4.5	1.88		Interp.
	225	41	64.9	55.9	1133	4.5	1.88		Interp.
	245	44.5	37.8	59	1210	4.5	1.88		Interp.
	270	47	41.3	62.9	1370	4.5	1.88		Interp.
	300	54	45.5	68.1	2280	4.5	1.88		Interp.
	330	58.5	49.8	74.8	2795	4.5	1.88		Interp.
Note: Certification level is limited to the lower rating of either the Certified Component Matrix, as listed here, or the internal subcomponents, as listed on the Certified Subcomponent Matrices.									

TRU PROJECT NO. 16037

[illegible]

SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 16037



Manufacturer: Loren Cook Company						TABLE 1.2			
Model Line: SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans									
Certified Product Construction Summary: SQN: 18 ga. Galvanized carbon steel housing. Aluminum Fan wheels. QMX: Heavy gauge carbon steel housing and fan wheel. Note: HP and XP models use a different wheel to create higher pressure.									
Certified Options Summary: SQN: Belt tensioner, Belt Guard, Motor cover, Flex duct connector, flanged inlet/outlet, Belt or direct drive; HP = High Pressure, perfect speed controller QMX: Belt Drive; Horizontal fan position; Top and side motor positions.									
Mounting Configuration: Base mounted - isolated Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.									
Building Code: CBC 2016		Seismic Certification Limits:				$S_{DS} = 1.95 g \ z/h=1.0$ $S_{DS} = 2.5 g \ z/h=0.0$		$I_p = 1.5$	
Model Line	Model	Dimensions (in)			Weight (lb.)	F_p/W_p	F_p/W_p	Notes	UUT
		Depth	Width	Height		$S_{DS}=1.95$	$S_{DS}=2.5$		
SQN-D (Direct Drive)	70	14.0	12.0	25.6	86	4.39	1.88		15
	90	17.0	14.0	29.6	90	4.39	1.88		Interp.
	100	22.0	14.0	29.6	100	4.39	1.88		Interp.
	120	22.0	18.4	29.6	105	4.39	1.88		Interp.
	135	22.3	20.8	38.4	135	4.39	1.88		Interp.
	150	23.9	23.0	43.1	160	4.39	1.88		Interp.
	165	27.0	25.4	52.7	200	4.39	1.88		6
SQN-HP (Belt Drive)	135	22.3	20.8	33.3	135	4.39	1.88		4
	150	23.9	23	35.8	150	4.39	1.88		Interp.
	165	27.0	25.3	40.1	175	4.39	1.88		Interp.
	180	30.0	27.6	42.4	200	4.39	1.88		Interp.
	195	32.3	29.9	44.9	225	4.39	1.88		Interp.
	210	35.0	31.3	46.3	250	4.39	1.88		Interp.
	225	37.3	33.5	48.8	300	4.39	1.88		Interp.
	245	38.0	36.0	53.3	350	4.39	1.88		Interp.
	270	41.5	39.7	56.9	400	4.39	1.88		Interp.
	300	42.0	44.0	61.3	450	4.39	1.88		Interp.
	330	45.8	48.4	65.7	500	4.39	1.88		Interp.
	365	46.0	50.0	67.3	550	4.39	1.88		Interp.
	402	50.3	55.1	72.4	800	4.39	1.88		Interp.
Note: Certification level is limited to the lower rating of either the Certified Component Matrix, as listed here, or the internal subcomponents, as listed on the Certified Subcomponent Matrices.									

SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 16037



Manufacturer: Loren Cook Company						TABLE 2.1			
Model Line: SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans									
Certified Product Construction Summary: SQN: 18 ga. Galvanized carbon steel housing. Aluminum Fan wheels. QMX: Heavy gauge carbon steel housing and fan wheel. Note: HP and XP models use a different wheel to create higher pressure.									
Certified Options Summary: SQN: Belt tensioner, Belt Guard, Motor cover, Flex duct connector, flanged inlet/outlet, Belt or direct drive; HP = High pressure, perfect speed controller QMX: Belt Drive; Bottom and side motor positions; Fan arrangement 9 only.									
Mounting Configuration: Ceiling suspended - isolated Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.									
Building Code: CBC 2016		Seismic Certification Limits:				$S_{DS} = 2.0 g \quad z/h=1.0$ $S_{DS} = 2.5 g \quad z/h=0.0$		$I_P = 1.5$	
Model Line	Model	Dimensions (in)			Weight (lb.)	F_P/W_P	F_P/W_P	Notes	UUT
		Depth	Width	Height		$S_{DS}=2.0$	$S_{DS}=2.5$		
SQN-D (Direct Drive)	70	14.0	12.0	25.6	86	3.6	1.5	UUT: 50 lbs.	14
	90	17.0	14.0	29.6	90	3.6	1.5		Interp.
	100	22.0	14.0	29.6	100	3.6	1.5		Interp.
	120	22.0	18.4	29.6	105	3.6	1.5		Interp.
	135	22.3	20.8	38.4	110	3.6	1.5		Interp.
	150	23.9	23.0	43.1	120	3.6	1.5		Interp.
	165	27.0	25.4	52.7	130	3.6	1.5		3
QMX-HP	90	19.9	15.9	30.0	180	3.6	1.5		7
	120	24.0	20.1	36.5	352	3.6	1.5		Interp.
	135	27.0	22.3	39.4	431	3.6	1.5		Interp.
	150	30.0	24.4	42.1	511	3.6	1.5		Interp.
	165	33.0	26.5	43.8	667	3.6	1.5		Interp.
	180	35.0	28.6	46.3	723	3.6	1.5		Interp.
	202	37.5	31.8	49.9	860	3.6	1.5		Interp.
	225	41.0	64.9	55.9	1023	3.6	1.5		Interp.
	245	44.5	37.8	59.0	1050	3.6	1.5		Interp.
	270	47.0	41.3	62.9	1085	3.6	1.5		Interp.
	300	54.0	45.5	68.1	1610	3.6	1.5		Interp.
	330	58.5	49.8	74.8	1885	3.6	1.5		Interp.
	365	64	54.8	80.3	2500	3.6	1.5		Interp.
	402	68.5	59.9	88.3	3045	3.6	1.5		Interp.
	445	74	66.1	94.9	3605	3.6	1.5		Interp.
Note: Certification level is limited to the lower rating of either the Certified Component Matrix, as listed here, or the internal subcomponents, as listed on the Certified Subcomponent Matrices.									

SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 16037



Manufacturer: Loren Cook Company						TABLE 2.1			
Model Line: SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans									
Certified Product Construction Summary: SQN: 18 ga. Galvanized carbon steel housing. Aluminum Fan wheels. QMX: Heavy gauge carbon steel housing and fan wheel. Note: HP and XP models use a different wheel to create higher pressure.									
Certified Options Summary: SQN: Belt tensioner, Belt Guard, Motor cover, Flex duct connector, flanged inlet/outlet, Belt or direct drive; HP = High pressure, perfect speed controller QMX: Belt Drive; Bottom and side motor positions; Fan arrangement 9 only.									
Mounting Configuration: Ceiling suspended - isolated Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.									
Building Code: CBC 2016		Seismic Certification Limits:				$S_{DS} = 2.0 g \quad z/h=1.0$ $S_{DS} = 2.5 g \quad z/h=0.0$		$I_p = 1.5$	
Model Line	Model	Dimensions (in)			Weight (lb.)	F_p/W_p	F_p/W_p	Notes	UUT
		Depth	Width	Height		$S_{DS}=2.0$	$S_{DS}=2.5$		
QMX-HP	490	80.5	72.4	103.3	4490	3.6	1.5		Interp.
	540	87	79.4	110.9	5090	3.6	1.5		Interp.
	600	95.5	87.9	122.1	6070	3.6	1.5		Interp.
QMX-XP	90	19.9	15.9	30	271	3.6	1.5		Interp.
	120	24	20.1	36.5	385	3.6	1.5		Interp.
	135	27	22.3	39.4	453	3.6	1.5		Interp.
	150	30	24.4	42.1	526	3.6	1.5		Interp.
	165	33	26.5	43.8	687	3.6	1.5		Interp.
	180	35	28.6	46.3	791	3.6	1.5		Interp.
	202	37.5	31.8	49.9	911	3.6	1.5		Interp.
	225	41	64.9	55.9	1133	3.6	1.5		Interp.
	245	44.5	37.8	59	1210	3.6	1.5		Interp.
	270	47	41.3	62.9	1370	3.6	1.5		8
	300	54	45.5	68.1	2280	3.6	1.5		Interp.
	330	58.5	49.8	74.8	2795	3.6	1.5		Interp.
	365	64	54.8	80.3	3288	3.6	1.5		Interp.
	402	68.5	59.9	88.3	4042	3.6	1.5		Interp.
	445	74	66.1	94.9	4780	3.6	1.5		Interp.
	490	80.5	72.4	103.3	5530	3.6	1.5		Interp.
	540	87	79.4	110.9	5890	3.6	1.5		Interp.
	600	95.5	87.9	122.1	6070	3.6	1.5		Interp.
QMX	90	19.9	15.9	30	240	3.6	1.5		Interp.
Note: Certification level is limited to the lower rating of either the Certified Component Matrix, as listed here, or the internal subcomponents, as listed on the Certified Subcomponent Matrices.									

SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 16037



Manufacturer: Loren Cook Company						TABLE 2.1			
Model Line: SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans									
Certified Product Construction Summary: SQN: 18 ga. Galvanized carbon steel housing. Aluminum Fan wheels. QMX: Heavy gauge carbon steel housing and fan wheel. Note: HP and XP models use a different wheel to create higher pressure.									
Certified Options Summary: SQN: Belt tensioner, Belt Guard, Motor cover, Flex duct connector, flanged inlet/outlet, Belt or direct drive; HP = High pressure, perfect speed controller QMX: Belt Drive; Bottom and side motor positions; Fan arrangement 9 only.									
Mounting Configuration: Ceiling suspended - isolated Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.									
Building Code: CBC 2016		Seismic Certification Limits:				$S_{DS} = 2.0 g \quad z/h=1.0$ $S_{DS} = 2.5 g \quad z/h=0.0$		$I_p = 1.5$	
Model Line	Model	Dimensions (in)			Weight (lb.)	F_p/W_p	F_p/W_p	Notes	UUT
		Depth	Width	Height		$S_{DS}=2.0$	$S_{DS}=2.5$		
QMX	90	19.9	15.9	30	240	3.6	1.5		Interp.
	120	24	20.1	36.5	309	3.6	1.5		Interp.
	135	27	22.3	39.4	418	3.6	1.5		Interp.
	150	30	24.4	42.1	485	3.6	1.5		Interp.
	165	33	26.5	43.8	557	3.6	1.5		Interp.
	180	35	28.6	46.3	618	3.6	1.5		Interp.
	202	37.5	31.8	49.9	803	3.6	1.5		Interp.
	225	41	34.9	55.9	937	3.6	1.5		Interp.
	245	44.5	37.8	59	1089	3.6	1.5		Interp.
	270	47	41.3	62.9	1230	3.6	1.5		Interp.
	300	54	45.5	68.1	1455	3.6	1.5		Interp.
	330	58.5	49.8	74.8	1750	3.6	1.5		Interp.
	365	64	54.8	80.3	2260	3.6	1.5		Interp.
	402	68.5	59.9	88.3	2785	3.6	1.5		Interp.
	445	74	66.1	94.9	3465	3.6	1.5		Interp.
	490	80.5	72.4	103.3	4180	3.6	1.5		Interp.
	540	87	79.4	110.9	4950	3.6	1.5		Interp.
	600	95.5	87.9	122.1	6070	3.6	1.5		9
Note: Certification level is limited to the lower rating of either the Certified Component Matrix, as listed here, or the internal subcomponents, as listed on the Certified Subcomponent Matrices.									

SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 16037



Manufacturer: Loren Cook Company						TABLE 2.2			
Model Line: SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans									
Certified Product Construction Summary: SQN: 18 ga. Galvanized carbon steel housing. Aluminum Fan wheels. QMX: Heavy gauge carbon steel housing and fan wheel. Note: HP and XP models use a different wheel to create higher pressure.									
Certified Options Summary: SQN: Belt tensioner, Belt Guard, Motor cover, Flex duct connector, flanged inlet/outlet, Belt or direct drive; HP = High pressure, perfect speed controller QMX: Belt Drive; Bottom and side motor positions; Fan arrangement 9 only.									
Mounting Configuration: Ceiling suspended - isolated Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.									
Building Code: CBC 2016		Seismic Certification Limits:				$S_{DS} = 1.85 g \ z/h=1.0$ $S_{DS} = 2.5 g \ z/h=0.0$		$I_P = 1.5$	
Model Line	Model	Dimensions (in)			Weight (lb.)	F_P/W_P	F_P/W_P	Notes	UUT
		Depth	Width	Height		S_{DS}=1.85	S_{DS}=2.5		
SQN-B (Belt Drive)	60	22.0	14.0	26.5	100	3.33	1.5		1
	70	22.0	14.0	26.5	100	3.33	1.5		Interp.
	80	22.0	14.0	26.5	100	3.33	1.5		Interp.
	100	22.0	14.0	26.5	100	3.33	1.5		Interp.
	120	22.0	18.4	30.9	110	3.33	1.5		Interp.
	135	22.3	20.8	33.3	125	3.33	1.5		Interp.
	150	23.9	23.0	35.8	150	3.33	1.5		Interp.
	165	27.0	25.3	40.1	175	3.33	1.5		Interp.
	180	30.0	27.6	42.4	200	3.33	1.5		Interp.
	195	32.3	29.9	44.9	225	3.33	1.5		Interp.
	210	35.0	31.3	46.3	250	3.33	1.5		Interp.
	225	37.3	33.5	48.8	300	3.33	1.5		Interp.
	245	38.0	36.0	53.3	350	3.33	1.5		Interp.
	270	41.5	39.7	56.9	400	3.33	1.5		Interp.
	300	42.0	44.0	61.3	450	3.33	1.5		Interp.
	330	45.8	48.4	65.7	500	3.33	1.5		Interp.
	365	46.0	50.0	67.3	550	3.33	1.5		Interp.
	402	50.3	55.1	72.4	805	3.33	1.5		Interp.
SQN-HP (Belt Drive)	135	22.3	20.8	33.3	135	3.33	1.5		Interp.
	150	23.9	23	35.8	150	3.33	1.5		Interp.
	165	27	25.3	40.1	175	3.33	1.5		Interp.
	180	30	27.6	42.4	200	3.33	1.5		Interp.
Note: Certification level is limited to the lower rating of either the Certified Component Matrix, as listed here, or the internal subcomponents, as listed on the Certified Subcomponent Matrices.									

