

Tape Testing Instructions

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CreateYourHealthyHome.com

MoldControlonaBudget.com

TeachYourselfEnvironmentalHomeInspecting.com

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Introduction

Mold needs food and water to grow.
Where would it find both at your home?

- For food, consider mold's job in nature: to break down organic material, such as wood and natural fibers. It would be less likely, but not impossible, to grow on synthetics, on paint (which usually contains a mildewcide), or on concrete.
- For water, think about the basement/crawlspace with higher humidity and about water pipes and leaks and floods. Think about where rain might penetrate the home.
- Sometimes the most obvious (visible mold) is a minor player. Most mold is invisible. Hidden mold in wall or ceiling cavities wouldn't show up in air samples – but the gases emitted through continued growth could affect health.
- The purpose of doing tape samples is to look for sources of mold growth. Unless you know where mold is growing, you don't know how to clean it up. Sample to answer a question, such as, "Is mold growing under base molding from a toilet overflow?" The slide tape under base molding in several locations.
- If you sample randomly, on dust from a wall, furniture, fan, rug, AC duct, return filters, etc., those often are unproductive tapes. An exception would be where there is an issue with high humidity, and you think mold might be growing on and under furniture.
- After we talk about how to take samples, I'll share where I would check if I were at your home. We need to be mold detectives...and sometimes mold dogs!

WARNING:

If you are sampling obvious powdery black or white mold, just take a tiny sample at the edge so that you are not exposed to a cloud of mold particulates released by disturbing the mold. Wear a mask. Just a little dot is needed for identification.

INSTRUCTIONS FOR TAPE SAMPLING

1. Use only clear, transparent, glossy, $\frac{3}{4}$ " transparent tape. Scotch-brand transparent tape is fine and available on Amazon. Either search for "Scotch transparent tape" or use these links

2-pack:

amazon.com/gp/product/B003GSB944/ref=ox_sc_act_title_1?smid=ATVPDKIKX0DER

4-pack:

amazon.com/Scotch-Transparent-Standard-Versatile-Wrapping/dp/B002U3VABI/

Avoid dollar store tape, packing tape, Magic tape, Satin tape and invisible tape. The light from the microscope will not go through Magic Tape. If all I can see is a cloud, the samples may have to be re-done.

2. Remove a 3" piece of tape (about the size of a microscope slide) from the roll.
3. Stick one end straight out from your index finger, like you were making your finger 3" longer.
4. Loop the other end back onto your thumb, sticky side out. If you push the tape down on a surface, you should be able to get a sample of the dust on that surface. Yes? Adjust the tape as needed.
5. To get a little more control with my sampling, I back off a little so that the tip of my index finger is positioned over the center of the tape. Then I press my index finger down on the surface I want to sample. The dust ends up on the center of the tape, making positioning under the light of the microscope easier.
6. All you want is a little mold in the center of the tape. If the whole tape is full of dust, I still can only look at the middle, where the light is. It's helpful if the tape ends are free of dust and sticky, so that the tape sticks better to the microscope slide.
7. Take your sample. Unless there is visible mold, touch the tape to multiple nearby surfaces to better the chances that the mold will not be missed. We are not publishing a research paper. We are interested in the questions, Is there any mold growth? Is it a lot or a little?
8. Avoid dusty surfaces. If I were sampling pressed wood shelving, for example, I would touch a tape to multiple spots on the under side of shelving. I'm looking for mold, not for dust, and too much dust makes it harder to see mold. (Older pressed wood shelving is a favorite spot for *Aspergillus* to grow.)
9. After taking the sample, make $\frac{1}{4}$ " tab on one end of the tape. This tab will make it easy for me to remove the tape from the bag it is stuck to. (Did you ever try to remove a piece of tape from a plastic bag when there was no tab? How about 20 pieces of tape?)

10. Mount the sticky side of your tape on the OUTSIDE of a sturdy plastic bag, such as Ziplock, but not on a flimsy baggy. A little of the debris will remain on the bag when I remove the tape, but most will stay on the sticky tape.
11. Avoid placement of tape over the white part of the bag, because sometimes the white comes off when I remove the tape.
12. Number each tape by writing with a permanent marker on the tape by the tab, not on the plastic bag. If the numbers are on the plastic bag, I need to right them on the tape, too. Why do you think I would do that? So I don't mix up the tapes. Make sense? It's a quality control measure.
13. Provide a key for locations. True, you can send in tapes without a key, but with a key, I may be able to give you useful feedback that you wouldn't get if I have no idea where the tapes were taken.
14. See page 18 for a photo of the tapes on a plastic bag.

MAILING INSTRUCTIONS

Mail your samples to EnviroHealth, 1009 Hemlock Circle, Manheim, PA 17545

Include your name, phone number, and email address in the mailing.

First class postage is fine. Please do not require a signature!

Sometimes I inspect out of town and am away for a few days. Other times I make extended field trips for 2-3 weeks. If your job is a rush, please call or email (contact information is on the first page) before sending anything. If I will be away for a long time, you can send the tapes to my temporary address. Have microscope, will travel ☺

TAPE SAMPLING COST

Enclose a check made out to EnviroHealth.

One tape is \$15, three are \$25, eight are \$50 and twenty are \$100.

If you have over twenty tapes, then the 21st, 22nd, 23rd, etc are \$4/each.

If you later send more tapes, they, too, are \$4/each.

