Technical Bulletin

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A Family of Heating & Cooling Brands.

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TECHNICAL TIP – Leaking boiler or Condensation

When fuel is burned it produces Carbon Dioxide and Water Vapor, such is the case with Natural Gas, Propane or Fuel Oil. If the water vapor is allowed to cool it forms condensation. The amount of condensation is directly proportionate to the temperature of the flue gases, the lower the temperature the more condensation. Condensation formation is fine if dealt with properly as is the case with a high efficiency condensing boiler. A cast iron boiler on the other hand is not meant to condense.

Cast iron boiler:

In some cases, the amount of condensation formation can be extreme and misdiagnosed as a leak in the boilers heat exchanger. Don't let this happen to you.

Signs of water below burner tray

Warning: Condensation is corrosive, and overtime can corrode a cast iron heat exchanger causing flue way passages to become restricted resulting in formation of Carbon Monoxide and risk of injury or death.

(Actual photo of boiler as result of flue gas condensation)

Is it a Leak or is it Condensation?

An actual leak in a boilers heat exchanger is almost always isolated to a single spot. If you suspect a boilers heat exchanger is leaking, following steps 1 and 2 below.

1. Examine the Heat Exchanger for signs of excessive condensation formation. See Photo 3 below. If there are signs of water (rust) in multiple areas of the heat exchanger it is most likely due to excessive condensation.

(View through observation door above burners)

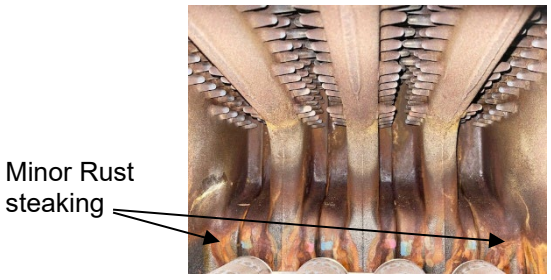


Photo 2: Normal Condition

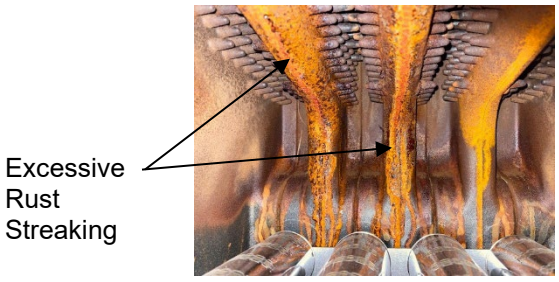


Photo 3: Excessive Condensation

2. Test for Leakage: Pressurize boiler to 20 psi. Cycle boiler off high limit several times while checking for signs of leaking from one area of the heat exchanger. Check for pressure loss and if necessary, allow boiler to sit for an hour and check pressure again. If there is no pressure loss the boiler sections are not leaking.

If you have any doubt, contact Technical Support at 1-800-253-7900

If boiler is condensing:

Increased return water temperatures will reduce or prevent condensation formation in the boilers heat exchanger. One of the easiest and functional ways to increase return water temperatures is by utilizing a by-pass pipe between the supply and return of the boiler. See Figure 1. For low temperature in-floor applications utilize primary/Secondary piping or a Thermostatic bypass valve

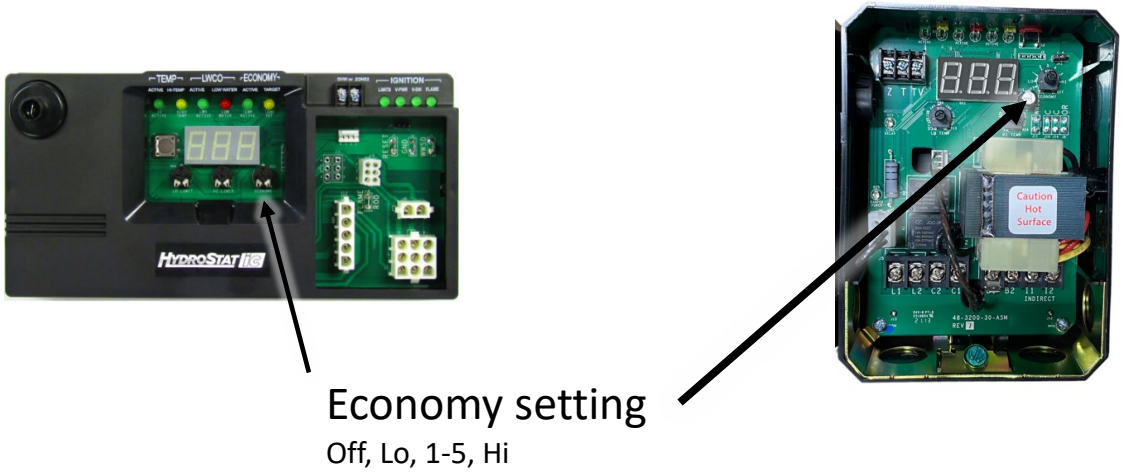
Bypass piping provides the ability to adjust return water temperatures, protecting the boiler from condensation forming due to low water temperature (below 130 degrees). Typical installations where a bypass is required are as follows:

- Large, converted gravity systems or other large water volume systems or systems with low design water temperatures.

When using bypass piping, adjust bypass valve until return water temperature is above 130°F. The bypass loop must be the same size piping as the supply and return piping.

Option 2: If the boiler is equipped with a Hydrolevel 3200 or 4200 control

When the Economy feature is active (1-5 or Hi), the Fuel Smart Hydrostat continually sets a target temperature below the high limit setting to maximize fuel efficiency. This will lower boiler water temperature. Adjusting the Economy dial to the *off* position will allow the boiler to reach high limit setting (default 180 degrees) each time there is a call for heat. This may help to reduce condensation formation.



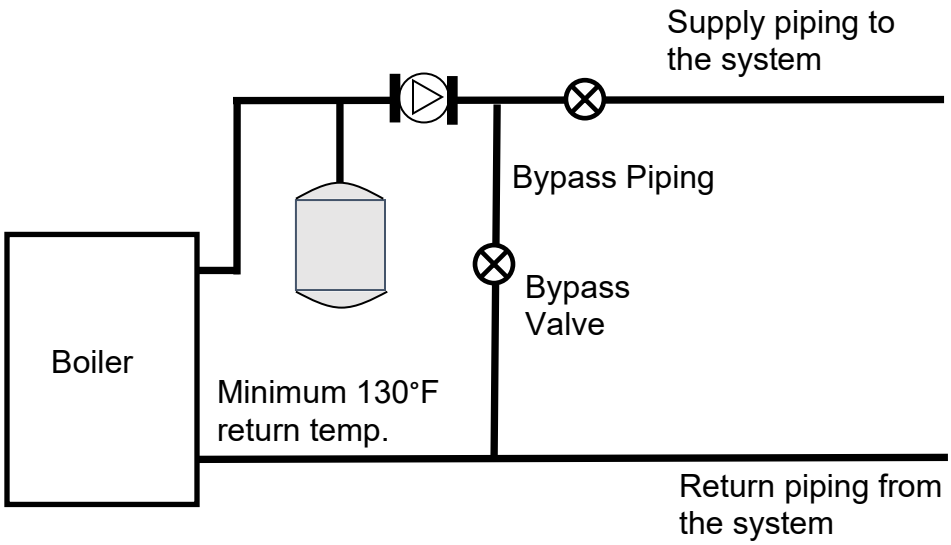


Figure 1