APPLICATION FOR HCAI SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0272

HCAI Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: ClimateCraft, Inc.

Manufacturer's Technical Representative: Andrew Hills

Mailing Address: 518 North Indiana Ave., Oklahoma City, OK 73106

Telephone: (405) 415-9230 Email: ahills@climatecraft.com

Product Information

Product Name: Air Handling Units

Product Type: Fans

Product Model Number: FanMatrix

General Description: Matrix fan towers consisting of four HSS 3”x3”x1/8” columns, with 11 gauge horizontal braces on three sides (located at the fans), 11 gauge seismic punched square, and 5/8” column base plates with internal vibration isolators. Mini Tower consisted of: 4 - HSS 2"x2"x1/8" columns, with 11 gauge horizontal braces on three sides with internal vibration isolators.

Mounting Description: Rigid, Floor Mounted

Tested Seismic Enhancements: None

Applicant Information

Applicant Company Name: The VMC Group

Contact Person: John Giuliano

Mailing Address: 113 Main Street, Bloomingdale, NJ 07403

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

Title: President

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

Company Name: THE VMC GROUP

Name: Kenneth Tarlow California License Number: S2851

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

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

Certification Method

☐ GR-63-Core ☒ ICC-ES AC156 ☐ IEEE 344 ☐ IEEE 693 ☐ NEBS 3

☐ Other (Please Specify):

Testing Laboratory

Company Name: CLARK TESTING LABORATORY, INC.

Contact Person: Devon Lohr

Mailing Address: 1801 Route 51, Jefferson Hills PA 15025

Telephone: (412) 387-1026 Email: dlohr@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) = 4.34

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

a_p (Amplification factor) = 2.5

R_p (Response modification factor) = 2.0

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height ratio factor) = 1

Natural frequencies (Hz) = See Attachment

Overall dimensions and weight = See Attachment

HCAI Approval (For Office Use Only) - Approval Expires on 07/18/2029

Date: 7/18/2023

Name: Timothy Piland Title: Senior Structural Engineer

Special Seismic Certification Valid Up to: S_{DS} (g) = 1.93 z/h = 1

Condition of Approval (if applicable):

Table 1a - Certified Components - MiniTower Fan Tower Arrays

Model Name: MiniTower **Drive Type:** Direct Drive

Fan Diameter \ Motor HP	3	5	7.5	10	Fan Tower Manufacturer	UUT
10"	X	X	X	X	CllimateCraft	UUT-06
11"	X	X	X	X		Inteprolated
12"	X	X	X	X		
14"	X	X	X	X		
16"	X	X	X	X		UUT-06

Note:

1) Mini Tower consisted of: 4 - HSS 2"x2"x1/8" columns, with 11 gauge horizontal braces on three sides with internal vibration isolators.

Table 1b - Certified Components - MiniTower Fan Structure

Array Configuration	Dimensions [in]	Overall Size					Fan Tower Material	Tested Tower Weight [lb]	UUT
		10	11	12	14	16			
		Internally Isolated							
1x1	Width	27	27	27	27	27	Carbon Steel	N/A	Inteprolated
	Depth	26	26	26	26	26			
	Height	30-84	30-84	30-84	30-84	30-84			
1x2	Width	27	27	27	27	27		631	UUT-06
	Depth	26	26	26	26	26			
	Height	**60**-108	60-108	60-108	60-108	60-108			
1x3	Width	27	27	27	27	27		N/A	Inteprolated
	Depth	26	26	26	26	26			
	Height	84-132	84-132	84-132	84-132	84-132			
1x4	Width	27	27	27	27	27		1363	UUT-06
	Depth	26	26	26	26	26			
	Height	120-138	120-138	120-138	120-138	120-**138**			

Note:

1) All fan/motor assemblies internally isolated with VMC SW-1C Spring Isolators, as tested

Table 2a - Certified Components - Matrix (MTX) Fan Towers

Model Name: MTX **Drive Type:** Direct Drive

Fan Diameter \ Motor HP	3	5	7.5	10	15	20	25	30	Fan Tower Manufacturer	UUT
12"	X	X	X	X	X	X	X	X	CllimateCraft	UUT-01
15"	X	X	X	X	X	X	X	X		Inteprolated
16"	X	X	X	X	X	X	X	X		UUT-01
18"	X	X	X	X	X	X	X	X		Interpolated
20"	X	X	X	X	X	X	X	X		UUT-01
22"	X	X	X	X	X	X	X	X		UUT-02, UUT-6
24"	X	X	X	X	X	X	X	X		UUT-02, UUT-6
27"	X	X	X	X	X	X	X	X		UUT-02, UUT-6

Note:

1) Matrix fan towers consisting of four HSS 3"x3"x1/8" columns, with 11 gauge horizontal braces on three sides (located at the fans), 11 gauge punched square, and 5/8" column base plates with internal vibration isolators.

