



DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION  
OFFICE OF STATEWIDE HOSPITAL PLANNING AND DEVELOPMENT

APPLICATION FOR HCAI SPECIAL SEISMIC  
CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0033

HCAI Special Seismic Certification Preapproval (OSP)

Type:  New  Renewal

Manufacturer Information

Manufacturer: Loren Cook Company

Manufacturer's Technical Representative: Bill Hohulin

Mailing Address: 2015 E Dale St., Springfield, MO 65803

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

Product Information

Product Name: Exhaust/Smoke Control Fans

Product Model Number(s): ACRU, VCR, ACSC

Product Category: Exhaust/Smoke Control Fans

Product Sub-Category: Exhaust/Smoke Control Fans

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).

Mounting Description: Base Mounted Curb Non-Isolated

Tested Seismic Enhancements: Seismic enhancements made to the test units and/or modifications required to address anomalies during the tests shall be incorporated into the production units.

Applicant Information

Applicant Company Name: 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

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**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: Zach Fischer

Mailing Address: 1801 Route 51, Jefferson Hills PA 15025

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

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

Contact Person: Jeremy Lange

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

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

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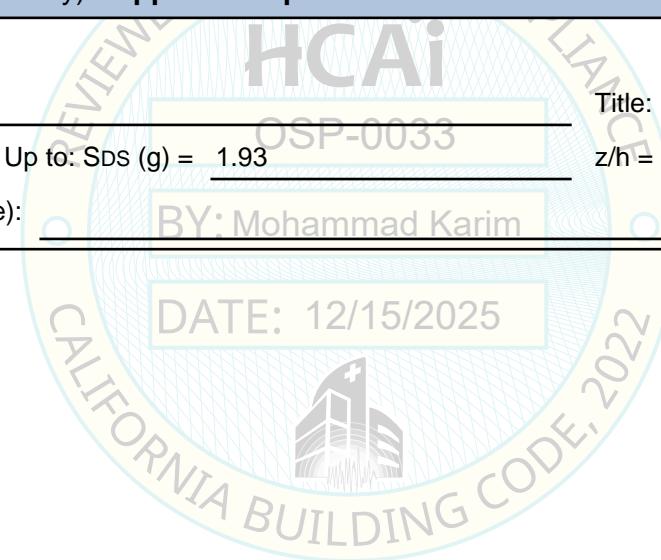
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**Seismic Parameters**

Design Basis of Equipment or Components (Fp/Wp) =	1.45
SDs (Design spectral response acceleration at short period, g) =	1.93
ap (Amplification factor) =	2.5
Rp (Response modification factor) =	6.0
Qo (System overstrength factor) =	2.0
Ip (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 12/15/2031**

Date:	12/15/2025	
Name:	Mohammad Karim	Title:
Special Seismic Certification Valid Up to:	SDs (g) = 1.93	z/h =
Condition of Approval (if applicable):	BY: Mohammad Karim	



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**Table 1: Certified Exhaust/Smoke Control Fans**

