



**DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
FACILITIES DEVELOPMENT DIVISION**

**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, BT40 1EJ, Northern Ireland, United Kingdom

Telephone: +44 28 2826 5348

Email: oflaherty_ciaran@cat.com

Product Information

Product Name: Emergency and Standby Power Systems

Product Type: Generators

Product Model Number: C27/C32/3512/3516/C175

General Description: Diesel Powered Generators & Control Panels

Mounting Description: See Certified Product Tables, 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





**DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
FACILITIES DEVELOPMENT DIVISION**

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

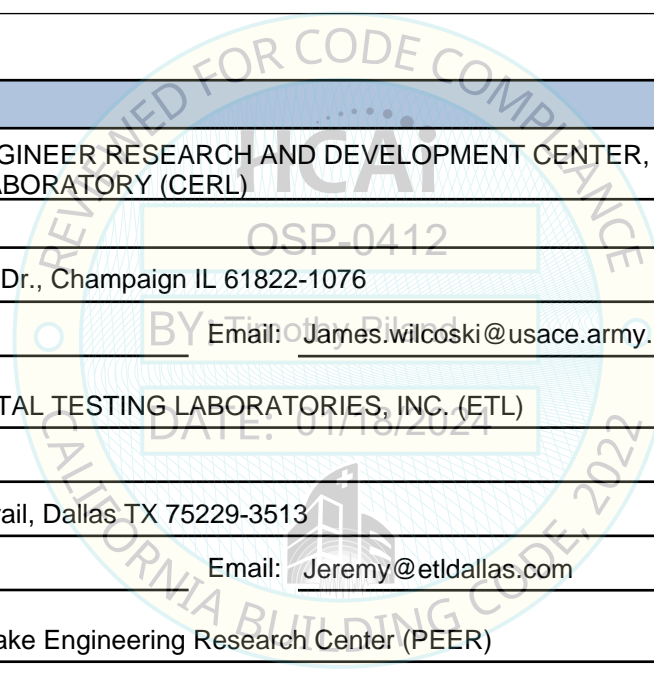
GR-63-Core ICC-ES AC156 IEEE 344 IEEE 693 NEBS 3
 Other (Please Specify): _____

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: (213) 373-6763 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: Pacific Earthquake Engineering Research Center (PEER)
Contact Person: Amarnath Kasalanati
Mailing Address: 1301 South 46th St., Bldg. 420, Richmond CA 94720-1729
Telephone: (510) 642-3437 Email: Amarnath1@berkeley.edu





**DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
FACILITIES DEVELOPMENT DIVISION**

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: $SDS=3.20 @ z/h=0$)

SDS (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

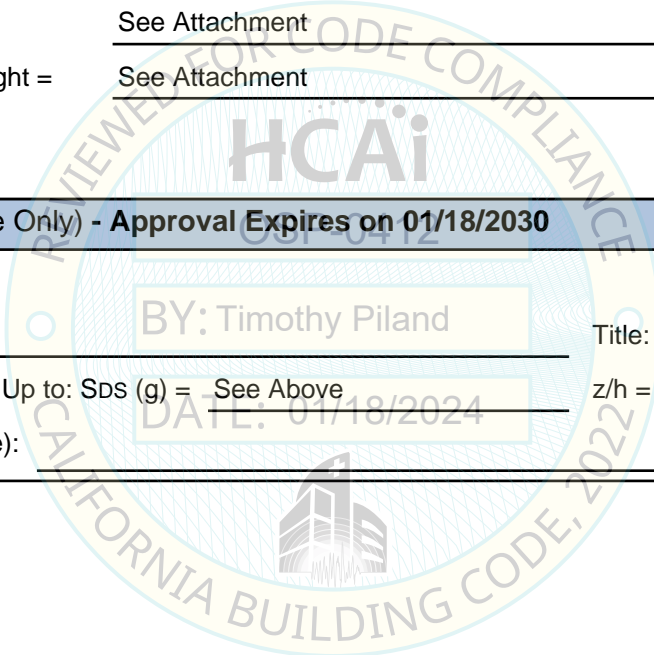
HCAI Approval (For Office Use Only) - Approval Expires on 01/18/2030

