



DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
FACILITIES DEVELOPMENT DIVISION

APPLICATION FOR HCAI SPECIAL SEISMIC
CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0192

HCAI Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: IEA, LLC, an Engendren Corporation Subsidiary

Manufacturer's Technical Representative: Rob Walsh

Mailing Address: 9625 55th Street, Kenosha, WI 53144

Telephone: (262) 942-1414

Email: RWalsh@iearad.com

Product Information

Product Name: Emergency and Standby Power Systems

Product Type: Remote Radiators

Product Model Number: See Attached OSP Product Summary

General Description: HCR units are modular radiators consisting of a varying number of individual core and fan

Mounting Description: HCR units are rigidly mounted and ECC & EC units are mounted with external isolators & snubbers,
Floor Mounted

Tested Seismic Enhancements: None

Applicant Information

Applicant Company Name: Dynamic Certifications Laboratories

Contact Person: Kelly Laplace

Mailing Address: 1315 Greg Street, Sparks, NV 89431

Telephone: (775) 358-5085

Email: kelly@shaketest.com

Title: Business Manager



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

Company Name: THE VMC GROUP

Name: Kenneth Tarlow

California License Number: S2851

Mailing Address: 980 9th Street, 16th Floor, Sacramento, CA 95814

Telephone: (832) 627-2214

Email: ken.tarlow@thevmcgroup.com

Certification Method

☐ GR-63-Core

☒ ICC-ES AC156

☐ IEEE 344

☐ IEEE 693

☐ NEBS 3

☐ Other (Please Specify): _____

Testing Laboratory

Company Name: DYNAMIC CERTIFICATION LABORATORY (DCL)

Contact Person: Kelly Laplace

Mailing Address: 1315 Greg St., Ste 109, Sparks NV 89431

Telephone: (775) 358-5085

Email: kelly@shaketest.com



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Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 1.39 (rigid mount), 4.34 (spring isolated)

SDS (Design spectral response acceleration at short period, g) = 1.93

a_p (Amplification factor) = 1.0 (rigid mount), 2.5 (spring isolated)

R_p (Response modification factor) = 2.5 (rigid mount), 2.0 (spring isolated)

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height ratio factor) = 1

Natural frequencies (Hz) = See Attachment

Overall dimensions and weight = See Attachment

HCAI Approval (For Office Use Only) - Approval Expires on 01/31/2028

Date: 1/31/2022

Name: Mohammad Karim

Title: Supervisor, Health Facilities

Special Seismic Certification Valid Up to: SDS (g) = 1.93

z/h = 1

Condition of Approval (if applicable):

**Table 1 - Special Seismic Certification
Certified Component Matrix**



DCL Project No.: 77276-2101

Manufacturer: IEA

Product Line: HCR Modular Radiators, ECC S072, EC 100

Product Construction: Fabricated carbon steel

Test Level: Sds = 1.93g, z/h = 1.0

Model	Dimensions (in)			Approx. Weight (lb)	Construction	Mounting	UUT
	Depth	Width	Height				
HCR-Q036	91.75	75.00	125.50	4,720	Carbon Steel	Rigid floor mounted	UUT-01
HCR-Q072	163.70	75.00	127.80	6,155			Interpolated
HCR-Q108	235.70	75.00	127.80	7,590			Interpolated
HCR-Q058	114.00	90.00	131.75	6,950			Interpolated
HCRQ116	211.70	90.00	131.75	9,936			Interpolated
HCR-Q174	307.75	90.00	131.75	11,400		Floor mounted with vibration isolator	UUT-02
ECC-S072	87.00	118.50	131.75	7,238			UUT-03
EC-100	97.75	124.23	153.00	9,315			UUT-04

Table 2 - Special Seismic Certification
Certified Subcomponent Matrix - Motors - HCR Modular Radiators



DCL Project No.: 77276-2101

Product Line: HCR Modular Radiators

Test Level: Sds = 1.93g, z/h = 1.0

Motors								
Model	HP	Dimensions (in)			Approx. Weight (lb)	Component Mfg.	Casing Material	UUT
		Depth	Width	Height				
EP0154 Type AEHH-8N	15	23.78	13.15	14.84	304	TECO Westinghouse	Cast Iron	UUT-01
EP0204 Type AEHH-8N	20	25.52	13.15	14.84	344			Interpolated
EP0254 Type AEHH-8N	25	26.8	15.04	16.52	429			Interpolated
EP0304 Type AEHH-8N	30	28.3	15.04	16.88	486	US Motors		UUT-02
U30P2D NEMA Premium		28.25	13.38	13.69	325			UUT-02
W22 - NEMA Premium		27.93	14.17	14.07	450	WEG Electric		UUT-02

Table 3 - Special Seismic Certification
Certified Subcomponent Matrix - Fuel Cooler - HCR Modular Radiators

DCL Project No.: 77276-2101

Product Line: HCR Modular Radiators

Test Level: Sds = 1.93g, z/h = 1.0

Fuel Coolers							
Model	Dimensions (in)			Approx. Weight (lb)	Component Mfg.	Construction Material	UUT
	Depth	Width	Height				
DH-326-211292	26.75	24.25	1.50	16.00	Thermal Transfer	Copper / Aluminum	UUT-01, UUT-02

