



OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION

APPLICATION FOR OSHPD SPECIAL SEISMIC
CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0667

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☒ New ☐ Renewal

Manufacturer Information

Manufacturer: Kohler

Manufacturer's Technical Representative: Brady Eifrid

Mailing Address: N7650 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: 80kW-500kW REOZJx Diesel Powered Electrical Generators

General Description: Application Diesel powered electrical Generators

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: VMC Group

Contact Person: John Giuliano

Mailing Address: Main Street, Bloomington, NJ 07403

Telephone: (973) 838-1780

Email: john.giuliano@thvmcgroup.com

Title: President





**OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION**

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: 1301 S. 46th Street, Berkeley CA 94804

Telephone: (510) 642-6475 Email: amarnath1@berkeley.edu



**OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION**

Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 3.6

S_Ds (Design spectral response acceleration at short period, g) = 2.0

a_p (Amplification factor) = 2.5 (internal neoprene isolation)

R_p (Response modification factor) = 2.5 (internal neoprene isolation)

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height ratio factor) = 1

Natural frequencies (Hz) = See Attached UUT Sheets

Overall dimensions and weight = See Attached Certified Product Tables

OSHPD Approval (For Office Use Only) - Approval Expires on 12/31/2025

Date: 12/7/2020

Name: Mohammad Aliaari

Title: Senior Structural Engineer

Special Seismic Certification Valid Up to: S_Ds (g) = 2.0

z/h = 1

Condition of Approval (if applicable): _____

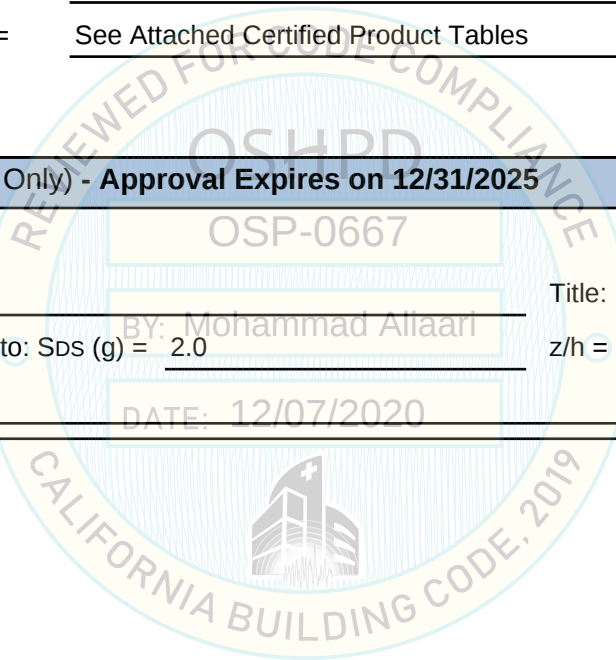


Table 1 - Certified Open & Enclosed Generators On Tanks (External Rigid Mounting)

Model	Max Rating [kW]	MFR	Configuration	Max Dimensions [in]			Max Wet Weight [lbs]	S _{DS}	z/h	UUT
				Length	Width	Height				
80REOZJF	80	Kohler	Open	142.0	72.0	86.6	11,508	2.0	1.0	Extrapolated
			Enclosed	142.0	72.0	106.6	12,233			
100REOZJF	100		Open	142.0	72.0	86.6	11,508			UUT-1
			Enclosed	142.0	72.0	106.6	12,850			
125REOZJG	125		Open	175.0	72.0	102.5	15,119			Interpolated
			Enclosed	175.0	72.0	111.0	15,919			
150REOZJF	150		Open	175.0	72.0	102.5	15,119			
			Enclosed	175.0	72.0	111.0	15,919			
180REOZJG	180		Open	214.0	72.0	111.0	17,336			
			Enclosed	214.0	72.0	122.4	18,636			
200REOZJF	200		Open	214.0	72.0	111.0	18,312			
			Enclosed	214.0	72.0	122.4	19,162			
230REOZJE	230		Open	210.0	51.2	110.4	15,847			
			Enclosed	210.0	52.7	121.0	16,297			
250REOZJE	250		Open	210.0	51.2	104.0	15,847			
			Enclosed	210.0	52.7	121.0	16,397			
275REOZJE	275		Open	210.0	51.2	110.4	15,847			
			Enclosed	210.0	52.7	121.0	16,697			
300REOZJ	300		Open	220.0	51.2	111.0	16,632			UUT-2
			Enclosed	220.0	51.2	116.0	18,000			
350REOZJC	350		Open	247.3	102.0	118.0	35,074			Interpolated
			Enclosed	271.3	102.0	137.0	37,279			
350REOZJD	350		Open	247.3	102.0	118.0	35,074			UUT-3
			Enclosed	271.3	102.0	137.0	37,279			
			Enclosed	271.3	56.0	129.0	22,250			Interpolated
400REOZJC	400		Open	286.0	102.0	118.0	38,991			
			Enclosed	286.0	102.0	137.0	41,196			
400REOZJD	400		Open	286.0	102.0	118.0	38,991			
			Enclosed	286.0	102.0	137.0	41,196			
500REOZJC	500		Open	327.0	102.0	118.0	43,437			UUT-4
			Enclosed	327.0	102.0	137.0	43,800			

