# APPLICATION FOR HCAI SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

**APPLICATION #: OSP-0612**

## HCAI Special Seismic Certification Preapproval (OSP)

**Type:** ☐ New ☒ Renewal

## Manufacturer Information

Manufacturer: Cummins Power Generation

Manufacturer's Technical Representative: Danielle Malone

Mailing Address: 1400 73rd Avenue NE, Minneapolis, MN 55432

Telephone: (763) 574-3559 Email: danielle.malone@cummins.com

## Product Information

Product Name: Emergency and Standby Power Systems

Product Type: Generators

Product Model Number: See Attachments

General Description: Gas generators consisting of various engines, alternators, enclosures, chassis/skids and controllers.

Mounting Description: Rigid, Floor Mounted

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: 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: DYNAMIC CERTIFICATION LABORATORY (DCL)

Contact Person: Kelly Laplace

Mailing Address: 1315 Greg St., Ste 109, Sparks NV 89431

Telephone: (775) 358-5085 Email: Kelly@shaketest.com

Company Name: UNIVERSITY OF CALIFORNIA, BERKELEY (PEER)

Contact Person: Amarnath Kasalanati

Mailing Address: 1301 S. 46th Street, Building 420, Richmond CA 94804

Telephone: (510) 643-6475 Email: amarnath1@berkley.edu

## Seismic Parameters

Design Basis of Equipment or Components ($F_p/W_p$) = 1.80

$S_{DS}$ (Design spectral response acceleration at short period, g) = 2.50

$a_p$ (Amplification factor) = 1.0

$R_p$ (Response modification factor) = 2.5

$\Omega_0$ (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 10/24/2028

Date: 10/24/2022

Name: Mohammad Karim Title: Supervisor, Health Facilities

Special Seismic Certification Valid Up to: $S_{DS}$ (g) = 2.5 z/h = 1

Condition of Approval (if applicable):

# Table 1 - Certified Product Table - Gas Generator Sets

| Model | Power Rating [ kW ] | RPM | Maximum Dimensions [ in ] | | | Maximum Weight[2] [ lb ] | UUT |
|---|---|---|---|---|---|---|---|
| | | | Length[2] | Width | Height[1,3] | | |
| C20 N6 | 20 | 1,800 | 82 | 34 | 46 | 1,110 | UUT-5 |
| C22 N6 | 22 | 1,800 | 82 | 34 | 46 | 1,150 | Interpolated |
| C25 N6 | 25 | 1,800 | 82 | 34 | 46 | 1,150 | Interpolated |
| C30 N6H | 30 | 3,600 | 82 | 34 | 46 | 1,120 | Interpolated |
| C30 N6 | 30 | 1,800 | 104 | 34 | 46 | 1,300 | Interpolated |
| C36 N6 | 36 | 1,800 | 104 | 34 | 46 | 1,380 | Interpolated |
| C36 N6H | 36 | 3,600 | 104 | 34 | 46 | 1,270 | Interpolated |
| C40 N6 | 40 | 1,800 | 104 | 34 | 46 | 1,400 | Interpolated |
| C40 N6H | 40 | 3,600 | 104 | 34 | 46 | 1,420 | Interpolated |
| C45 N6H | 45 | 3,600 | 104 | 34 | 46 | 1,420 | Interpolated |
| C50 N6H | 50 | 3,600 | 104 | 34 | 46 | 1,420 | Interpolated |
| C60 N6H | 60 | 3,600 | 104 | 34 | 46 | 1,540 | UUT-6 |
| C45 N6 | 45 | 1,800 | 136 | 40 | 58 | 2,580 | UUT-7 |
| C50 N6 | 50 | 1,800 | 136 | 40 | 58 | 2,600 | Interpolated |
| C60 N6 | 60 | 1,800 | 136 | 40 | 58 | 2,900 | Interpolated |
| C70 N6 | 70 | 1,800 | 136 | 40 | 58 | 2,870 | Interpolated |
| C80 N6 | 80 | 1,800 | 136 | 40 | 58 | 3,030 | Interpolated |
| C100 N6 | 100 | 1,800 | 136 | 40 | 58 | 3,170 | UUT-8 |
| C125 N6 | 125 | 1,800 | 160 | 40 | 72 | 3,767 | UUT-11 |
| C150 N6 | 150 | 1,800 | 160 | 40 | 72 | 4,350 | UUT-12 |
| C175 N6 | 175 | 1,800 | 160 | 40 | 72 | 4,663 | Interpolated |
| C200 N6 | 200 | 1,800 | 160 | 40 | 72 | 4,663 | Interpolated |
| C200 N6 | 200 | 1,800 | 113 | 40 | 83 | 4,140 | UUT-14 |

**Notes:**

1. Height for models C45 N6 - C100 N6 is 68-inches for the above-engine muffler configuration.
2. Maximum length and weight assumes a Sound Level 2 (SL2) enclosure.
3. The 83-inch height model C200 N6 test unit includes protuding exhaust/vent pipes.

