APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY	
APPLICATION #:	OSP – 0188-10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Trane

Manufacturer's Technical Representative: Shawn Jennings

Mailing Address: 101 William White Boulevard, Pueblo CO 81001

Telephone: 719-585-4392 Email: shawn.jennings@irco.com

Product Information

Product Name: RTWD Series R

Product Type: Helical Rotary Water Cooler Liquid Chiller

Product Model Number: RTWD 80 to 250 Ton Cooling Capacity
(List all unique product identification numbers and/or part numbers)

General Description: Cataloged Shell & Tube Chillers. Seismic enhancement 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: Base Mounted on Elastomeric Pads or on Spring Vibration Isolators, with new enlarged feet welded onto existing feet.

Applicant Information

Applicant Company Name: The VMC Group

Contact Person: John P. Giuliano, PE

Mailing Address: 113 Main Street, Bloomingdale NJ 07403

Telephone: 973-838-1780 Email: john.giuliano@thevmcgroup.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:  Date: 5-25-16

Title: President Company Name: The VMC Group

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

Company Name: The VMC Group

Name: Kenneth Tarlow California License Number: SE2851

Mailing Address: 113 Main Street, Bloomingdale NJ 07403

Telephone: 973-838-1780 Email: 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): _____

Testing Laboratory

Company Name: UCSD & Clark Dynamic Testing Laboratory

Contact Name: Gianmario Benzoni (UCSD) & JR Antenucci (Clark)

Mailing Address: Department of Structural Engineering, La Jolla CA 92093 (UCSD) & 1801 Route 51 South, Jefferson Hills PA 15025 (Clark)

Telephone: 858-534-1432 (UCSD) & 412-382-5500 (Clark) Email: gbenzoni@ucsd.edu (UCSD) & jrantenucci@clarkdynamic.com (Clark)

Seismic Parameters

Design in accordance with ASCE 7-10 Chapter 13: ☒ Yes ☐ No

Design Basis of Equipment or Components (F_p/W_p) = 1.8

S_{DS} (Design spectral response acceleration at short period, g) = 0.8 (Spring Isolated) & 1.0 (Elastomeric Pads)

a_p (In-structure equipment or component amplification factor) = 2.5 (Spring Isolated) & 2.5 (Elastomeric Pads)

R_p (Equipment or component response modification factor) = 2.0 (Spring Isolated) & 2.5 (Elastomeric Pads)

Ω_0 (System overstrength factor) = 2.0

I_p (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 7-10 Chapter 15: ☐ Yes ☒ 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) = _____

Ω_0 (System overstrength factor) = _____

C_d (Deflection amplification factor) = _____

I_p (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 ☒ No

List of Attachments Supporting Special Seismic Certification

☒ Test Report(s) ☒ Drawings ☐ Calculations ☒ Manufacturer's Catalog

☐ Other(s) (Please Specify): _____

OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2022

Signature:  Date: 9/14/16

Print Name: M. R. Karim Title: SHFR

Special Seismic Certification Valid Up to : S_{DS} (g) = See Above z/h = 1.0

Condition of Approval (if applicable): _____

Table 1 - Product Matrix

Chiller Model	Unit Size	Max Dimensions Within Range				Efficiency	Evaporator	Condenser	Material	Mfr	UUT
		Length (in)	Width (in)	Height (in)	Operating Weight (lbs)						
RTWD	80	142.5	35.1	76.1	5900	Standard	E1B03	C1B04	Carbon Steel	Trane	1A, 1B
	80	142.5	35.1	76.1	5900	High	E1A03	C1A03			interpolated
	90	142.5	35.1	76.1	5933	Standard	E1B03	C1B03			interpolated
	90					High	E1A01	C1A02			interpolated
	100	142.5	35.1	76.9	6255	Standard	E1B02	C1B02			interpolated
	100					High	E2A04	C2A04			interpolated
	110	142.5	35.1	76.9	6475	Standard	E1B01	C1B01			interpolated
	110					High	E2A03	C2A03			interpolated
	120	142.5	35.1	76.9	6531	Standard	E2B04	C2B03			interpolated
	120					High	E2A02	C2A02			interpolated
	130	142.5	35.1	76.9	6544	Standard	E2B03	C2B03			interpolated
	130					High	E2A01	C2A01			interpolated
	140	142.5	34.8	76.9	6972	Standard	E2B02	C2B02			interpolated
	150	150.8	49.4	76.8	8735	High	E3A04	C3A04			interpolated
	150					Premium	E4A03	C4A03			interpolated
	160	150.8	49.4	76.8	9182	High	E3A03	C3A03			interpolated
	160					Premium	E4A03	C4A03			interpolated
	180	150.8	49.4	76.8	9304	High	E3A02	C3A02			interpolated
	180					Premium	E4A02	C4A02			interpolated
	200	150.8	49.4	76.8	9348	High	E3A01	C3A01			interpolated
	200					Premium	E4A01	C4A02			interpolated
	220	136.7	49.9	76.9	9491	High	E5A03	C5A03			interpolated
	250	136.7	49.9	76.9	10070	High	E5A01	C5A01			2A, 2B

