ROBINS & MORTON

SUBMITTAL COVER SHEET

Project: Westover Hills Baptist Hospital (R&M Job #2270)
Date: 1/13/23
Submittal #: 237313 - 2.1
Submittal Title: Modular Central-Station Air Handling Units - PD (Outdoor AHU) REV 1
Subcontractor/Manufacture: Gowan-Garrett

PROJECT TEAM

Owner: Tenet Healthcare

Construction Team:
Robins & Morton

Design Team:

Architect:	Earl Swensson Associates
Civil:	Pape Dawson
Structural:	Structural Design Group
MEPF & LV:	SSR

SUBMITTAL ITEMS

1. AHU 1-3
2. AHU 1-4
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.

STAMPS

THESE DRAWINGS OR BROCHURES HAVE BEEN REVIEWED FOR GENERAL COMPLIANCE WITH CONTRACT DOCUMENTS AND CHECKED FOR COMPLETENESS AND FIELD DIMENSIONS.

THIS REVIEW DOES NOT RELIEVE THE SUBCONTRACTOR OR VENDOR OF RESPONSIBILITY FOR COMPLIANCE WITH CONTRACT DOCUMENTS.

- ☐ No Exceptions Taken
- ☑ Make Corrections Noted
- ☐ Revise and Resubmit
- ☐ Rejected

ROBINS & MORTON

DATE	REVIEWED BY
1/13/23	Andrew Anders

01/13/23: Attached revisions to the initial AHU submittal (submitted 01/06) was received from Steve T. (Gowan-Garrett) on 01/13/23 with the following comments:

"Spec compliance has been added and sound data has been added."

SSR

Review is for general compliance with the design concept of the project and, unless expressly noted otherwise, does not supersede the requirements of the plans, specifications, and other contract documents.

- ☑ NO EXCEPTIONS TAKEN
- ☐ MAKE CORRECTIONS NOTED
- ☐ RESUBMIT REQUESTED INFORMATION
- ☐ AMEND AND RESUBMIT
- ☐ REJECTED
- ☐ RECEIVED FOR RECORD ONLY

Reviewed By: jprice
Date Received: 1/17/2023
Date Reviewed: 1/26/2023

ROBINS & MORTON

SUBMITTAL COVER SHEET

STAMPS (cont.)

SUBMITTAL DATA

WESTOVER HILLS BAPTIST HOSPITAL

SAN ANTONIO, TEXAS

SUBMITTAL # 23 73 13-2
CUSTOM AIR HANDLING UNITS

OWNER	TENET HEALTHCARE CORPORATION 14201 DALLAS PARKWAY DALLAS, TEXAS 75254 469-893-2000
ARCHITECT	EARL SWENSSON ASSOCIATES, INC. 1033 DEMONBRUEN ST. # 800 NASHVILLE, TN 37203 615-329-9445
MEP ENGINEER	SMITH SECKMAN REID, INC. 3700 WEST SAM HOUSTON PKWY S. STE 200 HOUSTON, TEXAS 77042 713-784-8211
GENERAL CONTRACTOR	ROBINS & MORTON. 9601 McALLISTER FREEWAY, SUITE 221 SAN ANTONIO, TEXAS 78216 210-874-4330
MECHANICAL CONTRACTOR	GOWAN GARRETT INC. 424 MARINO RD. BRYAN, TEXAS 77808 979-778-3279

GOWAN - GARRETT
7205 S. WW White Rd.
San Antonio, Texas 78222
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WESTOVER HILLS BAPTIST HOSPITAL

SAN ANTONIO, TEXAS

SUBMITTAL DATA NO. 23 73 13-2

ITEM	MANUFACTURER	SPEC NO.	DRWG. NO.
MODULAR CENTRAL STATION AIR HANLDING UNITS		23 73 13	
CUSTOM AIR HANDLING UNITS AHU-1-3, AHU-1-4	TRANE		M0.03

NOTE

GARRETT MECHANICAL, INC.

Has reviewed only as to general design and requirements of the contract documents of this project. Subcontractor/Vendor to verify dimensions, quantities and field conditions for proper and complete installation of this work. Approval does not relieve subcontractors or supplier from responsibility for errors, omissions or deviations from the contract documents.

By: SKT Date: 01/13/2023

GMI SUBMITTAL NO: 237313-2

SECTION 23 73 13
MODULAR CENTRAL-STATION AIR HANDLING UNITS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Refer to drawings for additional required components and configuration of air handling unit(s).

1.02 RELATED REQUIREMENTS

A. Section 23 05 00- Common Work Results for HVAC

B. Section 23 05 13- Common Motor Requirements for HVAC Equipment

C. Section 23 05 48- Vibration Isolation

D. Section 23 05 93- Testing, Adjusting and Balancing for HVAC

E. Section 23 09 13- Instrumentation and Control Devices

F. Section 23 21 13- HVAC Piping

G. Section 23 31 13- Sheetmetal Ductwork

H. Section 23 33 00- Air Duct Accessories

I. Section 23 41 00- Particulate Air Filtration

J. Section 23 44 13- Ultraviolet Fixtures

K. Section 26 29 23 -Variable Frequency Motor Controllers.

1.03 REGULATORY REQUIREMENTS

C A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.04 REFERENCE STANDARDS

A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings; American Bearing Manufacturers Association, Inc.; 1990 (Reapproved 2008).

B. ABMA STD 11 - Load Ratings and Fatigue Life for Roller Bearings; American Bearing Manufacturers Association, Inc.; 2014.

C C. AHRI 260 - Sound Rating of Ducted Air Moving and Conditioning Equipment; 2011.

D. AHRI 410 - Standard for Forced-Circulation Air-Cooling and Air-Heating Coils; Air-Conditioning, Heating, and Refrigeration Institute; 2001 (R2011).

E. AHRI 430 - Standard for Central-Station Air-Handling Units; Air-Conditioning, Heating, and Refrigeration Institute; 2009.

F. ANSI/AHRI Standard 1350 - Mechanical Performance Rating of Central Station Air-Handling Unit Casings; 2014 edition.

G. ANSI/ASHRAE Standard 111-2008; Measurement, Testing, Adjusting and Balancing of Building HVAC Systems

H. ASHRAE Std 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings; 2013, Including All Addenda (ANSI/ASHRAE/IES Std 90.1).

I. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2011.

J. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

K. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2012.

L. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Current edition, including all revisions.

M. UL 795 - Commercial-Industrial Gas Heating Equipment; Current Edition, Including All Revisions.

1.05 SUBMITTALS

A. Submit Product Data in accordance with the requirements of Division 01, including but not limited to:

D A1. unit lengths and weights are less than scheduled values in some instances do to removal of air blenders and humidifiers

1. Project specific data: dimensions, weights, capacities, ratings, compliance with scheduled information.
2. Unit construction: casing materials, finishes, compliance with leakage and deflection requirements.
3. Section access doors and lights, coil pull and filter access.
4. Performance data for equipment provided by other manufacturers and installed within the air handling unit: filters, air cleaning devices, humidifiers, energy recovery/transfer/desiccant equipment.
5. Fan curves to include entire range of RPM curves, scheduled operating point clearly plotted, motor brake horsepower, and motor horsepower. For fan arrays noted to have N + 1 fans, provide fan operating points at both conditions: rated capacity with all fans running, rated capacity with one fan down.

C 2 ~10

6. Sound power level data: Fan outlet, inlet and casing radiation at rated capacity.
7. Electrical power supply wiring including wiring diagrams for interlock and control wiring, clearly indicating factory-installed and field-installed wiring.
8. Variable Frequency Drive product rating data for each fan motor or fan array. Comply with specification 26 29 23.
9. Locations and service requirements for electrical power connections for fans and internal unit wiring.

1.06 B. B. Casing performance - Casing air leakage shall not exceed leak class 6 (CL = 6) per ASHRAE 111 at specified casing pressure, where maximum casing leakage (cfm/100 ft2 of casing surface area) = CL X P0.65. Unit casing (wall/floor/roof panels and doors) shall be able to withstand up to 1.5 times design static pressure, or 8-inch w.g., whichever is less, and shall not exceed 0.0042 per inch of panel span (L/240).

10. Electrical service FLA for the power connection to each fan or fan array. Electrical service to fan connections at motor, drive or fan array motor terminal block will be based on FLA noted in latest review of submittal; changes required in electrical service at field installation due to differences in service connection requirements for equipment on site will be the responsibility of the manufacturer.

B. Indicate location of factory installed or field mounted control devices.

1.06 QUALITY ASSURANCE

C A. Certify unit components in accordance with AHRI Standard 430 as applicable.

D B. Certify casing leakage and deflection with AHRI Standard 1350.

C C. Certify coils in accordance with AHRI Standard 410. Substantiate performance by AHRI computer generated output.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Accept products on site in factory-fabricated protective containers, with factory-installed shipping skids and lifting lugs. Inspect for damage and notify manufacturer if damage is noticed.

B. Follow manufacturer's instructions for handling and storage.

C. Store in clean dry place and protect from weather, moisture infiltration, dust/dirt accumulation and construction traffic.

D. Do not operate units until ductwork has been cleaned, all scheduled/specified filters are in place, bearings lubricated, and fans have been test run under observation.

1.08 WARRANTY 1.08 A. Units Warranty is 12months from startup or 18 months from shipment

C A. The equipment manufacturer shall warrant parts and workmanship for one year from the date of substantial completion, or 18 months from equipment shipment.

C B. During this warranty period, the manufacturer will provide replacement parts as required to return the unit to operation.

C C. Warranty covers all parts except consumable items (belts, filters, fuses) for the warranty period.

D. Contractor shall provide all labor and parts necessary during the warranty period.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

C A. Haakon, Nortek Air (Temtrol and Ventrol), Pace, JCI/York (Solution and Custom), Trane (Performance and Custom)

B. Substitutions: Refer to Division 01.

2.02 GENERAL

A. Fabricate air handling units suitable for the scheduled air pressure operation.

B. Fabricate units with sections per the configurations shown on the mechanical plans and schedules.

C. Factory fabricate and test air handling units of sizes, capacities, and configuration as indicated and specified. Units shall be fully assembled on base rail up to practical shipping limitations. On units not shipped fully assembled, manufacturer shall tag each section to indicate location in direction of airflow to facilitate assembly at the job site.

D. The vendor and Contractor shall closely coordinate section splits and dimensions to accommodate the constraints involved with getting equipment into and out of mechanical rooms, areaways, building corridors, and interior/exterior doors to the building.

2.03 CASING

A. Unit shall be double wall constructed in all sections.

1. Exterior wall shall be galvanized steel.

2. Interior wall shall be solid galvanized steel. All portions of the interior of the unit exposed to the airstream shall be covered to allow cleaning and prevent fiberglass erosion into the airstream. Foil facing on insulation shall not be acceptable as a substitute for double wall construction.

3. Construction shall contain thermal breaks between all interior and exterior steel surfaces.

4. Insulation: Completely fill all panel cavities in all directions preventing voids and settling. Comply with NFPA 90A. Insulate all sections of air handling unit with injected foam as indicated below:

   a. Indoor units: 2" thick, R-13

   b. Outdoor units: 3" thick, R-20

B. For outdoor units:

1. Roof shall slope min 1/8” per foot to one or both sides.

2. All exposed surfaces shall have enamel coating passing 500 hour salt spray test ASTM B-117. Color shall be selected by

3. Roof curb shall extend under full width and length of unit. Coordinate height of curb and mounting of unit to curb with drawings. Exterior surface of curb shall have weatherproof coating.

4. Hoods for outside air intake or relief air shall be galvanized steel with enamel coating to match unit.

2.03 B 4. Weather hoods match unit exterior, embossed Al.

5. Sidewall louver frames and blades shall be aluminum with mill finish if furnished with hoods or galvanized steel with enamel coating to match unit if hoods are not furnished. Blades shall collect and drain water to sill. Size intake louvers for water penetration of 0.01 oz or less per sq ft of free area at 1250 fpm.

2.03 B 5 Weather hoods only furnished per quote. Louvers excluded in proposal

6. Drains from interior drain pans shall exit side of unit above base rail for connection to roof drain or extend inside curb plenum to floor below as shown on drawings.

2.03 B 6. Standard base drain pan piping to AHU exterior is thru the perimeter base rail.

C. Units with welds on exterior surfaces or welds that have burned through from interior welds shall also receive a final shop coat of zinc-rich protective paint in manufacturer's standard color.

2.03 B 6 C. Aluminum casing construction.

2.03 H. Assumes this section is not referring to internally mounted VFD's

2.03 I. Units supplied without walking grates in discharge/intake plenum

2.03 J. Dial Thermometer not supplied with unit. Thermometer is in ductwork so provided by others

D. Casing deflection shall meet or exceed AHRI 1350 Class D2 of 0.0042 in/in of span at 8" w.c. static pressure differential, positive or negative. Provide certification confirming casing construction meets requirement.

E. Unit casing shall meet or exceed any of the following requirements:

1. Leakage Class 6 (23 cfm/sf panel area at 8” positive and negative pressure) as based on the SMACNA test method and calculated as noted in ASHRAE Std 111 and AHRI 1350.

2. 1% of supply air volume

3. Provide certification confirming casing construction meets these requirements.

F. Floors shall support 300 lb load during maintenance activities.

G. Units shall be supported on support base rails running full length of unit.

H. Units shall have internally mounted motor and drives. Where belt drive fans are used, unit shall include a totally enclosed belt guard over drive components. Belt guard shall be provided with tachometer holes to facilitate RPM readings of the fan.

I. Bottom Inlet/Outlet Units: Provide galvanized steel or aluminum walking grate on structural supports. Provide raised supports for grate if smoke dampers are to be provided under grate; allow for space to install and service damper operator from unit plenum.

J. Install a dial type thermometer in either the discharge section of the air handling unit or in the supply ductwork immediately downstream of the air handling unit. Refer to the drawings for additional thermometer locations and information.

2.04 MIXING SECTION

A. Provide a functional section to support the damper assembly for modulating the volume of outdoor, return and relief (if applicable) air as shown on the drawings.

B. Damper Blades:

1. Provide galvanized steel airfoil design blades, compressible jamb seals and extruded-vinyl blade-edge seals on all blades.

2. Self-lubricating stainless steel or synthetic sleeve bearings.

3. Comply with ASHRAE 90.1 for rated maximum leakage rate of 3 cfm/sf at 1 in.w.c.

4. Base all leakage testing and pressure ratings on AMCA 500-D.

5. Arrange in parallel or opposed blade configuration.

2.05 COILS

A. Coils shall be manufactured by the same company as the supplier of the air handling unit and factory installed in the air handling units.

B. Coils shall be designed with aluminum plate fins and seamless copper tubes.

2.05 E. For stacked coils internal stacking rack not an available option from factory

2.05H 4. PT plugs cannot be installed on headers. Assumed installation in field by piping installer

C. Fins shall have collars drawn, belled and firmly bonded to the tubes by means of mechanical expansion of the tubes. No soldering or tinning shall be used in the bonding process. Coils shall be mounted in the unit casing to be accessible for service and can be removed from the unit either through the side or top.

D. Capacities, pressure drops and selection procedure shall be certified in accordance with AHRI Standard 410.

E. For stacked coils, the lower coil must be removable from the unit without removing the upper coil(s). Provide an internal stacking rack for the coil section if removable lower coils are not an available unit option.

F. All coils shall be enclosed in an insulated coil section. Coil headers and U-bends shall not be exposed.

G. Coils shall be proof tested to 300 psig and leak tested to 200 psig air pressure under water.

H. Hydronic Heating and Cooling Coils

1. Water flow shall be counter to air flow.
2. Headers shall be round copper pipe or red brass.
3. Tubes shall be 1/2" OD, min .016” wall thickness, or 5/8" OD, min .020” wall thickness.
4. Headers shall have PT plug connections on inlet and outlet connections.
5. Piping connections shall be extended out the side of the unit and capped.
6. Provide stainless steel supports, fasteners and end plate blankoffs.
7. Provide factory installed extended drain and vent connections for water coils.
8. Hydronic coils shall have copper or red brass coil connectors to match pipe specified connection material. For coil connections 2-1/2 " and larger provide black steel connections to match pipe specification. Where dissimilar pipe materials are used, provide dielectric pipe transition unions or flanges.

2.05 H 8. Heating Coils with 1.5" NPT supplied with black iron connections to reduce lead time

2.06 DRAIN PANS

A. Drain pans shall be insulated, double wall, stainless steel drain pan complying with ASHRAE 62.1 for indoor air quality and sufficiently sized to collect all condensate.

B. Provide cooling coil section with drain pan that extends under the entire width of the coil module and extends a minimum of 24 inches beyond the leaving face of the coil.

C. Provide humidifier section with drain pan that extends under the entire width and full length of the humidifier section.

D. Provide drain pan under the complete supply fan section for draw-thru configuration units.

E. Where two or more cooling coils are stacked vertically, provide intermediate condensate drip pans under coils above bottom coil. Intermediate pans shall extend a minimum of 6 inches in the

2.06 B Drainpan size not a selectable item from from the factory. Standard drainpan size to be supplied

2.07 B. Motor support structure not supplied with powder coating

downstream direction of the airflow. Each intermediate drain pan shall be piped to within 2 inches of the bottom drain pan.

C F. Slope in two planes to promote positive drainage. Locate outlet of sufficient diameter at lowest point of pan to prevent standing water under normal operating conditions.

C G. Provide separate, threaded drain connections constructed of drain pan material for each drain pan, extended sufficient distance beyond the base to accommodate field installed, condensate drain trapping.

H. Drain connection shall be exit casing above base rail.

2.07 FAN SECTION – FAN ARRAY

C A. Provide a complete fan array consisting of multiple, matching, direct driven, plenum fans with fan wheels that are rated and certified with tests and procedures in accordance with AMCA publication 211 and comply with the requirements of the AMCA Certified Ratings Program. All fans shall be selected to deliver the specified airflow quantity at the specified total static pressure and specified fan/motor speed with the loss of a single fan/motor. The fan-wall array shall be selected to operate at a system total static pressure that does not exceed 90% of the specified fan's peak static pressure producing capability at the specified fan/motor speed.

D B. Each fan/motor subsection shall include a galvanized steel enclosure with sound absorbing liner, fan inlet cone, and steel motor support plate rail and structure. The fan intake wall, inlet cone, and motor support structure shall be powder coated for corrosion resistance.

D → Fans to be rigid mount.

C. Each fan/motor assembly shall be isolated with rubber-in-shear isolators.

D → Transmitter per array supplied. Transmitter per fan not currently available from factory

D. Each fan shall have a Piezo ring for flow measurement.

C E. The fan array shall be spaced in the airway tunnel cross section to provide a uniform airflow and velocity profile across the entire airway tunnel cross section and components contained immediately upstream and downstream. The fan array shall not exceed the specified maximum coil and filter bank face velocity when measured at a point 12" from the intake side of the array and 48" from the discharge side of the array.

Side panels can be disassembled to allow for removal of fan assembly Access doors are sized appropriately for fan motor removal

D F. Each fan/motor assembly shall be removable through a 30" wide access door located on the each side the AHU fan section.

D G. Provide a structural beam at the ceiling of the fan section sized for the weight of each fan/motor/base sections to facilitate removal.

Beam for fan removal not currently offered by factory

C H. Provide a backdraft damper on each fan to prevent re-circulation through disabled fans and motors with near zero net system effect. Maximum pressure to open the damper fully shall not exceed 0.15" w.c.

D I. Provide one complete spare fan/motor assembly for each size of assembly provided on the project for emergency replacement.

Excluded on proposal

J. Motors

C 1. Motors shall be approved for use in a fan-wall array arrangement by the motor manufacturer. Motors shall be NEMA B.

C 2. Motors shall be rated for Variable Frequency Drive duty.

C 3. Refer to Section 23 05 13 for additional motor requirements.

C 4. All interior wiring serving motors shall be in conduit.

2.08 ACCESS SECTIONS

C A. Access sections shall be supplied as specified herein and between unit sections as shown on Drawings. All access doors shall be provided on the same side of the unit for each access section unless noted otherwise. Doors shall be full height, thermally broken and double wall constructed equal to unit casing as specified above with a minimum access section length of 19 inches unless noted otherwise. Doors shall contain a continuous gasket on all sides and include minimum 8" square reinforced safety glass viewing windows.

C B. Provide latching handles on access doors designed to seal door gasket against frame and operable from both the interior and exterior of the unit. Doors shall be hinged and swing open against pressure unless noted otherwise.

C C. On units over 7 feet tall, ganged/interlocked access door latches may be used.

2.09 PROVISION OF SECTIONS FOR EQUIPMENT BY OTHERS

A. Coordinate space required for equipment by others to be installed in unit. Obtain air path length, air velocity and access space required by manufacturer and incorporate into unit design/fabrication.

B. Incorporate following equipment provided by others:

1. Filters

2. Humidifiers

3. Air to Air Plate Heat Exchanger

4. Desiccant Dehumidifier Wheel

5. Ultraviolet Light for airborne pathogen control

C. See applicable related specification sections for specific equipment requirements.

2.10 ACCESSORIES

C A. Marine Lights: Provide factory mounted, water and dust resistant fluorescent or LED marine observation lights in all access, intake, discharge, and fan sections. Marine lights shall be prewired in conduit to a single timer switch located on the exterior of the module adjacent to the access door. Switches shall be factory mounted complete with outlet box for wiring connection by Division 26 and switch face plate. One switch shall control all lights within the unit.

B. Ultraviolet Lights for cooling coil cleanliness:

C 1. Provide UV lights to shine on wetted side of cooling coil.

C 2. Lamps shall generate UVc, 254 nm wavelength. Minimum intensity at any point on the coil face shall be 100 microwatts/square cm.

C 3. Lamps shall not produce ozone.

C 4. Provide access door interlock safety switch to disconnect power to light fixture if door is open.

2.11 ELECTRICAL

C A. Wire and test unit at factory before shipment. Comply with NEC requirements and conform with applicable U.L. or ETL Standards. Number code wiring per electrical wiring diagrams. Label electrical components according to electrical diagram.

C B. Provide 120 volt control circuit transformer and 120 volt convenience receptacle located on the access door side of the unit near the light switch.

C C. Route all wiring in rigid conduit or EMT and fasten to unit interior wall. Final connections to motors may be used with a maximum of 12” flexible metal conduit.

C D. Provide main control panel in an enclosed housing with a dead front cover over the main power circuit controls. Provide terminal blocks for main power connections and low voltage control wiring as required. Coordinate size of terminal blocks for power connection of fans or fan arrays with FLA of the fan or fan array. Electrical power service to the fans will be sized on FLA of fans or fan array as noted in latest reviewed submittal; field changes in electrical service due to changes in terminal block sizing will be the responsibility of the manufacturer.

C E. Provide disconnect switch to disable power before control panel door can be opened.

PART 3 - EXECUTION

Assumed this is in reference to motor overload panel

Comply **3.01 INSTALLATION**

A. Rigidly install A/C unit modules and base rails on a concrete curb of sufficient height to install properly sized condensate drain and to allow gravity steam condensate flow from the preheat coil to the condensate pump.

B. For units requiring shipping splits, align and seal unit modules per manufacturer's instructions to prevent leakage.

C. Provide clearance at each unit for routine service including the changing of filters, removal of coils, bearing greasing, opening of access doors, pulling of blower shaft, and removal of motors.

D. Ductwork: Duct connectors to each unit to allow for straight and smooth air flow. Do not install turns at the fan discharge which are in the opposite direction to fan wheel rotation.

E. Provide flexible connections at all duct connections to unit.

F. Piping:

1. Support piping independently of coils and with adequate flexibility to prevent undue stress at coil header connections.

2. Install full size drain lines from the drain pan connection and include trap to permit condensate to drain freely. Route drain piping to nearest floor drain and turn down. Provide minimum 1" air gap between the drain piping and floor drain cover to allow drain cover to be removed.

3. Install service valves on both supply and return lines to coils and install so valves can be shut off, a small section of pipe removed, and coil allowed to slide out.

Comply **3.02 START-UP, TESTING, TRAINING**

A. Start-up unit, check for proper performance, motor rotation, air leakage, or infiltration, etc.

B. Prepare unit for test and balance as required under Section 23 05 93.

C. Correct deficiencies found by test and balance firm.

D. Demonstrate and instruct maintenance personnel in the operation of the system.

E. Provide start-up paperwork in installation and operation manuals.

Comply **3.03 AIR MOVING EQUIPMENT OPERATION DURING CONSTRUCTION**

A. The use of air handling units, fans, or other permanent air moving equipment during construction is prohibited unless approved by the owner. If approved for use during construction, the following procedures shall be followed:

1. The contractor shall protect the interior of all ductwork, air handling units, and other equipment from the accumulation of dirt and dust and other contaminants. If the permanent equipment cannot be adequately protected, temporary air moving/ conditioning equipment and distribution systems shall be utilized as required for finishing trades.

2. Provide temporary filters on all return and exhaust air grilles, open ductwork, and transfer openings in the work area.

3. The contractor shall remove all filters used during construction and replace them with new filters prior to test and balance work and prior to substantial completion.

4. If the ductwork and/or equipment is found to be contaminated at any point during construction, an independent NADCA certified contractor shall be retained to clean the ductwork and/or equipment at the contractor's expense.

5. System operating temperatures shall be maintained to avoid condensation on ductwork and equipment surfaces. New or existing insulation found damaged shall be replaced.

B. Coordinate use of air handling equipment with ICRA plan, if applicable. Maintain required pressure relationships in construction areas adjacent to occupied areas.

END OF SECTION 23 73 13

SECTION 23 41 00
PARTICULATE AIR FILTRATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Pleated Filters

B. Cartridge Filters

C. Housing and Frames

D. Filter Pressure Gauges

1.02 RELATED REQUIREMENTS

A. Section 23 05 00 - Common Work Results for HVAC.

B. Section 23 73 13 - Modular Central-Station Air-Handling Units.

1.03 REFERENCE STANDARDS

A. ASHRAE 52.2; 2012: Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.

B. ASHRAE 52.1; 1992: Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter.

C. NFPA 90A: Standard for the Installation of Air-Conditioning and Ventilating Systems.

D. UL 586: Standard for High-Efficiency, Particulate Air Filter Units.

E. UL 867: Electrostatic Air Cleaners

F. UL 900: Standard for Air Filter Units.

G. ISO 9001-2000: Certified manufacturing facility

1.04 SUBMITTALS

A. Submit manufacturer's product data for review in accordance with the requirements of Division 01.

B. Submit evidence of manufacturing facility certification with ISO 9001-2000.

1.05 QUALITY ASSURANCE

A. MERV Ratings: Minimum Efficiency Reporting Value of MERV when evaluated under the guidelines of ASHRAE Standard 52.2; 2012.

B. Average atmospheric dust spot and arrestance: Average dust spot efficiency of and a minimum arrestance based evaluation ASHRAE Standard 52.1; 1992.

C. Performance: Media to maintain or increase in efficiency over the life of the filter.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Airguard, American Air Filter (AAF), Camfil, or Flanders/Precisionaire.

2.02 PLEATED PANEL FILTERS

A. Scheduled as AAF Perfect Pleat HC M8 - MERV 8.

B. Construction

1. Media: Cotton and synthetic blend, lofted to a uniform depth of 0.18", and formed into a uniform radial pleats. There shall be at least 15 pleats per linear foot for 2" deep filters.

2. Support: Welded wire grid, spot-welded on one-inch centers, treated for corrosion resistance, bonded to the downstream side of the media to maintain the radial pleat and prevent media oscillation.

3. Frame: Minimum 28-point high wet-strength beverage board. Bond frame to media to prevent air bypass. Include integral diagonal support members on the air entering and air existing side to maintain uniform pleat spacing in varying airflow.

4. Filter shall be rated by Underwriters Laboratories as UL Class 900.

C. Performance

1. The filter shall have a Minimum Efficiency Reporting Value of MERV 8 and MERV-A of 8 when evaluated under the guidelines of ASHRAE Standard 52.2-2012 must include -B with appendix J. Minimum arrestance of 92% The media shall maintain or increase in efficiency over the life of the filter.

2. Initial resistance to airflow: Not to exceed 0.25" w.g. at airflow velocity of 500 feet/minute on 2" deep model.

2.03 CARTRIDGE TYPE FILTERS

A. Scheduled as AAF Varicel RF - MERV 14.

1. Construction

a. Media: Microfine glass laminated to a reinforcing backing to form a uniform lofted media blanket.

b. Blanket: Form into uniform tapered radial pleats and bonded to a stiffened backing that is bonded to the downstream side of the media to preclude media oscillation.

c. Bonding: Mechanically and chemically bond media within the frame to prevent air bypass.

d. Frame: Constructed of corrosion resistant galvanized steel. Media support contour stabilizers shall be mechanically fastened to diagonal support members of the same construction shall create a rigid and durable filter enclosure. There shall be a minimum of four contour stabilizers on the air entering side and four on the air exiting side.

e. Filter shall be rated by Underwriters Laboratories as UL Class 900.

C

2. Performance

a. Performance: The filter media shall have an average efficiency of MERV 14 by ASHRAE 52.2-2012-B with Appendix J. It shall have an average arrestance of not less than 98%, 99 or 100 in accordance with that standard. The dust holding capacity shall not be less than 142 grams on the same standard.

b. Initial resistance to airflow: Not to exceed 0.53" wg at airflow velocity of 500 feet/minute.

c. Maximum pressure withstand rating: 10" w.g. without failure of the media pack.

B. Scheduled as AAF BioCel VXL - MERV 16.

1. Construction

a. Filter media shall be of a special grade of microfine glass fibers. No charged or synthetic media shall be used.

b. Media packs shall be assembled into a v-bank configuration. Computer-optimized pleat to height ratio shall create a radial air exiting and entering design. The filter outlet shall be radial in shape with a maximum of 60% open area and the inlet shall be 30% larger than any other V-bank style filter to maintain low-pressure drop and uniform airflow.

c. The media packs shall be completely sealed and bonded to the inside periphery of a polystyrene enclosing frame with a polyurethane sealant. . The enclosing frame shall include top and bottom molded tracks as an integral part of the frame to ensure a proper seal.

d. Media packs shall be recessed at least 1” from the headered side of the enclosing frame to allow uniform airflow when a prefilter is mounted directly to the enclosing frame. The header shall include a gasket on the vertical side to create a filter-to-filter seal in side-access housing applications.

e. Filter shall be rated by Underwriters Laboratories as UL Class 900.

2. Performance

a. Performance: The filter media shall have an average efficiency of MERV 16 by ASHRAE 52.2-2012-B with Appendix J. It shall have an average arrestance of not less than 98%, 99 or 100 in accordance with that standard. The dust holding capacity shall not be less than 230 grams on the same standard.

b. Initial resistance to airflow: Not to exceed 0.60" wg at airflow velocity of 500 feet/minute.

c. Maximum pressure withstand rating: 10" w.g. without failure of the media pack.

2.04 CARTRIDGE TYPE, HEPA FILTER

NA

A. Scheduled as AAF Astrocel I - HCX.

B. Construction

NA

1. Media: Continuous pleating of micro fine glass fiber media. Pleats shall be uniformly separated by corrugated aluminum separators incorporating a hemmed edge to prevent damage to the media.

2. Media pack: Potted into the enclosing frame with a fire-retardant urethane sealant.

3. Frame: 16-gauge steel, with a zinc aluminum alloy finish, and shall be bonded to the media pack to form a rugged and durable enclosure. The filter shall be assembled without the use of fasteners to ensure no frame penetrations. Overall dimensional tolerance shall be correct within -1/8", +0", and square within 1/8"

4. Gasket: Include a poured-in-place seamless sealing gasket on the downstream side of the enclosing frame to form a positive seal upon installation.

5. Filter shall be rated by Underwriters Laboratories as UL Class 900.

C. Performance

1. Efficiency: Minimum tested efficiency of 99.97% when evaluated according to IEST Recommended Practice RP-CC001.

2. Initial resistance to airflow: Not exceed 1.4" w.g. at airflow velocity of 500 feet/minute.

3. Maximum pressure withstand rating: 10" w.g. without failure of the media pack.

4. Supporting Data: Label filters as to tested efficiency, rated/tested cfm, pressure drop and shall be serialized for identification. Each filter must be individually tested, no batch testing will be allowed.

2.05 HOUSING AND FRAMES FOR HEPA FILTERS

A. General

1. Side-access absolute filter housing shall be constructed of 14-guage 304 stainless steel and shall include removeable dual access doors, challenge injection port, door gasketing and swing bolt filter retainers. An appropriate number of swing bolts to match air filters shall also be included.

2. Front loading individual filter frames, sized appropriately for air flow with no spaces between filter frame and unit construction with sealing methods noted below.

B. Construction

1. Absolute filter housing: All-welded construction of 14-guage galvanized steel (304 SST); reinforced with channel bracing to withstand 8.0" w.g. positive or negative pressure.

2. Standing flanges: Provide to mate housing to other housings or ductwork.

3. Housing shall be weatherproof without modification.

4. Doors: Pin-hinged removable access doors for service from either side of the housing. Doors shall include high-memory door gasketing to prevent leaks to ± 8.0" w.g.

5. Filter securing swing bolt assemblies: Same construction as the housing, and with equip-bearing filter clamps, to secure filters into the housing. There shall be a minimum of four assemblies per filter unit.

6. Housing shall include integral challenge injection port for introduction of filter evaluation challenge.

7. Housings shall include a filter track for application of a nominal 2" deep prefilter.

8. Housing shall include knife-edge gel seal opening for sealing to filter frame. Filters edge seal method shall be coordinated with housing.

C. Performance

1. The sealing assembly shall be capable of sealing each element with 30 inch/lbs. of torque to 50% filter gasket compression. The sealing assembly shall create a scan capable filter to housing seal.

NA **2.06 CONTAINMENT SYSTEMS (BAG IN/BAG OUT FILTER HOUSING)**

A. Acceptable Manufacturers: AAF International, Camfil, Flanders

B. Housing Seal Type:

1. Gasket Seal

2. Gel Seal with knife edge

C. Construction:

1. Housing: 14 gage 304 Stainless Steel, fully welded, side or front access as required.

2. Standard 24" x 24" x 11-1/2" HEPA filter frames, each compartment.

3. Prefilter compartment and door for 2" filter.

4. Separate individual door for each filter component.

5. Designed to withstand +/- 10" w.g. and factory tested to +10" w.g. in accordance with ANSI/ASME N509 and N510.

6. Upstream filter seal.

7. Pressure ports both upstream and downstream.

8. Pressure gauges; magnehelic for indoor or outdoor mounting.

9. External predrilled flanges for duct connection.

10. Doors to have high performance extruded neoprene gasket seal with star knob hand wheels.

11. Each filter module shall have a clamping mechanism, cam-operated with one hand lever with a 6" length so it can be handled through the bag. Door shall not be able to close unless filters are properly set and sealed.

12. Bag: 8 mil thick PVC changeout bag, non sticking, matt finish with elastic nitrile O-ring or stretch cord hemmed into the opening of the bag to fit securely around the two continuous bag ring flanges. Three gloved openings shall be built into the bag to facilitate filter handling. Bag and components shall be such that all changeout operations ensure the bag is between service technician and filter at all times. Bags shall be independently tested to prove operability at temperature ranges of 0 degrees F to 130 degrees F.

D. Filters: Provide HEPA filters and prefilters as scheduled on drawings.

E. Clearances: A minimum of 4 feet clearance in front of filter access door shall be provided to facilitate filter charging.

2.07 FILTER PRESSURE GAUGES

C A. Acceptable manufacturers: Dwyer Instruments, H.O. Trerice, or Weiss Instruments.

C B. Magnehelic: Direct reading 3-1/2 inch (90 mm) diameter diaphragm actuated dial in metal case, vent valves, black figures on white background, front recalibration adjustment, +/-3% full-scale accuracy. Range shall start at zero and have a maximum of 0.25" to 1.0" w.c. above the scheduled final resistance. Mark scheduled clean and dirty resistance on face of dial. If two filter beds are installed in tandem, provide magnehelic across each filter bed.

C C. Provide filter pressure gauges as specified in addition to BAS differential pressure sensor across each filter bank.

PART 3 - EXECUTION

Comply **3.01 INSTALLATION**

A. Provide filters in locations as shown on drawings. Provide quantity and sizes to comply with scheduled performance.

B. Upon completion of ductwork and fan system, clean systems as required in Section 23 05 00 - Common Work Results for HVAC and install specified filter media prior to placing system in operation.

C. All filters shall be installed prior to operating the HVAC system. Provide a complete change in filter media as required during construction and prior to the HVAC test and balance process. If equipment and/or ductwork is found to be contaminated at any point during construction, an independent NADCA certified contractor shall be retained to clean the ductwork and/or equipment at the contractors expense.

D. Install filters in accordance with manufacturer's published installation instructions. Provide manufacturer's recommended media change data to maintenance personnel.

E. Install filters in frames or apparatus casing so as to be leak free. Verify with light test from both sides.

F. Install and level filter gauges outside air stream for each bank of filters.

G. Protect cooling and/or heating coils with temporary media during construction.

H. Deliver one complete change of media to the maintenance personnel at Substantial Completion. Store spare media in a clean and dry place adjacent to equipment served or as coordinated with the Owner.

I. Provide insulation as required on filter housing to prevent condensation.

J. Insulate and make leak-proof filter access doors.

END OF SECTION 23 41 00

SECTION 23 44 13
ULTRAVIOLET FIXTURES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Ultraviolet Fixtures for air handling units

1.02 RELATED REQUIREMENTS

A. Section 23 05 93 - Testing, Adjusting, and Balancing for HVAC

B. Section 23 09 23 - Direct Digital Control System

C. Section 23 31 13 - Sheetmetal Ductwork

D. Section 23 73 13 - Modular Indoor Central-Station Air Handling Units

E. Division 26: Electrical

1.03 REFERENCE STANDARDS

A. NFPA 90A: Standard for the Installation of Air-Conditioning and Ventilating Systems.

B. UL Standard 1598- Luminaries

C. UL Standard 1995, 5th Edition - Heating and Cooling Equipment

D. NFPA 70 - National Electrical Code

1.04 SUBMITTALS

A. Submit product data for review in accordance with the requirements of Division 01 including lamp performance, lamp frame and spacing, spacing calculations for coil coverage, certification of UL listing, wiring diagrams, and installation and operating instructions.

B. Include UV source manufacturers name and model, maximum lamp rating in watts and voltage and AHU lamps can be installed in safely.

1.05 QUALITY ASSURANCE

A. UL Compliance: Comply with UL Standard 1995 as applicable to usage of UV-C Emitters in HVAC Equipment.

C

1.06 WARRANTY

A. Warrant UV-C fixtures to be free from factory defects for no less than one year from date of project substantial completion. "Green Lamps" shall be warranted for no less than two years (17,000 hours) from date of start-up and ballast shall be warranted for no less than non-pro-rated 5 years.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. American Ultraviolet Company, Sanuvox, Steril-Aire, or UVDI.

B. Substitutions: Refer to Division 01.

2.02 FIXTURES

A. High-Output utility fixtures: Designed specifically for HVAC applications and mounted in arrangements for cooling coil and drain pan irradiation as well as for pass-by air decontamination.

B. UV-C output: As specified herein and guaranteed for continuous destruction of all known molds, bacteria and viruses and shall produce the specified UV-C energy to prevent coil biological fouling and eliminate the need for coil cleaning and drain pan biocides.

C

C. Moisture-Proof design: Use UV-C "Cell" lamp design to incorporate an outer quartz sleeve with protective boot on power end for water-tight sealing.

D. Configuration: Single lamp configuration, sized to provide adequate coverage for air handling unit chilled water coils.

E. Provide fixture disconnect located outside of air handling unit for disconnecting means prior to access door being opened.

F. Fixture construction:

1. Factory assembled and tested prior to shipment.

2. Each assembly consists of housing, reflector, electronic ballast, lamp brackets, water-tight, plug-in power connectors for fixture to fixture connection as well as lamp to fixture connection and high output lamp. No plastic components shall be used. Wiring insulation and connectors shall be UV resistant.

3. Housings shall be constructed of heavy gauge, Type 316, hospital grade stainless steel.

4. Reflectors shall be fabricated from the highest grade polished aluminum lighting sheet material, which has a reflectivity rate of 88% when exposed to short-wave UV-C in the range of 254 nm.

2.03 BALLASTS

A. Solid-state electronic design, Class P rapid start with a 0.95 power factor minimum.

B. Voltage: 120V AC.

C. Designed for maximize photon production in air temperatures of 35 to 175 degrees F.

D. Minimum ballast start temperature of -20 degrees F.

E. RFI/EMI rating: As defined by FCC part 18A for industrial / commercial applications in regards to suppression.

F. Ballasts shall be UL listed.

2.04 UVC LAMPS

A. Rated for a two years (17,000 hours) continuous operational life with no greater than a 20% drop in UV-C output at end of lamp life.

B. Provide UV-C "Green Lamps" with mercury content not greater than 8 mg.

C. Guaranteed to produce no ozone.

C D. Minimum of 11.6 microwatts/cm2 per linear inch of lamp arc length at a distance of one meter as per IES Test Standards. Output shall be independently tested in airstreams of 400 feet per minute velocities at temperatures of 45 degrees F. Successful supplier shall submit independent documentation of specified performance with their submittals.

E. High-output variety, T5 lamp diameter, and shall be constructed from hard quartz tubing for superior UV-C transmittance. Electrodes shall be designed to maximize plasma convection and stability for high output lamp performance.

F. UL listed.

PART 3 - EXECUTION

Comply **3.01 INSTALLATION**

A. Provide factory technician for startup assistance and owner training at the project site to insure proper instructions on correct installation and operation of the UV-C System.

B. Provide factory startup report that UV-C system is installed and functioning in accordance with manufacturer's operating parameters.

C. Comply with manufacturer's installation instructions placement, wiring and testing.

D. Provide an interlock switch on the access to the UV-C Emitters to turn the lights off when the access is opened. Provide disconnect switch on unit exterior to turn off UV-C lamps prior to entering UV-C compartment. Install Caution Labels on all accesses to the fixtures.

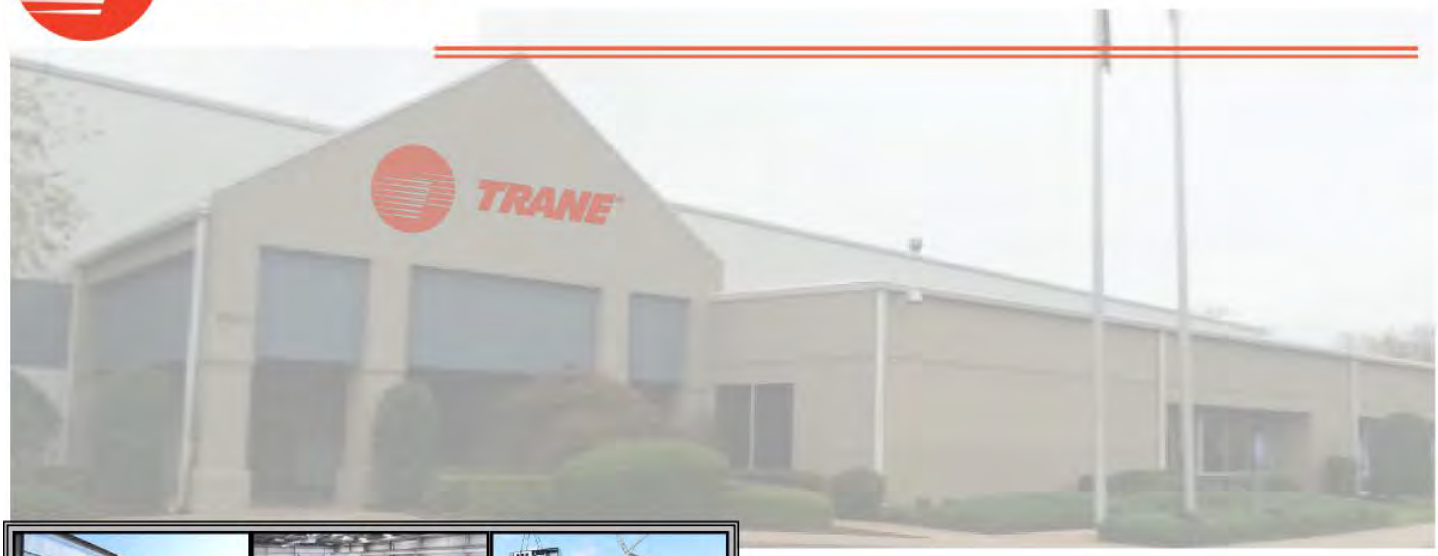
E. Install lamps on factory provided frame of powder coated or galvanized steel against corrosion with lamp spacing determined by factory calculations.

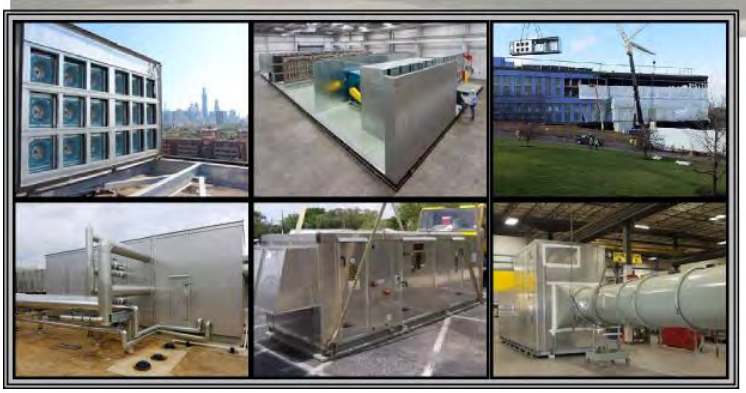
Comply **3.02 TRAINING**

A. Factory technician shall train Owner's Representative's operating personnel in UV-C system operation, maintenance and safety procedures.

END OF SECTION 23 44 13

TRANE® CUSTOM AIR HANDLING UNIT SUBMITTAL





PROJECT:

Westover Hills Baptist Hospital

Original Submittal Date: 01/04/2023

Revision: 0

Current Version Date:

Prepared By: CA, mbp

EQ: 23455

Location: San Antonio, TX

Sales Office: San Antonio, TX

Sales Person: Manny Rodriguez

Equipment Tag(s):

AHU-1-3
AHU-1-4

Submittal approval dates are the basis for determining manufacturing lead times. Manufacturing will not begin and shipping dates will not be issued until approved, stamped submittal drawings are received. Performance, openings and dimensions may vary from contract documents. Return of approved drawings constitutes acceptance of these variances.

Trane 9900 Aire Circle, Fort Smith, AR 72916 Phone: (479) 648-7402 Fax: (479) 648-7499

Westover Hills Baptist Hospital

- Title Sheet
- Clarifications and Exceptions
- Air Handling Unit Data
  - Unit Construction
  - Air Unit Drawings
  - Construction Details
- Fan/Motor Data
  - Fan Schedule
  - Selections
- Cooling Coil Data
  - Cooling Coil Schedule
  - Coil Selections and Drawings
- Heating Coil Data
  - Heating Coil Schedule
  - Coil Selections and Drawings
- Humidifier
  - Manufacturer's Data
- Dampers
  - Damper Schedule
  - Manufacturer's Data
- Blenders
  - Blender Schedule
  - Manufacturer's Data
- Filters
  - Filter Schedule
  - Gauge Information
  - Manufacturer's Data
- UV Irradiators
  - Manufacturer's Data

- Electrical

Trane 9900 Aire Circle, Fort Smith, AR 72916 Phone: (479) 648-7402 Fax: (479) 648-7499

Westover Hills Baptist Hospital

Unit Revision Log:

Date	Description

Unit Clarifications and Exceptions:

Inlet & exhaust weather hoods only provided. Louvers are not included.
Dial type thermometer not included.
Fan intake wall & motor structure constructed from galvanized steel components.
Fans are standard DDP without perforated enclosure and coplanar silencer.
3rd layer perf with fiberglass insulation provided in the supply & return fan section as indicated on drawing
Perforated layer is aluminum.
Spare fan and motor assembly are not provided.
PT plug connections not available in coil header, provided & installed by others in coil supply & return piping.
Vent and drain extended to casing exterior for coils adjacent to casing wall.
Drain pan under supply fan section not included.
Drain pans are integral to the AHU base with penetrations thru the base rail extending 3” for connection by others.
Filters are upstream loading. Side access filters not provided not provided due to size of filter bank.

Not Included:

Condensate drain "P" traps (drain will be stubbed through unit for exterior traps).
Field assembly, field testing, pressure testing, balancing or start-up, field instruction.
Any type of testing.
Damper operators, airflow measuring stations, controls, sensors, control transformers or control wiring.
Rigging or hoisting.
Piping, valves, control valves or accessories. All necessary pipe insulation is furnished and installed by others in the field.
Sales tax, special permits or duties.
Storage or protection of equipment while in storage.
Roof curbs.
Field electrical connections at section joints. Junction box is provided at each joint for field terminations.
Factory programming of a factory mounted unit controller, including factory and field/customer-provided unit controllers.
Travel costs associated with factory visits.

Please confirm handing of doors, handing of coil connections and drains, sizes and locations of all openings, or advise of any changes required.

Due to variability of local codes, it is the responsibility of the customer to verify compliance and identify specific requirements. Any correction necessary after shipment to satisfy local authorities shall be at the expense of the customer.

Job: Westover Hills Baptist Hospital
EQ Number: 23455
Date: Jan 04, 2023
Rev.:

UNIT CONSTRUCTION

BASE FRAME		– Aluminum beam perimeter with removable lifting lugs. – Aluminum structural intermediate supports installed at a maximum of 24” centers. – Aluminum grating provided over openings and dampers mounted in the floor. – Base color to match unit color if unit is painted.
CASING DESIGN		– AHU-1-3 & AHU-1-4 Trane Class “A” thermal break casing is designed & constructed not to exceed AHRI 1350 Class D2 of 0.0042 in/in of span (L/200) at 8" w.c. static pressure differential, positive or negative. – Casing design & construction air leakage not to exceed 1% of design airflow CFM at 8” w.c. static pressure differential, positive or negative.
CABINET	FLOOR	– Surface consists of caulked & stitch-welded 12 ga aluminum. – .050 aluminum bottom liner.
	WALLS (exterior)	– 3” Class “A” thermal break panel construction. – 0.050” Embossed Aluminum solid exterior. – 0.050” smooth aluminum solid interior – Internal tunnel walls (i.e. fan/damper/blender walls) are 3” un-insulated, 0.080” aluminum single wall C-panels. – Additional 2” fiberglass 1.5 PCF density insulation and perforated interior liner is installed over a foam double wall panel in the supply & return fan sections as indicated in drawing – Fire resistant (Fiberglass cloth) installed between the perforated material and the insulation
	ROOF	– 3” Class “A” thermal break panel construction – 0.050” Embossed Aluminum solid exterior. – 0.050” smooth aluminum solid interior – Additional 2” fiberglass 1.5 PCF density insulation and perforated interior liner is installed over a foam double wall panel in the supply & return fan sections as indicated in drawing – Fire resistant (Fiberglass cloth) installed between the perforated material and the insulation – Outdoor construction, roof is sloped for drainage. Minimum 1/4” per foot. – Sloped in one direction as indicated on the drawing. – 0.050 embossed aluminum standing seam outer roof cover
	SAFING	– All safing will be aluminum safing unless otherwise stated. – Cooling/Heating coil safing will be stainless steel – Filter rack safing will be aluminum safing
INSULATION		– 3”-R20 Injected foam installed in walls and roof. Foam is polyurethane foam isocyanate – Insulation in compliance with NFPA90A – 3”-R20 polyurethane foam sprayed onto the underside of the floor liner.
EXTERIOR PAINT		– Unit color will be Trane Slate Grey. – Paint system to meet 500hr salt spray requirements

Trane Custom 9900 Aire Circle, Fort Smith, AR 72916 Phone: (479) 648-7400 Fax: (479) 648-7499

TRANE Custom Air Handlers

Job: Westover Hills Baptist Hospital
EQ Number: 23455
Date: Jan 04, 2023
Rev.:

DRAIN PANS		– 16 ga. stainless steel, double-sloped insulated drain pans with 1-1/2in stainless steel MPT drain. All traps furnished and installed in field by others. – 16 ga. stainless steel intermediate drain pans on units with multiple stacked coils – Intermediate pans drain to the bottom pan via dual 1” PVC downspouts.
ACCESS DOORS	• Door thickness	– 3”
	• Exterior material	– 0.050” embossed Aluminum
	• Interior material	– 0.050 smooth Aluminum
	• Insulation	– 2.25#/ft3 polyurethane foam insulation
	• Handles	– Allegis K2
	• Hinge	– Continuous stainless steel piano Hinge
	• Windows	– 8”x12” Laminated/tempered, Thermal pane
	• Options	– All doors are thermal break – IP-2 test ports installed in each door.
ROOFCURB / base design		– Roof burb provided by other in the field – All outdoor units are designed to sit on a curb. The base structural is notched to prevent the curb from interfering at any section split or pipe chase, corridors etc. when the AHU perimeter framework overhangs the curb. Ensure correct dimensional information is provided to the curb supplier to ensure correct fit up. – Outdoor units designed to sit on a curb will also fit on a pad or dunnage. AHU perimeter structural framework and section split structural beams will sit on top of a pad or dunnage. – All openings in the base will be framed out with a channel height that is 2” smaller than the AHU perimeter channel height. This applies to all units except those with 4” perimeters. These units will have base openings framed out with 4” channel.
HOODS		– Hoods are shipped loose with the unit for field installation. – Hoods are complete with bird screen.
UNIT SUPPORT REQUIREMENTS		– AHU-1-3 & AHU-1-4 will ship in sections. Sections to be assembled at the jobsite. Reference IOM shipped with unit for details. – Unit requires full perimeter support & at each of the shipping split locations. – Installation co-ordination and AHU mounting details need to be made available to AHU manufacturer for review to ensure no interference issues occur at the jobsite. Installation contractor is responsible for providing these details to the AHU manufacturer. Contractor to work with local Trane office and AHU manufacturer.
FILTER GAGES		– Filter gages are surface mounted to the AHU casing. A combination of aluminum tubing and black poly tubing is used to pipe to the high/low port of the filter gage to either side of the filter frames.
COIL RACKS		– Cooling coil racks are stainless steel – Heating coil racks are stainless steel – Coils are removed through removable access plugs.

