

## INTRODUCTION

Over the past 10 years, awareness has grown of the effect of the indoor environment on an individual's sense of well-being. In particular, increasing attention has been paid to the issue of indoor air quality. High-quality indoor air results from good air circulation and exchange, proper temperature and humidity control, and control of airborne contaminants, odors, and dust.

In schools, hospitals, office buildings, and other institutions, paying attention to how a facility is cleaned can make a significant difference in the quality of indoor air and the chemicals to which workers and occupants are exposed. Good indoor air quality produces an environment that is healthy and comfortable. It is also good business, resulting in increased worker productivity, reduced absenteeism, and reduced medical and insurance costs. According to one analysis, US businesses could realize a productivity gain of \$30 to \$150 billion annually, and an increase in worker performance of 0.5 to 5 percent, by improving the indoor environment through better ventilation and cleaning.<sup>1</sup>

By choosing cleaning methods, products, and equipment carefully, identifying and addressing contamination "hot spots," reducing the on-site storage of toxic chemicals, and introducing higher standards as to what constitutes a "clean" space, janitorial cleaning can perform a real environmental service.

This guide is designed to assist those who wish to improve the indoor environment and worker health by using proper cleaning and preventive methods and choosing the safest available cleaning products. It addresses:

- ▶ Common causes of poor indoor air quality and how to prevent it.
- ▶ Cleaning methods to improve the indoor environment.
- ▶ Health and safety risks of janitorial workers and how to reduce them.
- ▶ Health effects of common cleaning chemicals and disinfectants, and how to minimize use and exposure.
- ▶ What to look for and avoid in janitorial cleaning products.
- ▶ Existing programs that have evaluated the environmental attributes of cleaning products.
- ▶ Products determined to be "environmentally preferable."

The information contained in this guide is applicable to all building types and can be used by a wide variety of groups, including:

- ▶ Janitorial service companies and janitorial departments that wish to reduce their chemical use and improve indoor air quality in the buildings they serve.
- ▶ Building occupants and janitorial workers concerned about the cleaning chemicals to which they might be exposed.
- ▶ Institutional purchasers interested in purchasing less toxic janitorial products.
- ▶ Labor unions and other groups concerned about occupational safety, indoor air quality, and janitorial chemical use.

## FINDINGS

### 1. Poor-quality indoor air can produce health effects in occupants ranging from headaches and dry eyes to nausea, dizziness, and fatigue.<sup>1</sup>

Building design flaws, heating and ventilation problems, occupant activities, and chemical products that are improperly used, sealed, or stored can contribute emissions and contaminants to the indoor environment. These, in turn, may cause "building-related illness," a diagnosable illness attributable to airborne building contaminants, or "sick building syndrome," which causes symptoms associated with occupancy of a specific building but no specific illness is identified.

### 2. Janitorial workers experience relatively high injury rates, many of which are due to the toxic chemicals found in cleaning products, particularly floor and carpet maintenance products, disinfectants, and specialty cleaners. These chemicals can cause headaches, asthma, burns, permanent eye damage, major organ damage, and even cancer.

Of particular concern are disinfectants, all of which pose health and/or environmental risks. Their active ingredients are among the most toxic chemicals used in cleaning, and include quaternary ammonium compounds (quats), bleach, ethyl and isopropyl alcohol, formaldehyde, and phenolic compounds.

**3. Improved cleaning methods and less toxic products can positively affect indoor air quality and worker health.**

In one study, implementation of improved cleaning and preventive techniques, such as focused dust removal from all surfaces, use of large entryway mats, and damp-mopping instead of sweeping, reduced airborne bacteria by 37 percent, fungi by 62 percent, and dust by 52 percent.<sup>2</sup> Another study found that the use of hazardous chemicals could be reduced by 5.4 pounds per janitor per year, or 13 percent, if janitors used fewer chemicals, substituted less toxic chemicals, installed mats and vacuumed, and avoided aerosol products.<sup>3</sup>

**4. Information is available to help entities choose less toxic products.**

Information on toxic ingredients, volatile organic compound (VOC) content, and flash point (the temperature at which a volatilized product can ignite) is readily available for most products. This information can be used to compare different products and choose those that are least likely to ignite and have the smallest quantity of toxic chemicals and the least impact on indoor air quality. Many manufacturers are now providing other environmental information as well, such as biodegradability, skin and eye irritation data, aquatic toxicity, and full ingredient lists upon request.

**5. Less toxic and equally effective products are available for almost all applications.**

INFORM's survey of groups that have evaluated and purchased cleaning products with less toxic chemicals or other positive health and environmental attributes found that many have switched entirely to less toxic and low-VOC products. Many products in use are also biodegradable, free of chemicals listed on the federal Toxics Release Inventory, and free of carcinogens. (See Table 6 for a list of all the environmentally preferable products used by the surveyed groups, including disinfectants, general-purpose cleaners, degreasers, tub and tile cleaners, toilet cleaners, and glass/window cleaners.)

## RECOMMENDATIONS

**1. By cleaning for health first and appearance second, janitorial service companies and departments can improve indoor air quality while protecting the health of building occupants and workers.**

Strategies such as preventing the introduction of dirt and dust into a facility, focusing on dust and airborne contaminant removal, preventing water damage, and using proper cleaning methods can reduce indoor air pollution and the toxicity and volume of products used. While occupants may complain that the lack of a "chemical" or "fragrant" smell indicates that bathrooms have not been adequately cleaned, they can be educated about the elements of effective cleaning and the importance of reducing the use of volatile, odorous products.

**2. By evaluating products and purchasing the least toxic ones available, institutions can reduce the risk to workers and the environment while maintaining high-quality cleaning standards.**

To make an informed decision about which products to use and which to avoid, buyers can read the material safety data sheets for all products, ask vendors about their products, and use the information provided by vendors to evaluate a product's environmental attributes. Products without toxic chemicals are available for most cleaning applications.

**3. To reduce their environmental and health impacts, disinfectants should be used carefully and selected based on their efficacy and purpose.**

Different disinfectants kill different organisms, so only products that contain the ingredients needed to kill the target organism should be used; the product label generally lists the types of organisms against which a disinfectant is effective. In addition, most disinfectants are only effective on clean surfaces, so surfaces should be cleaned before the disinfectant is applied. Label instructions should be followed precisely or the product may not be effective.

**4. Educating janitorial workers in proper cleaning methods, the effective use of cleaning chemicals, and the health hazards of specific chemicals contained in the products they use can reduce exposures to toxic chemicals and other building hazards.**

In some applications, even an environmentally preferable alternative product will still pose some type of health hazard or environmental risk (this can be the case when a disinfectant is required). Janitorial workers often handle highly toxic chemicals with little or no knowledge of their toxicity or how to prevent injury. Training them to handle hazardous products correctly, to avoid spraying or otherwise contaminating the air with cleaning products, and to dilute products correctly can reduce the risk of chemical injury and the amount of product required for the job.

**5. Facilities interested in reducing their use of toxic cleaning products can take advantage of the many janitorial pollution prevention projects that have successfully implemented improved cleaning practices and evaluated and promoted environmentally preferable products currently on the market.**

Groups that wish to implement their own programs can build on the successes of these projects and avoid the pitfalls of inadequate training or insufficient buy-in. Facilities planning to implement a janitorial pollution prevention project can contact the planners of previous projects, use existing evaluation schemes, or use the same products used in these successful programs.