Table 2 - Compressor

Size	Manufacturer	Material	UUT
GP2 K1	Trane	Cast Iron Class 35	1
GP2 K2			interpolated
GP2 L1			interpolated
GP2 L2			interpolated
GP2 M1			interpolated
GP2 M2			interpolated
GP2 N1			interpolated
GP2 N2			2

Table 3 - Compressor Starter

Type	Manufacturer	Materials	UUT
Wye-Delta Closed Transition	Curtiss Wright	Carbon Steel	1
Across the line			2

Table 4 - Water Box Configuration

Tube Passes	Manufacturer	Material	UUT
2	Trane	Cast Iron Class 35	1 & 2
3			extrapolated

Note: There is no structural between 2 pass and 3 pass

Table 5 - Unit Voltage

Model	UUT
200	1
230	interpolated
380	interpolated
400	interpolated
460	2

Table 6 - Control Panel

Manufacturer	Materials	Type	Dimensions (inches)			UUT
			L	W	H	
Trane	Carbon Steel	NEMA 1	88	7.5	32.5	1 & 2

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-1A

VMA-45097-A4

Model Line	Model Number	Manufacturer
RTWD	80	Trane

Product Construction Summary

Carbon Steel Base, Carbon Steel Evaporator, Carbon Steel Condenser

Options / Subcomponent Summary

Evaporator: Trane ; Condenser: Trane ; Compressor: Trane ; Compressor Starter: Curtiss-Wright ; Control Panel: Trane

UUT Properties

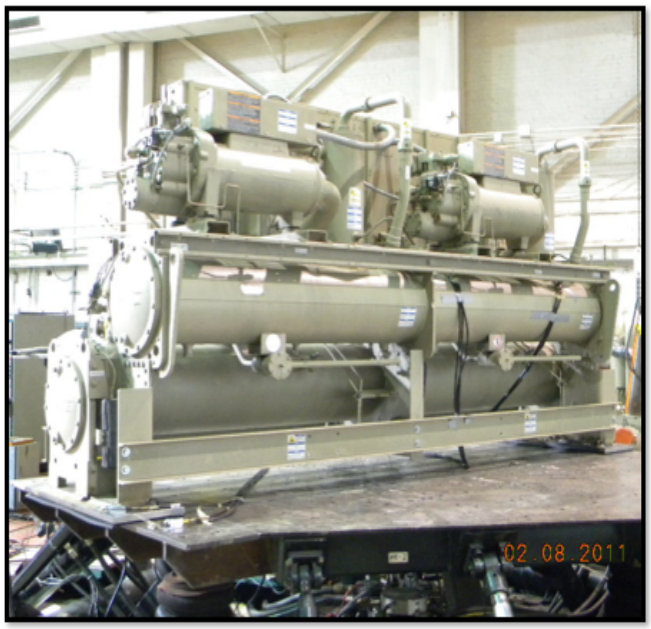
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
5785	142.50	34.31	75.94	6.60	11.60	19.00

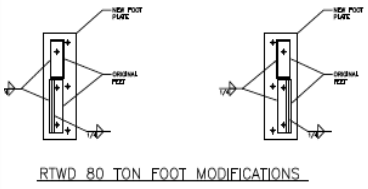
UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS} (g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2016	ICC-ES AC156	1.00	1.0	1.5	1.60	1.20	0.67	0.27

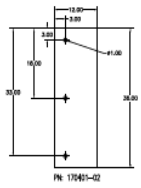
Test Mounting Details

UUT base mounted to Qty (6) VMC Shear-Flex elastomeric pads, with Qty (6) 3/4" dia SAE Grade 8 bolts to shake table. New enlarged feet welded onto existing feet.





RTWD 80 TON FOOT MODIFICATIONS



RTWD 80 TON FOOT PLATES

All units were filled with contents and maintained structural integrity and functionality

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-1B

VMA-45097-A4

Model Line	Model Number	Manufacturer
RTWD	80	Trane

Product Construction Summary

Carbon Steel Base, Carbon Steel Evaporator, Carbon Steel Condenser

Options / Subcomponent Summary

Evaporator: Trane ; Condenser: Trane ; Compressor: Trane ; Compressor Starter: Curtiss-Wright ; Control Panel: Trane

UUT Properties

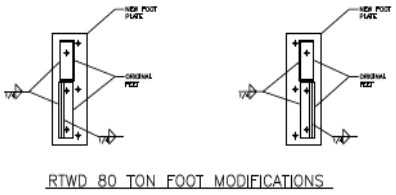
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
5785	142.50	34.31	75.94	2.50	4.20	6.10

UUT Highest Passed Seismic Run Information

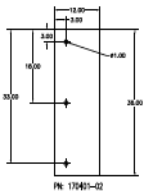
Building Code	Test Criteria	S_{DS} (g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2016	ICC-ES AC156	0.80	1.0	1.5	1.28	0.96	0.53	0.21

Test Mounting Details

UUT base mounted to Qty (6) VMC MSSH-1E-2000 spring vibration isolators, with Qty (24) 5/8" dia SAE Grade 8 bolts to shake table. New enlarged feet welded onto existing feet.



