APPLICATION FOR HCAI SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0412

HCAI Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Caterpillar (N.I.) Ltd.

Manufacturer's Technical Representative: Ciaran O'Flaherty

Mailing Address: Old Glenarm Road, Larne, Northern Ireland, United Kingdom BT401EJ

Telephone: +44-28-2826-5348 Email: oflaherty_ciaran@cat.com

Product Information

Product Name: Emergency and Standby Power Systems

Product Model Number(s): C27/C32/3512/3516/C175

Product Category: Emergency and Standby Power Systems

Product Sub-Category: Generators

General Description: Diesel Powered Generators & Control Panels

Mounting Description: See Certified Product Tables

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: TRU Compliance, by Structural Integrity Associates, Inc.

Contact Person: Victoria Ahrens

Mailing Address: 5215 Hellyer Ave Suite 210, San Jose, CA 95138

Telephone: (541) 292-5820 Email: vahrens@structint.com

Title: Certification Engineer

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

Company Name: STRUCTURAL INTEGRITY ASSOCIATES, INC.

Name: LACHEZAR HANDZHIYSKI California License Number: S6515

Mailing Address: 5215 Hellyer Avenue, Suite 210, San Jose, CA 95138

Telephone: (669) 437-0200 Email: Lhandzhiyski@StructInt.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) 373-4565 Email: james.wilcoski@usace.army.mil

Company Name: ENVIRONMENTAL TESTING LABORATORIES, INC. (ETL)

Contact Person: Jeremy Lange

Mailing Address: 11034 Indian Trail, Dallas TX 75229-3513

Telephone: (972) 247-9657 Email: jeremy@etldallas.com

Company Name: UNIVERSITY OF CALIFORNIA, BERKELEY (PEER)

Contact Person: Amarnath Kasalanati

Mailing Address: 325 Davis Hall, Berkeley CA 94720-1729

Telephone: (510) 642-3437 Email: Amarnath1@berkeley.edu

Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) =	4.50 (Genset: SDS=2.00 @ z/h=1); 2.40 (Genset: SDS=3.20 @ z/h=0); 1.50 (Ctrl Panels: SDS=2.00 @ z/h=1); 1.44 (Ctrl Panel: SDS=3.20 @ z/h=0)
S_{DS} (Design spectral response acceleration at short period, g) =	2.00 (z/h = 1); 3.20 (z/h = 0)
a_p (Amplification factor) =	2.5
R_p (Response modification factor) =	2.0 (Gensets Isolated); 6.0 (Control Panels)
Ω_0 (System overstrength factor) =	2.0
I_p (Importance factor) =	1.5
z/h (Height ratio factor) =	1 and 0
Natural frequencies (Hz) =	See Attachment
Overall dimensions and weight =	See Attachment

HCAI Approval (For Office Use Only) - Approval Expires on 04/07/2031

Date: 4/7/2025

Name: Mohammad Karim Title: Supervisor, Health Facilities

BY: Mohammad Karim

DATE: 04/07/2025

Special Seismic Certification Valid Up to: S_{DS} (g) = 2.0 z/h = 1

Condition of Approval (if applicable):

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 2100427, Rev. 5

TRU COMPLIANCE

TABLE 1

Manufacturer: Caterpillar Inc.

Model Line: C27/C32/3512/3516/C175 Generator Set

Certified Product Construction Summary:

Carbon Steel Base. Carbon Steel Enclosure (C27/C32). Carbon steel UL-142 fuel tank.

Certified Options Summary:

C27 & C32 available with and without fuel tank (1000 gal. or 2000 gal.) and enclosure. C175-16 available with and without radiator.

Mounting Configuration:

On fuel tank: base mounted - rigid with internal isolation. Off fuel tank: base mounted - isolated

Note: Installed mounting must be of similar configuration and equivalent strength and stiffness to those tested.

Building Code: CBC 2022 ***Seismic Certification Limits:*** ***S_{DS}= 2.0 g z/h=1.0*** ***S_{DS}= 3.2 g z/h=0.0*** ***I_p = 1.5***

Model Line	Model	Dimensions (in)			Weight (lbs.)	Notes	UUT
		Depth	Width	Height			
C27 (≤800 kW)	Open – Min. package	163.1	72.0	87.0	14,050		Extrap.
	Open – Max. package	172.0	84.0	86.0	14,050		Extrap.
	Enclosed – No tank	300.0	100.0	111.9	22,827		Extrap.
	Enclosed – 1000 gal.	300.0	100.0	127.0	36,400		1
	Enclosed - 2000 gal.	300.0	100.0	136.0	43,660		Interp.
C32 (≤1250 kW)	Open – Min. package	166.7	79.1	85.0	18,200		Interp.
	Open – Max. package	190.0	88.0	119.0	18,540		10
	Enclosed – No tank	300.0	100.0	111.9	25,300		Interp.
	Enclosed – 1000 gal.	300.0	100.0	127.0	38,806		Interp.
	Enclosed - 2000 gal.	300.0	100.0	136.0	46,130		2
C32B (≤1500 kW)	Open - Min. package	191.4	89.3	100.6	20,177		Interp.
	Open - Max. package	200.0	96.0	100.6	21,750		20
3512 (≤1250 kW)	Min. package	199.0	77.8	93.2	34,620		Interp.
	Max. package	212.6	81.6	93.2	34,620		Interp.
3512B (≤1500 kW)	Max. package	231.0	78.0	93.0	33,204		Interp.
3512B-HD (≤1500 kW)	Max. package	231.0	78.0	93.0	33,689		Interp.
3512C (≤1500 kW)	Max. package	233.1	89.8	110.0	38,688		Interp.
3512C-HD (≤1750 kW)	Max. package	243.2	89.8	110.0	40,660		Interp.
3516 (≤1600 kW)	Min. package	232.9	90.0	93.2	41,796		Interp.
	Max. package	246.0	90.0	93.2	41,796		Interp.
3516B (≤2250 kW)	Max. package	275.0	102.0	98.0	39,666		Interp.
3516B-HD (≤2000 kW)	Max. package	272.0	90.0	98.0	39,913		Interp.
3516C (≤2000 kW)	Min. package	253.3	93.7	116.5	44,708		Interp.
	Max. package	271.9	93.7	116.5	44,708		Interp.

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 2100427, Rev. 5

TRU COMPLIANCE

Manufacturer:	Caterpillar Inc.
Model Line:	C27/C32/3512/3516/C175 Generator Set

TABLE 1

Certified Product Construction Summary:

Carbon Steel Base. Carbon Steel Enclosure (C27/C32). Carbon steel UL-142 fuel tank.

Certified Options Summary:

C27 & C32 available with and without fuel tank (1000 gal. or 2000 gal.) and enclosure. C175-16 available with and without radiator.

Mounting Configuration:

On fuel tank: base mounted - rigid with internal isolation. Off fuel tank: base mounted - isolated

Note: Installed mounting must be of similar configuration and equivalent strength and stiffness to those tested.

Building Code: CBC 2022 | ***Seismic Certification Limits:*** S_{DS}= *2.0 g z/h=1.0*; S_{DS}= *3.2 g z/h=0.0* | I_p = *1.5*

Model Line	Model	Dimensions (in)			Weight (lbs.)	Notes	UUT
		Depth	Width	Height			
3516C-HD (≤2500 kW)	Min. package	257.3	100.9	123.2	43,139		12
	Max. package	277.0	120.0	109.0	44,175		3
3516E (≤2750 kW)	Max. package	324.0	104.0	128.0	51,000		11
C175-16 (≤3100 kW)	Min. package	300.8	108.5	130.2	61,192		Interp.
	Max. package	307.0	114.0	134.0	61,192		4

SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 2100427, Rev. 5

TABLE 2

Manufacturer: Caterpillar Inc.
Model Line: C27/C32/3512/3516/C175 Generator Set

Certified Product Construction Summary:
Carbon Steel Enclosure

Certified Options Summary:
ICE Box: Small or Large Display

Mounting Configuration:
Wall mounted - rigid or equipment mounted
Note: Installed mounting must be of similar configuration and equivalent strength and stiffness to those tested.

Building Code: CBC 2022 ***Seismic Certification Limits:*** S_{DS}= *2.0 g* *z/h=1.0* S_{DS}= *3.2 g* *z/h = 0.0* I_P= *1.5*

Model Line	Model	Dimensions (in)			Weight (lbs.)	Notes	UUT
		Depth	Width	Height			
ICE Control Panel w/ EMCP 4 Controller (Caterpillar)[1]	ICE - Small Display	16.0	28.0	18.0	105	*UUT6 on equipment* *UUT8 wall mount*	6, 8
	ICE - Large Display	16.0	28.0	18.0	110	*UUT7 on equipment* *UUT9 wall mount*	7, 9
Caterpillar® Energy Control System (ECS)	Cat ECS 100 (622-3612 & 621-9888)	8.5	28.0	18.5	95	*UUT16 on equipment* *UUT17 wall mount*	16, 17
	Cat ECS 200 (631-2323)	8.5	28.0	53.0	154	*UUT16 on equipment* *UUT19 wall mount*	16, 19
Cat GCCP Controller	Cat GCCP1.2 (634-5258)	8.5	28.0	18.5	68	*UUT16 & UUT20 on equipment* *UUT18 wall mount*	16, 18, 20

SPECIAL SEISMIC CERTIFICATION
CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 2100427, Rev. 5

Manufacturer: Caterpillar Inc.
Model Line: C27/C32/3512/3516/C175 Generator Set
Table Description: Standard Components

TABLE 3

Building Code: CBC 2022
Seismic Certification Limits: S_{DS} = 2.0 g z/h = 1.0; S_{DS} = 3.2 g z/h = 0.0; I_P = 1.5

