



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 [X] Renewal

Manufacturer Information

Manufacturer: IEA, LLC, an Engendren Corporation Subsidiary

Manufacturer's Technical Representative: Rob Walsh

Mailing Address: 9625 55th Street, Kenosha, WI 53144-7811

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 cores and fans

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 Certification Laboratories

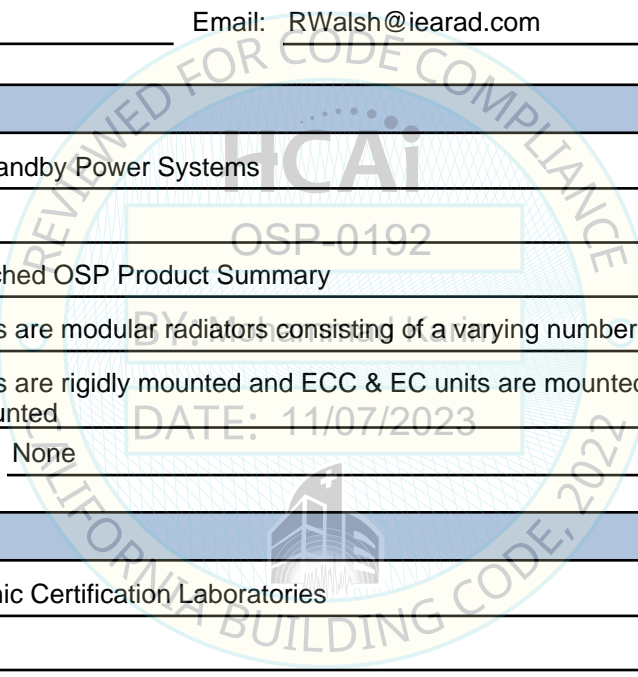
Contact Person: Kelly Laplace

Mailing Address: 1315 Greg Street, Sparks, NV 89431-6098

Telephone: (775) 358-5085

Email: kelly@shaketest.com

Title: Business Manager





**DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
FACILITIES DEVELOPMENT DIVISION**

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

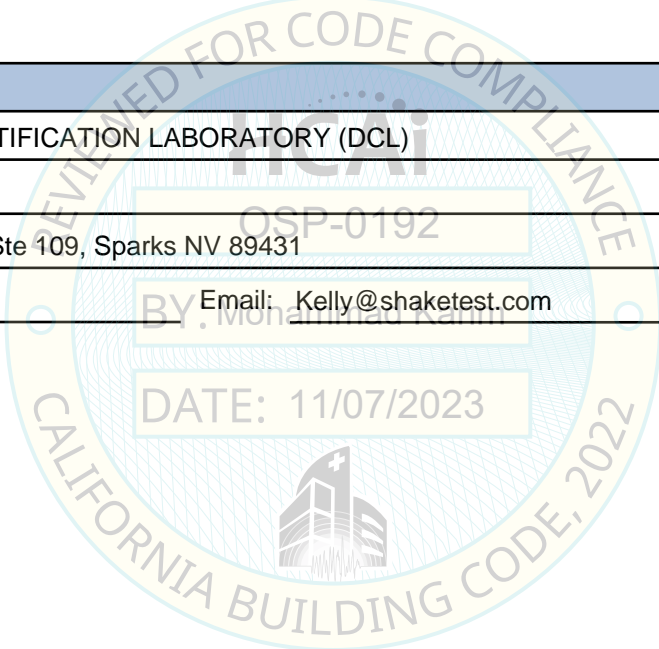
Company Name: THE VMC GROUP
Name: Kenneth Tarlow California License Number: S2851
Mailing Address: 980 9th Street, 16th Floor, Sacramento, CA 95814
Telephone: (832) 627-2214 Email: ken.tarlow@thevmcgroup.com

