

Multifamily Facility Management Services

BOILER MAINTENANCE FOR A STEAM SYSTEM

Description:

Steam systems are the norm in multifamily buildings (and some small commercial buildings) constructed between 1900 and 1930. A steam boiler is an efficient and long-lasting piece of equipment when properly maintained. However, poor maintenance will lower the efficiency and result in higher fuel bills. Poor maintenance will also cause rapid deterioration, shortening the life span of the boiler. Good maintenance is well worth the time and effort because replacing an existing boiler with one of comparable efficiency costs a considerable amount. The two important aspects of steam boiler maintenance are regular maintenance to the burner of the boiler (fire-side maintenance) and water treatment (water-side maintenance).

As with any combustion equipment, fire-side maintenance is critical for steam boilers in order to achieve safe, efficient operation. Water-side maintenance takes on a role of equal importance in steam boilers, since air and water are constantly being added to the steam system (unlike a hot water system which is essentially sealed). At the end of each steam boiler cycle, air enters the heating system through air vents located throughout the system. This air contains oxygen which mixes with the water in the boiler causing rust, pitting and corrosion. Some steam also escapes from the system during each boiler cycle. As a result, “make-up” water must be added to offset this loss, and this make-up water contains dissolved minerals. Because the escaping steam does not carry any minerals with it, these minerals eventually build up to high concentrations and precipitate, clinging to each other and to the surfaces within the boiler to produce scale. This scale reduces efficiency by degrading heat transfer; it also can damage heat exchanger surfaces by causing them to overheat, sag and rupture. Proper water treatment both neutralizes the oxygen in the water, and causes precipitated particles to form a loose sediment instead of clinging to one another.

How to Implement:

Regular maintenance of the burner itself should only be completed by a qualified, licensed contractor. For a gas-fired atmospheric burner this should be done every two to three years; for a gas-fired power burner or oil-fired burner it should be done annually. The contractor should clean, tune and adjust the burner for safety and maximum combustion efficiency. At the same time, the contractor should clean the fire side of the heat exchanger, if accessible, and check all controls (thermostat, cutouts, pressuretrols) and safety mechanisms (e.g. low water cutoff, high limit pressuretrols, safety valve) for proper operation. Any device that is not functioning

properly should be repaired or replaced. The contractor should also inspect flues and vents as well as check and lubricate the condensate pump, if applicable.

Steam boiler water should be tested at least once a week during the operating season, and water treatment should be added as indicated. Testing is a simple matter of drawing a small amount of water through the blow-down valve and counting the number of drops of indicator solution required to turn the test water a certain color. If the oxygen concentration is too high, an oxygen scavenging compound is added through an opening in a return pipe to the boiler. If the total dissolved solids are too high, some boiler water must be drained off through the blow-down valve and replaced with fresh make-up water. Chemical suppliers can provide details on testing and treatment of boiler water and are noted under *Boiler Parts and Supplies* in the Yellow Pages. The testing and treatment is fairly simple and straightforward to perform so that, once trained, on-site staff or the owner can complete this weekly task.

Water treatment causes precipitated particles to form a loose sediment or sludge instead of clinging to one another. This sediment can accumulate over the heating season and needs to be eliminated from the system. To remove this sediment, the blow-down valve(s) should be opened periodically during the heating season to flush out the sediment. In addition, the inside of the boiler should be washed thoroughly every summer. For safe operation, the low water cut-off mechanism should also be flushed regularly to remove sediment.