APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY	
APPLICATION #:	OSP –0117-10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: MTU America, Inc.

Manufacturer's Technical Representative: Ben Stratton

Mailing Address: 100 Power Drive, Mankato, MN 56001

Telephone: (507) 625-7973 Email: ben.stratton@ps.rolls-royce.com

Product Information

Product Name: Diesel Generator Set

Product Type: Electrical Power Generator

Product Model Number: 60kW to 3250kW Electrical Power Generators
(List all unique product identification numbers and/or part numbers)

General Description: *Enclosures are approved for units up to 600kW only. Seismic enhancement made to the test units and modifications required to address the anomalies observed during the tests shall be incorporated into the production units.*

Mounting Description: *All units without tanks may be mounted upon external spring vibration isolators below base. Additionally, units from 30kW to 600kW may be rigid floor mounted or rigid mounted to UL142 tank.*

Applicant Information

Applicant Company Name: The VMC Group

Contact Person: John Giuliano

Mailing Address: 113 Main St., Bloomingdale, NJ 07403

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

I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2016.

Signature of Applicant: Date: 9/28/16

Title: President Company Name: The VMC Group

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

Company Name: The VMC Group

Name: Mr. Kent Tarlow California License Number: SE2851

Mailing Address: 113 Main St., Bloomingdale, NJ 07403

Telephone: (973) 838-1780 Email: Ken.tarlow@thevmcgroup.com

Supports and Attachments Preapproval

☐ Supports and attachments are preapproved under OPM- _____
(Separate application for OSHPD Preapproval of Manufacturer's Certification (OPM) of Supports and attachments is required)

☒ Supports and attachments are not preapproved

Certification Method

☒ Testing in accordance with: ☒ ICC-ES AC156

☐ Other (Please Specify): _____

Testing Laboratory

Company Name: PEER, UC Berkeley

Contact Name: Clément Barthès

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

Telephone: (510) 665-3409 Email: clementbarthes@berkeley.edu

Seismic Parameters

Design in accordance with ASCE 7-10 Chapter 13: ☒ Yes ☐ No

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

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

a_p (In-structure equipment or component amplification factor) = 2.5 (Isolated); 1.0 (Rigid)

R_p (Equipment or component response modification factor) = 2.0 (Isolated); 2.5 (Rigid)

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = See Attachment

Equipment or Component Natural Frequencies (Hz) = See Attachment

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

Equipment or Components @ grade designed in accordance with ASCE 7-10 Chapter 15: ☐ Yes ☒ No

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

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

S_{D1} (Design spectral response acceleration at 1 second period, g) =

R (Response modification coefficient) =

Ω_0 (System overstrength factor) =

C_d (Deflection amplification factor) =

I_p (Importance factor) = 1.5

Height to Center of Gravity above base =

Equipment or Component Natural Frequencies (Hz) =

Overall dimensions and weight (or range thereof) =

Tank(s) designed in accordance with ASME BPVC, 2015: ☐ Yes ☒ No

List of Attachments Supporting Special Seismic Certification

☒ Test Report(s) ☐ Drawings ☐ Calculations ☒ Manufacturer's Catalog

☐ Other(s) (Please Specify):

OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2022

Signature: Date: 11/1/16

Print Name: M. R. Karim Title: SHFR

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

Condition of Approval (if applicable):