Date: 1/18/2024

Name: Timothy Piland Title: Senior Structural Engineer

Special Seismic Certification Valid Up to: $SDS (g) =$ See Above z/h = See Above

Condition of Approval (if applicable): _____



SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 2100427, Rev. 3



Manufacturer: Caterpillar Inc.						TABLE 1	
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:	$S_{DS} = 2.0\text{ g}$ $z/h=1.0$ $S_{DS} = 3.2\text{ g}$ $z/h=0.0$
						$I_p = 1.5$	
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
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.
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

SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 2100427, Rev. 3



Manufacturer: Caterpillar Inc.					TABLE 1		
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:				$S_{DS} = 2.0g \quad z/h=1.0$	$I_p = 1.5$
						$S_{DS} = 3.2g \quad z/h=0.0$	
Model Line	Model	Dimensions (in)			Weight (lbs.)	Notes	UUT
		Depth	Width	Height			
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. 3



Manufacturer: Caterpillar Inc.						TABLE 2	
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 on equipment UUT18 wall mount	16, 18

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 2100427, Rev. 3



Manufacturer: Caterpillar Inc.	Table Description: Standard Components	TABLE 3
Model Line: C27/C32/3512/3516/C175 Generator Set		

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

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.
	Modine	84SF		12,400 lbs.	4
		25SF		1,774 lbs.	10
	Caterpillar Inc.	A48	Caterpillar designed with Modine coolers	2,428 lbs.	14a
		A59	Caterpillar designed with Modine coolers	4,758 lbs.	Interp.
		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
		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.		

Notes:
1. Radiators are documented with dry weight.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 2100427, Rev. 3



Manufacturer: Caterpillar Inc.	Table Description: Standard Components	TABLE 3
Model Line: C27/C32/3512/3516/C175 Generator Set		

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

Component Type	Manufacturer	Model	Description	Notes	UUT
Radiator ¹	Caterpillar Inc.	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.
		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. 3



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:		$S_{DS} = 2.0g \quad z/h = 1.0$ $S_{DS} = 3.2g \quad z/h = 0.0$	
				$I_P = 1.5$	
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		

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

TRU PROJECT NO. 2100427, Rev. 3



Manufacturer: Caterpillar Inc.		Table Description: Optional Components			TABLE 5
Model Line: C27/C32/3512/3516/C175 Generator Set					
Building Code: CBC 2022		Seismic Certification Limits:		$I_p = 1.5$	
		$S_{DS} = 2.0g \quad z/h = 1.0$			
		$S_{DS} = 3.2g \quad z/h = 0.0$			
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. 3

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. 3

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.

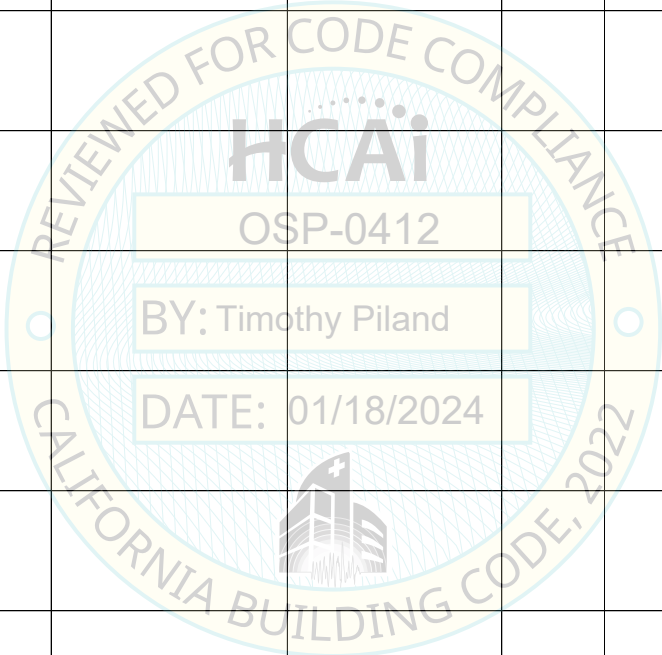
UNIT UNDER TEST (UUT) SUMMARY SHEET



TRU PROJECT NO. 2100427, Rev. 3

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



Notes:

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 2100427, Rev. 3



Manufacturer:	Caterpillar Inc.	UUT 1
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:	Test Mounting Details:
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



