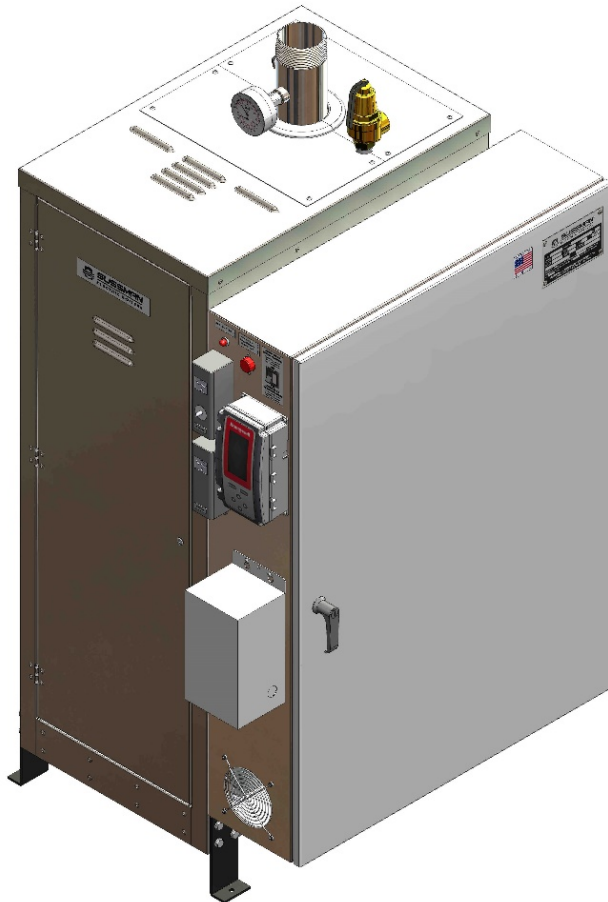




Series EW Hot Water Boiler

Installation, Operation, Maintenance Manual & Spare Parts List



Model No. _
Boiler Serial No. _
National Board No. _
Safety Valve Set PSIG
Pressure _ Power
Circuit Voltage _
Control Circuit Voltage _

Amps Phase _ HZ _

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IMPORTANT NOTE:

As you follow these instructions, you will notice warning and caution symbols. This blocked information is important for the safe and efficient installation and operation of electric boilers. These are two types of potential hazards that may occur during this installation and operation:

WARNING

states a hazard which may cause serious injury or death if precautions are not followed.

CAUTION

signals a situation where minor injury or product damage may occur if you do not follow instructions.

IMPORTANT NOTE:

This highlights information that is especially relevant to a problem-free installation.



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Rev I 9/19

1. Scope

This manual details the installation, operation and maintenance instructions, and spare parts list for Sussman Series **EW** Hot Water Boilers.

Sussman hot water boilers are designed and manufactured to meet A.S.M.E. and code regulations. When properly operated and maintained, you can expect years of trouble free service.

Carefully follow the instructions outlined in this manual to ensure proper installation and performance of your boiler.

2. Operating Principles and Specifications

Sussman electric hot water boilers provide safe, versatile, easy to use heat sources for low or high pressure hot water in industrial, commercial, or space heating applications.

Electric boiler operation:

1. A steel vessel is fitted with tubular resistance type heating elements, inlet and outlet connections, a drain-valve, a water level control, a pressure relief valve, and a temperature control. These devices are configured with a series of electrical controls for automatic operation.

2. When the boiler is switched on, an electronic level sensor first detects if a low water level condition exists.

If the sensor detects a low water level condition, the heaters will not energize until water is introduced through the piping system.

If a low water level condition does not exist, the sensor will activate the elements and immediately begin to heat the water.

3. In forced recirculating systems, the necessary flow through the boiler is maintained by a circulation pump (by others).

For most calculation purposes, pressure drop through the boiler can be assumed to be the equivalent of 10 ft. of standard inlet piping size

Flow through the boiler enters at the inlet (bottom of the boiler) and exits through the outlet (top of the boiler).

