

Protect the Environment...
Save the World
Stop Pollution



PV Vacuum Engineering Pte Ltd
(A member of Darco Water Technologies Limited)



Stop Polluting your Environment

There isn't a need to choose or compromise. Housekeeping does not need to be done at the expense of polluting the immediate proximity or its surrounding when it is being done.

Many people is unaware that even the most expensive portable vacuum cleaners that sells for thousands of dollars, pollute when it is doing cleaning.

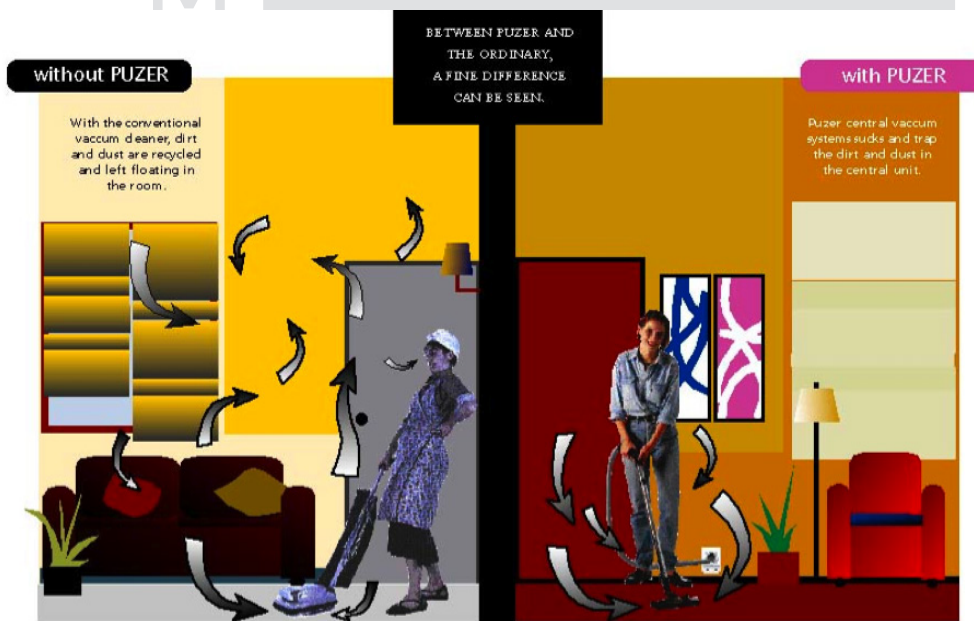
Study done & published many years ago such as May 1994 Article by Environment Protection Agency, have found that typical vacuuming does not reduce / remove fine particle less than 7 microns. This particle is part of the 40% to 60% of fine dust that is exhaust together with Portable Vacuum Cleaner (industrial or domestic)'s exhaust.

In Fact, the article further suggested that Central Housekeeping Vacuum System is the ONLY known method of vacuuming that does not recirculate microscopic particles back into the building environment.

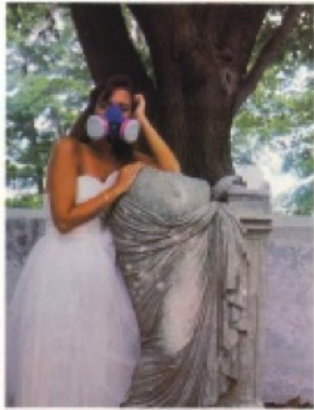
Increase in suspended fine particles (PM 2.5) in the air is bad for health and production yield. Fine particles causes problem for electronic components leading usually to their premature failure. Fine particle is also bad if the production process involves coating or painting to create an outstanding polish nice looking surface.

Research done by the Technical Research Centre of Finland (VTT) financed by the Finnish Work Environment Fund and VTT Building Technology had concluded that an Efficient Central Housekeeping Vacuum System provides significant cost savings over traditional industrial vacuum cleaners in one of the most demanding industry-Construction / Renovation.

Therefore, if a Central Housekeeping Vacuum System can do well for such a working environment, it will does Good for whatever working environment that you need.



