Rev 6 5 /4/2023 Decontamination protocols

Written by Jeff Charlton www.buildingforensics.co.uk

Member of the Chartered Institute of Environmental Health (UK), Councill Certified Indoor Environmental Consultant, CCIEC (USA). Hon Fellow BDMA.

What is decontamination?

The term decontamination is generally used to describe the process of removing all substances that can cause harm. Unfortunately, with water damage and mould, the contamination can include bacteria, chemicals, mould spores, fragments, mycotoxins and VOCS. In fact, there are over 30 specific contaminants likely to affect your health. (see our consensus document)

While some decontamination techniques would resolve all these issues, they can be at the top end of the cost spectrum. Put simply, the higher the level of decontamination and evidence required, the more expensive it's going to be.

The industry decontamination standard to be medically sound requires fine-particle cleaning of surfaces and air, is likely to cost six figures, and is almost certain to fail its first clearance test.

Risk reduction decontamination

From the foregoing, it can be seen that decontamination can vary in cost and outcomes. We provide the following extensive and unique range of services designed to reduce exposure risks and hazards within your budget.

The lowest cost decontamination

Soapy water is recognised as the most effective low-cost cleaning method and is often a first choice recommendation, but may not provide sufficient risk reduction. Some contaminants are not water-soluble, and some surfaces can absorb contamination when wet. Residual surfactants or soaps can affect pH and create another risk with biological activity.

Why is air cleaning to reduce building-related illness imperative?

Contamination, whether bacteria or mould, which affects human health, is found in three exposure forms: Parenteral (skin), ingestion (eating) or respiratory (breathing)

While some ingestion and parenteral contamination are possible, inhaling contamination is far more likely and may be the greatest risk. WHO state inhalation of mould spore fragments is perhaps 40 times more toxic because, depending on particle size, they can enter the bloodstream through the lower respiratory system (alveoli). When people realise they have been affected by mould, they have rarely licked it or eaten it, leaving a 24/7 inhalation risk.

It should be remembered that opening up cavities or mould reservoirs can release billions of spores.

Whatever form of surface cleaning is undertaken, the air will still pose an inhalation risk from spores and fragments, VOCs, possible mycotoxins, hyphal fragments, and, of course, bacteria.

It should therefore be recognised that airborne particles are, to some extent, air-buoyant and will float in stratified layers, gradually settling over hours, weeks and months. Just a small disturbance, like walking through a room or opening a door or window, can aerosolise fallen particles again, making them a health risk.

It should therefore be recognised that whether mould is treated, allowed to dry and decay naturally, there will be dead or non-viable hyphal fragments, and these will float at different heights from just above the floor to just below the ceiling.

The electrostatic effects on particles, known as Browning Motion, can cause small particles to energise one another and remain airborne for weeks.

Most would appreciate the requirement to clean the air we breathe to remove these hazardous particles, but misleading advertising hides the true effectiveness of air cleaning or scrubbing.

The reality is that opening windows causes only localised air changes within a few inches, and major air exchanges are required.

What is Air Scrubbing?

This is a general term for cleaning air, although there are several forms of **"Air Scrubbing"** which is the basis of risk reduction**.** Different procedures we use are outlined in the following sections

Air Scrub™ Chemical by Building Forensics

This is a proprietary process that fills the air with non-corrosive salt and, when charged, attracts small particles, causing them to clump. Then a second solution is fogged into the air, and the salt absorbs it, becoming too heavy to remain in the air. This causes precipitation or the raining of particles. This is the same process as is used to clean swimming pools. Very little moisture is used, averaging less than 2 litres in a 4-bedroom house. The product is non-toxic and causes debris to fall onto horizontal surfaces, where it forms a sacrificial skin that lasts 4 days, enabling the debris to be contained without re-aerosolising while it's cleaned up. This is the only system recognised as medically sound. The process takes around 5 hours before re-occupancy.

Mechanical

This is normally provided by mechanical fans fitted with HEPA filters that trap airborne contaminants. The HSE have published a research paper that shows why this equipment has major shortfalls: all particles have different buoyancies and float at different levels. Obviously, if a collection device is located on the floor, it can't capture particles floating higher above it, usually in the breathing zone.

