NPMSG ACADEMY

AHMA of Washington

The Importance of Indoor Air Quality

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Instructor Information

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- Certified Property Manager
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- Master Facility Executive
- National Affordable Housing Professional Executive
- Credential for Green Property Management
- OSHA, NFPA, and EPA Credentialed Professional
- Unrestricted Construction Supervisor License (Commonwealth of Massachusetts)
- Certified Home Inspector

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Disclaimer

The material, tables, charts, graphs, recommendations, etc., and other information contained in this training presentation is not intended to be or construed as legal advice of any kind nor should it be used to formulate any legal opinions. Participants should always consult with their own leadership and attorneys for advice of any legal nature.

The information that has been prepared and shared today, utilizes scientific and medical research data, as well as generally-accepted industry practices as its foundation. It is presented as a professional development and educational training opportunity that is designed to enhance employee skills and increase general knowledge of the subject.

While we endeavor to do so, some of this information may not be completely up-to-date at the time of the presentation due to recent changes within the industry as it relates to this topic.

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Course Overview

- This session will provide participants an overview of IAQ standards and associated environmental impacts
- We will define IAQ, Indoor Air Quality and its basic principles
- We will discuss the importance of IAQ and its impacts in multifamily housing
- Participants will learn to identify a variety of indoor air pollutants and/or hazards and develop a process to eliminate them
- We will identify proven methods in maintaining a safe and healthy community
- We will discuss IAQ and how important it was during the recent pandemic and what we need to do looking ahead

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Learning Outcomes

- Learn how to utilize the basic principles of IAQ to assess existing environmental conditions such as moisture, mold, pets, smoking, dust, dirt, pest droppings, carbon monoxide, radon, etc., as they all impact breathability and a person's overall health
- Learn how to apply the latest strategies to evaluate, identify, document, and mitigate issues and provide residents with the best and highest degree of indoor air and environmental quality
- Identify products and processes currently being used or are in-place that could potentially pose a health risk and replace them with less harmful alternatives
- Assess and redefine existing workflow processes that may inadvertently have a negative impact on a person's indoor quality of life issues
- Provide staff and residents the essential education needed as this is key to the success of the program

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Introduction

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What Is IAQ?

ASHRAE (the American Society of Heating, Refrigerating and Air-Conditioning Engineers) defines IAQ (Indoor Air Quality) as “a function of outside air quality, the design of the inside spaces and the ventilation air system, the way in which the HVAC system is operated and maintained, the presence of indoor sources of contaminants, and the strength of such sources.”

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Standards Development

- **ANSI,** the American National Standards Institute works in collaboration with ASHRAE on developing and implementing standards for IAQ
- **ANSI / ASHRAE 62.1-2019** “Ventilation for Acceptable Indoor Air Quality” and 62.2-2019 “Ventilation for Acceptable Indoor Air Quality in Residential Buildings” defines the roles of and minimum requirements for mechanical and natural ventilation systems and the building envelope intended to provide acceptable indoor air quality in residential buildings

Source: ASHRAE.org

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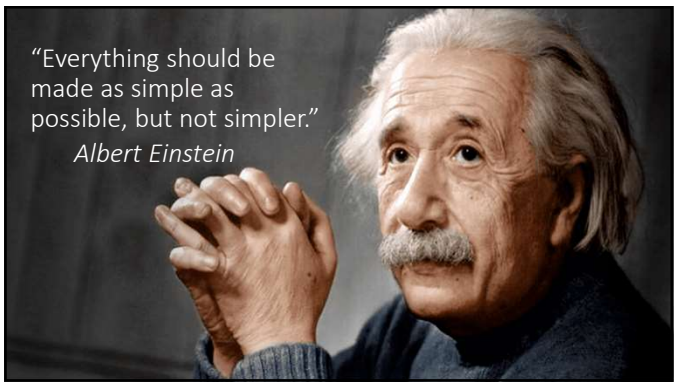

