

## Mold

### I. Introduction

Many buildings are being left vacant due to the shelter-in-place requirements directly attributed to the COVID-19 pandemic. One concern for vacant buildings is the growth of mold.

Much of the present day concern about “toxic mold,” especially *Stachybotrys chartarum*, is due to its identification in the mid-1990s in the homes of a small number of Cleveland, Ohio infants with an unusual form of lung bleeding. Although the Centers for Disease Control and Prevention (CDC) concluded that a possible association between the lung bleeding in the infants and exposure to molds, specifically *Stachybotrys chartarum*, was not proven, mold continues to evoke fear in the public.

This Sompo Advisor was developed from “Indoor Air Quality Investigative Guidelines”, published by the Department of Health and Human Services, U.S. Public Health Service (June 2003), and other sources.

### II. Health Effects

Fungi are present almost everywhere in the indoor and outdoor environments. Except for persons with severely impaired immune systems, indoor mold is not a source of fungal infections. Current scientific evidence does not support the proposition that human health has been adversely affected by inhaled mycotoxins in home, school, or office environments. Furthermore, studies have failed to show a causal relationship between the presence of toxigenic mold species and adverse health effects. Most of the evidence of severe health effects of fungi in humans is derived from ingestion of contaminated foods, i.e., grain and peanut products; or occupational exposures in agricultural settings where inhalation exposures were very high. Indeed, in certain agricultural work settings such diseases as farmer’s lung, grain fever, silo unloader’s syndrome, among others, are collectively known as Organic Dust Toxic Syndrome (ODTS).

Also, at these high exposures, a Type-III allergic reaction can occur, known as hypersensitivity pneumonitis (HP). With the possible exception of remediation to very heavily contaminated indoor environments, such high-level exposures are not expected to occur while performing remedial work.

It is believed that all fungi produce allergenic substances, however, relatively few have been tested for allergenicity. Fungal allergies are common: 10% of the general population and 40% of asthmatic patients are allergic to fungi. While serious allergic reactions to mold can occur, such as the above-mentioned hypersensitivity pneumonitis, these reactions have been shown

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to occur only at very high occupational concentrations of fungal spores and fragments. These concentrations occur at levels several orders of magnitude higher than typical levels found in the indoor environment.

The most commonly reported health effect resulting from mold exposure is immediate hypersensitivity. This is a Type I, IgE – mediated sensitization reaction whose clinical manifestations can vary from urticarial skin reactions (wheals and flares) to signs of hay fever (rhinitis and conjunctivitis), and among asthmatics can be a precursor to asthma attacks.

Workers performing remediation, renovations, or cleaning of widespread fungal contamination may be at risk for developing ODS or HP. A variety of biological agents may cause ODS including common species of fungi and ODS may occur after a single heavy exposure to dust contaminated with fungi and produces flu-like symptoms. ODS differs from HP in that it is not an immune-mediated disease and does not require repeated exposures to the same causative agent. HP may occur after repeated exposures to an allergen and can result in permanent lung damage.

### III. Causes and Controls

Fungi live in nearly all environments, indoors, outdoors, and on or within other living creatures, including humans. Since all fungi, including molds, lack chlorophyll, they must obtain nutrients from organic material. In addition to organic nutrients, molds also must have a water source for survival. Moisture problems such as flooding, roof leaks, plumbing leaks, sewage backup, groundwater infiltration, and high relative humidity levels above 70%, can cause an explosive growth of mold, dust mites, bacteria, and other biological agents. Swamp coolers increase humidity levels which promote and increase the growth of biological agents. Building materials supporting fungal growth must be remediated as rapidly as possible in order to ensure a healthy environment. Repair of the defects that lead to water accumulation or elevated humidity should be conducted in conjunction with or prior to fungal remediation.

Nearly all buildings will have some form of water problem during their lifetime. Appropriate management of these water problems will reduce microbial growth. In all situations, the underlying cause of water accumulation must be rectified or fungal growth will recur. Any initial water infiltration should be stopped and cleaned immediately. If the source of water is elevated humidity, dehumidification will be required to maintain/reduce levels below 60% to inhibit mold growth. Emphasis should be placed on ensuring proper repairs of the building infrastructure so that water damage and moisture buildup does not recur.