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TRANE Custom Air Handlers

Job: Westover Hills Baptist Hospital
EQ Number: 23455
Date: Jan 04, 2023
Rev.:

PIPE CONNECTIONS	– For units with staggered coil banks the supply and return connections of the coil closest to the wall will be extended through the casing wall but the supply and return connections and the vent and drain on the inside coil bank will be left inside the unit for piping by others. – All humidifier piping is by others. – Humidifier traps, valves, strainers, all shipped loose for field installation by others. – Pipe penetrations are sealed with Rubber grommets & sheet metal collars rings. – Pipe extension material is Sch. 40 blk pipe – Vent and drain material is Sch. 40 blk pipe – All pipe insulation is by other.
SHIP LOOSE	– 1 sets of pre-filters provided – 1 sets of final-filters provided – All Filters will be provided by the factory, boxed and shipped inside the AHU sections. Storage, handling, and installation at the jobsite is the responsibility of others. – Ship loose doors / door stops – Humidifier control valve, strainers and traps – Ship loose humidifier control parts, sensors – Filter clips – Intake / exhaust hoods – UV light bulbs – Section split sheet metal trim, caps, screws, and sealant. – Equipment IOMs - AHU - Special equipment IOM
SPARE PARTS	– N/A
ELECTRICAL	– Units are ETL labeled – Reference electrical data for details – EMT Conduit, Zinc Die-cast Compression Connector, and Flexible metal Conduit (FMC) are standard conduits. – Power wiring splices are connected with a power distribution block mounted in a NEMA 1 enclosure located on the ceiling/sidewall of the unit. – Electrical enclosures downstream (2 feet) of the cooling coil and downstream of the humidifier grid are to be rated for ‘damp location’. – Standard Lighting is Standard Single Pole 15A Switch, Marine Glass Globe with Wire Guard, 100W Incandescent, and Standard 20A GFIC Receptacles.
CONTROLS	– No factory provided controls
FAN VIBRATION	– Fans are balanced at the fan manufacturer’s facility. Vibration level to meet BV-3 balance levels.
TESTING	– Fans will be factory run and checked for proper operation/rotation and motor amp draw.

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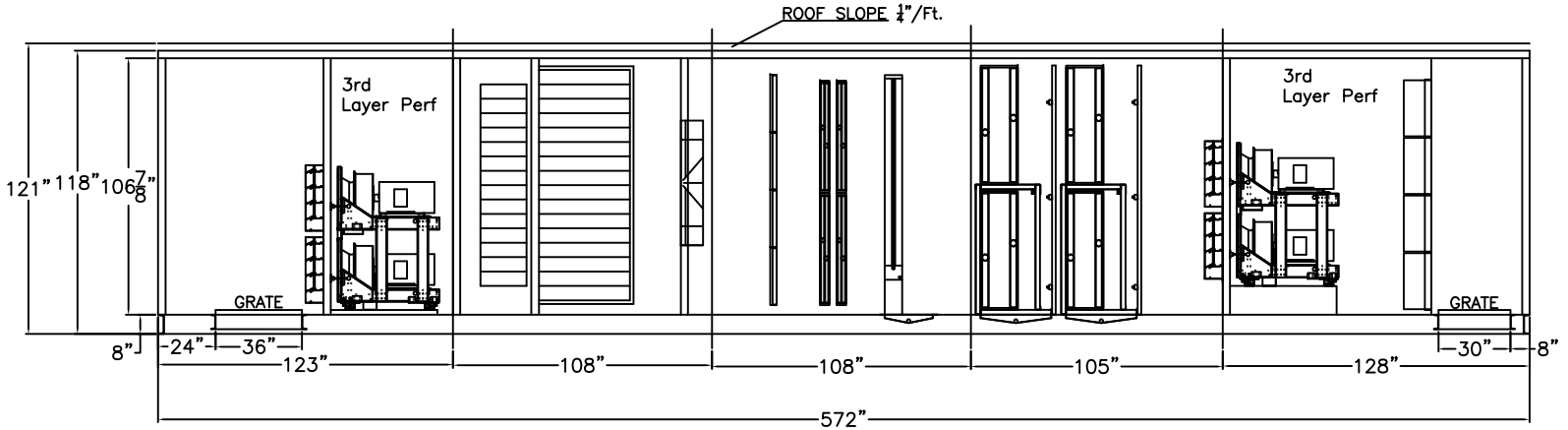
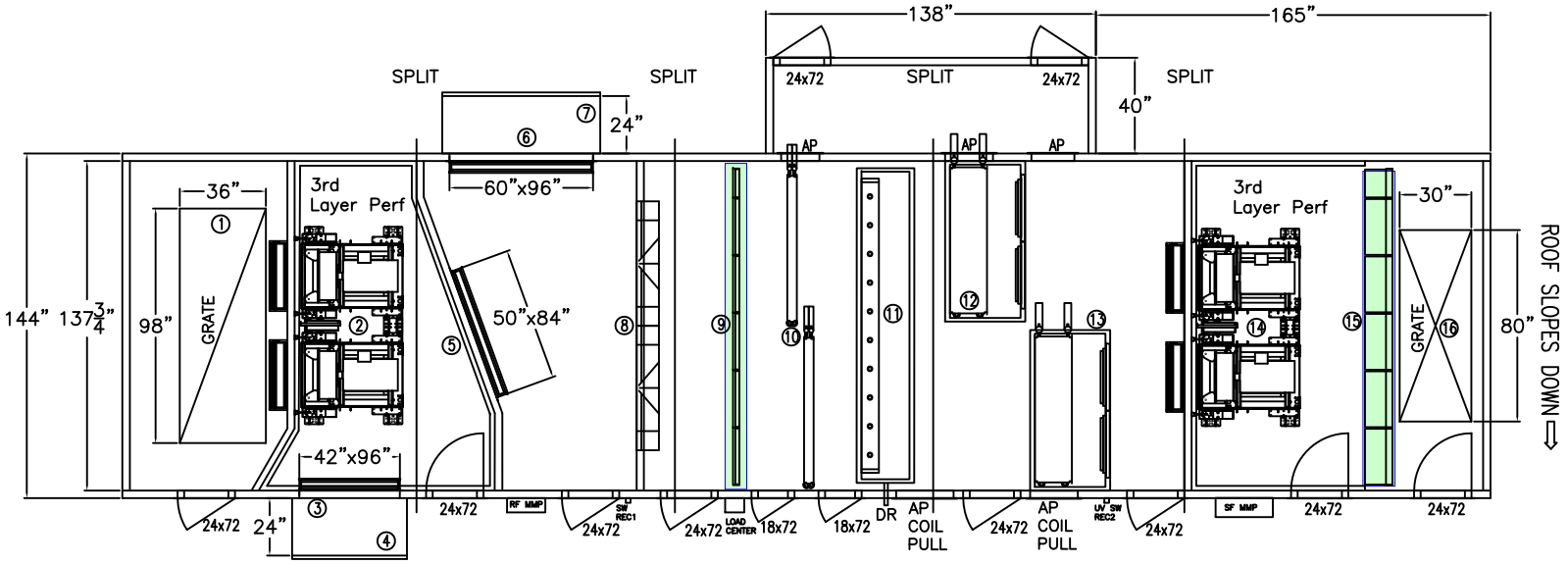




EQUIPMENT LIST

1–RA Opening – Base 88"x44"
2–RA Fans DDP 200 15 MHP
3–ExA Damper
4–ExA Hoods
5–RA Damper
6–OA Damper
7–OA Hoodsl
8–Air Blender
9–MERV8 2" Pre–filters
10–(4) Heating coils
11–Humidifier Grid
12–(4) Cooling Coils
13–UV Irradiators
14–SA Fans DDP 270 20 MHP
15–BioCel VXL Filters
16–SA Opening – Base 72"x42"

AP Access Plug
DR Condensate Drains
AF Filter Gage

#	Revision	Date	By:
		/	
		/	
		/	
		/	
		/	

UNIT CONSTRUCTION

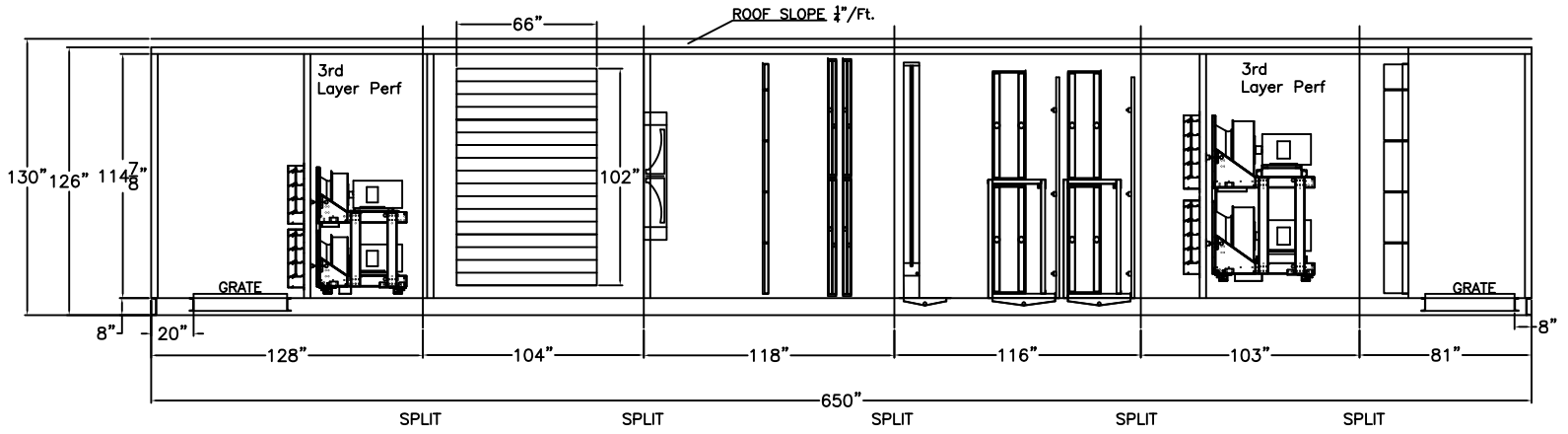
TYPE:	Outdoor	MOUNTING:	Curb
BASE:	C8x8.5		
FLOOR:	16 ga aluminum		
INSUL/LINER:	20 ga aluminum		
CASING:	18 ga Embossed Al.		
INSUL/LINER:	3" – 18 ga aluminum		
DOORS:	(see drawing)		
LIGHTING:	(see drawing)		
ISOLATION:	(see drawing)		

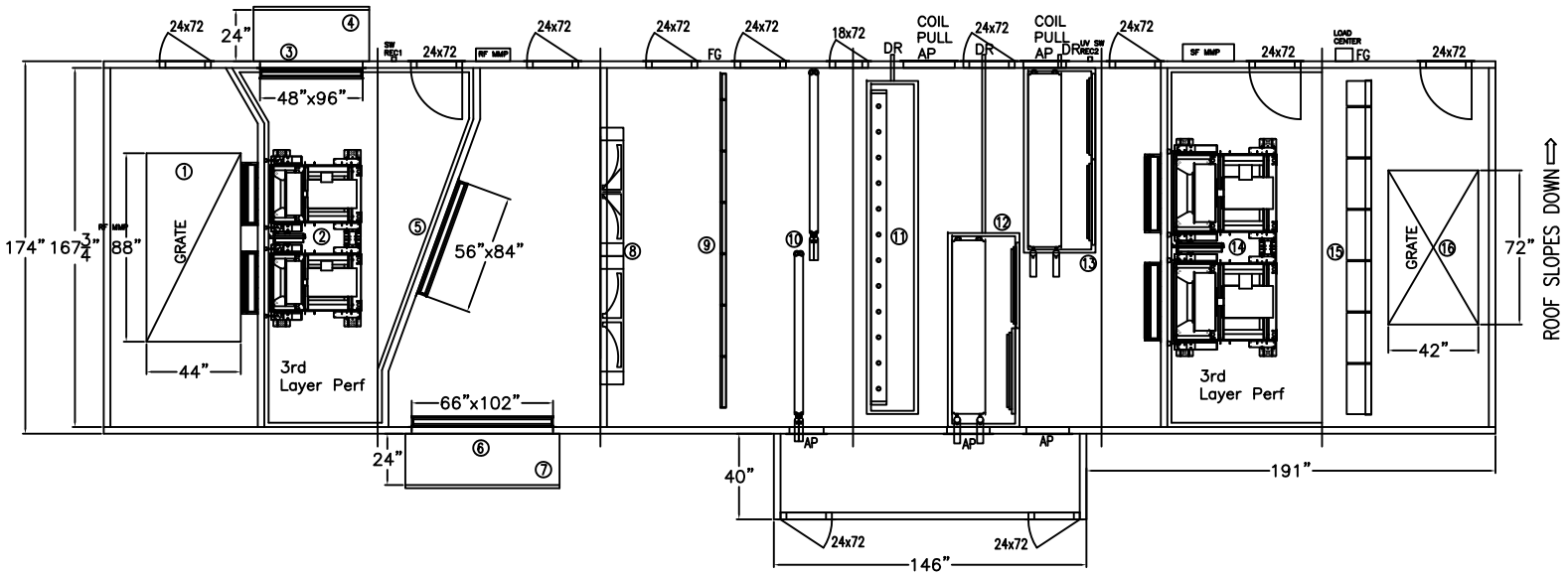
Sales Order#:

Openings and Dimensions may vary from Contract Documents. Return of approved drawings constitutes acceptance of these variances

Drawn by: lapar	DWG #: 23455 AHU–1–3	Sales Office		JOB Number	PROJECT: Westover Hillls Baptist Hospital
Approved by:	Unit Tag: AHU–1–3	Sanantonio, TX	Scale: None	EQ#23544	Description: 34,000 CFM
	Ship WT: ~29,600 lbs.		Date: 01/04/2023		

TRANE™ Custom Air Handlers





EQUIPMENT LIST

1–RA Opening – Base 88"x44"
2–RA Fans DDP 200 15 MHP
3–ExA Damper
4–ExA Hoods
5–RA Damper
6–OA Damper
7–OA Hoodsl
8–Air Blender
9–MERV8 2" Pre–filters
10–(4) Heating coils
11–Humidifier Grid
12–(4) Cooling Coils
13–UV Irradiators
14–SA Fans DDP 270 20 MHP
15–BioCel VXL Filters
16–SA Opening – Base 72"x42"

AP Access Plug
DR Condensate Drains
AF Filter Gage

#	Revision	Date	By:
		/	
		/	
		/	
		/	
		/	

UNIT CONSTRUCTION

TYPE:	Indoor	MOUNTING:	Curb
BASE:	C8x8.5		
FLOOR:	12 ga aluminum		
INSUL/LINER:	20 ga aluminum		
CASING:	18 ga Embossed AL.		
INSUL/LINER:	3" – 18 ga Aluminum		
DOORS:	(see drawing)		
LIGHTING:	(see drawing)		
ISOLATION:	(see drawing)		

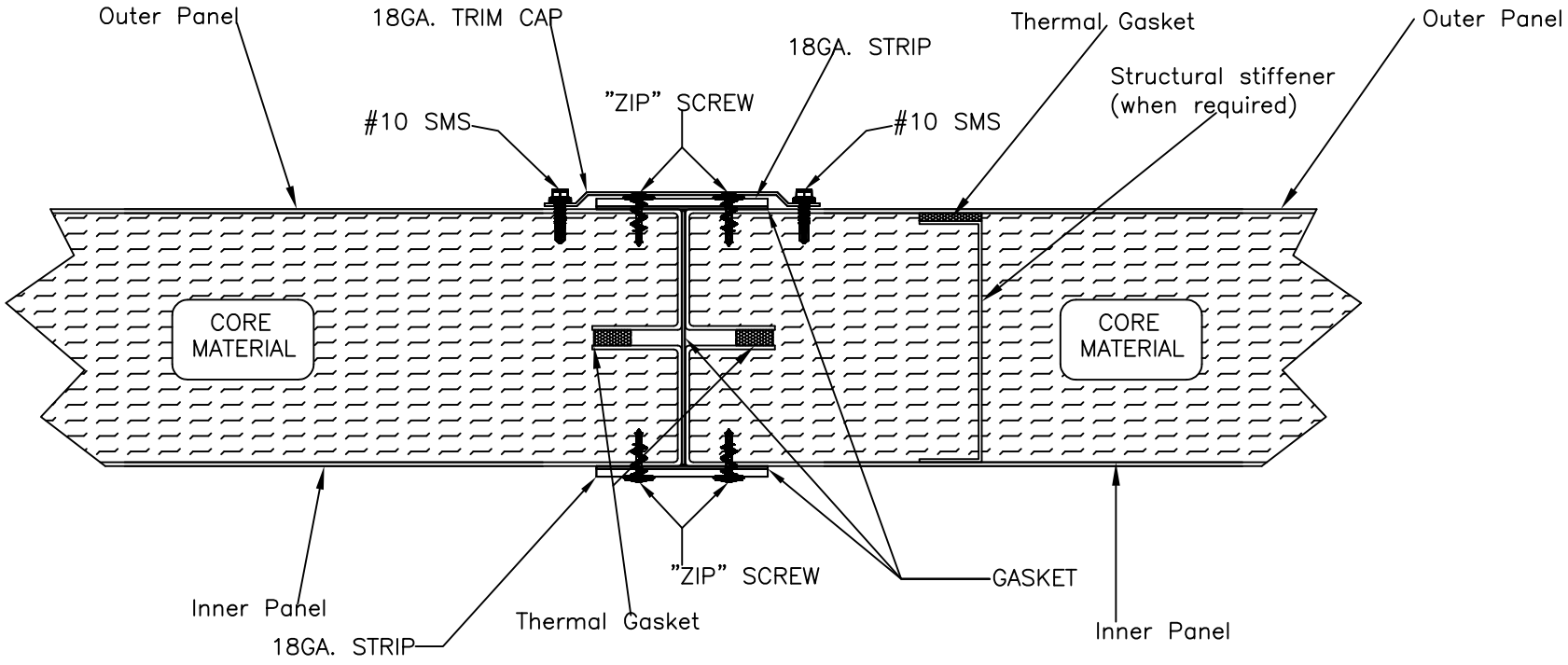
Sales Order#:

Openings and Dimensions may vary from Contract Documents. Return of approved drawings constitutes acceptance of these variances

Drawn by: lapar	DWG #: 23455 AHU–1–4	Sales Office		JOB Number	PROJECT: Westover Hills Baptist Hospital
Approved by:	Unit Tag: AHU–1–4	San Antonio, TX	Scale: None	EQ#23455	Description: 48,000 CFM
	Ship WT: ~38,000 lbs.		Date: 01/04/2023		

TRANE™ Custom Air Handlers

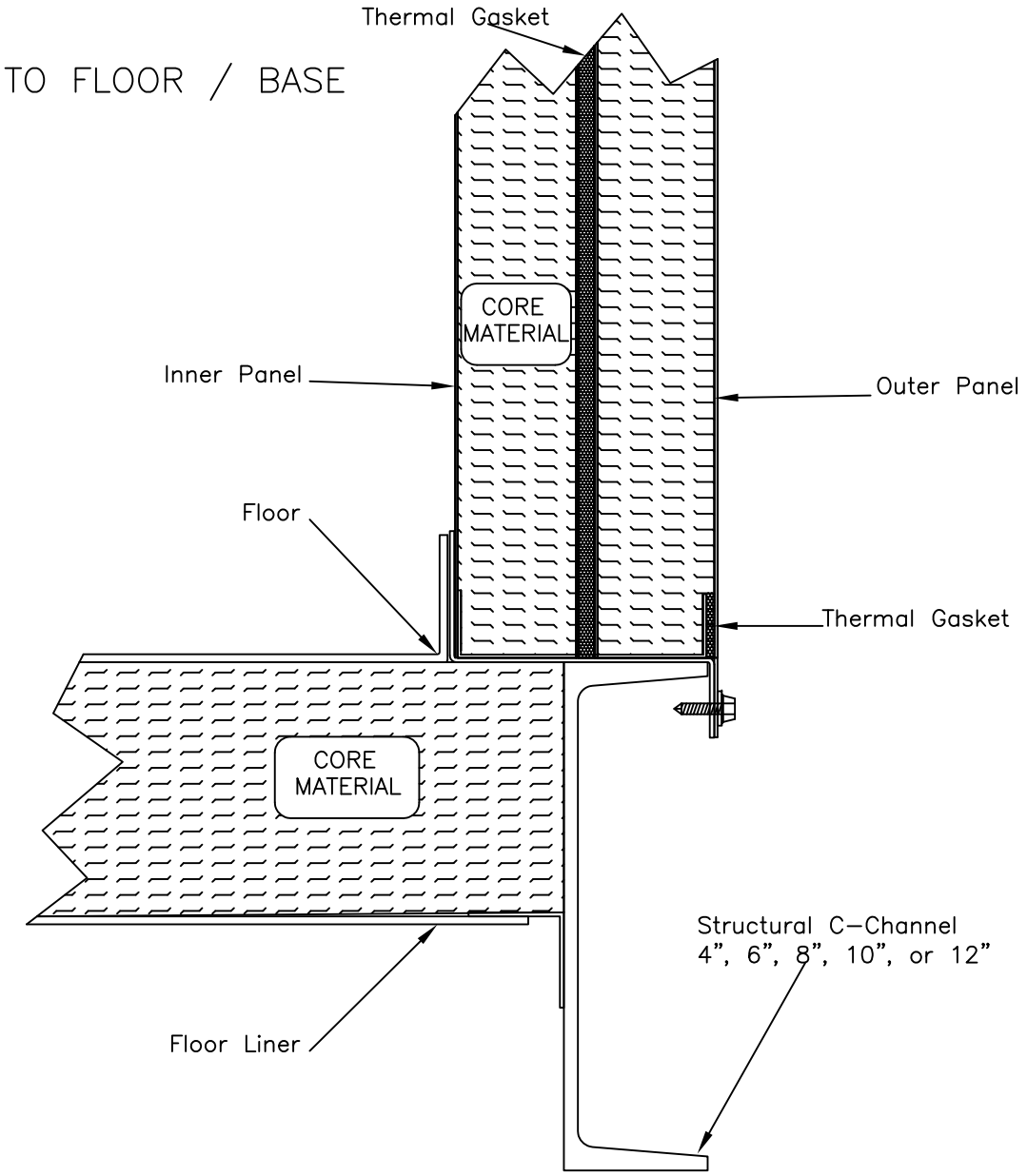
WALL TO WALL – SHIPPING SPLIT



PLAN VIEW

	WALL TO WALL CASING DETAIL	Dwg. Name: 22.dwg Rev. Date: 3/9/2011 Drawn by:

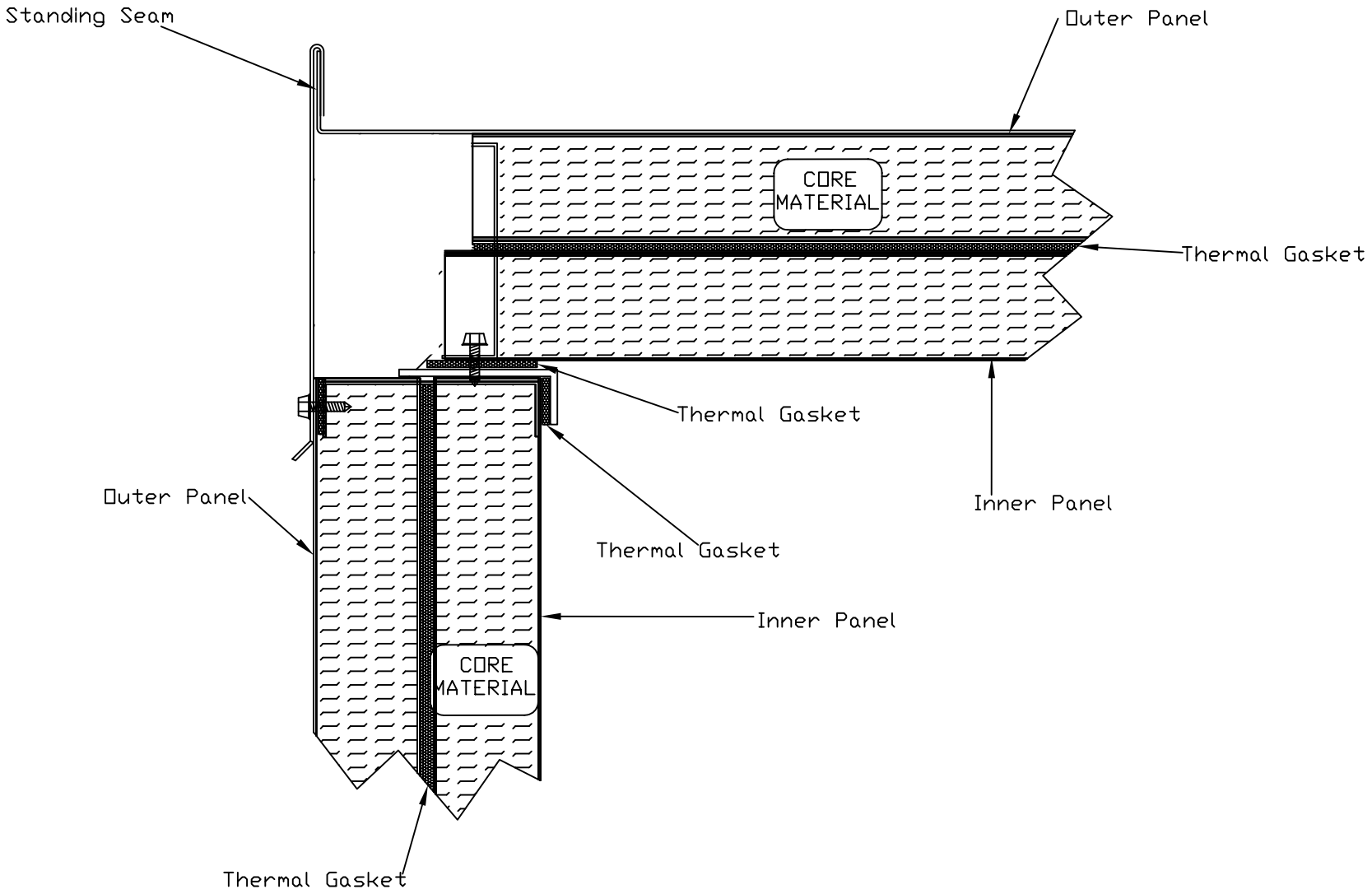
WALL TO FLOOR / BASE



PLAN VIEW

	WALL TO FLOOR / BASE DETAIL	Dwg. Name: 25.DWG Rev. Date: 3/9/2001 Drawn by:

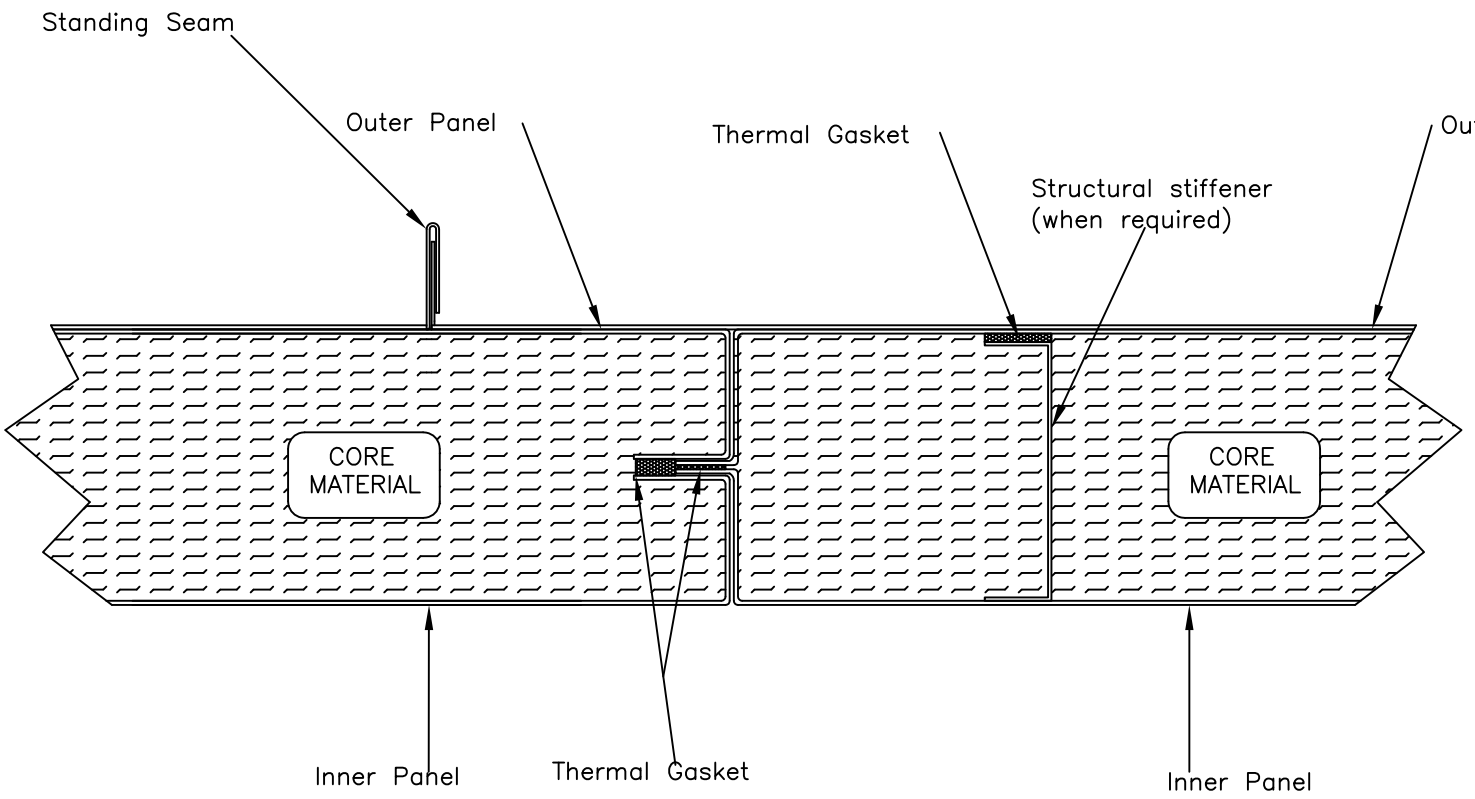
WALL TO OUTDOOR ROOF



PLAN VIEW

	WALL TO ROOF DETAIL	Dwg. Name: 24b. dwg Rev. Date: 3/9/2011 Drawn by:

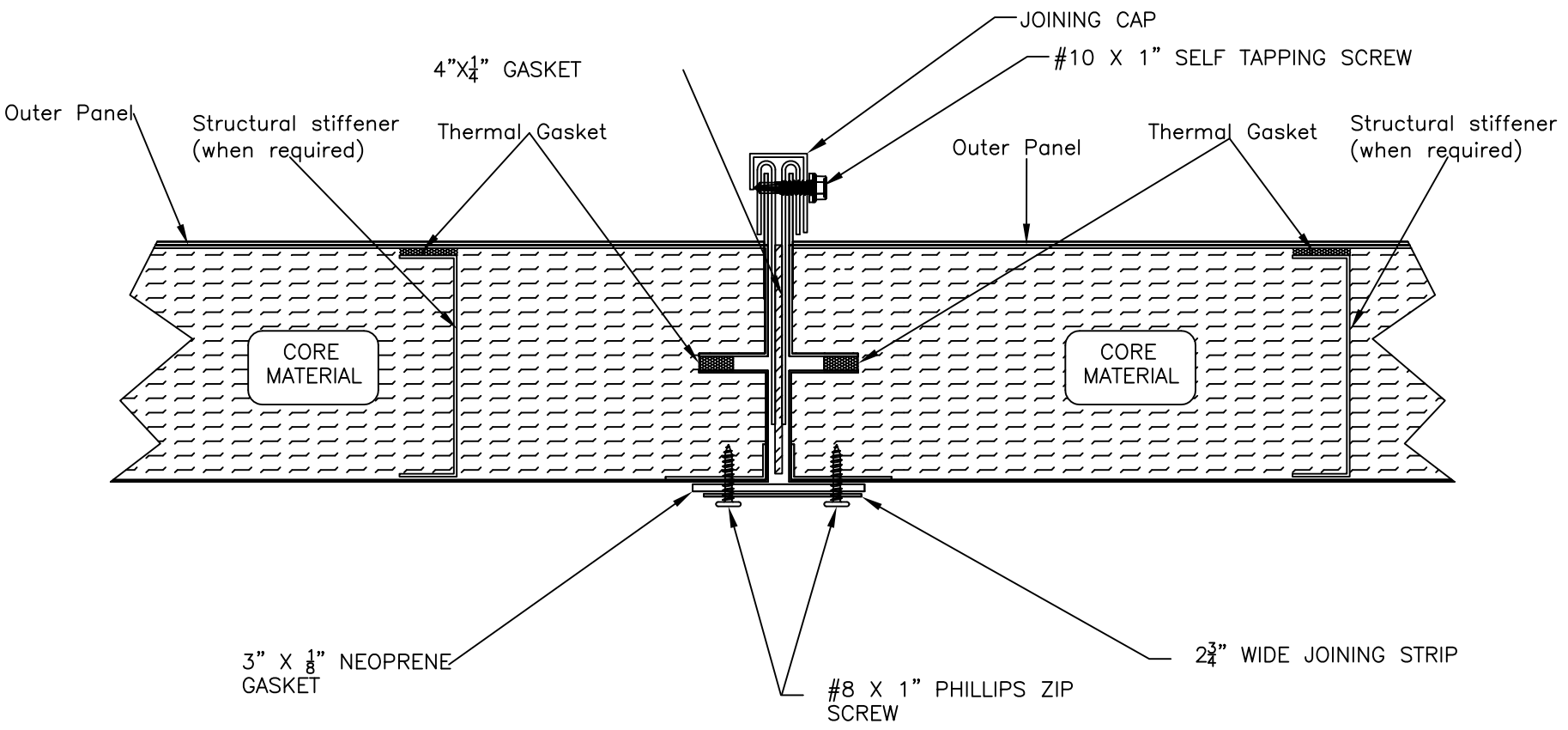
OUTDOOR ROOF TO ROOF



PLAN VIEW

	ROOF TO ROOF CASING DETAIL	Dwg. Name: 21.dwg Rev. Date: 3/9/2011 Drawn by:

OUTDOOR ROOF TO ROOF–SHIPPING SPLIT



PLAN VIEW

	OUTDOOR ROOF CASING DETAIL	Dwg. Name: 33.dwg Rev. Date: 3/9/2011 Drawn by:

PPG TrueFinish™
Industrial Coatings

SPECTRACRON® 380 POLY-IOTHANE™ HS EXTERIOR POLYURETHANE

DESCRIPTION:

SPECTRACRON 380 Poly-Iothane HS is a high performing, two component high solids exterior durable polyester polyurethane enamel. It is designed to provide excellent surface protection and exterior color and gloss retention.

HIGHLIGHTS:

- Excellent exterior color and gloss retention
- Excellent mar and chemical resistance
- Low VOC at ≤3.5 lbs. / gallon and no reportable HAPS or SARA 313 constituents
- Can be sprayed with airless, air-assisted airless and electrostatic equipment
- Can be applied directly to cleaned or blasted steel
- Contains no heavy metals
- Non-Flammable rating

TECHNICAL PROPERTIES:

PROPERTY	METHOD	RESULT
Color		Wide variety
Gloss @ 60° Angle	ASTM D523	Full
Pencil Hardness	ASTM D3363	F
Conical Mandrel	ASTM D522	Pass 180º, 1/8" Mandrel
Adhesion	ASTM D3359	5B Excellent
Humidity Resistance – Direct To Metal, No Primer	ASTM D2247	400 hours on B-1000 panels, No effect
Humidity Resistance – with W43181A Primer	ASTM D2247	1000 Hours, no rust, blisters or delamination
Salt Spray Resistance – Direct To Metal, No Primer	ASTM B117	300 hours on B-1000 panels, <3-5 mm Creepage
Salt Spray Resistance – with W43181A Primer	ASTM B117	1000 Hours, 3-5 mm Creepage, No blisters or delamination
12-Month Florida Exposure	ASTM D1014	>80% Retention
Substrates		HRS, CRS, Pretreated aluminum, some fiberglass & plastics (test adhesion to be certain)
Recommended Primers		Spectracron 501, 521, 531, 560, 571, DM19147, W43181 Series

PHYSICAL PROPERTIES:

PROPERTY	BLENDED
Weight per gallon (lbs/gallon)	10.0 ± 1.0 (color dependent)
Solid % (Weight)	65 ± 4% (color dependent)
Solid % (Volume)	50 ± 2%
Flash Point	110°F (43°C)
VOC	3.5 lbs/gallon (maximum)
Coverage @1 mil-no loss	770 - 834 sq ft
Shelf Life – Each Component	12 months unopened

Do not attempt to use this product without the current Material Safety Data Sheet.
Revision Date: 2/2008

SPECTRACRON® 380 POLY-IOTHANE™ HS EXTERIOR POLYURETHANE

SURFACE PREPARATION:

The surface must be clean and free of all contamination. A chemical pretreatment such as PPG Chemfos® KA Cleaner Coater or similar conversion coating and / or primer will improve the performance properties of the coating system. See your PPG Representative for recommendations.

APPLICATION DATA:

APPLICATION	BLENDED
Mixing Instructions	Mix 5:1 with Q3501 Activator or Mix 4:1 with GXH1086 (plural component systems) Activator or Mix 3:1 with DM18996 Activator
Wet Film Thickness	2.0 – 5.0 mils
Dry Film Thickness	1.2 – 2.5 mils
Thinner	Fast: TFS309-30; Medium: TFS309-60 or Q70 (to maintain Flash Point above 100°F); Slow: TFS309-80; Very Slow: TFS309-90
Reduction	10% if needed**
Clean up	TFS909 Clean Solvent
Pot Life @ 77ºF	1.0 – 1.5 hours
Viscosity - Zahn #3 EZ Cup	30 - 35" (can vary by color)
Meg Ohm Resistance	Ransburg Meter = 8KΩ; Graco Meter = 1.0 MΩ / cm. sq.

**Use of some thinners may reduce the Flash Point to fall below 110°F and may cause the VOC to exceed 3.5 lbs. / gallon

SPRAY APPLICATION	SPRAY EQUIPMENT*	FLUID PRESSURE (PSI)	ATOMIZATION PRESSURE (PSI)	FLUID NOZZLE	AIR NOZZLE
Conventional	DeVilbiss MBC-510	8-10	45-55	FF	797
Conventional	Binks – 2001 or 95	8-10	45-55	63C	63PE
Airless	Graco G-40	1800-2400	NA	.011 to .015"**	NA
Air Assisted Airless	Graco G-40	900-1300	20-40	.011 to .015"**	Alpha
HVLP	DeVilbiss – JGHV	8-10	55-60	FF	#46 MP

*Or Equivalent Brands **Graco Fine Finish Tips have proven to produce a better finish for both airless & air-assisted airless.

DRY TIMES	CURE SCHEDULE Air Dry @ 77°F @ 1.2 Mil DFT
Dry to touch	1-2 hours
Dry to handle	4 hours
To Recoat	1-2 hours
Force Dry	Flash 10 min. @ ambient: 20 min. @ 180°F

ADDITIONAL INFORMATION:

- For application below 50°F, please contact your technical sales/service representative
- No minimum or critical recoat time
- In-Service Temperature: 200°F (maximum)
- Avoid moisture contamination of the Spectracron Q3501 and GXH1086 and DM18996 components Moisture can gel the material and affect performance properties
- In general, accelerators not required

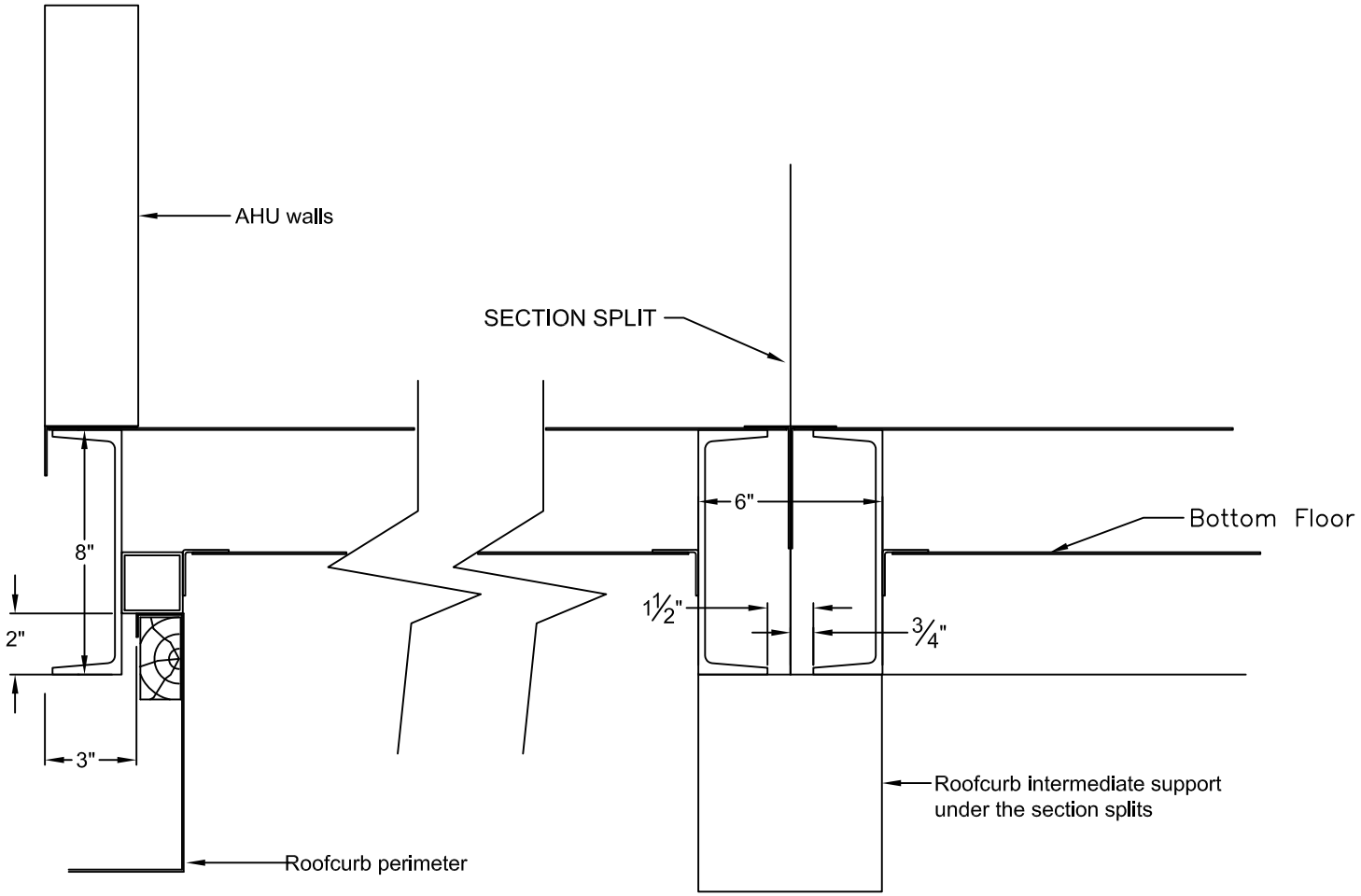
CONTACT 1-866-PPG TRUE

It is recommended that the customer should trial the product for adhesion and compatibility using all substrates, surface preparation techniques and application processes in the environment the product will be intended to be used in prior to actual product application.

The technical data presented in this bulletin is based upon information believed by PPG to be currently accurate. However, no guarantees of accuracy, comprehensiveness or performance are given or implied. Continuous improvements in coatings technology may cause future technical data to vary from what is in this bulletin.

Do not attempt to use this product without the current Material Safety Data Sheet.
Revision Date: 2/2008

REVISIONS				
BY	REV	DESCRIPTION	DATE	APPROVED



PRODUCTION DRAWINGS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS: DECIMALS: ANGLES:
±1/16 .X ±0.03 ±0.5°
.XX ±0.01
.XXX±0.005
---DO NOT SCALE DRAWING---

AHJ
MOUNTING

APPROVALS	DATE
DWN BY	
ENGINEER	

⚠ –REPRESENTS REVISION CHANGE

Typical Section Split
BASE DETAILS

SIZE	SO.#	EQ.#	REV
B	UNIT TAG:	SHEET OF	0

ROOF CURB STANDARDS

ASCD-29-002

RULES FOR OVERALL LENGTH AND WIDTH OF CURB:
*** The minimum size base that would get a roof curb is a unit built with a 6” base.

Unit with a 6” base = Length and width of unit submitted minus 3” on each side (6” overall) for outside dimension of roof curb.

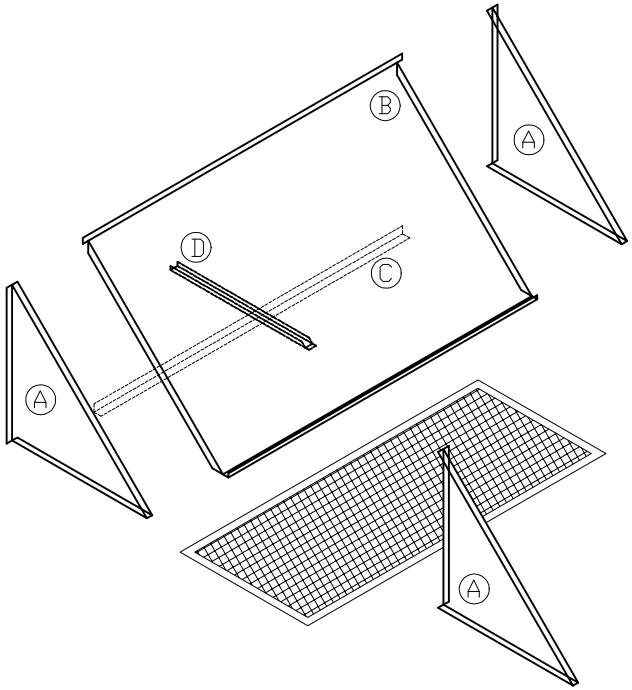
Unit with an 8” base = Length and width of unit submitted minus 3” on each side (6” overall) for outside dimension of roof curb.

Unit with a 10” base = Length and width of unit submitted minus 3-1/2” on each side (7” overall) for outside dimension of roof curb.

Unit with a 12” base = Length and width of unit submitted minus 3-13/16” on each side (7-5/8” overall) for outside dimension of roof curb.

SPECIAL RULES TO REMEMBER:

1. Run stiffeners the shortest distance possible (whichever is shortest, width or length).
2. The maximum spacing between cross stiffeners in a roof curb is 96”.
3. Height of stiffener is to be 2” less than the roof curb itself.
4. Cross stiffeners cannot be underneath a section split. Place a stiffener on one side or the another of a section split. **(This rule applies for a roof curb with a width of 12’ or less)**
5. Roof curbs with a width that exceeds 12’ will get reinforced stiffeners. This will be 2 stiffeners placed back-to-back with a 6” plate on the top and bottom of the stiffener support. This support will be placed directly underneath a section split.
6. Stiffeners cannot run underneath pipe chases or openings.
7. For certain jobs the roof curbs might be insulated or sloped, double check in unit book or ask the engineer if these will apply to your job.
8. For rules written next to dimensions on a standard roof curb drawing see the ACSD-29-03 drawing located in O:/AireSystems Construction Detail.



MATERIAL: 18ga. galvaneal, paint same color as unit.

TYPICAL WEATHER HOOD

For Reference Only

NOTES:

1) Only use center support (A) if the hood is more than 72" in the (H) dimension. If less than 72" then omit support and cross break hood.

BILL OF MATERIALS

RAIN HOOD

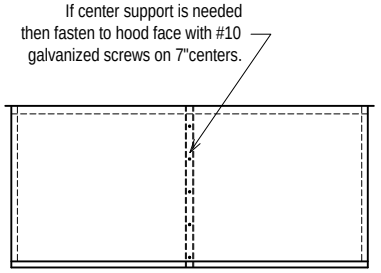
DESCRIPTION	TAG	QTY	MATERIAL	CUT LIST
Left side end piece.	A			
Right side end piece.	A			
Center support piece.	A			
Hood face.	B			
Rear support angle.	C			
Center horizontal support.	D			

BIRD SCREEN

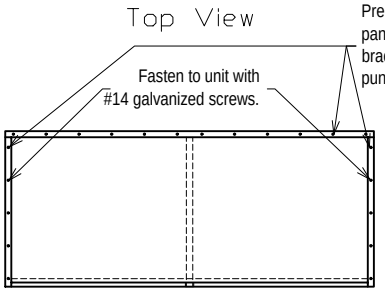
LENGTH	H - 1/2"
WIDTH	G + 1"

CLIPS

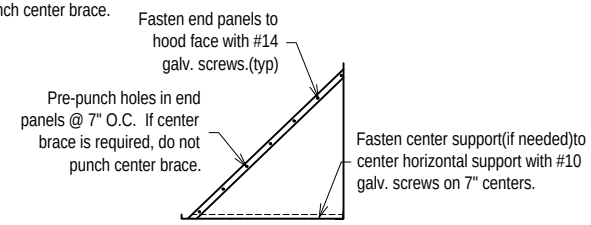
LONG CLIPS	QTY		CUT LIST	2-5/8" x H - 1/4"
SHORT CLIPS	QTY		CUT LIST	2-5/8" x G - 1 1/2"



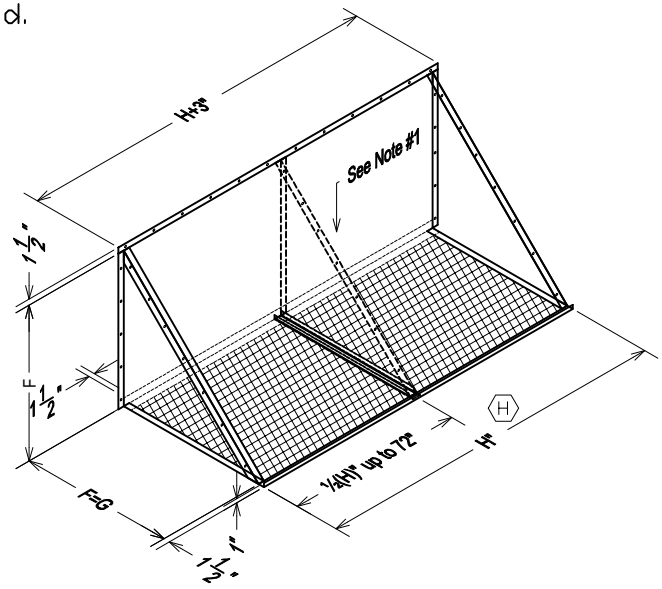
Top View



Front View



Side View



AIRESYSTEMS Custom Air Handlers SHOP DRAWINGS		All dimensions are in inches unless otherwise noted. Tolerance for all dimensions are ±1/16" unless otherwise noted. Tolerance for all angular dimensions are ±0°1'0" unless otherwise specified.	Revision Number / Revision Description / Revision Date
TITLE/DWG			
Job Number/Name	Job Name	TRACING Name	
Dsg. Name/Date	Drafter Name / Dsg. Sys Name	FILENAME	

Klima·flex 2

Handles

There are a variety of handle combinations depending upon your application. Choose between key locking, tool operated, or non-locking. Designed for ease of installation in the factory or the field, the handles are mounted with a single screw.

The handles have a built in, adjustable roller cam that reduces friction during the latching operation. The cam is normally placed on the right side of the handle, but can be moved to the left side. Contact Allegis for KlimaFlex-2 handles with the roller cam pre-mounted on the left side.

Tool-Operated

Key-Locking

Non-Locking

Pad-Lockable

KLIMAFLEX™ 2 SYSTEM - INSIDE AND OUTSIDE HANDLES

P/N	Description	Latching type	P/N	Description	Latching type
2651-205000	In-swing	Non-locking	2651-205400	Out-swing	Non-locking
2651-205105	In-swing	Square 8	2651-205505	Out-swing	Square 8
2651-205114	In-swing	Triangle 7	2651-205514	Out-swing	Triangle 7
2651-205134	In-swing	Recessed hexagon 8 (5/16")	2651-205534	Out-swing	Recessed hexagon 8 (5/16")
2651-205281	In-swing	Keyed: IL1333	2651-205681	Out-swing	Keyed: IL1333
			2651-205700	Out-swing	Padlockable

MATERIAL:
Handle: Glass reinforced nylon (PA6 GF30)
Roller cam: Steel, Glass reinforced nylon (PA6 GF30)

* Contact ALLEGIS for more information about adding your logo to the handle plug and/or custom colored handles.

