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What is mold?

Molds are part of the fungal kingdom, which also includes mushrooms, wood rots, and yeasts. There are two categories of fungi:

- **Fleshy macrofungi**: This type of mold grows fruiting bodies which we call mushrooms or toadstools.
- **Powdery microfungi**: This type of mold is normally referred to as mold or mildew which produces microscopic spores all along the surface of the fungal growth.

Mold spores

Mold spores are everywhere in the natural environment. They just lay there dormant waiting to be activated. They hide out in house dust. They get tracked in on shoes and get trapped in carpeting. They fly in on air currents. They are just searching for food. When they find food, which is anything biodegradable, they land on it and wait for a water source so they can start eating. If there is no water source forthcoming, they will go dormant or die of thirst. How do you activate the mold spores? Give them water. How do you deactivate them? Take the water away. It really is that simple, get rid of the water and you get rid of the mold.

The natural environment

Look outside your window. What do you see? You see mold growth everywhere on everything. Mold is in its ***natural environment.*** The main purpose of mold is to break down dead materials such as wood and fibers (substances used in building materials). It's the ***BIO*** in biodegradable.

Mold in the natural environment

Fleshy macrofungi

The artificial environment

If mold is everywhere, then why isn't it growing all over your house? It's because your house is an ***artificial environment.*** You control the temperature and the humidity of your home. This is what I always tell my clients.

"You don't have a mold problem, you have a water problem."

General information regarding mold

It is impossible to completely eliminate all molds and mold spores indoors. Mold will always be found floating in the air and in house dust. Indoor mold growth can be prevented by controlling water and moisture indoors. Indoor humidity should be kept between 35% and 50%.
If there is mold growth in your home, you must clean up the mold and fix the water problem. If you clean the mold but do not fix the water problem, the mold will grow back.

All molds require moisture for growth. Most molds cannot start growing until the temperature reaches 39° F (4° C.) Some molds use the humidity in the air as their only water source; other molds need more moisture. ***Stachybotrys*** for instance, known as the black mold, needs a constant supply of water to continue to grow.

In a home, mold is a quantity problem. A little mold is easily removable and should not be a big concern. Mold spores become a problem when there is unchecked growth in your home. Mold spores are small, can pass through the normal respiratory tract, and are drawn deeply into the lungs, leading to difficulty with breathing and allergic reactions.

All water damage and mold problems should be corrected immediately. It is impossible to completely eliminate all molds and mold spores indoors. Mold will always be found floating in the air and in house dust. Indoor mold growth can be prevented by controlling water and moisture indoors. If there is mold growth in your home, you must clean up the mold and fix the water problem.

If you clean the mold but do not fix the water problem, the mold will grow back.

Control your environment

1. Keep indoor humidity levels between 35% and 50%.
2. Fix all leaking pipes.
3. Repair water damage immediately.
4. Mold in the home is found in dark, damp, and frequently cluttered areas like the basement.
5. Control steamy areas like the kitchen and bathroom.
6. Reduce moisture entry to the attic and increase the ventilation.
7. In the fall, open your windows until all the humidity from the spring and summer is drawn out of your house. How will you know when that is accomplished? There won't be any more frost on the inside of the windows.
8. Provide plenty of natural light.

What causes Mold Growth?

Frequently during a home sale, I will be asked: "What is the one thing we need to do to correct the attic mold problem"? Unfortunately, it is usually never one thing but instead is a combination of things. Usually, excess moisture enters the attic through the ceiling, utility chases, electrical fixtures, missing or improperly installed insulation and the attic entry way. This warm moist air is condensing on the colder roof structures during the fall, winter, and spring months. Without proper ventilation, excess moisture cannot be carried away.

Historically mold in the attic is caused by the intrusion of warm moist air due to elevated humidity in the living space from:

1) Cooking and showers. Are you leaving the exhaust fans on long enough to remove excess humidity?
2) Gas appliances not exhausting to the exterior.
3) Excess humidity from clothes dryers. Are the clothes dryer exhaust pipes metal or plastic?
4) Fish tanks and plants.
5) Wet basements including open sump pump pits, dirt basements, and foundation cracks.
6) Effloresence caused by water infiltration into the basement usually due to improper yard grading or poorly installed gutters and drainpipes.
7) Drainpipes or sump pumps not discharging water far enough away from the foundation.
8) Inadequate ventilation in the attic due to:
9) Blocked, missing, or undersized soffit vents.
10) Blocked, missing, or undersized ridge vent.
11) Blocked, missing, or damaged soffit vent chutes.
12) Leaking ductwork due to improperly installed HVAC systems.
13) The bathroom fan venting into the attic or soffit.
14) The bathroom fan exhaust pipe is not insulated.
15) Excessive or improperly installed insulation including a missing vapor barrier.
16) Missing or under-designed attic staircases cover. The cover should be the same R-value as the insulation.
17) Open chasses around the plumbing, light fixtures, or chimney. (Air sealing)
18) A lack of solar drying (trees and shrubs).
19) Roofing, vent pipe flashing, and chimney flashing leaks.
20) Plumbing and heating system leaks.
21) Ice dams.

If you are the homeowner, ask yourself this question. Have I done anything to upset the balance of my home's operating systems? Have you performed any of these? If you have changed something in the home it may have impacted the way your home functions as a whole.

1. Upgraded the heating system.
2. Installed replacement windows.
3. Added insulation.
4. Added new siding.
5. Removed trees or shrubs.
6. Replaced your roof.

A common question about mold is:

"Is it the black mold?" This is usually asked about attic mold. The mold in the attic may be black, but it rarely is ***the black mold.*** The mold that most people are concerned with is Stachybotrys. **STACHYBOTRYS** (Known as "The Black Mold") is typically associated with **water damage**. This is a slow growing, dark mold that grows well on cellulosic (paper-containing) building materials. It can produce a number of different macrocyclic trichothecenes which have been described as being toxic to humans and animals. Individuals with chronic exposure to the toxins produced by this mold report cold and flu-like symptoms, sore throats, headaches, fatigue, dermatitis, itching and burning sensations of the eyes and nose, and general malaise. This mold is rarely found in outdoor air samples, and it is usually not found in indoor air samples unless the colony is dry is then physically disturbed. This mold is common everywhere growing on soil and decaying plant material. Stachybotrys needs a high water content to grow.

Stachybotrys

Cladosporium

So what type of mold is in your attic? If the mold growth is caused by water vapor as opposed to water leakage, the mold type is usually Cladosporium. Cladosporium is the most common spore type reported in the air worldwide. Outdoors it is found on dead and dying plant litter and soil. Indoors it is commonly found on wood and wallboard. It typically grows on window sills, textiles, and foods.

How is moist air introduced into the attic space?

Bath fan venting into the attic or soffit

Over the gutter soffit vents should not be used as water from the gutter could evaporate into the attic causing additional condensation problems.

Bath fan exhaust is being drawn back into the over the gutter hicks vent.

Bathroom fan vented through the roof

Be sure to Insulate the exhaust pipe.

Air infiltration through the utility chasses in the attic space.

Seal around ductwork

Seal around plumbing chasses

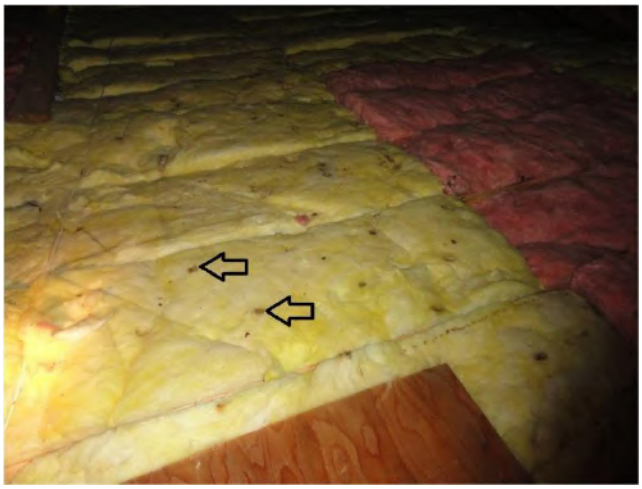
Install an attic staircase cover

Seal air infiltration at gable end

Note wet roof sheathing from improper air sealing and an underperforming ride vent.