Example: 24 tapes are \$100 for the first 20, then 4 x \$4 for \$116.

Example: 10 tapes are \$50 for the first 8, then \$5 each until you get to \$100, then, \$4 each.

If you have questions, either call or email me (contact info is on the first page).

SAMPLING TIPS

1. If you are sampling obvious mold, touch the tape to only a small edge of the mold. This will protect you from exposure from disturbed spores. If there is a lot of mold, wear a mask.

I've repeated this point, because one of my recent exposures was on-site to a square inch of black *Stachybotrys* that a client sampled in a hard-to-access location. I forgot to ask her to just touch the edge of the mold. She seemed ok, but I could feel the effects of that mold in my lungs for two weeks afterwards.

2. If you are sampling a surface where there is no visible mold, touch each tape to a few spots in the same vicinity of what you are testing. Get some visible debris on the tape but not too much. If sampling shelving in the basement, touch the tape to the undersides of the shelving, not the dusty top. The light from the microscope has to be able to go through the debris.
3. If you have a concern about a particular piece of furniture, do a composite sample where you touch one tape to 20 or so spots all over the furniture.

You could also sample all the furniture in a room with one tape, touching the tape to 2-3 spots on the undersides of all the furniture and a few spots on upholstery if present. If this composite tape is positive, you might have to send some separate tapes from the furniture to try to locate the guilty party.

4. Sometimes it can be useful to ask the question, "Well, why wouldn't mold be growing here or there?" If there is food and water, mold growth shouldn't be a surprise, especially if water got trapped and couldn't dry out promptly.
5. It is important to find where mold isn't, as well as where it is. You see a discolored area on a ceiling joist in the basement. Do you need to clean-up the small discolored area or do remediation of the whole basement?
6. High levels of mold may be present but not visible to the naked eye. The microscope is the tool for confirming invisible mold. At one two-year-old house, the entire subflooring (ceiling) in the basement was covered with *Aspergillus*, even though the subflooring looked perfectly clean.

A previous inspector had been through and taken spore trap samples, but nothing showed up. For whatever reason, the *Aspergillus* wasn't releasing spores to the air....or maybe the inspector missed it because he didn't do aggressive sampling, that is, stirring up some dust around the sampler. For safety, I put my sampler on the floor and only disturb the dust in the immediate vicinity of the sampler.

7. Brush off crumbly stuff on the tape. The tape has to sit flat on the microscope slide or I won't be able to focus.

8. Don't send tapes with paint chips or other solid bodies. I won't see anything but a dark spot under the microscope. The light from the microscope has to be able to penetrate through what you send.

There is another type of microscope where you can look at solid materials. A stereo microscope would be used to view insects, small flower, critters sieved out from sand at the water line of a shore.

WHERE I WOULD SAMPLE AT YOUR HOME

1. Inside each sink cabinet around plumbing
2. Under base molding behind toilets, using a putty knife for all samples under base molding
 1. If quarter round is at the bottom of base molding, the quarter round is often tight against the floor, so that the putty knife won't fit under. There is nothing you can do, other than check with a moisture meter.
3. In shower access or under base molding at common wall with shower
4. Under base molding around the washing machine, dishwasher, and refrigerator if accessible
5. Furniture composites in each room, especially if vintage furniture or if there is a question about the furniture; generally not necessary if everything is new
6. Under base molding at windows if any test elevated with moisture meter
7. Under sills/posts at exterior doors where rain water may seep under base molding and posts
8. Deep inside one supply vent per AC unit (Vent cover is sampled for lab assessment, with Big 2 test, Assured Bio Lab)
9. Attic, one composite sample from what is accessible near entry, plus discolorations are noted
10. Basement, unfinished – ceiling joists/subflooring – two composite tapes, different areas
11. Basement, finished – under base molding, several spots, one tape per exterior wall
12. Basement, underside of lower steps
13. Basement, underside of discolored subflooring under bathroom/kitchen plumbing
14. Crawlspace, ceiling joists and subflooring
15. Crawlspace, fiberglass insulation – on paper coating. The moisture barrier should be against the warm, i.e., facing the living areas
16. Other places specific to the client's home

At my inspections, culture plate air samples are taken in each room, at dehumidifiers, at carbon-based air purifiers, at humidifiers, at supply hoses of sleep apnea devices, and in suspect wall cavities as needed. Tapes and air samples work together, but tapes are my main tool for finding sources of mold growth. And then, of course, the Big 2 test (www.assuredbio.com, \$85 option) is done at one or more AC supply vents.

Where You Might Sample at your Home

KEY: Ask a question, and sample to get the answer.

Let's start from the attic and work our way down.

1. Attic

- Does mold in the attic matter for health? Unless you are using the attic for storage (or if the HVAC system is in the attic), the attic is pretty much sealed off from the living areas. Mold particulates cannot get through the flooring. Mold gases tend to rise, and they would be diluted if there is adequate ventilation in the attic.
- If your HVAC system is in the attic, the stakes rise, because mold could be drawn into a leaky system.

HVAC systems belong in conditioned spaces, such as the basement. See the DNAAC attachment for testing the AC or forced warm air heating system.

- If you want to use the attic for storage, then pay more attention. You don't want to be tracking mold particulates downstairs or have them settling on your stored items.
- If you are selling your home, by all means, take care of visible mold in the attic prior to listing it. Depending on the type and amount of mold, this may involve professional remediation or a do-it-yourself approach. Remediation guidelines are included below.
- Here are some patterns of mold growth in an attic:

- i. Dark growth on the north side of the attic or under eaves.