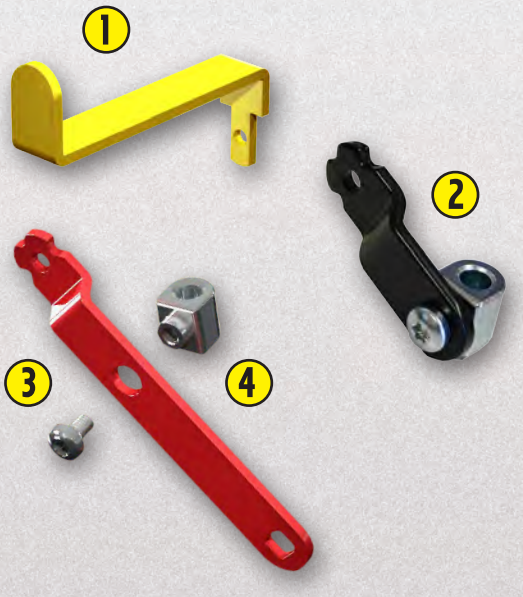
Klima·flex 2

Cams, Linkages & Accessories

In the KlimaFlex-2 System you can combine different parts to achieve the latching system required. Choose from the list below.

KLIMAFLEX™ 2 - INSIDE LATCHING OPTIONS

P/N	Description	Image
2651-901025	Safety catch for a 1" door	1
2651-901050	Safety catch for a 2" door	1
2651-901075	Safety catch for a 3" door	1
2651-901100	Safety catch for a 4" door	1
2651-902001	Rod link allows interlinking latch points w/o the use of inside safety handle	2
2651-904000	Inside security handle w/o rod link	3
2651-903001	Security handle w/ rod link	3 + 4
2651-903002	Rod link only; for inside handle	4



MATERIAL:
Safety catch, Rod link, Inside security handle, and Inside security handle with rod link: Steel, zinc plated

Roller Cam

The KlimaFlex-2 roller cam is designed to fit into either side of the K2 latching units. It is easy to adjust with a torx-bit. The roller cam reduces the friction during the latching operation. Set it so that the door closes smoothly and is kept securely closed.

MATERIAL:
Roller cam: Glass reinforced nylon (PA6 GF30)
Housing: Zinc die-cast
Bracket: Plated steel

KLIMAFLEX™ 2 - ROLLER CAM

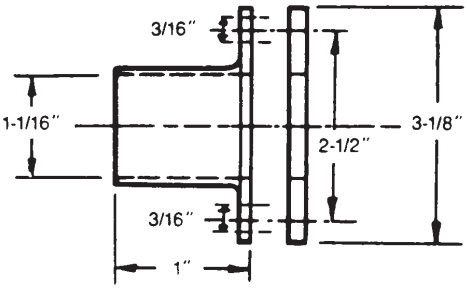
P/N	Ø of Roller
8-325-243	25 mm

SUBMITTAL RECORD
JOB _____
LOCATION _____
SUBMITTED TO _____
SUBMITTAL PREPARED BY _____
APPROVED BY _____
DATE _____

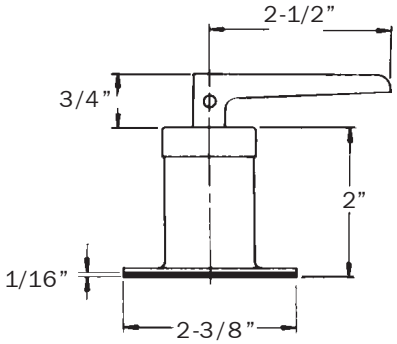
Submittal Form TH, IP - Instrument Test Ports

The **Instrument Test Port** has a durable cast zinc alloy construction with a heavy gauge zinc plated cap. Its Neoprene Expansion Plug can withstand up to 180°F and has resisted pressures up to 90 psi when installed. The TH-1 accommodates 1" of insulating materials and has an inside diameter of 1-1/16". The IP-2 accommodates 2" of insulation material and has an inside diameter of 1-1/8". The IP-4 offers a 3/4" diameter access to the air stream. All are designed for high velocity systems. A flat neoprene mounting gasket is supplied. However, for maximum protection against leakage, we recommend using Quad Seal.

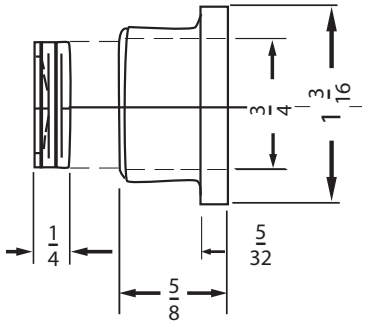
TH-1



IP-2



IP-4



INSTRUMENT TEST PORTS		
ITEM#	CODE	QTY PER CARTON
8036	TH1	25
8398	IP2	25
8340	IP4	25

Duro Dyne East Division, Bay Shore, NY 631-249-9000 Fax: 631-249-8346
Duro Dyne Midwest Division, Fairfield, OH 513-870-6000 Fax: 513-870-6005
Duro Dyne West Division, Fontana, CA 562-926-1774 Fax: 562-926-5778
Duro Dyne Canada, Lachine, Quebec, Canada 514-422-9760 Fax: 514-636-0328
www.durodyne.com E-mail: durodyne@durodyne.com

Printed in USA 7/14
BO008453

TRANE Custom Air Handlers

Westover Hills Baptist Hospital

EQ Number: 23455
Date: Jan 04, 2023
Rev.:

Fan Schedule

Unit No.	Fan Tag	Service	Total CFM	Fan TSP	Motor Hz	RPM	Array BHP	MHP	AMCA Class	Manufacturer & Model	Fan Type	Size
AHU-1-3	SF01	Supply	34,000	8.65	55.4	3246	67.23	25	III	Trane	Trane DDP	200
AHU-1-3	RF01	Return	26,550	2.12	62.3	1839	14.1	10	II	Trane	Trane DDP	200
AHU-1-4	SF01	Supply	48,000	9.41	73.7	2180	97.87	30	III	Trane	Trane DDP	270
AHU-1-4	RF01	Return	30,350	2.89	71.9	2115	21.59	10	II	Trane	Trane DDP	200

Unit No.	Fan Tag	Motor Mfg.	Motor Model Number	Volts/PH/HZ	Motor Enclosure	NEMA Frame Size	Bearings	Feature Codes
AHU-1-3	SF01	Baldor	EM2516T-G	230/460 / 3 / 60	ODP	256T	L10-200K	TR STD 80% Width
AHU-1-3	RF01	Baldor	EHM3313T	230/460 / 3 / 60	ODP	215T	L10-200K	TR STD 100% Width
AHU-1-4	SF01	Baldor	EHM2535T	230/460 / 3 / 60	ODP	286T	L10-200K	TR STD 80% Width
AHU-1-4	RF01	Baldor	EHM2523T	230/460 / 3 / 60	ODP	254T	L10-200K	TR STD 100% Width

Feature Codes

TR	Thrust Restraints
STD	Standard Finish

Fan Data		Motor Data	
Job description	Westover Hills BH Supply AHU-1-3	Power / Fan	25
Wheel Diameter/Type/Class	Trane DDP 20 inch AF Class 3	Voltage	230/460
Fan Set	2x2 array 80% width 9 blades	Poles	2
Number of Fans	4	Enclosure	ODP
Blades	9	Motor Frame	256T
Cabinet data		**AMCA 207 Calculations**	Yes
Internal width, in.	144	VFD driven motor efficiency	87.6 %
Internal height, in.	106	wta SE	62.65 %
Fan array width space claim, in.	82.4	% of peak wta SE	95.6 %
Fan array height space claim, in.	64.6	Fan Electrical Power, kW	55.21
AMCA 210 Performance		FEI	1.21
Total airflow	34000	**Fan Selection Options**	
Total Static Pressure	8.65	Plenum Fan Protective Enclosure	No
Total Brake Power	67.23	Coplanar separation	No
HP per fan	16.81	**Motor Interface Options**	
Altitude, ft.	0	VFD	Per fan
Fan Design Temp. deg F	70	Voltage	230/460
Operating Speed	3246	VFD Frequency	54.1 Hz.
Impeller max RPM	3438	Number of VFD's	4
HP limited max RPM	3438	VFD HP	25
%WO	72%		
Unit Static Efficiency	69%		
Redundancy	89.6%		
AMCA FEG	80		

	V13	12/13/2022 15:41

	Trane DDP Individual fan AMCA 300 Full Octave Lw (dB, ref 1 pW)*								
	1	2	3	4	5	6	7	8	
	63	125	250	500	1000	2000	4000	8000	L_{WA}
Outlet	92	97	98	101	95	93	93	85	102
Inlet	99	94	92	98	87	86	88	80	97

	Trane DDP 4 Fan Array AMCA 300 Full Octave Lw (dB, ref 1 pW)*								
	1	2	3	4	5	6	7	8	
	63	125	250	500	1000	2000	4000	8000	L_{WA}
Outlet	98	103	104	107	101	99	99	91	108
Inlet	105	100	98	104	93	92	94	86	103

* Trane DDP is AMCA certified for L_{WA}. Trane DDP full octave Lw is not licensed by AMCA International.

Redundancy Operation

Fan Data		Motor data	
Job description	Westover Hills BH Supply AHU-1-3	Power / Fan	25
Wheel Diameter/Type/Class	Trane DDP 20 inch AF Class 3	Voltage	230/460
Fan Set	2x2 array 80% width 9 blades	Poles	2
Number of Fans -1 (redundancy)	3	Enclosure	ODP
Blades	9	Motor Frame	256T
Cabinet data		**AMCA 207 Calculations**	Yes
Internal width	144	VFD driven motor efficiency	87.1 %
Internal height	106	wta SE	53.6%
Fan array width space claim	82.4	% of peak wta SE	81.7%
Fan array height space claim	64.6	Fan Electrical Power, kW	44.49
AMCA 210 Performance		FEI	1.09
Total airflow	30464	**Fan Selection Options**	
Total Static Pressure	6.944	Plenum Fan Protective Enclosure	No
Total Brake Power	54.2	Coplanar separation	No
HP per fan	18.07	**Motor Interface Options**	
Altitude, ft.	0	VFD	Per fan
Fan Design Temp.	70	Voltage	230/460
Operating Speed	3438	VFD Frequency	57.3 Hz.
Impeller max RPM	3438	Number of VFD's	4
HP limited max RPM	3438	VFD HP	25
%WO	80.9%		
Unit Static Efficiency	61.5%		
Redundancy	89.6%		
AMCA FEG	80		

12/13/2022 15:41

Trane DDP Individual fan AMCA 300 Full Octave Lw (dB, ref 1 pW)*

	1	2	3	4	5	6	7	8	
	63	125	250	500	1000	2000	4000	8000	L_{WA}
Outlet	94	98	98	101	97	95	99	88	104
Inlet	99	94	93	101	90	88	94	82	101

Trane DDP 3 Fan Array AMCA 300 Full Octave Lw (dB, ref 1 pW)*

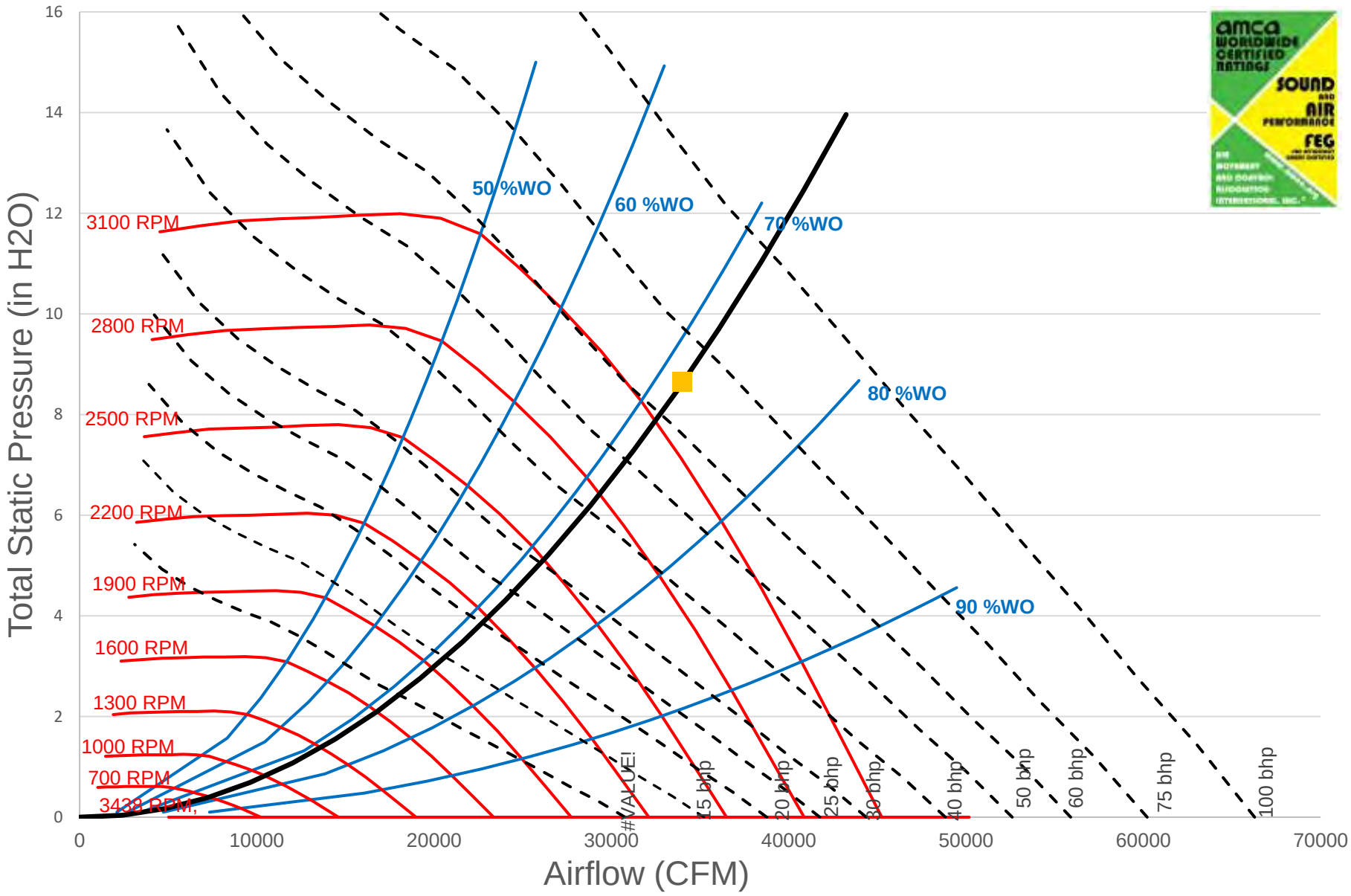
	1	2	3	4	5	6	7	8	
	63	125	250	500	1000	2000	4000	8000	L_{WA}
Outlet	99	103	103	106	102	100	104	93	109
Inlet	104	99	98	106	95	93	99	87	106

* Trane DDP is AMCA certified for L_{WA}. Trane DDP full octave Lw is not licensed by AMCA International.

TRANE TECHNOLOGIES

Westover Hills BH Supply AHU-1-3

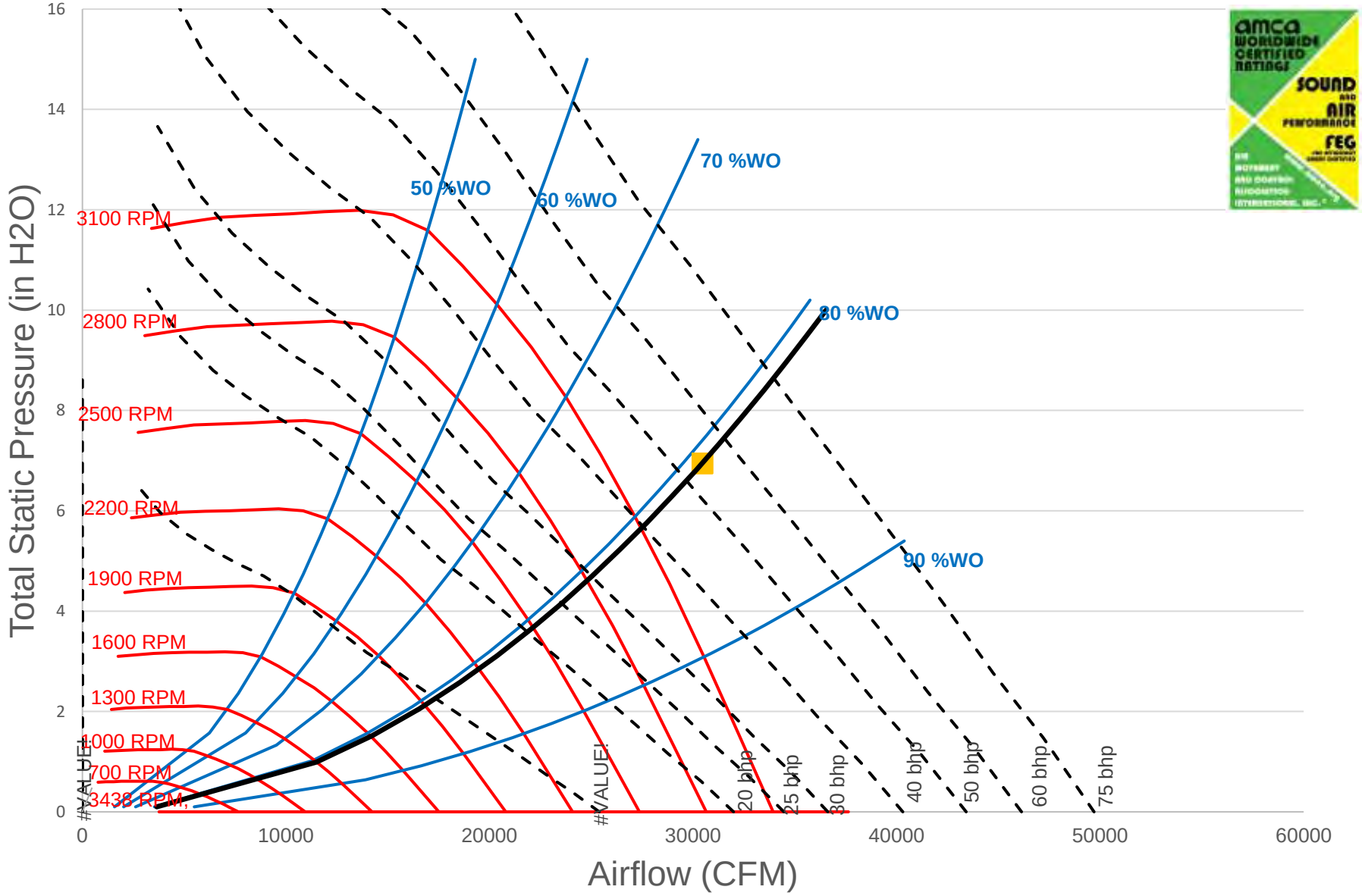
Trane DDP 20 inch AF Class 3 2x2 array 80% width 9 blades AMCA 210



TRANE TECHNOLOGIES

Westover Hills BH Supply AHU-1-3

Trane DDP 20 inch AF Class 3 2x2 array 80% width 9 blades n-1 fans 89.6% redundancy AMCA 210



Fan Data		Motor Data	
Job description	Westover Hills BH Return AHU-1-3	Power / Fan	10.0
Wheel Diameter/Type/Class	Trane DDP 20 inch AF Class 2	Voltage	230/460
Fan Set	2x2 array 100% width 9 blades	Poles	4
Number of Fans	4	Enclosure	ODP
Blades	9	Motor Frame	215T
Cabinet data		**AMCA 207 Calculations**	Yes
Internal width, in.	144	VFD driven motor efficiency	80.7 %
Internal height, in.	106	wta SE	53.85 %
Fan array width space claim, in.	81.4	% of peak wta SE	87.7 %
Fan array height space claim, in.	64.6	Fan Electrical Power, kW	12.34
AMCA 210 Performance		FEI	1.21
Total airflow	26650	**Fan Selection Options**	
Total Static Pressure	2.12	Plenum Fan Protective Enclosure	No
Total Brake Power	14.1	Coplanar separation	No
HP per fan	3.53	**Motor Interface Options**	
Altitude, ft.	0	VFD	Per fan
Fan Design Temp. deg F	70	Voltage	230/460
Operating Speed	1839	VFD Frequency	61.73 Hz.
Impeller max RPM	2674	Number of VFD's	4
HP limited max RPM	2363	VFD HP	10.0
%WO	79%		
Unit Static Efficiency	63.2%		
Redundancy	100.0%		
AMCA FEG	80		

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Trane DDP Individual fan AMCA 300 Full Octave Lw (dB, ref 1 pW)*

	1	2	3	4	5	6	7	8	
	63	125	250	500	1000	2000	4000	8000	L_{WA}
Outlet	87	89	91	88	86	86	88	74	93
Inlet	76	78	91	81	77	80	82	69	88

Trane DDP 4 Fan Array AMCA 300 Full Octave Lw (dB, ref 1 pW)*

	1	2	3	4	5	6	7	8	
	63	125	250	500	1000	2000	4000	8000	L_{WA}
Outlet	93	95	97	94	92	92	94	80	99
Inlet	82	84	97	87	83	86	88	75	94

* Trane DDP is AMCA certified for L_{WA}. Trane DDP full octave Lw is not licensed by AMCA International.

Redundancy Operation

Fan Data		Motor data	
Job description	Westover Hills BH Return AHU-1-3	Power / Fan	10.0
Wheel Diameter/Type/Class	Trane DDP 20 inch AF Class 2	Voltage	230/460
Fan Set	2x2 array 100% width 9 blades	Poles	4
Number of Fans -1 (redundancy)	3	Enclosure	ODP
Blades	9	Motor Frame	215T
Cabinet data		**AMCA 207 Calculations**	Yes
Internal width	144	VFD driven motor efficiency	81.7 %
Internal height	106	wta SE	43.0%
Fan array width space claim	81.4	% of peak wta SE	70.0%
Fan array height space claim	64.6	Fan Electrical Power, kW	14.34
AMCA 210 Performance		FEI	1.01
Total airflow	26650	**Fan Selection Options**	
Total Static Pressure	2.12	Plenum Fan Protective Enclosure	No
Total Brake Power	16.7	Coplanar separation	No
HP per fan	5.57	**Motor Interface Options**	
Altitude, ft.	0	VFD	Per fan
Fan Design Temp.	70	Voltage	230/460
Operating Speed	2238	VFD Frequency	75.13 Hz.
Impeller max RPM	2674	Number of VFD's	4
HP limited max RPM	2472	VFD HP	10.0
%WO	86.8%		
Unit Static Efficiency	52.6%		
Redundancy	100.0%		
AMCA FEG	80		

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Trane DDP Individual fan AMCA 300 Full Octave Lw (dB, ref 1 pW)*									
	1	2	3	4	5	6	7	8	
	63	125	250	500	1000	2000	4000	8000	L_{WA}
Outlet	89	92	93	96	94	91	98	87	102
Inlet	94	89	89	96	86	85	92	79	97

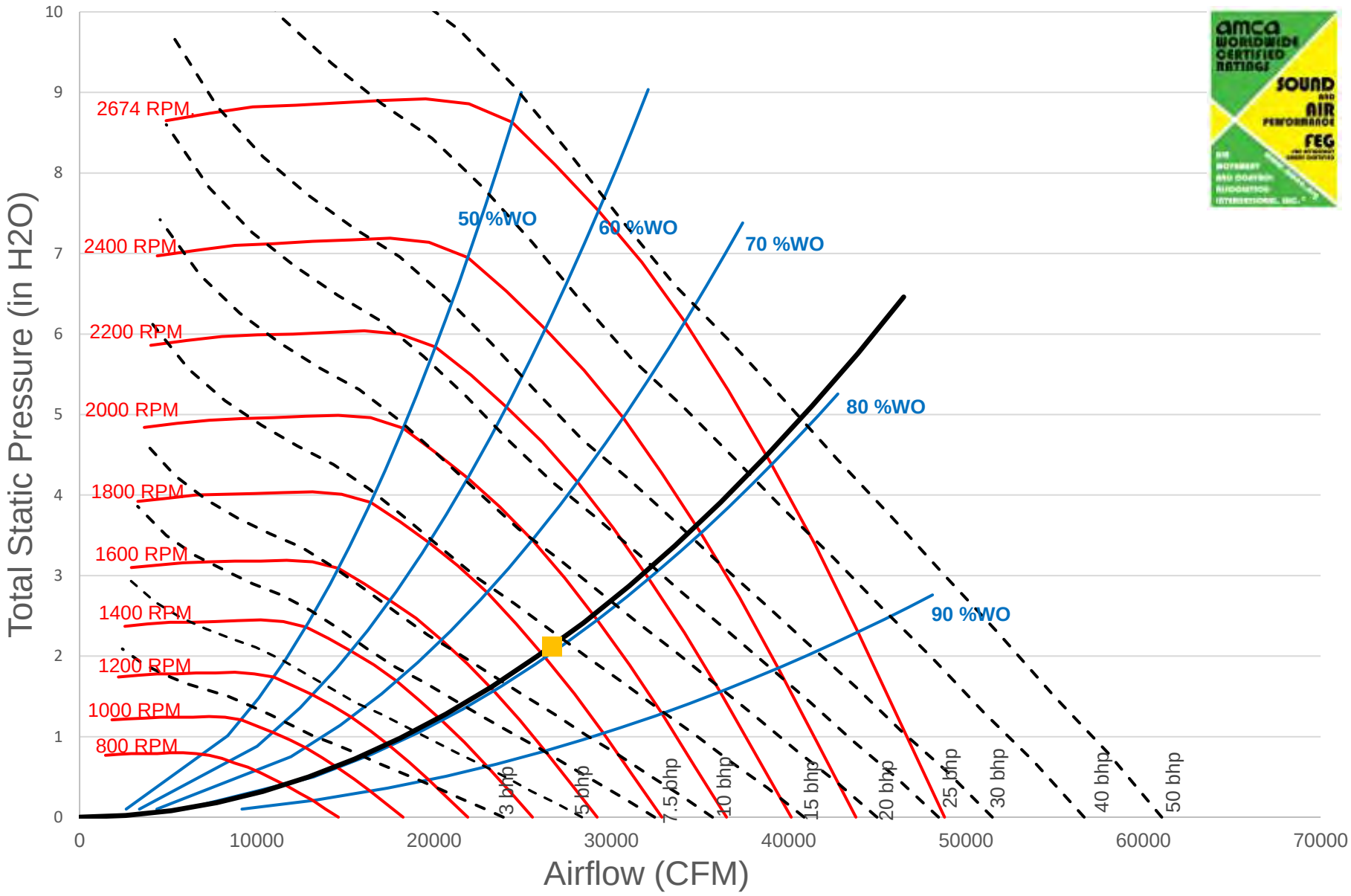
Trane DDP 3 Fan Array AMCA 300 Full Octave Lw (dB, ref 1 pW)*									
	1	2	3	4	5	6	7	8	
	63	125	250	500	1000	2000	4000	8000	L_{WA}
Outlet	94	97	98	101	99	96	103	92	107
Inlet	99	94	94	101	91	90	97	84	102

* Trane DDP is AMCA certified for L_{WA}. Trane DDP full octave Lw is not licensed by AMCA International.

TRANE TECHNOLOGIES

Westover Hills BH Return AHU-1-3

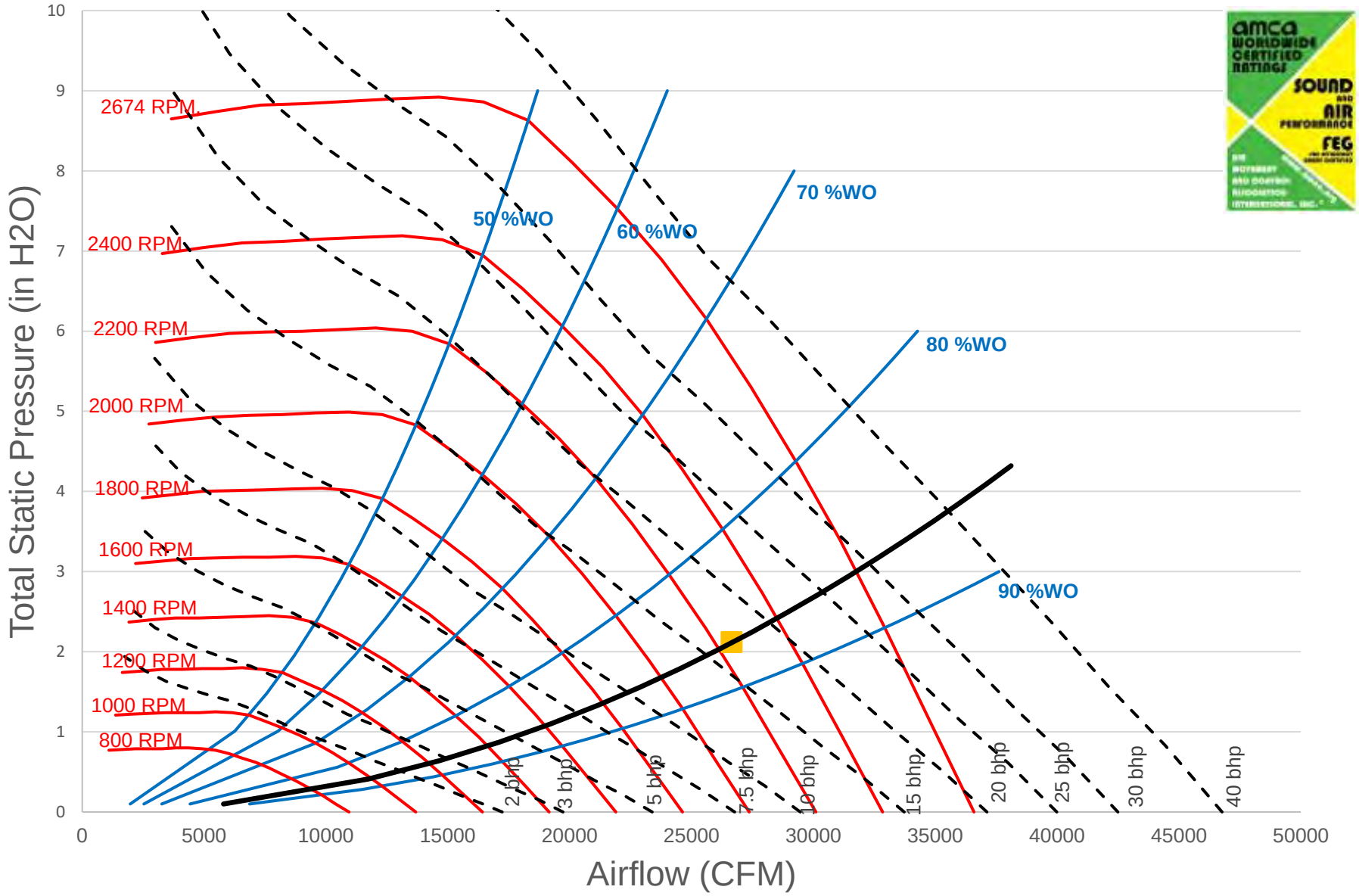
Trane DDP 20 inch AF Class 2 2x2 array 100% width 9 blades AMCA 210



TRANE TECHNOLOGIES

Westover Hills BH Return AHU-1-3

Trane DDP 20 inch AF Class 2 2x2 array 100% width 9 blades n-1 fans 100% redundancy AMCA 210



Fan Data		Motor Data	
Job description	Westover Hills BH Supply AHU-1-4	Power / Fan	30
Wheel Diameter/Type/Class	Trane DDP 27 inch AF Class 3	Voltage	230/460
Fan Set	2x2 array 80% width 9 blades	Poles	4
Number of Fans	4	Enclosure	ODP
Blades	9	Motor Frame	286T
Cabinet data		**AMCA 207 Calculations**	Yes
Internal width, in.	167	VFD driven motor efficiency	89 %
Internal height, in.	114	wta SE	66.47 %
Fan array width space claim, in.	104.7	% of peak wta SE	100 %
Fan array height space claim, in.	83	Fan Electrical Power, kW	79.94
AMCA 210 Performance		FEI	1.26
Total airflow	48000	**Fan Selection Options**	
Total Static Pressure	9.41	Plenum Fan Protective Enclosure	No
Total Brake Power	97.87	Coplanar separation	No
HP per fan	24.47	**Motor Interface Options**	
Altitude, ft.	0	VFD	Per fan
Fan Design Temp. deg F	70	Voltage	230/460
Operating Speed	2180	VFD Frequency	73.18 Hz.
Impeller max RPM	2546	Number of VFD's	4
HP limited max RPM	2332	VFD HP	30
%WO	61%		
Unit Static Efficiency	72.8%		
Redundancy	96.8%		
AMCA FEG	80		
		V13	12/13/2022 14:14

	Trane DDP Individual fan AMCA 300 Full Octave Lw (dB, ref 1 pW)*								
	1	2	3	4	5	6	7	8	
	63	125	250	500	1000	2000	4000	8000	L_{WA}
Outlet	95	96	101	96	93	94	92	82	100
Inlet	89	90	101	91	89	91	92	83	98

	Trane DDP 4 Fan Array AMCA 300 Full Octave Lw (dB, ref 1 pW)*								
	1	2	3	4	5	6	7	8	
	63	125	250	500	1000	2000	4000	8000	L_{WA}
Outlet	101	102	107	102	99	100	98	88	106
Inlet	95	96	107	97	95	97	98	89	104

* Trane DDP is AMCA certified for L_{WA}. Trane DDP full octave Lw is not licensed by AMCA International.

Redundancy Operation

Fan Data		Motor data	
Job description	Westover Hills BH Supply AHU-1-4	Power / Fan	30
Wheel Diameter/Type/Class	Trane DDP 27 inch AF Class 3	Voltage	230/460
Fan Set	2x2 array 80% width 9 blades	Poles	4
Number of Fans -1 (redundancy)	3	Enclosure	ODP
Blades	9	Motor Frame	286T
Cabinet data		**AMCA 207 Calculations**	Yes
Internal width	167	VFD driven motor efficiency	88.4 %
Internal height	114	wta SE	62.4%
Fan array width space claim	104.7	% of peak wta SE	93.9%
Fan array height space claim	83	Fan Electrical Power, kW	73.8
AMCA 210 Performance		FEI	1.23
Total airflow	46464	**Fan Selection Options**	
Total Static Pressure	8.817	Plenum Fan Protective Enclosure	No
Total Brake Power	90	Coplanar separation	No
HP per fan	30	**Motor Interface Options**	
Altitude, ft.	0	VFD	Per fan
Fan Design Temp.	70	Voltage	230/460
Operating Speed	2369	VFD Frequency	79.52 Hz.
Impeller max RPM	2546	Number of VFD's	4
HP limited max RPM	2370	VFD HP	30
%WO	72.7%		
Unit Static Efficiency	70.6%		
Redundancy	96.8%		
AMCA FEG	80		

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Trane DDP Individual fan AMCA 300 Full Octave Lw (dB, ref 1 pW)*									
	1	2	3	4	5	6	7	8	
	63	125	250	500	1000	2000	4000	8000	L_{WA}
Outlet	95	95	103	97	95	95	94	84	102
Inlet	87	91	103	89	88	89	89	79	98

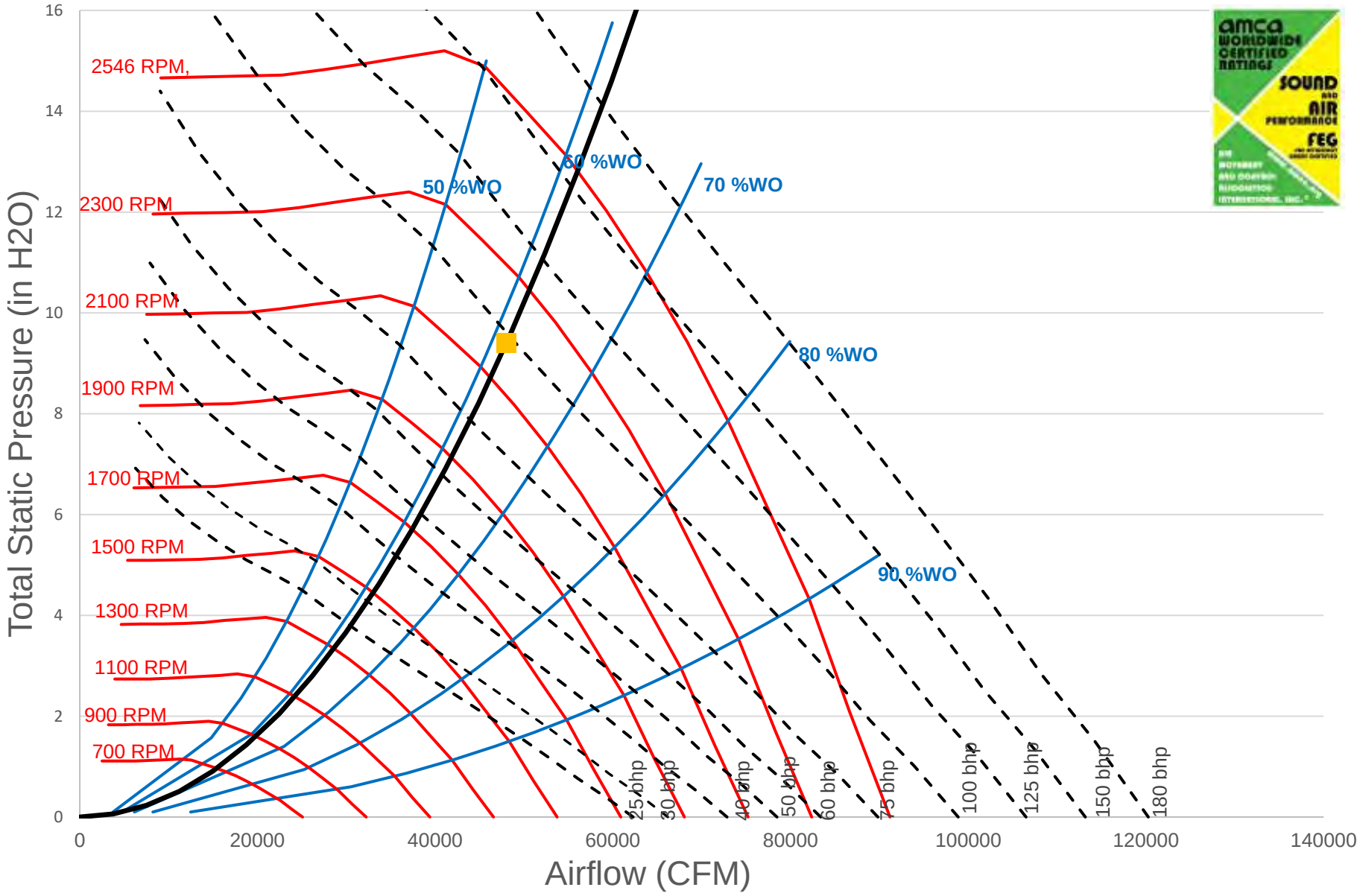
Trane DDP 3 Fan Array AMCA 300 Full Octave Lw (dB, ref 1 pW)*									
	1	2	3	4	5	6	7	8	
	63	125	250	500	1000	2000	4000	8000	L_{WA}
Outlet	100	100	108	102	100	100	99	89	107
Inlet	92	96	108	94	93	94	94	84	103

* Trane DDP is AMCA certified for L_{WA}. Trane DDP full octave Lw is not licensed by AMCA International.

TRANE TECHNOLOGIES

Westover Hills BH Supply

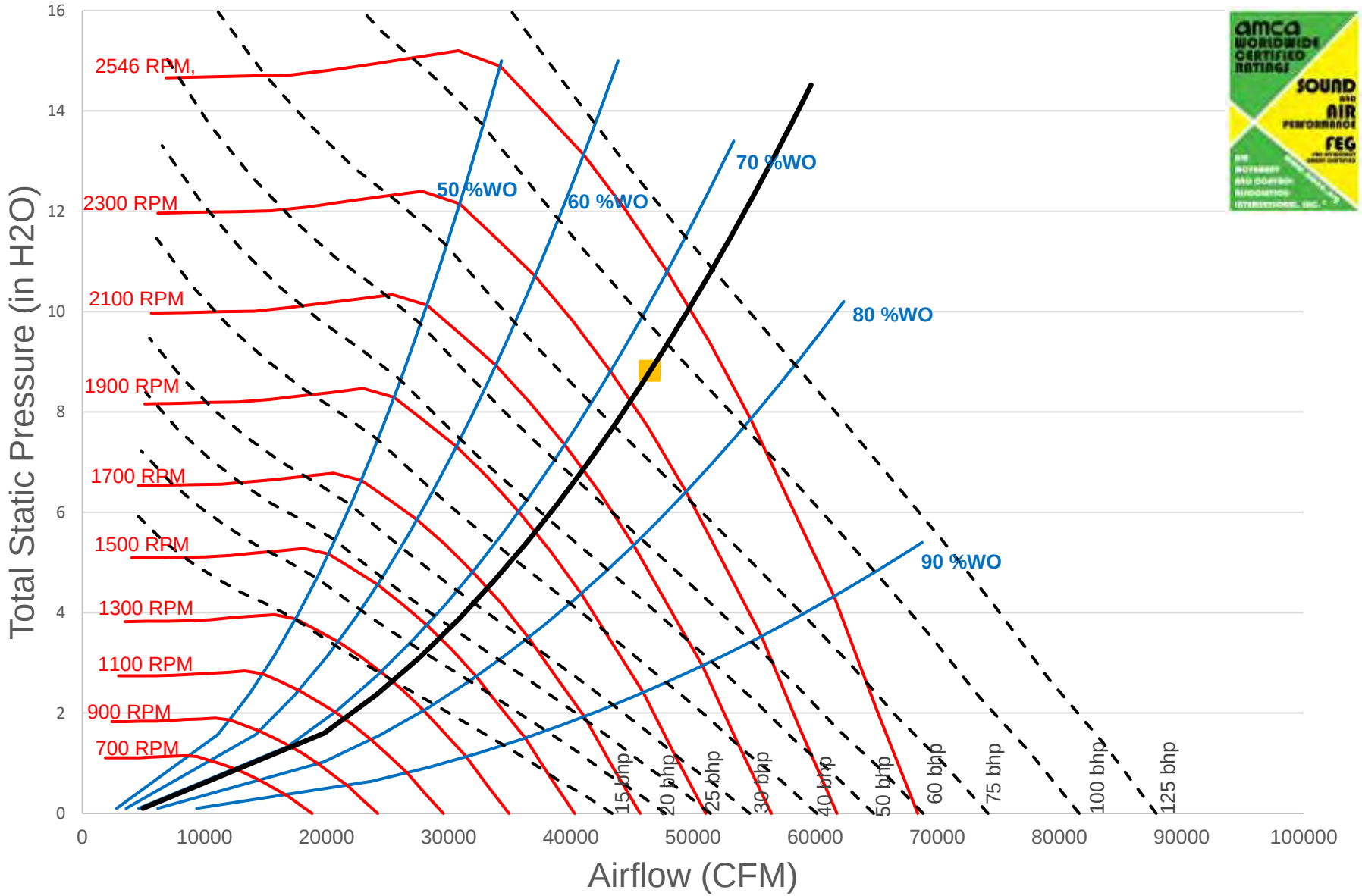
Trane DDP 27 inch AF Class 3 2x2 array 80% width 9 blades AMCA 210



TRANE TECHNOLOGIES

Westover Hills BH Supply

Trane DDP 27 inch AF Class 3 2x2 array 80% width 9 blades n-1 fans 96.8% redundancy AMCA 210



Fan Data		Motor Data	
Job description	Westover Hills BH Return AHU-1-4	Power / Fan	15
Wheel Diameter/Type/Class	Trane DDP 20 inch AF Class 2	Voltage	230/460
Fan Set	2x2 array 100% width 9 blades	Poles	4
Number of Fans	4	Enclosure	ODP
Blades	9	Motor Frame	254T
Cabinet data		**AMCA 207 Calculations**	Yes
Internal width, in.	167	VFD driven motor efficiency	84.9 %
Internal height, in.	114	wta SE	55.81 %
Fan array width space claim, in.	81.4	% of peak wta SE	88.7 %
Fan array height space claim, in.	64.6	Fan Electrical Power, kW	18.46
AMCA 210 Performance		FEI	1.19
Total airflow	30350	**Fan Selection Options**	
Total Static Pressure	2.89	Plenum Fan Protective Enclosure	No
Total Brake Power	21.59	Coplanar separation	No
HP per fan	5.4	**Motor Interface Options**	
Altitude, ft.	0	VFD	Per fan
Fan Design Temp. deg F	70	Voltage	230/460
Operating Speed	2115	VFD Frequency	71 Hz.
Impeller max RPM	2674	Number of VFD's	4
HP limited max RPM	2600	VFD HP	15
%WO	79%		
Unit Static Efficiency	64%		
Redundancy	100.0%		
AMCA FEG	80		

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Trane DDP Individual fan AMCA 300 Full Octave Lw (dB, ref 1 pW)*

	1	2	3	4	5	6	7	8	
	63	125	250	500	1000	2000	4000	8000	L_{WA}
Outlet	89	93	93	96	93	90	97	84	101
Inlet	94	89	88	96	85	84	91	78	96

Trane DDP 4 Fan Array AMCA 300 Full Octave Lw (dB, ref 1 pW)*

	1	2	3	4	5	6	7	8	
	63	125	250	500	1000	2000	4000	8000	L_{WA}
Outlet	95	99	99	102	99	96	103	90	107
Inlet	100	95	94	102	91	90	97	84	102

* Trane DDP is AMCA certified for L_{WA}. Trane DDP full octave Lw is not licensed by AMCA International.

Redundancy Operation

Fan Data		Motor data	
Job description	Westover Hills BH Return AHU-1-4	Power / Fan	15
Wheel Diameter/Type/Class	Trane DDP 20 inch AF Class 2	Voltage	230/460
Fan Set	2x2 array 100% width 9 blades	Poles	4
Number of Fans -1 (redundancy)	3	Enclosure	ODP
Blades	9	Motor Frame	254T
Cabinet data		**AMCA 207 Calculations**	Yes
Internal width	167	VFD driven motor efficiency	85.4 %
Internal height	114	wta SE	45.8%
Fan array width space claim	81.4	% of peak wta SE	72.8%
Fan array height space claim	64.6	Fan Electrical Power, kW	22.59
AMCA 210 Performance		FEI	1
Total airflow	30350	**Fan Selection Options**	
Total Static Pressure	2.89	Plenum Fan Protective Enclosure	No
Total Brake Power	26.7	Coplanar separation	No
HP per fan	8.9	**Motor Interface Options**	
Altitude, ft.	0	VFD	Per fan
Fan Design Temp.	70	Voltage	230/460
Operating Speed	2572	VFD Frequency	86.34 Hz.
Impeller max RPM	2674	Number of VFD's	4
HP limited max RPM	2674	VFD HP	15
%WO	86.2%		
Unit Static Efficiency	53.6%		
Redundancy	100.0%		
AMCA FEG	80		

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Trane DDP Individual fan AMCA 300 Full Octave Lw (dB, ref 1 pW)*

	1	2	3	4	5	6	7	8	
	63	125	250	500	1000	2000	4000	8000	L_{WA}
Outlet	89	93	93	96	93	90	97	84	101
Inlet	94	89	88	96	85	84	91	78	96

Trane DDP 3 Fan Array AMCA 300 Full Octave Lw (dB, ref 1 pW)*

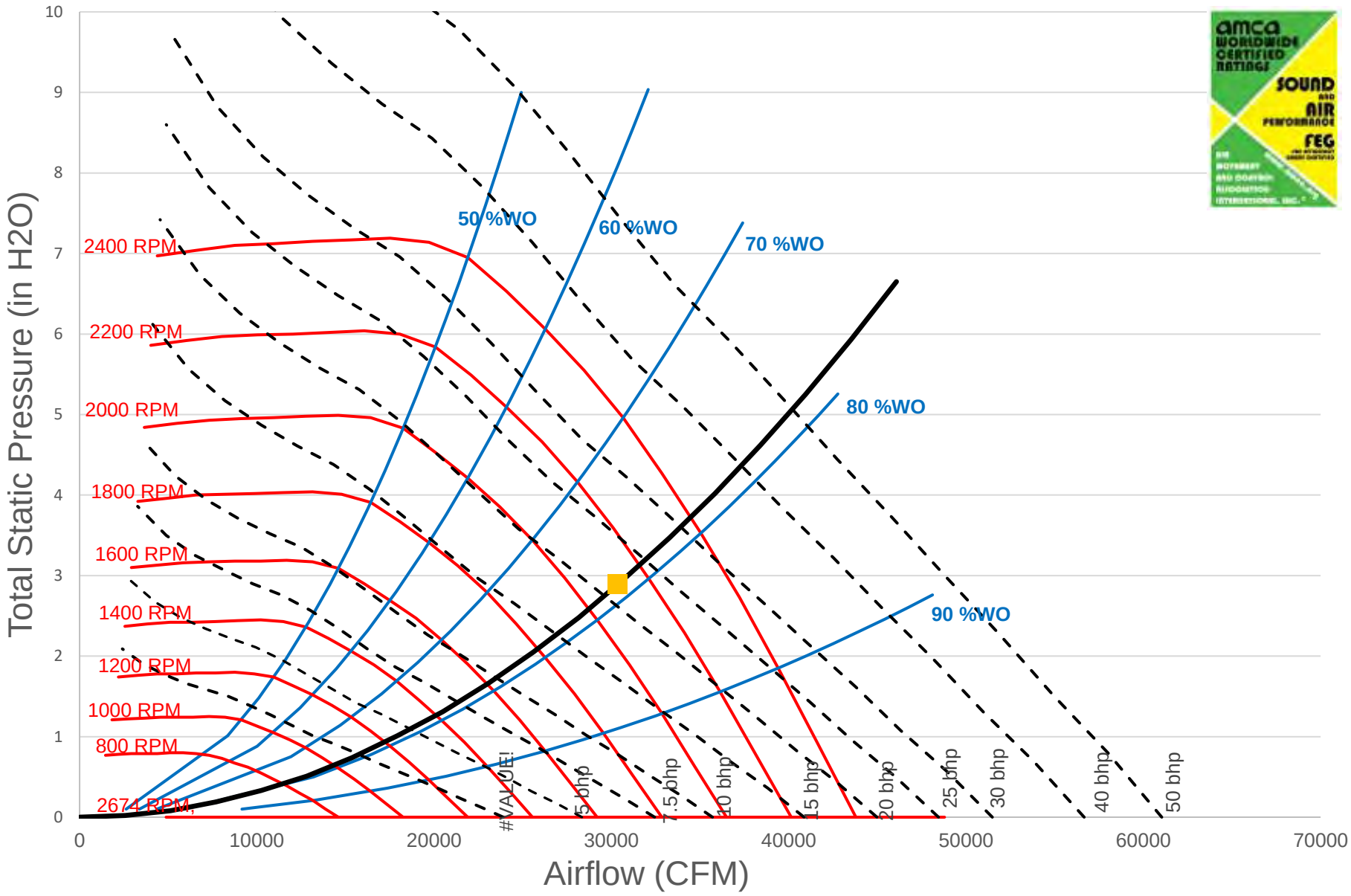
	1	2	3	4	5	6	7	8	
	63	125	250	500	1000	2000	4000	8000	L_{WA}
Outlet	94	98	98	101	98	95	102	89	106
Inlet	99	94	93	101	90	89	96	83	101

* Trane DDP is AMCA certified for L_{WA}. Trane DDP full octave Lw is not licensed by AMCA International.

