When the water hammer occurs at the end of the boiler cycle, look at the near boiler piping.

On gravity return systems, the Hartford Loop connection must be at least 2" below the water line.

At the end of the boiler cycle, the steam pressure is generally at its highest while the water level is at its lowest.

The steam pressure pushes the water down in the equalizer to expose the horizontal portion of the Hartford Loop to steam.

Steam then mixes with the returning condensate to create hammering.

Check for insulation on the near boiler piping of gravity return systems.

Without insulation on the boiler piping, when the boiler shuts down it can create a vacuum.

This vacuum can cause the water level in the boiler to surge, allowing steam into the return lines where it will momentarily hammer.

Insulate all steam piping, even around the boiler.

To correct, install a vacuum breaker above the water line of the boiler or on supply piping.

When the water hammer occurs in the boiler, look for causes of uneven temperatures in the boiler.

Sediment build up, mineral deposits from excessive fresh water make up and core sand from manufacturing can all cause uneven temperatures of the boiler water.

Steam systems rust from the inside.

The returning condensate can carry that rust or sediment back to the bottom of the boiler.

Heat from the burner can dislodge this sediment causing hammering in the boiler.

Poor circulation can cause areas of the boiler water to have different temperatures.

When very hot water in the boiler suddenly moves to areas of cooler water, hammering can occur.

To correct, flush bottom of boiler of any build up to improve circulation.

See .

Another cause of uneven temperature of the boiler water is the flame pattern of gas or oil power burners.

If the heat from the burner is concentrated into one area of the combustion chamber, it causes uneven temperature of the boiler water.

The surging of the hotter water to cooler areas of the boiler can cause the boiler itself to hammer.

Make sure that all insulation blankets and wet packs are properly installed in an oil fired boiler's combustion chamber to avoid temperature imbalance.