Facilities Development Division www.oshpd.ca.gov/fdd
400 R Street. Suite 200, Sacramento, California 95811-6213 Phone (916) 440-8300 Fax (916) 654-2973

APPLICATION FOR PREAPPROVAL

SPECIAL SEISMIC CERTIFICATION OF EQUIPMENT AND COMPONENTS

For Office Use Only

APPLICATION NO.

OSP – 0082-10

Check whether application is: NEW [ ] RENEWAL [√]

1.0

Kohler Power Systems — *Manufacturer*

Ms. Beth Splittgerber — *Manufacturer's Technical Representative*

444 Highland Dr, Kohler, WI 53044 — *Mailing Address*

920-565-3381 — *Telephone*

beth.splittgerber@kohler.com — *E-mail Address*

2.0

Kohler Power Generators — *Product Name*

Electrical Power Generator — *Product Type*

20 kW thru 2000 kW REOZ Diesel Powered Electrical Generators

Product model No (List all unique product identification numbers and/or serial numbers)

General Description: Rigid floor mounted Diesel Powered electrical generator above UL 142 fuel tanks with or without enclosures and internal vibration isolators. Only 550 – 2000 kW Open Genset (i. e. without enclosure) without fuel tank is approved for installation on external vibration isolators.

3.0

The VMC Group — *Applicant Company Name*

John P. Giuliano, PE — *Contact Person*

113 Main St, Bloomingdale NJ, 07403

Mailing Address

973-838-1780 — *Telephone*

john.giuliano@thevmcgroup.com — *E-mail Address*

I hereby agree to reimburse the Office of Statewide Health Planning and Development for the actual costs incurred by the department for review.

Signature of Applicant

11/30/11 — *Date*

President — *Title*

The VMC Group — *Company Name*

4.0 ***Registered Design Professional Preparing the Report***

The VMC Group
Company Name

Mr. Ken Tarlow — *Contact Name*
SE2851 — *California License Number*

113 Main St, Bloomingdale, NJ 07403
Mailing Address

973-838-1780 — *Telephone*
silas.ho@thevmcgroup.com — *E-mail Address*

5.0 ***California Licensed Structural Engineer Review and Acceptance of the Report***

The VMC Group
Company Name

Mr. Ken Tarlow — *Contact Name*
SE2851 — *California License Number*

113 Main St, Bloomingdale, NJ 07403
Mailing Address

973-838-1780 — *Telephone*
ken.tarlow@thevmcgroup.com — *E-mail Address*

6.0 ***Anchorage Pre-Approval***

☐ *Anchorage is pre-approved*
(Separate application for anchorage pre-approval is required)

☒ Anchorage is not Pre-approved

7.0 ***Certification Method***

☒ *Testing in accordance with:* ☒ *ICC-ES AC-156* ☐ *Other (Please Specify):*

☐ *Analysis*
☐ *Experience data*
☐ *Combination of Testing, Analysis, and/or Experience Data (Please Specify):*

8.0 ***Testing Laboratory (if applicable)***

Clark Dynamics — *Company Name*
J.R. Antenucci — *Contact Name*

1801 Route 51, Jefferson Hills, PA 15025
Mailing Address

417-387-1001 — *Telephone*
jantenucci@clarkdynamics.com — E-mail:

8.0 ***Testing Laboratory (if applicable)***

PEER, UC Berkeley	Wesley Neighbour
Company Name	*Contact Name*
1302 South 46th St. Bldg 420, Richmond, CA 94804	
Mailing Address	
510-665-3409	wdn@berkeley.edu
Telephone	E-mail:

8.0 ***Testing Laboratory (if applicable)***

Univ. Nev. at Reno	Gokhan Pekcan
Company Name	*Contact Name*
Dep't of Civil and Env Eng., UNR, Reno, NV 89523; MS 258	
Mailing Address	
775-784-4512	pekcan@unr.edu
Telephone	E-mail:

8.0 ***Testing Laboratory (if applicable)***

Trentec Labs	Timothy A. Geers
Company Name	*Contact Name*
4600 East Tech Dr., Cincinnati, OH 45245	
Mailing Address	
513-528-7900	tgeers@curtisswright.com
Telephone	E-mail:

