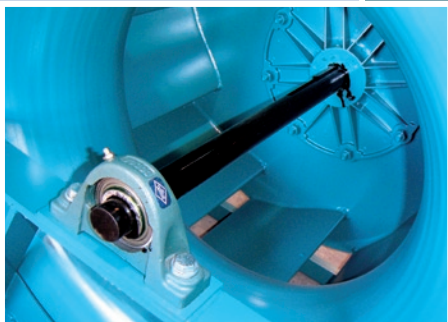
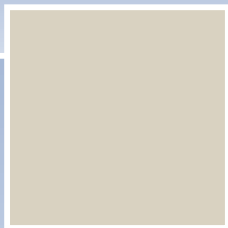
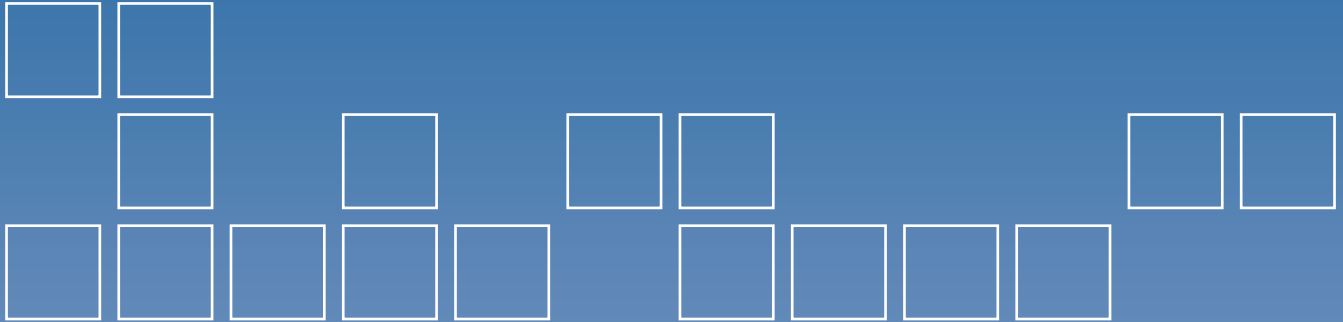


CUSTOM AIR HANDLERS



Alliance
AIR PRODUCTS

ENGINEERING & SERVICE



Alliance Air Products has brought together an engineering team focused on practical solutions to all aspects of air handling unit design. Our engineers are leaders in the industry with extensive experience in evaluating design requirements and developing air handlers that are optimized for each application. The payoff to our customers is a streamlined design and manufacturing process resulting in efficient, cost effective custom units.



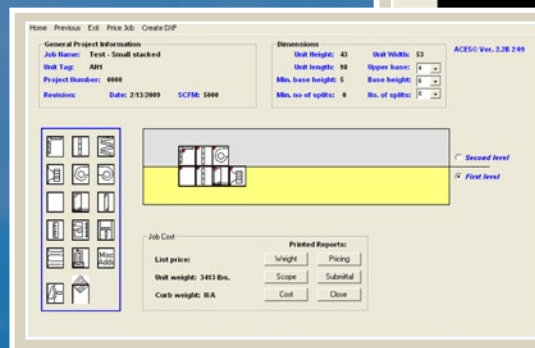
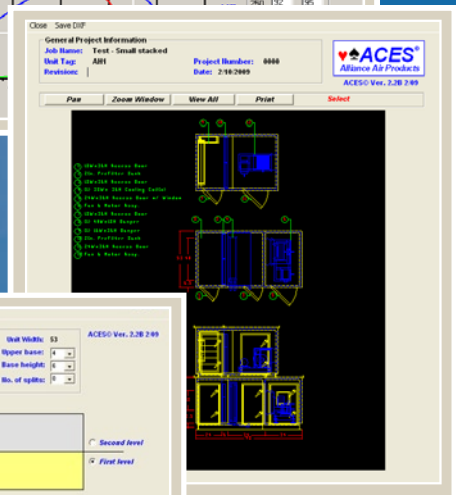
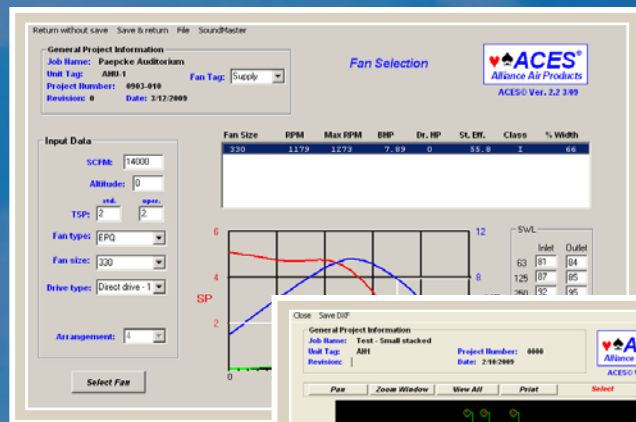
Design Services

Responsive & Knowledgeable

Our experienced and knowledgeable design team is dedicated to providing in-depth engineering solutions including the best unit layout and component selections for each application. By bringing our team early in the planning phase, we can tailor the unit capacity, layout, and cabinet size to precisely fit any new or retrofit project. Our services include visits to the jobsite to evaluate onsite requirements such as matching an existing footprint or to fit an unusual space.