TRANE TECHNOLOGIES

Westover Hills BH Return AHU-1-4

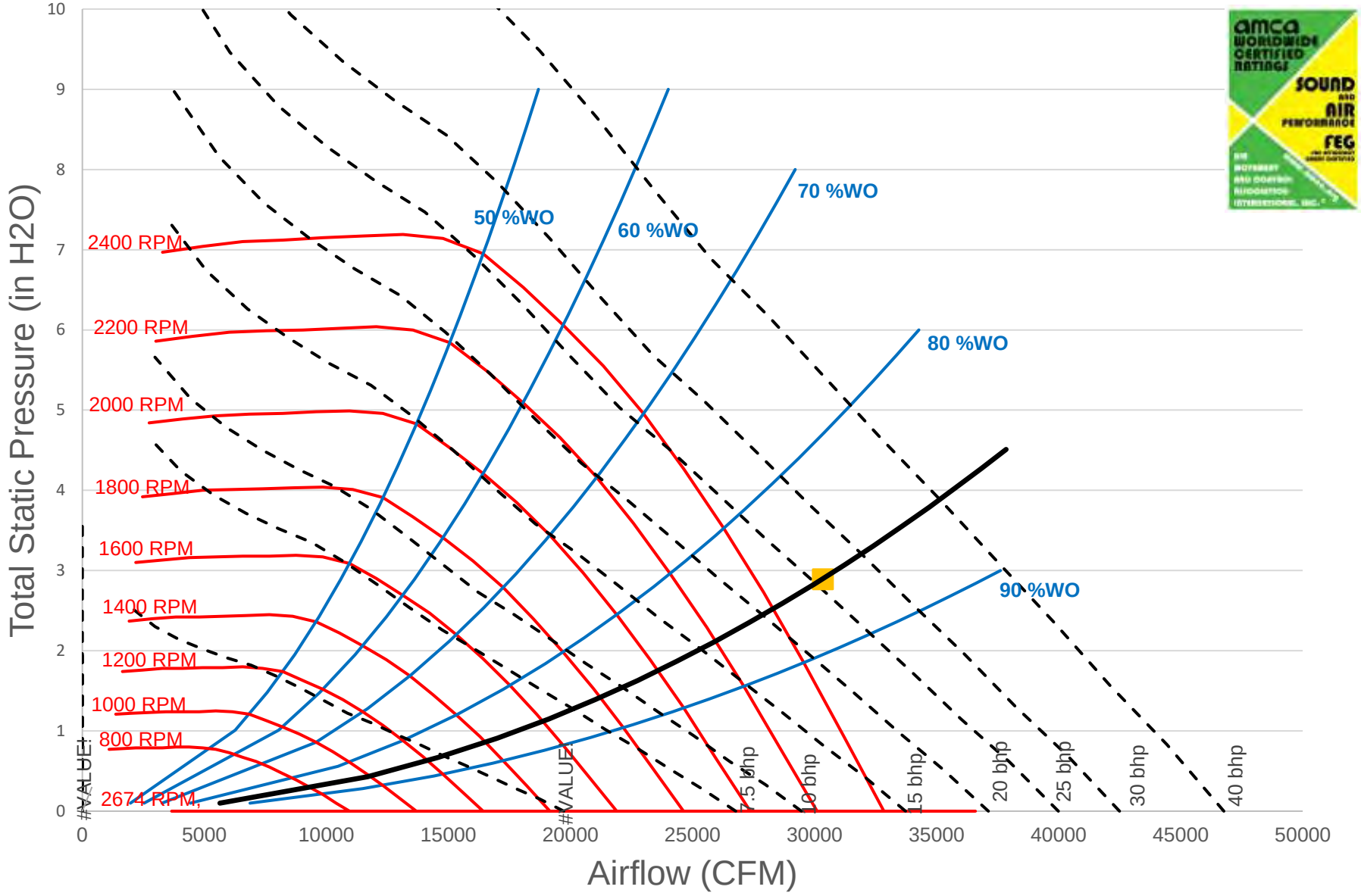
Trane DDP 20 inch AF Class 2 2x2 array 100% width 9 blades AMCA 210



TRANE TECHNOLOGIES

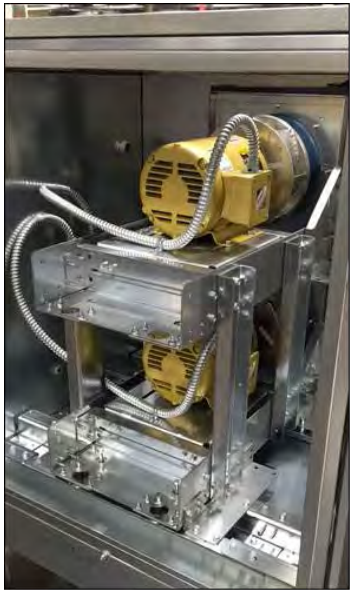
Westover Hills BH Return AHU-1-4

Trane DDP 20 inch AF Class 2 2x2 array 100% width 9 blades n-1 fans 100% redundancy AMCA 210



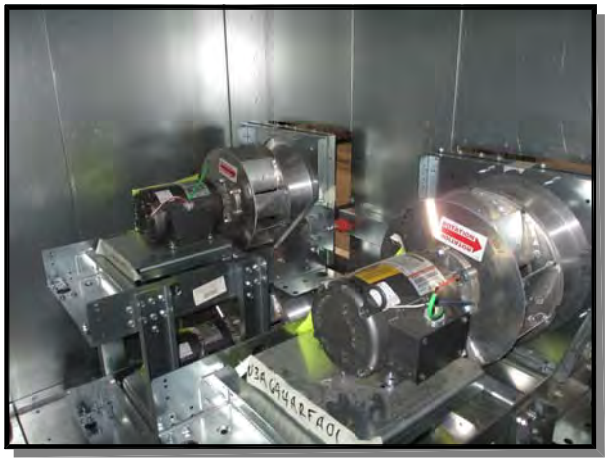
Trane DDP fans

- DIRECT-DRIVE PLENUM FAN SECTION
- The fan type shall be provided as required for stable operation and optimum energy efficiency. The fan shall be a single-width,
- single-inlet, multiblade-type direct-drive plenum fan. Motor bearing life of the direct-drive plenum fan shall be not less than L-10
- 250,000 hrs. Refer to the Product Data section for fan quantity and number of blades selected within each unit. Fans shall be tested
- and rated in-accordance with AHRI Standard 260 for sound performance.
- Motor Frame
- The motor shall be mounted integral to the isolated fan assembly and furnished by the unit manufacturer. The motor is mounted
- inside the unit casing on an adjustable base to permit adjustment of drive belt tension (not applicable for direct drive plenum fans).
- The motor shall meet or exceed all NEMA Standards Publication MG 1 requirements and comply with NEMA Premium efficiency
- levels when applicable except for fractional horsepower motors which are not covered by the NEMA classification. The motor shall
- be T-frame, squirrel cage with size, type, and electrical characteristics as shown on the equipment schedule. Refer to the Product
- Data section for selected fan motors within each unit.
- Two-Inch Spring Isolators
- Direct-drive fan and motor assemblies shall be internally isolated from the unit casing with 2-inch (50.8 mm) deflection spring
- isolators. The isolation system shall be designed to resist loads produced by external forces, such as earthquakes, and conform to
- the current IBC seismic requirements.

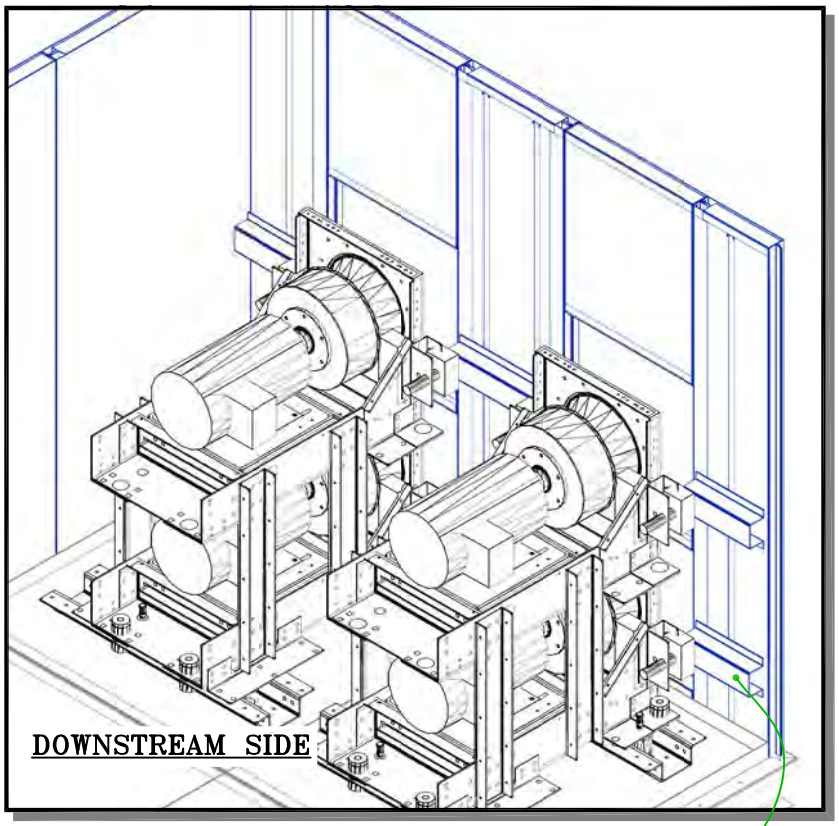


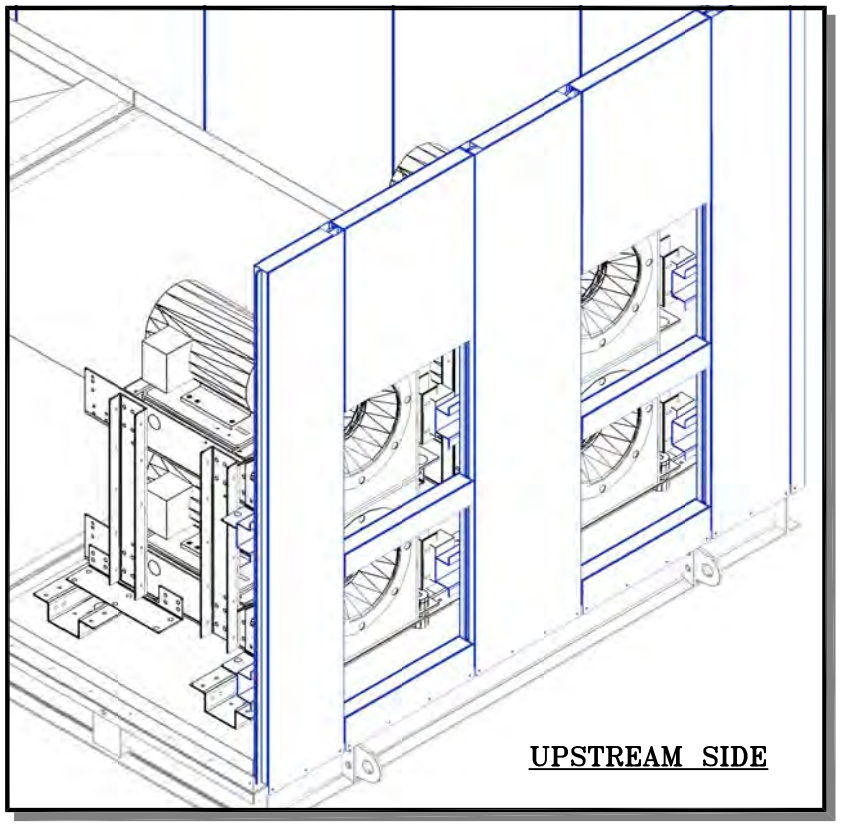
- Utilizing our superior design tactics to optimize the sled and better integrate with our units
- Superior stacking design provides and optimized design with improved performance as there are no performance-affecting walls
- Trane DDP fans are available in class III
- Unit level ratings (AHRI 260) and bare fan certification (AMCA 210 and 300)
- IBC and OSHPD
- Direct and spring-isolated

Focused on performance and flexibility

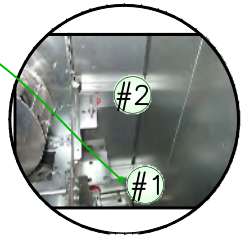


TYPICAL DDP FAN INSTALLATION





TRUST RESTRAIN HAT CHANNEL

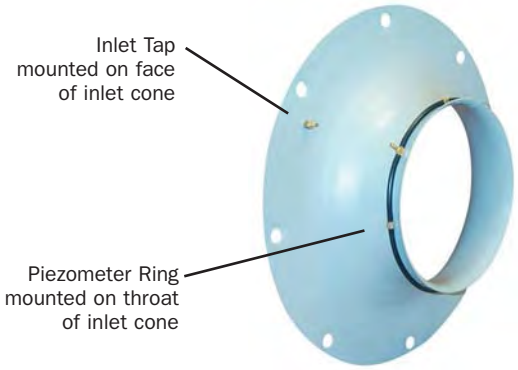


Fan Inlet Airflow Measuring System

A fan inlet airflow measuring system (piezometer) is available on many centrifugal and plenum fans. Trane's system determines airflow using a static pressure differential.

Note: *This type of system is different than a total pressure or thermal dispersion system. As such, the calculations will be different.*

Each system comes with a differential pressure transmitter. The minimum diameter is connected to the LO port of the transmitter and the reference pressure point is connected to (or actually is) the HI port of the transmitter.



Constant Factor K

The constant factor K is unique for each fan and is primarily a function of the area and other geometric properties of the fan inlet. Pre-engineered factors are available from the factory for fan types where the airflow measurement system is available.

Table 51. Constant K Factors

Fan Size (inches) / Type	Fan Class	Fan Name	K-Factor
10.50 AF direct-drive plenum	Any	10 TF, 10 TR, 10 UF, 10 UR	576.00
12 AF direct-drive plenum	Any	12 TF, 12 TR, 12 UF, 12 UR	945.00
13.50 AF direct-drive plenum	Any	13 TF, 13 TR, 13 UF, 13 UR	965.00
15 AF direct-drive plenum	Any	15 TF, 15 TR, 15 UF, 15 UR	1227.00
16 AF direct-drive plenum	Any	16 TF, 16 TR, 16 UF, 16 UR	1519.00
18 AF direct-drive plenum	Any	18 TF, 18 TR, 18 UF, 18 UR	1822.00
20 AF direct-drive plenum	Any	20 TF, 20 TR, 20 UF, 20 UR	2186.00
22 AF direct-drive plenum	Any	22 TF, 22 TR, 22 UF, 20 UR	2714.00
24 AF direct-drive plenum	Any	24 TF, 24 TR, 24 UF, 24 UR	3285.00
27 AF direct-drive plenum	Any	27 TF, 27 TR, 27 UF, 27 UR	3998.00
30 AF direct-drive plenum	Any	30 TF, 30 TR, 30 UF, 30 UR	4945.00

Note: This table to be used for the updated tap design - mid-2014 and beyond. Refer to prior editions of this publication for the previous design.

When a transmitter is supplied for each fan, the factor does not need to be adjusted. The resulting airflow will represent single-fan airflow. At the controller level, the individual airflows should be summed to get the total airflow. If a field-provided K-factor is to be used (see below), the measured airflow for the system should be divided by the number of active fans to get a single-fan K-factor.

Field-obtained factors can provide maximum accuracy. To obtain the factor in the field, measure the differential pressure output from the transmitter while measuring the airflow through the system. Once these two values have been measured, simply solve for K using the following equation:

BALDOR • RELIANCE

Premium Efficient Super-E® Motors

Three Phase,

1/2 thru 200 Hp NEMA 56 thru 447T

Applications: Energy saving applications where continuous or frequent duty is required. Suitable for use with inverter drives for variable torque and constant torque ratings as shown on page 193. NEMA Premium® efficiency. Inverter Ready per NEMA standard MG1 Part 31.4.4.2.

Features: Super-E® / XE motors have Class F insulation, 1.15 service factor, low-loss electrical grade lamination steel, NEMA Premium® efficiency and 3 year warranty.

BALDOR • RELIANCE

Product Information Packet

EHM3313T

10HP,1770RPM,3PH,60HZ,215T,3742M,OPSB,F1

BALDOR • RELIANCE Product Information Packet: EHM3313T - 10HP,1770RPM,3PH,60HZ,215T,3742M,OPSB,F1

Nameplate NP2094E06B03

CAT.NO.	EHM3313T								
SPEC.	37J637T853G1								
HP	10								
VOLTS	230/460								
AMPS	25/12.5								
RPM	1770								
FRAME	215T	**HZ**	60			**PH**	3		
SER.F.	1.15	**CODE**	H	**DES**	B	**CL**	F		
NEMA-NOM-EFF	91.7	**PF**	82						
RATING	40C AMB-CONT								
CC	010A	**USABLE AT 208V**	26						
DE	6307	**ODE**	6206						
AUTO	N	**MANUAL**	N	**NONE**	Y				
ENCL	OPSB	**SN**							
BLANK									

AHU-1-3 RETURN FAN MOTOR

BALDOR • RELIANCE Product Information Packet: EHM3313T - 10HP,1770RPM,3PH,60HZ,215T,3742M,OPSB,F1

AC Induction Motor Performance Data

Record # 53404 - Typical performance - not guaranteed values

Winding: 37WGT853-R026	**Type:** 3742M	**Enclosure:** OPSB

Nameplate Data			
Rated Output (HP)	10		
Volts	230/460		
Full Load Amps	25/12.5		
R.P.M.	1770		
Hz	60	Phase	3
NEMA Design Code	B	KVA Code	H
Service Factor (S.F.)	1.15		
NEMA Nom. Eff.	91.7	Power Factor	82
Rating - Duty	40C AMB-CONT		
S.F. Amps			

460 V, 60 Hz: High Voltage Connection	
Full Load Torque	29.7 LB-FT
Start Configuration	direct on line
Breakdown Torque	87.58 LB-FT
Pull-up Torque	44.18 LB-FT
Locked-rotor Torque	51.57 LB-FT
Starting Current	86.72 A
No-load Current	4.91 A
Line-line Res. @ 25ºC	1.18 Ω
Temp. Rise @ Rated Load	34°C
Temp. Rise @ S.F. Load	43°C
Locked-rotor Power Factor	37.9
Rotor inertia	1.03 LB-FT2

Load Characteristics 460 V, 60 Hz, 10 HP

% of Rated Load	25	50	75	100	125	150	S.F.
Power Factor	48	70	80	84	86	86	83
Efficiency	87.7	91.8	92.2	91.7	90.8	89.5	91.4
Speed	1793	1785	1777	1769	1759	1749	1763
Line amperes	5.6	7.31	9.53	12.15	15	18.24	14.2

BALDOR • RELIANCE

Product Information Packet

EHM2523T

15HP,1765RPM,3PH,60HZ,254T,3948M,OPSB,F1

BALDOR • RELIANCE Product Information Packet: EHM2523T - 15HP,1765RPM,3PH,60HZ,254T,3948M,OPSB,F1

Nameplate NP2094E06B03

CAT.NO.	EHM2523T								
SPEC.	39R006Y375G1								
HP	15								
VOLTS	230/460								
AMPS	36/18								
RPM	1765								
FRAME	254T	**HZ**	60			**PH**	3		
SER.F.	1.15	**CODE**	G	**DES**	A	**CL**	F		
NEMA-NOM-EFF	93	**PF**	85						
RATING	40C AMB-CONT								
CC	010A					**USABLE AT 208V**	38		
DE	6309			**ODE**	6208				
AUTO		**MANUAL**				**NONE**			
ENCL	OPSB	**SN**							
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BALDOR • RELIANCE Product Information Packet: EHM2523T - 15HP,1765RPM,3PH,60HZ,254T,3948M,OPSB,F1

AC Induction Motor Performance Data

Record # 66605 - Typical performance - not guaranteed values

Winding: 39WGY375-R001	**Type:** 3948M	**Enclosure:** OPSB

Nameplate Data			
Rated Output (HP)	15		
Volts	230/460		
Full Load Amps	36/18		
R.P.M.	1765		
Hz	60	Phase	3
NEMA Design Code	A	KVA Code	G
Service Factor (S.F.)	1.15		
NEMA Nom. Eff.	93	Power Factor	85
Rating - Duty	40C AMB-CONT		
S.F. Amps			

460 V, 60 Hz: High Voltage Connection	
Full Load Torque	44.53 LB-FT
Start Configuration	direct on line
Breakdown Torque	141 LB-FT
Pull-up Torque	60.4 LB-FT
Locked-rotor Torque	77.2 LB-FT
Starting Current	117 A
No-load Current	6.37 A
Line-line Res. @ 25ºC	0.62591 Ω
Temp. Rise @ Rated Load	26°C
Temp. Rise @ S.F. Load	32°C
Locked-rotor Power Factor	32.8

Load Characteristics 460 V, 60 Hz, 15 HP

% of Rated Load	25	50	75	100	125	150	S.F.
Power Factor	51	73	81	85	87	87	86
Efficiency	89.9	93.1	93.5	93	92.3	91.2	92.6
Speed	1792	1784.7	1776.9	1768	1759.3	1748.7	1763
Line amperes	7.67	10.4	13.8	17.7	21.8	26.5	20.2

BALDOR • RELIANCE

Product Information Packet

EM2516T-G

25HP,3515RPM,3PH,60HZ,256T,3938M,OPSB,F1

BALDOR • RELIANCE Product Information Packet: EM2516T-G - 25HP,3515RPM,3PH,60HZ,256T,3938M,OPSB,F1

Nameplate NP3553LUA

CAT.NO.	EM2516T-G							
SPEC.	39E366X424G1							
HP	25							
VOLTS	230/460							
AMPS	56/28							
RPM	3515							
FRAME	256T	**HZ**	60	**PH**	3			
SF	1.15	**CODE**	G	**DES**	A	**CLASS**	H	
NEMA NOM. EFF	91.7	**PF**	89					
RATING	40C AMB-CONT							
CC	010A	**USABLE AT 208V**	62					
DE	6309	**ODE**	6208					
ENCL	OPSB	**SN**						
VPWM INVERTER READY								
CT30-60(2:1) VT3-60(20:1)								
USABLE AT	50HZ 25HP 190/380V 68/34A							SF1.0

AHU-1-3 SUPPLY FAN MOTOR

BALDOR • RELIANCE Product Information Packet: EM2516T-G - 25HP,3515RPM,3PH,60HZ,256T,3938M,OPSB,F1

AC Induction Motor Performance Data
Record # 36405
Typical performance - not guaranteed values

Winding: 39WGX424-R006 **Type:** 3938M **Enclosure:** OPSB

Nameplate Data		
Rated Output (HP)		25
Volts		230/460
Full Load Amps		56/28
R.P.M.		3515
Hz	60 **Phase**	3
NEMA Design Code	B **KVA Code**	G
Service Factor (S.F.)		1.15
NEMA Nom. Eff.	91.7 **Power Factor**	89
Rating - Duty		40C AMB-CONT
S.F. Amps		

460 V, 60 Hz: High Voltage Connection	
Full Load Torque	37.2 LB-FT
Start Configuration	direct on line
Breakdown Torque	148 LB-FT
Pull-up Torque	54.9 LB-FT
Locked-rotor Torque	77.2 LB-FT
Starting Current	197 A
No-load Current	8.48 A
Line-line Res. @ 25ºC	0.38245 Ω
Temp. Rise @ Rated Load	46°C
Temp. Rise @ S.F. Load	57°C
Locked-rotor Power Factor	29
Rotor inertia	0.971 LB-FT2

Load Characteristics 460 V, 60 Hz, 25 HP

% of Rated Load	25	50	75	100	125	150	S.F.
Power Factor	50	79	86	89	90	90	90
Efficiency	87.5	91.8	92.3	91.7	90.7	89.4	91.1
Speed	3578.1	3559.4	3538.9	3515.1	3490	3461	3500
Line amperes	13.1	15.8	21.8	28.4	35.6	43.3	32.7

BALDOR • RELIANCE

Product Information Packet

EHM2535T

30HP,1775RPM,3PH,60HZ,286T,4060M,OPSB,F1

BALDOR • RELIANCE Product Information Packet: EHM2535T - 30HP,1775RPM,3PH,60HZ,286T,4060M,OPSB,F1

Nameplate NP2094E06B03

CAT.NO.	EHM2535T								
SPEC.	40J098X339G1								
HP	30								
VOLTS	230/460								
AMPS	72/36								
RPM	1775								
FRAME	286T	**HZ**	60			**PH**	3		
SER.F.	1.15	**CODE**	H	**DES**	A	**CL**	F		
NEMA-NOM-EFF	94.1	**PF**	82						
RATING	40C AMB-CONT								
CC	010A	**USABLE AT 208V**	76						
DE	6311	**ODE**	6309						
AUTO		**MANUAL**		**NONE**					
ENCL	OPSB	**SN**							
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BALDOR • RELIANCE Product Information Packet: EHM2535T - 30HP,1775RPM,3PH,60HZ,286T,4060M,OPSB,F1

AC Induction Motor Performance Data

Record # 56978 - Typical performance - not guaranteed values

Winding: 40WGX339-R001	**Type:** 4060M	**Enclosure:** OPSB

Nameplate Data			
Rated Output (HP)	30		
Volts	230/460		
Full Load Amps	72/36		
R.P.M.	1775		
Hz	60	Phase	3
NEMA Design Code	A	KVA Code	H
Service Factor (S.F.)	1.15		
NEMA Nom. Eff.	94.1	Power Factor	82
Rating - Duty	40C AMB-CONT		
S.F. Amps			

460 V, 60 Hz: High Voltage Connection	
Full Load Torque	88.8 LB-FT
Start Configuration	direct on line
Breakdown Torque	280 LB-FT
Pull-up Torque	130 LB-FT
Locked-rotor Torque	161 LB-FT
Starting Current	252 A
No-load Current	15.4 A
Line-line Res. @ 25ºC	0.22043 Ω
Temp. Rise @ Rated Load	29°C
Temp. Rise @ S.F. Load	35°C
Locked-rotor Power Factor	31.4

Load Characteristics 460 V, 60 Hz, 30 HP

% of Rated Load	25	50	75	100	125	150	S.F.
Power Factor	44	67	77	82	85	85	84
Efficiency	90.5	93.8	94.4	94.3	93.9	93.2	94.1
Speed	1793.6	1788.1	1782.5	1776.9	1770.4	1763.1	1773
Line amperes	17.7	22.5	29	36.3	44.3	53	41.1

TRANE Custom Air Handlers

Westover Hills Baptist Hospital

EQ Number: 23455
Date: Jan 04, 2023
Rev.:

Cooling Coil Schedule

Unit No.	Coil Tag	Air Flow (CFM)	Face Velocity (FPM)	No. Coils	Size H x L Each	Rows	Fins per ft.	Sensible Cooling	Total Cooling	Manufacturer	Model	Fin Design	* Handing
AHU-1-3	CC-1-3	34000	411	4	48x62	8	93	1122.7	1538.1	Trane	W	PE	Right
AHU-1-4	CC-1-4	48000	418	4	49x82	8	147	1905.5	2922.0	Trane	WD	PH	Left

Unit No.	Coil Tag	Ent Temp (Air) DB (F)	Ent Temp (Air) WB (F)	Lvg Temp (Air) DB (F)	Lvg Temp (Air) WB (F)	Ent Temp Fluid (F)	Lvg Temp Fluid (F)	Flow Rate (GPM)	Fluid Press Drop (Ft H_2O)	Air Press Drop (in H_2O)	Fluid	Turbulators
AHU-1-3	CC-1-3	81.0	66.2	51.0	50.9	42.0	57.0	204.4	5.42	0.495	Water	**Included**
AHU-1-4	CC-1-4	84.0	68.5	48.0	47.9	42.0	57.0	388.2	4.75	0.9.36	Water	**Included**

Fin Material	Tube Material	Casing Material	Coating	Flange Size
aluminum 0.0075"	5/8" OD Copper, 0.020" wall	Stainless steel	None	0.750"

* Trane – Hand is determined by facing the coil with air hitting in face.

TRANE

Job Name: Westower Hills Baptist Hospital
Prepared For:
Unit Tag: AHU-1-3 CC
Quantity: 1

Cooling Coil

Equipment Details

Coil utilization	Shipping coil

Coil Construction

Model Number	DW0B48062G0FB093BABB0AA**********
System type	Chilled Water 5/8” Shipping Coil, General (W)
Rows	8
Tube matl/wall thickness	.020 (0.508 mm) copper
Nominal fin spacing	93 fins per foot
Fin material	Aluminum
Fin type	Prima-flo E Standard
Actual coil face area	20.67
Nominal coil height	48" (1219 mm)
Finned length	62" (1575 mm)
Casing option	Stainless
Turbulators	Yes
Rigging weight	2272.5 lb
Installed weight	3063.2 lb
Tube matl/wall thickness	.020 (0.508 mm) copper

Coil Performance

Capacity	
Total capacity	1538.13 MBh
Sensible Capacity	1122.72 MBh
Air	
Elevation	0.00 ft
Actual airflow	34000 cfm
Entering dry bulb	81.00 F
Entering wet bulb	66.20 F
Leaving dry bulb	51.00 F
Leaving wet bulb	50.90 F
APD	0.495 in H2O
Face velocity	411 ft/min

Fluid	
Standard fluid flow rate	204.37 gpm
Entering fluid temp	42.00 F
Leaving water temperature	57.00 F
Fluid PD	5.42 ft H2O
Fluid velocity	1.76 ft/sec
Fluid type	Water
Fouling factor	0.00000 hr-sq ft-deg F/Btu
Volume	23.64 gal
Coil bank volume	94.55 gal
Reynolds number	6374.58 Each
AHRI 410 Classification	
AHRI 410 classification	AHRI ACHC certified
Data generation date	12/19/2022
Trane Select Assist update number	2661

Note: Certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

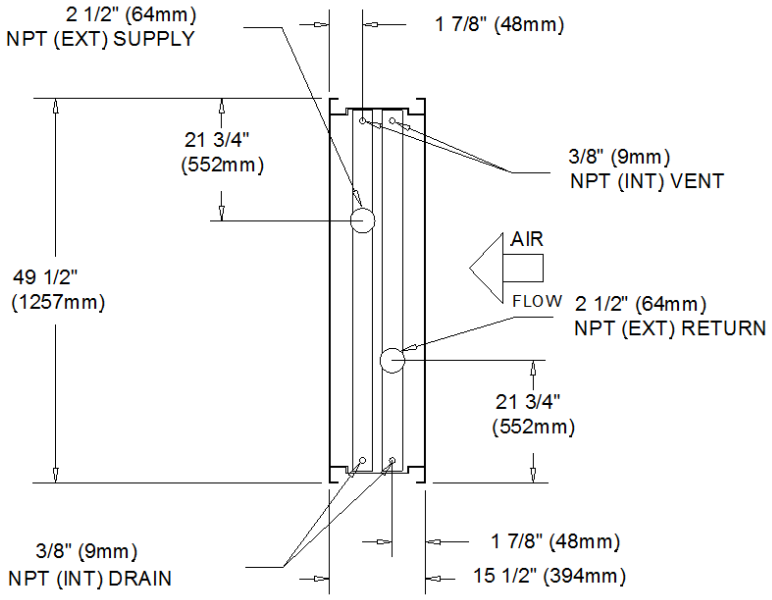
AHRI CERTIFIED

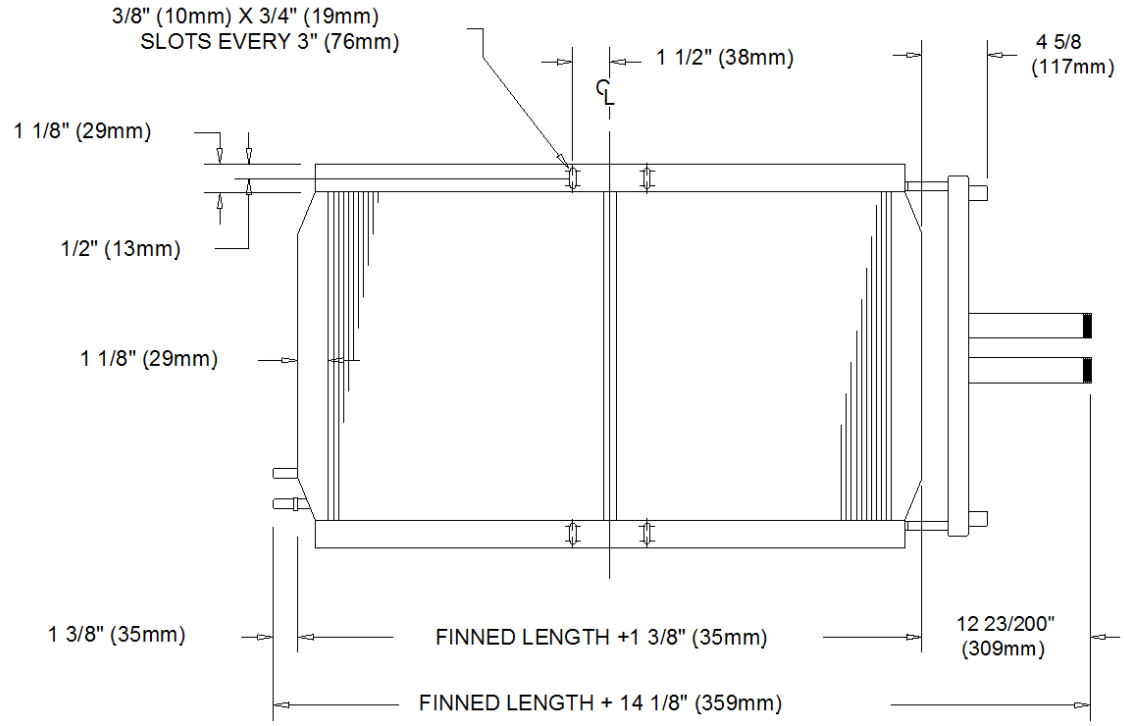
Coil Bank Details

Actual airflow	Total capacity	Sensible Capacity	Standard fluid flow rate	Fluid PD	Volume	Nominal coil height	Rigging weight	Installed weight
8500 cfm	384.53 MBh	280.68 MBh	51.09 gpm	5.42 ft H2O	23.64 gal	48" (1219 mm)	568.1 lb	765.8 lb
8500 cfm	384.53 MBh	280.68 MBh	51.09 gpm	5.42 ft H2O	23.64 gal	48" (1219 mm)	568.1 lb	765.8 lb
8500 cfm	384.53 MBh	280.68 MBh	51.09 gpm	5.42 ft H2O	23.64 gal	48" (1219 mm)	568.1 lb	765.8 lb
8500 cfm	384.53 MBh	280.68 MBh	51.09 gpm	5.42 ft H2O	23.64 gal	48" (1219 mm)	568.1 lb	765.8 lb

Tag: AHU-1-3 CC
Quantity: 1
Customer:
Project:
Name: Westower Hills Baptist Hospital

48" W 8 ROW
RIGHT HAND





Job Name: Westower Hills Baptist Hospital
Prepared For:
Unit Tag: AHU-1-4 CC
Quantity: 1

Cooling Coil

Equipment Details

Coil utilization	Shipping coil

Coil Construction

Model Number	DWDB49082G0FB147EABB0AB**********
System type	Chilled Water 5/8” Shipping Coil, High Water Flow (WD)
Rows	8
Tube matl/wall thickness	.020 (0.508 mm) copper
Nominal fin spacing	147 fins per foot
Fin material	Aluminum
Fin type	Prima-flo H Standard
Actual coil face area	28.19
Nominal coil height	49" (1245 mm)
Finned length	82" (2083 mm)
Casing option	Stainless
Turbulators	Yes
Rigging weight	3666.4 lb
Installed weight	4700.8 lb
Tube matl/wall thickness	.020 (0.508 mm) copper

Coil Performance

Capacity	
Total capacity	2922.04 MBh
Sensible Capacity	1905.45 MBh
Air	
Elevation	0.00 ft
Actual airflow	48000 cfm
Entering dry bulb	84.00 F
Entering wet bulb	68.50 F
Leaving dry bulb	48.00 F
Leaving wet bulb	47.90 F
APD	0.936 in H2O
Face velocity	426 ft/min

Fluid	
Standard fluid flow rate	388.24 gpm
Entering fluid temp	42.00 F
Leaving water temperature	57.00 F
Fluid PD	4.75 ft H2O
Fluid velocity	1.63 ft/sec
Fluid type	Water
Fouling factor	0.00000 hr-sq ft-deg F/Btu
Volume	30.91 gal
Coil bank volume	123.64 gal
Reynolds number	5871.52 Each
AHRI 410 Classification	
AHRI 410 classification	AHRI ACHC certified
Data generation date	12/20/2022
Trane Select Assist update number	2661

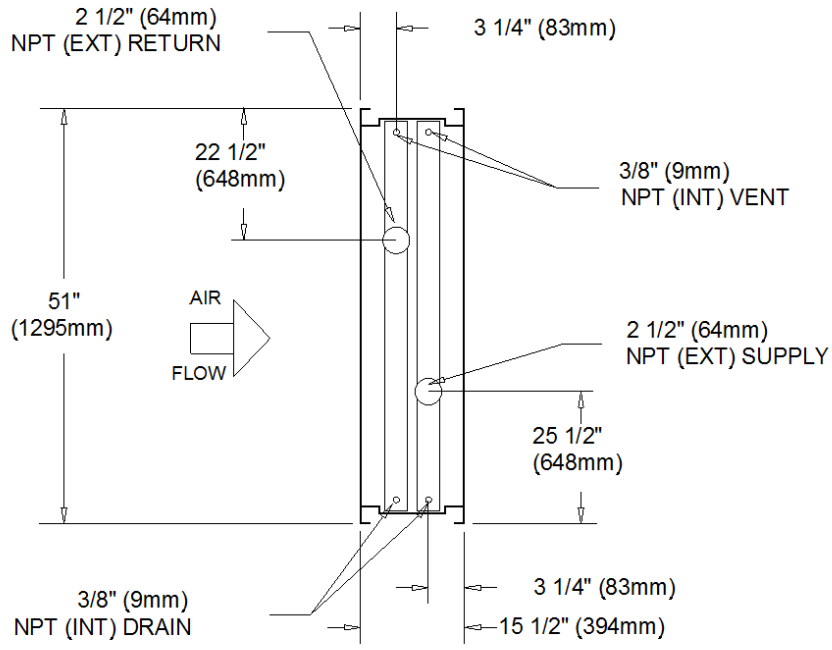
Note: Certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

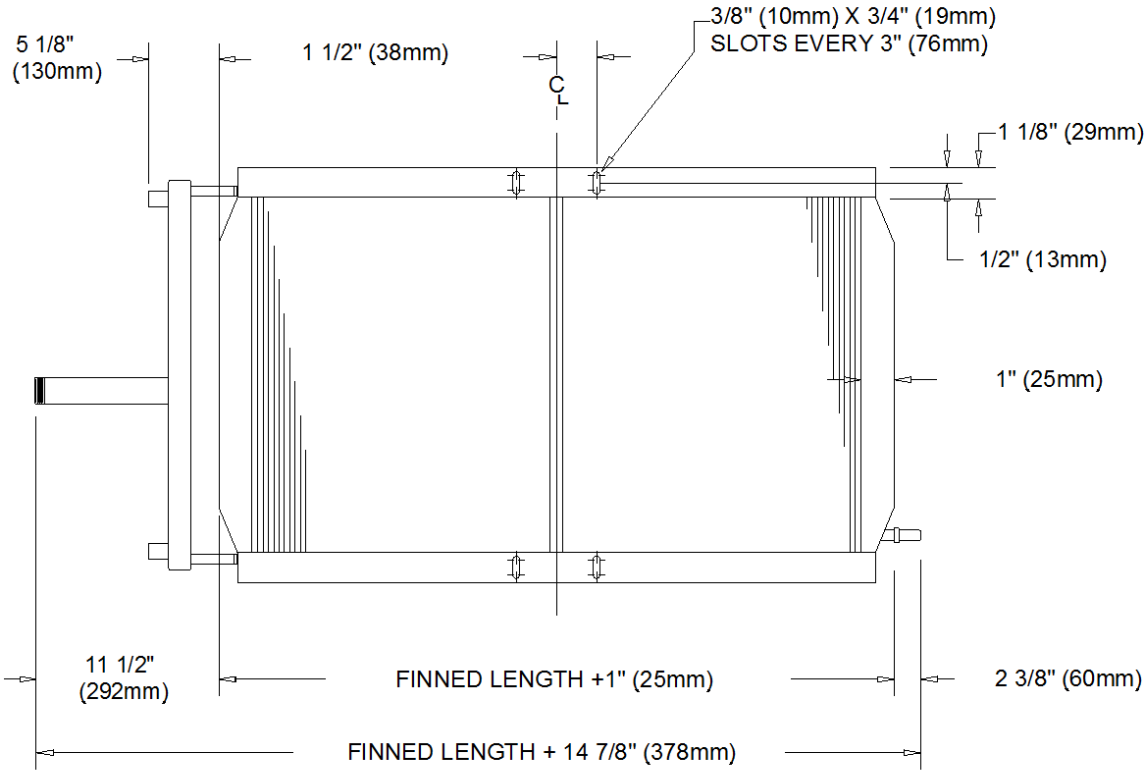
Coil Bank Details

Actual airflow	Total capacity	Sensible Capacity	Standard fluid flow rate	Fluid PD	Volume	Nominal coil height	Rigging weight	Installed weight
12000 cfm	730.51 MBh	476.36 MBh	97.06 gpm	4.75 ft H2O	30.91 gal	49" (1245 mm)	916.6 lb	1175.2 lb
12000 cfm	730.51 MBh	476.36 MBh	97.06 gpm	4.75 ft H2O	30.91 gal	49" (1245 mm)	916.6 lb	1175.2 lb
12000 cfm	730.51 MBh	476.36 MBh	97.06 gpm	4.75 ft H2O	30.91 gal	49" (1245 mm)	916.6 lb	1175.2 lb
12000 cfm	730.51 MBh	476.36 MBh	97.06 gpm	4.75 ft H2O	30.91 gal	49" (1245 mm)	916.6 lb	1175.2 lb

Tag: AHU-1-4 CC
Quantity: 1
Customer:
Project:
Name: Westower Hills Baptist Hospital

49" WD 8 ROW





TRANE Custom Air Handlers

Westover Hills Baptist Hospital

EQ Number: 23455
Date: Jan 04, 2023
Rev.:

Heating Coil Schedule

Unit No.	Coil Tag	Air Flow (CFM)	Face Velocity (FPM)	No. Coils	Size H x L Each	Rows	Fins per ft.	Total Heating (MBH)	Manufacturer	Model	Fin Design	* Handing
AHU-1-3	HC-1-3	15,655	202	4	45x62	1	80	415.9	Trane	5W	PE	Right
AHU-1-4	HC-1-4	27,695	246	4	54x75	1	80	906.9	Trane	5W	PE	Left

Unit No.	Coil Tag	Ent Temp (Air) DB (F)	Lvg Temp (Air) DB (F)	Ent Temp Fluid (F)	Lvg Temp Fluid (F)	Flow Rate (GPM)	Fluid Press Drop (Ft H_2O)	Max Air Pressure (in H_2O)	Fluid	Turbulators
AHU-1-3	HC-1-3	45.2	69.7	150.0	115.3	24.0	0.1	0.013	Water	Not Included
AHU-1-4	HC-1-4	36.8	67.0	150.0	121.9	64.6	053	0.19	Water	Not Included

Fin Material	Tube Material	Casing Material	Coating	Flange Size
aluminum 0.0075"	5/8" OD Copper, 0.020" wall	Stainless steel	None	0.750"

* Trane – Hand is determined by facing the coil with air hitting in face.

Job Name: Westower Hills Baptist Hospital
Prepared For:
Unit Tag: AHU-3-1 HC
Quantity: 1

Heating Coil

Equipment Details

Coil utilization	Shipping coil

Coil Construction

Model Number	D5WB45062G0AA080BABB00A**********
System type	Hot Water 5/8” Shipping Coil, General (5W)
Rows	1
Tube matl/wall thickness	.020 (0.508 mm) copper
Nominal fin spacing	80 fins per foot
Fin material	Aluminum
Fin type	Prima-Flo E Standard
Actual coil face area	19.38
Nominal coil height	45" (1143 mm)
Finned length	62" (1575 mm)
Casing option	Stainless
Turbulators	No
Rigging weight	336.8 lb
Installed weight	448.6 lb
Tube matl/wall thickness	.020 (0.508 mm) copper

Coil Performance

Capacity	
Total capacity	415.86 MBh
Air	
Coil type	5/8” Shipping Coil, General (5W)
Actual airflow	15655 cfm
Entering dry bulb	45.20 F
Leaving dry bulb	69.69 F
APD	0.013 in H2O
Face velocity	202 ft/min

Fluid	
Standard fluid flow rate	24.00 gpm
Entering fluid temp	150.00 F
Leaving fluid temp	115.28 F
Fluid PD	0.09 ft H2O
Fluid velocity	0.44 ft/sec
Fluid type	Water
Volume	3.36 gal
Fouling factor	0.00050 hr-sq ft-deg F/Btu
Reynolds number	4322.76 Each
AHRI 410 Classification	
AHRI 410 classification	Outside scope of AHRI
Data generation date	12/15/2022
Trane Select Assist update number	2660

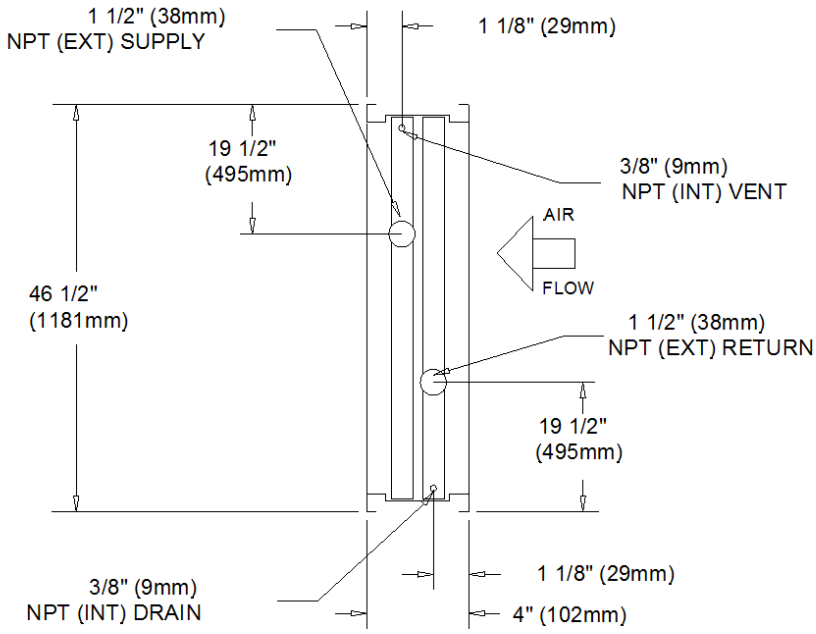
Note: Coil is NOT certified by AHRI. Coil is outside the scope of AHRI Standard 410.

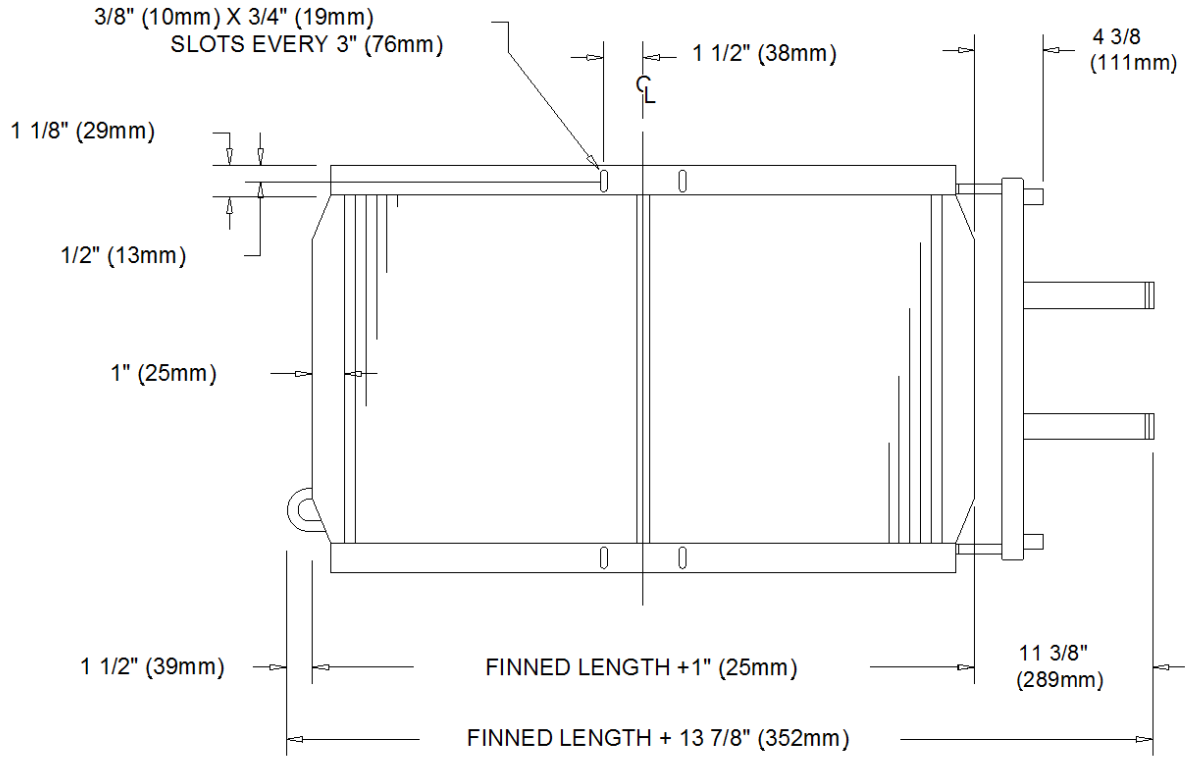
Coil Bank Details

Actual airflow	Total capacity	Fluid PD	Nominal coil height	Rigging weight	Installed weight
3914 cfm	103.96 MBh	0.09 ft H2O	45" (1143 mm)	84.2 lb	112.2 lb
3914 cfm	103.96 MBh	0.09 ft H2O	45" (1143 mm)	84.2 lb	112.2 lb
3914 cfm	103.96 MBh	0.09 ft H2O	45" (1143 mm)	84.2 lb	112.2 lb
3914 cfm	103.96 MBh	0.09 ft H2O	45" (1143 mm)	84.2 lb	112.2 lb

Tag: AHU-3-1 HC
Quantity: 1
Customer:
Project:
Name: Westower Hills Baptist Hospital

45" 5W 1 ROW





Job Name: Westower Hills Baptist Hospital
Prepared For:
Unit Tag: AHU-1-4 HC
Quantity: 1

Heating Coil

Equipment Details

Coil utilization	Shipping coil

Coil Construction

Model Number	D5WB54075G0AA080BABB00B**********
System type	Hot Water 5/8” Shipping Coil, General (5W)
Rows	1
Tube matl/wall thickness	.020 (0.508 mm) copper
Nominal fin spacing	80 fins per foot
Fin material	Aluminum
Fin type	Prima-Flo E Standard
Actual coil face area	28.13
Nominal coil height	54" (1372 mm)
Finned length	75" (1905 mm)
Casing option	Stainless
Turbulators	No
Rigging weight	445.7 lb
Installed weight	598.2 lb
Tube matl/wall thickness	.020 (0.508 mm) copper

Coil Performance

Capacity	
Total capacity	906.85 MBh
Air	
Coil type	5/8” Shipping Coil, General (5W)
Actual airflow	27695 cfm
Entering dry bulb	36.80 F
Leaving dry bulb	66.99 F
APD	0.019 in H2O
Face velocity	246 ft/min

Fluid	
Standard fluid flow rate	64.60 gpm
Entering fluid temp	150.00 F
Leaving fluid temp	121.88 F
Fluid PD	0.53 ft H2O
Fluid velocity	0.99 ft/sec
Fluid type	Water
Volume	4.58 gal
Fouling factor	0.00025 hr-sq ft-deg F/Btu
Reynolds number	9974.06 Each
AHRI 410 Classification	
AHRI 410 classification	AHRI ACHC certified
Data generation date	12/15/2022
Trane Select Assist update number	2660

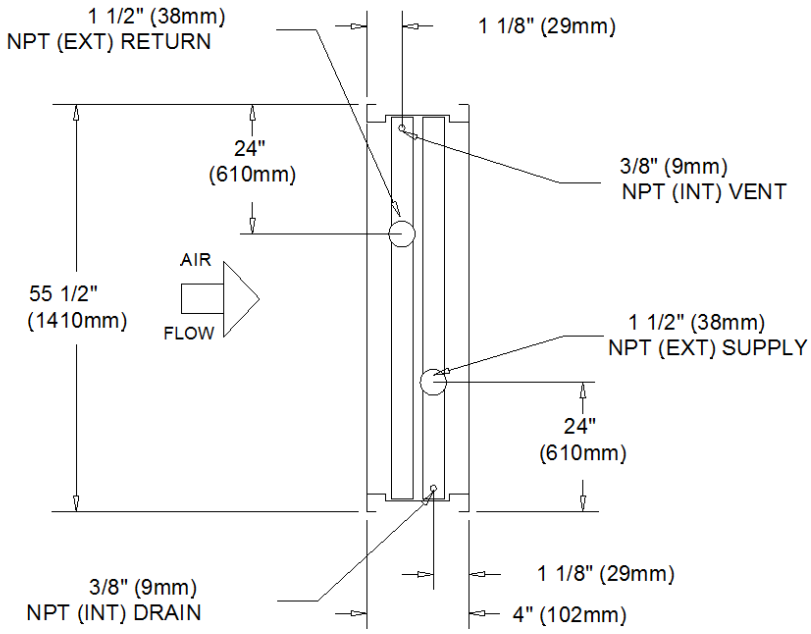
Note: Certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the Range of Standard Rating Conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at www.ahridirectory.org.

