

Carpets, Carpet Cleaning and Their Affect on Indoor Air Quality

By Ronald Goerne

The number of cases of asthma as well other respiratory and allergy problems among American school age children has increased alarmingly in the past 10 to 15 years leaving doctors, public health officials, parents, and school administrators searching everywhere for possible culprits.

Carpet was an immediate suspect and it seemed only logical because carpet fibers can house all types of dust mites, allergens, and other particulates that, once airborne, can create poor indoor air quality (IAQ). Research has linked poor IAQ to increased incidences of asthma, allergies, and other health problems.

In fact, recently Florida and Vermont school officials considered banning carpeting in their school districts led by allergists

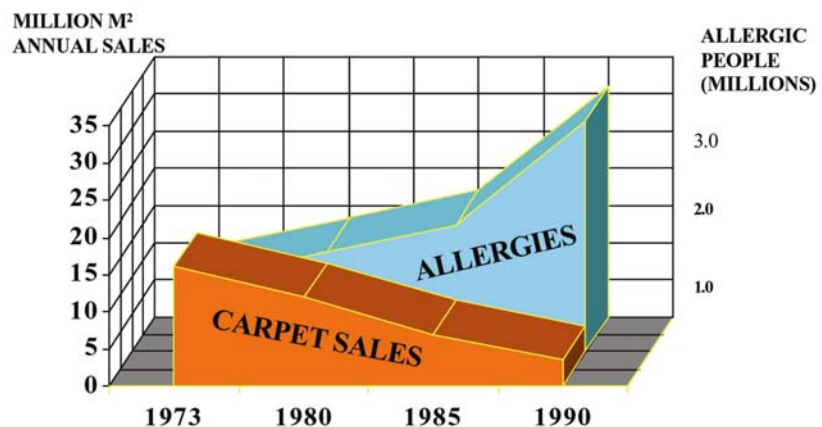
supporting carpets supposed negative impact on IAQ.

Sweden did ban the use and installation of carpeting in schools in the late

1970s. Schools there were instructed to only install traditional VCT (vinyl composition tile) flooring; carpeting and rugs was removed from classrooms entirely.

Later, studies in Sweden found that instead of eliminating the problem, improving IAQ and the health of school children, just the

CARPET SALES AND ALLERGIES IN SWEDEN



Data Source: Allergy -Swedish Statistical Central Bureau
Sales Swedish Institute of Fiber and Polymer Research

opposite occurred. As the graph below clearly indicates, as carpeting was removed, allergies actually increased.

In a presentation before the 2001 annual meeting of the Council of Education Facility Planners International in Orlando, FL, carpeting, Allen Hedge, a professor of design and environmental analysis at Cornell University in Ithaca, N.Y, reported that carpeting actually improves IAQ because it captures and holds dirt, dust, allergens, and other contaminants that could otherwise become airborne. His report stated that they are readily and effectively removed by vacuuming with high-efficiency vacuum cleaners and with proper carpet cleaning.

The Benefits of Carpet

“The aesthetic and physical attributes of carpet provide proven benefits for the learning environment. Carpet creates a warm and friendly environment that enhances how students perform in the classroom,” writes Susan Lang of Cornell University writing in *School Planning and Management* magazine (November 2001). Carpeting in schools provides several other benefits as well:

Safety

Carpeting helps prevent slips, trips, and falls, which present ongoing concerns for schools with hard-surface flooring. Studies have also shown that, on average, when someone does fall on a carpeted surface, fewer injuries are sustained.

Acoustics

Carpeting absorbs sound and is up to 10 times more efficient in noise reduction than any other form of floor covering, which can be an especially important consideration in the learning environment

Insulation

Carpeting provides a thermal resistance or “R” value. By insulating floor areas, carpeting reduces the amount of energy necessary to keep classroom temperatures comfortable.