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SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 16037



Manufacturer: Loren Cook Company		Table Description: Fan Motors				TABLE 3	
Model Line: SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans							
Building Code: CBC 2016		Seismic Certification Limits:		$S_{DS} = 2.0 g \quad z/h = 1.0$ $S_{DS} = 2.5 g \quad z/h = 0.0$		$I_P = 1.5$	
Component Type	Manufacturer	Model	Description	F_P/W_P $S_{DS}=2.0$	F_P/W_P $S_{DS}=2.5$	Notes	UUT
Fan Motors (Base mt. models)	Baldor	56	0.75 HP, 208-230/460V	4.5	1.88		Interp.
		143T	1 HP, 208-230/460V	4.5	1.88		Interp.
		145T	1.5 HP, 208-230/460V	4.5	1.88		Interp.
		145T	2 HP, 208-230/460V	4.5	1.88		Interp.
		182T	3 HP, 208-230/460V	4.5	1.88		10
		184T	5 HP, 208-230/460V	4.5	1.88		Interp.
		213T	7.5 HP, 208-230/460V	4.5	1.88		Interp.
		215T	10 HP, 230/460V	4.5	1.88		16
		254T	15 HP, 230/460V	4.5	1.88		Interp.
		256T	20 HP, 230/460V	4.5	1.88		Interp.
		284T	25 HP, 230/460V	4.5	1.88		11
		286T	30 HP, 230/460V	4.5	1.88		Interp.
		324T	40 HP, 230/460V	4.5	1.88		Interp.
		326T	50 HP, 230/460V	4.5	1.88		Interp.
		364T	60 HP, 230/460V	4.5	1.88		Interp.
		365T	75 HP, 230/460V	4.5	1.88		Interp.
		404T	100 HP, 230/460V	4.5	1.88		13
Fan Motors (Ceiling mt. models)	Baldor	56	0.75 HP, 208-230/460V	3.6	1.5		1
		143T	1 HP, 208-230/460V	3.6	1.5		Interp.
		145T	1.5 HP, 208-230/460V	3.6	1.5		Interp.
		145T	2 HP, 208-230/460V	3.6	1.5		Interp.
Note: Certification level is limited to the lower rating of either the Certified Subcomponent Matrix, as listed here, or the components as listed on the Certified Component Matrices.							

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SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 16037



Manufacturer: Loren Cook Company		Table Description: Fan Wheels - For base mounted models				TABLE 4.1	
Model Line: SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans							
Building Code: CBC 2016		Seismic Certification Limits:		$S_{DS} = 2.0\text{ g} \quad z/h = 1.0$ $S_{DS} = 2.5\text{ g} \quad z/h = 0.0$		$I_P = 1.5$	
Component Type	Manufacturer	Model	Description	$\frac{F_P}{W_P}$ $S_{DS}=2.0$	$\frac{F_P}{W_P}$ $S_{DS}=2.5$	Notes	UUT
Centrifugal Aluminum (BI)	Loren Cook	10	10" Al backward inclined wheel	4.5	1.88		15
		12	12" Al backward inclined wheel	4.5	1.88		Interp.
		13.5	13.5" Al backward inclined wheel	4.5	1.88		Interp.
		15	15" Al backward inclined wheel	4.5	1.88		Interp.
		16.5	16.5" Al backward inclined wheel	4.5	1.88		Interp.
		18	18" Al backward inclined wheel	4.5	1.88		Interp.
		19.5	19.5" Al backward inclined wheel	4.5	1.88		Interp.
		21	21" Al backward inclined wheel	4.5	1.88		Interp.
		22.5	22.5" Al backward inclined wheel	4.5	1.88		Interp.
		24.5	24.5" Al backward inclined wheel	4.5	1.88		Interp.
		27	27" Al backward inclined wheel	4.5	1.88		Interp.
		30	30" Al backward inclined wheel	4.5	1.88		Interp.
		33	33" Al backward inclined wheel	4.5	1.88		Interp.
		36.5	36.5" Al backward inclined wheel	4.5	1.88		Interp.
		40.25	40.25" Al backward inclined wheel	4.5	1.88		16
Carbon steel single thickness blade (QMX)	Loren Cook	9	9" Carbon steel single thickness blade	4.5	1.88		10
		12	12" Carbon steel single thickness blade	4.5	1.88		Interp.
		13.5	13.5" Carbon steel single thickness blade	4.5	1.88		Interp.
		15	15" Carbon steel single thickness blade	4.5	1.88		Interp.
		16.5	16" Carbon steel single thickness blade	4.5	1.88		Interp.
		18	18" Carbon steel single thickness blade	4.5	1.88		Interp.
Note: Certification level is limited to the lower rating of either the Certified Subcomponent Matrix, as listed here, or the components as listed on the Certified Component Matrices.							

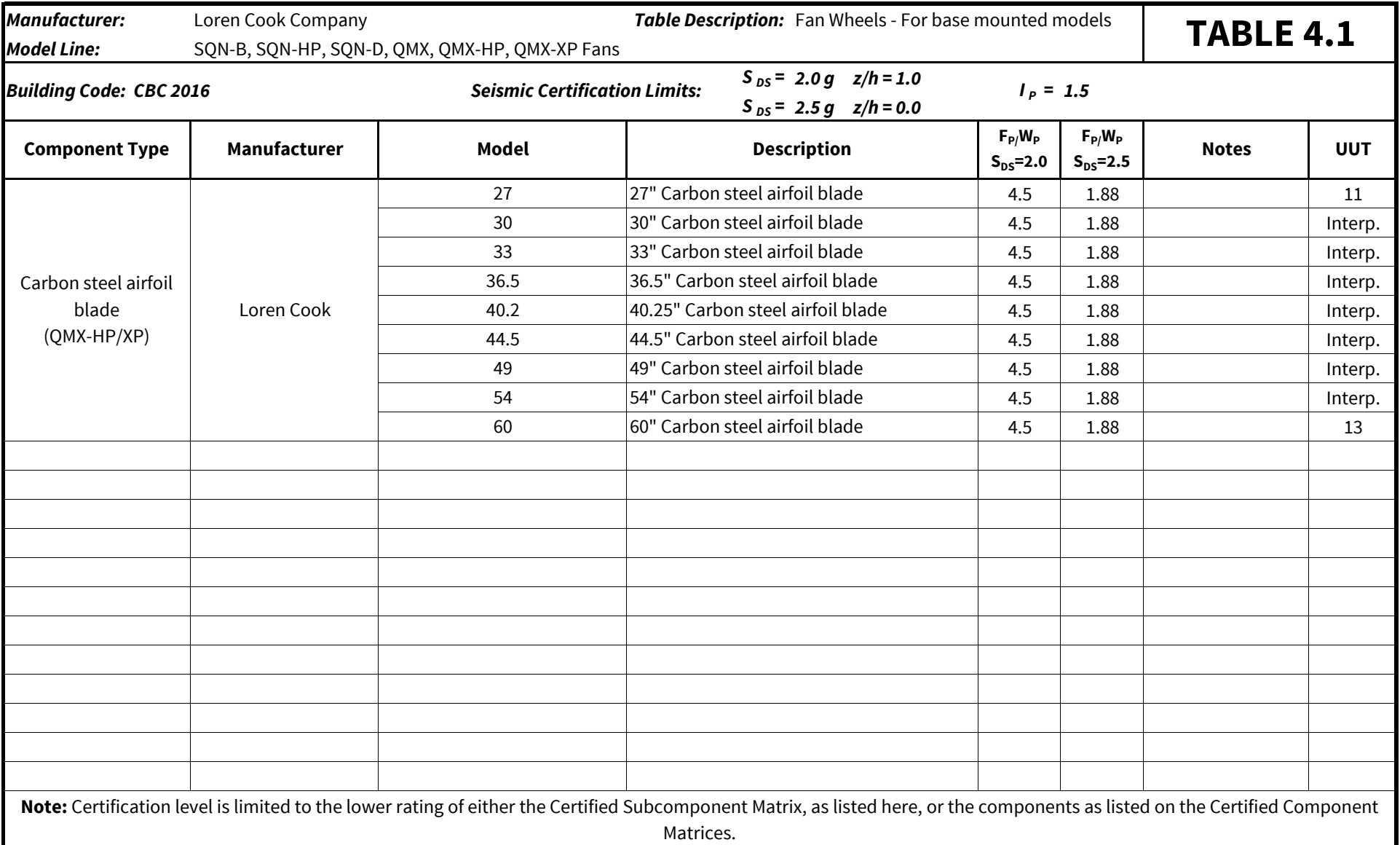
SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 16037