This is likely *Cladosporium*, a common mold that likes areas of condensation. It doesn't become airborne readily from these areas.

You could pay for remediation but if the mold is accessible, just spray 9% or 12% hydrogen peroxide on it and then, when dry, paint the area. Deal with this before you sell your home, so a home inspector doesn't point it out to a buyer.

Cladosporium is almost always found in air samples, but these spores typically blow in from the outside.

- ii. White fuzz on roof decking or growing where the rafters meet the roof

decking.

This typically would be Aspergillus, growing because of trapped moisture. Maybe a shower exhaust vents into the attic, and ventilation is lacking. This could be a significant issue worthy of remediation, though one homeowner donned a mask, goggle, and Tyvek suit and sprayed 9% hydrogen peroxide on it, to be followed by painting.

Before making a decision, consider whether the attic is used for storage or has a heating/AC unit in it. A higher standard of care may be called for.

- iii. There may be minor Cladosporium around the shower, exhaust vents, or windows. These usually are do-it-yourself clean up areas... perhaps with 9% or 12% hydrogen peroxide or a little Borax on a damp sponge. Contact me for a few do-it-yourself stories/photos.
- iv. Have I told you enough to help you sort out whether you need to sample in the attic? Sometimes it helps to ask, "Is there any way this could be a health issue?" "What are you going to do with the information if you get it?" Will you remediate? If not, why go looking for something that might be a disclosure item if you sell the house?
- v. There are times when remediation might be needed in an attic:
 1. There has been significant roof leakage, hurricane damage, or perhaps an ice dam.
 2. You want to use the attic for storage.
 3. Your heating/AC unit is in the attic. The latest recommendations are to make the attic into a conditioned space, to reduce temperature differentials and thereby minimize the growth of Cladosporium.

Some recommendations are for use of spray foam insulation. Be cautious about that. Things can go wrong with spray foam, including off-gassing chemicals.

I saw one "conditioned" attic where mold was growing on everything, even on the sprayfoam. It may be safer to tape styrofoam or similar boards between rafters and closing off eaves. Get suggestions from qualified contractors.

- o Living areas without plumbing, such as bedrooms, living room, dining room, office
 - i. Where might water have come in? At windows. For about \$35, you could buy a pinless moisture meter at a home supply store or on-line to check

below windows for potential water intrusion.

If you find areas of elevated moisture, then follow the path of the water. If, for example, you suspect that water may have dripped down to the bottom of the interior wall cavity, then you might be able to detect some mold by sampling under base molding.

Here's a trick. Take a putty knife. Wrap your tape around the end, and then slide the end under base molding in a few spots. I use my putty knife in just about every inspection for reaching cracks and crevices that I couldn't otherwise access.

- ii. Windowsills often have dark Cladosporium mold due to condensation. Cleaning these areas are homeowners' maintenance jobs. Cladosporium doesn't become airborne that easily from these places. Wipe it off., with a little Borax on a damp sponge. Re-paint if needed. Improve insulation around the window if needed.
- iii. Paint contains a mildewcide, so mold wouldn't typically grow on walls unless there was excessive moisture for some reason. That mold would probably be visible.

Mildew is mold. "-cide" means to kill. That is, there is a chemical placed in paint to kill mildew. I once saw a more "natural" paint, without a mildewcide, in a basement. The surface had been painted three months before, and mold was growing on the paint.

Home Depot on-line carries Caliwel, a latex paint where lime, not a chemical pesticide, kills mold...kind of like whitewash in a paint base. Caliwel would be an alternative to regular paint, though painting with regular paint is ok, too. Caliwel has some sort of petrochemical binder, which can be troublesome to some chemically sensitive people until it cures. The average person would hardly smell it once it dries.

EnviroBliss, a traveling remediation company from Brooklyn that I have worked with over the years, uses it routinely as a sealant and hasn't had feedback of reactions. Sealants, sometimes called "encapsulants" protect the homeowner's remediation investment against future mold growth, except in case of a flood, etc.

EarthPaint, www.earthpaint.net, offers a couple of choices, such as LimePrime, which may be better for sensitive folk. We have more history with Caliwel than with LimePrime, and Caliwel is registered with the EPA for use in mold remediation.

- iv. Sometimes a bedroom or closet wall is common with a bathroom plumbing

fixture, such as a sink, toilet, or shower fixture. If so, use the putty knife under the base molding on the other side of the wall by the fixture to see if you pick up any telltale mold spores.

- v. What about the furniture? Do you have any older or vintage furniture? Anything upholstered that might have been in a basement at one time? Anything from unknown origins? When I'm at a home, I typically do a composite sample from furniture. That is, I touch one tape to all the furniture in a room. This is a quick way to screen a room. If mold is found on the tape, then we have to go back and sample pieces individually in an attempt to find the source.

I touch the tape to a few pieces on the undersides or lower backs of the furniture – and also a few areas of upholstered surfaces.

I also sample the undersides of beds, both soft surfaces and wood slats supporting the mattress or box springs.

Is it worth sampling common places that *Cladosporium* would grow, such as windowsills? Up to you, but if you see discolorations on windowsills, you could also just clean the area and re-paint. I don't usually sample at windowsills, though I check under accessible ones with a moisture meter.

- vi. What about vents and ductwork?

