

AIR MAKE-UP UNITS

Overview, Applications & Products



Air Make-Up Units

UNITS PULL AIR INTO YOUR SPACE FROM OUTDOORS AND CONDITIONS IT TO THE INDOOR TEMPERATURE. WITHOUT IT, YOU GET BACK DRAFTING, POOR TEMPERATURE CONTROL, NEGATIVE AIR PRESSURE AND AIR QUALITY PROBLEMS.

Aerovent is the industry leader in air make-up systems.

The Aerovent Air Make-Up Unit is a complete air supply system in a self-contained package with fan, burner and controls. The unit is ready for connection to the gas line and power source.

These units are available in various sizes and types which can be designed into nearly all industrial requirements. The equipment is designed for tempering outside air and supplying it into the building for ventilation make-up and balancing of negative pressure. The units are also adaptable to other applications where ordinary heating or drying operations are involved. Available with centrifugal and axial fans.



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What is Make-Up Air?

Make-up air is outside air tempered and introduced into a building to eliminate negative pressure and provide a positive operating pressure within a facility.

Why Do You Need Make-Up Air?

Fans and blowers used in spray booths, hoods, ovens, dust collectors, ventilators and other plant equipment exhaust air to the outside. Without a controlled introduction of “make-up” air an air-starved environment will result.

When Do You Know You Need Make-Up Air?

Make-up air is required when:

- Gravity stacks from unit heaters and processes back vent.
- Exhaust systems do not perform at the rated volume leading to poor control of contaminants.
- The perimeter of the building is cold due to a high infiltration rate.
- There are several indrafts at exterior doors, windows and building openings.
- Exterior doors are hard to open.
- Heating systems are not able to maintain uniform comfort conditions throughout the building. The outer core area is cold due to infiltration while the center core is overheated.

How Much Does Make-Up Air Cost?

Make-up air does not cost money. It actually saves money by:

- Extending the life of heat exchangers on combustion equipment.

- Providing more uniform temperatures throughout the building, reducing overheated areas and cold drafty areas.
- Allowing exhaust systems to operate at designed capacity, reducing the need for additional equipment.
- Minimizing the damage to materials from contaminants that may exist in the local atmosphere.
- Reducing employee turnover and absenteeism because of better health conditions and plant cleanliness.
- Improving products with fewer rejects because furnaces operate at designed conditions.



How Much Do You Need?

The recommended procedure to determine the amount of make-up air needed is to total the CFM capacity of all the exhaust fans and blowers in the plant and add 10% to create a positive pressure situation. If the data is not available, the following equations can be used as a means of determining how much make-up air is required.

Paint Spray Booth:

125 to 175 CFM per square foot of face opening

Oven Exhaust:

One air change per minute of oven volume in cubic feet

Fume Exhaust:

CFM = area of discharge pipe in square feet x velocity (3,000 FPM average)

Roof Ventilator:

CFM = area of discharge pipe in square feet x velocity (3,000 FPM average)

Dust Collector:

Area of discharge pipe in square feet x velocity (4,000 FPM average)

Canopy Hoods:

100 to 300 CFM per square foot of hood open area

Combustion Air for Furnaces:

CFM = fuel consumed in Btu per hour divided by 6,000

Drying, Baking or Curing Ovens:

100 CFM per square foot of both cross sections

Pickling or Cleaning Tanks:

150 CFM per square foot of door opening or 200 CFM per square foot of hood face opening



Application Considerations

Direct-fired gas air make-up systems offer a wide range of facility air management choices, as well as maximum installation flexibility.

Air Balance

Exhaust fans cannot work properly without an adequate supply of air. If provision for air supply is not made, the vacuum created reduces the effectiveness of mechanical ventilation. Negative pressure also causes excessive infiltration, making it difficult to heat properly. These conditions can be corrected by replacing the exhausted air with clean, fresh, pre-treated air. The primary purpose of make-up air is to temper outside air and supply it in sufficient quantities to bring about the condition of balanced ventilation.

Depending upon the quantity of make-up air in relation to the exhaust, the heating system will shut down during the working day allowing the make-up air system to handle the entire load. The heating system then functions only to maintain satisfactory temperatures at nighttime and other plant shutdown periods.

When you add an air make-up system to an existing plant it is necessary to make a detailed analysis of the overall situation in order to determine what the relationship might be between the heat added by make-up air and that supplied from the plant heating system. Where exhaust systems already exist, the installation of make-up air usually will not increase the heating load and can bring about a reduction of overall heating costs. This may be understood by considering that infiltrated air, warmed at least partially by the plant heating system, is ultimately

mixed with room air and exhausted through the ventilating fans. Infiltration of unheated air results in a decline of heating efficiency. Most heating systems are not adequately rated to cope with infiltration when appreciable negative pressures exist. Air make-up units provide a systematic method of heating entering air and supplying it in controlled quantity. With the proper balance of supply and exhaust, infiltration is eliminated and negative pressures are equalized. By properly tempering supply air, the heating system is relieved of this abnormal load. The results are uniform space heating, effective ventilation and improved comfort.



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Application Considerations

Heating

Experience with fresh air heating systems has shown that it is practical and economically sound to heat industrial plants and even warehouses with fresh air. The question of whether to use 100% fresh air or recirculate some portion is debatable, and engineers are using both methods in their applications.