4. The boiler is controlled by sensing water temperature.

An adjustable temperature controller will switch off the heaters when the set temperature is reached. The temperature controller is backed up by a high limit temperature controller.

In the event that the boiler temperature overshoots the high limit set point, the controller will trip and de-energize all the heating circuits.

The high limit temperature controller must then be manually reset before the heaters will come back on.

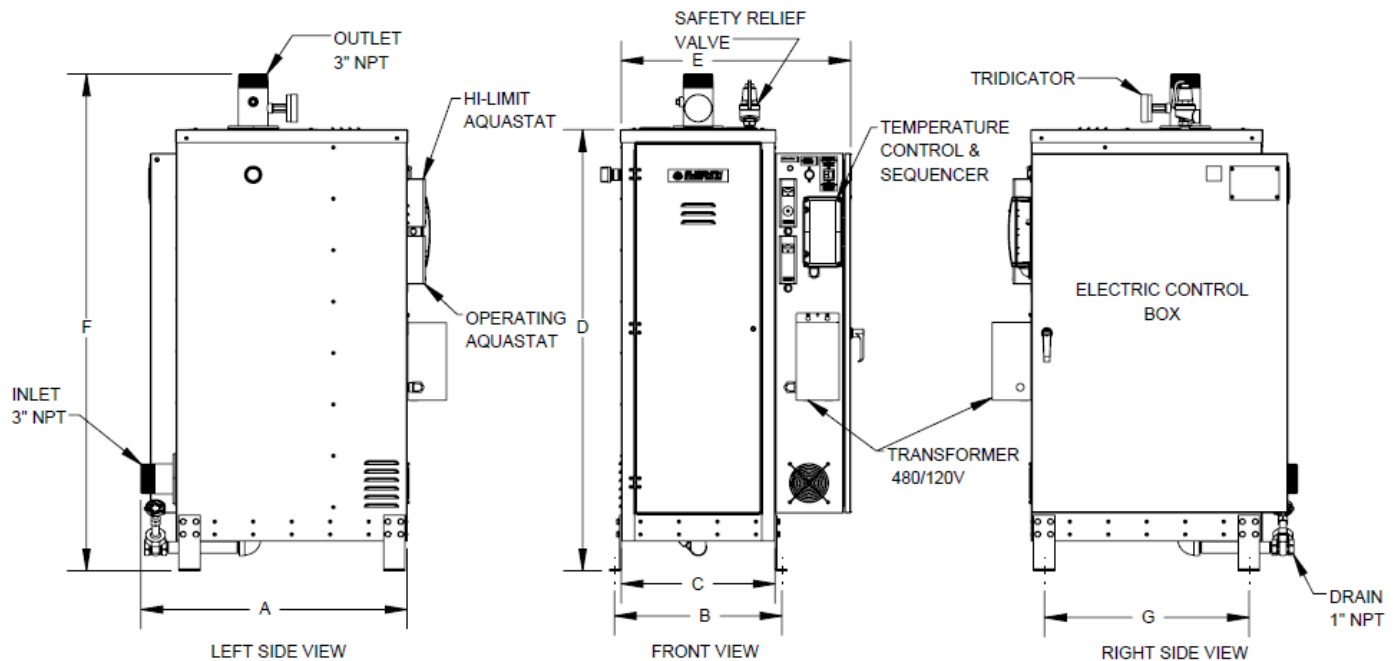
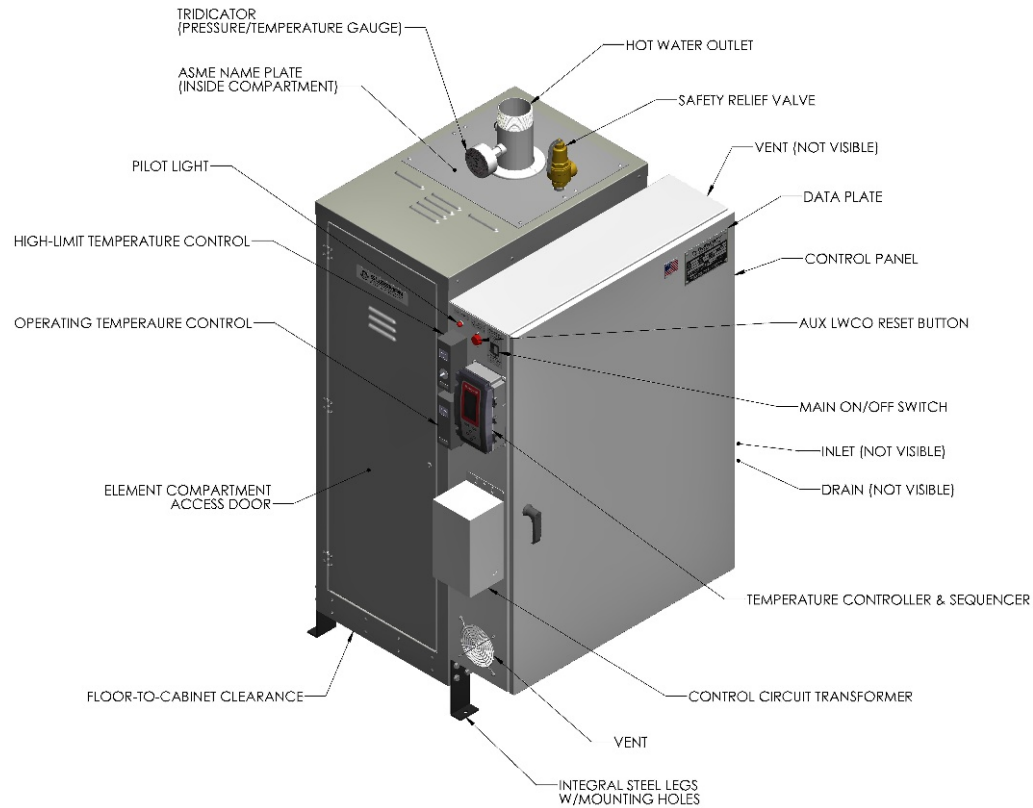
Note: Cycling on the high limit is unacceptable. The cause of a high limit trip must be determined and rectified before resetting the limit.

