



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

**APPLICATION FOR HCAI SPECIAL SEISMIC  
CERTIFICATION PREAPPROVAL (OSP)**

OFFICE USE ONLY

**APPLICATION #: OSP-0731**

**HCAI Special Seismic Certification Preapproval (OSP)**

Type:  New  Renewal

**Manufacturer Information**

Manufacturer: Kelvion Products Inc.

Manufacturer's Technical Representative: Lonnie Fultz

Mailing Address: 5050 South National Drive, Knoxville, TN 37914

Telephone: (317) 227-2929

Email: lonnie.fultz@kelvion.com

**Product Information**

Product Name: Emergency and Standby Power Systems

Product Type: Remote Radiators

Product Model Number: HB Model Remote Radiators, HB21 - HB95

General Description: Remote Radiators with core areas 3,024 - 13,680 sq.in.

Mounting Description: Rigid, Rigid Base Mounted

Tested Seismic Enhancements: None

**Applicant Information**

Applicant Company Name: VMC Group

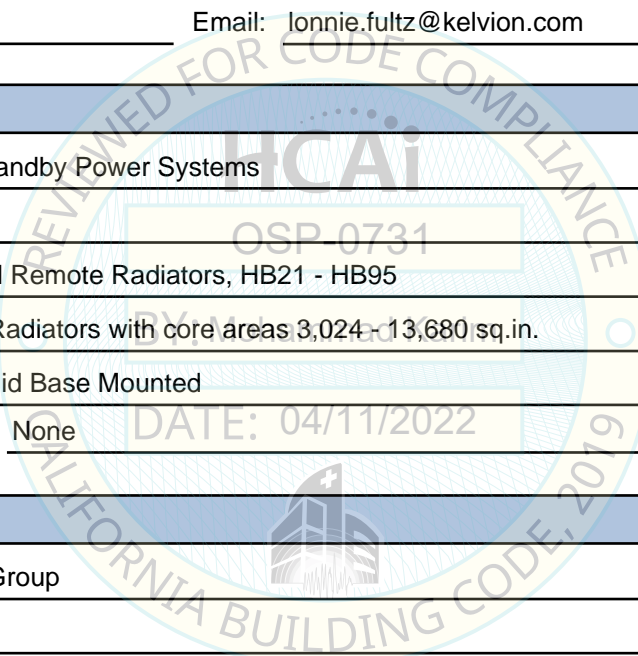
Contact Person: John Giuliano

Mailing Address: Main Street, Bloomingdale, NJ 07403

Telephone: (973) 838-1780

Email: john.giuliano@thvmcgroup.com

Title: President





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

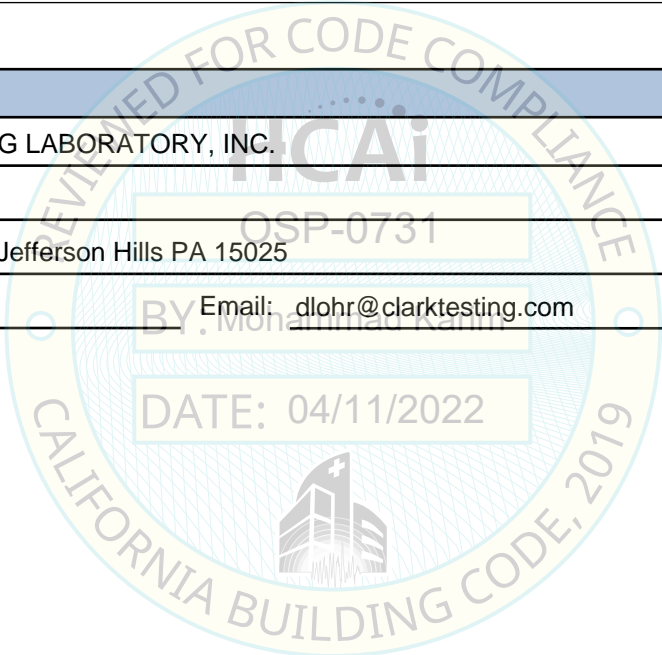
Company Name: THE VMC GROUP  
Name: Kenneth Tarlow California License Number: S2851  
Mailing Address: 980 9th Street, 16th Floor, Sacramento, CA 95814  
Telephone: (832) 627-2214 Email: ken.tarlow@thevmcgroup.com