Ergonomics

When compared to hard-surface flooring, working on a carpeted surface “reduces leg fatigue caused by constant walking, lecturing, pacing, and moving from student to student,” writes Lang. “It also provides a ‘soft spot’ for young students to expand their learning space.”

Lower Maintenance Costs

Carpeting is usually less expensive to maintain than hard-surface flooring. In most settings, vacuuming floor areas is 40 percent less labor intensive than sweeping and damp mopping a hard-surface floor. Carpeting can also look better longer between cleanings because it traps dirt within its fibers until vacuumed, whereas VCT flooring must be swept and mopped often to look clean.

Improved Health

Because carpeting can trap airborne allergens and microscopic particles that can pose potential health threats until they can be vacuumed or cleaned, it prevents these particulates from becoming airborne or spread throughout the school by entering heating, ventilation, and air-conditioning (HVAC) systems. This helps improve IAQ.

Carpets and IAQ

Virtually all man-made products used in the construction of any school or facility can impact IAQ because of the gaseous by-products they emit. This "off-gassing" occurs from building materials such as paints and adhesives, furnishings like furniture, wall coverings, and textiles, as well as the chemicals used to make these products. According to Lang, most of these products have emission levels up to 10 times higher than carpet,

In 1993, the Carpet and Rug Institute (CRI), the leading trade organization for the carpet industry, mandated that its members take steps to reduce emissions from carpeting. CRI began testing samples

of member manufacturer's carpet four times each year, using a testing chamber that simulates a real-life situation. These tests look for TVOC's—the total of all volatile organic compounds—found in the carpet samples.

According to CRI, off-gassing levels have dropped dramatically since testing began 10 years ago, and in some cases are no longer detectable.

The Importance of Cleaning

Carpet cleaning is often a seasonal task. Most schools are simply “maintained” during the course of the school year and it is not until summer and spring breaks that the “real” cleaning begins. This is also when school carpets are usually cleaned and, because carpet cleaning only occurs once or twice per year, it is vital that it is done right.

Most experts agree that to truly deep-clean a carpet, the best method is hot water extraction. This is the only procedure that can really remove embedded dirt, dust, and particulates hidden within the carpet fibers. Most experts also agree that for the best results—and to improve IAQ—the extractors should:

- Produce 200-500 PSI (pounds per square inch at point of contact)
- Heat the solution/water needed to clean carpets to a temperature of at least 200 Fahrenheit at the wand tip.

Because a truck-mount carpet cleaning system is not often practical for a school—or many other types of facilities—cleaning professionals



should look for portable extractors with the highest psi possible. This assures that the chemical solution used to clean carpets not only deep-penetrates the carpet fibers, dissolving dust and debris, but is also removed from the carpet. Additionally, a machine with high psi can powerfully remove moisture from the carpet, improving drying time and decreasing the possibility of mold or mildew developing, which can seriously harm IAQ.

When carpet cleaning, as with most all forms of cleaning, higher solution temperatures help break down oily residues, which are usually harder to remove from fibers than dry soils. Furthermore, most detergents are formulated to have higher efficacy (work better) at higher temperatures, which improves cleaning as well.

Unfortunately, not all carpet extractors heat the cleaning solution adequately enough to help the cleaning process. This is why cleaning professionals should evaluate machines based on the heat produced *at the wand tip*, since this is where the actual cleaning action will take place.

Carpeting as a Solution

Carpeting is one of the best ways to improve IAQ and the health of children in a school setting. But because children are closer to floor level, where many airborne particulates are located, and because their respiratory systems work much faster than adults, the care and cleaning of carpeting is very important.

To better ensure the health of students, facility service providers and school officials should establish and adhere to strict carpet cleaning standards that specify frequency schedules for carpets to be cleaned, when the work will be performed, and the types of machines to be used. Along with adequate employee training and supervision, these steps are likely to help make our schools look their best and become the healthy places to work and learn that we want for our children.

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* Graph Published 1991