# APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

| OFFICE USE ONLY | |
|---|---|
| APPLICATION #: | OSP – 0277 – 10 |

## OSHPD Special Seismic Certification Preapproval (OSP)

**Type:** ☐ New ☒ Renewal

## Manufacturer Information

Manufacturer: The Trane Company

Manufacturer's Technical Representative: Steve Lotspaih

Mailing Address: 3600 Pammel Creek Road, La Crosse, WI 54601

Telephone: 608-787-4100 Email: slotspaih@trane.com

## Product Information

Product Name: Performance Climate Changer

Product Type: Packaged Air Conditioning Units

Product Model Number: PCC Sizes 003 – 030 (CSAA)
(List all unique product identification numbers and/or part numbers)

General Description: Suspended external vibration isolated Air Conditioning Units. Sizes are determined by coil area, as depicted in the Certified Product and Certified Subcomponent Matrices. Stacked units are excluded from this pre-approval. Seismic enhancements made to the test units and modifications required to address anomalies observed during the tests shall be incorporated into the production unit.

Mounting Description: Suspended from building structure with spring isolated hangers.

## Applicant Information

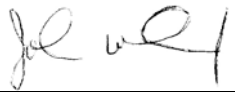
Applicant Company Name: The VMC Group

Contact Person: John Wilson, Jr.

Mailing Address: 113 Main St, Bloomingdale NJ, 07403

Telephone: 973-838-1780 Email: jwilson@thevmcgroup.com

I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2013.

Signature of Applicant:  Date: 12/2/13

Title: CEO Company Name: The VMC Group

## California Licensed Structural Engineer Responsible for the Engineering and Test Report(s)

Company Name: The VMC Group

Name: Mr. Ken Tarlow California License Number: SE2851

Mailing Address: 113 Main Street, Bloomingdale NJ, 07403

Telephone: 973-838-1780 Email: ken.tarlow@thevmcgroup.com

## Supports and Attachments Preapproval

☐ Supports and attachments are preapproved under OPM- _____
(Separate application for OSHPD Preapproval of Manufacturer's Certification (OPM) of Supports and attachments is required)

☒ Supports and attachments are not preapproved

## Certification Method

☒ Testing in accordance with: ☒ ICC-ES AC156

☐ Other (Please Specify): _____

## Testing Laboratory

Company Name: UC Berkeley

Contact Name: Wes Neighbour

Mailing Address: 1301 South 46th St, Richmond CA 94804

Telephone: 510-665-3414 Email: wdn@berkeley.edu

## Seismic Parameters

Design in accordance with ASCE 7-10 Chapter 13: ☒ Yes ☐ No

Design Basis of Equipment or Components ($F_p/W_p$) = 3.33g

$S_{DS}$ (Design spectral response acceleration at short period, g) = 1.85

$a_p$ (In-structure equipment or component amplification factor) = 2.5

$R_p$ (Equipment or component response modification factor) = 2.5

$\Omega_0$ (System overstrength factor) = 2.5

$I_p$ (Importance factor) = 1.5

z/h (Height factor ratio) = 1.0

Equipment or Component Natural Frequencies (Hz) = See Attached

Overall dimensions and weight (or range thereof) = See Attached

Equipment or Components @ grade designed in accordance with ASCE 7-10 Chapter 15: ☐ Yes ☒ No

Design Basis of Equipment or Components (V/W) =

$S_{DS}$ (Design spectral response acceleration at short period, g) =

$S_{D1}$ (Design spectral response acceleration at 1 second period, g) =

R (Response modification coefficient ) =

$\Omega_0$ (System overstrength factor) =

$C_d$ (Deflection amplification factor) =

$I_p$ (Importance factor) = 1.5

Height to Center of Gravity above base =

Equipment or Component Natural Frequencies (Hz) =

Overall dimensions and weight (or range thereof) =

Tank(s) designed in accordance with ASME BPVC, 2010: ☐ Yes ☒ No

## List of Attachments Supporting Special Seismic Certification

☒ Test Report(s) ☒ Drawings ☐ Calculations ☒ Manufacturer's Catalog

☒ Other(s) (Please Specify): Product & Sub-Component Matrices

## OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2019

Signature: Date: December 12, 2013

Print Name: Timothy J. Piland Title: SSE

Special Seismic Certification Valid Up to : $S_{DS}$ (g) = 1.85 z/h = 1.0

Condition of Approval (if applicable):

**OSHPD OSP Pre-Approval**

**Certified Product Table**

Trane CSAA Air Handlers (Performance Climate Changer)

**Table 1: Model Size**

| Model Number | Unit Size | Max Height | Max Width | Max Module Length | Max Module Weight | Module Types | UUT | MFR |
|---|---|---|---|---|---|---|---|---|
| CSAA | 003 | 29.00 | 32.00 | 52.25 | 395 | Fan Section | 1, 2 | Trane |
| | 004 | 29.00 | 44.00 | 52.25 | 539 | Air Mixing Section | Interpolated | |
| | 006 | 35.25 | 44.00 | 52.25 | 627 | Air Blender Section | Interpolated | |
| | 008 | 37.75 | 51.00 | 52.25 | 684 | Filter Section | Interpolated | |
| | 010 | 37.75 | 62.00 | 54.50 | 883 | Coil Section | Interpolated | |
| | 012 | 41.50 | 67.00 | 57.50 | 927 | UV Systems Section | 5 | |
| | 014 | 41.50 | 72.00 | 57.50 | 1080 | Diffuser Section | Interpolated | |
| | 017 | 49.00 | 72.00 | 57.50 | 1244 | Access Section | Interpolated | |
| | 021 | 52.75 | 80.00 | 55.50 | 1460 | Control Section | Interpolated | |
| | 025 | 61.50 | 80.00 | 56.50 | 1735 | Discharge Plenum Section | Interpolated | |
| | 030 | 61.50 | 94.00 | 57.50 | 1989 | Humidifier Section | 3, 4 | |

Overall unit length is variable depending on the installed modules

Units are certified for "inline" applications only.