Component Type	Manufacturer	Model	Description	Notes	UUT
Radiator[1]	AKG	25.5SF		*939 lbs.*	1
		27.5SF		*1,433 lbs.*	2
		AB23	508-8112 / 508-8113	*701 lbs. / 792 lbs.*	Interp.
		AB24		*1236 lbs.*	15a
		AB26		*1355 lbs.*	15b
	Young Touchstone	44SF		*6,356 lbs.*	Extrap.
		50SF		*7,535 lbs.*	Extrap.
		56SF		*8,008 lbs.*	3
		64SF		*8,645 lbs.*	Interp.
		73SF		*9,324 lbs.*	Interp.
		84SF		*12,400 lbs.*	4
	Modine	25SF		*1,774 lbs.*	10
		A38AV		*2,161 lbs.*	20
	Caterpillar Inc.	A48	Caterpillar designed with Modine coolers	*2,428 lbs.*	14a
		A59[2]	Caterpillar designed with Yinlun coolers	*4,150 lbs.*	21
		A59	Caterpillar designed with Modine coolers	*4,758 lbs.*	Interp.
		A68[2]	Caterpillar designed with Yinlun coolers	*4,800 lbs.*	22
		A68	Caterpillar designed with Modine coolers	*5,102 lbs.*	12
		69SF	Caterpillar designed with Modine coolers	*8,884 lbs.*	Interp.
		81SF	Caterpillar designed with Modine coolers	*9,965 lbs.*	11

Notes:

1. *Radiators are documented with dry weight.*

2. *Radiators shall not have any rigid connections to other components, except for the tested connections at the base.*

SPECIAL SEISMIC CERTIFICATION
CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 2100427, Rev. 5

TABLE 3

Manufacturer: Caterpillar Inc. ***Table Description:*** Standard Components
Model Line: C27/C32/3512/3516/C175 Generator Set

Building Code: CBC 2022 ***Seismic Certification Limits:*** S_{DS} = 2.0 g z/h = 1.0; S_{DS} = 3.2 g z/h = 0.0 I_P = 1.5

Component Type	Manufacturer	Model	Description	Notes	UUT
Radiator[1]	Caterpillar Inc.	37CT	Caterpillar designed with Modine coolers	*2,258 lbs.*	Interp.
		37CTD	Caterpillar designed with Modine coolers	*2,258 lbs.*	Interp.
		44CT	Caterpillar designed with Modine coolers	*2,427 lbs.*	Interp.
		44CTD	Caterpillar designed with Modine coolers	*2,427 lbs.*	Interp.
		48 CTD	Caterpillar designed with Modine coolers	*2,463 lbs.*	Interp.
		59CTD	Caterpillar designed with Modine coolers	*3,380 lbs.*	14b
Generator	Leroy-Somer	1200 Frame		*5,155 lbs.*	1
		1400 Frame		*7,277 lbs.*	2, 10
		1600 Frame		*10,496 lbs.*	Interp.
		1646 Frame		*8,514 lbs.*	20
		1800 Frame		*12,924 lbs*	Interp.
		2700 Frame		*16,178 lbs.*	Interp.
		3000 Frame		*20,043 lbs.*	3, 4, 11, 12

Notes:

1. *Radiators are documented with dry weight.*

SPECIAL SEISMIC CERTIFICATION
CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 2100427, Rev. 5

TRU COMPLIANCE

Manufacturer:	Caterpillar Inc.	***Table Description:*** Electronics and Controls	**TABLE 4**
Model Line:	C27/C32/3512/3516/C175 Generator Set		

Building Code: CBC 2022 ***Seismic Certification Limits:*** $S_{DS} = 2.0\,g$ $z/h = 1.0$; $S_{DS} = 3.2\,g$ $z/h = 0.0$; $I_P = 1.5$

Component Type	Manufacturer	Model	Description	Notes	UUT
Global Design Box w/ EMCP 4 Controller	Caterpillar	Base	Global Design Box controller		1, 2
		Side Extension Box	Side extension for Global Design Box		1, 2
		Rear Extension Box	Rear extension for Global Design Box		2
Molded Case Circuit Breaker	Schneider	NSJ Frame	14 lbs., 600A max		Extrap.
		L Frame	14 lbs., 600A max		Extrap.
		P Frame	32 lbs., 1,200A max		1
		R Frame	52 lbs., 3,000A max		7
		NT Frame	245 lbs., 5,000A max		2, 7
ICE Box	Caterpillar	Base	ICE Box controller		6, 7
		Side Extension Box	Side extension box for ICE Box	*UUT7: Qty (2)*	7
		Rear Extension Box	Rear extension box for ICE Box	*UUT7: Qty (1)*	6
		ICE Box - small display	ICE Control Panel w/ EMCP 4 Controller	*On equipment or remote mount*	6, 8
		ICE Box - large display	ICE Control Panel w/ EMCP 4 Controller	*On equipment or remote mount*	7, 9, 10

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SPECIAL SEISMIC CERTIFICATION
CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 2100427, Rev. 5

TRU COMPLIANCE

Manufacturer: Caterpillar Inc.
Model Line: C27/C32/3512/3516/C175 Generator Set

Table Description: Optional Components

TABLE 5

Building Code: CBC 2022

Seismic Certification Limits: $S_{DS} = 2.0\,g \quad z/h = 1.0$; $S_{DS} = 3.2\,g \quad z/h = 0.0$; $I_P = 1.5$

Component Type	Manufacturer	Model	Description	Notes	UUT
Silencer	Miratech	3972005	Exhaust Silencer		1
	Silex	3906968	Exhaust Silencer		2
Space Heater	Berko	HUHAA	480V 3-phase Heater		1, 2
Louvers	Ruskin	396-5818	Motorized Louver		1, 2
Jacket Water Heater	Hotstart	CSM Hotflow - 9kW	9KW Coolant Preheater		1, 2, 3
		CSM Hotflow - 12kW	12KW Coolant Preheater		4
Electrical Panel	Square D	QO Load Center	Electrical Panel Enclosure		1, 2
Battery Charger	Stored Energy Sys.	NRG 24	Genset engine Start Battery Charger		1, 2

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

Manufacturer: Caterpillar Inc.

Model Line: C27/C32/3512/3516/C175 Generator Set

UUT	Unit Description (Mounting)	Report Number (UUT#)	Testing Lab	Year Tested	ISO 17025 Accredited?	S_{DS}	z/h	I_P
1	C27 Gen. Set - Enclosed w/ 1000 Gal. Tank (base mounted - rigid)	2013-0764-TR-001 (UUT1)	ERDC-CERL	2014	No [1]	2.00 3.20	1.0 0.0	1.5
2	C32 Gen. Set - Enclosed w/ 2000 Gal. Tank (base mounted - rigid)	2013-0764-TR-001 (UUT2)	ERDC-CERL	2014	No [1]	2.00 3.20	1.0 0.0	1.5
3	3516C HD Generator Set (base mounted - isolated)	2013-0764-TR-001 (UUT3)	ERDC-CERL	2014	No [1]	2.00 3.20	1.0 0.0	1.5
4	C175-16 Generator Set (base mounted - isolated)	2013-0764-TR-001 (UUT4)	ERDC-CERL	2014	No [1]	2.00 3.20	1.0 0.0	1.5
5	NOT USED							
6a	ICE Box - min (base mounted - rigid)	14175, Rev. 1 (UUT6 Rigid)	Environmental Testing Lab (ETL)	2016	Yes	2.00 3.20	1.0 0.0	1.5
6b	ICE Box - min (base mounted - isolated)	14175, Rev. 1 (UUT6 Isolated)	Environmental Testing Lab (ETL)	2016	Yes	2.00 3.20	1.0 0.0	1.5
7a	ICE Box - max (base mounted - rigid)	14175, Rev. 1 (UUT7 Rigid)	Environmental Testing Lab (ETL)	2016	Yes	2.00 3.20	1.0 0.0	1.5
7b	ICE Box - max (base mounted - isolated)	14175, Rev. 1 (UUT7 Isolated)	Environmental Testing Lab (ETL)	2016	Yes	2.00 3.20	1.0 0.0	1.5
8	ICE Box 1 (wall mounted - rigid)	14175, Rev. 1 (UUT8)	Environmental Testing Lab (ETL)	2016	Yes	2.00 3.20	1.0 0.0	1.5
9	ICE Box 2 (wall mounted - rigid)	14175, Rev. 1 (UUT9)	Environmental Testing Lab (ETL)	2016	Yes	2.00 3.20	1.0 0.0	1.5

Notes:

1. *ERDC-CERL is not ISO 17025 accredited but has been reviewed by TRU Compliance and found to meet the requirements for ICC-ES AC156 testing. Review form is on file with TRU Compliance.*

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

Manufacturer: Caterpillar Inc.

Model Line: C27/C32/3512/3516/C175 Generator Set

UUT	Unit Description (Mounting)	Report Number (UUT#)	Testing Lab	Year Tested	ISO 17025 Accredited?	S_{DS}	z/h	I_P
10	C32 - Generator Set (base mounted - isolated)	1700630-TR-001 (UUT10)	Pacific Earthquake (PEER)	2017	Yes	2.00 3.20	1.0 0.0	1.5
11	3516E - Generator Set (base mounted - isolated)	1700630-TR-001 (UUT11)	Pacific Earthquake (PEER)	2017	Yes	2.00 3.20	1.0 0.0	1.5
12	3516C - Generator Set (base mounted - isolated)	1900323-TR-001 (UUT1)	ERDC-CERL	2020	No [1]	2.00 3.20	1.0 0.0	1.5
13	NOT USED							
14a	3512 Opt Radiator (base mounted - isolated)	2100427-TR-001 (UUT1.1)	Environmental Testing Lab (ETL)	2022	Yes	2.00 3.20	1.0 0.0	1.5
14b	3512 Fresco Rad (base mounted - isolated)	2100427-TR-001 (UUT1.2)	Environmental Testing Lab (ETL)	2022	Yes	2.00 3.20	1.0 0.0	1.5
15a	C32 49CTD Rad. (base mounted - isolated)	2100427-TR-001 (UUT2.1)	Environmental Testing Lab (ETL)	2022	Yes	2.00 3.20	1.0 0.0	1.5
15b	C32 49CTD Rad. (base mounted - isolated)	2100427-TR-001 (UUT2.2)	Environmental Testing Lab (ETL)	2022	Yes	2.00 3.20	1.0 0.0	1.5
16	Doghouse w/ ECS 100, ECS 200 & GCCP1.2 (base mounted - isolated)	2300056-TR-001 (UUT1)	Environmental Testing Lab (ETL)	2023	Yes	2.00 3.20	1.0 0.0	1.5
17	Cat ECS 100 (622-3612 & 621-9888) (wall mounted - rigid)	2300056-TR-001 (UUT2)	Environmental Testing Lab (ETL)	2023	Yes	2.00 3.20	1.0 0.0	1.5
18	Cat GCCP1.2 (634-5258) (wall mounted - rigid)	2300056-TR-001 (UUT3)	Environmental Testing Lab (ETL)	2023	Yes	2.00 3.20	1.0 0.0	1.5

Notes:

1. *ERDC-CERL is not ISO 17025 accredited but has been reviewed by TRU Compliance and found to meet the requirements for ICC-ES AC156 testing. Review form is on file with TRU Compliance.*

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

Manufacturer: Caterpillar Inc.

