

Boiler Water Monitoring



Success in this application can be applied to variety of other applications with similar challenges

Facts about Steam Boilers:

Steam boilers are critical to the operation of the plant and are very expensive to replace if not maintained correctly. Water quality is monitored in the boiler to prevent:

- Tube fouling which affects efficiency and performance
- Corrosion which reduces the life expectancy of the boiler and causes unsafe working conditions
- Poor control over the condensate which can lead to wasted water, chemicals and efficiency when excessive blowdowns occur due to poor water chemistry



Water Quality Monitoring to Optimize Boiler Performance

— Using pH, DO, and Conductivity

An important component of steam boilers are the tubes. The pH of the boiler water is normally kept alkaline to facilitate the formation of a thin oxide layer on the tubes. This oxide layer acts as a protective barrier against corrosion. Sodium phosphate & sodium hydroxide are used to promote this oxide formation, but too much of these chemicals can cause problems. Accurate pH monitoring can help prevent these issues. M4 Knick's SE 558 pH electrode is designed to work in low ionic activity liquid which is found in boiler water.

Oxygen has a significant impact on the lifespan of a boiler due to its ability to cause pitting and corrosion even at trace (ppb) concentrations. Most steam boilers use chemicals like hydrazine as an oxygen scavenger to prevent this problem. The SE 707 will easily monitor into the ppb range of dissolved oxygen to ensure the levels of hydrazine are adequate to prevent the damaging effects of oxygen.

The measurement of conductivity is one tool used to identify if contaminants are becoming concentrated in the boiler water. This can be from overdosing of chemicals or a break in a tube. When the conductivity levels be-

come too high, blow down of the boiler may be needed or inspection may be required to see if there is a failure somewhere in the steam system. M4 Knick's SE 604 is able to operate in very low conductivities such as those found in a typical boiler water system.

Connection to the analytical sensor is typically not submersible. To get around this, manufacturers will "pot" the cable into the sensor which forces the customer to completely disconnect the cable from the transmitter when exchanging sensors. To avoid this situation entirely, M4 Knick uses Memosens sensor connections. These connections are inductive and can be connected even when completely submerged.

When using the Memosens smart digital technology all calibrations can be done in the analyzer shop or lab. When a customer wants to replace a sensor they take a pre-calibrated sensor to the field and do a quick swap by disconnecting the inductive Memosens cable and connecting the new sensor. The calibration information is automatically shared with the system is ready to measure without any additional steps.



What was this Customer's Return on Investment?

- **Reduction in Maintenance Time and Costs:**
By using the M4 Knick Memosens sensors and transmitters, the customer greatly reduced the need for calibrations and frequent sensor replacements. This means fewer trips to recalibrate or replace electrodes which means reduced maintenance and sensor costs.
- **Built for Wet Environments:**
The sensors inductive connections and sealed transmitter design allows the system to operate in very wet locations without worrying about corrosion of metal components and damage to exposed circuit boards. The M4 Knick transmitter comes with a three year warranty.