

**IBC
CERTIFICATION
PROGRAM**

The VMC Group Special Seismic Certification

Learn How To Acquire Your VMA Number



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The VMC Group Special Seismic Certification

Pre-approval of Special Seismic Certification by The VMC Group is a **seismic qualification program** for equipment manufacturers.



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The VMC Group's Special Seismic Certification (VMA) Is Limited To

- Components that require Special Seismic Certification in accordance with ICC-ES AC156.

Or

- Components that require Special Seismic Certification in accordance with the IBC (International Building Code) chapters 16 & 17 for ASCE7-10 section 13.2.2.



Special Seismic Certification Definition

- Special Seismic Certification is “A Certificate of Compliance” provided by manufacturers offering assurance that after a Design Earthquake, the designated seismic system shall maintain:
 - Structural integrity and
 - Functionality.



Minimum Requirements for Certification

- For a product line with similar structural configuration The VMC Group requires at a minimum:
 - UUT (Unit Under Test) is selected as a representative sample with the least seismic capacity (ICC-ES AC156 4.5.1).
 - Group models are selected by “similarity of major structural configuration”. Typically 1 UUT or the (largest) per group.

Or

- Testing of at least two units (typically the smallest & the largest units).
- Either rationale requires**
- (Comparative or analytical) verification of similarities for interpolated or extrapolated units.



Testing of Two Units Required for Each Structural Configuration

- If the units are to be qualified for **different support, mounting, or attachment conditions:**

- With and without vibration isolators (internal and external isolators are NOT equivalent).

And

- Different mounting types, such as wall mounted vs. floor mounted, etc.
- Testing is required for the “worst-case” of each installation configuration.

Or

- **Testing of two units** will be required for **each anchorage or mounting configuration.**



Testing of Units Required for Each Material of Construction

- If the units are made of different material (e.g. carbon steel vs. stainless steel, etc.):
 - UUT shall be selected with the material providing the least seismic capacity.
 - Alternate materials may be certified by comparison rationale.

Or

- **Test of two units** shall be required for **each material**.
- **At least one test** is required for non-active components or structures.



Test of Two Units Required for Each Sub-Component Manufacturer

- If sub-components are made by different manufacturers:
 - A shake table test for each manufacturer is required for active components. UUT selected as a representative sample with the least seismic capacity (ICC-ES AC156 4.5.1).

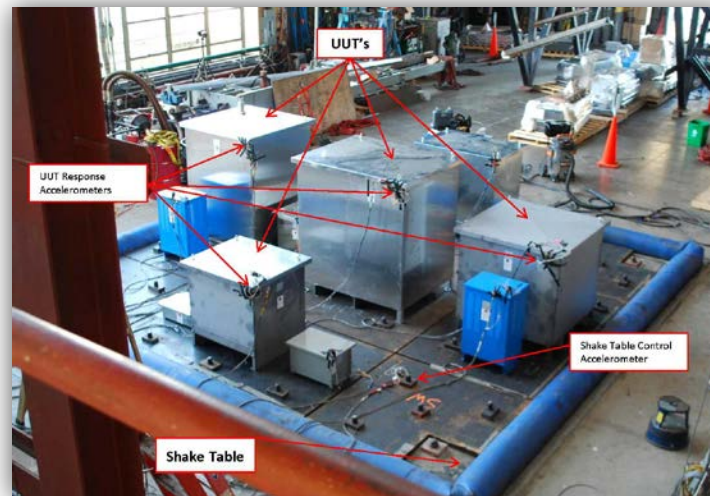
Or

- **Test of two units** shall be required for **each manufacturer**.
- **Special Seismic Certification** pre-approval is valid for components with design, construction and quality control equivalent to the units tested.



Simultaneous Testing of Multiple Units on the Shake Table is Permitted

- Multiple units can be tested on a single shake table simultaneously:
- Provided the table is capable of achieving the Required Response Spectra (RRS) with the total payload.



Test Facility Requirements

- Testing laboratory shall have ISO-17025 accreditation.

Or

- Testing shall be under the responsible charge of an independent licensed engineer.