Model Line: C27/C32/3512/3516/C175 Generator Set

UUT	Unit Description (Mounting)	Report Number (UUT#)	Testing Lab	Year Tested	ISO 17025 Accredited?	S_{DS}	z/h	I_P
19	Cat ECS 200 (631-2323) (wall mounted - rigid)	2300056-TR-001 (UUT4)	Environmental Testing Lab (ETL)	2023	Yes	2.00 3.20	1.0 0.0	1.5
20	C32B Gen. Set (base mounted - isolated)	2301377-TR-001 (UUT1)	ERDC-CERL	2024	No [1]	2.00 3.20	1.0 0.0	1.5
21	A59 Radiator (base mounted - isolated)	2400776-TR-001 (UUT1)	ERDC-CERL	2024	No [1]	2.00 3.20	1.0 0.0	1.5
22	A68 Radiator (base mounted - isolated)	2400776-TR-001 (UUT2)	ERDC-CERL	2024	No [1]	2.00 3.20	1.0 0.0	1.5

Notes:

1. *ERDC-CERL is not ISO 17025 accredited but has been reviewed by TRU Compliance and found to meet the requirements for ICC-ES AC156 testing. Review form is on file with TRU Compliance.*

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 1

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*C27 Generator Set – Enclosed w/ 1000 Gal. Tank*
Serial Number:	*N/A*
Test Report:	*2013-0764-TR-001 (UUT1)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
36,400	300.0	100.0	127.0	4.6	4.0	8.0

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon steel enclosure, carbon steel base, carbon steel UL-142 fuel tank.

Options/Subcomponent Summary:

Description	*Part Number*
C27 (≤800 kW)	*Enclosed - 1000 gal*
Battery Charger (Stored Energy System)	*NRG 24*
Electrical Panel (Square D)	*QO Load Center*
Generator (Leroy-Somer)	*1200 Frame*
Global Design Box w/ EMCP 4 Controller (Caterpillar)	*Base and side extension box*
Jacket Water Heater (Hotstart)	*CSM Hotflow - 9kW*
Louvers (Ruskin)	*396-5818*
Molded Case Circuit Breaker (Schneider)	*P Frame*
Radiator (AKG)	*25.5 SF*
Silencer (Miratech)	*3972005*
Spacer Heater (Berko)	*HUHAA*

Test Mounting Details:

UUT1 was base mounted - rigid to test fixture using sixteen (16) 3/4" Grade 8 bolts and is internally isolated with six (6) M4SSH-57K-400 spring isolators. Twenty-four (24) 5/8" Grade 8 bolts are used to mount the isolators to the fuel tank.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 2

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*C32 Generator Set – Enclosed w/ 2000 Gal. Tank*
Serial Number:	*N/A*
Test Report:	*2013-0764-TR-001 (UUT2)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
46,130	300.0	100.0	136.0	4.3	3.8	8.0

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon steel enclosure, carbon steel base, carbon steel UL-142 fuel tank.

Options/Subcomponent Summary:

Description	*Part Number*
C32 (≤1250 kW)	*Enclosed - 2000 gal.*
Battery Charger (Stored Energy System)	*NRG 24*
Electrical Panel (Square D)	*QO Load Center*
Generator (Leroy-Somer)	*1400 Frame*
Global Design Box w/ EMCP 4 Controller (Caterpillar)	*Base, side and rear extension box*
Jacket Water Heater (Hotstart)	*CSM Hotflow - 9kW*
Louvers (Ruskin)	*396-5818*
Molded Case Circuit Breaker (Schneider)	*NT Frame*
Radiator (AKG)	*27.5 SF*
Silencer (Silex)	*3906968*
Spacer Heater (Berko)	*HUHAA*

Test Mounting Details:

UUT2 was base mounted - rigid to test fixture using sixteen (16) 3/4" Grade 8 bolts and is internally isolated with six (6) M4SSH-57K-400 spring isolators. Twenty-four (24) 5/8" Grade 8 bolts are used to mount the isolators to the fuel tank.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 3

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*3516C HD Generator Set*
Serial Number:	*N/A*
Test Report:	*2013-0764-TR-001 (UUT3)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
44,175	277.0	120.0	109.0	3.7	3.9	8.2

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Base

Options/Subcomponent Summary:

Description	*Part Number*
3516C-HD (≤2500 kW)	*Max. Package*
Generator (Leroy-Somer)	*3000 Frame*
Jacket Water Heater (Hotstart)	*CSM Hotflow - 9kW*
Radiator (Young Touchstone)	*56SF*

Test Mounting Details:

UUT3 was base mounted - isolated to test fixture using sixteen (16) VMC M2SSH-1E spring isolators. Sixty-four (64) 3/4" Grade 8 bolts are used to mount the isolators to the test fixture.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 4

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*C175-16 Generator Set*
Serial Number:	*N/A*
Test Report:	*2013-0764-TR-001 (UUT4)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
61,192	307.0	114.0	134.0	3.5	3.3	7.7

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Base

Options/Subcomponent Summary:

Description	*Part Number*
C175-16 (≤3100 kW)	*Max. Package*
Generator (Leroy-Somer)	*3000 Frame*
Jacket Water Heater (Hotstart)	*CSM Hotflow - 12kW*
Radiator (Young Touchstone)	*84SF*

Test Mounting Details:

UUT4 was base mounted - isolated to test fixture using eighteen (18) VMC M2SSH-1E spring isolators. Seventy-two (72) 3/4" Grade 8 bolts are used to mount the isolators to the test fixture.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 6a

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*ICE Box - Min*
Serial Number:	*N/A*
Test Report:	*14175 (UUT6 Rigid)*

UUT Properties

Weight (lbs.)[1]	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
3,270	45.0	37.0	66.0	8.26	13.93	14.83

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Enclosure

Options/Subcomponent Summary:

Description	*Part Number*
ICE Box (Caterpillar)	*Base controller, rear extension box, and small display*
ICE Control Panel w/ EMCP 4 Controller (Caterpillar)	*Small Display*

Test Mounting Details:

[1] Weight is of UUT and the equipment mounting skid.

Test Mounting Details:

UUT6a was base mounted - rigid to the test fixture using six (6) 3/4" Grade 8 bolts.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

TRU COMPLIANCE

Manufacturer:	*Caterpillar Inc.*		**UUT 6b**
Model Line:	*C27/C32/3512/3516/C175 Generator Set*		
Model Number:	*ICE Box - Min*		
Serial Number:	*N/A*	***Test Report:***	*14175 (UUT6 Isolated)*

UUT Properties

Weight (lbs.)[1]	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
3,270	45.0	37.0	66.0	3.15	4.00	7.74

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Enclosure

Options/Subcomponent Summary:

Description	***Part Number***
ICE Box (Caterpillar)	*Base controller, rear extension box, and small display*
ICE Control Panel w/ EMCP 4 Controller (Caterpillar)	*Small Display*

Test Mounting Details:

[1] Weight is of UUT and the equipment mounting skid.

Test Mounting Details:

UUT6b was base mounted - isolated to the fixture using six (6) Mason SSLFH-C-1750 isolators using one (1) 5/8" Grade 8 bolt each. The isolators were mounted to the table using two (2) 5/8" Grade 8 bolts each.

Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 7a

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*ICE Box - Max*
Serial Number:	*N/A*
Test Report:	*14175 (UUT7 Rigid)*

UUT Properties

Weight (lbs.)[1]	Dimension (in) [2]			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
3,270	45.0	84.0	66.0	5.99	7.62	31.02

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Enclosure

Options/Subcomponent Summary:

Description	*Part Number*
Molded Case Circuit Breaker (Schneider)	*R and NT Frame*
ICE Box (Caterpillar)	*Base controller, side extension box, and large display*
ICE Control Panel w/ EMCP 4 Controller (Caterpillar)	*Large Display*

Test Mounting Details:

[1] Weight is of UUT and the equipment mounting skid.

[2] The width dimension is the combination of the Box and Panel.

Test Mounting Details:

UUT7a was base mounted - rigid to the test fixture using six (6) 3/4" Grade 8 bolts.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 7b

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*ICE Box - Max*
Serial Number:	*N/A*
Test Report:	*14175 (UUT7 Isolated)*

UUT Properties

Weight (lbs.)[1]	Dimension (in) [2]			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
3,270	45.0	84.0	66.0	3.15	5.83	4.88

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Enclosure

Options/Subcomponent Summary:

Description	*Part Number*
Molded Case Circuit Breaker (Schneider)	*R and NT Frame*
ICE Box (Caterpillar)	*Base controller, side extension box, and large display*
ICE Control Panel w/ EMCP 4 Controller (Caterpillar)	*Large Display*

Test Mounting Details:

[1] Weight is of UUT and the equipment mounting skid.

[2] The width dimension is the combination of the Box and Panel.