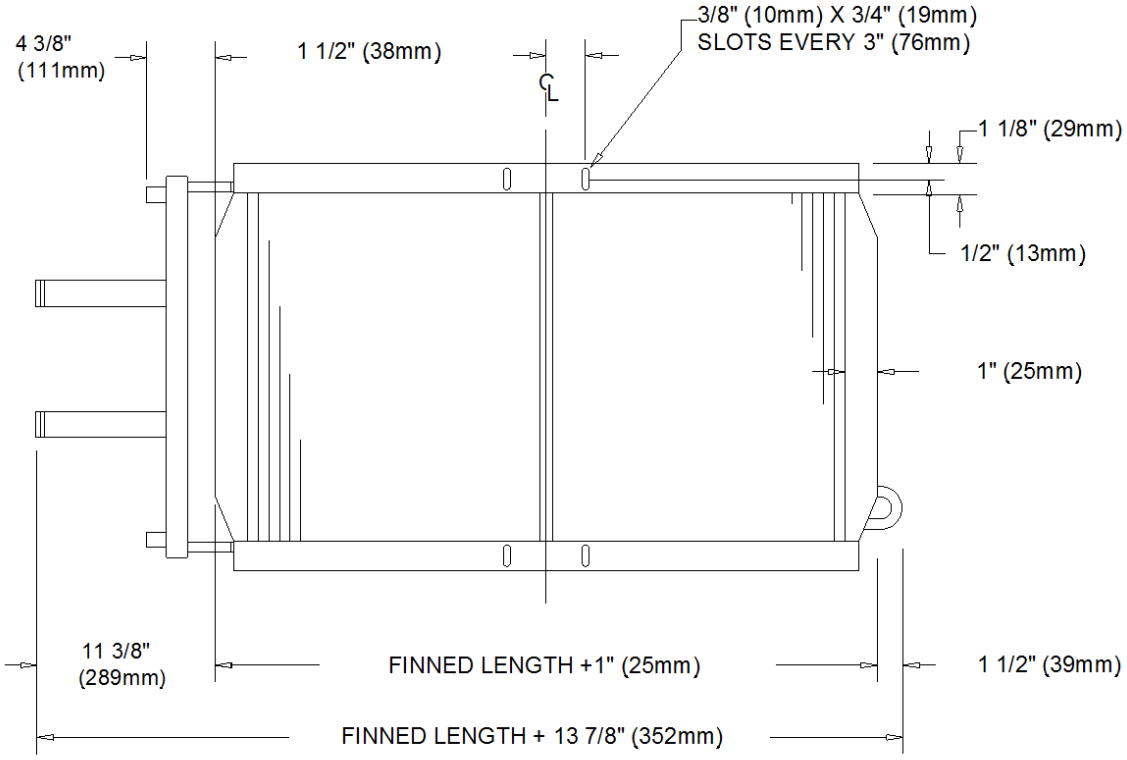
Coil Bank Details

Actual airflow	Total capacity	Fluid PD	Nominal coil height	Rigging weight	Installed weight
6924 cfm	226.71 MBh	0.53 ft H2O	54" (1372 mm)	111.4 lb	149.5 lb
6924 cfm	226.71 MBh	0.53 ft H2O	54" (1372 mm)	111.4 lb	149.5 lb
6924 cfm	226.71 MBh	0.53 ft H2O	54" (1372 mm)	111.4 lb	149.5 lb
6924 cfm	226.71 MBh	0.53 ft H2O	54" (1372 mm)	111.4 lb	149.5 lb

Tag: AHU-1-4 HC
Quantity: 1
Customer:
Project:
Name: Westower Hills Baptist Hospital

54" 5W 1 ROW





Humidifier

Detail Report

Report Information	
Report generated date	12-16-22
Systems/tags included in this report	H-1-3, H-1-4

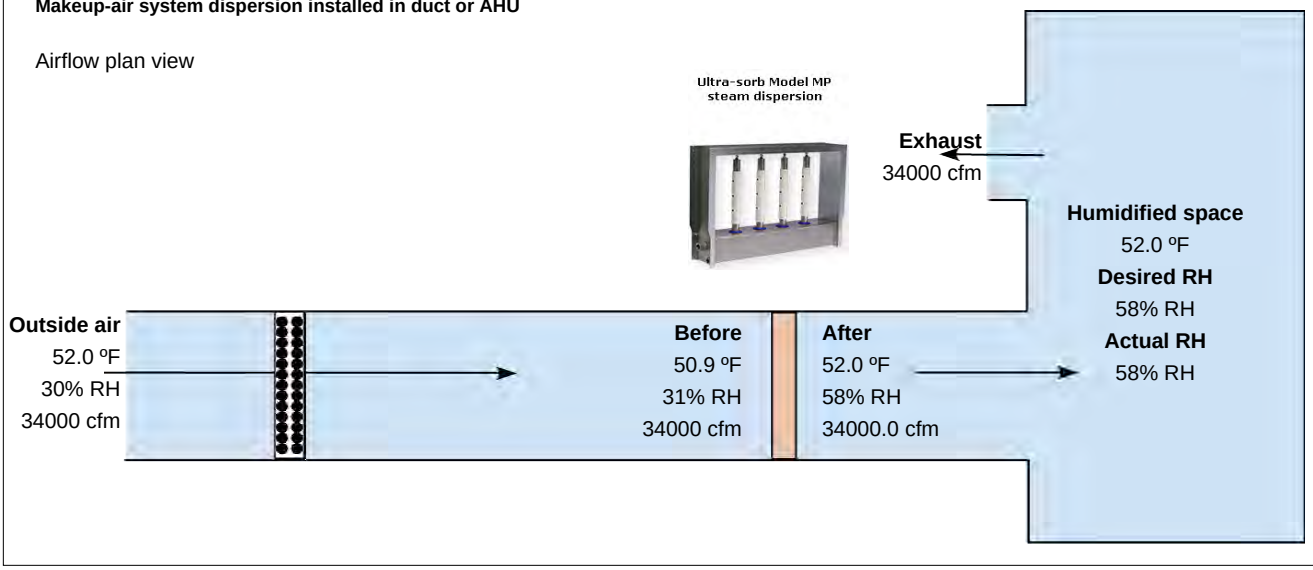
Project Information	
Project name	Westover Hills Baptist Hospital EQ#23455 RevB
Project description	DriSteem Ultra-Sorb Model MP Dispersion Panel
Project ID	206337
System Location	United States

System/tag : H-1-3

System View

Makeup-air system dispersion installed in duct or AHU

Airflow plan view



Load, Mechanical	
System Quantity	1
System Location	United States
Elevation at project site (ft)	789.0
Outside air dry bulb temperature (°F)	52.0
Outside air moisture content (%RH)	30.0
Ventilation system type	Makeup-air System, Dispersion Installed In Duct Or AHU

Load, Mechanical	
Total air volume (cfm)	34000.0
Outside air intake rate	Constant
Outside air intake (cfm)	34000.0
Desired air dry bulb temperature (°F) in humidified space	52.0
Desired air moisture content (% RH) in humidified space	58.0

driSteem™

Detail Report

Project ID: 206337
Project name: Westover Hills Baptist Hospital EQ#23455 RevB
System/tag : H-1-3 (continued)

Load, Mechanical continued	
Actual moisture content (% RH) in humidified space	58.0
Calculated load (lbs/hr)	361.01
Final load(lbs/hr)	361.01

Application: Dispersion	
Dispersion installation location	AHU
Available inside Duct/AHU width (inches)	137.0
Available inside duct/AHU height (inches)	106.0
Header location	Inside AHU
Trap location	Inside AHU
Air movement	Through dispersion assembly perimeter blanked off
Airflow direction	Horizontal

Steam dispersion, Ultra-sorb MP		
Unit quantity	1	
Steam pressure (psi)	25	
Face width (inches)	120.0	
Face height (inches)	78.0	
Duct/AHU wall thickness (inches)	3.0	
Tube diameter (inches)	1.5	
Tube spacing on-center (inches)	12.0	
Tube quantity	10	
Overall dimensions W x H x L (inches)	123.0 X 85.25 X 7.25	
Operating & shipping weight (lbs)	171	193

Options		
Enclosure material	Galvanized steel	
Header and tube material	304 Stainless Steel	
High-efficiency insulated tubes	Yes	
Steam valve provided by	DriSteem	
Steam valve material	Bronze	
Steam valve control type	Electric	
Steam valve voltage (Vac)	24V	
Capacity driven dual valve	No	
Controllability (1/3 - 2/3)	No	
Steam valve 1 size (inches & Cv)	0.75	7.5
Valve max capacity (lbs/hr)	433.65	
Ship assembled	No	

Application	
Energy source	Direct steam

Application: Generation	
NA	

Supply Water Guidelines	
NA	

Steam generation
NA

driSteem™

Detail Report

Project ID: 206337

Project name: Westover Hills Baptist Hospital EQ#23455 RevB

System/tag : H-1-3 (continued)

Performance		
Non-wetting distance (inches)	11	
Heat gain from assembly (°F) / steam (°F)	0.25	0.84
Load plus loss (lbs/hr)	370.32	
Air velocity (ft/min)	523.08	
Airflow pressure drop (inches w.c.)	0.0	

Control Options	
Input signal: others	2-10 Vdc

Steam Connections

Dispersion		
Inlet type and diameter (inches)	Coupling	1
Extended steam inlet length (inches)	15	

Generator	
NA	

Accessories

Dispersion Accessories
· Drane-kooler : Floor Stand
· Strainer 1 : 1.5" Cast Iron
· Steam trap : Cast iron inverted bucket

Generator Accessories
NA

System Accessories

· High-limit humidistat : Electric

· Airflow proving switch : Electric Pressure

Detail Report

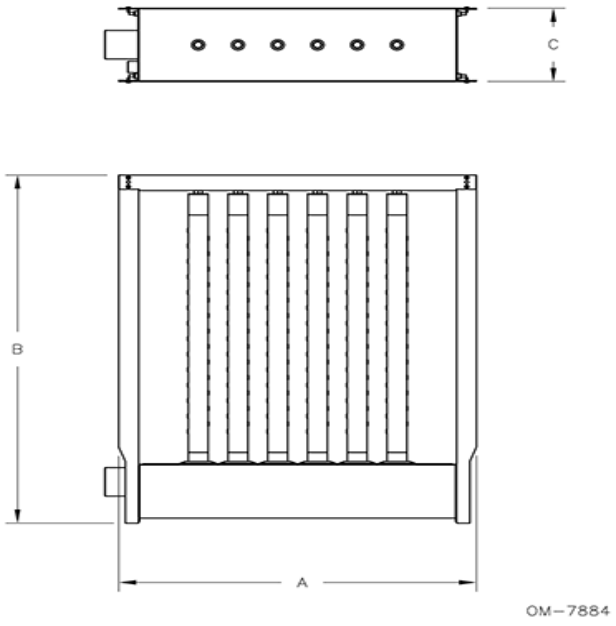
Project ID: 206337

Project name: Westover Hills Baptist Hospital EQ#23455 RevB

System/tag H-1-3

System Drawings

Dispersion dimensions



Dimensions (in.)		
A	B	C
123.0	85.25	7.25

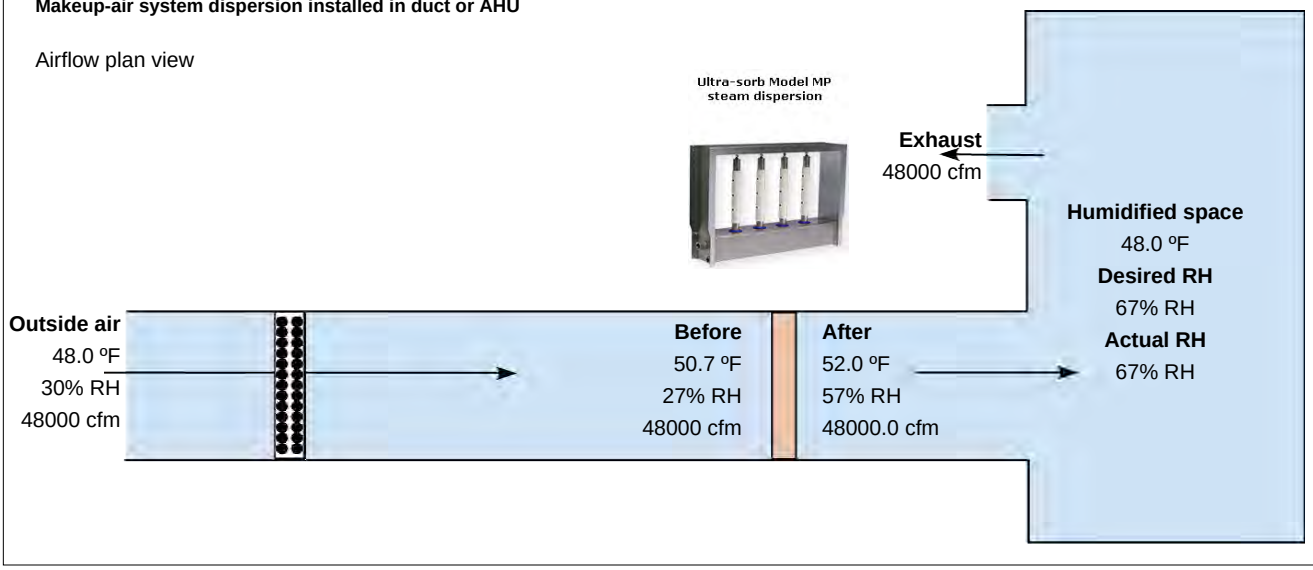
Detail Report

Project ID : 206337 | Project name : Westover Hills Baptist Hospital EQ#23455 RevB | System/tag : H-1-4

System View

Makeup-air system dispersion installed in duct or AHU

Airflow plan view



Load, Mechanical	
System Quantity	1
System Location	United States
Elevation at project site (ft)	789.0
Outside air dry bulb temperature (°F)	48.0
Outside air moisture content (%RH)	30.0
Ventilation system type	Makeup-air System, Dispersion Installed In Duct Or AHU
Total air volume (cfm)	48000.0
Outside air intake rate	Constant
Outside air intake (cfm)	48000.0
Desired air dry bulb temperature (°F) in humidified space	48.0
Desired air moisture content (% RH) in humidified space	67.0
Actual moisture content (% RH) in humidified space	67.0
Calculated load (lbs/hr)	584.56
Final load(lbs/hr)	584.56

Application	
Energy source	Direct steam

Application: Generation	
NA	

Supply Water Guidelines	
NA	

Application: Dispersion	
Dispersion installation location	AHU
Available inside Duct/AHU width (inches)	168.0
Available inside duct/AHU height (inches)	116.0
Header location	Inside AHU
Trap location	Inside AHU
Air movement	Through dispersion assembly perimeter blanked off
Airflow direction	Horizontal

driSteem™

Detail Report

Project ID: 206337

Project name: Westover Hills Baptist Hospital EQ#23455 RevB

System/tag : H-1-4 (continued)

Steam dispersion, Ultra-sorb MP		
Unit quantity	1	
Steam pressure (psi)	25	
Face width (inches)	144.0	
Face height (inches)	93.0	
Duct/AHU wall thickness (inches)	2.0	
Tube diameter (inches)	2	
Tube spacing on-center (inches)	12.0	
Tube quantity	12	
Overall dimensions W x H x L (inches)	147.0 X 100.25 X 7.25	
Operating & shipping weight (lbs)	232	262

Steam generation	
NA	

Options		
Enclosure material	Galvanized steel	
Header and tube material	304 Stainless Steel	
High-efficiency insulated tubes	Yes	
Steam valve provided by	DriSteem	
Steam valve material	Bronze	
Steam valve control type	Electric	
Steam valve voltage (Vac)	24V	
Capacity driven dual valve	No	
Controllability (1/3 - 2/3)	No	
Steam valve 1 size (inches & Cv)	1.0	12.0
Valve max capacity (lbs/hr)	693.84	
Ship assembled	No	

Performance		
Non-wetting distance (inches)	13	
Heat gain from assembly (°F) / steam (°F)	0.3	0.96
Load plus loss (lbs/hr)	600.53	
Air velocity (ft/min)	516.13	
Airflow pressure drop (inches w.c.)	0.0	

Control Options	
Input signal: others	2-10 Vdc

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Detail Report

Project ID: 206337

Project name: Westover Hills Baptist Hospital EQ#23455 RevB

System/tag : H-1-4 (continued)

Steam Connections

Dispersion		
Inlet type and diameter (inches)	Coupling	1
Extended steam inlet length (inches)	15	

Generator	
NA	

Accessories

Dispersion Accessories
· Drane-kooler : Floor Stand
· Strainer 1 : 1.5" Cast Iron
· Steam trap : Cast iron inverted bucket

Generator Accessories
NA

System Accessories

· High-limit humidistat : Electric

· Airflow proving switch : Electric Pressure

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Detail Report

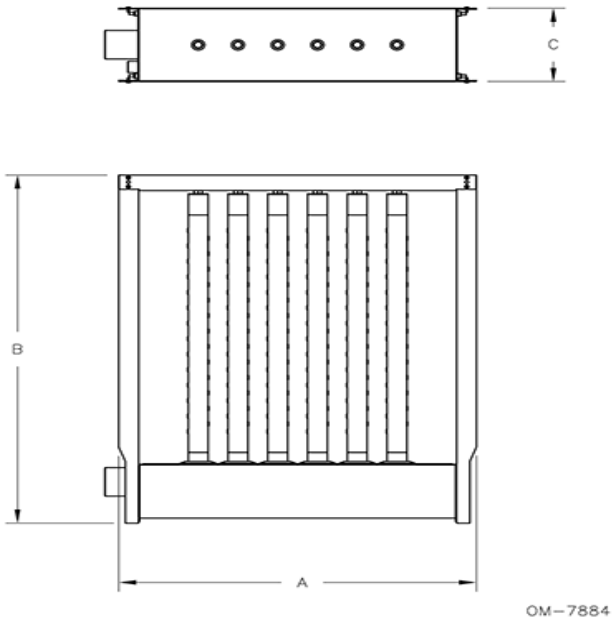
Project ID: 206337

Project name: Westover Hills Baptist Hospital EQ#23455 RevB

System/tag H-1-4

System Drawings

Dispersion dimensions



Dimensions (in.)		
A	B	C
147.0	100.25	7.25

TRANE Custom Air Handlers

Westover Hills Baptist Hospital

EQ Number: 23455
Date: Jan 04, 2023
Rev.:

Damper Schedule

Unit No.	Qty.	Service	Damper WXH (in)	CFM	Velocity (FPM)	Blade Action	Torque (in-lbs)	Manufacturer	Model	Actuators Provided?	Feature Codes
AHU-1-3	1	Outside air	60x96	34,000	850	Opposed	280	Ruskin	CD60	No	FF
AHU-1-3	1	Return air	50x84	2,6650	914	Opposed	205	Ruskin	CD60	No	FF
AHU-1-3	1	Exhaust air	42x96	26,650	952	Oppose	196	Ruskin	CD60	No	FF
AHU-1-3	4	Supply Fan ISO	29.3x27.3	8500	1530	Parallel	N/A	Trane	BD200	N/A	FF
AHU-1-3	4	Return Fan ISO	29.3x27.3	6663	1120	Parallel	N/A	Trane	BD200	N/A	FF
AHU-1-4	1	Outside air	66x102	48,000	1027	Opposed	328	Ruskin	CD60	No	FF
AHU-1-4	1	Return air	56x84	30,350	929	Opposed	229	Ruskin	CD60	No	FF
AHU-1-4	1	Exhaust air	48x96	30,350	948	Oppose	224	Ruskin	CD60	N0	FF
AHU-1-4	4	Supply Fan ISO	36.5x34.5	12,000	1372	Parallel	N/A	Trane	BD270	N/A	FF
AHU-1-4	4	Return Fan ISO	29.3x27.3	7588	1366	Parallel	N/A	Trane	BD200	N/A	FF

Feature Codes

FF	Front Flange
RF	Rear Flange

RUSKIN®

3900 Dr. Greaves Rd. • Kansas City, MO 64030 • (816) 761-7476 • FAX (816) 765-8955

CD60

AMCA CLASS 1A LEAKAGE RATED, HIGH PERFORMANCE CONTROL DAMPER

APPLICATION

Ruskin model CD60 incorporates an exclusive one-piece steel frame construction, making it the engineer's preferred frame design with no fasteners required. Frame corners are internally braced and machine staked. Exclusive one-piece aerodynamic dual skin airfoil blades are suitable for medium and high pressure velocity applications. Blade edge seals are mechanically fastened to ensure years of sustainable performance and reliability. Frame and blade construction, in concert with compression type chambered jamb seals, ensures leakage performance on par with requirements of the International Energy Conservation Code (IECC). Factory mounted and commissioned actuators are among the available options.

STANDARD CONSTRUCTION

FRAME
5" x 1" x 16 gauge (127 x 25 x 1.6) hot dipped galvanized steel hat channel reinforced with corner braces.

BLADES
Galvanized steel, one piece airfoil shaped, construction of 14 gauge (2.0) equivalent thickness, typically 6" (152) wide, maximum 8 5/8" wide. Opposed blade action standard, parallel blade action optional.

AXLES
1/2" (13) plated steel hex.

BEARINGS
Oil impregnated, self-lubricating, stainless steel sleeve.

BLADE SEALS
Ruskiprene blade edge seals mechanically fastened to blades.

JAMB SEALS
300 Series stainless steel cambered compression type.

LINKAGE
Shake proof Swedgelock™ plated steel assembly, concealed out of airstream.

CONTROL SHAFT
1/2" (13) dia. x 6" (152) long plated steel shaft on single section units.
1/2" (13) dia. jackshaft on multi-section assemblies up to 12 1/2 ft² (1.16 m²) and 1" (25) dia. jackshaft multi-section assemblies over 12 1/2 ft² (1.16 m²)

MAX PRESSURE
Up to 13 inches w.g. (see Performance Data on page 2).

MAX VELOCITY
Up to 6000 FPM (see Performance Data on page 2).

LEAKAGE
Class 1A (see Performance Data on page 2).

TEMPERATURE LIMITS
-72°F (-58°C) minimum and +275°F (+135°C) maximum.

MINIMUM SIZE
Single blade – 8"w x 6"h (203 x 152).
Two blades, opposed or parallel action: 8"w x 10"h (203 x 254).

MAXIMUM SIZE
Single section – 60"w x 72"h (1524 x 1829).
Multiple section assembly – Unlimited size.
*Units over 60"w or 72"h (1524 x 1829) are broken down into 48"w (1219) max sections.

ESTIMATED SHIPPING WEIGHT
7 lbs. (3.2kg) per square foot.

MEMBER OF

CERTIFICATE NUMBER AJA07/11923.

FEATURES

- One-piece airfoil blade for low pressure drop.
- One-piece interlocking frame design to reduce racking.
- Positive lock axles, noncorrosive bearings and shake proof linkage for low maintenance operation.

VARIATIONS

Ruskin model CD60 is available with the following variations at additional charge.

- Factory mounted and commissioned electric and pneumatic actuators, chain pull devices and manual locking handles.
- Front, rear or double flange frame with or without bolt holes.
- Stainless steel axles and linkage.
- SP100 switch package to remotely indicate damper blade position.
- Factory mounted sleeves with optional round or oval transitions.
- Enamel and epoxy finishes.
- Silicone blade edge seals.

NOTES

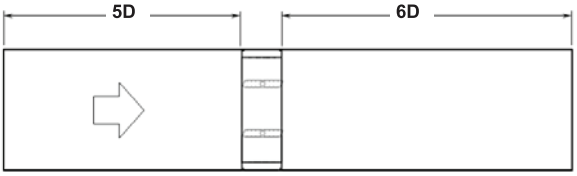
* Value shown in parenthesis ( ) are millimeters unless otherwise indicated.
* Units furnished approximately 1/4" (6) smaller than given opening dimensions.

AMCA LICENSED PERFORMANCE DATA

Pressure Drop Data

CD60 air performance testing is performed in accordance with AMCA Standard 500-D configuration 5.3 as illustrated below. All data are corrected to standard air density of .075 lb/ft³ (1.201 kg/m³).

$$D = \sqrt{\frac{4\,(W)\,(H)}{3.14}}$$



AMCA figure 5.3 was established to represent a fully ducted damper with straight duct upstream and downstream. With entrance and exit losses minimized by this straight duct arrangement, this configuration has the lowest pressure drop of all three configurations.

12" x 12" (305 x 305)		24" x 24" (610 x 610)		36" x 36" (914 x 914)		12" x 48" (305 x 1219)		48" x 12" (1219 x 305)	
Velocity (fpm)	Pressure Drop (in.wg)	Velocity (fpm)	Pressure Drop (in.wg)	Velocity (fpm)	Pressure Drop (in.wg)	Velocity (fpm)	Pressure Drop (in.wg)	Velocity (fpm)	Pressure Drop (in.wg)
499	0.02	506	0.005	517	0.005	508	0.005	509	0.01
869	0.06	998	0.03	1007	0.02	1002	0.03	1005	0.04
1417	0.17	1514	0.06	1404	0.03	1519	0.06	1523	0.08
1980	0.34	2012	0.11	1949	0.05	2019	0.10	2024	0.16
2986	0.79	2867	0.22	3004	0.12	2883	0.21	2884	0.32

Leakage Data

Air Leakage testing is performed in accordance with ANSI/AMCA Standard 500-D, figure 5.5.

Data are based on a torque of 7 in-lbs/ft² (.56 N.m./m²) applied to close and seat the damper during the test.

Air Leakage is based on operation between 32°F - 120°F (0°C - 49°C).

CD60	LEAKAGE CLASS*			
Maximum Damper Width	1" w.g. (0.25 kPa)	4" w.g. (1 kPa)	8" w.g. (2 kPa)	10" w.g. (2.5 kPa)
60" (1524)	1A	1	NA	NA

*** Leakage Class Definitions**

As defined by AMCA, the maximum allowable leakage is as follows:

Leakage Class 1A (is only defined @ 1" wg)
- 3 cfm/ft² (.92 cmm/m²) @ 1" wg (0.25 kPa)

Leakage Class 1
- 4 cfm/ft² (1.22 cmm/m²) @ 1" wg (0.25 kPa)
- 8 cfm/ft² (2.44 cmm/m²) @ 4" wg (1 kPa)
- 11.3 cfm/ft² (3.45 cmm/m²) @ 8" wg (2 kPa)
- 12.6 cfm/ft² (3.85 cmm/m²) @ 10" wg (2.5 kPa)

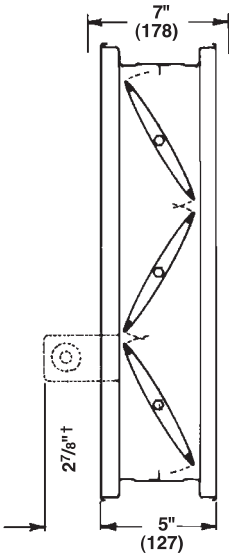
Maximum System Velocity and Pressure

The CD60 may be used in systems with total pressures exceeding 3.5" w.g. (.09 kPA) and velocities exceeding 3000 fpm (15.2 m/s) by reducing damper section width as indicated below:

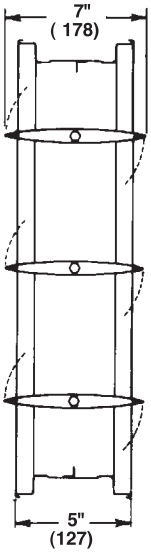
VELOCITY AND PRESSURE DATA		
DAMPER WIDTH INCHES	**MAXIMUM SYSTEM PRESSURE In. wg (kPa)**	**MAXIMUM SYSTEM VELOCITY FPM (m/s)**
60" (1524)	3.5" (0.9)	3000 (15.2)
48" (1219)	6.2" (1.5)	4000 (20.3)
36" (914)	8.5" (2.1)	4000 (20.3)
24" (610)	10.8" (2.7)	5000 (25.4)
12" (305)	13.0" (3.25)	6000 (30.5)

Ruskin Company certifies that model CD60 shown herein is licensed to bear the AMCA seal. The AMCA Certified Ratings Seal applies to Air Leakage and Air Performance ratings. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program.

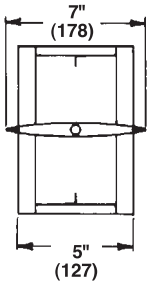
DIMENSIONAL INFORMATION



OPPOSED BLADE



PARALLEL BLADE



Low profile frame illustrated is typical for units under 12" (305) high.

CD60 SUGGESTED SPECIFICATION

Furnish and install, at locations shown on plans, or in accordance with schedules AMCA certified, low leakage airfoil control dampers meeting the following minimum construction standards. Control dampers shall be produced in an ISO9001 certified factory. Frame shall be one-piece uniframe construction of 16 ga. (1.6) galvanized steel roll formed hat channel structurally equivalent to a minimum 13 ga. (2.4) frame. Blades shall be 14 ga. (2.0) equivalent galvanized steel, roll-formed airfoil type for low pressure drop and low noise generation. Blade edge seals shall be Ruskiprene™ TPV type or equivalent mechanically locked into the blade edge. Adhesive or clip-on type seals are unacceptable. Jamb seals shall be stainless steel chambered compression type to prevent leakage between blade end and damper frame. Blade end overlapping frame is unacceptable. Multiple section dampers must have factory installed jackshafts unless clearly eliminated by engineer. Bearings shall be 304 stainless steel, oil impregnated, and self-lubricating sleeve type with a 450 pound (204 kg) minimum radial crush load. Bearings shall turn in extruded holes in the damper frame. Axles shall be hexagonal positively locked into the damper blade. Linkage shall be concealed out of airstream, within the damper frame to reduce pressure drop and noise. Temperature limits shall be -72°(-58°C) to +275°F (+135°C). Submittal must include leakage, maximum air flow and maximum pressure ratings based on AMCA Publication 500. Damper shall be tested and licensed in accordance with AMCA 511 for Air Performance and Air Leakage. Damper widths from 12" to 60" (305 to 1524) wide shall not leak any greater than 3 cfm/sq.ft. at 1" w.g. (15.2 l/s-m^2 at .25 kPa). Dampers shall be equivalent in all respects to Ruskin Model CD60.

	REVISION	VERSION
DRAWING	D	D

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES. TOLERANCE:
.X ± 0.0
.XX ± 0.03
.XXX ± 0.000
FINISH
ANGLES ± 3.0 ° HOLE DIA ± .005 / .005
CONFORMS TO ASME Y14.5M-1994.

TRANE

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DRAWN BY: A. LIN DRAWN DATE: 12-01-2016

DO NOT SCALE PRINT

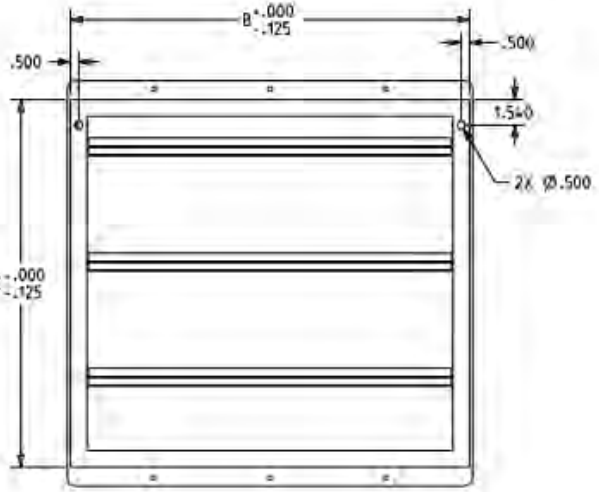
THIRD ANGLE PROJECTION

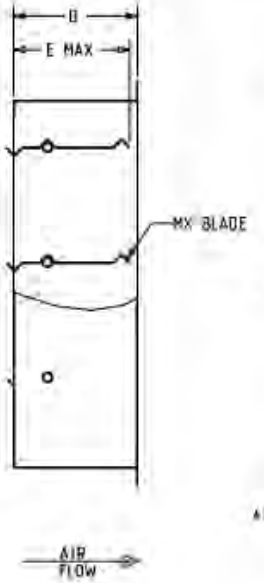
49513756 SHEET 1 OF 2 REV D

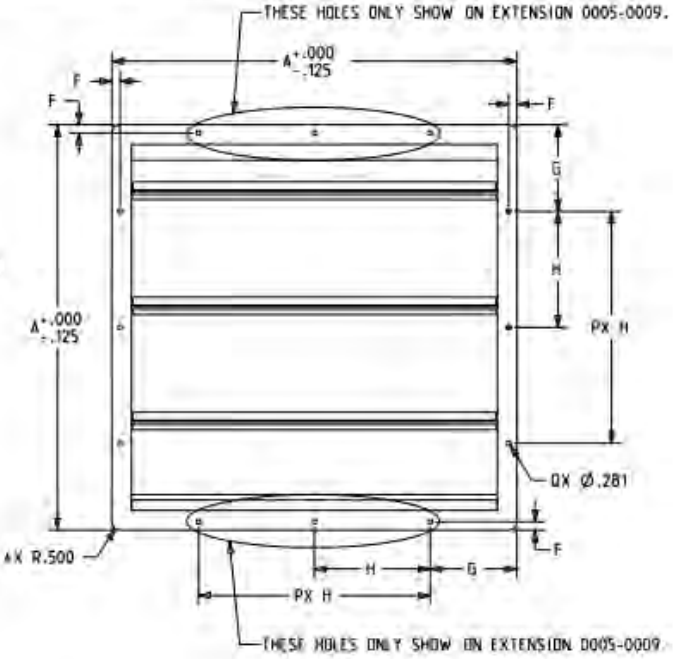
DAMPER BACKDRAFT

NOTES:
1. CHANGES TO THIS PRINT MAY AFFECT PURCHASING AND VENDOR. NOTIFY THEM OF CHANGES.
2. CONFORMS TO TRANE S65380222.
3. DAMPERS ARE FOR HORIZONAL BLADE INSTALLATION.

EXT	NAME	A	B	C	D	E	F	G	H	P	Q	M	WEIGHT
495137560001	DAMPER: BACKDRAFT 105 DDP FAN	16.125	15.750	13.830	7.500	7.250	.313	3.063	5.000	2	6	2	11.3
495137560002	DAMPER: BACKDRAFT 122 DDP FAN	19.188	18.813	16.893	7.500	7.250	.500	4.594	5.000	2	6	3	13.7
495137560003	DAMPER: BACKDRAFT 135 DDP FAN	20.000	19.625	17.705	7.500	7.250	.500	5.000	5.000	2	6	3	14.3
495137560004	DAMPER: BACKDRAFT 150 DDP FAN	22.500	22.125	20.205	7.500	7.250	.500	4.250	7.000	2	6	3	17.4
495137560005	DAMPER: BACKDRAFT 165 DDP FAN	24.500	24.125	22.205	7.500	7.250	.500	5.250	7.000	2	12	3	19.3
495137560006	DAMPER: BACKDRAFT 182 DDP FAN	27.125	26.750	24.830	7.500	7.250	.500	6.563	7.000	2	12	4	21.5
495137560007	DAMPER: BACKDRAFT 200 DDP FAN	29.625	29.250	27.330	7.500	7.250	.500	2.313	5.000	5	24	4	25.3
495137560008	DAMPER: BACKDRAFT 222 DDP FAN	31.875	31.500	29.580	7.500	7.250	.500	3.438	5.000	5	24	4	27.7
495137560009	DAMPER: BACKDRAFT 245 DDP FAN	34.375	34.000	32.080	7.500	7.250	.500	6.688	7.000	3	16	5	31.5
495137560012	DAMPER: BACKDRAFT FAN 400 MI	16.438	16.063	14.143	9.750	6.500	.688	2.750	5.469	2	6	2	13.3
495137560013	DAMPER: BACKDRAFT FAN 450 MI	20.500	20.125	18.205	9.750	6.500	.688	2.750	5.000	3	8	3	17.0
495137560014	DAMPER: BACKDRAFT FAN 500 MI	21.500	21.125	19.205	9.750	6.500	.688	2.750	5.333	3	8	3	18.0
495137560015	DAMPER: BACKDRAFT FAN 560, 630 MI	25.500	25.125	23.205	9.750	6.500	.688	2.750	5.000	4	10	4	72.8







	REVISION	VERSION
DRAWING	D	0

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN INCHES. TOLERANCE:
.X ±0.0
.XX ±0.03
.XXX ±0.000
FINISH
ANGLES ±3.0°
HOLE DIA +.005 -.005
CONFORMS TO ASME Y14.5M-1994.

TRANE

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DRAWN BY: K. LIN TRANE DATE 12-OCT-2016

DO NOT SCALE PRINT

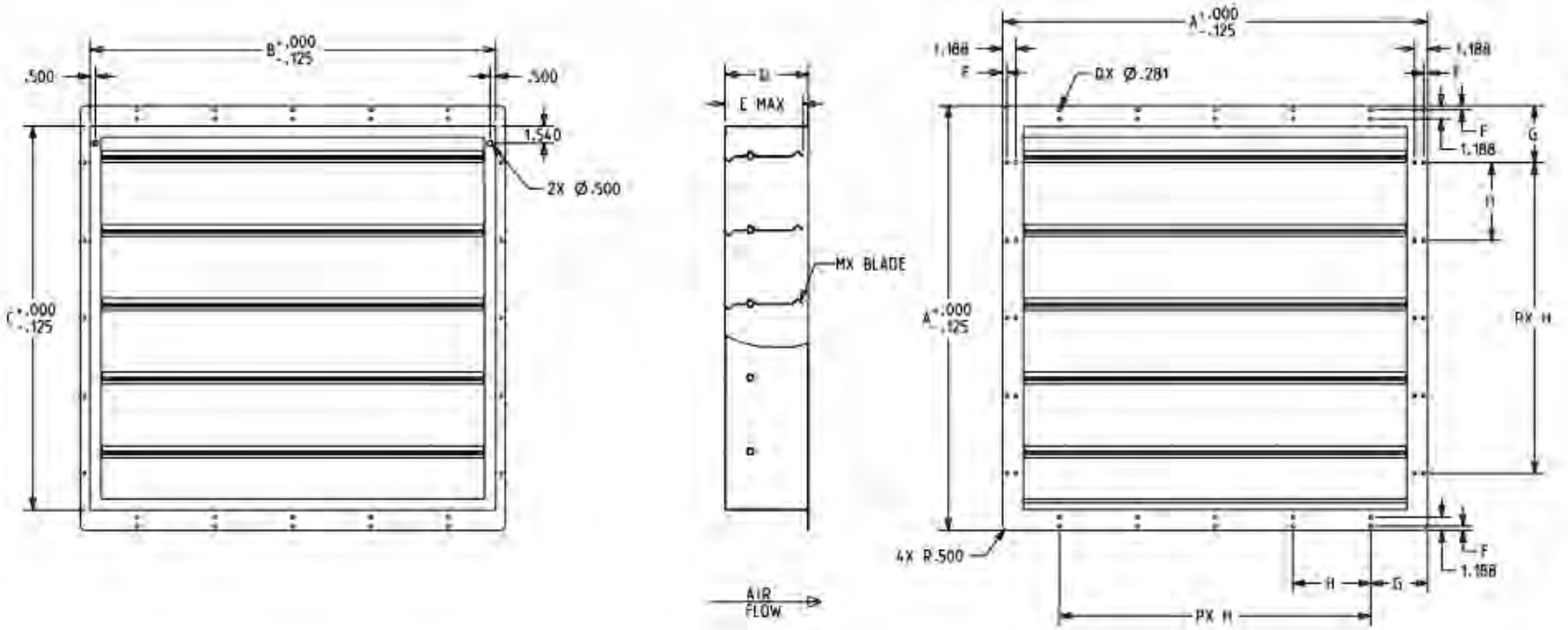
THIRD ANGLE PROJECTION

49513756 SHEET 2 OF 2 REV D

DAMPER BACKDRAFT

NOTES:
1. CHANGES TO THIS PRINT MAY AFFECT PURCHASING AND VENDOR. NOTIFY THEM OF CHANGES.
2. CONFORMS TO TRANE S653B0222.
3. DAMPERS ARE FOR HORIZONAL BLADE INSTALLATION.

EXT	NAME	A	B	C	D	E	F	G	H	P	Q	M	WEIGHT
49513760010	DAMPER; BACKDRAFT 270 ODP FAN	38.250	36.500	34.580	7.500	7.250	.375	5.125	7.000	4	40	5	34.4
49513760011	DAMPER; BACKDRAFT 300 ODP FAN	41.250	39.500	37.580	7.500	7.250	.282	6.625	7.000	4	40	6	37.2



TRANE Custom Air Handlers

Westover Hills Baptist Hospital

EQ Number: 23455
Date: Jan 04, 2023
Rev.:

Blender Schedule

Unit No.	Qty.	Manufacturer	Model	Height / Width	Depth
AHU-1-3	2	Blender Products	AB52	52	10.75
AHHU-1-4	2	Blender Products	AB60	60	9.31

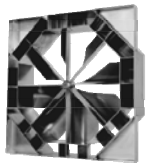
Blender Products

Input Cells — For Help w/Input Definitions? Read Comments on Input headings.

Air Blender® Selection Tool & Value Analysis Report

Input Job Information

Project:	Westover Hills Baptist Hospital	Country:	USA		
AHU Tag:	AHU-1-3	State:	TEXAS		
Eng. Firm:	Trane Custom	City:	SAN_ANTONIO_INTL_AP	Hours/Day:	24



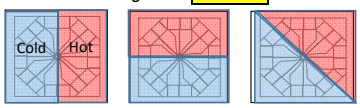
Input Air Handling System Information

Air Flow Rates	Inputs:
Maximum Supply CFM:	34000
Minimum OA CFM for IAQ:	7450
Minimum OA % for IAQ:	22%
Minimum Supply CFM:	26550
Minimum Supply %:	78%

Temperatures	Inputs:	
Return Air Temp.:	70	°F
Supply Air Setpoint:	55	°F
Min. OA Design Temp.:	Auto Select	°F
Freeze Stat Setpoint:	37	°F

Plenum Dimensions	Inputs:
Inside AHU Plenum Height (Inches)	106
Inside AHU Plenum Width (Inches)	137
Est. Retail $/ft. for Section wo/Blenders:	2023.24
AHU Plenum Velocity(fpm):	337

Mixing Alignment: Direction of Alignment: Vertical



Vertical Mixing Alignment | Horizontal Mixing Alignment | Diagonal Mixing Alignment

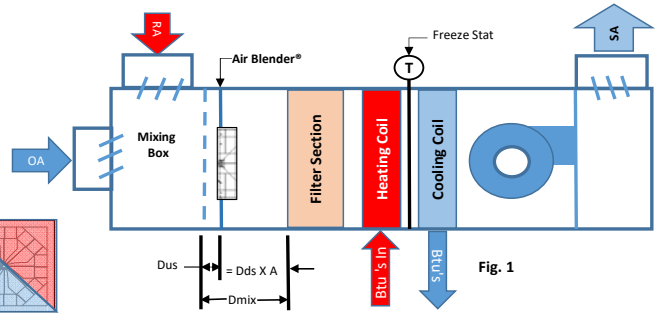
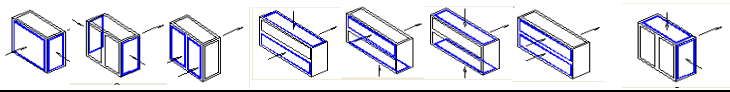


Fig. 1 — Typical AHU layout (reference only)

OA & RA Damper arrangements that induce particular mixing alignment and direction:



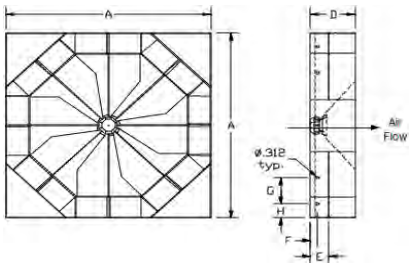
Input/Output: Optimized Air Blender® Selection:

	Inputs:	Selection Warnings
Set No. of Air Blenders®:	2	
Air Blender® Size:	52	
Avail. Dist. for Mixer Section:	Auto Select	
Air Blender® Selection Method:	Optimal Overall Performance	
	☐ Add Heat	
Selected Air Blender® Model:	ABS52	
No. of Air Blenders Specified	2	
ΔP@nominal CFM :	0.19	" w.c.
Min. Recommended CFM for AHU:	12438	ft^3/min
[1]ME @ 50% OA%:	26%	

Installation Dimensions:

[2]Du (distance upstream of mixer in section):	25	inches
Downstream distance (from Blender front face):	16	inches
[2]Dmix (total mixer section length):	40	inches

Blender Specification Form



Notes:

1. Mixing Effectiveness determined @ 50% OA to RA ratio as:
   ME = (1-(Tmax-Tmin)/(Tra-Toa)) x 100
   Where:
   Tmax = Maximum °F @ Dds X A distance from mixer
   Tmin = Minimum °F @ Dds X A distance from mixer
2. Dimension for Installation into AHU as per Fig. 1 above.

Air Blender® Dimensions for Single Blender

A:	52	inches
D:	9.31	inches
E:	2.5	
F:	1	inches
G:	4.3	inches
H:	1.16	inches

Suggested Retail $s forAB(s): $ 2,382
Est. Retail $s for Mix Section: $ 9,149.30

Input/Output: Savings Generated Using Airblender® vs. Standard Mixing Box

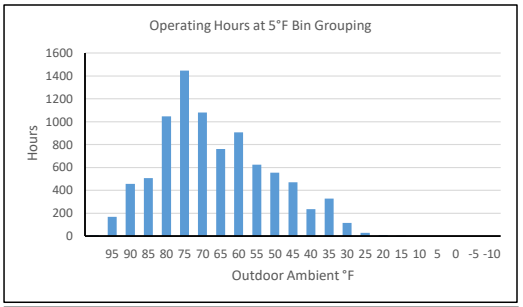
Job Location: SAN_ANTO TEXAS

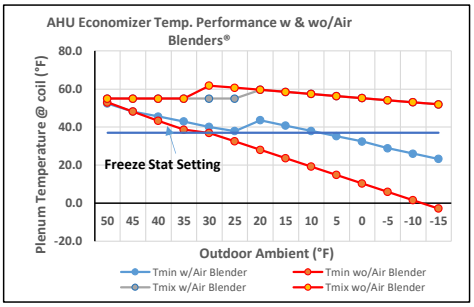
Energy Cost Parameters:	Inputs:	
Electrical Rate:	0.15	$/kw
Natural Gas Rate:	0.87	$/Therm
Chiller Plant Eff.:	0.96	Kw/Ton
Boiler Eff.:	0.85	%
Freeze Stat Alarm Cost:	**Inputs:**	
Avg. Maint. Cost for Alarm:	0	$
Est. # of Alarms wo/Air Blenders:	0	
Real Estate Opp. Costs:	**Inputs:**	
Rental Rate:	0	$/ft²/yr

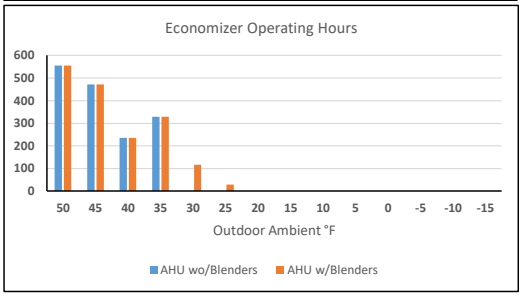
Annual Extended Full Economizer Operating Hours w/Air Blender®
145

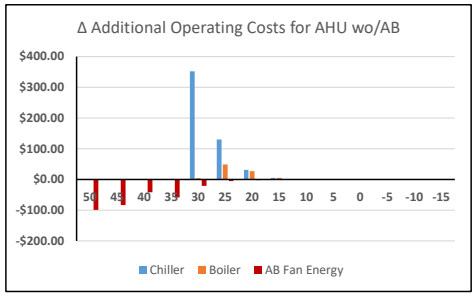
Annual Operating Costs Savings Improvement w/Air Blender®
-$943

Est. Payback on Air Blenders®
(9.70) years









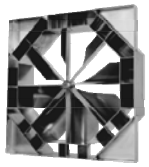
Blender Products

Input Cells — For Help w/Input Definitions? Read Comments on Input headings.

Air Blender® Selection Tool & Value Analysis Report

Input Job Information

Project:	Westover Hills Baptist Hospital	Country:	USA		
AHU Tag:	AHU-1-4	State:	TEXAS		
Eng. Firm:	Trane Custom	City:	SAN_ANTONIO_INTL_AP	Hours/Day:	24



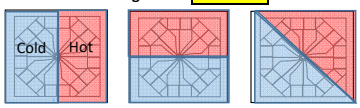
Input Air Handling System Information

Air Flow Rates	Inputs:
Maximum Supply CFM:	48000
Minimum OA CFM for IAQ:	17350
Minimum OA % for IAQ:	36%
Minimum Supply CFM:	30350
Minimum Supply %:	63%

Temperatures	Inputs:	
Return Air Temp.:	70	°F
Supply Air Setpoint:	52	°F
Min. OA Design Temp.:	Auto Select	°F
Freeze Stat Setpoint:	37	°F

Plenum Dimensions	Inputs:
Inside AHU Plenum Height (Inches)	114
Inside AHU Plenum Width (Inches)	167
Est. Retail $/ft. for Section wo/Blenders:	2199.99
AHU Plenum Velocity(fpm):	363

Mixing Alignment: Direction of Alignment: Horizontal



Vertical Mixing Alignment | Horizontal Mixing Alignment | Diagonal Mixing Alignment

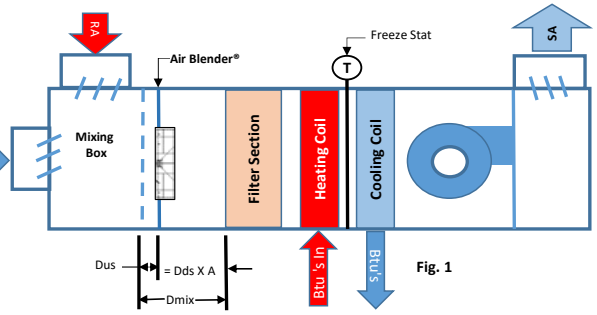
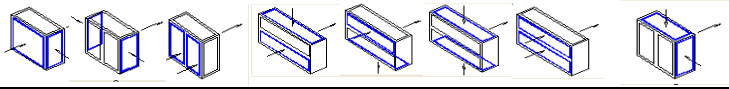


Fig. 1 — Typical AHU layout (reference only)

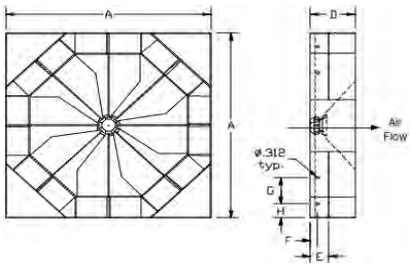
OA & RA Damper arrangements that induce particular mixing alignment and direction:



Input/Output: Optimized Air Blender® Selection:

	Inputs:	Selection Warnings
Set No. of Air Blenders®:	2	
Air Blender® Size:	Auto Select	
Avail. Dist. for Mixer Section:	Auto Select	
Air Blender® Selection Method:	Optimal Overall Performance	
	☐ Add Heat	
Selected Air Blender® Model:	ABS60	
No. of Air Blenders Specified	2	
ΔP@nominal CFM :	0.21	" w.c.
Min. Recommended CFM for AHU:	16560	ft^3/min
[1]ME @ 50% OA%:	55%	

Blender Specification Form



Notes:

1. Mixing Effectiveness determined @ 50% OA to RA ratio as:
   ME = (1-(Tmax-Tmin)/(Tra-Toa)) x 100
   Where:
   Tmax = Maximum °F @ Dds X A distance from mixer
   Tmin = Minimum °F @ Dds X A distance from mixer
2. Dimension for Installation into AHU as per Fig. 1 above.

