



THE VMC GROUP
The Power of Together™

CERTIFICATE OF COMPLIANCE



SEISMIC DESIGN OF NON-STRUCTURAL COMPONENTS AND SYSTEMS

Temtrol Inc. has qualified the listed **ITF and WF Custom Air Handler Products** as **CERTIFIED¹** for seismic application. The basis of qualification is by shake table testing and analysis, in accordance with the following International Building Code² releases.

IBC 2000, IBC 2003, IBC 2006, IBC 2009

The following model designations and construction configurations are included in this certification when properly installed and used as intended. A complete list of certified models, options, and installation methods are detailed in reports VMA-45145-01 as issued by The VMC Group.

| Group Designation | Model | Nominal Max Unit Width (in) | Nominal Max Unit Height w/ Base Rail (in) | Max Ship Split Plan Dimensions (in) | Max Unit Length | Vertical Configuration | Horizontal Configuration | Enclosure Materials | Vestibule Permitted |
|-------------------|-------|-----------------------------|---|-------------------------------------|-----------------|------------------------|--------------------------|---------------------|---------------------|
| IBCS1 | ITF | 168 | 144 | 504 x 144 | Unlimited | Non-Stacked | Split & Non-Split | Steel | yes |
| IBCS2 | WF | 168 | 144 | 504 x 144 | Unlimited | Non-Stacked | Split & Non-Split | Steel | yes |

| Internal Components | |
|---------------------------------------|---|
| Plenum Fans - Type AF01 (See Note A) | Fan Sizes 10 to 54 permitted (max motor HP 100) |
| Housed Fans - Type PF02 (See Note B) | Fan Sizes 10 to 54 permitted (max motor HP 100) |
| Housed Fans - Type PF 09 (See Note B) | Fan Sizes 10 to 54 permitted (max motor HP 100) |
| Fan Walls (See Note C) | Fan Sizes 10 to 22 permitted (max motor HP 12) |
| Sound Attenuator | All styles permitted |
| Fixed Blade Blenders | All styles permitted |
| Fixed Blade Louvers | All styles permitted |
| Movable Blade Dampers | All styles permitted |
| Humidifiers | All styles permitted |
| Air to Air Exchanger | All styles permitted (by Innergy Tech) |
| UV Light | All styles permitted (by Lumalier) |

| Internal Components | |
|----------------------------|---|
| Cooling Coils (See Note D) | Chilled Water (CW) permitted Refrigerant (DX) permitted |
| Heating Coils (See Note D) | Hot Water (HW) permitted Steam (NFS) permitted |
| Barrier Pre-Filters | All styles permitted |
| Barrier Final Filters | All styles permitted |
| Indirect Gas Heat Furnace | 200 - 600 MBH Heatco HMA style permitted |
| Compressors | ZP54K to ZP385K Copeland permitted |
| Condenser Fans | All styles permitted |
| Motor Overload Panel | All styles permitted |
| Motor Disconnect Panel | All styles permitted |
| Electrical Control Panel | All styles permitted |
| Motor Starter Panel | All styles permitted |
| Fan Drives | Yaskawa E7N, E7B, V1000 VFDs permitted ABB ACH550, ACS320 VFDs permitted |

- Note A: Fans covered consist of FC & AF blade styles, Direct & Belt drives, floor mounted, or on Seismic Isolation Base
- Note B: Fans covered consist of FC & AF blade styles, Arrangement 3 and 4 configurations, Direct & Belt drives, floor mounted, or on Seismic Isolation Base
- Note C: Small, Medium, and Large FWT Cubes Permitted to Max stack of 3 high
- Note D: Max coil face 51H x 126L and up to (4) stacked coils permitted
Max 12 rows, AL or CU fins, max 14 FPI spacing, max 0.010 fin thickness, max 0.049 tube wall, galv or SS coil casing permitted

The above referenced equipment is **APPROVED** for seismic application when properly installed³ and used as intended. Lookup the project specific S_{DS} value (Design Spectral Response Acceleration at Short Periods) in the table below as it pertains to the applicable building code and Importance Factor, I_p , and compare to the allowed value. Below grade, grade, and roof-level installations, as well as installations in essential facilities and for life safety applications, both requiring post event functionality, were $I_p=1.5$ are permitted and included in this certification, as limited by the tabulated values.

