



APPLICATION FOR PREAPPROVAL SPECIAL SEISMIC CERTIFICATION OF EQUIPMENT AND COMPONENTS

For Office Use Only

APPLICATION NO.
OSP -0192-10

Check whether application is: NEW RENEWAL

1.0	IEA	Ron Shaffer
	<i>Manufacturer</i>	<i>Manufacturer's Technical Representative</i>
	9625 55 th Street	Kenosha, WI 53144
	<i>Mailing Address</i>	
	(262) 612-1331	rshaffer@iearad.com
	<i>Telephone</i>	<i>E-mail Address</i>

2.0	HCR, ECC and EC Radiators	Radiators
	<i>Product Name</i>	<i>Product Type</i>
	HCR-Q036, HCR-Q072, HCR-Q108, HCR-Q058, HCR-Q116, HCR-Q174, ECC-S072, EC-100	
	<i>Product model No (List all unique product identification numbers and/or serial numbers)</i>	

General Description: Rigid floor mounted HCR units are modular radiators consisting of a varying number of individual core and fan sections. The ECC-S072 and EC-100 are engine coolers with fans are floor mounted on vibration isolators 7 snubbers.

3.0	IEA	Ron Shaffer
	<i>Applicant Company Name</i>	<i>Contact Person</i>
	9625 55 th Street	Kenosha, WI 53144
	<i>Mailing Address</i>	
	(262) 612-1331	rshaffer@iearad.com
	<i>Telephone</i>	<i>E-mail Address</i>

I hereby agree to reimburse the Office of Statewide Health Planning and Development for the actual costs incurred by the department for review.

Signature of Applicant

May 24, 2011

Date

Managing Partner
Title

Dynamic Certification Laboratories
Company Name

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Registered Design Professional Preparing the Report

4.0 DYNAMIC CERTIFICATION LABORATORIES, LLC
Company Name

JOSEPH LA BRIE, SE SE-3566

Contact Name California License Number

1315 Greg Street, Suite 109 Sparks, NV 89431

Mailing Address

(775) 358-5085

LaBrie@MakeltRight.net

Telephone

E-mail Address

California Licensed Structural Engineer Review and Acceptance of the Report

5.0 DYNAMIC CERTIFICATION LABORATORIES, LLC
Company Name

DR. AHMAD ITANI, SE SE-5220

Contact Name California License Number

1315 Greg Street, Suite 109 Sparks, NV 89431

Mailing Address

(775) 358-5085

Itani@shaketest.com

Telephone

E-mail Address

Anchorage Pre-Approval

- 6.0 [] Anchorage is pre-approved under OPA- (Separate application for anchorage pre-approval is required)
[X] Anchorage is not Pre-approved

Certification Method

- 70. [X] Testing in accordance with: [X] ICC-ES AC-156 [] Other (Please Specify):
[] Analysis
[] Experience data
[X] Combination of Testing, Analysis, and/or Experience Data (Please Specify): Testing

Testing Laboratory (if applicable)

8.0 DYNAMIC CERTIFICATION LABORATORIES, LLC KELLY LAPLACE, QUALITY MANAGER
Company Name Contact Name

1315 Greg Street, Suite 109 Sparks, NV 89431

Mailing Address

(775) 358-5085

Kelly@shaketest.com

Telephone

E-mail:

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Approval Parameters

9.0 Design in accordance with ASCE 7-05 Chapter 13: Yes No

Design Basis of Equipment or Components (F_p/W_p) = 1.39g
 S_{DS} (Spectral response acceleration at short period) = 1.93g
 a_p (In-structure equipment or component amplification factor) = 1.0
 R_p (Equipment or component response modification factor) = 2.5
 I_p (Importance factor) = 1.5
 z/h (Height factor ratio) = 1
 Equipment or Component fundamental period(s) = SEE ATTACHMENT
 Building period limits (if any) = NONE
 Overall dimensions and weight (or range thereof) = SEE ATTACHMENT

Equipment or Components @ grade designed in accordance with ASCE 7-05 Chapter 15: Yes No