Table 2 - Certified Open & Enclosed Generators Off Tanks (External Rigid Mounting)

Model	Max Rating [kW]	MFR	Configuration	Max Dimensions [in]			Max Weight [lbs]	S _{DS}	z/h	UUT
				Length	Width	Height				
80REOZJF	80	Kohler	Open	91.9	34.0	47.9	2,480	2.0	1.0	Interpolated
			Enclosed	111.1	45.5	60.0	3,269			
100REOZJF	100		Open	91.9	34.0	47.9	2,720			
			Enclosed	111.1	45.5	60.0	3,510			
125REOZJG	125		Open	106.3	44.1	60.1	2,702			
			Enclosed	139.0	45.4	69.0	3,632			
150REOZJF	150		Open	116.1	44.1	60.1	3,090			
			Enclosed	139.0	45.4	69.0	4,101			
180REOZJG	180		Open	118.1	51.2	65.7	3,190			
			Enclosed	161.2	51.2	84.0	4,810			
200REOZJF	200		Open	118.1	51.2	65.8	4,240			
			Enclosed	161.2	51.2	84.0	5,090			
230REOZJE	230		Open	118.1	51.2	74.4	5,400			
			Enclosed	162.3	52.7	84.9	5,850			
250REOZJE	250		Open	118.1	51.2	74.4	5,400			
			Enclosed	162.3	52.7	84.9	5,950			
275REOZJE	275		Open	118.1	51.2	74.4	5,400			
			Enclosed	162.3	52.7	84.9	6,250			
300REOZJ	300		Open	118.1	51.2	66.5	5,400			
			Enclosed	162.3	52.7	84.9	6,250			
350REOZJC	350		Open	142.9	56.1	75.6	8,600			
			Enclosed	218.3	58.9	93.0	11,500			
350REOZJD	350		Open	142.9	56.1	75.6	8,600			
			Enclosed	218.3	58.9	93.0	11,500			
400REOZJC	400		Open	142.9	56.1	75.6	8,600			
			Enclosed	218.3	58.9	93.0	11,500			
400REOZJD	400		Open	142.9	56.1	75.6	8,600			
			Enclosed	218.3	58.9	93.0	11,500			
500REOZJC	500		Open	142.9	56.1	75.6	8,600			
			Enclosed	218.3	58.9	93.0	11,500			

Table 3a - Certified Steel Enclosures

Type	kW Range	MFR	Type	Silencer	Enclosure Part Number	Weight [lb]	Int. Silencer Part No.	Silencer Weight [lb]	S _{DS}	z/h	UUT
REOZJx	80-100	Kohler	Steel Weather	Yes	GM87407-KA2	700	GM59117	57	2.0	1.0	Extrapolated
	80-100		Steel Sound Level 2	Yes	GM87407-KA1	725	GM59117	57			UUT-1
	125		Steel Weather	Yes	GM87408-KA2	750	GM71385	66			Interpolated
	125		Steel Sound Level 2	Yes	GM87408-KA1	800	GM71385	66			
	150		Steel Weather	Yes	GM87409-KA2	750	GM71385	66			
	150		Steel Sound Level 2	Yes	GM87409-KA1	800	GM71385	66			
	180-200		Steel Weather	Yes	GM110486-KA2	1,090	GM70083	101			
	180-200		Steel Sound Level 2	Yes	GM110486-KA1	1,290	GM70083	101			
	230-300		Steel Weather	Yes	GM110487-KA2	800	GM75600	135			UUT-2
	230-300		Steel Sound Level 2	Yes	GM110487-KA1	850	GM75600	135			
	350 - 500		Steel Weather	Yes	GM109350-KA3	1,850	GM110935	140			Interpolated
	350 - 500		Steel Sound Level 1	Yes	GM109350-KA2	1,900	GM110935	140			UUT-4
	350 - 500		Steel Sound Level 2	Yes	GM109350-KA1	2,200	GM109791, GM109792	165 (each)			