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





**DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION
FACILITIES DEVELOPMENT DIVISION**

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 (rigid mount),

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

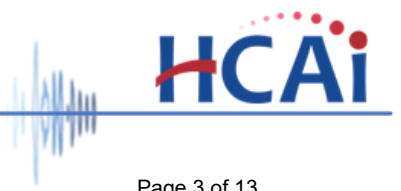
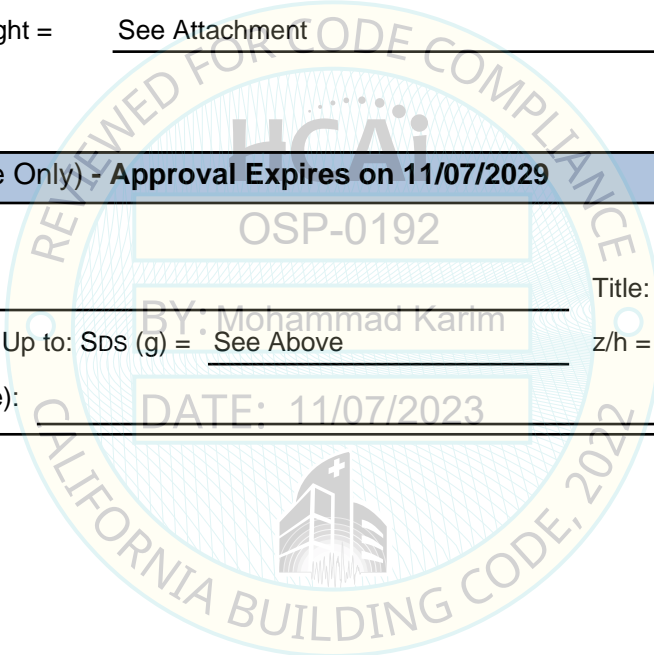
I_p (Importance factor) = 1.5

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 11/07/2029			
Date:	<u>11/7/2023</u>	OSP-0192	
Name:	<u>Mohammad Karim</u>	BY: Mohammad Karim	Title: <u>Supervisor, Health Facilities</u>
Special Seismic Certification Valid Up to: SDS (g) =	<u>See Above</u>	DATE: 11/07/2023	z/h = <u>1</u>
Condition of Approval (if applicable):	<u></u>		



Special Seismic Certification
Table 1 - Certified Component Matrix



DCL Project No.: 28697-2301

Manufacturer: IEA

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

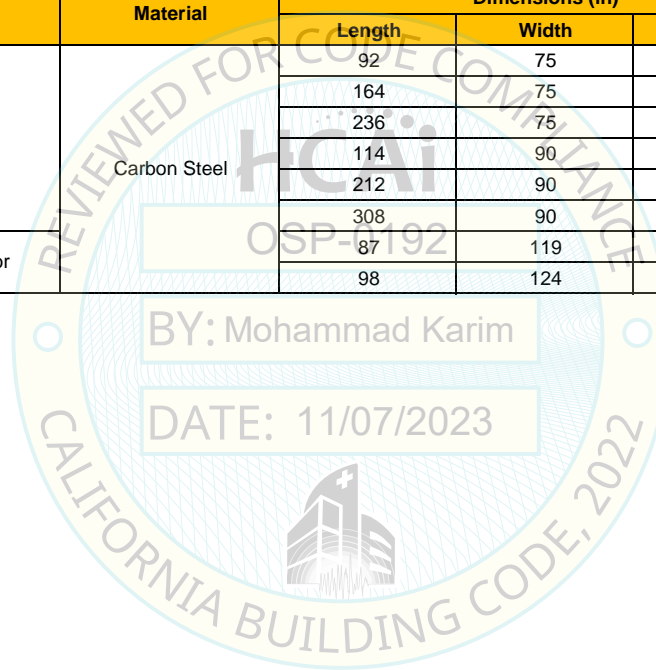
Product Construction: Carbon Steel

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

Model	Mounting	Material	Dimensions (in)			Weight (lb)	Unit
			Length	Width	Height		
HCR-Q036	Rigidly floor mounted	Carbon Steel	92	75	126	4, 720	UUT-01
HCR-Q072			164	75	128	6, 155	Interpolated
HCR-Q108			236	75	128	7, 590	Interpolated
HCR-Q058			114	90	132	6, 950	Interpolated
HCRQ116			212	90	132	9, 936	Interpolated
HCR-Q174			308	90	132	11, 400	UUT-02
ECC-S072	Floor mounted with vibration isolator		87	119	132	7, 238	UUT-03
EC-100			98	124	153	9, 315	UUT-04