The team is committed to quick customer response with design options focused on high quality, efficiency and cost savings. Our qualified engineers and designers can meet the most challenging building requirements including:

- **Sound Attenuation**
- **Space Constraints**
- **Weight Constraints**
- **Corrosive Environments**

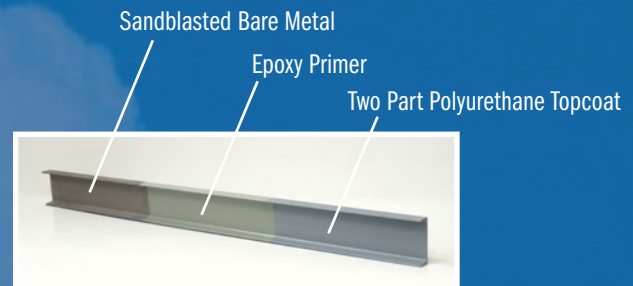


Another resource of Alliance Air Products is our software package, ACES, a powerful tool for air handler design. Within an intuitive environment, users can visualize their air handler layouts while optimizing component selections for air flow, energy loads and sound performance. Features are built in to produce quick component selections, comprehensive reports and design layouts in DXF format.

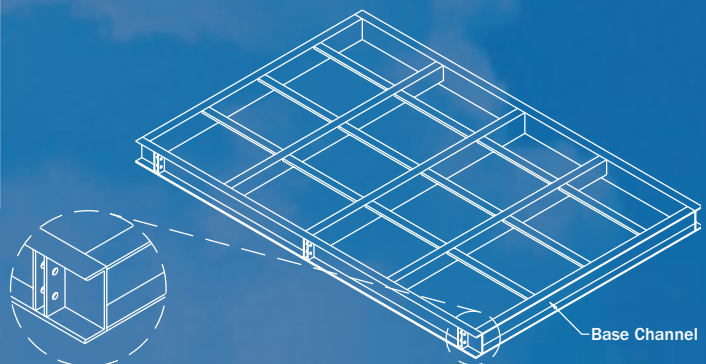
CONSTRUCTION FOCUSED ON QUALITY, DURABILITY & SERVICEABILITY

Base

Our all-welded base assemblies are designed for strength and corrosion resistance. We start out by sandblasting the perimeter structural channel to completely remove rust, dirt and scale. Then we apply a coat of epoxy primer followed by a 3 mil top coat of urethane enamel, providing 5,000 hours salt-spray corrosion protection.



We use rectangular structural tubing welded on 24 inch centers, as well as additional structural channel supports under major components, to provide exceptional strength and rigidity. Removable lifting lugs are provided as required around the perimeter channel.

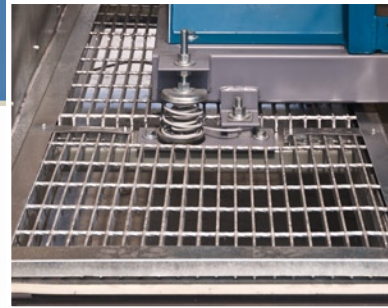
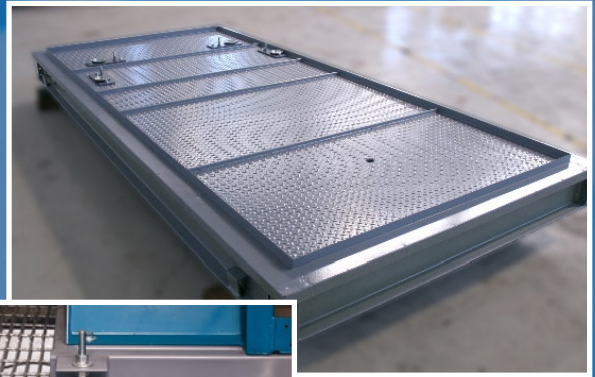
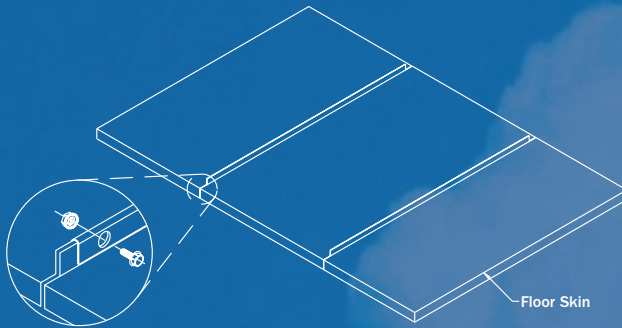


After welding, the perimeter channel is painted inside and out with epoxy enamel paint. Then the entire base is insulated with 2-inch minimum spray polyurethane foam, providing an aged R value of 12. An optional metallic liner can be applied to completely encapsulate the base insulation.