5. All boilers are fitted with a pressure relief valve which will open if the pressure approaches a set point chosen to be well below the withstand pressure of the boiler and system components.
6. Drain located at the bottom of the boiler are provided for maintenance purposes. Boilers should preferably be installed with flanged connections or unions with stop valves on the inlet and outlet to allow the boiler to be drained without draining the entire system and to simplify servicing.
7. Periodic inspections of the vessel interior will give advanced notice of an impending problem. The local boiler inspection authority is available for guidance in these instances.

2. Specifications (cont.)

Standard Boiler Features

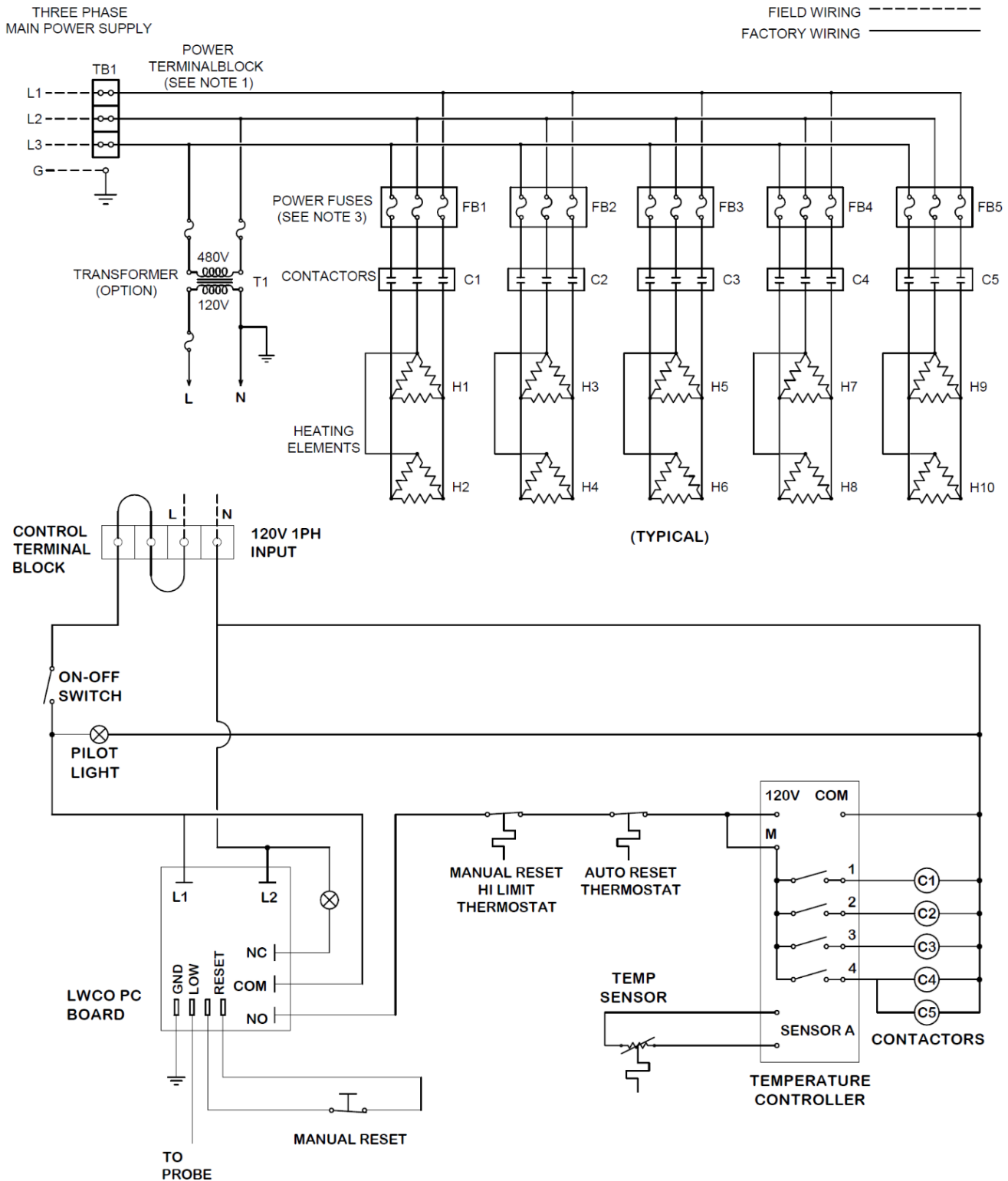
- Insulated ASME designed pressure vessel
- Vented control cabinet
- Pressure relief valve
- Pressure and Temperature gauges
- Drain valve
- Flanged heaters
- Control circuit on/off switch
- 11 Control circuit transformer (fused)
- 12 Power fusing
- 13 Magnetic contactors
- 14 Indicating pilot light
- 15 Electronic low water control
- 16 Push to reset button for low water simulation
- 17 On/off staging
- 20 High temperature controller



MODEL	DIMENSIONS - INCHES							VOLUME (GAL.)
	A	B	C	D	E	F	G	
EW12-EW72	28	19	17-1/4	39-1/2	17-1/4	46-1/4	19-1/2	6
EW90-EW180	28	18-3/4	17-1/4	39-1/2	26	46-1/4	21	14.3
EW205-EW315	31-1/4	19-1/2	18	51-1/2	27	58	24	36.4

2. Specifications (cont.)

Wiring Diagram - Power Circuit and Control Circuit use different voltage



NOTES:

1. Power Terminal Block only on boilers with two or more contactors.
2. On boilers with only one power contactor, connect power voltage to line side of contactor.
3. Power Fuses only on boilers rated 120 amperes and larger.
4. Refer to boiler nameplate for control and main power voltage

3. Installation

General

The boiler shall be installed by qualified personnel in accordance with the instructions contained in this manual. Furthermore, compliance with applicable National and local building and safety codes is necessary.

