

## Enhancing Indoor Air Quality Through Source Control

*Low odor floor finishes improve IAQ, reduce complaints*

By Christopher Cypcar, Ph.D.

A facility's indoor air environment is the complex result of several variables from inside and outside a building interacting together. Ideally, indoor air has the same amount of oxygen as outdoor air, but without the outdoor pollutants. However, there are many contributors to poor indoor air quality (IAQ) that can have a negative affect on a building's operations.

The Center for Disease Control (CDC) identifies source control and ventilation systems as two primary contributors to IAQ problems ([http://www.cdc.gov/niosh/pdfs/sec\\_2.pdf](http://www.cdc.gov/niosh/pdfs/sec_2.pdf)). For cleaning professionals, ensuring good IAQ can be a complicated mix of working with heating, ventilation and air conditioning (HVAC) professionals, as well as monitoring and controlling the numerous sources of IAQ pollutants occurring in the facility.

Due to the complexity of factors contributing to a facility's overall IAQ, this white paper will focus on its importance and how cleaning professionals can use source control to reduce the number of contributors to poor IAQ. Because floor finish activity is one area traditionally associated with odor complaints, the paper will detail how a source control audit can lead cleaning professionals to implement a comprehensive program to reduce odor and the frequency of floor finishing. In addition, it will demonstrate how source control can yield additional benefits beyond improved IAQ, such as complaint reduction, improved satisfaction and enhanced productivity.

### **What is IAQ and Why is it Important?**

Outdoor pollutants, such as tree pollen, mold spores, ozone and vehicle exhaust often infiltrate indoor environments via air handling systems, open doors and windows. Here, the outdoor pollutants combine with already present indoor air pollution from furnaces, paper products, pests, cleaning processes, even people, to decrease IAQ.

In most office buildings and homes, the common IAQ pollutants found in airborne particles include paper fibers, dead skin, clothing material, dust mite fragments, tree pollen, outdoor soils and mold spores. Pollutants present as gases or vapors are typically by-products of combustion (e.g. carbon monoxide from furnaces or cooking), emissions from some occupant activity (e.g. painting), or associated with off-gassing from new materials such as carpet.

There is a substantial body of evidence revealing the negative impact of poor IAQ on human health. The U.S. Environmental Protection Agency (EPA) states that poor IAQ can contribute to a wide variety of short and long-term effects on human health, ranging from watery eyes and dizziness to respiratory disease and even cancer in extreme cases (<http://www.epa.gov/iaq/ia-intro.html>). In addition to being a cause of disease, poor IAQ can make preexisting conditions, such as asthma, worse. The data summarized by the EPA, the American Lung Association and other organizations conclusively show why maintaining optimal IAQ in buildings is of utmost importance.

Poor IAQ can have a negative impact on people who regularly occupy affected spaces. More than 20 million Americans today are afflicted with asthma, a chronic respiratory disease often associated with poor IAQ. IAQ is a critical issue for adults occupying buildings of all types including healthcare, education, general office and retail facilities. Employees and employers are well aware of the adverse effect on employee health and productivity due to poor IAQ. A report to Congress on IAQ by the EPA revealed that employers spend tens of billions of dollars each year as the result of IAQ problems at their facilities.

### **Reducing Volatile Organic Compounds with Source Control**

One common class of indoor air pollutant is volatile organic chemicals (VOCs). These materials can leave liquid products and enter the air as gases when certain products are used and contribute to poor IAQ at high concentrations. Examples of source materials that often contain VOCs include: paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers and photographic solutions (<http://www.epa.gov/iaq/voc.html>). According to the EPA, concentrations of VOCs can be up to 10 times as high indoors as outdoors.

In addition to posing potential health related risks, many VOCs have unique odors associated with them that can result in nuisance complaints. A recent study performed by JohnsonDiversey revealed that 20 percent of hospital patients who smell a chemical believe that it automatically adds toxins and contaminants to the air. Patients who were medically compromised with respiratory issues were up to three times as likely as other patients to complain about floor finish odors. Technological enhancements in floor finishes have limited odors associated with floor finishing and reduced its impact on human health.

