



OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION

APPLICATION FOR OSHPD SPECIAL SEISMIC
CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY
APPLICATION #: OSP - 0327

OSHPD Special Seismic Certification Preapproval (OSP)

Type: [ ] New [X] Renewal

Manufacturer Information

Manufacturer: Multistack, LLC

Manufacturer's Technical Representative: On File

Mailing Address: 1065 Maple Avenue, P.O Box 510. Sparta, WI 54656

Telephone: On File Email: On File

Product Information

Product Name: ASP Air Cooled Modular Packaged Water Chillers

Product Type: Mechanical Equipment

Product Model Number: See attachments

(List all unique product identification numbers and/or part numbers)

General Description: 10 to 30 cooling ton chillers. Seismic enhancements made to the test units and modifications
required to address the anomalies observed during the tests shall be incorporated into the production units.

Mounting Description: Rigid Base Mount

Applicant Information

Applicant Company Name: DCL Labs, LLC.

Contact Person: Kelly Laplace

Mailing Address: 1315 Greg Street, Suite 109, Sparks, NV 89431

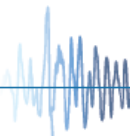
Telephone: (775) 358-5085 Email: kelly@shaketest.com

I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in
accordance with the California Administrative Code, 2016.

Signature of Applicant: [Handwritten Signature] Date: 11/19/20

Title: Business Manager Company Name: DCL Labs, LLC.

\*Access to Safe, Quality Healthcare Environments that Meet California's Diverse and Dynamic Needs\*





**OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT  
FACILITIES DEVELOPMENT DIVISION**

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

Company Name: VMC Group  
Name: Kenneth Tarlow California License Number: SE-2851  
Mailing Address: 113 Main Street, Bloomingdale, NJ 07403  
Telephone: (973) 838-1780 Email: [ken.tarlow@thevmcgroup.com](mailto:ken.tarlow@thevmcgroup.com)

**Supports and Attachments Preapproval**

- Supports and attachments are preapproved under OPM- \_\_\_\_\_  
(Separate application for OSHPD Preapproval of Manufacturer's Certification (OPM) of Supports and attachments is required)
- Supports and attachments are not preapproved

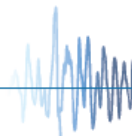
**Certification Method**

- Testing in accordance with:  ICC-ES AC156  
 Other (Please Specify): \_\_\_\_\_
- OSHPD  
OSP-0327  
BY: Mohammad Aliaari

**Testing Laboratory**

Company Name: DCL Labs  
Contact Name: Josh Sailer, Laboratory Manager  
Mailing Address: 1315 Greg Street, Suite 109, Sparks, NV 89431  
Telephone: (775) 358-5085 Email: [josh@shaketest.com](mailto:josh@shaketest.com)

DATE: 12/02/2020





OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION

Seismic Parameters

Design in accordance with ASCE 7-16 Chapter 13: [X] Yes [ ] No

Design Basis of Equipment or Components (Fp/Wp) = 1.13

S\_DS (Design spectral response acceleration at short period, g) = 1.57

ap (In-structure equipment or component amplification factor) = 1.0

Rp (Equipment or component response modification factor) = 2.5

Omega\_0 (System overstrength factor) = 2.0

Ip (Importance factor) = 1.5

z/h (Height factor ratio) = 1.0

Equipment or Component Natural Frequencies (Hz) = See attachments

Overall dimensions and weight (or range thereof) = See attachments

Equipment or Components @ grade designed in accordance with ASCE 7-16 Chapter 15: [ ] Yes [X] No

Design Basis of Equipment or Components (V/W) =

S\_DS (Design spectral response acceleration at short period, g) =

S\_D1 (Design spectral response acceleration at 1 second period, g) =

R (Response modification coefficient) =

Omega\_0 (System overstrength factor) = by: Mohammad Aliaari

Cd (Deflection amplification factor) =

Ip (Importance factor) = 1.5

Height to Center of Gravity above base =

Equipment or Component Natural Frequencies (Hz) =

Overall dimensions and weight (or range thereof) =

Tank(s) designed in accordance with ASME BPVC, 2015: [ ] Yes [X] No

List of Attachments Supporting Special Seismic Certification

[X] Test Report(s) [ ] Drawings [ ] Calculations [X] Manufacturer's Catalog

[X] Other(s) (Please Specify): Attachments

OSHPD Approval (For Office Use Only) - Approval Expires on December 31, 2025

Signature: M. Aliaari

Date: December 02, 2020

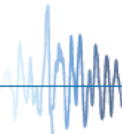
Print Name: Mohammad Aliaari

Title: Senior Structural Engineer

Special Seismic Certification Valid Up to : S\_DS (g) = 1.57

z/h = 1

Condition of Approval (if applicable):



