



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

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

OFFICE USE ONLY

**APPLICATION #: OSP-0624**

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

Type:  New  Renewal

**Manufacturer Information**

Manufacturer: Multistack, LLC

Manufacturer's Technical Representative: Darrin Anderson

Mailing Address: 1065 Maple Ave., Sparta, WI 54656

Telephone: (608) 366-2400

Email: DAnderson@multistack.com

**Product Information**

Product Name: Chillers

Product Type: Chillers - Air Cooled

Product Model Number: ARA020X, ARA030X, ASP060X, ARP060K, ARP060X, ARA060K, ARA060X

General Description: Air cooled chillers supported by sheet metal frame. Weight range of 2534 pounds to 5928 pounds.

Mounting Description: Rigid, Floor Mounted

Tested Seismic Enhancements: Seismic enhancements made to the test units and/or modifications required to address anomalies during the tests shall be incorporated into the production units.

**Applicant Information**

Applicant Company Name: Dynamic Certification Laboratories

Contact Person: Kelly Laplace

Mailing Address: 1315 Greg Street Suite 109, 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)**

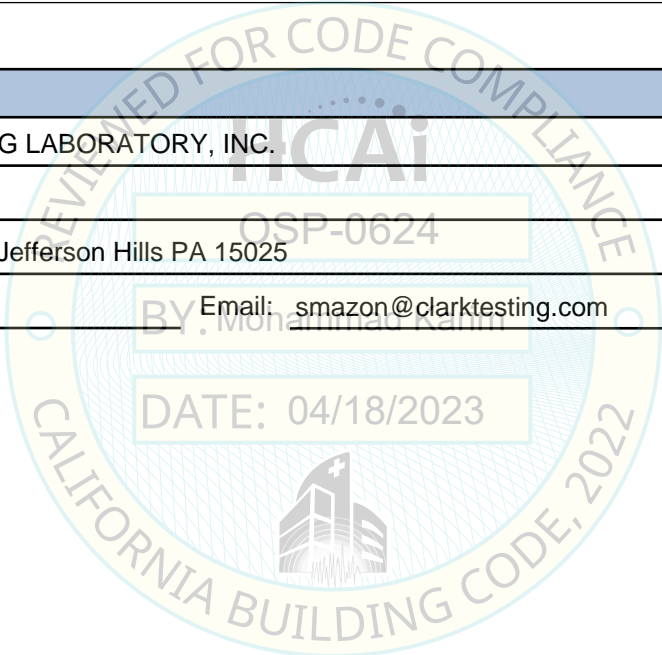
Company Name: THE VMC GROUP  
Name: Kenneth Tarlow California License Number: S2851  
Mailing Address: 980 9th Street, 16th Floor, Sacramento, CA 95814  
Telephone: (832) 627-2214 Email: ken.tarlow@thevmcgroup.com

**Certification Method**

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

**Testing Laboratory**

Company Name: CLARK TESTING LABORATORY, INC.  
Contact Person: Suzanne Mazon  
Mailing Address: 1801 Route 51, Jefferson Hills PA 15025  
Telephone: (412) 387-1001 Email: smazon@clarktesting.com





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**Seismic Parameters**

Design Basis of Equipment or Components ( $F_p/W_p$ ) = 1.44

SDS (Design spectral response acceleration at short period, g) = 2.0

$a_p$  (Amplification factor) = 1

$R_p$  (Response modification factor) = 2.5

$\Omega_0$  (System overstrength factor) = 2.5

$I_p$  (Importance factor) = 1.5

$z/h$  (Height ratio factor) = 1

Natural frequencies (Hz) = See Attachment

Overall dimensions and weight = See Attachment

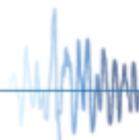
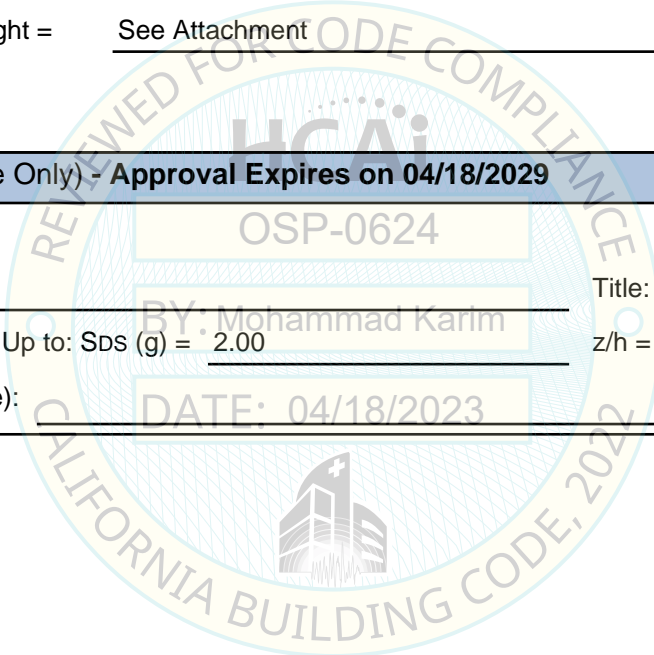
**HCAI Approval (For Office Use Only) - Approval Expires on 04/18/2029**

