



Liquid flow meter data prevents sugar plant shut down in Algeria

Panametrics' TransPort* PT878 portable ultrasonic flow meter performed flow measurements that saved GFD-LaBelle hundreds of thousands of Euros in projected total losses.

Challenge

GRD-LaBelle is a raw cane sugar refining mill in Algeria, where 1,000 tons of white crystallized sugar is produced per day. The sugar manufacturing process involves ten successive steps, one being the evaporation process that reduces water from the filtered juice containing about 15% sugar and 85% water. Boiled when in contact with steam, the juice passes through a series of evaporators, where temperature and pressure gradually decrease the water content. At the end of the evaporation process, the juice is transformed into syrup containing 65 to 70% sucrose.

During this process step, GRD-LaBelle could not recover enough condensates at the evaporator's outlet. The initial assumption was that the problem originated in the upstream area of the condensate receiver tank. Since there are no flow meters installed in this part of the process to measure recovered condensates, it remained unclear where the condensates went and so a plant shutdown seemed inevitable.



Condensate recovery vessel and downstream circuit of the condensates at the GRD-LaBelle plant

Result

Panametrics' Digital Solutions service engineer in Algeria, Allaoua Felfoul, suggested that GRD-LaBelle use a portable PT878 ultrasonic flow meter to help diagnose the problem. Allaoua and site engineers used one PT878 portable flow meter at three different locations to measure the flows passing through the circuits. Unexpectedly, the results showed flow rates well above estimated level but as per design, causing the operators to focus on other parts of the plant manufacturing process.

After a thorough investigation, engineers determined that manual valves downstream of the condensate receiver tank were the source of the problem and necessary corrective actions were made.

The valuable information provided by using the PT878 flow meter helped the customer avoid a planned shutdown for three days that would have resulted in a production loss of €5,000/hour (~USD\$5,500/hour) or an estimated total loss of €360,000 (~USD\$400,000).

"If the issue wouldn't have been identified and isolated, we'd have planned for a 3-day production stop and mobilized production and maintenance departments for a plant stop. We were at 700 ton/day of production, and in optimal production we reach up to 1,000 ton/day. A complete production stop costs €5,000/hour."

Sofiane Khider – Automation leader at GRD LaBelle

How we did it

It was critical to use a clamp-on flow meter to determine the condensate flow rates at different locations of the process because there are no permanent flow meters installed there. Using Panametrics' PT878 portable ultrasonic flow meter that could be moved to the different measurement points, the following measurements were carried out on carbon steel pipes with a nominal diameter of 125 mm and 6 mm wall thickness and at temperatures from 105 to 120°C:

1. At the condensate tray inlet

Estimated flow rate: 10–15 m³/h

Measured flow rate: 30 m³/h

2. At the condensate tray outlet

Estimated flow rate: 5–10 m³/h

Measured flow rate: 28 m³/h

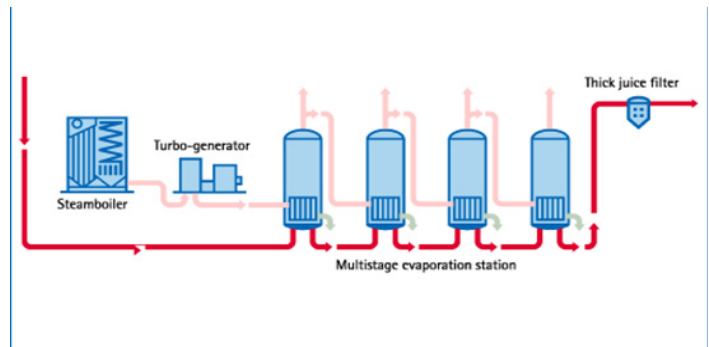
3. At the boiler feed tank

Estimated flow rate: 5–10 m³/h

Measured flow rate: 25 m³/h

It took Allaoua approximately 20 minutes to perform the measurement at each point. Based on the flow rate information from the PT878 flow meter, the root cause of the abnormal consumption of clear water used to produce steam was established.

Panametrics' TransPort PT878 portable ultrasonic liquid flow meter is a field-proven instrument that performs non-intrusive flow measurement within minutes. Its patented correlation algorithms resolve transit-time signals in ultrapure to extremely dirty liquids. Its built-in datalogger can store more than 100,000 flow data points and up to 32 sets of site location parameters.



Simplified sketch illustrating the flow process



Flow measurements at condensate inlet and outlet