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The Four Basic IAQ Principles

There are four basic principles when it comes to ensuring the best possible Indoor Air Quality

- Minimize Indoor Emissions
- Keep it Dry
- Keep it Ventilated Well
- Protect Interior Spaces from Outdoor Pollution

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IAQ Facts

- Indoor Air Quality (IAQ) is vitally important to everyone
- It affects the health and comfort of people both at home and at work
- Americans spend upwards of 90% of their time indoors
- Indoor air pollutants are typically two to five times higher in concentration than those found in the air outside
- Implementing and following good management practices and protocols will help keep buildings free from possible IAQ problems
- You need to be proactive when it comes to IAQ in operations, monitoring, and maintaining systems to ensure a healthy building

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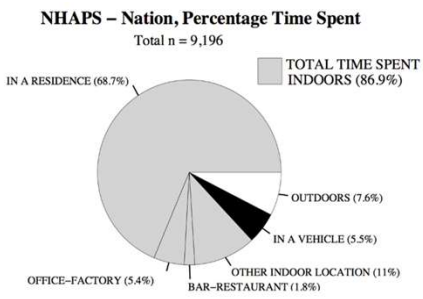

Chart: NHAPS

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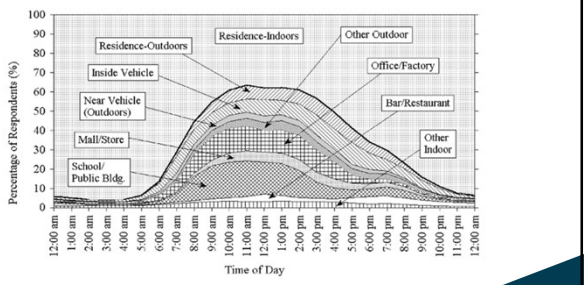

Chart: NHAPS

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Common Indoor Air Pollutants

- Mold
- Radon
- Lead
- Dust Mites
- Pet Dander
- Pests
- Carbon Monoxide
- Cigarettes and Second-hand smoke

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Physiological and Neurological Effects

- Development of Respiratory Problems and Shortness of Breath
- Allergies, Sneezing, Sinus Congestion and Coughing
- Headaches
- Dizziness
- Eye, Nose, Throat and Skin Irritation
- Fatigue, Drowsiness, Forgetfulness, General Malaise
- Exacerbation of Asthma, COPD, Emphysema, and Bronchitis
- Long-term exposure can also be a contributor to heart disease and various cancers

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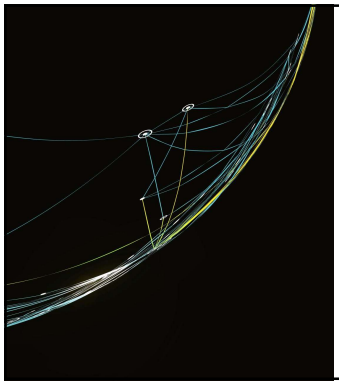

Improving IAQ

Three Steps

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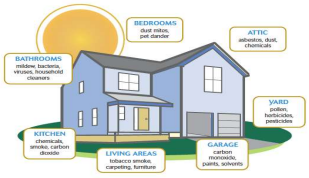
Step One – Source Control

- Traditionally, the most effective way to improve indoor air quality is to eliminate those individual sources of pollution or to reduce their emissions



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Step Two – Improved Ventilation

- Most buildings and home heating and cooling systems, including forced-air heating systems, do not mechanically bring fresh air into the home.
- Opening windows and doors when possible, operating window or attic fans, weather permitting, or running a window air conditioner with the vent control "open" increases the outdoor ventilation rate.

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Step Three – Air Cleaners

- There are many different sizes and types of air cleaners currently on the market, ranging from relatively inexpensive table-top models to more sophisticated and expensive whole-building systems.
- Perform an IAQ analysis by an environmental consulting firm to assess and determine the best options for your building / situation.

