



DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
FACILITIES DEVELOPMENT DIVISION

APPLICATION FOR HCAI SPECIAL SEISMIC
CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0747

HCAI Special Seismic Certification Preapproval (OSP)

Type: New Renewal

Manufacturer Information

Manufacturer: Cummins Power Generation

Manufacturer's Technical Representative: Abhishek Patil

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

Telephone: (763) 574-5000 Email: abhishek.patil@cummins.com

Product Information

Product Name: Emergency and Standby Power Systems

Product Type: Generators

Product Model Number: QSK38 and QSK50

General Description: Diesel generator sets without tanks or enclosures

Mounting Description: Spring Vibration Isolated, 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: VMC Group

Contact Person: John Giuliano

Mailing Address: Main Street, Bloomingdale, NJ 07403

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

Title: President





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

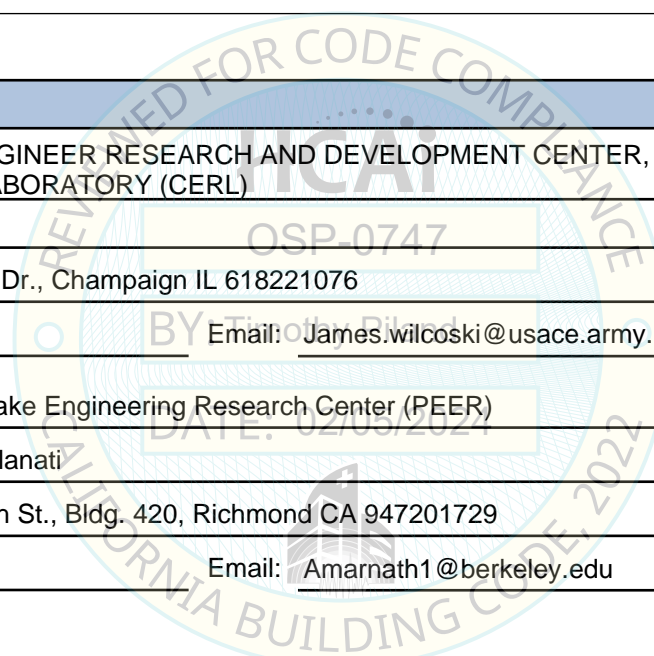
Company Name: THE VMC GROUP
Name: Kenneth Tarlow California License Number: S2851
Mailing Address: 980 9th Street, 16th Floor, Sacramento, CA 95814
Telephone: (832) 627-2214 Email: ken.tarlow@thevmcgroup.com

Certification Method

GR-63-Core ICC-ES AC156 IEEE 344 IEEE 693 NEBS 3
 Other (Please Specify): _____

Testing Laboratory

Company Name: U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER, CONSTRUCTION ENGINEERING RESEARCH LABORATORY (CERL)
Contact Person: James Wilcoski
Mailing Address: 2902 Newmark Dr., Champaign IL 618221076
Telephone: (217) 373-6763 Email: James.wilcoski@usace.army.mil
Company Name: Pacific Earthquake Engineering Research Center (PEER)
Contact Person: Amarnath Kasalanati
Mailing Address: 1301 South 46th St., Bldg. 420, Richmond CA 947201729
Telephone: (510) 642-3437 Email: Amarnath1@berkeley.edu





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Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 4.28

SDS (Design spectral response acceleration at short period, g) = 1.9

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 02/05/2030

Date: 2/5/2024

Name: Timothy Piland Title: Senior Structural Engineer

Special Seismic Certification Valid Up to: SDS (g) = 1.9 z/h = 1

Condition of Approval (if applicable): DATE: 02/05/2024

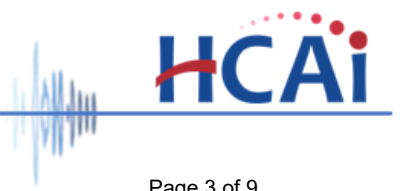
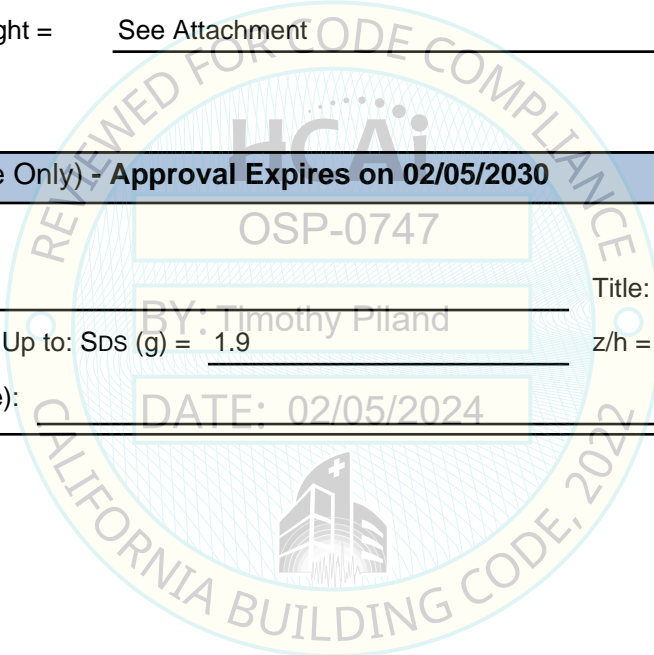