Table 2b - Certified Components - Matrix (MTX) Fan Structure

Array Configuration	Dimensions [in]	Overall Size								Fan Tower Material	Tested Tower Weight [lb]	UUT
		12	15	16	18	20	22	24	27			
		Internally Isolated										
1x1	Width	37	37	37	37	37	44	44	44	Carbon Steel	N/A	Interpolated
	Depth	48	48	48	48	48	48	48	48			
	Height	42 - 90	42 - 90	42 - 90	42 - 90	42 - 90	42 - 96	42 - 96	42 - 96			
1x2	Width	37	37	37	37	37	44	44	44			
	Depth	48	48	48	48	48	48	48	48			
	Height	72 - 126	72 - 126	72 - 126	72 - 126	72 - 126	84 - 126	84 - 126	84 - 126			
1x3	Width	37	37	37	37	37	44	44	44		UUT-01: 1886, UUT-02: 2176, UUT-06: 2913	UUT-01, UUT-02, UUT-06
	Depth	48	48	48	48	48	48	48	48			
	Height	114 - 144	114 - 144	114 - 144	114 - 144	114 - **144**	126 - 144	126 - 144	126 - **144**			

Note:

1) All fan/motor assemblies internally isolated with VMC SW-1C Spring Isolators, as tested

Table 3 - Certified Subcomponents - Fan Wheels

Model Family	Diameter	Type	Weight [lb]	Wheel Material	Housing Material	Manufacturer	UUT
MiniTower	10"	ANPA	9	Aluminum	Aluminum	Comerfri	UUT-06
	11"		10				Interpolated
	12"		13				
	14"		16				
	16"		19				UUT-06
Matrix Tower (MTX)	12"	12 Blade QEP	20	Aluminum	Carbon Steel	Greenheck Fan Corp.	UUT-01
	15"		23				Interpolated
	16"		26				UUT-01
	18"		29				Interpolated
	20"		33				UUT-01
	22"		52				UUT-02, UUT-06
	24"		67				UUT-02, UUT-06
	27"		75				UUT-02, UUT-06

Table 4 - Certified Subcomponents - Motor

Model Family	HP	Voltage[1,2]	Frame Size	Weight [lb]	Housing Material	Manufacturer	UUT
Premium Efficient AC	3	208-230 / **460**	182T	72	Carbon Steel	Nidec	UUT-06
	5		184T	120			Interpolated
	7.5		213T	160			Interpolated
	10		215T	170			UUT-06
	15		254T	300			Interpolated
	20		256T	340			Interpolated
	25		284T	380			Interpolated
	30 [3]		286T	492			UUT-06
Premium Efficient AC	3		182T	69	Carbon Steel	Baldor	UUT-01, UUT-02
	5		184T	95			Interpolated
	7.5		213T	146			Interpolated
	10		215T	158			UUT-01, UUT-02, UUT-06
	15		254T	217			UUT-06
	20		256T	286			Interpolated
	25		284T	417			Interpolated
	30		286T	380			UUT-01, UUT-02

Note:
1) The voltage is effected by the internal wiring connections only. Amp Draw (A) is dependent on the voltage.
2) 460V is the rated voltage of the motor. 480V power source was used during functionality testing.
3) This motor cannot be used in the top slot of a 1x3 Matrix (MTX) fan tower.

Table 5 - BalanceStream™

Wheel Size	Weight [lb]	Manufacturer	UUT
18" Diamater	35	ClimateCraft	Interpolated
20" Diamater	40		
22" Diamater	47		UUT-06
24" Diameter	54		
27" Diameter	63		

Note: This component is a spring actuated inlet cone which helps to optimize efficiency of the fans

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-1

Test Report: ETL Report# 12086

Model Line	Model Number	Manufacturer
FanMatrix	12MTX3, 16MTX10, 20MTX30	ClimateCraft

Product Construction Summary

Tower consisted of: 4 - HSS 3"x3"x1/8" columns, with 11 gauge horizontal braces on three sides (located at the fans), 11 gauge seismic punched square, and 5/8" column base plates

Options / Subcomponent Summary

Fan: Greenheck Fan Corp ; Motor: Baldor

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
1,886	37.0	48.0	144.0	4.3	4.0	4.3

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	2.51	1.74	0.70
		-	-	-	-	-	-	-

Test Mounting Details

UUT-1 was rigidly mounted to the shake table using (6) 5/8" diameter Grade 8 bolts.