Date: 4/18/2023

Name: Mohammad Karim Title: Supervisor, Health Facilities

Special Seismic Certification Valid Up to: SDS (g) = 2.00 z/h = 1

Condition of Approval (if applicable): DATE: 04/18/2023



# Special Seismic Certification

## Table 1 - Certified Components



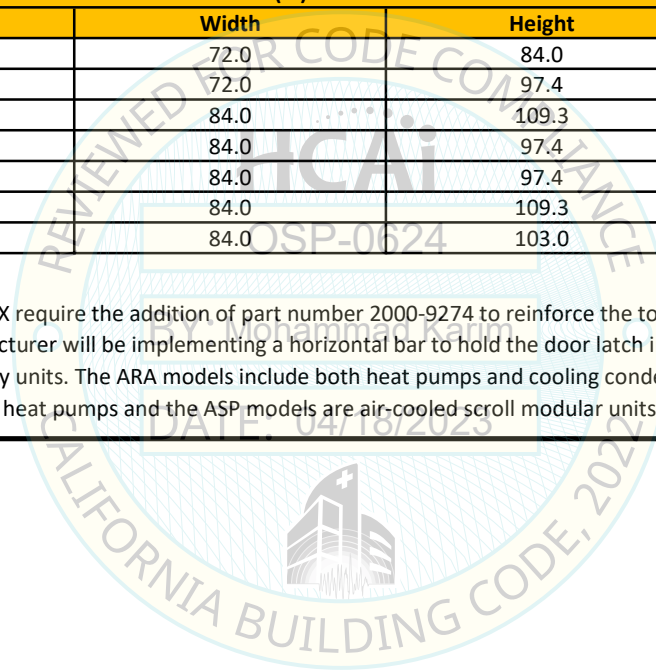
<b>DCL Project Number:</b>	04007-2301
<b>Manufacturer:</b>	Multistack, LLC
<b>Product Line:</b>	ARA, ARP, and ASP Air Cooled Chillers
<b>Test Levels:</b>	$S_{DS} = 2.0g$ , $z/h = 1$
<b>Mounting Configuration:</b>	Rigid Base Mount

Model Number	Dimensions (in)			Weight (lb.)	Unit
	Depth	Width	Height		
ARA020X	72.0	72.0	84.0	2534	UUT-01
ARA030X	84.0	72.0	97.4	3885	Interpolated
*ASP060X	84.0	84.0	109.3	5100	Interpolated
*ARP060K	72.0	84.0	97.4	5174	Interpolated
*ARP060X	72.0	84.0	97.4	5205	Interpolated
*ARA060K	84.0	84.0	109.3	5897	Interpolated
*ARA060X	84.0	84.0	103.0	5928	UUT-02

Notes:

\* Units ASP060X, ARP060K, ARP060X, ARA060K, and ARA060X require the addition of part number 2000-9274 to reinforce the top of the electrical box. This is standard on all units manufactured. To address an anomaly observed during the test, the manufacturer will be implementing a horizontal bar to hold the door latch in place.

The ARA models are air-to-water scroll modular heat recovery units. The ARA models include both heat pumps and cooling condensers. The ARP and ASP models are depopulated versions of the ARA models. The ARP models are air-to-water scroll modular heat pumps and the ASP models are air-cooled scroll modular units. Both the ARP and ASP models are similar in construction.



# Special Seismic Certification

## Table 2 - Certified Subcomponents



DCL Project Number: 04007-2301

### Compressors

Subcomponent No.	Quantity Tested	Manufacturer	Dimensions	Material	Weight (lb.)	Unit
ZPT244KCE	1	Copeland Scroll, Emerson Climate Technologies	23.8 x 15.8 x 29.6	Fe, Al, Cu, Plastic	230	UUT-01
ZPT364KCE	N/A		20.5 x 17.1 x 29.4	Fe, Al, Cu, Plastic	292	Interpolated
ZPT770KCE	1		29.4 x 21.9 x 40.9	Fe, Al, Cu, Plastic	826	UUT-02

