MBAA Safety Toolbox Talk

Steam Boiler Safety

Overview

Steam boilers and their distribution piping are the heat source for many breweries and if not maintained properly; can have serious consequences.

Boiler Safety Testing

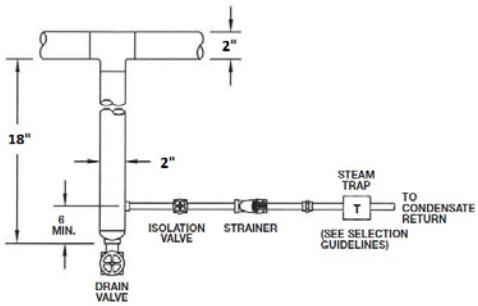
It is important to routinely test the boiler's safety features as required in the boiler manual. Most importantly are the low water safety controls and the flame monitoring devices. Routine testing of these safety devices will ensure that the boiler is operating safety. The low water safety controls should be tested on a weekly basis. Every steam boiler has two low water safety cutout devices. Water should be drained from the boiler to test each of these devices to ensure that they are operating correctly and that the cutoff device shuts down the burner when the low water condition is reached. The flame sensing device should be tested every month.

Combustion Adjustment:

In order to ensure that your boiler is operating safely and at peak operating efficiency, it is important to have burner combustion settings checked at least once a year. Tuning the combustion once a year will help to ensure that the boiler burner is operating in a safe range as well as at its optimum efficiency. This will help to ensure that the boiler is operating safely and save on fuel costs.

Steam Distribution Piping

Proper design of steam distribution piping will minimize unsafe operating and cold startup conditions. If steam distribution piping is not designed to properly remove condensate, it can build up and cause damage to the equipment. All piping must have a drip leg and steam trap at the end termination of the line. Any place where condensate can pool up must have a drip trap installed. This includes rises in piping and any equipment piping drops. If condensate is not properly removed from the steam piping, the piping can shake violently and potentially break. The condensate will also cause damage to the downstream equipment.



PROPER DRIP LEG DESIGN

It is also very important when opening and closing manual valves on a steam system that it is always done in a slow manner. It is never recommended to open or close a manual valve quickly, this can cause an unsafe condition if there is condensate in the lines.

Steam Trap Maintenance

Every steam system has a number of steam traps installed to aid in the removal of condensate. It is important to check steam traps for proper operation. A steam trap can fail in one of two ways – open or closed. A steam trap that has failed open will allow steam to pass through the trap continuously. This is a large waste in steam and fuel. A steam trap that has failed closed will not properly remove the water from the system piping or the jacketed kettles. This will cause the jacketed kettles to not heat as well as there is hot water in the jacket and not steam. It can also cause condensate to build up in the steam lines and could cause an unsafe condition with the steam system.

Vacuum Breakers

Vacuum Breakers are important to use on main steam lines as well as any jacketed steam kettle. Water expands to steam at a volume of 1,600:1. When steam cools and condenses, it will condense at the same rate. This will pull a vacuum in the steam header and jacketed kettle. The vacuum can damage the kettle and potentially cause steam leaks. The vacuum in the steam header will cause the boiler to flood and momentarily cause water to leave the boiler out into the system upon start of operation.

Air Vents

Air vents are important not only on main steam lines, but also on all jacketed kettles. If air and other non-condensable gases are not removed from the system, they can fill the jacketed kettles and heat exchangers with air and not let the steam in for heating. Carbon dioxide if present in the steam lines can also cause damage to the condensate piping by forming carbonic acid when combined with the condensing steam.

Photo credit: Watson McDaniel – www.watsonmcdaniel.com.

If you have any questions regarding this, please see your supervisor or manager or a member of the Safety Committee.

FOR MORE INFORMATION ON BREWERY SAFETY, PLEASE VISIT THE MBAA BREWERY SAFETY WEBSITE AT:
http://www.mbaa.com/brewresources/brewsafety