

OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT FACILITIES DEVELOPMENT DIVISION

APPLICATION FOR OSHPD SPECIAL SEISMIC	OFFICE USE ONLY
CERTIFICATION PREAPPROVAL (OSP)	APPLICATION #: OSP-0266
OSHPD Special Seismic Certification Preapproval (OSP)	
Type: New X Renewal	
Manufacturer Information	
Manufacturer: Caterpillar (N.I.) Ltd.	
Manufacturer's Technical Representative: Ciaran O'flaherty	
Mailing Address: Old Glenarm Road, Larne, No BT401EJ	
Telephone: (442) 828-2653 Email: oflahrty_ciaran@ca	ıt.com
FOR CODE COL	
Product Information	
Product Name: Emergency and Standby Power Systems	T
Product Type: Emissions After-Treatments	
Product Model Number: Clean Emissions Module (CEM) - 3516C-HD/C175-16	5 – see Attachment for specific models
General Description: After treatment module which reduces exhaust emission	ions.
Mounting Description: Rigid base mounted on or off frame.	
Tested Seismic Enhancements: None DATE: 08/16/2021	
S	201
Applicant Information	
Applicant Company Name: Structural Integrity Associates, Inc.	250
Contact Person: Galen Reid	
Mailing Address: 233 SW Wilson Ave Suite 101, Bend, OR 97702	

Email: greid@structint.com





Telephone: (541) 604-7225

Title: Manager, TRU Compliance



OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT FACILITIES DEVELOPMENT DIVISION

California Licensed Structural Enginee	r Responsible for the Engineering and Test Report(s)
Company Name: STRUCTURAL INTEGRITY	ASSOCIATES, INC.
Name: Andrew Coughlin	California License Number: S6082
Mailing Address: 5215 Hellyer Ave, Suite 10	I, San Jose, CA 95138-1025
Telephone: (415) 635-8461	Email: acoughlin@structint.com
Certification Method	
GR-63-Core X ICC-ES AC	156
Other (Please Specify):	
	EOR CODE CO.
Testing Laboratory	JEO MA,
Company Name: UNIVERSITY OF CALIFOR	NIA, BERKELEY (PEER)
Contact Person: Amarnath Kasalanati	OSP 0000
Mailing Address: 325 Davis Hall, Berkeley C	4 94720-1729
Telephone: (510) 642-6475	Email: Amarnath1@berkeley.edu
	DATE: 08/16/2021
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	FORWIA BUILDING CODE. 25







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Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 0.91 (z/h = 1); 1.03 (z/h = 0)

SDS (Design spectral response acceleration at short period, g) = 0.76 (z/h = 1); 2.28 (z/h = 0)

ap (Amplification factor) = 1.0

 R_p (Response modification factor) = 1.5

 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

OSHPD Approval (For Office Use Only) - Approval Expires on 12/31/2025

Date: 8/16/2021

Name: Mohammad Karim Title: Supervisor, Health Facilities

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

Condition of Approval (if applicable):





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SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

2100221-CR-001-R0



Manufacturer:	Caterpillar Inc.	TABLE 1
Model Line:	Cloan Emissions Modulo (CEM)	IMPLET

Certified Product Construction Summary:

Carbon steel frame structure, stainless steel cabinet.

Certified Options Summary:

Support frame: Helgesen; DOC Substrates: Emitec/BASF; SCR Substrates: Emitec/BASF; AMOX Substrates: Emitec/BASF; Urea Injection Mixing Tube: Spraying Systems/Helgesen; Flow Diffuser: Helgesen; Divergent/Convergent Mixer: Helgesen; Flow Straightener: Helgesen; "Cool Box": Helgesen.

Base mounted - rigid (with or without CEM Frame). FOR CODE Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.

Building Code: CBC 2019	Seismic Certification Limits:	$S_{\rm DS} = 0.76 g z/h$	/ D= 1.5
banding code. CDC 2023	4	S _{DS} = 2.28 g z/h	n=0.0

	141					2.28 g 2/11=0.0	-
Model Line	Model	Di	mensions	(in)00	Weight	Notes	UUT
Model Line	Model	Depth	Width	Height	(lb)	Notes	001
CEM	3516 <mark>C-HD</mark>	R 133	ha89m	ad 35ari	3600		1A, 1B, 10
CEM	C175-16	180	89	78	6400	O	3A, 3B
		DATE:	08/16/	2021			
		DAIL.	00/10/	2021			
	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		*		(6		
		4			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
		PALL			00,		
		VIA	BUIL	JING C			
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Notes:

1. Height and weight do not include mounting frame.

SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

2100221-CR-001-R0



Manufacturer:	Caterpillar Inc.	TABLE 2
Model Line:	Clean Emissions Module (CEM)	IADLEZ

Certified Product Construction Summary:

Stainless steel cabinet, plastic buffer tank.

