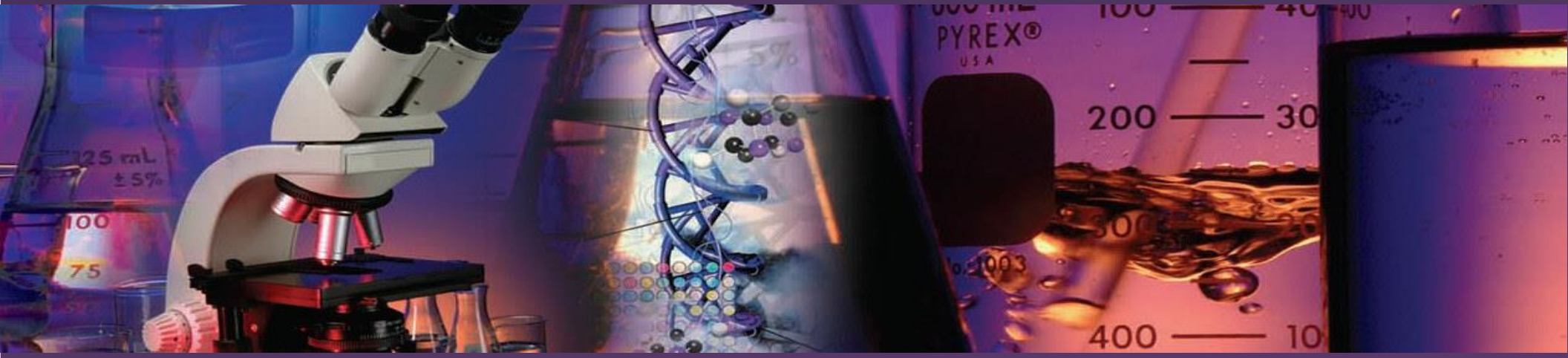
Mold & Mold Safety



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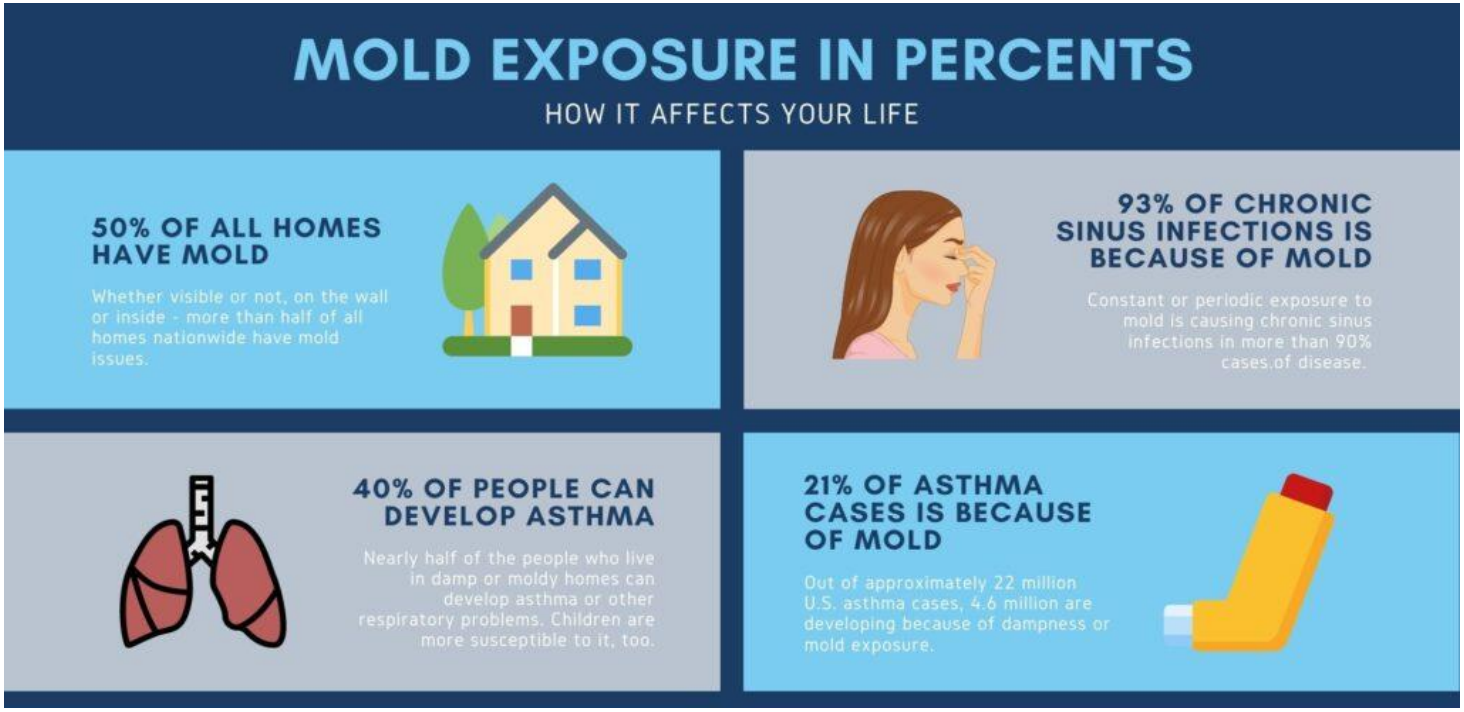
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Mold Exposure



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Mold Exposure

Indoor mold growth can, and usually does, produce toxins, irritants and allergens that have the potential to give mold workers (and occupants) headaches, skin rashes and respiratory problems.



Mold workers always protect themselves from exposure with respirators.

Minimum N-95 which is a true respirator and not a dust mask.

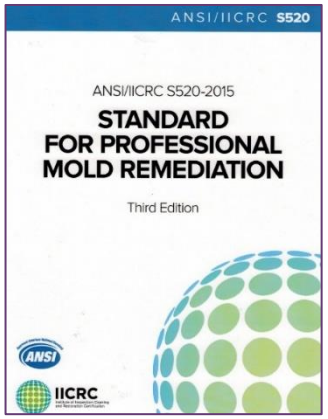
Significant levels of these same toxins, irritants and allergens are in the outside air – you breathe them all the time.

Is mold a hazard?

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Is Mold a Hazard? Depends on Who You Ask. IICRC says YES.

IICRC S520-2015 (Industry Proposed Guidelines) considers/declares mold a hazard.



As mold is considered a hazard by IICRC, IICRC has proposed using the same mold remediation procedures as for asbestos that causes cancer.

As a result, for IICRC exhausting mold contaminants and dusts generated inside the work area (containment) during demolition to the outdoors is prohibited. Contaminants must be collected onto air scrubber filters inside the containments. Then bagged and discarded. For IICRC, only clean air can be exhausted outdoors.

Air scrubber filters quickly get clogged with drywall dust and air exchange is limited. As a result, the interior of the IICRC specified containment is considered hazardous by IICRC (and it is), and **IICRC requires extensive Personal Protective Equipment (PPE) for mold remediation.**

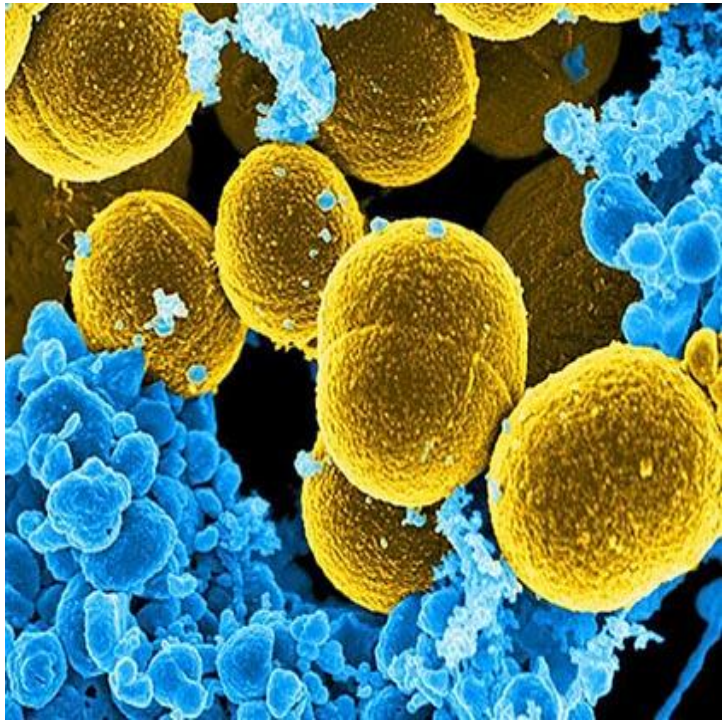
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Is Mold a Hazard? EPA/OSHA Says NO.

Mold and mold spores are all around us both indoors and outside.

EPA/OSHA (Federal Guidelines) do not consider mold a hazard.

Under EPA/OSHA guidelines, mold spores and drywall dusts released during demolition with few exceptions can be exhausted directly outdoors.



Mold is all around us. NOT a hazard.

As a result of being able to exhaust contaminants outdoors rather than (per IICRC) collected onto air scrubber filters that quickly clog with drywall dust during demolition, the workspace inside the containment is relatively clean of airborne contaminants with EPA/OSHA procedures.

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EPA/OSHA vs. IICRC Mold Remediation Procedures



Large air scrubber. The main HEPA filter costs $260 and rarely needs to be replaced when used only outside the containment

With EPA/OSHA (Federal) procedures, air scrubbers are used outside the containments. Scrubbers and filters stay relatively clean. Filters do not have to be often replaced.

Federal procedures that exhaust contaminants released during demolition to the outdoors can be shown to be both safer and more reliable while at the same time at a much lower cost than IICRC (Industry proposed) procedures.

Therefore, we prefer and only use EPA/OSHA mold remediation procedures in our work. Not IICRC (Industry proposed) procedures.

OSHA®

EPA
United States
Environmental Protection
Agency

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Mold Is Often at High Levels in the Outside Air. How can it be a Hazard?

Mold is often at high levels in the outside air. How can it be a hazard to health as claimed by IICRC so that it cannot be exhausted outdoors during remediation? Makes no sense.

See chart on the right showing typical outdoor levels of common mold spores in Florida during the month of February. In FLA, throughout the year, there are always large numbers of mold spores per cubic meter in the outside air. Mold is not a health hazard because people are exposed to high levels of mold in the outside air without harmful effects.

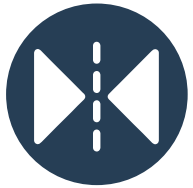
Fungi Identified *	Outdoor data	Typical Outdoor Data by Date† Month: February (n=1980)					
	cfu/m3	very low	low	med	high	very high	freq %
Acremonium	-	7	8	12	18	25	2
Alternaria	12	7	7	12	24	35	14
Aspergillus (total)	47	7	7	14	35	60	30
Aspergillus niger	24	5	7	12	24	35	13
Aspergillus sydowii	24	6	7	12	32	51	2
Aspergillus ustus	-	-	-	-	-	-	< 1
Aspergillus versicolor	-	7	7	12	25	58	8
Aureobasidium	12	7	7	12	24	35	14
Basidiomycetes††	-	8	14	59	160	370	8
Chaetomium	-	7	7	12	20	35	2
Cladosporium	160	12	24	120	440	860	80
Curvularia	-	-	-	-	-	-	< 1
Epicoccum	12	7	7	13	28	48	12
Fungi w/o identifying traits (total)**	24	7	12	21	47	71	62
Arthrospore-former	-	12	20	52	130	250	4
Non-sporulating fungi	24	7	12	21	36	67	60
Nigrospora	-	-	-	-	-	-	< 1
Paecilomyces	-	4	7	12	22	35	5
Penicillium	120	10	12	35	100	180	67
Rhizopus	-	5	7	11	12	18	3
Stachybotrys chartarum	-	-	-	-	-	-	< 1
Torula	-	-	-	-	-	-	< 1
Ulocladium	12	7	7	12	18	24	3
Yeasts	24	7	12	23	47	79	38
§ TOTAL CFU/m3	420						

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Mold Exposure and Health



People are continually being exposed to mold and at times, especially on summer days, even very high levels of mold in the outside air.



For healthy individuals (non-mold sensitive individuals), mold toxins, mold allergens and irritants are NOT accumulated in the body like some poisons are.



For healthy individuals, the body quickly eliminates mold toxins, allergens and irritants, so they don't build up.



As a result, for healthy individuals, typical mold exposure and even quite extensive mold exposure is **not harmful/hazardous to health.**

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The Key to Safe Work Conditions Inside Containments



During remediation, potentially hazardous levels — millions of mold spores — can and usually are released into the contained work area during removal of contaminated drywall.

The key to safety for mold workers is to focus on keeping the spore levels inside the containment at a low level rather than focusing on extensive Personal Protection Equipment (PPE).