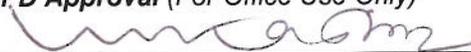
Design Basis of Equipment or Components (VW) =
 S_{DS} (Spectral response acceleration at short period) =
 S_1 (Spectral response acceleration at 1 second period) =
 R (Response modification coefficient) = 1.0
 Ω_0 (System overstrength factor) = 1.0
 C_d (Deflection amplification factor) = 1.0
 I_p (Importance factor) = 1.5
 Height to Center of Gravity above base =
 Equipment or Component fundamental period(s) = Sec
 Overall dimensions and weight (or range thereof) =

Tank(s) designed in accordance with ASME BPVC, 2007: Yes No

10.0 List of attachments supporting the special seismic certification of equipment or components:

- Test Report Drawings Manufacturer's Catalog
 Calculations Others (Please Specify):

11.0 OSHPD Approval (For Office Use Only)

 Signature & Date M. R. Karim, SHFR Name & Title	6/16/2011	December 31, 2016 Approval Expiration Date S_{DS} (g) = 1.93 z/h = 1.0 Special Seismic Certification Valid Up to
Condition of Approval (if any):		

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OSHPD PRE-APPROVAL OSP FOR SPECIAL SEISMIC CERTIFICATION
 MECHANICAL EQUIPMENT: Radiators

Approved Product Model Numbers

Model	Dimensions				Lowest Natural Frequency			Sds Level Approved	Materials of Construction	Mounting	Unit
	Length (in)	Width (in)	Height (in)	Operating Weight (lb)	F-B (Hz)	S-S (Hz)	V (Hz)				
HCR-Q036	91.75	75	125.5	4,720	5.0	5.8	23.3	1.93	Carbon Steel	Rigid floor mounted	UUT1
HCR-Q072	163.7	75	127.8	6,155	n/a	n/a	n/a		Carbon Steel	Rigid floor mounted	Interpolated
HCR-Q108	235.7	75	127.8	7,590	n/a	n/a	n/a		Carbon Steel	Rigid floor mounted	Interpolated
HCR-Q058	114	90	131.75	6,950	n/a	n/a	n/a		Carbon Steel	Rigid floor mounted	Interpolated
HCR-Q116	211.7	90	131.75	9,936	n/a	n/a	n/a		Carbon Steel	Rigid floor mounted	Interpolated
HCR-Q174	307.75	90	131.75	11,400	11.5	8.2	24.8		Carbon Steel	Rigid floor mounted	UUT2
ECC-S072	87	118.5	131.75	7,238	2.5	4.3	7.6		Carbon Steel	Floor mounted with vibration isolator	UUT3
EC-100	97.75	124.25	153	9,315	4.3	5.1	13.7		Carbon Steel	Floor mounted with vibration isolator	UUT4

Note: All units are carbon steel structure with aluminum fins, copper tubes in cooling coils and aluminum fans

UUT1



Unit Under Test (UUT) Summary Sheet

Manufacturer: IEA Radiators

Product Line: HCR Modular Radiators

Model Number: HCR Q036

Product Construction Summary: Fabricated carbon steel structure with aluminum fins, copper tubes, aluminum fans and multi-voltage 15 HP electric motor.

Options / Component Summary: 36 Sq Ft radiator, SR Coils, 6" Flange

UUT Properties

Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
4,720	92	75	125.6	5.0	5.8	23.3

Seismic Test Parameters

Building Code	Test Criteria	Sds	z/h	Ip	Aflx-H	Arig-H	Aflx-V	Arig-V
IBC 2009	ICC-ES AC156	2.26	1.0	1.5	3.62	2.71	1.51	0.6

Unit Mounting Description:



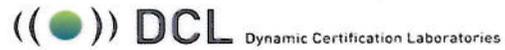
Unit mounted to shake table and ready for test.



Closeup of 3/4-inch Grade 8 bolt used for mounting (total of four).

The unit was mounted to the DCL-provided steel shake table interface frame at four corners through each of the unit's legs using Grade 8, 3/4-inch bolts. The steel interface frame was bolted to the shake table using M12 threaded rod at a spacing of approximately 8-inches on center. For shake table test, surge tank and cooling coils were filled with water to operating capacity.