Preinstallation

Inspect the boiler for possible damage due to shipping and handling. Claims for shipping damage shall be placed with the carrier and should be reported immediately to them. If damage has been sustained during shipping that may affect the safe and reliable operation of the boiler, contact the sales office to discuss corrective action.

Please have available the model number, serial number, voltage, kW, and phase of the supplied equipment. This information is available on the boiler nameplate.

MOUNTING

1. The boiler must be positioned on an adequate base, preferably concrete, sufficient to support its in-service weight, and then levelled and secured in place.

Note: When installing boiler, allow sufficient room to facilitate removal of elements if and when necessary.

NOTE: Allow a minimum of 36 inches clearance in front of doors for servicing of heating elements. Recommended clearance: 24 inches other sides of boiler for servicing.

2. Do not install boiler in any location where water could freeze.

3. Do not install boiler outdoors.

4. Do not install boiler near flammable or corrosive materials.

5. Do not install boiler in a location where leakage from the boiler tank or piping can damage to adjacent areas or to lower floors of the structure. Provide a floor drain and properly sloped floor from the boiler towards the drain or install a suitably plumbed drain pan under the boiler.

PLUMBING

Ensure that all plumbing connections are made according to local regulations and applicable codes.

1. Inlet and Outlet

For single boiler installations, stop valves are normally required on the inlet and outlet connections of the boiler to allow the boiler to be drained and cleaned without having to drain the entire system.

For multiple boiler installations in a single system, stop valves are always required at the inlet and outlet piping connections.

For connection: Pipe the system return piping to the boiler inlet (at the bottom) and the system inlet piping to the boiler outlet (at the top). Never reverse the two.

2. Pressure Relief Valve

The boiler is equipped with a pressure relief valve to prevent the boiler from exceeding the maximum allowable working pressure.

For connection: Pipe the outlet from the pressure relief valve to a suitable drain away from other equipment, walkways and personnel. Do not reduce the piping size from the pressure relief valve.

Do not install any other valves or plugs in this piping.

3. Drain Piping

Most jurisdictions prohibit the drain from the boiler from being directly discharged into the sewer system. However, in all cases, you must check with local authorities to ensure compliance with local regulations prior to the connection of any drain piping to any sewer system.

All low points in the piping system should be equipped with drains. Provisions should be made for separate shutoff and drain valves on individual equipment so that the entire system does not have to be drained for service of a particular item.

4. Circulation Pumps

Select a pump whose energy head exceeds the calculated energy head for the system at the design flow rate. Flow rate can be adjusted with a globe valve.

5. Expansion Tanks

Some closed systems require an expansion tank.

6. Provisions for Dismantling

Utilization of unions on the inlet and outlet piping connections are recommended to simplify future service requirements.

8. Insulation

To conserve energy and protect personnel, hot piping loops should be insulated after testing for leaks.

WIRING

ALL ELECTRICAL WIRING MUST BE PERFORMED BY A QUALIFIED ELECTRICIAN IN ACCORDANCE WITH NATIONAL AND LOCAL ELECTRICAL CODES.

CAUTION: *Assure that the power voltage and phase being supplied to the boiler matches the power voltage and phase of the boiler. Connecting incorrect power supply can damage boiler components or cause improper boiler operation. If the boiler power requirements do not match the power to be supplied to the boiler the boiler must be returned to the factory for conversion. Boilers cannot be field converted.*

ALL BOILERS ARE PRE-WIRED AND TESTED PRIOR TO SHIPMENT.

1. Ground boiler according to National Electric Code requirements to avoid shock.

2. Power wiring to boiler should be in accordance with National and Local Electrical Code requirements following wiring diagram supplied. Use proper size wire. Wire size is specified adjacent to field wiring terminals. This label states the wire size [AWG or MCM], minimum temperature rating (90 C) and conductor material (copper only). Deviation from these requirements may result in improper or unsafe boiler operation.