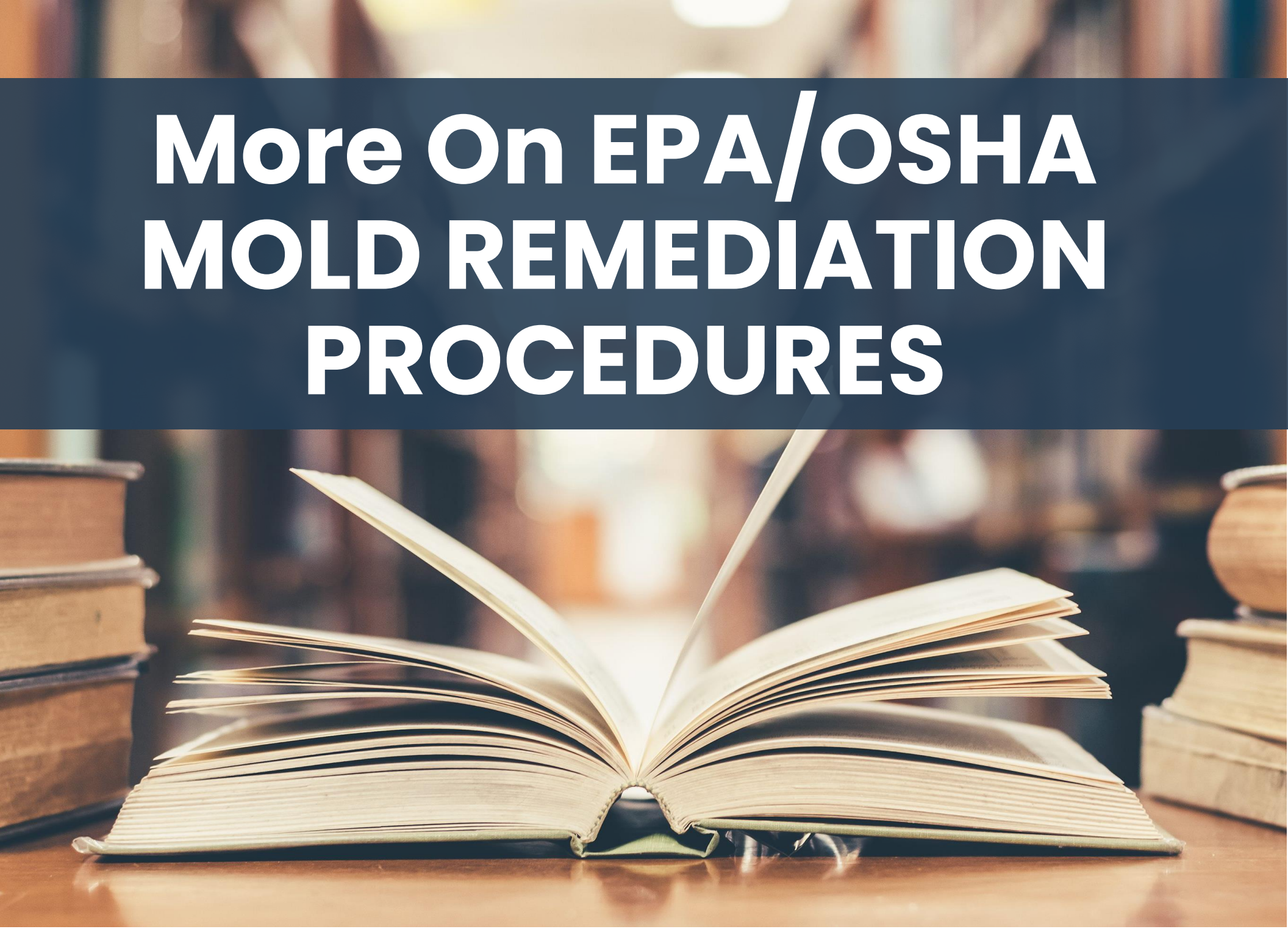
Eliminate or minimize exposure rather than try to protect against exposure with extensive PPE.

- We minimize exposure by exhausting outdoors the aerosolized contaminants released by demolition (EPA/OSHA Federal Guidelines).
- More than an N-95 rated respirator is not required or needed when following EPA/OSHA guidelines.

Focus on keeping the air inside the contained workspace (containment) clean rather than on extensive PPE.

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More On EPA/OSHA MOLD REMEDIATION PROCEDURES



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Remediation Standards Safety Guidelines



Guidelines for mold remediation safety have been published by the EPA/OSHA in the popular EPA booklet shown on the left.

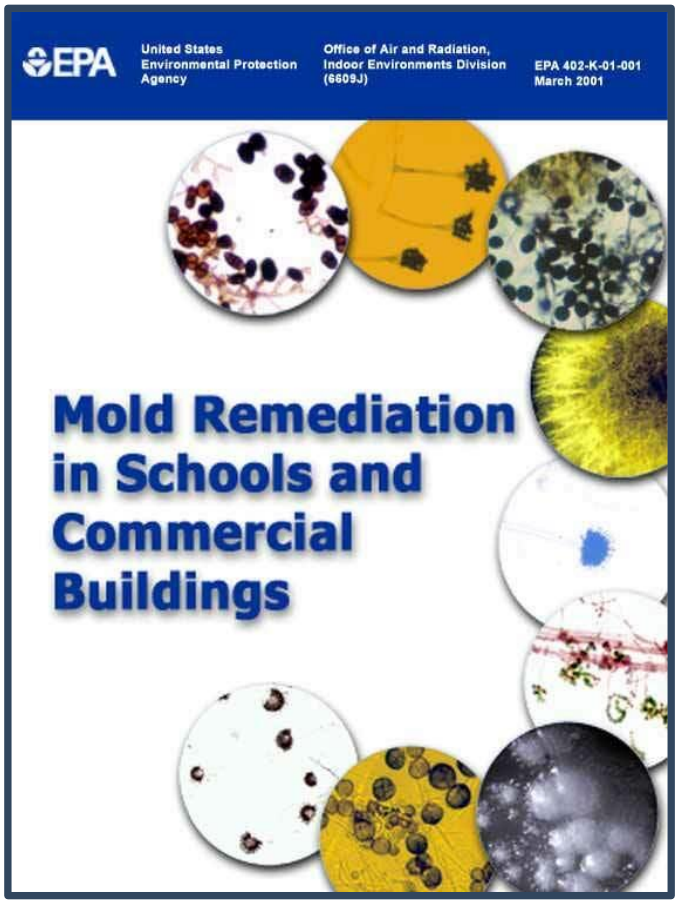
Mold remediation safety is also covered in IICRC S520-2015. As we will explain, IICRC takes a very different approach to mold safety vs EPA/OSHA.

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EPA/OSHA Mold Remediation Standards

In our experience EPA/ OSHA (Federal Guidelines) provides vs. IICRC the:

- Safer work conditions
- Better clearance testing results
- Cost less to implement than IICRC
- Requires less sophisticated workers vs IICRC
- And results in less potential legal liability as we will explain in detail over the course of this training.



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We Repeat: The Key to Mold Remediation Safety

According to EPA/OSHA, and based on our experience, the key to safe mold remediation is **NOT** extensive PPE (Personal Protection Equipment), such as wearing Moon Suits and Full Face respirators.

But instead keep the work environment (inside containment) as clean as possible and use limited PPE. **This not only is safer for workers but reduces cross contamination… less post remediation cleaning needed. Better results. And saves $$.**

Picture below. They've got it all wrong for mold.



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The Key to Mold Remediation Safety. Exhaust Outdoors.



High speed axial fan connected to ducting. Mouth of fan is placed inside the containment. Contaminants released during demolition are exhausted outdoors through the ducting.

We do this by building containments that use high speed axial fans and ducting to not only provide negative pressure but also **exhaust contaminants and cleaning agents/fumes from the containment to the outdoors.**

And by minimizing dry techniques such as sanding and scraping that further aerosolizes mold spores and particles.

OSHA®
Occupational Safety and Health Administration

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Key To Mold Remediation Safety. Eliminate the Risk





We build loose (EPA/OSHA) containments using a high-speed axial fan ducted outdoors. At our firm we use lay flat ducting (lower picture)

Clean air is pulled into the containment from the residence and “dirty” air (not filtered first) is exhausted outdoors.

The remediation work is then performed within a relatively clean work environment as mold, dust, bleach fumes, are exhausted outdoors by the powerful fan.

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Axial Fans for Exhausting Outdoors





Exhaust contaminants released during demolition to the outside through a window if the work is on an exterior wall with a window.

Or using ducting connected to the axial fan if not under a window.

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Benefits of EPA/OSHA

Per EPA/OSHA: In relatively clean work environments, where contaminants being released by demolition are exhausted outdoors, minimal PPE is required.



Workers can stay cool not having to wear Tyvek suits.



EPA compliant for mold work, N-95 masks give adequate respiratory protection with much better visibility than full face masks … workers can see their feet and avoid trip hazards.



Per EPA/OSHA: No toxic biocides / anti-microbials are ever used.



Per EPA/OSHA: Mold remediation is removal of mold and not just killing mold with biocides. Think Green, Chemical-Free.

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EPA Required Minimum PPE: N-95, Gloves, Goggles.







- Per EPA: The minimum PPE recommended is N-95 respirator, gloves and goggles or glasses.
- Some workers do not want to work with gloves when doing mold work because using gloves when handling knives and power tools can be dangerous.
- Is touching mold dangerous?

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What is Wrong With These Set Ups?







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Mold & Health

Molds Toxins (Mycotoxins)

- Mycotoxins are toxins produced by molds.
- In addition to toxins, molds can produce allergens, irritants, as well as immuno-suppressives that wear down the immune system.
- Not all molds produce toxins but many common molds that result from water damage do produce toxins.
- Mold toxins are produced by molds to defend a mold's turf against competitors that may include other species of mold as well as bacteria. But they have the side effect of making people sick!
- Mycotoxins are NOT inactivated (killed) by typical disinfectants used to kill mold or bacteria such as Microban® or Botanica®.



Toxin producing mold growing inside AC supply plenum

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Focus on Removal and Not Killing With Biocides

- Focus on removal. And not killing. Mycotoxins are removed either by:
  1. Cleaning (air or surface),
  2. Substrate removal (removal of moldy drywall); or
  3. Disintegration by strong oxidizing agent such as bleach/Tilex® or strong hydrogen peroxide or chlorine dioxide ($CLO_{2)}$.
- These procedures are considered Green, Chemical-Free.
- Oxidizers such as bleach, hydrogen peroxide, chlorine dioxide do not leave a residue that keeps on killing. All are EPA/OSHA/CDC approved.





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Common Toxigenic Molds In Water Damage Environments

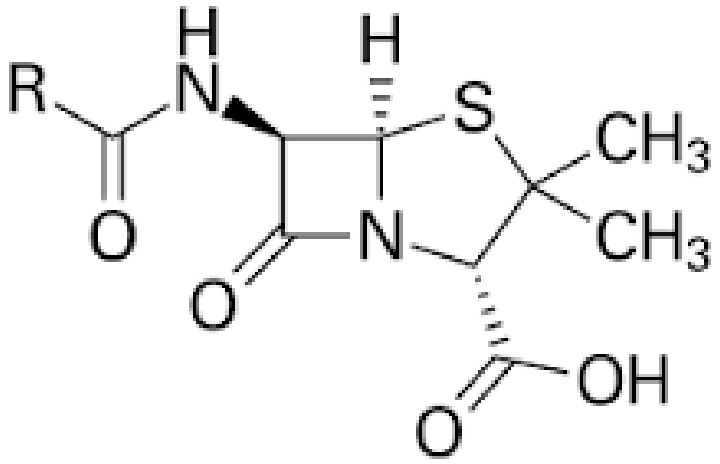
- Many types of molds found in water damaged homes contain/produce toxins:
  - Stachybotrys (Toxic Mold)
  - Aspergillus (some)
  - Penicillium (some)
  - Chaetomium
  - Trichoderma
  - Fusarium
  - Alternaria



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Molds Toxins (Mycotoxins)

- Penicillin is the most well known toxin produced by mold.
- It is of course toxic to bacteria but non toxic to people although some people are allergic to Penicillin.
- Our concern is with mold toxins that are toxic to people.
- Mycotoxins are present in many fruit juices and grains and cereals that we eat with generally no apparent ill affects.



Chemical structure of mold produced toxin Penicillin.

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Inside vs Outside Mold



Spores in the outside air have been exposed to sunlight, rain and wind over time.

Mold spores in the outside air are mostly old… mostly dead and as a result do not affect most people even those sensitive to mold.

On the other hand, even small amounts of fresh/live mold spores inside the home released from water damage or from contaminated AC/ducting will affect mold sensitive individuals especially the very young, very old, those with asthma and those that are immune compromised.

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Sensitivity to Mold



The issue regarding mold and health concerns is both dosage and a person's sensitivity that can vary dramatically.

Mold sensitivity is a function of several independent factors:

- How well someone clears the mold irritants, allergens and toxins from the body.
- Allergic to mold?
- Asthmatic?

Of course, someone can be any combination of the above.

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Sensitization

- When there is a mold problem and people are exposed to higher levels of indoor mold … some people become sensitized (more sensitive) to mold.
- Even if mold remediation work brings the level back down to where it was before … occupants may complain of mold related ailments.
- This can be real and not hypochondria.
- What are these ailments?
- The most common two ailments are **neurological and respiratory.**



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Neurotoxins Stachybotrys

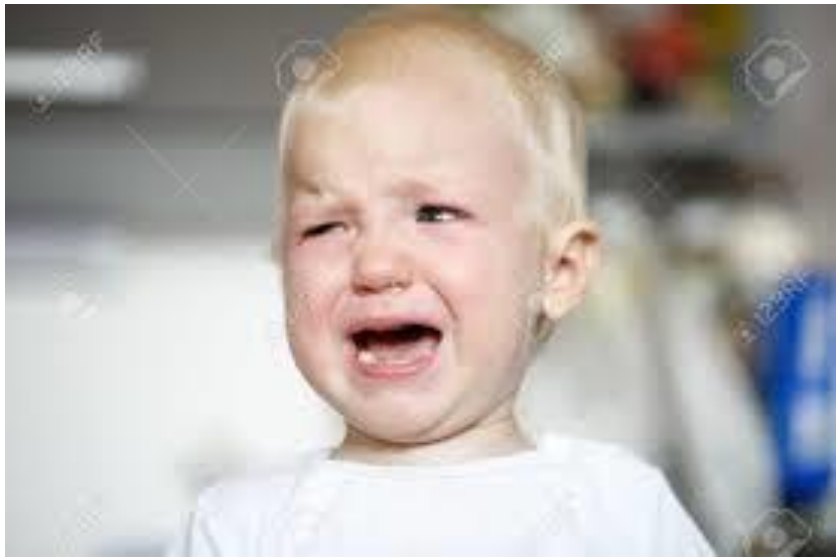
- Neurotoxins are a type of mold toxin (mycotoxin) that affects the nervous system.
- Stachybotrys, the so-called Black Mold, is a dangerous mycotoxin/ neurotoxin producer.
- Stachy produces a neurotoxin that has been used as a bio-warfare agent.
- Headaches are the most common symptom of neurotoxic mycotoxin exposure.



Stachybotrys (the black mold). Produces neurotoxins.