Certified Options Summary:

Enclosure: Helgesen; Pump: Grundfos; Pump Motor: 0.082 HP 100-240V; Buffer Tank: Shaw Development; ECM: Continental;

Electric Heaters: Chromalox; Dosing/Purge Manifold: Impro.

Mounting Configuration:

Base mounted - rigid

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

Building Code: CBC 2019 Seismic Certification Limits: $S_{DS} = 0.76 \text{ g}$ z/h=1.0 $I_{P} = 1.5$

Madallina	Mada &	Dimensions (in)			Weight	Notes	UUT	
Model Line	Model	Depth	Width	Height	(lb)	Notes	001	
Dosing Cabinet/ Buffer Tank (Caterpillar)	374-2499	BY: Mo	08/16/	41	n 265	For use with 3516C-HD & C175-16 EPD modules	2	
		DAIE.	00/10/	2021				
	Z				2			
		00			OK.			
		IVIA	BUILT	ING				

Notes:

1. Height and weight do not include mounting frame.

SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

2100221-CR-001-R0



 Manufacturer:
 Caterpillar Inc.
 Table Description: CEM Frame

 Model Line:
 Clean Emissions Module (CEM)

Building Code: CBC 2019 Seismic Certification Limits: $S_{DS} = 0.76 \text{ g} \quad z/h = 1.0$ $S_{DS} = 0.76 \text{ g} \quad z/h = 0.0$

unaing Coae: CBC 2019	9		Seismic Certification Limits: $S_{DS} = 2.28 g z/h = 0.0$						
Model Line	Model	Di	mension		Weight		Notes	דטט	
(Manufacturer)		Depth	Width	Height	(lb)	Marine Marine			
	381-3285 116 102 89 1261 Short position for 3516C-HD		1B						
CEM Frame	381-3285	116	102	113	1500	Carbon Steel	Height adjustment for 3516C-HD	Inter	
(Caterpillar)	416-5188	116	116 102 113 1500		Tall position for 3516C-HD	1C			
	363-2739	180	101/	164	2900 -	0266	Frame for C175-16	3B	
			////	<u> </u>					
				BY: N	ohamn	nad Karim			
				Maxxyywwww	7 17 17 17 17 17 17 17 17 17 17 17 17 17				
				DATE	09/16	/2021			
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Manufacti	•					
Model Lin	e: Clean Emissions Modu	le (CEM)		, ,		
UUT	Unit Description	Report Number	Testing Laboratory	S _{DS}	z/h	I _P
1A	3516C-HD rigid base mounted	PEER-STI/2012-06	UC Berkeley - PEER	2.28	1.0	1.5
	_	,		2.28	0.0	
1B	3516C-HD rigid base mounted	PEER-STI/2012-06	UC Berkeley - PEER	0.76	1.0	1.5
	on 381-3285 frame	,		2.28	0.0	
1C	3516C-HD rigid base mounted	PEER-STI/2012-06	UC Berkeley - PEER	0.76	1.0	1.5
	on 416-5188 frame		<u>, </u>	2.28	0.0	
2	374-2499 Dosing cabinet and	PEER-STI/2012-06	UC Berkeley - PEER	0.76	1.0	1.5
	buffer tank	CO TOTAL	Mp.	2.28	0.0	
3A	C175-16 rigid base mounted	PEER-STI/2012-07	UC Berkeley - PEER	2.28	1.0	1.5
		/ USHPU	7	2.28	0.0	
3B	C175-16 rigid base mounted on	PEER-STI/2012-07	UC Berkeley - PEER	0.76	1.0	1.5
	363-2739 frame	037-0200		2.28	0.0	
		BY: Mohammad Ka				
		<u> </u>				
	\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	DATE: 08/16/2021				
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		ANIA BUILDING	CO			
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2100221-CR-001-R0



UUT 1A

Manufacturer: Caterpillar Inc.

Model Line: Clean Emissions Module (CEM)

Model Number: 3516C-HD Serial Number: N/A

Product Construction Summary:

Carbon steel frame structure with stainless steel cabinet.

