Dirty Deeds
Coming clean about HVAC hygiene

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DIRTY DEEDS
Coming clean about HVAC hygiene
Regular correspondent Sean McGowan shines a light into Australia’s dirty ductwork to reveal the importance of cleaning HVAC&R systems – and how our industry can ensure it is done properly.

It seems like a rule for our industry that the things we should know most about are often out of sight and mind. Take for example the issue of HVAC hygiene. The dirt in our systems may be hidden, but it has a huge impact on the air we breathe in buildings and the quality of our food being refrigerated.

Despite hygiene being covered by Australian Standard AS/NZS 3666 Parts 1, 2 and 4, and AIRAH’s HVAC Hygiene Best Practice Guidelines, there are endless examples of dirty systems that are not only inefficient but are exposing the public to health risks. From mould build-up in ductwork to dirty cooling coils that impact both energy efficiency and performance, a lack of hygiene and maintenance can be a recipe for sick buildings and even sicker people.

One person who has seen his fair share of the filthy side of the industry is David Jones, M.AIRAH, managing director of Airconstruct IEQ – specialists in service delivery of targeted maintenance strategies. Having started out as an apprentice in 1985, Jones recalls a time when he was required to clean plant room floors until they were almost "fit enough to eat off". "It was the expectation of the day, but now we rarely paint the floors, let alone clean them," he says. “Cleaning and hygiene are not given the attention and seriousness they deserve.”

This lack of attention can, in most part, be blamed on a lack of general understanding about the issues of HVAC hygiene in the industry.

WHO’S RESPONSIBLE?

According to AS/NZS 3666, the building owner and/or facility manager must ensure that HVAC systems are inspected as per the standard. But all HVAC professionals can play an active role in helping to lift the hygiene standards of the plant and equipment we install and maintain. This includes ensuring that system designs and installations consider appropriate access for maintenance and cleaning.

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"At least half of the buildings we look at on a daily basis have no duct access panels installed," says Chris Bowd, business development manager for Queensland-based air conditioning cleaning specialist, Clean-Air Australia. “Therefore, it’s likely they have never had the ductwork inspected”

KEEPING IT CLEAN

HVAC technicians should regularly inspect the HVAC system as part of the site’s maintenance and service regime. Where contamination is found, a qualified air conditioning cleaning specialist should be called to provide a further inspection and report back to the building owner or facility manager. “This often involves sending samples to the laboratories for testing, so we know what we are dealing with, and consulting with science professionals for guidance,” says Jones. “There are a lot of dedicated people in this space and you can learn a lot by engaging with them.”
WHAT TO LOOK FOR

Dirty cooling coils are often the source of microbial contamination of a HVAC system.

“The problems of poor hygiene all start at the coil,” says Jones. “Then, courtesy of the fan, it goes all the way through the ductwork to the outlets and can often lead to unfavourable organisms adhering to the interior surfaces of the building.”

Not only does a dirty coil present serious health risks to building occupants, but a dirty or blocked coil also reduces airflow and leads to temperature complaints as the system can’t perform as designed.

A lack of regular cleaning can also dramatically reduce equipment lifespan.

“As well as sickness caused by microbial contamination, issues of fibreglass inhalation, increased fire risks and reduced system performance – as well as higher operating costs – are all results of not cleaning the system,” says Bowd.

WHO YA GONNA CALL?

Where once the HVAC professionals had the time to conduct regular and thorough cleaning of the systems they work on, today this is usually carried out by a third-party specialist HVAC cleaner.

“More often than not, there is just no time in the technician’s day to be allocated to cleaning,” says Jones. “That’s why it has to be delivered as a separate service.”

But what qualifications are required to be a specialist HVAC cleaner? This has been a contentious issue for some time, with many members of the industry demanding the completion of a Certificate III in Air Conditioning and Refrigeration.

“Unqualified personnel carrying out the cleaning of air conditioning systems is potentially very dangerous,” says Bowd, “and can result in injury or damage to the HVAC system.”

He says all technicians working in this field should, at the very least, hold a Construction White Card, be trained and comfortable working in confined spaces and at heights, and have completed some level of training both in house and in the field.

Bowd says the hazards involved in cleaning HVAC systems are significant. They include the risk of electrocution, cuts, falls from heights, entrapment, contamination inhalation, improper use of chemicals and industrial equipment and more.

“And these risks are compounded by the fact that the work is often carried out after hours with no other personnel in the building,” he says.

NADCA CERTIFICATION

There are no competencies specific to HVAC hygiene in the current vocational education and training (VET) framework and many HVAC tradespeople are unwilling to perform cleaning work. As a result, some practitioners have sought training from overseas organisations.

While some in the industry question the relevancy of the training and certification offered by the US-based National Air Duct Cleaning Association (NADCA),
AFTER

Drain pan and coil cleaning. Images: Airconstruct.

