APPLICATION FOR HCAI SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0836

HCAI Special Seismic Certification Preapproval (OSP)

Type: [X] New [ ] Renewal

Manufacturer Information

Manufacturer: Cummins Power Generation

Manufacturer's Technical Representative: Vyshnav Reveendran

Mailing Address: 1400, Fridley, MN 55432

Telephone: (763) 586-3000 Email: Vyshnav.Raveendran@cummins.com

Product Information

Product Name: Power Generator Systems

Product Model Number(s): DQDAA, B, C & DQCA, B, C & DQFAA, B, C, D, H

Product Category: Emergency and Standby Power Systems

Product Sub-Category: Generators

General Description: 250-1000 kW Open Diesel Powered Generators; off tank.

Mounting Description: Rigid Base Mounted or Externally isolated Base 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: 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: UNIVERSITY OF CALIFORNIA, BERKELEY (PEER)

Contact Person: Amarnath Kasalanati

Mailing Address: 325 Davis Hall, Berkeley CA 94720-1729

Telephone: (510) 642-3437 Email: amarnath1@berkley.edu

Company Name: UNIVERSITY OF NEVADA, RENO (UNR)

Contact Person: Patrick Laplace

Mailing Address: 1664 N. Virginia Street, Reno NV 89557

Telephone: (775) 784-8080 Email: plaplace@unr.edu

Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 1.4 (Rigid); 4.4 (Isolated)

S_{DS} (Design spectral response acceleration at short period, g) = 1.94

a_p (Amplification factor) = Rigid: 1.0; Isolated: 2.5

R_p (Response modification factor) = Rigid: 2.5; Isolated: 2.0

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height ratio factor) = 1 and 0

Natural frequencies (Hz) = See Attachment

Overall dimensions and weight = See Attachment

HCAI Approval (For Office Use Only) - Approval Expires on 02/04/2031

Date: 2/4/2025

Name: Mohammad Karim Title: Supervisor, Health Facilities

Special Seismic Certification Valid Up to: S_{DS} (g) = 1.94 z/h = 1

Condition of Approval (if applicable):

Table 1 - Gensets Off Tanks

Model	Rating [kW]	Configuration	Max Dimensions [in]			Max Weight [lb]	Mounting	UUT
			Length	Width	Height			
DQDAC	300	Open	119	50	66	5,113	Rigid	UUT-01
DQDAA, B, C	250, 275, 300	Open	119	50	66	5,113	Rigid/Isolated	Interpolated
DQCA, B, C	600, 750, 800	Open	173	73	81	15,247	Rigid/Isolated	Interpolated
DQFAA, B, C, D, H	750, 800, 900, 1000	Open	179	79	92	16,850	Rigid/Isolated	Interpolated
DQFAD	1000	Open	178.4	78.9	91.3	16,850	Isolated	UUT-14

Table 2 - Gensets On Tanks

Model	Rating [kW]	Configuration	Max Dimensions [in]			Max Weight[1] [lb]	Mounting	UUT
			Length	Width	Height			
DQDAC	300	Enclosed	222	86	104	14,250	Rigid	UUT-03

Notes

1. Weights include genset, enclosure, fuel tank, and, fuel

Table 3 - Certified Subcomponents: Engine Matrix

Manufacturer	Model	Applicable Genset Models	Material	Max. Weight [lb]	UUT
Cummins	QSL9-G7	DQDAA, B, C	Cast Iron	1,627	UUT-01
	QSK23	DQCA, B, C	Cast Iron	6,170	Interpolated
	QST30	DQFAA, B, C, D, H	Cast Iron	6,860	UUT-14

Note: Listed engine models are not interchangeable

Table 4 - Certified Subcomponents: Alternator Matrix

Manufacturer	Model	Applicable Genset Models	Material	Max. Weight [lb]	UUT
Cummins	HC4	DQDAA, B, C	Steel Laminations & Copper Windings	2,582	UUT-01
	S6	DQCA, B, C, DQFAA, B, C, D	Steel Laminations & Copper Windings	5,128	UUT-14

Table 5 - Certified Subcomponents: Radiator Matrix

Manufacturer	Core Size [ft]	Applicable Genset Models	Material		Max. Weight [lb]	UUT
			Core (fin + tube)	Supporting		
AKG	10	DQDAA, B, C	Aluminum + Aluminum	Carbon Steel	464	UUT-03
	26	DQCA, B, C	Aluminum + Aluminum	Carbon Steel	1,303	Interpolated
	34	DQFAA, B, C, D, H	Aluminum + Aluminum	Carbon Steel	1,614	UUT-14
Bearward	7	DQDAC	Aluminum + Aluminum	Carbon Steel	418	UUT-1

Table 6 - Certified Subcomponents: Controller Matrix

Manufacturer	Model	Applicable Genset Models	Material	Max. Weight [lb]	UUT
Cummins	PCC2100	DQDAA, B, C	Carbon Steel and Plastic	10	UUT-01
	PC 2.3	DQCA, B, C	Carbon Steel and Plastic	90	Interpolated
	PC 3.3	DQCA, B, C, DQFAA, B, C, D, H	Carbon Steel and Plastic	90	UUT-14

