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## **The Growing Concern about Indoor Air Quality in American Schools**

### ***The Role Jansan Distributors and Manufacturers' Reps Can Play in Solving the Problem***

Nearly 56 million people spend their days in America's public schools. According to the Department of Education's

National  
Center for  
Educational  
Statistics,  
almost half  
of these



schools report at least one unsatisfactory environmental condition, such as poor lighting or heating, unsanitary restrooms, or unhealthy indoor air quality (IAQ). Of all the

conditions reported, problems related to IAQ were mentioned more frequently than any others and were of greater concern.

Studies from a variety of independent organizations now conclude that these unsatisfactory conditions, especially poor IAQ, can impact the health of those using school facilities and even hinder academic achievement. A study conducted at the University of Georgia recently concluded: “In general, teachers who work in cleaner schools with better ventilation report using fewer sick days and rate students higher for motivation.” The study also reported less student lethargy and absenteeism in cleaner, better ventilated schools and concluded that there is “a relationship between the physical characteristics of a school, the level of teacher satisfaction, student behavior, academic achievement, and the health of teachers and students.”

Of greatest concern when discussing IAQ issues are the potential health risks. Poor IAQ is believed to be the major reason for the dramatic increase in asthma among school-age children—up more than 70 percent since 1980. In fact, asthma has reached epidemic proportions in the United States, with an estimated five million school-age children now afflicted by the respiratory illness which causes wheezing, coughing, and shortness of breath. Asthma and related IAQ health problems now result in 14 million missed school days per year, 4.2 million children experiencing asthma attacks, and, according to the Centers for Disease Control and Prevention (CDC), a threefold increase in the number of children dying from asthma in the past two decades.

### **The History and Causes of Poor IAQ in Schools**

Indoor air quality first became an issue after the oil embargo in 1973. Before the embargo, building ventilation standards

called for approximately 15 cubic feet per minute (CFM) of outside air to enter a facility for each building occupant. This ventilation was necessary to dilute or remove chemical, food, cleaning, and miscellaneous pollutants and odors from the indoor environment.

But after the oil crisis and the implementation of national energy conservation measures in schools and private and public facilities, the amount of outdoor air provided for ventilation was reduced to just 5 CFM per occupant.

Buildings, including educational facilities, were also required to have better-insulated, tighter-fitting windows that were often sealed closed. These measures did help conserve energy and prevent unmanaged outdoor air from entering the indoor environment. However, they also reduced indoor air ventilation rates and affected IAQ to such an extent that the lowered rates were often inadequate to maintain the health and comfort of building occupants. Though the

ventilation standards have been adjusted over the years, allowing for more outdoor air ventilation, IAQ problems persist and in many cases have become much worse.

These are some of the things that most contribute to poor IAQ in schools today:

- Chemical pollutants from the construction materials used in the buildings themselves
- Chemicals and toxins used in science and art classes
- Improperly maintained heating, ventilating, and air-conditioning systems
- Electronics such as fax machines, copiers, and computers

- Allergens from classroom animals as well as insects and pests in the buildings
- Reduced cleaning frequencies
- Pollutants from certain cleaning chemicals and tools
- Inefficient vacuum cleaners with poor air filtration capabilities

## **Cleaning and IAQ**

Some of the causes of unhealthy IAQ can be addressed only by structural contractors who must reengineer or repair buildings to allow for better ventilation or remove building



materials that are polluting or harmful to the indoor environment. Other IAQ problems may need to be corrected through operational changes made directly by schoolteachers and administrators. However, the janitor industry, and most specifically distributors and manufacturers' reps, can play a vital role by educating their customers on ways to reduce and eliminate indoor air quality

problems by employing improved cleaning technologies and equipment.

For instance, when cleaning restrooms, many janitorial professionals in schools use traditional methods that involve aerosolized chemicals. The cleaning worker is likely to inhale and be harmed by these products. Additionally, the fumes may enter the building's HVAC system to be carried throughout a facility. These potentially toxic vapors and chemicals have now become a source of indoor air pollution.

“To rectify this situation,” said David Frank, an industry cleaning expert and President of KnowledgeWorx, a janitorial consulting firm, “cleaning professionals can use quart-sized cleaning products that have flip-top sprayers to dispense liquid.” He also suggested using trigger sprayers equipped with nozzles that dispense the chemical in a foam form instead of a spray.