☑

9.0 ***Approval Parameters***

Design in accordance with ASCE 7-05 Chapter 13: ☒ Yes ☐ No

Design Basis of Equipment or Components (F_p/W_p) = 1.45g for z/h = 0.0, 4.34g for z/h = 1.0

S_{DS} (Spectral response acceleration at short period) = 1.93 g

a_p (In-structure equipment or component amplification factor) = 2.5

R_p (Equipment or component response modification factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height factor ratio)= 0.0 for 550 kW to 2000 kW, 1.0 for 20 kW to 500 kW

Equipment or Component fundamental period(s) = See attachment

Building period limits (if any) = N/A

Overall dimensions and weight (or range thereof) = See attachment

Equipment or Components @ grade designed in accordance with ASCE 7-05 Chapter 15: ☐ Yes ☒ No

Design Basis of Equipment or Components (V/W) =

S_{DS} (Spectral response acceleration at short period) =

S_1 (Spectral response acceleration at 1 second period) =

R (Response modification coefficient)=1.0

Ω_0 (System overstrength factor) =1.0

C_d (Deflection amplification factor) =1.0

I_p (Importance factor) =1.5

Height to Center of Gravity above base =

Equipment or Component fundamental period(s) = Sec

Overall dimensions and weight (or range thereof) =

Tank(s) designed in accordance with ASME BPVC, 2007: ☐ Yes ☒ No

10.0 ***List of attachments supporting the special seismic certification of equipment or components:***

☒ *Test Report*	☐ *Drawings*	☒ *Manufacturer's Catalog*
☐ *Calculations*	☐ *Others (Please Specify):*	

11.0 ***OSHPD Approval*** *(For Office Use Only)*

12/6/2011	**December 31, 2016**
Signature & Date	*Approval Expiration Date*
M. R. Karim, SHFR	S_{DS} (g) = **1.93** z/h = **See Section 9.0**
Name & Title	*Special Seismic Certification Valid Up to*

Condition of Approval (if any):

Kohler Product Line Matrix For REOZ Diesel Powered Gensets

Model	Configuration	Max Length [in]	Max Width [in]	Max Height [in]	Max Operating Weight [lbs]	Engine	Alternator	Radiator	Controller	S_{DS} Level	z/h	UUT	Mounting Config.
20kW REOZJ	Genset on Sub Base Tank	114	42	83	5,237	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0	1, 2, 3, 4	Rigid
30kW REOZJ	Genset on Sub Base Tank	114	42	83	5,373	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0		Rigid
40kW REOZJ	Genset on Sub Base Tank	114	42	92	6,597	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0		Rigid
50kW REOZJ	Genset on Sub Base Tank	114	42	92	6,769	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0		Rigid
60kW REOZJ	Genset on Sub Base Tank	114	42	92	7,020	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0	5, 6, 7	Rigid
80kW REOZJ	Genset on Sub Base Tank	134	46	90	8,044	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0		Rigid
100kW REOZJ	Genset on Sub Base Tank	134	46	90	8,540	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0		Rigid
100kW REOZJ	Genset on Sub Base Tank	134	46	90	8,540	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0		Rigid
125kW REOZJ	Genset on Sub Base Tank	174	46	105	10,428	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0		Rigid
150kW REOZJ	Genset on Sub Base Tank	174	45	105	10,902	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0		Rigid
180kW REOZJ	Genset on Sub Base Tank	197	53	119	13,432	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0		Rigid
200kW REOZJ	Genset on Sub Base Tank	197	53	119	14,272	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0		Rigid
230kW REOZJ	Genset on Sub Base Tank	210	53	121	17,016	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0		Rigid
250kW REOZJ	Genset on Sub Base Tank	210	53	121	17,116	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0		Rigid
275kW REOZJ	Genset on Sub Base Tank	210	53	121	17,416	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0	8	Rigid
300kW REOZJ	Genset on Sub Base Tank	220	53	121	18,299	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0		Rigid
350kW REOZJ	Genset on Sub Base Tank	301	102	138	39,082	John Deere	Marathon	JB Radiator Specialties	Kohler	1.93	1.0		Rigid

