

Boiler Water Treatment

Proper boiler water chemistry control is an essential parameter for all boiler operations. Treatment programs are designed to minimize oxygen corrosion, scale buildup, and the formation of precipitates throughout the system. A proper water treatment program can help address these problems to reduce the risk of boiler failures and decreasing thermal efficiency.

Water Treatment Programs

A water treatment program should be adopted as part of a regular preventive maintenance program and should address each specific application. This includes the type of boilers, the specific usage, operating schedules and the quality of the raw water at the location.

It is important to consult a qualified boiler water treatment company and follow the guidance and recommendations provided. They can help establish what tests are required, testing frequencies, procedures for sampling, chemicals to be used, and a method for recording and trending results.

Consider the following for implementing an effective boiler water treatment program :

- A boiler water treatment program is a “balancing act” to keep the boiler water chemistry within a relatively narrow range of acceptable chemical composition. For example, when excess free oxygen is trapped in the boiler water or feedwater, dissolved oxygen can cause localized corrosion and pitting of the boiler metal. This localized corrosion can result in a rapid failure of the boiler metal even though only a small amount of metal loss may have occurred. There are both chemical and mechanical methods available to reduce the amount of dissolved oxygen in boiler water.
- Evaluating local water quality is required to determine the amount of dissolved minerals in the water. Boiler scale occurs when these dissolved minerals accumulate on the boiler’s internal surfaces. Scale deposits act as an insulating material and can greatly reduce the efficiency of a boiler, which can lead to overheating and boiler damage.
- Adding too many chemicals to the boiler water can be as detrimental as not adding enough. Also, out-of-specification boiler water chemistry may void the manufacturer’s warranty.
- Maintaining an adequate pH level in your boiler can lessen the negative effects from corrosion. Consult with the boiler manufacturer to determine the ideal pH range for your boiler. It may be necessary to coordinate with a water treatment company or a qualified technician for assistance with testing requirements and adjusting boiler water pH.

Steam Boiler Systems

- Internal boiler water treatment, which uses chemical additives to control oxygen corrosion and the formation of scale inside the boiler, is the most common type of treatment. Some of these treatments include oxygen scavengers, phosphates and chelants.
- Some boilers systems may need external treatment of the feed and makeup water supply. This treatment focuses on removal of impurities before they reach the boiler. Treatment systems for makeup or feedwater are available that can help reduce hardness before the water enters the boiler system. These include chemical treatments, water softening, and water filtering systems such as reverse osmosis or media filters.
- Deaerators can also be a valuable external treatment method for boiler feedwater. This method focuses on reducing dissolved gas concentration prior to entering the boiler.
- Surface and bottom blow downs can help keep boiler water chemistry within specifications by reducing sediment, dissolved solids and other water impurities. Boilers should be blown down as recommended by the boiler manufacturer or as recommended by a water treatment technician familiar with your boiler.
- Steam condensate systems are susceptible to corrosion and may require implementing a volatile chemistry program. These are normally fed separately from other chemical treatments.

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Hydronic Boiler Systems

Hydronic boiler systems are normally closed-loop systems and do not require continuous makeup feedwater. Once a treatment program is established, minimal chemical addition is usually required. Consult the boiler manufacturer or a qualified boiler water treatment company for guidance on establishing a treatment program specific to these systems.



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