



Things you should know about removing Mold from your attic

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Removing Mold from Attic Sheathing

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One of the areas most prone to mold growth is the **underside of roof sheathing**. This is frequently due to poor ventilation of the attic space, poorly installed or insufficient insulation, water incursion from a roof or siding leak, or incorrect venting from bathrooms, clothes dryers or kitchens. Warm moist air from the house can leak into the attic space and cause condensation of water vapor on cold attic surfaces including roof rafters or trusses and roof sheathing. This can also lead to ice damming with resultant roof damage and water leaks.

Mold growth on the underside of attic sheathing is also one of the most difficult areas to clean due to poor access, tight quarters, lack of flooring, presence of roofing nails and uncomfortable temperature extremes. This article addresses the various methods available to tackle mold removal in this difficult area and the pluses and minuses of the different technologies.

Of course, prior to determining what type of remediation is necessary, it is important to confirm that the contaminant is indeed mold. Many times discoloration of attic sheathing is due to reasons unrelated to mold growth such as the presence of soot, paint spatter, wood preservatives, etc. Microscopic examination of a surface tape or swab sample is the best method available to definitively confirm mold growth.

While no one will argue that mold removal is unnecessary as it can lead to rot and structural damage, mold growth in the attic usually does not impact the quality of air in the home since the natural flow of warm house air is up into the attic space and not the reverse. There are, however, some instances where HVAC systems located in attics have been known to spread mold spores to other areas of the home. In addition, the presence of visible attic mold is enough to derail a house sale.

It should be recognized that the presence of mold on any surface is a symptom of a water problem. It is therefore important to identify the source(s) of the problem and correct it (them) prior to beginning a remediation program. If not, then all your efforts will be for naught as the problem will come back to haunt you. Post-remediation testing is also recommended to determine if the mold issues have been appropriately resolved and if adequate cleanup has been achieved.

Specialized remediation methods have been developed with varying success to deal with removal of mold from the attic area. All of these techniques require the use of containment to prevent the spread of bioaerosols and particulates to other areas of the home. They also require the use of personal protective equipment (PPE) to protect the remediator. Depending on the size of the affected area and method employed, this equipment may include, at a minimum, an N95 respirator as well as eye, hand and clothing protection to prevent exposure to airborne contaminants.

The following methods are currently still available to address remediation of mold particularly in attic sheathing, although many may also be appropriate to address mold in other areas of the home as well:

Removal – Removal of the affected materials should be considered based on the age of the roof, particularly when structural integrity is compromised or cost of replacement is less than the cost of remediation. Guidelines published by ACGIH, AIHA, RIA, IICRC, N.Y. City DOH and OSHA state that all mold growth should be removed unless it is not possible and then alternative methods to prevent exposure should be considered.

Hand or Power Sanding or Wire Brushing

This is the traditional method of mold removal which involves a combination of HEPA vacuuming, damp wiping with a detergent or perhaps spraying with an anti-microbial agent, and finishing with a sealant.

Sanding or wire brushing works well for small areas and is highly effective at mold removal, especially if there is little staining or penetration of molds into the wood structure. There is minimal time required for setup and tear down, and equipment expenses and maintenance are low.

Although it is physically possible to remove mold by sanding or wire brushing if the surfaces are smooth, it is a slow labor-intensive process when surfaces are rough and it is impractical for larger areas. It is also difficult to achieve complete removal due to mold hyphae penetrating into the wood surface and the large number of roofing nails.

Labor costs can also be significant. Following treatment, the area must be HEPA vacuumed and the air scrubbed to remove residual bioaerosols. Many times a sealant is also used, but this process can trap moisture which can lead to warping and decay of the sheathing and may cover up incompletely resolved mold issues.

Dry Ice Blasting (CO2 Blasting or Cryogenic Blasting)

In this process dry ice particles (frozen carbon dioxide), at a temperature of -109.3 F, are sent as a pressurized air stream onto a surface.

Dry ice blasting is efficient and particularly effective in accessing difficult to reach areas such as gaps in framing and tight spaces. It typically removes only about 1/32 of the wood surface with enough of an abrasive action to remove the mold spores, but not enough to negatively affect the structural integrity of the wood. The process is non-toxic, non-corrosive and only minimally abrasive. It does not damage electrical wiring and cleans thoroughly and efficiently. There is very little cleanup except to vacuum the residual wood particles and mold. The equipment is almost maintenance free and durable. Usually there is no need for follow-up work because it does a thorough job; however, some hygienists recommend follow-up treatment with a sealant or anti-microbial.

On the negative side, there is a large monetary output to purchase equipment, with commercial systems routinely costing between \$10,000 and \$20,000. It is important to wear appropriate PPE to limit exposure to airborne particles and mold spores. Also, since carbon dioxide gas is a by-product of the process, it is necessary to manage oxygen levels. The crews must add fresh air into the work space and exhaust the carbon dioxide gas usually through the negative airflow with a HEPA filtration system. At least two people are needed for the operation, one to blast and one to load the dry ice. Usually these individuals switch off after a few hours due to fatigue of the blaster.