Air Blender® Dimensions for Single Blender

A:	60 inches
D:	10.75 inches
E:	2.5
F:	1 inches
G:	5.08 inches
H:	1.16 inches

Installation Dimensions:

[2]Du (distance upstream of mixer in section):	16 inches
Downstream distance (from Blender front face):	48 inches
[2]Dmix (total mixer section length):	64 inches

Input/Output: Savings Generated Using Airblender® vs. Standard Mixing Box

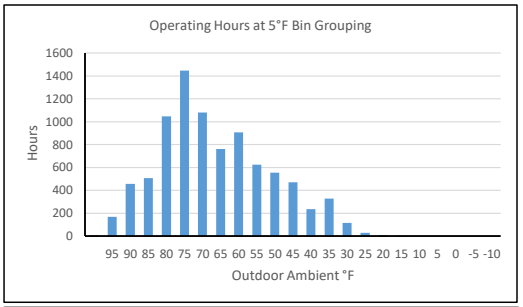
Job Location: SAN_ANTO TEXAS

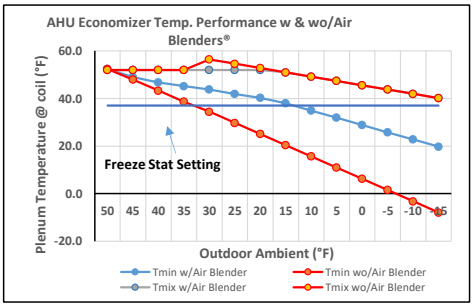
Energy Cost Parameters:	Inputs:	
Electrical Rate:	0.15	$/kw
Natural Gas Rate:	0.87	$/Therm
Chiller Plant Eff.:	0.96	Kw/Ton
Boiler Eff.:	0.85	%
Freeze Stat Alarm Cost:	**Inputs:**	
Avg. Maint. Cost for Alarm:	0	$
Est. # of Alarms wo/Air Blenders:	0	
Real Estate Opp. Costs:	**Inputs:**	
Rental Rate:	0	$/ft²/yr

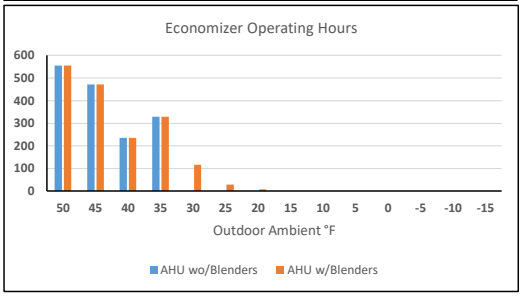
Annual Extended Full Economizer Operating Hours w/Air Blender®
153

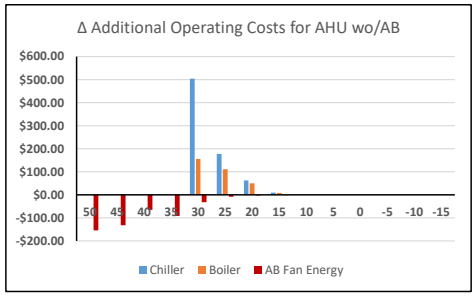
Annual Operating Costs Savings Improvement w/Air Blender®
-$1,354

Est. Payback on Air Blenders®
(10.80) years







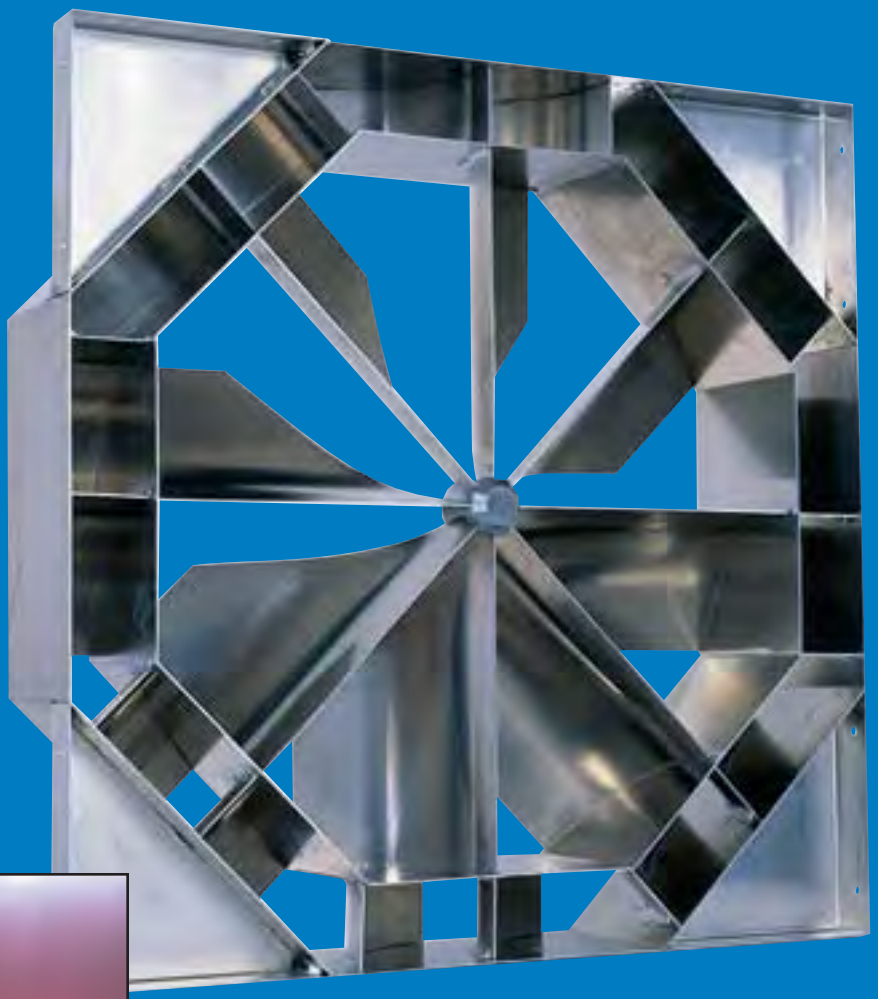


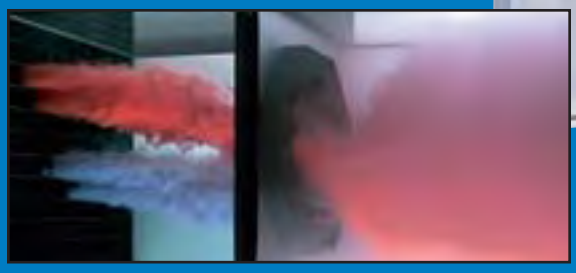
SERIES IV AIR BLENDER®

Static Air Mixer Designed to Mix Stratified Air Streams

BENEFITS:

- Mix to Even Temperature and Consistency
- Improve Freeze Coil Protection
- Reduce sensor error
- Improve Outside Air Dilution
- Meet IAQ Requirements



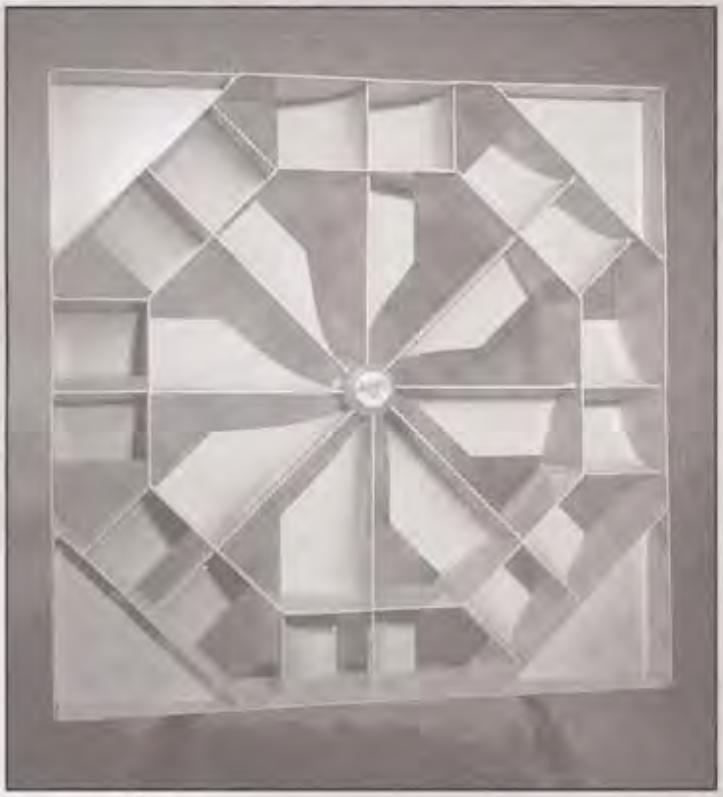


Blender Products, Inc.

Engineered Air Mixing Systems and Equipment

5010 Cook Street • Denver, Colorado 80216
Phone: 303.295.6111 • Fax: 303.296.1520
Toll-free: 800-523-5705
E-mail: INFO@airblender.com
Internet: www.airblender.com

S-IV 11/01



SERIES IV

NOW IN RESPONSE to the need for greater mixing and with the increased interest in good mixing for indoor air quality Blender Products announces the *Series IV* AIR BLENDER® static mixing device. The *Series IV* static mixing device is designed to meet the needs of today's HVAC mixing systems.

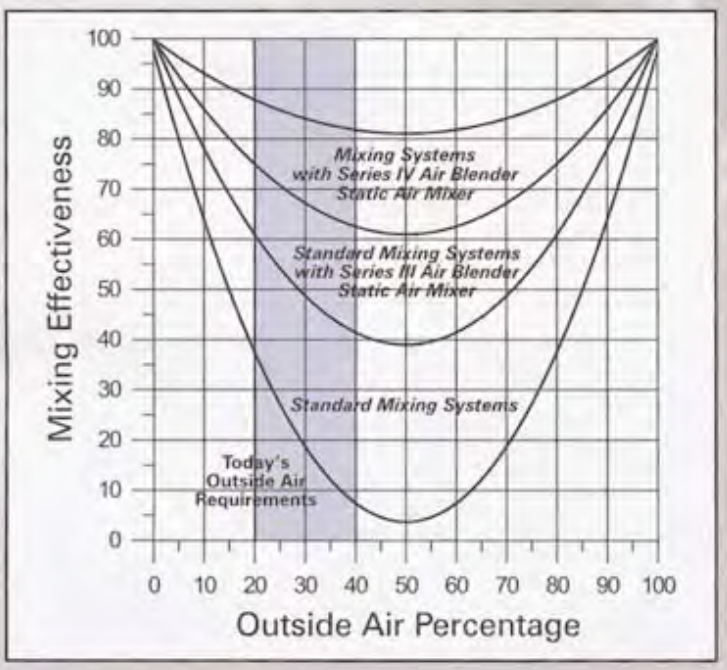
The *Series IV* has been redesigned to incorporate geometric, dynamic, and kinematic scaling, the same factors which govern the design of fans. By using proper scaling a designer can be assured that the performance of a smaller mixer is consistent with the full range of mixer sizes. No other static mixer manufactured in the HVAC industry can say this today.

The new model is also symmetrical in shape to provide the same performance for either orientation and to facilitate layout and installation. A new center was designed to provide greater strength and three methods of mounting the mixers are available.

However, the greatest features of the *Series IV* are not in the new design but in the application and performance characteristics.

A new selection procedure ensures that the mixer selected is the right unit for the job by accurately predicting the mixing effectiveness and pressure drop. Furthermore, when using the *Mixing Effectiveness Design Guide* the required mixing effectiveness can be determined to eliminate nuisance freeze stat trips, prevent possible frozen coils, reduce sensor error, and to enhance the mixing of outdoor air with the supply air stream to help meet IAQ requirements.

The performance of the new improved AIR BLENDER® Static mixing device provides by about 25% better mixing in most applications. This new level of performance allows more flexibility to reduce the mixing distance required downstream or to provide greater mixing at the same distance as before.



The Need for Mixing

Stratification in an air handling unit is the result of the momentum inherent in a stream of moving air. This stratification is apparent when two air streams of different temperatures are introduced into the same duct or plenum and the temperature across the duct or plenum varies. This situation occurs many times in the typical HVAC air handling system. The common places where this occurs is in the air handling unit mixing box and after face and bypass coil units.

Temperature Concerns

During the winter months, stratification results in a variety of problems. The most widely recognized problems are frozen coils and low temperature limit controller (freezestat) trips. In many cases, air handling units are unable to operate when the outside air temperature falls below 25°–30° F. Unfortunately, the solution to this problem has often been to close outside air dampers. Other problems associated with winter stratification are poor mixed air temperature control, and excessive energy use due to heating and cooling the mixed air.

Stratification has traditionally been thought to be limited to winter time, but it does exist during summer months as well, although the effects are different. During the winter months, stratification can result in damage to the system (frozen coils), inability to operate (nuisance Freezestat trips), and inefficient system operation (control sensor error). During the summer months, the effects of stratification are usually poor mixed air temperature control and increased energy usage.

Indoor Air Quality Concerns

The importance of stratification has also increased as a result of the new concerns over Indoor Air Quality. IAQ standards such as ASHRAE Standard 62 require more outside air than previously required in systems. As the amount of outside air is increased, the amount of mixing which must take place between the two air streams increases. In systems with inadequate mixing, systems may be unable to operate during the winter months due to freezestat trips. In other systems, the control systems may be unable to properly control the amount of outside air or the cooling or heating required to maintain comfort in the building.

Perhaps the biggest effect stratification has upon the system is the resulting uncertainty of how well the outside air is distributed throughout the building. Without good mixing of the recirculated and outside air, it is difficult to ensure that all areas of a building are receiving the correct amount of outside air and it may be necessary to bring in additional outside air to meet the required minimum ventilation rates dictated by ASHRAE 62-89.

Masking the Problems Versus Treating the Cause

Many solutions have been proposed for the stratification found in HVAC systems. For winter stratification, many people decide to use some type of antifreeze solution to prevent frozen coils. While this solution does prevent frozen coils, it does not address the question of control inaccuracy, coil efficiency, or outside air distribution throughout the return air stream. Other people have used very small dampers and high velocity jets to mix the air streams. This solution may provide mixing, but there is no way to predict how much mixing will be achieved and the small dampers may not provide the correct control for the system or may increase the pressure drop of the mixing box to unacceptable levels. Other people suggest the use of baffles to help mix. This method may provide mixing, but there is no way to know how much mixing will be achieved or the pressure requirements of the arrangement. In addition, the rapid changes in velocity will result in uneven velocity profiles and will affect the performance of any components located downstream of the baffle plates. Recently, heat recovery has been proposed as a solution to stratification. Like the other methods, this solution can help prevent frozen coils, but it does not address such issues as outside air distribution. The chart below summarizes the various approaches to solving stratification problems and their affect on several different aspects of stratification.

The SERIES IV AIR BLENDER® static air mixer and its related mixing systems address all of the areas affected by stratification and mixing. The mixing provided by the static mixer helps eliminate the freeze potential and control inaccuracies created by stratification and will help insure that the outside air is thoroughly distributed throughout the supply air stream. When installed correctly, the velocity profile downstream of the mixer will have a minimal effect upon the components located downstream of the mixer, and the pressure drop will be a known, predictable amount. Best of all, the AIR BLENDER® static mixer can be included in the original equipment design, eliminating costly modifications and complaints after system startup.

Method	Freeze Protection	Sensor Error and Control Accuracy	Velocity Profile	Pressure Drop	Mixing Effectiveness	Damper Control
Glycol	Known	No Effect	No Effect	No Effect	No Effect	No Effect
Baffles	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Dampers	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Heat Recovery	Known	Known	No Effect	Known	No Effect	No Effect
Averaging Bulb T-Stat	No Effect	Known	No Effect	No Effect	No Effect	Unknown
Series IV	Known	Known	Known	Known	Known	No Effect

TRANE Custom Air Handlers

Westover Hills Baptist Hospital

EQ Number: 23455
Date: Jan 04, 2023
Rev.:

Filter Schedule

	Unit No.	Filter Type	CFM	Face Velocity (FPM)	Filter Qty & Size	Fastener Type	Frame Type	Manufacturer	Filter Model	Gauge	Access	No. of Sets
PRE FILTER	AHU-1-3	Bank 1 - Pleated	34,000	386	(20) 24x24 (4) 12x24	C-70	Galv. Std No. 8	AAF	2" Perfect pleat	DM2002 Magnehelic	Upstream	1
FINAL FILTER	AHU-1-3	Bank 1 - Cartridge	34,000	386	(20) 24x24 (4) 12x24	C-80	Galv. Std No. 8	AAF	12" Varicel	DM2002 Magnehelic	Upstream	1
PRE FILTER	AHU-1-4	Bank 1 - Pleated	48,000	453	(24) 24x24 (10) 12x24	C-70	Galv. Std No. 8	AAF	2" Perfect pleat	DM2002 Magnehelic	Upstream	1
FINAL FILTER	AHU-1-4	Bank 1 - Cartridge	48,000	453	(24) 24x24 (10) 12x24	C-80	Galv. Std No. 8	AAF	12" Varicel VXL	DM2002 Magnehelic	Upstream	1

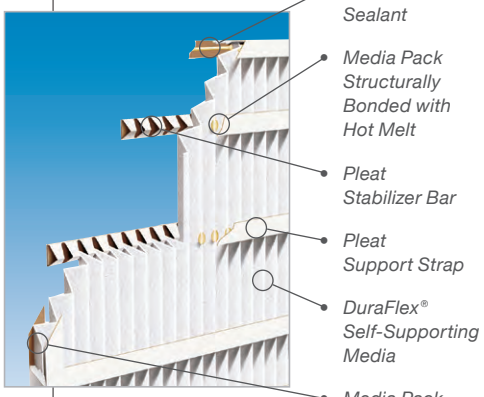
THE WORLD LEADER IN CLEAN AIR SOLUTIONS

PerfectPleat® HC M8

(High Capacity MERV 8)

EXTENDED SURFACE PLEATED PANEL FILTERS

- Highest performing self-supported pleated filter
- Mechanical efficiency – does not rely on electret charge technology
- Self-supporting DuraFlex® media made from virgin fiber; no wire support needed
- Consistent media with controlled fiber size and blend
- Available in 1″, 2″ and 4″ models
- Environmentally friendly – no dies, no metal, fully incinerable
- Patented media, filter design, and manufacturing process. Patents covered under one or more of the following US 6398839 B2; US 6254653 B1; US 6159318; US 6165242; US 6387140 B1 (1″ model only)



PerfectPleat® HC M8 2″ Filter Construction

The PerfectPleat HC M8 filter is designed to consistently increase efficiency throughout the service life of the filter. The PerfectPleat HC M8 filter has approximately 25% more media than our standard capacity filter, and is ideal for applications where pleated filters are currently in use and higher performance is desired. They have an initial MERV 8 rating respectively, but the efficiency increases significantly when dust holding begins. PerfectPleat HC M8 filters have distinctive self-supporting characteristics that allow a pleating pattern, which promotes airflow and maximizes dust holding capacity (DHC). Lower pressure drop and higher DHC means reductions in energy consumption and operating costs.

Superior Design and Construction

The perimeter frame is constructed from the highest wet-strength 28 pt. beverage carrier board, securely bonded to the media pack. The 1″ model employs three supporting straps on the air entering and air leaving sides of the filter to control pleat spacing and support the media pack in the perimeter frame.

Support straps on the air entering side are used in combination with uniquely designed pleat stabilizers on the air-leaving side of the 2″ model to provide additional strength. The support straps and pleat stabilizers ensure integrity against turbulent airflow. The 2″ filter resists crushing and abuse and provides excellent lateral stability for installation in side-access systems.

The 4″ model utilizes a two piece die cut frame with integral pleat spacers on the air leaving side. Pleat spacing is controlled by straps bonded to the air entering side and the multiple rows of pleat spacers on the air leaving side. The pleat spacers also ensure the pleats remain open during use, maximizing filter life.

DuraFlex® Media—Patented Media Design

Uniform size virgin fibers are assembled in closely controlled blends to create a media that is both self-supporting and consistent in performance. When pleated, DuraFlex media will hold its shape without the wire support characteristic of conventional pleated filters. That means no potential for the formation of rust and safer handling. With the superior resiliency of DuraFlex media and no need for wire support, PerfectPleat HC M8 filters can sustain significant abuse and maintain their shape and pleat spacing. The absence of wire also makes the filter totally incinerable, which can simplify disposal.

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PerfectPleat® HC M8 Filters

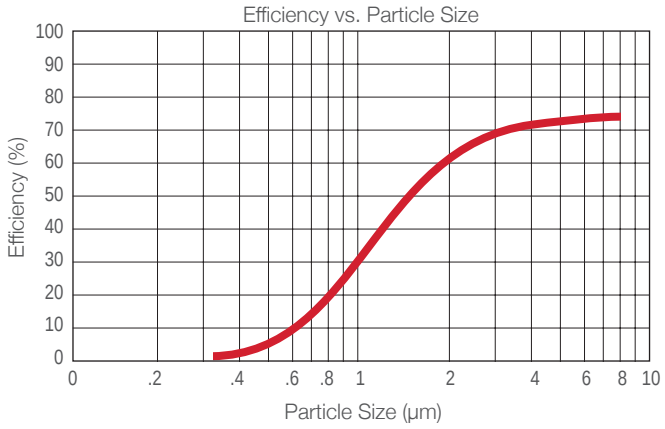
Performance Data

Filter	Pleats Per Linear Foot	Rated Initial Resistance (in. w.g.) 300 FPM	500 FPM	625 FPM	Recommended Final Resistance (in. w.g.)	ASHRAE 52.2 MERV	Continuous Operating Temperature Limits
1″ PerfectPleat HC M8	15	.23	.42	–	1.0	8	150°F (66°C)
2″ PerfectPleat HC M8	15	.12	.23	.34	1.0	8	150°F (66°C)
4″ PerfectPleat HC M8	11	.12	.25	.38	1.0	8	200°F (93°C)

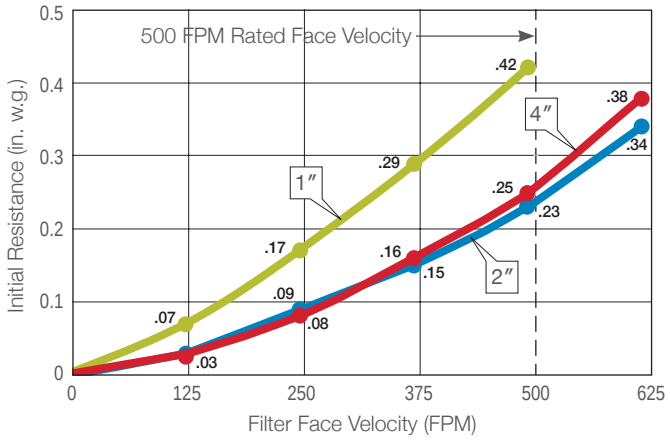
All performance data is based on ASHRAE Standard 52.2. Performance tolerance conforms to Section 6.4 of ANSI/AHRI Standard 850-2013.

***Underwriters Laboratories Classification** – PerfectPleat HC M8 filters are UL Classified. Testing was performed according to UL Standard 900.*

Composite Minimum Efficiency Curve



Initial Resistance vs. Filter Face Velocity



Product Information – Standard Sizes

Nominal Sizes (Inches) (W x H x D)	Actual Sizes (Inches) (W x H x D)	Rated Airflow (SCFM) 300 FPM	500 FPM	625 FPM	Pleats Per Filter
10 x 10 x 1	9½ x 9½ x ¾	200	350	–	11
10 x 20 x 1	9½ x 19½ x ¾	400	700	–	11
12 x 12 x 1	11½ x 11½ x ¾	300	500	–	14
12 x 20 x 1	11½ x 19½ x ¾	500	850	–	14
12 x 24 x 1	11⅜ x 23⅜ x ¾	600	1000	–	14
14 x 20 x 1	13½ x 19½ x ¾	600	1000	–	16
14 x 25 x 1	13½ x 24½ x ¾	750	1200	–	16
15 x 20 x 1	14½ x 19½ x ¾	650	1050	–	17
16 x 16 x 1	15½ x 15½ x ¾	550	900	–	19
16 x 20 x 1	15½ x 19½ x ¾	650	1100	–	19
16 x 25 x 1	15½ x 24½ x ¾	850	1400	–	19
18 x 20 x 1	17½ x 19½ x ¾	750	1250	–	21
18 x 24 x 1	17⅜ x 23⅜ x ¾	900	1500	–	21
18 x 25 x 1	17½ x 24½ x ¾	950	1550	–	21
20 x 20 x 1	19½ x 19½ x ¾	850	1400	–	24
20 x 25 x 1	19½ x 24½ x ¾	1050	1750	–	24
24 x 24 x 1	23⅜ x 23⅜ x ¾	1200	2000	–	29
25 x 25 x 1	24½ x 24½ x ¾	1300	2200	–	30
10 x 20 x 2	9½ x 19½ x 1¾	400	700	850	11
12 x 20 x 2	11½ x 19½ x 1¾	500	850	1050	14
12 x 24 x 2	11⅜ x 23⅜ x 1¾	600	1000	1250	14
14 x 25 x 2	13½ x 24½ x 1¾	750	1200	1500	16
15 x 20 x 2	14½ x 19½ x 1¾	650	1050	1300	17
15 x 25 x 2	14½ x 24½ x 1¾	800	1300	1650	17
16 x 16 x 2	15½ x 15½ x 1¾	550	900	1100	19
16 x 20 x 2	15½ x 19½ x 1¾	650	1100	1400	19
16 x 24 x 2	15⅜ x 23⅜ x 1¾	800	1350	1650	19
16 x 25 x 2	15½ x 24½ x 1¾	850	1400	1750	19
18 x 24 x 2	17⅜ x 23⅜ x 1¾	900	1500	1900	21
18 x 25 x 2	17½ x 24½ x 1¾	950	1550	1950	21
20 x 20 x 2	19½ x 19½ x 1¾	850	1400	1750	24
20 x 24 x 2	19⅜ x 23⅜ x 1¾	1000	1650	2100	24
20 x 25 x 2	19½ x 24½ x 1¾	1050	1750	2150	24
24 x 24 x 2	23⅜ x 23⅜ x 1¾	1200	2000	2500	29
25 x 25 x 2	24½ x 24½ x 1¾	1300	2150	2700	30
12 x 24 x 4	11⅜ x 23⅜ x 3¾	600	1000	1250	10
16 x 20 x 4	15⅜ x 19⅜ x 3¾	650	1100	1400	13
16 x 25 x 4	15⅜ x 24⅜ x 3¾	850	1400	1750	13
18 x 24 x 4	17⅜ x 23⅜ x 3¾	900	1500	1875	15
20 x 20 x 4	19⅜ x 19⅜ x 3¾	850	1400	1750	17
20 x 25 x 4	19⅜ x 24⅜ x 3¾	1050	1750	2150	17
24 x 20 x 4	23⅜ x 19⅜ x 3¾	1000	1650	2100	17
24 x 24 x 4	23⅜ x 23⅜ x 3¾	1200	2000	2500	21
25 x 29 x 4	24⅜ x 28⅜ x 3¾	1500	2500	3150	26

Energy savings may be realized by operating the PerfectPleat HC M8 filters to a lower final resistance. Contact your local AAF Flanders representative for a Total Cost of Ownership analysis for your specific application.

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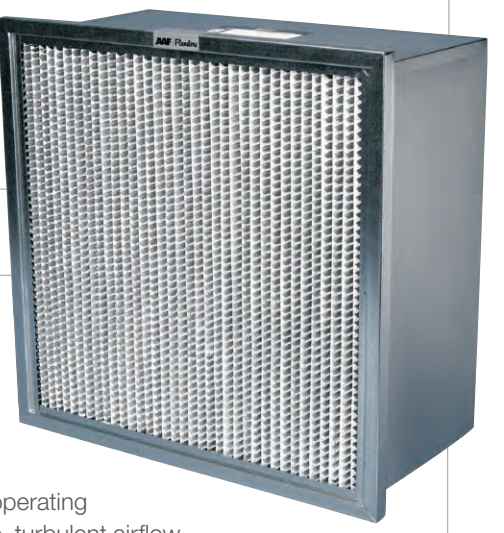
THE WORLD LEADER IN CLEAN AIR SOLUTIONS

VariCel®



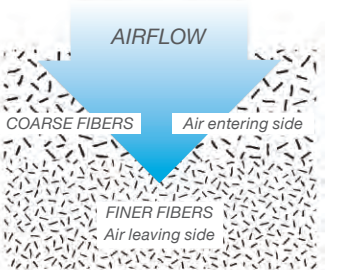
HIGH EFFICIENCY SUPPORTED PLEAT FILTERS

- MERV 15, MERV 14, MERV 13, and MERV 11 efficiencies
- Excellent performance in difficult operating conditions
- MERV 14 available with antimicrobial
- MERV 15, MERV 14, and MERV 13 meet LEED® Project Certification efficiency requirements
- UL Classified

The VariCel filter is a high capacity, extended surface, supported pleat filter engineered for a variety of applications. With a supported pleat media pack, the VariCel filter's rigid construction maintains a compact, unitized structure even under difficult operating conditions, such as variable air volume, turbulent airflow, repeated fan shutdown, high temperature operation, high humidity, or intermittent exposure to water, such as seacoast installations. Variable air velocity and repeated fan shutdown do not compromise performance.

Dual-Density Media Reduces Operating Costs

VariCel media is manufactured with two layers of glass fibers, coarser fibers on the air entering side and finer fibers on the air leaving side.



Our dual-density design allows dirt particles to be collected throughout the entire depth of the filter, utilizing the full cleaning potential of the media. Maximum dust holding capacity extends the life of the filter, minimizing operating costs.

The water-resistant media can withstand intermittent exposure to water, making VariCel filters ideal for installations in humid areas, or where the filters are exposed to moisture.

Designed to Improve Indoor Air Quality

VariCel high-efficiency filters are designed specifically to improve indoor air quality (IAQ). The MERV 14 and MERV 15 versions of the filter are particularly effective against air contaminants that are one micron or smaller in size. These contaminants include bacteria, viruses, and carrier particles for these pathogens. Removal of these particles helps ensure the best possible IAQ downstream of the filter.

Additionally, the MERV 14 efficiency filter is available with antimicrobial-treated media, intended to preserve the integrity of the media throughout the life of the filter. This antimicrobial preservative neither increases particle efficiency, nor kills microorganisms "on the fly" as they pass through the filter.

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VariCel® Filters

Engineered for a Variety of Applications

Type SH Single Header VariCel filters are designed for systems originally supplied by AAF Flanders. A unique 13⁄16" flanged header on the air entering side allows the filter to be easily inserted and latched into front and side access systems.

Type SH

Type DH Double Header VariCel filters are designed to upgrade air cleaning performance and reliability. Two 13⁄16" thick flanged headers make the filters compatible with the holding frames and latching devices of various manufacturers, including rear access systems.

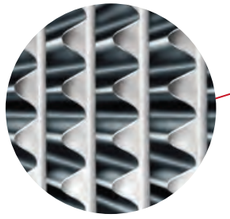
Type DH

Type HT (High Temperature) Series VariCel filters are designed for systems operating from 350°-900°F. Constructed of aluminized steel, HT VariCel filters offer rated efficiency with proven reliability over the life of the filter. See page 4 for models and temperature limits. HT VariCel filters are offered in a 12" depth, MERV 14 and MERV 11.

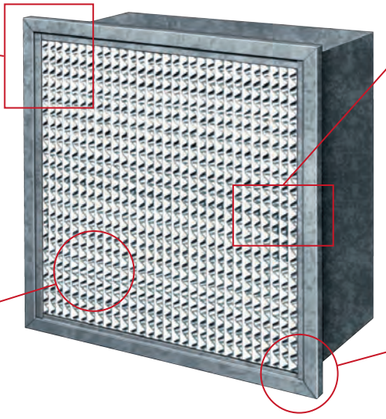
Type HT Series

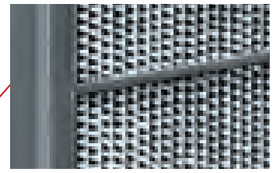
XL Series VariCel filters, single header (XL-S) and double header (XL-D), contain up to 67% more media and offer more than twice the service life of standard single and double header models. XL Series VariCel filters are offered in a 12" depth, MERV 14 and MERV 11.

Crimped Rear Flanges (SH) *are rolled over and riveted to add strength, eliminate sharp edges, and prevent bypass leakage.*

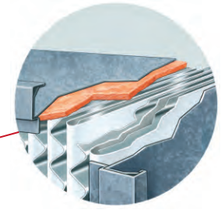


Corrugated Aluminum Separators with Rolled Edges *maintain uniform pleat spacing for optimum airflow. The separators are rolled to eliminate sharp edges, preventing media damage during shipping and personal injury during installation.*





Media Pack Restraint Steel Brace *on air leaving side adds support to the media pack.*



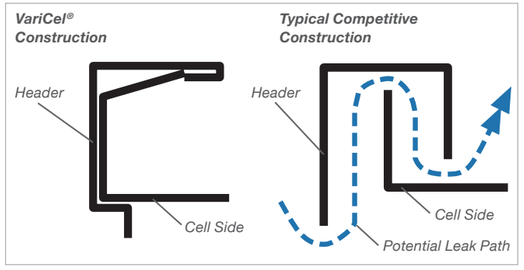
Media Pack Sealant – *A layer of high efficiency media seals the media pack into the cell sides. The media sealant prevents by-pass leakage and damage to the media and separators during shipping and handling. By allowing slight movement of the media pack when the filter is jarred, the cushioning sealant helps prevent tears and punctures to the media.*

Built Rugged for Dependable Performance

The VariCel filter's rigid construction with supported pleat media pack maintains a compact, unitized structure even under tough operating conditions. Variable air velocity and repeated fan shutdown do not compromise performance.

Unitized Construction

Interlocked header and cell sides, along the entire length of each side, provide maximum sealing. Competitive filters are designed with loose fitting headers that allow greater potential for bypass leakage.



Pleats and Separators Bonded for Strength

During the pleating process, spots of glue are applied to bond each separator to the adjacent pleat. This solidifies the media pack to minimize movement and prevent media damage. Burst strength is increased to prevent the filter from blowing out under variable air volume conditions or unusually high resistance.

Galvanized steel headers and cell sides resist damage during shipping and handling, and prevent corrosion over long service life (HT VariCel filters are constructed of aluminized steel).

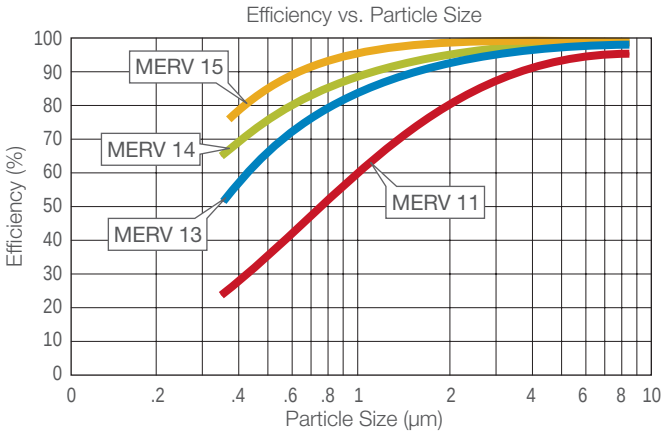
Easy Installation

Rigid construction and minimum depth make VariCel filters easy to install in all types of systems.

VariCel® Filters

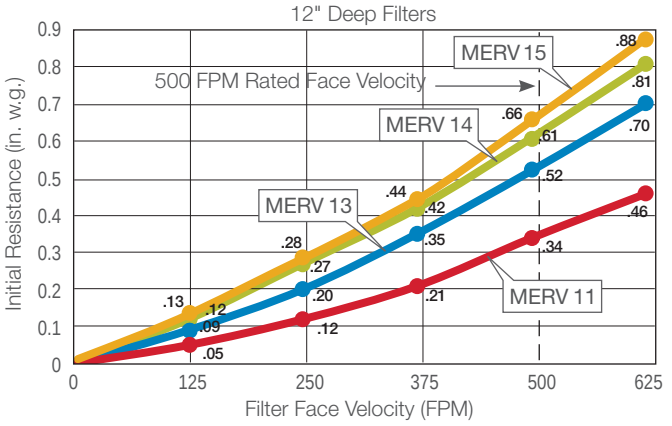
Performance Data

Composite Minimum Efficiency Curve



**Tested in accordance with ASHRAE Standard 52.2.*

Initial Resistance vs. Filter Face Velocity



12" deep filters are rated at 500 FPM filter face velocity.
6" deep filters are rated at 250 FPM filter face velocity.
Recommended final resistance for VariCel filters is 1.5" w.g.
Recommended final resistance for HT VariCel filters is 1.2" w.g.

Operating Temperature Limits

VariCel Model	Temperature Limit
Types SH, DH, XL	350°F 177°C
Type HT-500	500°F 260°C
Type HT-725	750°F 385°C
Type HT-900	900°F 482°C

Underwriters Laboratories Classification: All VariCel filters are UL Classified. Testing was performed according to UL Standard 900 and ULC-S111.

Prefilters Can Double VariCel® Filter Life

Using high-efficiency pleated prefilters such as AAF Flanders' MEGApleat®, PerfectPleat®, or PREpleat® filters will greatly extend the life of VariCel filters.

Options

- VariCel filters can be ordered with faceguards made of flattened, expanded, galvanized, or aluminized steel on one or both sides of the filter.
- Factory-installed gaskets are available on the front, back, or side(s) of the header(s).
- Vinyl coated separators are available for corrosive conditions.
- 1⅛" Single Header VariCel filters, designed for other manufacturers' equipment, are also available.

VariCel® is a registered trademark of AAF International in the U.S. and other countires.

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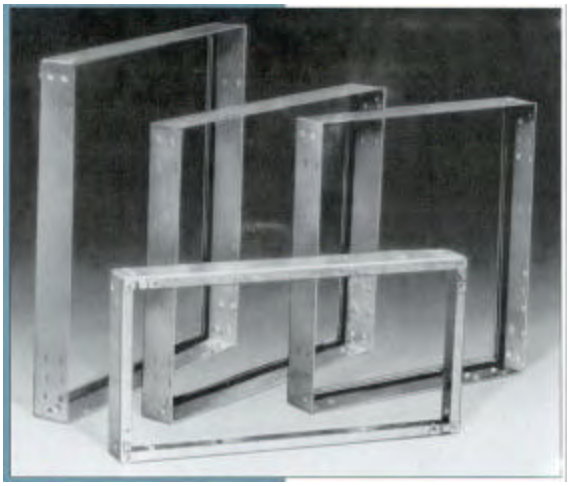
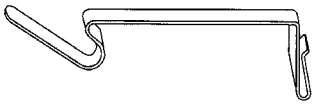
FILTER FRAMES and FASTENERS

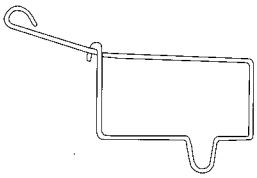


Specifications:
Type 8 Universal Holding Frames
Universal holding frames shall be constructed of not less than 16-gauge galvanized steel. They shall be equipped with polyurethane foam gaskets, fasteners, and filter centering dimples. The four sealing flange corners shall be flush mitered and secured in order to form a uniform sealing and gasketing surface. The in line depth shall not be less than 2.69" in order to effect adequate bearing surface for built-up filter banks. Filter fasteners shall be capable of being installed without the requirements of tools, nuts, or bolts. The holding frames shall be universal in that they shall be designed to accommodate standard size filters. Frames shall be equal to Farr Type 8.

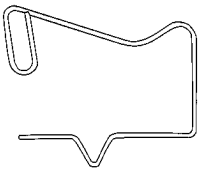


C-79 Series

C-80



C-77

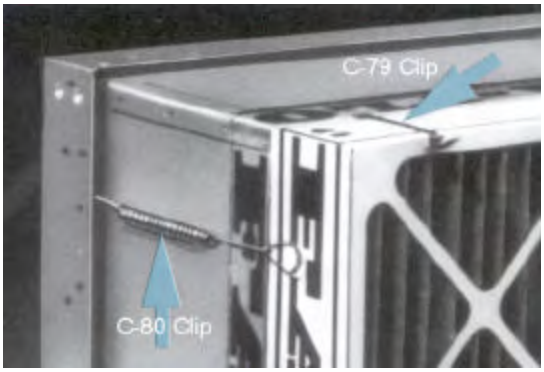


C-89

C-70

Fasteners:

2” Pre-filter -	C-70
4” Pre-filter	C-77
2” Pre-filter on 12” cartridge	VP-2
4” Pre-filter on 12” cartridge	VP-4
2” Pre-filter with bag filter	C-70
4” Pre-filter with bag filter	C-89
12” cartridge	C-80
6” cartridge	C-90



Prefilter is clipped to 12” cartridge filter with the C-79 clip.

THE WORLD LEADER IN CLEAN AIR SOLUTIONS

VariCel® VXL

HIGH EFFICIENCY SUPPORTED PLEAT FILTERS

- MERV 15, MERV 14, MERV 13, and MERV 11 efficiencies
- Excellent performance in difficult operating conditions
- Lightweight and easy to install
- Fully incinerable
- Single and double header models
- MERV 15 and MERV 14 available with antimicrobial
- MERV 13 and higher meet LEED® Project Certification efficiency requirements

The VariCel VXL filter is an 8-panel high efficiency filter designed for use in commercial and industrial HVAC installations. The VariCel VXL filter delivers the desired air quality when used in systems with difficult operating conditions, such as variable air volume, turbulent airflow, repeated fan shut-down, or moderate to high humidity. VariCel VXL filters can be used in high velocity systems operating at up to 750 FPM.

Header on the end panels allows installation in reverse flow installations.

Multiple mini-pleat media packs, assembled into a series of V-banks, permit substantially more media to be contained in the VariCel VXL filter—up to 50% more than standard rigid cartridge filters. Maximum effective media area provides greater airflow capacity, low resistance, high Dust Holding Capacity (DHC), and unusually long service life.

Construction

The header and cell sides provide a sturdy construction that resists damage during shipping, handling, and operation. Constructed of plastic, the VariCel VXL filter is fully incinerable.

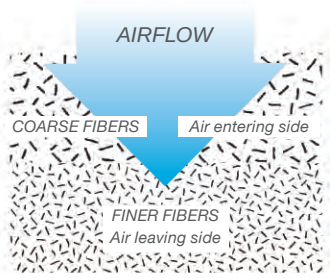
Separators

The thermoplastic separators maintain uniform spacing between pleats to allow optimal flow of air into and through the filter. They also ensure a large effective media area for low resistance and high DHC.

Dual-Density Media Reduces Operating Costs

The VariCel VXL media is manufactured with two layers of glass fibers, coarse fibers on the air entering side and finer fibers on the air leaving side.

Our dual-density design allows dirt particles to be collected throughout the entire depth of the media pack, utilizing the full filtering potential of the media and maximizing dust holding. Maximum DHC extends the life of the filter, minimizing operating costs.



Specifications

Maximum Operating Temperature: 176˚F (80˚C)

Media: Moisture-resistant, dual-density microglass paper formed into pleats.

Frame: The molded end panels are made of high impact polystyrene (HIPS). The extruded vertical components are made of acrylonitrile butadiene styrene (ABS).

Separators: Continuous beads of low profile thermoplastic material.

Underwriters Laboratories Classification: UL Classified. Testing was performed according to UL Standard 900.

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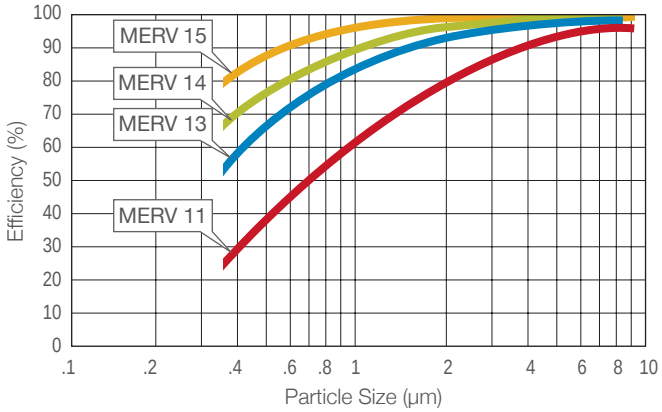
VariCel® VXL Filters

Product Information – Standard Sizes

Nominal Sizes (Inches) (W x H x D)	Actual Sizes (Inches) (W x H x D)	Rated Airflow Capacity (SCFM)			Media Area (sq. ft.)
		Low	Med	High	
20 x 20 x 12	19⅜ x 19⅜ x11½	1,400	1,750	2,100	137
24 x 12 x 12	23⅜ x 11⅜ x 11½	1,000	1,250	1,500	88
24 x 20 x 12	23⅜ x 19⅜ x 11½	1,650	2,100	2,500	161
24 x 24 x 12	23⅜ x 23⅜ x 11½	2,000	2,500	3,000	197

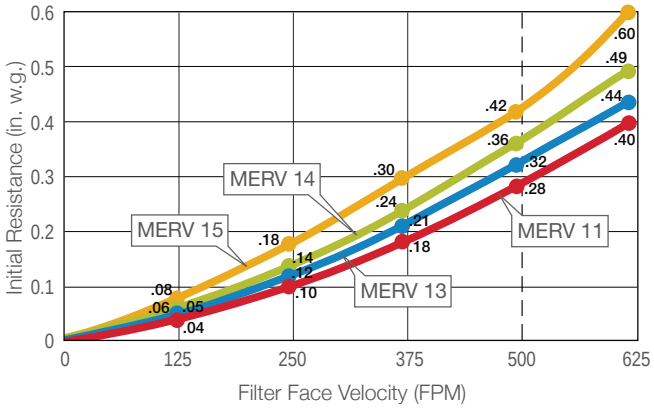
Performance Data

Composite Minimum Efficiency Curve



Tested in accordance with ASHRAE Standard 52.2.

Initial Resistance vs. Filter Face Velocity



Maximum recommended final resistance for all VariCel® VXL filters is 2 in. w.g.*

**Significant energy savings may be realized by operating the VariCel VXL filter to a lower final resistance. Contact your local AAF Flanders representative for a Total Cost of Ownership (TCO) analysis for your specific application.*

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Dwyer

SERIES 2000

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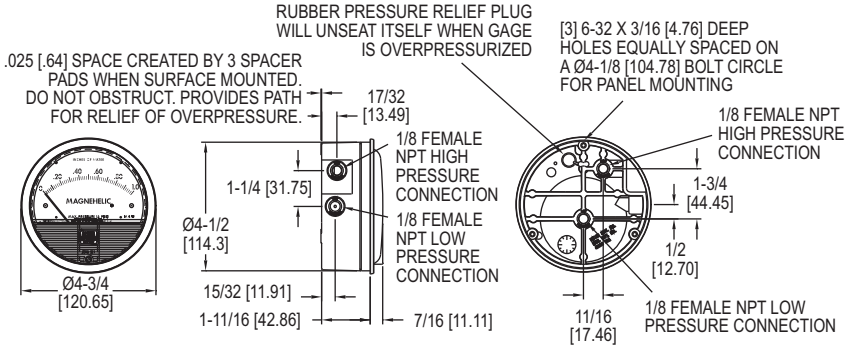
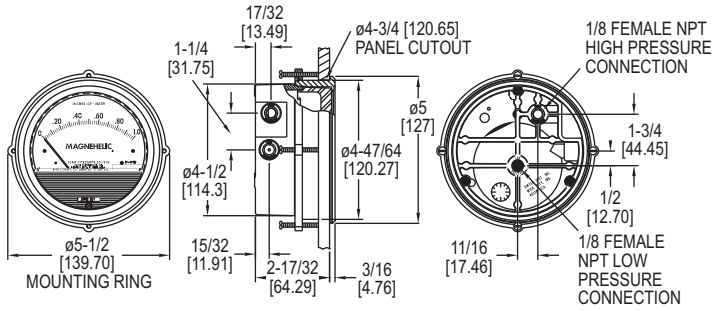
Indicate Positive, Negative or Differential, Accurate within 1%

5 YEAR LIMITED WARRANTY

Standard Magnehelic® Gage

High Accuracy Magnehelic® Gage
Note: Shown with optional -SS bezel





Select the **SERIES 2000** Magnehelic® Gage for a versatile low differential pressure gage with a wide choice of 81 models and 27 options to choose from. Using Dwyer's simple, frictionless Magnehelic® gage movement, it quickly indicates air or non-corrosive gas pressures--either positive, negative (vacuum) or differential. The design resists shock, vibration, over-pressures and is weatherproof to IP67.
Select the –HA High Accuracy Magnehelic® gage option for an accuracy within 1% of full scale. Also included with the –HA option at no extra cost are a mirrored scale overlay and a 6 point calibration certificate.

FEATURES/BENEFITS

- Easy to read gage through undistorted plastic face permits viewing from far away
- Patented design provides quick response to pressure changes means no delay in assessing critical situations
- Durable and rugged housing and high-quality components combine to provide long-service life and minimized down-time
- High accuracy option is twice as accurate as the standard Magnehelic® gage

APPLICATIONS

- Filter monitoring
- Air velocity with Dwyer pitot tube
- Blower vacuum monitoring
- Fan pressure indication
- Duct, room or building pressures
- Clean room positive pressure indication

SPECIFICATIONS

Service: Air and non-combustible, compatible gases (natural gas option available). **Note:** May be used with hydrogen. Order a Buna-N diaphragm. Pressures must be less than 35 psi.
Wetted Materials: Consult factory.
Housing: Die cast aluminum case and bezel, with acrylic cover. Exterior finish is coated gray to withstand 168 hour salt spray corrosion test.
Accuracy: ±2% (-HA model ±1) of FS (±3% (-HA ±1.5%) on -0, -100PA, -125PA, -10MM and ±4% (-HA ±2%) on -00, -60PA, -6MM ranges), throughout range at 70°F (21.1°C).
Pressure Limits: -20 in Hg to 15 psig (-0.677 to 1.034 bar); MP option: 35 psig (2.41 bar); HP option: 80 psig (5.52 bar).
Enclosure Rating: IP67.
Overpressure: Relief plug opens at approximately 25 psig (1.72 bar), standard gages only.❶
Temperature Limits: 20 to 140°F* (-6.67 to 60°C). -20°F (-28°C) with low temperature option.
Size: 4″ (101.6 mm) diameter dial face.
Mounting Orientation: Diaphragm in vertical position. Consult factory for other position orientations.
Process Connections: 1/8″ female NPT duplicate high and low pressure taps - one pair side and one pair back.
Weight: 1 lb 2 oz (510 g), MP & HP 2 lb 2 oz (963 g).
Standard Accessories: Two 1/8″ NPT plugs for duplicate pressure taps, two 1/8″ pipe thread to rubber tubing adapter, and three flush mounting adapters with screws. (Mounting and snap ring retainer substituted for three adapters in MP & HP gage accessories.)
Agency Approvals: Meets the technical requirements of EU Directive 2011/65/EU (RoHS II). **Note:** -SP models not RoHS approved.

Note: For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options.

*Low temperature models available as special options.

ACCESSORIES

Model	Description
A-432	Portable kit; combine carrying case with any Magnehelic® gage of standard range, except high pressure connection. Includes 9 ft (2.7 m) of 3/16″ ID rubber tubing, standhang bracket and terminal tube with holder
A-605	Air filter gage accessory kit; adapts any standard Magnehelic® gage for use as an air filter gage. Includes aluminum surface mounting bracket with screws, two 5 ft (1.5 m) lengths of 1/4″ aluminum tubing, two static pressure tips and two molded plastic vent valves, integral compression fittings on both tips and valves
A-605B	Air filter gage accessory kit; air filter kit with two plastic open/close valves, two 4″ steel static tips, plastic tubing and mounting flange
A-605C	Air filter gage accessory kit; air filter kit with two plastic open/close valves, two plastic static tips, plastic tubing and mounting flange

A-432

A-605

❶**Over Protection Note: See page 21 (Series 2000)**

Dwyer

SERIES 2000

MAGNEHELIC® DIFFERENTIAL PRESSURE GAGES

Indicate Positive, Negative or Differential, Accurate within 1%

Bezel provides flange for flush mounting in panel.

Clear plastic face is highly resistant to breakage. Provides undistorted viewing of pointer and scale.

Precision litho-printed scale is accurate and easy to read.

Calibrated range spring is flat spring steel. Small amplitude of motion assures consistency and long life. It reacts to pressure on diaphragm. Live length adjustable for calibration.

Red tipped pointer of heat treated aluminum tubing is easy to see. It is rigidly mounted on the helix shaft.

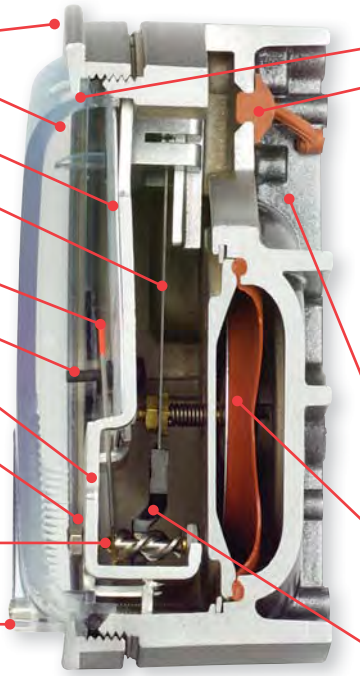
Pointer stops of molded rubber prevent pointer over-travel without damage.

"Wishbone" assembly provides mounting for helix, helix bearings and pointer shaft.

Jeweled bearings are shock-resistant mounted; provide virtually friction-free motion for helix. Motion damped with high viscosity silicone fluid.

Helix is precision made from an alloy of high magnetic permeability. Mounted in jeweled bearings, it turns freely, following the magnetic field to move the pointer across the scale.

Zero adjustment screw is conveniently located in the plastic cover, and is accessible without removing cover. O-ring seal provides pressure tightness.



O-ring seal for cover assures pressure integrity of case.

OVERPRESSURE PROTECTION
Blowout plug is comprised of a rubber plug on the rear which functions as a relief valve by unseating and venting the gage interior when over pressure reaches approximately 25 psig (1.7 bar). To provide a free path for pressure relief, there are four spacer pads which maintain 0.023″ clearance when gage is surface mounted. Do not obstruct the gap created by these pads.
The blowout plug is not used on models above 180″ of water pressure, medium or high pressure models, or on gages which require an elastomer other than silicone for the diaphragm.
The blowout plug should not be used as a system overpressure control. High supply pressures may still cause the gage to fail due to over pressurization, resulting in property damage or serious injury. Good engineering practices should be utilized to prevent your system from exceeding the ratings of any component.

Die cast aluminum case is precision made and iridite-dipped to withstand 168 hour salt spray corrosion test. Exterior finished in baked dark gray hammerloid. One case size is used for all standard pressure options, and for both surface and flush mounting.

Silicone rubber diaphragm with integrally molded O-ring is supported by front and rear plates. It is locked and sealed in position with a sealing plate and retaining ring. Diaphragm motion is restricted to prevent damage due to overpressures.

Samarium Cobalt magnet mounted at one end of range spring rotates helix without mechanical linkages.

