APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY

APPLICATION #: OSP-0610

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Trane

Manufacturer's Technical Representative: Kassie Hansen

Mailing Address: 2213 South 20th Street, La Crosse, WI 54601-7599

Telephone: (608) 518-5944 Email: KasseraA.Hansen@tranetechnologies.com

Product Information

Product Name: Chillers

Product Type: Chillers - Water Cooled

Product Model Number: CenTraVac (CTV), CVHF 350 – 1300

General Description: Catalogued Shell and Tube Water Cooled Chillers with 2-Stage Compressor

Mounting Description: Rigid Mounting to Floor & Elastomeric Pad, Rigid Mounting to Floor & Elastomeric Pad

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: The VMC Group

Contact Person: John Giuliano

Mailing Address: 113 Main Street, Bloomingdale, NJ 07403

Telephone: (973) 838-1780 Email: john.giuliano@thevmcgroup.com

Title: President

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: U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER, CONSTRUCTION ENGINEERING RESEARCH LABORATORY (CERL)

Contact Person: James Wilcoski

Mailing Address: 2902 Newmark Dr., Champaign IL 61822-1076

Telephone: () - Email: James.Wilcoski@usace.army.mil

Seismic Parameters

Design Basis of Equipment or Components (F_p/W_p) = 0.84

S_{DS} (Design spectral response acceleration at short period, g) = 1.16 (z/h = 1); 1.86 (z/h = 0)

a_p (Amplification factor) = 1.0

R_p (Response modification factor) = 2.5

Ω_0 (System overstrength factor) = 2.0

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

OSHPD Approval (For Office Use Only) - Approval Expires on 12/14/2027

Date: 12/13/2021

Name: Mohammad Karim Title: Supervisor, Health Facilities

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

Condition of Approval (if applicable):

Table 1 - Product Table

Model	Compressor Configuration	Frequency [Hz]	Compressor Size	Shell Sizes	Shell Lengths[1]	Max Dimensions [in]			Max Weight [lb]	SDS @ z/h = 0	SDS @ z/h = 1.0	Unit Mounting[2]	UUT
						Length	Width	Height					
CVHF	2-stage single	60	350 to 570	032	SS & LL	135	82	100	21,070	1.86	1.16	Rigid Extended Baseplate	UUT-1
		60	350 to 570	050	SS	135	82	100	20,007	1.86	1.16	Rigid + Pad w/ Extended Baseplate	Interpolated
		60	350 to 570	050	SL & LL	180	82	100	22,234	1.86	1.16		Interpolated
		60	350 to 570	050/080	SS	1350	82	104	21,150	1.86	1.16		Interpolated
		60	350 to 570	050/080	LL	180	82	104	27,037	1.86	1.16		Interpolated
		60	350 to 570	080	SS	135	95	114	27,958	1.86	1.16		Interpolated
		60	350 to 570	080	SL & LL	180	95	114	31,833	1.86	1.16		Interpolated
		60	620 to 870	080	SS	135	95	114	30,374	1.86	1.16		Interpolated
		60	620 to 870	080	SL & LL	180	95	114	34,249	1.86	1.16		Interpolated
		60	620 to 870	080/142	LL	180	111	118	41,235	1.86	1.16		Interpolated
		60	620 to 870	142	ML & LL	180	117	122	44,300	1.86	1.16		Interpolated
		60	1070 to 1300	080/142	LL	180	111	122	42,416	1.86	1.16		Interpolated
		60	1070 to 1300	142	ML & LL	180	119	122	44,787	1.86	1.16		Interpolated
		60	1070 to 1300	142	EL	203	119	122	46,064	1.86	1.16		Interpolated
		60	1070 to 1300	142/210	EL, ML, & LL	180	126	135	60,915	1.86	1.16		Interpolated
		60	1070 to 1300	210	LL	180	126	135	54,233	1.86	1.16		Interpolated
		60	1070 to 1300	250	EL	203	139	139	67,500	1.86	1.16	Extended Baseplate w/Pads	UUT-2

[1]Shell Lengths: S = Short, M = Medium, L = Long, E = Extended; First Letter = Evaporator Shell Length; Second Letter = Condenser Shell Length

