

## HVAC System Operations and Balance

Moisture problems can occur in commercial buildings when there is uncontrolled airflow. Common problems are due to imbalanced airflow that results in air loss to the outside.

Some common causes of negative pressure are insufficient return air supply, improper balance of ventilation and exhaust systems (combustion appliance venting, laboratory fume hoods, kitchen exhaust, etc.), and supply duct leaks. Relative humidity should be monitored in all areas of the building, as an indicator of problems. Check the HVAC system balance regularly to ensure appropriate pressures and airflow. Check HVAC response to thermostats, humidistats, and other control systems regularly.

## Plumbing Systems

Regular inspection of all key plumbing components can help avoid costly water damage and even more costly loss of building operations due to tenant down-time, temporary office relocations, or other resulting expenses.

Check key connections, especially at water main supply lines; key circulating pumps; rooftop water elements; janitors' closets and other areas such as sprinkler systems, which should be inspected, tested and maintained according to National Fire Protection Association standards. Pay close attention to all bathrooms and kitchens. Repair even the smallest leak immediately. Check all water supply pipes and primary system joints. Check all public bathroom and kitchen supply lines and drain systems. Replace leaking fittings or drains promptly. Check rooftop plumbing lines. Test basement flood control and sump systems monthly. Check floor drains in kitchens and bathrooms on a regular basis.

## Large Building Systems

Cooling towers in large buildings move enormous amounts of water. Appropriate drainage and basic plumbing systems are critical to performance and risk reduction. Fan belts, motors, and other basic system components should be appropriately inspected, lubricated and maintained. Check all rooftop systems monthly, especially all water distribution systems. Check all rooftop drainage elements monthly.

## Rapid Response to Water Damage Events

Water crises can occur even in the best-managed buildings. Emergency preparedness can mean rapid recovery from a failed cooling tower drain, a flooded basement, or soaked office carpets. Key elements of preparedness include knowing how to shut down water supply lines and making sure the controls work, knowing how to safely shut down electric and gas supply lines, access to appropriate tools, and telephone numbers for fire, police and emergency personnel. Contact information for water extraction companies and HVAC and plumbing specialists should also be readily available. Rapid response to a water crisis can be the key to quickly getting your building back to normal day-to-day operations.



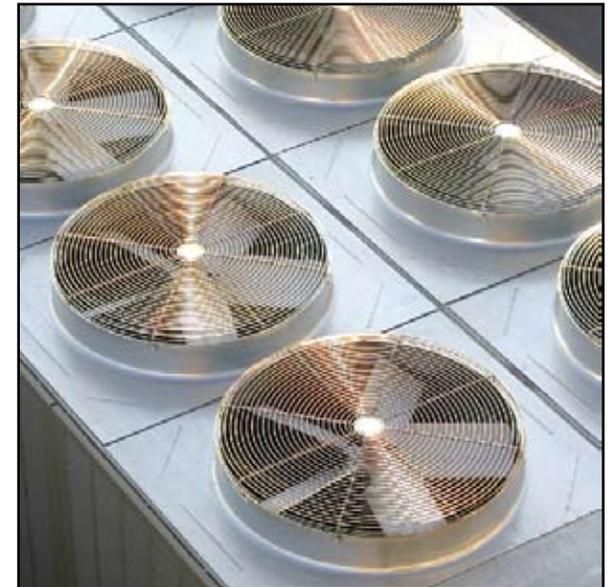
## Institute for Business & Home Safety

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# Water Damage Prevention for Commercial Buildings

## HVAC Systems



Proper operation and maintenance of the heating, ventilating and air conditioning (HVAC) system is essential to reducing the risk of water damage to a commercial building. And, while every building is unique and HVAC systems vary, this brief guide includes all of the basics you need to establish a solid Operations and Maintenance plan to help protect your building.

## Age of Systems and New Technology

Keep in mind that buildings and HVAC systems age at different rates. An aging HVAC system may not be able to meet the environmental needs of the building today.