BY: Mohammad Karim

DATE: 11/07/2023



Special Seismic Certification
Table 2 - Certified Subcomponents - HCR Modular Radiators



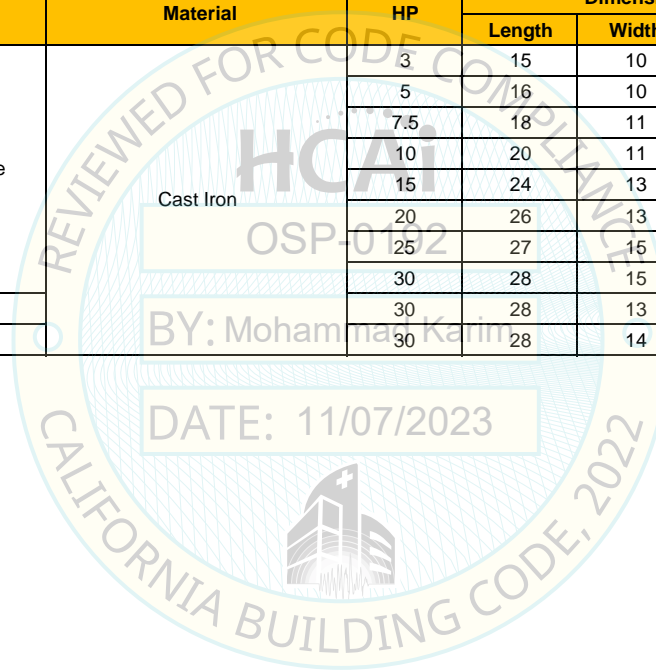
DCL Project No.: 28697-2301

Product Line: HCR Modular Radiators

Mounting configuration: Rigidly Floor Mounted

Test Level: Sds=2.26, z/h=1.0

Motors									
Model	Manufacturer	Material	HP	Dimensions (in)			Weight (lb)	UUT	
				Length	Width	Height			
EP0034	TECO Westinghouse	Cast Iron	3	15	10	9	130	Extrapolated	
EP0054			5	16	10	9	150	Extrapolated	
EP7/54			7.5	18	11	11	192	Extrapolated	
EP0104			10	20	11	11	265	Extrapolated	
EP0154 Type AEHH-8N			15	24	13	15	304	UUT-01	
EP0204 Type AEHH-8N			20	26	13	15	344	Interpolated	
EP0254 Type AEHH-8N			25	27	15	17	429	Interpolated	
EP0304 Type AEHH-8N			30	28	15	17	486	UUT-02	
U30P2D NEMA Premium			US Motors	30	28	13	14	325	UUT-02
W22 - NEMA Premium			WEG Electric	30	28	14	14	450	UUT-02



Special Seismic Certification

Table 3 - Certified Subcomponents - HCR Modular Radiators (continued)