[2]Pads Used for Leveling Purposes Only

Table 2 - Shells

	Size[1]	MFR	Evaporator			Condenser			Economizer			Materials	UUT
			Max Dimensions [in]		Max Weight [lb]	Max Dimensions [in]		Max Weight [lb]	Max Dimensions		Max Weight [lb]		
			OD	L		OD	L		OD	L			
Shells	032S	Trane	27.75	135	2,900	19.94	135	2,460	14	47.75	404	Carbon Steel	UUT-1
	032L		27.75	180	3,500	19.94	180	3,006	14	47.75	404	Carbon Steel	Interpolated
	050S		35.00	135	4,900	24.94	135	3,526	17.5	58.875	420	Carbon Steel	Interpolated
	050L		35.00	180	6,000	24.94	180	4,436	17.5	58.875	420	Carbon Steel	Interpolated
	080S		48.31	135	7,200	30.75	135	5,280	22	73.75	420	Carbon Steel	Interpolated
	080L		48.31	180	9,000	30.75	180	6,776	22	73.75	420	Carbon Steel	Interpolated
	142M		52.31	160	11,036	n/a	n/a	n/a	25.5	139.56	878	Carbon Steel	Interpolated
	142L		52.31	180	11,938	40.50	180	10,995	25.5	139.56	878	Carbon Steel	Interpolated
	142E		52.31	203	12,921	n/a	n/a	n/a	25.5	139.56	878	Carbon Steel	Interpolated
	210L		59.81	180	14,755	45.06	180	14,154	25.5	139.56	878	Carbon Steel	Interpolated
	250E		66.31	203	20,068	n/a	n/a	n/a	25.5	139.56	878	Carbon Steel	UUT-2
	250L		n/a	n/a	n/a	49.31	180	17,341	25.5	139.56	878	Carbon Steel	UUT-2

[1]Shell Size: S = Short, M = Medium, L = Long, E = Extended

Table 3 - AFDs

	Product Series / Model	MFR	Materials	Max Input Voltage [V]	Input Phase	Max Input Current [Amp]	Max Output [HP]	Max Dimensions [in]			Max Weight [lb]	UUT
								Length	Width	Height		
AFD's	Unit Mounted Drive	Rockwell	Carbon Steel	575	3	768	200	18	60	62	1,700	UUT-1
	Unit Mounted Drive	Rockwell	Carbon Steel	575	3	1530	400	26	98	76	3,000	UUT-2

Note: Drive is mounted onto the chiller and Trane controls the bracketing from the drive to chiller.

Table 4 - Compressors

Compressors	Model Number	MFR	Configuration	Frequency [Hz]	Size (NTON)	Body/Impeller Materials	Max Dimensions [in]			Max Weight [lb]	UUT
							Length	Width	Height		
	CPSZ048	Trane	2-stage single	60	350 to 570	Cast Iron/Aluminum	78.5	51.5	51	8,013	UUT-1
	CPSZ087	Trane	2-stage single	60	620 to 870	Cast Iron/Aluminum	81.5	55	55.5	5,756	Interpolated
	CPSZ130	Trane	2-stage single	60	1070 to 1300	Cast Iron/Aluminum	80.5	59.5	59.5	10,714	UUT-2

Table 5 - Control Panels

Control Panels	Model Number	MFR	Materials	Max Dimensions [in]			Max Weight [lb]	UUT
				Length	Width	Height		
	CNTL	Trane	Carbon Steel	6	30	36	131	UUT-1, UUT-2

Table 6 - Purge

Purge	Model Number	MFR	Materials	Max Dimensions [in]			Max Weight [lb]	UUT
				Length	Width	Height		
	PRGG	Trane	Carbon Steel	27.5	21.75	25.75	140	UUT-1, UUT-2

UNIT UNDER TEST (UUT)
Summary Sheet

UUT-1

30899-1901, UUT-03

Model Line	Model Number	Manufacturer
CTV	CVHF350	Trane

Product Construction Summary

Carbon Steel Shell & Tube Water Cooled Chiller

Options / Subcomponent Summary

Shells: Trane, AFD: Rockwell, Compressor: Trane, Control Panel: Trane, Purge: Trane

