



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



Solutions

Tomato Process Industry Measurement

Flow and custom concentration or density measurement



Fresh tomatoes



Promass 83 F



Food varieties

Product Information

Tomato processing involves one of the United States most popular fruits enjoyed in a variety of different forms. Tomato products can vary from 3.5% to 48.5% solids or simple juice measured at a target of 5 degree Brix.

Customer Profile

Endress+Hauser has various experience in the measurement from chopped raw tomato products to products ready to add into a can or bottle. The measurement requirements can vary - whether for mass, volume, or as a means to regulate the final product.

Value Proposition

- Quality
- Revenue
- Cost
- Efficiency
- Risk
- Soft Facts

Application description

Common products produced by the tomato industry are defined in tables published by the National Food Processors Association (NFPA) Bulletin 27-L. The NFPA tables define the refractive index, sugar scale, vacuum dried solids (AOAC) and net tomato soluble solids (NTSS), or specific gravity for all forms: juice, pulp, paste, paste 1+1, and ketchup. The product densities are referenced to 20 degrees C temperature.

Application challenges:

Tomato solids can create noisy outputs and unstable density or mass flow due to the effects of entrained air. Application range of operation and mounting requirements must be met to ensure the maximum repeatability. Customer knowledge of their process is critical to provide the desired measurement result. Excessive product shear can cause damage to the peptides and tomato solids.

Instrument used:

PROline Promass 83F

Previous instrument:

Densitometer or refractometry

Measurement results:

Coriolis mass flow meters can produce measurement resolution equal to 0.0005 g/cc density. Unlike refractometers, the Coriolis meter will measure all soluble and insoluble solids. Coriolis flow meters can deliver 0.1% mass flow accuracy with high repeatability.

Instrument description:

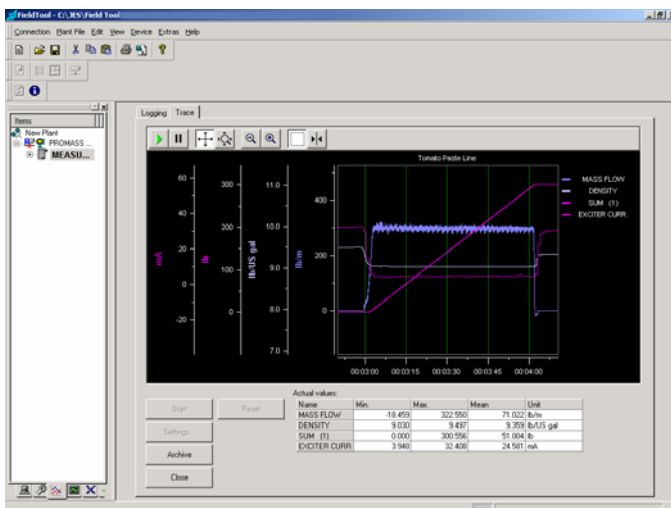
The Promass 83 series with custom concentration function is a multivariable meter designed to produce a direct measurement of mass flow, density, temperature, reference density, custom concentration, or a counter-inferred measurement of volumetric flow. The meter is ideally suited for batching operations or for grading final product density.

Measuring principle

Coriolis meters produce a measurement of mass flow based on the Coriolis effect. An independent measurement of product density is calculated from the resonant frequency of the sensing tube vibration.



An evaporation application is using a correlation of percent dry solids to the fluid density during the transfer of products through the production phase. The product test is shown over one minute as the mass flow rate, temperature, density and a conversion to percent dry solids were logged during the evaluation period.



A batching application for tomato paste 1 + 1 is pumped to be further mixed with other ingredients. A noticeable change in the measured density is obvious as the product, which entrains air, is pumped under pressure and the gas is compressed. Batching repeatability and density measurement were deemed "excellent" by the customer.

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