The HSE provide a detailed explanation of failures from Negative Pressure HEPA filter machines in their report RR988 http://www.hse.gov.uk/research/rrhtm/rr988.htm

In this paper, the research found that microscopic fragments float and remain airborne despite mechanical air cleaners operating, with fragments remaining in layers above the capture zone

A typical 1000 cfm Negative Pressure Unit (NPU) Not usually beneficial in cleaning air but can be used to contain work areas in negative pressure.

Chemical Risk Reduction

In this, airborne chemical and biological contamination can be neutralised and decontaminated to reduce exposure risks. The chemical is atomised to submicron size, where it penetrates or drills down into mould particles to oxidise them. Very successful in badly contaminated properties, and the chemical composition was developed by the US

military for WMD decontamination. All safety and efficacy data are available. In this process, the empty property is sprayed with an aerosolisation of up to 400,000 microdroplets per cubic meter. A solution of Hydrogen Peroxide is electrostatically charged to drill into spores and fragments, both oxidising and denaturing component parts. The property must remain unoccupied for 4 hours after treatment.

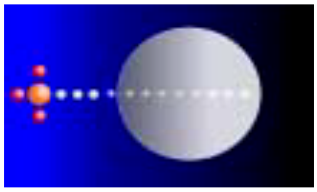
Chemical Bio Static

We use this protocol in homes that have been remediated and or, have limited health hazard presence from mould and or bacteria . The product manufactured by one of the world's largest chemical suppliers is Hypoallergenic. Used by leading sports clothing manufacturers to prevent odour in garments and shoes it provides long lasting mechanical defence on surfaces after its major sanitation action by electrostatic action

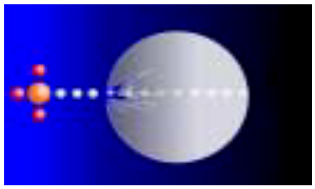
The chemical is electrostatically attracted to airborne particles and walls where it remains providing non chemical bio defence

Succesfully tested against most known moulds and bacteria and all safety and efficacy data is available

The property must remain unoccupied for 3 hours after treatment



The particulate is attracted to the treated surfaces by a positive charge and punctured by the long chain molecule.



The particle/microbe is then electrocuted by the natural forces of physics.

Moulds which the coating is proven to destroy and or prevent growing.

The defensive invisible film can last up to 2 years, although laboratory confirmation only states 90 days.

Aspergillus niger
Mucor sp.
Aspergillus fumigatus
Tricophyton mentagrophytes
Aspergillus versicolor
Tricophyton interdigitalie
Aspergillus flavus
Trichoderma flavus
Aspergillus terreus

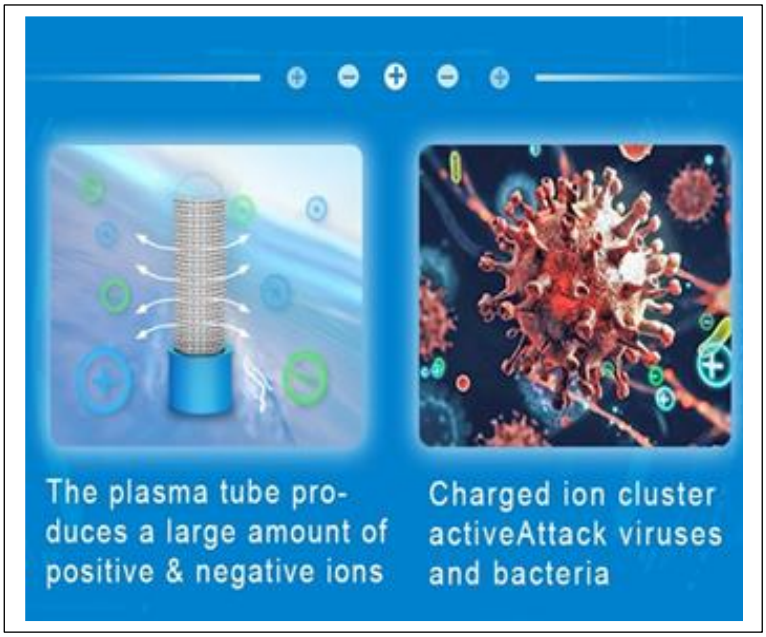
Penicillium citrinum
Aureobasidium pullulans
Penicillium elegans
Fusarium nigrum
Penicillium funiculosum
Fusarium solani
Penicillium humicola
Gliocladium roseum
Penicillium notatum
Stachybotrys atra
Algae
Yeast
Saccharomyces cerevisiae
Candida albicans
Penicillium variabile

