

Measuring And Improving The AIR

Lowering threats and preserving human health.

By: Bob Croft

Professional cleaners clean buildings, first and foremost, to keep occupants safe and healthy.

Besides controlling pathogens, which is probably the most significant health benefit cleaners can provide, improving indoor air quality (IAQ) also ranks high on the list of services to protect health.

Lungs are most easily damaged by particles between ½ micron and 10 microns in diameter — most allergens are within this size range.

Standard paper vacuum cleaner bags typically filter out particles only down to about the 10 micron size — dumpable cloth bags do much worse; thus, vacuuming with a standard machine serves only to pull lung-damaging particles out of the carpet and pump them into the air.

Similarly, feather dusting and dust mopping serve mostly to move the dust around.

Additionally, standard string wet mops often leave more fine particles on the floor than they remove.

Simple equipment and procedure changes can remove fine particles from the building and from its air.

IAQ results can be measured — simply and inexpensively — and results can be shared with clients, occupants and tenants or used by the supervisor to monitor the cleaning crew.

The few published studies of cleaning and its impact on IAQ generally involve a single, large facility with a multi-person cleaning crew, on-site supervisor and a dedicated set of equipment.

However, a typical cleaning service concentrates on “route work” — cleaning buildings between 1,500 and 20,000 square feet from one to five nights per

week by a one- or two-person team that travels from location to location.

These organizations do not have quite the tight control one might have in a single, large crew building.

Measuring Indoor Air Quality

My organization measures IAQ with a handheld particle counter that was purchased for about \$3,400 several years ago.

It requires an annual factory recalibration, which costs about \$438.

A handheld, rugged machine, it is easy to use and to download results using simple software.

We keep the readings permanently so we can review a client’s results over time, compare across a given crew’s buildings, etc.

We try to measure IAQ prior to starting a new account and every week or two after starting service until the results plateau and every couple of months thereafter.

We measure as we’re performing a routine daytime inspection visit; a reading, on the particle counter’s fastest setting, takes 25 seconds, so little if any time is added to the visit.

Each visit, depending on its size and air circulation, we take from two to 10 readings within a building.

We start with an exterior reading; if a shop or warehouse is attached, we’ll take a reading there as well — in each case, we’re determining what external forces may impact our cleanable area.

One reason we take measurements during normal business hours is so that we’re measuring the same air our client is breathing.

Another reason is so that we can show and discuss results with our client.



Technology helps to tell-all. Handheld devices can now measure the indoor environment quickly and accurately.

After starting a building, we generally see an air quality improvement within two or three weeks in those buildings cleaned five times per week.

In buildings cleaned once per week, we often need a couple of months — or longer in some cases — to see an impact.

We keep alert for paper shredders in operation, boxes being unpacked and printers in overdrive — all can cause temporary or local spikes.

People moving around the building will increase readings since the particle counter is measuring not simply the dust load in the building, but also the degree to which the dust is stirred up and airborne at a given moment.

In some buildings, readings will vary over the course of the business day, so we try to visit a given building at about the same time of day each time we’re taking IAQ readings.

A sudden spike in readings in several of a crew’s buildings may indicate a missing or improperly installed vacuum cleaner filter — or some other procedural error — and present the opportunity for a conversation with that crew.

Results

Given the vastly differing buildings, various cleaning schedules and uncontrollable exterior conditions, IAQ varies markedly from building to building, even among those outwardly similar.

We therefore assume that our only meaningful measurement of results is in the comparison of an existing building before and after the start of our service, based on multiple visits.

We usually have no way to know what

equipment and procedures our predecessors were using.

Also, the usage of a building could have changed at about the time the account was taken on.

Cleaning frequency might differ from your predecessor's or external conditions could overwhelm your efforts.

Thus, measured IAQ improvements — before start of service versus ongoing — can vary widely.

About one-sixth of our buildings show little or no results; one-third show particle count reductions in the 30 to 55 percent range; and about half show reductions of 55 to 85 percent.

These results are only from cases in which we can compare our results to our predecessor's.

Comparing our results to those of a construction cleanup — whether good or bad — seems meaningless.

We have not yet seen particle counts rise after the start of our service, as one might expect if the system were having little

Simple Changes To Impact Air Quality



- High-efficiency particulate air (HEPA) filter equipped backpack vacuums, used for both carpet and hard floors
- Microfiber damp mops that are changed and laundered often
- Dust wiping (not feather dusting) using microfiber cloths that are laundered often
- Avoiding aerosols, spray bottles, scouring powders and other products containing high levels of volatile organic compounds (VOCs).

impact — that is, if varied readings were entirely attributable to chance.

Cleaning for health and safety, with a strong focus on indoor air quality, produces a healthier building.

It produces a cleaner looking building as well — after all, removing dust from the air also keeps dust from landing on surfaces.

Additionally, ongoing cleaning costs tend to be reduced. A cleaner building when we service tonight gives us a cleaner building to be serviced tomorrow.

Monitoring indoor air quality provides a measure of cleaning effectiveness that is

quantifiable and can be shared with the client or tenant.

A quantifiably cleaner building sets a cleaning contractor apart from his competition and sets the building apart as well. **CM**

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