Floor

Unless specifications require a different material, the floor is constructed of 16 gauge bright galvanized sheet, using standing seam construction. The floor material is welded to the base cross members from underneath, eliminating penetrations which can lead to air and water leakage. Optional floor materials include aluminum treadplate, steel treadplate and stainless steel. As standard, we cover floor openings with galvanized steel or aluminum walkway grating.

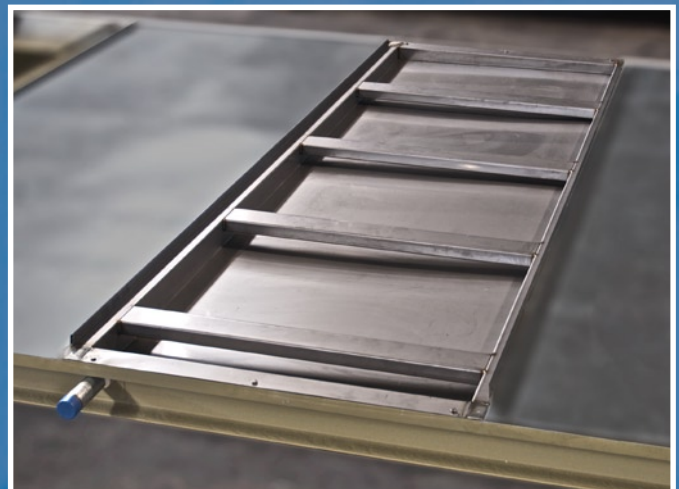


IAQ Condensate Drain Pan

IAQ drain pans are double-sloped to prevent standing water.

Standard features include:

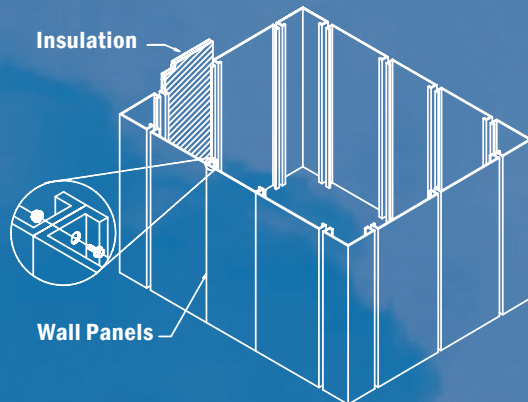
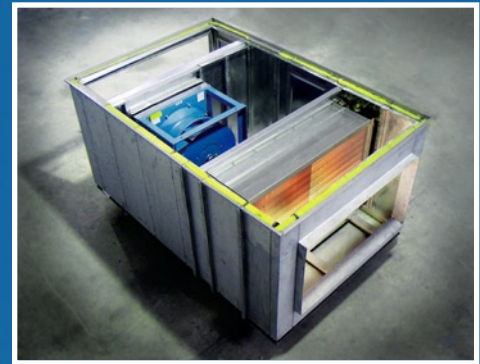
- **Fully welded, 16 gauge, 304 stainless steel pan recessed into the floor**
- **12 gauge, 304 stainless steel coil supports spaced 24 inches maximum within the pan**
- **Structural channel spanning the width of the pan for additional coil support**
- **2 inch, sprayed polyurethane foam insulation with an R-12 value under the pan to prevent condensation.**
- **Optional 20 gauge, bright galvanized under-liner to protect insulation**
- **1-¼ inch MPT, 304 stainless steel, low-point drain connection piped to unit exterior**



Casing

The unit casing is a double-break, formed panel design providing rigidity while encapsulating the raw insulation edges. Panels are caulked and bolted together for an airtight seal. The bolted construction eliminates any penetration through the exterior casing. Panels can be disassembled and reassembled for servicing without loss of structural integrity.

Optional thermal break design is available. A low thermal conductive neoprene gasket between the interior and exterior metal surfaces acts as a barrier against cold transmission preventing the cabinet from sweating.



Standard features include:

- **Minimum 16 gauge, paint grip, galvanized panels**
- **2 inch, 1-½ lb/ft³, fiberglass insulation**
 - **NFPA-90 approved**
 - **7.7 R-Value**
- **Reverse double-break panels are provided along the coil sections for easy unbolting during coil removal**
- **Unit leakage rate less than 1% of total CFM up to 1-½ times design static pressure**

A variety of top coats are available. Refer to Paint Section for more information.