Test Report Requirements

- Test reports shall be **reviewed and accepted by an independent, licensed structural engineer**, unless prepared by one.





An Initial Meeting With The VMC Group is Recommended

- The VMC Group strongly recommends holding an in-person meeting with the manufacturer's design team in order to develop a:
 - Tailored project plan
 - Project path definition
 - Seismic design level definition
 - Product scope definition
 - Analysis scope definition
 - Shake table testing scope definition
 - Mounting/attachment scope definition and
 - To define roles and responsibilities
 - The success criteria and
 - An engineering review



What is the Acceptance Criteria Following Shake Table Testing?

- Post test acceptance criteria for shake table testing shall be as required by ICC-ES AC156:
 - **Structural integrity** of components, supports and attachments shall be maintained.
 - **Functionality** of components shall be maintained equivalent to pre-shake table functionality test.
 - **Functionality test shall be similar to the manufacturer's typical pre-shipment performance tests.**



Can the Active Mechanical and Electrical Equipment Get a VMA by Analysis?

➤ **No.**

- Active and energized equipment/components shall be certified **exclusively** on the basis of shake table testing.
- **Only** connecting elements, attachments and supports can be justified by supporting analysis.





Auditing, Material Change and Maintaining Certification

- VMA approval is maintained based on all of the following:
 - Production of availability of the approved product design is current.
 - The continued use of accepted quality assurance/procedures.
 - Compliance with the terms stipulated in the approval agreement.
 - Successful re-examination of production samples to ensure conformity to approval requirements.
 - Satisfactory completion of engineering and quality assurance audit of the product at each manufacturing facility.



VMA Numbers are Nullified When:

- VMA approval is deemed nullified or invalid if any of the following occurs:
 - Design, construction or quality control/quality assurance methods are materially altered as defined in the VMA 1826.
 - Strength, stiffness, size, weight, materials, support, orientation or manufacturer are changed/altered so the product attributes are no longer equivalent to what was approved in the VMA.
 - Inappropriate usage of approved VMA approval certification marks.
 - When a certificate expires/non-renewal.



VMA Submittal Requirements

- Completed application with signature attached.
- Website listing fee of \$5,000 (per VMA#) payable to “The VMC Group”:
 - Application review, website listing fee and renewal fees are **non-refundable**.
- Onsite audit.
 - Travel expenses for hotel, airfare, meals, transportation, etc. to and from each manufacturing facility to conduct audit are at an additional cost.
- Complete test reports in electronic format that satisfy requirements of ICC-ES AC156.
- Verification of similarities for interpolated units in the form of manufacturer’s catalog and /or schematic cut sheets.
- All documents shall be received electronically by The VMC Group.



Contacting The VMC Group

- Please contact The VMC Group for more information about obtaining a VMA number at info@ibcapproval.com.



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Can I Get a VMA Number by Analysis or Experience Data?

- **No.**
- A VMA number is issued based on successful testing **only**.



Can I Get a VMA Number by Using Shake Test Data From Another Organization?

- **Yes.**
- Testing done by others shall be submitted for review and acceptance by The VMC Group engineering department. Additional fees may apply.



What R_p Value Can Be Used for Special Seismic Certification?

- $R_p/I_p = 1.0$ for Special Seismic Certification by testing in accordance with the ICC-ES AC156.
- $R_p = 1.0$ & $I_p = 1.5$ shall be used for analysis part of the component is Special Seismic Certification, since functionality can't be verified by analysis.
- ASCE7-10 does not provide R_p and a_p values for Special Seismic Certification.
- R_p and a_p values in ASCE7-10 can be used for design of supports and attachments.



What Test Protocol Should Be Used for Shake Table Testing?

- ICC-ES AC156; Acceptance criteria for seismic certification by shake table testing of non-structural components (effective November 1, 2010 and editorially revised February, 2013).
- **Where normal operating conditions of equipment involve variation of contents (e.g. empty and full of operating fluid, etc.) or configuration, each operating condition or configuration shall be simulated during the tests.**
- **If uni-axial or bi-axial tests are used for certification, a test at 45-degrees to two horizontal orthogonal directions shall be required in addition to tests in two horizontal and vertical directions.**





Can a Test Component with Rigid and Isolated Supports Justify Installation with Intermediate Support Conditions?