## Table 2 - Certified Subcomponents - Enclosures

| Model Number | Type | Manufacturer | Material | Dimensions [ in ] | | | Weight [ lb ] | UUT |
|---|---|---|---|---|---|---|---|---|
| | | | | Length | Width | Height | | |
| GD02-P1-ENCL | SL1 | Cummins | 12 Gauge 5052-0 Aluminum and Plastic | 72 | 34 | 46 | 125 | Extrapolated |
| GG02-P1-ENCL | SL2 | | | 82 | 34 | 46 | 132 | UUT-5 |
| GD03C-P2-ENCL | SL1 | | | 94 | 34 | 46 | 145 | Extrapolated |
| GG02-P2-ENCL | SL2 | | | 104 | 34 | 46 | 152 | UUT-6 |
| GG03-P1-ENCL | SL1 | | | 94 | 40 | 46 | 150 | Interpolated[1] |
| GG06-P1-ENCL-SND | SL2 | | | 104 | 40 | 46 | 160 | UUT-7 |
| GG06-P1-ENCL-WTHR | Weather | | | 94 | 40 | 46 | 120 | UUT-8 |
| GG09-P1-ENCL-WTHR | Weather | | 12 Gauge 5052-H32 Aluminum | 113 | 40 | 72 | 244 | UUT-11, UUT-14 |
| GG09-P1-ENCL-S1 | SL1 | | | 142 | 40 | 72 | 319 | Interpolated[1] |
| GG09-P1-ENCL-S2 | SL2 | | | 166 | 40 | 72 | 352 | UUT-12 |

**Notes:**

1. SL1 enclosure type is identical to SL2 type, except SL1 deletes a sound attenuation baffle on the air inlet end. Weather type enclosure is similar to SL1 and SL2 types, but without sound insulation and without inlet and outlet attenuation ducts.

## Table 3 - Certified Subcomponents - Gas Engines

| Model Number | Manufacturer | Size | kW Range | Material | UUT |
|---|---|---|---|---|---|
| 2.4L-NA | Cummins | 2.4L | 20-60 | Cast Iron | UUT-5 |
| 2.4L-T | | | | | Interpolated |
| 2.4L-NA+OC | | | | | |
| 2.4L-T+OC | | | | | UUT-6 |
| 5.9-NA | | 5.9L | 45-50 | | UUT-7 |
| 5.9-T | | | 60-100 | | UUT-8 |
| QSJ8.9G | | 8.9L | 125-150 | | UUT-11, UUT-12 |
| QSJ8.9G-G3 | | | 175-200 | | UUT-14 |

## Table 4 - Certified Subcomponents - Controls

| Model Number | Manufacturer | Material | Applicable kW Range | UUT |
|---|---|---|---|---|
| PCC1.1 | Cummins | Carbon Steel and Plastic | 10-100 | UUT-5, UUT-6, UUT-7, UUT-8 |
| PCC2.3 | | | 50-150 | UUT-11, UUT-12 |
| PCC3.3 | | | 125-200 | UUT-14 |

## Table 5 - Certified Subcomponents - Alternators

| Model Number | Manufacturer | Material | Alternator Phase | | Max Weight [ lb ] | UUT |
|---|---|---|---|---|---|---|
| | | | Certified | Tested | | |
| CA115-D14 | Cummins | Copper Windings w/ Steel Lamination; Steel and Aluminum Frame | Single or Three | N/A | 203 | Extrapolated |
| CA115-H14 | | | | Three | 254 | UUT-5 |
| CA115-J12 | | | | N/A | 276 | Interpolated |
| CA115-J14 | | | | N/A | 276 | |
| CA115-M12 | | | | N/A | 309 | |
| CA115-L14 | | | | N/A | 315 | |
| CA115-P12 | | | | N/A | 331 | |
| CA115-P14 | | | | N/A | 331 | |
| CA115-R12 | | | | N/A | 340 | |
| CA115-R14 | | | | N/A | 353 | |
| CA115-S14 | | | | N/A | 353 | |
| CA115-T12 | | | | N/A | 386 | |
| CA115-V14 | | | | N/A | 401 | |
| CA125-G14 | | | | N/A | 463 | |
| CA125-J14 | | | | N/A | 485 | |
| CA125-L14 | | | | N/A | 522 | |
| CA135-E12 | | | | Three | 536 | UUT-6 |
| CA125-P14 | | | | N/A | 639 | Extrapolated |
| UC224D | | Copper Windings w/ Steel Lamination; Steel Frame | | N/A | 627 | Extrapolated |
| UC224E | | | | Single | 684 | UUT-7 |
| UC224F | | | | N/A | 741 | Interpolated |
| UC224G | | | | N/A | 843 | |
| UC274C | | | | N/A | 893 | |
| UC274D | | | | N/A | 948 | |
| UC274E | | | | Three | 1,082 | UUT-11 |
| UC274F | | | | Three | 1,166 | UUT-8 |
| UC274G | | | | N/A | 1,276 | Interpolated |
| UC274H | | | | N/A | 1,378 | |
| UC274K | | | | Single | 1,603 | UUT-14 |
| UC274J | | | | Single | 1,603 | UUT-12 |

## Table 6 - Certified Subcomponents - Radiators

| Model Number | Manufacturer | Material | Dimensions [ in ] | | | Weight [ lb ] | UUT |
|---|---|---|---|---|---|---|---|
| | | | Height | Width | Depth | | |
| A044D176 | Enterex | Tank: Nylon 6 Core: Aluminum | 25.9 | 21.3 | 2.6 | 20 | UUT-5 |
| A042V597 | | | 29.3 | 28.2 | 3.3 | 18 | Interpolated |
| A042V593 | | | 29.3 | 28.2 | 3.3 | 22 | UUT-6 |
| A048U087 | | | 42 | 30.4 | 3 | 36 | UUT-7, UUT-8 |
| A058F021 | | | 42 | 30.4 | 3 | 36 | UUT-11, UUT-12 |
| A066X580 | Tata Toyo Radiator Ltd. (TTRL) | | 7.2 | 32.8 | 31.8 | 48 [1] | UUT-15 |
| A066X602 | | | 7.5 | 32.8 | 30.5 | 49 | Interpolated |
| A066X607 | | | 11.6 | 32.8 | 31.8 | 58 | |
| A066X609 | | | 12.9 | 32.8 | 31.8 | 68 | |
| A066X613 | | | 11.1 | 32.8 | 35 | 62 | |
| A066X617 | | | 12.9 | 32.8 | 35 | 75 [1] | UUT-16 |
| A052Y063, A048F760 | Modine | | 17.1 | 36 | 51.6 | 202 [1] | UUT-17 |
| A053Y720, A055E514 | | | 17.1 | 36 | 51.6 | 203 | Interpolated |
| A059U352 | | | 17.1 | 36 | 51.6 | 210 [1] | UUT-14, UUT-18 |

