



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

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

OFFICE USE ONLY

APPLICATION #: **OSP – 0033 – 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 E Dale Street, Springfield, MO 65803

Telephone: 417.869.6474 Email: bskidmore@lorencook.com

Product Information

Product Name: ACRU, VCR, ACSC

Product Type: Powered Ventilator

Product Model Number: See Attachment

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

General Description: Centrifugal Exhaust Fans for roof mount up to and including size 490. Applications include general Ventilation (ACRU), kitchen ventilation (VCR) and smoke control systems (ACSC). Seismic enhancements made to the test units and modifications required to address anomalies observed during the tests shall be incorporated into the production units.

Mounting Description: Rigid base mounted using manufacturer's specified mounting locations.

Wall mounted Units are excluded from this certification.

Applicant Information

Applicant Company Name: Tobolski Watkins Engineering, Inc.

Contact Person: Matthew Tobolski, Ph.D., S.E.

Mailing Address: 9246 Lightwave Ave. Suite 140, San Diego, CA 92123

Telephone: 858.381.5843 Email: mtobolski@tobolskiwatkins.com

I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2013.

Signature of Applicant:  Date: 6/6/2013

Title: President and CEO Company Name: Tobolski Watkins Engineering, Inc.

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





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

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

Company Name: Tobolski Watkins Engineering, Inc.
Name: Matthew Tobolski, Ph.D., S.E. California License Number: S5648
Mailing Address: 9246 Lightwave Ave. Suite 140, San Diego, CA 92123
Telephone: 858.381.5843 Email: mtobolski@tobolskiwatkins.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 Dynamic Test Laboratory
Contact Name: John R. Antenucci
Mailing Address: 1801 Route 51, Jefferson Hills, PA 15052
Telephone: 412.387.1004 Email: jrantenucci@clarkdynamic.com

Company Name: Environmental Testing Laboratory
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) = 1.45

S_{DS} (Design spectral response acceleration at short period, g) = 1.93g

a_p (In-structure equipment or component amplification factor) = 2½

R_p (Equipment or component response modification factor) = 6

Ω_0 (System overstrength factor) = 2½

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = 1.0

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, 2010: Yes No

List of Attachments Supporting Special Seismic Certification

Test Report(s) Drawings Calculations Manufacturer's Catalog

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

OSHDP Approval (For Office Use Only) – Approval Expires on December 31, 2019

Signature: 

Date: June 7, 2013

Print Name: Timothy J. Piland

Title: SSE

Special Seismic Certification Valid Up to : S_{DS} (g) = 1.93 z/h = 1.0

Condition of Approval (if applicable): Wall mounted Units are excluded from this certification.





UUT - 1

UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2012-0594-CO-001, rev.0

Manufacturer: Loren Cook Company
Model Line: Upblast Centrifugal Ventilator
Model Number: 245 ACSC (BELT DRIVE)

Product Construction Summary:

Belt drive upblast spun aluminum ventilator. Galvanized steel base and carbon steel wheel. Fiberglass insulation pad laying on top of the support base.

Certification excludes controllers and dampers– not tested.

Options/Subcomponent Summary:

2HP Baldor motor 460V three phase; roof curb with a height of 24".

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
430	49.0	49.0	41.0	6.3	7.0	15.6

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 2013	ICC-ES AC 156	2.28g	1.0	1.5	3.65g	2.74g	1.52g	0.61g

Test Mounting Details:



UUT was mounted directly to the seismic table using (24) 3/8"-16 socket cap bolts with flat washers and lock washers. Unit maintained structural integrity and remained functional per manufacturer requirement.



UUT - 2

**UNIT UNDER TEST (UUT)
Summary Sheet**

TWEI Project No.: 2012-0594-CO-001, rev.0

Manufacturer: Loren Cook Company

Model Line: Upblast Centrifugal Ventilator

Model Number: 490 ACRUB (BELT DRIVE)

Product Construction Summary:
Belt drive upblast spun aluminum ventilator. Galvanized steel base and aluminum wheel.
Certification excludes controllers and dampers- not tested.