Manufacturer: Loren Cook Company		Table Description: Fan Wheels - For base mounted models				TABLE 4.1	
Model Line: SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans							
Building Code: CBC 2016		Seismic Certification Limits:		$S_{DS} = 2.0 g \quad z/h = 1.0$ $S_{DS} = 2.5 g \quad z/h = 0.0$		$I_P = 1.5$	
Component Type	Manufacturer	Model	Description	F_P/W_P $S_{DS}=2.0$	F_P/W_P $S_{DS}=2.5$	Notes	UUT
Carbon steel single thickness blade (QMX)	Loren Cook	20.2	20.25" Carbon steel single thickness blade	4.5	1.88		Interp.
		22.5	22.5" Carbon steel single thickness blade	4.5	1.88		Interp.
		24.5	24.5" Carbon steel single thickness blade	4.5	1.88		Interp.
		27	27" Carbon steel single thickness blade	4.5	1.88		Interp.
		30	30" Carbon steel single thickness blade	4.5	1.88		Interp.
		33	33" Carbon steel single thickness blade	4.5	1.88		Interp.
		36.5	36.5" Carbon steel single thickness blade	4.5	1.88		Interp.
		40.2	40.25" Carbon steel single thickness blade	4.5	1.88		Interp.
		44.5	44.5" Carbon steel single thickness blade	4.5	1.88		Interp.
		49	49" Carbon steel single thickness blade	4.5	1.88		Interp.
		54	54" Carbon steel single thickness blade	4.5	1.88		Interp.
		60	60" Carbon steel single thickness blade	4.5	1.88		Interp.
Carbon steel airfoil blade (QMX-HP/XP)	Loren Cook	9	9" Carbon steel airfoil blade	4.5	1.88		Interp.
		12	12" Carbon steel airfoil blade	4.5	1.88		Interp.
		13.5	13.5" Carbon steel airfoil blade	4.5	1.88		Interp.
		15	15" Carbon steel airfoil blade	4.5	1.88		Interp.
		16.5	16.5" Carbon steel airfoil blade	4.5	1.88		Interp.
		18	18" Carbon steel airfoil blade	4.5	1.88		Interp.
		20.2	20.25" Carbon steel airfoil blade	4.5	1.88		Interp.
		22.5	22.5" Carbon steel airfoil blade	4.5	1.88		Interp.
		24.5	24.5" Carbon steel airfoil blade	4.5	1.88		Interp.
Note: Certification level is limited to the lower rating of either the Certified Subcomponent Matrix, as listed here, or the components as listed on the Certified Component Matrices.							

TRU PROJECT NO. 16037



SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 16037



Manufacturer: Loren Cook Company		Table Description: Fan Wheels - For base mounted models				TABLE 4.2	
Model Line: SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans							
Building Code: CBC 2016		Seismic Certification Limits:		$S_{DS} = 1.95 g \quad z/h=1.0$ $S_{DS} = 2.5 g \quad z/h = 0.0$		$I_P = 1.5$	
Component Type	Manufacturer	Model	Description	$\frac{F_P}{W_P}$ $S_{DS}=1.95$	$\frac{F_P}{W_P}$ $S_{DS}=2.5$	Notes	UUT
Centrifugal Aluminum HP (BI)	Loren Cook	13.5-HP	13.5" Al backward inclined HP wheel	4.39	1.88		4
		15-HP	15" Al backward inclined HP wheel	4.39	1.88		Interp.
		16.5-HP	16.5" Al backward inclined HP wheel	4.39	1.88		Interp.
		18-HP	18" Al backward inclined HP wheel	4.39	1.88		Interp.
		19.5-HP	19.5" Al backward inclined HP wheel	4.39	1.88		Interp.
		21-HP	21" Al backward inclined HP wheel	4.39	1.88		Interp.
		22.5-HP	22.5" Al backward inclined HP wheel	4.39	1.88		Interp.
		24.5-HP	24.5" Al backward inclined HP wheel	4.39	1.88		Interp.
		27-HP	27" Al backward inclined HP wheel	4.39	1.88		Interp.
		30-HP	30" Al backward inclined HP wheel	4.39	1.88		Interp.
		33-HP	33" Al backward inclined HP wheel	4.39	1.88		Interp.
		36.5-HP	36.5" Al backward inclined HP wheel	4.39	1.88		Interp.
		40.25-HP	40.25" Al backward inclined HP wheel	4.39	1.88		Interp.
Note: Certification level is limited to the lower rating of either the Certified Subcomponent Matrix, as listed here, or the components as listed on the Certified Component Matrices.							

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 16037



Manufacturer: Loren Cook Company		Table Description: Fan Wheels - For ceiling mounted models				TABLE 4.3	
Model Line: SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans							
Building Code: CBC 2016		Seismic Certification Limits:		$S_{DS} = 2.0\text{ g} \quad z/h = 1.0$ $S_{DS} = 2.5\text{ g} \quad z/h = 0.0$		$I_P = 1.5$	
Component Type	Manufacturer	Model	Description	$\frac{F_P}{W_P}$ $S_{DS}=2.0$	$\frac{F_P}{W_P}$ $S_{DS}=2.5$	Notes	UUT
Centrifugal Aluminum (BI)	Loren Cook	10	10" Al backward inclined wheel	3.6	1.5		1, 14
		12	12" Al backward inclined wheel	3.6	1.5		Interp.
		13.5	13.5" Al backward inclined wheel	3.6	1.5		Interp.
		15	15" Al backward inclined wheel	3.6	1.5		Interp.
		16.5	16.5" Al backward inclined wheel	3.6	1.5		3
Carbon steel airfoil blade (QMX-HP/XP)	Loren Cook	9	9" Carbon steel airfoil blade	3.6	1.5		7
		12	12" Carbon steel airfoil blade	3.6	1.5		Interp.
		13.5	13.5" Carbon steel airfoil blade	3.6	1.5		Interp.
		15	15" Carbon steel airfoil blade	3.6	1.5		Interp.
		16.5	16.5" Carbon steel airfoil blade	3.6	1.5		Interp.
		18	18" Carbon steel airfoil blade	3.6	1.5		Interp.
		20.2	20.25" Carbon steel airfoil blade	3.6	1.5		Interp.
		22.5	22.5" Carbon steel airfoil blade	3.6	1.5		Interp.
		24.5	24.5" Carbon steel airfoil blade	3.6	1.5		Interp.
		27	27" Carbon steel airfoil blade	3.6	1.5		8
		30	30" Carbon steel airfoil blade	3.6	1.5		Interp.
		33	33" Carbon steel airfoil blade	3.6	1.5		Interp.
		36.5	36.5" Carbon steel airfoil blade	3.6	1.5		Interp.
		40.2	40.25" Carbon steel airfoil blade	3.6	1.5		Interp.
		44.5	44.5" Carbon steel airfoil blade	3.6	1.5		Interp.
		49	49" Carbon steel airfoil blade	3.6	1.5		Interp.
		Note: Certification level is limited to the lower rating of either the Certified Subcomponent Matrix, as listed here, or the components as listed on the Certified Component Matrices.					