Many of the new HVAC equipment technologies available today are vastly more energy efficient than those of just a few years ago. Changes to windows, space use, office equipment and other modifications can have a significant impact on the demands, efficiency and water management performance of HVAC systems.

A regular audit of HVAC equipment can help identify components that may need to be updated. How old is the water pump? Is the compressor on its last legs? Are all drains in good shape? Make a checklist that includes the known or estimated dates each key HVAC component was installed. Make an equipment inspection schedule, and a list of prioritized HVAC components to be replaced over time.

## Air Filters

Inspect air filters monthly, or as recommended in the Operations and Maintenance manual. If you don't know how to access the filters, refer to the manual for your specific unit. When dust and debris are present, replace the filter with an identical filter as recommended by the manufacturer. If the filter is reusable, be sure it is completely clean and dry before reinstalling. Depending on its size, the equipment may have multiple filters that should be inspected or replaced.

## Condensate Drains

Inspect all condensate drains and drain pans monthly, especially if your building must provide cooling most of the year. If dirt, algae, or other contaminants are found, the drain line should be flushed and the drain pan carefully cleaned. Inspect for signs of rust, which could indicate a water problem and need for prompt repair. If the line

drains to the outdoors, ensure that drainage travels away from the structure. If the condensate drain is located on the roof, check that the drain is not clogged. Rooftop drains should never drain directly onto the roof or over the side of the building.

## Air Coils

Follow the manufacturer's instructions to obtain access to the air coils. All air coils should be inspected annually, at minimum, to confirm that equipment is operating at maximum capacity. Coils should be cleaned of dust and debris by careful brushing or vacuuming, to avoid damaging the coil fins. Keep outdoor condensing units clean from grass clippings and other debris. Condenser units must remain level in order for water to drain properly.

## Ductwork

Fresh air supply ducts must be kept free of debris and, if necessary, filtered at the inlet. Any rust, condensation, or other signs of moisture on ductwork can be a sign of a serious water management problem. Inspect ductwork seasonally for cleanliness, insulation, and tight connections. Inspect filters and ductwork to ensure adequate fresh air supply. Make immediate repairs at the first sign of condensation or rust.

## Operations and Maintenance Manual

Regular check-ups of key building systems help keep operating costs low and protect against expensive catastrophic equipment failure.

One of the best ways to minimize a building's risk of water damage is to develop, maintain, and follow a systematic Operations and Maintenance plan. A simple checklist with suggested timing of monthly, seasonal, or annual events should include:

- A written preventive maintenance program, with operating manuals and specifications for each piece of equipment, including model and serial numbers.

- Required spare parts, equipment specifications, and a parts suppliers list.
- An equipment history record file, noting dates of installation and repair history.
- Air balancing reports and airflow specifications.
- 'As-built' blueprints and system operation plans for mechanical, electrical, and plumbing systems.

Many modern HVAC systems are complex and require the skills of a trained professional. If your on-site maintenance staff is not fully familiar with HVAC systems, hire a professional before you are faced with a system failure or water management crisis. Before you hire, however, be certain that the company has extensive experience with your type of HVAC system, and that their clients are happy with their work. Do not make a final hiring decision without proof of license, insurance, and a clean reputation with the Better Business Bureau.

## Heating Systems and Burners

Furnace burners should be inspected at the beginning of each heating season, and regularly throughout the heating months.

Visually inspect the flame, which should be blue with a light yellow tip. If the flame is not this color, or, if the heating unit does not ignite promptly, contact an experienced HVAC professional. Cracked heat exchangers can create health, safety and water management problems. If checking these items is beyond the skills of your maintenance staff, be sure your HVAC professional is experienced in combustion appliance operation and safety.

Regularly check combustion gas exhaust components (chimneys, vents and connective pipes) to ensure proper venting of combustion byproducts. Check the heat exchangers seasonally. Check for backflow of combustion gasses, carbon monoxide levels and other indicators of improper heating system performance.