**Notes:**

1. Tested UUT-weights include skid weight

## Table 7 - Certified Subcomponents - Mufflers

| Model Number | Manufacturer | Location | Material | Dimensions [ in ] | | | Weight [ lb ] | UUT |
|---|---|---|---|---|---|---|---|---|
| | | | | Height | Width | Depth | | |
| A048F931 | Nelson | Above Engine | 18 Ga. Aluminized Carbon Steel | 20.5 | 7.9 | 5.1 | 35.3 | UUT-8 |
| A050B660 | | In Front of Radiator | 22 Ga. Dual Wall Aluminized Carbon Steel | 32.8 | 13.7 | 7.4 | 27.6 | UUT-7 |
| A053S158 | | Above Engine | 14 Ga. Aluminized Carbon Steel | 26.5 | 14.6 | 12 | 60 | UUT-11, UUT-14 |
| A053S148 | | In Front of Radiator | 22 Ga. Dual Wall Aluminized Carbon Steel | 31.1 | 20.5 | 16.1 | 70 | UUT-12 |
| A043T869 | Cummins | In Front of Radiator | 20 Ga. Aluminized Carbon Steel | 32.8 | 13.7 | 7.4 | 27.6 | UUT-5 |
| A043T871 | | | | 32.8 | 13.7 | 10 | 35.3 | UUT-6 |

## Table 8 - Certified Subcomponents - Chassis

| Model Number | Manufacturer | Material | Dimensions [ in ] | | | UUT |
|---|---|---|---|---|---|---|
| | | | Height | Width | Depth | |
| GD02-P1-SKID | Cummins | 10 Ga. Carbon Steel; Self Piercing Rivet Joints | 65.7 | 32.6 | 4.5 | Extrapolated |
| GG02-P1-SKID | | | 65.7 | 32.6 | 4.5 | UUT-5 |
| GD03C-P2-SKID | | | 87.6 | 32.6 | 4.5 | Extrapolated |
| GG02-P2-SKID | | | 87.6 | 32.6 | 4.5 | UUT- 6 |
| GG06-P1-SKID | | | 98 | 40 | 6.7 | UUT-7, UUT-8 |
| GG09-P1-SKID | | | 113 | 40 | 6.7 | UUT-11, UUT-12, UUT-14 |

# UNIT UNDER TEST (UUT)
## Summary Sheet

**UUT-5**

DCL 77789-1301

| Model Line | Model Number | Manufacturer |
|---|---|---|
| Gas Generator Sets | C20 N6 | Cummins |

**Product Construction Summary**

12 Gauge 5052-0 Aluminum and Plastic Enclosure, 10 Gauge Carbon Steel Skid with Self Piercing Rivet Joints

**Options / Subcomponent Summary**

Engine: Cummins; Radiator: Enterex; Chassis: Cummins; Alternator: Cummins; Muffler: Cummins; Enclosure: Cummins

**UUT Properties**

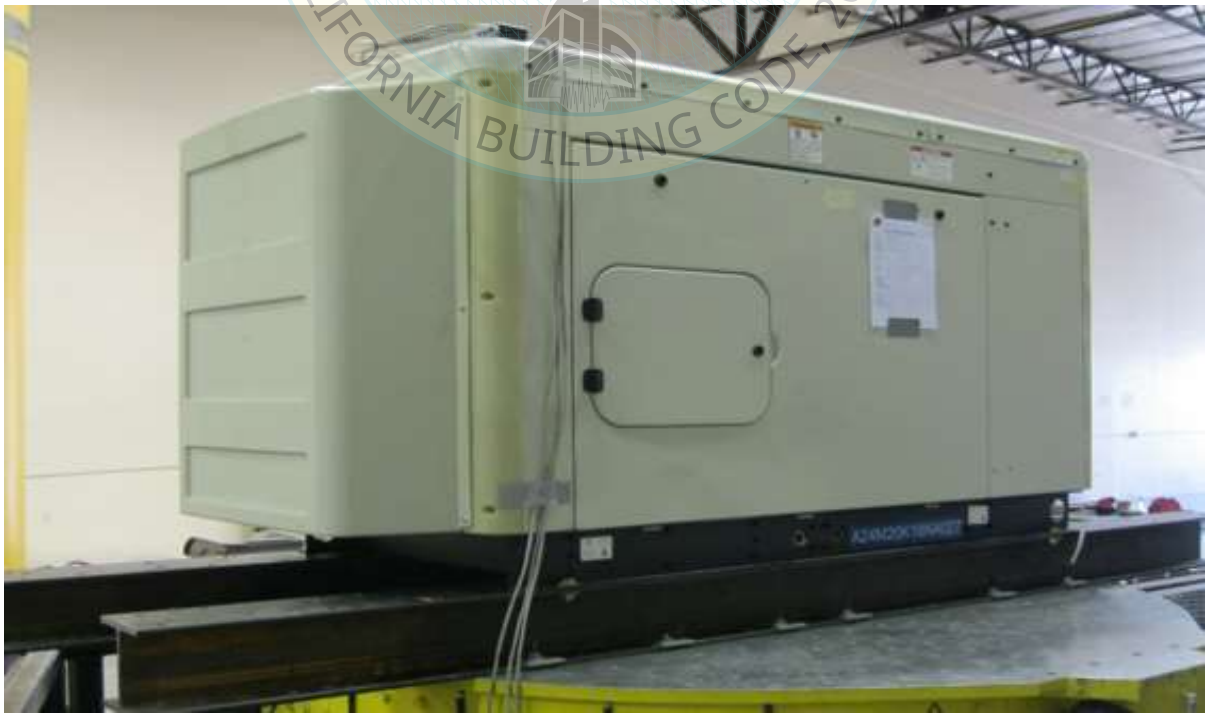
| Weight [ lbs ] | Dimensions [ in ] | | | Lowest Nat. Freq. [ Hz ] | | |
|---|---|---|---|---|---|---|
| | Length | Width | Height | F-B | S-S | V |
| 1,090 | 82.0 | 34.0 | 46.0 | 9.5 | 7.8 | 19.3 |

