



OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION

APPLICATION FOR OSHPD SPECIAL SEISMIC
CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP – 0324 – 10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: New Renewal

Manufacturer Information

Manufacturer: Caterpillar, Inc.

Manufacturer's Technical Representative: Jeremy Elder

Mailing Address: 100 Northeast Adams St., Peoria, IL 61629

Telephone: 803.405.8463

Email: Elder_Jeremy_D@cat.com

Product Information

Product Name: C27 / C32 Diesel Generator

Product Type: Diesel Generator

Product Model Number: C27, C32

(List all unique product identification numbers and/or part numbers)

General Description: Diesel powered generators with optional enclosure and carbon steel UL-142 fuel tank.

Mounting Description: On Tank: External spring isolated unit to rigid fuel tank floor mount.

Off Tank: External spring isolated unit to rigid enclosure sub-base or rigid floor mount.

Applicant Information

Applicant Company Name: Tobolski Watkins Engineering, Inc.

Contact Person: Matthew J. Tobolski, Ph.D., S.E.

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: _____

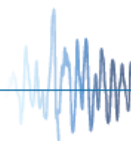
Date: 3/15/2013

Title: President & CEO

Company Name: Tobolski Watkins Engineering, Inc.

"Access to Safe, Quality Healthcare Environments that Meet California's Diverse and Dynamic Needs"

STATE OF CALIFORNIA – HEALTH AND HUMAN SERVICES AGENCY
OSH-FD-759 (REV 1/24/13)



osHPD

Page 1 of 3



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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, Ph.D., S.E. California License Number: S5648

Mailing Address: 9426 Lightwave Ave. Ste. 140, 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): _____

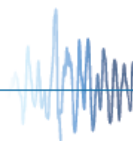
Testing Laboratory

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) = 1.58

S_{DS} (Design spectral response acceleration at short period, g) = 2.1

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

Equipment or Component Natural Frequencies (Hz) = See Attachments

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

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

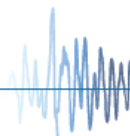
OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2019

Signature:  Date: June 26, 2013

Print Name: Timothy J. Piland Title: SSE

Special Seismic Certification Valid Up to : S_{DS} (g) = 2.1 z/h = 0

Condition of Approval (if applicable): _____





Special Seismic Certification UUT Summary Sheet

TWEI Project No.: 2012-0527-CO-001

Manufacturer:	Caterpillar
Model Line:	C27 / C32 Diesel Generator

UUT	Unit Description	Report Number	Location	S _{DS}	z/h	I _p
1*	C27 (800 kW) - Open	SRMD-2010-07	SRMD	2.1	0.0	1.5
2a	C27 (800 kW) – Enclosed (Empty Tank)	2012-0527-TR-001	CERL	2.1	0.0	1.5
2b	C27 (800 kW) – Enclosed (Full Tank)	2012-0527-TR-001	CERL	2.1	0.0	1.5
3*	3516C HD (2500 kW) - Open	SRMD-2010-07	SRMD	2.1	0.0	1.5

* Previously tested under OSP-0084-10.

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UUT – 1

UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2012-0527-CO-001

Manufacturer: Caterpillar

Model Line: C27 / C32

Model Number: C27 (800kW) Open

Product Construction Summary:
Carbon steel.

Options/Subcomponent Summary:
Radiator: AKG, engine: Caterpillar, alternator: Leroy-Somer SR4B, control box: Caterpillar, controls: Caterpillar EMCP Controller.

UUT Properties

Weight (kg)	Dimensions (mm)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
6,375	4,373	2,128	2,190	1.9	2.6	2.0

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	2.10g	0.0	1.5	2.10g	0.84g	1.40g	0.56g

Test Mounting Details:



Generator mounted to fixture with VMC M2SS spring isolators.
Unit maintained structural integrity and remained functional per manufacturer requirement.

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UUT – 2a

UNIT UNDER TEST (UUT) Summary Sheet

TWEI Project No.: 2012-0527-CO-001

Manufacturer: Caterpillar

Model Line: C27 / C32

Model Number: C27 (800kW) Enclosed (Empty Tank)

Product Construction Summary:
Carbon steel base frame, enclosure, and 2000 gallon carbon steel UL-142 fuel tank.