**Certification Method**

GR-63-Core     ICC-ES AC156     IEEE 344     IEEE 693     NEBS 3  
 Other (Please Specify): \_\_\_\_\_

**Testing Laboratory**

Company Name: CLARK TESTING LABORATORY, INC.  
Contact Person: Devon Lohr  
Mailing Address: 1801 Route 51, Jefferson Hills PA 15025  
Telephone: (412) 387-1026 Email: dlohr@clarktesting.com





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**Seismic Parameters**

Design Basis of Equipment or Components ( $F_p/W_p$ ) = 3.0

SDS (Design spectral response acceleration at short period, g) = 2.0 (z/h = 1) & 2.5 (z/h = 0)

$a_p$  (Amplification factor) = 2.5

$R_p$  (Response modification factor) = 3.0

$\Omega_0$  (System overstrength factor) = 1.5

$I_p$  (Importance factor) = 1.5

z/h (Height ratio factor) = 1 and 0

Natural frequencies (Hz) = See Attachment

Overall dimensions and weight = See Attachment

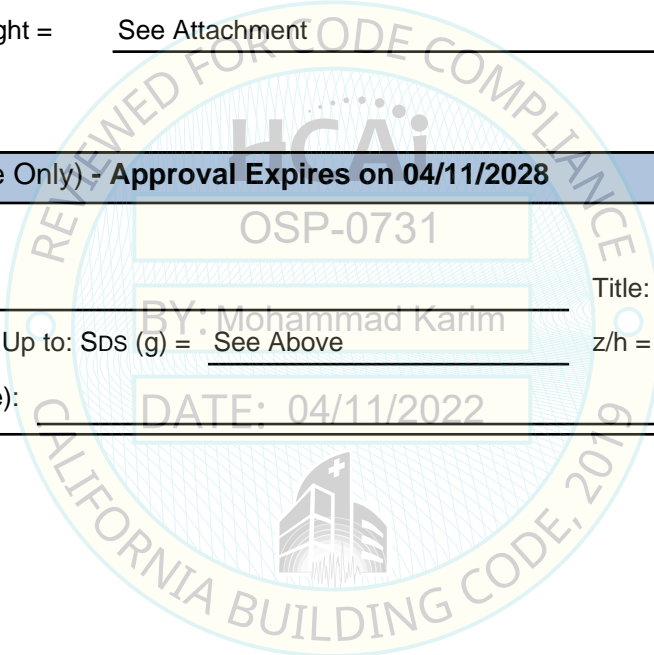
**HCAI Approval (For Office Use Only) - Approval Expires on 04/11/2028**

Date: 4/11/2022

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): DATE: 04/11/2022



**Table 1 - Certified Product Table**

Model	Radiator Core Area [ in ]	Max Volume [ gal ]	Dimensional Data			Max Weight <sup>2</sup> [ lb ]	Frame Construction	UUT
			Max Length [ in ]	Max Width [ in ]	Max Height [ in ]			
HB21	3,024	82.4	73.6	68.1	89.0	5,308	7 gauge (0.179") Carbon Steel	Interpolated
HB25 (Test Unit Part Number: R36739)	3,600	65.0	77.9	78.5	109.0	4,670		UUT-01
HB25	3,600	65.0	77.9	78.5	109.0	5,340		Interpolated
HB28	4,032	70.0	78.6	79.0	102.5	5,903		Interpolated
HB33	4,752	77.0	85.4	84.8	102.5	6,584		Interpolated
HB40	5,760	88.0	94.4	88.0	102.5	7,440		Interpolated
HB50	7,200	105.0	100.0	101.0	102.5	8,104		Interpolated
HB44	6,336	98.0	96.4	97.0	102.5	8,356		Interpolated
HB57	8,208	116.0	106.6	108.0	102.5	9,855		Interpolated
HB60	8,640	116.0	112.4	108.0	102.5	10,155		Interpolated
HB64	9,216	118.0	118.4	108.0	102.5	10,773		Interpolated
HB68	9,792	128.0	116.4	117.3	102.5	11,901		Interpolated
HB73	10,512	148.0	116.4	126.0	102.5	12,418		Interpolated
HB76	10,944	150.0	120.4	126.0	102.5	12,886		Interpolated
HB80	11,520	152.0	124.4	126.0	102.5	13,104		Interpolated
HB84	12,096	166.0	120.4	137.3	102.5	14,067		Interpolated
HB88	12,672	168.0	124.4	137.3	102.5	14,485		Interpolated
HB95	13,680	308.8	130.0	150.0	126.0	14,980		Interpolated
HB95 (Test Unit Part Number: R36738)	13,680	308.8	130.0	150.0	126.0	14,980		UUT-02

