

Slide 1

**Mold & Remediation  
Inside HVAC Systems**

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Slide 2

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Presenters

Robert Jurgiel, CIH,  
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Disclaimer

This presentation is not intended to be a comprehensive program covering all aspects of this topic. All technicians are encouraged to read and follow all applicable standards, codes and regulations related to this topic.

- ✓ It is the responsibility of each individual contractor to follow local building codes and licensing requirements and to work safely in accordance with OSHA guidelines.
- ✓ It is the contractor's responsibility to take proper precautions on each project to prevent cross contamination. Always take the health and safety of the building occupants into consideration before you conduct any cleaning procedures.
- ✓ All of the following tips are only general tips. They do not cover every situation and it is your responsibility to adapt these tips to the individual system you are working on.
- ✓ The Instructor is not responsible in any way for the work you perform after viewing this slide show. You are responsible for your own work.
- ✓ The views and opinions following are the instructors opinions and not necessarily the official position of the National Air Duct Cleaners Association.

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Slide 4

 What We'll Learn

- What is Mold & Why is it a Concern
- How Mold Forms inside HVAC
- Cleaning & Remediation
- IH / Contractor Relationships

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Slide 5

 **Mold & Remediation Inside HVAC Systems**

**What is Mold?**



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 **Mold & Remediation Inside HVAC Systems**

**What is Mold?**

- **Naturally Biological Growth**
  - Associated with decaying vegetation and "food"
  - Over 100,000 species
- **Growth Occurs**
  - Hyphae / Fruiting Bodies (Mycelial)
  - Spore Generation (Sporulation)

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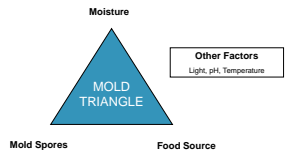
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 **Mold & Remediation Inside HVAC Systems**

### Mold Growth



Moisture

MOLD TRIANGLE

Mold Spores Food Source

Other Factors  
Light, pH, Temperature

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 **Mold & Remediation Inside HVAC Systems**

### Mold Growth & Moisture

- **Moisture Presence**
  - Controlling factor: Water
  - Water Source / Intrusion
  - Elevated Relative Humidity (>60%)
  - Stagnant air can result in localized elevated relative humidity

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 **Mold & Remediation Inside HVAC Systems**

### Mold Growth & Moisture

- **Moisture Presence**
  - Controlling factor

**Sources**

- Water Leak / Water Intrusion
- Elevated Relative Humidity (>60%)
- Stagnant air can result in localized elevated relative humidity

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**Mold Growth & Moisture**



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**Mold Growth & Moisture**



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**Why is Mold a Concern?**

- Actual Exposures / Illnesses
- Perceived Contamination
- Public Relation Issues
- Legal Issues
- Perceived Health Hazards

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**Mold Spore Hazards**

- Respiratory Irritation Symptoms
- Allergy-type Symptoms
- Asthma Conditions
- Respiratory Diseases
- Other

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**Mold & Remediation Inside HVAC Systems**

**Has anyone here ever experienced the following?**

- Dry, itchy, irritated eyes
- Sore, dry, irritated nose or throat
- Persistent cough
- Stuffy or runny nose
- Allergy symptoms
- Unusual tiredness or fatigue
- Sinus congestion or headaches
- Sneezing
- Asthma
- Nausea
- Cold-like or flu-like symptoms

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**Mold & Remediation Inside HVAC Systems**

**Perceived Health Hazards**

- **Fear the Unknown** (mental stress)
- **Easy Target**
  - Anything and everything can or will be blamed on mold exposure
  - Any change in someone's health may be attributed to mold exposure
  - May not be remotely connected

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**Mold inside HVAC Systems**

- Where?
  - Any where when conditions are right?
- Why?.. Moisture
  - Water leak in the system
  - Water intrusion into the system
  - Carry-over off the A-coil in the system
  - Condensation in the system

