PLEASE HANG THIS CARD NEAR THE BOILER

OPERATING INSTRUCTIONS for WEIL-McLAIN GAS BOILER

PCG/CG

Mr. Boiler Owner:

Below, the procedure is outlined for starting your Weil-McLain Boiler including instructions for the care of your heating system.

All mechanical equipment needs occasional attention. The boiler should be inspected, cleaned and if necessary, adjusted once a year. We recommend that your serviceman be called as he has been trained for the job and will have the necessary instruments to check your boiler. This will assure you that the operation of your heating system will remain highly efficient. Your Weil-McLain boiler will give you a lifetime of heating comfort, if you follow the few simple suggestions listed on this card.

FILLING STEAM AND WATER BOILERS

Do not fill the boiler (except for leakage tests) until the boiler is ready to be fired. **CAUTION: Do not add large quantities of cold feed water to any hot boiler!**

Steam Systems: The boiler should be filled to the normal water line and fired for about 15 minutes at a low rate sufficient to keep the boiler at steaming temperature with the steam vented to drive off dissolved gases (also see Skimming Steam Boilers).

Water Systems: The boiler and the entire system should be filled to about 12 pounds per square inch and heated to approximately 210°F for about 15 minutes to drive off dissolved gases. Before filling the system, make sure all the system air vents are closed. Open the hand water feed valve and beginning on the lower floor, open the air vents (one at a time) until water starts to flow; then, close the vent. Repeat this throughout the building until all heat distributing units are filled with water. Close the hand water feed valve when the correct boiler pressure is reached. After the system is in operation, keep the system filled with water by occasionally opening the air vents allowing any entrapped air to escape and adding enough make up water to maintain the correct system pressure. If your system is provided with a purge valve located in the system return piping, connect a garden hose to the drain valve located above the purge valve. Close the purge valve and open the hand water feed valve and allow the system to purge all air. Where the system has more than one circuit, purge each circuit separately by opening each balancing valve one at a time. When the system is purged of all air, close the drain cock located above the purge valve and open the purge valve. Fill the boiler and the entire system to the correct pressure. **Air in the system can interfere with circulation of water and prevent the heat distributing units from properly heating.**

TO START THE BOILER

1. Be sure the main Electric Switch is turned off.
2. CAUTION: Make sure that both the manual main shutoff valve and the pilot valve have been closed for at least five minutes before lighting the safety pilot burner.
3. Remove the jacket door and/or access panel.
4. Follow the "Starting up Boiler Instructions" on the operating instruction plate which is mounted on the Jacket Panel, located next to the Gas Control Assembly.

IF BOILER FAILS TO START, CHECK THE FOLLOWING

1. Check for loose connections and blown fuses.
2. Thermostat setting is above room temperature.
3. Gas is turned on at meter.
4. Be sure pilot is burning.
5. Manual main shut-off valve is fully open.
6. Make sure the safety pilot switch is on; see operating instruction plate.
7. If the above checks do not eliminate the trouble, call in your serviceman.

ADJUSTING THE BURNERS

Adjust the primary air to give a primary cone so that the points of the cone are between ¼ and ½ inch above the face of the Burner. At this point the flame should be light blue in color. If the flame has a yellow tip, open the Primary Air Shutter until the correct flame is secured. For manufactured gas, the shutter should be about one-quarter open. For natural gas and liquefied petroleum gas, the shutter should be approximately three-quarters open. If the flame is too hard, close the air shutter until proper flame is secured. Measure the gas input to the boiler by reading the meter. Be sure all other appliances connected to the same meter are shut off. Rate of gas flow (cu. ft. per hour) multiplied by the BTU value of the gas should check with the BTU input shown on the name plate of the boiler. If it is within 5%, adjust Pressure Regulator to obtain the desired flow (stem for adjustment is under the cap in top of the regulator). TURN CLOCK-WISE TO INCREASE AND COUNTER-CLOCK-WISE TO DECREASE THE RATE. If rate is more than 5% off of rated input, change orifice sizes. Check the Burners again and readjust the flames if necessary.

NOTE: For proper aspiration, the Manifold Gas Pressure should be at least 2½ inches of water column for manufactured gas, 3½ inches for natural and 11 inches for propane or LP-Air gases.

