

## **WATER TREATMENT**

### 4. **WATER TREATMENT FOR STEAM BOILERS:**

**CAUTION** *Failure to maintain an effective water treatment program as outlined below will void warranties and lead to premature pressure vessel failure.* There are three basic components for effective scale and corrosion prevention in steam boilers.

4.1 **SOFT WATER MAKE-UP:** All fresh water make-up must come through a softener 100% of the time

**CAUTION** Avoid deionized or reverse osmosis systems that lower pH levels.

#### 4.2 **BLOW-DOWN:**

The goal is to keep the TDS (Total Dissolved Solids) level between 2200 and 2600ppm. A uniform 15 second to 30 second blow-down is typical for most boilers when they are in proper control ranges. Subsequent boiler water analysis is required to properly determine exact length and frequency. To properly blow-down a boiler a washing action is recommended. This is achieved by slowly opening the blow-down valve for approximately 5 to 10 seconds, then slowly closing the valve and repeat again, until the recommended time has been achieved. This allows the solids to remain suspended for more uniform removal during the blow-down procedure. The water column also must be blown down at least once per shift; this helps to keep the column clear of debris and allows the operator to determine if the low water cut-offs and pump start controls are working. The blow-down tank should also be drained and flushed at least once every six months to help remove sludge and scale build up which can cause back pressure on the boiler leading to insufficient blow-downs.

4.3 **CHEMICAL TREATMENT:** Use an automatic chemical metering pump to inject boiler chemicals into the boiler feed line. The metering pump should

## **WATER TREATMENT** *continued*

be wired in series with the boiler feed pump and the point of connection should be a stainless steel tee down steam of the check valves and just before the shutoff valve at the feedwater inlet connection (see Page 48). Feeding chemicals directly into the feedwater tank is preferred by some water treatment specialists. If so, be aware that these chemicals can be highly corrosive to feedwater tanks at the point of entry and the dispersal in the tank dilutes their effectiveness inside the boiler where they are intended. In addition, pump seals exposed to high concentrations of chemicals often fail prematurely.

5. **CAUTION** Annual or more frequent waterside inspections will confirm the effectiveness of your water treatment program. A successful program is one that keeps both scale and corrosion in check.

6. Some low pressure steam boilers are installed in gravity return heating systems that do not have a return tank or feed pump (*see pages 50 & 51*). In most of these systems there is no water treatment taking place. For these installations, use soft water make-up and install a water meter in the make-up line. Check the low water cut-offs once a month by performing a slow steam evaporation test as described on page 18. Blow-down these boilers only when the TDS exceeds 2600 ppm.

7. The pH of a steaming boiler should be between 10.5 to 11.5. P/Alkalinity: 200-400 ppm. M/Alkalinity: 400-800 ppm. Sulfite: 20-60 ppm. Hardness (soft water): 0-Trace. Chlorines: 5 to 7 times the supply soft water level.