WallChek® II

Microbial Wall Cavity Sampling Device
Operating Manual

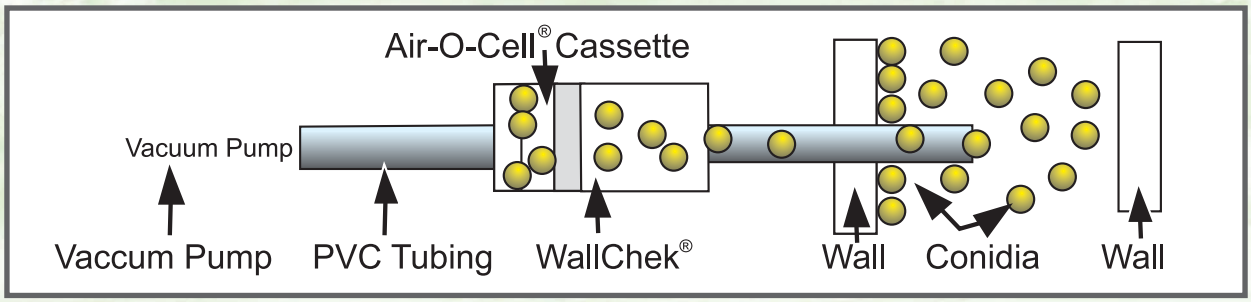
EMLAB P&K
THE PROVEN LEADER®

For the Experienced IAQ Investigator

INTRODUCTION

Wall cavities have been recognized for some time as significant amplification sites for toxigenic and allergenic fungi. Growth of these fungi in wall cavities can occur as a result of a number of circumstances ranging from construction and design defects to accidental water incursion. Standard of care within the industry and the principles in the New York City Department of Health and Canadian guidelines on managing toxigenic molds indicate that indoor sources of mold growth can cause detrimental health effects.

Assessment of microbial contamination in wall cavities presents a number of problems. Destructive testing may involve regulated issues, such as those encountered with asbestos, lead, and the National Emission Standard for Hazardous Air Pollutants. Typical destructive testing performed to gain access for visible inspection and surface sampling should be avoided. In addition to the aesthetic issues associated with destructive testing, there are potential hazards to the sampling technician and occupants should the wall penetration expose mycotoxigenic fungi to the ambient indoor air. In response to these issues, the WallChek® has been developed. The WallChek® Adapter is a novel non-destructive sampling device for assessing microbial contamination in wall cavities.



WallChek® Adapter

The WallChek® is a hollow cylindrical tube 2.5" in length and 1" in diameter. One end of the tube is machined to attach to the Air-O-Cell® cassette, the other is sealed, except for a ¼" tapered hole into which a 12" section of ¼" PVC tubing is inserted.

Air-O-Cell® Cassettes

The Air-O-Cell® is a particulate sampling cassette designed for the rapid collection and analysis of a wide range of airborne aerosols including mold spores, pollen, insect parts, and skin fragments. This sampling device is useful in providing rapid analysis of airborne contaminants in indoor air quality testing, allergy testing, and flood restoration monitoring.

APPLICATION AND INTERPRETATION

The WallChek® II has been developed as a useful tool to add to an investigator's arsenal of sampling methods when performing indoor bioaerosol investigations. In order to properly develop a sampling plan to test hypotheses formed for an investigation, the investigator should recognize the proper applicability of each sampling technology available for identifying microbiological contamination indoors.

The primary purpose of the WallChek® is to non-destructively assess fungal contamination within a wall cavity. The WallChek® II is used in conjunction with an Air-O-Cell® Cassette, which within itself has a well-defined scope of application. The Air-O-Cell® Cassette utilizes spore-trap technology for the microscopic analysis of fungal spores, pollen, dust particles, and fibers. Most common fungal genera can be positively identified including *Stachybotrys* spores. Fungi such as *Penicillium* and *Aspergillus* can also be identified, but may be grouped together as indistinguishable. This method is not applicable to environmental bacteria, amebae, viruses, endotoxins, or fungal toxins. Additional limitations may be presented if the WallChek® II sampling method is not followed precisely. Gypsum dust from within wallboards will be trapped on the Air-O-Cell® cassette along with any other dust or airborne particulates within the wall cavity. When excessive dust is trapped on the cassette, accurate microscopic analysis cannot be performed due to the masking of the mold spores by the gypsum dust. As described in the sample collection method, special care must be taken to avoid aerosolization of this dust when using the WallChek® II device.

A factor to consider when sampling with the WallChek® II device is the amount of moisture present in the wall cavity. Excessive moisture may inhibit aerosolization of mold spores from surfaces. Moisture measurements can be taken to assess the moisture content of the wall when sampling to ensure the highest recovery of mold spores with the WallChek® II device.

