Boiler Safety Meeting Kit

WHAT BOILER SAFETY MEANS

Boiler operation consists of many tasks to keep a boiler operating safely and efficiently. These tasks include tracking many data points, such as boiler pressure and temperature, boiler exhaust temperature, feedwater pressure and temperature, and boiler and water column blowdown timing. Continual checks should also be a part of any maintenance program.

DANGERS/HAZARDS OF BOILER OPERATIONS

Boilers are gas-fired or electric closed vessels that heat water or other liquid to generate steam. The steam is superheated under pressure and used for power, heating, or other industrial purposes. Though boilers are usually equipped with a pressure relief valve, if the boiler fails to contain the expansion pressure, the steam energy is released instantly. This combination of exploding metal and superheated steam can be extremely dangerous.

SPECIFIC DANGERS/HAZARDS

- Many older boilers and hot water and steam piping may have asbestos insulation coatings, wraps, or “lagging.” Workers should periodically inspect these areas to make sure that the materials are not damaged, flaking, or deteriorating. Damaged materials should be reported and repaired or removed immediately by a certified asbestos contractor. Signs of cracked surfaces, bulges, corrosion, or other deformities should be repaired by an authorized technician immediately.
- Sudden changes in temperature can warp or rupture the boiler. Boiler operators should ensure that the fuel system, including valves, lines, and tanks, is operating properly with no leaks. To prevent furnace explosions, it is imperative that boiler operators purge the boiler before ignition of the burner. Workers should check the fuel to air ratio, the condition of the draft, and the flame to make sure that it is not too high and not smoky.

BOILER MAINTENANCE

Examples of boiler maintenance and the dangers of neglecting them.

1. **Regular checks of safety equipment (LWCO, ALWCO, safety valves, gas/fuel train valves, etc.) is the first line of defense against major failure.** While many of these items will be looked at during the annual inspection by the jurisdiction or the insurance company, once a year is not enough. All these items should be checked and tested regularly to avoid any problems.

2. **Tracking the boiler operating pressure and temperature as well as the exhaust temperature allows the operator to trace any system inefficiencies.** If an operator notices the boiler pressure is consistently higher than the operational set point, that is reason to suspect an issue with the control switch operation. If an operator notices that the boiler exhaust temperature is consistently higher than 50°-100°F above the steam temperature, burner combustion should be retuned as well as checking the boiler internals for signs of scale, which will reduce the heat transfer rates and ultimately cause tube failures.
3. **Tracking the feedwater pressure and temperature allows the operator to notice any trends in proper feedwater system operation.** If the pressure or temperature are out of normal range, the feedwater may be unable to enter the boiler, or damage can result from thermal shocking. When the temperature differential between feedwater and boiler water is significant, thermal fatigue will begin to take effect on the boiler. This will be seen first at the feedwater coupling, which will develop cracks that will propagate into the boiler shell.
4. **Checking the flame in the sight glass** is an easy way to catch tuning or impingement issues before they become a major concern, and neglecting to check can result in poor combustion and potential boiler system failure. Burner explosions are also a major concern to look out for.
5. **Checking the water treatment equipment and taking water samples** ensures treatment and supply issues do not go unnoticed, which result in boiler inefficiencies, improper operation, unsafe conditions, and even component failures. Infrequent or complete lack of blowdown during boiler operation will also result in a high concentration of impurities that contribute to scale, corrosion, carry over, and other operational concerns.

REASONS FOR BOILER MAINTENANCE NEGLECT

Lack of Training and Cost Cutting: While training may seem like an unnecessary expenditure at times, properly trained operation and maintenance personnel will ultimately save the owner money by way of efficient operation, preventive maintenance, and continued service.

Revenues Down: When revenues are down, preventive maintenance is often seen as an area where expenditures can be minimized.

BEST BOILER WORK PRACTICES

Good Housekeeping: The area around the boiler should be kept clean of dust and debris, and no flammable materials should be stored near any boiler. Floors are often sealed concrete and can be very slippery when wet. Spills should be mopped or cleaned up immediately. Make sure that adequate lighting is provided.

Authorized Boiler Repair Technicians: Boiler repairs are allowed only by authorized boiler repair technicians. When entering a boiler for service or repair, authorized boiler repair workers should treat the vessel as a permit-required confined space. When the boiler is shut down for repair, all sources of energy should be isolated using approved lockout/tagout procedures.

Consistent Boiler Maintenance: Boiler operation should be performed on a weekly, monthly, semi-annual, and annual basis in accordance with the manufacturer’s recommendations.

FINAL WORD

Boiler Maintenance Neglect can be traced to lack of training and the implementation of cost-cutting strategies. Preventative maintenance is often seen as an area where expenditures can be reduced.