



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@thvmcgroup.com

Title: President



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

**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



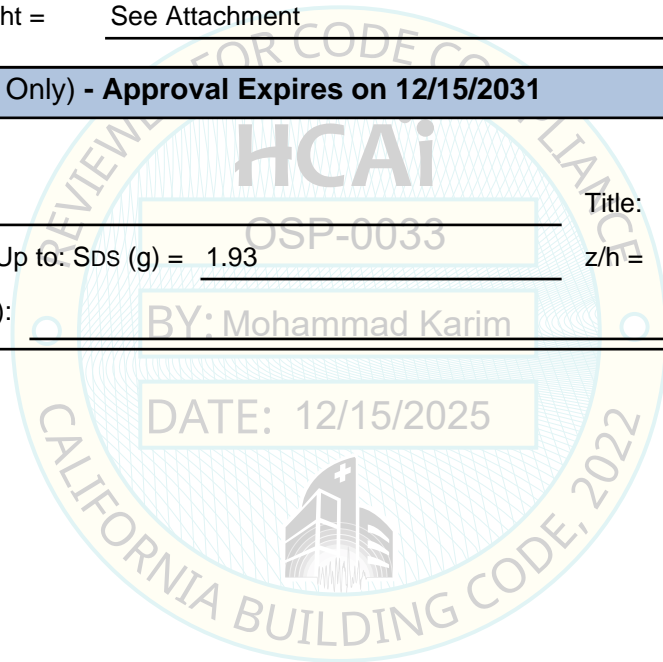
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Seismic Parameters

|  |                |
|--|----------------|
| Design Basis of Equipment or Components ( $F_p/W_p$ ) =          | 1.45           |
| Sds (Design spectral response acceleration at short period, g) = | 1.93           |
| $a_p$ (Amplification factor) =                                   | 2.5            |
| $R_p$ (Response modification factor) =                           | 6.0            |
| $\Omega_0$ (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 12/15/2031

|   |                                      |  |
|---|--------------------------------------|--|
| Date: 12/15/2025  |                                      |  |
| Name: Mohammad Karim                                      | Title: Supervisor, Health Facilities |  |
| Special Seismic Certification Valid Up to: Sds (g) = 1.93 | $z/h$ = 1                            |  |
| Condition of Approval (if applicable):                    |                                      |  |



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

| Model Line  | Model | Dimensions [ in ] |       |                   | Weight [ lb ]   | Manufacturer | Mounting Configuration                    | UUT          |
|---|-------|-------------------|-------|-------------------|-----------------|--------------|---|--------------|
|   |       | Depth             | Width | Height            |                 |              |   |              |
| ACRUD<br>ACRUD-HP<br>ACRUD-XP<br>VCRD<br>VCRD-HP<br>VCRD-XP<br><br>[ 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        |
| ACSC<br>ACSC-HP<br>ACSC-XP<br><br>[ Belt Drive ]                                    | 100   | 25.3              | 25.3  | 42.2              | 76              |              |   | Interpolated |
|   | 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        |
| ACRUB<br>ACRUB-HP<br>ACRUB-XP<br>VCR<br>VCR-HP<br>VCR-XP<br><br>[ Belt Drive ]      | 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 |
|   | 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 birdscreen.

**Table 2: Certified Subcomponents**

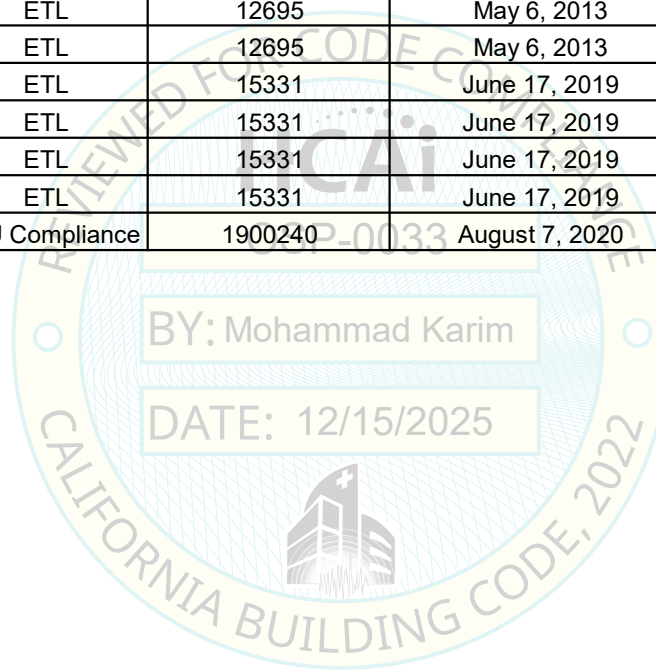
| Component Type | Manufacturer    | Model           | Weight<br>[ lb ] | Material                               | UUT          |
|----------------|-----------------|-----------------|------------------|--|--------------|
| Motor          | Baldor/Reliance | 1/3 HP          | 29               | Copper Windings,<br>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           | $S_{DS}$<br>z/h=0 | $S_{DS}$<br>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              |

BY: Mohammad Karim

DATE: 12/15/2025







# 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<br>[ 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<br>[ 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<br>[ 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<br>[ 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<br>[ 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<br>[ 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<br>[ 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<br>[ 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<br>[ 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.