Units are limited to be installed with maximum 79" rod spacing and 30" maximum rod length from fixed support.

Stacked units are not a part of this pre-approval.

**OSHPD OSP Pre-Approval**

**Certified Product Table**

Trane CSAA Air Handlers (Performance Climate Changer)

**Table 2: Base Frame Construction**

| Use | Base Construction | Baserail Height | Material | Section | UUT | MFR |
|---|---|---|---|---|---|---|
| Indoor | Bolted Baserails | 2.5 | 14 ga Galv CS | Cold Formed | 1, 2, 3, 4, 5 | Trane |

**OSHPD OSP Pre-Approval**

**Certified Product Table**

Trane CSAA Air Handlers (Performance Climate Changer)

**Table 3a: Enclosure Construction, Wall/ Roof Exterior Panels**

| Skin | Insulation | Panel Nominal Thickness | Wall/Roof Panel Material | Wall/Roof Panel Thickness | Wall/Roof Panel Type | UUT | MFR |
|---|---|---|---|---|---|---|---|
| Outer | Interstitial Foam | 2" | Galv CS | 22 ga | Solid | 1, 2, 3, 4, 5 | Trane |

**Table 3b: Enclosure Construction, Wall/ Roof Interior Panels**

| Skin | Insulation | Panel Nominal Thickness | Wall/Roof Panel Material | Wall/Roof Panel Thickness | Wall/Roof Panel Type | UUT | MFR |
|---|---|---|---|---|---|---|---|
| Inner | Interstitial Foam | 2" | Galv CS | 22 ga | Solid | 1, 5 | Trane |
| Inner | Interstitial Foam | 2" | Galv CS | 22 ga | Perforated | 3 | |
| Inner | Interstitial Foam | 2" | Stainless Steel | 22 ga | Solid | 2 | |
| Inner | Interstitial Foam | 2" | Stainless Steel | 22 ga | Perforated | 4 | |

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**Certified Product Subcomponent Table**

**Table 4a: Hydronic Coils**

| Dimensions | | Width (inches) Single Stack | | | | | UUT | MFR |
|---|---|---|---|---|---|---|---|---|
| | | 27.50 | · · · | 62.50 | · · · | 89.50 | | |
| Height (inches) | 22.50 | X | X | X | X | X | 1 | Trane |
| | · · · | X | X | X | X | X | Interpolated | |
| | 35.00 | X | X | X | X | X | 5 | |
| | · · · | X | X | X | X | X | Interpolated | |
| | 55.00 | X | X | X | X | X | 4 | |

**Table 4b: Hydronic Coil Options**

| Variable | Options | UUT | MFR |
|---|---|---|---|
| Casing Material: | Stainless Steel | 1, 5 | Trane |
| | Galv Steel Casting | 4 | |
| Tube Material: | Copper | 1, 4, 5 | |
| Tube Outer Diameter: | 1/2" | 1, 5 | |
| | 5/8" | 4 | |
| Tube Wall Thickness: | 0.016" | 1, 5 | |
| | · · · | Interpolated | |
| | 0.035" | 4 | |
| Permitted Fin Material: | Aluminum | 1, 5 | |
| | Copper | 4 | |
| Permitted Fin Pitch: | 6 | Extrapolated | |
| | · · · | Extrapolated | |
| | 10 | 5 | |
| | · · · | Interpolated | |
| | 14 | 1, 4 | |
| Permitted Tube Rows: | 1 | Extrapolated | |
| | 2 | 1 | |
| | · · · | Interpolated | |
| | 6 | 5 | |
| | 8 | 4 | |
| Header Type: | Hydronic | 1, 4, 5 | |
| Header Material: | Copper | 1, 4, 5 | |

**Table 4c: Refrigerant Coils**

| Dimensions | | Width (inches) Single Stack | | | UUT | MFR |
|---|---|---|---|---|---|---|
| | | 27.50 | · · · | 89.50 | | |
| Height (inches) | 22.50 | X | X | X | 2 | Trane |
| | · · · | X | X | X | Interpolated | |
| | 55.00 | X | X | X | 3 | |

**Table 4d: Refrigerant Coil Options**

| Variable | Options | UUT | MFR |
|---|---|---|---|
| Casing Material: | Stainless Steel | 2, 3 | Trane |
| Tube Material: | Copper | 2, 3 | |
| Tube Outer Diameter: | 1/2" | 2, 3 | |
| | 5/8" | Extrapolated | |
| Tube Wall Thickness: | 0.016" | 3 | |
| | · · · | Interpolated | |
| | 0.025" | 2 | |
| Permitted Fin Material: | Aluminum | 2, 3 | |
| Permitted Fin Pitch: | 6 | 2 | |
| | · · · | Interpolated | |
| | 14 | 3 | |
| Permitted Tube Rows: | 1 | Extrapolated | |
| | · · · | Extrapolated | |
| | 4 | 2 | |
| | · · · | Interpolated | |
| | 8 | 3 | |
| Header Type: | DX Header | 2 ,3 | |
| Header Material: | Copper | 2, 3 | |