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The Evaluation Stage

- The introduction of outdoor air is one important factor in promoting good air quality. Air may enter a home in several different ways, including:
  - through natural ventilation, such as windows and doors.
  - through mechanical means, such as outdoor air intakes associated with the heating, ventilation and air conditioning system.
  - through infiltration, a process by which outdoor air flows into the house through openings, joints and cracks in walls, floors and ceilings, and around windows and doors. Infiltration occurs in all homes to some extent

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The Evaluation Stage

- Natural ventilation will increase air movement through open windows and doors.
- Natural ventilation can also improve indoor air quality by reducing pollutants that are indoors by increasing air changes per hour. Examples of natural ventilation are:
  - Opening windows and doors when weather permits during the year.
  - Window shading such as closing curtains, blinds or lowering awnings can all help with controlling IAQ issues.

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The Evaluation Stage

- If used properly natural ventilation can, at times help moderate the indoor air temperature, which may become too hot in homes without air-conditioning systems or when power outages, blackouts, or brownouts limit or make the use of air conditioning impossible.
- Most forced hot air heating systems and air-conditioning systems do not bring enough outdoor air into the building mechanically therefore, infiltration and natural ventilation should be maximized to bring outdoor air into the home.

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The Evaluation Stage

- Advanced designs for new construction is starting to add mechanical features that bring outdoor air into the building through the HVAC system and its components.
- Some of these designs include installing energy-efficient heat recovery ventilators to mitigate the cost of cooling and heating the air during the summer and winter.
- Proper upkeep and maintenance of HVAC systems is critical and the most fundamental way to address, mitigate or possibly even eliminate IAQ issues.

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The Evaluation Stage

- An efficient particulate collector with a low air-circulation rate will not be effective, nor will a cleaner with a high air-circulation rate with a less efficient collector.
- The long-term performance of any air cleaning system depends on maintaining it according to the manufacturer's specifications.
- Another important factor in determining the effectiveness of an air cleaner is the strength of the pollutant source itself.

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The Evaluation Stage

- Smaller, personal style air cleaners may not have enough capability to remove satisfactory amounts of pollutants from strong nearby sources - like kitchens or bathrooms.
- People with any sensitivity to particulate sources, may find that air cleaners are helpful, but only in conjunction with other concerted mitigation efforts to remove the source.

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The Evaluation Stage

- The EPA does not recommend using air cleaners to reduce levels of radon and its decay from homes.
- The effectiveness of these devices is uncertain because they only partially remove the radon decay by-products and do not diminish the amount of radon entering the home.
- The EPA plans to do additional research on whether air cleaners are, or could become, a more-reliable means of reducing the health risk from radon.

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What Can Be Done Now

- Review your current IAQ Program and if you do not have one, establish one.
- Evaluate what processes you are following and the products that you are currently using may be negatively affecting indoor air quality.
- When considering rehab work or redecorating, look for "green" options that can do not negatively impact or could even improve indoor air quality.
- Review your existing O&M plan to ensure that is up-to-date.

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What Can Be Done Now

- Consider recommissioning your HVAC systems.
- Consider retro-commissioning systems as well.
- Evaluate your current housekeeping program to determine what products and processes you are currently following or using.
- Switch from traditional cleaners to green cleaning solutions and products.
- Use only Low-VOC or No-VOC products throughout the site.
- Minimize installation of items like cabinets, paints, and flooring that have extended off-gassing periods.

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What Can Be Done Now

- Increase trash chute cleaning and collection areas as that is important for odor control as well as it helps to deters pests – another potential IAQ issue.
- Check with the property HVAC service provider on what else beyond the minimum that is currently being done you could be doing to improve results.
- Review your IPM plans to see if there are less-intrusive treatment options.