### Fin Cooling

Subcomponent No.	Quantity Tested	Manufacturer	Dimensions	Material	Weight (lb.)	Unit
722/723	1	Multistack, LLC	30.0 x 65.0 x 5.0	Al, Cu	98	UUT-01
732F/733F	N/A		39.3 x 77.0 x 5.0	Al, Cu	120	Interpolated
734F	2		53.6 x 71.0 x 7.0	Al, Cu	180	UUT-02

### Evaporators

Subcomponent No.	Quantity Tested	Manufacturer	Dimensions	Material	Weight (lb.)	Unit
F200TX64	1	SWEP	9.6 x 20.6 x 6.8	SS, Cu	56	UUT-01
F200TX80	N/A		9.6 x 20.6 x 7.8	SS, Cu	76	Interpolated
P400TX110	1		12.0 x 27.3 x 11.1	SS, Cu	215	UUT-02

### Condenser

Subcomponent No.	Quantity Tested	Manufacturer	Dimensions	Material	Weight (lb.)	Unit
B120TX76	1	SWEP	7.6 x 18.2 x 6.8	SS, Cu	52	UUT-01
B120TX110	N/A		7.6 x 18.2 x 9.9	SS, Cu	64	Interpolated
B400THX154	1		12.0 x 27.3 x 15.1	SS, Cu	245	UUT-02

### Control Panel

Subcomponent No.	Quantity Tested	Manufacturer	Dimensions	Material	Weight (lb.)	Unit
65-1/2 W x 8 D x 13-3/4 H	1	Sporlan	65.5 x 8.0 x 13.8	Fe, Cu, Plastic	150	UUT-01
78-1/2 W x 9 D x 14-3/4 H	N/A		78.5 x 9.0 x 14.8	Fe, Cu, Plastic	160	Interpolated
74-1/2 W x 9 D x 17-1/2 H	1		74.5 x 9.0 x 17.5	Fe, Cu, Plastic	180	UUT-02

### Expansion Valves

Subcomponent No.	Quantity Tested	Manufacturer	Dimensions	Material	Weight (lb.)	Unit
SERI-G	1	SWEP	7.3 x 4.6 x 1.9	Cu, Fe, Al, Brass, SS, Nylon	5	UUT-01
SERI-J	N/A		7.5 x 4.8 x 1.9	Cu, Fe, Al, Brass, SS, Nylon	6	Interpolated
SERI-K	1		7.9 x 4.9 x 1.9	Cu, Fe, Al, Brass, SS, Nylon	7	UUT-02

# Special Seismic Certification

## Table 2 - Certified Subcomponents Cont.



DCL Project Number: 04007-2301

### Refrigerant Ball Valves w/Actuator

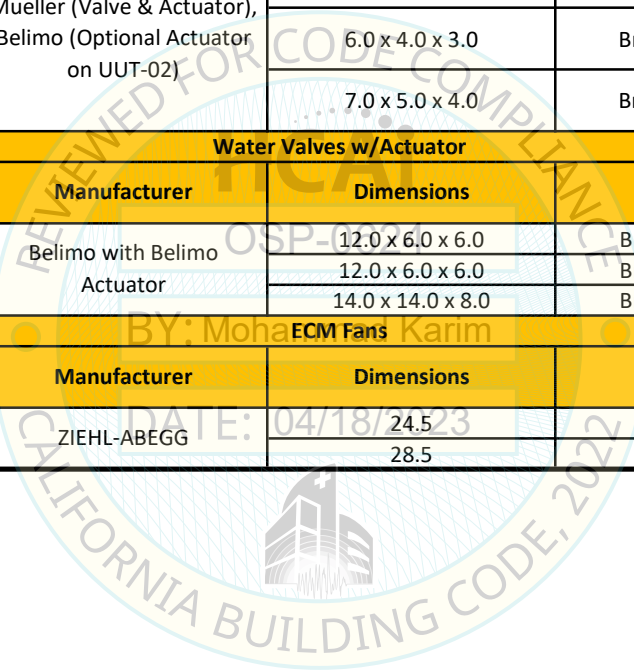
Subcomponent No.	Quantity Tested	Manufacturer	Dimensions	Material	Weight (lb.)	Unit
AC 17866 / P36418 & PRBUP-3-T (1-3/8" OD)	4	Mueller (Valve & Actuator), Belimo (Optional Actuator on UUT-02)	6.0 x 4.0 x 3.0	Brass, Cu, Plastic	10	UUT-01
AC 17867 / P36418 & PRBUP-3-T (1-5/8" OD)	N/A		6.0 x 4.0 x 3.0	Brass, Cu, Plastic	13	Interpolated
AC 17868 / P36419 & PRBUP-3-T (2-1/8" OD)	4		7.0 x 5.0 x 4.0	Brass, Cu, Plastic	20	UUT-02