Extract from May 1994 Article of Environment Protection Agency (USA)



The Challenge of Maintaining Indoor Air Quality

By John Jefferson Olyburn

Clearing for health isn't for everyone, but for those who expect to be in business in the 21st century—it will be a fundamental upon which you do business.

Accompanied by thousands of dollars of the newest materials and skills and motivated by an intense productivity of the site. The recent spate of corporate air quality efforts has led to a new breed of buildings. Windows, doors, ductwork or rigid air ducts. If you are experiencing one of these related symptoms, it may be worth while to find out the last time the ventilation air conditioning system and filtration was checked for maintenance in the air you breathe. The best time to check is when you are working or sleeping. In buildings with poor air quality, the most common symptoms are: eye irritation, sore throat, cough, and fatigue. These symptoms are often related to the building's ventilation system and filtration. If you are experiencing one of these related symptoms, it may be worth while to find out the last time the ventilation air conditioning system and filtration was checked for maintenance in the air you breathe.

Ever since 1979 and the "Cigarette" Commission that came from it, there has been a new focus on air quality. In today's environment, about 70 percent of the buildings we work in or sleep in contain high pollution levels. This can affect you in a number of ways. The most common are: eye irritation, sore throat, cough, and fatigue. These symptoms are often related to the building's ventilation system and filtration. If you are experiencing one of these related symptoms, it may be worth while to find out the last time the ventilation air conditioning system and filtration was checked for maintenance in the air you breathe.

ASHRAE 62.1-1989 (ASHRAE 62.1-1989) is the standard for minimum acceptable indoor air quality in commercial buildings. It sets a minimum level for the amount of outdoor air that must be provided to each person in a building. This is known as the "outdoor air requirement." The standard also sets a minimum level for the amount of outdoor air that must be provided to each person in a building. This is known as the "outdoor air requirement." The standard also sets a minimum level for the amount of outdoor air that must be provided to each person in a building. This is known as the "outdoor air requirement."

ASHRAE 62.1-1989 is the standard for minimum acceptable indoor air quality in commercial buildings. It sets a minimum level for the amount of outdoor air that must be provided to each person in a building. This is known as the "outdoor air requirement." The standard also sets a minimum level for the amount of outdoor air that must be provided to each person in a building. This is known as the "outdoor air requirement."

These particles build the building environment, while typical vacuuming does not reduce fine particle levels (less than 7 microns) indoors. These particles tend to build-up and have the potential to cause harm to the human lung.

The Building As a Workplace
A building undergoes constant change as it goes through its life cycle. Maintaining indoor air quality is not a one-time effort. The building can be thought of as a living organism. Within this organism the equipment, air conditioning, and filtration systems are in constant flux. Materials and building changes and alterations of the building's structure can affect indoor air quality. For example, a newly painted wall can emit a variety of chemical vapors. These include the solvents, surfactants, and pigments used in the paint. Other examples include new carpeting, new furniture, and new office equipment.

Carpet Care: Key To Good Air Quality
The importance of carpet maintenance is just beginning to be recognized. Carpet care is not just for the sake of appearance, but for those who expect to be in business in the 21st century. It will be a fundamental upon which you do business. Carpet care is a key to reducing and controlling indoor air quality. The challenge for carpet care is to keep the carpet clean and free of dirt and debris. This is done by vacuuming, for example, which removes about 80-90 percent of the dirt that is picked up from the carpet. The dirt that is not removed is recirculated back into the air. This is why it is important to vacuum regularly. The dirt that is not removed is recirculated back into the air. This is why it is important to vacuum regularly.

Biological Contaminants
There is a growing need for scientific research on the occurrence, health effects, environmental conditions, and control of biological contaminants in our indoor environment. All buildings are potentially major sources of biological contaminants. The Environmental Protection Agency already recognizes over 100 organic compounds as air pollutants that generally are not found outdoors, such as benzene, chloroform, carbon monoxide, and carbon dioxide. The EPA has also established that carpeting and floor mats are major indoor air quality pollutants. Carpeting and floor mats are major indoor air quality pollutants. Carpeting and floor mats are major indoor air quality pollutants.