MTU Onsite Energy - OSHPD Pre-Approved Units																
Model		Max kW Rating	Max Length[2]	Max Width[2]	Max Height[2]	Max Weight[3]	Radiator	Engine	Alternator	Controls	Enclosure[1]	Mounting System	S_{DS}	z/h	F_p	Tested / Interpolated / Extrapolated
DS0060D6S		60	114.3	40	67.375	3300	Diesel Radiator	John Deere	Marathon	MTU	Yes	Isolated w/o Tank	1.9	1	4.343	UUT 1
DS0060D6S		60	114.3	40	67.375	3300	Diesel Radiator	John Deere	Marathon	MTU	Yes	Non-Isolated w/o Tank	1.9	1	1.390	UUT 2
DS0060D6S		60	114.3	40	67.375	3300	Diesel Radiator	John Deere	Marathon	MTU	Yes	Non-Isolated with Empty Tank	1.9	1	1.390	UUT 3
DS0060D6S		60	114.3	40	67.375	3300	Diesel Radiator	John Deere	Marathon	MTU	Yes	Non-Isolated with Full Tank	1.9	1	1.390	UUT 4
DS0600D6S		600	170	84	103.13	21000	Bearward	MTU	Marathon	MTU	Yes	Non-Isolated w/o Tank	2	1	1.440	UUT 5
DS0600D6S		600	170	84	103.13	21000	Bearward	MTU	Marathon	MTU	Yes	Isolated w/o Tank	2	1	4.500	UUT 6
DS0600D6S		600	170	84	103.13	21000	Bearward	MTU	Marathon	MTU	Yes	Non-Isolated with Empty Tank	2	1	1.440	UUT 7
DS0600D6S		600	170	84	103.13	21000	Bearward	MTU	Marathon	MTU	Yes	Non-Isolated with Full Tank	2	1	1.440	UUT 8
MTU 12V4000 DS1250	1250_XC6	1250	240	89	115	45000	Diesel Radiator	MTU	Marathon	MTU	No	Isolated w/o Tank	2	0	1.500	Interpolated
MTU 12V4000 DS1500	1500_XC6	1500	240	89	115	45000	Diesel Radiator	MTU	Marathon	MTU	No	Isolated w/o Tank	2	0	1.500	Interpolated
MTU 12V4000 DS1750	1750_XC6	1750	240	89	120	45000	Diesel Radiator	MTU	Marathon	MTU	No	Isolated w/o Tank	2	0	1.500	Interpolated
MTU 12V4000 DS1750	1750LXC6	1750	240	89	120	45000	Diesel Radiator	MTU	Marathon	MTU	No	Isolated w/o Tank	2	0	1.500	Interpolated
MTU 12V4000 DS2000	2000_XC6	2000	258	103	141	52000	Diesel Radiator	MTU	Marathon	MTU	No	Isolated w/o Tank	2	0	1.500	Interpolated
MTU 16V4000 DS2250	2250_XC6	2250	258	103	141	52000	Diesel Radiator	MTU	Marathon	MTU	No	Isolated w/o Tank	2	0	1.500	Interpolated
MTU 16V4000 DS2250	2250_XC6	2250	258	103	141	52000	Diesel Radiator	MTU	Marathon	MTU	No	Isolated w/o Tank	2	0	1.500	Interpolated
MTU 16V4000 DS2500 / MTU 20V4000 DS2500	2500_XC6	2500	272	122	141	60000	Diesel Radiator	MTU	Marathon	MTU	No	Isolated w/o Tank	2	0	1.500	Interpolated
MTU 20V4000 DS2800	2800_XC6	2800	272	122	141	60000	Diesel Radiator	MTU	Marathon	MTU	No	Isolated w/o Tank	2	0	1.500	Interpolated
MTU 20V4000 DS3000	3000_XC6	3000	272	122	141	60000	Diesel Radiator	MTU	Marathon	MTU	No	Isolated w/o Tank	2	0	1.500	Interpolated
MTU 20V4000 DS3250	3250_XC6	3250	308	114.13	130.5	60000	Diesel Radiator	MTU	Marathon	MTU	No	Isolated w/o Tank	2	0	1.500	UUT 9
MTU 20V4000 DS3250	3250LXC6DT2	3250	300	122	141	64000	Diesel Radiator	MTU	Kato	MTU	No	Isolated w/o Tank	2.2	0	1.643	UUT 1-1
MTU 20V4000 DS3250	3250LXC6DT2	3250	300	122	141	64000	Diesel Radiator	MTU	Kato	MTU	No	Isolated w/o Tank	1.2	1	2.745	UUT 1-2

