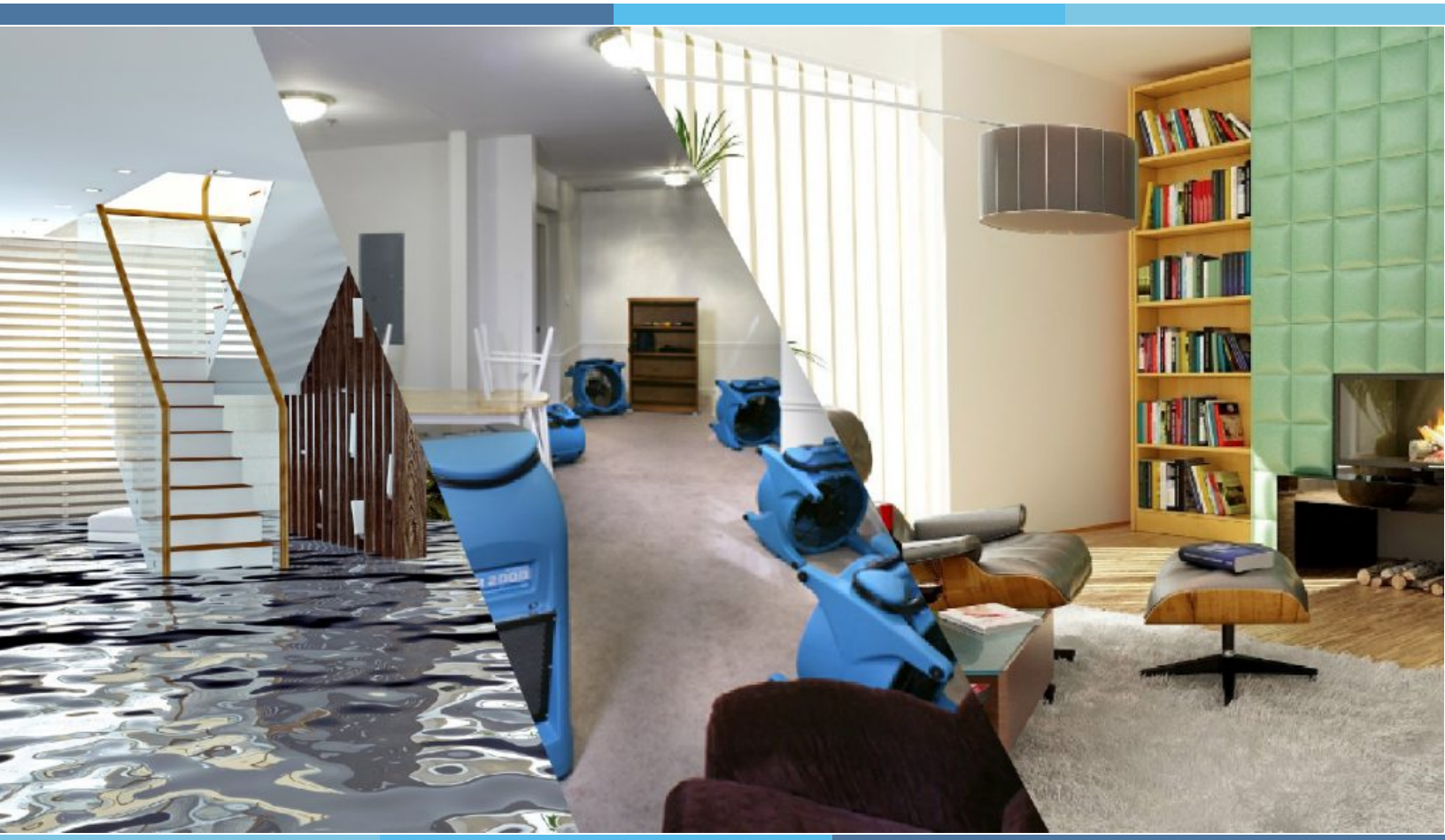
Spore Trap Air Sampling

Outside Air Comparisons



NAERMC
National Association of Environmentally Responsible Mold Contractors

Air Sampling

Investigations for mold in indoor environments may include the collection of air samples for direct microscopical examination (DME) for fungi, culture-based fungal air samples, or both. Such sampling requires clearly defined goals and a sampling plan before sample collection.

Prior to collecting any air samples for mold spores, the Mold Assessor must determine the purpose and relevance of the sampling as well as ascertain the questions the sampling will answer. Air sampling should be considered as ancillary to an informed visual inspection.

Testing results should confirm observations or otherwise support conclusions made based on the informed visual inspection.

In the absence of an informed visual inspection, air sampling alone cannot support any definitive conclusions.

According to the American Industrial Hygiene Association (AIHA): "Air sampling for mold spores does not and cannot evaluate potential health risks". But we feel this is too simplistic a statement. What about if there are massive levels of Indoor mold?

Q: What do the terms “viable,” “nonviable,” “direct microscopical examination” (DME) and “culturable sampling” mean?

