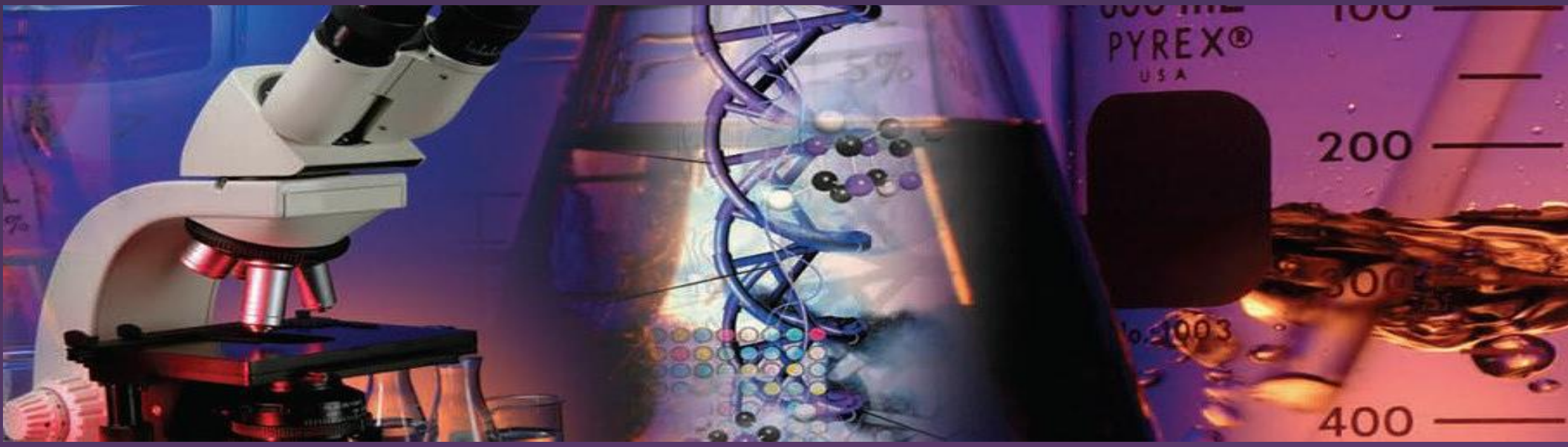
Water, Moisture Intrusion



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CONDITIONS FOR MOLD GROWTH

Conditions for Mold Growth

- Mold needs water (or elevated humidity) along with food (organic material such as wood or paper or fabric) in order to grow.
- But mold grows nicely on surface dust found on concrete, plastic, and other non-food sources when indoor humidity is elevated and also grows well on the inside of always dirty AC ducting and plenums, etc.
- Mold grows in a wide temperature range from cold (as in AC and ducting) as well as hot (as in the attic).
- But mold grows fastest at elevated temperatures.

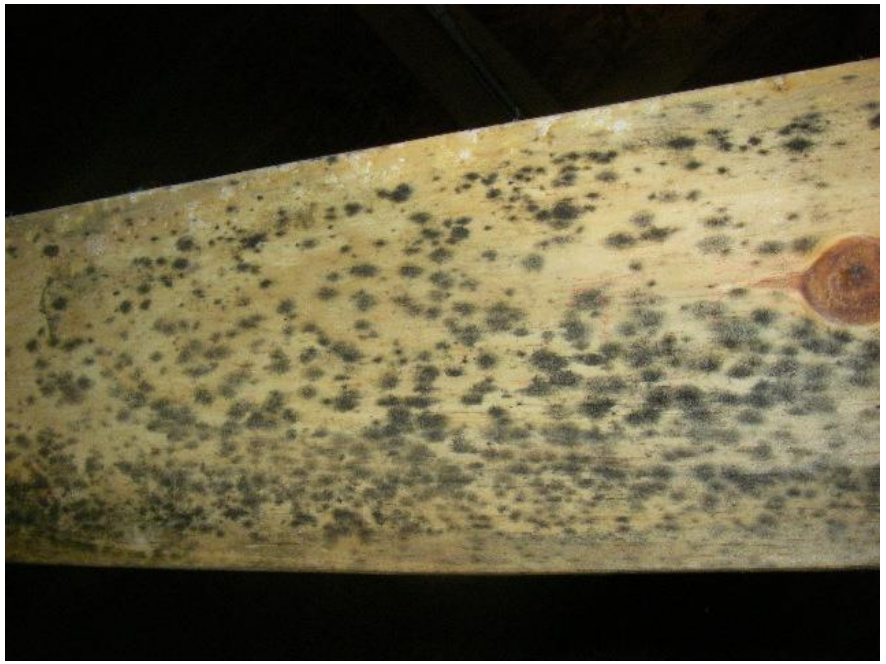


Mold growing on the lining of AC supply plenum.

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Mold Growth on Wood

- Molds grow only on the surface of wood and may be removed from wood surfaces with no structural damage to wood. EPA/OSHA/FEMA/ CDC recommend bleach to “clean/ remove” mold from wood. As do we.
- Dry rot (fungus … not mold) on the other hand grows inside of wood. Destroys wood. But again mold does not destroy wood.
- The paper face of drywall supports mold growth and of course given enough time can be damaged / destroyed by mold.

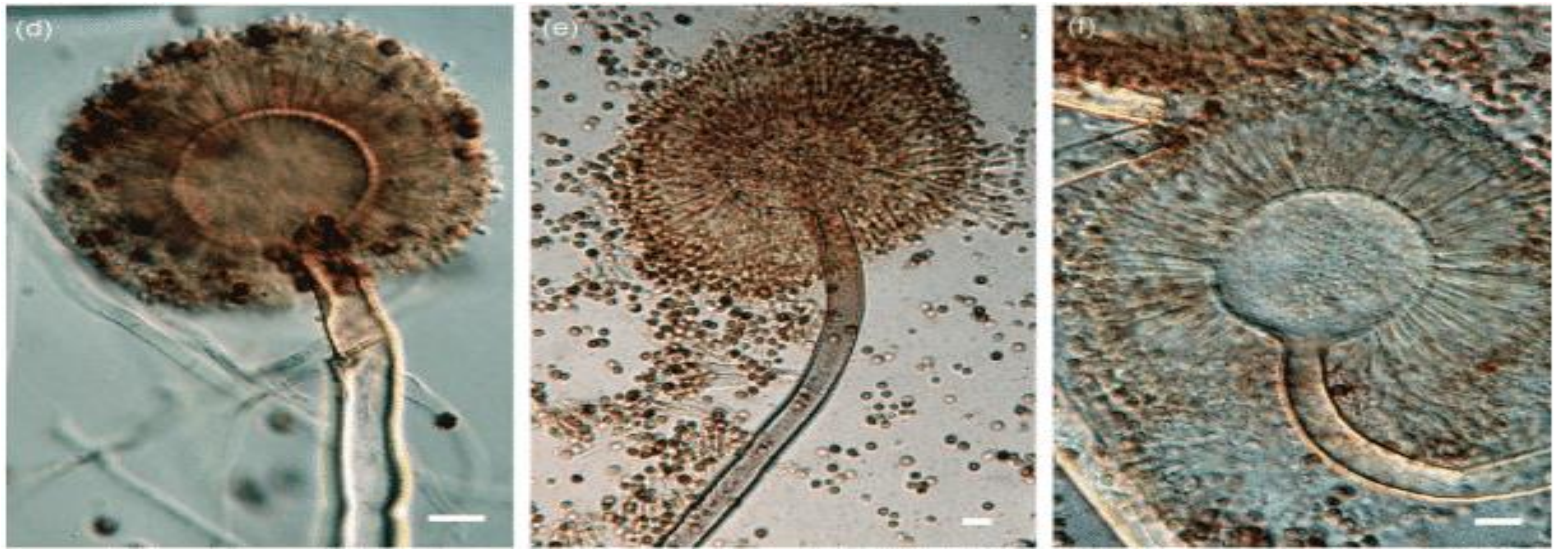


The U.S. Centers for Disease Control (CDC) recommends using a solution of 10 parts water to one part bleach to clean mold from surfaces. The solution should be applied using a bristle brush or sponge to scrub the surface of the wood.

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Mold Growth after a Water Event: Pen/Asp

- According to EPA/OSHA, water should be dried up **within 48 hours** to avoid mold growth. Why?
- Some species of Penicillium (Pen) and Aspergillus (Asp) (together called Pen/Asp) need minimal water and are first to appear after a water event. Can start to grow immediately and become readily visible on drywall as early as 5-7 days.
- Pen/Asp spores are always present in both the indoor air, outdoor air, and Pen/Asp grows well on dust inside of ducting and is constantly being released from ducting.
- So as soon as there is wet drywall … Pen/Asp spores will land on the wet food source and start to grow.



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Mold Growth after a Water Event: Pen/Asp

- Note that a building that had earlier water damage (very common) and subsequent earlier mold growth may have inactive (also called latent or dormant) mold hidden in walls or ceiling cavities.
- The new water source now causes the mold to become **active** even if the water is dried up within 48 hours.



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Mold Growth after a Water Event: Stachybotrys

- Stachybotrys (so-called black, toxic mold) grows well on wet cellulose materials like the wet paper face on drywall.
- “Stachy”(pronounced Stacky) needs more water, compared to Pen/Asp, to germinate.
- Exceptions: Cabinets are often made from pressed wood/particle board, which is highly water absorbent, and can show growth of Stachy with minimal water.
- As soon as 7 days, Stachybotrys, the mold commonly called the Black Toxic Mold can start to grow **if / when there are Stachy spores present.**



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Mold Growth after a Water Event: Stachybotrys

- Stachy is rarely present in the indoor air or the outdoor air. Therefore, even though Stachy can start to grow as soon as 7 days this assumes that there are spores present to initiate growth.
- Keep in mind, Stachybotrys does not grow on moist dust in AC ducting as does Pen/Asp. (Needs cellulose such as wet drywall paper or pressed wood cabinets.)
- So Stachy, unlike Pen/Asp, is not in the indoor air from growth inside of the AC ducting.
- If Stachy spores are found in the indoor air, they are probably there due to botched dry-out that spread mold, or botched remediation that spread mold or from mold growth on drywall in the bottom of AC closets or return air boxes.