Test Mounting Details:

UUT7b was base mounted - isolated to the fixture using six (6) Mason SSLFH-C-1750 isolators using one (1) 5/8" Grade 8 bolt each. The isolators were mounted to the table using two (2) 5/8" Grade 8 bolts each.

Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 8

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*ICE Box 1*
Serial Number:	*N/A*
Test Report:	*14175 (UUT8)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
105	16.0	28.0	18.0	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Enclosure

Options/Subcomponent Summary:

Description	*Part Number*
ICE Box (Caterpillar)	*Small Display*
ICE Control Panel w/ EMCP 4 Controller (Caterpillar)	*Small Display*

Test Mounting Details:

UUT8 was wall mounted - rigid using twelve (12) 1/4" lag screws. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 9

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*ICE Box 2*
Serial Number:	*N/A*
Test Report:	*14175 (UUT9)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
110	16.0	28.0	18.0	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Enclosure

Options/Subcomponent Summary:

Description	*Part Number*
ICE Box (Caterpillar)	*Large Display*
ICE Control Panel w/ EMCP 4 Controller (Caterpillar)	*Large Display*

Test Mounting Details:

UUT9 was wall mounted - rigid using twelve (12) 1/4" lag screws. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 10

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*C32 - Generator Set*
Serial Number:	*N/A*
Test Report:	*1700630-TR-001 (UUT10)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
18,540	190.0	88.0	119.0	2.9	2.0	4.5

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

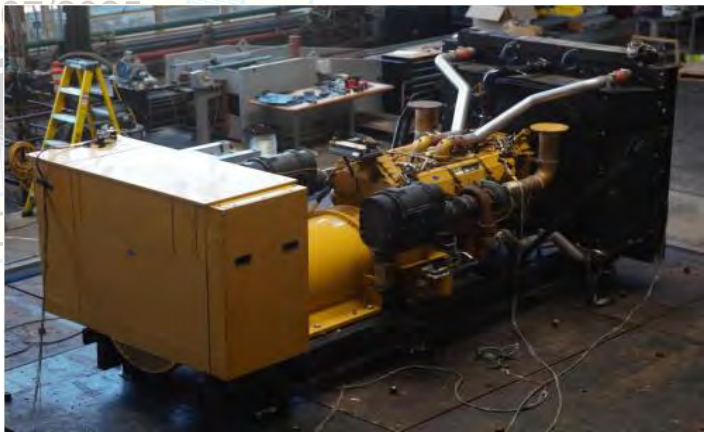
Product Construction Summary:

Carbon Steel Base

Options/Subcomponent Summary:

Description	*Part Number*
C32 (≤1250 kW)	*Open - Max. Package*
Generator (Leroy-Somer)	*1400 Frame*
ICE Box (Caterpillar)	*Large Display*
Radiator (Modine)	*25SF*

Test Mounting Details:



UUT10 was base mounted to test fixture using six (6) VMC M2SSH-1E 5150 spring isolators (and included hardware). Twelve (12) 3/4" Grade 8 bolts are used to mount the isolators to the test fixture.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 11

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*3516E - Generator Set*
Serial Number:	*N/A*
Test Report:	*1700630-TR-001 (UUT11)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
51,000	324.0	104.0	128.0	3.0	2.3	4.2

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Base

Options/Subcomponent Summary:

Description	*Part Number*
C516E (≤2750 kW)	*Max. Package*
Generator (Leroy-Somer)	*3000 Frame*
Radiator (Caterpillar)	*81SF*

Test Mounting Details:

UUT11 was base mounted to test fixture using fourteen (14) VMC M2SSH-1E 5150 spring isolators (and included hardware). The isolators were welded to the test fixture using three (3) 1" long 5/16" fillet welds along the long sides, and a 5/16" fillet weld along the entire length of the short sides.

Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 12

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*3516C - Generator Set*
Serial Number:	*N/A*
Test Report:	*1900323-TR-001-R0 (UUT1)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
43,139	257.3	100.9	123.2	3.3	3.3	5.6

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

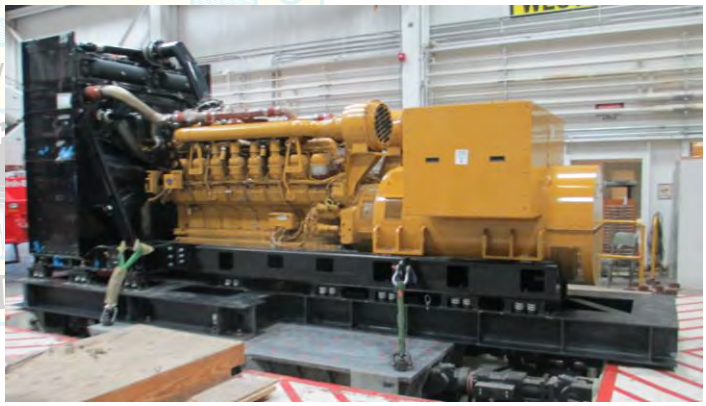
Product Construction Summary:

Carbon Steel Base

Options/Subcomponent Summary:

Description	*Part Number*
C516C-HD (≤2500 kW)	*Min. Package*
Generator (Leroy-Somer)	*3000 Frame*
Radiator (Caterpillar)	*A68*

Test Mounting Details:



UUT12 was base mounted to test fixture using ten (10) VMC M2SSH-1E 6500 spring isolators (with included hardware and added flat washer / under engine and alternator) and six (6) VMC M2SSH-1E 5150 spring isolators (with included hardware and added flat washer / under radiator). The isolators were welded to the test fixture using three (3) 2" long 5/16" fillet welds along the long sides, and a 5/16" fillet weld along the entire length of the short sides.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 14a

Manufacturer:	*Caterpillar Inc.*
Model Line:	*3512 Opt Radiator*
Model Number:	*607-9886*
Serial Number:	*2611476604*
Test Report:	*2100427-TR-001-R0 (UUT1.1)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
2,428	89.0	27.0	100.0	8.41	9.72	7.99

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Base

Options/Subcomponent Summary:

Description	*Part Number*
3512 Opt. Radiator (Caterpillar with Modine coolers)	*A48*

Test Mounting Details:

Test Mounting Details:

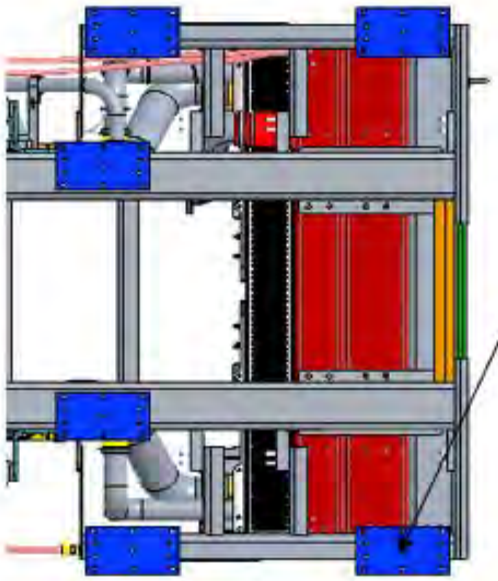
UUT14a was base mounted using six (6) CAT 353-9020 isolators were mounted to the bottom of the unit. See drawing below of isolator specs. Each isolator was mounted to the shake table with two (2) 3/4" Grade 5 Bolts and washers (12 total).
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

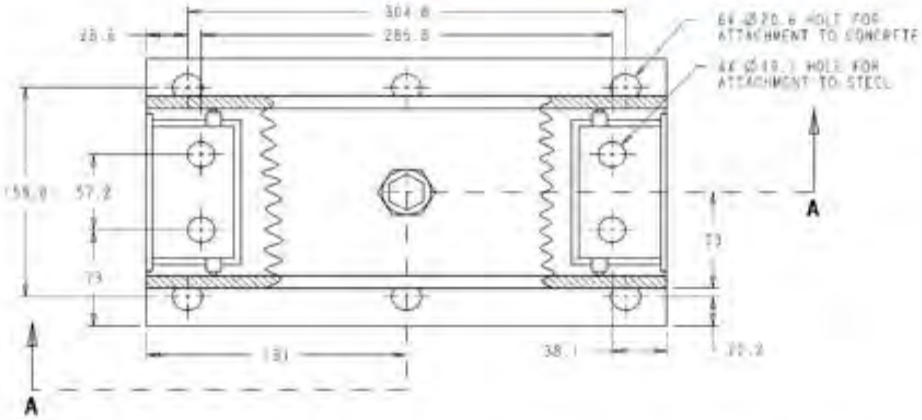
UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

Manufacturer:	*Caterpillar Inc.*	**UUT 14a**	
Model Line:	*3512 Opt Radiator*		
Model Number:	*607-9886*		
Serial Number:	*2611476604*	***Test Report:***	*2100427-TR-001-R0 (UUT1.1)*

Mounting Details:





SEISMICALLY RESTRAINED VIBRATION ISOLATOR 1" DEFLECTION				
RATED LOAD (LBS)	RATED DEFLECTION (IN)	SPRING RATE (LBS/IN)	SOLID LOAD (LBS)	COLOR CODE
5150	1.11	4626	7734	WHITE/ DK. PURPLE

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 14b

Manufacturer:	*Caterpillar Inc.*
Model Line:	*3512 Fresco Rad*
Model Number:	*572-8370*
Serial Number:	*2202-1903000201*
Test Report:	*2100427-TR-001-R0 (UUT1.2)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
3,380	98.0	25.0	108.0	5.84	9.49	9.57

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Base

Options/Subcomponent Summary:

Description	*Part Number*
Fresco Radiator (Caterpillar with Modine coolers)	*59CTD*

Test Mounting Details:

Test Mounting Details:

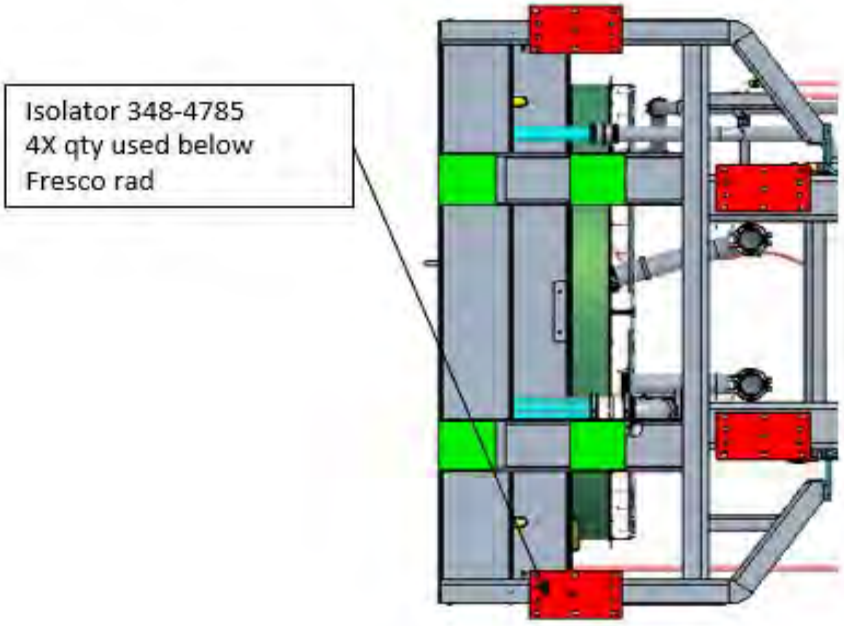
UUT14b was base mounted using four (4) CAT 348-4785 isolators were mounted to the bottom of the unit. See drawing below of isolator specs. Each isolator was mounted to the shake table with two (2) 3/4" Grade 5 Bolts and washers (8 total).
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

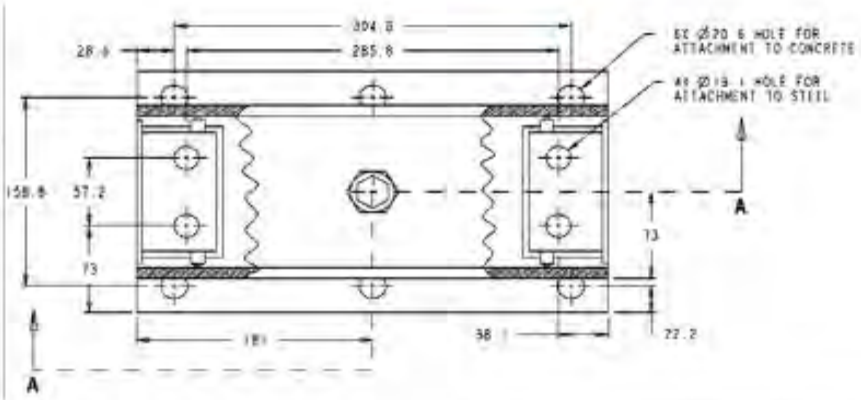
UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

Manufacturer:	*Caterpillar Inc.*	**UUT 14b**	
Model Line:	*3512 Fresco Rad*		
Model Number:	*572-8370*		
Serial Number:	*2202-1903000201*	***Test Report:***	*2100427-TR-001-R0 (UUT1.2)*

Mounting Details:





SEISMICALLY RESTRAINED VIBRATION ISOLATOR 1" DEFLECTION				
RATED LOAD (LBS)	RATED DEFLECTION (IN)	SPRING RATE (LBS/IN)	SOLID LOAD (LBS)	COLOR CODE
5980	1.11	5364	8968	WHITE/ DK. GREEN

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 15a

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C32 49CTD Rad.*
Model Number:	*508-8110*
Serial Number:	*N/A*
Test Report:	*2100427-TR-001-R0 (UUT2.1)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1,236	66.0	20.0	85.0	7.02	10.95	8.34

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Base

Options/Subcomponent Summary:

Description	*Part Number*
C32 Radiator (AKG)	*AB24*

Test Mounting Details:

Test Mounting Details:

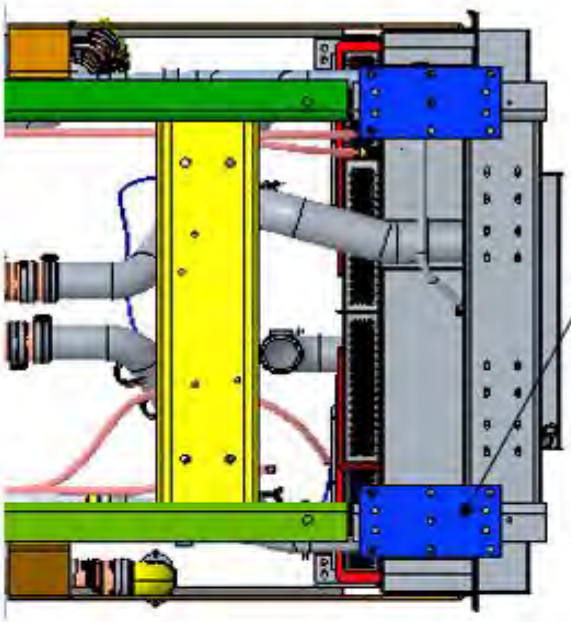
UUT15a was base mounted using two (2) CAT 353-9020 isolators were mounted to the bottom of the unit. See drawing below of isolator specs. Each isolator was mounted to the shake table with two (2) 3/4" Grade 5 Bolts and washers (4 total).
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

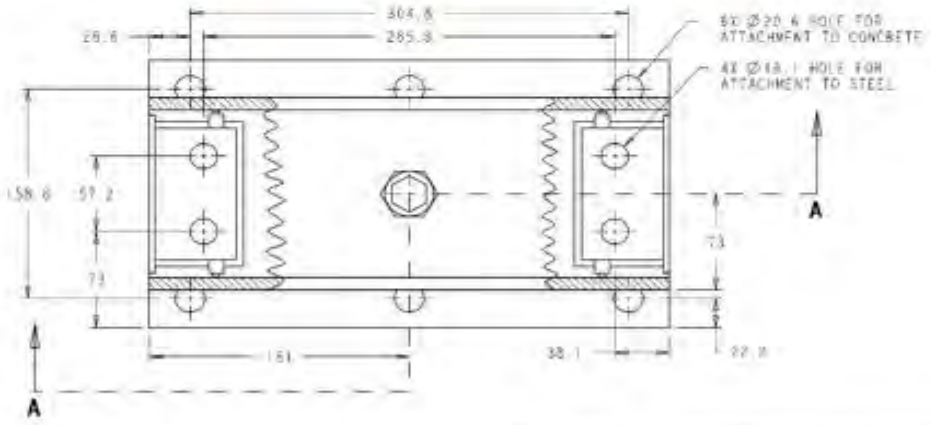
UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

Manufacturer:	*Caterpillar Inc.*	**UUT 15a**	
Model Line:	*C32 49CTD Rad.*		
Model Number:	*508-8110*		
Serial Number:	*N/A*	***Test Report:***	*2100427-TR-001-R0 (UUT2.1)*

Mounting Details:





SEISMICALLY RESTRAINED VIBRATION ISOLATOR 1" DEFLECTION				
RATED LOAD (LBS)	RATED DEFLECTION (IN)	SPRING RATE (LBS/IN)	SOLID LOAD (LBS)	COLOR CODE
5150	1.11	4626	7734	WHITE/ DK. PURPLE

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 15b

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C32 49CTD Rad.*
Model Number:	*508-8111*
Serial Number:	*N/A*
Test Report:	*2100427-TR-001-R0 (UUT2.2)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1,355	72.0	21.0	85.0	7.02	8.73	25.75

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

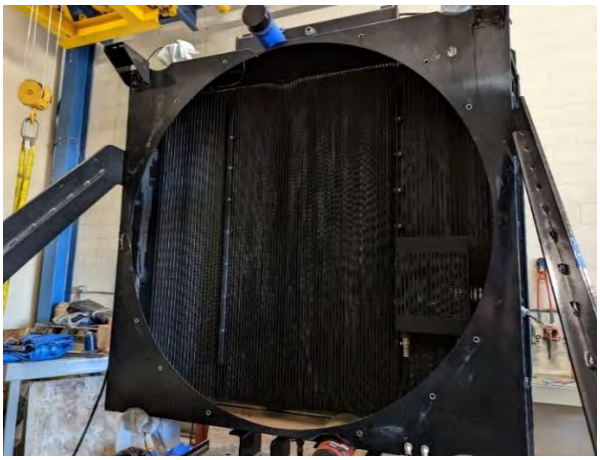
Product Construction Summary:

Carbon Steel Base

Options/Subcomponent Summary:

Description	*Part Number*
C32 Radiator (AKG)	*AB26*

Test Mounting Details:



Test Mounting Details:

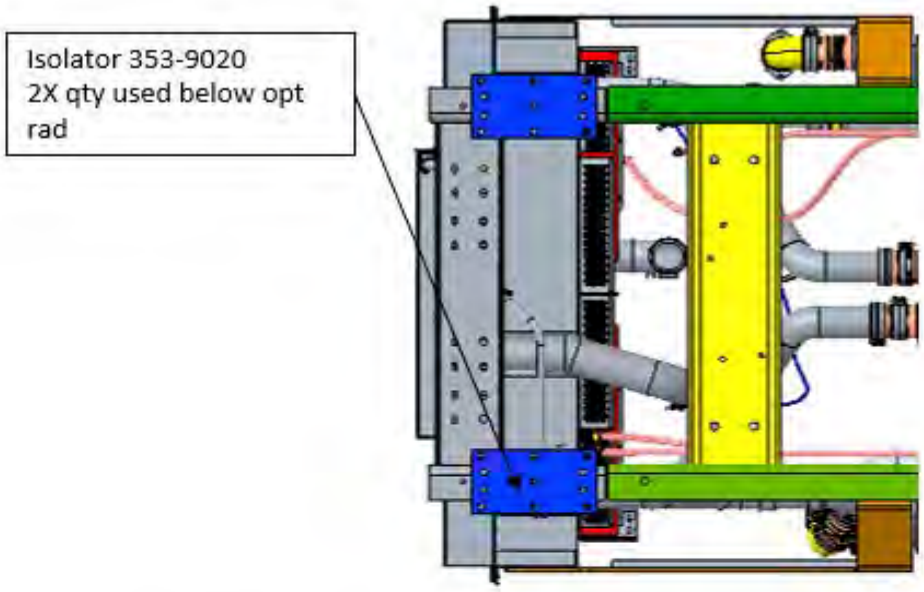
UUT15b was base mounted using two (2) CAT 353-9020 isolators were mounted to the bottom of the unit. See drawing below of isolator specs. Each isolator was mounted to the shake table with two (2) 3/4" Grade 5 Bolts and washers (4 total).
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