UUT2



Unit Under Test (UUT) Summary Sheet

Manufacturer: IEA Radiators

Product Line: HCR Modular Radiators

Model Number: HCR Q174

Product Construction Summary: Fabricated carbon steel structure with aluminum fins, copper tubes, aluminum fans and multi-voltage 30 HP electric motor.

Options / Component Summary: 174 Sq Ft radiator, SR Coils, 6" Flange

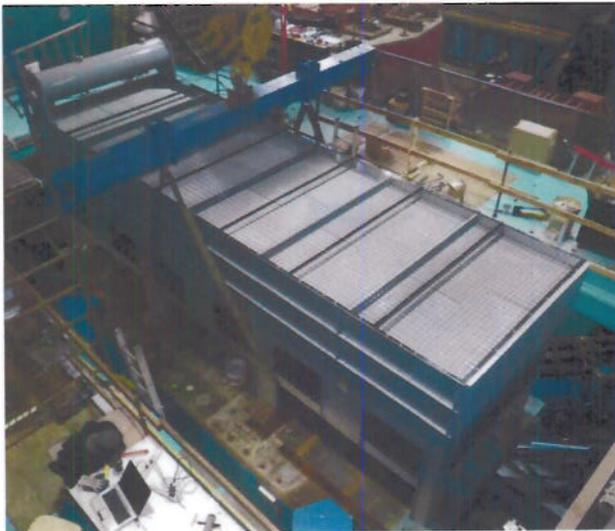
UUT Properties

Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
11,400	308	90	132	11.5	8.2	24.8

Seismic Test Parameters

Building Code	Test Criteria	Sds	z/h	Ip	Aflx-H	Arig-H	Aflx-V	Arig-V
IBC 2009	ICC-ES AC156	1.93	1.0	1.5	3.09	2.32	1.29	0.52

Unit Mounting Description:



Unit mounted to shake table and ready for test.



Closeup of 3/4-inch Grade 8 bolt used for mounting (total of twelve).

The unit was mounted to the DCL-provided steel shake table interface frame at twelve points through each of the unit's legs using Grade 8, 3/4-inch bolts (twelve total). The steel interface frame consisted of I-beams that were mounted to the SRMD shake table with A490 1 1/2-inch diameter bolts at a spacing of approximately 12-inches on-center. For shake table test, surge tank and cooling coils were filled with water to operating capacity.

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UUT3



Unit Under Test (UUT) Summary Sheet

Manufacturer: IEA Radiators

Product Line: ECC S072 (Stand-Alone Product)

Model Number: ECC S072

Product Construction Summary: Fabricated carbon steel structure with aluminum fins, copper tubes and aluminum fan.

Options / Component Summary: Fuel cooler, fan, fan shaft bearing, idler sheave bearing, low level alarm probe, pipe isolators and vibration isolators.

UUT Properties

Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
7,238	87	119	132	2.5	4.3	7.6

Seismic Test Parameters

Building Code	Test Criteria	Sds	z/h	Ip	Aflx-H	Arig-H	Aflx-V	Arig-V
IBC 2009	ICC-ES AC156	1.93	1.0	1.5	3.09	2.32	1.29	0.52

Unit Mounting Description:



Unit mounted to shake table and ready for test.



Closeup of CalDyne isolator mounted to unit and steel I-beam.

The unit was mounted at the base in six locations to vibration isolators supplied by CalDyne (6 total) using Grade 8, 3/4-inch bolts. Four of the isolators were CalDyne model RJJEQ A-3040, mounted on the heavy side of the unit (under the radiator); two furthest from the center of gravity and two at the approximate mid-point of the unit. Two of the isolators were CalDyne model RJJEQ A-2120, mounted on the light side of the unit (furthest from the radiator). The isolators were mounted to steel I-beams using a total of four (4) Grade 8, 5/8-inch bolts per isolator. The I-beams were attached to the UCSD shake table with 1 1/2-inch A490 bolts. For shake table test, jacket water cooling section was filled with water to operating capacity.