Chaetomium globusum
Penicillium chrysogenum
Rhizopus nigricans
Penicillium albicans
Cladosporium herbarum

The film also protects against most bacteria including E Coli to MRSA-

Electrostatic

In this protocol, we install Plasma generators, which can reduce airborne biological contamination by up to 99.99%. The process can take several days/weeks, depending on the size of the problem, and some may react to electrostatic by-products, such as minimal ozone release. All efficacy and safety data is available



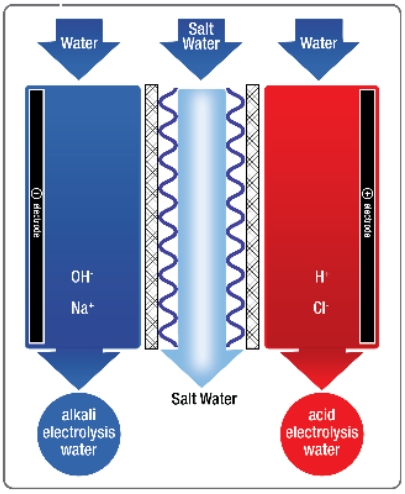
The fastest most effective mould removal protocol

Eco Safe (low cost)

This technique uses nature's own super-powerful and safest chemical decontamination protocol: Hypochlorous Acid. It is almost chemically neutral, used by hospitals for wound cleaning and skin treatment, and is a recognised and

accepted biocide with efficacy against moulds and yeasts. It recently gained international approval in controlling COVID and SARS and is produced in human white blood cells to combat infection.

The process usually takes less than an hour in most homes.



Hypochlorous acid is made by passing an electrical current through salt water and vinegar and is said to be 100 times more effective than bleach but non-toxic.

The machine is brought into your home and automatically calculates the dosage and produces a dry fog, making it safe to use in any home or office, and you can re-enter within 15 minutes of treatment.

The production unit of Hypochlorous acid dry mist

Ozone treatment

The most dangerous of all our protocols, and can only be used in detached homes or premises.

This process uses one of nature's strongest oxidisers O^3. It is set up in the unoccupied property, and one of two types of ozone is produced: nitrogen-free, with very high levels of O^3.

These high levels of gas are distributed throughout the property over a period designed to chemically oxidise spores, fragments, and, of course, bacteria. The procedures we use also create Hydrogen Peroxide as a surface benefit

This type of equipment can provide good results at very high levels, but is an extremely dangerous product which can only be used in unoccupied detached properties

Mycotoxins and residual cleaning

Testing for Mycotoxins in the home

Mycotoxins can be dispersed from limited species of toxigenic moulds and be extremely difficult to identify or locate their source.

Working with USA leading laboratories we have partnered them to focus on specific targets and indicators.

People often consider mycotoxin testing after urine or blood tests confirm their presence.

Removing Mycotoxins

While decontamination to remove toxigenic mycotoxin producers is usually required, removing mycotoxins may require more focused attention.

The chemical and mechanical properties of mycotoxins differ from mould spores and fragments and therefore require specific protocols for successful removal.

The machine shown below was developed specifically for mycotoxin removal when used in controlled environments.

We erect a purpose made mycotoxin treatment chamber in your home and install this machine.

You can then load the chamber with clothes soft goods furnishings etc.

Usually only undertaken after building decontamination

High level Risk Reduction and decontamination

In this protocol we decontaminate large areas following site specific surveys. This may require intrusive investigation and some soft demolition of surface finishes.

Costs and protocols by request