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Stachybotrys vs Pen/Asp Germination

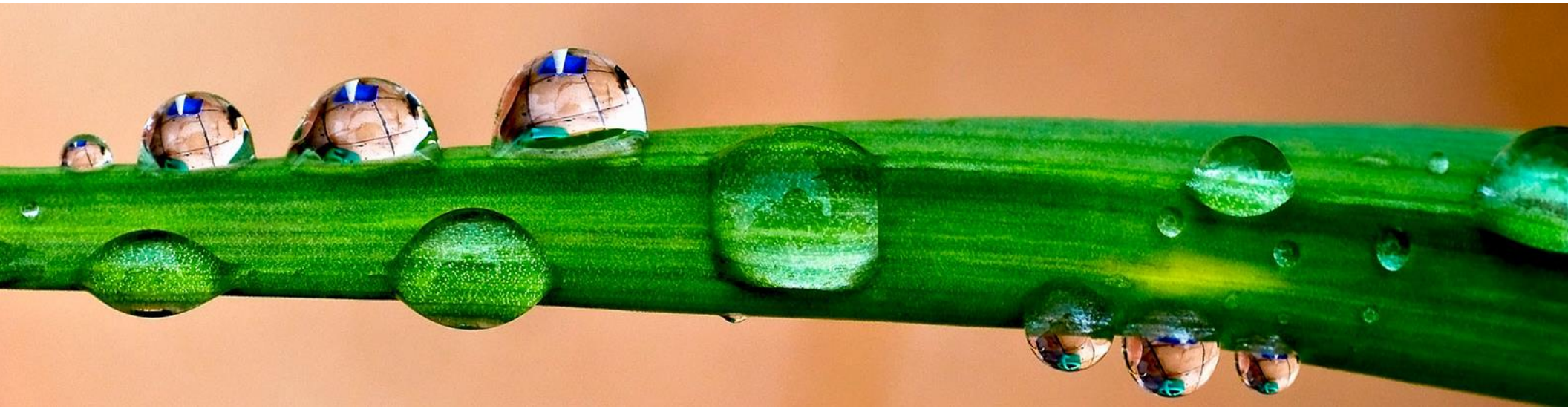
- While Pen/Asp spores are always in the air and ready to germinate, Stachy spores are not. Then where do the Stachy spores come from?
- Stachybotrys spores are heavy and quickly settle. They are plentiful in the outside soil and are carried into homes on shoes and by pets and are always a component of floor dust.
- Stachybotrys spores are spread in homes during indoor water releases (floods for short).
- The flood water containing Stachy spores, picked up from the heavy Stachy spores in the floor dust, come into contact with drywall or cabinets.
- As a result, Stachy starts to grow from the bottom of walls and cabinets unlike Pen/Asp which grows all over the face and back of wet/moist drywall as the Pen/Asp spores are found in the air.



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Water vs Humidity

- An actual water leak (and typically not simply elevated humidity) is generally needed for mold to start to grow (mold germination).
- Note that you can get a localized micro layer of water on a cool condensing surface in an air-conditioned building without there being an actual water leak.
- This cool condensing surface will cause mold spores such as Pen/Asp that don't need much water to germinate.
- But even with close to 100% humidity you don't usually get mold on your (non-air conditioned) garage walls/ceiling.



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Active vs Inactive Mold

Once mold has germinated, if there is sufficient moisture in the form of elevated humidity in the air (over 65% to 70%) the mold will remain Active (growing and producing gases and toxins and spores) without an actual water source/leak. Why? Mold once started can continue to grow by absorbing the water it needs from elevated humidity in the air. No longer needs a water source.

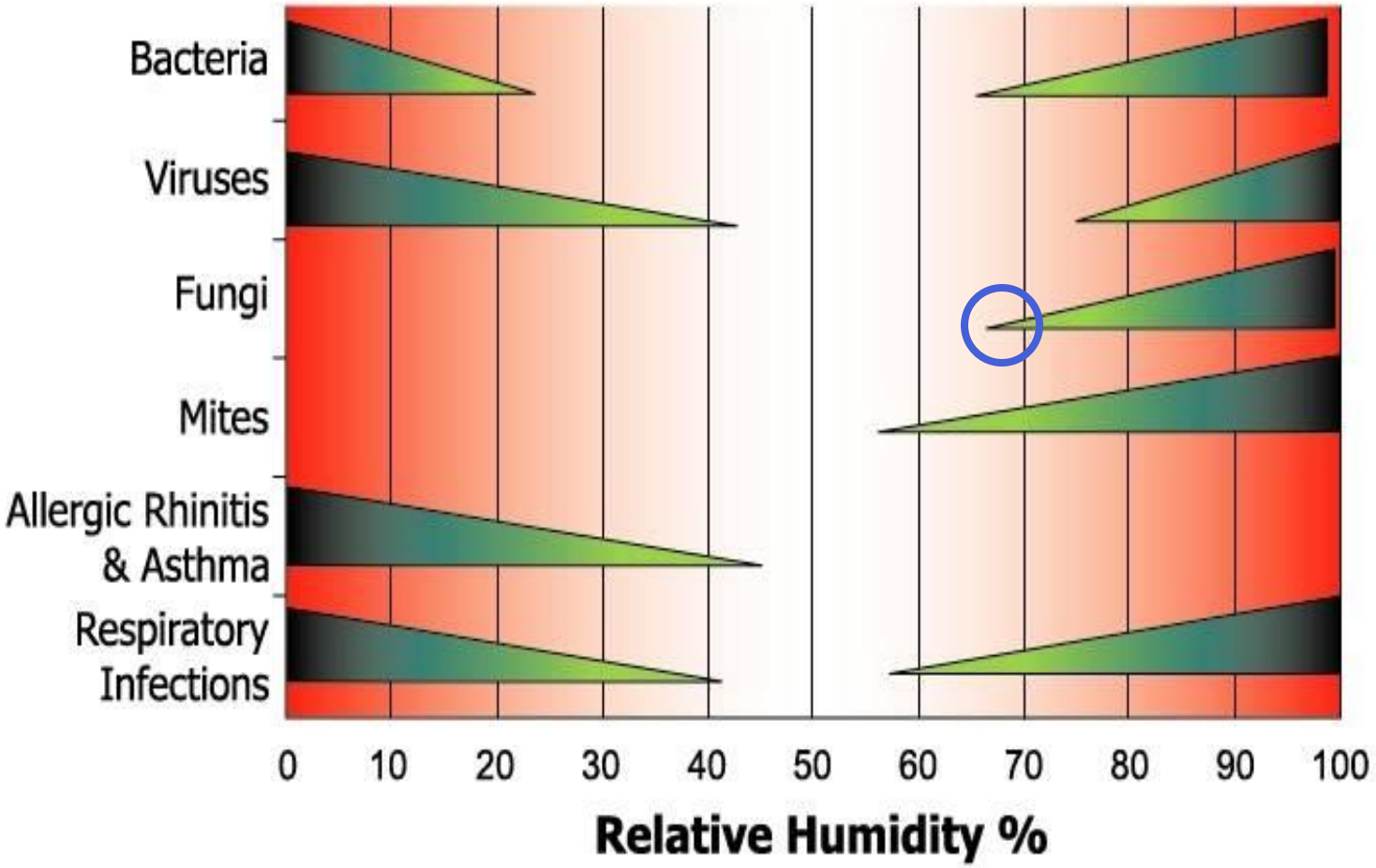
If indoor humidity is controlled (below 65%) and the water leak is fixed, mold will stop growing. It will become Inactive (also called latent or dormant).

And will eventually die.



