

Protect the Environment...  
Save the World!  
Vacuum Cleaner Vs CVC



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



# Portable (Domestic / Industrial) Vacuum Cleaner Vs Central Housekeeping Vacuum System

Portable Vacuum Cleaner for domestic or industrial and its consumables are one of the key contributor to our ever increasing disposal. In fact, according to Swiss Federal Laboratories for Material Testing & Research, it form part of the 30% e-waste that clog our landfills.

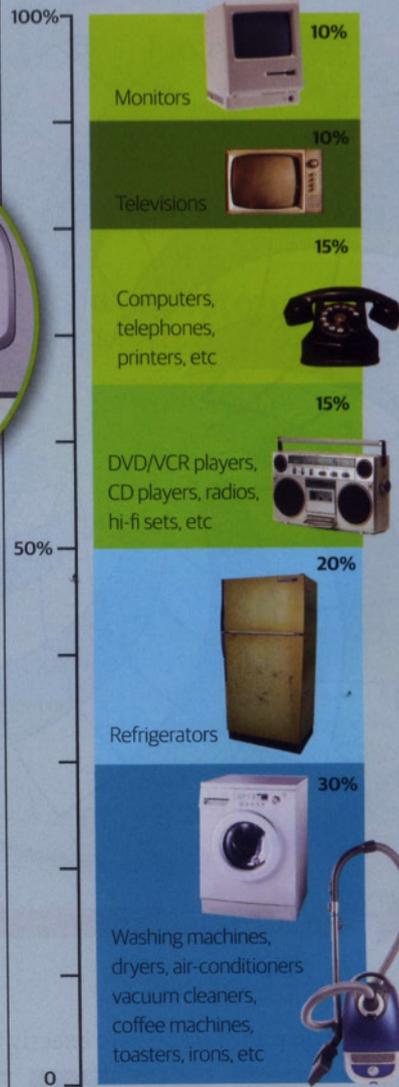
The use of Central Housekeeping Vacuum System will greatly reduce this negative impact that our Daily Housekeeping have on the Environment.

In the below table, we try to better understand why:

S/N	Components	Portable (Domestic / Industrial)	Central House-keeping Vacuum System	Remarks
1	Vacuum Producer average life.	300 to 600 hours.	40000 to 100000 hours Before bearing Change.	Portable Vacuum Cleaner uses motor that uses Carbon Brushes. Hence, it have a limited life span.  <b>Hence, more disposal when the motor fail which resulted in more disposal trash.</b>
2	Dust Emission with Exhaust Air in close proximity of user.	Limited to 0.05 mg/m3 (EN 60-312).  (This means that the exhaust air will contain 40% to 60% of Fine Dust).	Exhaust Air is discharged outside of the Building / Resident.	Such emitted dust add to the load of the air conditioning system, increasing resistance across Air Handling Unit resulting in higher energy consumption and more frequent filter change or cleaning requirement.  <b>Increase in Frequently of filter change, lead to more filter being sent to our landfill.</b>
3	Filter Bag Change.	Every 4 to 6 weeks (Average).	No Requirement.  The Central Container is Empty as and when it is full.	<b>Disposal Filter Bag add to the daily volume of trash going to the landfill.</b>
4	Hepa Filter Change.	Usually after every 6 to 12 filter bags change or 6 monthly.	No Requirement.	Hepa Filter are sometime added to a Portable Vacuum Cleaner to reduce the dust emission in their exhaust.  <b>However, having them, does mean that there will be more trash for disposal adding to the load at our landfill.</b>
5	Cleaning Efficiency.	Varies from 40+ to 97% depending on Type of Floor & condition of filter bag.	Average from 98% to 100% depending on type of floor.	The inability to clean effectively of a portable vacuum cleaner will usually lead to more need to clean.  <b>This create more demand of energy and led to more frequent change of consumables.</b>

### What is e-waste?

Mobile phones and other small consumer electronics are filled with harmful substances that need to be properly re-cycled, but according to the Swiss Federal Laboratories for Materials Testing and Research, it's your washing machine that's clogging the landfill.



Source: Swiss Federal Laboratories for Materials Testing and Research.

A United Nations Environment Programme report last year found that a staggering 70 percent of the world's e-waste is dumped in Asia and Africa. This is despite the Basel Convention on the "Control of Trans-boundary Movements of Hazardous Wastes and their Disposal" which makes it illegal to ship e-waste to another country.