**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 2019 | ICC-ES AC156 | 2.50 | 1.00 | 1.50 | 4.00 | 3.00 | 1.67 | 0.67 |

**Test Mounting Details**

UUT was mounted to the fixture using four (4) 5/8" 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**

DCL 77789-1301

| Model Line | Model Number | Manufacturer |
|---|---|---|
| Gas Generator Sets | C60 N6H | Cummins |

**Product Construction Summary**

12 Gauge 5052-0 Aluminum and Plastic Enclosure, 10 Gauge Carbon Steel Skid with Self Piercing Rivet Joints

**Options / Subcomponent Summary**

Engine: Cummins; Radiator: Enterex; Chassis: Cummins; Alternator: Cummins; Muffler: Cummins; Enclosure: Cummins

**UUT Properties**

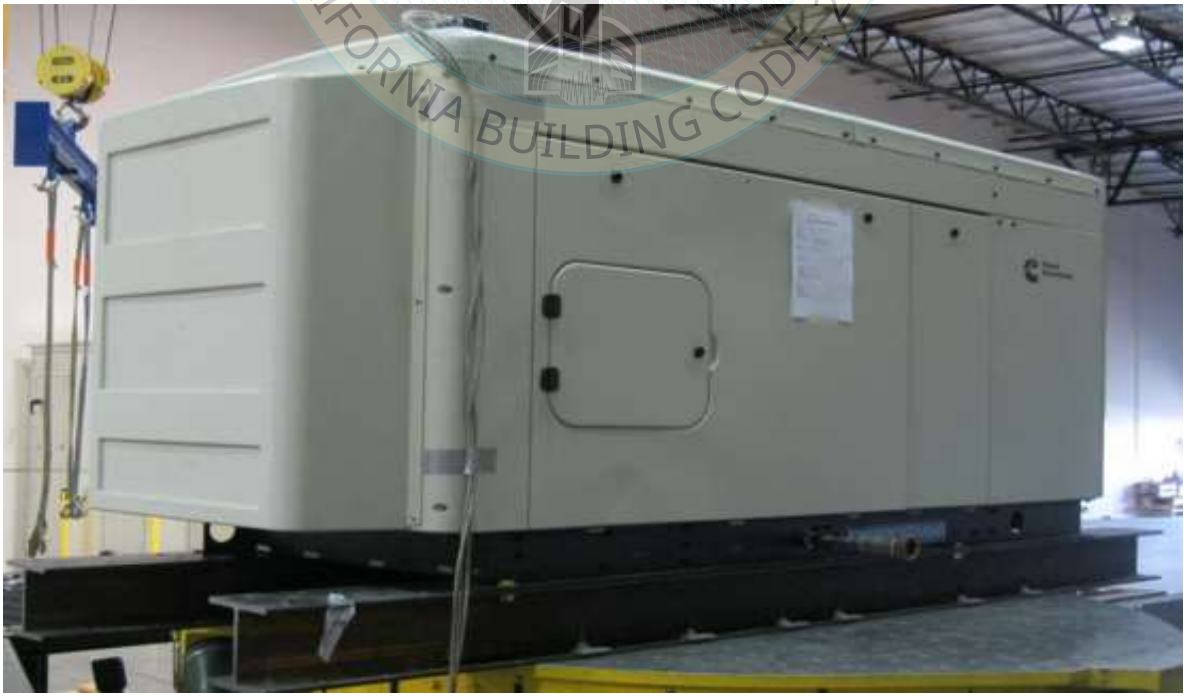
| Weight [ lbs ] | Dimensions [ in ] | | | Lowest Nat. Freq. [ Hz ] | | |
|---|---|---|---|---|---|---|
| | Length | Width | Height | F-B | S-S | V |
| 1,530 | 104.0 | 34.0 | 46.0 | 8.3 | 6.5 | 16.8 |

**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 2019 | ICC-ES AC156 | 2.50 | 1.00 | 1.50 | 4.00 | 3.00 | 1.67 | 0.67 |

**Test Mounting Details**

UUT was mounted to the fixture using four (4) 5/8" 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-7**

DCL 31272-1501b

| Model Line | Model Number | Manufacturer |
|---|---|---|
| Gas Generator Sets | C45 N6 | Cummins |