For the enclosure and base structure, as well as components considered active or energized, and critical to the unit's continued function, the basis of this certification was through successful tri-axis shake testing under the witness of the Certified Seismic Qualification Agency, The VMC Group. Seismic shake table testing was conducted in accordance with ICC-ES AC-156 to envelope a required response spectrum (RRS) defined by a maximum horizontal flexible region acceleration (A_{FLEX}) of 3.09 g and a horizontal zero period acceleration (A_{RIG}) of 2.32 g. The units cited in this certification were representative samples of a contingent of models and all remained captive and structurally sound after the seismic shake simulation and remained functionally operational after the simulation testing. A seismic importance factor, I_p , of 1.5 applies to this certification to include essential facility requirements and life safety applications for post event functionality. Analytical methods⁴ were utilized to supplement the shake testing. Additional calculations were conducted to ensure non-critical, non-active, or non-energized components, accessories, and options remained intact and attached to the unit under seismic load conditions.

This certification covers all applications that fall below the limitations in the chart below.

| |
|--|
| IBC 2009 / 2006 / 2003 / 2000 |
| $0.0 \leq S_{DS} \leq 1.93$ |
| $I_p \leq 1.5$ |
| (grade) $0.0 \leq z/h \leq 1.0$ (roof) |
| Rigid External Mounting Permitted |

Soil Classes A, B, C, D, E, Seismic Use groups I, II, III, IV, and Seismic Design Categories A, B, C, D, E, and F are all covered under this certification⁵, limited by the S_{DS} value stated above.



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Notes and Comments:

- 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 (2007). The test response spectrum (TRS) enveloped the design response spectrum (DRS) for all units tested. The units cited in this certification were representative samples 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 snow/ice loads no greater than 30 psf for all applications.
- The following building codes are addressed under this certification:
 - IBC 2000 – referencing ASCE 7-98 and ICC AC-156
 - IBC 2003 – referencing ASCE 7-02 and ICC AC-156
 - IBC 2006 – referencing ASCE 7-05 and ICC AC-156
 - IBC 2009 – referencing ASCE 7-05 and ICC AC-156
- Refer to the manufacturer supplied installation drawings for anchor locations and mounting considerations for seismic applications. 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 the building structure or intermediary supporting structure must be designed and approved by a registered professional and submitted to the Engineer of Record for the project or building for approval. 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 requirements detailed in the seismic installation drawings and the proper installation of all anchors and mounting hardware.
- The Seismic Design Acceleration, F_p/W_p , used for calculations and analysis, is defined per the building code (or respective design standard) for the section titled Seismic Design Requirements for Non-structural (architectural, mechanical, and electrical) Components. The seismic design level is based on the LRFD calculation shown below.

| | | | |
|--|---|--|---------|
| Isolated and non-isolated internal components, internal isolation devices, Unit base, and Unit Anchorage | | | |
| IBC 2009 / 2006 | $F_p/W_p = 0.4 \times (S_{DS}=1.93) \times (I_p=1.5) \times (a_p/R_p=1.25) \times (1+2(z/h=1.0))$ | | = 4.35g |
| IBC 2003 / 2000 | $F_p/W_p = 0.4 \times (S_{DS}=2.41) \times (I_p=1.5) \times (a_p/R_p=1.0) \times (1+2(z/h=1.0))$ | | = 4.35g |
- When the site soil properties or final equipment installation location are not known, the soil site coefficient, F_A , defaults to the Soil Site Class D coefficient. Soil Classes A, B, C, D, E, Seismic Use groups I, II, III, IV, and Seismic Design Categories A, B, C, D, E, and F are all covered under this certification, limited by the S_{ds} values on page 1, respective to the applicable building code, Importance factor, and z/h ratio. A seismic importance factor, $I_p=1.5$, applies to this certification to include essential facility requirements and life safety applications for post event functionality.

Certification Issued By: The VMC Group
Original Issue Date: 10/18/2010

Document Control Number: VMA-45145-01C (Revision 0)
Reference OSHPD Preapproval: OSP-0079-10



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