Insulation

The unit casing is insulated with a minimum 2 inch, 1-½ lb/ft³, NFPA-90 approved fiberglass. A wide variety of optional insulation is available including:

- **1" and 4" thick fiberglass with densities ranging from 1 lb/ft³ up to 3 lb/ft³**
- **Fiberglass faced with FSK, Mylar or Tedlar**

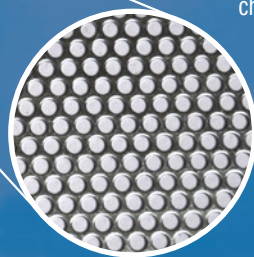
Special acoustical constructions are available including deep treatment sheetrock/fiberglass.



Liners

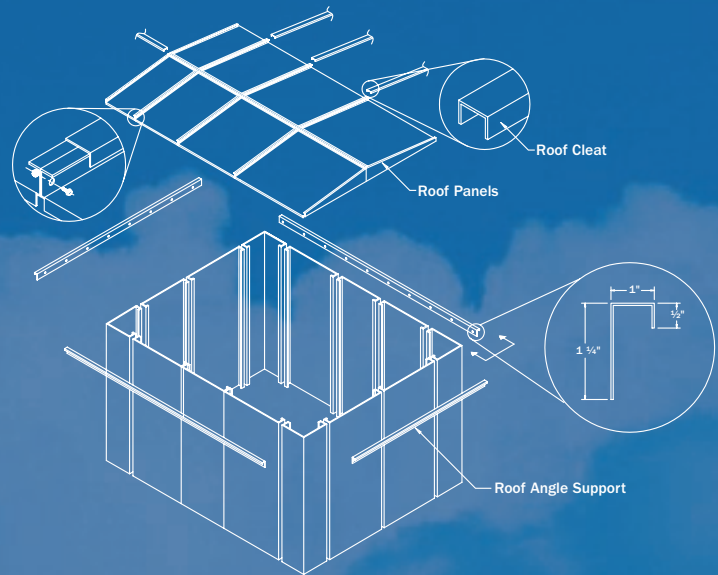
Liners are available in bright galvanized, stainless steel and aluminum in a range of thicknesses.

For improved acoustical performance, choose a perforated liner.



Roof

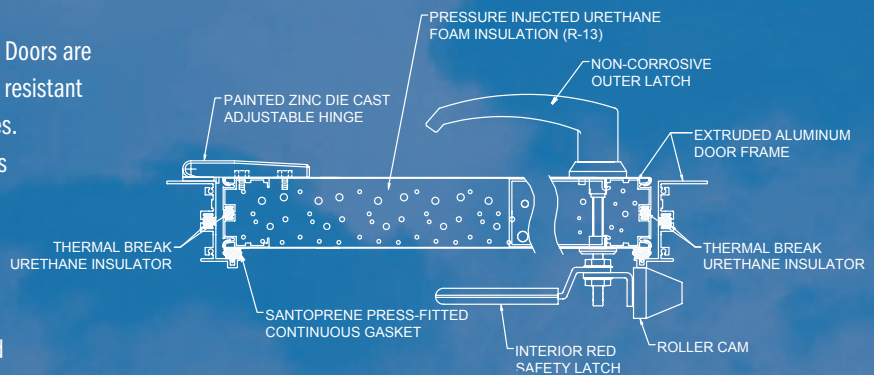
The roof is reinforced with reverse double-break flanges along the seams. The flanges are caulked and capped with a drive cleat to ensure an airtight, weatherproof seal. Roof panels are bolted to the casing panels along the exterior edge eliminating any penetration through the exterior casing. Outdoor units have a $\frac{1}{4}$ inch per foot slope for rain run-off.



Door

Doors and frames feature a thermal break design. Doors are double wall constructed with heavy duty, corrosion resistant latches and adjustable, painted zinc die cast hinges. Frames are composed of inner and outer extrusions separated by urethane insulators to prevent a cold bridge and reduce the possibility of exterior condensation.

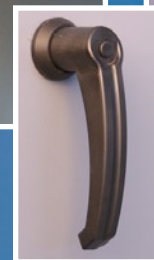
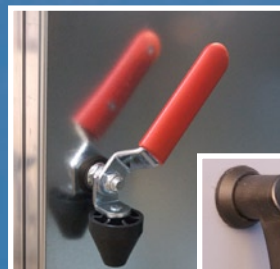
2 inch thick outswing doors with double hinges and latches are certified by independent testing to meet a zero total cfm leakage rate at 10.0" w.g. static pressure.



