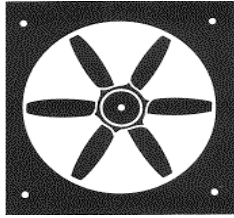


# FANTASTICS

A Quarterly Industrial Ventilation Newsletter

First Quarter 2010



## COMPANY NEWS

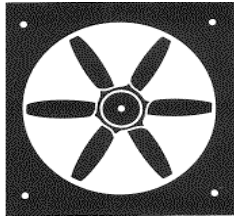
Most LTL freight companies have changed from a weight shipment cost to a density shipment cost. In many cases, the shipment of fans and blowers would increase substantially. To combat this new pricing structure, Ventilation Specialists, Inc. has obtained special pricing from a number of freight companies allowing us to ship class 85 for all fans and blowers which previously were classed from class 85 to class 200. High density fans and blowers will ship class 77.5 with this new pricing arrangement. In the future, our freight allowed prices should decrease while our competitors could increase.

## TECH REPORT

The following fan facts on the “Effects of Air Density on Fan Performance” has been contributed by the Hartzell Fan Company.

## FLOW AND DENSITY

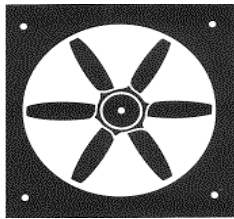
Let’s make sure we understand some basic concepts. Fans are constant volume machines. You’ve heard that before right? Let us explain. Imagine the fan wheel being a series of scoops. As it rotates each scoop gets filled with material. The volume of material is always the same, whether it is feathers or rocks. Of course the rocks weigh more so it takes more effort (BHP) to move them. Remember, a scoop is a scoop! Now expand this concept to a system. Let’s throw a scoop of rocks against a wall (resistance to flow). The energy imparted to the wall is greater than the energy you would get from the scoop of feathers hitting the wall. The same is true of duct systems. It takes more energy (static pressure) to push a denser material through the duct. In



## PRODUCT NEWS

Baldor Electric has completed the integration of Reliance Electric motors into their product line. Cross referencing of Reliance Electric motors into current Baldor Electric motors will continue to be available.

Cincinnati Fan Company has announced an expedited shipping of replacement parts program based on a 24 hour or 48 hour shipment. This means that an order will ship no later than the business day after they receive an order or the 2nd day after they receive an order. The 24 hour shipment requires a 50% premium and the 48 hour shipment requires a 25% premium.

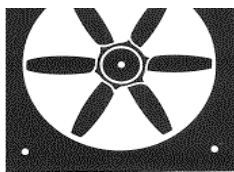


## PRODUCT NEWS

IAP Inc. continues to expand their capabilities for manufacturing specialty fans and blowers. They have the ability to build jet fans, air kits, plug fans, for a 1300° F continuous operation, extrusion cooling fans, tube axial fans to 84"Ø, B-Pack blowers for dust collection and cooling tower and heat exchanger adjustable pitch assemblies.

## ECONOMIC REPORT

The economy continues to improve although slowly. The fourth quarter of 2009 exhibited a number of capital improvement releases for the purchases of both fans and blowers and complete engineered ventilation systems. Our fan and blower manufacturers in many cases are rehiring workers. For the most part, shipments continue on normal schedules but sometimes are a week longer than normal.



the same manner, a fan is unable to generate as much static pressure when handling a less dense material. This illustration should help explain why we make corrections to the static pressure and not to the CFM. Standard air is defined as: sea level, 70 degrees Fahrenheit, 29.92 inches Hg, and 50% relative humidity. Standard density is therefore by definition 0.075 lb/ft<sup>3</sup>. Fans are rated at standard air, so corrections must be made to the static pressure only before selections from the rating tables can be made. Most applications require operating conditions other than standard air: temperature, elevation, molecular weight, moisture content, barometric pressure, etc. Some of these corrections are quite complex so usually they are handled by a computer program. Here's an example: 5,000 CFM, 1" SP @ 2500 feet elevation, 170 degrees Fahrenheit, saturated air. The density corrections are as follows:

2500 ft. elevation	=0.913 x
170° F	=0.842 x
Saturated air	= <u>0.831</u> (water vapor, i.e. a cloud is lighter than air)
Sub-total	0.639 x
Standard density	= <u>0.075</u>
Result	0.048 lb/ft <sup>3</sup> actual density

The selection would be made at 1.56" SP (1" divided by 0.639) from the standard density tables. That will select the fan at a higher RPM which will compensate for the lower density air. The resultant BHP needs to be multiplied by 0.639 to account for the lower density.

## **ACFM vs. SCFM**

Now let's discuss ACFM vs. SCFM. SCFM is the CFM converted to standard conditions. ACFM is the actual CFM required at the operating conditions. In our example on the previous page, the actual CFM needed is 5,000 ACFM. That is the CFM to select the fan for. Some people will "correct" that CFM to SCFM and get 7,825 SCFM. That number is needed for calculations involving mass flow (like heat transfer), but is not correct for the fan selection. Here's the best way to avoid problems. First, specify the actual CFM at the point in the system that the fan operates. Also, obtain the actual static pressure rise needed at that point, and the non-standard conditions. Take this information, calculate the density, correct the actual static pressure to the equivalent standard static pressure, and select the fan. Don't forget to adjust the brake horsepower as well!

**VENTILATION SPECIALISTS, INC.**

**PO Box 750, Winter Haven, FL 33882**

**Phone (863) 324-4000 Fax (863) 294-3646**

**Email: [vsifans@tampabay.rr.com](mailto:vsifans@tampabay.rr.com)**

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