Effective source control should include a review of the cleaning and floor care products used in the facility. For cleaning professionals, one way to ensure source control is to limit the number of VOCs used during the cleaning process. Cleaning and floor care products sometimes contain low levels of VOCs, usually present in formulas as solvents. While regulations control the amount of VOCs present in cleaning and floor care products, not all products are created the same.

Floor care formulations typically contain similar levels of solvents, but other volatile components vary from product to product. For example, many traditional floor finishes on the market are known for the ammonia smell that emanates from the area where floors are being finished. During a source control review, cleaning professionals should target odor causing chemicals and replace them with chemicals containing low odor properties.

### **Benefits of Source Control and Low Odor Floor Finishes**

In addition to limiting VOCs, source control can also benefit other aspects of a facility's operations. For instance, floor finish is one commonly identified source control focus area. While improving IAQ and reducing complaints is a possible catalyst for replacing traditional floor finishes with new low odor floor finishes, users will find they also yield several additional benefits such as enhanced productivity and reduced product and labor costs.

Scheduling flexibility is a benefit identified by building service contractors (BSCs) and cleaning professionals in healthcare and educational facilities who use low odor floor finishes. Low odor floor finishes do not require areas to close for extended periods of time. In educational facilities, floors can be finished at any point during the school year, not just when students are on a break. In hospitals, patients do not need to be removed from areas where floors are finished.

This scheduling flexibility can also benefit cleaning staff. With low odor floor finishes, staff members do not have to come in at odd hours, enhancing productivity. In addition, cleaners are empowered because they are able to complete their responsibilities during the day, enabling them to spend more time with their families.

High performing, low odor floor finishes also reduce the frequency of maintenance. Floor finishes with excellent mark and scratch resistant profiles keep floors looking great for a longer period of time, reducing product and labor costs. This reduction in the frequency of stripping and finishing also frees up labor so cleaning staff are able to complete additional duties throughout the facility.

### **Techniques for Reducing Frequency of Floor Maintenance and VOCs**

To further reduce the frequency of floor finishing, cleaning professionals can also make modifications in the way hard floors are cleaned to improve a building's IAQ. Easy techniques for keeping dirt outside the building include:

1. Keep outside entryways clean. Ensure that areas leading up to all doors are regularly maintained. This may include sweeping, power washing, etc. Frequency of maintenance should be determined by amount of traffic coming into the building and weather conditions rather than a calendar schedule.
2. Use matting systems at all entrances of the building to capture soils and moisture from shoes. Mats should be long enough for each shoe to hit the mat two times or a minimum of 12 to 15 feet.
3. Ensure frequent vacuuming and dirt removal of entryway mats and grating systems.
4. Frequently dust mop resilient tile floors, paying close attention to entryways and other particulate sources (e.g. near copy rooms).
5. Ensure areas under floor mats are cleaned periodically to limit the opportunity for bacterial and fungal growth. Replace wet floor mats with dry mats as soon as possible.

### **Conclusion: Low Odor Floor Finishes Improve Indoor Air Quality**

Recognizing the impact IAQ has on human health, more facilities are taking steps to enhance their IAQ by using products and chemicals that limit impact on the indoor environment. This trend is being driven by several groups in the healthcare industry, including patients, local and state governments and non-governmental organizations such as Hospitals for a Healthy Environment (<http://www.h2e-online.org/>).

With a few simple steps, cleaning professionals can take a proactive approach to improving IAQ by conducting a source control review and implementing low odor chemicals into their cleaning program.

This initiative will not only help limit potential health risks and nuisance complaints throughout the facility, but it can also improve the vitality of a cleaning department.

*Christopher Cypcar, Ph.D. is Group Leader of Global Innovation Floor Care Research and Development for JohnsonDiversey.*