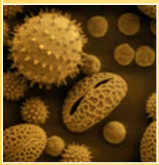
BIG BUILDINGS,

microscopic problems.



The role vacuuming plays in indoor air quality.

INDOOR AIR QUALITY EDUCATION

AMERICAN LUNG ASSOCIATION. HEALTH PARTNER

ProTeam

How does vacuuming relate to good indoor air quality?

Take a moment, on some sunny day at work or school, and look at the tiny particles hovering in a sunbeam at a window. Then consider the bacteria, viruses and mold spores you can't see. Could you be doing a better job of removing these pollutants from the air?

Hundreds of kinds of dirt and allergens, large and very, very small, are constantly churned throughout high-traffic buildings like offices, healthcare facilities and university classrooms. Both short and long term health can be at risk, especially since Indoor Air Quality is difficult to evaluate and to develop cleanliness standards for.

ProTeam is pleased to offer this guide on the important role vacuuming plays in air quality. When armed with the facts, a good plan and the right vacuum you will see real results — because better dirt capture is good for the indoor environment.

FACTS:

When conducting a building walkthrough inspection, indicators of IAQ problems include odors, unsanitary conditions, moisture in inappropriate locations, uneven temperatures, overcrowding and personal fans.[1]

Number of visits to office-based physicians for asthma-related ailments: 14.2 million.[2]

[1. Building Air Quality Action Plan, June 1998 – EPA/NIOSH]
[2. National Ambulatory Medical Care Survey: 2010 Summary, Table 13]

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FACT: 44% of space is carpeted in new college facilities projects completed in 2008.

[American School & University's 35th Annual Official Education Construction Report, May 2009.]

Vacuuming for a Cleaner Campus

You could write a thesis on the Indoor Air Quality (IAQ) challenges that university campuses face; buildings span many eras and tend to have multiple uses. Arming facilities staff with a comprehensive vacuuming program and the right tools could mean the difference between an A and a B on your next IAQ test.

Knowing Common Campus Ailment Triggers

Dorms, classrooms and auditoriums see hordes of people every day. Hundreds of common triggers such as chalk dust, pollen, mold spores and bacteria are common campus health threats. Even pet dander on the clothing of off-campus residents is a significant indoor irritant. And the constant flow of students paired with aging HVAC systems churn pollutants into the air.

Recognizing the Symptoms

College coursework is challenging enough. Classrooms and dormitories with poor IAQ may be responsible for higher absentee rates due to problems such as headaches, wheezing, runny nose, dizziness and fatigue, having an adverse effect on learning and concentration.

Change How You Vacuum

The proper vacuuming regimen using the right vacuum can make a significant impact on campus health and cleanliness:

- Versatile backpack vacuums are proven to clean twice as much area as an upright vacuum[1] — with easy to reach attachments they are best suited for cleaning under desks, upholstered chairs and dusty bookshelves
- A cleaning program calls for daily vacuuming of high traffic areas such as hallways, auditoriums and classrooms — vacuums that operate at sound levels under 70 dBA are suitable for day cleaning
- Quality, ergonomic CRI-certified vacuums with highly efficient filtration play an integral role in the green campus movement

Why is it hard to identify poor Indoor Air Quality?

Indoor Air Quality is a difficult subject to test. Large, high-traffic buildings have a lot of variables at play:

- Large numbers of people bring dirt and pollutants into buildings
- Outdoor pollution levels fluctuate due to weather inversions, construction dust and idling vehicles near doorways
- Indoor pollutants affect each person differently — it may be a combination of irritants or a very minute amount of a specific one that triggers an allergic reaction

[1. "Biomechanical Assessment of an Upright Vacuum Cleaner and Backpack Vacuum Cleaner", Nancy L. Denniston, M.S., Sheldon R. Simon, M.D., Kirby Clark, B.S., Department of Surgery, Division of Orthopaedics, Ohio State University, and Battelle Memorial Institute, Columbus, OH. Reviewed by Jim Fullmer, Certified Human Factors Professional. (Completed 2009)]

Cleanliness in Healthcare

Hospitals and senior living facilities must take cleanliness seriously. A HEPA vacuum can play an important role in improving cleanliness.

- 20% of all U.S. nursing homes were deemed deficient in the Housekeeping category[1].

How Clean is HEPA?

HEPA vacuum cleaners filter 99.97% of indoor pollutants 0.3 micron or more — this capture rate includes fungal spores, pollen, yeast and bacteria.

Healthy Cleaning Improves Ratings

5 Star Rating

A healthy, quiet, clean environment helps earn a facility the optimum 5 star health inspection rating on Nursing Home Compare.

☆ ☆ ☆ ☆ ☆

HCAHPS

10% of the questions on the HCAHPS patient survey relate directly to cleanliness and environmental noise[2].