Standard features include:

- **Double wall construction**
- **Paint grip, galvanized, exterior skin**
- **Bright galvanized, interior skin**
- **2 inch, R-13, polyurethane foam insulation**
- **Extruded aluminum frame**
- **Door can be opened from inside or outside the unit**
- **Available with in-swing or out-swing configuration to open against pressure**

Insulated thermal break window and door switch are available as options.



Paint

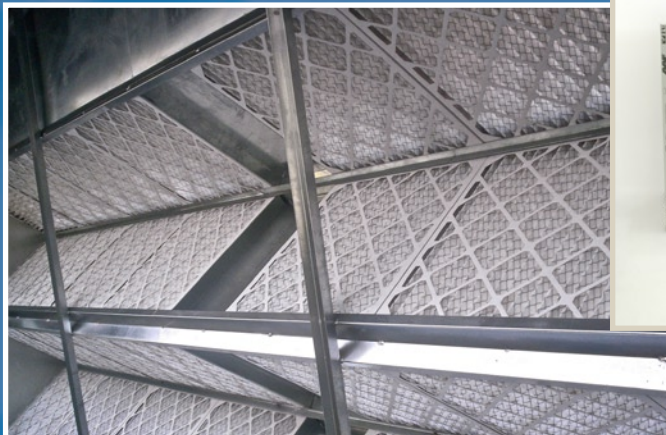
Unit exterior and wall panels are protected with a 3 mil coating of air dried polyurethane enamel rated for 2,000 hours salt spray per ASTM B-117. Base channels are sand blasted to white metal then epoxy primed and painted with a 3 mil coating of air dried polyurethane enamel rated for 5,000 hours salt spray per ASTM B-117.



Alternate systems and custom colors are available as options.

Filters

We offer a full line of filters with a range of efficiencies. Choose from a variety of options including high efficiency extended surface, HEPA, carbon and bag filters. Filter sections can be configured for face load or side load installation. Optional stainless steel filter frames and filter gauge are also available.



Damper

Damper blades and frame are made of extruded aluminum. Blades have an airfoil profile for minimal pressure drop. The assembly is a low leak design with extruded TPE thermoplastic frame seals and EPDM blade gaskets secured in an integral slot within the blade extrusion. On closure, the overlapping blades compress the gaskets ensuring a tight seal.

Linkage hardware is constructed of aluminum and corrosion resistant, zinc plated steel with cup point trunnion screws for a slip proof grip. Each bearing assembly is composed of a Celcon inner bearing fixed to an aluminum hexagon blade pin. These rotate within a polycarbonate outer bearing inserted into the frame. The result is no metal to metal or metal to plastic contact.

Available options include:

- **Parallel blade action (Opposed is standard)**
- **Multizone, 2 deck and 3 deck arrangements**
- **Corrosion resistant coatings**



Coils

Water, steam, and DX coils are constructed with plate type fins and extruded fin collars. Seamless 5/8 inch copper tubes are mechanically expanded into the fins to ensure maximum thermal contact. Coil performance is certified in accordance with ARI Standard 410.



Standard features include:

- **Aluminum and copper fins**
- **Heavy-wall copper headers and connections**
- **Numerous circuiting options to meet job requirements**
- **304 stainless steel casing supplied with chilled water and DX coils**
- **Intermediate drain pan between stacked chilled water and DX coils**
- **All coils are pressure tested at 350 PSIG minimum and also leak tested prior to shipment**



A coil removal panel is provided on the side of the coil section opposite the coil connections.

Protective coatings are available as an option.

Fan Assembly

Our standard plenum fans are belt drive Arrangement 3, direct drive (Arrangement 4) and Arrangement 1 (both bearings at the drive end of the wheel). Because Arrangement 4 and Arrangement 1 fans have unobstructed inlets, they are typically more efficient and in some cases perform better acoustically. Fans can be positioned horizontally or vertically. Fans can be supplied with forward curve wheels for light duty applications and fully welded, airfoil wheels for static pressures up to 9" w.g.

Fan assemblies are AMCA certified for sound and air performance. All are dynamically balanced and run tested at design speed prior to shipment to assure trouble free operation.



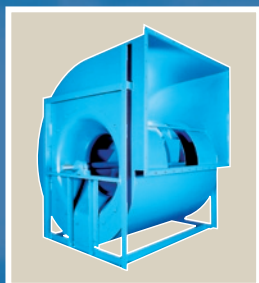
Standard features include:

- **Forward curve, backward incline and airfoil steel wheels available in sizes ranging from 9 inch through 66 inch nominal diameter**
- **Fully welded, structural steel, fan frame**
- **L50-200,000 hr bearings**
- **Vibration isolation with free floating, 2 inch deflection springs and seismic restraints to meet Zone Four of Uniform Building Code**
- **Flexible duct connection between fan and pressure wall**
- **Drive belts and sheaves rated at 150% of motor horsepower**
- **Motors suitable for use with inverter drives**
- **Adjustable motor bases**
- **Flexible, water tight conduit when wiring is required**
- **AMCA Class I, II, and III construction**

Fan assemblies are painted with the same coating as the unit. Stainless steel construction and other coatings are available as options.