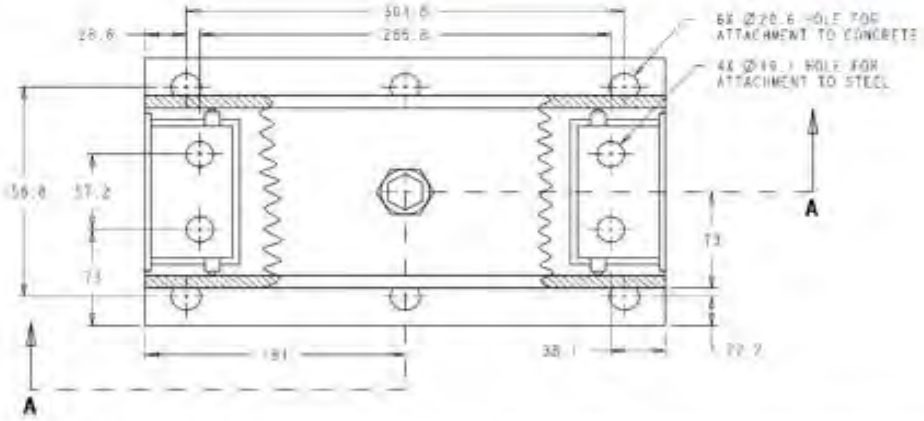
UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

Manufacturer:	*Caterpillar Inc.*	**UUT 15b**	
Model Line:	*C32 49CTD Rad.*		
Model Number:	*508-8111*		
Serial Number:	*N/A*	***Test Report:***	*2100427-TR-001-R0 (UUT2.2)*

Mounting Details:





SEISMICALLY RESTRAINED VIBRATION ISOLATOR 1" DEFLECTION				
RATED LOAD (LBS)	RATED DEFLECTION (IN)	SPRING RATE (LBS/IN)	SOLID LOAD (LBS)	COLOR CODE
5150	1.11	4626	7734	WHITE/ DK. PURPLE

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 16

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*Doghouse*
Serial Number:	*N/A*
Test Report:	*2300056-TR-001 (UUT1)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1,982	60.3	38.3	53.0	7.82	5.24	15.85

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Enclosure

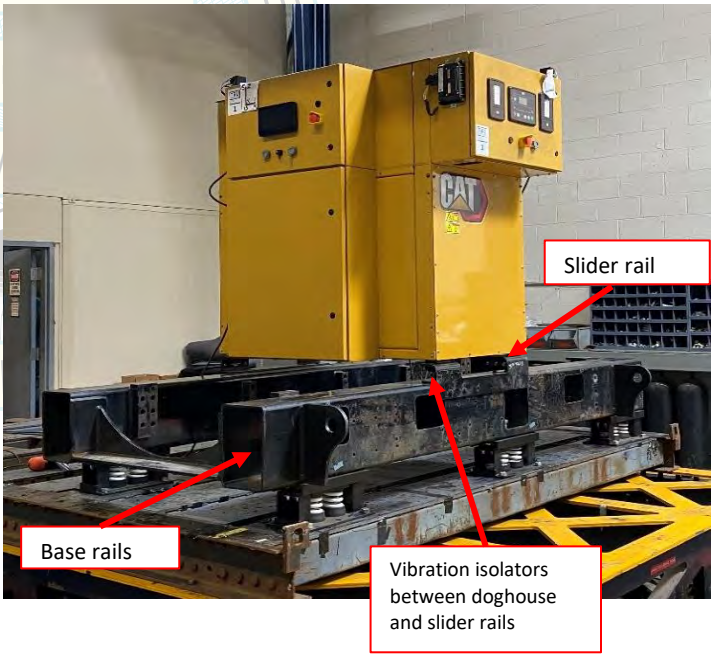
Options/Subcomponent Summary:

Description	*Part Number*
Cat ECS 100	*622-3612* *621-9888*
Cat ECS 200	*631-2323*
Cat GCCP1.2	*634-5258*

Test Mounting Details Continued:

The doghouse is connected to slider rails, which will connect to the base rails. Between the slider rails and the doghouse are vibration isolators (Barry Controls Div, Barry Wright Corp: P/N 26275-2). A complete genset uses this mounting configuration (including the base rails).

Test Mounting Details:



UUT16 was base mounted - isolated using six (6) VMC M2SSH-1E-5150 spring isolators (CAT: P/N 353-9020) to the equipment skid using one (1) 3/4" Grade 8 bolt each. The isolators were mounted to the table using four (4) 3/4" Grade 8 bolts and washers each (twenty-four (24) total)

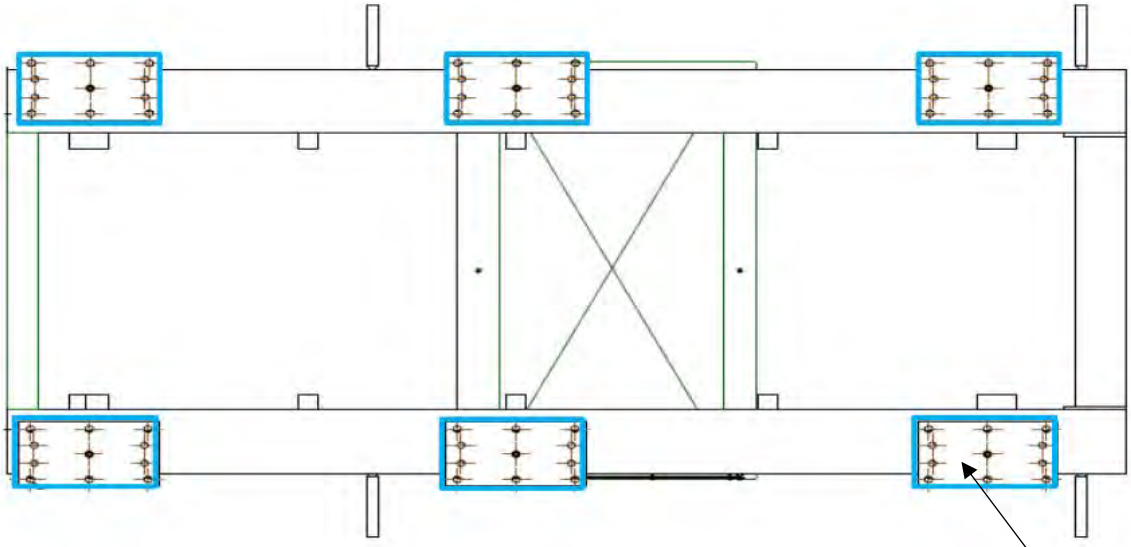
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

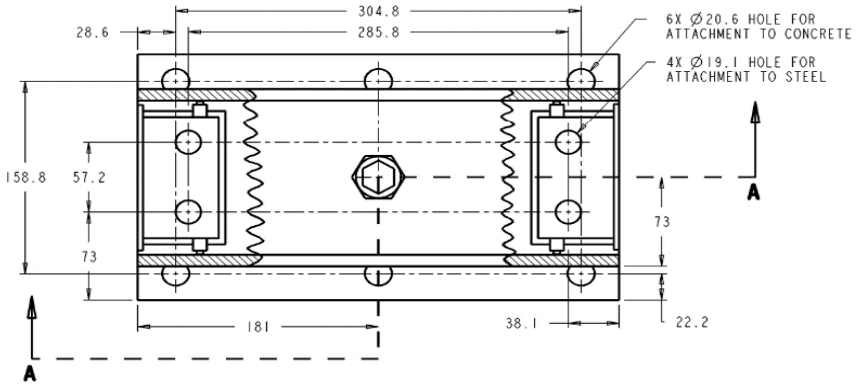
UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

Manufacturer:	*Caterpillar Inc.*	**UUT 16**	
Model Line:	*C27/C32/3512/3516/C175 Generator Set*		
Model Number:	*Doghouse*		
Serial Number:	*N/A*	***Test Report:***	*2300056-TR-001 (UUT1)*

Mounting Details:





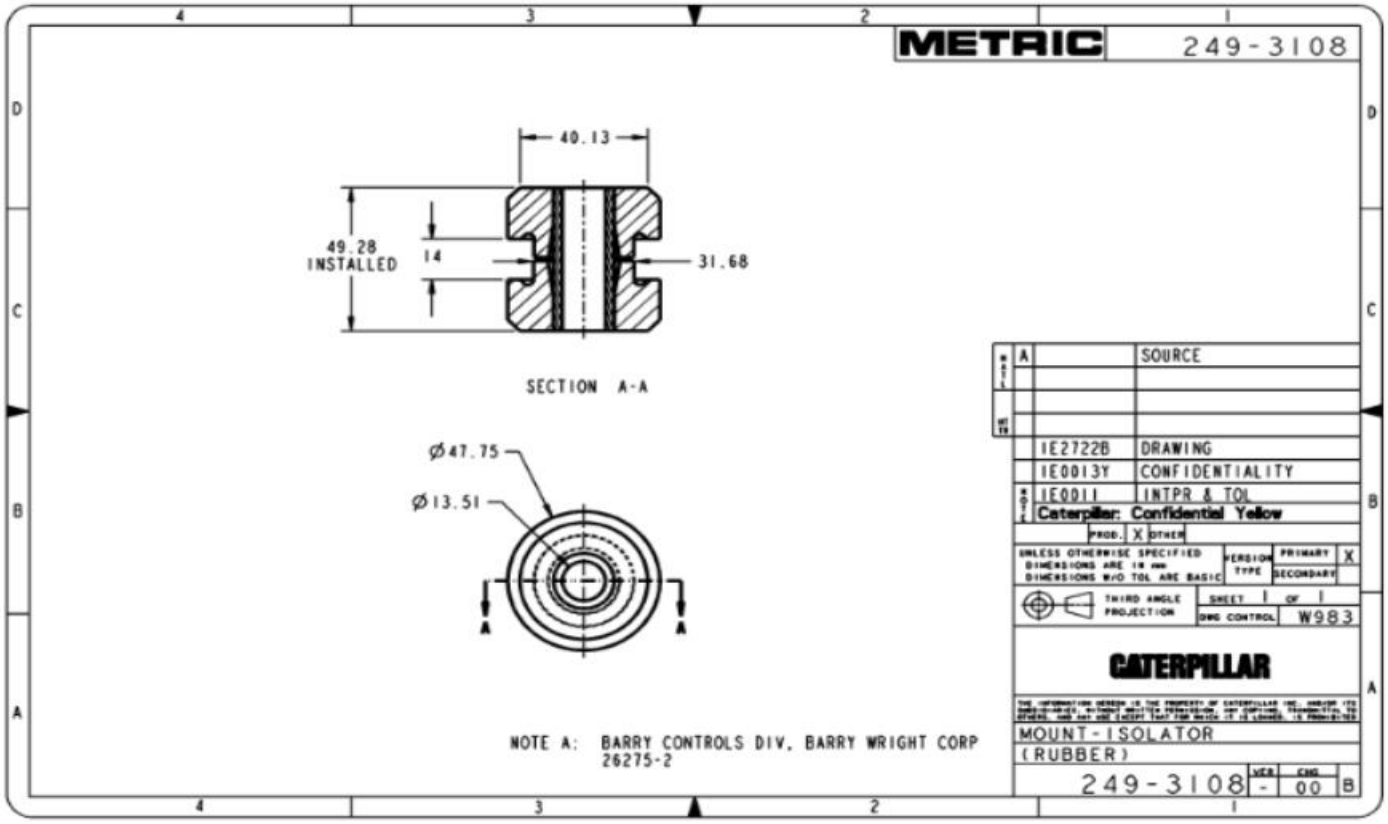
SEISMICALLY RESTRAINED VIBRATION ISOLATOR 1" DEFLECTION						
RATED LOAD (LBS)	RATED DEFLECTION (IN)	SPRING RATE (LBS/IN)	SOLID LOAD (LBS)	RATED TENSILE LOAD (LBS)	RATED SHEAR LOAD(LBS)	COLOR CODE
5150	1.11	4626	7734	14000	10000	WHITE/DK PURPLE

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

Manufacturer:	*Caterpillar Inc.*	**UUT 16**	
Model Line:	*C27/C32/3512/3516/C175 Generator Set*		
Model Number:	*Doghouse*		
Serial Number:	*N/A*	***Test Report:***	*2300056-TR-001 (UUT1)*

Mounting Details:



UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 17

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*Cat ECS 100 (622-3612 & 621-9888)*
Serial Number:	*N/A*
Test Report:	*2300056-TR-001 (UUT2)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
95	8.5	28.0	18.5	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Enclosure

Options/Subcomponent Summary:

Description	*Part Number*
N/A	*N/A*

Test Mounting Details:

UUT17 was wall mounted - rigid to the fixture using nine (9) 5/16" lag screws and washers.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*Cat GCCP1.2 (634-5258)*
Serial Number:	*N/A*
Test Report:	*2300056-TR-001 (UUT3)*

UUT 18

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
68	8.5	28.0	18.5	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

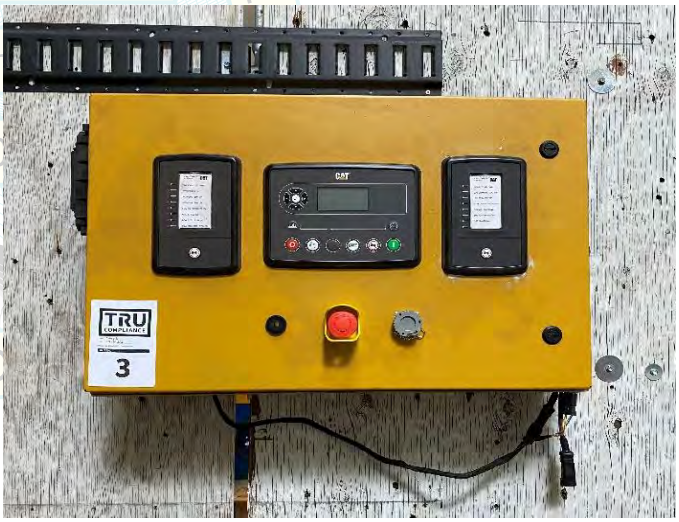
Product Construction Summary:

Carbon Steel Enclosure

Options/Subcomponent Summary:

Description	*Part Number*
N/A	*N/A*

Test Mounting Details:



UUT18 was wall mounted - rigid to the fixture using eight (8) 5/16" lag screws and washers.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 19

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*Cat ECS 200 (631-2323)*
Serial Number:	*N/A*
Test Report:	*2300056-TR-001 (UUT4)*

UUT Properties

Weight (lbs.)[1]	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height[1]	Front-Back	Side-Side	Vertical
154	8.5	28.0	53.0	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Enclosure

Options/Subcomponent Summary:

Description	*Part Number*
N/A	*N/A*

Test Mounting Details:

[1] The weight and height are the combination of UUT2 and UUT4.

UUT4 separately has a weight of 59 lbs. and height of 34.5".

UUT4 cannot function without UUT2.

Test Mounting Details:

UUT19 was wall mounted - rigid to the fixture using twenty-two (22) 5/16" lag screws and washers.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 20

Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*C32B Generator Set*
Serial Number:	*N/A*
Test Report:	*2301377-TR-001 (UUT1)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
21,750	200.0	96.0	100.6	3.75	4.05	7.81

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Base

Options/Subcomponent Summary:

Description	*Part Number*
C32B (≤1500 kW)	*Max. Package*
Generator (Leroy-Somer)	*1646 Frame*
Cat GCCP1.2 Controller (Caterpillar)	*634-5258*
Radiator (Modine)	*A38AV*

Test Mounting Details:

Test Mounting Details:

UUT20 was base mounted - isolated to test fixture using eight (8) VMC M2SSH-1E-6500 (CAT: P/N 348-5526) spring isolators and four (4) VMC M2SSH-1E-5150 (CAT: P/N 353-9020) spring isolators to the equipment skid using one (1) 3/4" Grade 8 bolt for each isolator. The isolators were welded to the test fixture using two (2) 1" long 5/16" continuous fillet welds along the long sides.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

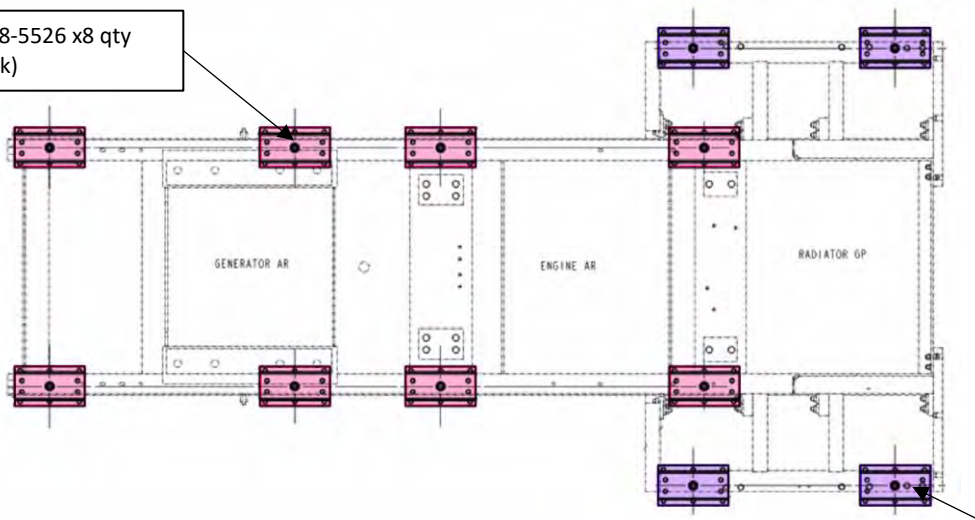
TRU PROJECT NO. 2100427, Rev. 5

UUT 20

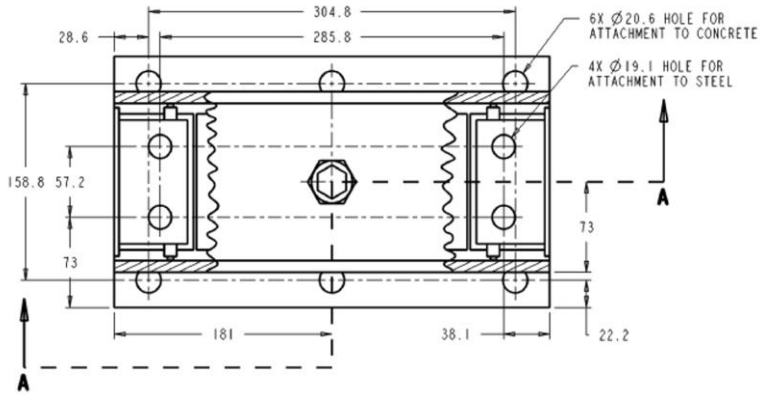
Manufacturer:	*Caterpillar Inc.*
Model Line:	*C27/C32/3512/3516/C175 Generator Set*
Model Number:	*C32B Generator Set*
Serial Number:	*N/A*
Test Report:	*2301377-TR-001 (UUT1)*

Mounting Details:

Isolator CAT: 348-5526 x8 qty used below (pink)



Isolator CAT: 353-9020 x4 qty used below (purple)



Isolator CAT: 348-5526 (48 lbs.)