Make Vacuuming Accountable

- Establish a cleaning program and train employees on proper vacuum use — ensure tasks are completed with work logs
- Frequent cleaning and proper replacement of vacuum cleaner filters is essential for maintaining vacuum cleaner effectiveness and saves money on repairs

Poor Indoor Air Quality is Hard to Remedy

It's not easy to clean the air in high square footage buildings. It takes planning and commitment to fix problems such as:

- Poorly coordinated cleaning programs and small facilities management budgets
- Dirty ventilation systems that spread airborne particles from one area to others
- Damp conditions encouraging growth of biological pollutants like mold and fungi
- Using inefficient vacuum cleaners with poor dust capture and filtration
- Inadequate vacuum cleaner filter maintenance practices

FACT:

Finnish researchers tested dust vacuumed from floors and tables in offices in nursing homes. They catalogued an estimated 500 bacterial species in the samples, including Staphylococcus and Streptococcus.*

[* Diversity and seasonal dynamics of bacterial community in indoor environment – Finland Environmental Health Department, National Public Health Institute, 2008] [1. State Inspections 2010, statehealthfacts.org] [2. Hospital Consumer Assessment of Healthcare Provider and Systems (HCAHPS) survey, questions #8 & #9 of 20 questions dealing directly with the in-hospital experience.]

OFFICE ENVIRONMENTS

Raise Your Business Indoor Air Quality With the Right Vacuum

As the concept of green building becomes more defined, business owners are beginning to see the value of clean air. An investment in a quality vacuum can result in LEED-EB points. Sure it's good PR, but it can also reduce sick days, raise morale and productivity and improve the chances of hiring staff.

How an Office Gets Sick

According to the EPA*, the main reasons for poor indoor air quality in office buildings are:

- Not removing pollutants such as asbestos, tobacco smoke, and mold
- Inadequate design, maintenance or operation of ventilation systems
- Unanticipated uses or poorly planned renovation of the office space that does not conform to the original building designs

Cleaning Tip

Look for claims that give some substance to [an environmentally-safe product] claim — the additional information that explains why the product is environmentally friendly or has earned a special seal.[1]

Watching the Bottom Line

Businesses that use quality vacuum cleaners benefit from numerous cost savings from their facilities maintenance budget.

- Backpack vacuums clean more area in less time, reducing the need for large cleaning staff
- Can pay higher wages, which translates to lower employee turnover rates
- Consider a vacuum cleaner with a generous warranty on parts, labor and repairs — better machines mean fewer costly repair bills
- Vacuum should meet LEED-EB guidelines on proper powered cleaning equipment; must be CRI Green Label certified, be ergonomically designed and operate at 70dBA or less

FACT:

In 1999, the ISSA (International Sanitary Supply Association) published time/labor data showing backpack vacuums to be more than twice as fast as typical upright vacuums:

14 Two Motor Upright - 3,240 ft/hr • 14 Tool & Backpack - 7,407 ft/hr[2]

[* Do You Suspect Your Office Has an Indoor Air Problem? – EPA Indoor Air Basic Information Guide, 2008]
[1. Shopping "Green", October 2012 – Federal Trade Commission]
[2. ISSA 540 Cleaning Times (www.issa.com). Used with permission.]

What to Look for in a Quality Vacuum Cleaner:
Using the right vacuum is a positive step towards removing contaminants from more than just floors. Look for these features when considering a new machine:

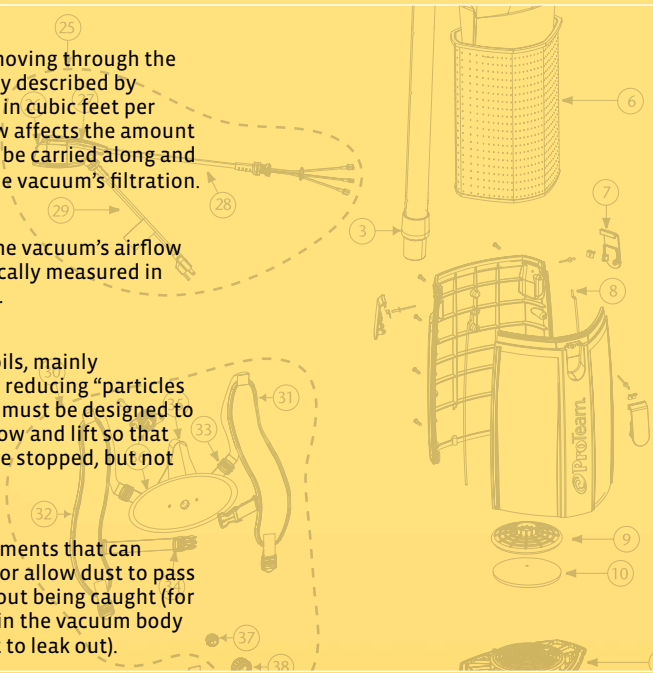
- A powerful motor with enough air flow and static lift to unseat dirt from carpeting and upholstery
- Multiple levels of filtration for high capture rates of tiny particles to prevent dirt from leaving the vacuum
- Ergonomic designs are comfortable for the operators – backpack vacuums have been proven to work faster than uprights and cut down on repetitive motion injuries and muscle strains*
- Freedom of Movement: articulating FlexFit™ harness is responsive to the motion of the user's shoulders, back and hips – increasing comfort and reducing fatigue