- **Yes.**
- Provided mounting configurations (e.g. installation is wall mounted, etc.) are similar and the only difference is in the attachments.



Are Tests in Accordance with ICC-ES AC156 By Non-US Shake Table Testing Facilities Acceptable?

- **Yes. Provided:**
 - Test facility has ISO 17025 accreditation.
 - Test report is available in English.
 - Test report is prepared under the responsible charge of a US licensed structural engineer.



What Systems/Components Require Special Seismic Certification for Buildings?

- Designated Seismic Systems as indicated by the authority having jurisdiction (AHJ) and/or the design team.



What Components are Exempt From Special Seismic Certification for Buildings?

- Equipment and components weighing not more than 20 lbs. supported directly on structures (and not mounted on other equipment or components).
- Moveable (mobile) and temporary equipment/components, which are not anchored to a structure or permanently attached to the building utility services such as electricity, gas or water.
- Pipes, ducts, conduits and cable trays, excluding in-line equipment and components.
- Underground tanks.
- Electrical motors and pumps not more than 10hp that are **rigidly supported directly** on a structure.



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Does a Small Amount of Hazardous Content in a Component Trigger Special Seismic Certification Requirements?

- **No.**
- Special Seismic Certification is required for components when the maximum allowable quantity of hazardous materials per control area as specified in the IBC 2012 section 414 are exceeded.



Do the Redundant or Optional Equipment Require Special Seismic Certification?

- **Yes.**
- All active components require Special Seismic Certification even if they are considered redundant or optional.
- Redundancy and options are provided only because they are considered necessary/required. Optional equipment may also have an effect on the functionality of the basic equipment.
- Consequential damage due to failure of redundant or optional components may cause failure of essential components.



Can the Supports and Attachments for Equipment With a VMA Number Be Substituted?

- **Yes.** Provided substituted supports and attachments have:
 - Similar installation configurations (e.g. support mounting, attachment, orientation, etc.) and
 - Equivalent strength and stiffness to those tested and approved.
 - Been tested to obtain quoted allowables.





What Does a Special Inspector Need to Verify in the Field For Special Seismic Certification?

- Special inspector shall verify:
 - Label for conformance with the certificate of compliance.
 - Anchorage or mounting for conformance with the certificate of compliance and construction documents.



Can a Single Product With Absolutely No Variation Be Certified By One Test Only?

- **Yes. Provided:**
 - The manufacturing process is ISO 9001 certified.
 - A single product (and not a product line with more than one product with variations) is certified.
 - Variations, if any, are limited to software and color/branding.



What Systems/Components Require Special Seismic Certification?

- Special Seismic Certification is required for **components that are part of the Designated Seismic System** in accordance with ASCE7-10 section 13.2.2.
- All components with an importance factor equal to 1.5 are part of the Designated Seismic System in accordance with ASCE7-10 section 1702.
- The component importance factor shall be in accordance with ASCE7-10 section 13.1.3.



How Much Change Can Be Made Before the VMA Becomes Invalid?

- The VMA will be nullified when:
 - Design, construction or quality control/quality assurance methods are materially altered.
 - Strength, stiffness, size, weight, materials, support, orientation, or manufacturer are changed/altered so that they are no longer equivalent to what was approved in the VMA.
 - Certificate expires.



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Where Do I Find a VMA Application Form?

- The VMA application form is available at: www.ibcapproval.com/Approval-Application.



Can We Submit Multiple Products Through A Single VMA Application?

- **No.**
- Each VMA number is for a single family of products.



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Will The VMC Group Distribute Approved VMA Numbers?


- **Yes.**
- All approved VMAs will be posted on www.ibcapproval.com.




