

CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS



Certification No.

VMA-49625-01C (Revision 9)

Expiration Date: 6/30/2027

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-49625-01 as issued by The VMC Group for a complete list of certified models, included accessories/options, and certified installation methods.

Cummins Power Generation, Inc.; Diesel Gensets
QSK95 Series; 2500 kW - 3500 kW

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	$z/h \leq 1.0$	$z/h = 0.0$
		$S_{DS} \leq 2.000 \text{ g}$	$S_{DS} \leq 2.400 \text{ g}$
Certified EC8 ⁹	Importance $Y_a \leq 1.5$ Soil Classes A-E, Type I-II	$a_g \leq 0.165 \text{ g}$	$a_g \leq 0.374 \text{ g}$

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
External Isolation Mounting From Unit Base To Rigid Structure



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Certified Product Table:

Model	Frequency (Hz)	Max kW Rating	Max kVA Rating	Length (in.)	Width (in.)	Height (in.)	Max Weight (lbs.)
C3500 D5	50	N/A	3500	311	119	144	76566
C3500 D5e							
C3750 D5			3750				78947
C3750 D5e	60	3000	N/A				74060
C3000 D6							
C3000 D6e							
C3250 D6		3250					79807
C3250 D6e							
C3500 D6e		3500					
C3500 D6							

Type	Model	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
AC156	All models not using MFTP Fuel Filter	2.40	2.00	3.20	2.40	1.61	0.65	4.50
	Any models using MFTP Fuel Filter	2.10	1.94	3.10	2.33	1.41	0.57	4.37

This certification includes the open generator set and included factory supplied options. This certification only covers accessories and options directly mounted to the genset. The genset 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. Fuel tanks, enclosures, and design specials 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	$z/h = 0.0$	0.701	0.614	0.374	0.284	0.711	0.711
Type 1 Only		0.596	0.596	0.481	0.366	0.596	0.596
Type 1 and Type 2				0.374	0.284		
Type 2 Only	$z/h = 1.0$	0.281	0.253	0.165	0.129	0.284	0.711
Type 1 Only		0.361	0.325	0.213	0.166	0.366	0.596
Type 1 and Type 2		0.281	0.253	0.165	0.129	0.284	

- * 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
 - Italian Eurocode 8 Annex Published 2007 (Building Code Annex)
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:
 - 1400 73rd Ave NE, Fridley, MN 55432
 - Royal Oak Way South, Daventry, NN11 8NU, United Kingdom
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 $f_1/f_a=1.0$ 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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