RTWD 80 TON FOOT MODIFICATIONS



RTWD 80 TON FOOT PLATES
1" STEEL
QTY: 2

All units were filled with contents and maintained structural integrity and functionality

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-2A

VMA-45097-A4

Model Line	Model Number	Manufacturer
RTWD	250	Trane

Product Construction Summary

Carbon Steel Base, Carbon Steel Evaporator, Carbon Steel Condenser

Options / Subcomponent Summary

Evaporator: Trane ; Condenser: Trane ; Compressor: Trane ; Compressor Starter: Curtiss-Wright ; Control Panel: Trane

UUT Properties

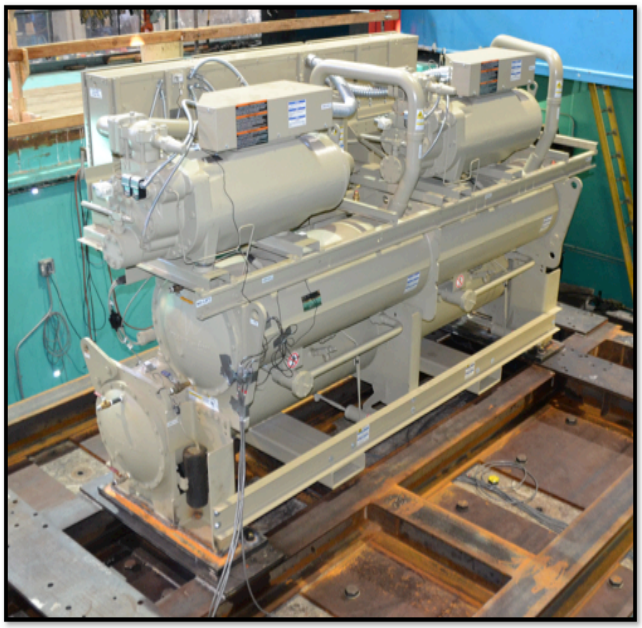
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
10,070	136.06	47.75	76.94	11.61	7.08	19.15

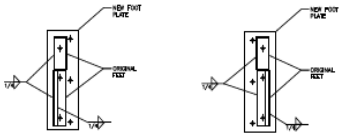
UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS} (g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2016	ICC-ES AC156	1.00	1.0	1.5	1.60	1.20	0.67	0.27

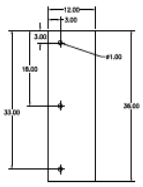
Test Mounting Details

UUT base mounted to Qty (6) VMC Shear -Flex elastomeric pads, with Qty (6) 3/4" dia SAE Grade 8 bolts to shake table. New enlarged feet welded onto existing feet.





RTWD 250 TON FOOT MODIFICATIONS



RTWD 250 TON FOOT PLATES
1" STEEL
QTY: 2

All units were filled with contents and maintained structural integrity and functionality

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-2B

VMA-45097-A4

Model Line	Model Number	Manufacturer
RTWD	250	Trane

Product Construction Summary

Carbon Steel Base, Carbon Steel Evaporator, Carbon Steel Condenser

Options / Subcomponent Summary

Evaporator: Trane ; Condenser: Trane ; Compressor: Trane ; Compressor Starter: Curtiss-Wright ; Control Panel: Trane

UUT Properties

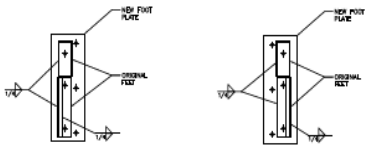
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
10,070	136.06	47.75	76.94	3.76	2.03	5.50

UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S_{DS} (g)	z/h	I_P	A_{FLX-H} (g)	A_{RIG-H} (g)	A_{FLX-V} (g)	A_{RIG-V} (g)
CBC 2016	ICC-ES AC156	0.80	1.0	1.5	1.28	0.96	0.53	0.21

Test Mounting Details

UUT base mounted to Qty (6) VMC MSSH-1E-2000 spring vibration isolators, with Qty (24) 5/8" dia SAE Grade 8 bolts to shake table. New enlarged feet welded onto existing feet.



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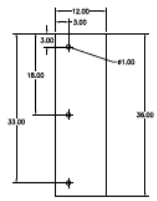

RTWD 250 TON FOOT PLATES
1" STEEL
QTY: 2

All units were filled with contents and maintained structural integrity and functionality