Carpet Care: Key To Good Air Quality
The importance of carpet maintenance is just beginning to be recognized. Carpet care is not just for the sake of appearance, but for those who expect to be in business in the 21st century. It will be a fundamental upon which you do business. Carpet care is a key to reducing and controlling indoor air quality. The challenge for carpet care is to keep the carpet clean and free of dirt and debris. This is done by vacuuming, for example, which removes about 80-90 percent of the dirt that is picked up from the carpet. The dirt that is not removed is recirculated back into the air. This is why it is important to vacuum regularly. The dirt that is not removed is recirculated back into the air. This is why it is important to vacuum regularly.

health problems inside the building environment, while typical vacuuming does not reduce fine particle levels (less than 7 microns) indoors. These particles tend to build-up and have the potential to cause harm to the human lung.

cleaners is how best to empty the carpet of the collected contaminants. Take vacuuming, for example, where filtration systems allow 40 to 60 percent of the fine dust picked up from the carpet to be recirculated back into the air.



Extract from May 1994 Article of Environment Protection Agency (USA)

later, sometimes, and often, gaps or tears that are biodegradable. Then, with the addition of a fresh film, provide an excellent place for mold to grow. As the paint film ages and is subjected to environmental influences such as sunlight, moisture changes begin to grow into for a combination of chemical changes that lead to a combination of different reactions.

As moisture and mold are limited to the paint film, the pH goes up. This simple change alone can severely limit the ability for bacteria to survive but improve the environment for fungi to survive. As the fungi overgrow the existing bacteria, their regular work can now occur when conditions are available. In the case of a wall, the reaction could be from joint. Be it joint to wall based on the joints and joint cement to wood. Otherwise, this same reaction can occur in the opposite order. Fungus in areas of high humidity, such as the Gulf Coast, Pacific Northwest, or river valleys, open levels in new buildings are precontaminated before occupancy or finishing over occurs. This latent spore load contained in the building materials or deposited on the materials during construction may have grown and cause the deterioration, discoloration, and health-related problems associated with fungal growth.

Cases of Contamination

A recent experience relating to this occurred within a residential development in central Florida. Frames were up and plasterboard with joint cement and tape had just been installed, when several cases of illness and contamination was reported. More significant though, was that the temperatures stayed near 87°F. Complete drying did not occur quickly and it was suspected that sufficient fungal spore levels existed. Construction was later completed. One month later, strips of fungal growth and staining



deposits, the carpet was then treated with carpet protector. Employees complained on the "new" carpet and the carpet did not stand up during the carpet trade.

Two other important areas of contamination reduction are central vacuuming and new dust and floor cloths. Many building owners are installing central-vacuum systems, not for the sake of possible nuisance suits for their buildings. Central vacuum systems are the only known method of vacuuming that does not recirculate microscopic particles back into the building environment, as the filtered exhaust air is ducted out of the building. This is a key to improving indoor air quality in all kinds of settings and is the only known method of vacuuming that does not recirculate microscopic particles back into the building environment, as the filtered exhaust air is ducted out of the building. This is a key to improving indoor air quality in all kinds of settings and is the only known method of vacuuming that does not recirculate microscopic particles back into the building environment, as the filtered exhaust air is ducted out of the building.

New dust and floor cloths allow removal of dust instead of just sweeping it around. These new cloths have an opposite charge of dust and hold the dust until they are washed. They can be washed hundreds of times without losing this ability—and there is no oil treatment to cause smearing or streaking.

These new products and systems can make a major positive impact on the quality of the environment and also save money in the same time by reducing the frequency of cleaning.

Some through vinyl wallpapers. These strips corresponded exactly with the joint cement. Upon discovery, all layers were heavily contaminated including the wood stud wall.

A hotel property in Florida was having problems and shortly discovered Legionnaires was present in the HVAC, cooling tower and outside water fountain. The fountain was used for the recycling and reuse of the cooling tower water. The hotel property had to spend over \$200,000 to totally clean and disinfect the entire operation and had close to 11,000 employees in buildings. All of this could have been prevented by a proper disinfecting program for the cooling tower. If that system is a major responsibility out of the property owner.

