

Dilution Ventilation

The Most Universal Solution

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HVAC manufacturers play an important role in providing indoor air quality. We make indoor environmental control products and, with the design engineers, distributors, reps and contractors, deliver them to the market. However, the contribution of the manufacturer is necessarily limited by the realities in buildings and at the same time it is dependent on industry standards.

There are three means of reducing the concentration of indoor pollutants: source control, air cleaning and ventilation. Manufacturers are pursuing contributions to source control (for those sources under their control). These include new drain pan designs, for example, and a wide variety of features meant to enhance cleanliness and cleanability of HVAC systems.

Other examples include products designed to provide better control of indoor relative humidity through humidification, dehumidification and preconditioning. Controls are available to ensure that the required ventilation is available when needed. And of course, the industry offers an array of air cleaning and filtration options for a variety of standard and special applications.

Significant progress has been made in recent years in characterizing the performance of particulate filters; standards for gaseous air cleaners may be forthcoming. These new tools are all welcome additions to our IAQ arsenal; however, because it is the only technology that addresses all indoor pollutants, dilution ventilation is the most universal solution.

To understand the role of manufactur-

ers in providing ventilation, it is helpful to understand the impact (and the limits) of the ventilation standards and the codes. The quality of the indoor environment is a result of many factors including lighting, noise, temperature, relative humidity, air movement and the concentrations of myriad chemicals, particles, odors, irritants and pathogens. All impact how we perceive our environment and some play a role in both short and long-term health.

There is also a clear understanding today that the degree to which we are affected by any of these factors is partly a result of our individual sensitivity. In this

context it is no wonder that engineers and manufacturers are concerned about liability when it comes designing, specifying and installing ventilation equipment. ASHRAE Standard 62-1999, *Ventilation for Acceptable Indoor Air Quality*, was recently published with this new caveat in the scope:

"2.3 Acceptable indoor air quality may not be achieved

in all buildings meeting the requirements of this standard for one or more of the following reasons:

(a) because of the diversity of sources and contaminants in indoor air;

(b) because of the many other factors that may affect occupant perception and acceptance of indoor air quality, such as air temperature, humidity, noise, lighting, and psychological stress; and

(c) because of the range of susceptibility in the population."

And earlier this year a petition to the ASHRAE Board of Directors was approved by overwhelming vote of the membership. The petition read in part:

"The goal of the [*indoor air quality or ventilation*] standard shall be to provide general dilution ventilation of occupied

spaces. That standard shall not make any claim for health, comfort, or occupant acceptability."

Why is this necessary? Because, given the infinite variables of sensitivity, designers and manufacturers of HVAC systems should not be put in a position of deciding what is acceptable. The function of dilution ventilation is to reduce the concentrations of indoor pollutants to something less than they would be without that ventilation. One role of the ventilation standard is to set the minimum dilution that society agrees is due all building occupants. This does not mean that it will be acceptable to all individuals or that it comes with zero risk.

Just as important, by setting the minimums as acceptable practice, the ventilation standard reduces debate and controversy in the workaday world about how good is good enough, how much outside air must be provided, etc. If followed, standards limit the liability of the producer and the practitioner. It is only within this framework of minimum outdoor air ventilation standards and codes that manufacturers and designers can deliver ventilation products and systems to the market.

The role of the standard is to affirm the minimum rates of dilution ventilation. The role of the codes is to enforce those minimum provisions and to remove the concerns for litigation, excessive variation in local requirements, etc. Manufacturers and designers, working within this codes and standards framework, are free to move ahead with confidence to develop innovative ventilation solutions to enhance the quality of the air we breathe, reduce cost and conserve energy.

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