Note: Enclosures Are Certified For Use With or Without Internal Silencers. Bold underlined number indicates UUT kW rating.

Table 3b - Certified Aluminum Enclosures

Type	kW Range	MFR	Type	Silencer	Enclosure Part Number	Weight [lb]	Int. Silencer Part No.	Silencer Weight [lb]	S _{DS}	z/h	UUT
REOZJx	80-100	Kohler	Aluminum Sound Level 2	Yes	GM87407-KA3	450	GM59117	57	2.0	1.0	Interpolated
	125		Aluminum Sound Level 2	Yes	GM87408-KA3	500	GM71385	66			
	150		Aluminum Sound Level 2	Yes	GM87409-KA3	500	GM71385	66			
	180-200		Aluminum Sound Level 2	Yes	GM110486-KA3	660	GM70083	101			
	230-300		Aluminum Sound Level 2	Yes	GM110487-KA3	525	GM75600	135			
	350 - 500		Aluminum Sound Level 1	Yes	GM110077-KA2	1,000	GM110935	140			
	350 - 500		Aluminum Sounds Level 2	Yes	GM110077-KA1	1,300	GM109791, GM109792	165 (each)			UUT-3

Note: Enclosures Are Certified For Use With or Without Internal Silencers. All enclosures in the 350 – 500 kW range are the same. Bold underlined number indicates UUT kW rating.

Table 4 - Certified Tanks

Type	kW Range	MFR	Dry Weights of Tanks [lb]	Wet Weights of Tanks [lb]	Gallons	Part Number	S _{DS}	z/h	UUT	
REOZJx	80- <u>100</u>	Kohler	1,312	2,762	215	GM69240-1	2.0	1.0	Extrapolated	
			1,840	4,639	415	GM69240-2			UUT-1	
			3,536	9,040	816	GM69240-3			Interpolated	
	125-150		1,612	3,743	316	GM70816-1				
	2,211		6,224	595	GM77834					
	4,573		12,417	1,163	GM70816-3					
	180-200		2,721	5,527	416	GM71640-1				
	3,440		8,600	765	GM71640-2					
	3,809		14,041	1,517	GM71640-3					
	230-275		2,738	6,481	555	GM74711-1				
	4,081		10,448	944	GM74929-1					
	300		2,738	6,481	555	GM74711-1				
	3,989		11,233	1,074	GM74711-2	UUT-2				
	350		2,864	5,589	404	GM85993-1			Interpolated	
			3,411	8,632	774	GM85993-3				
			4,071	11,902	1,161	GM85993-5				UUT-3
			6,416	15,434	1,337	GM109735-7			Interpolated	
			8,222	21,651	1,991	GM109735-10				
			8,958	26,765	2,640	GM109735-12				
	400		2,864	5,589	404	GM85993-1				
	3,411		8,632	774	GM85993-3					
	4,071		11,902	1,161	GM85993-5					
	6,702		17,130	1,546	GM109735-8					
	8,585		24,173	2,311	GM109735-11					
	9,758		30,431	3,065	GM109735-13					
	500		2,939	6,096	468	GM85993-2				UUT-4
			3,594	9,624	894	GM85993-4				
			4,616	13,607	1,333	GM85993-6				
			5,855	17,746	1,763	GM85993-8				
			7,020	18,925	1,765	GM109735-9				
			8,958	26,765	2,640	GM109735-12				
			10,720	34,462	3,520	GM109735-14				

Note: Bold underlined number indicates UUT kW rating.