Model Line	Model	Dimensions [ in ]			Weight [ lb ]	Manufacturer	Mounting Configuration	UUT
		Depth	Width	Height				
ACRUD ACRUD-HP ACRUD-XP VCRD VCRD-HP VCRD-XP [ Direct Drive ]	70	17.1	17.1	40.4	59	Loren Cook	Rigid Base on Carbon Steel Curb up to 24"	UUT-6
	90	21.1	21.1	40.4	67			Interpolated
	100	21.1	21.1	40.4 <sup>1</sup>	70 <sup>2</sup>			UUT-4
	101	25.3	25.3	40.4	71			Interpolated
	120	25.3	30.2	50.6	110			Interpolated
	135	30.2	30.2	50.6	118			Interpolated
	150	30.2	30.2	50.6	134			UUT-8
	165	34.7	34.7	54.3	136			Interpolated
	180	34.7	34.7	54.3	150			Interpolated
	195	39.5	39.5	57.5	159			UUT-3, -7
	210	45.3	45.3	59.4	262			Interpolated
	225	45.3	45.3	59.4	286			Interpolated
	245	49.3	49.3	62.1	310			Interpolated
	270	49.3	49.3	62.1	333			Interpolated
	300	54.3	54.3	65.4	383			UUT-9
	100	25.3	25.3	42.2	76			Interpolated
ACSC ACSC-HP ACSC-XP [ Belt Drive ]	120	30.2	30.2	50.3	114			Interpolated
	135	30.2	30.2	50.6	121			Interpolated
	150	34.7	34.7	52.3	143			Interpolated
	165	34.7	34.7	52.8	156			Interpolated
	180	39.4	39.4	56.9	189			Interpolated
	195	39.5	39.5	57.4	206			Interpolated
	210	45.3	45.3	59.4	334			Interpolated
	225	45.3	45.3	59.1	367			Interpolated
	245	49.3	49.3	65.1	430			UUT-1
	270	49.3	49.3	65.1	458			Interpolated
	300	54.3	54.3	70.1	466			Interpolated
	330	54.3	54.3	74.4	479			UUT-5
	100	25.3	25.3	42.2	70			Interpolated
	120	30.2	30.2	50.3	106			Interpolated
	135	30.2	30.2	50.6	112			Interpolated
ACRUB ACRUB-HP ACRUB-XP VCR VCR-HP VCR-XP [ Belt Drive ]	150	34.7	34.7	52.3	132			Interpolated
	165	34.7	34.7	52.8	143			Interpolated
	180	39.4	39.4	56.9	175			Interpolated
	195	39.4	39.4	57.4	192			Interpolated
	210	45.3	45.3	59.4	315			Interpolated
	225	45.3	45.3	59.1	342			Interpolated
	245	49.3	49.3	62.1	390			Interpolated
	270	49.3	49.3	62.1	418			Interpolated
	300	54.3	54.3	70.9	476			Interpolated
	330	54.3	54.3	71.4	542			Interpolated
	365	64.3	64.3	73.4	592			Interpolated
	402	64.3	64.3	75.7	612			Interpolated
	445	76.3	76.3	78.2	624			Interpolated
	490	76.3	76.3	82.1	637			UUT-10

**Notes:**

<sup>1</sup>Listed height is with 24" curb. Height of tested UUT with 8" curb is 24.4".

<sup>2</sup>Listed weight is with 24" curb. Weight of tested UUT with 8" curb is 42 lbs.

<sup>3</sup>Certified fans consist of aluminum base with aluminum construction and aluminum wheel. Option to include with or without fiberglass insulation and optional birdscreens.

**Table 2: Certified Subcomponents**

Component Type	Manufacturer	Model	Weight [ lb ]	Material	UUT
Motor	Baldor/Reliance	1/3 HP	29	Copper Windings, Carbon Steel Frame	Extrapolated
		...	...		Extrapolated
		3/4 HP	32		UUT-3
		...	...		Interpolated
		2 HP	48		UUT-1
	WEG	1/6 HP	23		Extrapolated
		...	...		Extrapolated
		5 HP	62		UUT-5
		...	...		Interpolated
		7.5 HP	77		UUT-10
	Quaece	1/4 HP	22		UUT-4
	McMillan	1/6 HP	9		UUT-6
		...	...		Interpolated
		1/4 HP	12		UUT-7
	Marathon	1 HP	18		UUT-8
		...	...		Interpolated
		5 HP	108		UUT-9
Motor Drives	Yaskawa	CMIR-VU4A0001_A	2.6	Plastic, Carbon Steel	Extrapolated
		CMIR-VU4A0002_A	3.1		UUT-8
		CMIR-VU4A0004_A	3.5		Interpolated
		CMIR-VU4A0005_A	4.2		Interpolated
		CMIR-VU4A0007_A	4.2		Interpolated
		CMIR-VU4A0009_A	4.2		UUT-9