Options/Subcomponent Summary:
Radiator: AKG, engine: Caterpillar, alternator: Leroy-Somer SR5, control box: Caterpillar, controls: Caterpillar EMCP Controller. Space heater, battery charger, AC lights, DC lights, motorized louvers, electrical panel, jacket water heater, enclosure, 2000 gallon carbon steel UL-142 fuel tank.

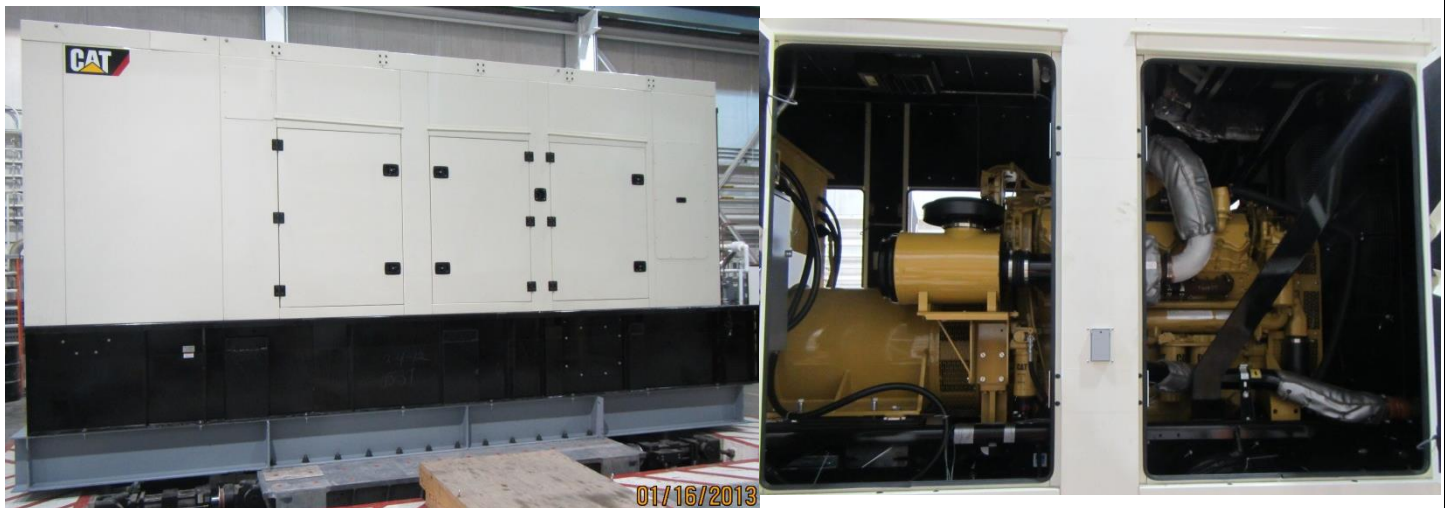
UUT Properties

Weight (kg)	Dimensions (mm)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
14,100	7,601	2,545	3,445	4.1	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	2.10g	0.0	1.5	2.10g	0.84g	1.40g	0.56g

Test Mounting Details:



Generator mounted to base with (6) VMC M4SSH spring isolators. Base mounted to fixture with (16) 7/8" Grade 8 bolts. Fuel tank was empty during test. Unit maintained structural integrity and remained functional per manufacturer requirement.

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UUT – 2b

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

TWEI Project No.: 2012-0527-CO-001

Manufacturer: Caterpillar

Model Line: C27 / C32

Model Number: C27 (800kW) Enclosed (Full Tank)

Product Construction Summary:
Carbon steel base frame, enclosure, and 2000 gallon carbon steel UL-142 fuel tank.

Options/Subcomponent Summary:
Radiator: AKG, engine: Caterpillar, alternator: Leroy-Somer SR5, control box: Caterpillar, controls: Caterpillar EMCP Controller. Space heater, battery charger, AC lights, DC lights, motorized louvers, electrical panel, jacket water heater, enclosure, 2000 gallon carbon steel UL-142 fuel tank.