“Another step cleaning professionals can take, which can produce dramatic improvements in IAQ in schools, is to switch to true HEPA air filtration vacuum cleaners,” said Frank. A true HEPA air filtration system means that the entire vacuum cleaner, including the machine’s casing and bag, is designed and sealed to accommodate a HEPA filter. This prevents dust and particulates from becoming airborne and escaping through the machine. HEPA-filtered air is 99.97 percent free of all particulates down to 0.3 microns in size. This is smaller than the period at the end of this sentence and will include many forms of bacterial, fungal, and other opportunistic microorganisms.

“HEPA filters are now the primary filtration systems found in electronic clean room assembly, isolation wards, surgical theaters, pharmaceutical processing, and many other applications where excellent IAQ is important and maximum

reduction or removal of submicron particulates is required,” said Tom Bogusevic, Vice President of Tornado Industries, which has just planned, designed, and introduced a high-efficiency HEPA vacuum cleaner for the educational and hospitality markets. “At Tornado, we believe HEPA air filtration systems on commercial vacuum cleaners are becoming increasingly important, especially when used in schools or where IAQ is an issue.”

According to Bogusevic, HEPA vacuum cleaners improve IAQ because of their ability to trap fine particulates and dust. This reduces the risks associated with the redistribution of potentially harmful particles and allergens back into the air. Additionally, using HEPA filtration systems can reduce dusting frequencies considerably, further preventing potentially harmful matter from becoming airborne.

## **Role of Distributors and Manufacturers’ Reps**

New and more efficient cleaning tools and technologies help reduce impurities and pollution in the indoor environment, improving IAQ and removing or minimizing contaminants.

Flip-top and foam sprayers or true HEPA air filtration systems on vacuum cleaners are just two examples of new cleaning tools that can lessen human exposure to airborne pollutants, reduce healthcare costs, and improve school attendance and academic achievement.

School officials and cleaning professionals need to understand the many issues surrounding indoor air quality and the cleaning practices that can hinder or improve IAQ.

Distributors and manufacturers' reps, knowledgeable in these issues, can help all parties maintain high cleaning performance standards and practices and improve IAQ by researching new cleaning products and technologies and helping cleaning professionals implement procedures that

improve IAQ and the health of buildings on an ongoing basis.

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***Editor: Sidebar***

## **HEPA Filters: What They Do and the Benefits They Provide**

Some vacuum cleaner manufacturers have or are now introducing HEPA filtration systems into their machines. Though the term “HEPA” is mentioned often in our industry, not everyone knows what it actually is and does.

HEPA stands for high-efficiency particulate air. The first HEPA filters were developed in the 1940s by the United States Atomic Energy Commission to fulfill a top-secret



need for an efficient, effective way to filter radioactive particulate contaminants. After World War II, the technology was released to the general public for commercial and residential use.

A HEPA filter can remove 99.97 percent of particles 0.3 microns in size. To understand just how small that is, the period at the end of this sentence is about 500 microns in diameter.

HEPA filters are now considered the best form of air-filtration system available. Hospitals and laboratories use them in HVAC (heating, ventilating, and air-conditioning) systems to

help eliminate foreign and heavy metal particles, infectious agents, and a variety of other undesirable contaminants in the environment.

## **Use in Vacuum Cleaners**

Because most Americans spend as much as 90 percent of their time indoors, the EPA\* now identifies indoor air pollution as one of the top five environmental risks to public health. Responding to these health concerns, some vacuum cleaner manufacturers are installing true HEPA air filtration systems that can trap and filter many pollutants including dust, mold spores, and pet dander, and can even remove odors.

Another reason HEPA air-filtration systems are being installed in vacuum cleaners is because of the dramatic increase in asthma in the United States. HEPA filters have proved that they can trap most known asthma triggers, from pollen grains to dust mite fecal pellets and, when used with antiallergy vacuum bags, other troublesome allergens.

## **What to Look for When Purchasing**

Cleaning professionals should realize that for a vacuum cleaner to provide all of the many benefits a HEPA air-filtration system can offer, the machine must be engineered and designed to work with the filter. This means that the vacuum cleaner must be completely sealed so that no dust or particles can escape from the casing when used.

Another factor to consider is the distance that air must travel through the vacuum cleaner. With a traditional upright vacuum, the air flows a relatively short distance from the surface through the machine and into the paper bags. In addition, an upright's sealed casing and powerful suction can provide excellent carpet cleaning performance and a healthy, dust-free indoor environment.

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Tom Bogusevic is Executive Vice President of Tornado Industries and a floor care expert.

\* Environmental Protection Agency

Editor: Photo "Courtesy of Tornado Industries"

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