Conclusion

Is there a cost effective solution to water bacteria in controlling and eliminating "Sick Building Syndrome"? Yes, but you will probably need an environmental audit to focus on areas where your applications relating to cleaning and disinfecting can be subjected or related to better but not indoor air quality. The results

central vacuuming system, a more sensitive dust reduction program, water room air filtration systems, water filtration to conditioning the incoming the elimination of Legionnaires and TB, copper protection, and water filtration systems, can provide cleaner indoor air. In fact, a direct water treatment and proper air filtration can totally eliminate mold, mildew, bacteria and other particulate-causing problems for rooms and buildings.

Indoor air quality is a movement that will demand much more attention in the future. The EPA is expected to become very aggressive on indoor air quality problems, with legislation enacted that would require facilities to test and prevent indoor air contamination. Be proactive, work to improve health and safety conditions now to avoid litigation later.

INDUSTRIAL WASTE WITH WATER
 JOHN DOE, PROJECT MANAGER
 LEADERSHIP AND PROJECT MANAGER
 JOHN DOE, PROJECT MANAGER
 JOHN DOE, PROJECT MANAGER
 JOHN DOE, PROJECT MANAGER

buildings. Central vacuum systems are the only known method of vacuuming that does not recirculate microscopic particles back into the building environment, as the filtered exhaust air is ducted out of the building. This is a key

MAINTENANCE SUPPLIES May 1994

Extract from Study By Technical Research Centre of Finland (VTT)

VTT Building Technology

The Central Vacuum System on the Renovation Site

The summary is based on a study conducted at the Technical Research Centre of Finland (VTT) by the Construction Management and Production Technology Group. The project was financed by The Finnish Work Environment Fund and VTT Building Technology.

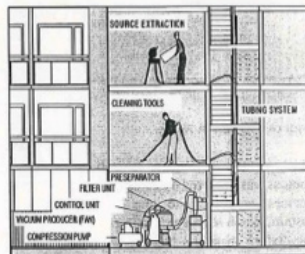
Quick implementation of a renovation project requires an efficient and reliable vacuum system. An efficient central vacuum system provides significant cost savings over traditional industrial vacuum cleaners. In addition to cost savings, the central vacuum system makes the work less strenuous and improves working conditions. According to users, the greatest advantages of the central vacuum system are strong suction and the maintenance free, light and easy to move equipment.

Introduction

The economic benefits of new production techniques and procedures generally need to be proven before they can gain wide acceptance. Improvement of the work environment and ergonomics, for instance, often also boosts labour productivity.

Auxiliary construction work, such as cleaning and materials handling, are key issues in improving site productivity. Exceptionally good results are achieved if work can be made less strenuous and working conditions improved while reducing the amount of auxiliary work and performing it more efficiently.

Reduced dust levels and strenuousness of work as well as higher productivity and quality through a central vacuum system more suited to the construction site were the goals of the study. An additional goal was to determine any possible advantages of the central vacuum system (Fig.) over the traditional industrial vacuum cleaner which would give a boost to its use in apartment block renovation.