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. 3



Manufacturer: Caterpillar Inc.	UUT 2
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.	Test Mounting Details:
---	-------------------------------

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



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. 3

Manufacturer:	Caterpillar Inc.	UUT 3
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:	Test Mounting Details:
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



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. 3




Manufacturer:	Caterpillar Inc.	UUT 4
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:	Test Mounting Details:
Carbon Steel Base	

Options/Subcomponent Summary:	OSP-0412
--------------------------------------	----------

Description	Part Number	
C175-16 (≤ 3100 kW)	Max. Package	Reviewed by: Timothy Piland
Generator (Leroy-Somer)	3000 Frame	DATE: 01/18/2024
Jacket Water Heater (Hotstart)	CSM Hotflow - 12kW	
Radiator (Young Touchstone)	84SF	

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. 3



Manufacturer:	Caterpillar Inc.	UUT 6a
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:	Test Mounting Details:
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:
<p>¹ Weight is of UUT and the equipment mounting skid.</p>

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. 3



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

Test Mounting Details:

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.

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. 3



Manufacturer:	Caterpillar Inc.	UUT 7a
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:	Test Mounting Details:
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:
<p>¹ Weight is of UUT and the equipment mounting skid.</p> <p>² The width dimension is the combination of the Box and Panel.</p>

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. 3

Manufacturer:	Caterpillar Inc.	UUT 7b
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:	Test Mounting Details:
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:
<p>¹ Weight is of UUT and the equipment mounting skid.</p> <p>² The width dimension is the combination of the Box and Panel.</p>

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. 3

Manufacturer: Caterpillar Inc. Model Line: C27/C32/3512/3516/C175 Generator Set Model Number: ICE Box 1 Serial Number: N/A					UUT 8				
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 3.2	1.0 0.0	1.5	3.20	2.40	2.13	0.85	
Product Construction Summary: Carbon Steel Enclosure					Test Mounting Details: 				
Options/Subcomponent Summary:									
Description	Part Number								
ICE Box (Caterpillar)	Small Display								
ICE Control Panel w/ EMCP 4 Controller (Caterpillar)	Small Display								



UUT8 was wall mounted - rigid to the fixture 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. 3

Manufacturer: Caterpillar Inc.	UUT 9
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	Test Mounting Details:
--	-------------------------------

Options/Subcomponent Summary:

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



UUT9 was wall mounted - rigid to the fixture 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. 3



Manufacturer:	Caterpillar Inc.	<h2>UUT 10</h2>
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:	Test Mounting Details:
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



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. 3



Manufacturer:	Caterpillar Inc.	UUT 11
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:	Test Mounting Details:
Carbon Steel Base	

Options/Subcomponent Summary:	
Description	Part Number
C516E (≤2750 kW)	Max. Package
Generator (Leroy-Somer)	3000 Frame
Radiator (Caterpillar)	81SF



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. 3



Manufacturer:	Caterpillar Inc.	UUT 12
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:	Test Mounting Details:
Carbon Steel Base	

Options/Subcomponent Summary: OSP-0412

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



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. 3



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)

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:	Test Mounting Details:
Carbon Steel Base	

Options/Subcomponent Summary:	
Description	Part Number
3512 Opt. Radiator (Caterpillar with Modine coolers)	A48