**Table 4e - Steam Coils**

| Dimensions | | Width (inches) Single Stack | UUT | MFR |
|---|---|---|---|---|
| | | 27.50 | | |
| Height (inches) | 22.50 | X | 1, 2 | Trane |

**Table 4f - Steam Coil Options**

| Variable | Options | UUT | MFR |
|---|---|---|---|
| Casing Material: | Stainless Steel | 2 | Trane |
| | Galv Steel Casting | 1 | |
| Tube Material: | Copper | 1, 2 | |
| Tube Outer Diameter: | 1" | 1, 2 | |
| Tube Wall Thickness: | 0.031" | 1, 2 | |
| Permitted Fin Material: | Aluminum | 1 | |
| | Copper | 2 | |
| Permitted Fin Pitch: | 6 | 1 | |
| | · · · | Interpolated | |
| | 11 | 2 | |
| Permitted Tube Rows: | 1 | 1, 2 | |
| Header Type: | Steam | 1, 2 | |
| Header Material: | Ductile Iron Casting | 1, 2 | |

**Table 5: Variable Frequency Drives**

| Model | Power Rating [hp] | Voltage Rating | | Max Weight [lbs] | UUT | MFR |
|---|---|---|---|---|---|---|
| | | 208 VAC | 460 VAC | | | |
| TR150 | 1.5 | X | X | 123 | 2 | Danfoss |
| | · · · | X | X | · · · | Interpolated | |
| | 40 | X | X | 325 | 4 | |
| TR200 | 1 | X | X | 123 | 1 | Danfoss |
| | · · · | X | X | · · · | Interpolated | |
| | 7.5 | X | X | 136 | 5 | |
| | · · · | X | X | · · · | Interpolated | |
| | 40 | X | X | 325 | 4 | |

**Table 6: Motor Starters**

| Model | Power Rating [hp] | Voltage Rating | | Max Weight [lbs] | UUT | MFR |
|---|---|---|---|---|---|---|
| | | 208 VAC | 460 VAC | | | |
| X13180863050 | 1 | X | X | 65 | 1 | Benshaw |
| X13180863· · · | · · · | X | X | · · · | Interpolated | |
| X13180863400 | 40 | X | X | 97 | 3 | |

**Table 7: Full System Controllers**

| Model | UUT | MFR |
|---|---|---|
| MP580 | 1, 3 | Trane |
| UC600 | 2, 4 | |

**Table 8: Plenum Fan, Direct Drive, Horizontal Shaft, Aluminum Wheel**

| Dimensions | | Power Rating | | | | | | Voltage Rating (All Dual Rated) | | UUT | MFR | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Motor HP | 0.75 | · · · | 1.5 | · · · | 20 | | | | | |
| | | Weight | 24 | · · · | 96 | · · · | 481 | 208 VAC | 460 VAC | | Fan | Motor |
| Blade Diameter | Single AF | 10.5" | X | X | X | X | X | X | X | 2 | Lau | Baldor |
| | | · · · | X | X | X | X | X | X | X | Interpolated | | |
| | | 24.5" | X | X | X | X | X | X | X | Interpolated | | |
| | Double AF | 20" | X | X | X | X | X | X | X | Interpolated | | |
| | | · · · | X | X | X | X | X | X | X | Interpolated | | |
| | | 24.5" | X | X | X | X | X | X | X | 3 | | |

**Table 9: Plenum Fan, Belt Drive, Horizontal Shaft, Galv CS Wheel**

| Dimensions | | Power Rating | | | | | | | Voltage Rating (All Dual Rated) | | UUT | MFR | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Motor HP | 0.75 | · · · | 1 | 5 | · · · | 40 | | | | | |
| | | Weight | 24 | · · · | 56 | 185 | · · · | 578 | 208 VAC | 460 VAC | | Fan | Motor |
| Blade Diameter | Single BC | 10" | X | X | X | X | X | X | X | X | 1 | Comefri | AOSmith |
| | | 11" | X | X | X | X | X | X | X | X | Extrapolated | Comefri | Baldor |
| | Single AF | 12" | X | X | X | X | X | X | X | X | Extrapolated | | |
| | | 18" | X | X | X | X | X | X | X | X | 5 | | |
| | | · · · | X | X | X | X | X | X | X | X | Interpolated | | |
| | | 32" | X | X | X | X | X | X | X | X | 4 | | |

UUT5 has a Single FC type blade. Plenum Fans and Housed Fans have similar structural configurations. Motor mounting configuration is the same for both fans.

**Table 10: Housed Fan, Belt Drive, Horizontal Shaft, Galv Carbon & Corten Steel Wheel**

| Dimensions | | Power Rating | | | | | | | | Voltage Rating (All Dual Rated) | | UUT | MFR | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Motor HP | 0.75 | · · · | 1 | · · · | 5 | · · · | 40 | | | | | |
| | | Weight | 24 | · · · | 56 | · · · | 185 | · · · | 578 | 208 VAC | 460 VAC | | Fan | Motor |
| Blade Diameter | Single FC | 9-4" | X | X | X | X | X | X | X | X | X | 1 | Comefri | AOSmith |
| | | 9-6" | X | X | X | X | X | X | X | X | X | Extrapolated | Comefri | Baldor |
| | | 9" | X | X | X | X | X | X | X | X | X | Extrapolated | | |
| | | 10" | X | X | X | X | X | X | X | X | X | Extrapolated | | |
| | | · · · | X | X | X | X | X | X | X | X | X | Extrapolated | | |
| | | 18" | X | X | X | X | X | X | X | X | X | 5 | | |
| | | · · · | X | X | X | X | X | X | X | X | X | Interpolated | | |
| | | 25" | X | X | X | X | X | X | X | X | X | Interpolated | | |
| | Single BC | 9" | X | X | X | X | X | X | X | X | X | Interpolated | | |
| | | 10" | X | X | X | X | X | X | X | X | X | Interpolated | | |
| | Single AF | 12" | X | X | X | X | X | X | X | X | X | Interpolated | | |
| | | · · · | X | X | X | X | X | X | X | X | X | Interpolated | | |
| | | 25" | X | X | X | X | X | X | X | X | X | 3 | | |