Multiple fan arrangements are available.



Gas Furnaces & Electric Heaters

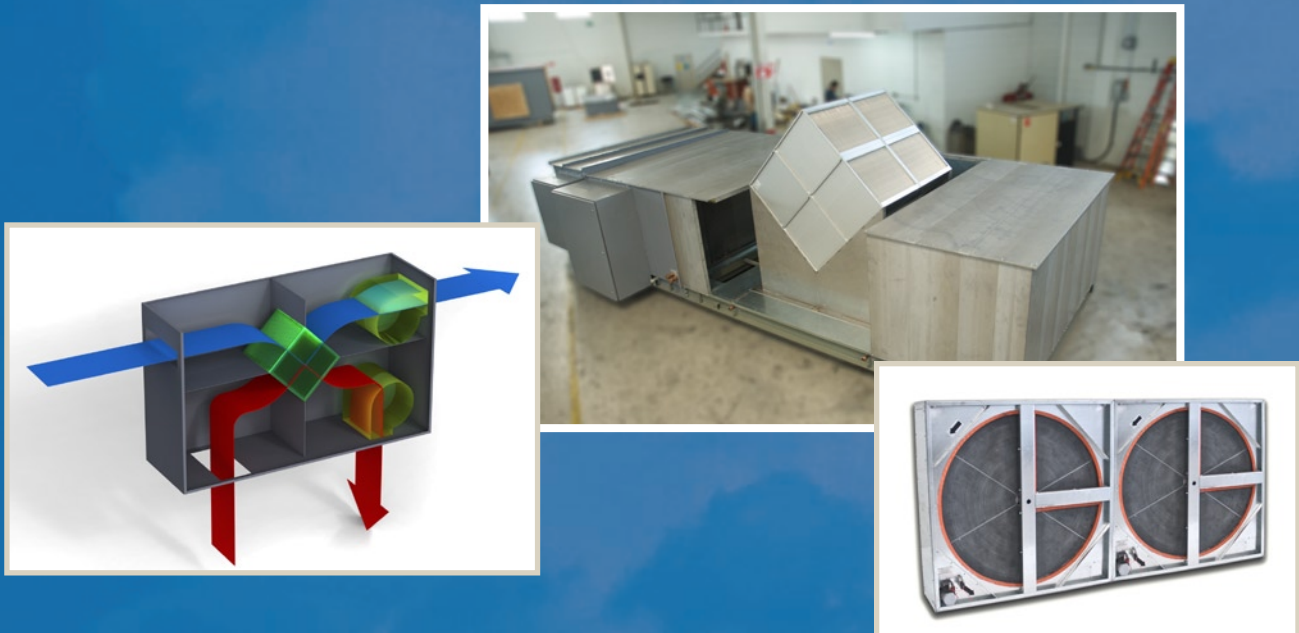
A complete line of high efficiency heaters is available including the following options:

- **Gas fired drum & tube, direct fired and duct furnaces**
- **Electric open coil and tubular element heaters**
- **Turn down ratios of 10:1 and greater are available**



Energy Recovery

Energy recovery ventilation provides fresh air and improved climate control while saving energy by reducing the heating or cooling requirements. Plated heat exchangers, energy recovery wheels, heat pipes and run around coils are available for maximum energy efficiency in ventilation systems where outdoor make-up air is introduced and heated or cooled air is exhausted. Systems can be designed to transfer both sensible and latent energy. By including energy recovery, systems can be sized with smaller direct expansion capacity resulting in lowering first costs while providing year round energy savings.



Humidifier

Humidifiers improve indoor air quality and comfort. Humidity control is also essential in many manufacturing processes, artifact preservation and elimination of static electricity. Isothermal humidifiers are available for in-house boiler systems. If steam is not available, a gas or electric generator can be supplied. Adiabatic systems are also available with atomizers or ultra-sonic nebulizers. Each humidifier section includes an IAQ double-sloped drain pan.

