



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

**APPLICATION FOR OSHPD SPECIAL SEISMIC
CERTIFICATION PREAPPROVAL (OSP)**

OFFICE USE ONLY	
APPLICATION #:	OSP – 0412 – 10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: New Renewal

Manufacturer Information

Manufacturer: Caterpillar, Inc.

Manufacturer's Technical Representative: Tony Goyer

Mailing Address: 3701 South Street, Lafayette, IN 47905

Telephone: 765-448-2380 Email: Goyer_Anthony_G@cat.com

Product Information

Product Name: C27/C32/3512/3516/C175 Generator Set

Product Type: Diesel Generator Set

Product Model Number: C27, C32, 3512, 3512C, 3516, 3516C, 3516C HD, C175-16, C175-20
(List all unique product identification numbers and/or part numbers)

General Description: Diesel powered generators. C27,C32 have optional enclosure and carbon steel UL-142 fuel tank.

Mounting Description: Generator set: external spring isolated. Fuel tank & enclosure: rigid base mount.

Applicant Information

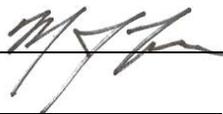
Applicant Company Name: Tobolski Watkins Engineering, Inc.

Contact Person: Matthew J Tobolski, PhD, SE

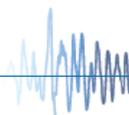
Mailing Address: 9246 Lightwave Ave., San Diego, CA 92123

Telephone: 858-381-5843 Email: mtobolski@tobolskiwatkins.com

I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2013.

Signature of Applicant:  Date: 9/26/2014

Title: President & CEO Company Name: Tobolski Watkins Engineering, Inc.





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

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

Company Name: Tobolski Watkins Engineering, Inc.

Name: Matthew J Tobolski, PhD, SE California License Number: S5648

Mailing Address: 9246 Lightwave Ave., San Diego, CA 92123

Telephone: 858-381-5843 Email: mtobolski@tobolskiwatkins.com

Supports and Attachments Preapproval

- Supports and attachments are preapproved under OPM- _____
(Separate application for OSHPD Preapproval of Manufacturer's Certification (OPM) of Supports and attachments is required)
- Supports and attachments are not preapproved

Certification Method

- Testing in accordance with: ICC-ES AC156
- Other (Please Specify): _____

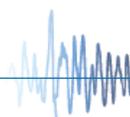
Testing Laboratory

Company Name: U.S. Army Engineer Research and Development Center

Contact Name: Jim Wilcoski

Mailing Address: 2902 Newmark Drive, Champaign, IL 61826

Telephone: 217-373-6763 Email: james.wilcoski@usace.army.mil





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Seismic Parameters

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

Design Basis of Equipment or Components (F_p/W_p) = 2.4 ($S_{DS}=3.2, z/h=0$), 4.5 ($S_{DS}=2.0, z/h=1.0$)

S_{DS} (Design spectral response acceleration at short period, g) = 3.2 ($z/h=0$), 2.0 ($z/h=1.0$)

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

R_p (Equipment or component response modification factor) = 2.0

Ω_0 (System overstrength factor) = 2.5

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = 0.0 ($S_{DS}=3.2$), 1.0 ($S_{DS}=2.0$)

Equipment or Component Natural Frequencies (Hz) = See Attachment A

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

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

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

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

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

R (Response modification coefficient) = _____

Ω_0 (System overstrength factor) = _____

C_d (Deflection amplification factor) = _____

I_p (Importance factor) = 1.5

Height to Center of Gravity above base = _____

Equipment or Component Natural Frequencies (Hz) = _____

Overall dimensions and weight (or range thereof) = _____

Tank(s) designed in accordance with ASME BPVC, 2010: Yes No

List of Attachments Supporting Special Seismic Certification

Test Report(s) Drawings Calculations Manufacturer's Catalog

Other(s) (Please Specify): Attachment A

OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2019

Signature:  Date: January 5, 2015

Print Name: Timothy J. Piland Title: SSE

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

Condition of Approval (if applicable): _____





Table #1

Special Seismic Certification Certified Product Matrix

TWEI Project No.: 2013-0764-CO-001

Manufacturer: Caterpillar

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

Certified Product Construction Summary:

Carbon steel base. Carbon steel enclosure. 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. C175-20 available without radiator only.