1) All Enclosures shall be Carbon Steel
2) Dimensions are without Enclosures
3) Weights do not include fuel or enclosure

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-1

Model Line	Model Number	Manufacturer
1600	DS0060D6S	MTU Onsite Energy

Product Construction Summary

All enclosures and generator frames tested were of Carbon Steel Construction

Options / Subcomponent Summary

Radiator: Diesel Radiator; Engine: John Deere; Alternator: Marathon; Controls: MTU

UUT Properties

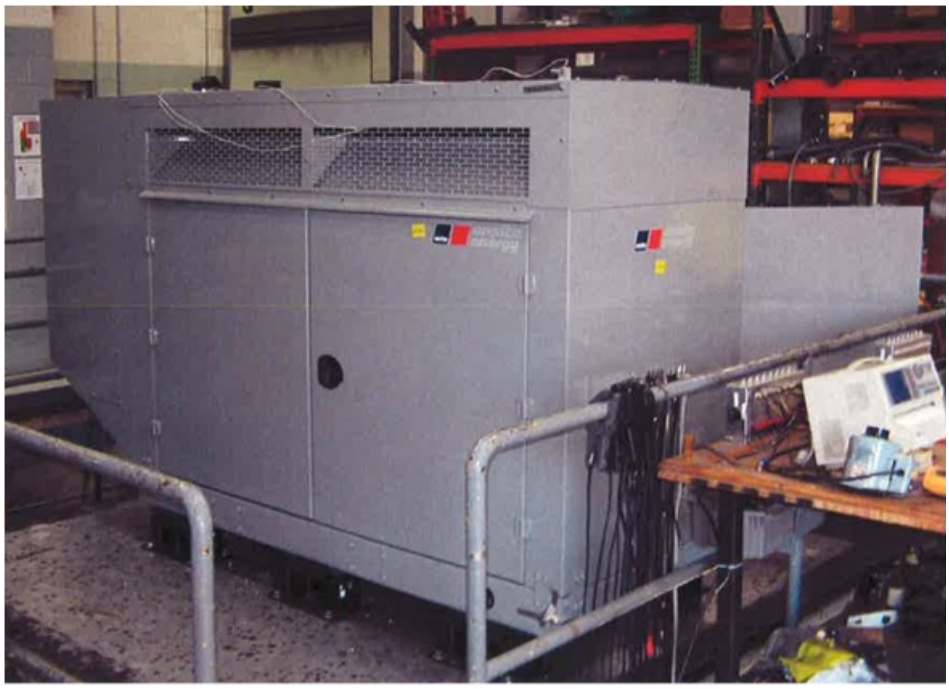
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
3,000	114.25	40	67.375	4.2	3.7	12.5

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 2016	ICC-ES AC156	1.93 g	1.0	1.5	3.09 g	2.32 g	1.29 g	0.51 g

Test Mounting Details

Genset Externally Isolated on (6) VMC MSS-1E Spring Isolators
Isolators attached to Fixture via (24) 5/8" Grade 8 Bolts



All units were filled with contents and maintained structural integrity and functionality

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-2

Model Line	Model Number	Manufacturer
1600	DS0060D6S	MTU Onsite Energy

Product Construction Summary

All enclosures and generator frames tested were of Carbon Steel Construction

Options / Subcomponent Summary

Radiator: Diesel Radiator; Engine: John Deere; Alternator: Marathon; Controls: MTU

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
3,000	114.25	40	67.375	2.2	1.7	1.7

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 2016	ICC-ES AC156	1.93 g	1.0	1.5	3.09 g	2.32 g	1.29 g	0.51 g

Test Mounting Details

Genset Attached to Fixture via (6) 5/8" Grade 8 Bolts

All units were filled with contents and maintained structural integrity and functionality