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Sample Certificate of Compliance For Components With VMAs Per VMA 1826

[INSERT CUSTOMER LOGO HERE]


THE VMC GROUP
The Power of Together™

CERTIFICATE OF COMPLIANCE
SEISMIC DESIGN OF NONSTRUCTURAL COMPONENTS AND SYSTEMS

 **VMA-XXXX-XXC (Revision X)**
Expiration Date: MM/DD/YYYY

Certification Parameters:
THE NONSTRUCTURAL COMPONENTS AND/OR SERVICE COMPONENTS, LISTS ON THIS CERTIFICATE ARE CERTIFIED FOR SEISMIC APPLICATIONS IN ACCORDANCE WITH THE FOLLOWING BUILDING CODE RELEASES:
IBC 2009, IBC 2003, IBC 2006, IBC 2009, IBC 2012. (SOFT STATES AS NEEDED)
THE FOLLOWING MODEL, SPECIFICATIONS, OPTIONS, AND ACCESSORIES ARE INCLUDED IN THIS CERTIFICATION. REFERENCE REPORT NUMBER: VMA-XXXXXX-XX AS ISSUED BY THE VMC GROUP FOR A COMPLETE LIST OF CERTIFIED MODELS, INCLUDED ACCESSORIES, AND CERTIFIED INSTALLATION METHODS.
[COMPANY NAME] [FAMILY TYPE]

THE ABOVE REFERENCED EQUIPMENT IS APPROVED FOR SEISMIC APPLICATION WHEN PROPERLY INSTALLED AND AS INTENDED, AND OBTAINS A SEISMIC CERTIFICATION LABEL REFERENCING THIS CERTIFICATE OF COMPLIANCE. AS LIMITED BY THE SEISMIC DESIGN, SEISMIC DESIGN CATEGORY, AND INSTALLATION, INCLUDING TO RESISTANCE TO UPLIFT, TO ITS SAFETY, APPLICATIONS, AND/OR IF EQUIPMENT CONTAINS FLAMMABLE LIQUIDS AND/OR GASES AND IS NOT LISTED TO THE CERTIFICATION WITH AN EQUIPMENT IMPORTANCE FACTOR ASSIGNED AS I=1.5.

Certified Seismic Design Levels	
$S_{DS} \leq X/XX \text{ g}$ $Z/N \leq 0.0$ (Equipment as Grade) SEE CLASSIFICATION A, B, C, D, SEISMIC HAZARD CATEGORY I, II, III, IV, AND SEISMIC DESIGN CATEGORY A, B, C, D, E, AND F SEE CLASSIFICATION AS APPLICABLE UNDER THE CERTIFICATION, LIMITED BY THE S_{DS} VALUE STATE ABOVE.	$S_{DS} \leq X/XX \text{ g}$ $Z/N \leq 1.0$ (Equipment on Racks)

Certified Seismic Installation Methods	
REFER TO THE VMA-XXXX-XXC CERTIFICATION LABEL FOR THE LIST OF CERTIFIED MODELS AND ACCESSORIES.	REFER TO THE VMA-XXXX-XXC CERTIFICATION LABEL FOR THE LIST OF CERTIFIED MODELS AND ACCESSORIES.
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State List of Active and Energized Components, Non-Active Components, and Equipment Structure
Qualified by successful seismic shake table testing at the nationally recognized (or an IBC laboratory) under the auspices of the Certified Seismic Laboratories Agency, the VMC Group. Testing was conducted in accordance with ASCE AC-108 to simulate the required response spectrum (RMS) of minimum horizontal peak acceleration ($A_{p,0.05}$) of X/XX g and 10% OVERSHOOT ON $A_{p,0.05}$ OF X/XX g. THE TEST SHAKE CORRESPONDS TO AN $S_{DS} = A/XX$ g WITH A Z/N OF X.XX. PERFORMANCE WAS VERIFIED BEFORE AND AFTER THE SHAKE TEST.
State of Design for Supports and Attachments to the Building:

[Customer Logo Here]



**Seismic Certification Label
International Building Code**

Reference Certificate of Compliance: [Example VMA-47831-01C]
Model Number: [Example IDLC400-3JU]
Equipment Rating: [Example 400kW Standby]
Product Type: [Example Industrial Genset]
Equipment Serial Number: [XXXXXXXXXXXXXXXXXXXX]

Reference corresponding labels on all non-factory components to verify system compliance

[Customer VMA-47831-01B RevQ]

