



## A Boiler or Water Heater Can Be Lethal

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**fact:**

Since 1990, there have been more than 30,000 boiler and pressure vessel accidents in the United States.

**fact:**

Cast-iron boilers can fracture into many small and/or large pieces in an accident, sending the "shrapnel" in all directions.

**fact:**

When water expands into steam, it has an expansion rate of approximately 1,600 times its original volume.

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# Boiler and Water Heater Safety



## What Emergency Personnel Should Know



# Causes of Water Heater or Boiler Failure

A recent survey identified the following leading causes of accidents:

1. Failure of the fuel-cutoff system when the water level inside the unit becomes too low for proper operation.
2. Operator error, poor maintenance, or improper maintenance.
3. Failure of any primary safety controls including the safety relief valve (which should relieve excess pressure or excessively high temperature of the water supply inside the tank when either condition rises above a safe operating level).
4. The addition of cold water to an extremely overheated water heater or boiler.



# If There Is an Accident, Call the Jurisdictional Official

1. Firefighters may very well be the first on the scene.
2. Deal with immediate emergencies first.
3. Prevent further injury.
4. Secure the area by not letting anyone or anything near the accident center.
5. Prevent any disruption of the damage until the local boiler inspector can investigate the accident scene.

## For more information, contact:

The National Board of Boiler and Pressure Vessel Inspectors  
1055 Crupper Avenue, Columbus, OH 43229-1183  
PHONE: 614.888.8320 FAX: 614.888.0750  
WEB SITE: [nationalboard.org](http://nationalboard.org)

# Safety Means Caution

An overheating water heater can quickly be identified by steam or a mixture of steam and water being discharged at the safety relief valve or from an open hot water faucet. If this condition is found at a faucet, close the faucet. In both cases, immediately shut down the water heater's source of heat. Allow the water heater to cool naturally without the addition of excess cold water.

An overheating boiler may exhibit the following conditions:

1. A discharging safety relief valve.
2. Pressure and/or temperature readings above the maximum allowed for the boiler.
3. Low or no water in boilers equipped with water-level gage glasses.
4. Scorched or burning paint on the skin casing.

When a water heater or boiler is overheating, the only safe intervention is to:

Remove the heat source by stopping the supply of fuel and air.

1. Do not try to relieve the pressure.
2. Do not add cool water the vessel.
3. Do not try to cool any part of the vessel with water.

Let the vessel cool down naturally. Get away from the vessel. Call a qualified repair company and notify the jurisdictional authority.

# Prevention Through Inspections

Most jurisdictions require regular inspections of boilers and pressure vessels in other than residential settings. However, people do not always comply with these regulations.

Typically, insurance companies require regular boiler or pressure vessel inspections before insuring or continuing policies on these units. A certificate indicates that a unit has passed inspection.

When actual or potential problems arise, call the jurisdictional official (a list is provided on the back of this brochure).

Note the unit identification number on the certificate. This will be needed by the jurisdictional official for locating and identifying the unit.

# Safety Checklist\*

1. **Exterior shell and/or insulation.** Look for indications of overheating.
2. **Leaks.** Look for water on the floor. Check for water or steam escaping from any part of a pressurized system including the boiler, valves, or piping.
3. **Flue gas leaks.** Look for black dust (soot) around sheet-metal joints. Check any part of boiler enclosure and breaching, especially in the connection to the stack.
4. **Controls.** Look for open panels, covers, and signs of rewiring on floor or bottom of panels. Check for jumper wires and locked shutoffs.
5. **Electrical.** Ensure that covers are installed on over-limit switches, temperature sensors, and controls.
6. **Safety valves.** Ensure that a safety valve is installed with full-sized discharge piping properly supported and directed to a point of safe discharge. Safety valve set pressure must be equal to or less than boiler maximum allowable working pressure. Safety valve relieving capacity must be equal to or greater than boiler output.
7. **Fuel sources.** Check for the ability to shut off the fuel source to the vessel.
8. **Gages.** Make sure temperature and pressure gages are operational and are located for proper monitoring.
9. **Proper piping.** Check for proper supports and allowance for expansion and contraction.
10. **Operating certificate.** Observe certificate, noting last date of inspection and expiration date when required.

Whenever you spot a potential problem, call a National Board-qualified repair organization. Note the inspection certificate number and the jurisdictional number assigned to the boiler or pressure vessel. If there is ever a problem or question related to this unit, those numbers will be needed by your jurisdiction's chief boiler inspector for identification purposes.

\*Information provided by The National Board of Boiler and Pressure Vessel Inspectors and The Ohio Department of Industrial Relations, Division of Steam Engineers.