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Neurological Disorders



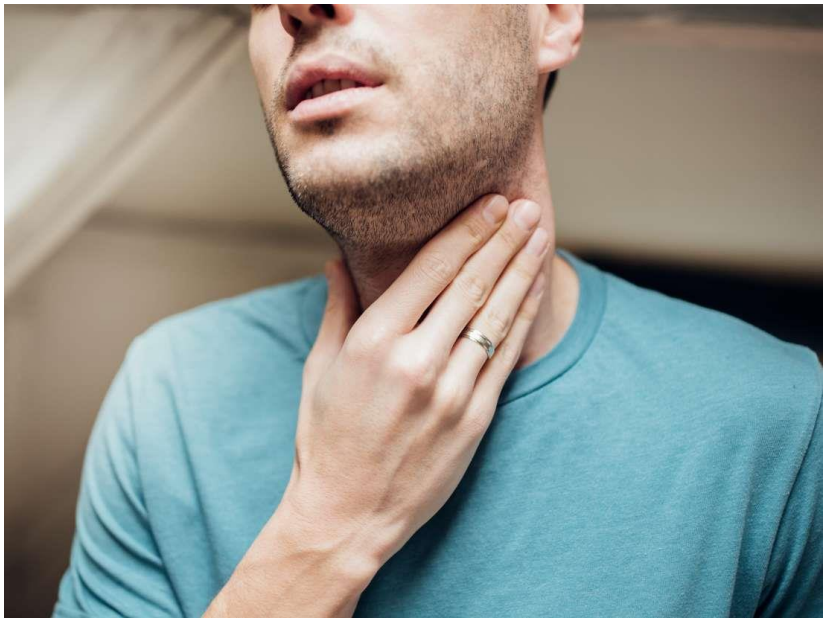
Neurological problems often found particularly in children occupying sick buildings, including both schools and homes, are headaches but also:

- Behavioral and sleep disorders.
- Inability to concentrate and lack of short-term memory.
- Possible cause or exacerbation of Attention Deficit Disorder

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Respiratory Symptoms

Respiratory irritation/symptoms from mold exposure are the most common problems from mold exposure.



According to the U.S. CDC web site, molds can cause:

- Nasal stuffiness,
- Eye and Throat irritation,
- Coughing or wheezing,
- Asthma symptoms in people with asthma

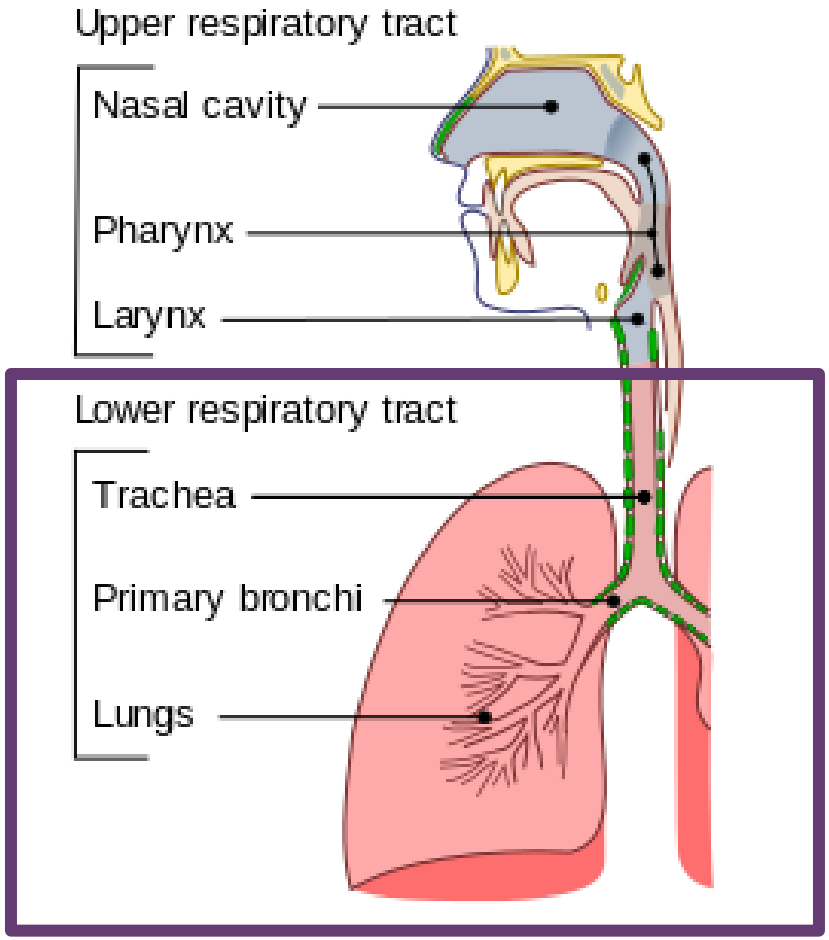
CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

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Small Size Mold Spores = Respirable

Mold spores are tiny – about the size of large bacteria. Sizes range from 2.0 to 20 micron. (A micron is one millionth of a meter.)

Spores in the smaller size range (< 5 micron), such as those produced by Penicillium & Aspergillus (Pen/Asp) molds, are called **respirable**, and lodge deeply in the lung sacs, called alveoli, in the lower respiratory system.

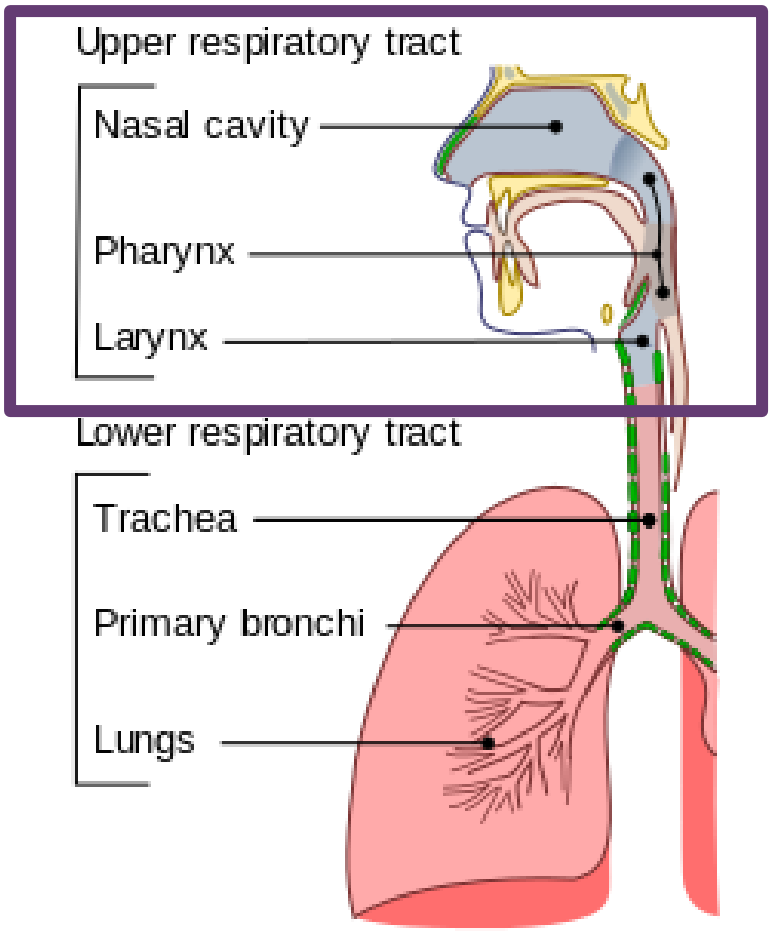


Hard for the body to remove. Removal is slow. Increasing toxins and irritant exposure.

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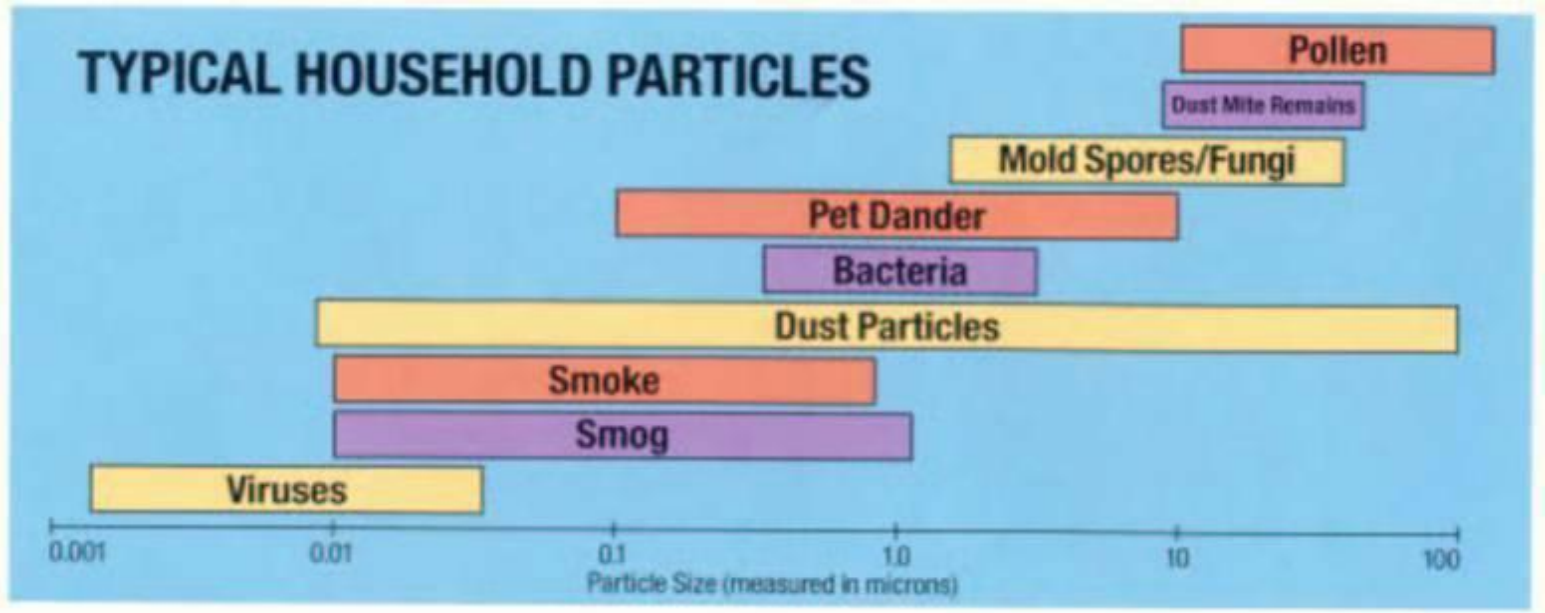
Larger Size Mold Spores Removed Quickly

- Spores in the larger size range (> 5 micron), such as those produced by Cladosporium or other larger size spores such as Stachybotrys are not respirable.
- Larger sized mold spores (non-respirable) are mostly removed from the body in the upper respiratory system before reaching the lungs.
- **And if they enter the lungs, they are quickly removed by the lung cilia. They don't become lodged in the lung alveoli.**



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Mold Spores Size Chart



Mold spores are larger than smoke particles; smaller than pollen; and larger than most bacteria.

Again, larger mold spores are easily removed from lungs. Smaller (respirable) spores not.

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Pen/Asp Mold Toxins

So on the one hand, toxins from Pen/Asp mold are less potent than Stachybotrys toxin.

However light-weight, aerodynamic, Pen/Asp mold spores when present are generally at much, much higher levels in the air than the (large, heavy, sticky) Stachybotrys spores that quickly settle out.

In addition, as discussed, Pen/Asp spores are very small (respirable) and lodge in the small lung sacs, taking longer to be removed from the body than the much larger (non-respirable) Stachybotrys spores, hence allowing more toxins and irritants to be absorbed by the body.



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Pen/Asp Mold in Air Ducts

- **Pen/Asp will often be the cause of many health problems in sensitive individuals. Why?**
- Pen/Asp (but not Stachy) **often colonizes ACs and air ducts** and therefore is easily aerosolized and readily transmitted throughout the building affecting the lungs and sinuses.

- **MOLD EXPOSURE AND RELATED IRRITATION AND/OR ILLNESS MUST BE FROM BREATHING MOLD.**
- **MOLD HIDDEN IN WALLS OR ATTICS DOES NOT REPRESENT SIGNIFICANT EXPOSURE.**
- **MOLD GROWTH IN AC'S AND AIR DUCTS ALWAYS REPRESENTS SIGNIFICANT EXPOSURE.**

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Pen/Asp Mold in Air Ducts

- Mold spores do not penetrate drywall or plaster materials. So if walls/ ceilings have no openings, there is no mold exposure from walls/ceilings even if there is significant hidden mold contamination.
- Mold growth in air ducts or from water damaged and mold contaminated return air mixer boxes as shown to the right are the common cause of mold related illness or irritation.
- Often indicated by musty odor in home.



Water damaged AC return air box with mold both outside and inside

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Mold as a Cause of Sinusitis

Chronic Sinusitis is often due to an inflammatory reaction to certain types of airborne fungi.

Source: www.MayoClinic.com

- When you see the term “Elevated Airborne Mold” the first thing that should come to mind are mold problems with the AC/Ducting.



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Cause of Mold Illness. Mold in the HVAC

Mold growth on fiberglass lined duct insulation and plenums is, in our experience, the #1 cause of mold related illness/ irritation.

Susceptible persons include children, asthmatics, the elderly, immune compromised.

Per both EPA & IICRC: Special attention must always be given to assessing mold problems related to the AC and/or ducting and/or plenums.



Disassembling and cleaning the AC blower, coils, lining and plenum.

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Review Questions

1. Ailments from mold and mold remediation work can be diverse including neurological problems, respiratory problems and other. Which symptom is not a common mold related ailment?

   a) Headaches
   b) Asthma like symptoms
   c) Sinus problems
   d) Hair loss

2. What is the most common route for indoor mold exposure causing health issues?

   a) Inhalation
   b) Ingestion
   c) Skin

3. Respiratory symptoms from mold exposure are the most common health problems from mold exposure. **T** or F?

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Review Questions

4. Neurological problems often found particularly in children occupying sick buildings, including both schools and homes, are: (Choose the **ONE correct** answer.)
   a) Behavioral and sleep disorders.
   b) Lack of short-term memory.
   c) Inability to concentrate
   d) **All of the above**

5. Mycotoxins. (Choose the **one INCORRECT** answer).

   a) Some but not all molds can produce toxic substances called mycotoxins.
   b) **Mycotoxins are inactivated (killed) by typical disinfectants used to kill mold or bacteria.**
   c) Mycotoxins are best removed either by cleaning or by disintegration with strong bleach or strong hydrogen peroxide.

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RESPIRATORY PROTECTION FOR WORKERS

N-95 Face Masks

- EPA/OSHA recommends N-95 respirators for mold work.
- While there are several types of N-95 respirators, some are better than others for mold work.
- The 8210 is a good quality product. (About $1 each in boxes of 20.)
- The 8511 **includes exhaust valve and works much better than 8210** and saves $$.
- Why saves $$? The exhaust value helps keep moisture from your breath from wetting the mask. When the mask is wet, it makes it hard to breathe. When hard to breathe, the mask will be discarded and a new one used.



