Building Forensics & IAQ Ltd

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A Guide to DIY mould assessments

Building related illness risk assessment

Those suffering Chronic Inflammatory Response (CIRS) or Environmentally Acquired Illness (EAI) will often request assessment of current homes or potential homes. There are many ways of undertaking this, but accuracy will always depend on expenditure regarding sampling and analysis.

With no set levels of safe exposure to mould or biological toxins it is recognised that different people with different genetics or immune response will see different levels of health impact. At Building Forensics, we combine the skills of the professionally competent Indoor Environmental Hygienist with practical building related science.

Many may decide to DIY assessments with ERMI and perhaps moisture meters. The following table provides some answers to typical questions we receive, and I hope it may assist you.

There is unfortunately a belief that wet materials are mouldy materials, but the reality is mould does not grow on wet materials and the development of mould is reliant on several environmental factors quite apart from moisture. More importantly the type and composition of substrate will affect the type of biological amplification and most importantly, invariably mould is not the most significant risk factor but can sometimes be an indicator of health risk. The following table shows typical questions we are often asked to answer

Question	Answer
Is the property safe?	Without extensive intrusive investigation and substantial sampling and analysis of surfaces, air impossible to state
If I spend substantial sums on analysis will it provide a definitive safe or hazardous for me?	We have no idea, due to varying genetics (typically HLA gene) and the level of your immune system it may be safe for you but not the atopic population. This is supported by peer reviewed medical literature.
What is my best option for risk assessment of my property	With NO international or UK standards of maximum exposure levels numbers of spores or types of mould is almost irrelevant. I say almost but distribution and species are a good indicators when coupled to other relevant information and controls.
If it is damp or wet is it a hazard	No but it may be a risk
We had a leak, but it dried naturally is it OK now?	Definitely not, historic water damage that was allowed to dry naturally is likely to be more hazardous than current water damage.
If I buy a moisture meter and I	Was it ever wet and if it was, moisture content has no relevance.

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find surfaces are dry is it safe.	Damp or wet areas however can form part of the overall risk assessment. Dry now doesn't mean there isn't mould contamination present
My humidity meter says its only 60% but I know mould only grows at 70% Rh and the temperatures is above 20C	Mould grows in refrigerators where temperatures and humidity are very low. Its often NOT moisture content but surface molecular activity that triggers mould growth and this is coupled to nutrients available from typical organic materials.
I want to know if the mould is Stachybotrys	This black mould is not the only potentially toxic species. There are many that grow in homes which are far more toxic especially synergistically.
Could the mould be affecting my health?	All mould is allergenic, but some are toxic and these can cause inflammatory response NOT just allergic response. It may be important to identify the differences by simple sampling techniques
I have visible mould growth can you tell if its toxic.	A waste of money. If it's not toxic, it's still a health hazard and if its been there more than 6 weeks it most likely is potentially toxic.
I have put out culture plates and they came back (high or Low) What does it mean?	This type of sampling does NOT conform to British standards and the World Health Organisation states this method and all culture-based sampling "Has Serious Limitations" this type of sampling is almost worthless
I have an ERMI score of 1 or 10 is that safe?	The ERMI test was patented by US government Environmental Protection Agency (EPA). It looked at the average mould levels in 1096 USA homes. These homes in different states and of different climate and construction to UK are therefore meaningless. Moreover even in USA the EPA state the ERMI "***MUST NOT be used for health impact assessments"*** as it was not developed or has significant use in this field. Building Forensics do use data from the QPCR-DNA to make health impact assessments from samples we take.
I have high mycotoxins in my urine is that significant?	Ask your doctor, but we or our colleagues in USA struggle to find the mycotoxins in homes of these high-test results. WE can however usually identify the mould species that can produce these secondary metabolites called Mycotoxins
If I measure high or low levels of moisture in my home is that enough to tell me if the home is safe	Absolutely not. It could be dry after water damage but there will still be mould presence especially in cavities and behind wallpaper
The mould was sprayed with fungicide, biocide or magic formulae.	Absolutely no chemical treatment available will destroy mould. It may temporarily remove it but it will almost always return unless other actions are taken. Mould has been boiled, steamed exposed to high levels of gamma radiation on International Space station and immersed in bleach for an hour. Still grows but becomes more toxic
The mould is dead is it now safe?	Unfortunately, according to WHO dead mould desiccates and fragments and can now by pass all human defences in the 5 micron size. Below 7.5 micron the mould fragment can pass directly into the blood stream where is effects can be increased by a factor of 40 times. (WHO)
Contractors have provided a quote to remove mould and decontaminate my property using XYZ process. Will it work?	I very much doubt it will work as they claim whatever XYZ is. There is a simple test as to their integrity or honesty. Tell them Building Forensics will be undertaking post treatment sampling and they will only get paid if the results are as they state. I suspect they will walk away or say we are scare mongers.
Is temperature and humidity monitoring a good guide to	Unfortunately, no. There could have been water damage before the monitoring. There could also be dew point condensation in

