The information presented in this report is designed to enable better understanding of the effects of sustainable cleaning and proper vacuuming of your facility.

Learn About:
- Indoor Air Quality
- Productivity
- Labor Savings
- Ergonomics
ProTeam is a proud partner of the American Lung Association. Together, we fight for clean indoor air so that we all can breathe easier. We spend the majority of our time indoors, so breathing healthy air where we live, work and play is critical.

ProTeam is committed to developing innovative cleaning technologies to address indoor air quality concerns and supporting the American Lung Association in their strategic imperative to improve the air we breathe.

For more information on indoor air quality, call 1-800-LUNG-USA or visit Lung.org.

**CLEANING OR POLLUTING?**

By Ben Walker
Project & Business Development, ManageMen, Inc.

The cleaning industry is on the cusp of progressive transformation. Education of cleaning professionals, from the executive-level down to the front-line cleaning worker, with cleaning for health as a focal point, will play a major role in that transformation. Cleaning for health is a philosophical approach that ensures that cleaning operations are properly gathering unwanted materials (dust, allergens, fungal spores, pathogens, etc.) and either disposing of them or putting them in their proper place.

“When our indoor environments are properly cleaned for health, they not only remove harmful materials, they also create a state of social, physical and mental well-being.”
When it comes to health and cleaning.

Cleaning for appearance removes “big” visible soil rather than cleaning for health that removes “small” invisible bacteria, dust and airborne particulates and other micro, bio- and chemical contaminants – largely the contributors to unhealthy indoor environments.

Workers thinking big need to **think small** when it comes to health and cleaning.

Cleaning for appearance removes “big” visible soil rather than cleaning for health that removes “small” invisible bacteria, dust and airborne particulates and other micro, bio- and chemical contaminants – largely the contributors to unhealthy indoor environments.

**ProTeam vacuums capture soil and safely contain harmful particles, as well as prevent them from being reintroduced back into the environment. The improved air quality is the result of ProTeam vacuums’ unique Four Level® Filtration system. This system captures tiny dust mites, bacteria, and other particles – which can cause unhealthy air.**
ProTeam is committed to **CLEANING FOR HEALTH**

Historically, the quality of vacuuming has been evaluated by the appearance of the carpet. However, the statistical data of expert studies in this report will demonstrate the importance of proper vacuuming to issues of indoor air quality, particulate removal and containment, and also present new concepts on labor efficiencies.

ProTeam high-quality to manufacturing provides high-filtration vacuums that triumph over the challenges of Cleaning for Health.
FACTS
to know about indoor air quality

**Carpets**

Daily vacuuming is more important than interim deep-cleaning methods.

Dry soil is abrasive; when ground into your carpet, it cuts into carpet fibers—dulling appearance and reducing the longevity.

1. Carpets cover 70% of the floors in the United States.
2. Carpet can hold more than its weight in soil.
3. 70–80% of dust, dirt and grime is tracked into a building from outside.
4. 30% of dirt is deposited in the first 3 feet, while 90% is tracked off in the first 25 feet.
5. Carpet soil generally consists of 85–95% dry soil and 5–15% oily soil.
6. Carpet has a high surface area and is known to act as an organic dust sink containing bio-contaminants and allergens.

**Hard Floors**

When using the correct tools, ProTeam backpack vacuums clean 52% faster than a dust mop in crowded classrooms and congested areas.

1. Using traditional dust mopping methods requires extensive time to train employees.
2. Vacuuming is a faster, healthier and more efficient way to clean hard floors.
3. Dust and dirt are immediately contained within the Four Level Filtration in ProTeam vacuums.
4. Dust mopping continually redistributes dirt and fine particulate on and into the floor, leaving scratches and dulling a high-gloss finish.
5. Dust bunnies reappear in 24 hours when a floor has been dust mopped as compared to 72 hours when cleaned with a ProTeam backpack vacuum.

Sources— Carpet and Rug Institute, Dalton GA; ISSA: International Sanitary Supply Association; IIREC: Institute of Inspection Cleaning and Restoration; Dust Mopping Floors for Health and Efficiency Test, Colorado State University, 1998
Environmental factors in schools can cause serious health problems for children.

The average American spends approximately 90 percent of his or her time indoors. Studies of human exposure to air pollutants by the EPA indicate that indoor levels of pollutants may be 2 to 5 times – and occasionally more than 100 times – higher than outdoor pollutant levels.

Children are more susceptible to air pollution because they breathe a greater volume of air relative to their body weight. To make matters worse, schools tend to be at a higher risk of poor indoor air quality because they can have 4 times the occupants as a regular office building for the same amount of floor space and generally less maintenance, making air quality in schools an area of a particular concern.

A cleaning for health vacuuming strategy – with an efficiently filtered vacuum cleaner – can help schools reduce asthma triggers by removing (rather than redistributing) the dust in a building.