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Model	Configuration	Max Length [in]	Max Width [in]	Max Height [in]	Max Operating Weight [lbs]	Engine	Alternator	Radiator	Controller	S_{DS} Level	z/h	UUT	Mounting Config.
400kW REOZJ	Genset on Sub Base Tank	301	102	138	39,082	John Deere	Marathon	JB Radiator Specialties	Kohler	1.93	1.0		Rigid
500kW REOZJ	Genset on Sub Base Tank	301	102	138	39,082	John Deere	Marathon	JB Radiator Specialties	Kohler	1.93	1.0	9, 10	Rigid
500kW REOZV	Genset without Sub Base Tank	154	52	76	7,695	Volvo	Marathon	Volvo	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	303	93	149	43,303	Volvo	Marathon	Volvo	Kohler	1.93	0.0		Rigid
500kW REOZV	Genset without Sub Base Tank	167	76	77	9,000	Volvo	Marathon	Volvo	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	350	86	139	35,100	Volvo	Marathon	Volvo	Kohler	1.93	0.0		Rigid
550kW REOZV	Genset without Sub Base Tank	145	53	78	11,280	Volvo	Marathon	Volvo	Kohler	1.93	0.0	11	Isolated
	Genset on Sub BaseTank	328	93	133	46,565	Volvo	Marathon	Volvo	Kohler	1.93	0.0	12, 13	Rigid
550kW REOZV	Genset without Sub Base Tank	167	76	77	11,130	Volvo	Marathon	Volvo	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	350	86	139	35,100	Volvo	Marathon	Volvo	Kohler	1.93	0.0		Rigid
600kW REOZV	Genset without Sub Base Tank	145	53	78	11,130	Volvo	Marathon	Volvo	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	328	93	133	46,565	Volvo	Marathon	Volvo	Kohler	1.93	0.0		Rigid
600kW REOZV	Genset without Sub Base Tank	167	76	78	11,130	Volvo	Marathon	Volvo	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	350	86	139	35,100	Volvo	Marathon	Volvo	Kohler	1.93	0.0		Rigid
750kW REOZM	Genset without Sub Base Tank	182	73	95	14,500	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	425	104	154	77,100	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Rigid

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Model	Configuration	Max Length [in]	Max Width [in]	Max Height [in]	Max Operating Weight [lbs]	Engine	Alternator	Radiator	Controller	S_{DS} Level	z/h	UUT	Mounting Config.
750kW REOZM	Genset without Sub Base Tank	196	73	95	14,500	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	450	104	154	76,210	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Rigid
800kW REOZM	Genset without Sub Base Tank	182	73	95	14,500	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	425	104	154	77,100	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Rigid
800kW REOZM	Genset without Sub Base Tank	196	73	95	14,500	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	450	104	154	76,210	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Rigid
900kW REOZM	Genset without Sub Base Tank	190	76	101	21,600	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	425	104	154	84,200	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Rigid
900kW REOZM	Genset without Sub Base Tank	199	76	101	21,600	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	450	104	154	83,310	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Rigid
1000kW REOZM	Genset without Sub Base Tank	190	76	101	21,600	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	425	104	154	84,200	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Rigid
1000kW REOZM	Genset without Sub Base Tank	199	76	101	21,600	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	450	104	154	83,310	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Rigid
1250kW REOZM	Genset without Sub Base Tank	228	88	98	26,500	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	589	114	207	108,990	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Rigid