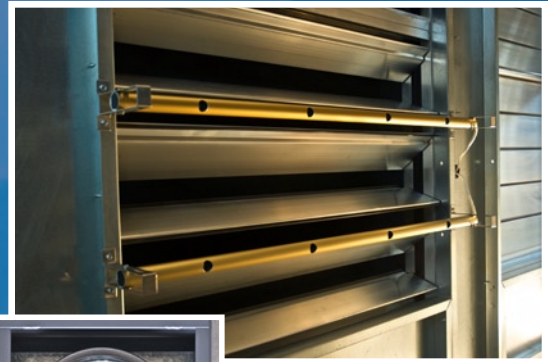


Airflow Measurement

Airflow measurement for monitoring and control is an effective component of building performance. Through proper flow measurement, energy usage can be reduced by identifying and optimizing demand. Airflow measurement systems can also help in obtaining LEED® certification. Systems are available for both duct openings and fan inlets.

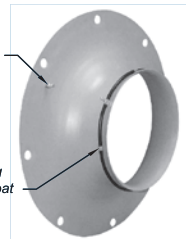
Air flow measurement systems are ideal for regulating the outside air intake to provide required dilution of contaminants resulting in improved indoor air quality. Proper building pressure can be obtained by monitoring differential flow rates between supply/return or supply/relief. The system allows for a $\pm 2\%$ accuracy of the reading.

Piezometer ring air flow measurement system is available on both plenum fans and housed fans. The inlet cone of the fan behaves as a flow nozzle. Flow is calculated by measuring the pressure drop through the inlet cone. No tubes or sensors are inserted in the high velocity airstream which could obstruct flow resulting in added system resistance, increased noise and reduced fan performance. The system allows for a $\pm 5\%$ accuracy within the operating range of the fan.



Inlet Tap
Mounted on
Face of Inlet
Cone

Piezometer Ring
Mounted at Throat
of Inlet Cone



Ultraviolet Emitter

Ultraviolet emitters reduce energy costs by terminating microorganism growth on the coil surfaces resulting in improved heat transfer and cooling capacity. Removing the dead microorganisms through the drain system will eliminate the need for costly cleaning programs and use of harmful chemicals and disinfectants. In addition to energy savings, ultraviolet emitters improve indoor air quality by preventing the spread of airborne infectious diseases caused by viruses and bacteria.

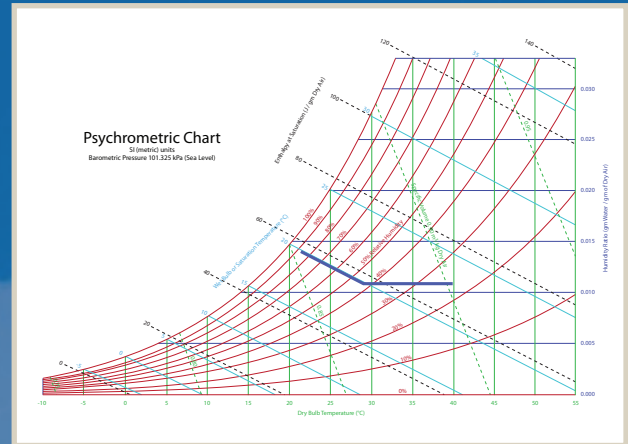


Evaporative Cooling

Evaporative cooling is an energy efficient and environmentally friendly cooling method using water as the working fluid.

Alliance Air Products offers indirect and direct evaporative systems providing cost effective cooling and ventilation with minimal energy consumption.

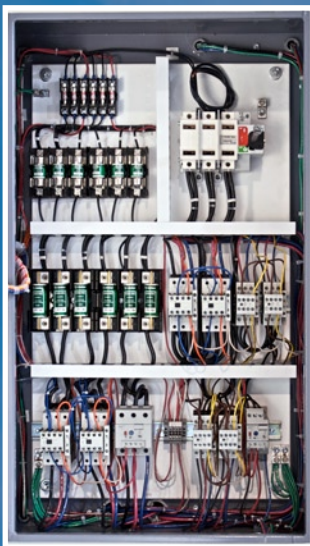
The systems can be packaged with DX or chilled water for maximum cooling efficiency.



Variable Frequency Drive

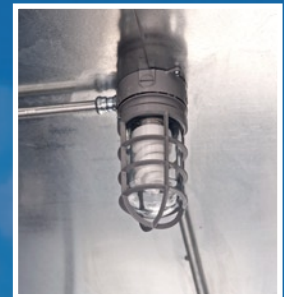
By varying fan speed based on demand, variable frequency drives reduce energy costs and provide the most efficient method of air volume control. VFDs have the lowest starting current of any starter type with the current level never exceeding the motor's full load amp rating during start-up or operation.

Frequency and motor speed is increased incrementally until the desired speed is met thus reducing stresses on motors and belts. VFDs are factory wired simplifying jobsite installation.