Table 7 - Certified Miscellanous Subcomponents

Component [Manufacturer]	Model	Applicable Genset Models	Material	Max. Weight [lb]	UUT
Enclosure [Cummins]	Thor-I	DQDAC	Carbon Steel	4,398	UUT-3
Tank [Henning]	270 Gallon	DQDAC	Carbon Steel	3,988	UUT-3

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-1

Test Report: PEI-PEER-CUM-130; UUT-30

Model Line	Model Number	Manufacturer
DQDAx	DQDAC	Cummins

Product Construction Summary

Carbon Steel Skid

Options / Subcomponent Summary

Engine: Cummins; Alternator: Cummins; Radiator: Bearward; Controller: Cummins

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
5,113	119.0	50.0	66.0	3.5	6.2	11.1

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	2.40	-	-
		2.48	0.0	1.5	-	-	1.66	0.67

Test Mounting Details

UUT-1 was rigidly mounted to the shake table using (4) 3/4" diameter 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-3

Test Report: VMA-45782-01E; UUT-1

Model Line	Model Number	Manufacturer
DQDAx	DQDAC-QSL9-G7	Cummins

Product Construction Summary

Strucutural Carbon Steel Skid and Carbon Steel Sheet Metal Enclosure

Options / Subcomponent Summary

Engine: Cummins; Alternator: Cummins; Radiator: AKG; Controller: Cummins; Enclosure: Cummins; Fuel Tank: Henning

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
14,250	222.0	86.0	104.0	5.5	4.3	9.3

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	2.40	-	-
		2.50	0.0	1.5	-	-	1.68	0.68

Test Mounting Details

Genset secured to fuel tank using (4) 3/4" diameter Grade 5 bolts. Fuel tank secured to fixture using (12) 1" 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-14

Test Report: DCL 25367-2401

Model Line	Model Number	Manufacturer
DQFAx	DQFAD	Cummins

Product Construction Summary

Carbon Steel Skid

Options / Subcomponent Summary

Engine: Cummins; Alternator: Cummins; Radiator: AKG; Controller: Cummins

UUT Properties

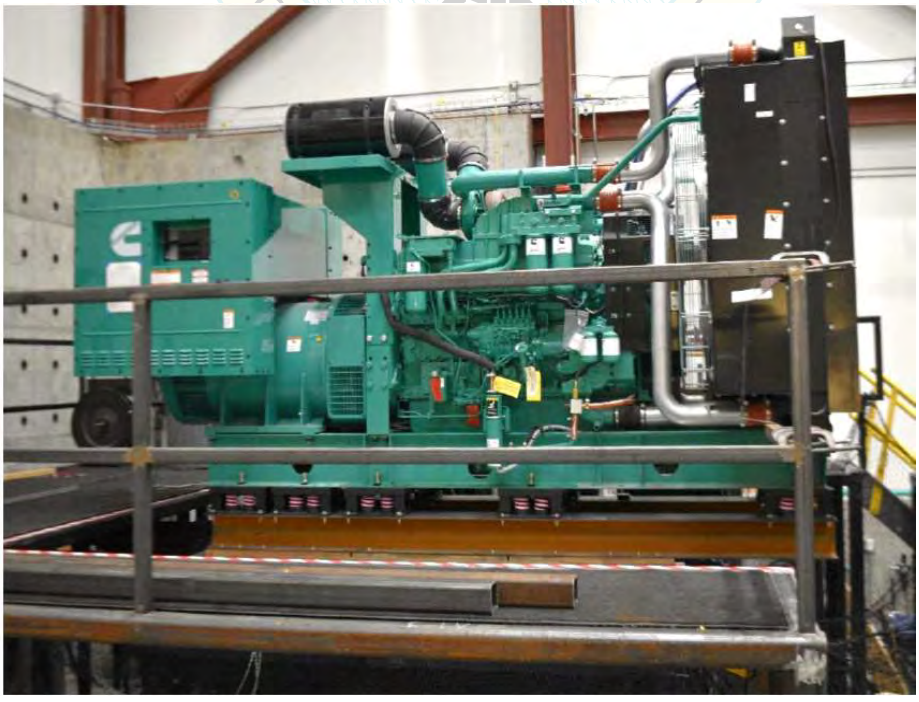
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
16,850	178.4	78.9	91.3	11.0	4.0	19.5

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 2022	ICC-ES AC156	1.94	1.0	1.5	3.10	2.33	1.30	0.52
		1.94	0.0	1.5	-	-	1.30	0.52

Test Mounting Details

UUT-14 was isolated using (10) VMC Group M2SSH-1E-3400 spring isolators. The isolators were connected to the equipment using (1) 3/4" Grade 8 bolt each, and were connected to the shake table using (4) 15/16" diameter Grade 8 bolts per isolator.



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