The lack of specialist training currently available in Australia means that NADCA training and certification should be pursued.

“The qualifications of Air Systems Cleaning Specialist and Ventilation System Mould Remediator have been designed to ensure that the personnel doing the cleaning understand the fundamentals of contamination control, correct cleaning procedures and the correct equipment to be used,” he says.

CLEANING BASICS

From staff defrosting cooling coils with boiling water, to the use of high-pressure water blasting around electrical equipment, we’ve heard plenty of horror stories that make the case for engaging specialist HVAC cleaners.

The correct cleaning processes and methods are typically determined by the type of contamination in the system. And according to Bowd, HVAC systems should be thoroughly cleaned in the direction of the airflow.

For example, dirt and dust in the HVAC system can generally be cleaned effectively by washing the coils and fans. Ductwork can be cleaned using a HEPA vacuum with spinning brushes, or with compressed air and an extraction system. Registers and grilles should be removed and washed.

Bowd says plastic sheeting should be used to protect surround porous surfaces. Chemicals designed for coil cleaning should be diluted according to safety data sheet (SDS) documentation and applied with an industrial sprayer to ensure no damage is done to the aluminum.

Coils should be cleaned by vacuuming the surface with a soft brush attachment to remove loose surface contamination. They are then washed with pressure cleaners on a wide fan from the air-off side to push the contamination out of the coil in the same direction it entered.

“Attempting to push the contamination through the coil into the condensate tray often results in packing the contamination into the centre of the coil and creating a larger pressure drop than before you started,” he says.

The coils are then washed from the air-on side to complete the cleaning.

TO SEEK OVERSEAS-BASED TRAINING OR NOT?

THE CASE FOR NADCA

According to Chris Bowd from Clean-Air Australia, the training offered by the US-based National Air Duct Cleaning Association (NADCA) is worth seeking out in the absence of appropriate training in Australia.

“NADCA training and certification is preferred to ensure the person conducting the client has a good understanding of contamination control methods,” Bowd says.

Where the air conditioning system is found to have microbial contamination, he recommends that the person responsible for the remediation project has also completed the intensive Applied Microbial Remediation Certification offered by the Institute of Inspection, Cleaning and Restoration Certification (IIIRC).

THE CASE AGAINST NADCA

According to Jones, the AIRAH HVAC Hygiene Best Practice Guidelines is one of the best publications available and should act as a yardstick for the industry until Australia has a formal training package.

“I don’t know why everyone looks to NADCA,” he says. “They are an American duct-cleaning association formed for entirely different reasons and for an entirely different market.”

Jones says there is enough knowledge locally to overcome the issues facing the Australian industry.

“The best way to get this issue right is to upskill specialist cleaners and bring them under our industry’s wing.”

MANAGING CONTAMINATION

When microbial contamination is found in an HVAC system, cleaning and remediation becomes significantly more complex.

“The system must be kept under negative pressure at all times,” Bowd says. “All areas must be HEPA vacuumed followed by a wet wipe with an approved sanitiser. Where porous materials are present, they should be replaced.”

Bowd says that the NADCA surface comparison is the most commonly used test for checking if the HVAC system has been cleaned effectively on both porous and non-porous surface.
“The test consists of using a HEPA-filtered vacuum cleaner achieving a minimum 80 inches of static lift with a 1.5-inch vacuum hose being passed over the internal surface four times, with the brush depressed on the surface,” he explains.

“The person performing the test will then compare the vacuumed surface with the surrounding surfaces. If the HVAC surface tested is visibly the same as the surrounding areas, then the area is considered clean.”

A CERT III IN HVAC HYGIENE?

Recognising the need for specific training in cleaning and sanitising split systems and air handling units (AHUs), Jones has been part of a group developing a Certificate III training package in HVAC hygiene.

The training package has been lodged with the Australian Skills Quality Authority (ASQA) and the group hopes it will soon be approved.

“The development of this training package recognises that HVAC technicians don’t have the time to perform all the cleaning work required,” says Jones.

“As a profession, we are already in high demand, and we are facing skills shortages that don’t seem to be getting any better. It made sense to create a qualification to upskill people who already hold core cleaning skills, so they can do some of the heavy lifting.”

Jones hopes that the training package will be in full swing by mid-year.

FOUR BIG REASONS TO CLEAN

ENERGY EFFICIENCY

Even the best designed plant will not operate efficiently if it is dirty or damaged.

SYSTEM EFFECTIVENESS

Dirty systems have less capacity to move and conditioned air.

INDOOR AIR QUALITY

Identifying microscopic dangers helps to reduce potential risks.

EQUIPMENT LIFESPAN

Rust never sleeps, and corrosion will shorten the life of mechanical plant.

Source: Clean-Air Australia