When direct-fired systems were first used, some authorities felt that positive exhaust was necessary to assure a balance and prevent the possibility of products of combustion buildup. It is now generally recognized that air can be supplied into most buildings having no mechanical exhaust and in quantities sufficient to heat them without building up a positive pressure of more than a few hundredths of an inch water gauge. It is the reverse of infiltration and this principle can be used to design fresh air plant heating.

The standard air make-up unit is used for industrial space heating with 100% outside air or with a fixed percentage of recirculation and in some designs with a combination of these. Your Aerovent sales representative can assist you in determining application requirements for general air make-up and for fresh air heating. They can supply detailed information as it may apply to specific conditions.

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Products

Door Air Heater

Model ADH – Aerovent’s Automatic Door Air Heater tempers the sudden influx of cold air when a roll-top or overhead door is opened. To mix hot and cold air, it is necessary to create a highly turbulent condition directly in front of the door. The Door Air Heater provides a high velocity blast of hot air to mix with the sudden influx of cold air, “bore through it” and splash off the floor. Installed at a car wash exit, the ADH Series of door air heaters directs high-speed air to help dry vehicles after a drying cycle. Typical applications include logistics terminals, industrial manufacturing and car wash.

Features

- ANSI-certified gas train
- Airflow proving and high-limit switches to prevent accidental overheating
- Flame safeguard relay to confirm functionality and safe condition before ignition to prevent accidental release of gas
- ETL listed to meet UL-508A for electrical safety
- Control components are mounted in a NEMA 12 enclosure for dust and weather ingress protection



Model ADH



Warehouse Application



Car Wash Application

Products (cont'd)

Air Make-Up Units

Our Model AEHP Pioneer Series and Model AEHV Voyager Series industrial direct gas fired make-up air systems are unmatched in construction integrity, design flexibility, application versatility and operating economy.

Model AEHP – Our basis of design for the complete AEH Series line. Like the pioneers of the past that have made America great, the AEHP Helped set the standard of excellence for direct-gas-fired heating and ventilating systems. The AEHP blend optimum functionality and reliability with a low first cost.

Construction features include a tubular steel frame, standing-seam exterior walls, choice of exterior colors, backward inclined airfoil fan, spherical roller bearings, a flame safeguard system, advanced gas and electrical controls and low-energy fan motors.

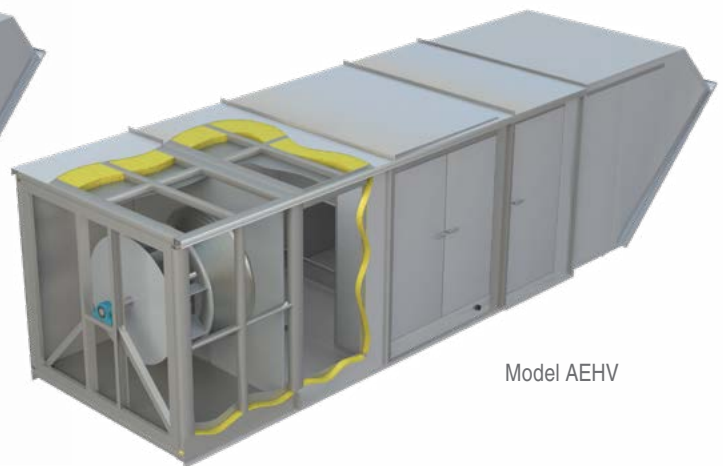
Model AEHV – Takes off on what the Pioneer Model started and sets a new level for premium design and construction in direct fired heating and ventilation systems. While retaining the operating performance and efficiency of the Pioneer. The innovative cabinetry design of the Voyager delivers a plethora of new user benefits.

Construction features include all of the features of the Model AEHP with the addition of a unique section-locking system, double-wall doors, double-wall floors, pitched roofs, motorized dampers, industry-leading return air models and discharge diffuser choices.

Model AEHP



Model AEHV



Industries Served

- Automotive
- Paper & Pulp
- Power Generation
- Food Processing
- Transit Stations
- Chemical Processing
- Wastewater & Sewage
- Manufacturing
- Foundries
- Pharmaceutical
- Textile
- Warehousing
- Mining
- Steel Mills
- Marine

AEH Series Advantages

Energy Savings

- 99.8% efficient burner
- 30:1 turndown burner capability
- Up to 40% less motor brake horsepower (vs. DWDI forward curved fans)

The Best Available Technology

- Two different models of construction to meet your design criteria
- Advanced components and controls
- Special solutions for design challenges

Multiple Sizes for Application Versatility

- Airflow capacities from 4,000 to 130,000 CFM
- Heating capacities from 200 to 17,000 MBH
- Horizontal and vertical systems provide low-cost, ductless installation flexibility

ETL Certification to ANSI Standards

- ANSI Z83.18a-2001 for 85/15 outside/return air models
- ANSI Z83.4a-2001 and CSA 3.7a-2001 for constant 100% or variable outside air models
- UL 1995 for models with fluid or steam coils

Literature Resources

Air Make-Up Units Direct-Fired Gas (Models AEHP, AEHV) - Catalog 875

Gas Door Air Heaters (Model ADH) - Catalog 895

Air Make-Up Units Direct-Fired Gas - IM-875

Gas Door Air Heaters - IM-895

Gas Door Air Heaters Flyer

Air Make-Up Units Overview Brochure





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