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Humidity and Mold

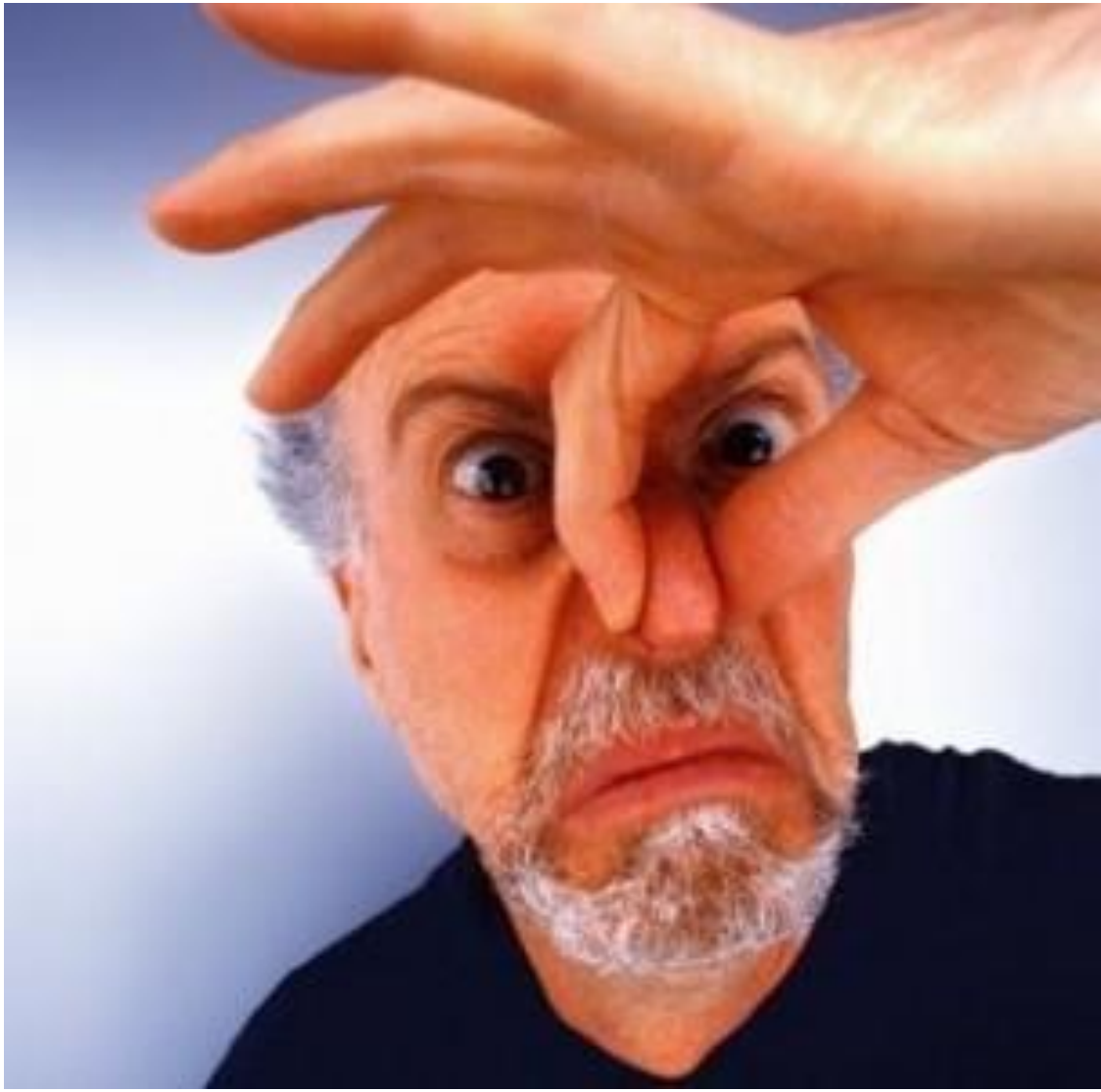


- The chart above shows the affect that humidity has on the growth of indoor mold (as well as bacteria, viruses, & dust mites).
- Below 65% - 70% humidity levels (blue circle) fungi/mold that has germinated will go Inactive in the absence of a water source.

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Mold Gases (mVOC's)

- Growing (active) molds produce "musty" or "earthy" odors.
- The odors come from mVOCs **(microbial volatile organic compounds)** … gases produced only by (active) growing molds.
- Odors are not produced when mold is either dead or inactive which can be due to either low levels of indoor humidity (such as during drier winter months) or lack of water source.



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Section Review Questions



1. Which of the type of mold needs minimal water to start to grow (48 to 72 hours) after a water event?

   a. **Aspergillus** b. Stachybotrys
   c. mVOCs d. Alveoli

2. Which of the following types of mold can begin growing as soon as 7 days following a water event but only with very wet water conditions?

   a. Aspergillus b. Penicillium
   c. **Stachybotrys** d. Pen/Asp

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Section Review Questions

3. Mold can cause many adverse health effects in mold sensitive people, but does NOT degrade wooden building materials as is the case with dry rot and wood rot.
   a. **True** b. False

4. mVOC's produced by growing molds and released into the air as a byproduct of mold growth, often have strong and/or unpleasant odors. What does mVOC stand for?

   a. Microbial volatile odor compound
   b. Microbial volatile organic compound
   c. Mold volatile organic compound



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Section Review Questions

5. Which of the following statements are true?

   a. Growing molds produce "musty" or "earthy" odors.
   b. The odors that come from **dormant** molds are called mVOCs.
   c. All molds regardless of color can produce mVOCs.
   d. HEPA air filters will not remove mVOC odors.

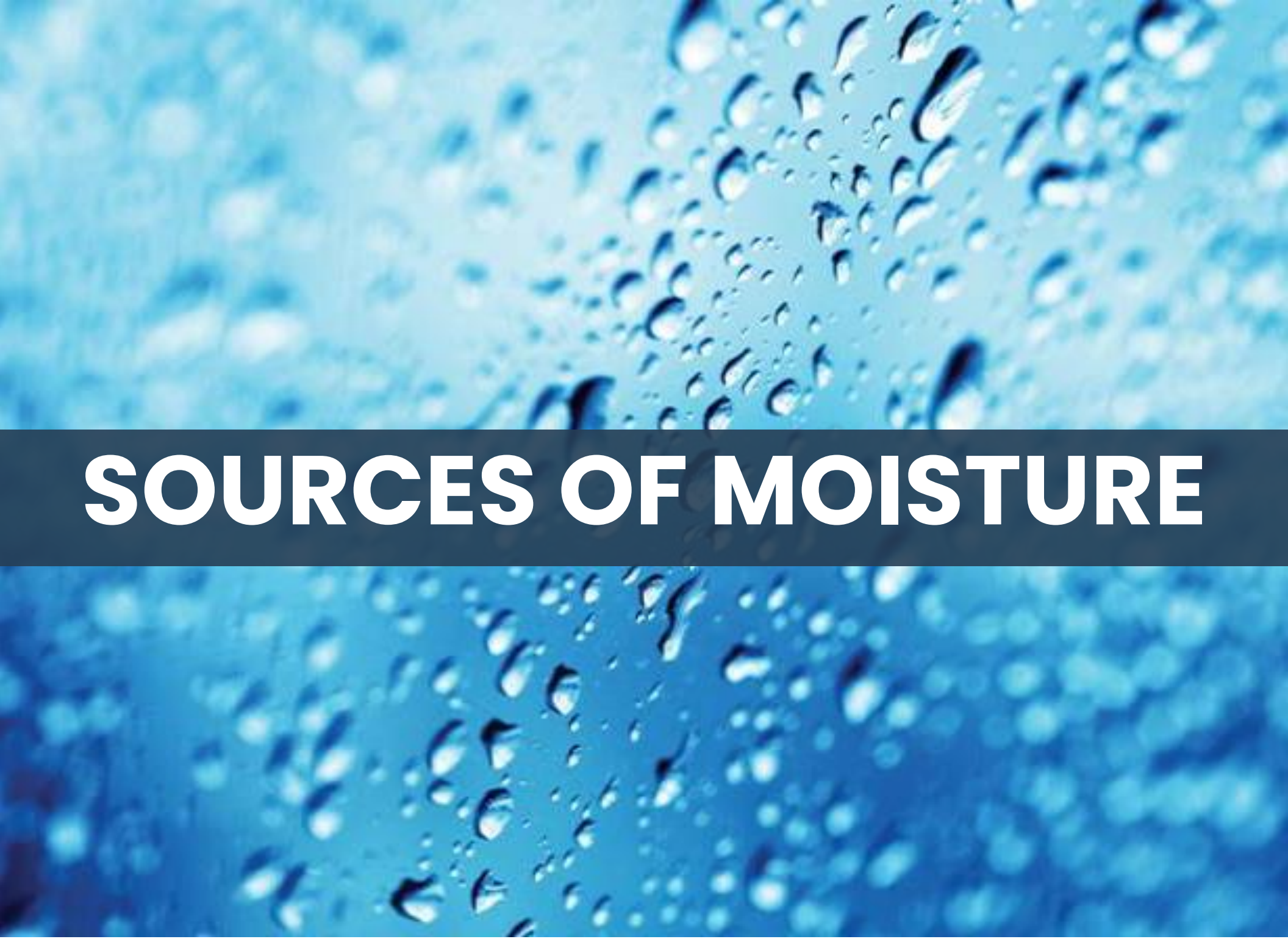
6. Which of the following is NOT a condition that affects mold growth? Pick one.

   a. Temperature
   b. Water
   c. Food Source
   d. Season of the year
   e. All of the above are needed for mold growth.

7. Per EPA: Water should be dried within _____ hours to avoid mold growth.

   a. 24
   b. **48**
   c. 72
   d. 96

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SOURCES OF MOISTURE

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Impact of Wall Insulation on Mold Growth

- Newer homes (in Florida) use FiFoil brand insulation on exterior walls to keep wetness on the furring strips from being transferred to the sheetrock.
- FiFoil does not hold or absorb moisture and is mold resistant but not mold proof.
- (Contrast to blown in cellulose insulation.)
- FiFoil is not a vapor barrier. Does not seal wall cavities and therefore allows the AC to dry exterior walls that are constantly getting wet during the rainy season.



FiFoil exterior wall insulation

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Vapor Diffusion – Wall Cavity



- Wallpaper on the other hand on outside walls keeps moisture inside of walls, and can lead to **mold growth.**

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Impact of Wall Insulation on Mold Growth

Older forms of exterior wall insulation include blown in **cellulose** insulation.

Cellulose insulation grows mold and holds moisture. It is the mold remediation contractor's friend.

Typically means mucho mold if it gets wet!



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Impact of Wall Insulation on Mold Growth



Blown in Cellulose Insulation

- Moisture that seeps into a wall from a leaking window generally produces the worst mold at the bottom of the drywall due to gravity.
- However, if there is blown in cellulose insulation in that wall, which is common in exterior walls in many older Florida homes (rather than FiFoil), the mold and water may be found higher up in the walls (from a roof leak) but very little at the bottom.
- Checking behind the baseboard for mold is not always proof of no mold or water damage when walls are insulated with blown in cellulose insulation.

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Humidity and Condensation

- Moisture behavior in a room is often controlled by surface temperatures.
- The coolest temperature is the first to have mold growth on the dust on its surface … typically AC grills.
- Cool metal surfaces of AC grills will condense moisture, and if dirty or dusty, they will support **mold growth.**



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HVAC Related Mold Problems Not From Actual Water Leaks



Opening in ceiling behind an AC supply plenum allowing moist, dirty, smelly attic air to enter home.

- In AC closets, openings in **floor, wall** or **ceiling** around AC pipes or electrical wires introduce moist/dirty and smelly air from the attic into the home.
- In AC closets especially, **openings behind supply plenums** introduce moist/ dirty and smelly attic air into homes.
- Can result in mold growth in the AC closet, ducting, and in the home.

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Humidity and Condensation

- High humidity in the attic can leak into a home and condense on drywall around AC grills (cool condensing surface) if the drywall around grills is not properly sealed/caulked. It never is!