When used correctly, the WallChek® II device can reliably identify sources of fungal growth within wall cavities, which may not be visible from within the room. As with all indoor microbial investigations, interpretation is subjective and should be based on comparing total numbers and ranking of fungal genera of suspect and control sample locations. Typically, microbial growth within walls are dominated by a few genera therefore, growth that has developed to the point of being detected using this system, may not have developed to the point of being visible to the naked eye.

Data interpretation may be significantly impacted by dilution factors. The number of genera on a sample from within a 4" wall would be very different from a 12" plumbing wall simply because of the volume of air available for the spores/conidia dispersal; hence, it is strongly suggested that blue prints be reviewed when conducting WallChek® II sampling in commercial settings.

RECOMENDED SAMPLING EQUIPMENT

WallChek® Adapter
Hand Drill or a variable speed drill with ¼" drill bit
Stud Finder
Vacuum Pump capable of pulling 15Lpm
(Rotary Vane or Em-Lite II)
Rotameter
Flexible PVC Tubing
Isopropyl Alcohol Wipes
Air-O-Cell® Cassettes
WallChek® In-Line Filter

SAMPLING METHOD

Wall preparation for sampling

- Select wall cavity for sampling. This can be determined from visual inspection or through historical information of water intrusion.
- Using a hand drill, slowly drill a ¼" hole 3" to 6" above the floor. Rapid drilling could result in increased aerosolized dust from the wallboard.

Wall Sampling

- Clean the inside of the WallChek® Adapter with an alcohol wipe.
- Slowly insert the ¼" tubing until the tip has reached the back of the wall cavity. This may not always be possible due to insulation or other obstructions within the wall cavity.
- Attach an Air-O-Cell® cassette to the WallChek® Adapter. This is not the cassette to be submitted for analysis; it is used to vacuum excess dust and debris from the sampling penetration area and can be reused many times.
- Gently tap on the wall two times approximately 4' above and 4' to each side of the wall penetration.
- Attach the tubing from the sampling pump to the "vacuum" cassette and turn pump on for 5-10 seconds.
- Turn pump off and remove "vacuum" cassette. Cassette can be re-used do not discard.

Air-O-Cell® Cassettes

- Remove the tape seal covering from the round end of the cassette and place it on the side of the device.
- Connect the Air-O-Cell® Adapter to the round end of the cassette and then insert the adapter into the tubing.
- Remove tape seal from inlet of the Air-O-Cell® cassette and place it on the side of the device.
- Connect Air-O-Cell® cassette to the WallChek® adapter without disturbing the tubing in the wall.
- Turn on the pump and draw air at 15Lpm for 2 minutes.
- Ensure the sample flow does not vary during sampling.
- Turn pump off disconnect Air-O-Cell® cassette from WallChek® Adapter and replace seals on the cassette.
- Using a permanent marker label the cassette with the sample information, matching this information along with the serial number of the cassette to the sample information on the chain of custody.
- Record the flow rate and sampling time or the total volume collected on the chain of custody.
- Secure the samples and the chain of custody in a shipping container (no refrigeration needed) and ship to the laboratory for analysis.

QUALITY CONTROL

The vacuum pump should be calibrated with a rotameter prior to use and recalibrated when non-standard temperatures or pressures are encountered. It may be useful to sample a non-suspect wall cavity and/or other sources of wall entrainment as a negative control.

Flow Meter Calibration

- Measure the flow rate of the sampling pump with a rotameter that has been calibrated to a primary standard.
- Do not place cassette in line while calibrating the flow meter.
- Flow meter should be calibrated regularly to a primary standard.
- Calibration data should be recorded in a calibration log.
- Adjust the flow of the pump to 15Lpm.
- Turn pump off.

Clean WallChek® with water (or isopropyl alcohol) and thoroughly dry. Failure to completely dry the unit may adversely effect the next sample taken. Use of the <0.8µ in-line filter will assist in the control of aerosolization of spores from within the wall cavity.

LABORATORY ANALYSES

If samples are to be sent to a commercial laboratory it is **strongly recommended** using a laboratory that has been proficiency tested and accredited by the American Industrial Hygiene Association's (AIHA) EMLAP programs whenever possible. It is strongly recommended that analyses be performed by reading the slide at 600X (or greater) power.

SAMPLE SUBMISSION

It is essential to ensure sample integrity from initial collection to final reporting. This includes the ability to trace possession of the sample from the collection point to receipt at the laboratory. All samples submitted to a laboratory should be accompanied by a completed Chain of Custody form. This form contains fields for reporting, sample identification, analyses requested, and other important information.

All individual sample containers should be properly labeled with sample identification. Each sample should also be sealed in a zip type bag or other suitable container to prevent any contamination during shipping.

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