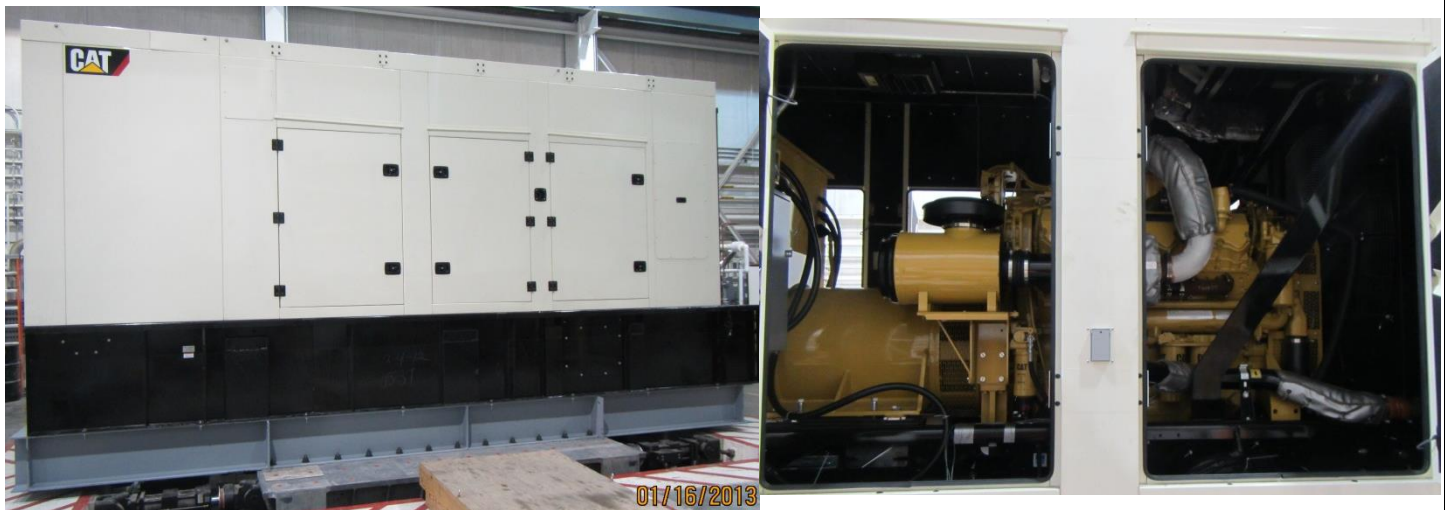
UUT Properties

Weight (kg)	Dimensions (mm)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
19,846	7,601	2,545	3,445	3.8	2.9	7.8

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	2.10g	0.0	1.5	2.10g	0.84g	1.40g	0.56g

Test Mounting Details:



Generator mounted to base with (6) VMC M4SSH spring isolators. Base mounted to fixture with (16) 7/8" Grade 8 bolts. Fuel tank was filled with 1700 gallons of water which has a weight equivalent to approximately 2000 gallons of diesel fuel. Unit maintained structural integrity and remained functional per manufacturer requirement.

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UUT – 3

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

TWEI Project No.: 2012-0527-CO-001

Manufacturer: Caterpillar

Model Line: 3500

Model Number: 3516C HD (2500kW)

Product Construction Summary:
Carbon steel.

Options/Subcomponent Summary:
Radiator: Young-Touchstone, engine: Caterpillar, alternator: Leroy-Somer SR4B, control box: Caterpillar, controls: Caterpillar EMCP Controller.

UUT Properties

Weight (kg)	Dimensions (mm)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
21,940	7,645	2,667	3,277	2.2	2.7	1.2

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	2.10g	0.0	1.5	2.10g	0.84g	1.40g	0.56g

Test Mounting Details:



Generator mounted to fixture with VMC M2SSH spring isolators.
Unit maintained structural integrity and remained functional per manufacturer requirement.

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Table #1

Special Seismic Certification Certified Product Matrix

TWEI Project No.: 2012-0527-CO-001

Manufacturer: Caterpillar

Model Line: C27 / C32 Diesel Generator

Certified Product Construction Summary:
Carbon steel construction for base frame and enclosure. Tested with enclosure and full and empty 2000 gallon carbon steel UL-142 fuel tank.

Certified Options Summary:
C27 and C32 are available with and without carbon steel UL-142 fuel tank and enclosure. See Table #2 for internal components.