Cladosporium is common on vent covers due to condensation. It's a homeowner's maintenance job to wipe it off. *Cladosporium* on vent covers doesn't answer the question of whether the AC system is contaminated.

I don't sample vent covers. Usually I'll take a vent cover off and reach as deep down inside a duct as I can. If mold is growing on a tape from deep down, that's potentially more concerning than surface mold on a vent cover.

A better way to sample the AC system is on a DNA level. See the DNA AC testing attachment. Choose the \$85 test option.

- o Living areas with plumbing, that is, bathrooms, laundry areas, and the kitchen
 - i. Follow the path of where water might have gone, even if you aren't aware of any water. Maybe a toilet overflow happened before you lived in the house. If water got into a wall cavity, there is a good chance that *Aspergillus* and/or *Penicillium* are alive and well, continuing to grow and give off gases just from the relative humidity of unconditioned wall spaces.
 - ii. These areas are where the putty knife comes in handy. Again, wrap the 3"

tape around the end of the putty knife and slide the knife under base molding around the toilet, next to the shower, under a suspect window, etc.

- iii. Bathrooms – I'd sample inside the sink cabinet near the plumbing and at plumbing access holes. Use the putty knife under base molding behind the toilet, if accessible. Often there is tile, rather than base molding. If there is a bathtub access panel, take that off, and sample inside on drywall and wood.

Many times the plumbing for the tub is on a common wall with a closet or bedroom. Do the putty knife trick under base molding from the closet or bedroom, if accessible.

Sometimes I find *Stachybotrys* growing under wood posts on either side of the shower. Water may leak out from the edges of a shower curtain. Slide the putty knife under the left and right wood posts.

Cladosporium commonly grows on bathroom ceilings and on caulking. Unless out of curiosity, it's generally not necessary to sample these places. Just wipe them off. A stain may remain because of the melanin in the *Cladosporium*. Paint as needed. Re-do caulking with a more water-resistant type.

If caulking isn't tight and water infiltrates during showers, there would be a risk for hidden *Stachybotrys*, which would be a remediation job. Keeping caulking in good repair is a must.

iv. Laundry

1. Use a good flashlight to check as best you can behind the washer and under the slop sink. If you can pull the washing machine out, all the better. Even if nothing suspicious is seen, slide a putty knife under base molding behind any sink or appliance with water.

v. Kitchen

1. As you did with bathroom sink cabinets, use one tape to sample around the rear base and at plumbing access areas.
2. Sample under base molding adjacent to appliances with water, i.e., dishwasher, refrigerator.
3. If you can, pull out the refrigerator and dishwasher and sample under base molding behind them.

- Basement, finished

- i. Tip: If there is thick insulation in the wall cavities, it may protect the back of the drywall from mold. Likewise, insulation between ceiling joists may mostly protect surfaces it covers, assuming it is not put on backwards, thus potentially trapping moisture. The vapor barrier should face the “warm,” that is, the living area of the house.

Fiberglass should be handled as carefully as asbestos or mold. Wear a mask, goggles, gloves, etc.

- ii. Here are three questions to answer relating to mold in a finished basement:

- 1. Is mold growing on structural wood?
 - 2. Is mold growing behind finished walls?
 - 3. Is mold growing on furniture?

- iii. On structural wood?

- 1. Maybe you can access ceiling joists and subflooring above ceiling tiles. If not, sample ceiling joists and subflooring in an unfinished area of the basement. The furnace/boiler room usually is lowest risk for mold, because of the heat and dryness.
 - 2. Try to sample under the bottom step. Steps may not be “structural” per se, but lower steps can harbor *Aspergillus* and be a decent indicator of the risk for mold growth in other places of the basement.

- iv. Behind finished walls?

- 1. Use the putty knife to go beneath base molding on exterior walls, maybe one tape for several spots under each side of the basement.
 - 2. If there is a plumbing access hole, stick your hand down to the sill plate and lower back of drywall to sample. Brush off crumbly stuff.
 - 3. Extrapolate from another area. If you find mold on other accessible sill plates (such as under steps) or mold on ceiling joists/subflooring (such as in a storage room), the chances could be that maybe this basement shouldn't have been finished.
 - 4. If you see a lot of efflorescence (mineral deposits) on lower

foundation walls in unfinished areas, maybe there is water infiltration from lower foundation walls in finished areas, too.

Walk around your outside foundation during a heavy rain. Are downspouts directing water away from the foundation? Is water ponding by the foundation wall?

What kind of soil do you have? Sandy soil allows for drainage much better than clay soil. I inspected two hundred-year-old houses, side-by-side, on Long Island. The unfinished basement at one house was fine, no mold. The next-door finished basement had mold on the new materials. Lunch was fed to mold.

Basements were meant for root cellars and wine cellars, buffer areas between the house and the earth. Finishing them raises the risk for mold growth – though there are ways to finish them and reduce the risk for mold growth. One amazing “unfinished” basement seen years ago looked like a western saloon...with concrete walls painted by an artist.

v. On furniture?

1. Do a composite sample. Touch one tape to the undersides of all the furniture, plus a few spots on upholstered furniture.

Or, maybe there's a particular piece you suspect, and you'll use one tape just for that piece, touching the tape to 15-20 spots all over the furniture. Avoid getting a heavy level of dust on the tape, because that will make it harder to see mold spores under the microscope.