**Notes:**

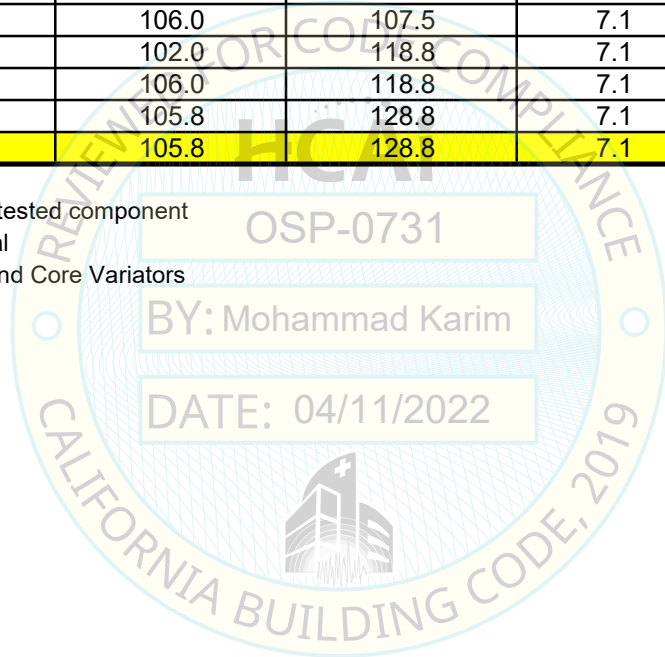
- 1) Yellow highlight indicates tested unit
- 2) Weight includes coolant, core, surge tank, fuel cooler, and standard fan weights
- 3) Kelvion Products Inc. is the manufacturer of all models

## Table 2 - Certified Subcomponents - Cores

Applicable Radiator Model	Height [ in ]	Width [ in ]	Depth [ in ]	Manufacturer	UUT
HB21	58.6	52.5	7.1	Kelvion Products Inc.	Extrapolated
HB25	58.3	59.4	7.1		UUT-01
HB28	63.3	63.1	7.1		Interpolated
HB33	70.0	66.3	7.1		Interpolated
HB40	78.0	70.0	7.1		Interpolated
HB44	80.0	78.8	7.1		Interpolated
HB50	83.6	83.8	7.1		Interpolated
HB57	90.2	90.0	7.1		Interpolated
HB60	96.0	90.0	7.1		Interpolated
HB64	102.0	90.0	7.1		Interpolated
HB68	100.0	98.8	7.1		Interpolated
HB73	98.0	107.5	7.1		Interpolated
HB76	102.0	107.5	7.1		Interpolated
HB80	106.0	107.5	7.1		Interpolated
HB84	102.0	118.8	7.1		Interpolated
HB88	106.0	118.8	7.1		Interpolated
HB95	105.8	128.8	7.1		Interpolated
HB95	105.8	128.8	7.1		UUT-02

**Notes:**

- 1) Yellow highlight indicates tested component
- 2) All dimensions are nominal
- 3) See Table 3 for Material and Core Variators