Wet gable end from the same attic

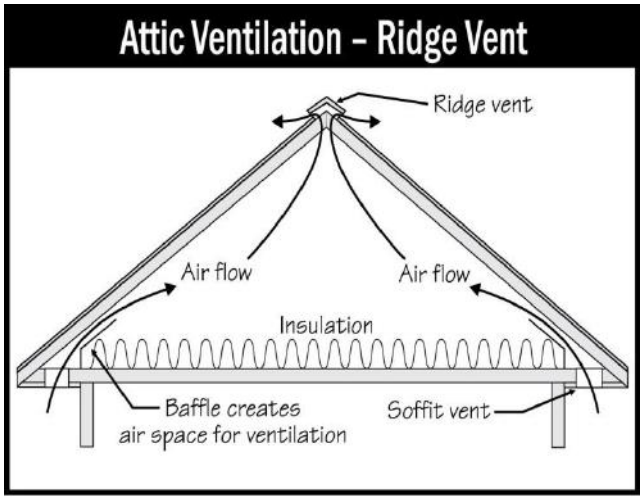
Condensation drip marks on the insulation and the attic staircase.



Frost forming on the sheathing and roofing nails.

Remove excess moisture with an attic ventilation system

Illustration of a balanced ventilation system



Install soffit vent chutes and insulation dams

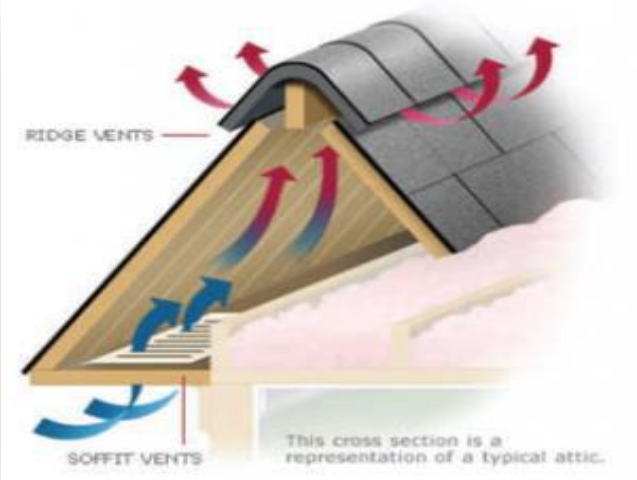
For vinyl siding, remove old panels, cut open soffit.

For wood siding, install new soffit vents.

This is a “roll” style vent installed over an improperly cut ridge.

This rolled ridge vent is collapsed by the caps.

Illustration of airflow



Remove ridge caps

Cut ridge, outside view

Cut ridge, inside view

Install a collapse resistant ridge vent

Install new ridge caps

There are many different ways to remediate an attic.

Step one is the cleaning phase. Listed below are the common options.

1) Remove the plywood. This is usually done if the roof covering needs to be replaced. Unless the sheathing is delaminated or punky, there is usually no reason to remove it. In most cases the gable ends and rafters will still have mold growth and will still require remediation.
2) Dry ice or soda blasting. This method uses dry ice or baking soda to etch the surface of the wood. This method creates a lot of dust without actually killing the mold. Vacuuming and clean up is time consuming and can be cost prohibitive for most real-estate transactions.
3) Bleach bath. This method uses chlorine bleach or products containing chlorine bleach. Some of the most popular brands are MMR or RMR. This method can remove much of the staining. The down side is introducing toxic and corrosive chlorine gas to an enclosed environment. This method is not a safe practice for the installers or the inhabitants of the home.
4) Disinfectants. The most commonly used one of these is Shockwave. Shockwave is an EPA-registered disinfectant; sanitizer and cleaner designed for use on various surfaces subject to microbial contamination, ideal for flooding and mold remediation. ShockWave is especially useful as an all-in-one product for treating wood framing, carpets, and other porous and nonporous surfaces as part of a complete mold remediation project.

Step two is the scraping and etching phase.

After application, the wood surfaces are wire brushed to remove loose surface activity and to etch the wood for better sealant adhesion. There is very little debris with this method.

Step three is the sealing and preventative phase:

1) After cleaning, some type of sealant should be applied to the bare wood. The most widely used product is IAQ 6000. Fiberlock IAQ 6000 does not contain any compounds with toxic metals, such as barium, boron, or zinc, which are present in other mold-resistant coatings. IAQ 6000 contains an EPA-registered, broad-spectrum fungicide to prevent the growth of mold on the surface of the cured film. Additionally, its smooth finish minimizes dirt buildup that provides nutrients for mold growth.
2) Sealants usually come in clear or white.

Our company uses the Shockwave with IAQ 6000 method which is quick and cost effective.

