



APPLICATION FOR PREAPPROVAL SPECIAL SEISMIC CERTIFICATION OF EQUIPMENT AND COMPONENTS

For Office Use Only

APPLICATION NO.
OSP-0232-10

Check whether application is: NEW RENEWAL

1.0 Cascade Air Systems, LLC Stan Fredricks
Manufacturer *Manufacturer's Technical Representative*
12555 Energy Road Fort Morgan, CO 80701

Mailing Address

(970) 867-3229

cascadeair@kci.net

Telephone

E-mail Address

2.0 Compact Cabinet Air Conditioning Units, Horizontal, Direct Drive Packaged Compact Cabinet Air Conditioning Units
Product Name *Product Type*

7SH, 8SH, 9SH, 11SH, 12SH, 13SH, 15SH, 16SH

Product model No (List all unique product identification numbers and/or serial numbers)

General Description: Rigid ceiling-mounted Horizontal-housed fan with internal spring-isolated direct drive units in 18-gage-G-90 galvanized steel cabinet with aluminum profile post and beam construction. Units are 120V to 460V, with heating and cooling coil(s), motor with isolators, direct drive fan and VFD controller.

3.0 DYNAMIC CERTIFICATION LABORATORIES, LLC JOSEPH LA BRIE, S.E.
Applicant Company Name *Contact Person*
1315 GREG STREET, SUITE 109 SPARKS, NV 89431

Mailing Address

(775) 358-5085

LaBrie@makeitright.net

Telephone

E-mail Address

I hereby agree to reimburse the Office of Statewide Health Planning and Development for the actual costs incurred by the department for review.

Signature of Applicant

11/10/11

Managing Partner
Title

Date
Dynamic Certification Laboratories, LLC
Company Name



Registered Design Professional Preparing the Report

4.0 DYNAMIC CERTIFICATION LABORATORIES, LLC
Company Name

JOSEPH LA BRIE, S.E. SE-3566
Contact Name *California License Number*

1315 GREG STREET, SUITE 109, SPARKS, NV 89431
Mailing Address

(626) 445-0366 LaBrie@MakeltRight.net
Telephone *E-mail Address*

California Licensed Structural Engineer Review and Acceptance of the Report

5.0 DYNAMIC CERTIFICATION LABORATORIES, LLC
Company Name

DR. AHMAD ITANI, SE SE-5220
Contact Name *California License Number*

1315 GREG STREET, SUITE 109, SPARKS, NV 89431
Mailing Address

(775) 358-5085 Itani@shaketest.com
Telephone *E-mail Address*

Anchorage Pre-Approval

6.0

Anchorage is pre-approved under OPA-
 (Separate application for anchorage pre-approval is required)

Anchorage is not Pre-approved

Certification Method

7.0 Testing in accordance with: ICC-ES AC-156 Other (Please Specify):

Analysis

Experience data

Combination of Testing, Analysis, and/or Experience Data (Please Specify): Testing

Testing Laboratory (if applicable)

8.0 DYNAMIC CERTIFICATION LABORATORIES, LLC KELLY LAPLACE, PROJECT ENGINEER
Company Name *Contact Name*

1315 GREG STREET, STE 109 SPARKS, NV 89431
Mailing Address

(775) 358-5085 Kelly@shaketest.com
Telephone *E-mail:*



Approval Parameters

9.0

Design in accordance with ASCE 7-05 Chapter 13: Yes No

Design Basis of Equipment or Components (F_p/W_p) = 4.35

- S_{DS} (Spectral response acceleration at short period) = 1.93g
- a_p (In-structure equipment or component amplification factor) = 2.5
- R_p (Equipment or component response modification factor) = 2.0
- I_p (Importance factor) = 1.5
- z/h (Height factor ratio) = 1.0
- Equipment or Component fundamental period(s) = SEE ATTACHMENT
- Building period limits (if any) = NONE
- Overall dimensions and weight (or range thereof) = SEE ATTACHMENT

Equipment or Components @ grade designed in accordance with ASCE 7-05 Chapter 15: Yes No

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

- S_{DS} (Spectral response acceleration at short period) =
- S_1 (Spectral response acceleration at 1 second period) =
- R (Response modification coefficient) = 1.0
- Ω_0 (System overstrength factor) = 1.0
- C_d (Deflection amplification factor) = 1.0
- I_p (Importance factor) = 1.5
- Height to Center of Gravity above base =
- Equipment or Component fundamental period(s) = Sec
- Overall dimensions and weight (or range thereof) =

Tank(s) designed in accordance with ASME BPVC, 2007: Yes No

List of attachments supporting the special seismic certification of equipment or components:

- Test Report
- Drawings
- Manufacturer's Catalog
- Calculations
- Others (Please Specify):

11.0 OSHPD Approval (For Office Use Only)

12/16/2011

December 31, 2016

Signature & Date
M. R. Karim, SHFR

Approval Expiration Date
 S_{DS} (g) = **1.93** z/h = **1.0**

Name & Title

Special Seismic Certification Valid Up to

Condition of Approval (if any):

Table 1



Special Seismic Certification Approved Units

Manufacturer: Cascade Air

Product Line: Compact Cabinet Fan, Horizontal

Certified Product Construction:

18 gage (G-90) galvanized steel cabinet with aluminum profile post-and-beam construction, 22 gage galvanized solid liner and 2" fiberglass insulation.