MODEL CHART

Model	Range, Inches of Water
2000-00N†••	.05-0-.2
2000-00†••	0-.25
2000-0†•	0-.50
2001	0-1.0
2002	0-2.0
2003	0-3.0
2004	0-4.0
2005	0-5.0
2006	0-6.0
2008	0-8.0
2010	0-10
2012	0-12
2015	0-15
2020	0-20
2025	0-25
2030	0-30
2040	0-40
2050	0-50
2060	0-60
2080	0-80
2100	0-100
2120	0-120
2150	0-150
2160	0-160
2180*	0-180
2250*	0-250
Zero Center Ranges	
2300-00†••	0.125-0-0.125
2300-0†•	.25-0-.25
2301	.5-0-.5
2302	1-0-1
2304	2-0-2
2310	5-0-5
2320	10-0-10
2330	15-0-15

Model	Range, PSI
2201	0-1
2202	0-2
2203	0-3
2204	0-4
2205	0-5
2210*	0-10
2215*	0-15
2220*	0-20
2230**	0-30
Model	**Range, CM of Water**
2000-15CM	0-15
2000-20CM	0-20
2000-25CM	0-25
2000-50CM	0-50
2000-80CM	0-80
2000-100CM	0-100
2000-150CM	0-150
2000-200CM	0-200
2000-250CM	0-250
2000-300CM	0-300
Zero Center Ranges	
2300-4CM	2-0-2
2300-10CM	5-0-5
2300-30CM	15-0-15

Model	Range, MM of Water
2000-6MM†••	0-6
2000-10MM†•	0-10
2000-15MM	0-15
2000-25MM	0-25
2000-30MM	0-30
2000-50MM	0-50
2000-80MM	0-80
2000-100MM	0-100
2000-125MM	0-125
2000-150MM	0-150
2000-200MM	0-200
2000-250MM	0-250
2000-300MM	0-300
Zero Center Ranges	
2300-6MM†••	3-0-3
2300-10MM†•	5-0-5
2300-20MM†•	10-0-10
Model	**Range, Pa**
2000-60NPA†••	10-0-50
2000-60PA†••	0-60
2000-100PA†•	0-100
2000-125PA†•	0-125
2000-250PA	0-250
2000-300PA	0-300
2000-500PA	0-500
2000-750PA	0-750
2000-1000PA	0-1000
Zero Center Ranges	
Model	**Range, Pa**
2300-60PA†••	30-0-30
2300-100PA†•	50-0-50
2300-120PA	60-0-60
2300-200PA	100-0-100
2300-250PA	125-0-125
2300-300PA	150-0-150
2300-500PA	250-0-250
2300-1000PA	500-0-500

Model	Range, kPa
2000-0.5KPA	0-0.5
2000-1KPA	0-1
2000-1.5KPA	0-1.5
2000-2KPA	0-2
2000-2.5KPA	0-2.5
2000-3KPA	0-3
2000-4KPA	0-4
2000-5KPA	0-5
2000-8KPA	0-8
2000-10KPA	0-10
2000-15KPA	0-15
2000-20KPA	0-20
2000-25KPA	0-25
2000-30KPA	0-30
Zero Center Ranges	
2300-1KPA	.5-0-.5
2300-2KPA	1-0-1
2300-2.5KPA	1.25-0-1.25
2300-3KPA	1.5-0-1.5

Dual Scale Air Velocity Units For use with pitot tube

Model	Range, in w.c./ Velocity F.P.M.
2000-00AV†••	0-.25/ 300-2000
2000-0AV†•	0-.50/ 500-2800
2001AV	0-1.0/ 500-4000
2002AV	0-2.0/ 1000-5600
2005AV	0-5.0/ 2000-8800
2010AV	0-10/ 2000-12500

Dual Scale English/Metric Models

Model	Range, in w.c.	Range, Pa or kPa
2000-00D†••	0-.25	0-62 Pa
2000-0D†•	0-0.5	0-125 Pa
2001D	0-1.0	0-250 Pa
2002D	0-2.0	0-500 Pa
2003D	0-3.0	0-750 Pa
2004D	0-4.0	0-1.0 kPa
2005D	0-5.0	0-1.25 kPa
2006D	0-6.0	0-1.5 kPa
2008D	0-8.0	0-2.0 kPa
2010D	0-10	0-2.5 kPa
2015D	0-15	0-3.7 kPa
2020D	0-20	0-5 kPa
2025D	0-25	0-6.2 kPa
2050D	0-50	0-12.4 kPa
2060D	0-60	0-15 kPa

†These ranges calibrated for vertical scale position • Accuracy ±3% •• Accuracy ±4% *MP option standard **HP option standard

VELOCITY AND VOLUMETRIC FLOW UNITS
Scales are available on the Magnehelic® gage that read in velocity units (FPM, m/s) or volumetric flow units (SCFM, m^3/s, m^3/h). Stocked velocity units with dual range scales in inches w.c. and feet per minute are shown above. For other ranges contact the factory.
When ordering volumetric flow scales please specify the maximum flow rate and its corresponding pressure.
Example: 0.5 in w.c. = 16,000 CFM.

ACCESSORIES

Model	Description
A-321	Safety relief valve
A-448	3-piece magnet kit for mounting Magnehelic® gage directly to magnetic surface
A-135	Rubber gasket for panel mounting
A-401	Plastic carry case
A-310A	3-way vent valves. In applications where pressure is continuous and the Magnehelic® gage is connected by metal or plastic tubing which cannot be easily removed, we suggest using Dwyer A-310A vent valves to connect gage. Pressure can then be removed to check or re-zero the gage.

A-310A

UV Irradiators

DATE:	December 26, 2022
PROJECT NAME:	EQ#23455 Westover Hills Baptist Hosp.
LOCATION:	–
CONTACT:	Siddique Jeddy
ENGINEER:	–
CONTRACTOR:	–
UVR REP:	Trane Custom
QUOTE #:	120622-01DS

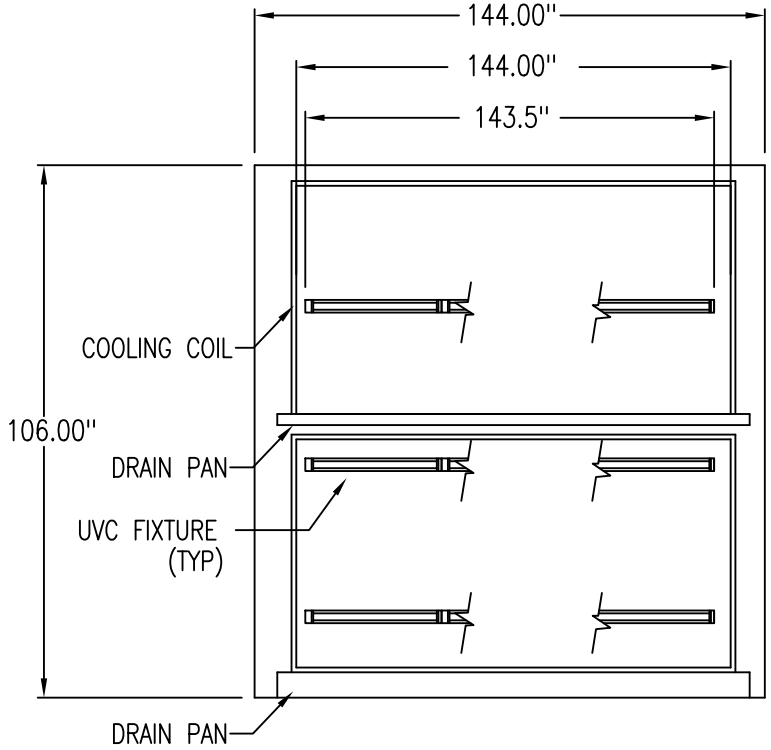
TOTAL EQUIPMENT:	–
SHIPPING ESTIMATE:	–
TOTAL:	–

UV RESOURCES
PO BOX 800370
SANTA CLARITA, CA 91380 USA
Ph.: 877.UV4.HVAC FAX: 877.794.1294
SOFTWARE REVISION: 1.09.0091.ADM

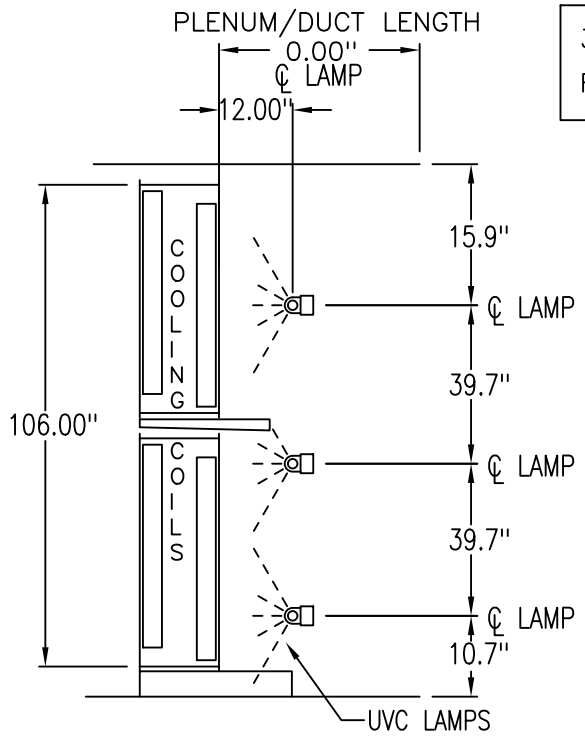
UV-C Parts Summary Sheet

Part#	Description	Total Qty	
52844541	DEF 22" Double Ended P-n-P Fixture-HO-120-277V	6	
52854541	DEF 34" Double Ended P-n-P Fixture-HO-120-277V	9	
52044541	DEF 22" Double Ended HO Set of Lamps (1 x Set of 6)	6	
52054541	DEF 34" Double Ended HO Set of Lamps (1 x Set of 9)	24	
52040001	DEF-22" Fixture High Spectral Aluminum Reflector	6	
52050001	DEF-34" Fixture High Spectral Aluminum Reflector	24	
52854540	DEF 34" Double Ended P-n-P Fixture-HO-120-277V w/o Lamp	15	

TERMS: FOB Factory, Freight Prepaid & Add, NET 30 upon approved credit, Min. Order $100 NET



FRONT ELEVATION VIEW



SIDE ELEVATION VIEW

3 Rows

Fixtures per row: 5

PARTS LIST PER UNIT

MODEL#	PART#	DESCRIPTION	QTY	WEIGHT	
DEF-221-T5-HO-120-277	52844541	DEF 22" Double Ended P-n-P Fixture-HO-120-277V	6	12.00	
DEF-341-T5-HO-120-277	52854541	DEF 34" Double Ended P-n-P Fixture-HO-120-277V	9	27.00	
DEF-22L-HO-T5-1	52044541	DEF 22" Double Ended HO Set of Lamps (1 x Set of 6)	6	1.00	
DEF-34L-HO-T5-1	52054541	DEF 34" Double Ended HO Set of Lamps (1 x Set of 9)	9	1.00	
DEF-22-AF	52040001	DEF-22" Fixture High Spectral Aluminum Reflector	6	1.50	
DEF-34-AF	52050001	DEF-34" Fixture High Spectral Aluminum Reflector	9	2.25	

TOTAL PRICE: -

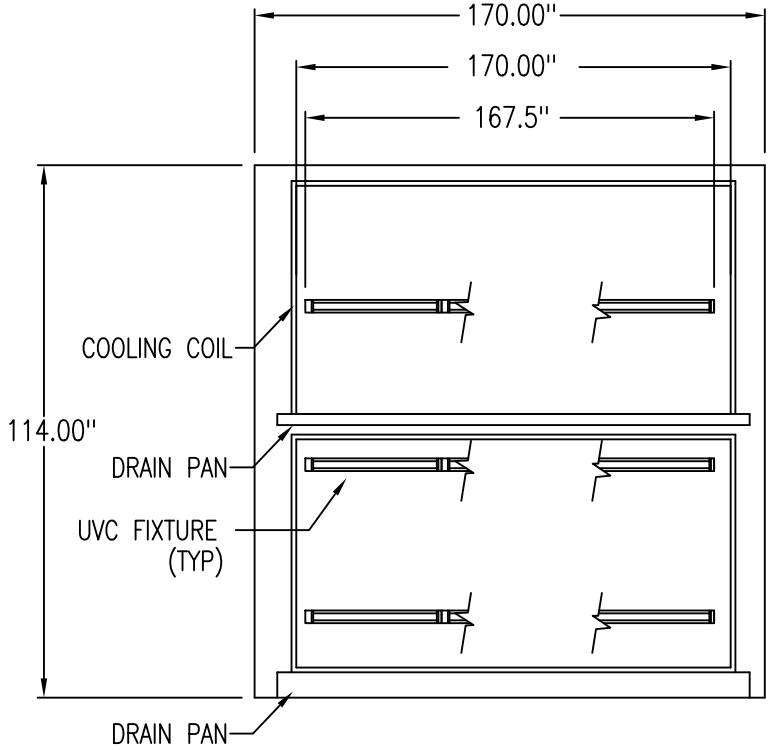
NOTES:

1. FIXTURES ARE UL/CUL LISTED PER ABQK.
2. REFER TO IOM FOR INSTALLATION DETAILS.
3. COIL SIZES AND QUANTITIES MAY VARY, DRAWINGS ARE FOR ILLUSTRATION PURPOSES ONLY.
4. CAUTION: NEVER LOOK AT LAMPS WHILE ILLUMINATED; EYE AND SKIN DAMAGE MAY RESULT FROM EXPOSURE.
5. VERTICAL AND HORIZONTAL SUPPORTS SUPPLIED BY OTHERS.

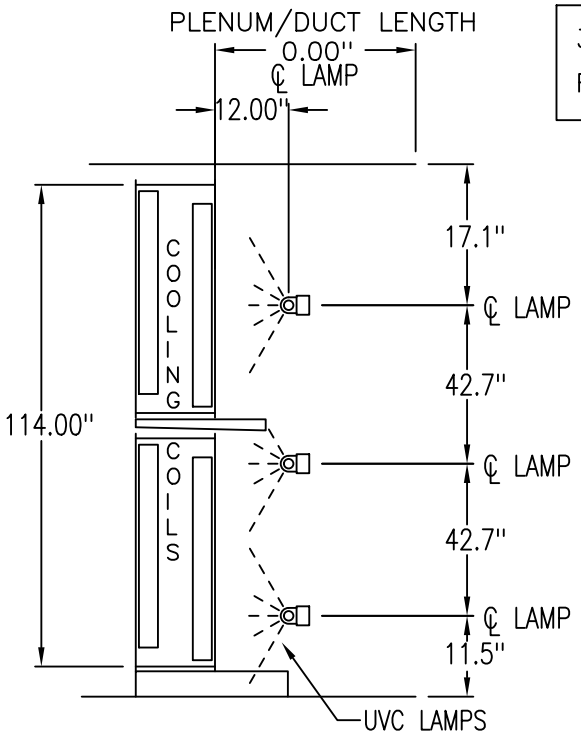
Software Rev: 1.09.0091.ADM

UV RESOURCES
PO BOX 800370
SANTA CLARITA, CA 91380 USA
Ph.: 877.UV4.HVAC FAX: 877.794.1294

PROJECT NAME: EQ#23455 Westover Hills Baptist Hosp.		DATE: December 26, 2022	LAMP WATTS PER SQUARE FOOT: 9.06
AHU TAG: AHU-1-3			
CONTACT: Siddique Jeddy	LOCATION: -	ENGINEER: -	APPLICATION PRESSURE DROP: 0.030
REP FIRM: Trane Custom	QUOTE NO: 120622-01DS	CONTRACTOR: -	TOTAL ELECTRICAL WATTS: 1008 (8.40 A @ 120V)



FRONT ELEVATION VIEW



SIDE ELEVATION VIEW

3 Rows

Fixtures per row: 5

PARTS LIST PER UNIT

MODEL#	PART#	DESCRIPTION	QTY	WEIGHT	
DEF-340-T5-HO-120-277	52854540	DEF 34" Double Ended P-n-P Fixture-HO-120-277V w/o Lamp	15	45.00	
DEF-34L-HO-T5-1	52054541	DEF 34" Double Ended HO Set of Lamps (1 x Set of 15)	15	1.00	
DEF-34-AF	52050001	DEF-34" Fixture High Spectral Aluminum Reflector	15	3.75	

TOTAL PRICE: -

NOTES:

1. FIXTURES ARE UL/CUL LISTED PER ABQK.
2. REFER TO IOM FOR INSTALLATION DETAILS.
3. COIL SIZES AND QUANTITIES MAY VARY, DRAWINGS ARE FOR ILLUSTRATION PURPOSES ONLY.
4. CAUTION: NEVER LOOK AT LAMPS WHILE ILLUMINATED; EYE AND SKIN DAMAGE MAY RESULT FROM EXPOSURE.
5. VERTICAL AND HORIZONTAL SUPPORTS SUPPLIED BY OTHERS.

Software Rev: 1.09.0091.ADM

UV RESOURCES
PO BOX 800370
SANTA CLARITA, CA 91380 USA
Ph.: 877.UV4.HVAC FAX: 877.794.1294

PROJECT NAME: EQ#23455 Westover Hills Baptist Hosp.		DATE: December 26, 2022	LAMP WATTS PER SQUARE FOOT: 8.92
AHU TAG: AHU-1-4			
CONTACT: Siddique Jeddy	LOCATION: -	ENGINEER: -	APPLICATION PRESSURE DROP: 0.030
REP FIRM: Trane Custom	QUOTE NO: 120622-01DS	CONTRACTOR: -	TOTAL ELECTRICAL WATTS: 1200 (10.00 A @ 120V)

UV RESOURCES

DEF UV-C Series – High Output Datasheet

BENEFITS

- Meets all "fixture" specifications
- Fixture-to-fixture Plug-n-Play
- Installs quickly and easily anywhere
- Easy to specify, source, and purchase
- Water-proof ballast/ components
- Destroys coil/drain pan microbial infestations
- Restores AHU capacity and efficiency
- Ends tedious coil/drain pan cleanings
- Improves indoor environmental quality
- Industry's lowest cost of ownership
- UL, CUL and other agency sanctions
- 3-year fixture, 1-year lamp warranties

For over 100 years, UV-C energy has benefited humanity by disinfecting water, air, food, and more. It's used worldwide in waste and bottled water plants for surface decontamination and airborne disinfection of the deadliest microorganisms known.

Published research shows that UV-C not only disinfects surfaces and airstreams but it also destroys organic compounds. Its photo-destruction of this material in HVAC equipment is widely established by academia, independent research and ASHRAE.

UV systems are widely installed in hospitals to disinfect HVAC air streams, cooling coils and drain pans to keep them free of microorganisms and other organic debris that reduce airflow and coil heat transfer efficiency. It stops the proliferation of infectious or allergenic agents and lowers the cost of maintaining and operating HVAC equipment.

UV Resources manufactures the most affordable, effective, efficient, and reliable products in the industry. The DEF is constructed of premium materials such as stainless steel, polycarbonate, and Teflon® for sustainability in all environments. Power supplies are waterproof and spectral lamps are high-efficiency, low-waste content products that surpass today's environmental standards.

These benefits, along with ease of installation and low cost, make the DEF series and all UVR products and systems the user's choice for most any UV-C system in today's HVAC equipment.

Application

DEF High Output fixtures meet all ASHRAE guidelines and are suitable for most any UV-C application. They connect end-to-end using PnP connections for fast, simple, and reliable installations of any length and number of rows necessary to achieve the specified irradiance. They can be installed in supply, return, or exhaust plenums, and ducts, to disinfect moving air streams and/or surfaces, preventing microbial proliferation and transfer to conditioned spaces, and to preclude the buildup of organic materials. Various sizes and 120–277V voltage options allow easy fit-up most anywhere.

HIGH OUTPUT

REPRESENTED BY:

UV RESOURCES

Corporate Office
P.O. Box 800370
Santa Clarita, CA 91380-0370
Phone 877.884.4822
Fax 877.794.1294
Website www.UVResources.com

CONSTRUCTION

FIXTURES are factory-assembled and tested. They consist of a housing, "waterproof" power source, lamp sockets, quick connects, and lamp. Construction is designed to withstand HVACR environments and is UL/C-UL (ABQK) Listed.

HOUSING is constructed of heavy-gauge 304 stainless steel, and is equipped with 6-1/2" conduit knockouts on the fixture's top, bottom, and ends for ease of wiring. Fixtures can be mounted anywhere in an HVACR system or as shown on system plans.

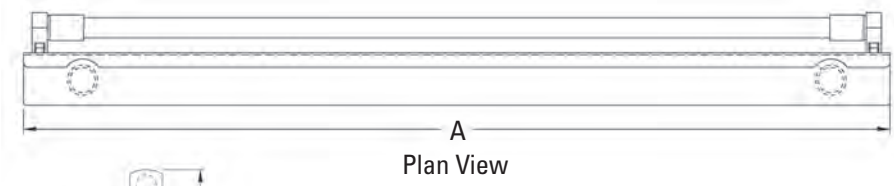
POWER SUPPLY is a waterproof, Type 1, outdoor, high-power factor, electronic rapid-start type with overload and end-of-lamp-life circuit protection that maximizes lamp radiance, life, and system reliability at temperatures of 1–70°C. Input: 120–277 Vac, 50/60 Hz, with a sound rating of A.

SOCKETS are bi-pin, single-click safety, twist-lock type and constructed of polycarbonate.

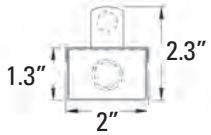
LAMP is a very high output, T5 diameter, medium bi-pin type that produces broad-band UV-C at 253.7 nm. Each lamp produces the specified output at any airflow velocity and temperature of 1–70°C. Minimum useful lamp life is 9,000 hours and up to 18,000 when used continuously, with no more than a 20% output loss, depending on conditions.

INDEPENDENT TESTING – Fixtures have been independently tested to verify UV output under various conditions and in conformance to UL/C-UL (ABQK).

DEF UV-C Series – Standard Output



Plan View



End View

Part No.	Dim "A"
52844541	21.5
52854541	33.5
52844540	21.5
52854540	33.5

ORDERING INFORMATION

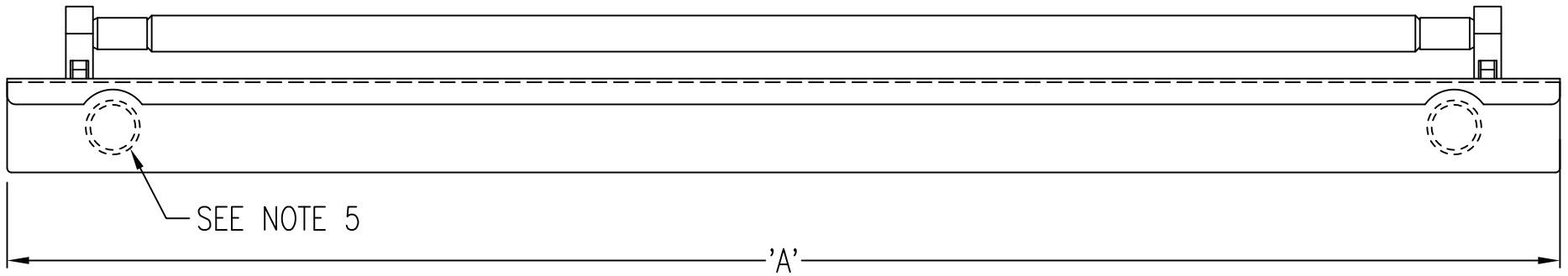
Model #	P/N	Description	Electrical
FIXTURING			
DEF-221-T5-HO-120-277	52844541	DEF 22" Double Ended Fixture – High Output - MV	120–277 Vac, 50–60 Hz
DEF-341-T5-HO-120-277	52854541	DEF 34" Double Ended Fixture – High Output - MV	120–277 Vac, 50–60 Hz
DEF-220-T5-HO-120-277	52844540	DEF 22" Double Ended Fixture – High Output - MV – Without Lamp	120–277 Vac, 50–60 Hz
DEF-340-T5-HO-120-277	52854540	DEF 34" Double Ended Fixture – High Output - MV – Without Lamp	120–277 Vac, 50–60 Hz
LAMPS			**Watts**
DEL-22L-HO-T5-1	52044541	DEL 22" Double Ended High Output Lamp	45 W
DEL-34L-HO-T5-1	52054541	DEL 34" Double Ended High Output Lamp	75 W
DEL-22L-HO-EL-T5-1	52046541	DEL 22" Double Ended High Output EncapsuLamp Lamp	45 W
DEL-34L-HO-EL-T5-1	52056541	DEL 34" Double Ended High Output EncapsuLamp Lamp	75 W
ACCESSORIES			
UVR-24V UVM	90001201	UVReport™ UV-C Monitor – 24 Vac w/Sensor	24 Vac
UVR-120–240V ISS	90001500	Access Interlock Safety Switch – 120–277 Vac	120–277 Vac

The health aspects associated with the use of this product and its ability to aid in the disinfection of environmental air have not been investigated by UL.

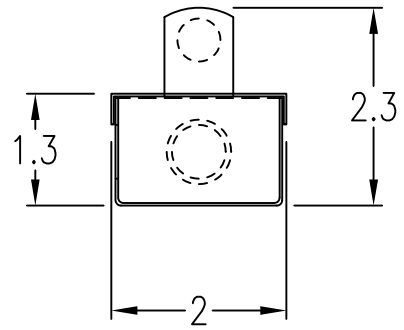
CLASSIFIED C UL US

The UVR website contains tools that let you select and specify complete UV-C systems. You'll also find valuable content that will help simplify installation, operation, and maintenance of UV-C systems. For more information, go to **www.uvresources.com**

Specifications subject to change without notice.



PLAN VIEW



END VIEW

NOTES:

1. UL/CUL LISTED.
2. WATERPROOF BALLAST.
3. WIRED FOR PnP INSTALLATION
4. HEAVY GAUGE STAINLESS STEEL CONSTRUCTION.
5. WEEP-HOLE CONDENSATE RELIEF DESIGN.
6. PRE-PUNCHED MOUNTING HOLES - #6 SCREWS.
7. 6- 1/2" ELECTRICAL KNOCKOUTS-2 ON ENDS, 4- ON SIDES.
8. WARNING LABELS INCLUDED WITH EACH FIXTURE.

GENERAL:

1. REFER TO PRODUCT IOM FOR INSTALLATION DETAILS.
2. USE INTERLOCK SWITCHES ON ALL ACCESSES TO LAMPS.
3. CAUTION: NEVER LOOK AT LAMPS WHEN LIT - EYE AND SKIN DAMAGE MAY RESULT FROM EXPOSURE.

PARTS LIST

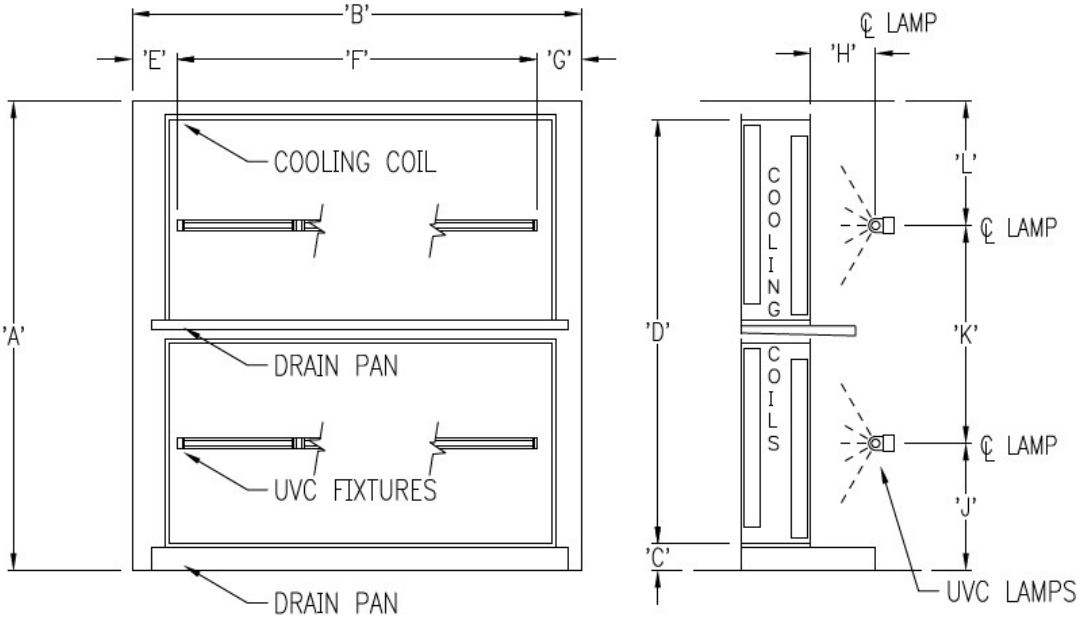
'A' DIM	QTY	MODEL#	PART #	DESCRIPTION
21.5"		DEF-221-T5-HO-120-277	52844541	DEF 22" DOUBLE ENDED PLUG-N-PLAY FIXTURE - HIGH OUTPUT - 120-277V
33.5"		DEF-341-T5-HO-120-277	52854541	DEF 34" DOUBLE ENDED PLUG-N-PLAY FIXTURE - HIGH OUTPUT - 120-277V

UV RESOURCES
PO BOX 800370
SANTA CLARITA, CA 91380 USA
Ph.: 877.UV4.HVAC FAX: 877.794.1294

DRAWING NAME:		LOCATION:	LAMP WATTS PER SQUARE FOOT:
CONTACT:	AHU TAG:	ENGINEER:	APPLICATION PRESSURE DROP:
REP FIRM:	QUOTE NO:	CONTRACTOR:	TOTAL ELECTRICAL WATTS:

EPA™ Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), EPA Establishment No. 92627

Layout Drawing Example



Maintenance:

The intensity of the ultraviolet energy emitted from the UV lamps is dependent on the cleanliness and lamp age. The surface of the lamp should be kept as clean as possible for optimum intensity. Depending on the filtration level of the HVAC system and the general hygiene of the building, periodic cleaning may be necessary. Before attempting any maintenance procedures, always follow all warnings and cautions as detailed in this maintenance section.

Cleaning Lamps

Note: If lamps are found to be broken, see the proper warning and cautions below regarding broken lamps and hazardous vapors.

1. Disconnect all electrical power to the unit and the UV lamps.
2. Wearing soft cloth gloves and safety glasses grasp lamp with fingers and twist lamp until it can be removed from tombstone.
3. Wipe down each lamp with a clean cloth and isopropyl alcohol. Avoid touching lamp glass with hands as skin oils can accelerate lamp degradation. (If lamps are coated with Teflon they can be touched with bare hands).
4. Apply dielectric grease to 4 pins. Place lamp back in tombstone and twist lamp until it clicks into place.

Replacing the Lamps

Ultraviolet lamps should be replaced annually if operated continuously or after 9,000 hours of use if operated intermittently. Replacement lamps must be the specific size and wattage as originally supplied from the factory.

Note: Although the lamps may continue to generate a characteristic blue glow beyond 9,000 operating hours, the ultraviolet energy emitted by the bulbs degrades over time and will no longer provide the intended benefit.

Lamp Disposal:
UV lamps should be treated the same as other mercury-containing devices, such as fluorescent bulbs, according to local regulations. Most lamps must be treated as hazardous waste and cannot be discarded with regular waste. Low-mercury bulbs often can be discarded as regular waste; however, some states and local jurisdictions classify these lamps as hazardous waste. The U.S. EPA's universal waste regulations allow users to treat mercury lamps as regular waste for the purpose of transporting to a recycling facility. The National Electrical Manufacturers Association (NEMA) maintains a list of companies claiming to recycle or handle used mercury lamps at www.lamprecycle.org

EQUIPMENT WARRANTY

This warranty supersedes and replaces any warranty statements orally made by a Salesperson, Distributor or Dealer or contained in the written instructions or other Brochures or informational documents in relation to this product. This warranty gives you specific legal rights, and you may also have other rights which vary from State to State.

UV Resources (UVR) warrants to the original buyer that its Products shall be free from defects in material or workmanship under normal use and service for the periods of time set forth below. This warranty is contingent upon proper use of Products and will not apply if adjustment, repair or parts replacement is required because of an accident, unusual physical, electrical or electro-mechanical stress, neglect, misuse, failure of electric power, humidity control, transportation, unauthorized repair actions, or not installed or maintained in accordance with UVRs' specifications hereunder, or where Product serial numbers have been altered, defaced, or removed. UVRs' obligation under this warranty shall not arise until the Purchaser of the Product returns the defective part to UVR. This warranty is limited to the repair and/or replacement of parts. This warranty does not cover any labor or subsequent damage incurred as the result of Product failure or indirectly arising from the design, construction, installation, servicing, or operation of Products. UVR and its resellers' liability under this warranty shall in no event exceed the cost of goods sold under the original sale contract.

Under the conditions specified above, UV Resources warrants all DEF Product fixtures for a period of three (3) years from date of purchase and all lamps for a period of 12 months from date of installation provided lamps are installed within 3 months from date of purchase. Buyer must provide proof of purchase. This is UVR's sole warranty. No warranties are extended beyond those described herein and it is expressly agreed that this warranty will be in lieu of all warranties of fitness and merchantability. UVR neither assumes, nor authorizes any person to assume for it, any obligation in connection with the Products. **Buyer shall not return to UVR any allegedly defective goods without UVRs' prior written authorization**. This warranty may not be assigned or transferred.

UVR
UV RESOURCES
UVResources.com
877-884-4822
P.O. Box 800370 • Santa Clarita • California • 91380

GENERAL INSTALLATION INSTRUCTIONS
Access Door Interlock Safety Switch

CAUTION! Never Expose Eyes or Skin to UV-C light – Completely Read all Materials before Starting

SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause fire, electrical shock, or other conditions which may cause personal injury or property damage. Consult a qualified installer, service agency, or your supplier for information or assistance. The qualified installer or agency must use factory kits or accessories when installing this product. Refer to the individual instructions packaged with kits or accessories when installing them. Follow all safety codes, wear safety glasses and work gloves. Read all instructions thoroughly and follow any warnings or cautions attached to any accessed area. Consult local building codes and the National Electrical Code (NEC) for all applicable requirements.

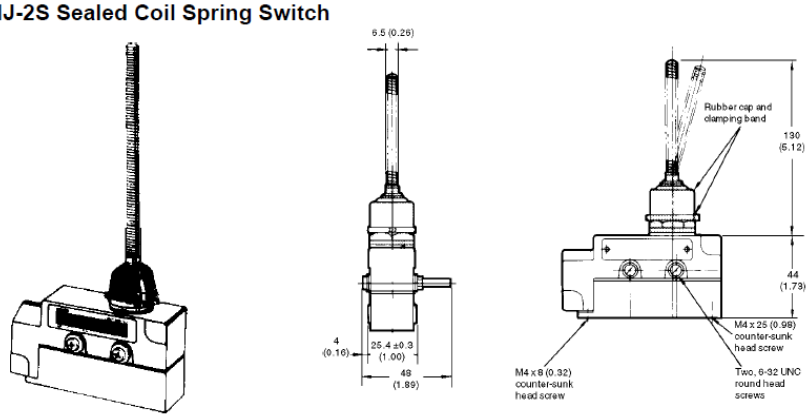
Understand the signal words DANGER, WARNING or CAUTION. These words are universally used for overall safety. DANGER identifies the most serious hazards, which will result in severe personal injury or death. WARNING signifies hazards, which could result in personal injury or death. CAUTION is used to identify unsafe practices, which would result in minor personal injury or product and property damage.

WARNING: Before installing or servicing this unit, turn off and lock-out all power, there may be more than one (1) switch.

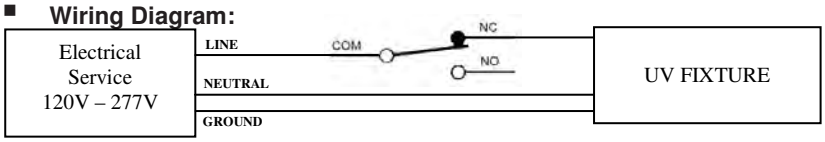
NOTE: **Access Door Interlock Safety Switch** should not be used as a main disconnect for the UV-C Light assembly. A power switch should be used outside of the unit, next to the UV-C Light assembly access as the main disconnect. The Access Door Safety Switch is to be used as a secondary “safety interlock” to be sure the lamps are off if the plenum is accessed accidently.

■ Dimensions

ZE-NJ-2S Sealed Coil Spring Switch



■ **Wiring Diagram:**



*Switch is wired as ”normally closed” (NC) so that power disconnects when the switch is actuated by an opened door.

CAUTION: **Using the Access Interlock Safety Switch in any other method than shown voids product warranty and may do damage to the entire system.**

■ **RATINGS**

Maximum Carrying Currents

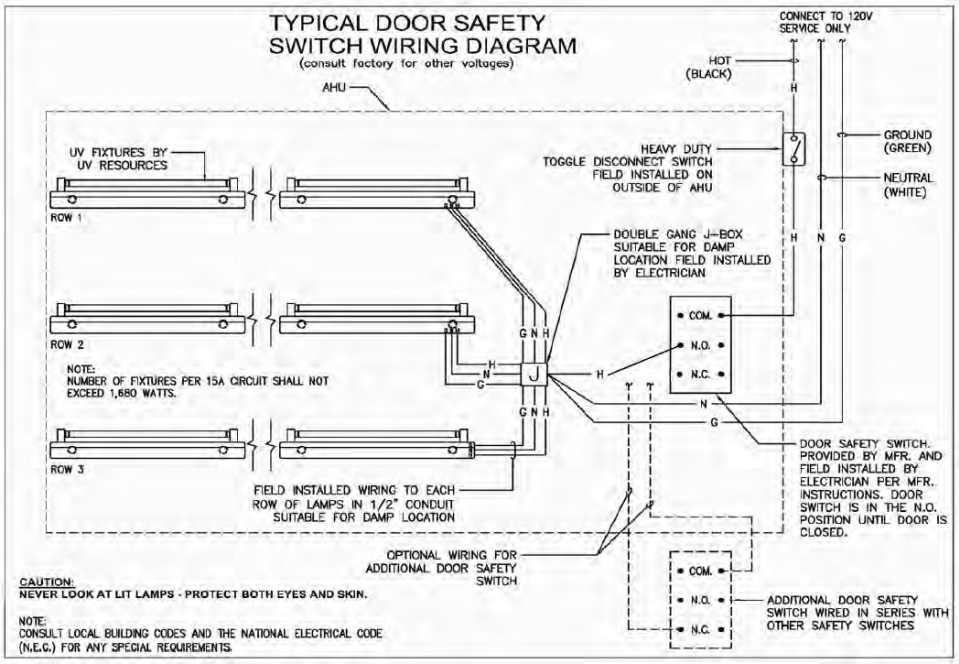
Rated voltage	Non-inductive load (amps)				Inductive load (amps)				Inrush current (amps)	
	Resistive load		Lamp load		Inductive load		Motor load			
	NC	NO	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	15	15	3	1.5	15	15	5	2.5		
250 VAC	15	15	2.5	1.25	15	15	3	1.5		
480 VAC	10	10	1.5	0.75	6	6	1.5	0.75	30 max.	15 max.
125 VDC	0.5	0.5	0.5	0.5	0.05	0.05	0.05	0.05		
250 VDC	0.25	0.25	0.25	0.25	0.03	0.03	0.03	0.03		

Note:
1. Inductive load has a power factor of 0.4 minimum (AC) and a time constant of 7 msec (DC).
2. Lamp load has an inrush current of 10 times the steady-state current, while motor load has an inrush current of 6 times the steady-state current.

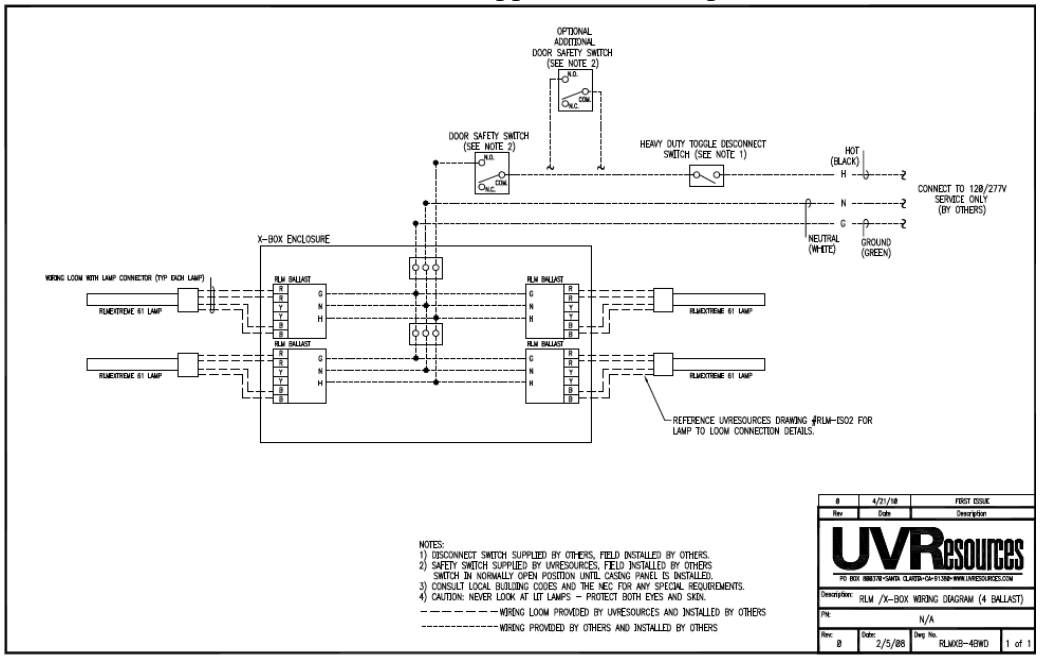
■ CHARACTERISTICS

Enclosure rating	UL	Types 3, 4, and 13
	NEMA	Types 1, 2, 3, 4, 5 for "-N types";
	IEC 144	IP65 for "-N types";
Ambient operating temperature		-10° to 80°C (14° to 176°F)
Vibration	Malfunction durability	10 to 55 Hz, 1.5 mm (0.06 in) double amplitude
Shock	Malfunction durability	20 G
	Mechanical durability	100 G

DEF Application Example



RLM Xtreme Application Example



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(877) UV4-HVAC (884-4822) • Fax: (877) 794-1294
www.UVResources.com

Job: WESTOVER HILLS BAPTIST HOSPITAL
EQ NUMBER: 23455

[ELECTRICAL DRAWING AND DATA SUBMITTAL]

REV0 - ORIGINAL SUBMITTAL - SENT 01/04/2023

Trane 9900 Aire Circle, Fort Smith, AR 72916 Phone: (479) 648-7438 Fax: (479) 648-7499

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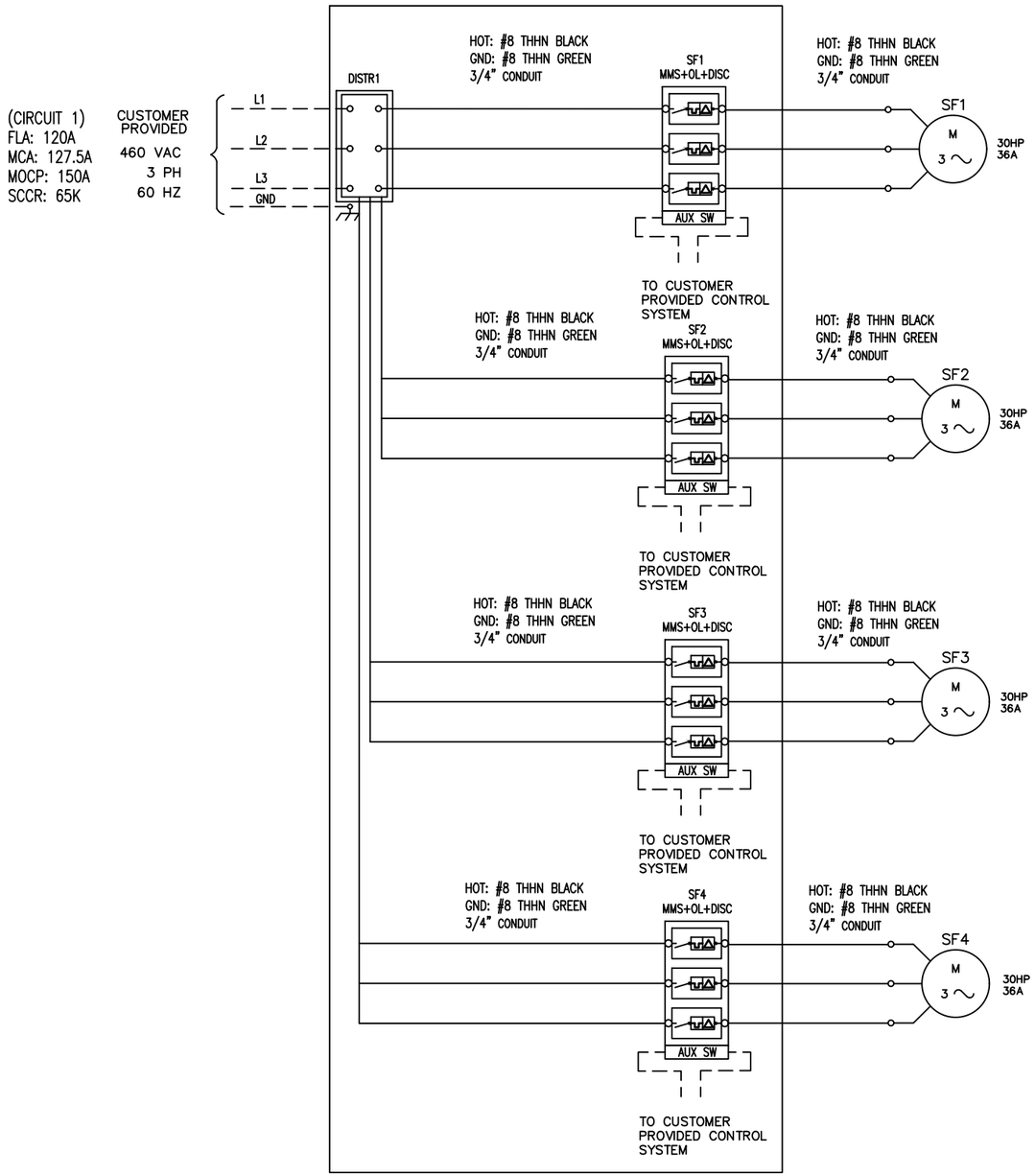

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DATE 12/19/22	SIMILAR TO	SHEET 1 of 2	

LEGEND

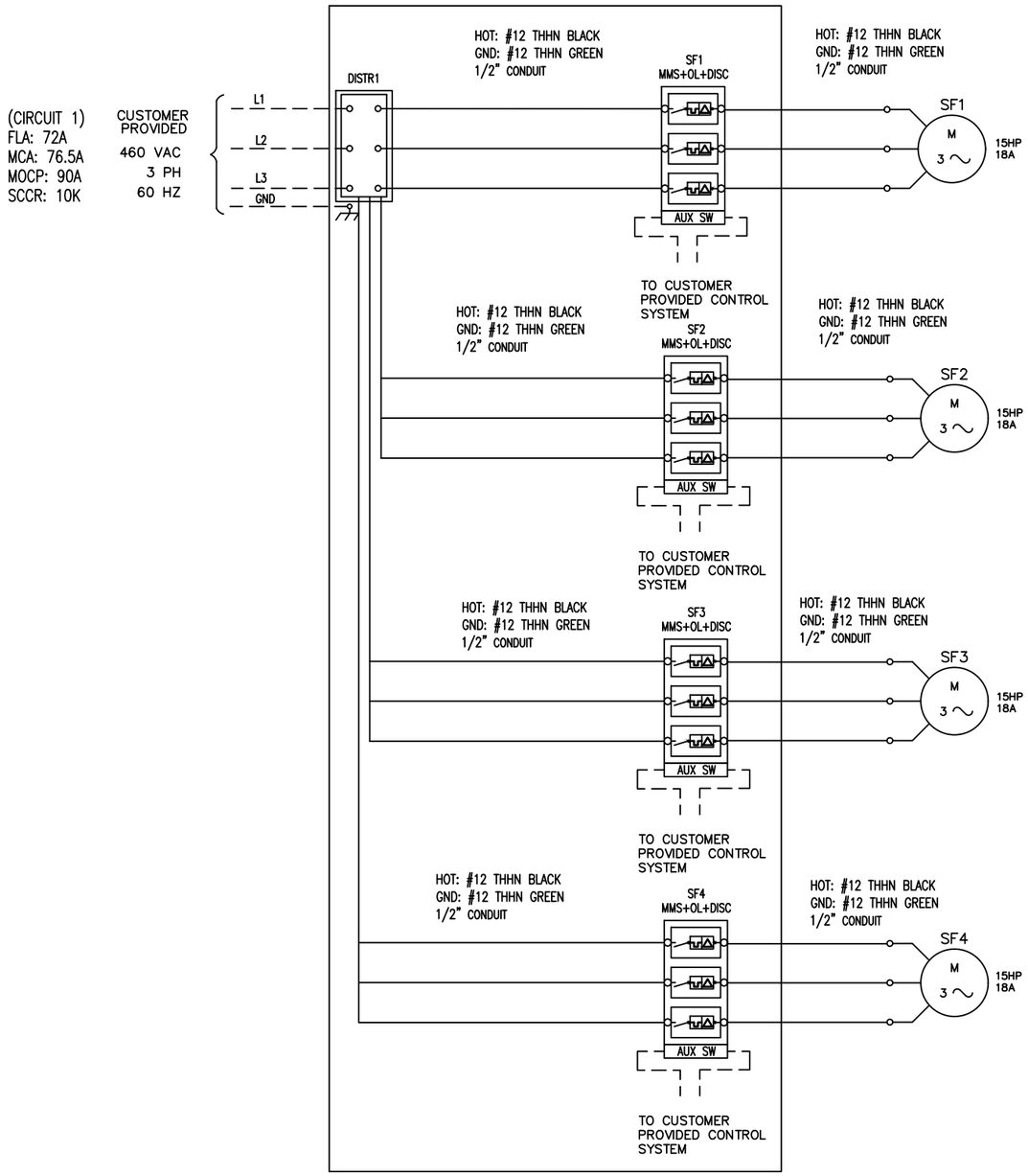
DEVICE DESIGNATION	DESCRIPTION	MODEL NUMBER / MFGR. / VENDOR
SF1-4	FAN MOTOR, 480V, 3PH, 60Hz, 30HP	SEE MOTOR SCHEDULE
MMP DISTR1	460V POWER DISTRIBUTION: DISTR BLK/COVER	9080LBA363206 / LB33
MMS-SF1-4 (4)	MANUAL MOTOR PROTECTOR, ON/OFF SW, AUX SW	GV3P50
(AUX SW) (4)	AUX SWITCH FOR MMS, 1 N.O. / 1 N.C.	GVAN11
MMP ENCL	HOFFMAN NEMA3R ENCLOSURE FOR MMPs W/PANEL	A30R248HCR / A30P24
RF1-4	FAN MOTOR, 480V, 3PH, 60Hz, 15HP	SEE MOTOR SCHEDULE
MMP DISTR1	460V POWER DISTRIBUTION: DISTR BLK/COVER	9080LBA363106 / LB33
MMS-SF1-4 (4)	MANUAL MOTOR PROTECTOR, ON/OFF SW, AUX SW	GV2P21
(AUX SW) (4)	AUX SWITCH FOR MMS, 1 N.O. / 1 N.C.	GVAN11
MMP ENCL	HOFFMAN NEMA3R ENCLOSURE FOR MMPs W/PANEL	A30R248HCR / A30P24
REC (2)	P&S 20A WEATHER-RESISTANT GFCI RECEPTACLE	X19200728010
REC COVER (3)	RED DOT WEATHER PROOF RECEPTACLE COVER	CKPS
LT1-10	RAB VAPORPROOF INCANDESCENT/FLUORESCENT FIXTURE	VX100DG
LT1-10 BULB	CREE 10W LED BULBS - 60W EQUIVALENT	A19-60W-P1-27K-E26-U1
SW	P&S 15A SPST LIGHT SWITCH	PS15AC1W
SW COVER	MULBERRY OUTDOOR RATED SELF CLOSING FLIP COVER	30509
UV SW	P&S 15A SPST LIGHT SWITCH, RED PILOT LIGHT	PS15AC1RPL
K1	SCHNEIDER ELECTRIC 25A CONTACTOR, 120VAC COIL	LC1D25G7
DSW1-2	UV DOOR LIMIT SWITCH	XCKJ10541H7

NOTES:

1. UNLESS OTHERWISE NOTED, ALL SWITCHES ARE SHOWN AT 25°C(77°F) AT ATMOSPHERIC PRESSURE, AT 50% RELATIVE HUMIDITY, WITH ALL UTILITIES TURNED OFF AND AFTER A NORMAL SHUTDOWN HAS OCCURRED.
2. SOLID LINES INDICATE FACTORY WIRING. DASHED LINES INDICATE FIELD WIRING. PHANTOM LINES INDICATE OPTIONAL FEATURES.
3. THIS IS AN INDOOR KNOCKDOWN UNIT.

⚠ WARNING	⚠ AVERTISSEMENT	⚠ ADVERTENCIA
HAZARDOUS VOLTAGE!	TENSION DANGEREUSE!	¡VOLTAJE PELIGROSO!
DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE.	COUPER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCÉDURES DE VERROUILLAGE ET DES ÉTIQUETTES AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.	DESCONECTE TODA LA ENERGÍA ELÉCTRICA, INCLUSO LAS DESCONEXIONES REMOTAS Y SIGA LOS PROCEDIMIENTOS DE CIERRE Y ETIQUETADO ANTES DE PROCEDER AL SERVICIO. ASEGÚRESE DE QUE TODOS LOS CAPACITORES DEL MOTOR HAYAN DESCARGADO EL VOLTAJE ALMACENADO. PARA LAS UNIDADES CON EJE DE DIRECCIÓN DE VELOCIDAD VARIABLE, CONSULTE LAS INSTRUCCIONES PARA LA DESCARGA DEL CONDENSADOR.
FAILURE TO DO THE ABOVE BEFORE SERVICING COULD RESULT IN DEATH OR SERIOUS INJURY.	NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAÎNER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.	EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.

CAUTION	ATTENTION	PRECAUCIÓN
USE COPPER CONDUCTORS ONLY!	N'UTILISER QUE DES CONDUCTEURS EN CUIVRE!	¡UTILICE ÚNICAMENTE CONDUCTORES DE COBRE!
UNIT TERMINALS ARE NOT DESIGNED TO ACCEPT OTHER TYPES OF CONDUCTORS.	LES BORNES DE L'UNITÉ NE SONT PAS CONÇUES POUR RECEVOIR D'AUTRES TYPES DE CONDUCTEURS.	LAS TERMINALES DE LA UNIDAD NO ESTÁN DISEÑADAS PARA ACEPTAR OTROS TIPOS DE CONDUCTORES.
FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.	L'UTILISATION DE TOUT AUTRE CONDUCTEUR PEUT ENDOMMAGER L'ÉQUIPEMENT.	SI NO LO HACE, PUEDE OCASIONAR DAÑO AL EQUIPO.



