

CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS



Certification No.

VMA-51763-01C (Revision 15)

Expiration Date: 9/30/2027

Certification Parameters:

The nonstructural products (mechanical and/or electrical components) listed on this certificate are **CERTIFIED¹** FOR SEISMIC APPLICATIONS in accordance with the following building code² releases.

IBC 2021, 2018, 2015, 2012; EC8 2004

The following model designations, options, and accessories are included in this certification. Reference report number VMA-51763-01 as issued by VMC Group for a complete list of certified models, included accessories/options, and certified installation methods.

Cummins Power Generation, Inc.; Diesel Gensets
UK/India Manufactured; 565-2250 kW, 706-2813 kVA

The above referenced equipment is **APPROVED** for seismic application when properly installed³, used as intended, and contains a Seismic Certification Label referencing this Certificate of Compliance⁴. 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	$z/h \leq 1.0$	$z/h = 0.0$
		$S_{DS} \leq 0.900 \text{ g}$	$S_{DS} \leq 1.500 \text{ g}$
Certified EC8 ⁹	Importance $Y_a \leq 1.5$ Soil Classes A-E, Type I-II	$a_g \leq 0.078 \text{ g}$	$a_g \leq 0.175 \text{ g}$

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	External Isolation Mounting From Unit Base To Rigid Structure



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Certified Product Table:

Model Number	Radiator Mfr.	Freq. [Hz]	Max [kW] (kVA)	Engine Model	Max Length [in] (mm)	Max Width [in] (mm)	Max Height [in] (mm)	Max Weight [lbs] (kg)
C700 D5, C825 D5A	Bearward	50	660 (825)	VTA28	159 (4047)	63 (1609)	86 (2179)	12884 (5843)
C1000 D5, C1100 D5			888 (1132)	QST30	174 (4417)	79 (2000)	94 (2387)	16801 (7620)
C1000 D5B, C1100 D5B, C1250 D5AB			1000 (1250)	KTA38	186 (4731)	66 (1682)	99 (2509)	19635 (8925)
C1400 D5, C1675 D5, C1675 D5A			1340 (1675)	KTA50	237 (6019)	80 (2032)	116 (2946)	34222 (15522)
C2000 D5, C1760 D5e, C2250 D5, C2000 D5e, C2500 D5A			2000 (2500)	QSK60	243 (6172)	98 (2489)	135 (3422)	40001 (18144)
C600 D6	Bearward	60	603 (754)	VTA28	159 (4047)	58 (1473)	86 (2179)	12873 (5838)
C900 D6, C1000 D6			1012 (1265)	QST30	174 (4417)	79 (2000)	94 (2387)	16801 (7620)
C900 D6B, C1000 D6B			1020 (1276)	KTA38	186 (4731)	66 (1682)	99 (2509)	19635 (8925)
C1250 D6, C1500 D6			1545 (1931)	KTA50	237 (6019)	80 (2033)	116 (2946)	34280 (15549)
C2000 D6, C2250 D6A			2250 (2813)	QSK60	243 (6175)	98 (2489)	126 (3201)	39392 (17867)
C825 D5, C825 D5E, C900 D5, C900 D5E	AKG	50	720 (900)	QSK23	170 (4318)	73 (1856)	85 (2148)	14412 (6537)
C660 D6, C750 D6, C800 D6		60	800 (1000)					
C1000 D5B, C1100 D5B, C1250 D5AB		50	1000 (1250)	KTA38	186 (4731)	66 (1682)	99 (2509)	19635 (8925)
C900 D6B, C1000 D6B		60	1020 (1276)					

Models	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
With Bearward Radiators	AC156	1.50	0.90	1.5	1.08	1.00	0.40	2.03
With AKG Radiators			0.64		0.77			1.44

This certification includes open diesel engine generators as detailed in the above charts. The diesel engine generator configuration and options shall be a catalogue design and factory supplied. The diesel engine generator shall be installed and attached to the building structure per the manufacturer's 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, all connections for electrical, fuel, heating or cooling fluid, or other pipe/conduit connections and all non-catalogued, standard options and/or configurations not detailed in the above charts. Flexibility in the connections must be maintained as to not transmit load into the equipment. Design specials, tanks, and enclosures are outside the scope of this certification.



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Cross-Code Compliance:

EC8 Approved Equivalent a_g							
Earthquake Type	Install Height	f_1/f_a					
		0.01	0.10	0.50	1.0	2.0	100.0
Type 2 Only	z/h = 0.0	0.328	0.288	0.175	0.133	0.333	0.333
Type 1 Only		0.370	0.370	0.226	0.171	0.370	0.370
Type 1 and Type 2		0.328	0.288	0.175	0.133	0.333	0.333
Type 2 Only	z/h = 1.0	0.132	0.118	0.078	0.061	0.133	0.370
Type 1 Only		0.169	0.152	0.100	0.078	0.171	0.370
Type 1 and Type 2		0.132	0.118	0.078	0.061	0.133	0.333

- * The type of earthquake to use per country/region is listed in the national annex
- * The f_1/f_a is fundamental frequency of the building divided by that of the component
- * The column for $f_1/f_a=1.0$ can be used as the most conservative approved ground motion





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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
 - EC8 2004 full reference Eurocode EN-1998 2004
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:
 - Royal Oak Way South, Daventry NN11 8NU, United Kingdom
 - Plot No. B3-1, SEZ unit, Village Surwadi Nandal, Tal.Phaltan, Dist. Satara-415522, Maharashtra, India
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.
9. The Eurocode 8 maximum ground motion for equipment installed at grade or roof listed assumes that the fundamental frequency of the component is exactly twice that of the building (approximately 5 times more stiff compared to the building). If the frequency of the building or equipment is not known for a particular project, the cross-code table for EC8 may be used after the certified product table for the value of $f_1/f_b=1.0$ as it represents the worst case amplification (and thus approves the lowest most conservative maximum ground motion).

John P. Giuliano, PE
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