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Humidity and Condensation

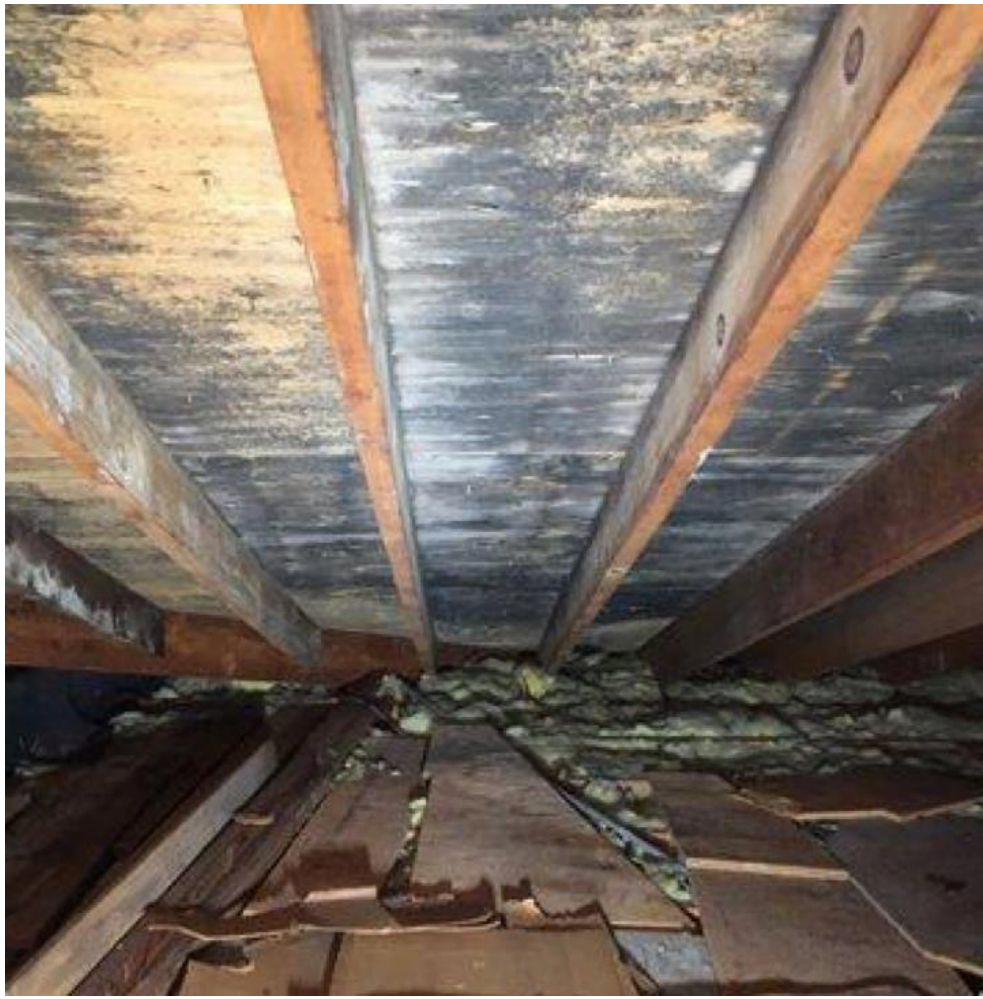


- During moist summer months, moisture will condense on the outside of windows in an air-conditioned home.
- During winter months, moisture condenses on the insides of windows. Watch for indoor **mold growth.**

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Other Moisture Related Mold Problems in Attics

- Exhausting moisture (dryer exhaust) into the attic or ceiling plenums can lead to mold growth.
- How can this happen? Dryer exhaust line breaks. Or new roof put on but dryer exhaust through the roof is not connected.
- Insufficiently insulated AC supply ducting or overcooling (running the AC below 72-73 degrees) can cause condensation on ducting (duct sweating) resulting in mold in the attic.



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Other Moisture Related Mold Problems in Attics



- Deteriorated or broken foam insulation on AC coolant lines in attics causes condensation and mold growth on insulation and drywall below.
- Also caused by rats. Rats in attics need water. They chew off coolant line insulation and “drink” the moisture condensing on the cold copper line.
- Or deteriorated foam insulation in older high-rise buildings inside chases running between floors will result in hidden condensation and mold.

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Mold Related HVAC Problems Actual Leaks



- This air handler located in a garage has return air ducted to the unit. The return air mixer box under the air handler (blue arrow) is moldy from a leak as a result of a plugged AC drain line.
- Often the outside of the RA box is painted over by a seller before a mold inspection.
- We like to peek under the baseboards around the AC return air mixer box to check for hidden or covered-up mold/water damage (yellow arrow.)

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Mold Related HVAC Problems From Actual Water Leaks

- This air handler has **non-ducted return air** (no white box return air mixer box underneath). Return air comes through louvered door.
- The drain pan overflowed, and mold is growing in and on the walls beneath the unit. Often painted over.
- We like to peek under the baseboards in AC closets to check for hidden or covered-up mold/water damage.



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Section Review Questions



1. Home and office AC systems are a common source of mold contamination.

   a. **True** b. False

2. Air leaks in an AC closet can occur (pick the one best answer)

   a) around the adjoining storage area.

   b) around AC pipes or electrical conduits going thru walls, ceiling or floor.

   c) around an improperly insulated closet door.

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Section Review Questions

3. HVAC air leakage problems can occur around (pick the one best answer)
   a) Return air grills that leak around the edges because the drywall opening was overcut during construction and not caulked.
   b) Air filter slots, when the air handler is located in a garage or attic.
   c) Leaking AC ducts in attics and crawl spaces.
   d) All of the above

4. Which of the following is NOT a potential source of indoor moisture?
   a) Bathing
   b) Cooking
   c) Laundry
   d) Some electronic devices
   e) Window Leaks



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Section Review Questions

5. Indicate which one(s) of the following are often associated with indoor air quality problems that originate from mold contaminated attic air: (check all that apply)

   a) Leaks in return air ducts

   b) Mold in AC closet

   c) Leaky recessed lighting fixtures

   d) Open windows

   e) Improperly insulated windows

   f) Leaky plumbing fixtures

6. Vinyl wallpaper on an exterior wall in a hot humid climate is a good strategy to prevent mold.

   a) True

   b) False

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Section Review Questions

7. Moist air from bathroom, kitchen or dryer can be safely vented to the attic to prevent mold growth.

   a) True

   b) False

8. Mold can grow not only on but in wood potentially destroying the wood.

   a) True

   b) False

9. A visual Assessment of the exterior of an AC return air mixer box is sufficient.

   a) True

   b) False. These are often painted on the outside. Always check inside or check behind baseboard.

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MORE ON HEATING, VENTILATION, & AC (HVAC)



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Air Handler & Components

Fiberglass lined supply plenum made from duct board connects unit to ducting. Almost always moldy.

Air handler

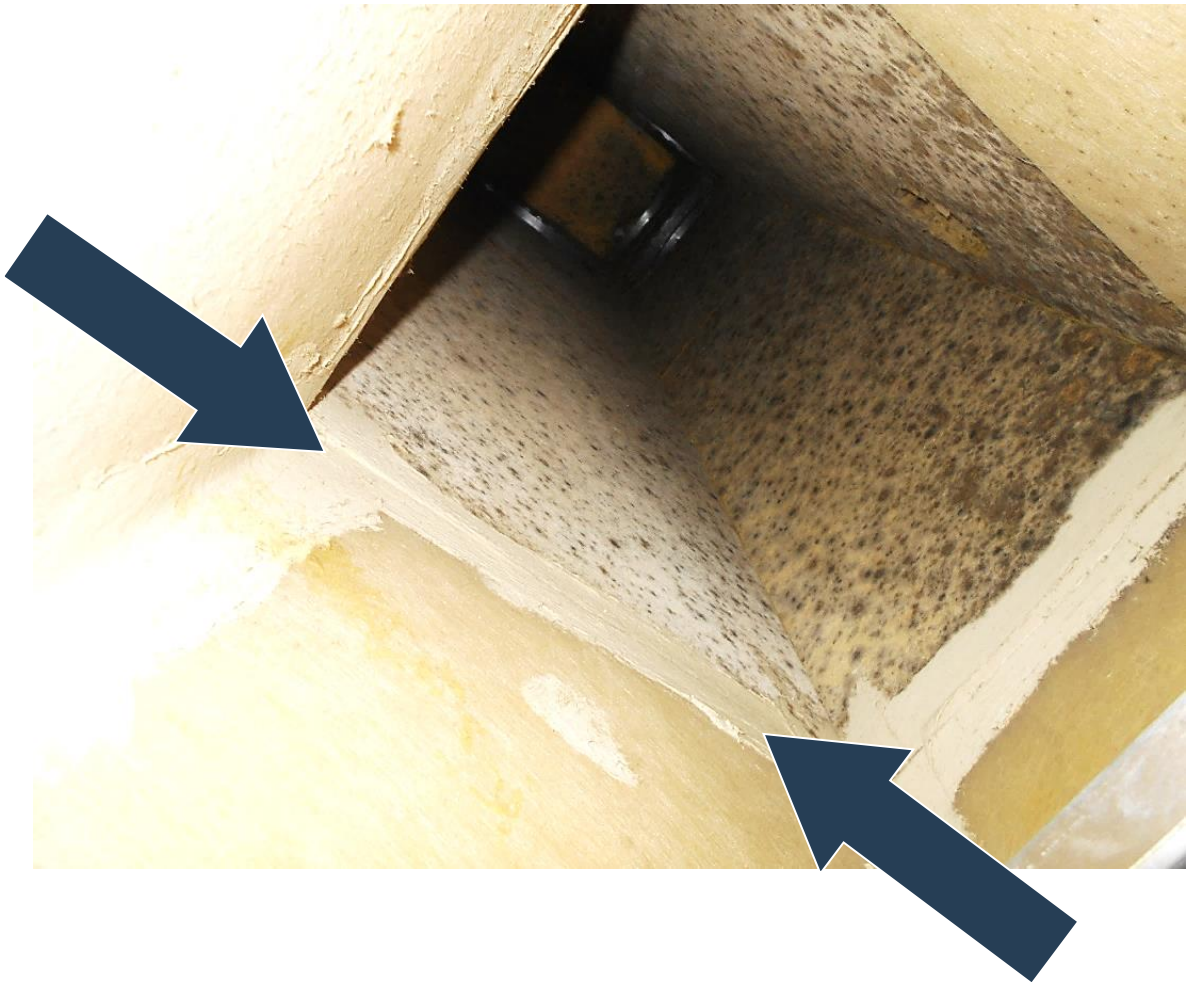
Insulated coolant line

Drain line



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AC Supply Plenum. Almost Always Moldy.



