

IAQ in the 21st Century

Why is our indoor environment important to our health?

- Most people are aware that outdoor air pollution can damage their health but may not know that indoor air pollution can also have significant effects.
- EPA studies of human exposure to air pollutants indicate that indoor air levels of many pollutants may be 2-5 times higher than outdoor levels.
- Occasionally levels of many pollutants may be more than 100 times higher than outdoor levels.
- These levels of indoor air pollutants are of particular concern because it is estimated that most people spend as much as 90% of their time indoors.



The dramatic rise in the number of sick buildings demands we change our approach to IAQ

- Sick Building Syndrome (SBS) related illnesses are emerging as a critical health, environmental and legal issue throughout the world.
- The World Health Organization estimates that 30% of the world's modern buildings are plagued by indoor air pollution.
- A recent national NIOSH study found that more than 50% of IAQ problems were related to poor ventilation.
- IAQ litigation increases every year; and recent IAQ lawsuits have commanded hefty settlements. Businesses are faced with evermore stringent responsibilities in providing employees with a safe work environment.
- It is estimated that poor air quality directly results, on an annual basis, in \$1 billion in medical costs and \$60 billion in employee sick leave and lost production.

Stemming the tide of asthma



- About 17 million Americans have asthma.
- Asthma is the leading cause of long-term illness in children.
- National Academy of Sciences Institute of Medicine has issued a report, *Clearing the Air: Asthma and Indoor Air Exposures*, on the role of indoor environmental pollutants in the development and exacerbation of asthma. The report affirms the government's asthma initiative to educate the public about the ways they can help control asthma by managing indoor air quality.

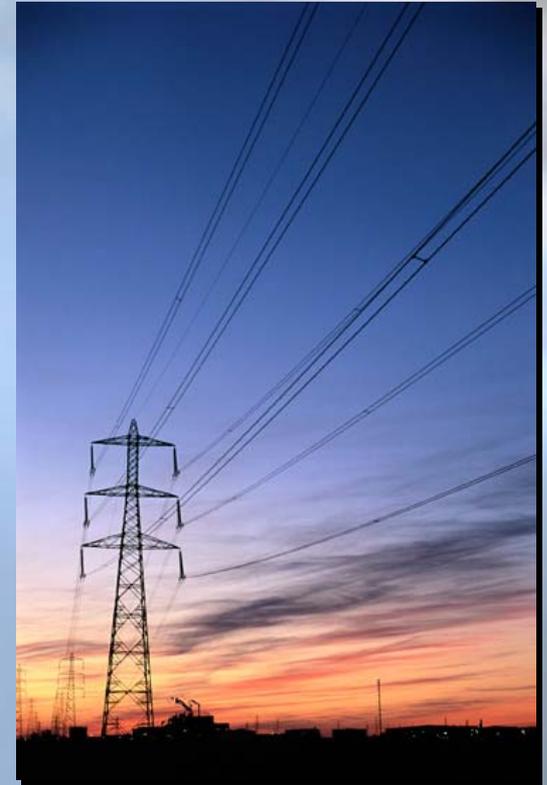
Reducing asthma triggers

- Body parts and feces of dust mites can trigger asthma in sensitive individuals.
- Molds can be found almost anywhere; they can grow on virtually any substance when moisture is present. Molds can trigger asthma episodes in sensitive asthmatics. There is no practical way to eliminate all mold and mold spores in the indoor environment; the way to control indoor mold growth is to control moisture.
- Environmental Tobacco Smoke (ETS) may trigger asthma episodes and make asthma symptoms more severe in children who already have asthma. Moreover, ETS is a risk factor for new cases of asthma in children who have not previously exhibited asthma symptoms.
- Your pet's dead skin flakes, urine, feces, and saliva can trigger asthma.
- Droppings or body parts of cockroaches can be asthma triggers.



Energy in the 21st Century and IAQ

- The cost of daytime energy use is expected to increase in the future.
- How do we manage increasing energy costs with the need to provide more ventilation air?

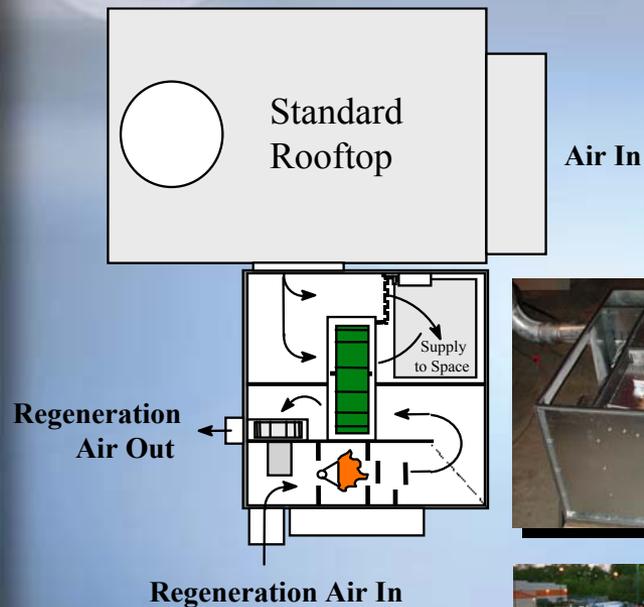


IAQ in the 21st Century

“A paradigm shift is predicted where people of the 21st century will not tolerate mediocre indoor air. The aim will be to establish fresh and pleasant indoor air, stimulating for work purposes and with no negative effects on health. But, we do have important new research results that are predicted to influence the development in a positive direction. Decreasing pollution from materials in a space has been shown to improve perceived air quality and productivity, while decreasing SBS symptoms. Source control works and pays off. Increased ventilation has also been shown to improve both perceived air quality and the productivity of office workers, as well as to decrease SBS symptoms.”

**Professor P. Ole Fanger, D.Sc. Director,
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Some interesting answers to the IAQ/Energy dilemma



In the last decade, a resurgence of the use of energy recovery ventilators began the process of improving indoor air quality by shifting sensible ratios of conventional equipment to remove more moisture from outside air. At the same time, desiccant dehumidifiers were being applied in greater numbers to commercial/ institutional buildings like supermarkets, hospitals and schools to control humidity.

Together, these systems have demonstrated they can remove moisture effectively, reduce electric use and lower electricity peak demand.

Some interesting answers to the IAQ/Energy dilemma

The use of actively regenerated desiccant technology, as we have already seen from industrial applications, both increases moisture removal and provides for independent temperature and humidity control.

The use of clean burning natural gas, propane and *CleanOil* fuel will clearly provide counterbalancing price opportunities and choice in the future to remove moisture from buildings.

Some interesting answers to the IAQ/Energy Dilemma

Finally, electric deregulation has stimulated the growth of distributed energy resources.

On site power generation harnessing waste heat to regenerate desiccant systems offers a future where we can actively remove moisture from ventilation air virtually for no energy cost.



Parting Thoughts

- A paradigm shift is predicted where people of the 21st century will not tolerate mediocre indoor air.
- Sick Building Syndrome is on the rise.
- Poor air quality triggers asthma.
- Poor air quality costs money.
- Ventilation air is a key solution to improve air quality.
- Moisture management is essential to improve air quality.
- Independent temperature and humidity control is best for moisture management.
- Desiccant solutions have been important moisture management tools in industry and are emerging as critical tools to manage moisture in tomorrow's buildings.
- Desiccant based cooling, heating and power (CHP) systems will lead energy efficient solutions well into the 21st Century.
- For more information, please contact us at:



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