Programs that promote healthy indoor air quality (IAQ) can:
- Improve Health
- Increase Students’ Ability to Learn
- Improve Test Scores
- Improve Adult Productivity in the School System

Maintaining healthy physical conditions and good environmental quality in schools can yield a high rate of return on academic outcomes.

Sources—
https://www.epa.gov/iaq-schools/why-indoor-air-quality-important-schools
https://www.epa.gov/indoor-air-quality-iaq/schools-and-indoor-air-quality
Housekeeping is probably the most common means of removing potential allergens, and vacuum cleaners are the most commonly used tool. Vacuum cleaning removes some fungus and spores from carpeting, but it also reintroduces them to the air, either through the action of the vacuum’s beater bar or through conventional bags.

Vacuuming without proper filtration is one of the main causes of the reintroduction of allergens and harmful particles into the air.

FILTRATION:
- Noun
  1. the process of filtering
  2. the act or process of removing something unwanted from a liquid, gas, etc., by using a filter

People can inhale particles 10 microns and smaller.

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Vacuum cleaning removes some fungus and spores from carpeting, but it also reintroduces them to the air, either through the action of the vacuum’s beater bar or through conventional bags.

Vacuums with high filtration collection systems retrieve soil and safely contain harmful particles, preventing them from being reintroduced into the built environment.

This chart illustrates the relative size of different common particulate.

ProTeam backpacks with ProLevel™ Filtration are up to 99.9% effective at capturing and containing particles measuring .5µ or larger.

ProLevel Filtration is a multi-layer filtration system, including a HEPA media filter, that is tested within the vacuum by an independent lab pursuant ASTM 3150.

technical definitions:

**HEPA**
A HEPA (High Efficient Particulate Air) filter is a throwaway, extended-medium, dry type filter in a rigid frame having a minimum particle collection efficiency of 99.97% (that is, a maximum particle penetration of 0.03%) for 0.3-µ particles.

**ULPA**
An ULPA (Ultra-Low Penetration Air) filter is a throwaway, extended-medium, dry type filter in a rigid frame, having a minimum particle collection efficiency of 99.999% (that is a maximum particle penetration of 0.001%) for particles in the size range of 0.1 to 0.2 µ.∑

Source— Robert A. Woellner, President, Senior Scientist. Quality Environmental Services & Technologies Inc.; http://www.engineeringtoolbox.com/particle-sizes-d_934.html
Backpack Vacuum Cleaning Effectiveness

In soil removal tests conducted at Turi Surface Solutions Laboratory:
A ProTeam Backpack vacuum removed more than 98% of the soil – a 10% increase with vacuuming compared to sweeping.

Source—Toxics Use Reduction Institute (TURI), University of Massachusetts Lowell, November 2012.

VACUUM CLEANER EFFICIENCY

In 5 passes, the ProTeam backpack vacuum is:
43% more efficient than a commercial upright vacuum and
30% more efficient than a canister in removing soil. **

Measurement in grams

<table>
<thead>
<tr>
<th></th>
<th>ProTeam Backpack</th>
<th>Canister</th>
<th>Upright</th>
</tr>
</thead>
</table>
| **Soil removed does not include carpet fiber**
| 4.0 grams        | 2.8 grams        | 2.3 grams|

Sources—Quality Environmental Services & Technologies, 1996; APC Filtration, Inc., 1996; An Evaluation of ProTeam’s QuarterVac and CoachVac in a School Environment, Dr. Eric Brown, Cleaning Research International, UK, 1994
The results of two studies by the Department of Surgery, Division of Orthopedics, at Ohio State University and the Battelle Memorial Institute, determined that ProTeam backpack vacuum cleaner’s ease-of-use and ergonomic design allowed workers to vacuum more than twice the area in half the time with less fatigue and body strain (a figure backed by the ISSA official timetables for cleaning).

**Ergonomic Motion**
With a backpack – vacuum side-to-side, not front-to-back

- Backpack vacuums are lightweight. When worn properly, the effect of the backpack on body joints and posture is negligible and similar to walking.
- When working near stairs, using a backpack improves mobility and is recommended to reduce the risk of falling.
- Backpack vacuum users use a more neutral posture compared to extreme arm and leg extensions seen when using an upright.
- Backpack vacuum users experience less body stress due to the use of larger muscle groups by minimizing “hunching over” often associated with upright and canister vacuums.
- Efficiency is increased by allowing more carpet to be cleaned in a shorter amount of time due to the natural walking motion used.

**Arms Getting Tired?**
The arms are the main muscles used when vacuuming front-to-back.

**Side-to-Side Vacuuming**
uses leg and back muscles that do not fatigue as easily as the arms.

“Side-to-side vacuuming, along with a typical work-rest schedule, is one of the best ways to vacuum large areas on a regular basis.”