Certified Options:

120V-460V, heating and cooling coils, motor with isolators, direct drive fan, filters, disconnect, VFD and VFD controller.

Certified Mounting Description:

Rigid Ceiling Suspended (Braced with Strut)

Cabinet Model	Serial No.	Dimensions				Lowest Natural Frequency			Sds Level Approved	Unit
		Length (in)	Width (in)	Height (in)	Operating Weight (lb)	F-B (Hz)	S-S (Hz)	V (Hz)		
7SH	CCF-H .3KS H-C BI	64	25	18	330	8.0	7.0	28.5	1.93	UUT3
8SH	CCF-H XKS H-C BI where X = .3 to 6	64 to 108	25 to 60	18 to 48	330 to 1,790					Interpolated
9SH										Interpolated
11SH										Interpolated
12SH										Interpolated
13SH										Interpolated
15SH										Interpolated
16SH	CCF-H 6KS H-C BI	108	60	48	1,790	8.0	6.8	13.8		UUT4

Table 2

UUT3 Unit Under Test Summary Sheet

Manufacturer: Cascade Air

Product Line: Compact Cabinet Fan, Horizontal

Model Number: 7SH (Serial No. CCF-H .3KS H-C BI)

Product Construction Summary:

18 gage (G-90) galvanized steel cabinet with aluminum profile post-and-beam construction, 22 gage galvanized solid liner and 2" fiberglass insulation.

Options / Component Summary:

120V, heating and cooling coils, 0.25HP motor with isolators, direct drive fan, filters, disconnect, VFD and VFD controller

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
330	64	25	18	8.0	7.0	28.5

Seismic Test Parameters

Building Code	Test Criteria	Sds	z/h	Ip	Aflx-H	Arig-H	Aflx-V	Arig-V
CBC 2010	2010 ICC-ES AC156	1.93	1.0	1.5	3.09	2.32	1.29	0.51

NOTE: The unit was full of operating fluid during the test and passed all pre- and post-shake functionality checks.

Unit Mounting Description:



UUT3, mounted to DCL steel shake table interface frame, instrumented and ready for test.



UUT3 close-up of mounting hardware (brackets, lateral bracing and threaded rod with stiffener).

UUT3 was tested in a rigid ceiling-mount configuration, mounted to the DCL steel shake table interface frame using 1/2-inch threaded rod, 1"x1"x3/16" angle iron rod stiffener and SRC-1 Mason Seismic Rod Clamps. The unit was braced with solid channel, Mason SSBS020 strut anchors, 1/2-inch diameter Grade 5 bolts and channel nuts. The DCL shake table interface frame was mounted to the shake table using M12 threaded rod, spaced approximately 8-inches on-center.

Table 3

UUT4 Unit Under Test Summary Sheet

Manufacturer: Cascade Air

Product Line: Compact Cabinet Fan, Horizontal

Model Number: 16SH (Serial No. CCF-H 6KS H-C BI)

Product Construction Summary:

18 gage (G-90) galvanized steel cabinet with aluminum profile post-and-beam construction, 22 gage galvanized solid liner and 2" fiberglass insulation.

Options / Component Summary:

480V, heating and cooling coils, 5HP motor with isolators, direct drive fan, filters, disconnect, VFD and VFD controller

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1,790	108	60	48	8.0	6.8	13.8

Seismic Test Parameters

Building Code	Test Criteria	Sds	z/h	Ip	Aflx-H	Arig-H	Aflx-V	Arig-V
CBC 2010	2010 ICC-ES AC156	1.93	1.0	1.5	3.09	2.32	1.29	0.51

NOTE: The unit was full of operating fluid during the test and passed all pre- and post-shake functionality checks.

Unit Mounting Description:



UUT4, mounted to DCL shake table interface frame, instrumented and ready for test.



UUT4 close-up of mounting hardware (brackets, lateral bracing and threaded rod with stiffener).

UUT4 was tested in a rigid ceiling-mount configuration, mounted to the DCL steel shake table interface frame using 5/8-inch threaded rod, 1"x1"x3/16" angle iron rod stiffener and SRC-1 Mason Seismic Rod Clamps. The unit was braced with solid channel, 45 degree 3"x2-5/16"x1/4" channel angle brackets constructed of hot rolled carbon steel, and 1/2-inch diameter Grade 5 bolts. The DCL shake table interface frame was mounted to the shake table using M12 threaded rod, spaced approximately 8-inches on-center.