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**Mold inside HVAC Systems**



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**Mold inside HVAC Systems**



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**Mold inside HVAC Systems**




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**Water Leaks in the HVAC System**

- Overflowing Condensate Pan



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**Water Leaks in the HVAC System**

- Humidifier Leaks



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**Water Intrusions into HVAC System**

- Roof Leaks
- Roof-top Units (panels left off)
- Overhead Pipe Leak
- Flooding Events
- Subsurface Ducts

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### Carry Over off the A-Coil

- Too High Fan Speed
- Clogged Sections of Coil
- **Hydrophobic Conditions**
  - Coils designed to be hydrophilic
  - Caused by surface contaminants (grease, oil, wax, polymers, etc.)

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### Condensation inside HVAC System

- **Cold Surfaces**  
(A-Coil with condensate pan)
- **Pressure or Air Speed Changes**

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### Remediation inside HVAC System

- **Methods Vary**
  - Depending on Conditions inside & outside each HVAC system
- **Common Elements**
  - Contaminant removal
  - Use of engineering controls
  - Use of PPE
  - Proper training of personnel
  - Correct the cause of the moisture

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**Remediation inside HVAC System**



The slide features a blue header with the NADCA logo and title. The main content includes a color-coded HVAC system diagram of a 'Personnel Building' with a legend for 'Supply Air', 'Return Air', and 'Exhaust Air'. To the right are two small photographs: the top one shows a person in a white protective suit working in a confined space, and the bottom one shows a close-up of a circular duct opening.

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**Remediation inside HVAC System**



Cleaning Methods Tests

The slide features a blue header with the NADCA logo and title. The main content includes a photograph of a dark, textured surface, likely an HVAC duct, with a red circle highlighting a specific area. The text 'Cleaning Methods Tests' is positioned to the right of the photo.

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**Remediation inside HVAC System**



Encapsulation after Cleaning

The slide features a blue header with the NADCA logo and title. The main content includes a photograph showing a close-up of a white, fibrous material, possibly a filter or duct lining, with a dark, irregular area at the bottom. The text 'Encapsulation after Cleaning' is positioned to the right of the photo.

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**Remediation inside HVAC System**



Know your PPE Requirements!

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 **Mold & Remediation Inside HVAC Systems**

**Biocides / Disinfectants**

- Use only EPA-registered products
- Follow manufacture instructions
- Know dwell times
- Limited Use inside HVAC Systems
  - Typically, only allowed for non-duct, hard surfaces (i.e. condensate pans, coils, other HVAC sys. components)
  - Why?

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**Other Remediation Notes**

- HVAC System Containment
  - HVAC system under negative pressure with HEPA filtration system
- Containment outside HVAC System
  - Depends on the contaminant
  - Depends on the occupants
  - Depends on how with the affected materials are being removed (i.e., vacuum or bulk removal)

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**Mold & Remediation Inside HVAC Systems**

### Conclusions

- **Mold is a Concern**
  - Hazardous to occupants and workers
  - Increase risks (real or perceived)
- **Caused by Moisture**
- **Remediation Complexity**
  - Training, experience & knowledge
- **Must Correct the Moisture Issue**

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**Mold & Remediation Inside HVAC Systems**

### IH Relationship

- Industrial Hygienist's are not HVAC Remediation Experts – Generally speaking
- Many do not understand how HVAC cleaning gets performed properly
- IH needs to understand the process of cleaning
- What are we trying to accomplish?
- Working together is necessary for successful completion of the project

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### IH Relationship

- May want to partner for an HVAC assessment
- Can assist in scope of work – microbial contamination
- Utilize them for testing to determine the extent of the contamination

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### IH Relationship

- Education is a 2-way street
- Ask Questions
- Clear Communication is Key
- IH can assist you in managing client expectations
- Relationships are a Work in Progress

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Title of Presentation

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Slide 39



Title of Presentation

### Presenter Contact Information

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Thank you  
for  
Participating!



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