SEISMICALLY RESTRAINED VIBRATION ISOLATOR 1" DEFLECTION						
RATED LOAD (LBS)	RATED DEFLECTION (IN)	SPRING RATE (LBS/IN)	SOLID LOAD (LBS)	RATED TENSILE LOAD (LBS)	RATED SHEAR LOAD (LBS)	COLOR CODE
6500	1.04	6250	9750	14000	10000	WHITE/ GRAY

Isolator CAT: 353-9020 (48 lbs.)

SEISMICALLY RESTRAINED VIBRATION ISOLATOR 1" DEFLECTION						
RATED LOAD (LBS)	RATED DEFLECTION (IN)	SPRING RATE (LBS/IN)	SOLID LOAD (LBS)	RATED TENSILE LOAD (LBS)	RATED SHEAR LOAD(LBS)	COLOR CODE
5150	1.11	4626	7734	14000	10000	WHITE/DK PURPLE

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 21

Manufacturer:	*Caterpillar Inc.*
Model Line:	*A59 Rad.*
Model Number:	*565-5542*
Serial Number:	*N/A*
Test Report:	*2400776-TR-001-R0 (UUT1)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
4,150	90.0	86.5	118.0	4.16	3.99	10.26

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Base

Options/Subcomponent Summary:

Description	*Part Number*
A59 Radiator (Caterpillar with Yinlun coolers)	*A59*

Test Mounting Details:

Test Mounting Details:

UUT21 was base mounted - isolated to the test fixture using four (4) VMC M2SSH-1E-4000 (CAT: P/N 348-5526) spring isolators to the equipment skid using one (1) 3/4" Grade 8 bolt for each isolator. The isolators were mounted to the test fixture using four (4) 3/4" Grade 8 bolts for each isolator.

Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

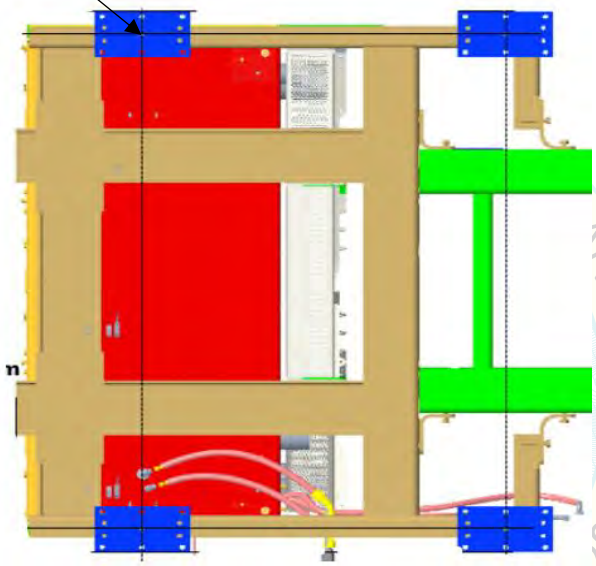
TRU PROJECT NO. 2100427, Rev. 5

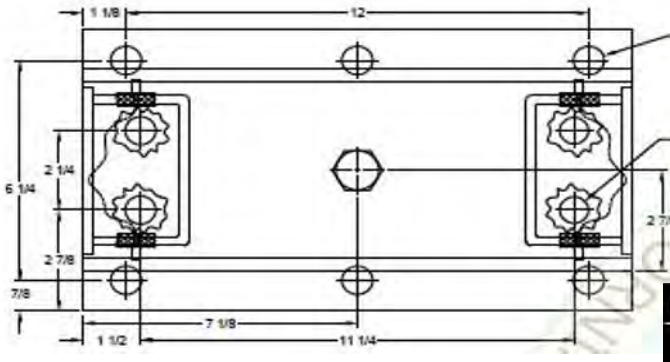
UUT 21

Manufacturer:	*Caterpillar Inc.*
Model Line:	*A59 Rad.*
Model Number:	*565-5542*
Serial Number:	*N/A*
Test Report:	*2400776-TR-001-R0 (UUT1)*

Mounting Details:

Isolator CAT: 348-5526 x4 qty used below





MODEL M2SSH-1E SEISMICALLY RESTRAINED VIBRATION ISOLATOR FOR 1" DEFLECTION

MODEL	STATIC LOAD (LBS)	STATIC DEFLECTION (IN)	STATIC SPRING RATE (LBS/IN)	SPRING COLOR CODE
M2SSH-1E-1650N	1650	1.07	1538	RED/DK. BLUE
M2SSH-1E-2000	2000	1.00	2000	TAN
M2SSH-1E-2400N	2400	1.04	2300	TAN/DK. BLUE
M2SSH-1E-2800	2800	1.00	2800	PINK
M2SSH-1E-3400N	3400	1.10	3100	PINK/DK. BLUE
M2SSH-1E-4000	4000	1.11	3600	WHITE
M2SSH-1E-5150N	5150	1.11	4626	WHITE/DK. PURPLE
M2SSH-1E-5980N	5980	1.11	5364	WHITE/DK. GREEN
M2SSH-1E-6500N	6500	1.04	6250	WHITE/GRAY

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 5

UUT 22

Manufacturer:	*Caterpillar Inc.*
Model Line:	*A68 Rad.*
Model Number:	*564-1955*
Serial Number:	*N/A*
Test Report:	*2400776-TR-001-R0 (UUT2)*

UUT Properties

Weight (lbs.)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
4,800	101.0	72.0	139.0	4.16	3.94	10.25

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS}(g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2022	ICC-ES AC156	2.0	1.0	1.5	3.20	2.40	2.13	0.85
		3.2	0.0					

Product Construction Summary:

Carbon Steel Base

Options/Subcomponent Summary:

Description	*Part Number*
A68 Radiator (Caterpillar with Yinlun coolers)	*A68*

Test Mounting Details:

Test Mounting Details:

UUT22 was base mounted - isolated to the test fixture using six (6) VMC M2SSH-1E-4000 (CAT: P/N 348-5526) spring isolators to the equipment skid using one (1) 3/4" Grade 8 bolt for each isolator. The isolators were mounted to the test fixture using four (4) 3/4" Grade 8 bolts for each isolator.

Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

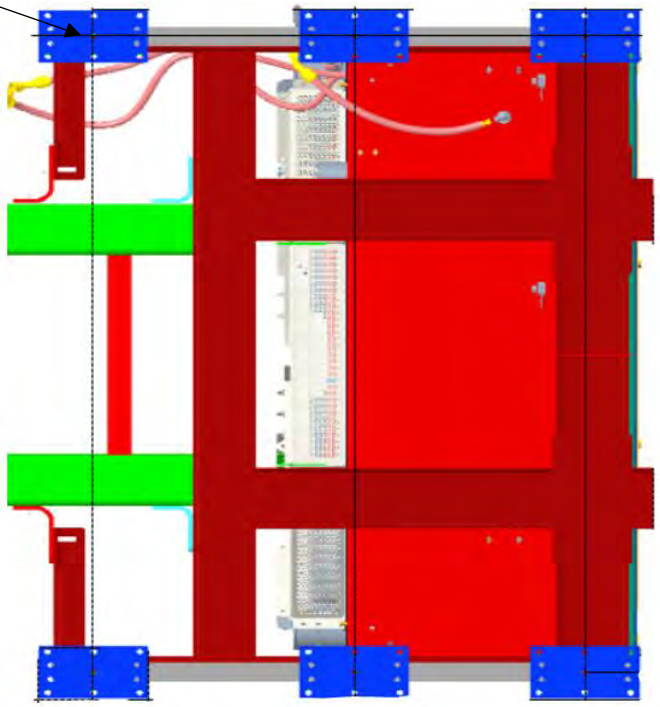
TRU PROJECT NO. 2100427, Rev. 5

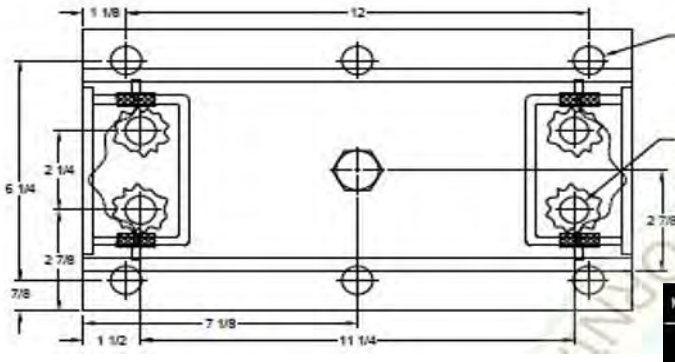
UUT 22

Manufacturer:	*Caterpillar Inc.*		
Model Line:	*A68 Rad.*		
Model Number:	*564-1955*		
Serial Number:	*N/A*	***Test Report:***	*2400776-TR-001-R0 (UUT2)*

Mounting Details:

Isolator CAT: 348-5526 x6 qty used below





MODEL M2SSH-1E SEISMICALLY RESTRAINED VIBRATION ISOLATOR FOR 1" DEFLECTION

MODEL	STATIC LOAD (LBS)	STATIC DEFLECTION (IN)	STATIC SPRING RATE (LBS/IN)	SPRING COLOR CODE
M2SSH-1E-1650N	1650	1.07	1538	RED/DK. BLUE
M2SSH-1E-2000	2000	1.00	2000	TAN
M2SSH-1E-2400N	2400	1.04	2300	TAN/DK. BLUE
M2SSH-1E-2800	2800	1.00	2800	PINK
M2SSH-1E-3400N	3400	1.10	3100	PINK/DK. BLUE
M2SSH-1E-4000	4000	1.11	3600	WHITE
M2SSH-1E-5150N	5150	1.11	4626	WHITE/DK. PURPLE
M2SSH-1E-5980N	5980	1.11	5364	WHITE/DK. GREEN
M2SSH-1E-6500N	6500	1.04	6250	WHITE/GRAY