UUT's 1 & 5 were tested with Galv CS, UUT3 was tested with Corten Steel

**Table 11: Parallel Blade Dampers**

| Dimensions | | Width (inches) | | | | | | | | | UUT | MFR | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 13.25 | · · · | 16.25 | · · · | 55.5 | · · · | 66.25 | · · · | 71 | | Damper | Actuator |
| Height (in.) | 13.97 | X | X | X | X | X | X | X | X | X | Extrapolated | Ruskin CD60 Series | Belimo AF Series |
| | · · · | X | X | X | X | X | X | X | X | X | Extrapolated | | |
| | 17 | X | X | X | X | X | X | X | X | X | 1, 2, 5 | | |
| | · · · | X | X | X | X | X | X | X | X | X | Interpolated | | |
| | 23.5 | X | X | X | X | X | X | X | X | X | 3 | | |
| | · · · | X | X | X | X | X | X | X | X | X | Interpolated | | |
| | 28.5 | X | X | X | X | X | X | X | X | X | 3, 4 | | |

Dimensions are of nominal component size
All dampers are galvanized CS
UUT1 uses 35 in*lb Belimo actuator, UUT3 , 4, and 5 use 133 in*lb Belimo actuators (all 24VAC)

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**Table 12: Traq Dampers**

| Dimensions | | Diameter (inches) | | | UUT | MFR | |
|---|---|---|---|---|---|---|---|
| | | 13.00 | · · · | 24.00 | | Damper | Actuator |
| Unit Size | 003 | X | X | X | 2 | Trane Traq Series | Belimo AF Series |
| | · · · | X | X | X | Interpolated | | |
| | 030 | X | X | X | 4 | | |

All dampers are galvanized CS
All actuators are 24VAC
UUT 2 & 4 use 133 in*lb Belimo actuators

**Table 13: General Purpose Transformer**

| Model | Power | Voltage | | Phase | Frequency | UUT | MFG |
|---|---|---|---|---|---|---|---|
| | | Input | Output | | | | |
| | KVA | VAC | VAC | | Hz | | |
| 3S1F | 3 | 240 or 480 | 120 or 240 | 1 | 60 | 1, 4 | Square D |

**Table 14: TCACS Filter (Catalytic)**

| Dimensions | | Length (inches) | | | Voltage | Phase | Frequency | UUT | MFR |
|---|---|---|---|---|---|---|---|---|---|
| | | 21.00 | · · · | 62.00 | VAC | | Hz | | |
| Height (inches) | 12.00 | X | X | X | 120 | 1 | 60 | 4 | Genesis Air |
| | · · · | X | X | X | | | | Interpolated | |
| | 20.00 | 1, 4 | X | X | | | | 1, 4 | |
| | · · · | X | X | X | | | | Extrapolated | |
| | 24.00 | X | X | X | | | | Extrapolated | |

UUT 1 used (1) 20"H x 21"L TCACS
UUT 4 used (1) 12"H x 21"L, (1) 12"H x 62"L, (2) 20"H x 21"L, (2) 20"H x 62"L TCACS
All constructed with Galv Carbon Steel (18GA)

**Table 15: UV Lights**

| Model | Voltage | Phase | Frequency | UUT | MFG |
|---|---|---|---|---|---|
| | VAC | | Hz | | |
| Standard UV Light | 120 | 1 | 60 | 1, 4 | Ultraviolet Devices |

Frame made from Galvanized CS

**Table 16: Filter Rack**

| Filter Rack Type | | | | Size | | | | | UUT | MFG |
|---|---|---|---|---|---|---|---|---|---|---|
| Load Access | Angle Type | | Holds Filter Type | 003 | · · · | 012 | · · · | 030 | | |
| Side Loading | Flat | | 2" | X | X | X | X | X | 2, 5 | Qualex |
| | | | 4" | X | X | X | X | X | Interpolated | |
| | | | CMDS 2"/ 4" Combo | X | X | X | X | X | 4 | |
| | | | Bag/ Cartridge (BC) | X | X | X | X | X | 1, 2 | |
| | Angled | | 2" | X | X | X | X | X | 1 | |
| | | | 4" | X | X | X | X | X | 3 | |
| Front Loading | Flat | | 2" | X | X | X | X | X | 1 | |
| | | | 4" | X | X | X | X | X | Interpolated | |
| | | | Bag (B) | X | X | X | X | X | 2 | |
| | | | Catridge (C) | X | X | X | X | X | 3 | |
| | | | HEPA | X | X | X | X | X | 4 | |

