VMC GROUP
THE POWER OF TOGETHER™

aksa POWER GENERATION

CERTIFICATE OF COMPLIANCE

SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Certification No.

VMA-49842-01C (Revision 02)

Expiration Date: 11/30/2023

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 2006, 2009, 2012; TEC 2007

The following model designations, options, and accessories are included in this certification. Reference report number **VMA-49842-01** as issued by VMC Group for a complete list of certified models, included accessories/options, and certified installation methods.

AKSA Power Generation; Diesel Gensets
APD Mitsubishi Engine Models; 660kW – 2000kW

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 University of California San Diego Charles Lee Powell Structural Research Laboratories under the of the ISO Accredited Product Certification Agency, VMC Group.

Certified Seismic Design Levels			
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**
		$S_{DS} \leq 0.750$ g	**$S_{DS} \leq 0.750$ g**
		Horizontal Design[5] $\frac{F_p}{W_p} = 0.4 S_{DS} I_p \frac{a_p}{R_p}\left(1 + 2\frac{z}{h}\right) \leq$ **1.688 g**	
Certified **TEC**	**Importance I ≤ 1.5** Soil Groups A-D Zone 1 - Zone 4	**H_i/H_N = 1.0**	**H_i/H_N = 0.0**
		$A_0 \leq 0.600$	**$A_0 \leq 0.600$**
		Horizontal Design[6] $\frac{F_e}{W_e} = 0.5 A_0 I\left(1 + 2\frac{H_i}{H_N}\right) \leq$ **0.900 g**	

Certified Seismic Installation Methods	
Rigid Mounting From Unit Base To Rigid Structure	External Isolation Mounting From Unit Base To Rigid Structure
External Isolation Mounting From Unit Base To Fuel Tank	

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Certified Product Table:

Table 1 - Certified Mitsubishi Engine Gensets

Model	Max Rating [kW]	EPA Rating	Max Dimensions [in]			Max Weight (lbs)	Mount Configuration	Tank	Enclosure[1]
			Length	Width	Height				
APD-ULM*	800-2000	Tier 2	480.0	96.0	114.0	92,349	External Isolation Mounting From Unit Base To Fuel Tank; Rigid Mounting From Unit Base To Rigid Structure	On Tank	Open/Enclosed
APD-EPAM*	800-2000	Tier 2	480.0	96.0	114.0	92,349			Open/Enclosed
APD*M	660-2000	N/A	480.0	96.0	141.3	52,911	External Isolation Mounting From Unit Base To Rigid Structure; Rigid Mounting From Unit Base To Rigid Structure	Off Tank; With Remote Tank	Open/Enclosed
APD*M-6	1004-2000	N/A	480.0	96.0	114.0	52,911			Open/Enclosed

Note: 1. See Certification Report for Enclosure options and materials

Type	A_{FLEX-H}	A_{RIG-H}	A_{FLEX-V}	A_{RIG-V}	F_p/W_p	ZPA_H	ZPA_V
AC156	1.200 g	0.900 g	0.500 g	0.200 g	1.688 g	0.810 g	0.180 g

This certification **includes** the open and enclosed generator sets and when installed with or without sub-base or remote fuel tank. The generator set and included options shall be a catalogue design and factory supplied. The generator set and applicable options shall be installed and attached to the building structure per the manufacturer supplied seismic installation instructions. This certification **excludes** all non-factory supplied accessories, including but not limited to mufflers, isolation/restraint devices, remote control panels, remote radiators, pumps and other electrical/mechanical components.

IBC CERTIFIED VMC GROUP

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ADVANCED ANTIVIBRATION COMPONENTS

DCL DYNAMIC CERTIFICATION LABORATORIES, LLC

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SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

Notes and 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 units cited in this certification 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 2012 – referencing ASCE7-10 and ICC AC-156
   IBC 2009 – referencing ASCE7-05 and ICC AC-156
   IBC 2006 – referencing ASCE7-05 and ICC AC-156
   TEC 2007 – full reference Turkish Earthquake Code 2007 - EN

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 observing the installation detailed in the seismic installation drawings and 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, 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 does not guarantee the equipment will remain compliant to NEMA, IP, UL, or CSA standards after a seismic event.

6. This certificate applies to units manufactured at:
   No. 19 Tongjiang North Road, Changzhou New District, Changzhou, China,
   Rüzgarlıbahçe Mah. Selvi Çıkmazı No:10 Kavacık – Beykoz 34805 İstanbul – Türkiye

7. This project follows VMC Group’s ISO-17065 Scheme for Product Certification of Nonstructural Components.

John P. Giuliano, PE
President, VMC Group

IAS ACCREDITED Product Certification Agency

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