CERTIFICATE OF COMPLIANCE
SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Certification No.

VMA-50102-01C (Revision 9)

Expiration Date: 12/31/2026

Certification Parameters:

The nonstructural products (mechanical and/or electrical components) listed on this certificate are CERTIFIED[1] FOR SEISMIC APPLICATIONS in accordance with the following building code[2] releases.

IBC 2021, 2018, 2015, 2012, 2009, 2006

The following model designations, options, and accessories are included in this certification. Reference report number VMA-50102-01 as issued by VMC Group for a complete list of certified models, included accessories/options, and certified installation methods.

Trane; Water Cooled Chillers

Series E CenTraVac CVHH & CDHH; 900 Ton - 3300 Ton

The above referenced equipment is **APPROVED** for seismic application when properly installed[3], used as intended, and contains a Seismic Certification Label referencing this Certificate of Compliance[4]. As limited by the tabulated values, below grade, grade, and roof-level installations, installations in essential facilities, for life safety applications, and/or of equipment containing hazardous contents are permitted and included in this certification with an Equipment Importance Factor assigned as I_p=1.5. The equipment is qualified by successful seismic shake table testing at the nationally recognized CERL (US Army Corp. of Engineers) Laboratory under the witness of the ISO Accredited Product Certification Agency, the VMC Group.

Certified Seismic Design Levels[8]			
Certified **IBC**	**Importance $I_p \leq 1.5$** Soil Classes A-E Risk Categories I-IV Design Categories A-F	z/h ≤ 1.0	z/h = 0.0
		$S_{DS} \leq 1.450$ g	$S_{DS} \leq 2.280$ g

The qualified seismic design level stated is the highest for all series this certificate covers. For more information, see the certified product tables on page 2.

Certified Seismic Installation Methods	
Rigid Mounting From Unit Base To Rigid Structure	Elastomeric Pad Base Mounting From Unit Base To Rigid Structure

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Certified Product Table:

Model	Stage[2]	Compressor Size [Ton]	Shell Size	Shell Length	Max Length [in]	Max Width [in]	Max Height [in]	Max Weight [lbs]
CVHH	2-Stage	900-1200	100	MM	160	110	125	55,950
			100 to 160/200	M-HM		128	140	82,650
			100 to 220	LL	181	120	146	95,750
		1500-1700	200			115	142	84,750
			200 to 220	L-HL		133		93,700
			220	LL		120	146	96,400
	3-Stage	950-1050	100 to 160/200	MM	160	114	140	76,400
				M-HM		128		84,350
			100 to 220	LL	181	120	146	97,350
		1250-1550	200	L-HL		133	142	96,000
			200 to 220	LL		120	146	98,450
CDHH	2-Stage	2000-2600	400/440	MM	312	132	142	133,550
		2800-3300	440	XX	360	139		157,700
	3-Stage	1750-2250	400/440 to 440				145	161,759

1. Seismic configuration Simplex chillers and Standard Configuration Duplex Chillers are listed.
2. Contact manufacturer for Standard Configuration Simplex Chillers details.
3. 2-Stage Units & 3-Stage Units have operating frequencies of 60 Hz & 50 Hz, respectively.

Group	Type	S_{DS} (z/h=0)	S_{DS} (z/h=1)	A_{Flex-H}	A_{Rig-H}	A_{Flex-V}	A_{Rig-V}	F_p/W_p
Seismic CVHH Simplex	AC156	2.28	1.45	2.32	1.74	1.52	0.61	1.74
Standard CVHH Simplex	ASCE 7	1.92	1.20	N/A	N/A	N/A	N/A	1.44
Standard CDHH Duplex		1.00	1.00					1.20

This certification includes the Centrifugal Water Cooled chiller and included factory supplied options. This certification only covers accessories and options directly mounted to the chiller. The chiller and applicable options shall be installed per the manufacturer supplied seismic installation instructions. For a list of certified configurations and options please directly contact the manufacturer. This certification excludes all non-factory supplied accessories and options, including but not limited to isolation/restraint devices, other electrical/mechanical components and all connections for electrical, fuel, heating or cooling fluid, or other pipe/conduit connections and configurations not detailed in the above charts. Flexibility in the connections must be maintained as to not transmit load into the equipment. Design specials are outside the scope of this certification.

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Notes & Comments:

1. All equipment listed herein successfully passed the seismic acceptance criteria for shake testing non-structural components and systems as set forth in the ICC AC-156. The Test Response Spectrum (TRS) enveloped the Required Response Spectrum (RRS) for all units tested. The tested units were representative sample(s) of a contingent of models and all remained captive and structurally sound after the seismic shake simulation. The units also remained functionally operational after the simulation testing as functional testing was completed by the equipment manufacturer before and after the seismic simulations. Although a seismic qualified unit inherently contains some wind resisting capacity, that capacity is undetermined and is excluded from this certification. Snow/Ice loads have been neglected and thus limit the unit to be installed both indoors (covered by an independent protective structure) and out of doors (exposed to accumulating snow/ice) for ground snow loads no greater than 30 psf for all applications.

2. The following building codes are addressed under this certification:
   IBC 2021 referencing ASCE7-16 and ICC-ES AC-156
   IBC 2018 referencing ASCE7-16 and ICC-ES AC-156
   IBC 2015 referencing ASCE7-10 and ICC-ES AC-156
   IBC 2012 referencing ASCE7-10 and ICC-ES AC-156
   IBC 2009 referencing ASCE7-05 and ICC-ES AC-156
   IBC 2006 referencing ASCE7-05 and ICC-ES AC-156

3. Refer to the manufacturer supplied installation drawings for anchor requirements and mounting considerations for seismic applications. Required anchor locations, size, style, and load capacities (tension and shear) may be specified on the installation drawings or specified by a 3rd party. Mounting requirement details such as anchor brand, type, embedment depth, edge spacing, anchor-to-anchor spacing, concrete strength, special inspection, wall design, and attachment to non-building structures must be outlined and approved by the Engineer of Record for the project or building. Structural walls, structural floors, and housekeeping pads must also be seismically designed and approved by the project or building Structural Engineer of Record to withstand the seismic anchor loads as defined on the installation drawings. The installing contractor is responsible for ensuring the proper installation of all anchors and mounting hardware.

4. For this certificate and certification to remain valid, this certificate must correspond to the "Seismic Certification Label" found affixed to the unit by the factory. The label ensures the manufacturer built the unit in conformance to the IBC seismic design criteria set forth by the Certified Seismic Qualification Agency, the VMC Group, and meets the seismic design levels claimed by this certificate.

5. Mechanical, Electrical, and Plumbing connections to the equipment must be flexibly attached as to not transfer load through the connection. The structural integrity of any conduit, cable trays, piping, ductwork and/or flexible connections is the responsibility of others. This certification makes no statements of compliance in regards to NEMA, IP, UL, CSA, or other relevant standards after a seismic event. For compliance to other relevant standards, please contact the manufacturer.

6. This certificate applies to units manufactured at:
   Trane, 2600 Losey Blvd South, La Crosse, WI 54601
   No. 88 Middle Suzhou Road, Taicang, Jiangsu 215400 P.R.C. China

7. This certification follows the VMC Group's ISO-17065 Scheme.

8. The qualified seismic design level stated is the highest for all series this certificate covers. For more information, see the certified product tables on page 2.

John P. Giuliano, PE
President, VMC Group

IAS ACCREDITED Product Certification Agency

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