All filters racks are made from Galvanized CS

**Table 17: Filter Media**

| Filter Media Type | | | | Size | | | | | UUT | UUT |
|---|---|---|---|---|---|---|---|---|---|---|
| Filter Size | Filter Type | | MERV Rating | 003 | · · · | 012 | · · · | 030 | | |
| 2" | Permanent | | 2 | X | X | X | X | X | 1, 2 | Airguard Industries |
| | Throwaway | | 5 | X | X | X | X | X | 2, 4 | |
| | Pleated | Coated | 7 | X | X | X | X | X | Interpolated | |
| | | Regular | 8 | X | X | X | X | X | 1, 4, 5 | |
| 4" | Pleated | Coated | 7 | X | X | X | X | X | 3 | |
| | | Regular | 8 | X | X | X | X | X | 2, 3, 4 | |
| | High Efficiency | 65% | 11 | X | X | X | X | X | 3 | |
| | | 85% | 12 | X | X | X | X | X | Interpolated | |
| | | 95% | 14 | X | X | X | X | X | 4 | |
| 12" | Cartridge | 65% | 11 | X | X | X | X | X | 3 | |
| | | 85% | 12 | X | X | X | X | X | Interpolated | |
| | | 95% | 14 | X | X | X | X | X | 1 | |
| 18" | Short Bag | 65% | 12 | X | X | X | X | X | 2 | |
| | | 85% | 13 | X | X | X | X | X | Interpolated | |
| | | 95% | 14 | X | X | X | X | X | Interpolated | |
| 30" | Long Bag | 65% | 12 | X | X | X | X | X | Interpolated | |
| | | 85% | 13 | X | X | X | X | X | 1 | |
| | | 95% | 14 | X | X | X | X | X | 1 | |
| - | HEPA | 99.97% | 17 | X | X | X | X | X | 4 | |

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**Table 18: Inlets/ Outlet Openings**

| Dimensions | | Height (inches) | | | | | | | | | UUT | MFR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 7 | · · · | 19 | · · · | 25 | · · · | 41 | · · · | 49 | | |
| Width (inches) | 10 | 1 | X | X | X | X | X | X | X | X | 1 | Trane |
| | · · · | X | X | X | X | X | X | X | X | X | Interpolated | |
| | 22 | X | X | 5 | X | X | X | X | X | X | 5 | |
| | · · · | X | X | X | X | X | X | X | X | X | Interpolated | |
| | 28 | X | X | X | X | 2 | X | X | X | X | 2 | |
| | · · · | X | X | X | X | X | X | X | X | X | Interpolated | |
| | 30 | X | X | X | X | X | X | 3 | X | 3 | 3 | |

**Table 19: Access Doors**

| Dimensions | | Height (inches) | | | | | | | UUT | MFR |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 22 | · · · | 35 | · · · | 52 | · · · | 55 | | |
| Width (in.) | 10 | 1, 2 | X | 5 | X | X | X | 4 | 1, 2, 4, 5 | Trane |
| | · · · | X | X | X | X | X | X | X | Interpolated | |
| | 14 | 1, 2 | X | X | X | X | X | X | 1, 2 | |
| | 15 | X | X | X | X | X | X | 4 | 4 | |
| | · · · | X | X | X | X | X | X | X | Interpolated | |
| | 17 | X | X | 5 | X | X | X | X | 5 | |
| | 18 | X | X | X | X | 3, 4 | X | X | 3, 4 | |
| | 19 | X | X | 5 | X | X | X | 3 | 3, 5 | |
| | 20 | 1, 2 | X | X | X | X | X | 4 | 1,2, 4 | |
| | · · · | X | X | X | X | X | X | X | Interpolated | |
| | 22 | X | X | X | X | X | X | 4 | 4 | |
| | · · · | X | X | X | X | X | X | X | Interpolated | |
| | 27 | X | X | X | X | X | X | 3 | 3 | |
| | · · · | X | X | X | X | X | X | X | Interpolated | |
| | 29 | 1, 2 | X | X | X | X | X | X | 1, 2 | |
| | · · · | X | X | X | X | X | X | X | Interpolated | |
| | 31 | X | X | X | X | X | X | 3 | 3 | |

All access doors are 2" thick double wall construction

**Table 20: Miscellaneous Components**

| Component | Availablity | UUT | MFG |
|---|---|---|---|
| Humidifier | All Sizes | 2 | Armstrong Humidipak |
| Air Blender | All Sizes | 1 | Trane |
| Diffuser | All Sizes | 3 | Trane |
| Silencer | All Sizes | 2 | Trane |
| Attenuation Panel (Perforated) | All Sizes | 3 | Trane |
| Marine Lights | All Sizes | 1, 2, 3, 4 | Trane |
| Light Switch and Receptical | All Sizes | 2, 4 | Trane |

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## UUT #1

***Manufacturer:*** *Ingersoll Rand - Trane*

***Model Series:*** *CSAA Size 003 (Performance Climate Changer)*

***Series Construction Summary:***

| Enclosure Construction | Base Construction | Modules | Installation Method |
|---|---|---|---|
| Outer Panel - Galv CS 22ga Solid Panel<br>Inner Panel - Galv CS 22ga Solid Panel<br>Insulation - Interstitial Foam<br>Panel Thickness - 2" Nominal | Assembled (Bolted)<br>14ga Galv CS<br>Base Height 2.5" | Mixing Box Section<br>Filter Section<br>Coil Section<br>Fan Section<br>UV Light Section<br>Blender Section | Suspended<br>Isolated<br>86-3/8" Max Rod Spacing<br>5/8" Dia. Typical Rod |