1. **Airflow:**
Volume of air moving through the vacuum (usually described by manufacturers in cubic feet per minute). Airflow affects the amount of soil that can be carried along and contained in the vacuum's filtration.

2. **Lift:**
The ability of the vacuum's airflow to lift dirt (typically measured in "inches of lift").

3. **Filtration:**
Capturing of soils, mainly responsible for reducing "particles out." Filtration must be designed to work with airflow and lift so that the particles are stopped, but not the airflow.

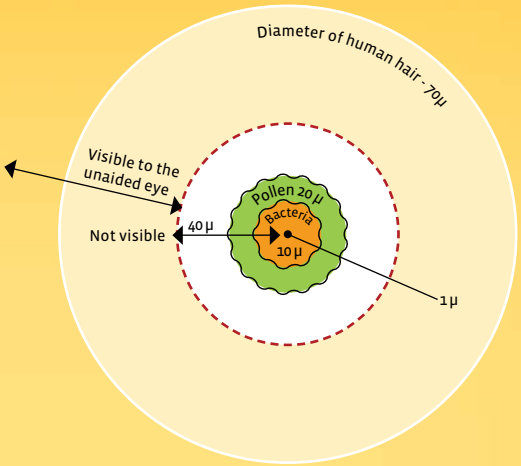
4. **Design:**
Mechanical elements that can reduce airflow or allow dust to pass by a filter without being caught (for example, gaps in the vacuum body that allow dust to leak out).



TIP:

To achieve clean vacuuming, a vacuum needs excellent filtration with a properly sized and sealed filter system that uses the appropriate filter media.

[* "Biomechanical Assessment of an Upright Vacuum Cleaner and Backpack Vacuum Cleaner", Nancy L. Denniston, M.S., Sheldon R. Simon, M.D., Kirby Clark, B.S., Department of Surgery, Division of Orthopaedics, Ohio State University, and Battelle Memorial Institute, Columbus, OH. Reviewed by Jim Fullmer, Certified Human Factors Professional. (Completed 2009)] [1. JW Vaughan, JA Woodfolk, TA Platts-mills. "Assessment of vacuum cleaners and vacuum cleaner bags recommended for allergic subjects". Journal of Allergy and Clinical Immunology. November 1999. 104(5):914-16.] [2. Ibid.] [3. Popplewell EJ, Innes VA, et al. Pediatr Allergy Immunol. 2000 Aug;11(3):142-8.]



[The relative size of airborne particles.]

Filtration systems involve bags and filters, and commercial vacuum manufacturers typically describe efficiency in percentage of particles removed. Testing and reporting, however, are not standardized, so manufacturers' claims can be tough to compare. Some elements to keep in mind:

Microns:
This measurement of particles (1 micron = 1 millionth of a meter) is often used in promoting particle removal. To put things in perspective, your hair is about 70 microns in diameter and, without magnification, you can only see particles that are about 10 microns or larger.

Bags:
The amount of dust that can escape varies greatly, even among micro filter bags, but some micro filter bags capture nearly 2400 percent more dust than single-ply bags. Micro filter bags have greater media density that allows them to capture far more fine dust.[1]

Filters:
Layered micro filters have been shown to greatly increase vacuum efficiency.[2] "Electrostatic" micro filters use positively- and negatively-charged fibers that capture charged particles in the air passing through the filter. High efficiency particle air (HEPA) filter media have also been shown to be effective at removing allergens and particles indoors.[3]

ProTeam has partnered with the American Lung Association® in a campaign designed to promote awareness and education about Indoor Air Quality issues.

This educational partnership recognizes the American Lung Association's mission of preventing lung disease and promoting lung health as well as ProTeam's goal of developing innovative cleaning technologies to address Indoor Air Quality concerns.

For more information on how to improve Indoor Air Quality in your facilities through vacuuming, visit www.pro-team.com to download this brochure and related articles and case studies.

For more information on the American Lung Association, visit www.lung.org or call 800-LUNG-USA.

For more information about ProTeam's complete line of commercial vacuums, call 866-888-2168 or visit www.pro-team.com.

ProTeam
Cleaning for Health® Since 1987

ProTeam makes a contribution to the American Lung Association to participate in this educational opportunity.

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