

Boiler Systems

Chapter 3

7.0 Chemical Treatment

7.1 OVERVIEW

This section deals with specific chemical treatments. Type, purpose, and application are all discussed. The treatments are divided along the lines of preboiler and condensate systems, and the boiler itself. The preboiler system is usually treated with pH adjustment chemicals, amines, and oxygen control chemicals, called scavengers. The condensate system is treated with pH adjustment and corrosion control chemicals, volatile amines and filming amines. The boiler is treated with chemicals to control deposition of salts and corrosion products, buffering of pH, and dispersants.

The main objective in every case is to permit the safe and efficient operation of the boiler and steam handling system. Corrosion control aids in boiler cleanliness and prevention of equipment failures. Deposit control aids in the maintenance of good heat transfer, which translates into better efficiency and prevention of tube failures. In the condensate system, corrosion and deposit control are essential for recovery of condensate for re-use.

In discussing chemical treatment in boiler systems, the following terminology will be used:

- Pretreatment or external treatment: Chemical and physical treatment of makeup water to prepare a consistent, satisfactory quality boiler feedwater.
- Internal treatment: Chemical treatment of the boiler water to control mineral scaling, corrosion and general deposition in the boiler drums and boiler tubes.
- Condensate treatment: Chemical treatment of steam condensate, applied either in the steam lines or in the boiler, to control carbonic acid and dissolved oxygen compsion in the condensate lines.

As a general rule, the higher the boiler pressure, the higher the quality of feedwater required. Therefore, the higher the pressure, the more chemical treatment is concentrated outside the boiler in water preparation (chapter 2), and the less internal boiler water treatment and condensate treatment is required.

Boilers are often classified by operating (throttle) pressure. These groupings are arbitrary, and there is much overlapping between groups, but for purposes of discussing chemical treatment the following groupings are convenient:

Low pressure steaming boilers, operating below about 300 psig, that use
untreated, or at best zeolite softened feedwater to make steam primarily for HVAC
and humidification use. Feedwater may or may not be mechanically deserated.
These boilers require substantial internal treatment to maintain clean surfaces and
prevent corrosion. Systems are simple, and precise control of chemical dosages and
boiler operations is generally not required.

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