Jim Fullmer, Certified Human Factors Professional

Source— Battelle Memorial Institute, Ohio State University, Columbus, Ohio, 1998. Reviewed by Jim Fullmer, Certified Human Factors Professional, 2009.
STAY COOLER
open weave avoids collecting (or trapping) heat during operation

LESS FATIGUE
vacuum feels lighter and more comfortable

WEIGHT DISTRIBUTION
innovative design distributes weight evenly for lighter feel

FREEDOM OF MOVEMENT
articulating flexibility is responsive to the motion of the user’s shoulders, back and hips—increasing comfort and reducing fatigue

IMPROVED BALANCE
pivoting ball joint distributes the weight to the natural center of gravity

20% less pressure is felt on the body with the FlexFit articulating harness vs. a standard harness.

Source—Auburn University, 2013. FlexiForce Sensor
Team Cleaning® is a flexible, efficient and cost-effective cleaning system for custodial operations. Team Cleaning applies the power of systems to reduce costs and maximize productivity.

It offers solutions to the many challenges that managers face—through better deployment of labor, effective cleaning methods, simplified training resulting in heathier environments.

Team Cleaning Tasks Are Grouped Into 4 Distinct Functions

ProTeam Education Products and Services offered:

- **Light-Duty Specialist™**
  Dusting, emptying trash, spot cleaning, etc.

- **Vacuum Specialist™**
  Vacuuming carpets and hard floors

- **Restroom Specialist™**
  Cleaning, sanitizing and restocking restrooms

- **Utility Specialist™**
  Cleaning lobbies, spot cleaning, glass, mopping and scrubbing floors, etc.

Team Cleaning results in increased productivity, less equipment, clear-cut responsibilities and easier supervision.

Team Cleaning allows flexible staffing configurations depending on the size and type of facility. The assigned tasks to each Specialist remains constant. The exception is smaller facilities where the workers may switch from one Specialist’s duties to another. All workflow is driven based on Specialist’s Job Cards.
In a five-day program the key to efficient, balanced workflow is to divide the cleanable square feet assigned to the Light Duty and Vac Specialists into four equal quadrants to manage cleaning frequencies: daily (routine), weekly (detail) and monthly (periodical).

The Light Duty and Vac Specialist Job Cards clearly show the starting point, a path to follow, assigned tasks and allotted time to perform. The detail is performed Monday through Thursday on a rotation basis to complete weekly requirements.

Monthly periodical frequencies are rotated over four Fridays utilizing the same designated quadrants; in this manner, the schedule has been fully met.

**Vac Specialist as an Example:**
- **Routine:** traffic areas – Monday–Friday
- **Detail:** square all corners – weekly by quadrant Monday–Thursday
- **Monthly periodical:** clean vents, etc.… using four Friday quadrants

“Thirty years ago when the ProTeam Backpack Vacuum System was created it represented at the time, a technological breakthrough. In retrospect, we now know it was disruptive technology as compared to other offerings to the cleaning industry. It was initially an experiment that within time was recognized as superior to the age old upright vacuum from the perspective of productivity, filtration, ease of use and a much lower fatigue factor. These enabled operators to extend vacuuming through a full shift and opened the door to a more efficient workflow system attaining a new level of high performance cleaning utilizing specialists working with team interaction – Team Cleaning. This disruptive innovation is now recognized by most leading industry experts as the best practice for addressing today’s marketplace challenges.”

*Jim Harris, Sr. Founder and President, Concepts4*
The comparison chart below shows how many hours need to be allocated to vacuuming using different vacuum types in the square feet required to be cleaned.