**Product Construction Summary**

12 Gauge 5052-0 Aluminum and Plastic Enclosure, 10 Gauge Carbon Steel Skid with Self Piercing Rivet Joints

**Options / Subcomponent Summary**

Engine: Cummins; Radiator: Enterex; Chassis: Cummins; Alternator: Cummins; Muffler: Cummins; Enclosure: Cummins

**UUT Properties**

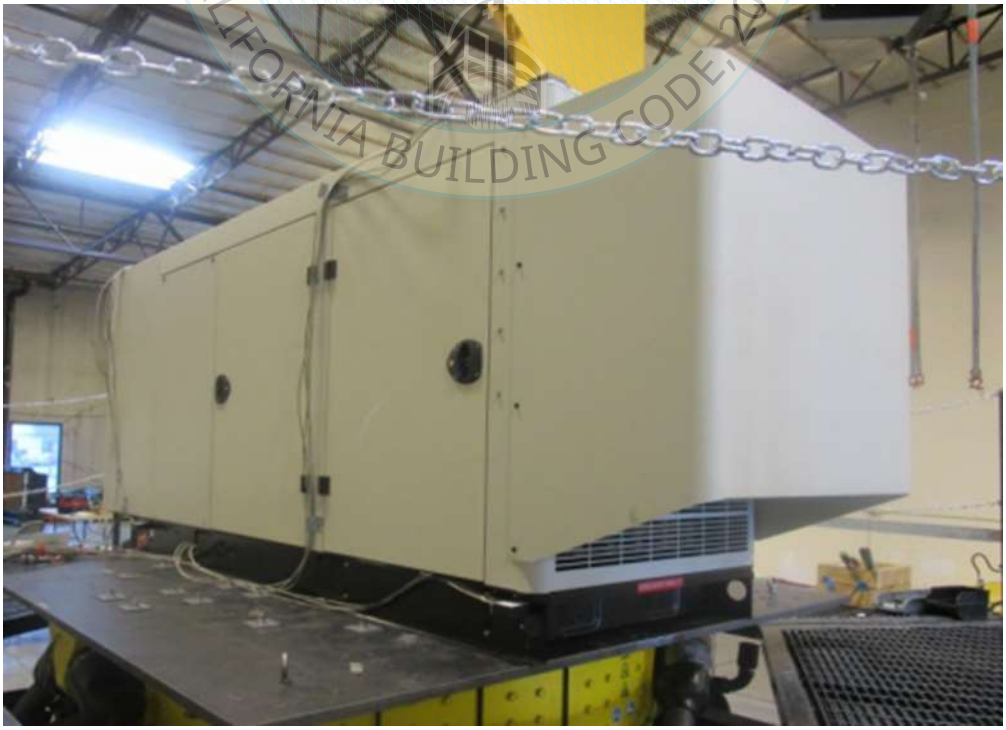
| Weight [ lbs ] | Dimensions [ in ] | | | Lowest Nat. Freq. [ Hz ] | | |
|---|---|---|---|---|---|---|
| | Length | Width | Height | F-B | S-S | V |
| 2,580 | 136.0 | 40.0 | 58.0 | 8.3 | 3.5 | 12.8 |

**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 2019 | ICC-ES AC156 | 2.50 | 1.00 | 1.50 | 4.00 | 3.00 | 1.67 | 0.67 |

**Test Mounting Details**

UUT was mounted to the fixture using four (4) 5/8" 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-8**

DCL 31272-1501b

| Model Line | Model Number | Manufacturer |
|---|---|---|
| Gas Generator Sets | C100 N6 | Cummins |

**Product Construction Summary**

12 Gauge 5052-0 Aluminum and Plastic Enclosure, 10 Gauge Carbon Steel Skid with Self Piercing Rivet Joints

**Options / Subcomponent Summary**

Engine: Cummins; Radiator: Enterex; Chassis: Cummins; Alternator: Cummins; Muffler: Cummins; Enclosure: Cummins

**UUT Properties**

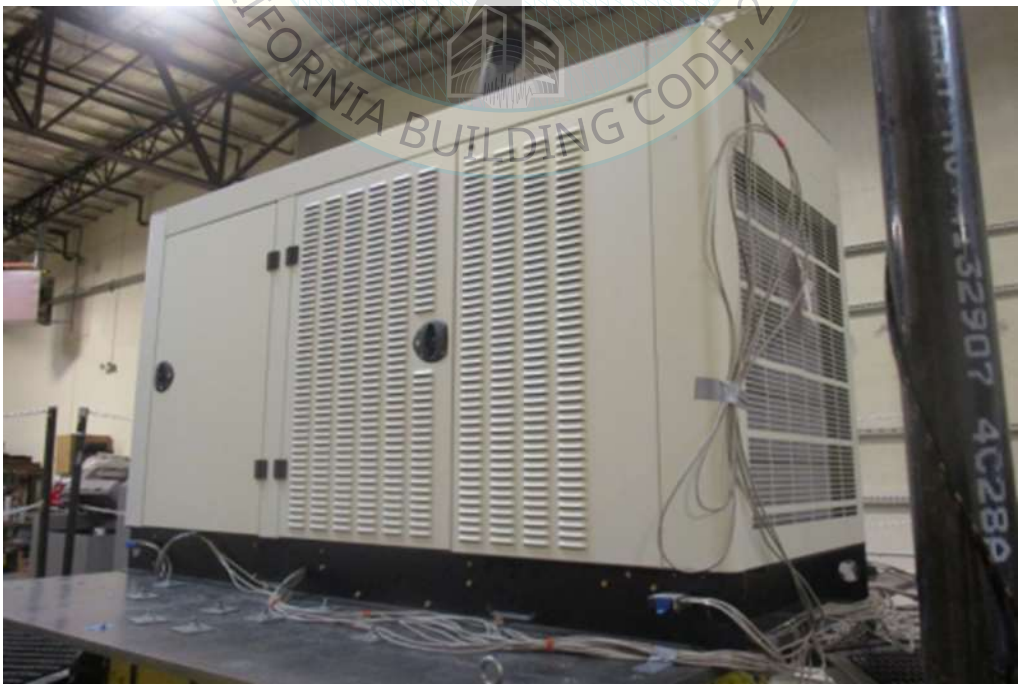
| Weight [ lbs ] | Dimensions [ in ] | | | Lowest Nat. Freq. [ Hz ] | | |
|---|---|---|---|---|---|---|
| | Length | Width | Height | F-B | S-S | V |
| 3,110 | 98.0 | 40.0 | 58.0 | 7.8 | 6.8 | 13.0 |