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DATE 12/19/22	SIMILAR TO	SHEET 1 of 2	

⚠ WARNING

HAZARDOUS VOLTAGE!

DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS AND FOLLOW LOCK OUT AND TAG PROCEDURES BEFORE SERVICING. INSURE THAT ALL MOTOR CAPACITORS HAVE DISCHARGED STORED VOLTAGE. UNITS WITH VARIABLE SPEED DRIVE, REFER TO DRIVE INSTRUCTIONS FOR CAPACITOR DISCHARGE.

FAILURE TO DO THE ABOVE BEFORE SERVICING COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠ AVERTISSEMENT

TENSION DANGEREUSE!

COUPER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCÉDURES DE VERROUILLAGE ET DES ÉTIQUETTES AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.

NE PAS RESPECTER CES MESURES DE PRÉCAUTION PEUT ENTRAÎNER DES BLESSURES GRAVES POUVANT ÊTRE MORTELLES.

⚠ ADVERTENCIA

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EL NO REALIZAR LO ANTERIORMENTE INDICADO, PODRÍA OCASIONAR LA MUERTE O SERIAS LESIONES PERSONALES.

CAUTION

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FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.

ATTENTION

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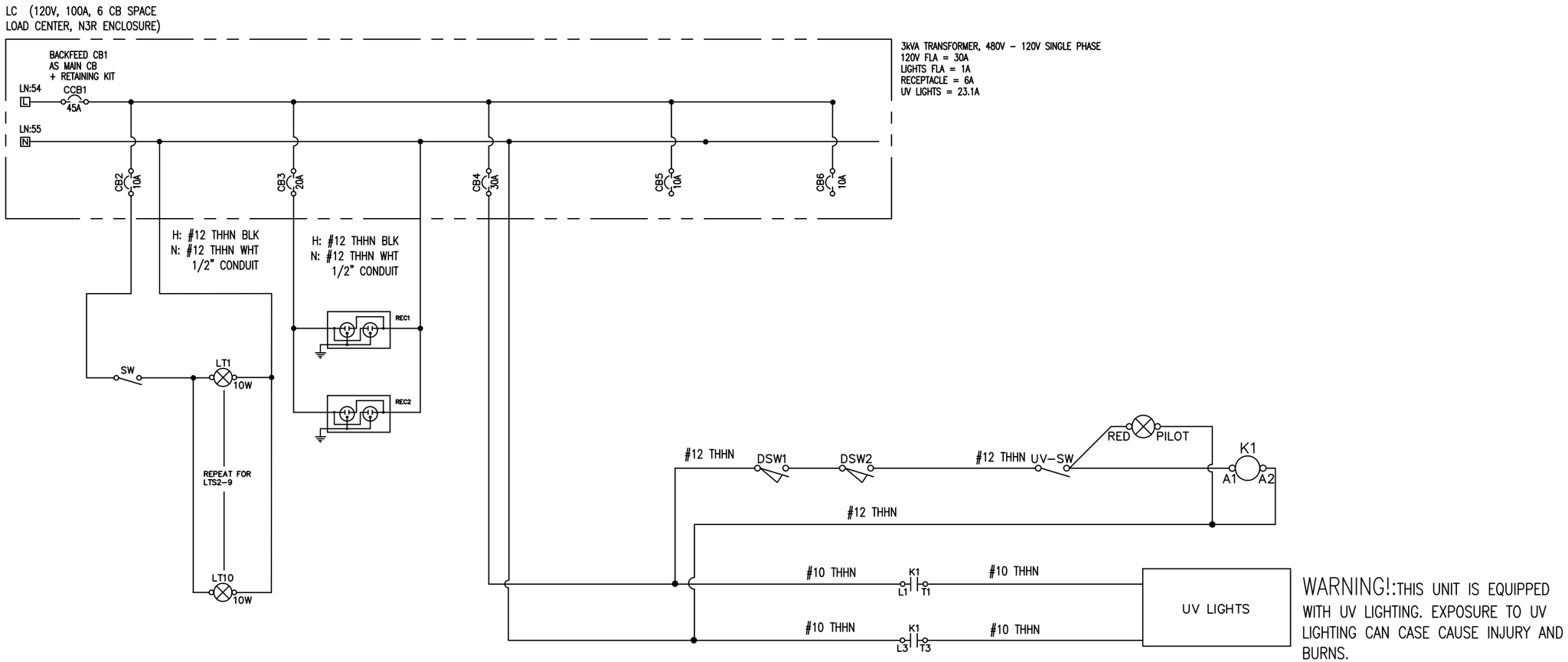

WARNING!: THIS UNIT IS EQUIPPED WITH UV LIGHTING. EXPOSURE TO UV LIGHTING CAN CASE CAUSE INJURY AND BURNS.

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01/04/2023

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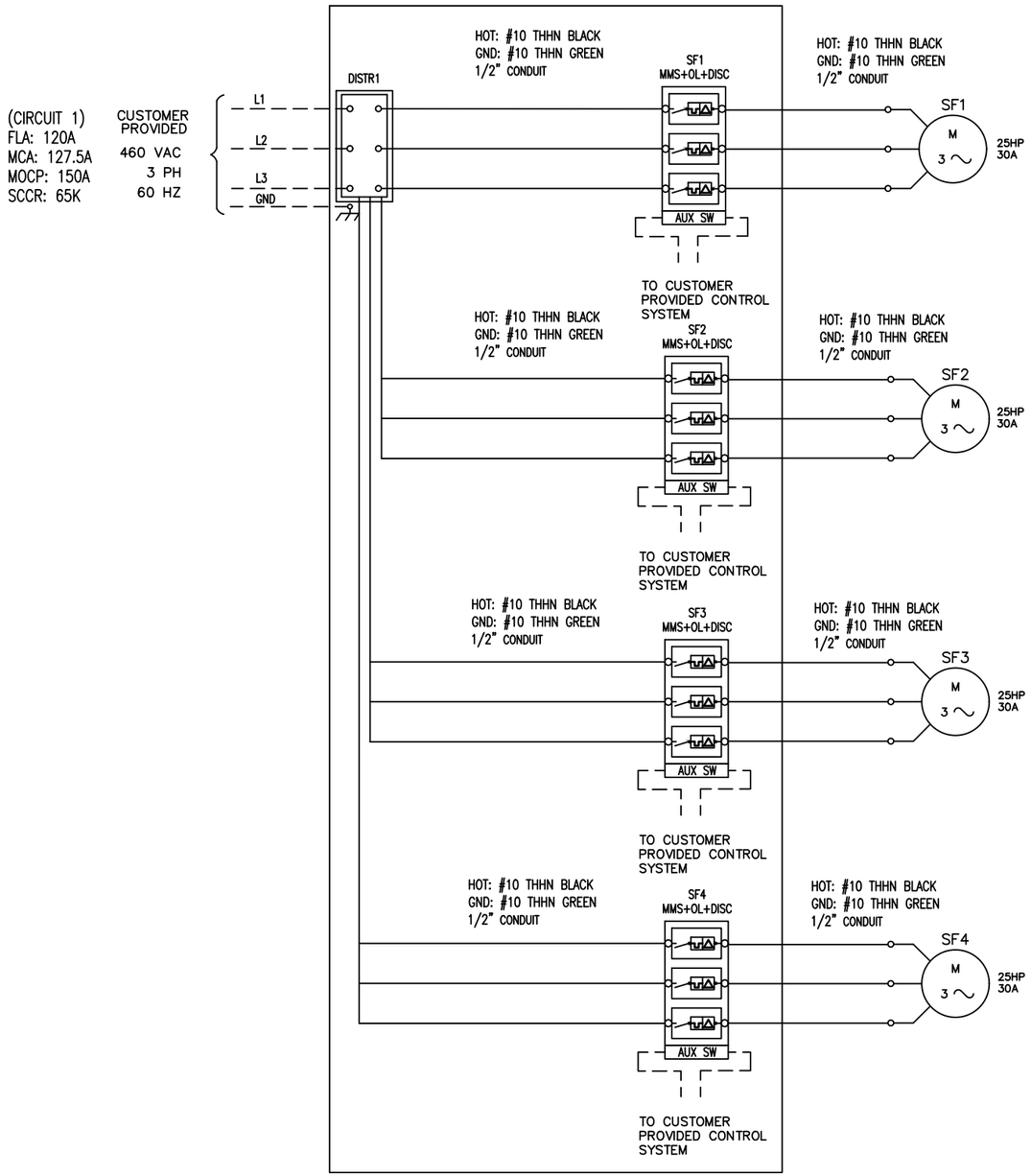

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DATE 12/19/22	SIMILAR TO	SHEET 1 of 2	

LEGEND

DEVICE DESIGNATION	DESCRIPTION	MODEL NUMBER / MFGR. / VENDOR
SF1-4	FAN MOTOR, 480V, 3PH, 60Hz, 25HP	SEE MOTOR SCHEDULE
MMP DISTR1	460V POWER DISTRIBUTION: DISTR BLK/COVER	9080LBA363106 / LB33
MMS-SF1-4 (4)	MANUAL MOTOR PROTECTOR, ON/OFF SW, AUX SW	GV3P40
(AUX SW) (4)	AUX SWITCH FOR MMS, 1 N.O. / 1 N.C.	GVAN11
MMP ENCL	HOFFMAN NEMA3R ENCLOSURE FOR MMPs W/PANEL	A30R248HCR / A30P24
RF1-4	FAN MOTOR, 480V, 3PH, 60Hz, 10HP	SEE MOTOR SCHEDULE
MMP DISTR1	460V POWER DISTRIBUTION: DISTR BLK/COVER	9080LBA363106 / LB33
MMS-SF1-4 (4)	MANUAL MOTOR PROTECTOR, ON/OFF SW, AUX SW	GV2P16
(AUX SW) (4)	AUX SWITCH FOR MMS, 1 N.O. / 1 N.C.	GVAN11
MMP ENCL	HOFFMAN NEMA3R ENCLOSURE FOR MMPs W/PANEL	A20R166HCR / A20P16
REC (2)	P&S 20A WEATHER-RESISTANT GFCI RECEPTACLE	X19200728010
REC COVER (3)	RED DOT WEATHER PROOF RECEPTACLE COVER	CKPS
LT1-10	RAB VAPORPROOF INCANDESCENT/FLUORESCENT FIXTURE	VX100DG
LT1-10 BULB	CREE 10W LED BULBS - 60W EQUIVALENT	A19-60W-P1-27K-E26-U1
SW	P&S 15A SPST LIGHT SWITCH	PS15AC1W
SW COVER	MULBERRY OUTDOOR RATED SELF CLOSING FLIP COVER	30509
UV SW	P&S 15A SPST LIGHT SWITCH, RED PILOT LIGHT	PS15AC1RPL
K1	SCHNEIDER ELECTRIC 25A CONTACTOR, 120VAC COIL	LC1D25G7
DSW1-2	UV DOOR LIMIT SWITCH	XCKJ10541H7

NOTES:

1. UNLESS OTHERWISE NOTED, ALL SWITCHES ARE SHOWN AT 25°C(77°F) AT ATMOSPHERIC PRESSURE, AT 50% RELATIVE HUMIDITY, WITH ALL UTILITIES TURNED OFF AND AFTER A NORMAL SHUTDOWN HAS OCCURRED.
2. SOLID LINES INDICATE FACTORY WIRING. DASHED LINES INDICATE FIELD WIRING. PHANTOM LINES INDICATE OPTIONAL FEATURES.
3. THIS IS AN INDOOR KNOCKDOWN UNIT.

⚠ WARNING

HAZARDOUS VOLTAGE!

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FAILURE TO DO THE ABOVE BEFORE SERVICING COULD RESULT IN DEATH OR SERIOUS INJURY.

⚠ AVERTISSEMENT

TENSION DANGEREUSE!

COUPER TOUTES LES TENSIONS ET OUVRIR LES SECTIONNEURS À DISTANCE, PUIS SUIVRE LES PROCÉDURES DE VERROUILLAGE ET DES ÉTIQUETTES AVANT TOUTE INTERVENTION. VÉRIFIER QUE TOUS LES CONDENSATEURS DES MOTEURS SONT DÉCHARGÉS. DANS LE CAS D'UNITÉS COMPORTANT DES ENTRAÎNEMENTS À VITESSE VARIABLE, SE REPORTER AUX INSTRUCTIONS DE L'ENTRAÎNEMENT POUR DÉCHARGER LES CONDENSATEURS.

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⚠ ADVERTENCIA

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CAUTION

USE COPPER CONDUCTORS ONLY!

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FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT.

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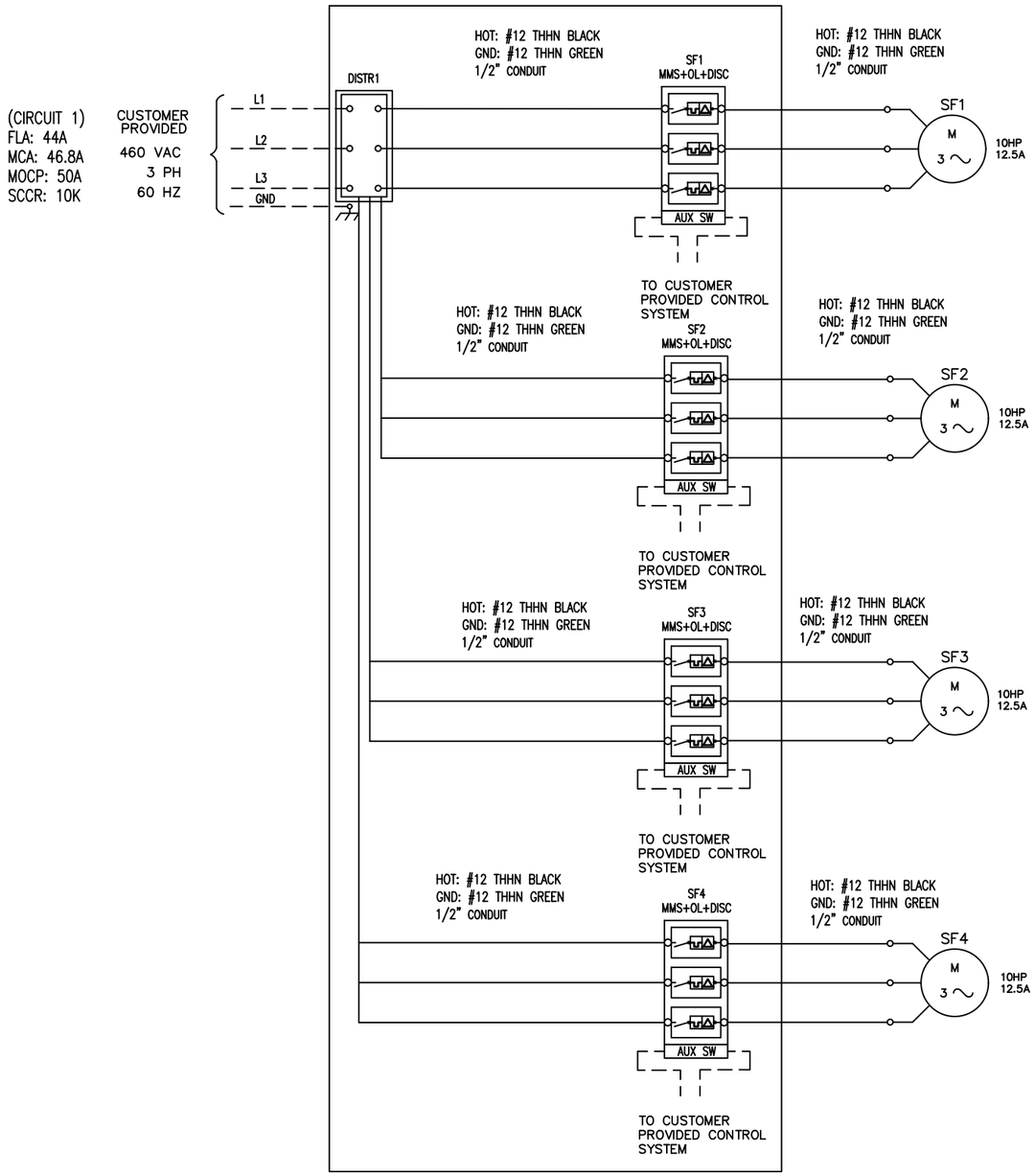

REPLACES	AUTOCAD	2345-ELEC-AHU-1-3-2	REV A
REVISION DATE	TRANE CUSTOM THIS DRAWING IS PROPRIETARY AND SHALL NOT BE COPIED OR ITS CONTENTS DISCLOSED TO OUTSIDE PARTIES WITHOUT THE WRITTEN CONSENT OF TRANE CUSTOM	WESTOVER HILLS BAPTIST HOSPITAL	
DRAWN BY: CDA		TAG: AHU-1-3 ELECTRICAL DIAGRAM	
DATE: 12/19/22	SIMILAR TO	SHEET 1 of 2	

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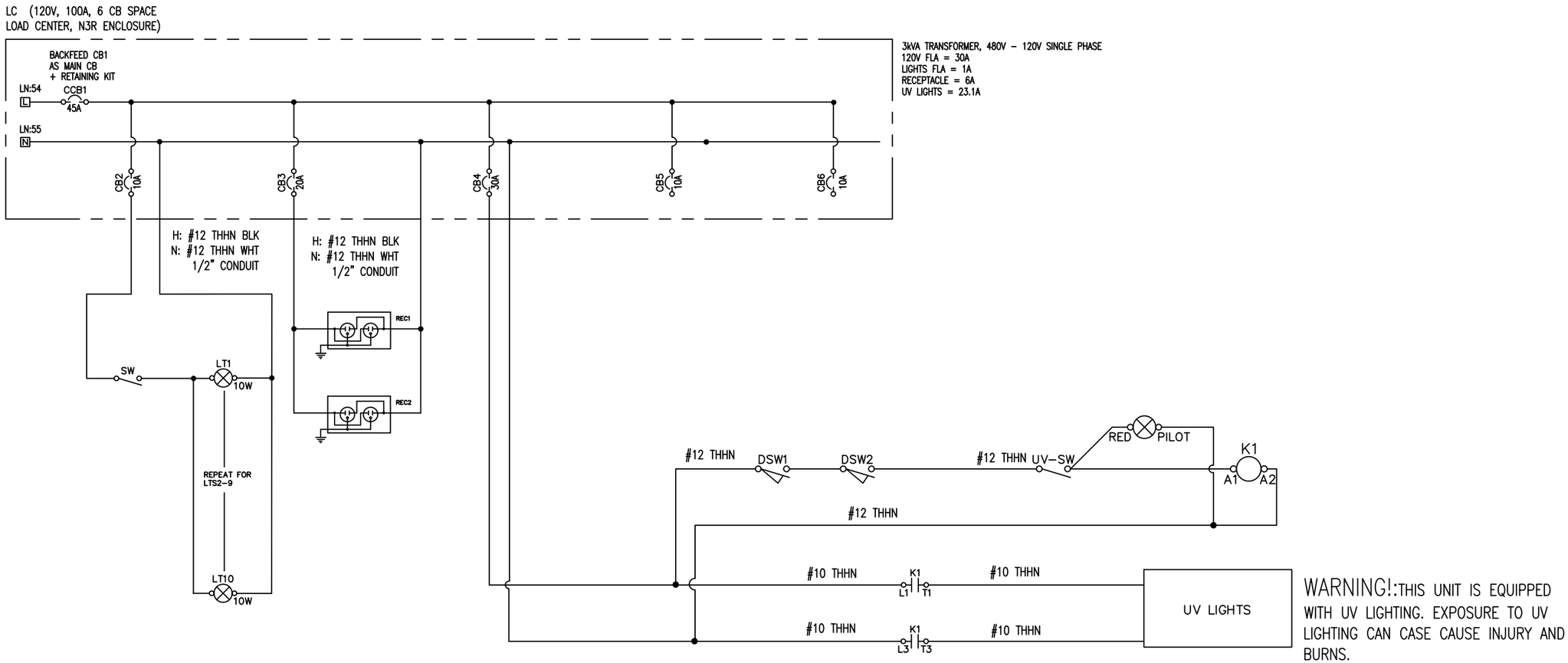
REPLACES	AUTOCAD	23456-ELEC-AHU-1-3-3	REV A
REVISION DATE	TRADE CUSTOM	WESTOVER HILLS BAPTIST HOSPITAL	
DRAWN BY CDA	THIS DRAWING IS PROPRIETARY AND SHALL NOT BE COPIED OR ITS CONTENTS DISCLOSED TO OUTSIDE PARTIES WITHOUT THE WRITTEN CONSENT OF TRANE CUSTOM	TAG: AHU-1-3 ELECTRICAL DIAGRAM	
DATE 12/19/22	SIMILAR TO	SHEET 3 of 3	



WARNING!:THIS UNIT IS EQUIPPED WITH UV LIGHTING. EXPOSURE TO UV LIGHTING CAN CASE CAUSE INJURY AND BURNS.

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Schneider Electric
www.schneider-electric.us

Starters **TeSys® GV2 and GV3 Manual Starter and Protector**

individual fan motor on/off + overload protection switch

Refer to Catalog **2520CT0001**

GV2ME

The GV family of products are 3-pole, horsepower rated, UL 508 listed, manual starters. They include a manual disconnect, class 10 ambient-compensated thermal overload relay, and an instantaneous magnetic trip mechanism in one compact unit.

Any GV manual starter can be used alone for local manual control of a motor with individual full-load currents up to 220 amps. The GV family of products may also be used in group motor installations in accordance with National Electric Code article 430-53. Group motor installations give you greater panel density for smaller size and require fewer parts and less wiring necessary for installation when compared to conventional panel designs.

The GV2P and GV3P products also have an additional UL 508 type E rating as a stand alone self-protected manual combination starter. The UL 508 type E rating requires the addition of line side insulating barrier GV2GH7 for the GV2P or part number GV3G66 for the GV3P. The GV2P and the GV3P self-protected manual combination starter may also be combined with specific size contactors from the LC1D product family for a UL 508 Type F combination starter construction. These products have UL-listed short circuit current rating from 10–100 KA depending on application size and voltage. See www.us.telemecanique.com for more information.

How to Order

To order the basic motor starter, select the model number (GV2ME••, GV2P••, or GV3P••) with the appropriate thermal setting from the table below. The thermal trip range and setting should be determined from the motor nameplate full-load current.

GV2P21 with GV2GH7 installed

Table 18.126:

Thermal Setting (A)	Maximum Horsepower Ratings 1Ø 115 V hp	1Ø 230 V hp	3Ø 200 V hp	3Ø 230 V hp	3Ø 460 V hp	3Ø 575 V hp	Group Motor Applications Max. Fuse or Circuit Breaker	GV2/3M push button Catalog Number	GV2/3M push button $ Price	GV2/3P rotary handle Catalog Number	GV2/3P rotary handle $ Price
0.11–0.16	—	—	—	—	—	—	1200 A	GV2ME01▲	159.	GV2P01	212.
0.16–0.25	—	—	—	—	—	—	1200 A	GV2ME02▲	159.	GV2P02	212.
0.25–0.40	—	—	—	—	—	—	1200 A	GV2ME03▲	159.	GV2P03	212.
0.40–0.63	—	—	—	—	—	—	1200 A	GV2ME04▲	180.	GV2P04	233.
0.63–1	—	—	—	—	0.5	0.5	1200 A	GV2ME05▲	180.	GV2P05	233.
1–1.6	—	0.1	—	—	0.75	1	1200 A	GV2ME06▲	180.	GV2P06	233.
1.6–2.5	—	0.667	0.5	0.5	1	1.5	1200 A	GV2ME07▲	180.	GV2P07	233.
2.5–4	1/8	0.333	0.75	1	2	3	1200 A	GV2ME08▲	180.	GV2P08	233.
4–6.3	1/4	0.5	1.5	1.5	3	5	1200 A	GV2ME10▲	180.	GV2P10	233.
6–10	0.5	1.5	2	3	5	7.5	1200 A	GV2ME14▲	180.	GV2P14	233.
9–14	0.75	2	3	3	10	10	1200 A	GV2ME16▲	224.	GV2P16	278.
13–18	1	3	5	5	10	15	1200 A	GV2ME20▲	224.	GV2P20	278.
17–23	1.5	3	5	7.5	15	20	1200 A	GV2ME21▲	224.	GV2P21	278.
20–25	2	3	5	7.5	15	20	1200 A	GV2ME22▲	224.	GV2P22	278.
24–32	2	5	10	10	20	30	1200 A	GV2ME32	224.	GV2P32	278.
9–13	0.5	1.5	3	3	7.5	10		—	—	GV3P13	404.
12–18	0.75	2	5	5	7.5	10		—	—	New! GV3P18	404.
17–25	1.5	3	7.5	7.5	15	20		—	—	GV3P25	404.
23–32	2	3	10	7.5	20	25		—	—	GV3P32	404.
30–40	3	5	10	10	25	30		—	—	GV3P40	504.
37–50	3	7.5	15	10	30	40		—	—	GV3P50	504.
48–65	3	10	20	15	40	50		—	—	GV3P65	504.

▲ For spring terminals add 3 to the catalog number, for example, GV2ME013. GV2ME32 is not available with spring terminals.

GV3P

Table 18.127:

Thermal Setting (A)	Maximum Horsepower Ratings 1Ø 115 V hp	1Ø 230 V hp	3Ø 200 V hp	3Ø 230 V hp	3Ø 460 V hp	3Ø 575 V hp	Toggle Operator Standard Interrupt Catalog Number	Standard Interrupt $ Price	High Interrupt Catalog Number	High Interrupt $ Price
12–20	—	—	—	5	10	15	GV7RE20	417.	GV7RS20	813.
15–25	—	—	—	7.5	15	20	GV7RE25	417.	GV7RS25	813.
25–40	—	—	—	10	30	30	GV7RE40	417.	GV7RS40	813.
30–50	—	—	—	15	30	40	GV7RE50	417.	GV7RS50	813.
48–80	—	—	—	30	60	75	GV7RE80	417.	GV7RS80	813.
60–100	—	—	—	30	75	100	GV7RE100	456.	GV7RS100	891.
90–150	—	—	—	50	100	150	GV7RE150	502.	GV7RS150	978.
132–220	—	—	—	75	150	200	GV7RE220	502.	GV7RS220	978.

GV7RE20

Specifications. . . . . page 18-36
Accessories . . . . . pages 18-34 to 18-35
Dimensions . . . . . pages 18-52 to 18-55

E164864
CCN NLRV

LR81630
Class 3211 05

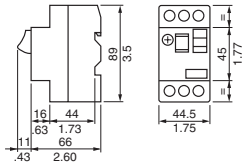
Dimensions

TeSys® Manual Starters and Protectors

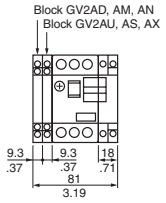
Refer to Catalog **2520CT0001**

www.schneider-electric.us

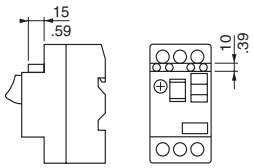
GV2M



GV2AD, AM, AN, AU, AS, AX

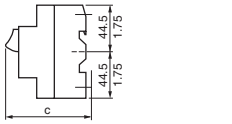


GV2AE

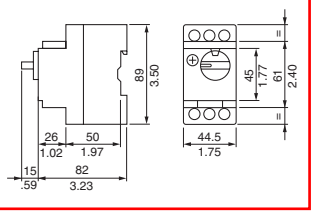


Mounting of GV2M

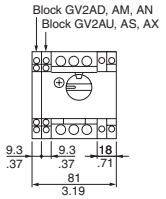
On 35 mm ⊔ rail
C = 78.5 mm (3.09") on AM1DP200 (35 x 7.5 mm)
C = 86 mm (3.39") on AM1DE200, ED200 (35 x 15 mm)



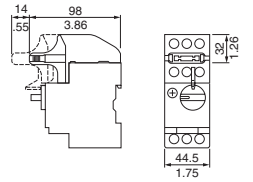
GV2P



GV2AD, AM, AN, AU, AS, AX

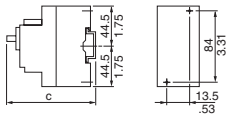


GV2AK00



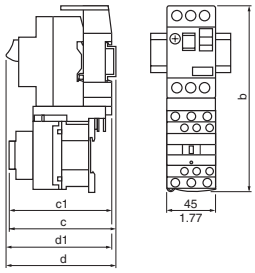
Mounting of GV2P

On 35 mm ⊔ rail
C = 98.5 mm (3.88") on AM1DP200
(35 x 7.5 mm)
C = 106 mm (4.17") on AM1DE200, ED200
(35 x 15 mm)

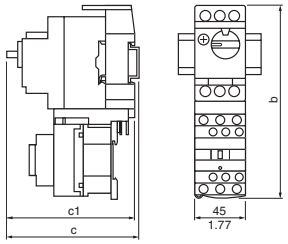


GV2AF4 + LAD31

Combination GV2ME + TeSys D range contactor

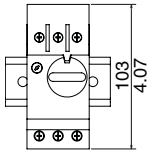


Combination GV2P + TeSys D range contactor



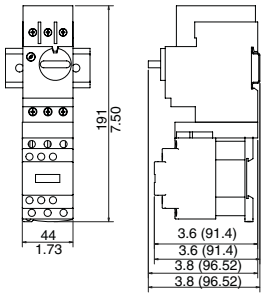
GV2P + GV2GH7

for UL 508 Type E application



GV2P + GV2GH7 + TeSys D contactor

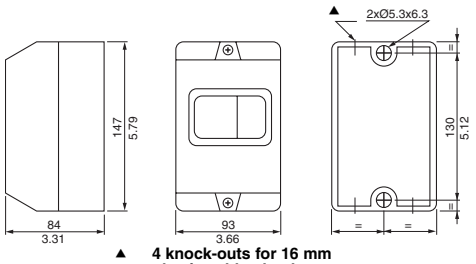
for UL 508 Type E application



GV2ME +	LC2D09 to D18	LC2D25 and D32
b	7.4 (188.6)	7.8 (199)
c1	3.6 (92.7)	3.9 (99)
c	3.9 (98.2)	4.11 (104.5)
d1	3.9 (98.3)	3.9 (98.3)
d	4.1 (103.8)	1.4 (103.8)

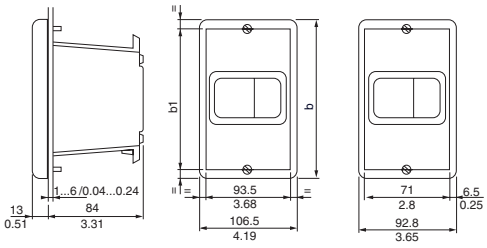
GV2P +	LC2D09 to D18	LC2D25 and D32
b	6.61 (168.1)	7.9 (199.5)
c1	4.6 (116.8)	4.6 (116.8)
c	4.8 (122.3)	4.8 (122.3)
—	—	—
—	—	—

Surface mounting enclosure GV2MC0 ●



▲ **4 knock-outs for 16 mm plastic cable glands or no. 16 conduit.**

Flush mounting enclosure GV2MP0 ● (bracket cut-out)



GV2	b		b1	
	IN	mm	IN	mm
MP01, MP02	5.51	140	5.00	127
MP03, MP04	5.24	133	4.61	117

Product Data Sheet

GVAN11

MANUAL STARTER AUX CONTACT 575VAC 5AMP I

this is 1 N.O. / 1 N.C. aux switch for monitoring the "normal" / "Off" state of the MMP. (The states will be the opposite when the MMP is switched "On" or in the "not tripped" state.)

N.O. = (Open when MMS is "Off" or "Tripped")
= Closes when "MMP Ok" (or "Not Tripped", "On" position)

N.C. = Close when MMS is OFF or TRIPPED
= (Opens when MMS is ON or OK (Not Tripped))

(normal usage: wire N.O. aux switches in series to UC600 Controller input, which = "MMPs Ok" or "Not Tripped". If the series "Opens", 1 or more MMP Off or Tripped (MMPs Not Ok).

Technical Characteristics

Shipping and Ordering

Category	22367 - Protectors, Starter, Manual, Type GV2
Discount Schedule	I11
GTIN	00785901212430
Package Quantity	1
Weight	0.1 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y
Country of Origin	CZ

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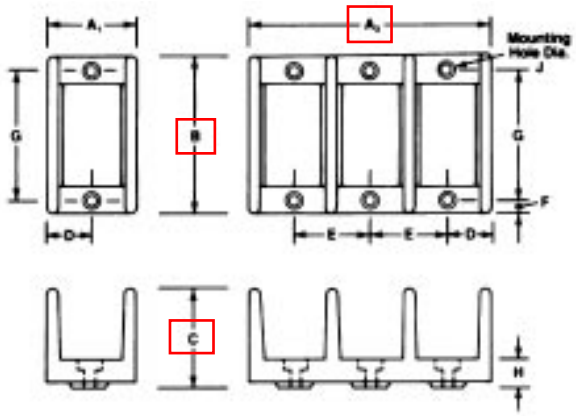
Terminal Blocks
Power Distribution Blocks
Copper or Aluminum Wire

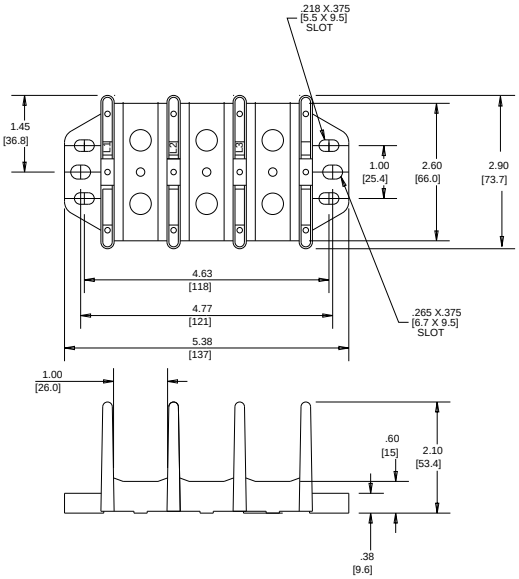
CLASS 9080	STANDARD			
				
Maximum Voltage Rating	600	600	600	600
Service Class	B & C	B & C	B & C	B & C
Amperage Rating-CU Wire	310 amp.	335 amp.	335 amp.	350 amp.
Amperage Rating-AL Wire	250 amp.	270 amp.	270 amp.	270 amp.
Wire Range Lugs suitable for use with 75° C Conductors.	MAIN (1) #6 - 350 MCM BRANCH (1) #6 - 350 MCM	MAIN (1) #6 - 400 MCM BRANCH (4) #14 - #2 AWG	MAIN (1) #6 - 400 MCM BRANCH (6) #14 - #2 AWG	MAIN (2) #14 - 2/0 AWG BRANCH (6) #14 - #4AWG
Tightening Torque	MAIN #6-350 MCM - 275 lbf-in (31.0 N-m) BRANCH #6-350 MCM - 275 lbf-in (31.0 N-m)	MAIN #6-400 MCM - 275 lbf-in (31.0 N-m) BRANCH #3-#2 50 lbf-in (5.6 N-m) #6-#4 45 lbf-in (5.1 N-m) #8 40 lbf-in (4.5 N-m) #14-#10 35 lbf-in (4.0 N-m)	MAIN #6-400 MCM - 275 lbf-in (31.0 N-m) BRANCH #3-#2 50 lbf-in (5.6 N-m) #6-#4 45 lbf-in (5.1 N-m) #8 40 lbf-in (4.5 N-m) #14-#10 35 lbf-in (4.0 N-m)	MAIN #6-2/0 120 lbf-in (13.5 N-m) #8 40 lbf-in (4.5 N-m) #14-#10 35 lbf-in (4.0 N-m) BRANCH #14-#4 35 lbf-in (4.0 N-m)
Lug Material	Tin Plated High Conductive AL	Tin Plated High Conductive AL	Tin Plated High Conductive AL	Tin Plated High Conductive AL
Base Material	General Purpose Phenolic	General Purpose Phenolic	General Purpose Phenolic	General Purpose Phenolic
Temperature Rating	-40 to 302°F -40 to 150°C	-40 to 302° F -40 to 150° C	-40 to 302° F -40 to 150° C	-40 to 302° F -40 to 150° C
Listings		File E60616 Guide XCFR2		File LR70361
Flammability Rating	UL94V-0	UL94V-0	UL94V-0	UL94V-0
ONE POLE BLOCKS				
Block Catalog Number	9080 LBA163101	9080 LBA163104	9080 LBA163106	9080 LBA163206
Block Dimensions (D)x(H)x(W)	2.61x4.00x1.94 in. 66.3x101.6x49.3 mm	2.61x4.00x1.94 in. 66.3x101.6x49.3 mm	2.61x4.00x1.94 in. 66.3x101.6x49.3 mm	2.61x4.00x1.94 in. 66.3x101.6x49.3 mm
TWO POLE BLOCKS				
Block Catalog Number	9080 LBA263101	9080 LBA263104	9080 LBA263106	9080 LBA263206
Clear Plastic covers	9080 LB32	9080 LB32	9080 LB32	9080 LB32
Block Dimensions (D)x(H)x(W)	2.61x4.00x3.47 in. 66.3x101.6x88.1 mm	2.61x4.00x3.47 in. 66.3x101.6x88.1 mm	2.61x4.00x3.47 in. 66.3x101.6x88.1 mm	2.61x4.00x3.47 in. 66.3x101.6x88.1 mm
THREE POLE BLOCKS				
Block Catalog Number	9080 LBA363101	9080 LBA363104	9080 LBA363106	9080 LBA363206
Clear Plastic covers	9080 LB33	9080 LB33	9080 LB33	9080 LB33
Block Dimensions (D)x(H)x(W)	2.61x4.00x5.00 in. 66.3x101.6x 27.0 mm	2.61x4.00x5.00 in. 66.3x101.6x127.0 mm	2.61x4.00x5.00 in. 66.3x101.6x127.0 mm	2.61x4.00x5.00 in. 66.3x101.6x127.0 mm

Terminal Blocks
Power Distribution Blocks
Dimensions

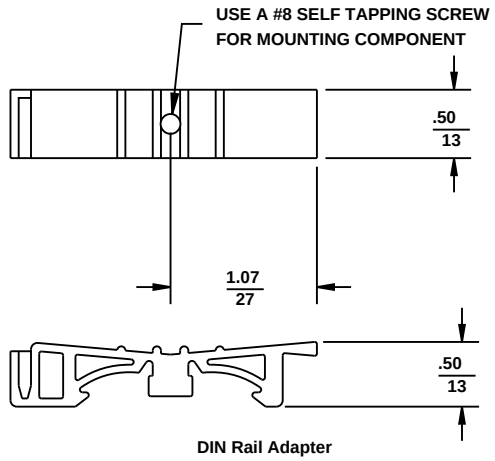


General Dimensions

1 Pole	2 Pole	3 Pole	A1	A2	A3	B	C	D	E	F	G	H	J
LBA161101 LBA161104	LBA261104	LBA161101 LBA361104	.76	1.40	2.03	2.29	1.62	.38	.64	.19	1.93	.32	.18
LBA162101 LBA162104 LBC162101	LBA262101 LBA262104	LBA362101 LBA362104 LBC362101	1.13	1.94	2.75	2.88	1.78	.56	.81	.31	2.25	.24	.205
LBA163101 LBA163104 LBA163106 LBA163206 LBC163101 LBC163106 LBC163206	LBA263101 LBA263104 LBA263106 LBA263206 LBC263106 LBC263206	LBA363101 LBA363104 LBA363106 LBA363206 LBC363101 LBC363106 LBC363206	1.94	3.47	5.00	4.00	2.61	.97	1.53	.31	3.38	.40	.203
LBA164101 LBA164108	LBA264108	LBA364101 LBA364108	2.28	4.16	6.04	4.75	2.92	1.14	1.88	.31	4.13	.51	.20
LBA165202 LBA1652021 LBA165106 LBA165112 LBA165212 LBC165208 LBC165212	LBA265202 LBA2652021 LBA265106 LBA265112 LBA265212	LBA365202 LBA3652021 LBA365106 LBA365112 LBA365212 LBC365208 LBC365212	3.17	5.88	8.54	5.50	3.12	1.58	2.69	.38	4.75	.50	.265



Dimensions for LBA362106



DIN Rail Adapter

HINGE-COVER, MEDIUM, TYPE 3R

APPLICATION

These enclosures have a size range of 16 x 12 x 6-in. to 48 x 36 x 16-in. and meet basic functionality requirements for applications that require protection from rain, sleet, snow or dripping water.

FEATURES

- Drip shield top and seam-free sides, front, and back protect from rain, snow, or sleet
- 16 gauge plated steel continuous hinge has stainless steel pin
- Cover fastened securely with captive plated steel screws
- Collar studs provided for mounting optional panels
- Hasp and staple provided for padlocking
- No gasketing or knockouts

SPECIFICATIONS

- 16 or 14 gauge galvanized steel

FINISH

ANSI 61 gray polyester powder paint finish inside and out over galvanized steel. Optional solid panels are white.

ACCESSORIES

See also Accessories.
Industrial Corrosion Inhibitors
Electric Heater
Grounding Device
Panel Support Kit
Panels for Type 3R, 4, 4X, 12 and 13 Enclosures
Rack Mounting Angles - U Style (Type RA)
Terminal Block Kit Assembly for Junction Boxes Overview
Touch-Up Paint
Steel and Stainless Steel Window Kits

BULLETIN: A3M

INDUSTRY STANDARDS

UL 50, 50E Listed; Type 3R; File No. E27567
cUL Listed per CSA C22.2 No 94; Type 3R File No. E27567

NEMA/EEMAC Type 3R
IEC 60529, IP32

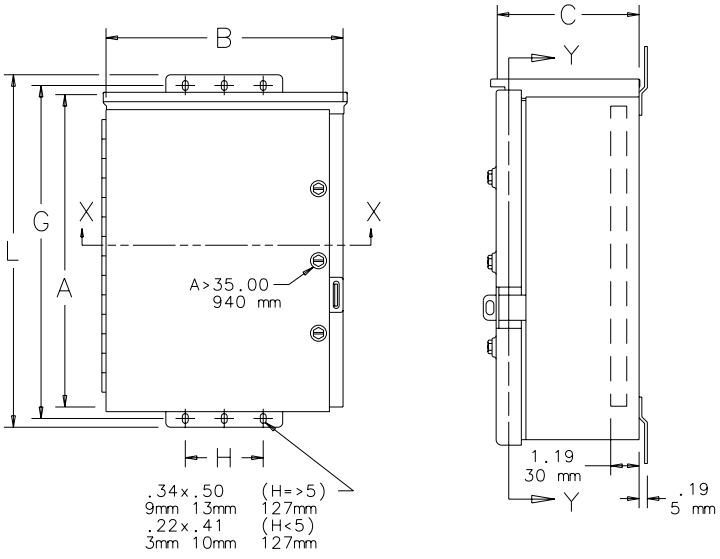
Standard Product

Catalog Number	AxBxC in.	AxBxC mm	Panel	Perforated Panel	Panel Size D x E (in.)	Panel Size D x E (mm)	Mounting G x H (in.)	Mounting G x H (mm)	Overall L (in.)	Overall L (mm)
A16R126HCR	16.00 x 12.00 x 6.00	406 x 305 x 152	A16P12	A16P12PP	13.00 x 9.00	330 x 229	17.00 x 3.00	432 x 76	18.00	457
A16R166HCR	16.00 x 16.00 x 6.00	406 x 406 x 152	A16P16	A16P16PP	13.00 x 13.00	330 x 330	17.00 x 13.00	432 x 330	18.00	457
A18R186HCR	18.00 x 18.00 x 6.00	457 x 457 x 152	A18P18	A18P18PP	15.00 x 15.00	381 x 381	19.00 x 13.00	483 x 330	20.00	508
A20R166HCR	20.00 x 16.00 x 6.00	508 x 406 x 152	A20P16	A20P16PP	17.00 x 13.00	432 x 330	21.00 x 13.00	533 x 330	22.00	559
A20R208HCR	20.00 x 20.00 x 8.00	508 x 508 x 203	A20P20	A20P20PP	17.00 x 17.00	432 x 432	21.00 x 13.00	533 x 330	22.00	559
A24R208HCR	24.00 x 20.00 x 8.00	610 x 508 x 203	A24P20	A24P20PP	21.00 x 17.00	533 x 432	25.00 x 13.00	635 x 330	26.00	660
A24R248HCR	24.00 x 24.00 x 8.00	610 x 610 x 203	A24P24	A24P24PP	21.00 x 21.00	533 x 533	25.00 x 13.00	635 x 330	26.00	660
A30R248HCR	30.00 x 24.00 x 8.00	762 x 610 x 203	A30P24	A30P24PP	27.00 x 21.00	686 x 533	31.00 x 13.00	787 x 330	32.00	813
A18R1810HCR	18.00 x 18.00 x 10.00	457 x 457 x 254	A18P18	A18P18PP	15.00 x 15.00	381 x 381	19.00 x 13.00	483 x 330	20.00	508
A30R308HCR	30.00 x 30.00 x 8.00	762 x 762 x 203	A30P30	A30P30PP	27.00 x 27.00	686 x 686	31.00 x 27.00	787 x 686	32.00	813
A24R2410HCR	24.00 x 24.00 x 10.00	610 x 610 x 254	A24P24	A24P24PP	21.00 x 21.00	533 x 533	25.00 x 13.00	635 x 330	26.00	660
A30R2410HCR	30.00 x 24.00 x 10.00	762 x 610 x 254	A30P24	A30P24PP	27.00 x 21.00	686 x 533	31.00 x 13.00	787 x 330	32.00	813
A36R3610HCR	36.00 x 36.00 x 10.00	914 x 914 x 254	A36P36	A36P36PP	33.00 x 33.00	838 x 838	37.00 x 30.00	940 x 762	38.00	965
A30R3012HCR	30.00 x 30.00 x 12.00	762 x 762 x 305	A30P30	A30P30PP	27.00 x 27.00	686 x 686	31.00 x 27.00	787 x 686	32.00	813
A36R2412HCR	36.00 x 24.00 x 12.00	914 x 610 x 305	A36P24	A36P24PP	33.00 x 21.00	838 x 533	37.00 x 13.00	940 x 330	38.00	965
A36R3012HCR	36.00 x 30.00 x 12.00	914 x 914 x 305	A36P30	A36P30PP	33.00 x 27.00	838 x 686	37.00 x 27.00	940 x 686	38.00	965
A42R3012HCR	42.00 x 30.00 x 12.00	1067 x 914 x 305	A42P30	—	39.00 x 27.00	991 x 686	43.00 x 27.00	1092 x 686	44.00	1118
A36R3612HCR	36.00 x 36.00 x 12.00	914 x 914 x 305	A36P36	A36P36PP	33.00 x 33.00	838 x 838	37.00 x 27.00	940 x 686	38.00	965
A42R3612HCR	42.00 x 36.00 x 12.00	1067 x 914 x 305	A42P36	—	39.00 x 33.00	991 x 838	43.00 x 27.00	1092 x 686	44.00	1118
A48R3612HCR	48.00 x 36.00 x 12.00	1219 x 914 x 305	A48P36	—	45.00 x 33.00	1143 x 838	49.00 x 27.00	1245 x 686	50.00	1270
A60R3612HCR	60.00 x 36.00 x 12.00	1524 x 914 x 305	A60P36	—	57.00 x 33.00	1448 x 838	61.00 x 27.00	1549 x 686	62.00	1575
A30R3016HCR	30.00 x 30.00 x 16.00	762 x 762 x 406	A30P30	A30P30PP	27.00 x 27.00	686 x 686	31.00 x 27.00	787 x 686	32.00	813
A48R3616HCR	48.00 x 36.00 x 16.00	1219 x 914 x 406	A48P36	—	45.00 X 33.00	1143 X 838	49.00 X 27.00	1245 X 686	50.00	1270

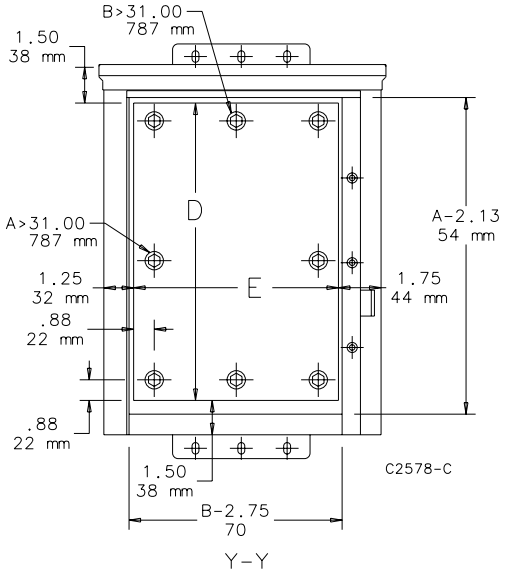
Purchase panels separately. Optional aluminum panels are available for most sizes.

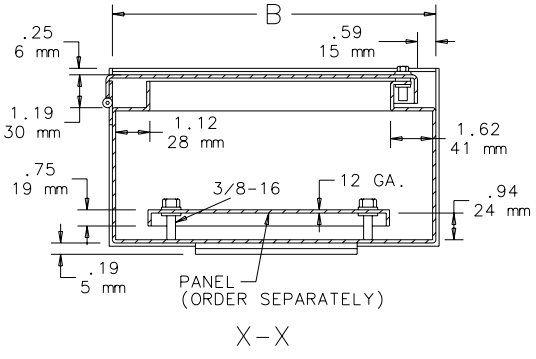
Purchase perforated panels separately.

Flanged on all four sides.


B
G
L
A
X
X
A>35.00
940 mm
H
.34x.50 (H=>5)
9mm 13mm 127mm
.22x.41 (H<5)
3mm 10mm 127mm

C
Y
1.19
30 mm
Y
.19
5 mm


B>31.00
787 mm
1.50
38 mm
A>31.00
787 mm
D
A-2.13
54 mm
1.25
32 mm
E
1.75
44 mm
.88
22 mm
.88
22 mm
1.50
38 mm
B-2.75
70
C2578-C
Y-Y


B
.25
6 mm
.59
15 mm
1.19
30 mm
1.12
28 mm
1.62
41 mm
.75
19 mm
3/8-16
12 GA.
.94
24 mm
.19
5 mm
PANEL
(ORDER SEPARATELY)
X-X

LIGHTING COMPONENTS

Light Fixture:

RAB - Die Cast Aluminum Marine-Type incandescent Fixture, Clear Glass Globe, AL Guard, UL & CSA Listed, 120/277 VAC Rated	RAB - SHARK - LED Fixture - 2' - UL Listed Wet Location - IP 66, 100,000 Hour LED Life - 120/277 VAC Rated Polycarbonate	Lithonia - 4' Flourescent Fixture - Enclosed and Gasketed. UL & CSA Certified Ballast. IP65 Rated, 120, 277V or MVOLT Available

Selection
RAB Fixture - Die Cast

Bulbs:

CREE - A19 Style - UL Listed - 120VAC - 25,000 Hour Life - 2700K	GE - T8 - 32W - 4' Flourescent Bulb - 30,000 Hours Life - 4100K - UL Certified

Selection
10W - 60W Equivalent

Light Switch:
Industrial Grade, back and side wired
120/277 VAC, UL and CSA rated.

#	Selection	Options
1	15A	Outdoor Silicone Bubble Cover
2	15A - Red Pilot Light	Self Closing Outdoor Cover
3	None	None
4	None	None
5	None	None

UV Door Switch:
Schneider Electric Limit Switch/Lever Arm
Type C, Heavy Duty, 10A, 600V, UL Listed

Selection
2 - Included

GFCI Receptacle:
Pass & Seymour Model 7899-W, commercial specification grade, duplex, weather resistant/outdoor grade with LED indicator. White.
20A-125V@Receptacle
UL/CSA Listed

Selection	Options
20A	Clear Bubble Cover

Lighting Disconnect:
Square D Light Duty Disconnect - 120V - 30A - UL Listed

Selection
None

QO Load Center - 100A Panel - Plug-On Breakers
120V/1Ph/3Wire- 6 or 8 Slots - NEMA1 or NEMA3R

Selection
6-Slot N3R

Transformer - Single Phase - General Purpose - Square D
240 x 480 V Primary 120/240V Secondary 60Hz

Selection
None

Westover Hills Baptist Hospital EQ # 23455

Calculations based on ARI260

AHU-1-3 Calculated Sound Power								
Band Ctr Freq	63	125	250	500	1000	2000	4000	8000
Bottom Supply	80	93	89	95	84	86	85	74
Bottom Return	85	88	87	84	77	80	78	72
OA Inlet	87	89	87	88	81	85	83	75
EA Discharge	86	88	88	87	81	85	83	73
Casing	95	96	91	93	93	78	75	67

Third layer perforated liner in supply & return fan sections

Supply Airflow: 34,000 CFM @ 8.65”wc TSP
Return Airflow: 26,550 CFM @ 2.12”wc TSP

AHU-1-4 Calculated Sound Power								
Band Ctr Freq	63	125	250	500	1000	2000	4000	8000
Bottom Supply	90	93	97	92	87	89	88	69
Bottom Return	91	87	88	81	77	83	82	71
OA Inlet	92	88	90	82	81	87	86	72
EA Discharge	91	88	90	84	83	89	87	74
Casing	99	97	96	91	93	89	86	80

Third layer perforated liner in supply & return fan sections

Supply Airflow: 48,000 CFM @ 9.41”wc TSP
Return Airflow: 30,350 CFM @ 2.89”wc TSP