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 16037



Manufacturer: Loren Cook Company		Table Description: Fan Wheels - For ceiling mounted models				TABLE 4.3	
Model Line: SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans							
Building Code: CBC 2016		Seismic Certification Limits:		$S_{DS} = 2.0 g \quad z/h = 1.0$ $S_{DS} = 2.5 g \quad z/h = 0.0$		$I_P = 1.5$	
Component Type	Manufacturer	Model	Description	F_P/W_P $S_{DS}=2.0$	F_P/W_P $S_{DS}=2.5$	Notes	UUT
Carbon steel airfoil blade (QMX-HP/XP)	Loren Cook	54	54" Carbon steel airfoil blade	3.6	1.5		Interp.
		60	60" Carbon steel airfoil blade	3.6	1.5		Interp.
Carbon steel single thickness blade (QMX)	Loren Cook	9	9" Carbon steel single thickness blade	3.6	1.5		Interp.
		12	12" Carbon steel single thickness blade	3.6	1.5		Interp.
		13.5	13.5" Carbon steel single thickness blade	3.6	1.5		Interp.
		15	15" Carbon steel single thickness blade	3.6	1.5		Interp.
		16.5	16" Carbon steel single thickness blade	3.6	1.5		Interp.
		18	18" Carbon steel single thickness blade	3.6	1.5		Interp.
		20.2	20.25" Carbon steel single thickness blade	3.6	1.5		Interp.
		22.5	22.5" Carbon steel single thickness blade	3.6	1.5		Interp.
		24.5	24.5" Carbon steel single thickness blade	3.6	1.5		Interp.
		27	27" Carbon steel single thickness blade	3.6	1.5		Interp.
		30	30" Carbon steel single thickness blade	3.6	1.5		Interp.
		33	33" Carbon steel single thickness blade	3.6	1.5		Interp.
		36.5	36.5" Carbon steel single thickness blade	3.6	1.5		Interp.
		40.2	40.25" Carbon steel single thickness blade	3.6	1.5		Interp.
		44.5	44.5" Carbon steel single thickness blade	3.6	1.5		Interp.
		49	49" Carbon steel single thickness blade	3.6	1.5		Interp.
		54	54" Carbon steel single thickness blade	3.6	1.5		Interp.
		60	60" Carbon steel single thickness blade	3.6	1.5		9
Note: Certification level is limited to the lower rating of either the Certified Subcomponent Matrix, as listed here, or the components as listed on the Certified Component Matrices.							

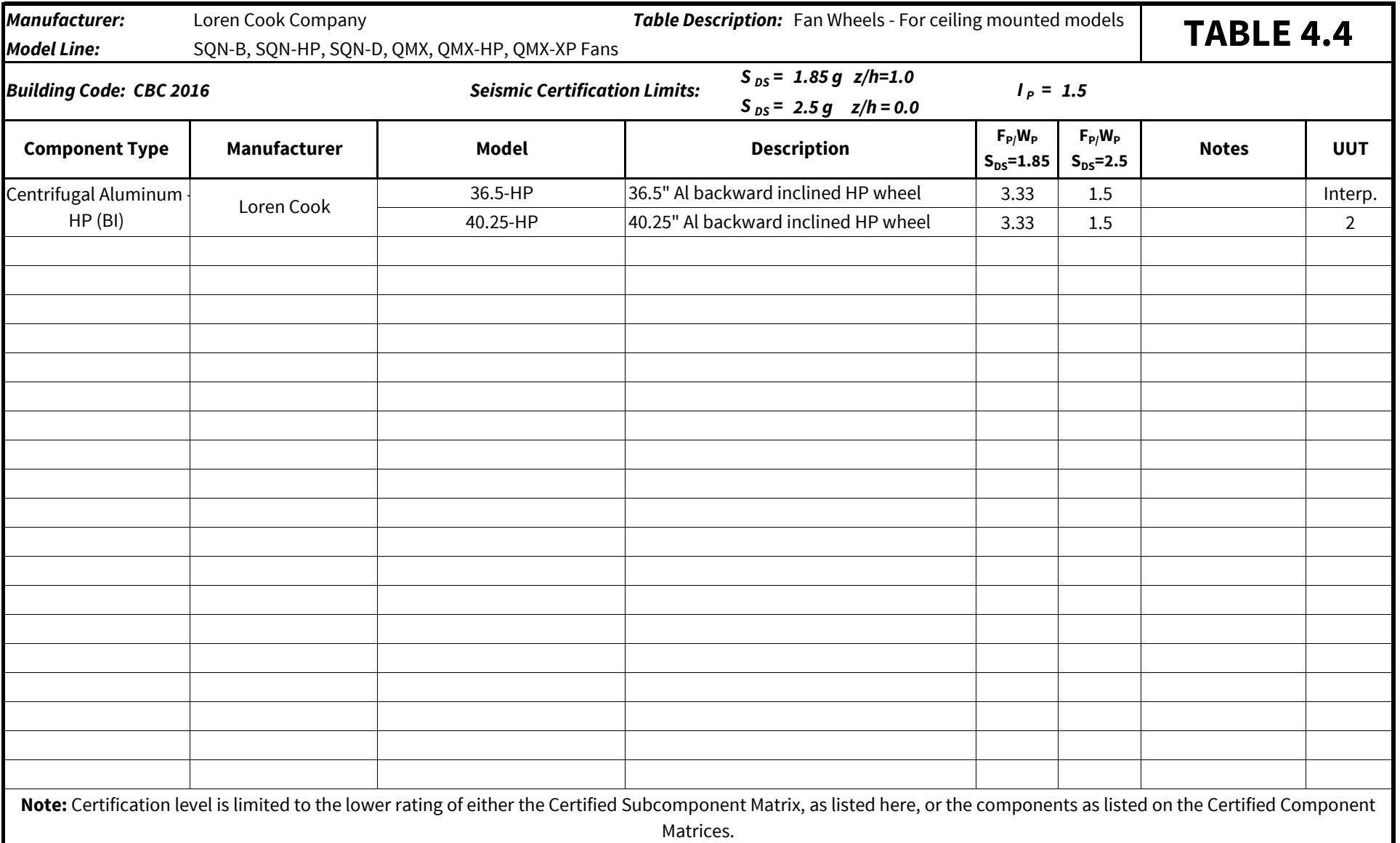
SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 16037



Manufacturer: Loren Cook Company		Table Description: Fan Wheels - For ceiling mounted models				TABLE 4.4	
Model Line: SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans							
Building Code: CBC 2016		Seismic Certification Limits:		$S_{DS} = 1.85 g \ z/h=1.0$ $S_{DS} = 2.5 g \ z/h=0.0$		$I_P = 1.5$	
Component Type	Manufacturer	Model	Description	F_P/W_P $S_{DS}=1.85$	F_P/W_P $S_{DS}=2.5$	Notes	UUT
Centrifugal Aluminum (BI)	Loren Cook	18	18" Al backward inclined wheel	3.33	1.5		Interp.
		19.5	19.5" Al backward inclined wheel	3.33	1.5		Interp.
		21	21" Al backward inclined wheel	3.33	1.5		Interp.
		22.5	22.5" Al backward inclined wheel	3.33	1.5		Interp.
		24.5	24.5" Al backward inclined wheel	3.33	1.5		Interp.
		27	27" Al backward inclined wheel	3.33	1.5		Interp.
		30	30" Al backward inclined wheel	3.33	1.5		Interp.
		33	33" Al backward inclined wheel	3.33	1.5		Interp.
		36.5	36.5" Al backward inclined wheel	3.33	1.5		Interp.
		40.2	40.25" Al backward inclined wheel	3.33	1.5		Interp.
Centrifugal Aluminum HP (BI)	Loren Cook	13.5-HP	13.5" Al backward inclined HP wheel	3.33	1.5		Interp.
		15-HP	15" Al backward inclined HP wheel	3.33	1.5		Interp.
		16.5-HP	16.5" Al backward inclined HP wheel	3.33	1.5		Interp.
		18-HP	18" Al backward inclined HP wheel	3.33	1.5		Interp.
		19.5-HP	19.5" Al backward inclined HP wheel	3.33	1.5		Interp.
		21-HP	21" Al backward inclined HP wheel	3.33	1.5		Interp.
		22.5-HP	22.5" Al backward inclined HP wheel	3.33	1.5		Interp.
		24.5-HP	24.5" Al backward inclined HP wheel	3.33	1.5		Interp.
		27-HP	27" Al backward inclined HP wheel	3.33	1.5		Interp.
		30-HP	30" Al backward inclined HP wheel	3.33	1.5		Interp.
		33-HP	33" Al backward inclined HP wheel	3.33	1.5		Interp.
Note: Certification level is limited to the lower rating of either the Certified Subcomponent Matrix, as listed here, or the components as listed on the Certified Component Matrices.							

