

HEATING AND COOLING SYSTEM

Is the boiler inspected and serviced on a regular basis?

Each year, hundreds of accidents are reported nationally involving steam and hot water heat boilers in businesses, public buildings and other facilities. The majority of these incidents are attributed to malfunctioning low water cutoffs, operator error, poor maintenance and/or corrosion. Most boiler problems don't occur suddenly, they develop slowly over a long period of time. Properly functioning control or safety devices are absolutely essential for any boiler. The only way you can be confident they will work is to regularly perform ongoing maintenance and inspections.

Recommendation(s):

The following safety items should be verified concerning the safe operation of boilers:

- A current inspection certificate must be present. All boilers within commercial establishments and public buildings of assembly must be inspected annually by a qualified inspector. The current certificate should be posted in the boiler room. This documents that the boiler is in compliance.
- All boilers that are required to have operating certificates must have a manufacturer's nameplate attached. The nameplate must have the appropriate ASME code symbol, the allowable working pressure, date of manufacture, and the minimum relief valve capacity.
- A remote emergency shutdown switch that can be manually activated should be marked for easy identification and installed just outside of the boiler room door. The switch should be protected to prevent tampering.
- There should be no signs of overheating, corrosion or erosion within the boiler.
- Every steam and hot water heating boiler must have at least one safety or safety relief valve. The safety valve is designed to relieve all the pressure that can be generated within the boiler. The safety or safety relief valve must be set to open at or below the maximum allowable working pressure established by the manufacturer. The maximum allowable working pressure is listed on the required boiler nameplate. If water and scale buildup on the floor around the boiler is found, this indicates that the relief valve has been leaking for some time and should be repaired or replaced immediately.
- There should be no signs of leaks from any part of the boiler or external piping to the boiler.
- All gauges and meters should be operational.

- The boiler room should be kept clean and clear of all unnecessary items. The boiler room should not be used as a storage area. The burner requires proper air circulation in order to prevent incomplete fuel combustion.
- Boiler operating log sheets should be kept along with maintenance records. Manufacturer's recommendations to establish a preventive maintenance schedule based on operating conditions, past maintenance, and repair should be followed. Boiler logs are the best method to assure a boiler is receiving the required attention and providing a continuous record of the boiler's operation, maintenance and testing. Maintenance and testing should be performed and recorded in the log on a regularly scheduled basis. A responsible individual should initial the log to verify that each operation was performed, who performed it, and when it was done.
- Proper start-up and shut-down procedures should be established for the boiler(s) according to manufacturer's recommendations. Before start-up, ensure that the boiler room is free of all potentially hazardous conditions such as flammable liquids or combustible materials.
- Water level control and low water fuel cutoff devices must be installed and tested. Switches should not be bypassed. It is not unusual for a maintenance worker to remove the cover and install a "jumper" wire to prevent the switch from operating. This starts out as a temporary convenience, often to fix a boiler that keeps shutting off on low water while being operated at high demand, or as a temporary means to test other circuits in the control system. This bypass can easily become a permanent and dangerous condition. A boiler that regularly shuts down may have a very serious problem that could lead to a catastrophic accident. A jumper wire should never be permanently installed in a low water device.
- Cleaning and maintenance of the water gage glass, or sight glass should be completed regularly. The water gage glass on a steam boiler enables the operator to visually observe and verify the actual water level in the boiler. If not properly cleaned and maintained, a gage glass can seem to show there is sufficient water when the boiler is actually operating in a low water condition.

Tasks:

1. Boiler maintenance

Hire a qualified boiler service technician to inspect and service the boiler on an annual basis.

Are all combustibles stored at a minimum distance of 36 inches away from the boiler?

As building space becomes limited, boiler rooms are often utilized to store various combustible or even flammable items. Due to the increased fire hazard, boiler rooms should never be used as storage facilities. If the boiler is not located in its own individual room, all combustible materials should be kept a minimum distance of 36 inches away from the boiler.

Recommendation(s):

- If combustible materials are being stored in the boiler room, they should be removed and permanently relocated to prevent a potential fire. If the storage of these items is necessary, a minimum clearance of 36 inches from the boiler and other mechanical equipment should be maintained.

Tasks:

1. Boiler clearance

Remove any combustible items that are being stored within 36 inches of the boiler and instruct all employees and/or volunteers not to place any combustible items within 36 inches of the boiler.

2. Boiler room housekeeping

Conduct regular periodic inspections of the boiler room on a regular periodic basis to ensure this clearance is being maintained and housekeeping is adequate.

Is the heating, ventilation and air conditioning systems serviced on an annual basis?

A little maintenance goes a long way toward keeping your forced-air equipment working properly. Always follow manufacturer instructions for recommended professional maintenance.

Recommendation(s):

- The first step in maintaining your furnace is to replace the filters a minimum of every three months. When filters become clogged with debris, they cut down on a furnace's efficiency and, over time, can cause parts to wear out faster.
- When changing the filters, a visual inspection should also be conducted. During the visual inspection, check the surrounding area for discoloration, soot, or disconnected vents. If any of these conditions exist, contact a qualified service company immediately.
- A qualified heating and cooling contractor should be hired to service the heating and cooling system on an annual basis.

Tasks:

1. Furnace inspection and servicing

Set up a preventative maintenance program for the heating and cooling system, including hiring a qualified heating and cooling technician to inspect and service the heating and cooling system on an annual basis.