Table 4 - Special Seismic Certification
Certified Subcomponent Matrix - Fuel Cooler - ECC S072

DCL Project No.: 77276-2101

Product Line: ECC S072

Test Level: Sds = 1.93g, z/h = 1.0

Fuel Coolers							
Model	Dimensions (in)			Approx. Weight (lb)	Component Mfg.	Construction Material	UUT
	Depth	Width	Height				
DH-326-211292	26.75	24.25	1.50	16.00	Thermal Transfer	Copper / Aluminum	UUT-03

Table 5 - Special Seismic Certification
Certified Subcomponent Matrix - Fuel Cooler - EC 100



DCL Project No.: 77276-2101

Product Line: EC 100

Test Level: Sds = 1.93g, z/h = 1.0

Fuel Coolers						
Model	Dimensions (in)			Approx. Weight (lb)	Component Mfg.	Construction Material
	Depth	Width	Height			
DH-326-1-1	25.00	24	1.50	8.00	Thermal Transfer	Copper / Aluminum
						UUT-04

Table 6 - Special Seismic Certification
Certified Subcomponent Matrix - Fans - HCR Modular Radiators

DCL Project No.: 77276-2101

Product Line: HCR Modular Radiators

Test Level: Sds = 1.93g, z/h = 1.0

Fans					
Model	Dimensions		Component Mfg.	Material	UUT
	Diameter (in)	Approx. Weight (lb)			
10000 Class, Series 24SD	60	105	Moore Fan	Aluminum	UUT-01
10000 Class, Series 30SD	84	171			UUT-02

Table 7 - Special Seismic Certification
Certified Subcomponent Matrix - Fans - ECC S072

DCL Project No.: 77276-2101

Product Line: ECC S072

Test Level: Sds = 1.93g, z/h = 1.0

Fans					
Model	Dimensions		Component Mfg.	Material	UUT
	Diameter (in)	Approx. Weight (lb)			
15/10201	84	431	Truflo	Carbon Steel	UUT-03

Table 8 - Special Seismic Certification
Certified Subcomponent Matrix - Fans - EC 100



DCL Project No.: 77276-2101

Product Line: EC 100

Test Level: Sds = 1.93g, z/h = 1.0

Fans					
Model	Dimensions		Component Mfg.	Material	UUT
	Diameter (in)	Approx. Weight (lb)			
10000 Class, Series 30SD	84	171	Moore Fan	Aluminum	UUT-04

Table 9 - Special Seismic Certification
Certified Subcomponent Matrix - Fan Shaft Bearing - HCR Modular Radiators

DCL Project No.: 77276-2101

Product Line: HCR Modular Radiators

Test Level: Sds = 1.93g, z/h = 1.0

Fan Shaft Bearing						
Model	Dimensions (in)			Approx. Weight (lb)	Component Mfg.	Casing Material
	Depth	Width	Height			
5-2000 Series	5.13	5.13	2.97	1.00	Dodge	UUT-01, UUT-02
2000 Series	6.13	6.13	3.52	1.81		UUT-01, UUT-02

Table 10 - Special Seismic Certification
Certified Subcomponent Matrix - Fan Shaft Bearing - EC 100

DCL Project No.: 77276-2101

Product Line: EC 100

Test Level: Sds = 1.93g, z/h = 1.0

Fan Shaft Bearing						
Model	Dimensions (in)			Approx. Weight (lb)	Component Mfg.	Casing Material
	Depth	Width	Height			
USRBE5000-307	4.47	13.50	7.38	39.0	Seal-Master	Cast Iron

Table 11 - Special Seismic Certification**Certified Subcomponent Matrix - Idler Sheave Bearing - ECC S072**

DCL Project No.: 77276-2101

Product Line: ECC S072

Test Level: Sds = 1.93g, z/h = 1.0

Idler Sheave Bearing					
Model	Dimensions		Component Mfg.	Material	UUT
	Diameter (mm)	Approx. Weight (lb)			
5309-C	1.77	5.00	MRC	52100 Steel	UUT-03

Table 12 - Special Seismic Certification**Certified Subcomponent Matrix - Idler Sheave Bearing - EC 100**

DCL Project No.: 77276-2101

Product Line: EC 100

Test Level: Sds = 1.93g, z/h = 1.0

Idler Sheave Bearing					
Model	Dimensions		Component Mfg.	Material	UUT
	Diameter (mm)	Approx. Weight (lb)			
5312-C	2.36	6.28	MRC	52100 Steel	UUT-04

Table 13 - Special Seismic Certification**Certified Subcomponent Matrix - Miscellaneous - HCR Modular Radiators**