### Table 3 - Certified Subcomponents - Core Variations

Parameter	Notes	Manufacturer	UUT
Core Type	RL or RD (Solder-Bonded)	Kelvion Products Inc.	Extrapolated
	KD/KS (Solder-Bonded)		UUT-01, UUT-02
	KD/KS (Mechanically-Bonded)		UUT-01, UUT-02
Casing Material	Steel		UUT-01, UUT-02
Tube Material	85/15 red brass		UUT-01, UUT-02
	70/30 brass		UUT-01, UUT-02
Tube Outer Dimensions (Oval, WxH)	1/2" x .100" Oval (solder-bonded only)		UUT-01, UUT-02
	3/4" x .135" Oval		UUT-01, UUT-02
Tube Wall Thickness	0.006"		Extrapolated
	0.008" (KD/KS)		UUT-01, UUT-02
	0.009"		Interpolated
	0.0012" (KD/KS - MB only)		UUT-01, UUT-02
Permitted Fin Material	0.0024" Cu		Extrapolated
	0.00276" Cu		UUT-01, UUT-02
Permitted Fin Pitch (Fins Per Inch)	4.5		Extrapolated
	5		Extrapolated
	5.5		Extrapolated
	7		Extrapolated
	9		UUT-01
	10		Extrapolated
Fin Type	Louvered or Dimpled	UUT-02	
	Dimpled	Extrapolated	
Permitted Tube Rows	3	UUT-01, UUT-02	
	4	Interpolated	
	5	Interpolated	
	6	Interpolated	
	7	Interpolated	
	8	UUT-01, UUT-02	
Header Type	0.051" brass	Extrapolated	
	0.064" brass	UUT-01, UUT-02	
	0.625" steel	UUT-01, UUT-02	

**Notes:**

1) Yellow highlight indicates tested component

### Table 4 - Certified Subcomponents - Fuel Coolers

Customer Part Number	Manufacturer	Weight [ lb ]	UUT
7-2177A	Kelvion Products Inc.	10.0	UUT-01
7-1018A		25.5	Interpolated
7-2189A		30.0	Interpolated
7-2981A		42.5	Interpolated
7-1361A		63.0	UUT-02

**Notes:**

- 1) Yellow highlight indicates tested component
- 2) Coolers are applicable to all Radiator Models

### Table 5 - Certified Subcomponents - Fans

Fan [ Material ]	Motor Fan	Rating [ HP ]	5.00	7.50	10.00	15.00	20.00	25.00	30.00	40.00	50.00	60.00	75.00	100.00	UUT
		Weight [ lb ]	93	128	162	270	289	388	430	570	650	912	955	1,203	
HM [ Nylon Blade ]	Size [ in ] Weight [ lb ]	36 25	118	153	187	295	314	413	455	595	675	937	980	1,228	Extrapolated
	Size [ in ] Weight [ lb ]	42 25	118	153	187	295	314	413	455	595	675	937	980	1,228	Extrapolated
	Size [ in ] Weight [ lb ]	48 45	138	173	207	315	334	433	475	615	695	957	1,000	1,248	Extrapolated
	Size [ in ] Weight [ lb ]	54 57	150	185	219	327	346	445	487	627	707	969	1,012	1,260	UUT-01
HTEC [ Thermoset Composite Blades ]	Size [ in ] Weight [ lb ]	48 52	145	180	214	322	341	440	482	622	702	964	1,007	1,255	Extrapolated
	Size [ in ] Weight [ lb ]	54 75	168	203	237	345	364	463	505	645	725	987	1,030	1,278	Interpolated
	Size [ in ] Weight [ lb ]	60 75	168	203	237	345	364	463	505	645	725	987	1,030	1,278	Interpolated
	Size [ in ] Weight [ lb ]	72 170	263	298	332	440	459	558	600	740	820	1,082	1,125	1,373	Interpolated
	Size [ in ] Weight [ lb ]	84 185	278	313	347	455	474	573	615	755	835	1,097	1,140	1,388	Interpolated
	Size [ in ] Weight [ lb ]	96 285	378	413	447	555	574	673	715	855	935	1,197	1,240	1,488	UUT-02

**Notes:**

- 1) Yellow highlight indicates tested component
- 2) Table main body values indicate overall fan weight (Fan weight + Motor Weight)
- 3) All fans are Laminar Flow, Belt-Driven, Radial Fans
- 4) All Fans manufactured by Horton
- 5) All motor housings are Cast Iron, all motors use 3-Phase 230/460V Power, all motors are manufactured by Teco (Westinghouse), and all fan wheels are A715 Grade Stainless Steel