SKIMMING STEAM BOILERS

All new boilers and steam and water piping contain oil, grease, chips, and other foreign matter. It is essential to clean new heating systems to remove these materials in order to avoid overheating of boiler metal, foaming and priming, and high maintenance costs on strainers, traps, and vents. The boiler installer should use the following procedure to clean oil, grease, and other impurities from the new boiler:

1. Close the valve in the building steam supply main(s).
2. Provide a 1¼" to 2½" skim line, with valve, from the boiler skim tapping and run this line to a convenient floor drain.
3. Fire the boiler at a low rate sufficient to keep the boiler at steaming temperature allowing the steam, along with entrained water and impurities, to discharge through the skim piping to the drain.
4. Feed the water to the boiler as required to maintain proper water level in the gauge glass. It may be necessary to cycle the burners to prevent a rise in steam pressure above several pounds.
5. Continue the boiling and skimming process for at least two hours or until the water leaving the skim line is clear of all grease, oil and impurities. On unusual jobs, the skimming procedure may require repeating one or more times. CAUTION – THE USE OF CHEMICAL CLEANERS IS NOT RECOMMENDED!
6. Drain boiler and, while boiler is warm but NOT HOT, remove safety valve and insert a hose nozzle into the opening. Flush all interior surfaces of the boiler with water under full pressure until all traces of dirt and impurities are removed and the drain water runs clear.
7. Replace safety valve; close drain cock; fill with fresh water to the water-line. Start burners and steam for 15 minutes to remove all dissolved gases; stop burners.
8. Drain boiler sufficiently to remove skim piping; plug skim tapping; refill boiler to waterline.
9. To prevent the return of impurities to the boiler from new or old piping systems, waste all condensate for several days or until no impurities are contained in the condensate. NOTE – IT IS IMPERATIVE THAT FEEDWATER BE SUPPLIED TO MAINTAIN THE CORRECT WATER LEVEL AND THAT A LOW WATER CUTOFF IS OPERATIVE!

BOILER SERVICE AND MAINTENANCE

Leaks in the boiler and piping system must be repaired at once. The use of makeup water in large quantities is undesirable and may damage the boiler after an extended period of time. If serious leaks occur, stop the burners and gradually reduce boiler pressure or temperature. Do not attempt to make repairs while a steam boiler has pressure or hot water boiler temperatures are above 130°F.

Foaming or priming may occur in a steam boiler and cause large quantities of water to pass out into the steam main(s). It can be observed by violent fluctuations of water level, in the gauge glass. This trouble may be caused by dirt, oil, or precipitates in the boiler water, too high a boiler water level, a high overload on the boiler (ie, the sudden release of boiler steam pressure into the mains by action of fast operating valves), or the addition of too much boiler water treatment. With serious foaming or priming, stop the burners and decrease boiler load. Then alternately blowdown and slowly feed fresh water several times. If trouble persists, it may be necessary to skim the boiler one or more additional times.

Any problem in regard to large amounts of makeup water, extreme foaming or priming, scale in the boiler, or internal corrosion or pitting, should be referred to a company specializing in boiler water chemistry. DO NOT try "homemade cures" or boiler "patent medicines" on the market under various trade names, as serious damage to the boiler, personnel, and property may result.

Frequently check the boiler water level in the gauge glass of steam boilers, and check the boiler operating pressure of steam or water boilers. Test the low water cutoff by opening its blowdown valve to remove dirt, rust, and sediment, and observe that burners stop as the water level approaches the bottom of the water gauge glass (gauge glass on steam boilers only).

On steam boilers, open the water gauge glass blowdown valve and blow clear; close blowdown valve. If water gauge glass leaks or breaks, close both gauge glass cocks and repair; open gauge cocks after repairing.

Periodically test boiler safety or relief valve(s) to make sure they open at the proper pressure. Make sure that the valve reseats and does not leak. Replace any defective or leaking valve.

Periodically check and if necessary, clean the boiler flues. The frequency of cleaning will depend upon the fuel used, the flame adjustments, boiler temperature, draft conditions, and other job factors. Protect the burners and controls from dust and dirt during cleaning.

DO NOT DRAIN BOILER during periods of shutdown unless heating system is exposed to freezing temperatures. On steam boilers, open boiler blowdown valve and flush till clear while under steam pressure. On water boilers, open boiler drain cock to remove impurities that have settled to the bottom of the boiler. Refill as required to the correct water line for steam boilers or the correct pressure for water boilers. Turn off all electrical power connections to the boiler and its auxiliaries. Clean all carbon, rust, and other deposits from the fire-side of the boiler heating surfaces in order to protect the boiler from the corrosive action of combustion deposits (see Cleaning Boiler Heating Surfaces). Apply a thin coating of oil or grease if the boiler is to remain out of service for extended periods of time. If the water side of the boiler must be cleaned or inspected, open the blowdown valve and drain the boiler.