Table 5 - Certified Engines

Type	kW Range	Manufacturer	Model Number	Weight [lb]	S _{DS}	z/h	UUT
REOZJx	80 - 125 / 100	John Deere	4045HF285	1,082	2.0	1.0	UUT-1
	150		6068HF285	1,340			Interpolated
	180		6068HFG82	1,340			
	200		6068HFG85	1,495			
	230 - 275		6090HF484	1,986			UUT-2
	300		6090HFG86	1,854			UUT-3
	350 - 400		6135HFG84 / 6135HF485	2,941/3,291			UUT-4
	500		6135HFG75	2,941			

Note: Bold underlined numbers indicate UUT kW rating, engine model number and weight.

Table 6 - Certified Block Heaters

Type	kW Range	Manufacturer	Model Number	Weight [lb]	S _{DS}	z/h	UUT
REOZJx	80	Kim Hotstart	TPS151GT8-001	1.7	2.0	1.0	Extrapolated
	100		TPS152GT8-002				UUT-1
			TPS151GT8-001				
	125		TPS152GT8-002				Interpolated
			TPS151GT8-001				
	150		TPS151GT12-001				
	180		TPS151GT8-001				
	200		CB125108-005				
	230		CB125108-005				
			CB125108-005, CB125808-005, CB125208-005				
	250		CB125808-005				
	275		CB125208-005				
	300		CB125408-005	UUT-2			
	350		CB125108-005	UUT-3			
	400		CB125108-005	Interpolated			
	500		CB125108-005	UUT-4			

Table 7 - Certified Air Filter Assemblies

Type	kW	Manufacturer	Model Number	Weight [lb]	S _{DS}	z/h	UUT			
REOZJx	80	Cummins Filtration	FHG14002-301-140-7	12	2.0	1.0	Extrapolated			
	100						UUT-1			
	125						Interpolated			
	150									
	180									
	200	Donaldson Co, Inc	D120038-016-140	17.4						
	230									
	250									
	275			UUT-2						
	300		FRG180031-387-140	44			UUT-3			
	350						Interpolated			
	400						UUT-4			
	500									

Note: Each model from 80 to 180 kW range uses identical Cummins Filtration air filter, mounted with the same bracing and rigidity.

Table 8 - Certified Alternators

Type	kW Range	Manufacturer	Model Number	Weight [lb]	S _{DS}	z/h	UUT
REOZJx	80	Kohler	4PX, 4RX, 4TX	812	2.0	1.0	Extrapolated
	100 - 125		4RX, 4TX, 4SX	1,165			UUT-1
	150		4SX				Interpolated
	180		4UA, 4SX				
	200		4UA	2,360			
	230						
	250						
	275						
	300	Marathon	4M, 5M	2,960			UUT-2
	350						UUT-3
	400						Interpolated
	500		5M				UUT-4

Note: Bold underlined numbers indicate UUT kW rating and alternator model numbers.

Table 9 - Certified Radiators

Type	kW Range	Manufacturer	Model Number	Weight [lb]	S _{DS}	z/h	UUT
REOZJx	80 - 100	JB Radiator	RS-6479	74	2.0	1.0	UUT-1
	125		RS-6889	86			Interpolated
	150		RS-5847	79			Interpolated
	180		RS-7306	137			Interpolated
	200		RS-5849	119			Interpolated
	230 - 300		RS-6977	215			UUT-2
	350 - 500		RS-8510	401			UUT-3, UUT-4

Note: Bold underlined numbers indicate UUT kW ratings.

Table 10 - Certified Skids

Type	kW Range	Manufacturer	Material / Thickness	Weight [lb]	S _{DS}	z/h	UUT
REOZJx	80 - 300	Kohler	Carbon Steel / 7 Ga.	286	2.0	1.0	UUT-1, UUT-2
	350 - 500		Carbon Steel / 0.25"	736			UUT-3, UUT-4

Table 11 - Certified Controllers

Type	kW Range	Manufacturer	Model Number	Weight [lb]	S _{DS}	z/h	UUT
REOZJx	80 - 500	Kohler	DEC550	2.2	2.0	1.0	Extrapolated
			DEC3000	3.3			
			DEC6000	4.1			
			APM402	3.3			UUT-2, UUT-3
			APM603	3.2			UUT-1, UUT-4