3. A disconnect switch employing circuit breakers or fuses should be installed between the main source and the boiler. This disconnect switch should be located near the boiler and clearly marked for easy access and identification should the boiler need to be turned off due to an emergency.

4. Pump (supplied by others) and boiler control circuit must be interlocked to ensure that the pump is running when boiler is energized.

5. With main power off, make sure all wiring terminations are tight to avoid arcing, carbonizing or overheating of contacts.

CAUTION Boilers are susceptible to lightning damage due to water line connections. An industrial type lighting/surge protector should be installed according to the manufacturer's recommendation at the service entrance. Consult your contractor or electrical dealer.

WARNING Substitution of components or modification of wiring system voids the warranty and may lead to dangerous operating conditions.

4.Start-Up and Operation

The following procedures should be performed in sequence to eliminate problems on start-up.

START-UP

It is presumed that all electrical wiring and plumbing has been checked prior to this start-up procedure.

1. Make sure that the hot water boiler valves and switches are in the following positions:

- Water Outlet Open
- Water Inlet(s) Open
- Drain Valve(s) Closed
- Slowdown Valve(s) Closed
- Water Make-up/Feed Water Open
- Circulation Pump Off
- Main Power Off
- Service Loop Isolating Valves Open

2. Allow the boiler and system to completely fill and vent.

3. Adjust the temperature controller to its lowest setting, by turning the dial on the front of the control.

4. Make sure that the electrical control panel door is closed.

5. Ensure that the system (external to the boiler) is fully prepared for operation and that personnel are aware that the system is being started up.

6. Start the circulation pump. Adjust the flow rate through the system to the desired flow rate. Confirm balanced flow through multiple boilers.

7. Check the system piping for leaks.

8. Vent any air in the boilers or system proceeding with the start-up. Air venting procedures may require repeating.

9. Turn on the boiler by switching the Control Switch to ON. The power light should be on and the heating elements should energize provided that the low water level switch is not tripped. If the red "low level" pilot light is on, then the level sensor is detecting a low water level condition and will not energize the elements. When the boiler

fills, the light should shut off and the elements will energize.

10. Set the temperature controller to the desired temperature setting by pressing the MENU button on the controller.

Note that the temperature control should be set lower than the high limit controller setting. The high limit controller is set to prevent exceeding the maximum allowable temperature as shown on the boiler nameplate.

11. Set the temperature differential (by removing the controller cover and turning the small dial on the side) to the minimum setting. Note that fine tuning of the temperature control may be required for your specific application.
12. The pointers on the tridicator (at the outlet of the boiler) should begin to rise until the temperature reaches the set point of the temperature controller.
13. At this point, the controller will de-energize the heaters.
14. Do a final check for leaks and functionality of the boiler and system.
15. The system should now be operational.
16. It is not normally necessary to pre-boil water to clean the heating elements of the interior of the vessel. They have already been semi-cleaned prior to installation and there is no excessive grease or oil inside the boiler. However, if pre-boiling is desired, ensure that the detergents used are not harmful.

Water treatment may be necessary in hard water areas, since excessive scale buildup on internal boiler components will result in heating element failure and costly repairs.

5.0 Maintenance

Sussman hot water boilers, when properly maintained, will provide many years of trouble free service. To establish a good preventative maintenance program, it is recommended that the following maintenance procedures be adhered to.

ELECTRICAL VERIFICATION

1. All electrical connections in the power circuit should be inspected and re-tightened periodically.
2. Every four months, the following verifications are to be made.
 - a. Remove, clean and reinstall all controller electrodes.
 - b. If more than one electrode is supplied, to ensure that the wires are re-connected to the correct terminals, we recommend that the first electrode be removed. Clean and reinstalled: then the second and so on.
 - c. Check all fuses for continuity.
 - d. Visually inspect all contactors for signs of overheating.
 - e. Ensure that all electrical connections are tight.

MECHANICAL VERIFICATION

Regularly inspect the heating elements by removing. Maintenance frequency will Depend on water conditions and operating conditions.