TRU PROJECT NO. 16037



UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16037




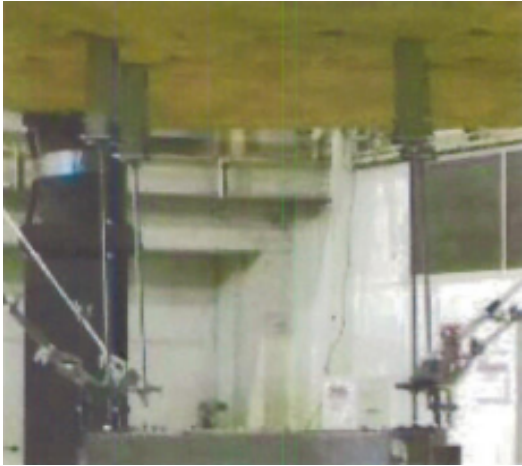
Manufacturer:	Loren Cook Company	UUT 1
Model Line:	SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans	
Model Number:	60 SQN-B	
Serial Number:		N/A

Product Construction Summary:
18 ga. 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 (lb)	Dimension (in)			Lowest Natural Frequency (Hz)					
	Depth	Width	Height	Front-Back	Side-Side	Vertical			
100	22	14	26.5	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 2016		ICC-ES AC156	2.5	1.0	1.5	4.0	3.0	1.67	0.67

Test Mounting Details:

Ceiling mounted - isolated using Caldyne HH30 ET80 isolators and 1/4" diameter carbon steel cables. 3/8" ASTM A307 Grade A steel threaded rods connected to UUT through (2) 1/4" thick angle brackets fastened using (1) 5/16" Grade 2 bolt and bolted together with (2) 3/8" Grade 5 bolts. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16037



Manufacturer:	Loren Cook Company	UUT 2
Model Line:	SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans	
Model Number:	402 SQN-HP	
Serial Number:		N/A

Product Construction Summary:
18 ga. 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 (lb.)	Dimension (in)			Lowest Natural Frequency (Hz)					
	Depth	Width	Height	Front-Back	Side-Side	Vertical			
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} (g)	z/h	I _p	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2016		ICC-ES AC156	1.85	1.0	1.5	2.96	2.22	1.67	0.67

Test Mounting Details:



Ceiling mounted - isolated using HH30 ET347 isolators and 3/8" carbon steel cables. 1/2" ASTM A307 Grade A threaded rod connected to UUT using (2) 1/4" thick angle brackets fastened using (2) 5/16" Grade 2 bolts and bolted together with (2) 3/8" Grade 5 bolts. Field installations require 2 cable restraints at each corner and a single universal mounting foot at each corner with cable attached as close to the unit as possible. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

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UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16037



Manufacturer:	Loren Cook Company	UUT 3
Model Line:	SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans	
Model Number:	165 SQN-D	
Serial Number:		N/A

Product Construction Summary:
18 ga. 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 (lb.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
130	27	25.4	52.7	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 2016	ICC-ES AC156	2.5	1.0	1.5	4.0	3.0	1.67	0.67

Test Mounting Details:



Ceiling mounted - isolated using HH30 ET80 isolators with 1/4" carbon steel cables. 3/8" ASTM A307 Grade A threaded rods connected to UUT through (1) 1/4" thick angle bracket fastened using (1) 5/16" Grade 2 bolt. Field installations require 2 cable restraints at each corner. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16037



Manufacturer:	Loren Cook Company	UUT 4
Model Line:	SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans	
Model Number:	135 SQN-HP	
Serial Number:		N/A

Product Construction Summary:
18 ga. 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 (lb.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
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} (g)	z/h	I _p	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2016	ICC-ES AC156	1.95	1.0	1.5	3.1	2.3	1.67	0.67

Test Mounting Details:



Floor mounted - isolated using Caldyne JQAE106K isolators. Isolators mounted directly to 1/4" carbon steel angle brackets which are attached to the side of the UUT at the base using (1) 5/16" Grade 2 bolt. Each isolator was attached to the table using (2) 1/2" Grade 5 bolts. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16037



Manufacturer:	Loren Cook Company	UUT 5
Model Line:	SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans	
Model Number:	402 SQN-B	
Serial Number:		N/A

Product Construction Summary:
18 ga. 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 (lb.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
735	50.3	55.1	72.4	3.2	3.4	7.7

UUT Highest Passed Seismic Run Information								
Building Code	Test Criteria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2016	ICC-ES AC156	2.5	1.0	1.5	4.0	3.0	1.67	0.67

Test Mounting Details:



Floor mounted - isolated using Caldyne JQBKS-ET473 isolators. Isolators mounted directly to 1/4" carbon steel angle brackets which are attached to the side of the UUT at the base using (2) 5/16" Grade 2 bolts. Each isolator was attached to the table using (2) 1/2" Grade 5 bolts. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16037



Manufacturer:	Loren Cook Company	UUT 6
Model Line:	SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans	
Model Number:	165 SQN-D	
Serial Number:		N/A

Product Construction Summary:
18 ga. 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 (lb.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
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} (g)	z/h	I _p	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2016	ICC-ES AC156	1.95	1.0	1.5	3.1	2.3	1.67	0.67

Test Mounting Details:



Floor mounted - isolated using Caldyne JQAE79K isolators. The isolators are mounted directly to 1/4" carbon steel angle brackets which are attached to the side of the UUT at the base using (1) 5/16" Grade 2 bolt. Each isolator was attached to the table using (2) 1/2" Grade 5 bolts. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16037



Manufacturer:	Loren Cook Company	UUT 7
Model Line:	SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans	
Model Number:	90 QMX-HP	
Serial Number:		N/A

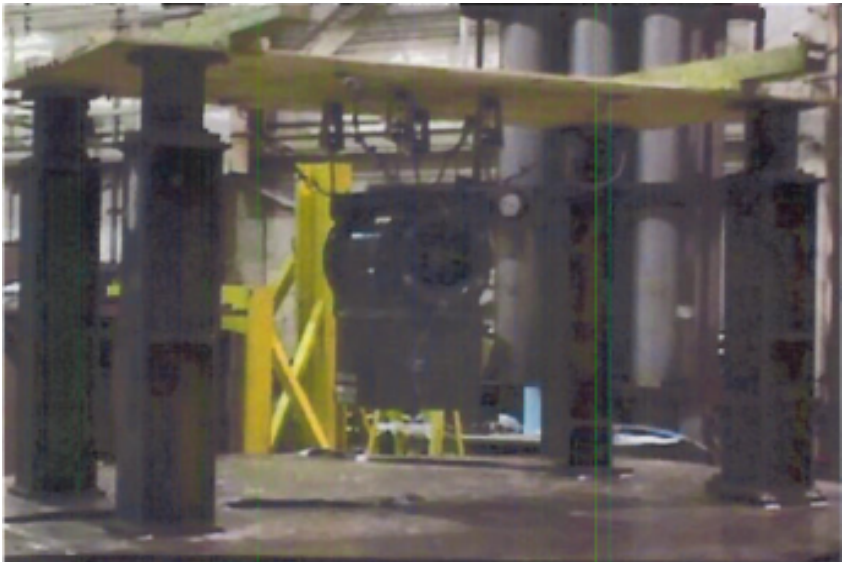
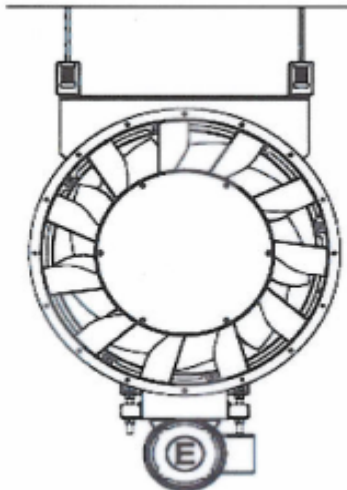
Product Construction Summary:
Heavy gauge carbon steel housing and fan wheel. Fan housing attached to carbon steel base frame.

