Mold Remediation Overview

Hurricane flood waters have receded, leaving a mess and a growing health hazard - MOLD

Mold – Hazardous to Workers' Health

Flood waters caused by hurricanes, rising rivers from torrential rains, and other natural disasters can leave a wake of destruction. After the immediate clean-up, workers are left with a major health hazard — mold. Many types of mold are innocuous, but other types can be extremely toxic. Prolonged exposure to mold, even benign or dead mold, can result in a heightened sensitivity, leading to allergic reactions.

What is Mold?

Molds are fungi that can be found anywhere, growing on virtually any substance. All that is needed is moisture, oxygen and an organic source. Molds reproduce by creating tiny spores, which continually float through the air. Most molds are harmless, but some can cause respiratory and other disorders when workers come in contact with fungi. Inhalation is the route of exposure of most concern to flood cleanup workers. Molds and their spores are particulates. But some molds, mold remediation methods and other factors in the environment may require more than an N95 respirator for protection. Any remediation work that disturbs mold and causes mold spores to become airborne increases the degree of respiratory exposure.

What Are the Causes of Mold?

Molds are fungi and are part of the natural environment, they can be found anywhere - inside or outside - throughout the year. About 1,000 species of mold can be found in the United States, with more than 100,000 known species worldwide. Outdoors, molds play an important role in nature by breaking down organic matter.

Indoors, mold growth should be avoided. Problems may arise when mold starts eating away at structural materials and personal possessions, affecting the look, the smell, and possibly affecting the structural integrity of wood framed buildings and homes. Molds can grow on virtually any substance, as long as three elements are present - moisture or water, oxygen, and an organic source. Molds reproduce by creating tiny spores - viable seeds, visible only through magnification - that float through our indoor and outdoor air. When these spores land on a damp spot and begin to grow, they digest whatever organic matter they land on to survive. When moisture or water leaks go unchecked, molds will grow on wood, paper, carpet, walls and insulation - feasting on everyday dust and dirt that gather in moist areas. All molds share the characteristics of growing without sunlight - this explains why mold infestation is often found in damp, dark, hidden spaces like under carpets and behind walls. Light and air circulation allow moisture to dry-up making those areas less hospitable for mold.

Disaster Recovery – What Are My Risks and How Can I Protect Myself?

Flood conditions contribute to the growth and transmission of many kinds of fungi (mold), some of which can cause sickness. Cleanup workers are at an increased risk of exposure to airborne fungi and their spores because workers often handle moldy building materials, decaying vegetable matter, rotting waste material, and other fungus-contaminated debris during clean-up.

One particularly toxic type of mold is Stachybotrys chartarum, a greenish-black mold that grows on materials with high cellulose content (drywall, wood, paper, ceiling tiles) that are chronically wet or moist. Stachybotrys is one of several molds that can produce mycotoxins - the effects of which are not completely understood, but which are known to cause some health risks.

Without wearing the proper respiratory protection, a worker inhales the fungal material - or spores, into the respiratory tract via airborne dust particles. There are many different kinds of fungi, including mildew, molds, rusts, and yeasts. Most of these are harmless, but some can cause respiratory issues, including allergies, asthma, infection or toxic effects when workers inhale or come into contact with fungi. Inhalation is the route of exposure of most concern to flood cleanup workers - respiratory protection for workers in cleanup areas is vital to health. Minimally, workers should protect themselves by wearing an N95 disposable mask - for more severe areas a half-mask respirator with P100 filters and for areas with high mold and fumes from clean-up chemicals, a full facepiece with organic vapor cartridge and P100 filter. For better understanding of your personal protection needs, a Safety Expert should be consulted.

NIOSH and OSHA Recommendations

There are no federal government standards or regulations for mold exposure. However, government agencies have provided guidelines on personal protective equipment (PPE) for workers. The level of protection recommended increases with the size and scope of the infected site. At a minimum, an N95 respirator, gloves, and goggles are recommended. Full protection includes a full-facepiece respirator with P100 filters, body suit, boots, gloves, and head protection. Molds are fungi that can be found anywhere, growing on virtually any substance. All that is needed for growth is moisture, oxygen, and an organic source. Molds reproduce by creating tiny spores, which continually float through the air. Most molds are harmless, but some can cause respiratory and other disorders when workers come in contact with fungi. Inhalation is the route of exposure of most concern to flood cleanup workers. Molds and their spores are particulates. But with some molds, remediation methods and other factors in the environment may require more than an N95 respirator for protection. Any remediation work that disturbs mold and mold spores, and causes them to become airborne, increases the degree of respiratory exposure.

Mold Remediation Q&A

Q1: **What is mold?**
A1: Molds are fungi that can be found anywhere, growing on virtually any substance. All that is needed is moisture, oxygen, and an organic source. Molds reproduce by creating tiny spores, which continually float through the air. Molds and mold spores are classified as particulates when considering respiratory protection.

Q2: **Are molds harmful?**
A2: Most molds are harmless — think of cheese and mushrooms, but some molds can cause respiratory and other disorders. Persons with allergies are particularly susceptible. Prolonged exposure to mold can cause some people to become sensitized. People with weakened immune systems or chronic lung disease may develop mold infections in their lungs.