### TIME SPENT VACUUMING

<table>
<thead>
<tr>
<th>VACUUM TYPE</th>
<th>2,500 Sq. Ft.</th>
<th>5,000 Sq. Ft.</th>
<th>10,000 Sq. Ft.</th>
<th>25,000 Sq. Ft.</th>
<th>100,000 Sq. Ft.</th>
<th>500,000 Sq. Ft.</th>
<th>1,000,000 Sq. Ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Motor Upright</td>
<td>52.5 Min</td>
<td>1.75 Hrs</td>
<td>3.5 Hrs</td>
<td>8.75 Hrs</td>
<td>35 Hrs</td>
<td>175 Hrs</td>
<td>350 Hrs</td>
</tr>
<tr>
<td>ProTeam Dual Motor Upright</td>
<td>46 Min</td>
<td>1.5 Hrs</td>
<td>3 Hrs</td>
<td>7.7 Hrs</td>
<td>30 Hrs</td>
<td>154 Hrs</td>
<td>308 Hrs</td>
</tr>
<tr>
<td>Tank Canister</td>
<td>1 Hr</td>
<td>2 Hrs</td>
<td>4 Hrs</td>
<td>10 Hrs</td>
<td>40 Hrs</td>
<td>200 Hrs</td>
<td>400 Hrs</td>
</tr>
<tr>
<td>ProTeam Speed Canister</td>
<td>22 Min</td>
<td>44 Min</td>
<td>1.5 Hrs</td>
<td>3.7 Hrs</td>
<td>15 Hrs</td>
<td>73 Hrs</td>
<td>147 Hrs</td>
</tr>
<tr>
<td>ProTeam Backpack</td>
<td>20.3 Min</td>
<td>40.5 Min</td>
<td>1.4 Hrs</td>
<td>3.4 Hrs</td>
<td>13.5 Hrs</td>
<td>67.5 Hrs</td>
<td>135 Hrs</td>
</tr>
<tr>
<td>ProTeam Backpack*</td>
<td>15 Min</td>
<td>30 Min</td>
<td>1 Hr</td>
<td>2.5 Hrs</td>
<td>10 Hrs</td>
<td>50 Hrs</td>
<td>100 Hrs</td>
</tr>
<tr>
<td>ProTeam Battery Backpack*</td>
<td>10.5 Min</td>
<td>21 Min</td>
<td>42 Min</td>
<td>1.75 Hrs</td>
<td>7 Hrs</td>
<td>35 Hrs</td>
<td>70 Hrs</td>
</tr>
</tbody>
</table>

*used in a Team Cleaning System

Cordless Backpack vacuums are 5X more productive than corded uprights.

Sources—ISSA 612 Cleaning Times (www.issa.com). Used with permission.
CASE STUDY #1

ABC Services

Labor Rate: $13.00/hour
Vacuuming Area: 100,000 sq. ft.
Annual Work Months: 12
Monthly Work Days: 22

**50% REDUCTION**

• 15 Elevators – 30 seconds each
• 5 Elevator Landings – 2 min.
• 4 Building Entrances – 3 min.
• Cafeteria Common Area – 10 min.
• Skybridge Common Area – 10 min.

Takes only 45.5 minutes to clean using a battery backpack.

### ANALYSIS OF BACKPACK VACUUM SAVINGS

<table>
<thead>
<tr>
<th>VACUUM TYPE</th>
<th>Sq. Ft. Per Hour</th>
<th>Daily Cost</th>
<th>Monthly Cost</th>
<th>Annual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>14” Upright</td>
<td>2,857</td>
<td>$455</td>
<td>$10,011</td>
<td>$120,120</td>
</tr>
<tr>
<td>Pull Behind Canister w/14” Tool</td>
<td>7,059</td>
<td>$184</td>
<td>$4,052</td>
<td>$48,576</td>
</tr>
<tr>
<td>ProTeam Backpack w/14” Tool</td>
<td>7,407</td>
<td>$176</td>
<td>$3,861</td>
<td>$46,464</td>
</tr>
<tr>
<td>ProTeam Backpack w/14” Tool*</td>
<td>10,000</td>
<td>$130</td>
<td>$2,860</td>
<td>$34,320</td>
</tr>
<tr>
<td>ProTeam Battery Backpack w/14” Tool*</td>
<td>13,000</td>
<td>$100</td>
<td>$2,200</td>
<td>$26,400</td>
</tr>
</tbody>
</table>

*used in a Team Cleaning System

Annual Savings using a ProTeam Backpack Vacuum* versus a Pull Behind Canister w/14” Tool: $14,256 or 29%!

Annual Savings using a ProTeam Backpack Vacuum* versus a 14” Upright: $85,800 or 71%!

Source— ISSA 612 Cleaning Times (www.issa.com). Used with permission.

CASE STUDY #2

Marcis & Associates cleans the 2.4 million square ft M.D. Anderson building in Texas

• 15 Elevators – 30 seconds each
• 5 Elevator Landings – 2 min.
• 4 Building Entrances – 3 min.
• Cafeteria Common Area – 10 min.
• Skybridge Common Area – 10 min.

**50% REDUCTION**

Takes only 45.5 minutes to clean using a battery backpack.
Carpet and Rug Institute Approved

ProTeam vacuums have earned Seal of Approval/Green Label from the Carpet and Rug Institute (CRI) signifying the vacuum systems meet higher standards for carpet cleaning effectiveness and indoor air quality. Vacuums must pass three cleaning requirements: soil removal, dust containment and carpet fiber protection.

ProTeam Is a Member

ISSA  AHE  VDTA  NPMA
BSCAI  NWFA  CRI  PRSM
NRA  CIRI  CSSA  RFMA
ARSCI  IHRSA  USGBC  DKi

Partnerships

ProTeam is a proud partner of the American Lung Association. Together, we fight for clean indoor air so that we all can breathe easier. We spend the majority of our time indoors, so breathing healthy air where we live, work and play is critical.

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