Special Seismic Certification Approved Components



Manufacturer: Cascade Air

Product Line: Compact Cabinet Fan, Horizontal

Heating Coils

Manufacturer	Mfg. Part No.	Size of coil with booster (in) (W x L)	Construction Material	Unit
Luvata Grenada LLC	4 BS 0601	11 x 16	Copper tubing, aluminum fins, stainless steel and galvanized housing	UUT3
	Varies	11-38 inches wide by 16-51 inches long		Interpolated
	4 MQ 0602	38 x 51		UUT4

Cooling Coils

Manufacturer	Mfg. Part No.	Size of coil with header (in) (W x L)	Construction Material	Unit
Luvata Grenada LLC	4 WQ 1006	11 x 13	Copper tubing, aluminum fins, stainless steel and galvanized housing	UUT3
	Varies	11-38 inches wide by 13-48 inches long		Interpolated
	4 WH 0804	38 x 48		UUT4

Motors

Manufacturer	Mfg. Part No.	HP / RPM	Construction Material	Unit
Baldor Motors	34 F006	0.25 / 3450	Rolled Carbon Steel	UUT3
	HM 9210	1 / 1800		Interpolated
	EHM/HM 9214 T	1.5 / 1800		
	EHM/HM 9218 T	2 / 1800		
	EHM /HM 9222 T	3 / 1800		
	EHM/HM 9226 T	5 / 1800		
	H3M 9201	0.5 / 3600		
	EH3M/H3M 9202	0.5 / 1800		
	EH3M/H3M 9204	0.75 / 3600		
	EH3M/H3M 9205	0.75 / 1800		
	EH3M/H3M 9206	1 / 3600		
	EH3M/H3M 9210	1/1800		
	H3M 9212 T	1.5 / 3600		
	EH3M/H3M 9214 T	1.5 / 1800		
	EH3M/H3M 9217 T	2 / 3600		
	EH3M/H3M 9218 T	2 / 1800		
	EH3M/H3M 9221 T	3 / 3600		
	EH3M/H3M 9222 T	3 / 1800		
	EH3M/H3M 9225 T	5 / 3600		
	EH3M/H3M 9226 T	5 / 1800		


Special Seismic Certification

Approved Components



Manufacturer: Cascade Air

Product Line: Compact Cabinet Fan, Horizontal

Fans - Direct Drive				
Manufacturer	Mfg. Part No.	Size	Construction Material	Unit
Comefri USA	ATE 7	Smallest  Largest	Fiberglass, polyamide	UUT3
	ATE 8			Interpolated
	ATE 9			
	ATE 10			
	ATE 11			
	ATE 12			
	ATE 14			
	ATE 16			
	ATE 18			

VFD and VFD Controller				
Manufacturer	Mfg. Part No.	HP	Volt / Phase	Unit
Yaskawa America	CIMR-XCBM-A0P20	0.25	115v/1ph	UUT3
	CIMR-XCBM-A0P40	0.5	115v/1ph	Interpolated
	CIMR-XCBM-A0P40	0.75	115v/1ph	
	CIMR-XCBM-A0P70	1	115v/1ph	
	CIMR-E7U-20P41	0.5	208v/3ph	
	CIMR-E7U-20P71	0.75	208v/3ph	
	CIMR-E7U-21P51	1	208v/3ph	
	CIMR-E7U-22P21	3	208v/3ph	
	CIMR-E7U-23P71	5	208v/3ph	
	CIMR-E7U-20P41	0.5	240v/3ph	
	CIMR-E7U-20P71	1	240v/3ph	
	CIMR-E7U-21P51	2	240v/3ph	
	CIMR-E7U-22P21	3	240v/3ph	
	CIMR-E7U-23P71	5	240v/3ph	
	CIMR-E7U-40P41	0.5	480v/3ph	
	CIMR-E7U-40P41	0.75	480v/3ph	
	CIMR-E7U-40P71	1	480v/3ph	
	CIMR-E7U-41P51	2	480v/3ph	
	CIMR-E7U-42P21	3	480v/3ph	
	CIMR-E7U-43P71	5	480v/3ph	

Isolators			
Manufacturer	Mfg. Part No.	Construction Material	Unit
Amber Booth	AMSR1 C	n/a	UUT3, UUT4

Special Seismic Certification Approved Components



Manufacturer: Cascade Air

Product Line: Compact Cabinet Fan, Horizontal

Disconnect Switch and Disconnect Switch Enclosure

<i>Manufacturer</i>	<i>Mfg. Part No.</i>	<i>Description</i>	<i>Unit</i>
Hubbell	C51151	Non-Fused Disconnect, Commercial Switch, 15 Amps, 115/277VAC	UUT3
Steel City	4"x4"x1.75	NEMA1, 4"x4"x1.27" steel junction box	UUT3
Cutler-Hammer	DH361NGK	Fused Disconnect, 277/480VAC/3Ph/30Amp	UUT4

Filters

<i>Manufacturer</i>	<i>Mfg. Part No.</i>	<i>Size(LxWxD, inches)</i>	<i>Description</i>	<i>Unit</i>
Flanders	M-13	20 x 10 x 2	MERV-13, Pleated Model	UUT3
Camfil-Farr	Aero-Pleat	24 x 24 x 2	MERV-8	UUT4
Camfil-Farr	3030	24 x 16 x 2	A8-A MERV-8	UUT4

Note: Filters may be Flanders or Camfil-Farr, 20-24"L x 10-24"W x 2"D, MERV-8 or MERV-13