***Configuration Summary:***

| Hydronic Coil (CW/HW Water Coils) | Steam Coil (NFS Coils) | Plenum Fan Belt Drive | Housed Fan Belt Drive | Motor Starter | VFD | Controller |
|---|---|---|---|---|---|---|
| Trane SST Casing<br>Alum Fin 14 fpi<br>2 Row Copper Tube<br>1/2" dia 0.016 wall<br>Hydronic Header | Trane Galv Steel Casing<br>Alum Fin 6 fpi<br>1 Row Copper Tube<br>1" dia 0.031 wall<br>Steam Header | Comefri<br>10" BC Single Fan<br>1HP, 208VAC<br>AOSmith Motor<br>Galv CS Wheel | Comefri<br>9-4" FC Single Fan<br>1HP, 208VAC<br>AOSmith Motor<br>Galv CS Wheel | Benshaw<br>1HP, 208VAC<br>X13180863050 | Danfoss<br>1HP, 208VAC<br>TR200 | Trane<br>MP580 |

| Filter Racks | Filter Media | UV Light Array | Modular Transformer | Dampers | Damper Actuators | TCACS | Other Sections |
|---|---|---|---|---|---|---|---|
| Bag/Cartridge Flat Side Load<br>2" Angled Side Load<br>2" Flat Front Load | 2" Permanent<br>2" Pleated<br>12" Cartridge<br>30" Long Bag | UV Devices, Inc.<br>120VAC, 0.5A | Square D<br>480/120VAC,<br>3KVA<br>Model 3S1F | Ruskin<br>CD 60 Series<br>Galv CS Blades<br>16.25"W x 17"H | Belimo<br>AF 24-MFT Series<br>24VAC,<br>35 in.lb. | Genesis Air<br>Size 003,<br>120VAC | Blender<br>Mixing Box |

***Component Summary:***

| Item | Dimensions | | | | Lowest Natural Frequency | | |
|---|---|---|---|---|---|---|---|
| | Length (in) | Width (in) | Height (in) | Weight (lb) | F-B (Hz) | S-S (Hz) | V (Hz) |
| CSAA Size 003 Enclosure Corner | 275.0 | 32.0 | 29.0 | 2,090 | N/A | N/A | N/A |
| | | | | 34.2 psf | | | |

***Seismic Test Parameters:***

| Qualifiaction Method | Sds | z/h | Ip | Aflx-H | Arig-H | Aflx-V | Arig-V |
|---|---|---|---|---|---|---|---|
| ICC-ES AC156 (2012) | 1.850 | 1.0 | 1.5 | 2.96 | 2.22 | 1.23 | 0.49 |

***Pre/Post Shake Functionality Test Results:***

| | |
|---|---|
| Pre: | Functional Pass |
| Post: | All units were full of contents and maintained structural integrity and functional compliance. |

***Representative Photo:***

***UUT Mounting Description:***

| | | |
|---|---|---|
| UUT to Trapeze | Bottom Base Clip | (32) 1/2" Grade 8 Bolts |
| | Top Roof Connection | (55) 1/4-20 Screws |
| Seismic Restraint and Isolation System | | VMC HRS Hangers and SB-250 Cable Kits |

## UUT #2

***Manufacturer:*** *Ingersoll Rand - Trane*

***Model Series:*** *CSAA Size 003 (Performance Climate Changer)*

***Series Construction Summary:***

| Enclosure Construction | Base Construction | Modules | Installation Method |
|---|---|---|---|
| Outer Panel - Galv CS 22ga Solid Panel<br>Inner Panel - Stainless Steel 22ga Solid Panel<br>Insulation - Interstitial Foam<br>Panel Thickness - 2" Nominal | Assembled (Bolted)<br>14ga Galv CS<br>Base Height 2.5" | Mixing Box Section<br>Filter Section<br>Coil Section, Fan Section<br>Control Section<br>Humidifier Section<br>Silencer Section | Suspended<br>Isolated<br>91-1/8" Max Rod Spacing<br>5/8" Dia. Typical Rod |

***Configuration Summary:***

| Refrigerant Coil (DX Coils) | Steam Coil (NFS Coils) | Plenum Fan Direct Drive | Variable Frequency Drive | Dampers | | Damper Actuators |
|---|---|---|---|---|---|---|
| Trane SST Casing<br>Alum Fin 6 fpi<br>4 Row Copper Tube<br>1/2" dia 0.025 wall DX Header | Trane SST Casing<br>Copper Fin 11 fpi<br>1 Row Copper Tube<br>1" dia 0.031 wall<br>Steam Header | Lau<br>10.5" AF Single Fan<br>1.5HP, 208VAC<br>Baldor Motor<br>Alum Wheel | Danfoss<br>1.5HP, 208VAC<br>TR150 Series | Trane<br>Traq Series<br>Galv CS<br>Blades<br>13" Diameter | Ruskin<br>CD 60 Series<br>Galv CS<br>Blades<br>16.25"W x 17"H | Belimo<br>AF 24-MFT Series<br>24VAC,<br>35 in.lb. |
| Filter Racks | Filter Media | Other Sections | Controller | | | |
| 2" Flat Side Load<br>Bag/Cartridge Flat Side Load<br>Bag Flat Front Load | 2" Permanent<br>2" Throwaway<br>4" Pleated<br>18" Short Bag | Silencer<br>Humidifier<br>Mixing Box | Trane<br>UC600 | | | |

***Component Summary:***

| Item | Dimensions | | | | Lowest Natural Frequency | | |
|---|---|---|---|---|---|---|---|
| | Length (in) | Width (in) | Height (in) | Weight (lb) | F-B (Hz) | S-S (Hz) | V (Hz) |
| CSAA Size 003 Enclosure Corner | 230.0 | 32.0 | 29.0 | 1,680 | N/A | N/A | N/A |
| | | | | 32.9 psf | | | |