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-3

Model Line	Model Number	Manufacturer
1600	DS0060D6S	MTU Onsite Energy

Product Construction Summary

All enclosures and generator frames tested were of Carbon Steel Construction

Options / Subcomponent Summary

Radiator: Diesel Radiator; Engine: John Deere; Alternator: Marathon; Controls: MTU

UUT Properties

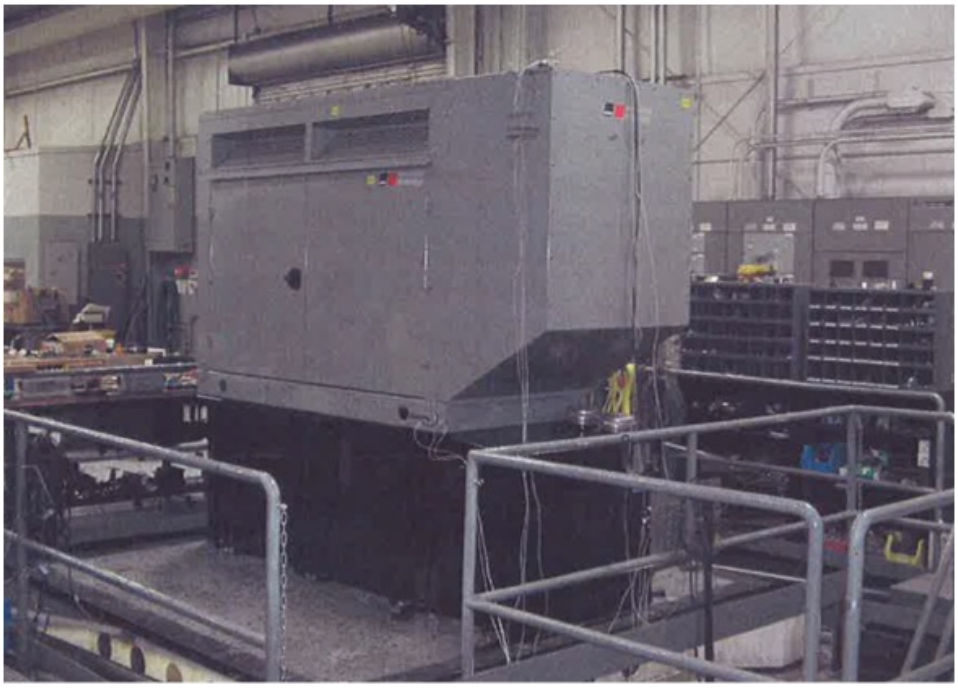
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
7,410	114.25	40	103.375	5.8	4	10.1

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 2016	ICC-ES AC156	1.93 g	1.0	1.5	3.09 g	2.32 g	1.29 g	0.51 g

Test Mounting Details

Genset Attached to Empty Tank via (6) 5/8" Grade 8 Bolts
Empty Tank Attached to Fixture via (8) 5/8" Grade 8 Bolts



All units were filled with contents and maintained structural integrity and functionality

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-4

Model Line	Model Number	Manufacturer
1600	DS0060D6S	MTU Onsite Energy

Product Construction Summary

All enclosures and generator frames tested were of Carbon Steel Construction

Options / Subcomponent Summary

Radiator: Diesel Radiator; Engine: John Deere; Alternator: Marathon; Controls: MTU