### Water Valves w/Actuator

Subcomponent No.	Quantity Tested	Manufacturer	Dimensions	Material	Weight (lb.)	Unit
F650VIC & SY1 (2" NPS)	2	Belimo with Belimo Actuator	12.0 x 6.0 x 6.0	Brass, Plastic, FE	20	UUT-01
F650VIC & SY1	N/A		12.0 x 6.0 x 6.0	Brass, Plastic, FE	20	Interpolated
F680VIC & SY1 (3" NPS)	2		14.0 x 14.0 x 8.0	Brass, Plastic, FE	28	UUT-02

### ECM Fans

Subcomponent No.	Quantity Tested	Manufacturer	Dimensions	Material	Weight (lb.)	Unit
ZN071-ZIO.GL	2	ZIEHL-ABEGG	24.5	Aluminum	80	UUT-01
ZN080-ZIO.GL	4		28.5	Aluminum	100	UUT-02



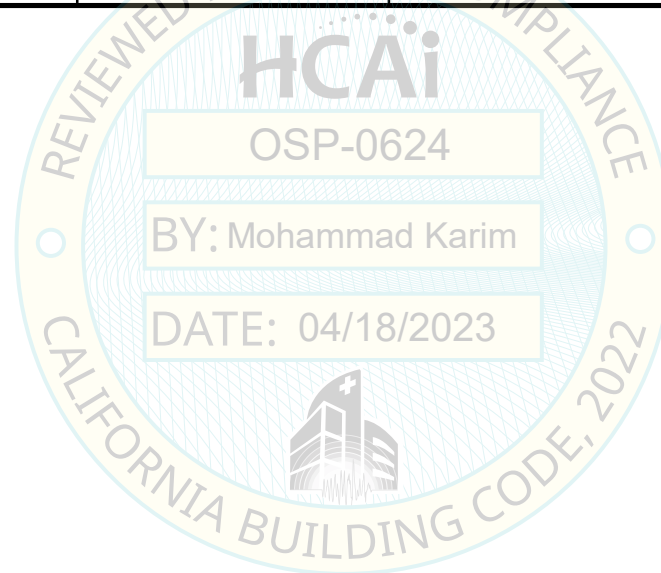
# Special Seismic Certification

## Table 3 - Tested Units



**Testing Laboratory:** Clark Dynamic Test Laboratory (Test Report: JID 18-01271 Rev.0)  
**DCL Project Number:** 04007-2301  
**Manufacturer:** Multistack, LLC  
**Test Levels:**  $S_{ps} = 2.0g$ ,  $z/h = 1$   
**Mounting Configuration:** Rigid Base Mount

Model Number	Dimensions (in)			Weight (lb.)	Unit
	Depth	Width	Height		
ARA020X	72	72	84	2534	UUT-01
ARA060X	84	84	103	5928	UUT-02



# UUT-01 UNIT UNDER TEST (UUT) Summary Sheet



**DCL Project Number:** 04007-2301

**Manufacturer:** Multistack, LLC

**Test Laboratory:** Clark Dynamic Test Laboratory Inc. (Report Number JID 18-01271 Rev.0, UUT1)

**Product Line:** ARA Air Cooled Chiller

**Model Number:** ARA020X

**Product Construction Summary:**

Copper and aluminum heat exchangers with stainless steel condensers. Welded carbon steel sheet metal frame.

**Options / Component Summary:**

Provided in Table 2

**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
2,534	72	72	84	6.54	5.26	N/A

**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	2.00	1.0	1.5	3.20	2.40	1.34	0.54

**Unit Mounting Description:**

Rigidly bolted to shake table with four (4) 1/2" diameter Grade 5 steel bolts per frame (8 bolts total).



Overall view of UUT-01



# UUT-02 UNIT UNDER TEST (UUT) Summary Sheet



**DCL Project Number:** 04007-2301

**Manufacturer:** Multistack, LLC

**Test Laboratory:** Clark Dynamic Test Laboratory Inc. (Report Number JID 18-01271 Rev.0, UUT2)

**Product Line:** ARA Air Cooled Chiller

**Model Number:** ARA060X

**Product Construction Summary:**

Copper and aluminum heat exchangers with stainless steel condensers. Welded carbon steel sheet metal frame.

**Options / Component Summary:**

Provided in Table 2

**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
5,928	84	84	103	6.91	5.33	N/A

**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	2.00	1.0	1.5	3.20	2.40	1.34	0.54

**Unit Mounting Description:**

Rigidly mounted to table with eight (8) 3/8" thick 2x2x4" steel angles welded to unit base and shake table with 1/4" fillet welds.



Overall view of UUT-02