

## Mold Contamination Risk Reductions

*Uncontrolled growth of mold and bacteria indoors can expose employees and occupants to unhealthy conditions, result in property damage, and impair the use of buildings. Although the compensability of exposure to indoor mold is often debatable, the response to, and defense of these claims, can consume resources. Since mold and bacteria are naturally present in indoor environments, the recognition of those factors that promote their growth indoors is critical to control their amplification. The key to biological contaminant control is to prevent water from entering the building and to control the relative humidity inside.*

### **Water Intrusion**

Roof leaks, plumbing leaks or sewer back-ups that allow water into the structure are often the triggering event that leads to a mold and bacteria problem. Water intrusion that occurs during construction and renovations is also associated with uncontrolled mold growth. The key to control is preventive maintenance of building systems, as well as regular inspections to identify leaks. Thorough planning prior to construction activities is critical to avoid moisture from entering the structure. Consideration should be given to protecting construction materials from precipitation once they are delivered to the site. Additionally, building openings should be protected when possible to reduce the amount of moisture that enters the interior of the structure during the construction process.

Local weather conditions influence the degree of mold risk. Buildings located in areas with high precipitation or persistent high humidity must defend against the outdoor conditions. In order to control indoor mold growth, the humidity should be kept below 60% relative humidity. Properties located within flood plain areas may also need special design considerations such as sump pumps, moisture barriers, and exterior grading to prevent rising surface and ground water from entering the structure. Properties in the 100-year flood plain should be evaluated for suitability. Basements and crawlspaces that are persistently high in humidity can be sources of mold within the structure that can damage stored contents and building structure integrity.

Interior moisture sources can also contribute to the humidity levels within the structure. Indoor pools, spas, laundries or other wet processes add a significant moisture load. The heating, ventilation and air conditioning (HVAC) systems need to be designed to handle the excess moisture load to remove the moisture from the structure.

Buildings that have a history of water leaks present a higher degree of mold risk. Persistent small leaks that are not resolved, such as small roof leaks or leaks around window frames, are commonly associated with uncontrolled mold growth. More extensive leaks that take longer than two days to clean up and to dehumidify the area are also high risk indicators. If porous or semi-porous materials have been wetted and remain within the building, these materials are likely to harbor mold growth. Buildings constructed of biodegradable materials are also likely to harbor biological activity as the building envelope and structure members can absorb moisture.

### **Building Maintenance**

Preventive maintenance of HVAC, plumbing and other building systems can reduce the potential for mold growth. Building owners that disregard HVAC maintenance of basic components such as filter changes and condensate drains are at increased risk. HVAC systems that cycle off during non-occupancy hours to save energy can result in fluctuations in temperature and humidity conditions, which may promote mold growth. Undersized and oversized HVAC systems are also associated with inadequate moisture control.

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### **Visible Mold Growth**

The New York City Department of Health has published Guidelines on Assessment and Remediation of Fungi in Indoor Environments. The Guidelines help to define the potential degree of risk and provide suggested cleanup methods based on the extent of damage and the building materials involved. These guidelines outline general abatement strategies based on the square footage of moldy area.

The levels are defined as follows:

- Level I: Small Isolated Areas (10 square feet or less) - e.g., ceiling tiles, small areas on walls
- Level II: Mid-Sized Isolated Areas (10 - 30 square feet) - e.g., individual wallboard panels
- Level III: Large Isolated Areas (30 - 100square feet) - e.g., several wallboard panels
- Level IV: Extensive Contamination (greater than 100 contiguous square feet in an area)
- Level V: Remediation of HVAC Systems

Additionally, The EPA Document "Mold Remediation in Schools and Commercial Buildings" provides guidance on cleanup methods, personal protective equipment (PPE), and type of containment suggested.

### **Cleanup Methods**

If mold growth has been a problem in the past, or if remediation has occurred, the cleanup methods used can be an indication of the probability of a reoccurrence. If cleanup was slow to occur (more than 2 days) after the leak, and if it was limited to air drying and vacuuming up water, there may be the chance that the cleanup was inadequate.

Cleanup should include:

- Discarding water damaged porous and semi-porous materials
- HEPA vacuuming
- Containment of work areas
- Dehumidification
- Clearance inspections and sampling

### **Reducing Mold Risk**

The New York City Department of Health Guidelines, citing ASHRAE 55-1992, suggest that:

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. An immediate response (within 24 to 48 hours) and thorough cleanup, drying, and/or removal of water damaged materials will prevent or limit mold growth. If the source of water is elevated humidity, relative humidity should be maintained at levels below 60% to inhibit mold growth. Emphasis should be on ensuring proper repairs of the building infrastructure, so that water damage and moisture buildup do not recur. (Section 3, Remediation, Guidelines on Assessment and Remediation of Fungi in Indoor Environments, New York City Department of Health)

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To reduce your risk of indoor mold contamination, consider the following when purchasing and managing properties:

- Avoid basements
- Do not locate in a flood plain
- Any visible mold should be less than 10 square feet
- Design to handle excess humidity sources
- Maintain roofs and plumbing systems to prevent sudden or chronic leaks
- Choose non-biodegradable building materials
- Avoid properties that have a history of water leaks
- Assure recent renovations did not allow water intrusion or use wetted construction materials
- Assure HVAC systems are maintained and run continuously to control temperature and humidity levels
- Any cleanups should be done within 48 hours using documented processing for containment dehumidification, and disposal of wet porous and non-porous materials