Certified Mounting Summary:

On Tank: Internal spring isolated unit to rigid fuel tank floor mount. Off Tank: External spring isolated.

Building Code: CBC 2013

Seismic Certification Limits:

$S_{DS} = 2.00g$
 $S_{DS} = 3.20g$

$z/h = 1.0$
 $z/h = 0.0$

$I_p = 1.5$

Model Line	Model	Dimension (in)			Max Wt. (lb)	Notes	UUT
		Depth	Width	Height			
C27 (≤800 kW)	Open – Min. package	163.1	72.0	87.0	14,050		
	Open – Max. package	172.0	84.0	86.0			
	Enclosed – No tank	300.0	100.0	111.9	22,827		
	Enclosed – 1000 gal.	300.0	100.0	127.0	36,332		1
	Enclosed – 2000 gal.	300.0	100.0	136.0	43,660		
C32 (≤1000 kW)	Open – Min. package	166.7	79.1	85.0	18,200		
	Open – Max. package	177.0	84.0	85.0			
	Enclosed – No tank	300.0	100.0	111.9	25,300		
	Enclosed – 1000 gal.	300.0	100.0	127.0	38,806		
	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		
	Max. package	212.6	81.6	93.2			
3512C (≤1500 kW)	Min. package	234.0	89.8	109.9	38,688		
	Max. package	245.4	89.8	109.9			
3516 (≤1600 kW)	Min. package	232.9	90.0	93.2	41,796		
	Max. package	246.0	90.0	93.2			
3516C (≤2000 kW)	Min. package	253.3	93.7	116.5	44,708		
	Max. package	271.9	93.7	116.5			
3516C HD (≤2500 kW)	Min. package	271.5	118.3	108.9	44,175		
	Max. package	277.3	120.2	108.9			3
C175-16 (≤3100 kW)	Min. package	300.8	108.5	130.2	61,192		
	Max. package	307.4	113.8	134.3			4
						Continued on next page	

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Table #2

Special Seismic Certification Certified Subcomponent Matrix

TWEI Project No.: 2013-0764-CO-001

Manufacturer: Caterpillar

Model Line: C27/C32/3512/3516/C175 Generator Set – Standard Components

Certified Product Construction Summary:
Construction specific to component.

Certified Options Summary:

Certified Mounting Summary:
Components are mounted within the unit.

Building Code: CBC 2013 **Seismic Certification Limits:** $S_{DS} = 2.00g$ $z/h = 1.0$
 $S_{DS} = 3.20g$ $z/h = 0.0$ $I_p = 1.5$

Model Line	Model	Dimension (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
Radiator (AKG)	25.5SF						1
	27.5SF						2
Radiator (Young Touchstone)	44SF						
	50SF						
	56SF						3
	64SF						
	73SF						
Generator (Leroy-Somer)	84SF						4
	1200 Frame						1
	1400 Frame						2
	1600 Frame						
	1800 Frame						
	2700 Frame						
	3000 Frame						3,4

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Table #3

Special Seismic Certification Certified Subcomponent Matrix

TWEI Project No.: 2013-0764-CO-001

Manufacturer: Caterpillar

Model Line: C27/C32/3512/3516/C175 Generator Set – Electronics and Controls

Certified Product Construction Summary:
Construction specific to component.

Certified Options Summary:

Certified Mounting Summary:
Components are mounted within the unit, except High Voltage Box is wall mounted.

Building Code: CBC 2013 **Seismic Certification Limits:** $S_{DS} = 2.00g$ $z/h = 1.0$
 $S_{DS} = 3.20g$ $z/h = 0.0$ $I_p = 1.5$

Model Line	Model	Dimension (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
Global Design Box w/ EMCP 4 Controller (Caterpillar)	Base						1,2
	Side Ext. Box						1,2
	Rear Ext. Box						2
High Voltage Box w/ EMCP 4 Controller (Caterpillar)	HVB					UUT 3: Powered on during test	3,4
Molded Case Circuit Breaker (Schneider)	NSJ Frame (600A max)						
	L Frame (600A max)						
	P Frame (1,200A max)						1
	R Frame (3,000A max)						
	NT Frame (5,000A max)						2

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UUT - 1

**UNIT UNDER TEST (UUT)
Summary Sheet**

TWEI Project No.: 2013-0764-CO-001

Manufacturer: Caterpillar, Inc.