UUT Properties

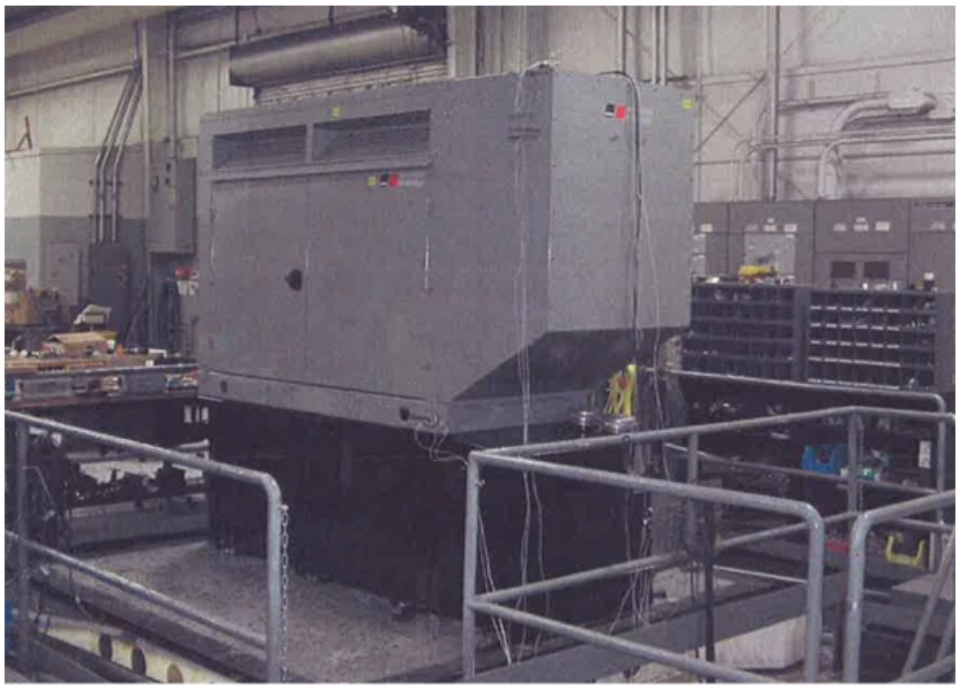
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
7,410	114.25	40	103.375	5.2	13.1	11.4

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 2016	ICC-ES AC156	1.93 g	1.0	1.5	3.09 g	2.32 g	1.29 g	0.51 g

Test Mounting Details

Genset Attached to Full Tank via (6) 5/8" Grade 8 Bolts
Full Tank Attached to Fixture via (8) 5/8" Grade 8 Bolts



All units were filled with contents and maintained structural integrity and functionality

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-5

Model Line	Model Number	Manufacturer
1600	DS0600D6S	MTU Onsite Energy

Product Construction Summary

All enclosures and generator frames tested were of Carbon Steel Construction

Options / Subcomponent Summary

Radiator: Bearward; Engine: MTU; Alternator: Marathon; Controls: MTU

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
16,220	170	84	103.125	15.7	7.7	9.6

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 2016	ICC-ES AC156	2.00 g	1.0	1.5	3.20 g	2.40 g	1.33 g	0.53 g

Test Mounting Details

Genset Attached to Fixture via (10) 3/4" Grade 8 Bolts

All units were filled with contents and maintained structural integrity and functionality

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-6

Model Line	Model Number	Manufacturer
1600	DS0600D6S	MTU Onsite Energy

Product Construction Summary

All enclosures and generator frames tested were of Carbon Steel Construction

Options / Subcomponent Summary

Radiator: Bearward; Engine: MTU; Alternator: Marathon; Controls: MTU

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
16,220	170	84	103.125	2.4	2.4	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 2016	ICC-ES AC156	2.00 g	1.0	1.5	3.20 g	2.40 g	1.33 g	0.53 g

Test Mounting Details

Genset Externally Isolated on (10) VMC MSSH-1E Spring Isolators
Attached to Fixture via (40) 3/4" Grade 8 Bolts

All units were filled with contents and maintained structural integrity and functionality