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Model	Configuration	Max Length [in]	Max Width [in]	Max Height [in]	Max Operating Weight [lbs]	Engine	Alternator	Radiator	Controller	S_{DS} Level	z/h	UUT	Mounting Config.
1250kW REOZM	Genset without Sub Base Tank	250	88	98	26,500	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	589	114	207	104,990	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Rigid
1600kW REOZM	Genset without Sub Base Tank	252	88	102	31,600	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	589	114	207	115,380	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Rigid
1600kW REOZM	Genset without Sub Base Tank	267	88	102	31,600	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	589	114	207	111,000	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Rigid
1750kW REOZM	Genset without Sub Base Tank	254	109	122	35,000	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	589	126	207	119,890	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Rigid
1750kW REOZM	Genset without Sub Base Tank	269	109	122	36,000	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	589	126	207	115,090	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Rigid
2000kW REOZM	Genset without Sub Base Tank	254	109	122	35,000	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Isolated
	Genset on Sub BaseTank	589	126	207	119,890	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0		Rigid
2000kW REOZM	Genset without Sub Base Tank	269	109	122	36,000	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0	14	Isolated
	Genset on Sub BaseTank	589	126	207	115,090	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0	15, 16	Rigid

Notes

1) Highlighted Units Have Been Shake Tested
2) Max Operating Weight Includes Fuel Weight Assuming a Specific Gravity of 0.90
3) Rigid mounted gensets shall be mounted on UL142 Tanks. Vibration isolated gensets are certified without sub-base tanks.
4) Test dimensions vary due to multiple configurations of UUT's. See UUT matrix.
5) Rigid mounted Gensets are Certified with and without Enclosures. Vibration isolated gensets are certified without enclosures.

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KOHLER POWER SYSTEMS
20 kW thru 2000 kW

Shake Tested Units

UUT	Model	Description	Enclosure Style	Length [in]	Width [in]	Height [in]	Measured Oper Wt [lbs]	Engine Mnf.	Alternator Mnf.	Radiator Mnf.	Controller Mnf.	S_{DS} Level	z/h	Mounting Config.	Lowest Nat. Freq.		
															X	Y	Z
1	20 kW REOZJ	Empty Tank	Steel	91	42	50	3,003	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0	Rigid	5.1	3.3	1.4
2	20 kW REOZJ	Full Tank	Steel	91	42	50	3,874	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0	Rigid	4.0	2.8	2.9
3	20 kW REOZJ	Empty Tank	Steel	114	41	66	2,830	John Deere	Kohler	JB Radiator Specialties	Kohler	2.00	1.0	Rigid	6.9	5.0	14.8
4	20 kW REOZJ	Full Tank	Steel	114	41	66	3,670	John Deere	Kohler	JB Radiator Specialties	Kohler	2.00	1.0	Rigid	7.1	5.8	17.0
5	60 kW REOZJ	Full Tank	Steel	91	42	86	5,725	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0	Rigid	4.7	3.1	8.6
6	60 kW REOZJ	Full Tank	None	91	42	86	5,125	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0	Rigid	N/A	3.1	8.6
7	60 kW REOZJ	Full Tank	Aluminum	91	42	86	5,475	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0	Rigid	16.4	18.7	N/A
8	275 kW REOZJ	Empty Tank	Steel	162	53	105	8,250	John Deere	Kohler	JB Radiator Specialties	Kohler	1.93	1.0	Rigid	5.1	3.6	N/A
9	500 kW REOZJ	Empty Tank	Steel	300	68	131	16,670	John Deere	Marathon	JB Radiator Specialties	Kohler	1.93	1.0	Rigid	4.8	5.5	5.4
10	500 kW REOZJ	Full Tank	Steel	300	68	131	29,900	John Deere	Marathon	JB Radiator Specialties	Kohler	1.93	1.0	Rigid	4.3	5.5	5.3
11	550 kW REOZV	No Tank	None	139	53	78	11,280	Volvo	Marathon	Volvo	Kohler	1.93	0.0	**Isolated**	2.4	1.9	4.3
12	550 kW REOZV	Empty Tank	Steel	282	86	120	19,346	Volvo	Marathon	Volvo	Kohler	1.93	0.0	Rigid	5.7	7.6	8.1
13	550 kW REOZV	Full Tank	Steel	282	86	120	23,482	Volvo	Marathon	Volvo	Kohler	1.93	0.0	Rigid	5.2	5.3	7.9
14	2000 kW REOZM	No Tank	None	268	109	122	36,000	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0	**Isolated**	3.0	3.4	4.4
15	2000 kW REOZM	Empty Tank	Aluminum	511	124	157	52,200	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0	Rigid	3.1	2.7	4.4
16	2000 kW REOZM	Full Tank	Aluminum	511	124	157	62,330	Mitsubishi	Marathon	Young Touchstone	Kohler	1.93	0.0	Rigid	2.7	2.2	2.4