A: Direct microscopical examination (DME), sometimes called direct examination or direct exam, samples for airborne mold are commonly referred to as “nonviable,” “spore trap” or “total spore count” samples for mold or fungi. The term “nonviable” means that cultures are not grown in the laboratory to identify the fungi detected in these samples. These samples are typically collected using an inertial impactor with air sampling cassettes. Some commonly used cassettes include, but are not limited to, Air-O-Cell®, Allergenco-D® and Pro-15®.

When analyzing direct examination samples, fungi are identified using microscopical techniques to examine spores, mycelial fragments (hyphal fragments) and other fungal structures captured by the air sampling cassette. Fungi are said to be identified only as exato the genus level by direct exam. However, because differentiation of spores by microscopical exam alone is limited, fungi are often reported only as a group (for example, “Penicillium/Aspergillus-like”). Identifying individual species from Penicillium, Aspergillus or most other genus by direct microscopical evaluation is not possible and requires culturing the sample or using molecular (DNA) methods.

Results are typically reported in spores per cubic meter of air (spores/m3) along with the number and/or relative percentage of each spore type. Common turnaround times for direct exam/spore trap samples are same day if delivered to the lab in the morning.

“Viable” or “culturable” mold sampling is more appropriately called “culture-based analysis” for mold or fungi. Types of fungi in air samples are identified by impaction directly onto growth media and by growth of the fungal cultures on the media in the laboratory. Culture based air samples for mold are commonly collected by inertial impaction samplers. Examples of such samplers include Andersen N6, SKC BioStage and Buck BioAire.

The sample collected on the impaction surface is incubated in the laboratory. The fungal colonies able to grow on the media are counted and identified by traditional microbiological methods (colony morphology, microscopical examination of spores and mycelial fragments, colony growth characteristics, etc.)

According to the American Industrial Hygiene Association (AIHA): "Air sampling for mold spores does not and cannot evaluate potential health risks". But we feel this is too simplistic a statement. What about if there are massive levels of Indoor mold?

Air Sampling

Results are reported as colony forming units per cubic meter of air (CFU/m3). Turnaround time (meaning the time it takes to provide results after the lab receives the samples) for culturable fungal air samples is usually seven to 14 days.

Fungi are usually identified to the genus level, with options to the genus and species level. The number and/or relative percentage of each fungal type in a sample is usually reported as well. Typically, fungal species identification (if offered by the laboratory) involves extra days or weeks of analysis to determine other growth characteristics, and this usually involves extra cost to the customer.

Comparing Indoor vs Outdoor to Determine If Elevated or Not.

According to AIHA: "Both direct examination and culturable approaches typically involve collecting and comparing indoor versus outdoor samples. Based on on-site environmental conditions, the investigator is usually trying to determine whether any significantly elevated fungal levels are occurring indoors that are different or unusual when compared with the outdoor microbial flora. Some investigations also compare levels of fungi in complaint/concern versus non-complaint/noconcern areas in the indoor environment."

This is overly simplistic. Outdoor mold growth varies by season and even time of day. Outdoor mold levels vary by location.

Location: For instance in South Florida, how does one usefully compare indoor mold levels to outdoor levels taken near the Everglades vs taken in Miami Beach with the wind coming from the Ocean? You cannot.

Windows Open or Not: In Florida where windows are never opened comparison of Indoor mold levels to Outdoor is not valid.

AC filters: In Florida with windows never left open and where indoor air is filtered, the quality of the air filter massively affects the indoor vs outdoor ratio.

Pre vs Post Remediation Air Sampling: What impact does the purpose of the sampling have on indoor vs outdoor comparisons. Pre vs Post Remediation Clearance Testing? Certainly there is no simple comparison of Indoor/Outdoor that applies to both Pre and Post Sampling.

(In Florida) Why Do Mold Assessors Compare the Indoor Air vs Outdoor Air for Post Remediation Clearance testing? Because the Outdoor Air is almost always much higher than the indoor filtered air, the Indoor Air is compared to the Outdoor Air in order to to pass bad work.

Q: Does a correlation exist between culture based and DME of Air Sampling?

A: Per AIHA: "There is no consistent correlation between measurement results from culture-based and direct examination samples for mold. However, even though these types of results cannot be directly compared, investigators may choose to incorporate both types of air sampling in their projects, as well as incorporate molecular (DNA) methods, which may be even more specific than culturable methods. The types of information obtained from the different sampling types may differ; therefore, the type of sample collection to be used is dependent on the question(s) that sampling is intended to address." How about this question...

If culture based testing does not correlate to spore trap testing how confident are we in the value of such testing? The answer is depends on what the testing is for. Is it for Pre or Post Remediation testing?

For Post Remediation testing, spore traps can be very useful in proving the remediator did not leave the home contaminated when the spore count is below 500 and there is No Stachybotrys in the air sample. Testing MUST be performed in the living space and NOT the containment.