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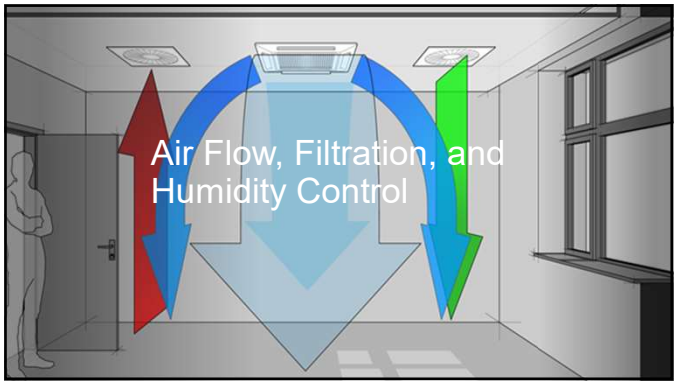

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IAQ Controls

- During the recent Covid-19 pandemic crisis, there was evidence that indicated a need for increased environmental controls specifically with a focus on IAQ and its impacts.
- Increase air filtration, air flow, and humidity are all three key components required to be undertaken in minimizing risk.
- Proper filtration is an obvious and vitally important part in making sure that your building has is meeting its IAQ potential.

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IAQ Controls

- Recent studies have shown that through aerosolization, a virus could be spread farther than originally thought and through an HVAC system's components.
- In most commercial HVAC systems, filters are measured in MERV, Minimum Efficiency Reporting Values.
- The MERV measurement ascends in quality from MERV 1 through MERV 20.
- The most common filters found in commercial AHUs are MERV 6 to MERV 8.
- ASHRAE recommends a higher efficiency rating, ideally MERV 13 or MERV 14, if possible.

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IAQ Controls

- If the AHU's blower motor is not sufficient, an increase of static pressure will slow the flow of air, which is counterproductive to the task of catching particulates including viruses in the filtration system. In this regard, air flow is likewise a key component in the IAQ effort and cannot be ignored.
- Good air flow will also assist in humidity control. You should maintain a relative humidity of 40% to 60% inside your buildings as this will help decrease transmissibility of respiratory illnesses and the likelihood of infecting its occupants.

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IAQ Controls

- HEPA filters are not usually a viable option either due to the relatively high cost and these filters pose considerably more resistance to air flow than MERV filters
- Properly maintaining an HVAC system or any of its components is the imperative to manage an effective IAQ program at your property.
- If your existing HVAC system already incorporates a makeup air unit, this will also increase ventilation, thus contributing to an even healthier indoor environment.

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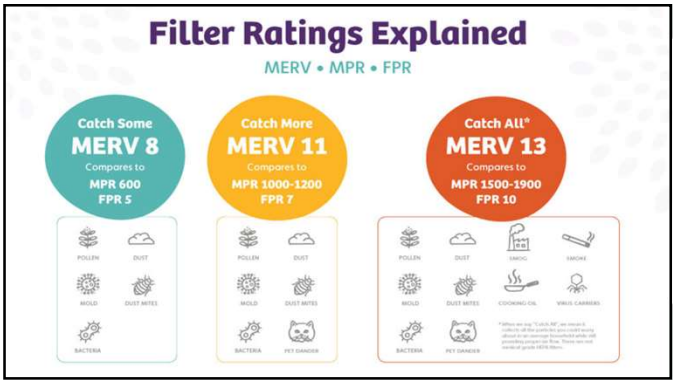

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Preventive Maintenance

An HVAC system must be properly operated and maintained all times.

- It can ensure and even extend the useful life of the equipment.
- It can reduce your energy bills.
- It keeps you protected with warranty claims coverage.
- It reduces premature breakdowns and failures which can cost an owner many tens of thousands of dollars – possibly more.
- Improves indoor air quality.
- Improves resident comfort.
- Keeps your building and property safe.
- Helps to protect the environment.

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Preventive Maintenance

- Timely in-unit filter changes are key to reducing mitigation of odors not only in the unit where the equipment is located to ensure good IAQ, but not doing this PM timely can also negatively impact neighbors by recirculating trapped odors.
- For in-unit fan coil units, ensure that the drain pan is properly maintained and kept free from clogs by using antimicrobial tablets when you perform regular PM.
- For ducts, branch lines and trunks, ensure that they are cleaned periodically so that grease, dirt and dust doesn't begin to manifest into odors that is spread throughout the building.