Typical mold remediation of an attic

Step 1) Install a containment barrier if applicable.
Step 2) Remove mold and apply a disinfectant and an anti-microbial sealant.

You could also:
1) Remove contaminated insulation.
2) Seal all utility chasses.
3) Install soffit vents.
4) Install soffit vent chutes.
5) Replace the ridge vent.
6) Install an attic staircase cover.
7) Vent the bathroom fan to the exterior.

Other work such as landscaping, gutters and drainpipes, insulation and chimney flashing shall be performed by others.

Install containment barrier if applicable.

Apply disinfectant

1. Critical barriers are set at attic scuttle.
2. The contained area will be kept under negative air pressure and a minimum of 2 air changes per hour will be provided.
3. Personal Protection Equipment will be worn by all remediation specialists.
4. Disinfect the attic structure using an industry accepted anti-microbial.

Remove mold

A difficult job

5. All impacted (mold covered) semi-porous surfaces (rafters, roof sheathing, and gable ends) will be wire brushed and cleaned. Other cleaning options could include dry ice or soda blasting.
6. A final coat of an industry accepted anti-microbial sealant (white in color) will be applied to the treated area of the attic structure. White sealant allows you to distinguish old mold growth with any new activity.

Apply Sealant

Finished attic

Frequently asked questions

FAQ 1; Should you use bleach to kill mold? (MMR is industrial strength bleach)

NO. Professor Jeffrey Morrell. Department of wood science Oregon State University has this to say: "The ion structure of chlorine bleach may prevent it from penetrating into porous materials such as drywall and wood. Sodium hypochlorite may stay on the surface of materials, whereas mold may have mycelium growing into the materials. Thus when you spray porous surfaces with bleach, the water in the solution soaks into the material while the chemicals stay on top."

FAQ 2; What is a soffit vent?

A soffit vent is an intake vent installed in the soffit area between the siding and the facia board. The current intake ventilation standard is a **minimum** of 12 sq. inches of net free ventilation per linear foot.

FAQ 3; What is a soffit vent chute or rafter baffle?

A soffit vent chute prevents the insulation from contacting the roof sheathing. The insulation damn prevents blown in cellulose from spilling over into the soffit area.

FAQ 4; Can I use circle vents in the soffit area?

NO. Even two, four inch round vents in every bay do not supply the needed twelve square inches per foot of net free ventilation required by the building code.

FAQ 5; Can I use an over the gutter vented drip edge (hicks vents)?

NO. Water from the gutter can evaporate into the vented drip edge and get drawn into the attic creating condensation on the plywood and eventual mold growth.

FAQ 6; What is a ridge vent?

A ridge vent is an exhaust vent installed at the peak of the roof. The sheathing needs to be cut a **minimum** of one inch on each side of the ridge to achieve 24 sq. inches per foot of exhaust for balanced ventilation.

FAQ 7; Do all ridge vents work the same?

NO. The "shingle vent II" has side wings that create a wind up-lift much like an airplane wing. Other venting systems such as the roll vent do not provide ample air flow and should not be used to ventilate an attic.

FAQ 8; Can you combine gable and ridge vents.

MAYBE, The ridge vent may draw air from the gables, instead of the soffits. If the ridge vent is installed improperly or there is not sufficient air flow in the attic, then both ridge and gables may be used together.

FAQ 9; Should I install an attic fan to cool down the attic?

MAYBE. It really depends on the CFM (cubic feet per minute) of the fan and the available air from the soffits. An attic vent fan can create a huge amount of negative air pressure. If the soffit vents are not of sufficient size to balance the amount of exhaust created by the fans, then air can be

drawn (make-up air) up from the living space, or down from the ridge vent. In the summer, cooler "air conditioned" air from the living space can get drawn into the attic actually making the house warmer and warm air can be drawn down from the ridge vent making the attic hotter.
NOTE; The same problem occurs when ridge vents are installed without soffit vents.

FAQ 10; Can I vent the bathroom fan into the soffit?

NO. By definition, soffit vents are intake vents, and ridge vents are exhaust vents. Warm moist air from the bathroom exhaust can be drawn right back into the attic through the soffit vents. The fan should be vented through the roof or gable end with an insulated pipe.

FAQ 11; What is an attic staircase cover?

A staircase cover is installed on the inside of the attic over the pull-down staircase or scuttle. It prevents heat from being transferred (convection) to the attic in the winter and prevents heat from the roof (migration) downward in the summer. The staircase cover should be equal to or greater than the R-value of the attic insulation.