3M™ Particulate Respirator 8210



3M™ 8511

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N-95 Respirator

- N-95 is 95% effective. But what does that mean? 95% effective down to .3 micron.
- About 10% the size of the smallest mold spore. **And is 99%+ effective for mold spores.**
- Some N-95 respirators have rubber seals (3M 8214) that results in a better fit (especially with facial hair) than other N-95 masks. Expensive. Rarely used due to expense.



3M™ N-95 Particulate Respirator with rubber seal

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N-95 3M 8511 Respirator



3M™ Particulate Respirator 8511

Our favorite N-95 respirator is the 3M 8511. Costs about $1.50 each on Amazon.

Home Depot/Lowes: Buy 4 boxes of 10 and get a significant discount.

Also, Home Depot has their own brand which is excellent and you get 15 for the price of 10 with 3M.

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N-100 Respirator

- N-100 (3M 8233) works 99.97% down to 0.3 microns.
- Overkill for mold. Yes.
- Expensive compared to 8511.
- Do you need N-100?
- Exhaust contaminants outdoors. Keep work environment clean. And then the much lower cost 8511 will be all you need.
- **If you use N-100 rather than N-95 you need to comply with OSHA respiratory plan regulations.**
- We never use.



3M™ Particulate N-100 Respirator 8233

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Full & Half Face Respirators



- The top mask is about $10 without the cartridges (3M Half Face 6000 Series).
- The bottom mask is a full face 6000 Series respirator. (about $100).



- Both come in 3 sizes.
- **But if you use these rather than N-95 you need to comply with OSHA respiratory plan regulations.**

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Cartridges

- The most popular cartridges are those that filter out:
  - Particulates such as dust and mold spores (HEPA)
  - Chlorine vapor from bleach or Chlorine Dioxide
  - Paint vapors
  - Organic vapors
- For sewage work. Choose a filter cartridge that filters out not only particles but also organic vapors.



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Irritant Smoke Generators. N-95 Are Exempt



VeriFit

- As per OSHA respiratory plan compliance requirements: Check your (non N-95) respirator using positive and negative pressure each time after donning.
- Smoke generators are for formal fit testing/ training.
- Respirator fit testing is accomplished in three simple steps:
  - Bend the smoke generator to break the enclosed ampoule.
  - Remove cap and wait 5 seconds.
  - Compress bellows.

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OSHA Respiratory Standard

- Mold remediation contractors are required by law to **read and comply with** the OSHA standards for respiratory protection if using more than N-95 respirators.
  - Occupational Safety & Health Administration. Respiratory Protection Standard, 29 CFR 1910.134. 63 FR 1152. January 8, 1998.
  - Each employee must be fit tested and trained in the use of respirators except if you use N-95's.
  - N-95's are exempt from OSHA Respiratory Protection Program requirements, and completely filter mold spores, so long as the work environment is kept relatively clean by exhausting outdoors and avoiding dry, dust producing techniques.
  - **Best to avoid OSHA respiratory compliance.** Best to stick with N-95's and keep containments clean by exhausting contaminants as well as fumes from cleaning agents outdoors with high-speed axial fans ducted to the exterior.

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OSHA Respiratory Standard Compliance per IICRC

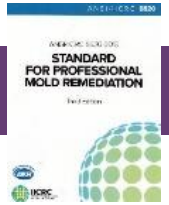
8.3.2.1.1 Respirators

"Respirators range from NIOSH-approved N-95 filtering face-piece respirators, to full-face air-purifying respirators (APR) or powered air-purifying respirators (PAPR) equipped with HEPA (N100, R100, or P100) filters cartridges and air-supplied respirators, such as self-contained breathing apparatus (SCBA)."

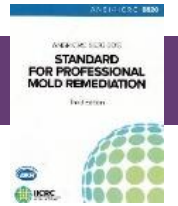
"HEPA filters cartridges **should be used** to protect against fungal spores and fragments, bacteria spores, dust and particles." **[Per IICRC. Not N-95's]**



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OSHA Respiratory Standard Compliance per IICRC

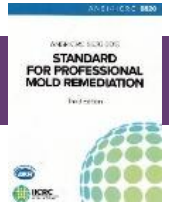


IICRC says: Should use HEPA (not N-95).

Why? IICRC does not exhaust contaminants outdoors. Work is done under hazardous conditions.

- **IICRC follows Asbestos protocols and captures contaminants on filters and only allows clean/filtered air to be exhausted outdoors.**
- **They treat mold as a hazard.**
- **And it is a hazard if you don't exhaust contaminants outdoors during remediation.**

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IICRC: Respirators



8.3.2.1.1 Respirators

"Air-purifying respirators (APR) or **powered air-purifying respirators (PAPR)** shall not be used in oxygen-deficient atmosphere or in other atmosphere that are immediately dangerous to life or health (IDLH). "

- IICRC defines PAPR = Powered Air-Purifying Respirators.
- Silly overkill when discussing mold remediation.



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IICRC S520-2015 & Respirators

8.3.2.1.1 Respirator Use and Written Respiratory Protection Plan

Employees shall wear respirators whenever engineering and work practice controls are not adequate to prevent atmospheric contamination at the job site. Untrained visitors to work sites should warned of hazards and encouraged to not enter the worksite.

Respiratory protection regulations are found at 29 CFR 1910.134. Respiratory protection program outlines written program requirements and shall include, but not be limited to:

Selection and use of NIOSH-approved respirators;

- Medical evaluation;
- Respirator fit testing;
- Use, instruction and training in the use and limitations of the respirator prior to wearing it;
- Designated program administrator; and
- Cleaning and maintenance program.

If using HEPA filtered respirators, work is illegal if not compliant with OSHA 29 CFR 1910.134.

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Per IICRC. Warning: Hazardous Conditions

8.3.2.1.1 Applicable Regulations

Applicable sections of the Federal safety and health regulations that can impact the employees of a remediation business include, but are not limited to, the following OSHA Standards found in Title 29 of the Code of Federal Regulations (CRF) parts 1910 and 1926:

29 CRF 1910 – General Industry Standards

29 CRF 1926 – Constructions Industry Standards

The OSHA Standards for the constructions Industry (29 CFR 1926) requires that no employee "shall work in surrounding or under working conditions which are **unsanitary, hazardous, or dangerous** to his or her health or safety" (29 CFR 1926.10)."

Warning: Building a containment without exhausting contaminants outdoors results (per IICRC) in hazardous work conditions. As such requires HEPA filtered respirators and not N-95.

Requires OSHA respiratory plan compliance.

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Illegal Contracting OSHA

- Mold remediators that are using HEPA filtered respirators (and not the simpler N-95) without complying with OSHA 29 CFR 1910.134 written respiratory program requirements are performing illegal contracting.
- Subject to $10000 fine.



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Illegal Contracting Workers Comp

- If work is being performed under hazardous mold conditions (as is the case working in IICRC containments) workers MUST have worker's comp coverage for hazardous conditions (Asbestos Classification).
- No one ever does, as this is very expensive and makes you uncompetitive. As a result, **mold remediation work using IICRC containment procedures is always illegal.**

The Bureau of **Workers' Compensation Fraud** investigates suspected criminal violations of **Florida's Workers' Compensation** laws. ... During Fiscal Year 2017/2018, investigative efforts by the Bureau of **Workers' Compensation Fraud** resulted in 502 cases presented for prosecution, 398 arrests, and 335 successful prosecutions.



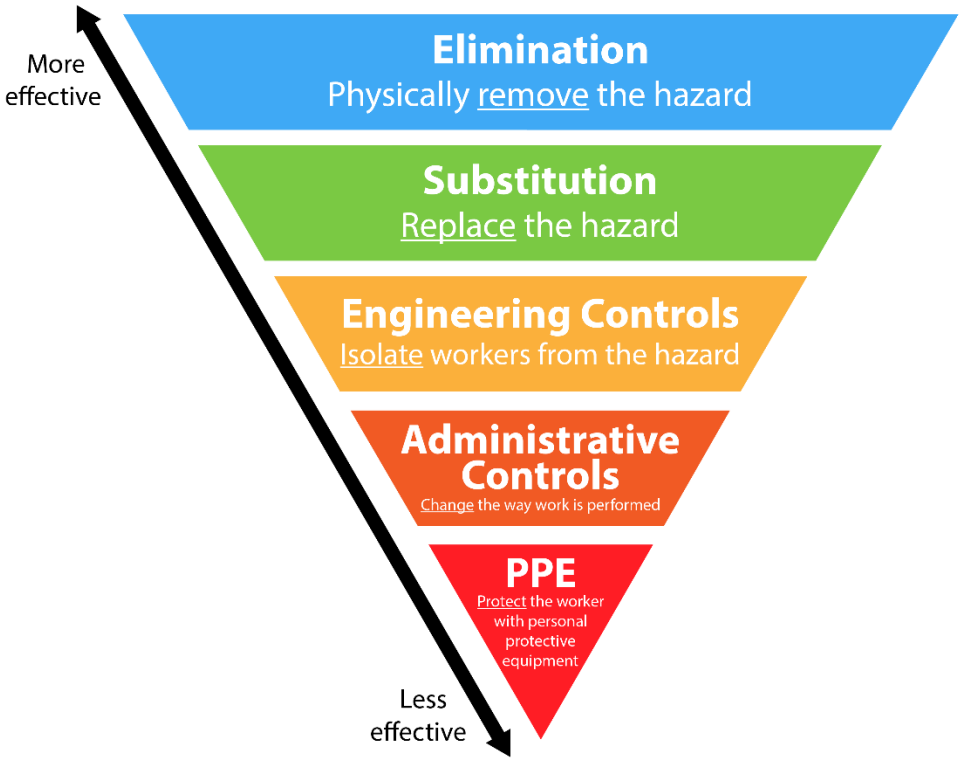
www.myfloridacfo.com › Division › DIFS › WCFraud

Bureau of Workers' Compensation Fraud - Florida Department ...

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OSHA Triangle

- According to OSHA, and based on our experience, the key to safe mold remediation is not excessive PPE (Personal Protection Equipment), such as wearing Moon Suits, or HEPA cartridge respirators, but keeping the work environment inside the containment as clean as possible by exhausting outside (Eliminate the risk.)
- Best to Eliminate the risk (OSHA Most Effective) than rely on PPE (OSHA least effective) to try to protect against the risk



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Section Review. Eliminate or Minimize the Risk.

- We do this by building small containments with high rates of air flow that exhaust contaminants and cleaning agents/fumes outdoors, keeping the work environment inside the containments as clean and safe as possible.
- BEST TO FOLLOW EPA/OSHA FEDERAL GUIDELINES.
  - EXHAUST CONTAMINANTS OUTDOORS SO WORK ENVIRONMENT IS NOT HAZARDOUS.
  - USE N-95 RESPIRATORS. THEREFORE, NO OSHA RESPIRATORY PLAN COMPLIANCE REQUIRED.
  - NO WORKER'S COMP FOR HAZARDOUS CONDITIONS REQUIRED.
  - AND SAVE MONEY ON PPE TO BOOT.

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Section Review



Do you need better than an N-95 respirator to safely handle mold problems?



No you don't if …. the air inside the containment around the work area is exhausted outdoors with good air flow and care is taken to avoid extensive dust creation.



Focus on better ventilation, minimize dust and less on higher levels of personal protection.



Focus on exhausting outdoors both mold spores and dust released during mold removal work along with bleach and any other cleaning agent/ disinfectant fumes.

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Review Questions

1. PAPR means

   a) **Powered Air Purifying Respirator**
   b) Powered Asbestos Protection Respirator .

2. 3M 8511 N-95 respirator is popular for mold work because: (Pick **all correct** answers.)

   a) **Relatively low cost.**
   b) **Has exhaust valve to improve comfort and keeps the inside dry.**
   c) Has good fit due to rubber seal.



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Review Questions

3. Higher quality respirators such as N-100 or Full-Face respirators are always recommended. (Pick **all correct** answers.)

   a) **Not really. Best to use good containments that have high air flow rate and exhaust contaminated dusts outdoors than rely on more expensive respiratory protection.**

   b) Correct, as you can't put a cost on safety.

   c) **Not really. Full face masks can block your vision compared to N-95**

   d) **Not really. N-100 respirators are expensive and an overkill so long as the work space (containment) stays relatively clean by exhausting contaminants outdoors during remediation.**



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Avoiding Dehydration



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Avoiding Dehydration

Heat prostration and/or dehydration from wearing Tyvek suits during remediation is one of the biggest health problems for remediation workers.

OSHA has very strict rules about workers in hot areas using Tyvek suits.

Some companies insist on workers wearing Tyveks. In that case leave the AC on to keep the work area cool. (As long as the work is not in the AC closet area of course.)



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Avoiding Dehydration

- Limiting the time spent in hot Tyvek suits can be a real money saver:
  - Workers are much more efficient when they are comfortable.
  - OSHA limitations on working in hot environments can be minimized.
  - You save on Tyvek suits.



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Avoiding Dehydration



This model would not look so happy if she were wearing that Tyvek suit in a hot attic.

- Safely limit the use of Tyvek suits on mold remediation jobs by:
  - Moistening to keep down “dusts”
  - Running the AC
  - Exhausting contaminants outdoors to keep the work environment inside the containment as clean as possible during remediation.

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Worker's Comp For Hazardous Conditions

- IICRC S520-2015 Section 8.11: Requires Tyvek suits and shoe covers to protect workers from **hazardous conditions.**
- Again, this mandates Worker's Comp for Hazardous conditions. Very expensive.
- There are no Worker's Comp categories for hazardous mold conditions. You must use Asbestos category. Very expensive.
- Best to treat mold as not a hazard. Exhaust contaminants outdoors during remediation. Avoid Tyveks. Avoid Worker's Comp for hazardous conditions.