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

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-2

Test Report: ETL Report# 12086

Model Line	Model Number	Manufacturer
FanMatrix	22MTX3, 24MTX10, 27MTX30	ClimateCraft

Product Construction Summary

Tower consisted of: 4 - HSS 3"x3"x1/8" columns, with 11 gauge horizontal braces on three sides (located at the fans), 11 gauge seismic punched square, and 5/8" column base plates

Options / Subcomponent Summary

Fan: Greenheck Fan Corp ; Motor: Baldor

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
2,176	44.0	48.0	144.0	3.7	3.6	4.7

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	2.51	1.74	0.70
		-	-	-	-	-	-	-

Test Mounting Details

UUT-2 was rigidly mounted to the shake table using (6) 5/8" diameter Grade 8 bolts.

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

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-6

Test Report: JID 20-00450

Model Line	Model Number	Manufacturer
Air Handler	80177	ClimateCraft

Product Construction Summary

MiniTower (4)16MiniTX10 consisted of: 4 - HSS 2"x2"x1/8" columns, with 11 gauge horizontal braces on three sides (located at the fans). MiniTower (2)10MiniTX3 consisted of: 4 - HSS 2"x2"x1/8" columns, with 11 gauge horizontal braces on three sides (located at the fans). FanMatrix Tower 22MTX15, 24MTX30, 27MTX30 consisted of: 4 - HSS 3"x3"x1/8" columns, with 11 gauge horizontal braces on three sides (located at the fans), 11 gauge seismic punched square, and 5/8" column base plates

Options / Subcomponent Summary

MiniTower (4)16MiniTX10 Subcomponents - Fan: Comerfri ; Motor: Baldor & Nidec
MiniTower (2)10MiniTX3 Subcomponents - Fan: Comerfri ; Motor: Nidec
FanMatrix Tower 22MTX15, 24MTX30, 27MTX30 Subcomponents - Fan: Greenheck Fan Corp ; Motor: Baldor & Nidec ; BalanceStream: ClimateCraft

UUT Properties

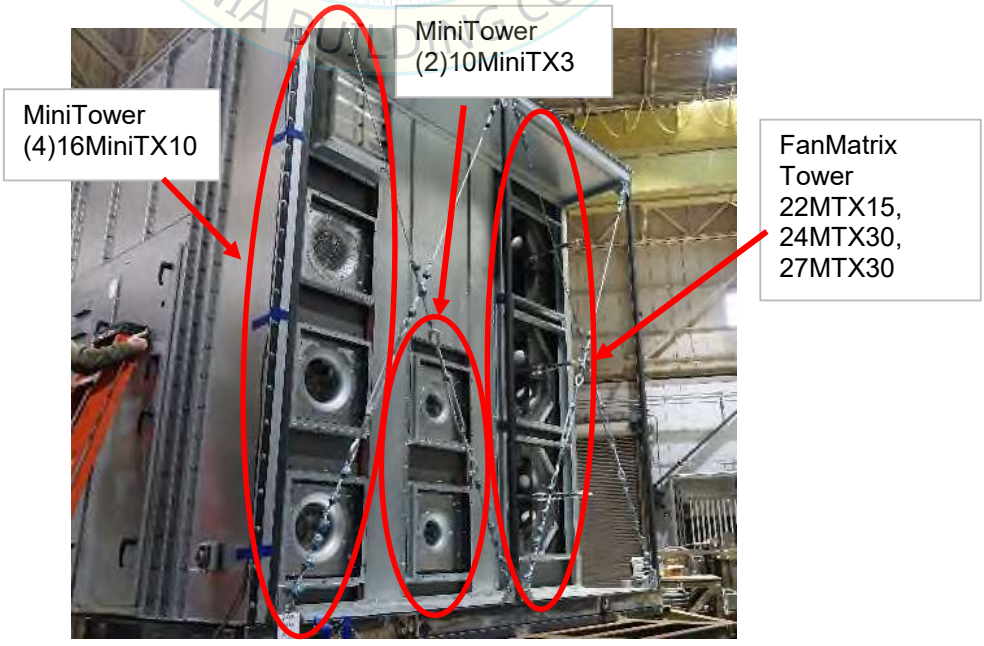
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
9,194	120.0	146.0	151.0	3.2	7.8	13.4

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	1.93	1.0	1.5	3.09	2.32	1.29	0.52
		-	-	-	-	-	-	-

Test Mounting Details

UUT-6 was rigidly mounted to the shake table using (6) 7/8" diameter Grade 5 bolts.
The 4-high fan tower was attached directly to the base/floor of the UUT-6 using (6) 5/8" diameter Grade 8 bolts. The 2-high fan tower was attached directly to the base/floor of the UUT-6 using (6) 5/8" diameter Grade 8 bolts. The 3-high fan tower was attached directly to the base/floor of the UUT-6 using (6) 5/8" diameter Grade 8 bolts.



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