## Shake Test Index

UUT	Model Number	Test Lab	Test Report Written by	Test Report Number	Test Date	Mounting	S <sub>DS</sub> z/h=0	S <sub>DS</sub> z/h=1
1	245 ACSC	Clark	Clark	EL8964	October 7-9, 2009	Rigid Base Mounted	2.28	2.28
3	195 VCRD-HP	ETL	ETL	12695	May 6, 2013	Rigid Base Mounted	1.93	1.93
4	100 ACRUD	ETL	ETL	12695	May 6, 2013	Rigid Base Mounted	2.50	2.50
5	330 ACSC	ETL	ETL	12695	May 6, 2013	Rigid Base Mounted	2.50	2.50
6	70 ACRUD	ETL	ETL	15331	June 17, 2019	Rigid Base Mounted	1.93	1.93
7	195 VCRD-XP	ETL	ETL	15331	June 17, 2019	Rigid Base Mounted	1.93	1.93
8	150 ACRUD	ETL	ETL	15331	June 17, 2019	Rigid Base Mounted	1.93	1.93
9	300 ACRUD-XP	ETL	ETL	15331	June 17, 2019	Rigid Base Mounted	1.93	1.93
10	490 ACRUB	ETL	TRU Compliance	1900240	August 7, 2020	Rigid Base Mounted	2.00	2.00





## UNIT UNDER TEST (UUT) Summary Sheet

UUT-1

Test Report: Clark EL8964

Model Line	Model Number	Manufacturer
ACRU, VCR, ACSC	245 ACSC	Loren Cook

### Product Construction Summary

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

### Options / Subcomponent Summary

Motor: Baldor 2HP motor 460V three phase; Carbon Steel Roof Curb with a height of 24"

### UUT Properties<sup>1</sup>

Weight [ lbs ]	Dimensions [ in ]			Lowest Nat. Freq. [ Hz ]		
	Length	Width	Height	F-B	S-S	V
430	49.3	49.3	65.1	6.3	7.0	15.6

<sup>1</sup>Note: Unit weight and height includes weight and height of curb.

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>P</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2022	ICC-ES AC156	2.28	1.0	1.5	3.65	2.74	1.52	0.61

### 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.



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



## UNIT UNDER TEST (UUT) Summary Sheet

UUT-3

Test Report: ETL 12695

Model Line	Model Number	Manufacturer
ACRU, VCR, ACSC	195 VCRD-HP	Loren Cook

### Product Construction Summary

Direct drive upblast spun aluminum ventilator. Aluminum base and aluminum wheel. Fiberglass insulation pad laying on top of the support base. Certification excludes dampers and controllers - not tested

### Options / Subcomponent Summary

Motor: WEG 3/4HP motor 230V single phase; Carbon Steel Roof Curb with a height of 24"

### UUT Properties<sup>1</sup>

Weight [ lbs ]	Dimensions [ in ]			Lowest Nat. Freq. [ Hz ]		
	Length	Width	Height	F-B	S-S	V
175	39.5	39.5	57.5	7.1	6.7	6.7

<sup>1</sup>Note: Unit weight and height includes weight and height of curb.

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>P</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2022	ICC-ES AC156	1.93	1.0	1.5	3.09	2.32	1.29	0.51

### Test Mounting Details

UUT was mounted directly to the seismic table using (24) 3/8"-16 Grade 8 socket cap bolts with flat washers and lock washers.



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



## UNIT UNDER TEST (UUT) Summary Sheet

UUT-4

Test Report: ETL 12695

Model Line	Model Number	Manufacturer
ACRU, VCR, ACSC	100 ACRUD	Loren Cook

### Product Construction Summary

Direct drive upblast spun aluminum ventilator. Aluminum base and aluminum wheel. Certification excludes dampers and controllers - not tested

### Options / Subcomponent Summary

Motor: Quaece 1/4HP motor 115V single phase; Carbon Steel Roof Curb with a height of 8"

### UUT Properties<sup>1</sup>

Weight [ lbs ]	Dimensions [ in ]			Lowest Nat. Freq. [ Hz ]		
	Length	Width	Height	F-B	S-S	V
42	21.2	21.2	24.4	16.3	15.8	22.6

<sup>1</sup>Note: Unit weight and height includes weight and height of curb.