DCL Project No.: 77276-2101

Product Line: HCR Modular Radiators

Test Level: Sds = 1.93g, z/h = 1.0

Miscellaneous								
Model	Dimensions (in)			Approx. Weight (lb)	Component Mfg.	Construction Material	Description	UUT
	Depth	Width	Height					
0.0075 AL Fins, 0.625 x 0.20 CU Tubes	15.00	90.00	300.00	2380.00	Super Coils	Copper / Aluminum	Cooling Coil	UUT-01, UUT-02
0.0075 AL Fins, 0.625 x 0.32 CU Tubes	9.50	75.00	85.00	555.00				UUT-01, UUT-02
EL150K1	2.75	4.75	5.00	2.63	Murphy Industries	Cast Iron	Liquid Level	UUT-01, UUT-02

Table 14 - Special Seismic Certification
Certified Subcomponent Matrix - Miscellaneous - ECC S072



DCL Project No.: 77276-2101

Product Line: ECC S072

Test Level: Sds = 1.93g, z/h = 1.0

Miscellaneous								
Model	Dimensions (in)			Approx. Weight (lb)	Component Mfg.	Construction Material	Description	UUT
	Depth	Width	Height					
913-NLU-TD10-T	4.00	1.75	1.75	0.19	Cooper-Standard	Brass	Low Level Alarm Probe	UUT-03
SM6-165-A	2.25	3.25	1.65	0.14	Isolation Dynamics	Stainless Steel	Pipe Isolators	UUT-03

Table 15 - Special Seismic Certification
Tested Units

DCL Project No.: 77276-2101

Manufacturer: IEA

Product Line: HCR Modular Radiators, ECC S072, EC 100

Product Construction: Fabricated carbon steel

Test Level: Sds = 1.93g, z/h = 1.0

Model	Dimensions (in)			Approx. Weight (lb)	Construction	Mounting	Sds (g), z/h=1	UUT
	Depth	Width	Height					
HCR-Q036	91.75	75.00	125.50	4,720	Carbon Steel	Rigid floor mounted	1.93	UUT-01
HCR-Q174	307.75	90.00	131.75	11,400				UUT-02
ECC-S072	87.00	118.50	131.75	7,238		Floor mounted with vibration isolator		UUT-03
EC-100	97.75	124.23	153.00	9,315				UUT-04

UUT-01 UNIT UNDER TEST (UUT) Summary Sheet



DCL Project Number: 77276-2101

Manufacturer: IEA, LLC

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 Square Foot Radiator, SR Coils, 6" Flange

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
4,720	91.75	75.00	125.50	5.0	5.8	23.3

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2019	ICC-ES AC156	2.26	1.0	1.5	3.20	2.71	1.51	0.60

Unit Mounting Description: 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 (four bolts total).



Overall view of UUT-01

UUT-02 UNIT UNDER TEST (UUT) Summary Sheet



DCL Project Number: 77276-2101

Manufacturer: IEA, LLC

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 Square Foot Radiator, SR Coils, 6" Flange

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
11,400	307.75	90.00	131.75	11.5	8.2	24.8

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2019	ICC-ES AC156	1.93	1.0	1.5	3.09	2.32	1.29	0.52

Unit Mounting Description: 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).



Overall view of UUT-02

UUT-03 UNIT UNDER TEST (UUT) Summary Sheet



DCL Project Number: 77276-2101

Manufacturer: IEA, LLC

Product Line: ECC S072 (Stand-Alone Product)

Model Number: ECC S072

Product Construction Summary:

Fabricated carbon steel structure with aluminum fins, copper tubes, aluminum fan

Options / Component Summary:

Fuel Cooler, Fan, Fan Shaft Bearing, Idler Sheave Bearing, Low Level Alarm Probe, Pipe Isolators, and Vibration Isolators

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
7,238	87.00	118.50	131.75	2.5	4.3	7.6

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2019	ICC-ES AC156	1.93	1.0	1.5	3.09	2.32	1.29	0.52

Unit Mounting Description: The unit was mounted at the base in six locations to vibration isolators supplied by CalDyne 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; two further 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. The isolators were mounted to steel I-beams using a total of four (4) Grade 8, 5/8-inch bolts per isolator.



Overall view of UUT-03

UUT-04 UNIT UNDER TEST (UUT) Summary Sheet



DCL Project Number: 77276-2101

Manufacturer: IEA, LLC

Product Line: EC 100 (Stand-Alone Product)

Model Number: EC 100

Product Construction Summary:

Fabricated carbon steel structure with aluminum fins, copper tubes, aluminum fan

Options / Component Summary:

Fuel Cooler, Fan, Fan Shaft Bearing, Idler Sheave Bearing, and Vibration Isolators

Note: The UUT was operational before and after shaking and was full of operating content during the tests. The structural integrity of the component attachment system and force-resisting systems was maintained.

UUT Properties

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
9,315	97.75	124.23	153.00	4.3	5.1	13.7

Seismic Test Parameters

Building Code	Test Criteria	Sds (g)	z/h	Ip	Aflx-H (g)	Arig-H (g)	Aflx-V (g)	Arig-V (g)
CBC 2019	ICC-ES AC156	1.93	1.0	1.5	3.09	2.32	1.29	0.52

Unit Mounting Description: The unit was mounted at the base in six locations to vibration isolators supplied by CalDyne 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; two further 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. The isolators were mounted to steel I-beams using a total of four (4) Grade 8, 7/8-inch bolts per isolator.



Overall view of UUT-04