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### IV. Assessment

Generally, the following should be considered when performing a visual mold assessment:

- Look for visible mold growth (may appear cottony, velvety, granular, or leathery and have varied colors of white, gray, brown, black, yellow, green). Mold often appears as discoloration, staining, or fuzzy growth on the surface of building materials or furnishings. When mold is visible, testing is not recommended.
- Search areas with noticeable mold odors using your sense of smell to locate the source(s). “Mold odors” are typically described as “earthy” or “musty.” Not all mold growth produces noticeable odors and dormant or dead mold will not be odorous. However, when such odors are detected they are a reasonable indicator of mold, bacteria and wetness.
- Look for signs of excess moisture or water damage. Look for water leaks, standing water, water stains, and condensation problems.
- Search behind and underneath materials (carpet and pad, wallpaper, vinyl flooring, sink cabinets), furniture, or stored items (especially things placed near outside walls or on cold floors).
- Examine or survey suspected areas with a moisture meter to determine locations of elevated moisture within materials or at surfaces in problem areas. Pay attention to colder surfaces, slab floors, hidden spaces, and areas of poor air circulation. Note that a measurement of relative humidity in room air can fail to identify excess moisture because it is not an indicator of the amount of humidity or condensation available to mold growing on a cool surface.

Tools for this inspection include appropriate personal protective equipment such as disposable rubber gloves and respiratory protection depending on the extent of mold growth, a flashlight, moisture meter, a camera, building plans, a ladder, and a tape measure.

Testing - Sampling should rarely, if ever, be performed. If mold growth is identified, the moisture source must be eliminated and the mold growth abated, regardless of the species involved. If a thorough initial assessment fails to identify the problem and there is still reason to suspect mold growth, then sampling by a qualified professional familiar with current guidelines, using a laboratory accredited through the Environmental Microbiology Laboratory Accreditation Program (EMLAP), may be warranted.

However, all testing methods for mold have limitations that can confound the interpretation of results. Depending on a number of factors, these limitations can over- or under-estimate spore concentrations. Moreover, given the lack of established health risks, there is little benefit to identifying the species of mold.

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### V. Mold Abatement

The primary response to fungal contamination in buildings is the prompt remediation of contaminated material and infrastructure repair. The goal of remediation is to remove or clean contaminated materials in a way that prevents the emission of fungi and dust contaminated with fungi from leaving a work area and entering an occupied or non-abatement area while protecting the health of workers performing the abatement.

Precautions taken should include:

- proper training of remediation workers
- personal protective equipment
- work practices to eliminate worker exposures
- isolation of the area of contamination
- prevention of the spread of contamination out of the abatement area

The simplest and most expedient remediation that properly and safely removes fungal growth from buildings should be used. An immediate response (within 24 to 48 hours) and thorough drying, and/or removal of water damaged materials will prevent or limit mold growth.

The use of gaseous, vapor-phase, or aerosolized biocides for remedial purposes is not recommended. Emphasis should be placed on preventing contamination through proper building construction and maintenance and prompt repair of water damaged areas. **Air, bulk, or surface sampling should not be part of a routine assessment and are not required to undertake a remediation.**

Effective communication with building occupants is an essential component of all remedial efforts. Group meetings held before and after remediation with full disclosure of plans and results can be an effective communication mechanism. Individuals complaining of persistent health problems should be referred to their private physician.

The table on the following page contains the EPA recommended guidelines regarding cleaning materials to prevent mold growth within the 24 to 48 hour time frame.

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### VI. Assistance

For additional information or assistance with mold problems, contact your Sompo International Risk Control Team or email us at: [GRSRiskControlQuestions@sompo-intl.com](mailto:GRSRiskControlQuestions@sompo-intl.com).