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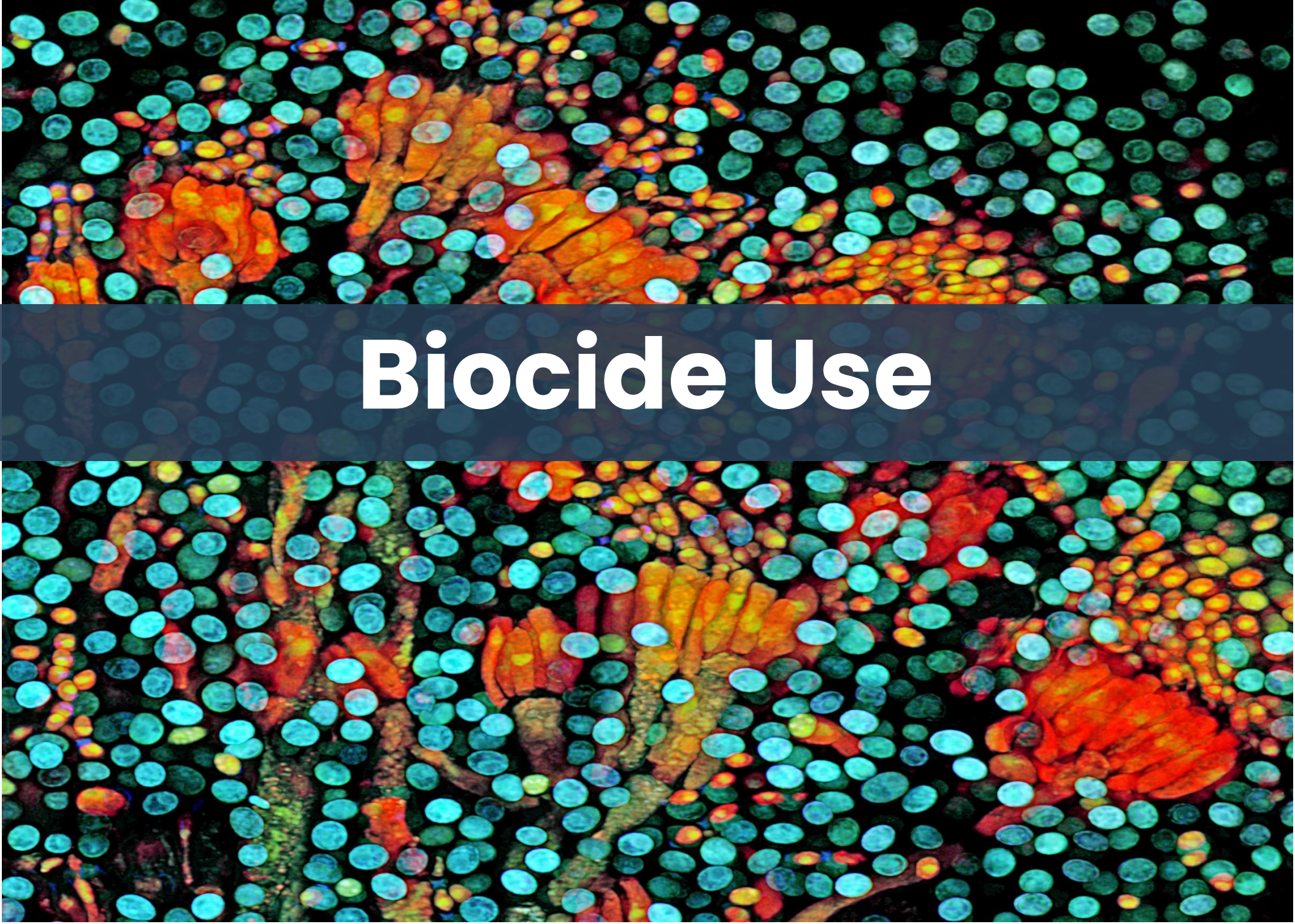
Review Questions

1. How can you safely reduce the use of Tyvek suits? (Pick the **ONE correct** answer.)

   a) Moistening
   b) HEPA vacuuming instead of dust producing sweeping.
   c) Exhausting contaminants outdoors instead of collecting them on air scrubber filters.
   d) **All of the above**



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Biocide Use

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Biocides (Anti-Microbials)

- Biocides: Such as Microban®, Sporicidin® are agents used for disinfecting that have residual killing power. They are almost always used after water damage mitigation in order to keep down odor from bacterial growth.
- Is residual killing power good or bad?
  - Biocides Do NOT eliminate mold toxins and allergens.
  - Biocide residues are irritants. Fix the moisture problem and then biocides are not needed to keep mold from returning.
  - Go Green, Chemical-Free for mold and water damage restoration.



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Antimicrobial/Disinfectant



Antimicrobial/Disinfectant / Sanitizer - retards or stops microbial growth.

Terms for Biocide that seem more friendly.

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Homeowners Today Want Green Chemical-Free

- Bleach, Hydrogen Peroxide, Lysol, Ozone, Chlorine Dioxide, Alcohol.
- None of these agents leave a toxic residue.
- NOT CONSIDERED BIOCIDES.
- Considered Green, Chemical-Free.
- Can be used in food prep areas.



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Oxidizers

- **Oxidizers:** Strong Bleach, Tilex®, Strong Hydrogen Peroxide, Chlorine Dioxide (CLO_2)
  - Green Chemical-Free.
  - They not only kill mold, but they also remove mold along with toxins and allergens by oxidation/ disintegration.
  - They do not leave a toxic residue.
  - Can be used in food prep areas.



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Microban® (MediClean) Description from Jon Don Web Site

PRODUCT INFORMATION

Microban® Germicidal Cleaner Concentrate is a **one-step**, quat-based disinfectant that is effective against a broad spectrum of bacteria, viruses, mold, and mildew.

This multi-purpose quaternary disinfectant can be used in **residences**, commercial institutions, **daycare centers, nurseries**, or restaurants.

Microban® Germicidal Cleaner Concentrate **can safely treat both hard nonporous surfaces and carpets.** It leaves behind a delightful mint scent.

Compare above product description written by Jon Don sales/marketing on the Jon Don web site to what is on the back label of the Microban® container which is the ONLY EPA approved description of the product.

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Microban® (MediClean®) Label Compare to Jon Don Marketing



Microban Germicidal Cleaner Concentrate is for use on the following **hard non-porous** surface countertops, countertop laminates, stovetops, sinks. Appliances. refrigerators, microwave ovens (exterior), tables, picnic tables, outdoor furniture, chairs, desks, telephones, highchairs, bed frames, washable walls, cabinets, doorknobs, telephones, shower stalls, tubs and glazed ceramic tiles, whirlpool …

On the other hand, the EPA approved label (not Jon Don marketing) says hard non-porous surfaces only.

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Microban® vs Bleach Description Jon Don Web Site

Reasons why Microban (MDSP) is superior to bleach according to Jon Don web site:

- Bleach **doesn't provide residual protection** after initial application. [But that is what we want. No residual killing chemicals! Make sure it stays dry and mold will not return.]
- **Bleach is often more expensive to use in disinfectant situations. [Yeh. Sure!]**

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Review Questions

1. What is a biocide? (Choose **one or more correct** answers.)

   a) **Kills mold and bacteria.**
   b) **Keeps on killing**
   c) Eliminates toxins and allergens.
   d) Kills all spores



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Biocides That Leave Toxic Residues



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Biocides: Water Based Quats



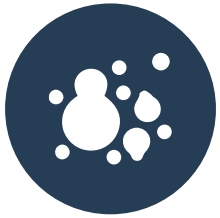
- Microban® (now called MediClean®) and many other disinfectants are based on quaternary ammonium compounds. "Quats" for short.
- These are water based and not alcohol based as is Lysol.
- While alcohol based Quats such as Lysol work with very low levels of Quats because the alcohol greatly adds to the disinfectant power of the Quat…
- Water based Quats must have a much higher concentration of Quat to be an effective disinfectant.
- Hence their use is restricted to hard surfaces followed by rinse.

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Biocides: Water Based Quats



Water based Quats work well on killing bacteria and some molds but none will kill all mold spores or deactivate mycotoxins.



They will kill most actual mold, but only non greasy/slimy molds such as Cladosporium (Clad), Penicillium and Aspergillus.



Water based Quats such as Mediclean will not kill greasy/slimy mold such as Stachybotrys which is the commonly called "black toxic mold."

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Biocides: Water Based Quats

- As mentioned, because they are not alcohol based which is in itself a very good disinfectant, the water based Quats must rely on high concentrations of Quat.
- Therefore water based Quats such as Microban leave a heavy chemical residue. Not what we want in our homes.
- None of these water-based Biocides (Microban, Mediclean, Sporicidin) have EPA approvals for use on any porous or semi-porous surfaces such as wood, drywall, carpet, fabrics.
- **Even though heavily used in the industry on porous and semi-porous surfaces.**

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Warning

- Microban, Mediclean, Shockwave and similar products are water based Quats.
- All are **hospital grade** disinfectants suitable for disinfecting sewage (feces) and blood borne diseases. Very strong.
- "Hospital grade" sounds good, but what it means is that it is not for household use when used as a disinfectant (at disinfectant strength.)
- It is a Federal offense to use a biocide contrary to EPA label directions.
    - Why risk your license?
    - Don't use biocides.
    - Go Green, Chemical-Free. And save money on biocides.

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Green, Chemical-Free
Disinfectants

Chlorine Dioxide Gas Benefits

- ClO_2 gas technology offers many **BENEFITS as a disinfectant:**
  - Environmentally Friendly
  - EPA/RMP & OSHA PSM Compliance
  - Efficacy Over Broad pH Range
  - Taste & Odor Control



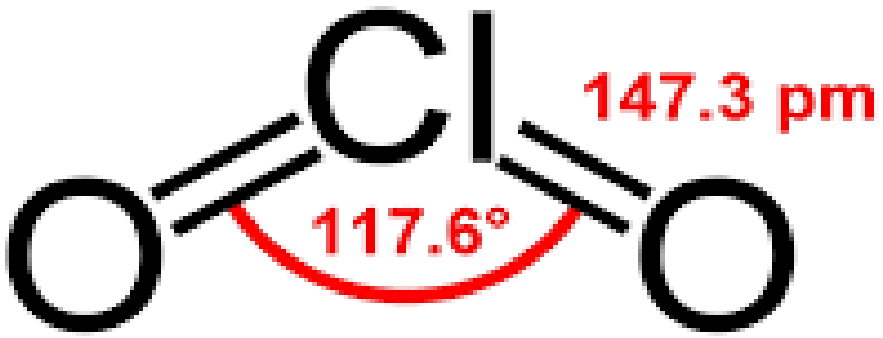
Untreated and stored for 6 weeks at 4°C

Treated with 10 mg/l Chlorine dioxide gas for 10 min and stored for 6 weeks at 4°C

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Chlorine Dioxide Gas Properties

- Although chlorine dioxide (ClO_2) contains a chlorine atom, its chemistry and properties make it more similar to oxygen than chlorine.
- Making it an effective and environmentally safe biocide ideal for disinfecting vital water supplies to exacting standards.
- Chlorine bleach is very reactive and will bleach carpeting and fabrics.
- In contrast, ClO_2 gas is far less reactive and does not bleach carpet or fabrics …
- Regardless of its concentration or contact time, chlorine dioxide reacts immediately with the cell walls of microorganisms.



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Chlorine Dioxide Gas: Eco-Friendly

- CD can be purchased in a pre-mixed stabilized form in a sealed/ moisture proof container.
- A close relative to bleach, it has many of the benefits of dilute bleach when it comes to disinfecting, but is gentler to fabrics, and better tolerated by chemically sensitive persons.
- Chlorine dioxide leaves no chemical residue. This makes chlorine dioxide the most eco-friendly biocide that can be used. And residual odor dissipates rapidly compared to ozone.
- **Leaves no residue. Excellent for "polishing" after remediation or duct cleaning. We like. We use.**



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Example: Chlorine Dioxide Gas Dispenser

- Chlorine dioxide is provided in a stabilized form, as a powder. No mixing required. Add water to the canister. CLO_2 gas is released slowly over approximately ½ hour
- After remediation or duct cleaning we put one or two 100 gram cartridges under the air handler with the AC FAN = ON to sanitize (pre-cleaned ducting) as well as to "polish" the entire home.
- **Danger:** Chlorine Dioxide gas is dangerous to inhale and should only be done by professionals and only on unoccupied rooms.
- Breaks down in 6-8 hours. Best to treat unoccupied homes or offices overnight.
- **We like. We use.**



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Lysol: Special Case of Quat

- Lysol (in a can) or generic. A special case. Alcohol based powerful disinfectant with only a small amount of Quat biocide/ disinfectant **because it is alcohol based and not water based such as Mediclean®/Microban®.**
- Because Lysol leaves a relatively small of amount of Quat when the alcohol evaporates, it is EPA approved for all surfaces including kitchens and food prep surfaces.
- Can be sprayed on fabric furniture. Books etc.
- Does not kill greasy mold. But is very effective against dry molds such as Clad, Asp and Pen.
- Quats, even Lysol, do not remove mold or mold allergens or toxins. Only kills (most) molds. Dead mold killed by Quat is still allergenic or toxic.
- The focus should be removal of mold and not just killing mold. Spray with Lysol and wipe clean. **We use this product. We like.**

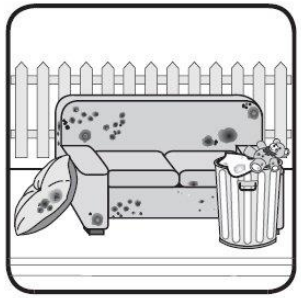


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Bleach Recommended by CDC To Clean/Remove Mold

Get Rid of Mold

After a flood, mold will grow in your house. It can make you sick. You will need to clean your house.



Take things that were wet for 2 or more days outside.

Things that stayed wet for 2 days have mold growing on them even if you can't see it.

Take out stuff made of cloth, unless you can wash them in **hot** water. Also take out stuff that can't be cleaned easily (like leather, paper, wood, and carpet).

Use bleach to clean mold off hard things (like floors, stoves, sinks, certain toys, countertops, flatware, plates, and tools).



Follow these steps:

- Never mix bleach with ammonia or other cleaners.
- Wear rubber boots, rubber gloves, goggles, and N-95 mask.
- Open windows and doors to get fresh air when you use bleach.
- Mix no more than 1 cup of bleach in 1 gallon of water.
- Wash the item with the bleach and water mixture.
- If the surface of the item is rough, scrub the surface with a stiff brush.
- Rinse the item with clean water.
- Dry the item or leave it out to dry.