- Below the blue arrows is new fiberboard installed when the new AC was purchased.
- Nasty, mold covered, original supply plenum (above blue arrows) left in place when new air handler installed. This is typical.

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Air Handler & Components

Blower is inside here above coils. Needs cleaning.

AC coils are inside down here above drain line.

Air returns here under the unit. This area may be open or may be ducted or closed with a return air grill.



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Blower Rarely Cleaned by AC Contractors



- AC contractors that are hired to clean coils, rarely if ever, clean the blower.
- You need to ask for the blower to be cleaned.
- Asking for “coil cleaning“ means skip blower cleaning.

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Fiberglass Lined Duct Board



- The AC supply plenum (inside yellow box on left) sits on top of the air handler, goes thru the AC closet ceiling and connects the air handler to the ducting in the attic.
- The supply plenum is almost always fiberglass lined (surface has nooks and crannies like an English muffin). Collects dust.
- Dust + Moisture + Cold Air = Mold Growth and resultant odors and irritation.

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Fiberglass Lined Duct Board

- In all new Florida homes there is always fiberglass lined rigid ducting used for supply plenums and for connecting lengths of flex duct.
- Pen/Asp mold is always found on the dirt/dust accumulated on the inside rough lining of fiberglass duct board.
- When the AC is on, Pen/Asp spores and mold fragments are constantly being released into the indoor environment.



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Fiberglass Lined Supply Plenum. Flex Duct Plugs Into It.

Round flex duct in the attic, plugs into supply plenum.

AC closet ceiling.

Fiberglass lined AC supply plenum after cleaning and sealing.



Top of Air Handler

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Round Flex Duct



Newer homes have (here silver colored) flex duct that is lined with smooth, thin plastic lining.

The smooth plastic lining of flex duct makes it "somewhat" resistant to the accumulation of surface dirt and accumulation of mold on the dirt… compared to fiberglass lined duct board.

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Hole In AC Closet Ceiling

Hole at the top of AC closet allowing air handler to pull moldy, hot/humid attic air into AC closet.

Building Code defect.

Inspection report should recommend sealing all holes in AC closets.



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Painted Over AC Grills



Always remove grills that appear “suspicious”. You never know what you will find!



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Back of suspicious grill. Nasty. Major rust/ water damage.



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Behind suspicious grill. Heavy mold.



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Seal Drywall Openings Around Recessed Lights.

- Drywall around recessed lights not caulked. Moist, hot attic air leaking in during the summer months. Comes into contact with cold ceiling drywall causing condensation around lights and resultant mold. Easy to fix. Bleach ceiling. Then seal/caulk around recessed lights to eliminate mold and odor problems from attic air entering homes and offices.



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Seal Drywall Around AC Registers





- Same problems with HVAC registers set in ceilings. Mold growing on ceiling around register. The drywall is often over cut and not sealed (arrow).
- Moist, hot attic air enters the house. Comes into contact with cold ceiling drywall. Mold results. Bleach ceiling. Seal/caulk drywall around HVAC “cans”. Stops mold from coming back**.**

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Summary: HVAC Systems



When air leaks involving the HVAC system impact non-conditioned spaces such as ceiling plenums, unfinished basements, attics, or wall cavities, such defects can result in mold problems.



The leaks may be cold air being released (supplied) from the AC unit or ducting, that mixes with non-conditioned (moist) outside air causing condensation.



Or the leaks may be on the return side where the unit or ducting is pulling moist, dirty non-conditioned air from attics or wall cavities into the AC and ducting.



Often resulting in mold and odors that affect the sale of the home and/or occupant health.

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Section Review Questions

1. Leaking AC supply ducting in attics is bad because the cold air leaking out can create a cool condensing surface where elevated moisture supports microbial growth

   True or False

2. Leaking AC return air ducting in attics is bad because (one or more.)

   a) Such leaks pull in non conditioned (dirty) attic air and will cause mold contamination of the HVAC and/or ducting.

   b) Such leaks cannot be avoided.



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Section Review Questions

3. Fiberglass duct board used to make supply plenums and return air boxes and sometimes ducting….

   a) Has many nooks and crannies and accumulates dust/dirt and results in mold growth over time.

   b) Can never result in mold growth since mold requires paper or wood (organic matter) to eat.

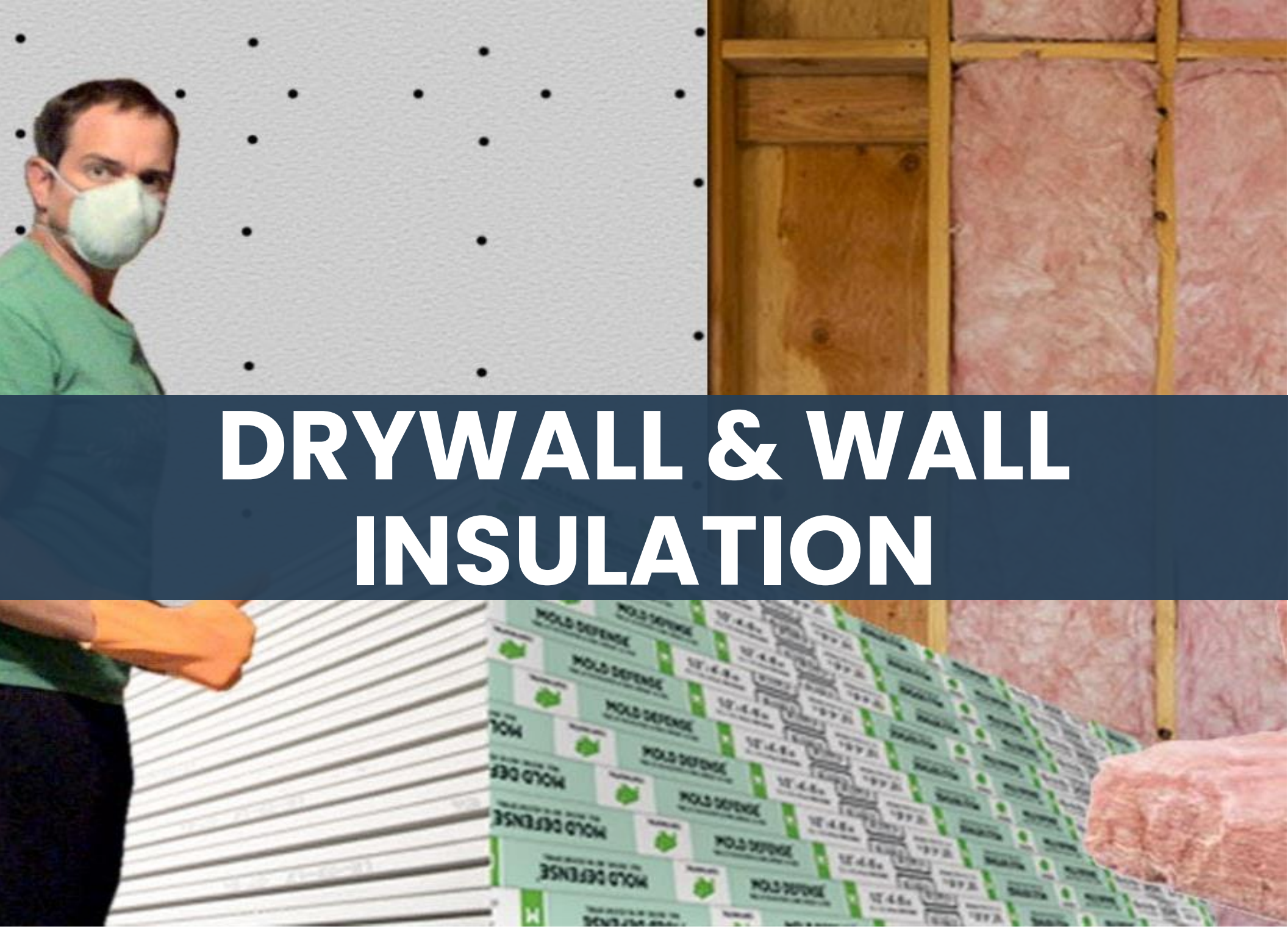
4. Leaks in the AC supply ducting are no big deal because on the supply side you are never sucking in non-conditioned air. Pick one correct answer.

   a) Wrong. Cool escaping air in an attic will cause condensation problems and mold growth.

   b) Wrong. Escaping air can pressurize wall cavities or ceiling plenums and push smells and possibly microbial contaminants into the living space**.**

   c) All of the above are wrong.

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DRYWALL & WALL INSULATION

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Old Wall Insulation



- Paper faced fiberglass insulation in exterior wall under window leak. Window not properly caulked.
- The fiberglass wall insulation holds moisture and significantly elevates the extent of moisture and mold problems. Blown in cellulose insulation is even worse because mold eats wet cellulose.

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Old Wall OSB Backing. Not Concrete Block Structure



- Arrow points to crack in exterior stucco wall with OSB* backing.
- Fiberglass insulation holds the moisture. Several years later the OSB backing has completely dissolved.
- Look for such problems in older stucco over OSB buildings.

*OSB: Oriented Strand Board is an engineered wood made of pressurized wood strands and adhesives. Subject to rotting when exposed to water.