Model Line: Diesel Generator Sets

Model Number: C27 Generator Set – Enclosed w/ 1000 Gal. Tank

Product Construction Summary:
Carbon steel enclosure, carbon steel base, carbon steel UL-142 fuel tank.

Options/Subcomponent Summary:
C27 generator set with AKG radiator, Caterpillar engine, Leroy-Somer alternator, and Caterpillar Global Design Box w/ EMCP 4 controller.

UUT Properties

Weight (lb)	Dimensions (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}	z/h	I _p	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
CBC 2013	ICC-ES AC 156	2.0g	1.0	1.5	3.20g	2.40g	1.33g	0.53g
		3.2g	0.0	1.5	3.20g	1.28g	2.13g	0.85g

Test Mounting Details:



Unit is mounted to test fixture using (16) 3/4" Grade 8 bolts and is internally isolated with (6) M4SSH-57K-400 spring isolators. (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.
Contents were included in testing per operating conditions.

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UUT - 2

**UNIT UNDER TEST (UUT)
Summary Sheet**

TWEI Project No.: 2013-0764-CO-001

Manufacturer: Caterpillar, Inc.

Model Line: Diesel Generator Sets

Model Number: C32 Generator Set – Enclosed w/ 2000 Gal. Tank

Product Construction Summary:
Carbon steel enclosure, carbon steel base, carbon steel UL-142 fuel tank.

Options/Subcomponent Summary:
C32 generator set with AKG radiator, Caterpillar engine, Leroy-Somer alternator, and Caterpillar Global Design Box w/ EMCP 4 controller.

UUT Properties

Weight (lb)	Dimensions (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}	z/h	I _p	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
CBC 2013	ICC-ES AC 156	2.0g	1.0	1.5	3.20g	2.40g	1.33g	0.53g
		3.2g	0.0	1.5	3.20g	1.28g	2.13g	0.85g

Test Mounting Details:



Unit is mounted to test fixture using (16) 3/4" Grade 8 bolts and is internally isolated with (6) M4SSH-57K-400 spring isolators. (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.

Contents were included in testing per operating conditions.

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UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2013-0764-CO-001

Manufacturer: Caterpillar, Inc.

Model Line: Diesel Generator Sets

Model Number: 3516C HD Generator Set

Product Construction Summary:
Carbon steel base.

Options/Subcomponent Summary:
3516C HD generator set with Young Touchstone radiator, Caterpillar engine, Leroy-Somer alternator, and Caterpillar High Voltage Box w/ EMCP 4 controller.

UUT Properties

Weight (lb)	Dimensions (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}	z/h	I _p	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
CBC 2013	ICC-ES AC 156	2.0g	1.0	1.5	3.20g	2.40g	1.33g	0.53g
		3.2g	0.0	1.5	3.20g	1.28g	2.13g	0.85g

Test Mounting Details:



Unit is mounted to test fixture using (16) VMC M2SSH-1E spring isolators. (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.

Contents were included in testing per operating conditions. High Voltage Box was powered on during testing.

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UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2013-0764-CO-001

Manufacturer: Caterpillar, Inc.

Model Line: Diesel Generator Sets

Model Number: C175-16 Generator Set

Product Construction Summary:
Carbon steel base.

Options/Subcomponent Summary:
C175-16 generator set with Young Touchstone radiator, Caterpillar engine, Leroy-Somer alternator, and Caterpillar High Voltage Box w/ EMCP 4 controller.

UUT Properties

Weight (lb)	Dimensions (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}	z/h	I _p	A _{FLX-H}	A _{RIG-H}	A _{FLX-V}	A _{RIG-V}
CBC 2013	ICC-ES AC 156	2.0g	1.0	1.5	3.20g	2.40g	1.33g	0.53g
		3.2g	0.0	1.5	3.20g	1.28g	2.13g	0.85g

Test Mounting Details:



Unit is mounted to test fixture using (18) VMC M2SSH-1E spring isolators. (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.

Contents were included in testing per operating conditions.

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