Table 12 - Certified Miscellaneous Components

Type	kW Range	Manufacturer	Model Number	Weight [lb]	S _{DS}	z/h	UUT
REOZJx	350-500	TPI Corporations	GM107653 Space Heater	19	2.0	1.0	UUT-4
		Vyron	GM110157 Motorized Intake	67			UUT-3, UUT-4
			GM110158 Gravity Discharge Dampers	43			UUT-3, UUT-4
			CoolSys	GM110142 Venting Fan			28



UNIT UNDER TEST (UUT) Summary Sheet

UUT-1

DCL 31214-2001

Model Line	Model Number	Manufacturer
Emergency Power Generators	100REOZJF	Kohler

Product Construction Summary

100 kW Diesel Genset, Steel Sound Level 2 Enclosure, 816 gallons Fuel Tank

Options / Subcomponent Summary

John Deere Engine, Kohler Alternator, JB Radiators Radiator, Kohler APM603 Controller

UUT Properties

Wet Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
12,850	142	72	106.5	5.5	3.5	10

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	1.00	1.5	3.2	2.4	1.34	0.54

Test Mounting Details

UUT rigidly base mounted to fixture using (14) Grade 8, 3/4" Dia. bolts, 2" x 2" x 1/4" carbon steel plate washer, circular washer and nut. Fixture rigidly base mounted to shake table.



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



UNIT UNDER TEST (UUT) Summary Sheet

UUT-1

DCL 31214-2001

Model Line	Model Number	Manufacturer
Emergency Power Generators	100REOZJF	Kohler

Product Construction Summary

100 kW Diesel Genset, Steel Sound Level 2 Enclosure, 816 gallons Fuel Tank

Options / Subcomponent Summary

John Deere Engine, Kohler Alternator, JB Radiators Radiator, Kohler APM603 Controller

UUT Properties

Wet Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
12,850	142	72	106.5	5.5	3.5	10

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	1.00	1.5	3.2	2.4	1.34	0.54

UUT-1 Miscellaneous Notes

Notes:

Height measurement of 106.5" includes the exhaust pipe height.
98.5" is the measured height without exhaust pipe.

Internal steel/neoprene isolators underneath engine (Qty. 2) and alternator (Qty. 2)
Manufacturer: Kohler
Engine Isolator Part No. 324074
Alternator Isolator Part No. 336024

UUT-1 was mounted to tank using (4) M20 Class 8.8 bolt, 1/4" steel backing plate, (2) washers and nut.
Off tank Genset to be installed using minimum (4) M20 Class 8.8 bolt, 1/4" steel backing plate, (2) washers and nut.

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



UNIT UNDER TEST (UUT) Summary Sheet

UUT-1

DCL 31214-2001

Model Line	Model Number	Manufacturer
Emergency Power Generators	100REOZJF	Kohler

Product Construction Summary

100 kW Diesel Genset, Steel Sound Level 2 Enclosure, 816 gallons Fuel Tank

Options / Subcomponent Summary

John Deere Engine, Kohler Alternator, JB Radiators Radiator, Kohler APM603 Controller

UUT Properties

Wet Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
12,850	142	72	106.5	5.5	3.5	10

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	1.00	1.5	3.2	2.4	1.34	0.54

UUT-1 Miscellaneous Notes

Summary of anomalies, design changes and manufacturer responses:

Anomaly 1: A plastic hinge at the top of the door snapped apart.

Design Change: Enclosure Door plastic hinges to be replaced with SS hinges. Stainless steel hinges were tested on UUT3 and didn't experience anomaly. UUT1 must also have stainless steel hinges used on UUT3.

Anomaly 2: Junction Box housing surrounding alternator slightly deformed.

Manufacturer Response: For the purposes of protecting the alternator wiring from rodent intrusion, the front panel curvature follows the alternator diameter very closely. Anticipating the ability for the alternator (on rubber isolators) to move independent of the ridged skid-mounted junction box, the front panel has a perforated area that can permissibly be contacted by the alternator in extreme seismic events. This area may experience slight yielding by design, and did not pose any risk to the operation of the generator set.

Anomaly 3: Genset skid cross member slightly deformed.

Manufacturer Response: The purported yielding of skid cross member, localized at the isolator locations was not significant enough to be measured. This did not pose any risk to the operation of the generator set. As the engine and alternator are bolted together, the exact alignment of skid mounting is not critical. Furthermore, the radiator is connected to the forward engine mounts, meaning that any shift in the skid support does not change relative position of the radiator to the engine driven cooling fan.