**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 2019 | ICC-ES AC156 | 2.50 | 1.00 | 1.50 | 4.00 | 3.00 | 1.67 | 0.67 |

**Test Mounting Details**

UUT was mounted to the fixture using four (4) 5/8" 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-11**

DCL 14849-1601

| Model Line | Model Number | Manufacturer |
|---|---|---|
| Gas Generator Sets | C125 N6 | Cummins |

**Product Construction Summary**

12 Gauge 5052-H32 Aluminum and Plastic Enclosure, 10 Gauge Carbon Steel Skid with Self Piercing Rivet Joints

**Options / Subcomponent Summary**

Engine: Cummins; Radiator: Enterex; Chassis: Cummins; Alternator: Cummins; Muffler: Nelson; Enclosure: Cummins; Controller: Cummins

**UUT Properties**

| Weight [ lbs ] | Dimensions [ in ] | | | Lowest Nat. Freq. [ Hz ] | | |
|---|---|---|---|---|---|---|
| | Length | Width | Height | F-B | S-S | V |
| 3,566 | 113.0 | 40.0 | 71.5 | 9.5 | 4.8 | 14.3 |

**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 2019 | ICC-ES AC156 | 2.50 | 1.00 | 1.50 | 3.20 | 3.00 | 1.67 | 0.67 |

**Test Mounting Details**

UUT was mounted to the fixture using six (6) 5/8" 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-12**

DCL 14849-1601

| Model Line | Model Number | Manufacturer |
|---|---|---|
| Gas Generator Sets | C150 N6 | Cummins |

**Product Construction Summary**

12 Gauge 5052-H32 Aluminum and Plastic Enclosure, 10 Gauge Carbon Steel Skid with Self Piercing Rivet Joints

**Options / Subcomponent Summary**

Engine: Cummins; Radiator: Enterex; Chassis: Cummins; Alternator: Cummins; Muffler: Nelson; Enclosure: Cummins; Controller: Cummins

**UUT Properties**

| Weight [ lbs ] | Dimensions [ in ] | | | Lowest Nat. Freq. [ Hz ] | | |
|---|---|---|---|---|---|---|
| | Length | Width | Height | F-B | S-S | V |
| 4,350 | 160.0 | 40.0 | 71.5 | 8.0 | 3.3 | 13.8 |

**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 2019 | ICC-ES AC156 | 2.50 | 1.00 | 1.50 | 3.20 | 3.00 | 1.67 | 0.67 |

**Test Mounting Details**

UUT was mounted to the fixture using six (6) 5/8" 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-14**

DCL 17317-2101

| Model Line | Model Number | Manufacturer |
|---|---|---|
| Gas Generator Sets | C200 N6 | Cummins |

**Product Construction Summary**

12 Gauge 5052-H32 Aluminum and Plastic Enclosure, 10 Gauge Carbon Steel Skid with Self Piercing Rivet Joints

**Options / Subcomponent Summary**

Engine: Cummins; Radiator: Modine; Chassis: Cummins; Alternator: Cummins; Muffler: Nelson; Enclosure: Cummins; Controller: Cummins

**UUT Properties**

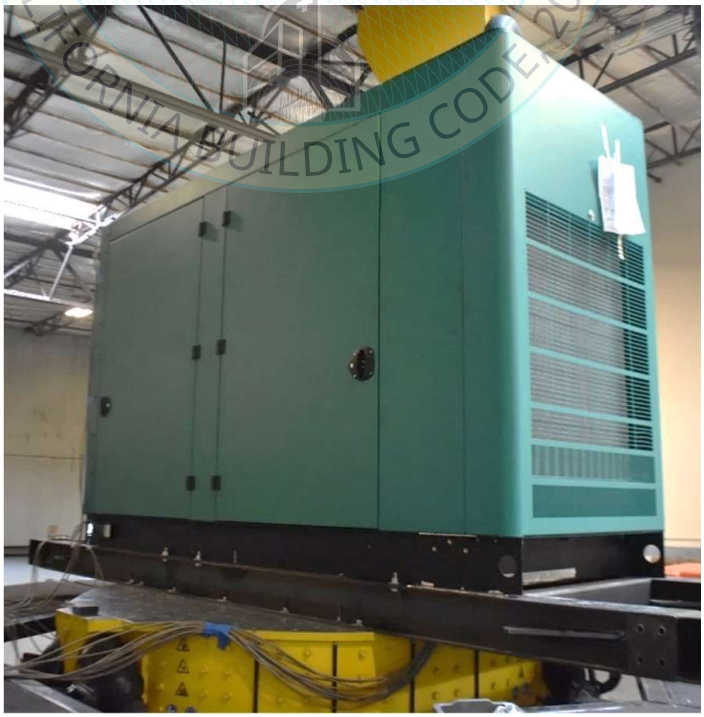
| Weight [ lbs ] | Dimensions [ in ] | | | Lowest Nat. Freq. [ Hz ] | | |
|---|---|---|---|---|---|---|
| | Length | Width | Height | F-B | S-S | V |
| 4,140 | 113.0 | 40.0 | 83.0 | 4.6 | 7.7 | 14.0 |

**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 2019 | ICC-ES AC156 | 2.50 | 1.00 | 1.50 | 4.00 | 3.00 | 1.67 | 0.67 |

**Test Mounting Details**

UUT was mounted to the fixture using six (8) 5/8" grade 5 bolts.