prevent mould growth	cavities which are NOT monitored, and mould growth can be there.
I am going to buy a new home is this the safest option?	About 25% of our clients are new home owners who became sick after moving into their brand new home. Have you ever seen an umbrella over a building site or stored materials? Mould is almost inevitable in new builds, but builders will usually bleach and paint over prior to sale. That just leaves what's in the cavities and air
I'm going to buy a GREEN HOUSE, is that the safest option?	No I don't think so. Many have re constituted building materials or are wood based. I have seen some so contaminated they should be torn down.
I haven't the money for a professional survey, what can I do?	Use your eyes and nose to inspect for current or historic water damage. See if your health worsens and move out if it does.
Which is the worst mould for health impact?	Some moulds may be inert or dormant but when in competition with other moulds and bacteria combine and create a very toxic air.
Is mould the only health issue in a property?	NO. Bacteria are now considered to rival or perhaps even increase the health risk. Gram positive and negative bacteria usually grow within 48 hours of water damage. Mould and bacteria are natural enemies and have produced chemical warfare agents to combat each other.
Are VOCs (Volatile Organic Chemicals) a health hazard? Should they be tested?	Yes, possibly the only UK legislation covers some of the gases we identify in buildings. They range from formaldehyde to Sulphur dioxide, carbon monoxide and of course carbon dioxide levels can be a great indicator of healthy air and ventilation. We have a small surcharge for Total VOC testing and is often very worthwhile but not essential.
My property is at 22C and only 60% and because that's below the trigger 70% I won't get mould growth, will I?	Unfortunately, this is a misconception. The amount of moisture in the air at these levels is approx .0010 grams/kg of dry air. Typically, the ambient or outside air in UK is less than .0006g/kg. Therefore, the air is wet and can condense on cooler outside wall surfaces or cavities and result in mould growth. You would have to reduce the temperature to appro14c to reduce the risk and of course this is impractical but indicates a moisture management issue. Here Dew Point is the significant issue for mould growth,
If I install a good quality air cleaner will it reduce my exposure.	The simple answer here is a little. Unfortunately, the machines on floor level generally only collect the heavier whole spores which fall out of the air through gravity. The smaller lighter spore & Hyphae fragments remain airborne for much longer due to the laws of physics and they are constantly re circulated through simple movement of walking and opening doors. These are in your breathing zone.
If my ERMI is really low, is that good?	Its better than really high but it has no relevance to building related health issues and there are many potential flaws in DIY sampling.
How important are bacteria in building related illness?	Some forms of bacteria may pose a higher risk than mould with regards to inflammatory response. The sampling for gram positive and negative bacteria should be a major issue with health risk assessments, although initial investigation may exclude this unless requested by the medical profession and or Nutritionist. These bacteria colonise before mould.
Will infra-red scan tell me if the property is wet?	Absolutely not. IR scans in the hand of a qualified technician can show Delta t (Δt) which is differences in temperature and indicates poor insulation, air drafts and or moisture differences causing he substrate to cool.