Remove plugs from the boiler and open the drain cock. Hose the inside of the boiler with high pressure water to remove sludge and sediment, flush again. Dry insides of boiler thoroughly, or refill with fresh water and heat to release dissolved gases (see Filing Steam and Water Boilers). Repeated draining and filling of the boiler and/or the heating system can lead to the same consequences as adding too much makeup water – this is mainly true where the makeup water is "hard" and the same precautions must be used as indicated in the second paragraph above.

SHUT DOWN OF BOILER

1. Turn off main electric switch.
2. Close main shut-off valve.
3. Close pilot valve.
4. Open the boiler drain cock to remove impurities that may have settled to the bottom of the boiler; it may be necessary to drain one or two gallons of water until all traces of sediment are gone. Refill the boiler to the proper water level or pressure (See Filling Heating System). Boiler water does not have to be crystal clear for proper operation, but should be free of any sludge or sediment.
5. During severe winter weather have heating system operation checked periodically or thoroughly drain your heating and plumbing systems.

CLEANING THE BURNERS

Depending upon the type of gas, the boiler may be provided with ribbon type or drill port type burners and the burners should be cleaned at least once a year. To clean the burners, attach a piece of metal tubing to the hose end of a hand air pump (or tire pump). Bend one end of the tubing to form a 90 degree angle and blow air through the ports at the top of each burner head. If the burners can not be properly cleaned in this manner, clean the burners according to the procedure outlined below.

CLEANING DRILL PORT BURNERS:

1. Remove the drawer assembly (for boilers with removable drawer assemblies only).
2. Remove the burners.
3. Use a pipe cleaner or a drill (slightly smaller than the openings at the top of the burners) and clean each opening. CAUTION; do not use a file or other objects which could enlarge the drilled openings.
4. Remove any foreign particles collected in the burner mixer tubes.

CLEANING RIBBON TYPE BURNERS:

1. Remove the drawer assembly (for boilers with removable drawer assemblies only).
2. Remove the burners.
3. Remove the retainers that hold the ribbon assemblies in place.
4. Insert the edge of a screwdriver at the base of the ribbon assembly at one end of the burner head then pry out the ribbon assembly.
5. The ribbon assembly can be "fanned" out and cleaned. Do not remove the stainless steel rivet which holds the ribbons in correct assembly.
6. Cleanout the burner head casting, including the carry over slots that cross the center of each burner and the burner mixer tubes.
7. Replace the ribbon assemblies in the burner heads.
8. Replace the ribbon retainers.

CLEANING BOILER HEATING (fire-side) SURFACES

At the end of every heating season, it is advisable to clean the flues in the boiler. Soot is an effective insulator and prevents the hot gases from heating the water as efficiently as possible. Normally this boiler will be cleaned from the top as described below.

1. Remove the top jacket panel of the boiler.
2. Remove the cleanout opening cover or the flue opening cover at the top of the boiler sections.
3. Remove the burners, if not already removed for cleaning, to avoid brushing soot and dirt into the ribbon assembly during Step 4.
4. Insert wire flue brush vertically through openings between sections and scrub all flue surfaces vigorously. (Flue brush provided with boiler.)
5. Replace the clean burners.
6. Replace the cleanout opening cover or the flue opening cover making sure the original gas-tight seal is maintained between the cover and the boiler sections.
7. Replace jacket top panel.

WATER BOILER CONTROLS

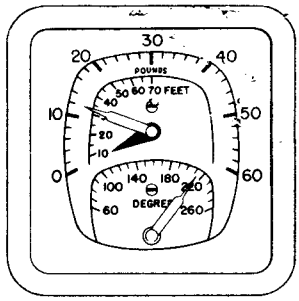
CIRCULATOR CARE:
Never operate the circulator without water.

A. Follow lubricating instructions on circulators that are provided with oil cups or oil holes.
B. Follow venting instructions on circulators with water lubricated bearings which require no oil.

BOILER PRESSURE: The initial fill pressure of a hot water system is generally to 12 pounds per square inch. When the system is heated to the limit control setting, the pressure may range up to 30 pounds per square inch. Normal system pressure will fluctuate between the fill pressure, when the system is cold; and up to 20 to 28 pounds per square inch when the system is hot.