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 (lb.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
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} (g)	z/h	I _p	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2016	ICC-ES AC156	2.5	1.0	1.5	4.0	3.0	1.67	0.67

Test Mounting Details:



Ceiling mounted - isolated using Caldyne HH30-ET129 isolators. The UUT was attached to the isolators using 20" long 3/8" ASTM A307 Grade A threaded rod and 1/4" carbon steel cable at each corner. Field installations require 2 cable restraints at each corner and compression struts on each hanging rod. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16037



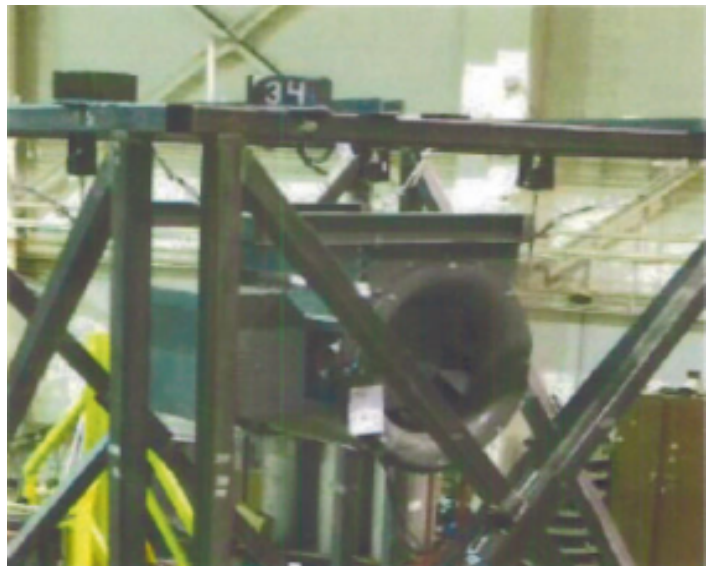
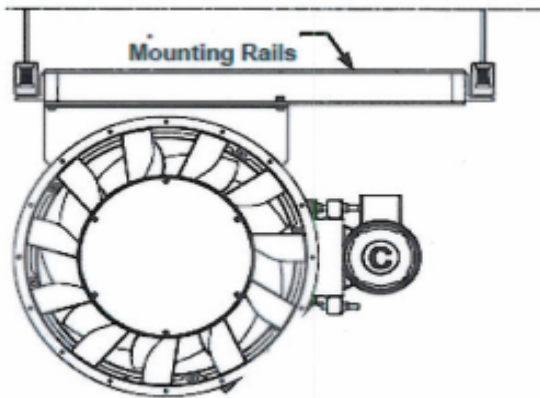
Manufacturer:	Loren Cook Company	UUT 8
Model Line:	SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans	
Model Number:	270 QMX-XP	
Serial Number:		N/A

Product Construction Summary:
Heavy gauge carbon steel housing and fan wheel. Fan housing attached to a 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 (lb.)	Dimension (in)			Lowest Natural Frequency (Hz)					
	Depth	Width	Height	Front-Back	Side-Side	Vertical			
1,370	47	41.3	62.9	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 2016		ICC-ES AC156	2.5	1.0	1.5	4.0	3.0	1.67	0.67

Test Mounting Details:



Ceiling mounted - isolated using Caldyne HH30-ET940 isolators. The UUT was connected to the isolators using 24" long 3/4" ASTM A307 Grade A threaded rod and 3/8" carbon steel cable at each corner. Field installations require 2 cable restraints at each corner and compression struts on each hanging rod. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16037



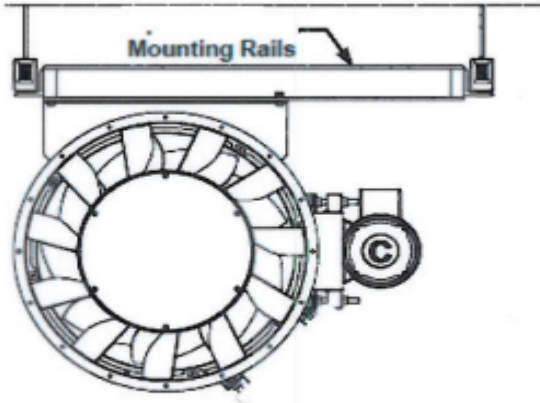
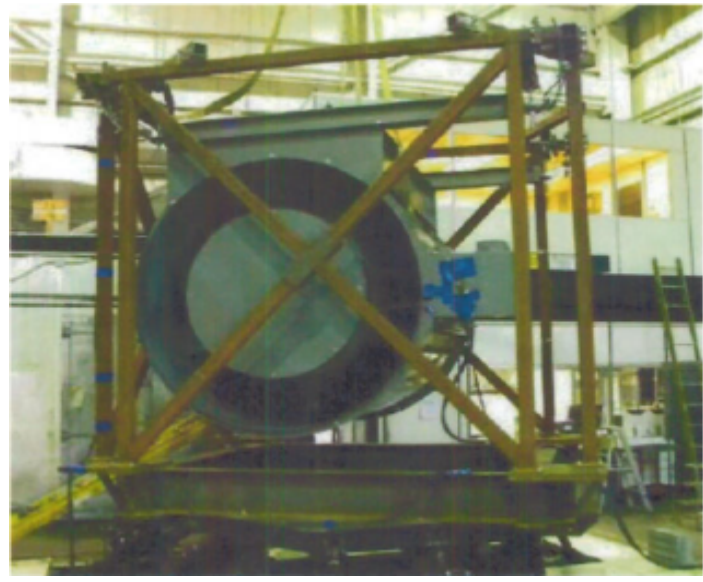
Manufacturer:	Loren Cook Company	UUT 9
Model Line:	SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans	
Model Number:	600 QMX	
Serial Number:		N/A

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 "C"; Motor cover/Belt guard; Adjustable motor base; Inlet/outlet collars; Extended lube lines

UUT Properties									
Weight (lb.)	Dimension (in)			Lowest Natural Frequency (Hz)					
	Depth	Width	Height	Front-Back	Side-Side	Vertical			
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} (g)	z/h	I _p	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2016		ICC-ES AC156	2.5	1.0	1.5	4.0	3.0	1.67	0.67

Test Mounting Details:

Ceiling mounted - isolated using Caldyne HH30-ET2060 isolators. The UUT was connected to the isolators using 24" long 1" ASTM A307 Grade A threaded rod with 3/8" carbon steel cable at each corner. Field installations require 2 cable restraints at each corner. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16037



Manufacturer:	Loren Cook Company	UUT 10
Model Line:	SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans	
Model Number:	90 QMX	
Serial Number:		N/A

Product Construction Summary:

Heavy gauge carbon steel housing and fan wheel. Fan housing attached to a 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

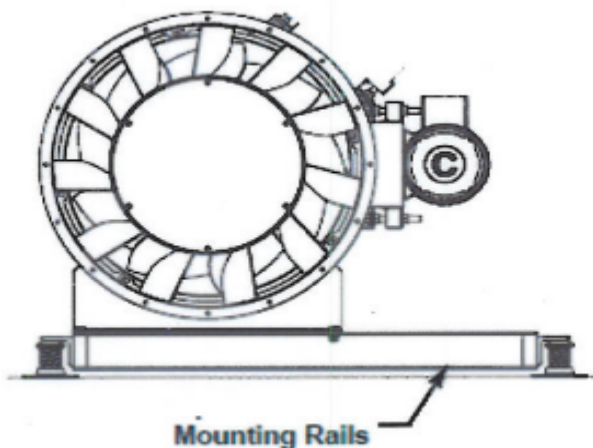
UUT Properties

Weight (lb.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
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} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2016	ICC-ES AC156	2.5	1.0	1.5	4.0	3.0	1.67	0.67

Test Mounting Details:



Floor mounted - isolated using JQAE106K isolators at each corner. Each isolator was attached to the table using (2) 1/2" Grade 5 bolts.

Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Contents were included in testing per operating conditions.