2. If carpeting got wet, it may be worthwhile sampling the area that had been wet. In general, tape-testing of carpeting doesn't show much, even though the carpet could have a high level of microparticles, which are broken up pieces of disintegrating mold. Many microparticles are allergens and inflammagens. Mold doesn't have to be alive to affect us.

The DNA test mentioned above for the AC could also be used for a vacuum cleaner sample.

o Basement, unfinished

- i. Questions to ask: Is the structure moldy? Are contents moldy?
- ii. Take composite tape tests from several areas of ceiling joists and subflooring. One suggestion is to do a tape for each quadrant of the

unfinished basement.

- iii. If the heating/AC system is in the basement, check the return ducts. Sometimes sheetmetal is tacked between the bottoms of ceiling joists to form a return duct – common but not a good idea. What if the ceiling joists are moldy? Sample ceiling joists near a return duct.
 - iv. Pay attention to the ceiling plumbing penetrations under bathrooms, washers, and kitchens. Sample suspicious areas.
 - v. Sample semi-permanent wood, such as work tables and the backing of electric boxes.
 - vi. Sample vulnerable stored items, such as books, furniture, papers. Store vulnerable items in plastic bins.
 - vii. If you have pressed wood shelving, sample the undersides of shelves. As mentioned above, *Aspergillus* loves the older shelving. Newer shelving rarely has mold growth. Plastic, metal, or painted shelves are better choices.
 - viii. There are two other places I often sample for a history of mold in the basement: the top of cross supports (between ceiling joists) and the top of the hot water heater. These samples would be surrogates for how much mold is floating around in the air.
- o Crawlspace
 - i. Usually the only place needing sampling would be ceiling joists and subflooring, unless there is moldy subflooring under a bathroom, etc.

Q & A

“My house is 100 years old. I hate the thought of how much mold it must have.”

You might be pleasantly surprised.

- o Mold doesn't like plaster.
- o Old wood is generally more mold resistant than new wood. Old wood is usually denser, better quality, dried out, and has less nutrient value than softer new wood. At one conference, the presenter called new houses “self-composting houses.” In a newer basement especially, consider painting every square inch of wood to protect it from most mold.

I inspected a NJ house under construction and was so impressed with the builder. He

waterproofed the basement and used no pressed wood products at all. You don't see many houses like that. There was some mold that came in on wood. I told him where to spray with 9% hydrogen peroxide and paint.

“My basement smells musty.”

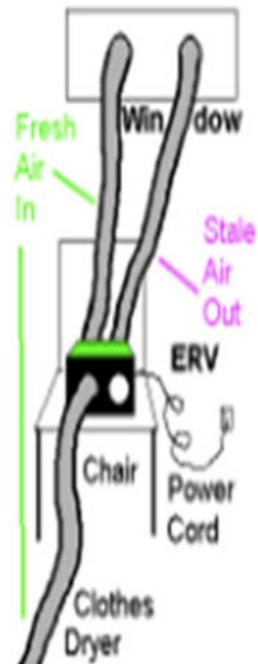
- Mold might be growing, giving off MVOCs, which are volatile organic compounds produced by mold.
- Carpeting and stuffed furniture may have absorbed musty smells and should be discarded. Carpeting is not recommended in basements. Check out offerings at Lumber Liquidators. They have formaldehyde-free products, many from the European Union. Or, check out polished concrete instead of floor covering.
- Sample ceiling joists and subflooring, as well as lower steps/stairwell.
- Think about installing a Panasonic ERV if you have a window and assuming the basement isn't conditioned.

<https://www.acwholesalers.com/Panasonic-Ventilation-FV-04VE1/p32041.html>

One client I have dealt with simply positioned it on a chair, as shown, so it could be very mobile.

To complement an HVAC operation, I suggest a timer to force the ventilator to operate, for say, 20 minutes out of every hour, to reduce the feeling of stuffiness that can occur when the outdoor temperature is similar to indoor, or the home is exceptionally well insulated, where the unit may not operate for hours.

Conclusion



The words “clothes dryer” refer to clothes dryer hosing.

“I have an old dehumidifier and wonder if I should get a new one.”

- Upgrade to an EnergyStar unit at the least.
- When dehumidifiers are run in moldy spaces, they get moldy. The filters protecting the innards are not very effective.
- Sometimes the dehumidifiers are a source of mold in a basement. I do an air sample on the air coming out of the dehumidifier.
- Check YouTube for videos on deep cleaning of dehumidifiers.

“Is tape sampling good for testing the AC system?”

- Generally speaking, no.

The better test is the Big 2+ with Assured Bio Labs – see DNA AC Testing attachment. The Big 2+ detects tiny pieces of DNA and is much more sensitive than tape testing. You will get clues about what might be going on in inaccessible places where you can't tape test.

“There was an ice dam on my roof, and now there are water stains on a bedroom ceiling.”

1. If the drywall is accessible from the attic, investigate from there. Maybe dealing with mold from above could avoid a remediation job. But if staining is extensive and water went down into the wall cavity, remediation may be in order. Unless there is visible black mold on the ceiling (*Stachybotrys*), the mold, if any, would likely be confined to the attic side of the drywall.

If you plan to have a handyperson just cut out the stained area, first cover beds, rugs, etc., with plastic drop cloths. If there is not much staining, paint it. If the attic above has ventilation, any gases produced by the mold would likely be dissipated in the attic, not drawn into the bedroom.

