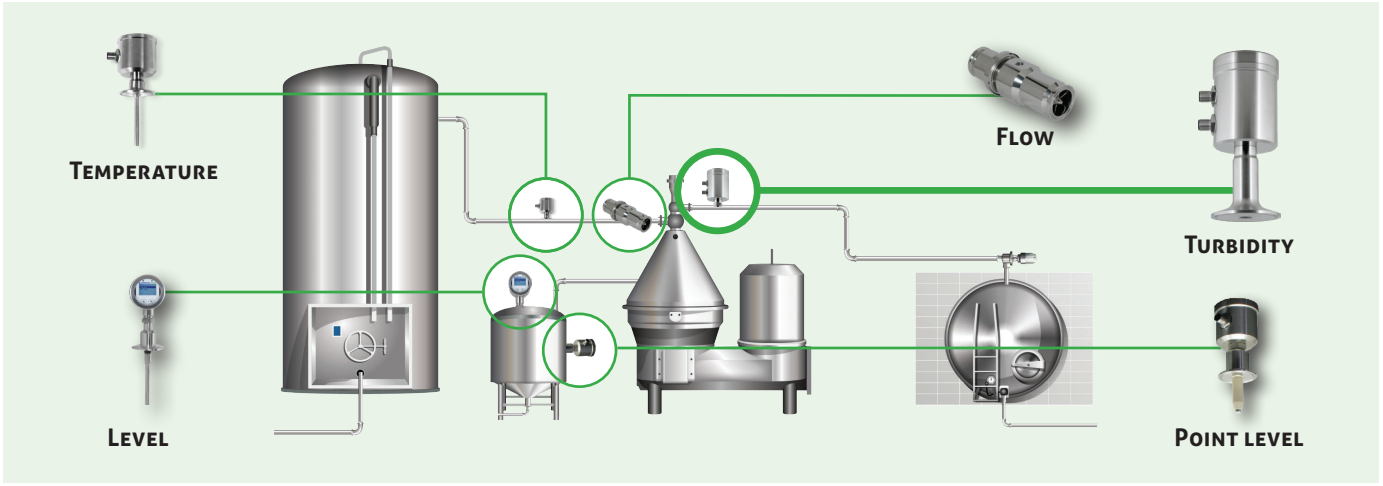
Customer application: Butter oil separation **FOOD**

Reliable butter oil separation through automated phase separation with turbidity measurement

During the production, processing, and packaging of butter, the processing equipment is regularly cleaned and remaining butter residues are washed out with pre-tempered water to ensure reliable hygienic production.

From this mixture, **high-purity butter oil** can be separated as a **valuable raw material.**
An important instrument for its automated, economical, and high-quality refinement is the **ITM-51 turbidity sensor** with a measuring range that is perfectly adapted to this application. In addition, sensors for flow rate, point level and temperature that match the specific medium support the process control for maximum system efficiency and reliability.



The application

The water-butter oil mixture from the plant rinsing process is pumped into a stacking tank in which natural phase separation already takes place. In a separator, the butter oil phase should be concentrated to a refinement degree of 99.5%. However, visual control during phase separation did not allow sufficient accuracy for the final product. Continuous sampling offered better quality, but this required a lot of manpower and proved to be very cost-intensive.

Finally, automated phase separation based on high-precision turbidity measurement of the butter oil mixture with the ITM-51 turbidity sensor proved to be the most efficient method for ensuring consistently high and verifiable production quality in practical operation.

The Anderson-Negele solution

The ITM-51 turbidity sensor uses the backscattered light method, which detects the reflection of particles in the medium. **With only one sensor head,** it can be integrated very easily and **front-flush into** the pipe system using a **weld-on socket or adapter.**

For precise separator control, the ITM-51 was **programmed individually in the application itself.** For this purpose, samples were taken in a test run, analyzed in the laboratory and compared with the values displayed in the sensor. In the practical test case, a range of 0-50 % TU was preset for a target maximum value of 0.5 % water content in the butter oil mixture.

The high process reliability in the separation of the phases ensures a constant quality of the butter oil. It also means that waste water management is considerably simplified, since the residual water is only contaminated to the minimum.

Further Anderson-Negele instruments

Flow
The reliable operation of the separator is monitored by one flow meter in the separator inlet and one in the separator outlet. Due to the low conductivity of the butter oil mixture, magnetic-inductive flow meters cannot be used here. The HM turbine flow meter is ideal for this application. Independent of the conductivity of the media, it achieves a very high measuring accuracy of ±0.5 % due to a rotor with non-contact pulse measurement.

Level / Point level
At certain intervals, the residual mass from the separator has to be emptied into a discharge drum. The fill level of this container must be monitored for automated control of the entire process. For this purpose, continuous level measurement with the potentiometric NSL-F is possible, which ensures fast and very precise level monitoring even with the pasty, creamy mass. Alternatively, an LS point level detector can be used, which is likewise independent of the conductivity of the medium and indicates with a full signal that emptying of the discharge container is required.

Temperature
Process monitoring based on temperature is made possible by a large number of different sensor types. In this application, the flush version of the TSM/TSB version is ideal, as no components protrude into the tube and the product flow remains completely unobstructed and can be cleaned by pigs.

Sensors used / recommended in this application (Process connections exemplary)

Turbidity ITM-51	Flow HM	Level NSL-F	Point level LS	Temperature TSM/TSB
				
Advantages	**Advantages**	**Advantages**	**Advantages**	**Advantages**
· Compact, robust, cost-saving and cost-effective · Glass-free sapphire optics · Very high accuracy ±2 % of measured value · Process temperature up to 226°F (130°C), CIP cleaning up to 284°F (140 °C) / 120 min. · Front flush design, therefore pig cleaning possible	· Compact turbine flow meter, measuring accuracy ±0.5 %. · For dosing and filling applications, independent of conductivity · Cost-effective alternative to magnetic-inductive systems · Very simple and fast rotor removal	· Maximum use of resources through precise measurement even with foam, pasty or adhesive media · Conductivity < 50 µS · For open and pressurized vessels from 50...3000 mm · Measuring accuracy < 1 % of the rod length · CIP cleaning up to 290°F (143 °C) / 120 min	· Reliable, capacitive point level monitoring, independent of conductivity and foam · Dielectric constant from >20 for difficult media · Response time <1 s · Different variants and options for optimal adaptation to applications	· Very high precision and variety of options for optimal adaptation to all applications · Front flush design possible · Many options for head size, transmitter, LCD display, process adaption, rod length...

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