All Base Structure is carbon steel.
All sub-base fuels tanks are UL142 certified

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Special Seismic Certification
KOHLER POWER SYSTEMS
20 kW thru 2000 kW

Shake Tested Units

UUT's #1 & #2. Same unit tested with and without fuel.
Sub-Base Fuel Tank is Mounted Directly to the Table Using (6) 5/8” Diameter ASTM A325 Bolts.

UUT's #3 & #4. Same unit tested with and without fuel.
Sub-Base Fuel Tank is Mounted Directly to the Table Using (6) 3/4” Diameter ASTM A325 Bolts.

UUT #5
Sub-Base Fuel Tank is Mounted Directly to the Table Using
(2) 5/8” Diameter Strain Bolts and (2) 7/8” Diameter Strain Bolts

UUT #6
Sub-Base Fuel Tank is Mounted Directly to the Table Using
(2) 5/8” Diameter Strain Bolts and (2) 7/8” Diameter Strain Bolts

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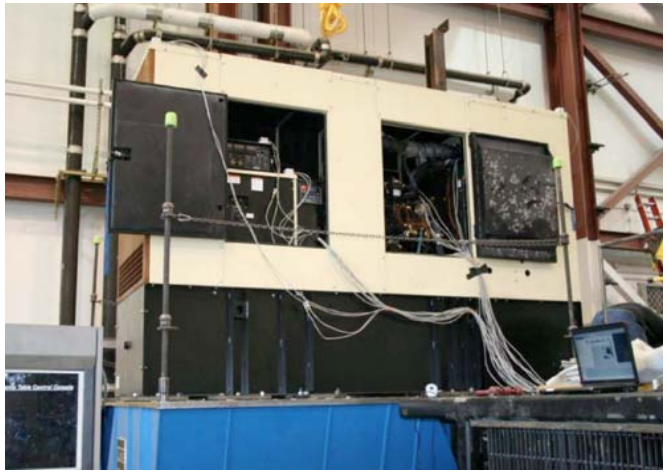
Special Seismic Certification
KOHLER POWER SYSTEMS
20 kW thru 2000 kW

Shake Tested Units

UUT #7
Sub-Base Fuel Tank is Mounted Directly to the Table Using
(2) 5/8” Diameter Strain Bolts and (2) 7/8” Diameter Strain Bolts



UUT #8
Sub-Base Fuel Tank is Mounted to Table Using (12) 3/4" Diameter Bolts

UUT's #9 & #10. Same unit tested with and without fuel
Sub-Base Fuel Tank is Mounted Directly to the Fixture Using
(14) 3/4” Diameter ASTM A490 Bolts

UUT #11
Skid is Mounted Atop (6) M2SS-1E Seismic Spring Mounts Provided
by The VMC Group. The Mounts are Attached to the Fixture Using
(4) 3/4” Diameter ASTM 490 Bolts per Mount.

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Special Seismic Certification

KOHLER POWER SYSTEMS

20 kW thru 2000 kW

Shake Tested Units

UUT's #12 & #13. Same unit tested with and without fuel
Sub-Base Fuel Tank is Mounted Directly to the Fixture Using
(18) 3/4" Diameter ASTM A490 Bolts

UUT #14
Skid is Mounted Atop (12) M2SSH-1E Seismic Spring Mounts Provided by The VMC Group.
The Mounts are Attached to the Fixture Using (4) 3/4" Diameter ASTM 490 Bolts per Mount.

UUT's #15 & #16. Same unit tested with and without fuel
Sub-Base Fuel Tank is Mounted Directly to the Fixture Using
(26) 3/4" Diameter ASTM A490 Bolts

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