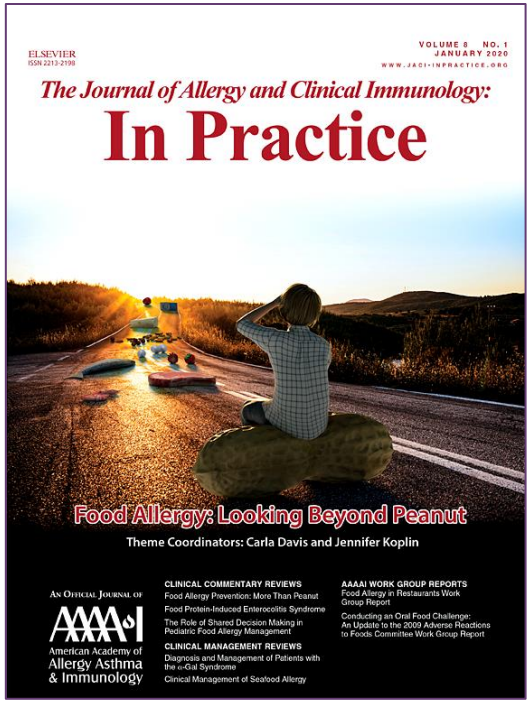
Recommendations from the Centers for Disease Control and Prevention

CDC Flyer on Mold recommends using BLEACH to remove mold

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Bleach–Effectivity Studies

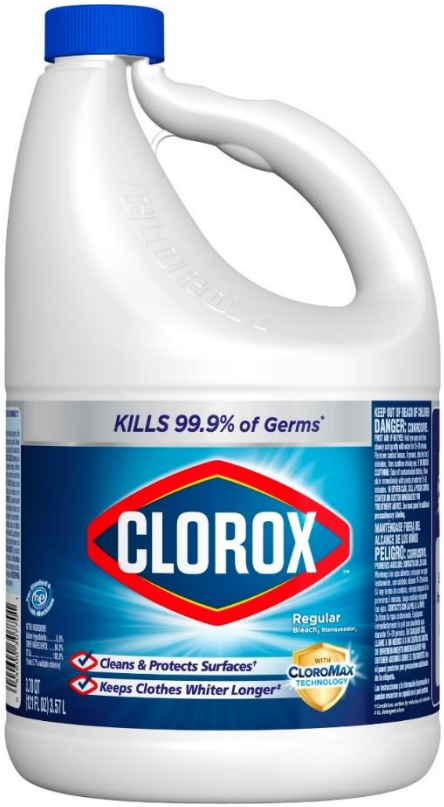
- *Human Studies Show Bleach Solution Reduces Allergenic Properties of Mold*
- Dilute bleach (1:16) not only kills common household mold and mold spores, but neutralizes the mold allergens that cause most mold-related health complaints.
  - Published in the September 2005 issue of *The Journal of Allergy and Clinical Immunology.*



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Bleach

- Pool chlorine is 10% bleach
- Clorox (household) bleach is typically 5-6% bleach.
- Tilex® is typically 30% to 50% bleach and diluted with water.
- Tilex is considered a strong bleach product, but suitable for household use according to the EPA.
- When a mold consultant or the CDC says a 10% bleach solution, they do not mean pool chlorine. They mean household bleach diluted 9 parts water to 1 part bleach. **This is considered dilute bleach.**
- While the CDC recommends 10% (dilute) bleach to clean mold off of hard surfaces, we use strong (1 part bleach to 2 part water as in Tilex®) to remove mold by disintegration from drywall and wood.
- **Bleach leaves no toxic residue. We like. We use.**



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Strong Bleach Kills Mold and Eliminates Toxins and Allergens

While dilute bleach will neutralize allergens, it does not kill all mold and mold spores, nor will it neutralize all mold toxins. Toxins and allergens are not the same thing.

Toxins are stronger and need a stronger approach.

Only strong bleach neutralizes mold toxins. It does this by disintegration.



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Bleach–Good for Hard & Porous Surfaces



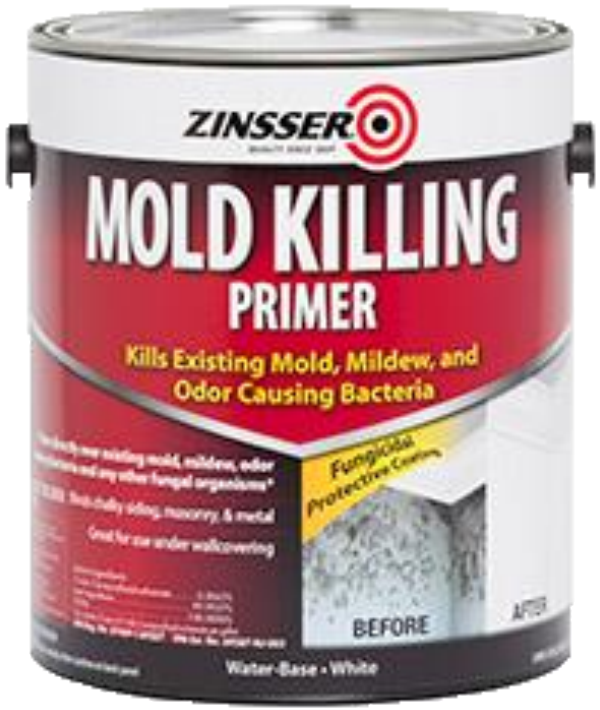
DEODORIZING			
Garbage Cans	2/3 Cup	1 Gallon	After washing and rinsing, brush inside with bleach solution. Let drain.
Drains	1 Cup (8 oz)	—	Flush drains. Pour into drain. Flush with hot water.
MOLD, MILDEW & STAIN REMOVAL			
All Surfaces	2/3 Cup	1 Gallon	Add bleach to powdered detergent solution. Apply, let stand for at least 2 minutes. Wipe and rinse.

DILUTION TABLE: PPM (Parts Per Million Available Chlorine).
Check chlorine concentration with standard test strip.

- As far as we know, bleach is the only disinfectant that says on its label that it can be used to r**emove** mold on all surfaces. (Label from Clorox brand bleach.)
- It does not exclude porous surfaces, like ALL others do.
- **Strong bleach (such as Tilex®) actually removes ALL mold and toxins and allergens by disintegration.**

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After Bleaching Structural Wood



- After removing mold from wood with strong bleach, paint/seal wood with KILZ Latex primer or KILZ Premium primer for interior surfaces, inhibits mold re-growth.
- Regular KILZ does not contain a mold inhibitor.
- After removing mold from wood with strong bleach paint with Zinsser Mold Killing Primer …. mold and mildew proof interior primer with 5-year warranty.
- Products listed are for example purposes. They can be found at Home Depot, Lowes and Walmart.

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After Bleach Application. Seal With Zinsser 123.



- Remediate mold. Bleach wood. Follow by Zinsser Mold Killing Primer. Take a picture.
- Looks very good. Very professional. And it is good. Mold will not come back.

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Section Review



Do not believe any claims that something can clean and disinfect in a single step.



Cleaning means removing and not covering up by spraying with chemicals.



Biocides such as Mediclean®, Microban®, Shockwave® while commonly used after water damage are not legally permitted to be sprayed in disinfectant strength on any surface except hard surfaces and then rinsed. Not carpet. Not wood. Not drywall.

- **Mold remediators or dry-out contractors that apply biocides not completely compliant to EPA approved label instructions are performing illegal contracting.**

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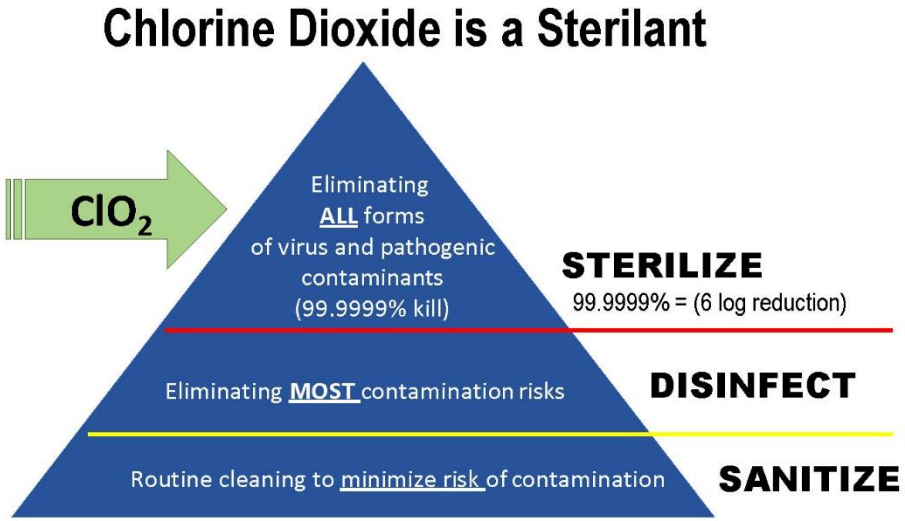
Section Review: Label Use Only

- It is a illegal to use biocides contrary to label directions. Only the label is EPA approved. Marketing material is not.
- Best to stick with household cleaners/ disinfectants that you can buy at the grocery store.
- Best to focus remediation on removing mold and not just killing it.
- Strong bleach or strong hydrogen peroxide are the only disinfectants that remove mold, mold toxins and irritants. They do so by disintegration/oxidation.
- Sometimes you need to use a brush to loosen the surface film and then re-bleach.
- When using bleach, protect your eyes and hands … use goggles and gloves.

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Section Review: Polishing & De-Odorizing

- Following remediation which is generally focused on drywall or cabinet removal and bleaching structural wood, we often **"polish" / sanitize and deodorize** the indoor air using Chlorine Dioxide.
- This removes by oxidation mold spores and fragments from not only surface dusts throughout the home but also…
- Airborne spores and fragments in both the air and AC ducting. **CLO2 treatment is performed overnight in an empty home.**



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Section Review: Avoid Breathing Cleaning Agent Fumes

- Strong bleach and strong hydrogen peroxide can be irritants. However we only use these oxidizers inside containments that are exhausted to the outside using high flow rate axial fans.
- Strong bleach and strong hydrogen leave no toxic residue when they dry. Are considered green, chemical-free and highly recommended.
- Microban, MediClean, Botanica are also irritants. Often used inside containments that are not exhausted outside or with a low flow rate because filtering the air impedes the air flow especially when filters are covered with drywall dust.
- **Workers get sick spraying Microban/MediClean, Botanica etc inside containment.**
- **Microban/MediClean, Botanica etc all leave a toxic chemical residue. Not recommended.**
- **Best to go Green, Chemical-Free.**





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Non-Filtered Axial Fans vs Filtering Exhaust Air



4000 cfm Axial Fan



500 cfm best case.

- Axial fans connected to lay flat ducting do not have filters that clog with drywall dust. And have much higher air flow rates than air scrubbers … whose filters quickly get covered with drywall dust and cannot keep the indoor air in a containment as clean as can non-filtered axials.
- **Non-Filtered Axials:** No filters to buy. Save $$. Much safer for workers. Reduces cross contamination. Best to keep the air scrubber outside the containment.

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Review Questions

1. EPA approved products for household use and will keep you out of trouble. (Pick **one or more correct** answers.)

   a) **Lysol**
   b) **Soap & Water**
   c) **Bleach**
   d) Microban

2. The best way(s) to keep mold from returning is: (Pick **one or more correct** answers.)

   a) Spray with biocide that keeps on killing.
   b) **Make sure that the water problem has been fixed.**
   c) **Use mold resistant drywall. Sometimes one cannot stop seepage or other water intrusion completely.**
   d) **Paint with mold inhibiting paint/primer.**

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Review Questions

3. What type of products are approved for semi-porous or porous materials such as wood, or drywall? . (Pick **one or more correct** answers.)

   a) Microban
   b) **Lysol**
   c) **Bleach**

4. Quat based biocide?

   a) **Quat based biocide such as Microban is water based and has a high concentration of quaternary ammonium complex (Quat.) Not suitable for kitchen surfaces.**
   b) Lysol in a spray can has a higher concentration of Quat than water based Lysol which makes it more effective.

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Sewage Hazards

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Mold & Black Water

- The first thing to consider with regard to mold growth, as a result of a leak or flood, is to ask if the water that caused the mold growth was clean, or was it sewage contaminated?
- If the mold was caused by black water (sewage), then a mold remediation contractor with experience dealing with sewage spills needs to be called in.
    - Without special training, do not perform mold remediation on mold resulting from black water.



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Black Water



Contains pathogenic agents and is grossly unsanitary and dangerous.

Includes toilet back-flow from beyond any trap regardless of color. Is removed wet. It is not dried by Airmovers! Why?

- Sewage pathogens (disease causing agents) are not aerosolized to the extent of fungal (mold) spores unless you blow air on them.
- Sewage is always mitigated wet. If dry when you get there. .. wet it. Sewage is always mitigated wet.

Do not blow air on sewage and aerosolize sewage pathogens that include AIDs viruses, as well as pathogenic bacteria and parasites.

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Sewage Hazards: Exposure by Touching

- In mold remediation jobs that involve sewage water, **the primary route of exposure of sewage pathogens is ingestion** (rather than inhalation, as with mold).
- Touching sewage and then touching the mouth (eyes or nose) is hazardous.
- Sewage toxins are **not inactivated** by spraying with disinfectant products such as Microban®/ Mediclean® or Sporicidin®.
- Do not believe any claims with regard to sewage treatment products that say: “Cleans, disinfects and deodorizes in one step.”

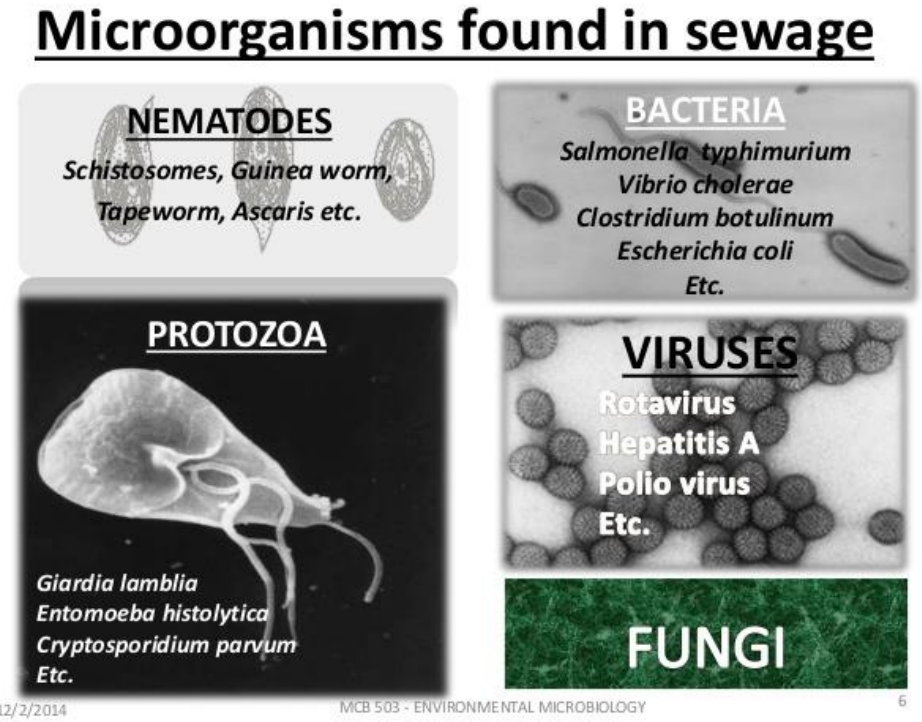


Sewage toxins are **not inactivated** by spraying with disinfectant products such as Microban®/ Mediclean® or Sporicidin®.