FAQ 12; How much attic insulation do I need?

The current standard for insulation in an attic is R-49. "R" stands for resistance to heat flow.

FAQ 13; Can I have too much insulation in my attic?

MAYBE. Moisture can be brought into the attic in many ways. In older homes vapor barriers were not installed. Moisture can also travel through recessed light fixtures, electrical, plumbing and chimney chasses, and gaps in drywall. More insulation means the likelihood for trapping water vapor will increase. If you add more insulation, you will need to add additional ventilation.

FAQ 14; Should I insulate my basement ceiling?

NO. Insulation should be installed around the perimeter of the basement at the floor joist pockets to reduce air infiltration. A dirt basement should not be insulated without a properly installed vapor barrier.
1) A 700 sq. ft dirt basement can discharge 10 gallons of water a day. Even a concrete floored basement can discharge large quantities of water through simple evaporation. The insulation can absorb the water vapor and become soggy; presenting a condition that can lead to mold growth.
2) The average ground temperature is 55 degrees. If it is below 55 degrees outside, your basement will be warmer than the living areas of the house if the floors are insulated. The correct way to insulate a basement with a concrete floor would be to insulate the floor joist pockets only and then the walls and add a zone of heat to the basement. Since the basement is already at 55 degrees, it doesn't take a lot to heat it. That warmth will translate to the upper living space floors making the home more comfortable and energy efficient. The added benefit is a warm, dry, mold free basement.

FAQ 15; Why do I get mold in my attic.

The reason attics are prone to mold-growth in some parts of the country is that in the winter time, the roof sheathing can get wet from condensation. Roof sheathing is vulnerable to condensation because warm, interior air can migrate through the sheetrock ceiling and it will drop its moisture on the first cold thing it hits, which is the roof sheathing. This can lead to frost on nail heads, the

leading edge of a condensation problem. The nails are even colder than the roof sheathing, so often the first place to reach dew point. You can even see a few ice crystals on the roof sheathing. This is similar to the beads of condensation you see on your ice-cold beer glass on a hot summer day. So the answer is: temperature differentials are the reason for this problem. These temperature differentials create surfaces that can reach dew point and cause condensation; this creates water, which leads to mold or fungal growth.

FAQ 16; Why is warm air migrating into my attic from my house?

Houses are like chimneys. Cold air infiltrates down low and hot air escapes out the top, this is often referred to as the stack effect. A sheetrock ceiling with paint is called, in building science terms, a vapor diffusion retarder. This means your ceiling retards or slows the vapor moving through it. In most houses, the "vapor diffusion retarder" has lots of breaches and openings where interior air can easily pass into the attic – think can lights, fans, and attic access hatches.

FAQ 17; Why is this more of an issue in some climate zones?

Building standards and practices are regional and regional environmental factors can have an enormous impact on building design and performance. Put simply, if you live in a hot arid climate, you are unlikely to find this problem. This is a problem most frequently associated with regions of the country that get cold in the winter.

FAQ 18; Have modern energy codes exacerbated this problem?

YES. The more insulation you add to the floor of an attic, the more heat loss you prevent from inside the house and the colder the roof decking becomes in the winter. The colder the roof decking gets, the easier it is to reach dew point and have condensation problems when warm interior air hits the decking. In addition, homes constructed to modern energy codes are more air-tight than older homes, making it easier to develop high indoor relative humidity in the winter months because there are fewer natural air changes.

FAQ 19; Can adding more roof cavity ventilation prevent this seasonal condensation problem?

MAYBE *It could also make the problem WORSE*. The best way I have heard roof cavity ventilation described is that it is like your backup parachute. You should not really need it if everything is going well, meaning your house is generally dry. If the main parachute fails and your house starts to get too wet, you sure do want to have a back-up. So if your attic is nearing dew point, the flow of exterior air can help keep the wood sheathing dry. However, if you add too much ventilation, you can create a negative air pressure in the attic and exacerbate the stack effect and actually pull MORE interior air from the house up into the attic. In some cases, adding more roof cavity ventilation can worsen the situation, especially if the holes in the vapor diffusion retarder (the ceiling) have not been systematically sealed first. ***Air sealing with foam to prevent vapor migration should be a top priority.***

FAQ 20; Is mold in the attic likely to affect the indoor air quality in the house?