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. 3

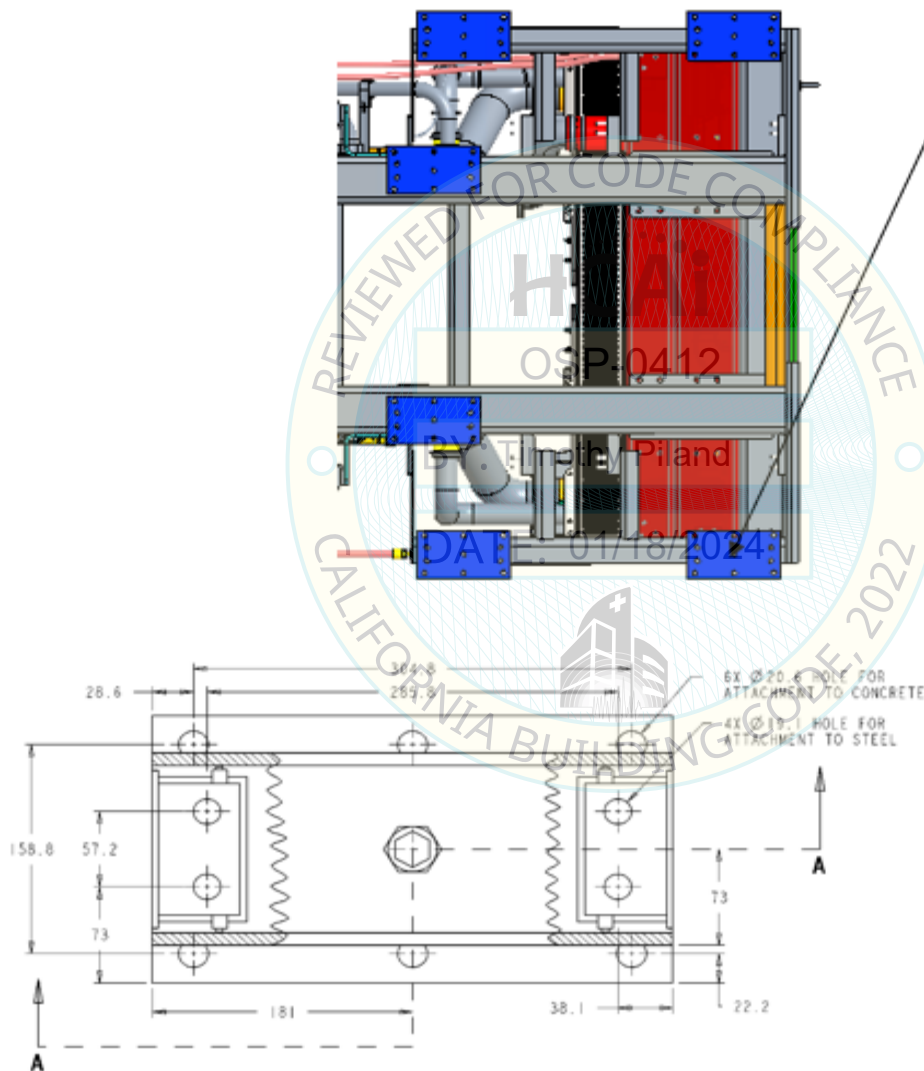


UUT 14a

Manufacturer: Caterpillar Inc.
Model Line: 3512 Opt Radiator
Model Number: 607-9886
Serial Number: 2611476604

Test Report: 2100427-TR-001-R0 (UUT1.1)

Mounting Details:



Isolator 353-9020
6X qty used below opt rad

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. 3



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)

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

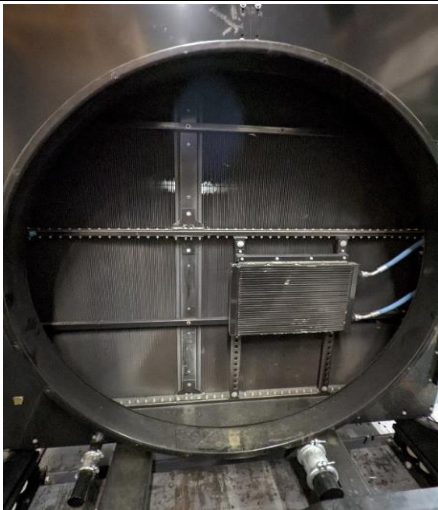
Test Mounting Details:

Options/Subcomponent Summary:

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



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. 3

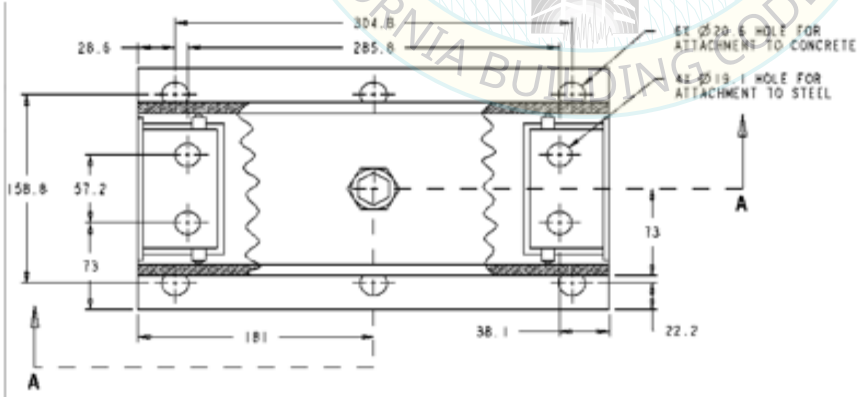
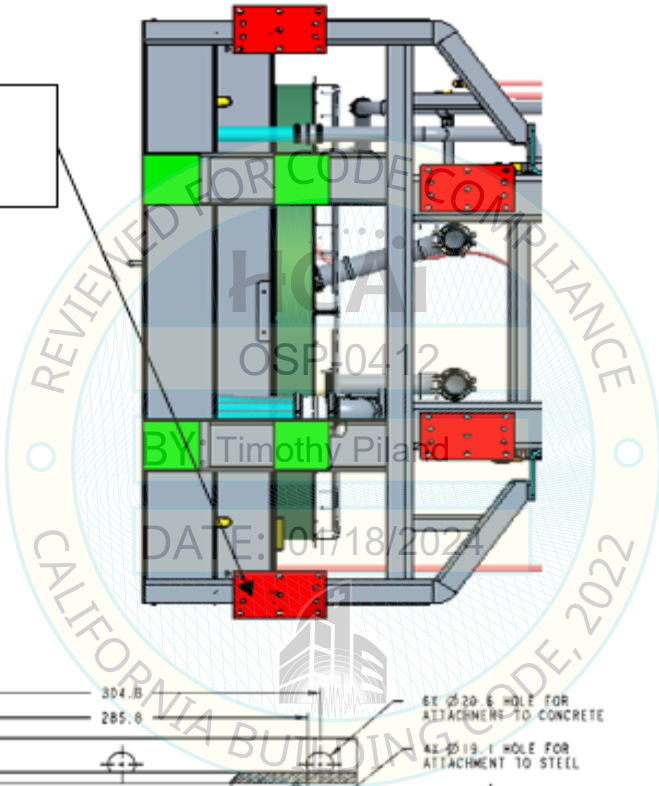
Manufacturer: Caterpillar Inc.
Model Line: 3512 Fresco Rad
Model Number: 572-8370
Serial Number: 2202-1903000201

UUT 14b

Test Report: 2100427-TR-001-R0 (UUT1.2)

Mounting Details:

Isolator 348-4785
4X qty used below
Fresco rad



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. 3



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)	

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	Test Mounting Details:
---	-------------------------------

Options/Subcomponent Summary:	
Description	Part Number
C32 Radiator (AKG)	AB24

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



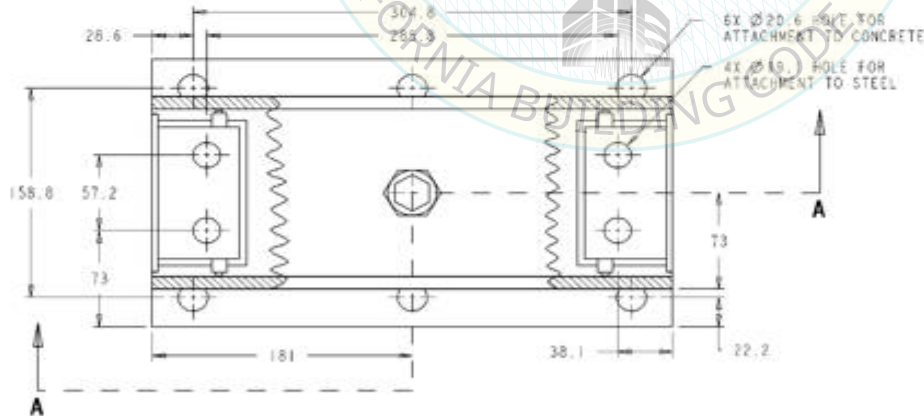
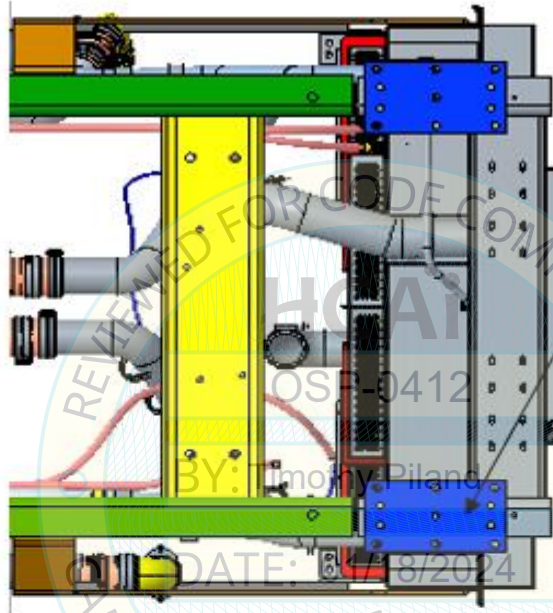
TRU PROJECT NO. 2100427, Rev. 3