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Cellulose Wall Insulation

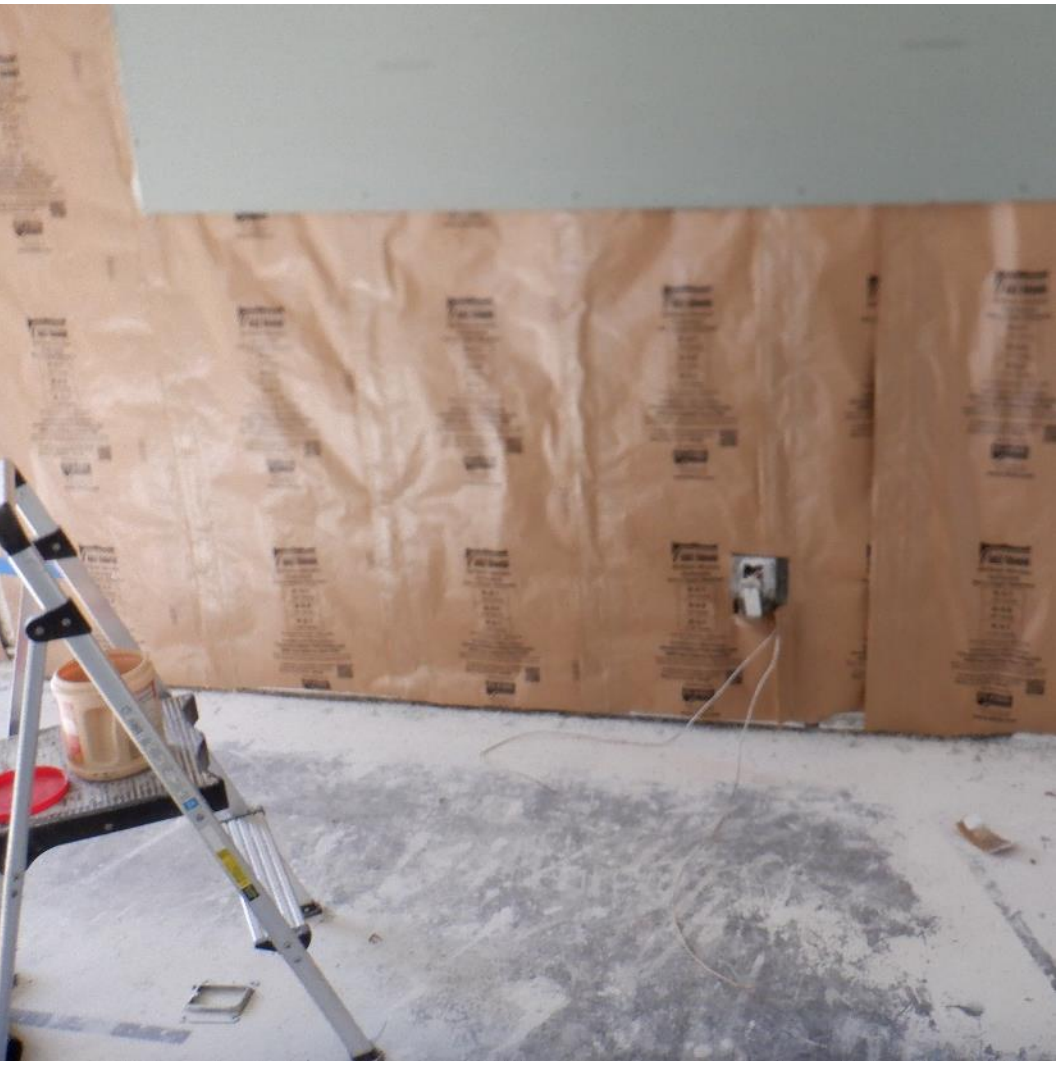


Blown in cellulose insulation. Traps moisture and grows mold. When remediating best to remove and replace blown in cellulose insulation with FiFoil (www.FiFoil.com)



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FiFoil Insulation

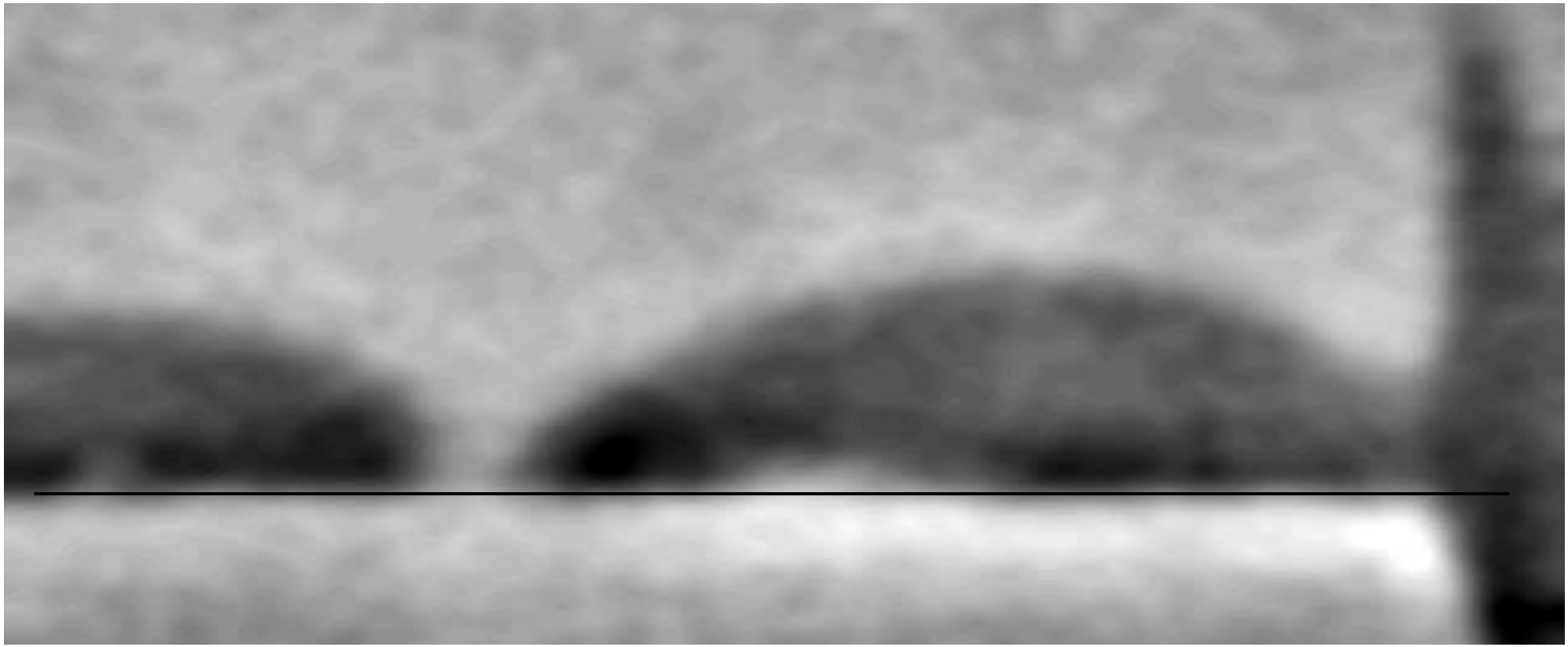


FiFoil brand insulation is present in all FLA new construction. Aluminum foil on the back and wax paper on the front. Keeps moisture from being transferred from furring strips to drywall.

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On Rebuilding, Hang Drywall Off of The Floor

- Infrared pix (dark half circles) of water wicking up drywall because drywall was not hung with a gap at the floor. 80% of all water damage to drywall could be avoided if drywall were hung off the floor ¼ to 3/8 inch as recommended by the Gypsum Industry Association.
- (Fortunately for us mold remediators, drywall is usually hung without a gap at the floor. So plenty of mold after a water event.)



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Cut Open Walls to Dry Out Insulation

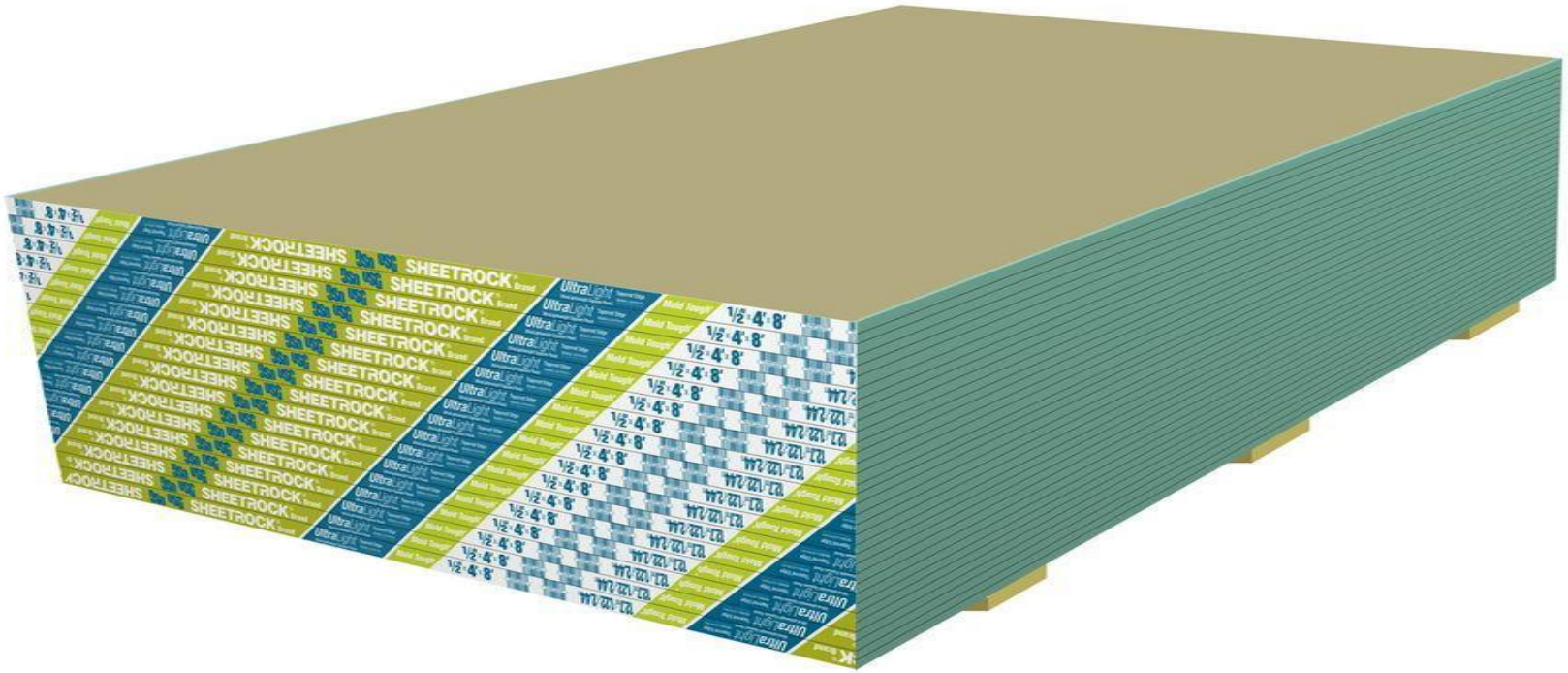
- Insulation inside of wet walls does not dry without resulting in mold growth in the wall. Cut open walls to dry if insulated.
- Note that wet fiberglass insulation when dried does not lose its R value (insulation ability).
- Does not have to be replaced unless mold on paper face.