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-7

Model Line	Model Number	Manufacturer
1600	DS0600D6S	MTU Onsite Energy

Product Construction Summary

All enclosures and generator frames tested were of Carbon Steel Construction

Options / Subcomponent Summary

Radiator: Bearward; Engine: MTU; Alternator: Marathon; Controls: MTU

UUT Properties

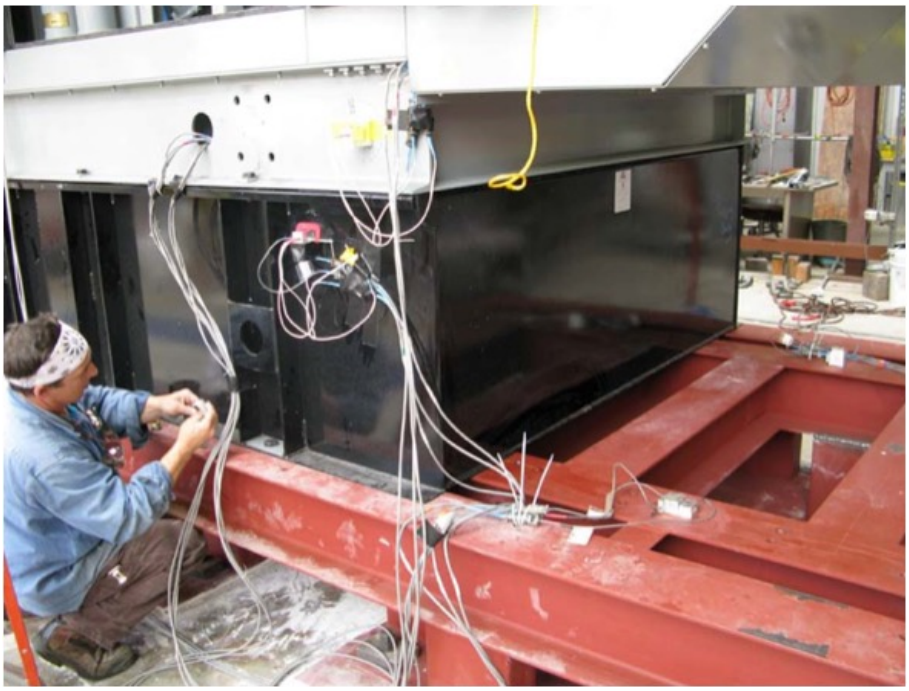
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
24,590	170	84	103.125	11.1	6.2	9.5

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 2016	ICC-ES AC156	2.00 g	1.0	1.5	3.20 g	2.40 g	1.33 g	0.53 g

Test Mounting Details

Genset Attached to Empty Tank via (10) 3/4" Grade 8 Bolts
Empty Tank Attached to Fixture via (10) 7/8" Grade 8 Bolts



All units were filled with contents and maintained structural integrity and functionality