Options/Subcomponent Summary:

Support Frame: Helgesen; DOC Substrates: (4) Emitec/BASF; SCR Substrates: (20) Emitec/BASF; AMOX Substrates: (8)

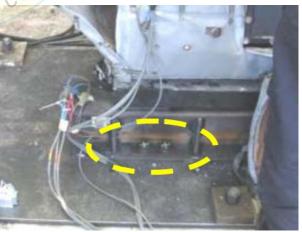
Emitec/BASF; Urea Injection Mixing Tube: Spraying Systems Helgesen; Flow Diffuser: Helgesen; Divergent/Convergent Mixer:

Helgesen; Flow Straightener: Helgesen; "Cool Box": Helgesen,

			UUT Pr	operties		7						
Weight Dimension (in)					Lowest Natural Frequency (Hz)							
(lb)	Depth	Width	Width SHeight 66		Front	-Back	Side-Side		Vertical			
3,600	133	89		35		10.6		8.4		.2		
		UUT Highe:	st Passed S	eismic Run	Inform	ation						
Buildi	ng Code	Test Crit	eria	S _{DS} (g)	z/h	I _P O	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)		
CDC 2010		ICC ES AC1E	ICC-ES AC156 (2018) 8/1		1.0	1 -	2.05	2.74	1.50	0.61		
CBC	CBC 2019				0.0	1.5	3.65	2.14	1.52	0.61		

Test Mounting Details:





Rigid base mounted to fixture plates with (16) 3/4" A490 bolts.

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

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UUT 1B

Manufacturer: Caterpillar Inc.

Model Line: Clean Emissions Module (CEM)

Model Number: 3516C-HD Serial Number: N/A

Product Construction Summary:

Carbon steel frame structure with stainless steel cabinet.

Options/Subcomponent Summary:

Support Frame: Helgesen; CEM Frame: Caterpillar - 381-3285 (Short Position); DOC Substrates: (4) Emitec/BASF; SCR Substrates: (20) Emitec/BASF; AMOX Substrates: (8) Emitec/BASF; Urea Injection Mixing Tube: Spraying Systems Helgesen; Flow Diffuser: Helgesen; Divergent/Convergent Mixer: Helgesen; Flow Straightener: Helgesen; "Cool Box": Helgesen.

			UUT Pr	operties		7					
Weight		Dimension (in)		Lowest Natural Frequency (Hz)						
(lb)	Depth	Width	OSHe	ight266	Front	-Back	Side-Side		Vertical		
4,860	133	89 12		24	5	.9	6.5		8.2		
		UUT Highe.	st Passed Se	eismic Run	Inform	ation					
Buildi	ng Code	Test Crit	teria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)	
CDC	CBC 2019		ICC-ES AC156(2018)/1		1.0	1.5	2.20	0.01		0.61	
СВС					0.0	1.5	2.28	0.91	1.52		

Test Mounting Details:





CEM rigid base mounted to frame with (16) 3/4" A490 bolts. Frame rigid mounted to fixture plates with (16) 7/8" A490 bolts. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

2100221-CR-001-R0



UUT 1C

Manufacturer: Caterpillar Inc.

Model Line: Clean Emissions Module (CEM)

Model Number: 3516C-HD Serial Number: N/A

Product Construction Summary:

Carbon steel frame structure with stainless steel cabinet.

Options/Subcomponent Summary:

Support Frame: Helgesen; CEM Frame: Caterpillar - 416-5188 (Tall Position); DOC Substrates: (4) Emitec/BASF; SCR Substrates: (20) Emitec/BASF; AMOX Substrates: (8) Emitec/BASF; Urea Injection Mixing Tube: Spraying Systems Helgesen;

Flow Diffuser: Helgesen; Divergent/Convergent Mixer: Helgesen; Flow Straightener: Helgesen; "Cool Box": Helgesen.

			UUT Pr	operties		7				
Weight				Lowes	t Natural	Frequen	cy (Hz)			
(lb)	Depth	Width	OSHe	OSHeight 66		Front-Back		-Side	Vertical	
5,100	133	89	1	148		4.9		.3	8.2	
		UUT Highe:	st Passed S	eismic Run	Inform	ation				
Buildi	ng Code	Test Crit	teria	S _{DS} (g)	z/h	I _P	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)
CDC 2010		ICC ES AC1E	ICC-ES AC156 (2018) / 1		1.0	1, -	2.28	0.91	1.50	0.61
СВС	CBC 2019				0.0	1.5	2.20	0.91	1.52	

Test Mounting Details:





CEM rigid base mounted to frame with (16) 3/4" A490 bolts. Frame rigid mounted to fixture plates with (16) 7/8" A490 bolts. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.

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UUT 2

Manufacturer: Caterpillar Inc.

