APPLICATION FOR HCAI SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0543

HCAI Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Kohler Power Systems

Manufacturer's Technical Representative: Brady Eifrid

Mailing Address: N 7650 Lakeshore Road, Sheboygan, WI 53083

Telephone: (920) 457-4441 Email: brady.eifrid@kohler.com

Product Information

Product Name: Emergency and Standby Power Systems

Product Type: Generators

Product Model Number: 1250kW through 2000kW REOZMD

General Description: Spring isolated base mounted diesel-powered generator on and off fuel tanks with or without enclosures.

Mounting Description: Rigid and Isolated Gensets on and off Fuel Tanks, 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: U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER, CONSTRUCTION ENGINEERING RESEARCH LABORATORY (CERL)

Contact Person: James Wilcoski

Mailing Address: 2902 Newmark Dr., Champaign IL 61822-1076

Telephone: (217) 352-6511 Email: james.wilcoski@usace.army.mil

Company Name: UNIVERSITY OF CALIFORNIA, BERKELEY (PEER)

Contact Person: Wesley Neighbour

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

Telephone: (510) 655-3409 Email: wdn@berkeley.edu

Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 1.45

S_{DS} (Design spectral response acceleration at short period, g) = 1.93

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) = 0

Natural frequencies (Hz) = See Attachment

Overall dimensions and weight = See Attachment

HCAI Approval (For Office Use Only) - Approval Expires on 12/06/2028

Date: 12/6/2022

Name: Mohammad Karim Title: Supervisor, Health Facilities

Special Seismic Certification Valid Up to: S_{DS} (g) = 1.93 z/h = 0

Condition of Approval (if applicable):

Table 1A - Certified Gensets Off Tank

Model	Max. Rating [kW]	Configuration	Max. Package Dimensions [in]			Max. Weight [lb]	UUT[1]
			Length	Width	Height		
1250REOZMD	1280	Open	250	88	98	26,500	Extrapolated
		Enclosed	444	114	165	32,500	Interpolated
1600REOZMD	1600	Open	267	88	102	31,600	Interpolated
		Enclosed	485	114	165	40,180	Interpolated
1750REOZMD	1780	Open	269	109	122	36,000	Interpolated
		Enclosed	511	126	165	45,065	Interpolated
2000REOZMD	2000	Open	268	109	122	38,000	UUT-02
		Enclosed	511	124	165	47,065	Interpolated

1. Interpolated and extrapolated units are based on units tested in both Table 1A & Table 1B

Table 1B - Certified Gensets On Tank

Model	Max. Rating [kW]	Configuration	Max. Package Dimensions [in]			Weight [lb]			UUT
			Length	Width	Height	Tested Genset	Tested Tank[1]	Max. Weight[2]	
1250REOZMD	1280	Open	250	88	132	N/A	N/A	98,123	Extrapolated
		Enclosed	584	108	214	33,155	70,245	103,400	UUT-01
1600REOZMD	1600	Open	267	88	136	N/A	N/A	98,123	Interpolated
		Enclosed	589	114	207	N/A	N/A	103,400	Interpolated
1750REOZMD	1780	Open	269	109	156	N/A	N/A	106,560	Interpolated
		Enclosed	589	126	207	N/A	N/A	115,625	Interpolated
2000REOZMD	2000	Open	268	109	156	N/A	N/A	106,560	Interpolated
		Enclosed	511	124	157[3]	46,730	15,600	116,975	UUT-03

1. Tested Tank Weight includes fuel weight assuming density of fuel is 7lbs/gal
2. Max. Weight assumes genset paired with largest tank
3. Measured height is for enclosure only, excluding skid and tank height. Max height dimension including skid and tank height is 207 inches