I'm guessing about half the time there are elevated levels of mold in a ceiling water stain when a drill hole is made and a tube inserted for air testing. Because a little bit of mold can make a lot of spores, it's not possible, even from an air sample, to predict how much mold is hidden up there. How long was the ceiling wet? How much water? Where did the water travel?

“The roof leaked.”

- Follow the path of the water. If the leak was into a wall or ceiling cavity, remediation may be in order. Tape sampling probably wouldn't show anything, unless there was so much water that a tape from under base molding might be positive for mold. On-site, I might drill a hole into the ceiling or wall cavity, insert a tube attached to an air sampler, and take an air sample.

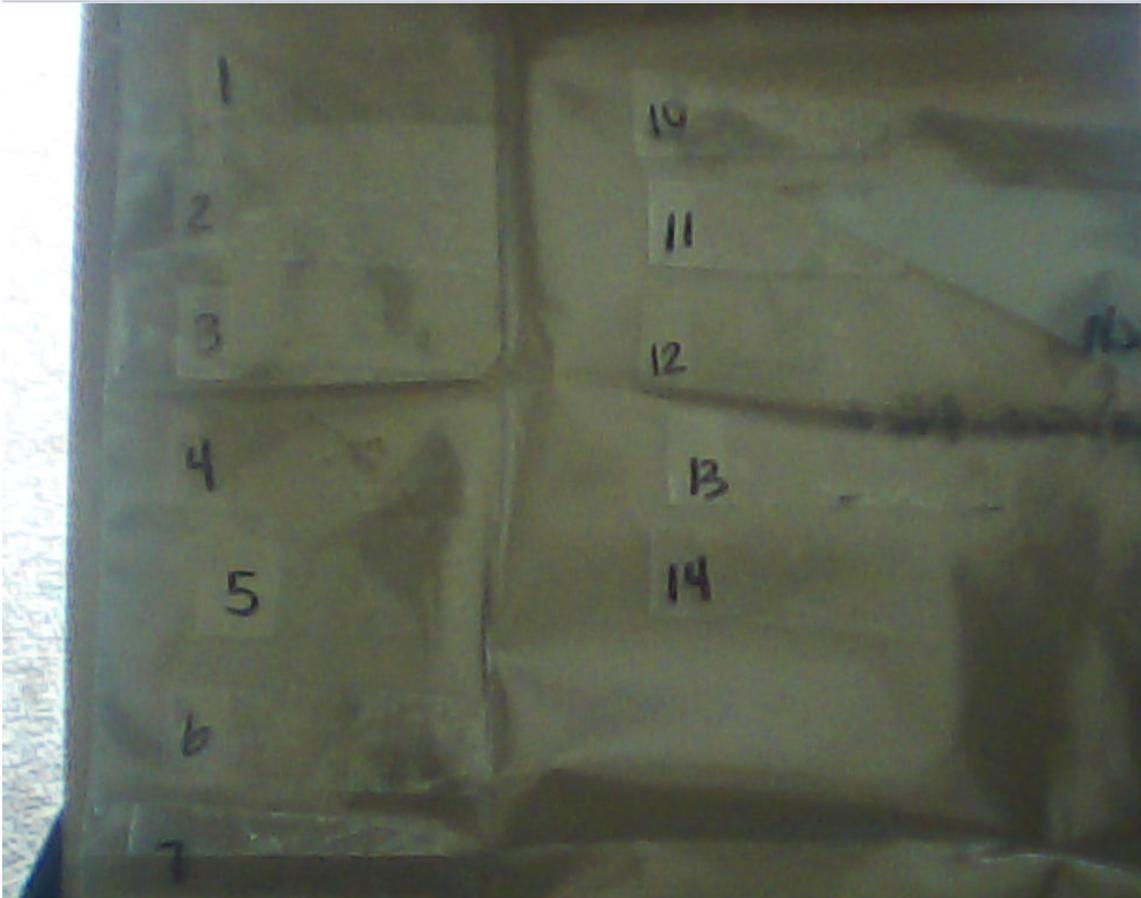
“A window leaked.”

- You may get confirmation of mold by sliding a putting knife under base molding. Even if not, ask the question, “Well, why wouldn't mold be growing in the wall cavity?” You have wood, and now you have water. Bingo. Food and water. Plan on remediation or, if doing it yourself, protect furniture and rugs with drop cloths. Wear a mask. Maybe use a box knife to cut out drywall to minimize construction dust. HEPA vacuum at the cut as it is being made. Safely remove insulation and bag for disposal. HEPA vacuum in the wall cavity. Wipe any visible mold. Paint.

Unless there is a nearby neighboring house, you could also put an exhaust fan in a nearby window to help draw dust and mold particulates out.

Photos of tapes mounted on a plastic bag.

Notice the small tab on the left side and numbers written on the tape, not on the plastic bag. Avoid placement of tapes over white areas on the outside of some bags.



ADDENDUM

On mold test interpretation and remediation

Tip: DO NOT MAKE REMEDIATION DECISIONS BASED SOLELY ON ERMI RESULTS OR ON MYCOTOXIN LAB RESULTS (clinical or environmental)

- If old dust is sampled or if visible mold or water-damaged areas are sampled, results can be skewed and make the whole house sound like a disaster area when it likely is not.
- Presence does not equate to exposure. If doing ERMI or mycotoxin dust tests, sample where you are exposed, not at water-damaged areas or visible mold.
- On the other hand, ERMI and mycotoxin testing can miss significant mold, so don't depend even on good results.
- Know where mold growth is and match remediation steps to what needs to be done to safely get rid of it and keep it from coming back.
- Remediation is not always needed. Sometimes just a simple paint job would suffice.