Model Line: Clean Emissions Module (CEM)

Model Number: Dosing Cabinet - 374-2499 **Serial Number:** N/A

Product Construction Summary:

Stainless steel cabinet, plastic buffer tank.

Options/Subcomponent Summary:

Enclosure: Helgesen; **Pump:** Grundfos; **Pump Motor:** 0.082 HP, 100-240V; **Buffer Tank:** Shaw Development; **ECM:** Continental;

Electric Heaters: Chromalox; Dosing/Purge Manifold: Impro.

			UUT Pr	operties		7					
Weight	Dimension (in)				Lowest Natural Frequency (Hz)						
(lb)	Depth	Width	OSHeight 266		Front-Back		Side-Side		Vertical		
265	31	14	4	41	15.1		5.6		6.6		
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 2019		ICC-ES AC156 (2018) / 1		0.76	1.0	1.5	2.28	0.91	1.52	0.61	
				2.28	0.0						

Test Mounting Details:





TRU Compliance, by Structural Integrity Associates, Inc.

Rigid base mounted to fixture plate with (8) 3/8" A490 bolts.

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

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2100221-CR-001-R0



UUT 3A

Manufacturer: Caterpillar Inc.

Model Line: Clean Emissions Module (CEM)

Model Number: C175-16 Serial Number: N/A

Product Construction Summary:

Carbon steel frame structure with stainless steel cabinet.

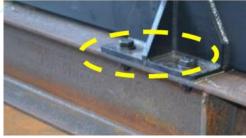
Options/Subcomponent Summary:

Support Frame: Helgesen; DOC Sub-Strates: (6) Emitec/BASF; SCR Sub-Strates: (24) Emitec/BASF; AMOX Sub-Strates: Emitec/BASF; Urea Injection Mixing Tube: Spraying Systems Helgesen; Flow Diffuser: Helgesen; Divergent/Convergent Mixer: Helgesen; Flow Straightener: Helgesen; "Cool Box": Helgesen.

			UUT Pro	operties		71						
Weight		Dimension (in)				Lowest Natural Frequency (Hz)						
(lb)	Depth	Width	OSHeight 66		Front-Back		Side-Side		Vertical			
6,400	180	89	78		///////////////////// 1	11.0		15.3		21.8		
		UUT Highe.	st Passed Se	eismic Run	Informa	ation						
Buildi	ng 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 2019		ICC-ES AC156 (2018) / 1		2,28	1.0	1.5	3.65	2.74	1.52	0.61		
				2.28	0.0							

Test Mounting Details:







CEM rigid base mounted to beams with (16) 7/8" Grade 8 bolts. Beams rigid mounted to fixture plates with (8) 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.

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UUT3B

Manufacturer: Caterpillar Inc.

Model Line: Clean Emissions Module (CEM)

Model Number: C175-16 Serial Number: N/A

Product Construction Summary:

Carbon steel frame structure with stainless steel cabinet.

Options/Subcomponent Summary:

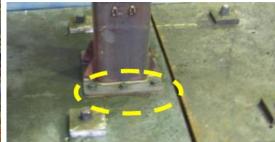
Support Frame: Helgesen; CEM Frame: Caterpillar - 363-2739; DOC Sub-Strates: (6) Emitec/BASF; SCR Sub-Strates: (24) Emitec/BASF; AMOX Sub-Strates: Emitec/BASF; Urea Injection Mixing Tube: Spraying Systems Helgesen; Flow Diffuser: Helgesen; Divergent/Convergent Mixer: Helgesen; Flow Straightener: Helgesen; "Cool Box": Helgesen.

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			UUT Pr	operties		7						
Weight		Dimension (in)				Lowest Natural Frequency (Hz)						
(lb)	Depth	Width	OSHeight 266		Front	t-B <mark>ack</mark> Side		e-Side Ve		rtical		
9,300	180	89	242		6	6.0		3.7		18.3		
		UUT Highest	t Passed S	eismic Run	Inform	ation						
Buildi	ing Code	Test Criteria		S _{DS} (g)	z/h	I _P O	A _{FLX-H} (g)	A _{RIG-H} (g)	A _{FLX-V} (g)	A _{RIG-V} (g)		
CBC 2019		ICC-ES AC156 (2018) / 1		0.76	1.0	1.5	2.28	0.91	1.52	0.61		
				2 28	0.0	/1.5						

Test Mounting Details:







CEM rigid base mounted to frame with (16) 7/8" Grade 8 bolts. Frame rigid mounted to fixture plates with (24) 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.