NO. The difficult thing here is finding un-debatable metrics to prove this. But logically, mold in the attic is not likely an indoor air quality issue due to the stack effect. Mold in a crawl space below your house could contribute mold spores to interior air, which is no guarantee of a health hazard,

but simply a statement of fact: we breathe the air that is below our house. But most of the air in your attic is going up and out the upper roof cavity venting and not into your house. Exceptions can be found, notably, a leaky cold air return duct in the attic could deliver significant amounts of attic air into the house

FAQ 21; Is mold in my attic likely to affect my enjoyment of my house?

NO. Unless you have a significant problem, the mold and seasonal condensation in your attic could go undetected for years. The one area of concern would be the indoor relative humidity inside the house. Because this seasonal condensation problem in your attic can be related to high relative humidity inside the house, there is a chance you have a more problematic moisture problem inside that you would need to diagnose and repair. A simple example would be water accumulation in the crawl space below your house. You might start to see signs of this inside like condensation on window frames and toilet tanks.

FAQ 22; Could mold in my attic impact the resale value of my house?

YES. This is the best reason to have attic mold problems treated professionally. Because condensation is a seasonal problem related to dew point, relative humidity and occupant behavior, it is difficult for an inspector to determine if an attic condensation problem is active or not. In addition, when home buyers see mold on roof decking, they can't un-see it. If they are unfortunate enough to watch any form of reality TV, they probably think it will kill them and, in my experience, there is not much I can do to convince them otherwise.

FAQ 23; Can people in the house contribute to attic mold problems?

YES. We call this occupant behavior. Remember that people are constantly dumping moisture into a house by breathing, cooking, bathing, and washing and even with hobbies such as aquariums and indoor plants. The objective in winter months is to keep indoor relative humidity around 35-50%. You can often accomplish this by using bath and kitchen fans to exhaust moist air to the exterior. In especially cold climates, houses may be equipped with heat recovery ventilators; these help you get air changes in the house without losing too much heat in the process. Small, modern houses with lots of people living in them are prone to high relative humidity and mold problems. This is especially true of houses that have electric heaters and do not have forced air heat as the leakage out the ductwork in a forced air system can dry the interior.

FAQ 24; How do I know if I have an active condensation problem in my attic?

Attic condensation problems are seasonal and can vary depending on occupant behavior, so they can be difficult to understand, especially in the midst of a real estate transaction. The best time to check your attic for condensation is in the winter, first thing in the morning, when you see frost on the grass outside. These are the mornings I frequently find condensation in the attic.

FAQ 25; How can I fix this problem?

By now you should understand both why your attic may be getting wet and how you should deal with a mold problem: stop the water!

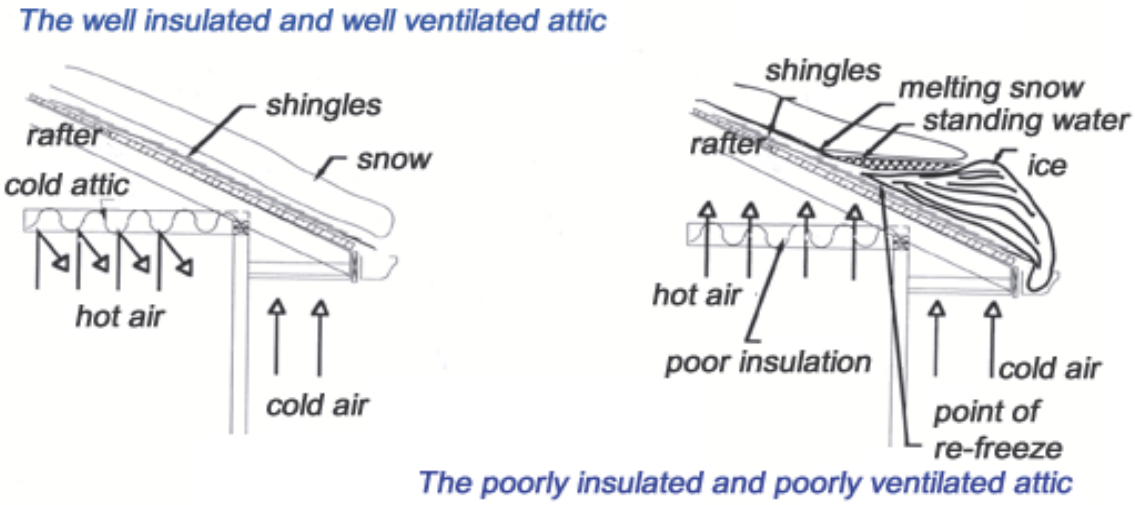
Mold remediation Companies: As I see it, mold remediation companies create value by putting their name on a seasonal and unfounded problem when it arises during a real estate transaction, so you want to choose a reputable company that has been in the business for a while and will stand behind their work.