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**6 Final criteria proposal**

**SUMMARY TABLE**

CRITERION	SUB-CRITERION	ACCEPTANCE THRESHOLDS or requirement level	METHOD OF PROOF
DURABILITY and REPARABILITY	Durability of motor	≥ 550 hours	test report according to EN 60-312
	Durability of power nozzles	≥ 1000 drum rotations	test report according to EN 60-312
	Durability of hoses	≥ 40 000 oscillations	test report according to EN 60-312
	Reparability	Spare parts availability during 10 years	Declaration on one's honour Checking by auditor
CLEANING EFFICIENCY and ENERGY CONSUMPTION	Dust removal on wilton carpet	on standardised Wilton carpet: k ≥ 67 % after 5 strokes	test report according to EN 60-312
	Dust removal on hard floor	On hard floor : k ≥ 97% after 1 stroke	test report according to EN 60-312
	Suction head motion resistance	R< 30N	test report according to EN 60-312
RECOVERY and PREVENTION OF ECOTOXICOLOGICAL HAZARDS	End of life Recovery	Plastics marking and easy access to electric and electronic parts	Checking by auditor
	Prevention of ecotoxicological hazards	absence of heavy metals in the plastics electrical and electronic components containing heavy metals able to be easily isolated	Checking by auditor
EMISSION OF REJECTED DUST	Emission of rejected dust	quantity < 0,05 mg/m <sup>3</sup>  a new criterion will be proposed after the end of CSTB study	test report according to EN 60-312  A new method will be proposed after the end of CSTB study
NOISE	Noise	sound level ≤ 77 dBA	test report according to EN 60 704-2-1 and EN 60 704-3
CONSUMER INFORMATION	Consumers information note	Information Note in packaging	Checking by auditor



# Indoor Air Quality

those exposed, it is fatal in approximately 10 to 15 percent of cases. Since cooling towers and water distribution systems are implicated as sources of air-borne spread, this places a burden on designers, engineers, and operators. Proper maintenance of cooling towers and other hot water service systems is essential.

## Fungi

Some fungi cause infectious diseases, while others cause allergies or irritations. Fungi include diverse organisms. Hyphae, or a mass of hyphae called a mycelium, constitutes the vegetated body of the fungus which carries on the activities that allow growth and reproduction. All fungi spores found indoors are derived from outdoor sources. Humidity is a key factor if allowed to rise indoors, as fungi tend to grow on damp surfaces. Some will grow in standing water, such as a humidifier reservoir or HVAC system drain pans. Fungi can produce VOC (volatile organic compounds) that cause the typical moldy odor—these substances can be irritating to the mucous membranes and may cause headaches.

## Biological Contaminants

There is a definite need for accelerating research on the occurrence, health effects, environmental conditions, and control of biological contaminants in our indoor environment. All buildings can potentially cause related illness or reactions from biological contaminants. The Environmental Protection Agency already recognizes over 500 organic compounds adverse to our health that potentially can be found indoors, such as benzene, chloroform, carbon, styrene, PC-4, bacterias, spores, and viruses. The EPA has also concluded that carpeting and fabrics not cleaned and properly maintained have the potential to cause a variety of

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.

Some of the sources of health issues related to atmospheric dust and unhealthy air consisting of particulate matter, 1 to 10 microns, include: lung damaging dust from combustion by-products or building materials, such as asbestos and fiberglass; fungi plant spores, such as mildew and Legionella; bacteria and related spores; skin flakes (slough), dander and hair follicles; insects and insect feces; and paper shreds.

## The Building As Biosphere

A building undergoes constant change as it goes through its life cycle, manifesting microbial contamination in varied but inevitable ways at different stages. The building can be thought of as a biosphere. Within this biosphere the organisms are in constant flux. Nutrient and humidity changes and alteration of life-limiting (toxic) surfaces allow microbes to adjust and often adapt to the ever-changing conditions in their environment.

For example, a freshly painted surface contains a variety of microbial nutrients from the paint. These include the thickeners, surfactants, dispersing agents, coalescing agents, unreacted

## Carpet Care: Key To Good Air Quality

By Allen L. South, SCS Associates

**T**he importance of carpet maintenance is just beginning to be recognized as key to good air quality. Cleaning 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.

Carpet acts as a filter to capture and hold airborne particulates—the biggest contributor to poor indoor air quality. The challenge for suppliers and carpet 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.

Recent tests by several carpet fiber manufacturers show that many of the detergents used in commercial carpet cleaning leave sticky residues. This causes a Catch 22 situation where rapid resoiling leads to more frequent cleaning, adding additional levels of sticky detergent—and shorter and shorter intervals between cleanings. The result is a build up of hard mineral scale and sticky soil—and, more importantly, contaminants which are difficult to remove.

But these problems have led to the development of several new products: non-sticky detergents and a detergent which will remove mineral deposits and strip out detergent residues. Also, specific products and systems have been developed to address the severity of soiling at different levels ranging from regular or moderate to heavy. Commercial carpet protector is also recommended.

In a recent test using these products, a carpet in a very heavy traffic area of a Chicago retail headquarters was being extraction cleaned nightly due to resoiling and general poor appearance—although it was only one year old. Using a three step process to strip out the detergent residue and mineral