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Preventive Maintenance

- Waste disposals can also trap food particles and create a malodorous condition within a resident's unit.
  - Residents should be told how to address this problem by running cold water when using it and to report any leaking disposals to Management immediately.
- Smoking and cooking odors are #1 and #2 when it comes to resident complaints with respect to IAQ.
- Ensure that all exhaust fans are working properly and as previously noted, ensure that they exhaust to the outside of the building

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Preventive Maintenance

- Timely preventive maintenance checks will help to improve many areas of your property's operations, including IAQ.
- IAQ issues are one of the most often complained about issues during a resident's time on a property.
- Failing to properly address them can cause not only ongoing problems for management with disgruntled residents, but it can also cause early lease terminations.
- When this happens, it can oftentimes cost thousands of dollars in additional turnover costs and staff time than if it was addressed when reported.

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The HVAC Preventive Maintenance Contract

- The Service Agreement must be property and equipment specific, not generic.
- May vary by services provided and by price – you need to know what you need before starting this process.
- Should list all HVAC components, including models and serial numbers for all components, as well as fuel and electrical sources.
- Must reference the manufacturer's warranty requirements and any specific requirements to maintain.

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The HVAC Preventive Maintenance Contract

- Should list all services and intervals of each visit: monthly, quarterly, semi-annual, or annually.
- Must list what is and isn't included in the base contract price.
- Should list any optional or recommended services and those costs.
- Should clearly list the duration of the contract term and any termination provisions.
- Never allow for cross-outs – always insist that any corrections be edited and sent again.

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What Your Checklist Should Include

General:

- ✓ Is the space being inspected comfortable?
- ✓ Check and document the temperature, humidity, air movement and if there are any visual deficiencies.
- ✓ Check air supply to ensure no malodors or stuffiness.
- ✓ Check all exhaust and returns including making sure that the grilles are clean and unobstructed.
- ✓ Check equipment for any unusual noises, vibrations, and/or cavitation.

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What Your Checklist Should Include

General:

- ✓ Check overall cleanliness – no excess dust, dirt, build-ups.
- ✓ Check for moisture sources and mold.
- ✓ Ensure system pressure is properly balanced.
- ✓ Check all windows, walls, and doors for possible air leaks or damage allowing for infiltration.
- ✓ Check all exterior door gaskets and replace damaged ones as needed.

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What Your Checklist Should Include

Exterior:

- ✓ Proper drainage is away from building. This includes roof downspouts.
- ✓ Are storm drains free from obstructions and debris.
- ✓ For any pad-mounted HVAC systems outside, ensure that the intakes are free from debris, mulch, leaves and other build-up.
- ✓ Are trash areas located far enough away from building doors, windows, and HVAC intake ducts.
- ✓ If your site has designated exterior smoking areas, are they far enough away so that no second-hand smoke travels into the building.

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What Your Checklist Should Include

Exterior:

- ✓ Check all window and door gaskets to ensure that no air infiltration can occur.
- ✓ Make sure that lawn irrigation sprinklers if used, do not hit building causing moisture which in turn can affect microbial and mold growth.
- ✓ Advise residents, guests and service providers that may be driving on your site not to let vehicles idle when picking-up or dropping-off passengers or delivering when doing so is near any exterior air intakes, doors and/or windows.