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Clean Sewage With Wet-Vac. Then Discard Wet-Vac.

- Sewage contamination should be cleaned by removal using low-pressure flushing (20-40 psi) with water and then extracted (remove bulk water with a Wet-Vac and then discard Wet-Vac.)
- This removes the organisms as well as toxins associated with them.
- Again, do NOT blow air on sewage spills, as this WILL aerosolize the toxins and pathogens.



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Sewage Hazards: Post Remediation Testing

- Care should be taken when discarding recovered sewage and rinse water.
- They should be discharged back into the sanitary sewer system. Not into the street or yard or storm drains.
- After the sewage contamination has been cleaned by low pressure flushing, the now cleaned area can then be sanitized by applying a disinfectant such as strong bleach or strong hydrogen peroxide that does not leave residual “killing” chemicals.
- Test for sewage bacteria after cleaning and sanitizing.



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Tetanus



Tetanus bacteria

- Tetanus is a serious illness that can easily be avoided.
- Workers should have up-to-date Tetanus inoculations, and…
- Wear gloves.
- For workers involved in sewage cleanup, we also recommend vaccinations for:
  - Tetanus/diphtheria
  - Hepatitis A and B

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Odors

- Goal of sewage remediation is zero pathogens.
- However, if there is odor, you will not have happy occupants.
- Odors can be caused by:
  - Smells released from wet building or contents;
  - Bacteria;
  - Fungi;
  - Urine
- So-called deodorizers only temporarily cover up the smell with scents. The scents can cause adverse reactions in some sensitive individuals. Not recommended.
- **Chlorine Dioxide gas treatment can be used to effectively and permanently remove smells once the contamination is 100% cleaned. Recommended but requires over-night treatment of vacant property.**



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Ozone

- Ozone treatment can be used effectively to remove smells once the contamination is 100% cleaned.
- As with Chlorine Dioxide, ozone treatment is dangerous and should only be done by professionals, and only on unoccupied rooms.
- Ozone will leave an odor that can last for days or weeks. Far longer than Chlorine Dioxide. Not recommended.



Small Ozone Generator

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Hydroxyl Generators

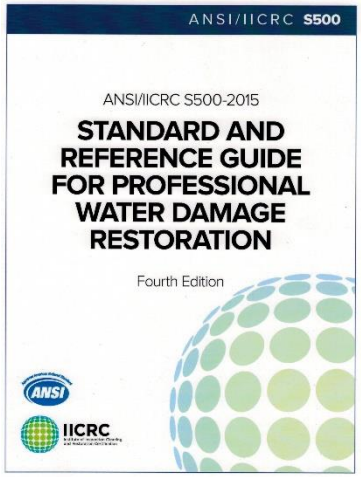
- Hydroxyl generators are also used to control odor. Have largely replaced ozone generators for odor elimination.
- Manufacturers state that they can be used in occupied spaces but such use is illegal in some states.



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Sewage Damaged Carpet





- Carpet that has been exposed to sewage MUST be discarded.
- Sewage-damaged carpet should not be “cleaned”, because:
  - “Carpet Cleaning” usually means minimal cleaning, and then soaking carpet with chemicals that keep on killing and keep down odor.
  - IICRC S500 Standard for Professional Water Damage Restoration states that carpet and pad that has been exposed to any form of non-clean water (Gray or Black) must be discarded.

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Section Review

- Sewage pathogens are not aerosolized to the same extent as mold spores. Exposure to sewage pathogens is by ingestion … not breathing. Wear gloves. Do not touch your mouth or nose during work. Do not blow air on sewage spills to dry.
- Disinfectants do not kill or remove sewage toxins. Low pressure flushing removes sewage. Follow with disinfecting the clean surface with bleach or strong hydrogen peroxide.
- Carpet exposed to sewage must be discarded. Again, carpet "cleaning" is generally soaking with chemicals and should be avoided.
- Do not cover up odors with fragrance.
- Ozone treatment or hydroxyl generators or chlorine dioxide will eliminate odor only in a completely clean and dry environment. Clean means removal of all trace of sewage. Not simply spraying sewage with biocides.
- Get a tetanus shot before doing mold and sewage work.
- Test for the absence of sewage bacteria upon completion of sewage clean up.

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Review Questions

1. The primary way workers get sick when cleaning up sewage contamination is:
   a) Touching the sewage and then touching their mouths (ingestion.)
   b) Inhalation.
   c) Through the skin.
   d) Infections in the eyes.

2. The best way to clean up a sewage problem is:
   a) Spray with biocide to kill the bacteria and viruses and remove toxins.
   b) Cleaning by low pressure washing/extraction, followed by application of disinfectant on clean and dry surface.
   c) Dilute bleach.
   d) Drying followed by ozone.

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Review Questions

3. Odors can be caused by (Pick the **one best answer**):

   a) Smells released from wet building or contents.
   b) Bacteria.
   c) Fungi.
   d) Pet Urine.
   e) **All of the above**

4. When are biocides that keep on killing recommended by IICRC? *(Our class though does not recommend biocides after sewage. But only Green, Chemical-Free procedures such as bleach or hydrogen peroxide to sanitize after sewage is completely cleaned from hard surfaces … and after carpet/pad, drywall, pressed wood (not hard surfaces) exposed to sewage are removed/discarded.)*

   a) **Black water clean up.**
   b) Mold work.

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Lead & Asbestos

EPA Lead Paint Law









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EPA Lead Paint Regulations

EPA requires that firms performing Renovation, Repair, and Painting (RRP) projects that may disturb lead-based paint in **pre-1978 homes**, child care facilities and schools be RRP Lead Paint Certified by the EPA.

Firms must use certified renovators who are trained by EPA-approved training providers to follow lead-safe work practices. Any contractor performing work on pre-1978 homes or child-occupied facilities must employ at least one Certified Renovator who has successfully completed the RRP training. Companies must also process an application to become a Lead Safe Certified Firm.



Individuals can become certified renovators by taking an eight-hour RRP training course from an EPA-approved training provider.

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EPA Lead Paint Certification Courses

- **Lead Paint Renovator Certification Initial Courses.** As of April 22, 2010, anyone who performs renovations, repairs, or painting (RRP) in pre-1978 housing or child-occupied facilities must be Lead-Safe Certified by the EPA or an EPA-Authorized state. Individuals and firms that are not certified could face fines of up to $37,500 per day.
  - This Lead Paint Renovator (RRP) Initial Certification course is 8 hours in length and includes lead safety training approved by the EPA or applicable EPA-Authorized state program. The course concludes with a certification exam.
- **RRP Certification Renewal.** Already RRP Certified? Take the 4-hour refresher course to renew your certification.



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EPA Lead Paint Regulations

- Contractors must use lead-safe work practices and follow these three simple procedures:
  - Contain the work area.
  - Minimize dust.
  - Clean up thoroughly.
- Read EPA's Regulations on Residential Property Renovation at 40 CFR 745.80, Subpart E.
- Lead is a serious hazard for infants and small children. How about adults? Data is conflicting.



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Lead Paint Instant Testing



Remediators that are RRP certified should bring an Instant Lead Test kit with them.

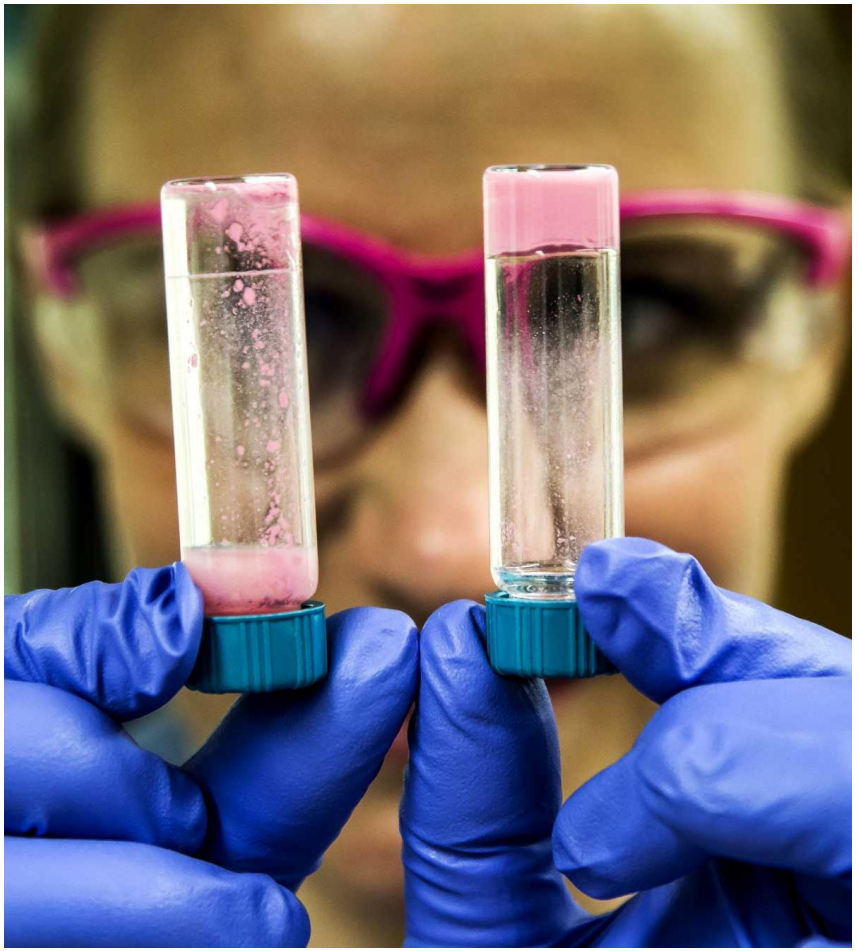
No time to wait for lab results.

EPA recognized. Does that mean EPA approved? No.

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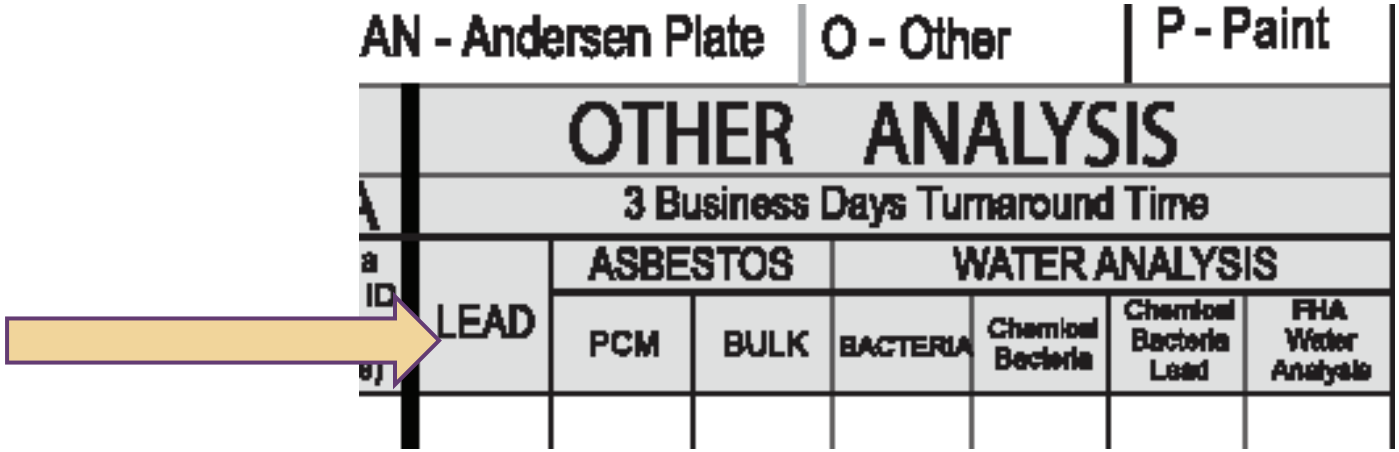
Lead Paint Lab Testing

- Assessors should take a chip or chips of paint in homes built prior to 1978 and send to a lab for analysis along with the mold samples.
- The EPA Paint Chip Sample Collection Guide, provides step-by-step instruction on how to collect paint chip samples and submit them for analysis.



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Lead Paint testing



- Many labs provide full EPA lead paint testing. Not instant.
- Mold assessors like these as they are billable.
- The Lab Tests, compared to Instant Tests, tests for lead paint not only on surfaces but also in older layers of paint. Submit a chip of paint.

Mold remediators that are removing drywall from homes built before 1978 that do not check for lead paint are performing illegal work.

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Asbestos



- Houses built between 1930 and 1950 may have asbestos.
- Demolition work should not be done on any old buildings unless a hygienist has issued a clearance.
- Asbestos can be in plaster used in ceilings, especially popcorn. It can be in plaster used in walls, which was then covered up with drywall or plaster without asbestos. Can be in insulation on hot water heater pipes. Can be in linoleum floor tiles. Can be in many places …
- Asbestos is a very serious hazard.

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Asbestos vs. Mold

- The IICRC S520 containment and Personal Protective Equipment (PPE) concepts for mold remediation are derived from asbestos work where you cannot exhaust contaminants outside.
- However mold remediation is best done by exhausting mold contaminants outdoors (Federal approach) rather than collecting contaminated dusts onto air scrubber filters.
- Results in lower cost and better outcomes than the more expensive Asbestos remediation techniques that do not exhaust contaminants outdoors (IICRC approach).



Mold remediators do not remediate asbestos. Mold remediators that are performing demolition on homes built before 1950 that have not been checked for asbestos are performing illegal work.