Q3: **What kind of exposures to mold should I be concerned about?**
A3: Mold inhalation is the route of exposure of most concern. Molds reproduce by creating tiny spores which continually float through the air. Mold can also become airborne when it is disturbed during cleanup. Direct contact with mold can cause dermatitis on people who are allergic to mold.

Q4: **I don't see any mold. How do I know if it is present?**
A4: Visual signs are usually the best way to tell if mold is present. But, mold grows in hidden places, such as behind walls. You can also have the air monitored to detect the presence of mold, but it is expensive and should be done by someone trained in microbial investigations.

Q5: **Even if you have killed the mold with a biocide (chlorine or other solution), is it still dangerous?**
A5: Yes. Even dead mold can cause allergic reactions.

Q6: **What is the Permissible Exposure Limit (PEL) for mold?**
A6: There is no established PEL or Threshold Limit Value (TLV) for mold.

Q7: **What type of respirator is required for protection from mold?**
A7: Since there are no established Permissible Exposure Levels, there is no specific type of respirator that is required. However, certain federal agencies, particularly the Environmental Protection Agency (EPA), do provide recommendations.

Q8: **Are there U.S. standards that regulate worker exposure to mold?**
A8: There are no federal standards or regulations that address respiratory protection from mold and mold spores. EPA recommends a respirator with N95 or P100 filters.

Q9: **What respirator does Honeywell Safety Products recommend?**
A9: Depending on the size of the remediation job, the biocides used and other contaminants that may be present, Honeywell recommends an N95 respirator as the most basic protection. More protection will be provided with a half-mask or full facepiece with OV/AG/P100 or Multi-Contaminant like the Defender full-facepiece respirator with P100 filters. For larger remediation jobs, a powered air-purifying respirator (PAPR) with OV/AG/HEPA may be desired. For unknown hazards, potential IDLH, or confined space, a PD-SAR or SCBA may be needed.

Q10: **Why does Honeywell Safety Products recommend an Organic Vapor / Acid Gas cartridge filter combination since mold is a particulate?**
A10: Workers need to be protected from the solutions used to remediate the mold, usually an acid gas. Some molds give off gases and vapors referred to as microbial volatile organic compounds (MVOC).

Q11: **Should I always use an Organic Vapor / Acid Gas cartridge filter combination?**
A11: No. If you know that there are no other contaminants present, that the mold is not emitting gases or vapors, and the work being done is tearing down infected substances rather than using a biocide to kill mold, then a particulate filter would be sufficient. But if you are unsure, we recommend the added protection of an OV/AG filter combination.

Q12: **Why does Honeywell Safety Products recommend a P100 instead of an N95 filter for some exposures?**
A12: While there are no PELs established for mold, workers would benefit from a P100 when exposed to higher concentrations of mold. Other contaminants must also be considered, most especially the presence of lead and asbestos in older buildings.

Q13: **What other contaminants are present?**
A13: Lead, asbestos, organic vapors, acid gases - P100 class filter with a gas and/or vapor cartridge may be required. Higher concentrations may require a powered air purifying respirator (PAPR) or continuous flow supplied air respirator (CF-SAR). Concentrations above 1000 times the PEL will require a pressure demand supplied airline respirator (PD-SAR) or Self-Contained Breathing Apparatus (SCBA).

Q14: **Is there oil present in the atmosphere?**
Q14: An R (Restricted to 8 hours use) or P (oil Proof – no restrictions) class filter is required.

Q15: **Can some molds emit toxic vapors or gases that can make workers ill?**
A15: Yes, chemical cartridges may be needed.

Q16: What other chemicals are being introduced to scrub down the area?
A16: EPA & CDC recommend a bleach solution - in which Acid Gas cartridges may be needed. If the area is poorly ventilated or if concentrations exceed 10 times the PEL for half masks and 50 times for full facepieces, a PAPR or CF-SAR will be required. Concentrations above 1000 times the PEL will require a PD-SAR or SCBA.

Q17: What if there are there large concentrations of mold in a poorly ventilated area?
A17: Higher concentrations may require a PAPR or CF-SAR. Concentrations above 1000 times the PEL will require a PD-SAR or SCBA.

Q18: What is the best recommendation if the site concentrations are Immediately Dangerous to Life or Health (IDLH), or have the potential to become IDLH?
A18: A PD-SAR with an escape cylinder or an SCBA is required.

Q19: What gloves should I use?
A19: Gloves that will keep mold from direct contact with the skin are desired. Also, consider all the other chemicals that may be present, including the solutions used to kill mold. Nitrile gloves would offer sufficient protection for most applications. Refer to the North® Selection Guide for more information.

Q20: Why do I need eye protection?
A20: Mold and mold spores can be an eye irritant. Goggles should be worn with half mask and disposable respirators. For prolonged exposure or for remediation of large areas (more than 100 sq ft), a full facepiece is recommended.

For more information
www.honeywellsafety.com
Technical Service: 800.873.5242

Honeywell Industrial Safety
900 Douglas Pike
Smithfield, RI 02917

USA
Phone: 800.430.5490
Fax: 800.322.1330

CANADA
Phone: 888.212.7233
Phone: 888.667.8477

www.honeywell.com