Table 2 - Certified Subcomponents: Enclosure Matrix

Model	Material	Description[1]	Part No.[2]	Max. Weight[3] [lb]	Manufacturer	UUT
REOZMD	Aluminum	Weather enclosure, 40°C & 50°C Cooling Package	GM72613-TPG	2,550	Global Power Components	Extrapolated
		Weather enclosure, 40°C & 50°C Cooling Package	GM72616-TPG	2,800		
		Weather enclosure, 40°C Cooling Package	GM72617-TPG	2,950		
		Weather enclosure, 40°C & 50°C Cooling Package	GM72637-TPG	3,120		
		Weather enclosure, 50°C Cooling Package	GM72618-TPG	3,275		
		Weather enclosure, 40°C & 50°C Cooling Package	GM72640-TPG	3,495		
		Weather enclosure, 40°C Cooling Package	GM72641-TPG	3,710		
		SL1 enclosure, 40°C & 50°C Cooling Package	GM72621-TPG	3,850		
		Weather enclosure, 50°C Cooling Package	GM72642-TPG	4,485		
		SL1 enclosure, 40°C & 50°C Cooling Package	GM72624-TPG	4,700		
		SL1 enclosure, 40°C Cooling Package	GM72625-TPG	4,825		
		SL2 enclosure, 40°C Cooling Package	GM72633-TPG	4,825		
		SL1 enclosure, 40°C & 50°C Cooling Package	GM72648-TPG	5,070		
		SL1 enclosure, 40°C & 50°C Cooling Package	GM72645-TPG	5,345		
		SL2 enclosure, 40°C & 50°C Cooling Package	GM72632-TPG	5,400		
		SL2 enclosure, 40°C & 50°C Cooling Package	GM72653-TPG	5,490		
		SL1 enclosure, 50°C Cooling Package	GM72626-TPG	5,575		
		SL2 enclosure, 40°C & 50°C Cooling Package	GM72656-TPG	5,680		
		SL2 enclosure, 40°C & 50°C Cooling Package	GM72629-TPG	5,930		UUT-01
		SL1 enclosure, 50°C Cooling Package	GM72650-TPG	5,960		Interpolated
		SL2 enclosure, 40°C Cooling Package	GM72657-TPG	6,250		
		SL2 enclosure, 50°C Cooling Package	GM72634-TPG	6,375		
		SL1 enclosure, 40°C Cooling Package	GM72649-TPG	6,510		
		SL2 enclosure, Internal Silencer, 50°C Cooling Package	GM72658-TPG	9,375		UUT-03

1. SL1: Sound Level 1. SL2: Sound Level 2.
2. Enclosure kits exclude silencers except for UUT-03 enclosure (GM72658-TPG).
3. Only UUT-03 enclosure weight include internal silencer weight. All other enclosures weights exclude silencers weights.

Table 3 - Certified Subcomponents: Tank Matrix

Model	Range [kW]	Usable Capacity [gallons]	Material	Max. Weight[1] [lb]	Manufacturer	UUT
REOZMD	1250 - 2000	1,350	Carbon Steel	15,600	Global Power Components	UUT -03
		1,600		17,740		Interpolated
		2,100		21,895		
		2,600		26,045		
		3,130		30,625		
		4,150		40,085		
		5,150		46,175		
		6,160		56,500		
		7,700		70,245		UUT -01

1. Max. Weight includes fuel weight assuming density of fuel is 7lb/gal

Table 4 - Certified Subcomponents: Engine Matrix

Model	Part Number	Material	Max. Weight [lb]	Manufacturer	UUT
REOZMD	S12R-Y2PTAW-1	Carbon Steel	11,620	Mitsubishi	UUT-01
	S16R-Y2PTAW-1		14,399		Interpolated
	S16R-Y2PTAW2-1		14,729		
	S16R-Y2PTAW2-1		14,729		UUT-02, UUT-03

Table 5 - Certified Subcomponents: Alternator Matrix

Model	Part Number	Material	Max. Weight [lb]	Manufacturer	UUT
REOZMD	7M4046B54:D55	Carbon Steel	5,950	Marathon	Extrapolated
	7M4048		6,300		
	7M4366-3300/4160v		6,900		
	7M4050		7,230		
	7M4368-3300/4160v		7,500		
	7M4368-33/4160v		7,500		
	7M4052		7,800		UUT-01
	7M4370-3300/4160v		8,200		Interpolated
	7M4054		8,600		
	7M4374-3300-4160v		9,300		
	7M4056		9,740		
	7M4058		9,740		UUT-02, UUT-03

Table 6 - Certified Subcomponents: Radiator Matrix

Model	Part Number	Max. Weight [lb]	Manufacturer	UUT
REOZMD	YT427819 (40°C Package)	2,860	Young Touchstone	Extrapolated
	YT427820 (50°C Package)	2,950		UUT-01
	YT427808 (40°C Package)	3,050		Interpolated
	YT427809 (50°C Package)	3,260		
	YT427810 (50°C Package)	3,425		
	YT4277811 (50°C Package)	4,000		UUT-02, UUT-03

Table 7 - Certified Subcomponents: Fuel Cooler Matrix

Model	Part Number	Max. Weight [lb]	Manufacturer	UUT
REOZMD	MOC8M	70	Young Touchstone	UUT-01, UUT-02, UUT-03

Table 8 - Certified Subcomponents: Skid Matrix

Model	Part Number	Material	Max. Weight [lb]	Manufacturer	UUT
REOZMD	GM80614	Carbon Steel	4,822	Kohler	Extrapolated
	GM80615		4,822		
	GM80616		4,973		UUT-01
	GM80620		5,133		Interpolated
	GM80623		5,180		
	GM79125		5,289		UUT-02, UUT-03