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What Your Checklist Should Include

Exterior:

- ✓ Check the roof area for any water ponding around equipment.
- ✓ Ensure that drains, scuppers, gutters and downspouts are open and free of debris and leaves.
- ✓ Ensure that plumbing stacks and exhaust ducts are properly vented away from any air intakes
- ✓ Check rooftop and makeup air units to ensure fans are all working as designed ensuring intakes are open, at least minimally

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What Your Checklist Should Include

Exterior:

- ✓ Make sure roof exhausts are all working properly.
- ✓ Check for additional possible air contaminants near the building including, but not limited to nearby chimneys, stacks, proximity of other properties to have their exhaust negatively impact you, i.e., restaurants, power plants, transfer stations, and recycling plants, gas stations etc., and your residents.
- ✓ Roof flashing and caulking are intact and not allowing water to enter the envelope.

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What Your Checklist Should Include

Interior:

- ✓ Ensure that trash rooms are clean, and trash removed daily if no chute access.
- ✓ Clean trash chutes (if applicable) no less than monthly to avoid odors and buildup.
- ✓ Ensure that interior carpets and floors are vacuumed and cleaned daily.
- ✓ Do not use air fresheners in common areas, except possibly in restrooms as their use can trigger chemical sensitivity issues with some residents and can become an IAQ issue.

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What Your Checklist Should Include

Interior:

- ✓ Check for mold and other moisture issues, especially in areas that are not used often where the problem can become exacerbated easily.
- ✓ Ensure interior door gaskets in common hallways are all intact with no cracks or breaks.
- ✓ Check for Radon and/or Lead Based Paint environmental issues. For radon, check active systems for operating fan.
- ✓ Ensure that all bathroom facilities, whether in-unit or in common areas have operating exhaust fans, this applies to kitchen exhausts as well.

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What Your Checklist Should Include

Interior:

- ✓ Check all mechanical areas to ensure they are clean, debris-free, and dry.
- ✓ Ensure that floor drains in basements or in mechanical spaces are clear and odor-free.
- ✓ Ensure that no standing water is present from equipment like boiler and hot water heater blowdown pipes, water storage expansion tanks, fire pumps, etc.
- ✓ Check for any pipes leaking, however minor and repair quickly, a small leak can become a catastrophe in short order.

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What Your Checklist Should Include

Interior:

- ✓ Check ceiling acoustical ceiling tiles for signs of leak damage as well as on walls, mold could be growing.
- ✓ Check stairwells to ensure that they are clean, dry, free from debris and odors.
- ✓ Ensure that any storage spaces in a building are odor-free, not musty, or show signs of moisture infiltration.
- ✓ Check cooling tower sump and make sure it is clean with no slime and algae, ensure that there are no leaks or overflows onto roof areas causing ponding.

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What Your Checklist Should Include

Interior:

- ✓ Check for mold in all mechanical areas – again, no matter how small it may seem, it should be properly addressed to remove it as soon as possible.
- ✓ Ensure that HVAC equipment and chimney flues are clear and unobstructed and gaskets are all tight as well as the fuel source with no leaks.
- ✓ If there are any windows in these mechanical areas, ensure that they can open and operate correctly.

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What Your Checklist Should Include

Ventilation Systems:

- ✓ Ensure that any HVAC systems and components are free from leaks.
- ✓ Ensure that all filters are clean and dry.
- ✓ Check for moisture, satins and /or water stains on HVAC units with no signs of mold or mildew.
- ✓ Ensure that condensate pans are free from buildup and slime and all drains are clear and working properly
- ✓ Check fan blades and make sure they are clean and free from dust and dirt buildup.

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What Your Checklist Should Include

Ventilation Systems:

- ✓ Check ductwork to make sure that heavy amounts of dust and dirt are not present.
- ✓ Ensure that all combustion equipment is properly vented and exhausted to outside.

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Additional Resources

- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) www.ashrae.org
- U.S. Centers for Disease Control and Prevention www.cdc.org
- Indoor Air Quality Association (IAQA) www.iaqa.org
- National Center for Healthy Housing (NCHH) www.nchh.org
- U.S. Dep't of Housing & Urban Development (HUD) www.hud.gov
- Your State and Local Department of Public Health
- Energy Star Education: https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/communicate-your-success/energy-star-communications-toolkit

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THANK YOU!

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