A good company will diagnose the water problem first and foremost. They will look inside the home for issues that could cause high relative humidity and then shift their focus to the ***air barriers*** that separate the house from the attic. They will also evaluate fan terminations and roof cavity ventilation in the attic to try and prevent further condensation. Finally, they will remove or encapsulate any existing mold on the framing. Where I work, this is often done by using an industrial paint/sealer on the attic framing in question. Once the framing is cleaned or painted, it provides a fresh surface for monitoring to see if the condition returns.

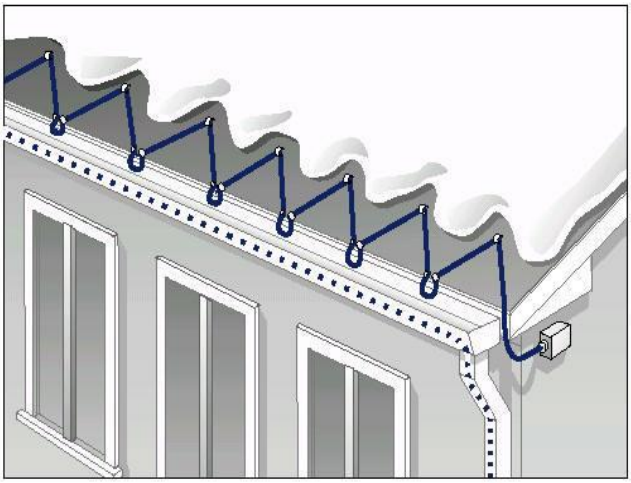
Summary

I hope this handout provides some useful tools for understanding and explaining mold problems in residential construction as well as how and why we get mold problems in our attics. Your experience with this condition could vary by climate zone.

ICE DAMS:
The majority of ice dam problems can be eliminated with proper attic ventilation.



In certain situations, a self-regulating heating cable or heated drip edge may be required.



The photo’s below show a typical basement mold remediation job.

We suit up and go in.

The Crew

Erect containment barrier

Containment

Set up air scrubbers

Air scrubber

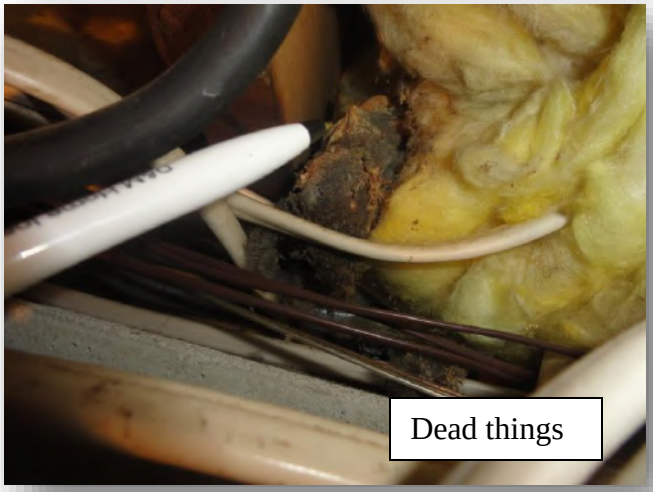
Remove damaged materials

This is a child's play room

Stachybotrys

Stachybotrys

This is what we find behind basement insulation.