Certified Mounting Summary:
On Tank: External spring isolated unit to rigid fuel tank floor mount. Off Tank: External spring isolated unit to rigid enclosure sub-base or rigid floor mount.

Building Code: CBC 2013 **Seismic Certification Limits:** $S_{DS} = 2.10g$ $z/h = 0.0$ $I_p = 1.5$

Model Line	Model	Dimension (mm)			Weight (kg)	Notes	UUT
		Depth	Width	Height			
C27 (up to 800 kW)	Open – no tank	4,373	2,128	2,190	7,133		1 ¹
	Enclosed – no tank	7,010	2,545	2,842	10,354		
	Enclosed – 1000 gal.	7,601	2,545	3,234	16,480		
	Enclosed – 2000 gal.	7,601	2,545	3,445	19,846		2
C32 (up to 1000 kW)	Open – no tank	4,511	2,128	2,150	8,255		
	Enclosed – no tank	7,010	2,545	2,842	11,476		
	Enclosed – 1000 gal.	7,601	2,510	3,234	17,602		
	Enclosed – 2000 gal.	7,601	2,545	3,445	20,968		
3516C HD (2500 kW)	Open	7,645	2,667	3,277	21,940		3 ²

1. Certified under OSP-0084-10.
2. Certified under OSP-0084-10, not included as part of this certified product matrix. Shown as component reference only.

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Table #2

Special Seismic Certification Certified Product Matrix

TWEI Project No.: 2012-0527-CO-001

Manufacturer: Caterpillar

Model Line: C27 / C32 Diesel Generator – Primary Internal Components

Certified Product Construction Summary:

Carbon steel construction for base frame and enclosure. Tested with enclosure and full and empty 2000 gallon carbon steel UL-142 fuel tank.

Certified Options Summary:

C27 and C32 are available with and without carbon steel UL-142 fuel tank and enclosure.

Certified Mounting Summary:

On Tank: External spring isolated unit to rigid fuel tank floor mount. Off Tank: External spring isolated unit to rigid enclosure sub-base or rigid floor mount.

Building Code: CBC 2013

Seismic Certification Limits:

$S_{DS} = 2.10g$

$z/h = 0.0$

$I_p = 1.5$

Model Line	Model	Dimension (mm)			Weight (kg)	Notes	UUT
		Depth	Width	Height			
Radiator (AKG)	A25.5CT						1 ^{1,2}
	AB27.5						
	AB32						
Alternator (Leroy-Somer)	SR4B						1 ^{1,3} ¹
	SR5						2
Engine (Caterpillar)	C27 Tier 2						1 ^{1,2}
	C27 T4i						
	C32 Tier 2						
	3516C HD						3 ²
Control Box (Caterpillar)	Common Design Box						1 ²
	Global Design Box						2,3 ¹
Controls (Caterpillar)	EMCP 3 Controller						1 ^{2,3} ²
	EMCP 4 Controller						2

1. Certified under OSP-0084-10.
 2. Certified under OSP-0084-10, not included as part of this certified product matrix. Shown as component reference only.

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Table #3

Special Seismic Certification Certified Product Matrix

TWEI Project No.: 2012-0527-CO-001

Manufacturer: Caterpillar

Model Line: C27 / C32 Diesel Generator – Options & Accessories

Certified Product Construction Summary:
Specific to certified options.

Certified Options Summary:

Certified Mounting Summary:
Listed subcomponents are mounted directly to the C27/C32 Common Enclosure.

Building Code: CBC 2013 **Seismic Certification Limits:** $S_{DS} = 2.10g$ $z/h = 0.0$ $I_p = 1.5$

Model Line	Model	Dimension (mm)			Weight (kg)	Notes	UUT
		Depth	Width	Height			
Space Heater (Berko)	HUHAA	215	355	406	12		2
Battery Charger (Stored Energy Sys.)	NRG 24	165	195	318	2		2
Motorized Louvers (Ruskin)	396-5818	458	2224	2292	243		2
Electrical Panel (Square D)	QO Load Center	130	390	661	13		2
Jacket Water Heater (Hot Start)	CSM Hotflow	305	524	320	20		2

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