Industrial Control Panels

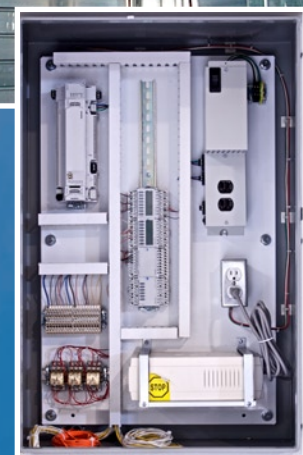
As a UL 508A listed panel shop, we offer custom starter panels and single source power panels with our air handlers. A single source power panel simplifies installation at the jobsite by providing a single point, main power connection at the unit. Starter panels include a main disconnect switch, H-O-A switches, starters, contactors, fuses, overloads, transformers and relays. NEMA 1 and NEMA 3R enclosures are available. All electrical is in accordance with NEC. Other options include step down transformers, marine lights with switch and GFI outlets.



Factory Installed Controls

Factory installed end devices are available for systems including economizers, multizones and variable air volume control. From initial design through testing, Alliance Air Products can provide single source responsibility insuring proper operation at the jobsite.

Factory installation also prevents jobsite penetrations through the cabinet which may cause leaks. Installation options include factory mounting and wiring of damper actuators, temperature and humidity sensors, pressure switches and other control devices. In addition to convenience and peace of mind to the customer, the service reduces start-up time while achieving a more close integration of the air handler with the building control system.

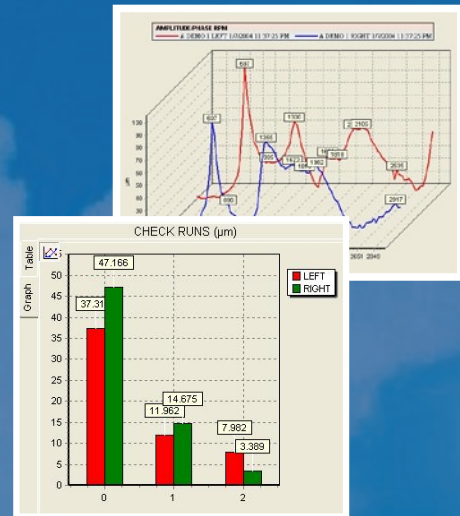


Quality Control



Fan Balancing Test

All completed fan assemblies including motors, belts and sheaves are dynamically balanced to the requirements of AMCA Standard 204-09, Quality Grade G6.3. Both horizontal and vertical axes are analyzed with the fan running at design speed. If required, more rigorous balance quality levels can be provided for most fan assemblies.



Electrical Function and High Potential Tests

All electrical assemblies including VFD bypass panels and starter panels receive a full functional check. Motors are run under load and checked for proper amp draw, and all high voltage panels and wiring are subjected to a high potential test to check insulation resistance.



Coil Leakage Test

After the air handling unit has been fully assembled, one of the final quality checks is the coil leakage test. All coil assemblies, except direct expansion coils, are sealed and pressurized to 150 PSIG for a period of one hour. Direct expansion coils are provided with a nitrogen padding charge, which is checked once at receiving and again at final assembly.

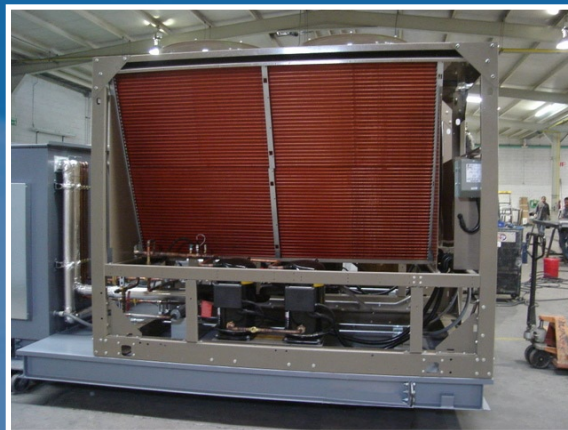
In addition to these production checks, a number of QC inspections are made during and after the assembly process. These include structural base leveling and squareness, paint film thickness, dimensional checks, verification of opening locations and sizes, fit-up of split sections and stacked units, and overall squareness

Custom Rooftop DX Package

Alliance Air Products offers custom DX units to meet specific requirements of new or replacement projects. Choose air-cooled or water-cooled condensing systems combined with 100% make-up, constant volume and variable air volume operation.



Our custom designs offer flexibility for space constraints and retrofits with the same high quality construction as our air handlers. Units can be tailored for specific job requirements with additional options such as economizers, gas heat, energy recover and multizone.



Condensing units are available from 5 to 120 tons. Cooling capacities are precisely calculated to match design loads for optimum performance with minimal energy consumption.



Units are thoroughly inspected during manufacturing. Refrigeration lines are factory piped, evacuated and precharged. Refrigeration, electrical and optional customer supplied controls are fully tested prior to shipment for guaranteed reliability at the jobsite.



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