Manufacturer: Caterpillar Inc.
Model Line: C32 49CTD Rad.
Model Number: 508-8110
Serial Number: N/A

UUT 15a

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. 3




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)

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:	Test Mounting Details:
Carbon Steel Base	

Options/Subcomponent Summary:	
Description	Part Number
C32 Radiator (AKG)	AB26

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. 3

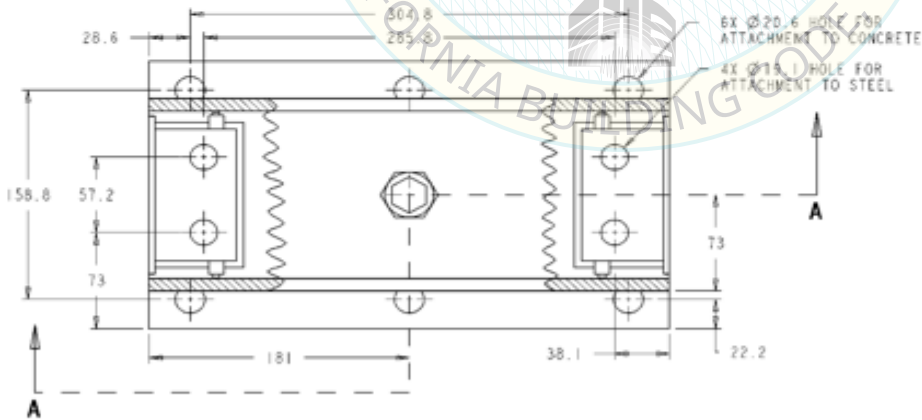
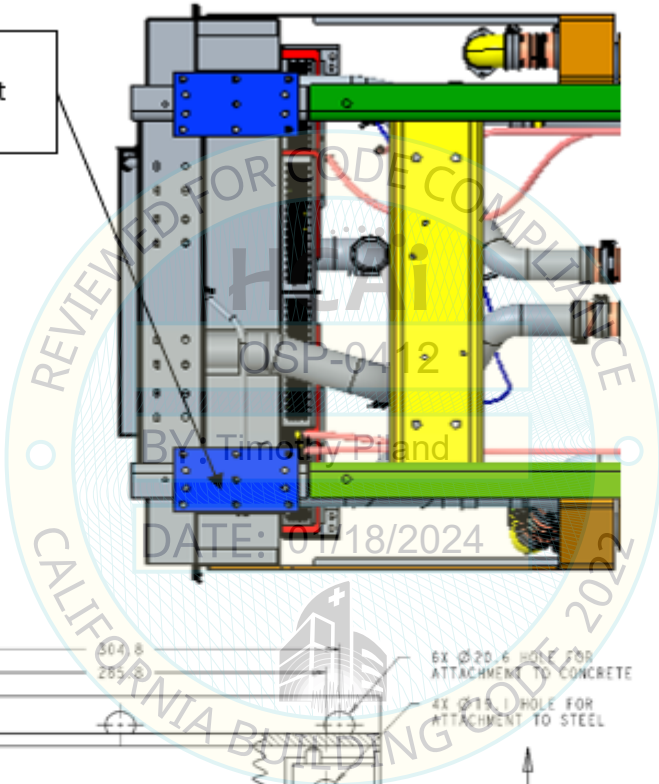
Manufacturer: Caterpillar Inc.
Model Line: C32 49CTD Rad.
Model Number: 508-8111
Serial Number: N/A

UUT 15b

Test Report: 2100427-TR-001-R0 (UUT2.2)

Mounting Details:

Isolator 353-9020
 2X qty used below opt
 rad



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. 3



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)	

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

Test Mounting Details:

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).

