

Juice and Citrus Products Processing

Pressure Transmitters, Magnetic Flowmeters, Liquid Analyzers, Recorders

Improved Citrus Processing with Robust Instrumentation

Plant Name: Juice and citrus products producer
Industry: Food and Beverage
Product(s): Orange juice and related citrus products

Application

In today's tightening orange juice market, facilities must improve efficiency to deliver high-quality products. With that goal in mind, a leading U.S. juice and citrus processor uses or sells each part of the orange. Nothing goes to waste.

As fruit enters the process, human graders pick out and remove unacceptable pieces. The fruit then proceeds to processing areas to become juice or other products. The oranges move to extractors, equipment provided by OEMs, which separate the seeds, pulp, and juice destined for different plant areas.



Juice from the fruit can be blended per recipes with other ingredients or sent to evaporators to concentrate. Peels go to high-pressure presses to squeeze out oils for a D-Limonene product. The pulp can be sold to the market or blended with the juice.

Challenges

The competitive and price-sensitive market demanded the juice and citrus products producer to boost operational efficiency. Due to a recent new contract to produce juice for a major beverage supplier, the producer also expanded production capacity by adding 40 tanks to an existing plant area. The expansion also led to eliminating challenges from the current process areas by upgrading 50 of the existing tanks.

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For example, the pressure transmitters used to determine tank levels **required frequent maintenance and replacement multiple times each season**. Cleaning the evaporators before and after a processing season led to hard, fine particles denting and damaging the diaphragm seals in the pressure transmitter, resulting in incorrect level indications.

Cleaning was a challenge also because as teams sprayed down the process equipment, the **flow meters' displays often became flooded** and required removal and separate cleaning.

Solution

In the drive to improve efficiency, the juice and citrus products producer needed a reliable partner to help determine ways to reduce maintenance costs and deliver high returns. The producer selected Yokogawa products such as the EJAC80E Diaphragm Seal System with DPharp sensor technology for level control and monitoring, ADMAG AXG magnetic flow meters (magmeters) for flow measurement, and FLXA402 analyzers for pH and conductivity monitoring.

Since the EJAC80E Diaphragm Seal System offers robust construction, the maintenance team **no longer needs to replace them multiple times each season**. In fact, records show that the **EJAC80E diaphragms operated for two years without requiring replacement**. The robust seals endure the fine particles that damaged competitors' transmitters. They survived multiple seasons and **did NOT require disassembly during pressure washing**. Further, with Yokogawa's innovative temperature compensation, the pressure transmitters provide consistently accurate measurements.

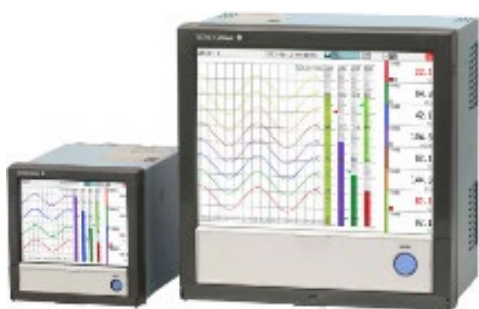


The Yokogawa magmeters require no replacements during product runs and are simple to clean after harsh water flushing and spray down. The **displays continue to work flawlessly** as they dry and return to full operation without requiring additional maintenance attention or disassembly.

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The FLXA402 analyzers measure pH and conductivity during clean in place (CIP), as the tanks are cleaned with caustic then flushed with water. Employees can be **confident in the sanitary equipment conditions** and monitor precisely when the caustic is thoroughly washed out of the system. No excessive flushing means **reduced water consumption and waste**.



In the not-from-concentrate tank farm, a layer of nitrogen covers the top of the juice. Yokogawa SMARTDAC+ recorders are **trusted to monitor and control the nitrogen level that preserves the product and keeps the juice fresh**. Since the SMARTDAC+ is FDA 21 CFR Part 11 compliant, important process data is safe, secure, and accessible by the right people at the right time.

Summary

The Yokogawa solution will provide a full return on investment due to maintenance cost reductions enabled by their increased reliability, robustness, and ease of use. There is no need for technicians to slow or stop the process to adjust instrument readings manually. Precise and stable measurements allow reliable, continuous operation.

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Key Advantages

- Improved savings with robust transmitter construction — longevity means fewer replacements.
- Less maintenance and a smoother process thanks to easier-to-clean instruments.
- Less parts and installation costs since one sensor can measure the full range of conductivity from 0-2000 mS/cm
- Long-term success results from strong support, both local and remote.