Table 9 - Certified Subcomponents: Controller Matrix

Model	Model/Part Number	Max. Weight [lb]	Manufacturer	UUT
REOZMD	DECISION MAKER 6000/ GM78092-2	<10	Kohler	UUT-01
	DECISION MAKER 550/ GM76122-2	<10		UUT-02, UUT-03

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-1

Test Report: 30383-1701; UUT-17

Model Line	Model Number	Manufacturer
REOZMD	1250 REOZMD	Kohler

Product Construction Summary

Enclosed diesel powered electrical generator set 1250 kW on tank

Options / Subcomponent Summary

Enclosure, Fuel Tank, Engine, Alternator, Radiator, Controller, Skid, Fuel Cooler

UUT Properties

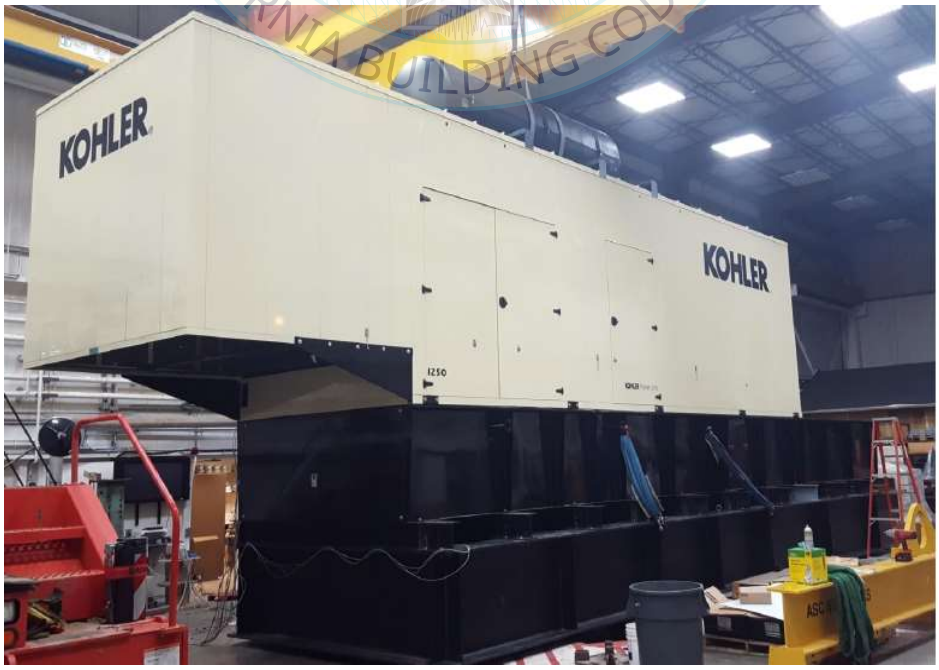
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
103,400	584	108	214	2.5	2.5	5.5

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	1.93	0.0	1.5	1.93	0.77	1.29	0.52
		-	-	-	-	-	-	-

Test Mounting Details

UUT-1 was internally isolated using (10) VMC Group M2SSH-1E spring isolators. The skid was attached to the isolators using (1) 3/4" Grade 8 bolt per isolator. The isolators were connected to the tank using (4) 3/4" diameter Grade 8 bolts per isolator. The tank was rigidly connected to the shake table using (26) 3/4" 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-2