DCL Project No.: 28697-2301

Product Line: HCR Modular Radiators

Mounting configuration: Rigidly Floor Mounted

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

Fuel Coolers								
Model	Manufacturer	Material	Dimensions (in)			Weight (lb)	UUT	
			Depth	Width	Height			
DH-326-211292	Thermal Transfer	Copper / Aluminum	27	24	2	16	UUT-01, UUT-02	
Fans								
Model	Manufacturer	Material	Diameter (in)		Weight (lb)	UUT		
10000 Class, 24SD	Moore Fan	Aluminum	60		105	UUT-01		
10000 Class, 30SD			84		171	UUT-02		
Fan Shaft Bearing								
Model	Manufacturer	Material	Dimensions (in)			Weight (lb)	UUT	
			Depth	Width	Height			
5-2000	Dodge	Cast Iron	5	5	3	1	UUT-01, UUT-02	
2000			6	6	4	2	UUT-01, UUT-02	
Miscellaneous								
Model	Manufacturer	Material	Description	Dimensions (in)			Weight (lb)	UUT
				Depth	Width	Height		
0.0075 AL Fins, 0.625 x 0.20 CU Tubes	Super Coils	Copper / Aluminum	Cooling Coil	15	90	300	2380	UUT-02
0.0075 AL Fins, 0.625 x 0.32 CU Tubes				10	75	85	555	UUT-01
EL150K1	Murphy Industries	Cast Iron	Liquid Level	3	5	5	3	UUT-01, UUT-02

Special Seismic Certification
Table 4 - Certified Subcomponents - ECC S072



DCL Project No.: 28697-2301

Product Line: ECC S072

Mounting configuration: Floor mounted with vibration isolator

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

Fuel Coolers									
Model	Manufacturer	Material	Dimensions (in)			Weight (lb)	UUT		
			Depth	Width	Height				
DH-326-211292	Thermal Transfer	Copper / Aluminum	27	24	2	16	UUT-03		
Fans									
Model	Manufacturer	Material	Diameter (in)		Weight (lb)	UUT			
15/10201	Truflo	Carbon Steel	84		431	UUT-03			
Idler Sheave Bearing									
Model	Manufacturer	Material	Diameter (mm)		Weight (lb)	UUT			
5309-C	MRC	52100 Steel	2		5	UUT-03			
Miscellaneous									
Model	Manufacturer	Material	Material	Description	Dimensions (in)			Weight (lb)	UUT
					Depth	Width	Height		
913-NLU-TD10-T	Cooper-Standard	Brass	Brass	Low Level Alarm Probe	4	2	2	<1	UUT-03
SM6-165-A	Isolation Dynamics	Stainless Steel	Stainless Steel	Pipe Isolators	2	3	2	<1	UUT-03