Options/Subcomponent Summary:
7.5HP WEG motor 460V three phase; roof curb with a height of 24".

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
820	76.0	76.0	58.0	3.9	3.9	9.4

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 2013	ICC-ES AC 156	1.93g	1.0	1.5	3.09g	2.32g	1.29g	0.52g

Test Mounting Details:



UUT was mounted directly to the seismic table using (28) 3/8"-16 socket cap bolts with flat washers and lock washers. Unit suffered a structural failure during the test. Provide oversized washer to prevent bolt failure.

© 2010 Tobolski Watkins Engineering, Inc.



UUT - 3

UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2012-0594-CO-001, rev.0

Manufacturer: Loren Cook Company

Model Line: Upblast Centrifugal Ventilator

Model Number: 195 VCRD – HP (DIRECT DRIVE)

Product Construction Summary:
Direct drive upblast spun aluminum ventilator. Galvanized steel base and aluminum wheel. Fiberglass insulation pad laying on top of the support base.
Certification excludes controllers and dampers- not tested.

Options/Subcomponent Summary:
3/4HP Baldor motor 230V single phase; roof curb with a height of 24".

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
174.5	49.0	49.0	41.0	7.13	6.67	6.70

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 2013	ICC-ES AC 156	1.93g	1.0	1.5	3.09g	2.32g	1.29g	0.52g

Test Mounting Details:



UUT was mounted directly to the seismic table using (24) 3/8"-16 socket cap bolts with flat washers and lock washers. Unit maintained structural integrity and remained functional per manufacturer requirement.

© 2010 Tobolski Watkins Engineering, Inc.



UUT - 4

UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2012-0594-CO-001, rev.0

Manufacturer: Loren Cook Company

Model Line: Upblast Centrifugal Ventilator

Model Number: 100 ACRUD (DIRECT DRIVE)

Product Construction Summary:
Direct drive upblast spun aluminum ventilator. Galvanized steel base and aluminum wheel.
Certification excludes controllers and dampers- not tested.

Options/Subcomponent Summary:
1/4HP Quaece motor 115V single phase; roof curb with a height of 8".

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
42	21.2	21.2	16.4	16.32	15.76	22.55

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 2013	ICC-ES AC 156	2.50g	1.0	1.5	4.00g	3.00g	1.67g	0.67g

Test Mounting Details:



UUT was mounted directly to the seismic table using (12) 3/8"-16 socket cap bolts with flat washers and lock washers. Unit maintained structural integrity and remained functional per manufacturer requirement.

© 2010 Tobolski Watkins Engineering, Inc.



UUT - 5

UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2012-0594-CO-001, rev.0

Manufacturer: Loren Cook Company

Model Line: Upblast Centrifugal Ventilator

Model Number: 330 ACSC (BELT DRIVE)

Product Construction Summary:
Belt drive upblast spun aluminum ventilator. Galvanized steel base and carbon steel wheel. Fiberglass insulation pad laying on top of the support base.
Certification excludes controllers and dampers- not tested.

Options/Subcomponent Summary:
5HP WEG motor 460V three phase; roof curb with a height of 24".

UUT Properties

Weight (lb)	Dimensions (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
478.5	54.25	54.25	50.4	9.20	9.13	8.78

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 2013	ICC-ES AC 156	2.50g	1.0	1.5	4.00g	3.00g	1.67g	0.67g

Test Mounting Details:



UUT was mounted directly to the seismic table using (40) 3/8"-16 socket cap bolts with flat washers and lock washers. Unit maintained structural integrity and remained functional per manufacturer requirement.

© 2010 Tobolski Watkins Engineering, Inc.