“I just got my report for air sample results. Can you help me interpret them?”

- Look at the counts for Aspergillus/Penicillium. Most labs give a raw count and a counts/cubic meter. The latter number is an extrapolation depending on the amount of air drawn into the air pump. If 10% of a cubic meter was drawn in, then you would multiply the raw count by 10 to see what that equated to in a cubic meter.

It's easy to compare the raw counts for Aspergillus/Penicillium, which are marker molds for dampness, water damage, cross-contamination. If the raw counts are low, in the low single digits, there may be no red flags from the air samples.

- The better way to do air samples is called “aggressive sampling” and involves stirring up some dust. Many inspectors set up tripods for passive sampling and get under-counts for mold or miss it completely.
- If raw counts are 5-10-20 and on up, there's likely an issue that has to be ferreted out. Tape samples are one important tool for finding sources of mold growth. For mold to show up in an air sample, there has to be a pathway from the mold growth to the air.

Also look at three other molds, the ones that are associated with floods, prolonged leaks, etc.: Stachybotrys, Chaetomium, and Trichoderma. If you don't see any of them,

good. If you see some, where was it wet for a week or more – where do mold spores have access to room air?

EnviroHealth basic mold remediation guidelines

- Set up containment and negative pressure.
- Follow industry guidelines for worker protection, that is, an N95 or P100 respirator, goggles, etc.
- HEPA vacuum.
- Remove contaminated items that can be removed. Bag for proper disposal.
- Clean items that are to be salvaged. Remove to safe storage. Unless mold is growing on an item, think in terms of dust removal. The mold particulates will be among the dust particulates.
- HEPA vacuum, including ceiling joists and subflooring, if they are involved.
- Treat contaminated surfaces that cannot be removed. Wipe as needed. Treatment options include, for cleaning:
 - 3% hydrogen peroxide
 - 9% or 12% hydrogen peroxide
 - 27% hydrogen peroxide can be purchased from a swimming pool supply store, for about \$20-\$30. One brand is Soft Swim C.
 - HANDLE with care. Wear gloves, goggles, respirator, long sleeves. 27% can burn and is hazardous. Keep away from children.
 - Pour a little of the 27% onto dirt outside, to make sure it fizzes and isn't a dud. The strength of hydrogen peroxide decreases over time.
 - Dilute the 27% to 9% (1 part hydrogen peroxide poured into 2 parts water)
 - When you spray 9% hydrogen peroxide onto mold, it will fizz.
 - Contact me for before-and-after do-it-yourself photos from a client's attic project.
 - Your before-and-after DIY photos would be welcomed.
 - Treatment options include, for encapsulation:
 - Caliwel
 - Regular paint

- Fiberlock Advanced Peroxide Cleaner and Fiberlock IAQ 1000 foaming hydrogen peroxide, or Fiberlock Mold Stain Remover
 - Serum 1000
- HEPA vacuum.
 - Apply 2 coats of sealant to unpainted wood surfaces. Options include:
 - Caliwel, from www.caliwel.com, www.homedepot.com online, not in Home Depot stores; may off-gas slightly on wood products, such as strandboard and pressed wood. For most folk, the smell is almost gone by the time the paint dries. Registered with the EPA for use in mold remediation.
 - LimePrime, www.earthpaint.net, likely not registered with the EPA.
 - regular no- or low-VOC paint, which traditionally contains a mildewcide (pesticide)
 - Fiberlock 6000 Gen3.
 - Complete final vacuuming and cleaning.
 - Arrange for an independent inspector to do post-remediation testing, preferably aggressive (stirring up dust).

“What is a good HEPA vacuum for dealing with mold?”

- The remediator colleague mentioned above, Pierre Cajuste of EnviroBliss, uses the Euroclean GD 930 for the dirty jobs of remediation and a Nilfisk GM80 for fine cleaning.

I measure air coming out the vacuum’s exhaust with a laser particle counter. The Nilfisk is close to zero, but the Euroclean’s reading is high. With the Euroclean, the filter is placed before the motor, so you get motor dust entering the exhaust air stream. However, all debris picked up by the vacuum goes through the HEPA filter.

- Commercial suppliers for the industry include www.jondon.com and www.jendcosafety.com. If you were considering the Nilfisk, consider buying directly from their local sales representative. Contact their headquarters at 800-645-3475.
- Here are some options for a quality vacuum cleaner for routine cleaning:
 1. Miele C3 – better HEPA filter, sealed rubber gaskets, better design for homeowner – around \$900

2. Shark, sealed canister – but empty the canister outside. If you can swing the Miele, go for that.

“I want to do the remediation job myself but am not sure how to set up negative pressure and containment.”

- Check out www.sunbeltrentals.com. They are all over and rent equipment such as negative air machines (which are air scrubbers that discharge to the exterior). They generally have good customer service for homeowners.

“Keep it simple” philosophy

- Find the mold – through tape samples (and extensive, aggressive air sampling, if I am on-site);
- Safely get rid of it...rather than having costly remediation when you might not even know where the mold is growing.
- Keep the mold from growing back by applying a sealant.
- Address the central air system – testing, treatment, and prevention against future issues – see the DNA AC Testing and Ventilation attachments.
- Have a good HEPA vacuum cleaner. Get rid of clutter. Damp-dust. Avoid carpeting. Make the house easy to keep clean.
- Invest in your home, not in making the labs richer.