Live things

Mold on insulation

Stachybotrys on drywall

Mold on concrete

Open up foundation cracks

Back cut cracks

Repair cracks

Fill with water plug

Blend in cracks

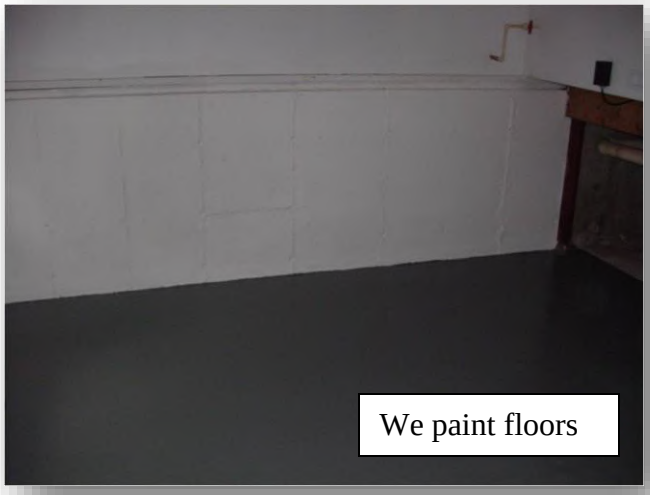
Cracks are invisible

No mice, snakes, squirrels or mold

Basement with mopped floors

Basement with sealed walls and ceiling

Basement with a painted floor



Commonly found molds and their habitat

Identification	Outdoor Habitat	Indoor Habitat	Allergic Potential	Comments
Aspergillus	Common everywhere. Grows on soil, dead plant material, nearly anything organic.	Common wherever humidity is too high. Grows on wallboard, leather, food, wood, etc. Capable of growing over a wide range of moisture conditions from very dry to very wet.	Known allergen causing Type I (hay fever and asthma) allergies and Type III (hypersensitivity, pneumonitis). Can cause allergenic sinusitis, and ABPA (allergenic bronchopulmonary aspergillosis).	Aspergillus fumigatus and Aspergillus niger are the most common species found in indoor air.
Cladosporium (Typical Attic Mold usually a result of condensation.)	The most common spore type reported in the air worldwide. Found on dead and dying plant litter, and soil.	Commonly found on wood and wallboard. Commonly grows on window sills, textiles, and foods.	Type I (hay fever and asthma), Type III (hypersensitivity pneumonitis) allergies.	A very common and important allergen source both outdoors and indoors.
Eurotium	Commonly seen growing on stored seeds or other water deprived substrates.	Grows on leather, textiles, and other poorly wetting items.	Eurotium is the sexual state of Aspergillus and so would presumably have the same kinds of production of allergens and toxins.	Whenever Eurotium is present Aspergillus is almost always present also.
Ganoderma	Common everywhere growing on hardwood trees.	None known.	None known.	
Hyphae	Common everywhere.	All substrates.	None known.	Hyphae are the "root-like" food absorption strands common to nearly all fungi. They sometimes can become airborne.
Ascospores	Common everywhere. Constitutes a large part of the airspora outside. Can reach very high numbers in the air outside during the spring and summer. Can increase in numbers during and after rainfalls.	Very few of this group grows inside. The notable exception is Chaetomium and Ascotricha.	Little known for most of this group of fungi. Dependent on the type (see Chaetomium and Ascotricha).	
Basidiospores	Commonly found everywhere, especially in the late summer and fall.	Not normally found growing indoors. Can grow on wet lumber, especially in crawl spaces.	Some allergenicity reported. Type I (hay fever, asthma) and Type III (hypersensitivity pneumonitis).	Among this group are dry rot fungi Serpula and Poria that are particularly destructive to buildings.

Identification	Outdoor Habitat	Indoor Habitat	Allergic Potential	Comments
Penicillium/Aspergillus	Common everywhere. Normally found in the air in small amounts in outdoor air. Grows on nearly everything.	Wetted wallboard, wood, food, leather, etc. Able to grow on many substrates indoors.	Type I (hay fever and asthma) allergies and Type III (hypersensitivity pneumonitis) allergies.	This is a combination group of Penicillium and Aspergillus and is used when only the spores are seen. The spores are so similar that they cannot be reliably separated into their respective genera.
Scopulariopsis	Common everywhere. Mostly reported from soil, dung, and fingernails.	Wetted wallboard, wood, and paper products.	None known.	
Smuts, myxomycetes	Commonly found everywhere, especially on logs, grasses and weeds.	Smuts don`t normally grow indoors, but can occasionally be found on things brought from outside and stored in the house. Myxomycetes can occasionally grow indoors but need lots of water to be established.	Type I (hay fever and asthma) allergies.	Smuts and myxomycetes are a combined group of organisms because their spores look so similar and cannot be reliably distinguished from each other.
Stachybotrys (Sheetrock Mold, usually a result of water damage)	Common everywhere growing on soil and decaying plant material	Wallboards and other paper products that are wetted. Needs high water content of substrate to grow.	Type I (hay fever and asthma) allergies.	Wet spored mold that generally must be dried out and disturbed before spores can get into the air.