



WHY PROVIDE MAKE-UP AIR?

Practically all air removed from a building is replaced by outside air at the same rate. Outside air will enter by any means available, when the inside air pressure is less than outside air pressure. This happens when exhaust exceeds supply systems capacity to replenish the building envelope with air.

Possible consequences of this negative pressure differential are degraded exhaust system performance, loss of environmental control, adverse safety and performance effects on appliances which combust fuel and processes which vent gaseous products via natural draft, increased building structural loads, and excessive forces on exterior doors. Unfortunately, these problems occur where an inadequate amount of replacement or make-up air has been provided.

A good make-up air system will alleviate all of these ills by providing the correct amount of replacement air. It may also reduce plant overhead by lowering heating, cooling, and ventilating costs.

Simple Make-Up Air Systems

A make-up air system might consist of a wall-mounted Hartzell propeller fan coupled with an automatic shutter or an inlet weatherhood and a control system to activate the fan motor. For rooftop installations, a powered Hartzell hooded roof ventilator, which may contain a motorized shutter, can be used successfully. These systems would provide make-up air mainly for ventilation purposes.

Tempered Make-Up Air

In many areas, air must be conditioned before entering a facility. This necessitates that the make-up air system have heating and often air cooling and filtering abilities. A so called make-up air unit is required.



Series GFC Gas Unit

Typically a make-up air system includes an air mover section, usually a propeller or centrifugal type fan, an air tempering section containing heating and where necessary cooling and filtering equipment, and a control system.

Hartzell offers direct gas fired (natural and LP gas), high temperature hot water (or water-glycol solution), and pressurized steam heating systems. The gas fired units are

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built to stringent standards. The steam units are available with a variety of non-freeze type coils.

Fan selection and power requirements are generally determined by the application. When only general ventilation is required (fan pressure requirements are low), a propeller type fan can be utilized. To supply make up air through a duct system with a resistance of 0.5 in w.g. or more, a centrifugal fan should be considered. In either system, diffusers may be used to direct the discharge air velocity.



Series SFC Steam Unit

Make-Up Air with Recirculation

In situations where the inside air quality is acceptable, often a portion of the inside air may be drawn back through the make-up air unit where it is recirculated back into the building. Advantages of using Hartzell Recirculating Make-Up Air units are lowered heating costs, better indoor air mixing (reduced air stratification), as well as constant building pressurization.

In summary, an adequate amount of make-up air is required for personnel, machines, and processes to operate properly, efficiently, and safely. Failure to provide adequate make-up air is often the cause of unnecessary expenditures for additional exhaust systems and heating or cooling equipment. These devices in turn compound the problem of air starvation within the building. Reliable, cost effective equipment is available from Hartzell to supply the make-up air necessary to balance air removed from a structure.



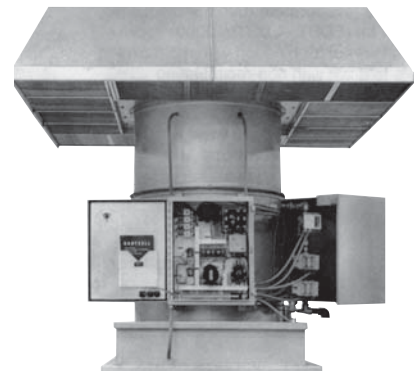
Other Heating Equipment Options

Hartzell also offers gas fired door heaters, gas fired econo units, and steam unit heaters for other issues in the plant.

Gas fired door heaters can be utilized to correct the problem of cold air rushing into the plant when an overhead door is opened. Our door heater directs a blast of high velocity heated air toward the door opening. As a result of the turbulence created, the hot air mixes with the cold air and the "bite" of the cold air is eliminated. This unit can be mounted horizontally or vertically or at any angle and will turn on whenever the door is raised far enough to trip the switch.

Our Econo Models are a low cost alternative to many make up air problems. They are ideal for supplying tempered make-up air or for total fresh air heating systems.

Steam unit heaters are ideal for injecting spots of heat into your plant when you have a steam source available.



Series 78V Gas Econo Unit

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