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



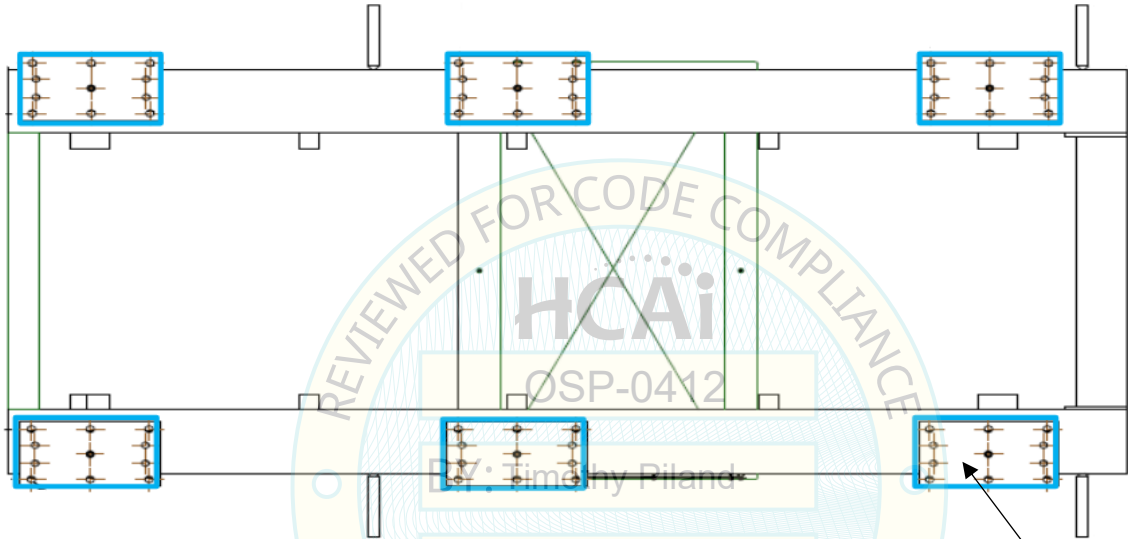
TRU PROJECT NO. 2100427, Rev. 3

Manufacturer: Caterpillar Inc.
Model Line: C27/C32/3512/3516/C175 Generator Set
Model Number: Doghouse
Serial Number: N/A

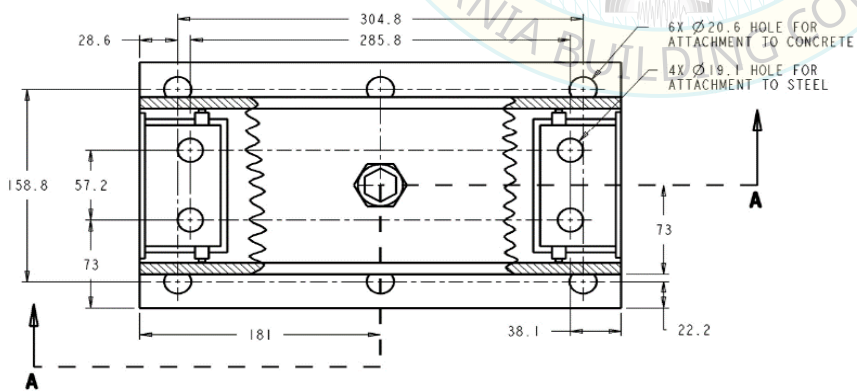
UUT 16

Test Report: 2300056-TR-001 (UUT1)

Mounting Details:



Isolator CAT: 353-9020
6X qty used below



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



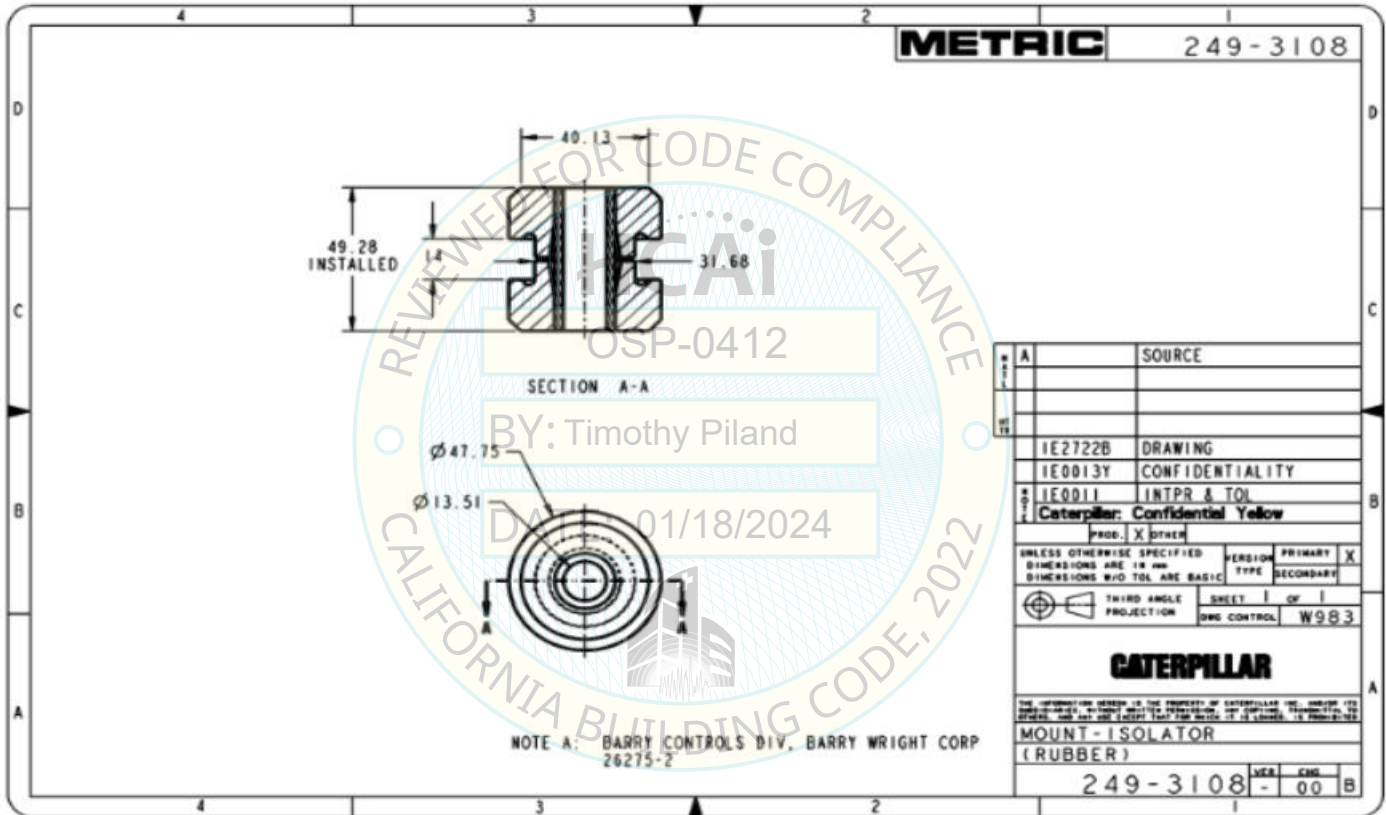
TRU PROJECT NO. 2100427, Rev. 3

Manufacturer: Caterpillar Inc.
Model Line: C27/C32/3512/3516/C175 Generator Set
Model Number: Doghouse
Serial Number: N/A

UUT 16

Test Report: 2300056-TR-001 (UUT1)

Mounting Details:



UNIT UNDER TEST (UUT) SUMMARY SHEET



TRU PROJECT NO. 2100427, Rev. 3

Manufacturer:	Caterpillar Inc.	UUT 17
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:	Test Mounting Details:
--------------------------------------	-------------------------------

Carbon Steel Enclosure

Options/Subcomponent Summary:

Description	Part Number
N/A	N/A



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. 3

Manufacturer: Caterpillar Inc.	UUT 18
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 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	Test Mounting Details:
--	-------------------------------

Options/Subcomponent Summary: OSP-0412

Description	Part Number
N/A	N/A



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. 3



Manufacturer:	Caterpillar Inc.	UUT 19
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

Test Mounting Details:

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.



UUT19 was wall mounted - rigid to the fixture using thirteen (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.