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Rebuild With Green board

Moisture resistant drywall. Good idea to install after mold remediation. Not mold proof. Hang drywall off the floor with a 1/4” to 3/8 “ gap.



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Section Review Questions

1. If you use mold resistant drywall you never need to worry about mold problems.
   a) No. Mold resistant paper faced drywall will grow mold if wet long enough. It is not mold proof.
   b) No. If walls get wet and then you install cabinets, the cabinet backs can get moldy.
   c) Both a & b.

2. You should always leave cellulose wall insulation in place during mold remediation because it is made from recycled material and is good for the environment.
   a) When walls are cut open for mold remediation replace cellulose insulation with FiFoil that meets current FL Building Code.
   b) Right. Best to stay with recycled products**.**

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Section Review Questions

3. Because fiberglass wall insulation does not lose its R value if it gets wet, you never have to open wet insulated walls.

   a) On the contrary, such insulated walls will never dry before mold has a chance to grow unless they are cut open during the drying process.

   b) That's right.



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WINDOW INSTALLATION DEFECTS



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Seal Window Screw Holes

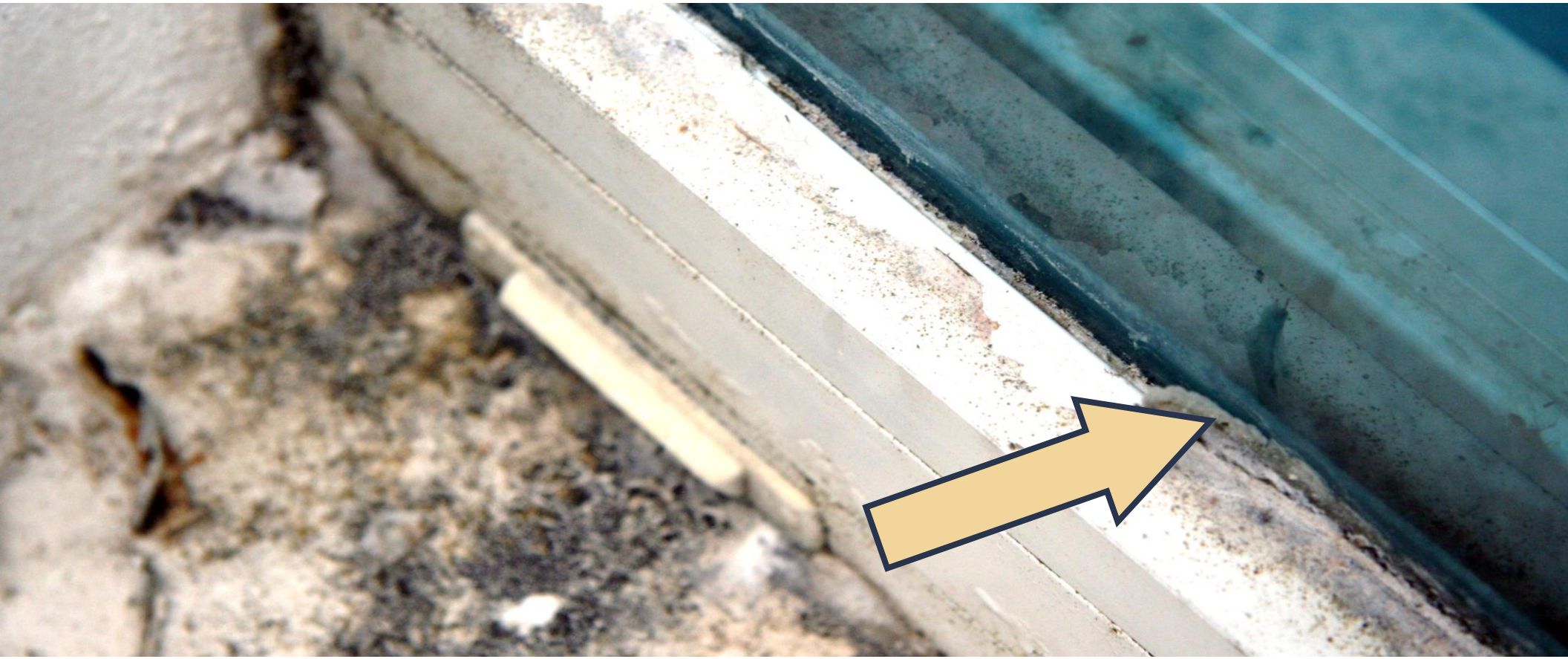
An Inspection that finds mold and/or moisture problems under windows should investigate the window outside. Recommend that all screw holes be sealed.



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Salt Water Deteriorates Window Seals

- Window in 3-year-old, ocean front, building. Seals deteriorated and water entering building. Mold inside.
- This window seal is not compatible with salty ocean air. The Inspector should not only point out damage inside under windows but explain why windows are leaking.



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Defects Around Hurricane (Impact) Windows

- Retrofit hurricane (impact) window too small for opening. Missing window buck. Leaking. Mold.
- Note that retrofit impact windows are often installed wrong and will often result in mold and water intrusion.



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Defects Around Hurricane Windows

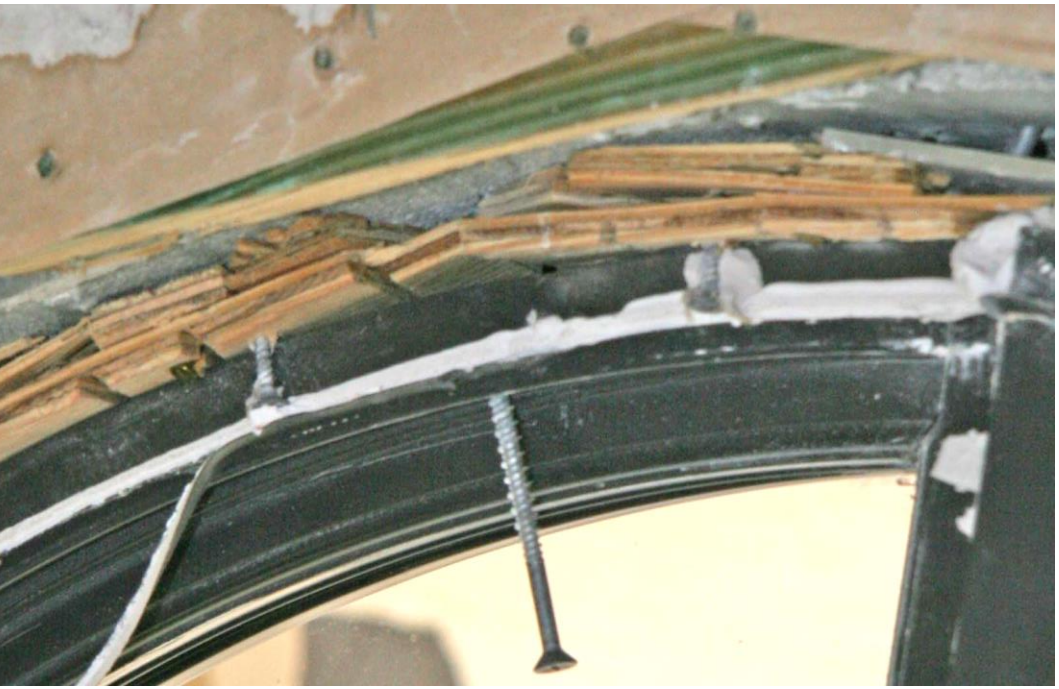




Retrofit hurricane window too small for opening. Missing window buck. Screws too short. Leaking. Mold.

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Defects Around Hurricane Windows



- Gaps too large. Screws too short and do not penetrate concrete properly.
- Window bucks all messed up. Not solid. Not continuous.
- **Common when retrofitting arch windows.**

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Impact Window Installation Building Codes

- Check manufacturer window installation guides for proper impact window installation. Generally, these require:
  - Continuous wood buck if windows are not exact fit.
  - Windows and doors must be installed with ¼" X 4" Tapcons (concrete screws) so the Tapcons can penetrate a minimum of 1½" into the concrete.
  - In the event that the existing window opening has ¼" or more of separation between the buck and the frame, shims must be installed.





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Section Review Questions

1. Leaking windows can always be easily fixed.
   - **a) Not at all. The may be installed improperly.**
   - **b) Always use mold resistant drywall when rebuilding under a leaking window; hang drywall off the floor; use FiFoil insulation.**

2. When a house is retrofitted with hurricane (impact) windows this usually fixes water leaks and intrusions under and around windows.
   - **a) Not always. Sometimes they get worse because the windows are the wrong size (too small) and it is too much trouble (time/money) to properly install new window bucks. So windows never fit right and always leak.**
   - b) That's right!