Table 1 - Certified 60 Hz Diesel Open Generator Sets

Type	Model	Max Rating [kW]	Max Dimensions [in]			Max Weight [lbs]	UUT
			Length	Width	Height		
QSK38	C1000D6E	1000	199.5	84.0	94.2	22,950	UUT-02
	C1250D6E	1250	199.4	84.0	94.2	26,092	Interpolated
	C1500D6E	1500	199.0	84.0	94.2	26,800	UUT-01
QSK50	C1500D6E	1500	224.7	97.2	96.2	31,100	Interpolated
	C1750D6E	1750	224.7	97.2	96.2	31,143	Interpolated
	C2000D6E	2000	224.7	97.2	96.2	32,234	Interpolated
	C2000D6E ¹	2000	220.0	86.0	95.0	32,234	UUT-03

¹Dimensions of test unit differ from manufacturers' cutsheets, due to difference in measuring points.

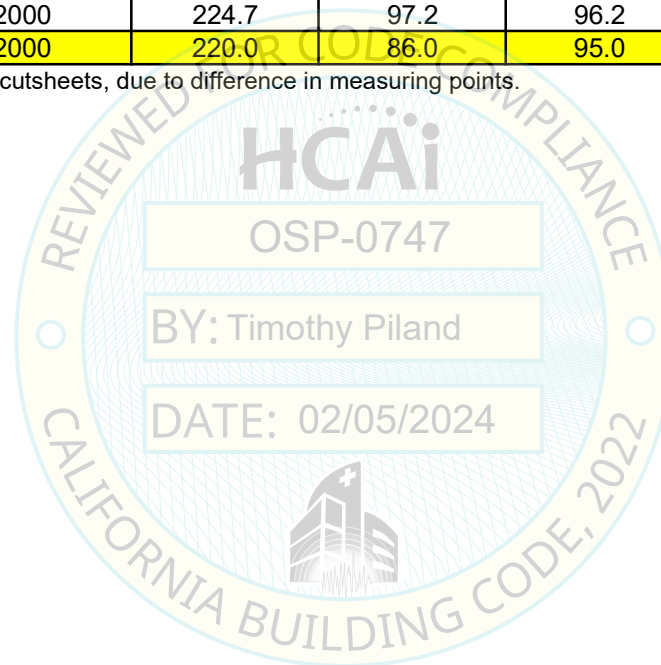


Table 2 - Certified Engines

Manufacturer	kW Range	Model	Material	Weight [lbs]	UUT
Cummins	1000	QSK38 HE800 Turbo	Cast Iron	9,872	UUT-02
	1250	QSK38 HE800 Turbo	Cast Iron	9,872	Interpolated
	1500	QSK38 HE800 Turbo	Cast Iron	9,872	UUT-01
	1500	QSK50 HE800 Turbo	Cast Iron	13,595	Interpolated
	1750	QSK50 HE800 Turbo	Cast Iron	13,595	Interpolated
	2000	QSK50 HPRC Turbo	Cast Iron	13,595	UUT-03

Table 3 - Certified Block Heaters

Manufacturer	kW Range	Model	Material	Weight [lbs]	UUT
Hotstart	1000-1500	CKM1060260-000	Carbon Steel	14	UUT-01, UUT-02
	1500-2000	CKM1060260-000	Carbon Steel	14	UUT-03

Table 4 - Certified Air Filter/Cleaner Assemblies

Manufacturer	kW Range	Model	Material	Weight [lbs]	UUT
Cummins Filtration	1000-1500	Normal Duty - HE800 Turbo	Carbon Steel	221	UUT-02
		Heavy Duty - HE800 Turbo	Carbon Steel	488	UUT-01
	1500-2000	Normal Duty - HE800 Turbo	Carbon Steel	552	Interpolated
		Heavy Duty - HE800 Turbo	Carbon Steel	552	UUT-03

Table 5 - Certified Alternators

Manufacturer	kW Range	Model	Material	Weight [lbs]	UUT
Cummins	1000 - 1250	S6 E - H	Steel Lamination & Copper Windings	6,447	UUT-02
	1250 - 1500	S7 C - H		8,990	Interpolated
	1500 - 2000	S7 C - J		9,941	Interpolated
	1000 - 2000	S9 B		11,135	UUT-01
	1500 - 2000	S9 C		12,236	Interpolated
		S9 D		12,236	UUT-03