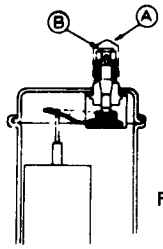
BOILER WATER TEMPERATURE: Modern hot water heating systems with "closed" type expansion tanks may operate at water temperatures up to 250° F. Set the high limit control at 220° F; during severe weather you may find this temperature setting needs to be raised or lowered, depending upon the characteristics of your heating system.

PRESSURE–TEMPERATURE–ALTITUDE GAUGE: This gauge indicates the boiler pressure in pounds-per-square-inch and in feet of water column (altitude) above the boiler by the moveable hand. The fixed hand may be changed to indicate the proper position for the moveable hand on manually filled hot water heating systems. For those systems with automatic fill valves, the fixed hand is usually left at the zero setting. The third hand indicates the boiler water temperature in degrees fahrenheit.



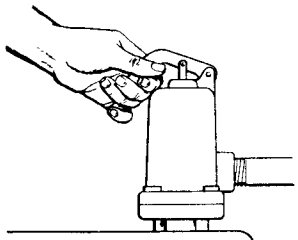
Combination Pressure-Temperature-Altitude Gauge

FLOAT TYPE AIR VENT: If your system is provided with a Float Type Air Vent(s) which automatically expells air from the heating system, when the system is filled with water, loosen cap Ⓐ slowly so that particles of dirt or scale are not deposited on the valve seat by the escaping air. Should dirt or scale lodge on the valve seat causing it to leak, remove cap and push the valve core Ⓑ in by hand to permit water to flush the valve seat clean. Release the valve core quickly and replace cap. For normal operation and venting, unscrew the cap at least two turns.



Float Type Air Vent

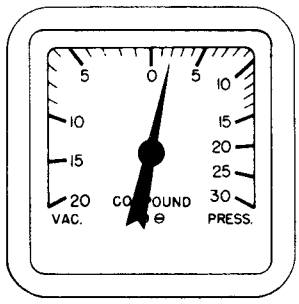
WATER RELIEF VALVE: Check the relief valve at least once a year by pulling the handle and allowing a small quantity of water to flow. Be sure the relief valve reseats properly and is entirely free from seepage. If the relief valve sticks or appears to be clogged, it should be repaired or replaced immediately.


Manually opening Pressure Relief Valve.

STEAM BOILER CONTROLS

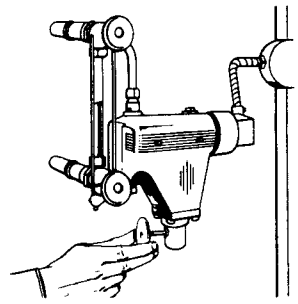
BOILER PRESSURE. Steam boiler pressures may range up to 15 psig maximum, but in normal residential service usually will not exceed 5 psig and may even operate under vacuum conditions at certain times.

The compound gauge used for steam boilers indicates steam pressure in pounds per square inch (psig) and boiler vacuum in inches of mercury (hg).



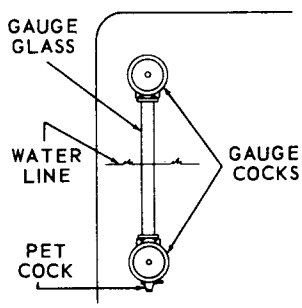
Pressure Gauge.

CLEANING LOW WATER CUT-OFF. Accumulated sediment in the low water cut-off should be flushed out through a blow-off valve provided for this purpose at least once each month of heating system operation. If the low water cut-off is internally mounted in the boiler, it is not possible to flush the unit by external means. It may be necessary to have it removed periodically from the boiler and cleaned by your serviceman.


Flushing Low Water Cut-off.

CLEANING THE GAUGE GLASS. This may be done by closing the lower gauge glass cock and carefully opening the petcock below the glass to blow water and sediment out of the gauge glass by steam pressure. Then slowly open the lower gauge glass cock, allowing a small amount of water to flush out through the open petcock. Close petcock and fully open the lower gauge cock. The water level should immediately rise to its proper level. If gauge glass breaks, close off both gauge cocks and loosen glass retaining nuts to remove gauge glass. Replace broken gauge glass with new gauge glass made of heavy walled pyrex. DO NOT USE THIN GLASS TUBING!

CHECKING THE SAFETY VALVE. The safety valve should open at 15 psig to prevent excessive boiler pressure. Manually open the safety valve once each year by pulling the valve lever or handle and allowing a small amount of steam to escape. This will help to assure proper operation of the safety valve if boiler pressures reach 15 psig. Be sure that the valve reseats properly and does not leak steam. If the safety valve sticks or appears to be clogged it should be repaired or replaced immediately by your serviceman.



Gauge glass.