The dry ice blasting equipment is cumbersome and usually can't be brought into the work area; however, 50 to 100 foot hoses are available and can be brought into the building. Deep stains are not effectively removed by this method, leading home-owners to think that complete removal has not been achieved. It is therefore sometimes necessary to follow up with bleaching, an anti-microbial application and/or a sealant. Dry ice is expensive and in some areas there is limited availability. It comes in 500-pound bins, which are difficult to maneuver and have a limited shelf life, with freshness of the ice being an issue. Fresher ice feeds through the machine best. It is important to plan work in advance to allow for scheduling of ice deliveries.

Media Blasting

This method utilizes a pressurized stream to propel various types of abrasive media.

Sand Blasting (also called Glass Bead Blasting).

This process involves the use of a pressurized stream of various grades of sand to remove mold. It is very effective at mold removal; however, sand blasting media can have up to 70 percent crystalline silica which causes a silicosis concern due to possible inhalation. It is a very aggressive medium and leaves a residue consisting of blasting media, wood and mold which requires extensive cleanup. In addition, the considerable amount of dust generated by the process makes it difficult to see the work surface. Sand blasting is not appropriate for inhabited spaces since the

dust is difficult to contain to the work area. The sand is very inexpensive and readily available; however, based on potential negative health issues and the dust problems, sand blasting is not recommended for routine mold removal.

Soda Blasting.

This method uses a specifically formulated medium of sodium bicarbonate to remove surface mold under pressure. It is usually applied as a dry crystalline powder literally “exploding” mold off of surfaces with no heat buildup or sparks. It can be used on many different kinds of surfaces, is non-toxic, food grade, 100 percent water soluble, a natural deodorant, environmentally safe and doesn’t damage surfaces when used at the recommended pressure of 40-60 psi. It effectively cleans fungal contamination from irregular and problem surfaces cost-effectively. Also, it can successfully remove soot, which can frequently occur along with mold, from surfaces. Use of this blasting medium should be followed with HEPA vacuuming and damp wiping.

The equipment used for soda blasting is relatively inexpensive, with commercial grade units starting at approximately \$1800. The blasting media comes in five-pound bags at about \$25 per bag, which can cover approximately 150-200 square feet. Smaller blasting units can be hand-carried to reach difficult to access areas or a 50-75-foot hose is available.

Soda blasting does produce a residue which requires containment to prevent spread of dust and mold spores both inside and outside the containment areas. It is important to take special care to avoid re-contamination of the treated surfaces by airborne particulates produced by the process.

Corn Cob Blasting

This method uses a pressurized stream of ground corn cobs to remove mold. It is a very successful method for mold removal, is non-hazardous to workers and is environmentally friendly. It is safe to use around electronics, is dust free, non-sparking, leaves a clean dry surface, and since it is a soft abrasive, doesn’t cause damage to surfaces. Different grades are available for various jobs. The blasting media is inexpensive and availability is not an issue. It is easily shipped in individual 50-pound bags or bags can be pelletized.

The corn cob media is very absorbent and can absorb 400 times its weight in water, so it is an excellent drying agent. The equipment is relatively inexpensive with commercial units costing between \$1000 and \$6000. The small machines are portable and small enough to get into tight spaces; however, there are also 50 and 100 foot long hoses available to reach difficult or cramped areas.

As with other forms of particulate blasting, corn cob blasting leaves a residue that must be cleaned by sweeping or vacuuming.

Walnut Shell Blasting

Similar in function and price to corn cob blasting, this uses the same blasting equipment. Unfortunately, the media is moderately abrasive and may etch wood or affect the grain.

Other Blasting Media

Other blasting media, such as plastic or glass beads are also available, but there is limited experience regarding their use in mold removal.

Chemical Treatments (Biocides, Ozone)

Although not usually recommended, the use of anti-microbial chemicals may be used effectively in some instances and in combination with other treatment methods. It should be noted that some biocides are considered pesticides and require a pesticide applicator's license to apply. Also, fungicides developed for outside use should never be used indoors. Use of biocides and other chemicals kill the mold, but doesn't necessarily remove it. Since mold is allergenic and toxigenic whether alive or dead, leaving the dead mold in place is not recommended.

New York City Guidelines and others do not recommend biocides, believing the effectiveness of these chemical agents is unproven and may cause health concerns for people. Bleach (sodium hypochlorite), for example, is effective, but should be used with extreme caution due to its bleaching ability, corrosiveness and potential negative health concerns.

In conclusion

although the removal of mold on attic sheathing represents a particular challenge to remediators, there are numerous highly effective methods which can be employed. When using any of the aforementioned remediation technologies, it is important to use HEPA-filtered air scrubbers to remove residual airborne mold and other particulates from the air and to perform post-remediation mold testing at the conclusion of the project. This is important to verify that the mold has been effectively removed and that residual containments have not been spread to other areas of the home.

The best method of post-remediation testing involves a combination of air and surface sampling of the affected and inhabited areas of the home as well as an outside (background) sample. Sampling the inhabited areas of the home is particularly important if waste materials have been taken for disposal through those areas.

Mold removal based on the traditional method of hand or power sanding, although inexpensive, produces variable success due to the limited accessibility of many attic spaces and the presence of roofing nails. The newer methods of dry ice blasting, soda blasting, and corn cob blasting have proven to be particularly effective at cleaning mold-contaminated surfaces and achieving successful results. The remediation contractor should weigh the cost and effectiveness of the different methods when determining the appropriate technology for specific conditions.

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