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



UNIT UNDER TEST (UUT) Summary Sheet

UUT-2

DCL 31214-2001

Model Line	Model Number	Manufacturer
Emergency Power Generators	300REOZJ	Kohler

Product Construction Summary

300 kW Diesel Genset, Steel Sound Level 2 Enclosure, 1074 gallons fuel tank

Options / Subcomponent Summary

John Deere Engine, Kohler Alternator, JB Radiators Radiator, Kohler APM402 Controller

UUT Properties

Wet Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
18,000	220	51	116	6.5	4	11

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	1.00	1.5	3.2	2.4	1.34	0.54

Test Mounting Details

UUT rigidly base mounted to fixture using (14) Grade 8, 3/4" Dia. bolts, plate washer, circular washer and nut. Fixture rigidly base mounted to shake table.



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



UNIT UNDER TEST (UUT) Summary Sheet

UUT-2

DCL 31214-2001

Model Line	Model Number	Manufacturer
Emergency Power Generators	300REOZJ	Kohler

Product Construction Summary

300 kW Diesel Genset, Steel Sound Level 2 Enclosure, 1074 gallons fuel tank

Options / Subcomponent Summary

John Deere Engine, Kohler Alternator, JB Radiators Radiator, Kohler APM402 Controller

UUT Properties

Wet Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
18,000	220	51	116	6.5	4	11

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	1.00	1.5	3.2	2.4	1.34	0.54

UUT-2 Miscellaneous Notes

Notes:

Internal steel/neoprene isolators underneath engine (Qty. 2) and alternator (Qty. 2)
Manufacturer: Kohler
Engine Isolator Part No. 324391
Alternator Isolator Part No. 354622

UUT-2 was mounted to tank using (10) M24 Class 8.8 bolt, 1/4" steel backing plate, (2) washers and nut.
Off tank Genset to be installed using minimum (10) M20 Class 8.8 bolt, 1/4" steel backing plate, (2) washers and nut.

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



UNIT UNDER TEST (UUT) Summary Sheet

UUT-3

DCL 31214-2001

Model Line	Model Number	Manufacturer
Emergency Power Generators	350REOZJD	Kohler

Product Construction Summary

350 kW Diesel Genset, Sound Level II Aluminum Enclosure, 1161 gallons fuel tank

Options / Subcomponent Summary

John Deere Engine, Marathon Alternator, JB Radiators Radiator, Kohler APM402 Controller

UUT Properties

Wet Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
22,250	271	56	128.5	9	6	17.5

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	1.00	1.5	3.2	2.4	1.34	0.54

Test Mounting Details

UUT rigidly base mounted to fixture using (18) Grade 8, 3/4" Dia. bolts, 2" x 2" x 1/4" carbon steel plate washer, circular washer and nut. Fixture rigidly base mounted to shake table.



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



UNIT UNDER TEST (UUT) Summary Sheet

UUT-3

DCL 31214-2001

Model Line	Model Number	Manufacturer
Emergency Power Generators	350REOZJD	Kohler

Product Construction Summary

350 kW Diesel Genset, Sound Level II Aluminum Enclosure, 1161 gallons fuel tank

Options / Subcomponent Summary

John Deere Engine, Marathon Alternator, JB Radiators Radiator, Kohler APM402 Controller

UUT Properties

Wet Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
22,250	271	56	128.5	9	6	17.5

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	1.00	1.5	3.2	2.4	1.34	0.54

UUT-3 Miscellaneous Notes

Notes:

Same as UUT-4.

Internal steel/neoprene isolators underneath engine (Qty. 2) and alternator (Qty. 2)

Manufacturer: Kohler

Engine Isolator Part No. GM86134

Alternator Isolator Part No. GM84170

UUT-3 was mounted to tank using (14) M24 Class 8.8 bolt, 1/4" steel backing plate, (2) washers and nut.

Off tank Genset to be installed using minimum (14) M20 Class 8.8 bolt, 1/4" steel backing plate, (2) washers and nut.

Bracing Uplift Kit installed. Same as UUT-4.