***Seismic Test Parameters:***

| Qualifiaction Method | Sds | z/h | Ip | Aflx-H | Arig-H | Aflx-V | Arig-V |
|---|---|---|---|---|---|---|---|
| ICC-ES AC156 (2012) | 1.850 | 1.0 | 1.5 | 2.96 | 2.22 | 1.23 | 0.49 |

***Pre/Post Shake Functionality Test Results:***

| | |
|---|---|
| Pre: | Functional Pass |
| Post: | All units were full of contents and maintained structural integrity and functional compliance. |

***Representative Photo:***

***UUT Mounting Description:***

| | | |
|---|---|---|
| UUT to Trapeze | Bottom Base Clip | (24) 1/2" Grade 8 Bolts |
| | Top Roof Connection | (44) 1/4-20 Screws |
| Seismic Restraint and Isolation System | | VMC HRS Hangers and SB-250 Cable Kits |

## UUT #3

***Manufacturer:*** *Ingersoll Rand - Trane*

***Model Series:*** *CSAA Size 030 (Performance Climate Changer)*

***Series Construction Summary:***

| Enclosure Construction | Base Construction | Modules | Installation Method |
|---|---|---|---|
| Outer Panel - Galv CS 22ga Solid Panel<br>Inner Panel - Galv CS 22ga Perforated Panel<br>Insulation - Interstitial Foam<br>Panel Thickness - 2" Nominal | Assembled (Bolted)<br>14ga Galv CS<br>Base Height 2.5" | Mixing Box Section<br>Filter Section<br>Coil Section, Fan Section<br>Access or Blank Section<br>Diffuser Section<br>Discharge Plenum Section | Suspended<br>Isolated<br>84" Max Rod Spacing<br>3/4" Dia. Typical Rod |

***Configuration Summary:***

| Refrigerant Coil (DX Coils) | Plenum Fan Direct Drive | Housed Fan Belt Drive | Motor Starter | Controller | Dampers | |
|---|---|---|---|---|---|---|
| Trane<br>SST Casing<br>Alum Fin 14 fpi<br>8 Row Copper Tube<br>1/2" dia 0.016 wall<br>DX Header | Lau<br>24.5" AF Double Fan<br>20HP, 460VAC<br>Baldor Motor<br>Alum Wheels | Comefri<br>25" AF Single Fan<br>40HP, 460VAC<br>Baldor Motor<br>Corten Steel Wheel | Benshaw<br>40HP,<br>460VAC<br>X1318086340<br>0 | Trane<br>MP580 | Ruskin<br>CD 60 Series<br>Galv CS Blades<br>66.25"W x 23.5"H | Ruskin<br>CD 60 Series<br>Galv CS Blades<br>71"W x 28.5"H |

| Filter Racks | Filter Media | Other Sections | Damper Actuators | |
|---|---|---|---|---|
| 4" Angled Side Load<br>Cartridge Flat Front Load | 4" Coated Pleated<br>4" Pleated<br>4" High Efficiency<br>12" Cartridge | Diffuser<br>Mixing Box<br>Discharge Plenum | Belimo<br>AF 24-MFT Series<br>24VAC,<br>133 in.lb. | |

***Component Summary:***

| Item | Dimensions | | | | Lowest Natural Frequency | | |
|---|---|---|---|---|---|---|---|
| | Length (in) | Width (in) | Height (in) | Weight (lb) | F-B (Hz) | S-S (Hz) | V (Hz) |
| CSAA Size 030 Enclosure Corner | 272.0 | 94.0 | 61.5 | 6,560 | N/A | N/A | N/A |
| | | | | 36.9 psf | | | |

***Seismic Test Parameters:***

| Qualifiaction Method | Sds | z/h | Ip | Aflx-H | Arig-H | Aflx-V | Arig-V |
|---|---|---|---|---|---|---|---|
| ICC-ES AC156 (2012) | 1.850 | 1.0 | 1.5 | 2.96 | 2.22 | 1.23 | 0.49 |

***Pre/Post Shake Functionality Test Results:***

| | |
|---|---|
| Pre: | Functional Pass |
| Post: | All units were full of contents and maintained structural integrity and functional compliance. |

***Representative Photo:***

***UUT Mounting Description:***

| | | |
|---|---|---|
| UUT to Trapeze | Bottom Base Clip | (32) 1/2" Grade 8 Bolts |
| | Top Roof Connection | (25) 5/8" Grade 8 Bolts |
| Seismic Restraint and Isolation System | | VMC HRS Hangers and SB-250 Cable Kits |

## UUT #4

***Manufacturer:*** *Ingersoll Rand - Trane*

***Model Series:*** *CSAA Size 030 (Performance Climate Changer)*

***Series Construction Summary:***

| Enclosure Construction | Base Construction | Modules | Installation Method |
|---|---|---|---|
| Outer Panel - Galv CS 22ga Solid Panel<br>Inner Panel - Stainless Steel 22ga Perforated Panel<br>Insulation - Interstitial Foam<br>Panel Thickness - 2" Nominal | Assembled (Bolted)<br>14ga Galv CS<br>Base Height 2.5" | Mixing Box Section<br>Filter Section<br>Coil Section<br>Fan Section<br>Control Section<br>UV Light Section | Suspended<br>Isolated<br>79-1/8" Max Rod Spacing<br>3/4" Dia. Typical Rod |

