After the Mold
Rush

ASHRAE Tennessee Valley Chapter
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For more information

www.epa.gov/iaq
or
epa.gov/mold

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US EPA

- Mission: to protect human health and the environment

- Authority on indoor air contaminants such as mold: “to conduct research and disseminate information”
What we’re covering

- EPA recommendations on mold
- Other EPA programs you may like
Introduction to Molds

- Can be found almost anywhere where moisture and oxygen are present
- All molds have the potential to cause health effects
- Solve moisture problems before they become mold problems!
Why the Mold Rush?

- Money - $32 million case
- Celebrity – Brockavich, others
- Sick people
- Everywhere
- Extreme cases fascinate
“Mold is Gold” - Contractor

- Homeowners would still pay after insurance cut coverage
Molds are Everywhere

- In air or settled,
- Indoors and out
- To grow, they need:
  - Moisture
  - Food (organic), O2
- Hidden growth common in water damaged areas
Why Be Pro-Active on Mold?

- Mold problems usually worsen with time
  - Ostrich methods do not solve this
  - Judges and juries understand wood rot

- Health effects can be serious, affecting productivity, possible legal actions
EPA on Molds

• Popular guidance

• Health Effects in Appendix B

March, 2001
Health Effects and Symptoms related to molds

- Headaches
- Skin irritation
- Breathing difficulties
- Allergic reactions
- Aggravation of asthma symptoms
- Other symptoms likely: list not all-inclusive
Health Effects and Symptoms related to molds

- Hypersensitivity Pneumonitis
  - resembles bacterial pneumonia
  - uncommon

- Opportunistic Infections
  - Aspergillus fumigatus, Trichoderma
  - immune-compromised individuals
Moisture and Molds

- Control Moisture to Control Molds
  - Leaks – roof, window
  - Floods
  - Condensation
  - Plumbing leaks
  - Unvented appliances
Fix the Water First -- Prevent Mold Regrowth!

- Fix leaky plumbing
- Stop condensation, fix promptly
- Keep HVAC system clean, dry
- Vent moisture-generating appliances outside
- Clean and dry wet/damp spots within 24-48 hrs
Plan the Remediation Before Starting Work

- Questions to consider
  - Are there existing moisture problems?
  - Are there hidden sources of water?
  - Do occupants report musty odors? Or health problems?
  - Are materials or furnishings visibly damaged?
  - Is consultation with health professions indicated?
Mold Remediation – Key Steps!

- Consult health professional throughout
- Select remediation manager
- Assess size of mold problem, type of mold-damaged materials
- Communicate with building occupants
Mold Remediation – Key Steps! (continued)

- Plan remediation, adapt guidelines to fit
- Select personal protective equipment (PPE)
- Select containment equipment
- Select remediation personnel/team
Mold Remediation – Key Steps! (concluded)

- Fix water or moisture problem
- Clean and dry moldy materials. Discard what cannot be cleaned
- Dry non-moldy items within 48 hours
- Check for return of moisture and mold
Communicate w/ Occupants When Remediating

- **Essential** for successful mold remediation
- Occupant perception of health risk **crucial**
Communicate When You Remediate

- Establish that occupant health and safety are top priority, and occupant concerns are taken seriously
- Present remediation status clearly
- Identify direct contact for occupants
Guidelines for Remediating Mold Growth Caused by Clean Water

- Table 2, Page 14 - MUCH information
- EPA divides into
  - Small ( < 10 square feet)
  - Medium (10-100 square feet)
  - Large (>100 square feet)
- Cleanup, protective equipment, and containment vary with size
EPA’s Cleanup Methods

- **Wet Vacuum**
  - Do not use if materials are dry

- **Damp Wipe** non-porous surfaces
  - Water, detergent

- **HEPA Vacuum**
  - High Efficiency Particulate Air
  - Filter installation crucial

- **Discard**
  - Water damaged, not salvageable
  - Seal bags before removal
Wet Vacuum

- Remove water from floors, carpets, hard surfaces
- Do not vacuum porous surfaces
- Only use when materials are still wet, or you may spread spores
- Clean and dry vacuum machine after use
Damp Wipe

- Dead or alive, molds can have effects
- Remove by wiping or scrubbing with water, or water and detergent
- Dry quickly
- Porous materials may have to be discarded
HEPA Vacuum

- HEPA- High Efficiency Particulate Air
- Use in final cleanup, after contaminated materials removed
- Make sure filter sealed
- Wear protective gear to change filter
  - Dispose of old filters in well-sealed bags
Discard

