

# REMEDIALTE or REPLACE

MICROBIOALLY CONTAMINATED AIR HANDLING SYSTEMS

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## abstract

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Over recent years there has been a growing awareness of the costly effects of microbial growth in the indoor environment and also the health effects of some of these common toxic moulds.

Unfortunately there has been little discussion regarding the solution to dealing with existing mould or furthermore how to prevent reoccurrence.

There is little knowledge in Australia as to what can be successfully remediated so in most cases, mould contaminated surfaces or components of HVAC systems are usually removed and replaced at a great expense to the property owner or insurer.

The purpose of this article is to enlighten Facility Managers and those who maintain Air Handling Systems as to the possibility to successfully remediate mould contaminated Air Handling Systems

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By now, most people involved in the Mechanical Services Industry are to some degree aware of the damaging or harmful effects of unchecked Microbial Growth in Air Handling Systems.

Most now know that Air Handling Systems contaminated with significant microbial growth have the potential to cause many problems ranging from nuisance odours, costly property damage to serious illnesses.

Mould can grow on almost any surface in an Air Handling System including Cooling & Heating Coils, Fans, Motors & Shrouds and Ducts that are both internally or externally lined.

Although the most commonly found components or surfaces with significant microbial growth on them are coils and internally insulated products, mould can grow very successfully on metal surfaces including Galvanised Ducts, aluminium Smoke Dampers and even Stainless Steel.

When an Air Handling System is found to be harbouring any form of microbial growth, those responsible for maintaining the system have the responsibility to ensure that it is removed safely and effectively. Turning a blind eye to any level of visual microbial growth in an Air Handling System won't make it go away. In fact, in most cases, the problem will only get worse and end up costing the property owner more in many different ways.

It the right conditions, a small cluster of vegetating mould on a cooling coil may completely cover the coil within a month or two leading to massively reduced airflows, increased energy consumption and potential exposure to occupants (cont.)

### Dealing with Mould

Once the presence of mould has been confirmed in an air handling system, how do those responsible for the maintenance of the system know what can be done to deal with it?

There are generally only two feasible options with dealing with mould contaminated components of air handling systems - Remediation or Replacement. Remediation can often be far less expensive than replacing mould contaminated components, however, when the cost of remediation comes close to cost of replacement the later of the two may be considered more favourably depending on the situation.

The question is raised as to what can be successfully remediated. The answer to this question will greatly depend on the extent of the microbial growth, the surface that mould is growing on and the ability/expertise of those attempting the remediation.

### Heating & Cooling Coils:

There are some very effective coil cleaning products available that if used correctly can very successfully remove fungal growth from coils. Generally the deeper the coil is the harder it will be to remove all the microbial growth from in-between the fins. It is important that if the coil is going to be cleaned in place, that proper engineering controls are implemented to ensure that any mould spores that become airborne during the process are controlled.

### Non porous surfaces:

Most non porous surfaces such as Gal Ducting, Fire Dampers, Smoke Dampers, Fans and Shrouds are generally able to be remediated rather easily by removing the visual fungal growth and disinfecting the surface. Access to these components of an Air Handling System is generally rather basic through either existing inspection provisions or from inside the Air Handling Unit.

### Internal Insulation:

Internal insulation requires far greater measures and expertise to ensure proper and successful remediation and in some cases replacement may be the only option.

The single biggest challenge in dealing with microbial contaminated internal insulation is access. If replacement of the internal insulation inside ductwork is required, it is rare that it can be achieved without disassembling the duct to access the insulation. This can obviously turn into a tremendous exercise depending on where the ducts are located, duct size and construction. Removing the contaminated insulation is one thing but installing new insulation can be an even greater endeavour. In most cases where internal insulation has been removed, due to the effort, the insulation is not reinstated but alternatively new insulation is placed around the outside of the duct. The cost to remove and replace internal insulation in Air Conditioning Ducts, especially when they have to be disassembled to facilitate access can be extremely high and almost equal the original supply and install cost.

If remediation of internal insulation can be achieved, the cost may be less than a quarter than that of replacement.

If the integrity of the internal insulation has been compromised, is soggy/heavily wetted or is in a state of bad disrepair, the insulation should in most cases be replaced.

In most cases, the remediation of internally insulated surfaces is a three stage process involving removal of the fungal growth, disinfecting the surface and then treating with an approved antimicrobial coating or treatment.



Applying an Anti-Microbial Treatment inside a Duct

## Flexible Ductwork

The cost of remediating flexible ductwork is usually not feasible given the relative cheap price of replacing it. As well as the cost involved, the nature of flexible ducts and materials used to make them do not lend themselves to easy remediation. Some types of semirigid Flexiducts however, such as Plastiflex, can be successfully remediated if done correctly.

## Verification:

The completion of any mould remediation project should be verified by persons other than those providing the remediation service. Generally it is advisable that for larger mould remediation projects an independent consulting microbiologist (not contracted by the remediator) be involved in reviewing the project and to verify if in fact the goal of successful remediation has been achieved. For the smaller projects that may not warrant the need for an analytical result, photographs or video should be taken before and after to demonstrate effective remediation.

## The Dangers:

During any mould remediation project, whether it requires cleaning and treating of the contaminated components or replacement, certain engineering controls must be implemented to prevent the spread of microbial spores. All procedures involved in any disturbance of microbial growth should be done in a controlled manor which will almost always require the use of HEPA\* filtered Negative Air Machines and HEPA equipped Vacuums. \**High Efficiency Particulate Air*

The uncontrolled spread of mould spores generated during a poorly managed mould remediation project may lead to widespread contamination of an area and end up requiring an entire building to be remediated or at worst case, even demolished.

## Prevention of Reoccurrence:

After an Air Handling System has been successfully remediated the last thing anyone would want is for the mould to start growing back again. One of the most important things is to ensure that the Relative Humidity in the system is what it should be and there is no excessive water activity in the system.

Some of the best ways to ensure against reoccurrence of microbial growth in Air Handling Systems is regular inspections, keeping the system clean and application of approved (and proven) antimicrobial treatments designed specifically for Air Handling Systems.

## Summary:

There may be a misconception that mould can only grow in Air Handling Systems that are poorly maintained or extremely dirty.

Experience has shown that visually clean Air Handling Systems with the presence of dormant spores (not visible to the naked eye) and Relative Humidity above 60% RH can alone provide the right conditions for microbial growth and end up requiring total system remediation. As always, a proactive approach to HVAC Hygiene will help to ensure that an Air Handling System is safeguarded from microbial growth.

## About the Author:

Mr Jeremy Stamkos is the Managing Director of Enviro Air Pty Ltd. Enviroair Pty Ltd is a company that has been specializing in the decontamination and remediation of Commercial and Industrial HVAC Systems since early 1990.

Enviroair Pty Ltd is Certified in Mould Remediation by the Indoor Air Quality Association (IAQA) in the USA and Certified as Air Systems Cleaning Specialists by the National Air Duct Cleaners Association (NADCA) USA.