***Configuration Summary:***

| Hydronic Coil (CW/HW Water Coils) | Plenum Fan Belt Drive | Variable Frequency Drive | | Dampers | | Damper Actuators |
|---|---|---|---|---|---|---|
| Trane Galv Steel Casing<br>Copper Fin 14 fpi<br>8 Row Copper Tube<br>5/8" dia 0.035 wall<br>Hydronic Header | Comefri<br>32" AF Single Fan<br>40HP 480VAC<br>Baldor Motor<br>Galv CS Wheel | Danfoss<br>40HP,<br>460VAC<br>TR200 Series | Danfoss<br>40HP,<br>460VAC<br>TR150 Series | Trane<br>Traq Series<br>Galv CS Blades<br>24" Diameter | Ruskin<br>CD 60 Series<br>Galv CS Blades<br>71"W x 28.5"H | Belimo<br>AF 24-MFT Series<br>24VAC,<br>133 in.lb. |
| **Filter Racks** | **Filter Media** | **Controller** | **UV Array** | **TCACS** | **Modular Transformer** | **Other Sections** |
| 2"/4" Combo Flat Side Load<br>HEPA Flat Front Load | 2" Throwaway<br>2" Pleated<br>4" Pleated<br>4" High Efficiency, HEPA | Trane<br>UC600 | UV Devices, Inc.<br>120VAC, 0.5A | Genesis Air<br>Size 030, 120VAC<br>Assorted Ballest Sizes | Square D<br>480/120VAC, 3KVA<br>Model 3S1F | Mixing Box |

***Component Summary:***

| Item | Dimensions | | | | Lowest Natural Frequency | | |
|---|---|---|---|---|---|---|---|
| | Length (in) | Width (in) | Height (in) | Weight (lb) | F-B (Hz) | S-S (Hz) | V (Hz) |
| CSAA Size 030 Enclosure Corner | 279.0 | 94.0 | 61.5 | 7,410 | N/A | N/A | N/A |
| | | | | 40.7 psf | | | |

***Seismic Test Parameters:***

| Qualifiaction Method | Sds | z/h | Ip | Aflx-H | Arig-H | Aflx-V | Arig-V |
|---|---|---|---|---|---|---|---|
| ICC-ES AC156 (2012) | 1.850 | 1.0 | 1.5 | 2.96 | 2.22 | 1.23 | 0.49 |

***Pre/Post Shake Functionality Test Results:***

| | |
|---|---|
| Pre: | Functional Pass |
| Post: | All units were full of contents and maintained structural integrity and functional compliance. |

***Representative Photo:***

***UUT Mounting Description:***

| | | |
|---|---|---|
| UUT to Trapeze | Bottom Base Clip | (40) 1/2" Grade 8 Bolts |
| | Top Roof Connection | (30) 5/8" Grade 8 Bolts |
| Seismic Restraint and Isolation System | | VMC HRS Hangers and SB-250 Cable Kits |

## UUT #5

***Manufacturer:*** *Ingersoll Rand - Trane*

***Model Series:*** *CSAA Size 012 (Performance Climate Changer)*

***Series Construction Summary:***

| Enclosure Construction | Base Construction | Modules | Installation Method |
|---|---|---|---|
| Outer Panel - Galv CS 22ga Solid Panel<br>Inner Panel - Galv CS 22ga Solid Panel<br>Insulation - Interstitial Foam<br>Panel Thickness - 2" Nominal | Assembled (Bolted)<br>14ga Galv CS<br>Base Height 2.5" | Mixing Box Section<br>Filter Section<br>Coil Section<br>Fan Section | Suspended<br>Isolated<br>126" Max Rod Spacing<br>5/8" Dia Rod |

***Configuration Summary:***

| Hydronic Coil (CW/HW Water Coils) | Housed Fan Belt Drive | Variable Frequency Drive | Dampers | Damper Actuators | |
|---|---|---|---|---|---|
| Trane SST Casing<br>Alum Fin 10 fpi<br>6 Row Copper Tube<br>1/2" dia 0.016 wall<br>Hydronic Header | Comefri<br>18" FC Single Fan<br>7.5HP, 460VAC<br>AOSmith Motor<br>Galv CS Wheel | Danfoss<br>7.5HP, 460VAC<br>TR200 Series | Ruskin<br>CD 60 Series<br>Galv CS Blades<br>55.5"W x 17"H | Belimo<br>AF 24-MFT Series<br>24VAC,<br>133 in.lb. | |
| Filter Racks | Filter Media | Other Sections | | | |
| 2" Flat Side Load | 2" Pleated | Mixing Box | | | |

***Component Summary:***

| Item | Dimensions | | | | Lowest Natural Frequency | | |
|---|---|---|---|---|---|---|---|
| | Length (in) | Width (in) | Height (in) | Weight (lb) | F-B (Hz) | S-S (Hz) | V (Hz) |
| CSAA Size 030 Enclosure Corner | 106.5 | 66.5 | 41.5 | 1,860 | N/A | N/A | N/A |
| | | | | 37.8 psf | | | |

***Seismic Test Parameters:***

| Qualifiaction Method | Sds | z/h | Ip | Aflx-H | Arig-H | Aflx-V | Arig-V |
|---|---|---|---|---|---|---|---|
| ICC-ES AC156 (2012) | 2.00 | 1.0 | 1.5 | 2.96 | 2.22 | 1.23 | 0.49 |

***Pre/Post Shake Functionality Test Results:***

| | |
|---|---|
| Pre: | Functional Pass |
| Post: | All units were full of contents and maintained structural integrity and functional compliance. |

***Representative Photo:***


***UUT Mounting Description:***

| | | |
|---|---|---|
| UUT to Trapeze | Bottom Base Clip | (8) 5/8" A-307 Threaded Rod |
| | Top Roof Connection | (8) 5/8" A-307 Threaded Rod |
| Seismic Restraint and Isolation System | | VMC HRS Hangers and SB-250 Cable Kits |