



# PROTECT YOUR BOILERS

## MONITORING TOC IN CONDENSATE RETURN

**Industrial boilers are at the heart of the steam circuit that drives many industrial processes. Recovering the high quality condensate is a common re-use strategy because boiler operators do not want to lose this expensive water. However, they also don't want to damage the boiler with contaminated condensate return. Some organic contaminants are not detectable to conventional analytical instruments. Fortunately, monitoring TOC has been shown to detect contaminants such as sugars and alcohol, thus avoiding expensive repairs and plant interruptions.**

Condensate return analysis is often restricted to monitoring for corrosion. Monitoring pH, conductivity, iron, copper and ammonia can provide early detection of corrosion, and ammonia in the presence of oxygen can cause serious damage to copper.

Some industries process organics. Pulp and paper, petroleum and chemical refining, wet mills and food processing all use steam in their processes. These industries need to protect boilers against organic contaminants because damaged pipes and heat exchangers may cause a plant's own product to contaminate the condensate.

If a steam circuit contains organic contaminants, then traditional analysis methods may be insufficient. Some classic on-line measurements for boiler water condensate are conductivity, pH and turbidity, and these are ideal for detecting corrosion. However, they are ineffective in detecting some organic compounds, especially sugars and alcohols.

With the majority of organic mole-

cules being non-ionic they will not be detected by conductivity or pH. Further, many organic compounds lack chromophore and therefore have no measurable absorbance using optical methods such as turbidity. Failing to detect these contaminants may lead to a false positive and signal that it is ok to reuse the condensate.

Re-using condensate contaminated with organics will result in fouling of the boiler, early shutdown and interrupted plant operations. So it's easy to see that the financial implications of inadequate monitoring are far reaching. Many large production facilities today charge individual production units for steam consumption and they are credited for clean condensate returned to the boiler. With the addition of an organics monitor the quality of condensate returned can be accurately assessed.

### Monitoring Organic Contaminants

Total Organic Carbon (TOC) analysis is the accepted method for monitoring organic contaminants. In boiler condensate the concentrations of

organics are low, typically in the range of 0 to 15 mg/L and are measured between the condenser and the return condensate line.



### The QuickTOCcondensate

High temperature TOC analysis at 1200 °C requires no catalyst.

- ▲ Accurate at low ranges
- ▲ Detects all organic compounds
- ▲ Rapid 3-minute TOC analysis
- ▲ No reagents
- ▲ Low maintenance design
- ▲ No memory effects