Table 1

Special Seismic Certification Certified Product Matrix

TWEI Project No.: 2012-0594-CO-001, rev.0

Manufacturer: Loren Cook Company

Model Line: Upblast Centrifugal Ventilator **DIRECT DRIVE – VENTILATOR DETAIL**

Certified Product Construction Summary:
Base is made of galvanized steel, and Upblast is made of aluminum. Aluminum wheel.

Certified Options Summary:
With or without fiberglass insulation. Three additional units were added to cover all variations in matrix (UUT 3, 4 & 5)

Certified Mounting Summary:
Galvanized steel roof curb up to 24" height. Rigid base mounted using manufacturer's specified mounting locations. Wall mounted units are excluded from certification. SEOR is responsible for anchorage design.

Building Code: CBC 2013 **Seismic Certification Limits:** $S_{DS} = 1.93g$ $z/h = 1.0$ $I_p = 1.5$

Model Line	Model	Dimension (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
ACRUD ACRUD-HP ACRUD-XP VCRD VCRD-HP VCRD-XP (Direct Drive)	70	18.0	18.0	13.4	20		
	90	21.1	21.1	16.4	28		
	100	21.1	21.1	16.4	30	UUT: ACRUD tested - 8" curb	4
	101	25.3	25.3	16.4	30		
	120	30.2	30.2	28.1	67		
	135	30.2	30.2	28.6	72		
	150	34.7	34.7	30.3	87		
	165	34.7	34.7	30.8	90		
	180	39.5	39.5	35.9	102		
	195	39.5	39.5	33.5	110	UUT: VCRD-HP tested -24" curb	3

© 2010 Tobolski Watkins Engineering, Inc.



Table 2

Special Seismic Certification Certified Product Matrix

TWEI Project No.: 2012-0594-CO-001, rev.0

Manufacturer: Loren Cook Company

Model Line: Upblast Centrifugal Ventilator **BELT DRIVE - VENTILATOR DETAIL**

Certified Product Construction Summary:
Base is made of galvanized steel, and Upblast is made of aluminum.

Certified Options Summary:
Aluminum or carbon steel wheels. With or without fiberglass insulation. Three additional units were added to cover all variations in matrix (UUT 3, 4 & 5)

Certified Mounting Summary:
Galvanized steel roof curb up to 24" height. Rigid base mounted using manufacturer's specified mounting locations. Wall mounted units are excluded from certification. SEOR is responsible for anchorage design.

Building Code: CBC 2013 **Seismic Certification Limits:** $S_{DS} = 1.93g$ $z/h = 1.0$ $I_p = 1.5$

Model Line	Model	Dimension (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
ACRUB ACRUB-HP ACRUB-XP VCR VCR-HP VCR-XP (Belt Drive)	100	25.3	25.3	20.2	30		
	120	30.2	30.2	28.3	61		
	135	30.2	30.2	28.6	66		
	150	34.7	34.7	30.3	77		
	165	34.7	34.7	30.8	83		
	180	39.4	39.4	35.8	100		
	195	39.4	39.4	36.4	110		
	210	45.3	45.3	38.4	220		
	225	45.3	45.3	38.1	242		
	245	49.3	49.3	41.1	264		
	270	49.3	49.3	41.1	286		
	300	54.3	54.3	49.9	336		
	330	54.3	54.3	50.4	374		
	365	64.3	64.3	52.4	420		
	402	64.3	64.3	54.7	484		
445	76.3	76.3	57.2	556			
490	76.3	76.3	58.1	715	UUT: ACRUB tested - 24" curb	2	
ACSC ACSC-HP ACSC-XP (Belt Drive)	100	25.3	25.3	20.2	36		
	120	30.2	30.2	28.3	69		
	135	30.2	30.2	28.6	75		
	150	34.7	34.7	30.3	88		
	165	34.7	34.7	30.8	96		
	180	39.4	39.4	35.9	114		
	195	39.4	39.4	36.4	126		

© 2010 Tobolski Watkins Engineering, Inc.