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Review Questions

1. Mold remediators can check for Asbestos before doing mold work by:
   a) Taking samples and sending to the lab.
   b) Only necessary in older buildings. (Trick question.)
   c) Mold Remediators are not approved for Asbestos testing.

2. The best way to remove Asbestos is:
   a) Follow OSHA and EPA guidelines for Asbestos removal.
   b) Mold Remediators are not permitted to remove Asbestos.
   c) Mold Remediators can remove asbestos under the direction of a Hygienist.
   d) Drying followed by ozone.

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Review Questions

3. Mold remediation of heavily moldy areas should use upgraded procedures for mold removal developed for Asbestos.

   a) Yes. Safety is best.
   b) No. Asbestos removal procedures do not allow you to exhaust contaminants outdoors. Exhausting contaminants outdoors reduces cost and improves quality of work and is safer for workers.

4. EPA requires that firms performing renovation, repair, and painting projects that may disturb lead-based paint in, [Date], in YYYY, ZZZZ be certified by EPA when working in:

   a) Pre-1978 homes
   b) Child Care Facilities and Schools

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NAERMC (That's us) Recommended SAFE Mold Remediation Procedures



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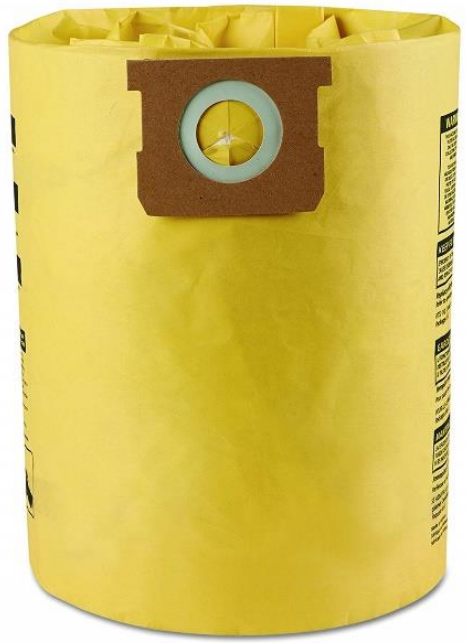
Example Remediation Quote. Short & Sweet

- ✓ We do not leave dead mold as dead mold is still allergenic and harmful. Always remove mold.
- ✓ We use no biocides that are chemicals that leave a toxic residue that "keeps on killing" and can be harmful to occupants.
- ✓ All work to be done under (what we call an) EPA Level 1 containment [that's the EPA Limited containment but we don't like to use the word "limited" … sounds so limited] by a State Licensed Mold Remediation contractor.
- ✓ Remove moldy/water damaged drywall under rear window [or wherever] **to the extent needed to restore to "as new"**. [We do not specify how much drywall to remove. Why? No reason to.]
- ✓ Remediate opened wall [or ceiling] cavity.

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HEPA VAC (Shop-Vac with HEPA Filter)

- HEPA Vac (but we use Shop-Vac with Drywall filter bag pre-filter in front of round HEPA filter) and Swiffer to clean surfaces.



Shop Vac drywall bag pre-filter (left) protects the round HEPA filter (right)



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Clean and Then Encapsulate Cavities with White Paint/Primer

- After surface cleaning, seal any exposed wood or drywall with white mold-inhibiting encapsulant (Zinsser or Kilz II or better. We prefer Zinsser.)
- Looks good. Looks are important.



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Clean Floors and Furniture Surfaces With Swiffer



Clean floors and surfaces with Swiffer. Leaving the floors and content in the work room dust free is important.

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Clean Air. Air Scrub

Air scrub after cleaning floor and surfaces … before testing. (Here we show a 1400 cfm air scrubber)



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Post Remediation Air Testing Outside Containment

After cleaning floors and cleaning the air, sample the air outside the containment (here we show battery operated sampling pump) with count down timer.



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12-Month Warranty

- We provide a 12 month mold free warranty covering work performed.
- See us at: www.Mold-Free.org



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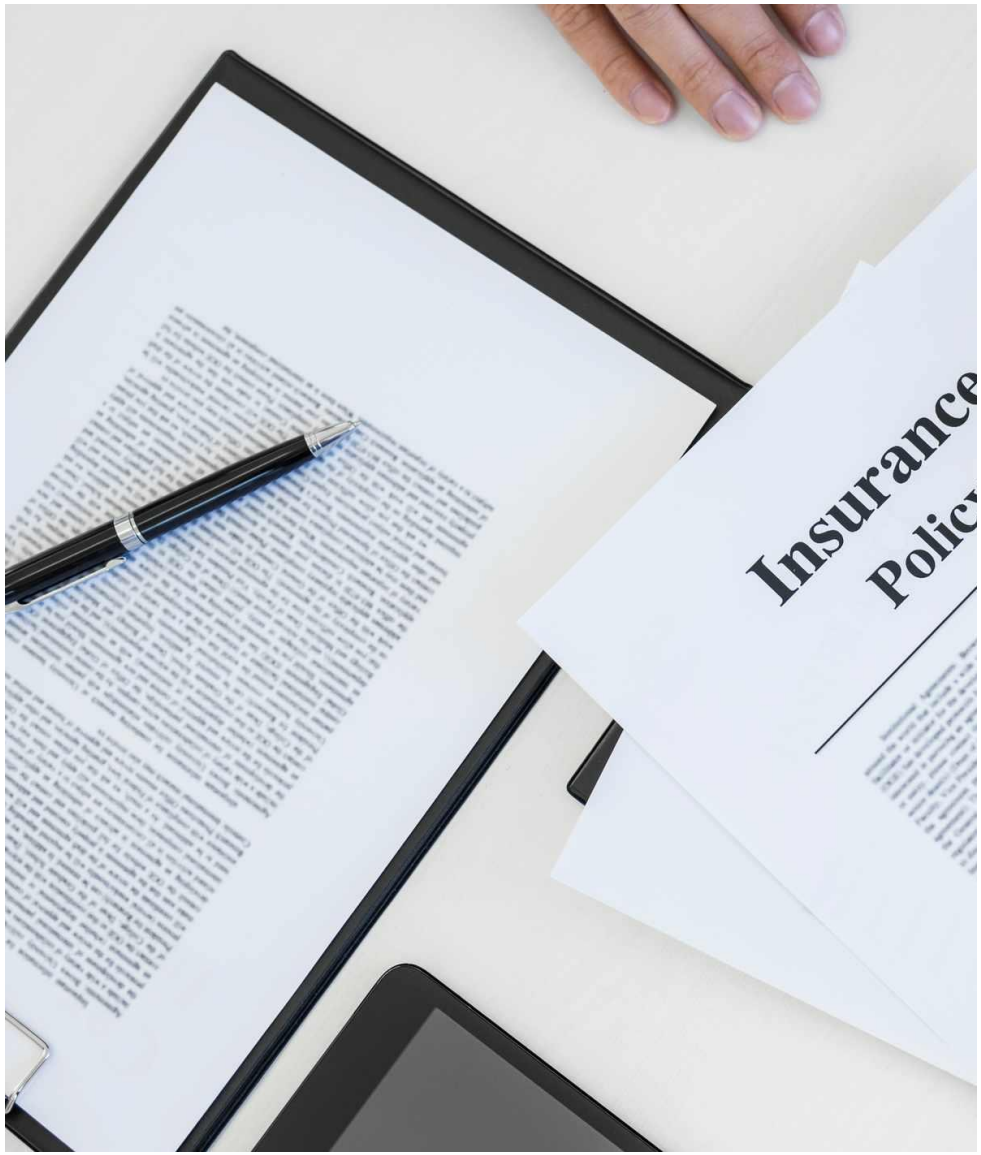
If Dirty Carpet or Dirty AC/Ducting

- If Dirty Carpet or Dirty AC/Ducting include disclaimer in Quote: “Test results are for information purposes, if the results come back Elevated have your carpets cleaned and/or AC/ducting cleaned.”



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For Insurance …



For insurance, Protocols and/or Remediation Quotes … not so short and sweet.

There is no one format for protocols or remediation quotes that fits all.

See Insurance Protocol example we email to you with Passing Certificate.

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For Insurance … Cross Reference Xactimate to IICRC

- For insurance, Protocols … not so short and sweet.
- For insurance we cross reference the Xactimate line items with IICRC S500 or IICRC S520 "required" procedures to justify billing items.
- And to prove compliance with IICRC.
- See example.

Master Bath

DESCRIPTION	QTY	RESET	REMOVE	REPLACE	TAX	O&P	TOTAL
REMOVE THE CEILING DRYWALL APPROX 64 SQ' TO THE EXTENT NEEDED TO REMOVE ALL WATER DAMAGE.							
1. Protect - Cover with plastic	50.00 SF		0.00	0.31	0.00	3.10	18.60
Content outside of containment							
2. Floor protection - heavy paper and tape	150.00 SF		0.33	0.00	0.00	9.90	59.40
3. Peel & seal zipper	1.00 EA		0.00	12.59	0.00	2.52	15.11
4. Containment Barrier/Airlock/Decon. Chamber	200.00 SF		0.00	0.89	0.00	35.60	213.60
Containment barrier – Ref: ANSI/IICRC S500-2015 13.3.2							
5. Containment Barrier - tension post - per day	6.00 DA		0.00	3.30	0.00	3.96	23.76
Ref S500-2015 13.3.2 containment up 2 days wait for testing							
6. Detach & Reset Recessed light fixture	2.00 EA	87.76	0.00	0.00	0.00	35.10	210.62
7. Tear out and bag wet insulation - Category 3 water	64.00 SF		1.08	0.00	0.00	13.82	82.94
8. Tear out wet drywall, cleanup, bag - Cat 3	64.00 SF		1.54	0.00	0.00	19.72	118.28
Tear out wet drywall, clean up, bag, per Sq FT – Cat 3. Ref: S500-2015 Bulk Material removal. 13.3.2 Ref S500-2015 17.3.2.1/ 17.3.2.2 Remove and replace Cat 3 intrusions. Approx 2 sheets of ceiling drywall.							
9. Plastic bag - used for disposal of contaminated items	4.00 EA		0.00	3.38	0.00	2.70	16.22
10. Hazardous Waste/Mold Cleaning Technician - per hour	0.50 HR		0.00	66.63	0.00	6.66	39.98
extra labor to double bag contaminated materials for disposal per (IICRC S520-2015 12.2.6)							
11. Apply anti-microbial agent to the surface area	64.00 SF		0.00	0.28	0.00	3.58	21.50
Safe for home or kitchen use. No chemical residue. Ref S500-2015 13.4							
12. Seal the surface area w/anti-microbial coating - one coat	64.00 SF		0.00	1.20	0.00	15.36	92.16
Fungicidal coatings: High perm rated, water based mold resistant encapsulant as per Mold Assessor Recommendation applied on properly cleaned and sanitized structure elements. Ref S520-2015 5.8.2							
13. Air mover axial fan (per 24 hour period) - No monitoring	1.00 EA		0.00	34.25	0.00	6.86	41.11
Negative air fan inside containment attaches to lay flat ducting to exhaust to the outside. Ref S500-2015 13.3.2							
14. Ducting - lay-flat - Large	50.00 LF		0.00	0.45	0.00	4.50	27.00
Attached to negative air fan inside containment to exhaust to the outside. Ref S500-2015 13.3.2							

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Summary

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What You Should Have Learned

- The key to safety for mold workers:
  - **Eliminate or minimize the risk/level of hazard (airborne contaminants):** Keep the spore levels inside the containment at a low level. We do this by following EPA/OSHA Federal Guidelines and exhausting the contaminants outdoors and not collecting them onto filters as required by IICRC S520-2015.
  - **Eliminate or minimize the risk/level of hazard (airborne contaminants):** Use moist methods rather than dry methods to keep aerosolized spores to a minimum.
  - **During demolition, because you exhaust aerosolized contaminants outdoors,** the levels of spores inside the containment are relatively low, extensive PPE is not required.
  - No need to wear more than N-95 respirators inside the containment. Not HEPA filtered respirators that require both OSHA respiratory plan compliance and require super expensive Worker's Comp for hazardous conditions.

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What You Should Have Learned

- With relatively clean work area inside containments that exhaust contaminants outdoors and workers using N-95 respirators EAP approach) we repeat: **Compliance with arduous OSHA respiratory plan not required. Workers do not need to have Worker's Comp for hazardous conditions as with IICRC approach.**
- The danger of working with sewage spills. Don't blow air on sewage. Mitigate sewage wet. If dry when you get there. Wet it. Then mitigate wet.
- Heat prostration is the most common serious ailment when working with mold. Again exhaust contaminants outdoors. Don't use Tyveks. And keep the AC on unless the work is in the AC closet. And eliminate the need to Tyveks and heat prostration.

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What You Should Have Learned



- Use only cleaners that are approved for household use.
- Strong bleach-based oxidizing cleaners such as Tilex® (30%-50% bleach and the rest water) leave no harmful residue and remove mold by disintegration along with toxins and irritants and not just kill it.
- Chemicals called biocides that leave a residue that keeps on killing should not be used for mold work. Stop the leak. Mold will not return.
- The so called “Hospital Grade” biocides can contaminate the job site for years.
- Hospital grade means strong and means only suitable for hospitals and not for residential use.
- A baby’s room in a home does not look in any way like a hospital room.

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What You Should Have Learned



When the mold is removed and not just killed …

When the cause of the mold, which is always moisture, is properly fixed.

There is no reason to use any chemicals that leave a residue to keep on killing.

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What You Should Have Learned About Illegal Contracting

- Using biocides not according to label directions is illegal contracting per the US EPA.
- Not testing for lead paint, prior to material removal if the house is built before 1978 is illegal contracting.
- Mold remediation in a home built before 1950 is illegal unless there has been an asbestos test.
- Using HEPA filtered respirators rather than N-95 without complying with OSHA respiratory standard is illegal contracting… and requires Worker's Comp for hazardous conditions.
- Wearing Tyvek's to protect against hazardous conditions requires having Worker's Comp for hazardous conditions. If you don't have it, it is illegal contracting.



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What You Should Have Learned About Illegal Contracting

- Best to follow EPA/OSHA (Federal) guidelines:
  - Keep the containment clean by exhausting contaminants **as well as cleaning agent** fumes to the outside.
  - No Tyveks needed.
  - No need to wear more than N-95s rather than HEPA filtered respirators.



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