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

# UNIT UNDER TEST (UUT)
## Summary Sheet

**UUT-15**

DCL 35261-2101b; UUT-1

| Model Line | Model Number | Manufacturer |
|---|---|---|
| Radiator for Gas Generator Sets | A066X580 | Tata Toyo Radiator Ltd. |

**Product Construction Summary**

Nylon Tank; Aluminum Core
Note: Shall be installed with generator set, all connections to the generator set shall be flexible

**Options / Subcomponent Summary**

Radiator Only Dimensions:
Weight: 48 lbs.
LxWxL: 7.2" x 32.8" x 31.8"

**UUT Properties**

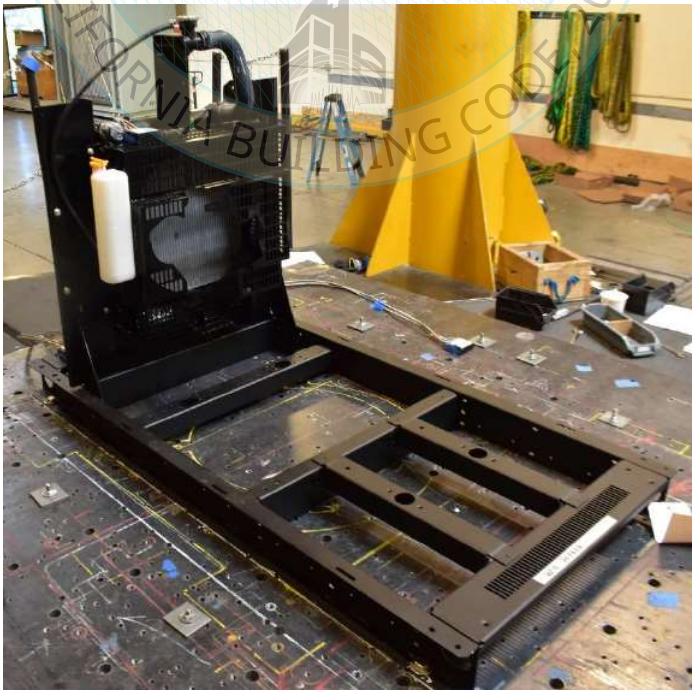
| Weight [ lbs ] | Dimensions [ in ] | | | Lowest Nat. Freq. [ Hz ] | | |
|---|---|---|---|---|---|---|
| | Length | Width | Height | F-B | S-S | V |
| 170 | 66.0 | 34.0 | 46.0 | >33.3 | 16.0 | >33.3 |

**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 2019 | ICC-ES AC156 | 2.50 | 1.00 | 1.50 | 3.20 | 3.00 | 1.67 | 0.67 |

**Test Mounting Details**

Radiator attached to skid with (10) M12 Class 8.8 bolts. Skid attached directly to shake table using (4) 5/8" 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-16**

DCL 35261-2101b; UUT-2

| Model Line | Model Number | Manufacturer |
|---|---|---|
| Radiator for Gas Generator Sets | A066X617 | Tata Toyo Radiator Ltd. |

**Product Construction Summary**

Nylon Tank; Aluminum Core
Note: Shall be installed with generator set, all connections to the generator set shall be flexible

**Options / Subcomponent Summary**

Radiator Only Dimensions:
Weight: 75 lbs.
LxWxL: 12.9" x 32.8" x 35"

**UUT Properties**

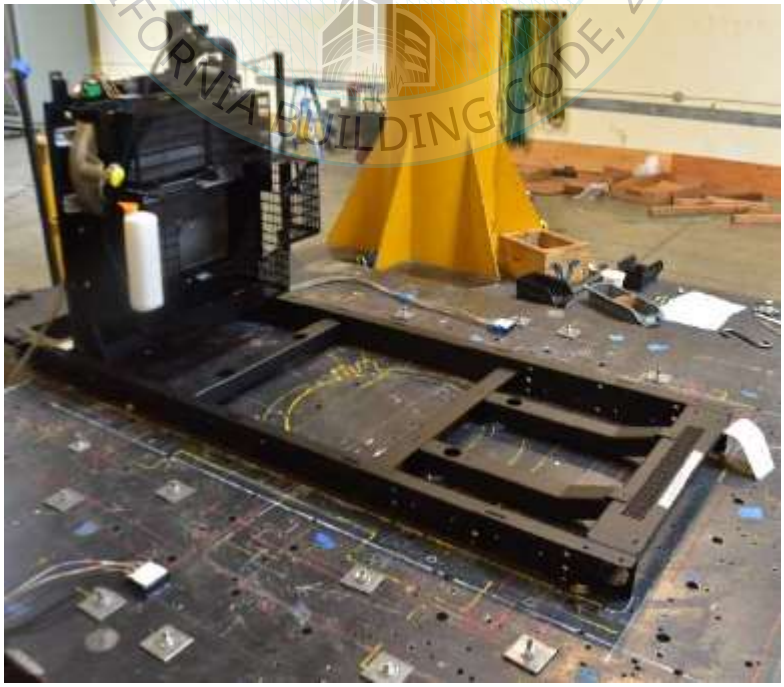
| Weight [ lbs ] | Dimensions [ in ] | | | Lowest Nat. Freq. [ Hz ] | | |
|---|---|---|---|---|---|---|
| | Length | Width | Height | F-B | S-S | V |
| 230 | 87.5 | 34.0 | 46.0 | 24.5 | 14.5 | >33.3 |