#### EPA Recommended Mold Cleanup and Prevention Guidelines

Water Damage – Cleanup and Mold Prevention	
Guidelines for Response to Clean Water Damage within 24-48 Hours to Prevent Mold Growth*	
Water-Damaged Material†	Actions
<ul style="list-style-type: none"> <li>➤ Books and papers</li> </ul>	<ul style="list-style-type: none"> <li>➤ For non-valuable items, discard books and papers.</li> <li>➤ Photocopy valuable/important items, discard originals.</li> <li>➤ Freeze (in frost-free freezer or meat locker) or freeze-dry.</li> </ul>
<ul style="list-style-type: none"> <li>➤ Carpet and backing – dry within 24-48 hours§</li> </ul>	<ul style="list-style-type: none"> <li>➤ Remove water with water extraction vacuum.</li> <li>➤ Reduce ambient humidity levels with dehumidifier.</li> <li>➤ Accelerate drying process with fans.</li> </ul>
<ul style="list-style-type: none"> <li>➤ Ceiling tiles</li> </ul>	<ul style="list-style-type: none"> <li>➤ Discard and replace.</li> </ul>
<ul style="list-style-type: none"> <li>➤ Cellulose insulation</li> </ul>	<ul style="list-style-type: none"> <li>➤ Discard and replace.</li> </ul>
<ul style="list-style-type: none"> <li>➤ Concrete or cinder block surfaces</li> </ul>	<ul style="list-style-type: none"> <li>➤ Remove water with water extraction vacuum.</li> <li>➤ Accelerate drying process with dehumidifiers, fans, and/or heaters.</li> </ul>
<ul style="list-style-type: none"> <li>➤ Fiberglass insulation</li> </ul>	<ul style="list-style-type: none"> <li>➤ Discard and replace.</li> </ul>
<ul style="list-style-type: none"> <li>➤ Hard surface, porous flooring§ (Linoleum, ceramic tile, vinyl)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Vacuum or damp wipe with water and mild detergent and allow to dry; scrub if necessary.</li> <li>➤ Check to make sure underflooring is dry; dry underflooring if necessary.</li> </ul>
<ul style="list-style-type: none"> <li>➤ Non-porous, hard surfaces (Plastics, metals)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Vacuum or damp wipe with water and mild detergent and allow to dry; scrub if necessary.</li> </ul>
<ul style="list-style-type: none"> <li>➤ Upholstered furniture</li> </ul>	<ul style="list-style-type: none"> <li>➤ Remove water with water extraction vacuum.</li> <li>➤ Accelerate drying process with dehumidifiers, fans, and/or heaters.</li> <li>➤ May be difficult to completely dry within 48 hours. If the piece is valuable, you may wish to consult a restoration/water damage professional who specializes in furniture.</li> </ul>
<ul style="list-style-type: none"> <li>➤ Wallboard (Drywall and gypsum board)</li> </ul>	<ul style="list-style-type: none"> <li>➤ May be dried in place if there is no obvious swelling and the seams are intact. If not, remove, discard, and replace.</li> <li>➤ Ventilate the wall cavity, if possible</li> </ul>
<ul style="list-style-type: none"> <li>➤ Window drapes</li> </ul>	<ul style="list-style-type: none"> <li>➤ Follow laundering or cleaning instructions recommended by the manufacturer.</li> </ul>
<ul style="list-style-type: none"> <li>➤ Wood surfaces</li> </ul>	<ul style="list-style-type: none"> <li>➤ Remove moisture immediately and use dehumidifiers, gentle heat, and fans for drying. (Use caution when applying heat to hardwood floors.)</li> <li>➤ Treated or finished wood surfaces may be cleaned with mild detergent and clean water and allowed to dry.</li> <li>➤ Wet paneling should be pried away from wall for drying.</li> </ul>

\* Even if materials are dried within 48 hours, mold growth may have occurred. Items may be tested by professionals if there is doubt. Note that mold growth will not always occur after 48 hours; this is only a guideline.

These guidelines are for damage caused by clean water. If you know or suspect that the water source is contaminated with sewage, or chemical or biological pollutants, then Personal Protective Equipment and containment are required by OSHA. An experienced professional should be consulted if you and/or your remediators do not have expertise remediating in contaminated water situations. Do not use fans before determining that the water is clean or sanitary.

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† If a particular item(s) has high monetary or sentimental value, you may wish to consult a restoration/water damage specialist.

§ The subfloor under the carpet or other flooring material must also be cleaned and dried. See the appropriate section of this table for recommended actions depending on the composition of the subfloor.