# Special Seismic Certification Certified Components



**Manufacturer:** Multistack, LLC

**Product Line:** ASP Air Cooled Modular Packaged Water Chillers

**Certified Product Construction:**  
Powder-coated carbon steel frame

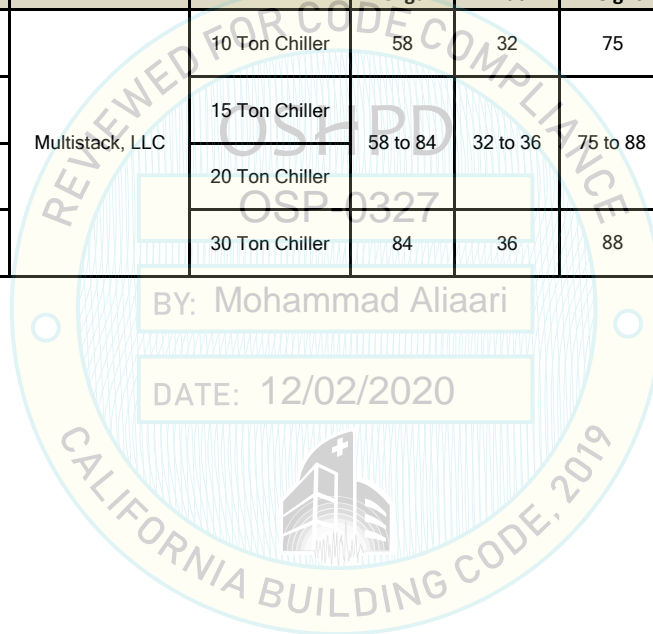
**Certified Options:**  
10 to 30 cooling ton capacity, Copeland Scroll (ZP) compressors, single or dual refrigerant circuit, 460V, direct electrical connection, air cooled units, standard ambient, brazed stainless steel evaporator, copper tube with aluminum fin condenser, standard fan configuration with R410A refrigerant.

**Mounting Description:**  
Rigid Base Mount

Model Number	Manufacturer	Description	Dimensions (inches)			Weight (lb)	Sds (g), z/h=1	Unit
			Length	Width	Height			
ASP010X	Multistack, LLC	10 Ton Chiller	58	32	75	1,120	1.57	UUT2
ASP015X		15 Ton Chiller	58 to 84	32 to 36	75 to 88	1,120 to 2,030		Interpolated
ASP020X		20 Ton Chiller						Interpolated
ASP030X		30 Ton Chiller	84	36	88	2,030		UUT5

BY: Mohammad Aliaari

DATE: 12/02/2020



# Model Number Nomenclature

**Manufacturer:** Multistack, LLC

**Product Line:** ASP Air Cooled Modular Packaged Water Chillers

## Multistack ASP Model Number Chart

A B C D E F G H I J K L M N O P - Q

Variable	Definition	Allowable Value	Allowable Value Description
A	Series	ASP	Air Cooled Modular
B	Module Nominal Capacity	010	10 Tons
		015	15 Tons
		020	20 Tons
		030	30 Tons
C	Compressor Type	A	Copeland Scroll (ZR)
		X	Copeland Scroll (ZP)
		N	None
D	AHRI Certified	C	Certified
		N	Not Certified
E	No. of Refrigerant Circuits	1	Single
		2	Dual
F	Frame Designation	1	32" x 58"
		2	36" x 72"
		3	36" x 84"
G	Voltage	A	208/3/60
		L	230/3/60
		H	460/3/60
H	Power Connection	1	Direct Connection
		2	Multiple Module Connections
I	Application	A	Air Cooled
		C	Remote Condenser
		D	Cond Unit
		H	Heat Recovery
J	Ambient	S	Standard
		H	High
K	AHRI Version	1	Standard
L	Evaporator	A	Brazed SS
		B	Brazed SMO
		N	None
M	Condenser	A	Cu Tube Al Fin
N	Condenser Coating	B	Bronzeglow
		H	Heresite
		E	Electrofin
		-	N/A
O	Fan Configuration	S	Standard
		H	High Static
		L	Low Sound
P	Auxiliary Condenser	-	N/A
Q	Refrigerant	-410A	R-410A
		-134A	R-134A