UUT Properties

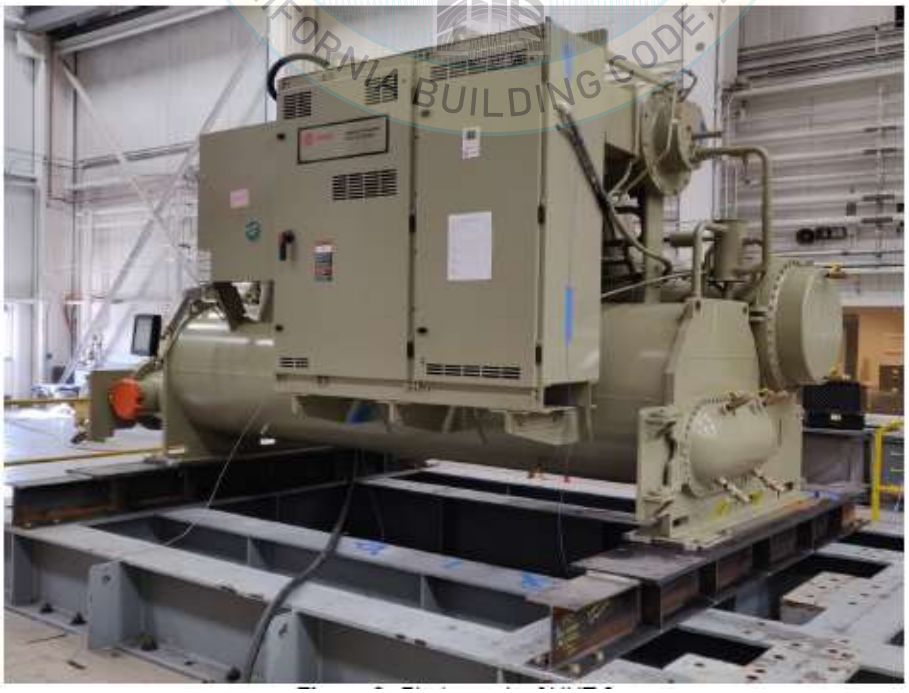
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
21,070	135	82	100	9.5	11.5	17.0

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 2019	ICC-ES AC156	1.16	1.0	1.50	1.86	1.39	-	-
CBC 2019	ICC-ES AC156	1.86	0.0	1.50	-	-	1.24	0.50

Test Mounting Details

Chiller is rigidly base mounted to table interface fixture using (10) 7/8" diameter, grade 8 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

30899-1901, UUT-04

Model Line	Model Number	Manufacturer
CTV	CVHF1300	Trane

Product Construction Summary

Carbon Steel Shell & Tube Water Cooled Chiller

Options / Subcomponent Summary

Shells: Trane, AFD: Rockwell, Compressor: Trane, Control Panel: Trane, Purge: Trane

UUT Properties

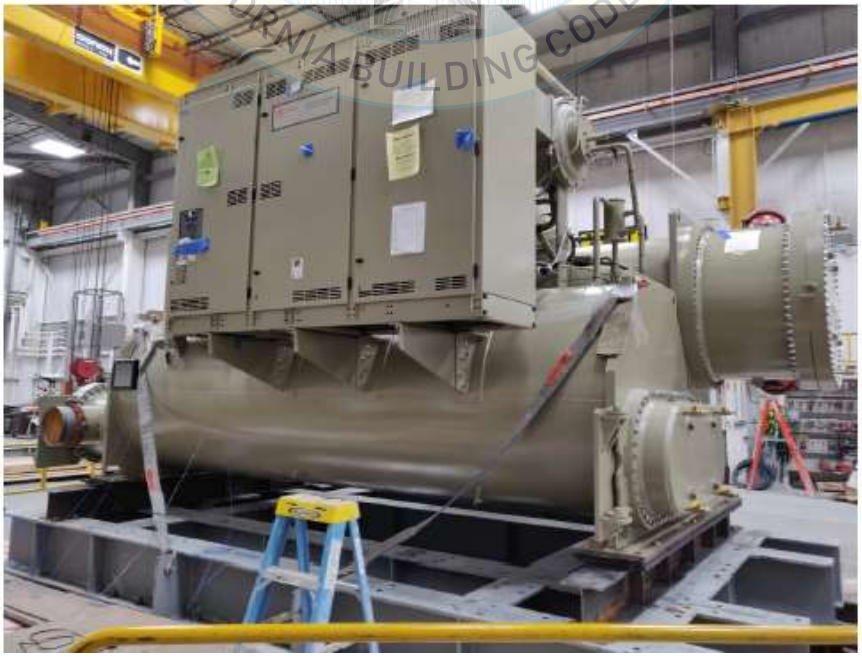
Weight [lbs]	Dimensions [in]			Lowest Nat. Freq. [Hz]		
	Length	Width	Height	F-B	S-S	V
67,500	203	139	139	8.0	9.0	17.0

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 2019	ICC-ES AC156	1.16	1.0	1.50	1.86	1.39	-	-
CBC 2019	ICC-ES AC156	1.86	0.0	1.50	-	-	1.24	0.50

Test Mounting Details

Chiller is partially rigid base mounted on (12) 14"x18"x3/4" VMC Maxi-Flex Black Elasomeric Pads to table interface fixture using (18) 7/8" diameter, grade 8 bolts



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