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>P</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2022	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67

### Test Mounting Details

UUT was mounted directly to the seismic table using (12) 3/8"-16 Grade 8 socket cap bolts with flat washers and lock washers.



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



## UNIT UNDER TEST (UUT) Summary Sheet

UUT-5

Test Report: ETL 12695

Model Line	Model Number	Manufacturer
ACRU, VCR, ACSC	330 ACSC	Loren Cook

### 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 dampers and controllers - not tested

### Options / Subcomponent Summary

Motor: WEG 5HP motor 460V three phase; Carbon Steel Roof Curb with a height of 24"

### UUT Properties<sup>1</sup>

Weight [ lbs ]	Dimensions [ in ]			Lowest Nat. Freq. [ Hz ]		
	Length	Width	Height	F-B	S-S	V
479	54.3	54.3	74.4	9.2	9.1	8.8

<sup>1</sup>Note: Unit weight and height includes weight and height of curb.

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>P</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2022	ICC-ES AC156	2.50	1.0	1.5	4.00	3.00	1.67	0.67

### Test Mounting Details

UUT was mounted directly to the seismic table using (40) 3/8"-16 Grade 8 socket cap bolts with flat washers and lock washers.



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: ETL 15331

Model Line	Model Number	Manufacturer
ACRU, VCR, ACSC	70 ACRUD	Loren Cook

### Product Construction Summary

All aluminum housing; Direct drive upblast spun aluminum; Backward inclined aluminum fan wheel; Two piece top cap with 3" height extension Certification excludes dampers - not tested.

### Options / Subcomponent Summary

Motor: Mcmillan 1/6HP motor 120V single phase; Galvanized Carbon Steel Roof Curb with a height of 24"; fan mounted speed control; NEMA 3 Disconnect; Electronically commutated Vari-flow motor; Birdscreen

### UUT Properties<sup>1</sup>

Weight [ lbs ]	Dimensions [ in ]			Lowest Nat. Freq. [ Hz ]		
	Length	Width	Height	F-B	S-S	V
59	17.1	17.1	40.4	12.2	11.4	19.4

<sup>1</sup>Note: Unit weight and height includes weight and height of curb.

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>P</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2022	ICC-ES AC156	1.93	1.0	1.5	3.09	2.32	1.29	0.51

### Test Mounting Details

Fan to curb (hinged base): (15) #12 sheet metal screws (5 per side).

Curb to table: (12) 3/8" grade 8 socket cap bolts with flat washers (3 bolts/washers per side).



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



## UNIT UNDER TEST (UUT) Summary Sheet

UUT-7

Test Report: ETL 15331

Model Line	Model Number	Manufacturer
ACRU, VCR, ACSC	195 VCRD-XP	Loren Cook

### Product Construction Summary

All aluminum housing; Direct drive upblast spun aluminum; Backward inclined aluminum fan wheel; Two piece top cap with stainless steel quick release latches Certification excludes dampers - not tested.

### Options / Subcomponent Summary

Motor: Mcmillan 1/4HP motor 120V single phase; Galvanized Carbon Steel Roof Curb with a height of 24"; fan mounted speed control; NEMA 3 Disconnect; Electronically commutated Vari-flow motor; UL762

### UUT Properties<sup>1</sup>

Weight [ lbs ]	Dimensions [ in ]			Lowest Nat. Freq. [ Hz ]		
	Length	Width	Height	F-B	S-S	V
129	39.5	39.5	57.5	10.4	9.5	9.4

<sup>1</sup>Note: Unit weight and height includes weight and height of curb.

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>P</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2022	ICC-ES AC156	1.93	1.0	1.5	3.09	2.32	1.29	0.51

### Test Mounting Details

Fan to curb (hinged base): (24) #12 sheet metal screws (8 per side).

Curb to table: (24) 3/8" grade 8 socket cap bolts with flat washers (6 bolts/washers per side).