**Special Seismic Certification  
Certified Subcomponents**



**Manufacturer:** Multistack, LLC

**Product Line:** ASP Air Cooled Modular Packaged Water Chillers

**Compressors**

Model Number	Manufacturer	Description	Weight (lb)	Unit
ZPT122	Copeland	5 Ton Compressor	88	UUT2
ZRT136	Copeland	5 Ton Compressor	86	UUT2
ZPT206	Copeland	7.5 Ton Compressor	103	Interpolated
ZPT208	Copeland	7.5 Ton Compressor	105	
ZRT216	Copeland	7.5 Ton Compressor	132	
ZPT244	Copeland	10 Ton Compressor	107	
ZRT250	Copeland	10 Ton Compressor	135	
ZPT364	Copeland	15 Ton Compressor	146	UUT5
ZRT380	Copeland	15 Ton Compressor	146	UUT5

\*The only difference between ZP and ZR compressors is the refrigerant. The heavier refrigerant was tested.

\*\*Each unit contains two compressors.

**Condensers**

Model Number	Manufacturer	Description	Weight (lb)	Unit
715	Multistack, LLC	3/8" Cu tubing/6 Rows/Al Fins	100	UUT2
716	Multistack, LLC	3/8" Cu tubing/6 Rows/Al Fins	100	UUT2
715	Multistack, LLC	3/8" Cu tubing/6 Rows/Al Fins	100	Interpolated
716	Multistack, LLC	3/8" Cu tubing/6 Rows/Al Fins	100	
720	Multistack, LLC	7 mm Cu tubing/4 Rows/Al Fins	180	
721	Multistack, LLC	7 mm Cu tubing/4 Rows/Al Fins	180	
730F	Multistack, LLC	7 mm Cu Tubing/4 Rows/Al Fins	230	UUT5
731F	Multistack, LLC	7 mm Cu Tubing/4 Rows/Al Fins	230	UUT5

\*Two condensers are used for every size water chiller

**BPHE Evaporators**

Model Number	Manufacturer	Description	Unit
P/F120Tx34	SWEP	20.7" x 9.6" x 4.7"	UUT2
P/F120Tx44	SWEP	20.7" x 9.6" x 5.6"	Interpolated
P/F200Tx64	SWEP	20.7" x 9.6" x 7.9"	
P/F200Tx80	SWEP	20.7" x 9.6" x 9.3"	UUT5

**Expansion Valves**

Model Number	Manufacturer	Description	Unit
SERI-D	Parker Hannifin	2-10 Ton	UUT2
SERI-G	Parker Hannifin	10-25 Ton	Interpolated
SERI-J	Parker Hannifin	25-45 Ton	UUT5

**Controller / Display**

Model Number	Manufacturer	Description	Unit
pCO3	Carel	Carel original software	UUT2, UUT5
pCO5	Carel	Carel software upgrade	Extrapolated*
pCO5+	Carel	Carel software upgrade	Extrapolated*
C.pCO	Carel	Carel software upgrade	Extrapolated*

\*Controllers/Displays are identical to those tested in UUT2 and UUT5. Software change only.

**Solenoid Valve**

Model Number	Manufacturer	Description	Unit
3524-13	Parker Hannifin	5/8" diameter valve	UUT2
4036-13	Parker Hannifin	1 1/8" diameter valve	UUT5

**Fan Motor**

Model Number	Manufacturer	Description	Unit
A6T11NB65A	Leeson	1 HP	UUT2
C182T17FB29E	Leeson	2 HP	UUT5

**VFDs**

Model Number	Manufacturer	Description	Weight (lb)	Unit
4A0004B	Yaskawa	J1000 Drive Model CIMR-J; 3-Phase, 400V Class (4.3"Wx5.0"Hx5.4"D)	3.8	UUT2, UUT5
2A0012B	Yaskawa	J1000 Drive Model CIMR-J; 3-Phase, 200V Class (4.3"Wx5.0"Hx5.4"D)	3.8	Extrapolated*

\*Within the confines of the tested options. Dimensions, weight, design and construction of extrapolated components are the same as what was tested in UUT2 and UUT5.