- Remove damaged materials and seal in plastic bags, typically 6 mil double bags
- Minimize spore dispersion in building
- Discard as construction waste
- Large items may be wrapped in poly sheeting and sealed with duct tape
Personal Protective Equipment (PPE)

- Gloves to protect skin from molds, and from potentially irritating cleaners
- Goggles or full-face respirator: protect eyes from dust
- Disposable clothing recommended on medium (>10 sq.ft.) or large projects to avoid skin contact and spread of mold
Personal Protective Equipment (PPE) (continued)

- **Respirators**
  - Minimum: N-95, NIOSH approved
  - Limited: air-purifying with HEPA filter cartridge
  - Full: for intense or long-term exposure, full face, powered air purifying respirator is recommended. Follow OSHA regulations
Containment

- Containment limits release of mold and minimizes exposure
- Maintain negative air pressure in containment
- Exhaust air to outdoors and ensure adequate make-up air provided
- If working, polyethylene sheeting will billow inward
Limited Containment

- For 10-100 sq. ft. of visible moldy material
- Single layer 6 mil polyethylene surrounding the area
- Slit entry
- Vents, chases, risers sealed
- Clean surfaces prior to removal of items
Full containment

- Recommended for >100 sq. ft. moldy material, or if needed to prevent contamination
- Double layers polyethylene sheets
- Airlock constructed to hold waste, allow persons to put on or take off PPE
Hidden Molds

- Molds may grow above ceiling, under carpet, back of drywall, etc.
- Potential danger to investigator - use PPE
- Revise remediation plan if hidden molds discovered
Remediation and HVAC

- Do not run HVAC if contaminated with mold or if contamination is suspected.
- Consult EPA’s *Should You Have the Air Ducts in Your Home Cleaned?* for details (www.epa.gov/iaq/pubs)
Mold Remediation and Biocides

- Biocide use (such as bleach) is **not recommended** as a routine practice during mold remediation.
- If used, always ventilate the area, taking care not to distribute mold spores.
- Ensure applicators are properly licensed.
EPA Position on Sampling

- EPA does not advise testing for mold except for legal reasons, if it would change physician’s treatment, or to discover hidden mold
- Plan a sampling strategy to confirm suspected sources & exposure
- Use experienced professional to interpret results
Sample less, save more

- No guidelines for mold levels exist
  - 20,000 kinds of molds - standard unlikely
  - Many methods - air, surface, spore trap, bulk, water, tape lift, dust, PCR, enzyme

- If you see mold growing, you don’t need to test --it’s there!
- Sampling only a snapshot
Sampling Pitfalls

- Inadequate number of samples
- Outdoor control samples omitted
- Unneeded or inappropriate samples
- If you cannot sample properly, it is preferable not to sample. Inadequate sample plans may generate misleading, confusing, and useless results
Standards or Threshold Limit Values (TLVs) for airborne concentrations of molds, or mold spores, have not been set. EPA has no regulations or standards for airborne mold contaminants.

Despite a lack of standards, it is clearly prudent to avoid exposure to molds.
Useful equipment

- Moisture Meters
  - Learn if materials are wet/water damaged
  - Monitor progress as material dries
- Humidity Gauges
- Humidistat to turn on HVAC
- HVAC Filter - upgrade to MERV-8+
How Do You Know You Have Finished?

- Water problem completely fixed
- Mold removal completed
  - no visible mold, odors, or damaged materials
- Revisit: no sign of mold, water
- Occupants: no symptoms
- Ultimately, a judgment call
Other Stuff from EPA

- Better Indoor Air Quality (IAQ) for
  - Asthma
  - Schools
  - Homes
Schools CAN Improve Their Indoor Environments

- Schools have IAQ-related problems
- Many IAQ problems are easily identified and resolved by school staff
- It costs less to prevent IAQ problems than to fix them!
- Being proactive is KEY!
IAQ Tools for Schools

- Voluntary and flexible
- Low- and no-cost methods
- Survey, walkthrough, communicate
- Save $$, raise test scores
- Re-build trust with community
- http://www.epa.gov/iaq/schools/index.html
Indoor airPLUS

Better Environments Inside and Out
Indoor airPLUS

- Qualified new homes earn label
- Must meet Energy Star
- Must meet requirements in moisture control, combustion, HVAC, radon, pests barriers, materials
- Third-party verified (HERS Rater)
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Questions?