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-8

Model Line	Model Number	Manufacturer
1600	DS0600D6S	MTU Onsite Energy

Product Construction Summary

All enclosures and generator frames tested were of Carbon Steel Construction

Options / Subcomponent Summary

Radiator: Bearward; Engine: MTU; Alternator: Marathon; Controls: MTU

UUT Properties

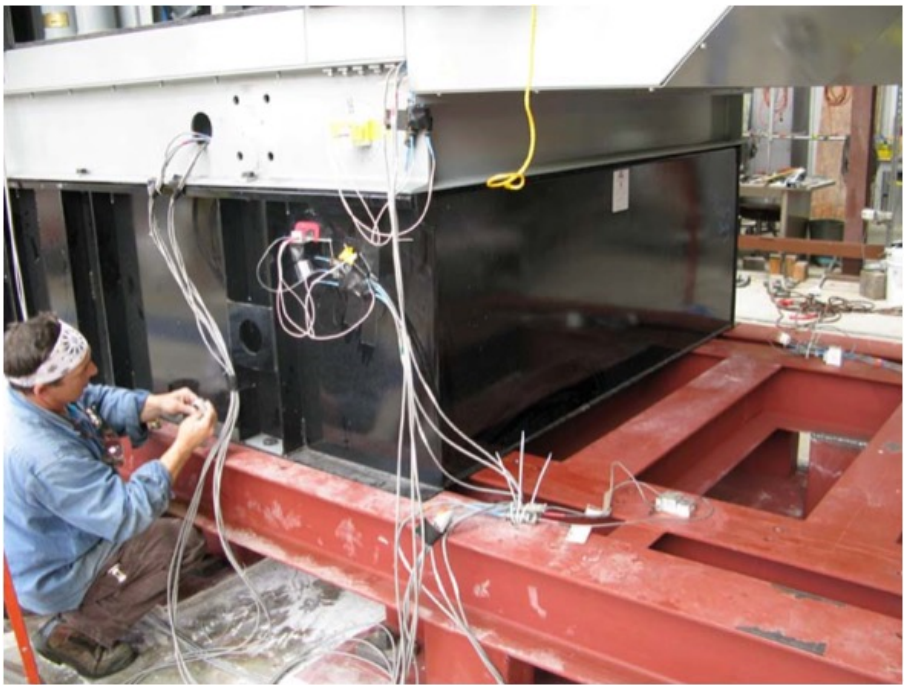
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
45,900	170	84	103.125	6.6	6.4	10.6

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 2016	ICC-ES AC156	2.00 g	1.0	1.5	3.20 g	2.40 g	1.33 g	0.53 g

Test Mounting Details

Genset Attached to Full Tank via (10) 3/4" Grade 8 Bolts
Full Tank Attached to Fixture via (10) 7/8" Grade 8 Bolts



All units were filled with contents and maintained structural integrity and functionality

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-9

Model Line	Model Number	Manufacturer
1600	MTU 20V4000 DS3250 / 3250_XC6	MTU Onsite Energy

Product Construction Summary

All enclosures and generator frames tested were of Carbon Steel Construction

Options / Subcomponent Summary

Radiator: Diesel Radiator; Engine: MTU; Alternator: Marathon; Controls: MTU

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
60,553	308	114.125	130.5	2.2	2.7	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 2016	ICC-ES AC156	2.00 g	1.0	1.5	3.20 g	2.40 g	1.33 g	0.53 g

Test Mounting Details

Genset Externally Isolated on (16) VMC M2SSH-1E Spring Isolators
Isolators attached to Fixture via (64) 3/4" Grade 8 Bolts

All units were filled with contents and maintained structural integrity and functionality

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-1-1

Model Line	Model Number	Manufacturer
1600	MTU 20V4000 DS3250 / 3250LXC6DT2	MTU Onsite Energy

Product Construction Summary

All enclosures and generator frames tested were of Carbon Steel Construction

Options / Subcomponent Summary

Radiator: Diesel Radiator; Engine: MTU; Alternator: Kato; Controls: MTU

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
61,500	300	121	141	1.8	1.9	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 2016	ICC-ES AC156	2.19 g	0.0	1.5	2.19 g	0.88 g	1.46 g	0.58 g

Test Mounting Details

Genset Externally Isolated on (16) VMC M2SSH-1E Spring Isolators
Isolators attached to Fixture via (64) 3/4" Grade 8 Bolts

All units were filled with contents and maintained structural integrity and functionality

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-1-2

Model Line	Model Number	Manufacturer
1600	MTU 20V4000 DS3250 / 3250LXC6DT2	MTU Onsite Energy

Product Construction Summary

All enclosures and generator frames tested were of Carbon Steel Construction

Options / Subcomponent Summary

Radiator: Diesel Radiator; Engine: MTU; Alternator: Kato; Controls: MTU

UUT Properties

Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
61,500	300	121	141	1.8	1.9	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 2016	ICC-ES AC156	1.22 g	1.0	1.5	1.95 g	1.46 g	0.81 g	0.33 g

Test Mounting Details

Genset Externally Isolated on (16) VMC M2SSH-1E Spring Isolators
Isolators attached to Fixture via (64) 3/4" Grade 8 Bolts

All units were filled with contents and maintained structural integrity and functionality