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TECHNICAL PUBLICATION

INFORMATION & STRATEGY FOR THE FACILITY MANAGER

The Different Types of Blowdowns on Steam Boilers

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There are generally 3 types of blowdowns on steam boilers. Oftentimes these types are used interchangeably. This article will discuss the differences and the purposes of each type of blowdowns. Blowdowns are necessary evil. It costs money to blowdown a boiler but the cost of non-compliance is far greater.

Safety Blowdowns

This is THE most important blowdown because it is legally required by the State Fire Marshall to be done at least once a day. The blowdowns are done on the water level columns (both primary and secondary) to simulate a low water level condition, and to ensure that the columns are not restricted.

As a steam boiler boils water, the water level in the boiler drops. The water column senses this drop and activates the feedwater pump to transfer more water to the boiler. If the water level continues to drop, it activates a secondary sensor, which kicks off the burner, to prevent overheating. If both the primary and secondary level sensors fail, the boiler will continue to run dry. This will result in overheating and possibly start a fire. If the boiler is overheated and suddenly your sensor works and starts feeding cooler water to an overheated boiler, this will result in a violent and massive steam expansion, which could lead to an explosion of the boiler. Because of such potential fatal consequences, it is a law that daily safety blowdowns must be implemented. This type of blowdown must be done manually to ensure compliance.

Bottom Blowdowns

As a steam boiler boils water, the minerals are continually left behind, forming sludge. The amount of sludge formed depends on the type of chemical treatment. By gravity, the sludge finds its way down to the bottom of the boiler and possibly into the drain line. Left in the boiler, the sludge will continue to accumulate, packing itself, and is eventually baked hard. To prevent this problem, an operator must blowdown the bottom of the boiler daily to remove any accumulated sludge while it is still soft. Failure to do so could lead to pluggage of the drain line preventing drain down for inspections and repairs. In addition, excessive build-up can cause dangerous hot spots. If a blockage occurs, the operator will have to pump the water out, rod the plugged line, and physically remove the solids from the bottom of the boiler, very laborious and costly endeavor.

Skimming Blowdowns

Skimming blowdowns are done at slightly below the boiler water line. This is done to help control the solid level in the boiler water, to keep the boiler running efficiently, and to ensure quality steam.

As a steam boiler boils water, the solid level increases. Eventually, the solids in the boiler water reach a supersaturation point where they begin to precipitate and deposit on the boiler tubes. The deposits reduce heat transfer efficiency, and increase operating costs. A mere 1/32” deposit can reduce efficiency by up to 4%.

Supersatured water results in a high water surface tension, which can cause the steam bubbles to carry some of the boiler water with it, producing poor quality, contaminated, wet steam. This is called a carryover condition. Carryover steam can foul the process the steam is intended for. It can also foul the steam and condensate system resulting in premature failures and higher maintenance and repair costs.

To prevent supersaturation, the boiler water must be skimmed frequently, to purge the high solids. Because solid level rises continually, a boiler operator would need to adjust this level frequently to ensure compliance. This can be very laborious and costly.

Sometimes an operator would simply leave the skimming valve open all day, but too much skimming wastes energy, water, and chemicals.

A more cost efficient way to control the solid level in the boiler water is with a Blowdown Controller. The controller takes the place of an operator. It takes boiler water samples and reads the solid levels in the boiler water, at pre-set intervals. Then, it compares the readings to a pre-set point. If the reading is at or above the set point, the controller will activate a solenoid valve to blowdown the boiler water, and will continue to blowdwon until the solid level drops below the set point.

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