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UUT4



Unit Under Test (UUT) Summary Sheet

Manufacturer: IEA Radiators
Product Line: EC 100 (Stand-Alone Product)
Model Number: EC 100
Product Construction Summary: Fabricated carbon steel structure with aluminum fins, copper tubes and aluminum fan.
Options / Component Summary: Fuel cooler, fan, fan shaft bearing, idler sheave bearing, and vibration isolators.

UUT Properties

Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
9,315	98	125	153	4.3	5.1	13.7

Seismic Test Parameters

Building Code	Test Criteria	Sds	z/h	Ip	Aflx-H	Arig-H	Aflx-V	Arig-V
IBC 2009	ICC-ES AC156	1.93	1.0	1.5	3.09	2.32	1.29	0.52

Unit Mounting Description:



Unit mounted to shake table and ready for test.



Closeup of CalDyne isolator mounted to unit and steel I-beam.

The unit was mounted at the base in six locations to vibration isolators supplied by CalDyne (6 total) using Grade 8, 3/4-inch bolts. Four of the isolators were CalDyne model RJJEQ D-4560, mounted on the heavy side of the unit (under the radiator); two furthest from the center of gravity and two approximately 1/3 of the distance from the heavy end of the unit. Two of the isolators were CalDyne model RJJEQ D-2403, mounted on the light side of the unit (furthest from the radiator). The isolators were mounted to steel I-beams using a total of four (4) Grade 8, 7/8-inch bolts per isolator. The I-beams were attached to the UCSD shake table with 1 1/2-inch A490 bolts. For shake table test, jacket water and aftercooler cooling sections were filled with water to operating capacity.

APPROVED COMPONENT LIST

Motors					
Mfg. Part No.	Component Mfg.	Description	Mounting	Size	Unit
15 HP, Catalog# EP0154 Type AEHH-8N	TECO Westinghouse	Motor	Rigid	Smallest ↓ Largest	UUT1
20 HP, Catalog# EP0204 Type AEHH-8N	TECO Westinghouse	Motor	Rigid		Interpolated
25 HP, Catalog# EP0254 Type AEHH-8N	TECO Westinghouse	Motor	Rigid		Interpolated
30 HP, Catalog# EP0304 Type AEHH-8N	TECO Westinghouse	Motor	Rigid		UUT2
30 HP, Catalog# U30P2D NEMA Premium	US Motors	Motor	Rigid		UUT2
30 HP, W22 - NEMA Premium	WEG Electric	Motor	Rigid		UUT2

Miscellaneous					
Mfg. Part No.	Component Mfg.	Description	Mounting	Size	Unit
DH-326-211292	Thermal Transfer	Fuel Cooler	Flexible	n/a	UUT1, UUT2, UUT3
DH-326-1-1	Thermal Transfer	Fuel Cooler	Flexible		UUT4
10000 Class, Series 24SD	Moore Fan	Fan	Rigid		UUT1
10000 Class, Series 30SD	Moore Fan	Fan	Rigid		UUT2, UUT4
15/10201	Truflo	Fan	Rigid		UUT3
S-2000 Series	Dodge	Fan Shaft Bearing	Rigid		UUT1, UUT2
2-7/16 WMFL13/2075	QM Bearing	Fan Shaft Bearing	Rigid		UUT3
USRBE5000-307	Seal-Master	Fan Shaft Bearing	Rigid		UUT4
5309-C	MRC	Idler Sheave Bearing	Rigid		UUT3
5312-C	MRC	Idler Sheave Bearing	Rigid		UUT4
913-NLU-TD10-T	Cooper-Standard	Low Level Alarm Probe	Rigid		UUT3
SM6-165-A	Isolation Dynamics	Pipe Isolators	Rigid		UUT3
RJEC	CalDyn	Vibration Isolators	Rigid		UUT3, UUT4
Standard Duty; .0075 AL Fins, .625 x .020 CU Tubes	Super Coils	Cooling Coil	Rigid		UUT1, UUT2
Heavy Duty; .0075 AL Fins, .625 x .032 CU Tubes	Super Coils	Cooling Coil	Rigid		UUT1, UUT2
EL150K1	Murphy Industries	Liquid Level	Rigid		UUT1, UUT2



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