Practical development work

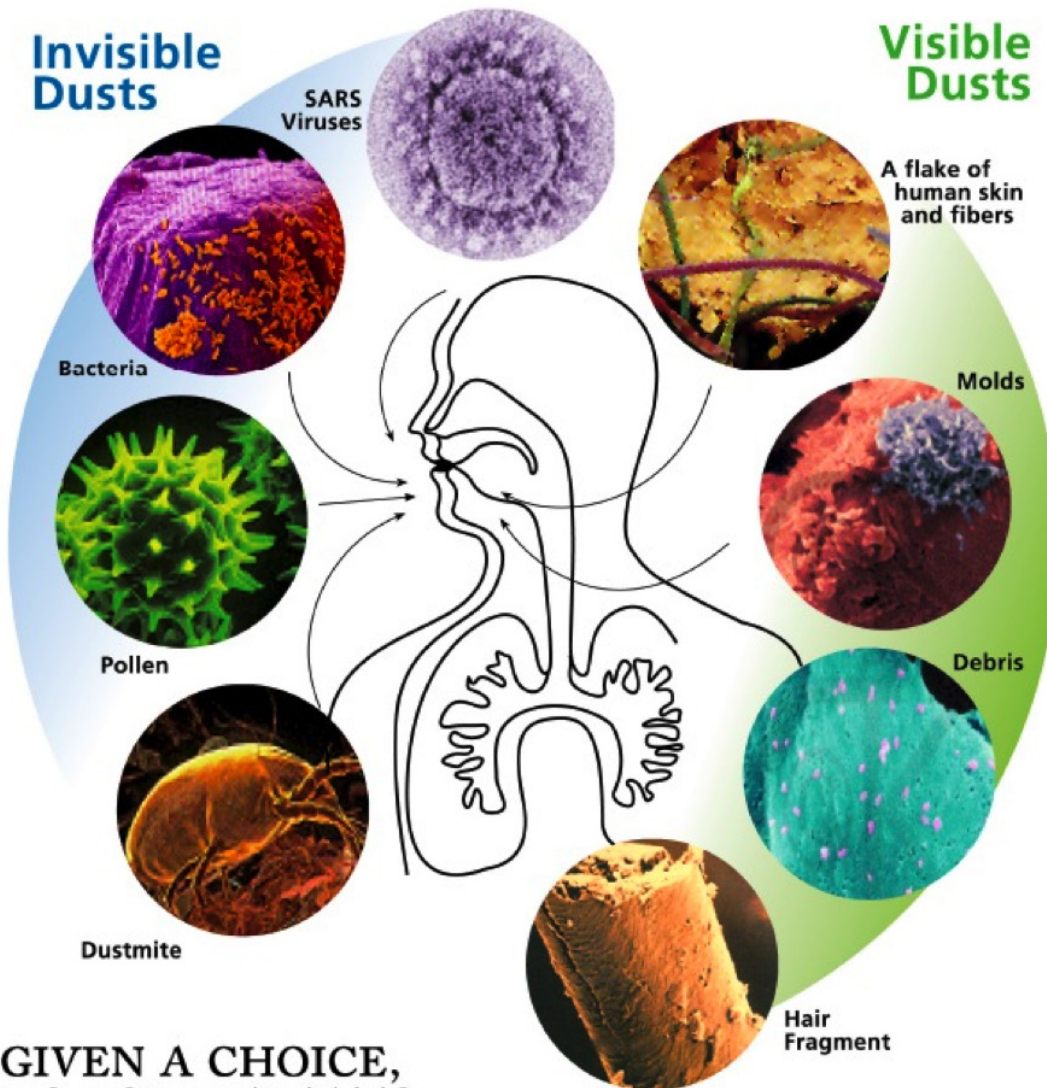
The use of the central vacuum system and the related problems and needed development with respect to various work phases were examined through worker interviews and site monitoring. The research project sought to find practical solutions.



Quick implementation of a renovation project requires an efficient and reliable vacuum system. An efficient central vacuum system provides significant cost savings over traditional industrial vacuum cleaners. In addition to cost savings, the central vacuum system makes the work less strenuous and improves working conditions. According to users, the greatest advantages of the central vacuum system are strong suction and the maintenance free, light and easy to move equipment.

What are these fine particles...

THE TRUE INDOOR AIR AROUND US



GIVEN A CHOICE, DO YOU WANT TO BREATHE DIRTY AIR?

With our naked eye, the air we breathe may not seem as polluted. Put it under a 1000x magnification, we will see tiny creatures floating around in the air which we are highly susceptible to breathe in. Only with Puzer, we are able to keep your breathing path as clear as possible, by clearing those micro-particles in your living space.

Contact us for a solution:

Puzer Asia Pte Ltd,
(A subsidiary of PV Vacuum Engineering Pte Ltd)
21 Marsiling Industrial Estate Road 9
Level 2, Singapore 739175
Telephone 65-6755 6169
Facsimile 65-6755 2801