Table 6 - Certified Radiators

Manufacturer	kW Range	Model	Material	Weight [lbs]	UUT
Modine	1000	33.2 SQ FT	Carbon Steel	1,828	UUT-02
	1000	33.2 SQ FT	Carbon Steel	1,875	Interpolated
	1250				Interpolated
	1500				UUT-01
	1500 - 2000	52 SQ FT	Carbon Steel	2,518	UUT-03

Table 7 - Certified Skids / Chassis

Manufacturer	kW Range	Model	Material	Weight [lbs]	UUT
BTD	1000 - 1500	S9 B	Carbon Steel	1,826	UUT-01
	1250 - 1500	S7	Carbon Steel	2,015	Interpolated
	1000 - 1250	S6	Carbon Steel	2,040	UUT-02
	1500 - 2000	S7 and S9	Carbon Steel	2,203	UUT-03

Table 8 - Certified Controllers

Manufacturer	kW Range	Model		Material	Weight [lbs]	UUT
Cummins	1000 - 2000	PCC 3300 V2	Low Voltage	Carbon Steel & Electrical Components	146	UUT-02
		PCC 3300 V2	High Voltage		146	UUT-01, UUT-03

Table 9 - Circuit Breaker

Manufacturer	kW Range	Model Number	Material	Weight [lbs]	UUT
Schneider Electric	1000 - 2000	600A	Copper	32	Interpolated
		630A	Copper	32	Interpolated
		800A	Copper	32	Interpolated
		1000A	Copper	32	UUT-02
		1200A	Copper	32	Interpolated
		1600A	Copper	52	Interpolated
		2000A	Copper	52	Interpolated
		2500A	Copper	109	Interpolated
		3000A	Copper	75	Interpolated
		1600A	Copper	110	Interpolated
		2000A	Copper	110	Interpolated
		2500A	Copper	110	Interpolated
		3200A	Copper	110	Interpolated
		2500A	Copper	110	UUT-02

Note: Breakers used for S6 and S7 Alternators, S9 Alternator does not have a circuit breaker.

Table 10 - Certified Miscellaneous Components

Manufacturer	kW Range	Model		Material	Weight [lbs]	UUT
Northern Battery	1000 - 2000	Standard Battery	#31-5	Lead Acid	234 ¹	UUT-01, UUT-02
Cummins		Standard Battery Tray	N/A	Carbon Steel	52	UUT-01, UUT-02
		Standard + Redundant Battery Tray	N/A	Carbon Steel	286 ²	UUT-01

Notes:

- 1) Weight is 4 individual batteries added together
- 2) Weight is second battery bracket with 4 additional batteries



UNIT UNDER TEST (UUT) Summary Sheet

UUT-1

Test Report: 31881-2201

Model Line	Model Number	Manufacturer
QSK38	C1500D6E	Cummins

Product Construction Summary

Carbon Steel Skid

Options / Subcomponent Summary

Engine: Cummins; Block Heater: Hotstart; Filter: Cummins Filtration; Alternator: Cummins; Radiator: Modine; Controller Cummins; Battery: Nothern Battery, Cummins

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
26,800	199.0	84.0	94.2	4.2	3.4	8.5

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	1.90	1.0	1.5	3.04	2.28	1.27	0.51
		-	-	-	-	-	-	-

Test Mounting Details

UUT-1 was isolated using (14) VMC M2SSH-1E-2800N 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) 3/4" diameter Grade 8 bolts per isolator.



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: 31881-2202

Model Line	Model Number	Manufacturer
QSK38	C1000D6E	Cummins

Product Construction Summary

Carbon Steel Skid

Options / Subcomponent Summary

Engine: Cummins; Block Heater: Hotstart; Filter: Cummins Filtration; Alternator: Cummins; Radiator: Modine; Controller Cummins; Circuit Breaker: Schneider Electric; Battery: Nothern Battery, Cummins

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
22,950	199.5	84.0	94.2	2.3	3.0	5.6

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	1.90	1.0	1.5	3.04	2.28	1.27	0.51
		-	-	-	-	-	-	-

Test Mounting Details

UUT-2 was isolated using (14) VMC M2SSH-1E-2800N 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) 3/4" diameter Grade 8 bolts per isolator.



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: 21832-2301

Model Line	Model Number	Manufacturer
QSK50	C2000D6E	Cummins

Product Construction Summary

Carbon Steel Skid

Options / Subcomponent Summary

Engine: Cummins; Block Heater: Hotstart; Filter: Cummins Filtration; Alternator: Cummins; Radiator: Modine; Chassis: BTD; Controller Cummins; Circuit Breaker: Schneider Electric

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
32,234	220.0	86.0	95.0	3.5	3.0	6.5

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	1.90	1.0	1.5	3.04	2.28	1.27	0.51
		-			-	-	-	-

Test Mounting Details

UUT-3 was isolated using (14) VMC M2SSH-1E-3400N 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) 5/8" diameter Grade 8 bolts per isolator.



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