CORN WET MILLS

Wet mills separate corn kernels into oil, protein, starch, and fiber, and every part of the grain contributes to a commercial product. Water plays a central role throughout the milling process, carrying, washing, and separating the kernels, and supporting the steam circuit that carries heat throughout the process. Monitoring water quality in the mill protects boilers, guards against product loss and lowers milling costs, while monitoring wastewater confirms regulatory compliance.

Monitoring TOC in Wet Mill Boiler Condensate Return

An EPA-funded Energy Star report identified Corn Wet Milling as the most energy-intensive process in the food processing industry.

"Corn wet milling is an energy-intensive industry because it is a wet process that produces dry products. For many of the products, dewatering, evaporating and drying are required, and these often entail the use of large amounts of energy."

In fact, energy is the second largest business expense in US corn milling. Only the cost of corn feedstock is greater. So energy efficiencies hold the greatest opportunity for process improvement and cost reduction.

A large portion of the energy consumed in wet milling takes place in boilers and these boilers are at the heart of the steam circuit that channels heat throughout the milling process.

Recovering condensate is common and necessary. It conserves both water and heat. But reusing condensate exposes the boiler to potential contaminants, so monitoring for contaminants is important.

Sugars and alcohols pose a particular threat to boilers.

Wet mills commonly conserve water through countercurrent introduction of makeup water. This method involves introducing fresh makeup water only in the last step, starch washing. Then each stage becomes a source of makeup water for the previous stage. Without this strategy much more heat and water would eventually be discharged. Since this process water has product suspended in it, as it passes through the heat exchanger any cracks will expose the condensate to product. If sugar enters the boiler, the result is foaming and increased pressure, leading to costly boiler down-time and maintenance.

An added difficulty is that sugars and alcohols escape detection using most conventional analytical methods. They have no significant impact on pH and conductivity, and the molecular structure lacks chromophore, so it isn't measurable using optical methods.

In thousands of installations, measuring Total Organic Carbon (TOC) has provided a fast, effective method of monitoring for sugars, alcohols and other organic compounds in boiler condensate return lines.

The QuickTOC$_{condensate}$ provides the fastest low-range TOC measurement available, and the low maintenance design requires no catalysts or reagents.

QuickTOCultra

Many ranges and configurations to monitor TOC / COD / Total Nitrogen in a variety of applications.

QuickTOCeondensate

LAR's high-temperature analyzer specifically configured for boiler condensate monitoring.

Monitoring Compliant Discharge Through 1200°C Combustion TOC

Accidental discharge of sugars and organics can be harmful to aquatic life and disrupts the operation of downstream treatment. To monitor discharge, the QuickTOCultra uses the reportable US EPA Method 415.1 to provide rapid, accurate monitoring, to protect against product loss and to verify compliant discharge.

LAR's QuickTOCultra integrates into process control systems, so monitoring discharge enables manufacturers to achieve the maximum production capacities possible while maintaining compliance.

1701 Creek Rd, Ste D, West Bend, WI 53090 ▲ 262-429-1310 ▲ www.larllc.com

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