

BOILER WATER TREATMENT FOR EFFICIENT LONG TERM OPERATION

To ensure a boiler runs properly over the course of its lifetime, treating the water that circulates within the system is mandatory. If the water is not treated properly, the boiler will begin to have problems within the first year, and its useful life will be significantly shortened. Boiler symptoms resulting from untreated water include overheating, failure to produce hot water or steam, a drop in the boiler flow rate, and an overall loss of efficiency.

RECOMMENDED GUIDELINES

Water treatment recommendations vary depending on the operating pressure of the boiler, the application (steam or hot water), and other parameters. General guidelines to prevent corrosion and scaling in low-pressure boilers are as follows:

TOTAL HARDNESS	1 PPM MAXIMUM
TOTAL ALKALINITY	600 PPM MAXIMUM
TOTAL SILICA	150 PPM MAXIMUM
IRON CONTENT	0.1 PPM MAXIMUM
PH	8.5 – 10.5
TOTAL DISSOLVED SOLIDS	2,200 TO 2,500 PPM
OXYGEN CONTENT	0 PPM
CARBON DIOXIDE	0 PPM

To protect the integrity of the boiler and ensure it continues to produce good steam quality, it is important to properly treat the feedwater, or the water going into the boiler. A water treatment system will:

- Prevent deposits on boiler surfaces that weaken metal and cause heat transfer losses;
- Prevent oxygen corrosion, which causes pitting of boiler tubes and rust deposits;
- Prevent low pH (below 9 causes corrosion);
- Prevent steam condensate contamination.

WATER TREATMENT PROGRAM

Boiler water treatment is executed by mechanical equipment and chemical solutions available to treat boiler feedwater easily and cost effectively. The best solution is to use a combination of both approaches. Treating boiler feedwater mechanically with the proper water treatment equipment can remove 90% to 97% of the impurities. The remaining impurities can be easily removed by chemical treatment. Using a chemical-only approach is expensive due to the cost of the chemicals, and it also can be environmentally hazardous since the facility will be flushing excess chemicals into its waste stream. In addition, using a chemical-only approach is the most time consuming and requires constant monitoring to ensure proper treatment is always in place.

Commonly, the most important piece of water treatment equipment is a water softener, which ensures good boiler water quality. Water softeners use a process called ion exchange to remove calcium and magnesium from the water. The hardness minerals are replaced with a highly soluble sodium or potassium ion that will not cause scale buildup, helping a boiler maintain efficiency throughout its life.

Another equipment widely used for boiler water treatment is a deaerator, which reduces oxygen and carbon dioxide to minute levels. The deaerator uses a mechanical scrubbing method to eliminate the harmful gases from a feedwater supply. A deaerator frequently is used in larger facilities and in facilities that run multiple boilers. The deaerator removes almost all harmful gases, and the remaining gases are removed by chemical means. The initial investment in a deaerator is easily recovered by an extended boiler and steam equipment lifecycle, lower maintenance costs, and reduced downtime. The proper deaerator for a particular boiler application can be specified by the boiler manufacturer.



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