Special Seismic Certification
Table 5 - Certified Subcomponents - EC 100



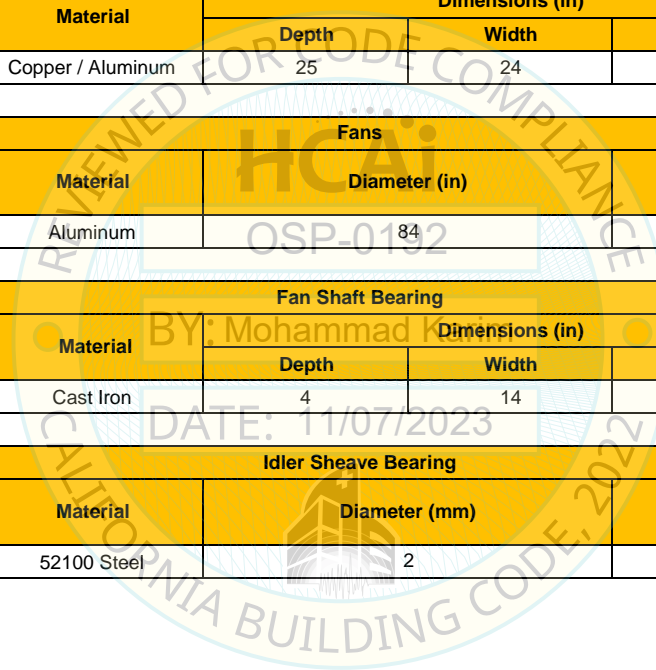
DCL Project No.: 28697-2301

Product Line: EC 100

Mounting configuration: Floor mounted with vibration isolator

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

Fuel Coolers							
Model	Manufacturer	Material	Dimensions (in)			Weight (lb)	UUT
			Depth	Width	Height		
DH-326-1-1	Thermal Transfer	Copper / Aluminum	25	24	2	8	UUT-04
Fans							
Model	Manufacturer	Material	Diameter (in)		Weight (lb)		UUT
10000 Class, Series 30SD	Moore Fan	Aluminum	84		171		UUT-04
Fan Shaft Bearing							
Model	Manufacturer	Material	Dimensions (in)			Weight (lb)	UUT
			Depth	Width	Height		
USRBE5000-307	Moore Fan	Cast Iron	4	14	7	39	UUT-04
Idler Sheave Bearing							
Model	Manufacturer	Material	Diameter (mm)		Weight (lb)		UUT
5312-C	MRC	52100 Steel	2		6		UUT-04



Special Seismic Certification
Table 6 - Tested Units



DCL Project No.: 28697-2301

Manufacturer: IEA

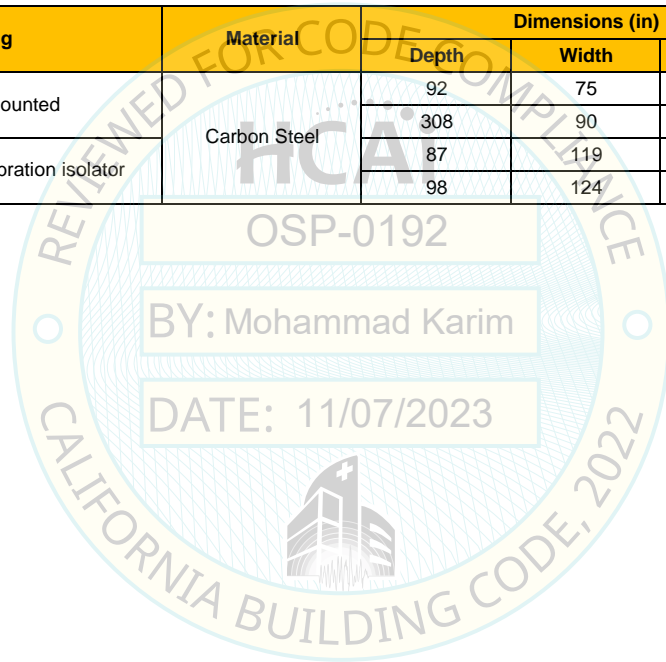
Product Line: HCR Modular Radiators, ECC S072, EC 100

Report Number: 88135-1001b

Product Construction: Carbon steel

Test Level: Sds=2.26, z/h=1.0 for UUT-01 and Sds = 1.93g, z/h = 1.0 for UUT-2 through UUT-04

Model	Mounting	Material	Dimensions (in)			Weight (lb)	Unit
			Depth	Width	Height		
HCR-Q036	Rigidly floor mounted	Carbon Steel	92	75	126	4, 720	UUT-01
HCR-Q174			308	90	132	11, 400	UUT-02
ECC-S072	Floor mounted with vibration isolator		87	119	132	7, 238	UUT-03
EC-100			98	124	153	9, 315	UUT-04



UUT-01 UNIT UNDER TEST (UUT) Summary Sheet



DCL Project Number: 28697-2301

Manufacturer: IEA, LLC

Product Line: HCR Modular Radiators

Model Number: HCR Q036

Product Construction Summary:

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)		
	Length	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 2022	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: 28697-2301

Manufacturer: IEA, LLC

Product Line: HCR Modular Radiators

Model Number: HCR Q174

Product Construction Summary:

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)		
	Length	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 2022	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 SRMD Test Facility-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: 28697-2301

Manufacturer: IEA, LLC

Product Line: ECC S072 (Stand-Alone Product)

Model Number: ECC S072

Product Construction Summary:

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)		
	Length	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 2022	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: 28697-2301

Manufacturer: IEA, LLC

Product Line: EC 100 (Stand-Alone Product)

Model Number: EC 100

Product Construction Summary:

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)		
	Length	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 2022	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