**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 2019 | ICC-ES AC156 | 2.50 | 1.00 | 1.50 | 3.20 | 3.00 | 1.67 | 0.67 |

**Test Mounting Details**

Radiator attached to skid with (10) M12 Class 8.8 bolts. Skid attached directly to shake table using (4) 5/8" 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-17**

DCL 35261-2101b, UUT-3

| Model Line | Model Number | Manufacturer |
|---|---|---|
| Radiator for Gas Generator Sets | A052Y063 | Modine |

**Product Construction Summary**

Nylon Tank; Aluminum Core
Note: Shall be installed with generator set, all connections to the generator set shall be flexible

**Options / Subcomponent Summary**

Radiator Only Dimensions:
Weight: 202 lbs.
LxWxL: 17.1" x 36" x 51.6"

**UUT Properties**

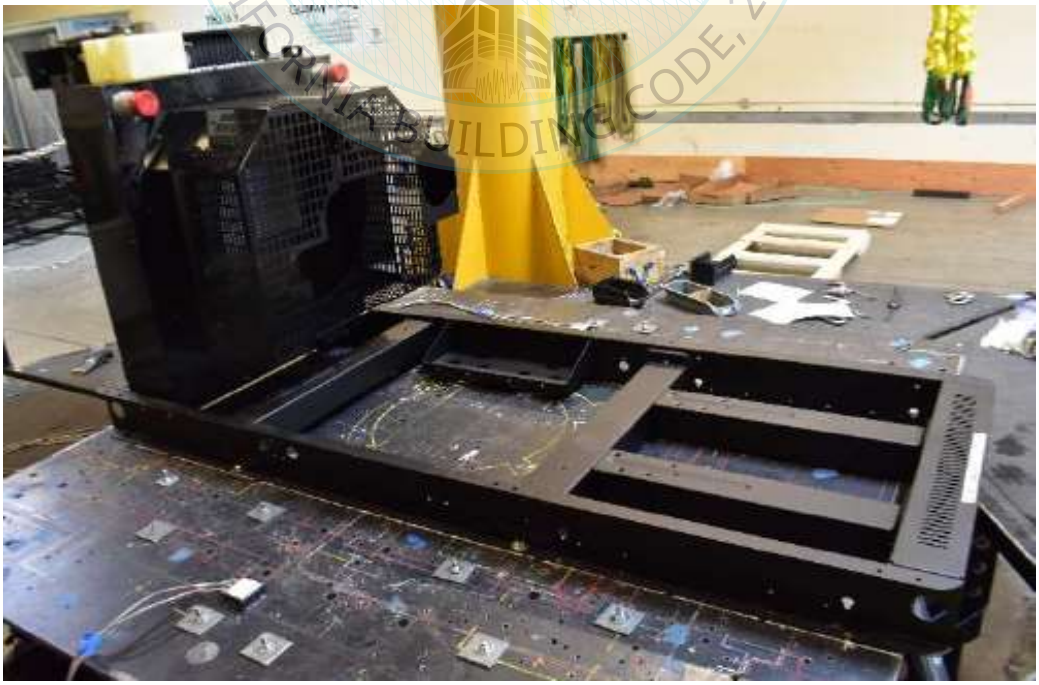
| Weight [ lbs ] | Dimensions [ in ] | | | Lowest Nat. Freq. [ Hz ] | | |
|---|---|---|---|---|---|---|
| | Length | Width | Height | F-B | S-S | V |
| 340 | 98.0 | 40.0 | 51.0 | 10.5 | 7.5 | 28.5 |

**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 2019 | ICC-ES AC156 | 2.50 | 1.00 | 1.50 | 3.20 | 3.00 | 1.67 | 0.67 |

**Test Mounting Details**

Radiator attached to skid with (6) M12 Class 8.8 bolts. Skid attached directly to shake table using (4) 5/8" 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-18**

DCL 35261-2101b; UUT-4

| Model Line | Model Number | Manufacturer |
|---|---|---|
| Radiator for Gas Generator Sets | A059U352 | Modine |

**Product Construction Summary**

Nylon Tank; Aluminum Core
Note: Shall be installed with generator set, all connections to the generator set shall be flexible

**Options / Subcomponent Summary**

Radiator Only Dimensions:
Weight: 210 lbs.
LxWxL: 17.1" x 36" x 51.6"

**UUT Properties**

| Weight [ lbs ] | Dimensions [ in ] | | | Lowest Nat. Freq. [ Hz ] | | |
|---|---|---|---|---|---|---|
| | Length | Width | Height | F-B | S-S | V |
| 390 | 113.0 | 40.0 | 55.0 | 8.0 | 15.0 | >33.3 |

**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 2019 | ICC-ES AC156 | 2.50 | 1.00 | 1.50 | 3.20 | 3.00 | 1.67 | 0.67 |

**Test Mounting Details**

Radiator attached to skid with (6) M12 Class 8.8 bolts. Skid attached directly to shake table using (6) 5/8" Grade 8 bolts.

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