Test Report: PEER-STI/2011-15; UUT-1

Model Line	Model Number	Manufacturer
REOZMD	2000 REOZMD	Kohler

Product Construction Summary

Open diesel powered electrical generator set 2000 kW off tank

Options / Subcomponent Summary

Engine, Alternator, Radiator, Controller, Skid, Fuel Cooler

UUT Properties

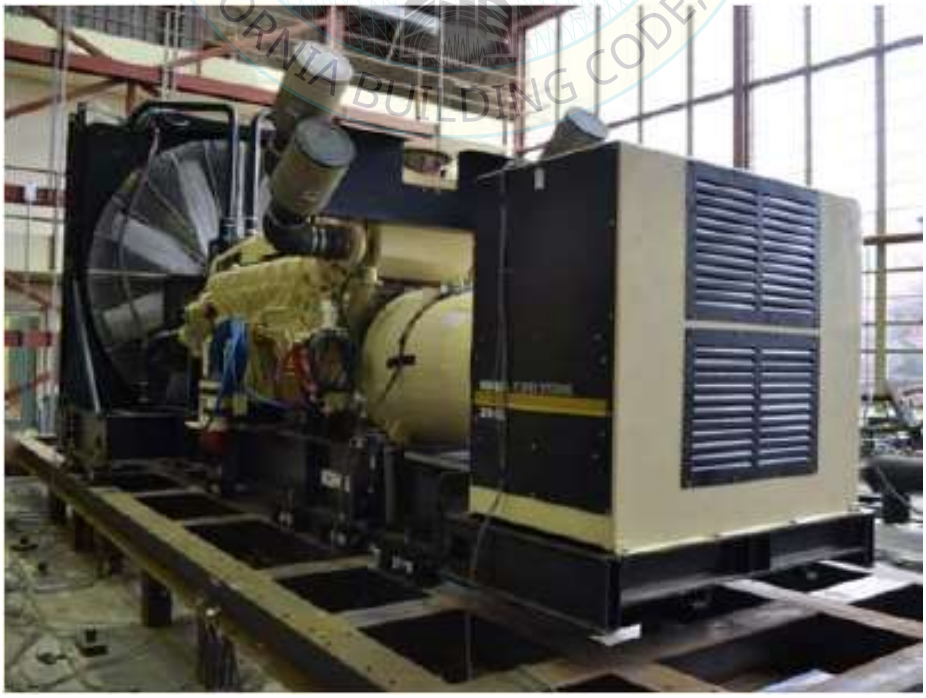
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
38,000	268	109	122	3.0	3.4	4.4

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	1.93	0.0	1.5	1.93	0.77	1.29	0.52
		-	-	-	-	-	-	-

Test Mounting Details

UUT-2 was isolated using (12) VMC Group M2SSH-1E 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: PEER-STI/2011-15; UUT-3

Model Line	Model Number	Manufacturer
REOZMD	2000 REOZMD	Kohler

Product Construction Summary

Enclosed diesel powered electrical generator set 2000 kW on tank

Options / Subcomponent Summary

Enclosure, Fuel Tank, Engine, Alternator, Radiator, Controller, Skid, Fuel Cooler, Internal Silencer

UUT Properties

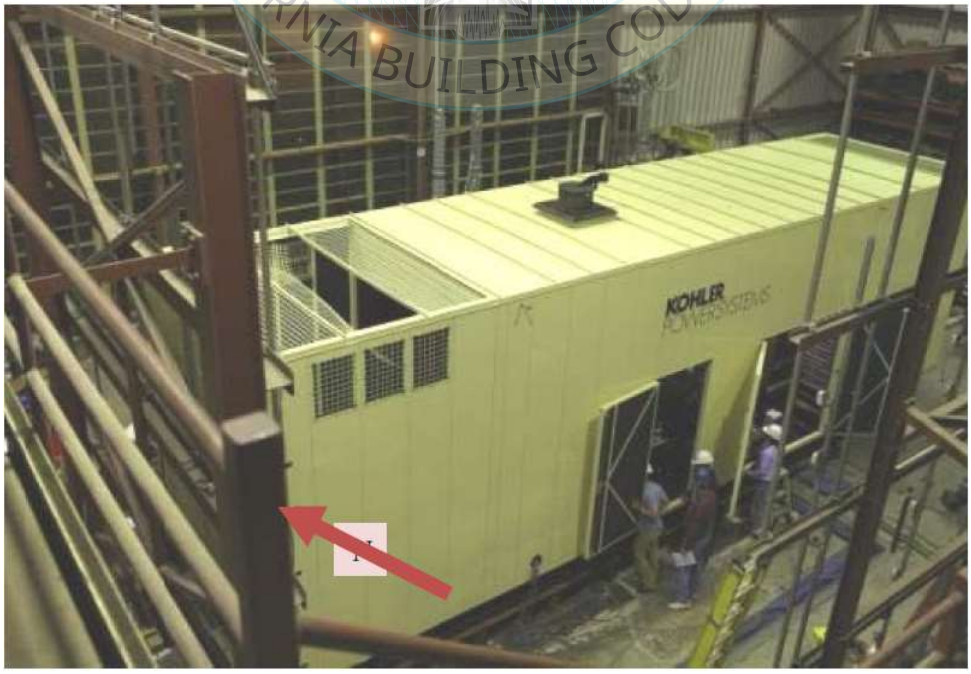
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
62,330	511	124	157	7.7	6.8	4.3

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	1.93	0.0	1.5	1.93	0.77	1.29	0.52
		-	-	-	-	-	-	-

Test Mounting Details

UUT-3 was internally isolated using (12) VMC Group M2SSH-1E spring isolators. The skid was attached to the isolators using (1) 3/4" Grade 8 bolt per isolator. The isolators were connected to the tank using (4) 3/4" diameter Grade 8 bolts per isolator. The tank was rigidly connected to the shake table using (26) 3/4" Grade 8 bolts.



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