2. Furnace filter maintenance

Have a designated employee and/or volunteer monitor the furnace filters and replace them at a minimum of every three months.

Are adequate clearances maintained between heating units and combustible materials?

Combustible stock needs to be stored no closer than three feet from heating units or vent pipes, or the combustible stock can become ignited.

Recommendation(s):

- Combustible materials needs to be stored no closer than three feet from heating units, vent pipes, or other mechanical equipment. Otherwise, the combustible stock can be ignited.
- If combustible materials have to be stored within the building, the best way to prevent a fire is by permanently relocating the material to closet or storage room free of equipment.

Tasks:

1. Furnace clearance

Remove any combustible items that are being stored within 36 inches of the heating and cooling units and instruct all employees and/or volunteers to not place any combustible items within 36 inches of the heating and cooling units.

2. Furnace room housekeeping

Inspect the furnace room on a regular periodic basis to ensure this clearance is being maintained and housekeeping is adequate.

Are wood burning stove(s) utilized?

Every year there are many unexpected fires, property damage claims and personal injuries associated with wood burning stove use. Most problems occur due to carelessness, poor maintenance and lack of inspections.

Recommendation(s)

The following safety information will help reduce possible hazards associated with wood burning stoves:

- The stove should be a manufactured unit with a UL listing and professionally installed.
- Adequate air space clearances and circulation around the stove should be provided, as listed on the label.
- Stoves that do not have clearances listed on the label should not be installed within 36 inches of unprotected surfaces (this is necessary to make sure that heat radiating from the stove or chimney will not ignite adjacent combustible materials, prevent sparks from escaping into the building and prevent sparks from escaping from the chimney).
- The stove should sit on a non-combustible hearth which extends at least 18 inches out from the stove in all directions.
- The connecting stove pipe should not pass through floors, closets, concealed spaces or enter the chimney in the attic.
- The connecting stove pipe should have an 18 inch clearance from unprotected combustible materials.
- The chimney should be approved for use and include one of the following types:
 - Masonry with approved liner;
 - Listed metal insulated all fuel;
 - Listed metal triple wall all fuel;
 - Listed pre-fabricated all fuel.
- The chimney should have a two inch clearance from all combustibles, such as joists, rafters and wall panels.
- Dry wood should not be stored near or under the stove.
- Ashes should be emptied into a metal container with a tight fitting lid.
- A 10 pound ABC dry chemical fire extinguisher should be readily available.

Tasks:

1. Wood burning stove maintenance

Inspect the building's wood stove and place on a routine maintenance program.

Are all hot water heater(s) annually inspected?

Most of us don't think about our water heater as long as we get hot water when we need it. But, inspections can often find significant safety problems with gas-fired water heaters. An improperly installed water heater can spill toxic fumes, start a fire, or leak, causing extensive water damage.

Recommendation(s):

The following safety precautions should be followed for hot water heaters:

- All hot water heaters should be installed according to the manufacturer's guidelines.
- If the device is in a garage or shop area where there is a potential for flammable vapors, raise it so the pilot light is 18 in. above the floor. This can help prevent ignition of gasoline vapors that collect near the floor.
- The hot water heater should be flushed through the drain valve at least annually. This will remove any sediment accumulations.
- The temperature/pressure relief valve should be tested annually to ensure proper working condition. This valve protects the heater from over pressurizing and from exceeding 210 degrees Fahrenheit. The drain line for this should be installed down and out. If the line is installed uphill or through too many twists and turns on its way out, the venting may not be sufficient and the tank may explode in an emergency. Furthermore, if it opens once and water pools within the line, it will corrode the valve and prevent it from working.
- A 36 inch clearance from all combustible materials should be maintained around the hot water heater.
- Gas hot water heaters must be properly vented to prevent the accumulation of carbon monoxide. This can occur when a chimney or flue becomes blocked or damaged and prevents combustion gases from being exhausted from the building.
- Any leaks should be immediately fixed to prevent any possible water damage from occurring to the building.

Tasks:

1. Hot water heater inspection

Annually inspect the building's hot water heater(s) and place on a routine maintenance program.

Is the temperature for the hot water heater set below 120° F?

Each year, approximately 3,800 injuries and 34 deaths occur in the home due to scalding from excessively hot tap water. The majority of these accidents involve the elderly and children under the age of five. The U.S. Consumer Product Safety Commission (CPSC) urges all users to lower their water heaters to 120 degrees Fahrenheit. In addition to preventing accidents, this decrease in temperature will conserve energy and save money.

Most adults will suffer third-degree burns if exposed to 150 degree water for two seconds. Burns will also occur with a six-second exposure to 140 degree water or with a thirty second exposure to 130 degree water. Even if the temperature is 120 degrees, a five minute exposure could result in third-degree burns.

Recommendation(s):

Keep the thermostat on your church's hot water heater set to produce a water temperature less than 120 degrees Fahrenheit. Hot water over the temperature of 120 degrees Fahrenheit greatly increases the risk of causing a burn that may require medical attention. All hot water heaters thermostats should be set at a maximum temperature of 120 degrees Fahrenheit.

Tasks:

1. Hot water temperature

Test the building's water temperatures on a regular basis to determine if the hot water temperature is over 120 degrees Fahrenheit and adjust accordingly to maintain a water temperature below 120 degrees Fahrenheit.