“It’s not always mold”

- “They missed mold,” was a complaint against the inspector/remediation team.

I got a call from a guy who bought a 100-year-old townhouse and complained that when he entered the townhouse, he got a headache, brain fog, and couldn’t sleep. He was fine outside the townhouse.

He had had mold remediation done, but his symptoms didn’t change. He assumed that mold had to have been missed, so he called me to find it. I checked for mold, formaldehyde, and gas leaks – and found nothing. I asked him to turn off his nearby modem. Voila. The pressure in his head let up.

He called me a week later to report that he had hard-wired everything. His headaches and brain fog had stopped, and he could sleep.

It isn't always mold. See the attached, "Wireless to Hard-wired."

- Other clients have been affected by environmental issues they never dreamed of and which didn't turn out to be related to mold:
 - 5-year-old stopped bed-wetting the night the voltage was reduced at her bed – see www.createyourhealthyhome.com, EMF tab, body voltage tab, for instructions on how to measure/reduce.
 - 4-year-old started sleeping through the night when a wiring error was fixed and voltage was reduced at his bed.
 - Woman could work again in her basement office once gas leaks were repaired. She had thought the smell was mold.
 - Woman was on the highest level of asthma medication and assumed the issue was mold. It turned out that the vacuum cleaner used by the cleaning service was spreading dog dander from house to house to house. She was severely allergic to dogs. Once she provided her own vacuum to the cleaning service, she stopped her asthma medication within a week.
 - Woman's cough was 80% better within one week after getting a quality HEPA vacuum cleaner.
 - Many homeowners don't realize that carbon dioxide levels double/triple or more in tight homes with no ventilation. Some studies show mental sluggishness/dysfunction at 1,000 ppm (parts per million), compared to the less than 500 ppm of outside air.

Most of the houses I inspect measure around 1,000 ppm, with some over 2,000 ppm. I'm updating this piece from an extended stay facility where levels were 1300 ppm. I was having trouble staying awake – until a kind woman from the front desk showed me how to open the windows. Yea! That made all the difference. Those windows will be open until I leave here.

Plenty of my clients' homes are at levels close to this stuffy motel room. They put the AC on and think they are getting better air, but central air just re-circulates the same old air, with the same old carbon dioxide levels.

See Ventilation attachment.

- Woman's itch stopped once the laundry detergent was changed. Branch Basics was recommended, www.branchbasics.com. You might explore that website, because it gives valuable information about healthier substitutes for common household products. The co-founder, Marilee Nelson, wears a second hat as a consultant in least toxic building materials for folk renovating or building a new home. 830-367-1197;

Marileenelson11@hotmail.com.

- Homeowners had no idea how toxic their plug-ins made the air. When the formaldehyde meter alarm went off in their bathroom, within five minutes all the plug-ins were gone from the house.

The meter went off at 0.30 mg/m³; many houses are at 0.15 or 0.20 mg/m³– more than halfway there. Often pressed wood in kitchen cabinets or strandboard in building materials is a source. Formaldehyde off-gases forever. A speaker at a recent Indoor Air Quality Association's annual (on-line) conference commented that in a typical kitchen having eight cabinets with pressed wood shelving, figure 11 pounds of formaldehyde. You heard that right. 11 pounds.

Check out Lumber Liquidators for flooring. Their products are tested to be formaldehyde-free, thanks to a class-action lawsuit against them. They get some products from the European Union, more stringent than our regulations. For sources for least toxic products, check in with Marilee Nelson (see above). For flooring, Marilee recommends Kahrs Engineered floor covering, with underlayment, check with Joel Hershberg, www.greenbuildingsupply.com.

- Hot water temperature was measured with a meat thermometer at the kitchen sink...way below 120 degrees because the establishment of the 55+ community was concerned about scalding. The plumbing code calls for 120 degrees at the faucet in order to kill legionella bacteria in the hot water heater.
- Woman started getting migraines from being in new buildings. Doctor said, "Formaldehyde exposure, but the underlying issue is mercury toxicity. Get rid of the mercury, and the body will handle the formaldehyde." She had her silver amalgams removed; he guided her in a type of homeopathic detoxing. It took two years for the headaches to stop, but it's been over 20 years since she had a migraine. Lady was the writer.

Incidentally, mold can give off aldehydes, so there is a link between the mold and formaldehyde.

- Husband of a mold sensitive client told me that he had improved sleep once they moved from their moldy house. He was surprised to learn that he, too, apparently was sensitive to mold.

RESOURCES:

Some of the many:

- *My House Is Killing Me*, 2nd edition, by Jeff May – also available on Audible
- www.microwavenews.com – sign up for free notification of research findings relating to health effects from exposure to wireless radiation
- *Electric Hostage: Knowing Our Enemy Can Mean Survival*, by Sal La Duca – more of the theory behind electrosensitivity, for electricians as well as homeowners – www.emfrelief.com.
- *The Non-Tinfoil Guide to EMFs: How to Fix our Stupid Use of Technology*, by Nicholas Pineault – more of a popular level book
- Search on “Nate Adams Electrify” – interesting guy.

Last words

I hope this information has been helpful to you. You are part of the team. Your comments and suggestions are welcomed.

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