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LEAKS AFFECTING CABINETS

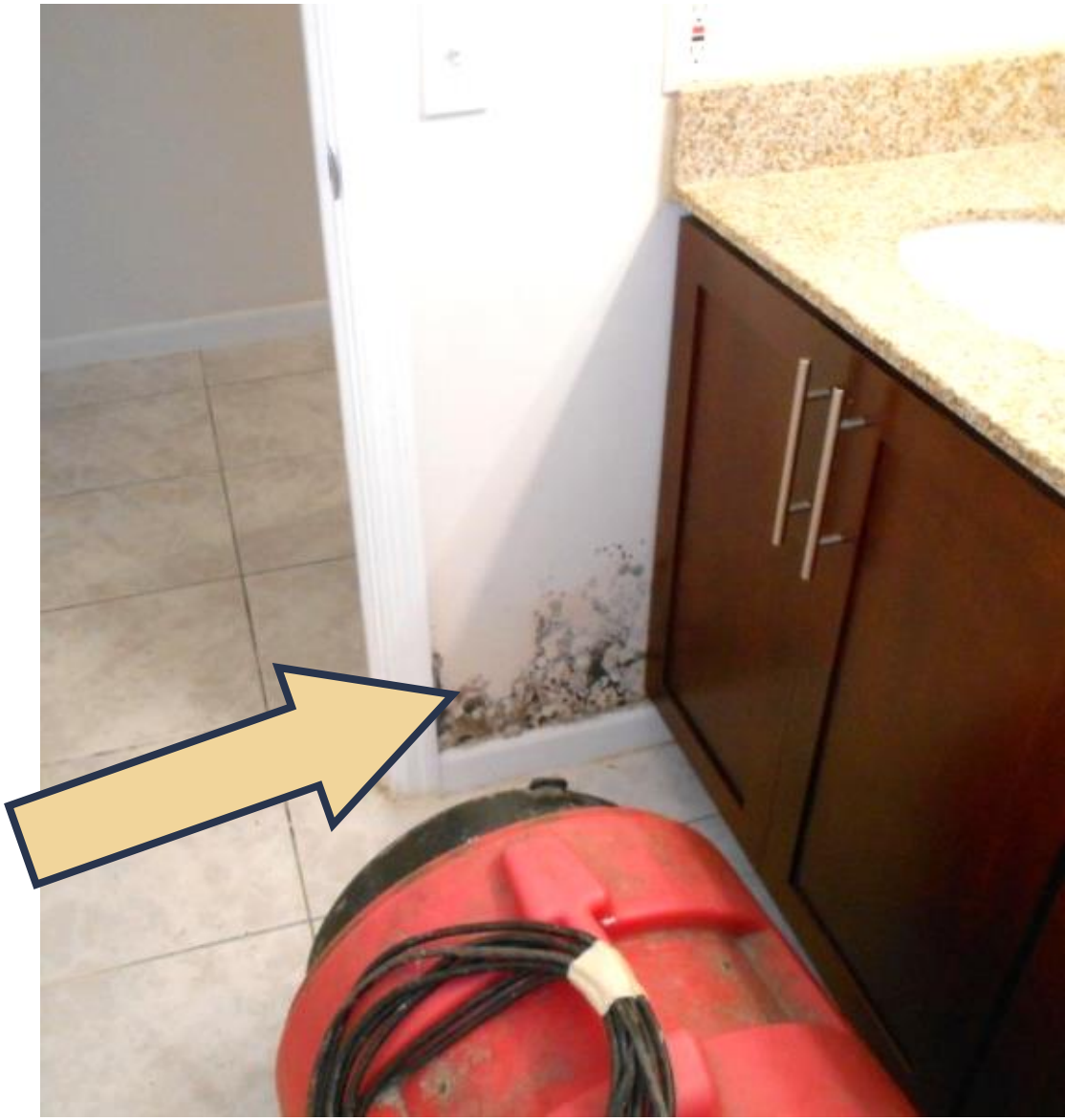


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Mold or Water Damaged Bath or Kitchen Cabinets

Investors will bleach and then paint over such problems. Will there be mucho mold under the vanity to the right. No doubt.

Suggestion: Test for hidden mold under suspicious cabinets.



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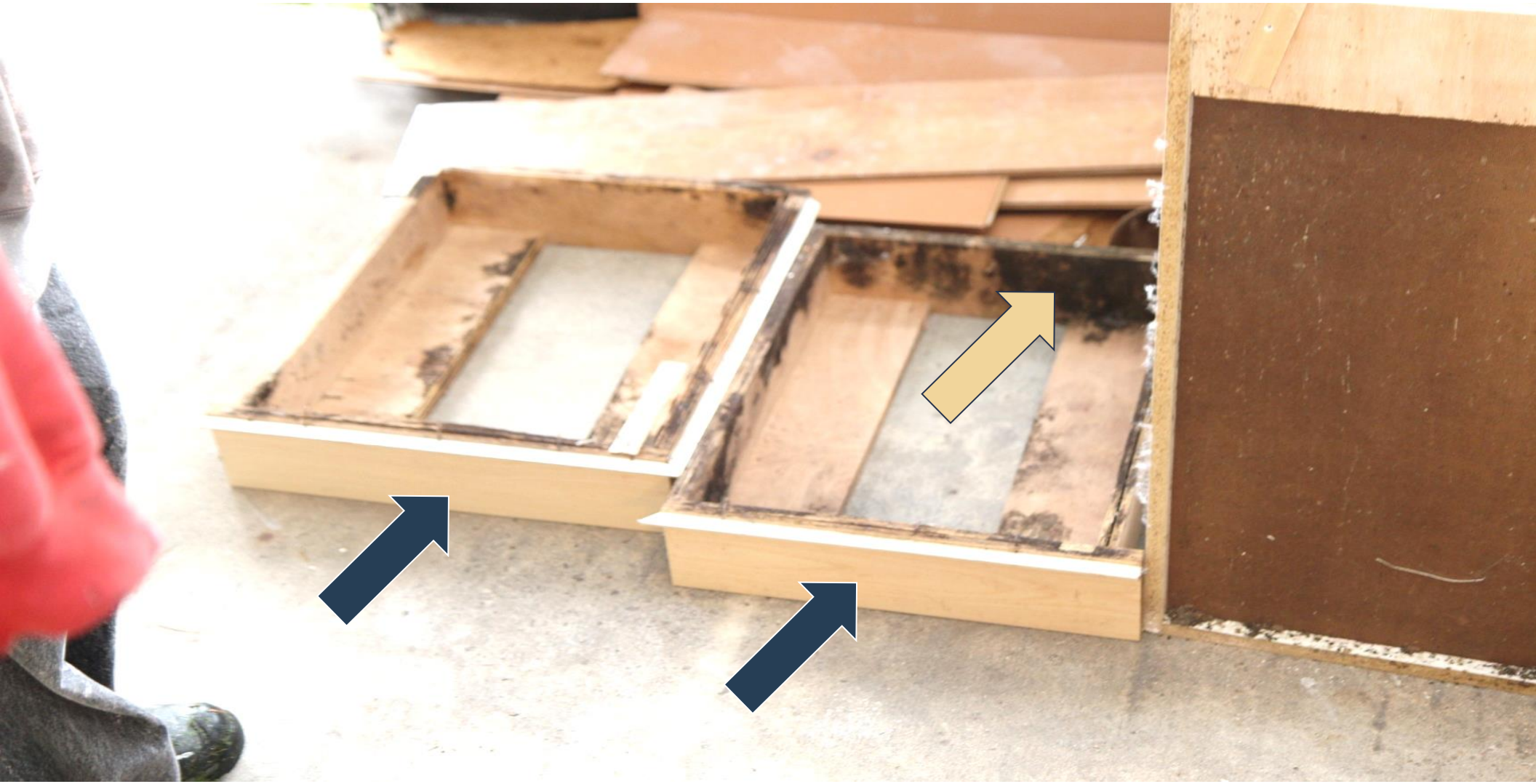
Mold or Water Damaged Bath or Kitchen Cabinets



This is what was behind the vanity. Stachybotrys toxic mold.

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Mold or Water Damaged Bath or Kitchen Cabinets



- Yellow arrow points to heavy mold (black toxic Stachy) in cabinet bases but brand new pristine toe kicks (blue arrows). Flipper special. Cover up mold. Sell as new.

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Mold or Water Damaged Bath or Kitchen Cabinets



- Heavy white-colored Pen/Asp mold under cabinet base from earlier leak.
- No apparent problems on exterior.
- This can easily (and only) be caught by mold testing under cabinets.

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Mold or Water Damaged Bath or Kitchen Cabinets

- Water stains indicate water exposure. Wear and tear or mold problem?
- Stains do not in any way mean mold underneath.
- Cabinet hinges (blue arrow) not good quality chrome finish. Rust easily.
- Best to test for mold underneath. Or inspector should say: “Remediator should further investigate”.



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Section Review Questions

1. Earlier leaks under cabinets …

   a) Damage to cabinets may have been covered up by sellers with no apparent water damage staining or visible mold.

   b) All cabinets can be tested for earlier water damage without destructive testing using air sampling extension tubes.

2. When you send the samples to a lab that determines Elevated or Not Elevated your job is easy. If results come back Elevated you recommend further investigation by State Licensed Mold Remediation contractor.

   a) True b) False



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Section Review Questions

3. If lab test results for mold under cabinets come back Not Elevated you never say there is no problem or no mold. What do you say?

   a) You say results came back Not Elevated.

   b) If the testing was negative but the cabinets look in bad shape, you might want to mention that a mold remediation contractor remove and check for interior mold and/or water damage.



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COURSE REVIEW QUESTIONS



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Review Questions

1. What can be said about HVAC installation? Pick all the correct answers.

   a) Never is a problem. The problem with AC is always with the design.

   b) If an HVAC closet is open to the wall or ceiling, you are pulling in contaminated air.

   c) If there are leaks in the AC supply plenum, released cold air can cause condensation on AC closet drywall and result in mold.

2. Which of the following is **not true** about drywall and wall insulation installation?

   a) Drywall should be hung off of the floor.

   b) If a marble or tile floor is installed, the drywall should be hung off the floor with sufficient gap that is does not get wet when the thick stone floor is installed.

   c) Fiberglass wall insulation that gets wet must always be discarded.

   d) All are true

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Review Questions

3. Pick the one best answer with regard to building exteriors.

   a) Cellulose exterior wall insulation made from recycled newspapers is a good idea because it is environmentally sound.

   b) Non-absorbent foil backed insulation (FiFoil) for exterior walls dramatically helps cut down mold and moisture problems as there is always at least some water/moisture intrusion thru exterior walls.

   c) Exterior walls and windows generally do not leak.



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Review Questions

4. When a house is retrofitted with hurricane (impact) windows this usually fixes water leaks and intrusions under and around windows.

   a) Often this makes matters worse. The windows may be too small and openings around the windows too large to properly caulk. Rarely will the window installer replace the old bucks with new correctly sized wood and properly shim.

   b) That's right!



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