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UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16037



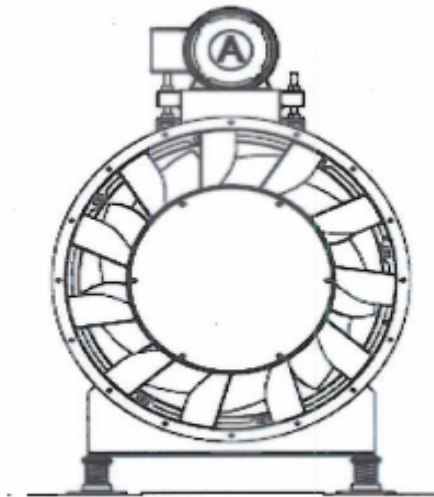
Manufacturer:	Loren Cook Company	UUT 11
Model Line:	SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans	
Model Number:	270 QMX-HP	
Serial Number:		N/A

Product Construction Summary:
Heavy gauge carbon steel housing and fan wheel. Fan housing attached to a 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 (lb.)	Dimension (in)			Lowest Natural Frequency (Hz)						
	Depth	Width	Height	Front-Back	Side-Side	Vertical				
1,085	47	41.3	62.9	4.9	7.7	5.4				
UUT Highest Passed Seismic Run Information										
Building Code		Test Criteria		S _{DS} (g)	z/h	I _p	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2016		ICC-ES AC156		2.5	1.0	1.5	4.0	3.0	1.67	0.67

Test Mounting Details:



Floor mounted - isolated using a Caldyne JQBET473K isolator at each corner. Each isolator was attached to the table using (2) 1/2" Grade 5 bolts.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16037



Manufacturer:	Loren Cook Company	UUT 13
Model Line:	SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans	
Model Number:	600 QMX-HP	
Serial Number:		N/A

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 (lb.)	Dimension (in)			Lowest Natural Frequency (Hz)						
	Depth	Width	Height	Front-Back	Side-Side	Vertical				
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} (g)	z/h	I _p	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CBC 2016		ICC-ES AC156		2.0	1.0	1.5	3.2	2.4	2.13	0.85
				3.2	0.0					

Test Mounting Details:



Floor mounted - isolated using (4) Mason SSLFH-C-1750 isolators w/ (1) 1/2" Grade 8 bolt attaching Isolator to unit & (4) 5/8" Grade 8 bolts attaching each isolator to the table.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16037



Manufacturer:	Loren Cook Company	UUT 14
Model Line:	SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans	
Model Number:	70 SQN-D	
Serial Number:		N/A

Product Construction Summary:

Galvanized carbon steel housing

Options/Subcomponent Summary:

10" Al backward inclined wheel - Carbon steel housing - Removable access doors - Inlet and discharge duct collars - Universal mounting feet - 1/2 HP, 120/208-240VAC EC Motor

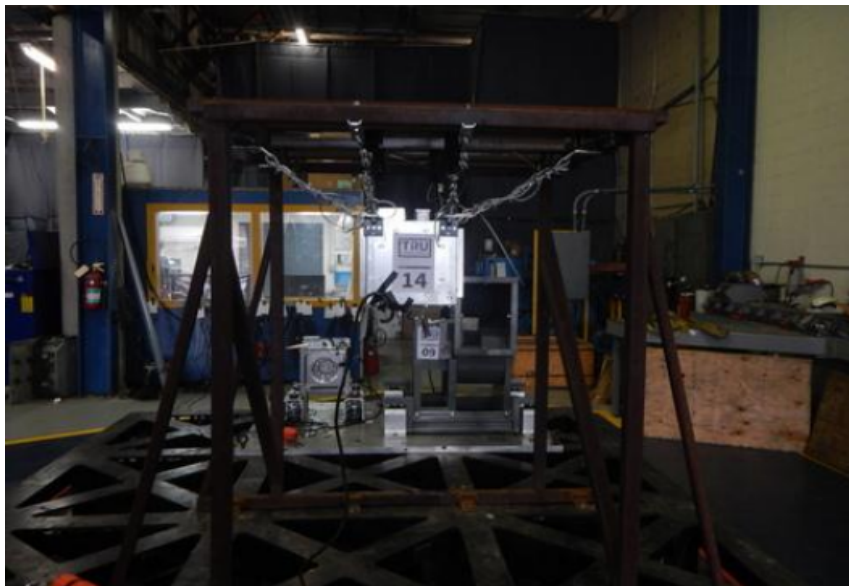
UUT Properties

Weight (lb.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
50	14	12	25.6	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 2016	ICC-ES AC156	2.0	1.0	1.5	3.2	2.4	2.13	0.85
		3.2	0.0					

Test Mounting Details:



Ceiling suspended - isolated using Kinetics SH-1-70 spring isolators with (4) 18" long by 3/8" ASTM A307 Grade A threaded drop rods and (8) KSWC-2 cable braces.

Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16037



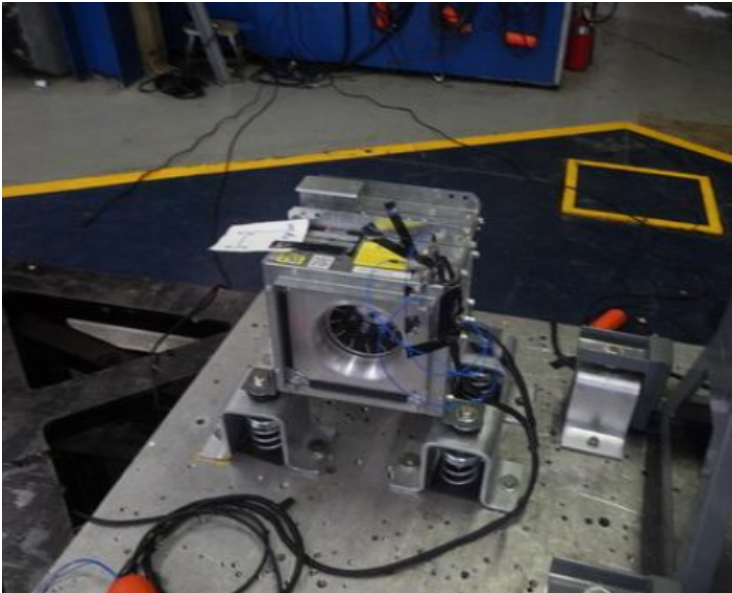
Manufacturer:	Loren Cook Company	UUT 15
Model Line:	SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans	
Model Number:	70 SQN-D	
Serial Number:		N/A

Product Construction Summary:
Galvanized carbon steel housing

Options/Subcomponent Summary:
10" Al backward inclined wheel - 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 (lb.)	Dimension (in)			Lowest Natural Frequency (Hz)						
	Depth	Width	Height	Front-Back	Side-Side	Vertical				
86	14	12	25.6	12.9	12.5	> 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 2016		ICC-ES AC156		2.0	1.0	1.5	3.2	2.4	2.13	0.85
				3.2	0.0					

Test Mounting Details:



Floor mounted - isolated using (4) SRS-100 isolators w/ (1) 5/8" Grade 8 bolt attaching Isolator to unit & (2) 5/8" Grade 8 bolts attaching each isolator to the table.

Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.

Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16037



Manufacturer:	Loren Cook Company	UUT 16
Model Line:	SQN-B, SQN-HP, SQN-D, QMX, QMX-HP, QMX-XP Fans	
Model Number:	402 SQN-B	
Serial Number:		N/A

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 (lb.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
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} (g)	z/h	I _p	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)	
CBC 2016	ICC-ES AC156	2.0	1.0	1.5	3.2	2.4	2.13	0.85	
		3.2	0.0						

Test Mounting Details:



Floor mounted - isolated using (4) SRS-450 isolators w/ (1) 5/8" Grade 8 bolt attaching Isolator to unit & (2) 5/8" Grade 8 bolts attaching each isolator to the table.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
Contents were included in testing per operating conditions.