### Table 6 - Certified Subcomponents - Surge Tanks

Applicable Radiator Model	Notes	Diameter [ in ]	Fluid Capacity [ gal ]	Material / Thickness	Manufacturer	Max. Operating Weight [ lb ]	UUT
HB21	8" dia. (R33346 kit)	8	12	0.075" shell (.179" end/divider)	Kelvion Products Inc.	102	Extrapolated
HB21		8	12			102	Extrapolated
HB25		8/12/16/18	13 - 70			112 - 445	UUT-01
HB28		8/12/16/18	14 - 74			117 - 468	Interpolated
HB33		8/12/16/18	15 - 80			123 - 475	Interpolated
HB40		8/12/16/18	16 - 84			131 - 523	Interpolated
HB44		8/12/16/18	18 - 94			144 - 578	Interpolated
HB50		8/12/16/18	19 - 98			150 - 603	Interpolated
HB57		8/12/16/18	20 - 105			160 - 643	Interpolated
HB60		8/12/16/18	20 - 105			160 - 643	Interpolated
HB64		8/12/16/18	22 - 125			175 - 702	Interpolated
HB68		8/12/16/18	24 - 125			186 - 755	Interpolated
HB73		8/12/16/18	24 - 125			186 - 755	Interpolated
HB76		8/12/16/18	26 - 137			205 - 833	Interpolated
HB80		8/12/16/18	26 - 137			205 - 833	Interpolated
HB84		8/12/16/18	26 - 137			205 - 833	Interpolated
HB88		8/12/16/18	18			147	879
HB95	18	147	879	Interpolated			
HB95 (R36738)	18" dia. (R47848 kit)	18	147	879	UUT-02		

**Notes:**

- 1) Yellow highlight indicates tested component





# UNIT UNDER TEST (UUT) Summary Sheet

UUT-1

Test Report: JID 21-00096

Model Line	Model Number	Manufacturer
Remote Radiators	HB25 (Part Number: R36739)	Kelvion Products Inc.

**Product Construction Summary**

Carbon Steel Frame

**Options / Subcomponent Summary**

Core: Kelvion Products Inc. ; Fuel Cooler: Kelvion Products Inc. ; Fan: Horton ; Motor: Teco (Westinghouse) ; Surge Tank: Kelvion Products Inc.

UUT Properties						
Weight [ lbs ]	Dimensions [ in ]			Lowest Nat. Freq. [ Hz ]		
	Length	Width	Height	F-B	S-S	V
4,670	77.9	78.5	109.0	14.3	19.1	26.1

UUT Highest Passed Seismic Run Information								
Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2019	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	-	-
		2.50	0.0	1.5	-	-	1.68	0.68

**Test Mounting Details**

UUT-1 was rigidly mounted to the shake table using (16) 5/8" diameter Grade 5 bolts.



All units were filled with contents and maintained structural integrity and functionality after AC-156 test.



# UNIT UNDER TEST (UUT) Summary Sheet

UUT-2

Test Report: JID 21-00096

Model Line	Model Number	Manufacturer
Remote Radiators	HB95 (Part Number: R36738)	Kelvion Products Inc.

**Product Construction Summary**

Carbon Steel Frame

**Options / Subcomponent Summary**

Core: Kelvion Products Inc. ; Fuel Cooler: Kelvion Products Inc. ; Fan: Horton ; Motor: Teco (Westinghouse) ; Surge Tank: Kelvion Products Inc.

UUT Properties						
Weight [ lbs ]	Dimensions [ in ]			Lowest Nat. Freq. [ Hz ]		
	Length	Width	Height	F-B	S-S	V
14,980	130.0	150.0	126.0	9.4	17.0	9.8

UUT Highest Passed Seismic Run Information								
Building Code	Test Criteria	S <sub>DS</sub>	z/h	I <sub>p</sub>	A <sub>FLX-H</sub>	A <sub>RIG-H</sub>	A <sub>FLX-V</sub>	A <sub>RIG-V</sub>
CBC 2019	ICC-ES AC156	2.00	1.0	1.5	3.20	2.40	-	-
		2.50	0.0	1.5	-	-	1.68	0.68

**Test Mounting Details**

UUT-2 was rigidly mounted to the shake table using (18) 5/8" diameter Grade 5 bolts.



All units were filled with contents and maintained structural integrity and functionality after AC-156 test.