Manufacturer: Kohler

Bracing Uplift Kit Part No.: GM111156

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



UNIT UNDER TEST (UUT) Summary Sheet

UUT-3

DCL 31214-2001

Model Line	Model Number	Manufacturer
Emergency Power Generators	350REOZJD	Kohler

Product Construction Summary

350 kW Diesel Genset, Sound Level II Aluminum Enclosure, 1161 gallons fuel tank

Options / Subcomponent Summary

John Deere Engine, Marathon Alternator, JB Radiators Radiator, Kohler APM402 Controller

UUT Properties

Wet Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
22,250	271	56	128.5	9	6	17.5

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	1.00	1.5	3.2	2.4	1.34	0.54

UUT-3 Miscellaneous Notes

Summary of anomalies, design changes and manufacturer responses:

Before shake testing, UUT-3 Enclosure was retrofitted with bracing uplift kit, this kit included additional exhaust clamp which was intended to improve the silencer connection.

Anomaly 1: Fan blades hit the shroud and experienced minor damages.

Manufacturer Response: The minimal damage sustained to the fan blades is not detrimental to the performance of the generator set. The material type of the fan blades will not permit the sustained edge fractures to propagate and cause an entire blade failure.

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



UNIT UNDER TEST (UUT) Summary Sheet

UUT-4

DCL 31214-2001

Model Line	Model Number	Manufacturer
Emergency Power Generators	500REOZJC	Kohler

Product Construction Summary

500 kW Diesel Genset, Sound Level II Steel Enclosure, 3520 gallons fuel tank

Options / Subcomponent Summary

John Deere Engine, Marathon Alternator, JB Radiators Radiator, Kohler APM603 Controller

UUT Properties

Wet Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
43,800	326.75	102	135.25	8.5	4.5	11.5

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	1.00	1.5	3.2	2.4	1.34	0.54

Test Mounting Details

UUT rigidly base mounted to fixture using (15) Grade 8, 3/4" Dia. bolts, 2" x 2" x 1/4" carbon steel plate washer, circular washer and nut. Fixture rigidly base mounted to shake table.



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



UNIT UNDER TEST (UUT) Summary Sheet

UUT-4

DCL 31214-2001

Model Line	Model Number	Manufacturer
Emergency Power Generators	500REOZJC	Kohler

Product Construction Summary

500 kW Diesel Genset, Sound Level II Steel Enclosure, 3520 gallons fuel tank

Options / Subcomponent Summary

John Deere Engine, Marathon Alternator, JB Radiators Radiator, Kohler APM603 Controller

UUT Properties

Wet Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
43,800	326.75	102	135.25	8.5	4.5	11.5

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	1.00	1.5	3.2	2.4	1.34	0.54

UUT-4 Miscellaneous Notes

Notes:

Same as UUT-3.
Internal steel/neoprene isolators underneath engine (Qty. 2) and alternator (Qty. 2)
Manufacturer: Kohler
Engine Isolator Part No. GM86134
Alternator Isolator Part No. GM84170

UUT-4 was mounted to tank using (12) M20 Class 8.8 bolt, 1/4" steel backing plate, (2) washers and nut.
Off tank Genset to be installed using minimum (12) M20 Class 8.8 bolt, 1/4" steel backing plate, (2) washers and nut.

Bracing Uplift Kit installaed. Same as UUT-3
Manufacturer: Kohler
Bracing Uplift Kit Part No.: GM111156

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



UNIT UNDER TEST (UUT) Summary Sheet

UUT-4

DCL 31214-2001

Model Line	Model Number	Manufacturer
Emergency Power Generators	500REOZJC	Kohler

Product Construction Summary

500 kW Diesel Genset, Sound Level II Steel Enclosure, 3520 gallons fuel tank

Options / Subcomponent Summary

John Deere Engine, Marathon Alternator, JB Radiators Radiator, Kohler APM603 Controller

UUT Properties

Wet Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
43,800	326.75	102	135.25	8.5	4.5	11.5

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	1.00	1.5	3.2	2.4	1.34	0.54

UUT-4 Miscellaneous Notes

Summary of anomalies, design changes and manufacturer responses:

Before shake testing, UUT-4 Enclosure was retrofitted with bracing uplift kit, this kit included additional exhaust clamp which was intended to improve the silencer connection.

Anomaly 1: Fan blades hit the shroud and experienced minor damages.

Manufacturer Response: The minimal damage sustained to the fan blades is not detrimental to the performance of the generator set. The material type of the fan blades will not permit the sustained edge fractures to propagate and cause an entire blade failure.

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