**Fans**

Model Number	Manufacturer	Description	Unit
24.5" Diameter	Multiwing	PPG Axial Fan	UUT2
30" Diameter	Multiwing	PPG Axial Fan	UUT5

**Motorized Valve**

Model Number	Manufacturer	Description	Unit
SY1	Belimo	2" Diameter Valve	UUT2, UUT5

## Special Seismic Certification



### Tested Components

**Manufacturer:** Multistack, LLC

**Product Line:** ASP Air Cooled Modular Packaged Water Chillers

**Certified Product Construction:**

Powder-coated carbon steel frame

**Certified Options:**

10 and 30 cooling ton capacity, Copeland Scroll (ZP) compressors, single or dual refrigerant circuit, 460V, direct electrical connection, air cooled units, standard ambient, brazed stainless steel evaporator, copper tube with aluminum fin condenser, standard fan configuration with R410A refrigerant.

**Mounting Description:**

Rigid Base Mount

Model Number	Manufacturer	Description	Dimensions (inches)			Weight (lb)	Sds (g), z/h=1	Unit
			Length	Width	Height			
ASP010X	Multistack, LLC	10 Ton Chiller	58	32	75	1,120	1.57	UUT2
ASP030X	Multistack, LLC	30 Ton Chiller	84	36	88	2,030	1.93	UUT5

BY: Mohammad Aliaari

DATE: 12/02/2020



# UUT2



## Unit Under Test Summary Sheet

**Manufacturer:** Multistack, LLC

**Product Line:** ASP Air Cooled Modular Packaged Water Chillers

**Model Number:** ASP010X

**Product Construction Summary:** Powder-coated carbon steel frame

**Options / Component Summary:**

10 cooling ton capacity, Copeland Scroll (ZP) compressors, single refrigerant circuit, 32" x 58" frame size, 460V, direct electrical connection, air cooled unit, standard ambient, brazed stainless steel evaporator, copper tube with aluminum fin condenser, standard fan configuration with R410A refrigerant.

**Unit Mounting Description:**

The unit was base-mounted to the DCL steel shake table interface plate with four 1/2-inch diameter Grade 5 bolts. The bolts were spaced 23 inches on center widthwise and 51-3/16 inches on center length wise. The shake table interface plate was attached to the shake table with M12 threaded rod, spaced approximately 8-inches on-center.

**UUT Properties**

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Length	Width	Height	Front-Back	Side-Side	Vertical
1,120	58	32	75	5.3	7.5	13.3

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	1.57	1.0	1.5	2.51	1.88	1.05	0.42



Test Setup of UUT2

**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.



UUT5



**Unit Under Test Summary Sheet**

**Manufacturer:** Multistack, LLC

**Product Line:** ASP Air Cooled Packaged Modules

**Model Number:** ASP030X

**Product Construction Summary:** Powder-coated carbon steel frame

**Options / Component Summary:**

30 cooling ton capacity, Copeland Scroll (ZP) compressors, single refrigerant circuit, 36" x 84" frame size, 460V, direct electrical connection, air cooled unit, standard ambient, brazed stainless steel evaporator, copper tube with aluminum fin condenser, standard fan configuration with R410A refrigerant.

**Unit Mounting Description:**

The unit was base-mounted to the DCL steel shake table interface plate with six 1/2-inch diameter Grade 5 bolts. The bolts were spaced 27-1/2 inches on center widthwise and 38-11/16 inches on center length wise. The shake table interface plate was attached to the shake table with M12 threaded rod, spaced approximately 8-inches on-center.

**UUT Properties**

Operating Weight (lb)	Dimensions (inches)			Lowest Natural Frequency (Hz)		
	Length	Width	Height	Front-Back	Side-Side	Vertical
2,030	84	36	88	4.3	4.5	9.8

**Seismic Test Parameters**

Building Code	Test Criteria	Sds (g)	z/h	Ip (g)	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	0.51



**Test Setup of UUT5**

**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.