I have high moisture readings on a dry wall, why is this?	The average moisture meter has two pins and is calibrated for wood. When used on some other substrates they can record 100% wet even when stone dry. Moisture readings other than for wood are difficult for the untrained to analyse
A contractor has been recommended for mould decontamination, and remediation. How do I know if they are qualified and competent?	Ask in writing: To see their certification and who issued it. Was it a supplier/manufacturer or a recognised training program? Ask how long the training took and ask all questions in writing and get response in writing.
A decontamination process has been recommended which is said to be used in hospitals. Is it OK?	I doubt any decontamination protocols used in hospitals are available to the public. I have seen similar claims which turned out to be a trial but never used again. Ask them for their successful decontamination protocol and certification and if it involves assessing mould growth on cultures, ask what of fragments which don't grow but are more harmful, be suspicious
If I remove mould from surfaces is that sufficient?	No, once mould is present it will release spores into the air you breathe and that's generally what makes people sick. Touching mould during clean up will see thousands of spores released.

Decontamination DIY

There are two basic forms of decontamination, surface and air.
In all cases surface decontamination is simply cleaning and even those with mould sensitivity can DIY if properly protected.
The general advice is to wear a FFP1 or P3 mask, goggles and gloves but this is simply inadequate and the following explanation may assist in risk management.

In Table 1 below you see the ***Nominal*** protection factors as provided by the manufacturers of ***ALL*** masks. This measurement is arrived at by gluing a mask onto a manikin called a "Sheffield head" which of course doesn't move.

Next to the Nominal protection factors are the ***Assigned*** protection factors and these are developed from measurement during actual use where the face jaw move, and leakage occurs.
You will note the dramatic drop in protection in real life testing.
You should also be aware that mould decontamination will see very high numbers of particles so exposure even when using the best FFP3 or similar is certain.

The other issue with mask and goggles is that goggles leak too and their poor fitting and sometimes ventilation holes prevent misting is another route to eyes and body exposure.
With mould an hyphae fragments often chemically contaminated the ears are another route of entry so ear plugs should be worn.

The solution and Building Forensics recommendation is:

- Tyveck disposable suit with hood
- Ear plugs
- Overshoes (polythene)
- Nitrile gloves
- FULL FACE mask with HEPA or ABEK filter

Table 1

Standard	Description	Filter class	Nominal PF	Assigned PF
EN149	Filtering face piece for particulates	FFP1 FFP2 FFP3	4 12.5 50	4 10 20
EN140	Half Mask	P1 P2 P3 Gas	4 12 50 50	4 10 20 10
EN136	Full face mask All classes	P2 P3 Gas	17 1000 2000	10 40 20
EN12942	Power assisted Full face mask	TM1 TM2 TM3	20 200 2000	10 20 40

This is a typical FFP3 or FP1 particle mask by Drager
This is one of the best manufacturers but this and similar products are completely inadequate protection for DIY mould and biological clean up.

The 3M full face respirator fitted with ABEK cartridges. £78 .83 on Amazon

file:///C:/Users/User/Desktop/3M%20Reusable%20Full%20Face%20Mask,%20Medium,%206800,%20EN%20safety%20certified_%20Amazon.co.uk_%20Business,%20Industry%20&%20Science.html

These come in different face sizes small, medium & large. Follow manufacturer's instructions

The process you follow should allow safe removal of PPE (personal protective equipment) by careful turning gloves inside out as taking off and similar principles to removing PPE,
protective suit off first and then overshoes
Followed by mask and then gloves
Remember all PPE is now contaminated
The suit, gloves and overshoes are a once only wear
Wipe the filters face with disposal cloth
Wipe over respirator
All clothing removal in a controlled environment

Hope it helps

Jeff Charlton

PS we can assist in air cleaning through our web site www.airscrub.co.uk