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



## UNIT UNDER TEST (UUT) Summary Sheet

UUT-8

Test Report: ETL 15331

Model Line	Model Number	Manufacturer
ACRU, VCR, ACSC	150 ACRUD	Loren Cook

### Product Construction Summary

All aluminum housing; Direct drive upblast spun aluminum; Backward inclined aluminum fan wheel; Two piece top cap with stainless steel quick release latches (sizes 120-300). Certification excludes dampers - not tested

### Options / Subcomponent Summary

Motor: Marathon 1HP motor 450V three phase; Motor Drive: Yaskawa; Galvanized Carbon Steel Roof Curb with a height of 24"; fan mounted speed control; NEMA 3 Disconnect; Electronically commutated Vari-flow motor; Plastic drain tube; Birdscreen

### UUT Properties<sup>1</sup>

Weight [ lbs ]	Dimensions [ in ]			Lowest Nat. Freq. [ Hz ]		
	Length	Width	Height	F-B	S-S	V
132	34.6	34.6	54.3	8.3	8.0	16.7

<sup>1</sup>Note: Unit weight and height includes weight and height of curb.

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>ds</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2022	ICC-ES AC156	1.93	1.0	1.5	3.09	2.32	1.29	0.51

### Test Mounting Details

Fan to curb: (24) #12 sheet metal screws (6 per side).

Curb to table: (20) 3/8" grade 8 socket cap bolts with flat washers (5 bolts/washers per side).



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



## UNIT UNDER TEST (UUT) Summary Sheet

UUT-9

Test Report: ETL 15331

Model Line	Model Number	Manufacturer
ACRU, VCR, ACSC	300 ACRUD-XP	Loren Cook

### Product Construction Summary

All aluminum housing; Direct drive upblast spun aluminum; Backward inclined aluminum fan wheel; Two piece top cap with stainless steel quick release latches (sizes 120-300). Certification excludes dampers - not tested.

### Options / Subcomponent Summary

Motor: Marathon 5HP motor 460V three phase; Motor Drive: Yaskawa; Galvanized Carbon Steel Roof Curb with a height of 24"; fan mounted speed control; NEMA 3 Disconnect; Plastic drain tube; Birdscreen

### UUT Properties<sup>1</sup>

Weight [ lbs ]	Dimensions [ in ]			Lowest Nat. Freq. [ Hz ]		
	Length	Width	Height	F-B	S-S	V
383	54.3	54.3	65.4	9.0	10.1	16.5

<sup>1</sup>Note: Unit weight and height includes weight and height of curb.

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>P</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2022	ICC-ES AC156	1.93	1.0	1.5	3.09	2.32	1.29	0.51

### Test Mounting Details

Fan to curb: (36) #12 sheet metal screws (9 per side).

Curb to table: (32) 3/8" grade 8 socket cap bolts with flat washers (8 bolts/washers per side).



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



## UNIT UNDER TEST (UUT) Summary Sheet

UUT-10

Test Report: ETL 1900240-TR-001

Model Line	Model Number	Manufacturer
ACRU, VCR, ACSC	490 ACRUB	Loren Cook

### Product Construction Summary

Belt drive upblast spun aluminum ventilator. Aluminum base and aluminum wheel. Certification excludes dampers and controllers - not tested

### Options / Subcomponent Summary

Motor: WEG 7.5HP motor 460V three phase; Carbon Steel Roof Curb with a height of 24"

### UUT Properties<sup>1</sup>

Weight [ lbs ]	Dimensions [ in ]			Lowest Nat. Freq. [ Hz ]		
	Length	Width	Height	F-B	S-S	V
637	76.3	76.3	82.1	4.4	4.4	3.0

<sup>1</sup>Note: Unit weight and height includes weight and height of curb.

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>P</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2022	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	1.33	0.53

### Test Mounting Details

UUT was mounted directly to the seismic table using (28) 3/8" Grade 5 bolts with flat washers and lock washers. Fan was mounted to curb using (52) 3/8" Grade 5 bolts. An additional 1.75" OD aluminum fender washer with galvanized SAE washer was added to each brace bolt at outside of housing.



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