competences

Food & Beverage: Improve quality and reduce costs

Endress+Hauser

People for Process Automation

Your challenges, our mission

“First serve, then earn!” George H. Endress, our company founder, believed that customers always came first. He was truly convinced that if customers were happy, the business would become successful almost on its own.
This attitude is even stronger today.
Our complete portfolio of instruments, solutions and services is tailored to address your specific challenges.

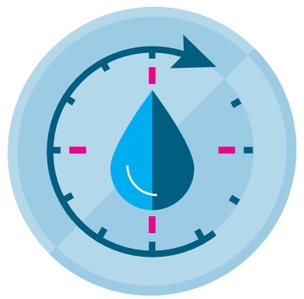
Manufacturing processes in the food & beverage industry are subject specific requirements. Manufacturers also must adhere to hygiene regulations to ensure food safety and reliability. At the same time, the plants need to operate efficiently.

Apart from the growing demands placed on food manufacturing processes, the industry is facing new challenges stemming from the impact of global megatrends. According to recent estimates, the world population will grow rapidly to 9.7 billion by the year 2050, two billion more than today. And once again, the industry will be challenged with producing enough food to satisfy this need. In more concrete terms, this equates to a 70 percent increase, an incredible statistic.

At the same time, the conditions have unfortunately become less favorable. Climate change and water scarcity will have an impact on fresh water availability. Solely resource conservation by means of water management and reuse can ensure continuous and sustainable production. Addressing these issues requires drastically changing the way food is produced and changing the way we eat. The solutions call for innovative technologies and ideas - now more than ever.

9.7 billion people on our planet by 2050, 2 billion more than today

70% more food has to be produced to ensure world’s nutrition



Climate change and water scarcity will have an impact on fresh water availability

Trust in quality

Ensure quality while reducing operational costs

Fulfilling the growing demands of safety, quality and efficiency within the food & beverage industry requires a partner with a complete portfolio of instruments, solutions and services.
Whether you need to upgrade your instrumentation to comply with hygiene regulations and standards, reduce utility costs or monitor critical production parameters - you can rely on Endress+Hauser.

Our know-how and expertise was, and continues to be acquired through collaboration with food & beverage producers from all over the world. This enables us to develop our entire instrumentation, solutions and services portfolio to satisfy the demands of your industry, so that you can guarantee food safety and quality while reducing operational costs.

Customers around the world gain a wealth of information from their processes by using our **products, solutions and services**

Relying on our **industry knowledge and skills,** we work together with our customers to find the best solution for every application

As a family-owned company since 1953, we are a reliable partner in every aspect – **for our customers, employees and shareholders**

Want to know more about our food & beverage expertise?
Visit us at www.endress.com/food-beverage

Repeatability in processing

Ensure consistent product quality and taste with our reliable inline quality monitoring. Benefit from a complete instrument portfolio and a strong global service organization.

Compliance to food safety and quality standards

Meet global hygiene regulations for food safety and quality standards with robust, proven in-use instrumentation. Benefit from traceable and accredited calibration services at your facility or in our lab.

High plant availability

Receive quality guidance of the optimum-fit products for your specific needs from a network of global and local experts who stay by your side through the entire life cycle ensuring plant availability.

Resource conservation

Get real-time, accurate data from your critical process points and save money on raw materials, water, energy and labor, without interruption in your production.

How we can support you

From raw materials, end products and utilities, to production and packaging – Endress+Hauser is there for you throughout the entire plant life cycle

Repeatability in processing

Monitor critical process parameters to ensure consistent product quality

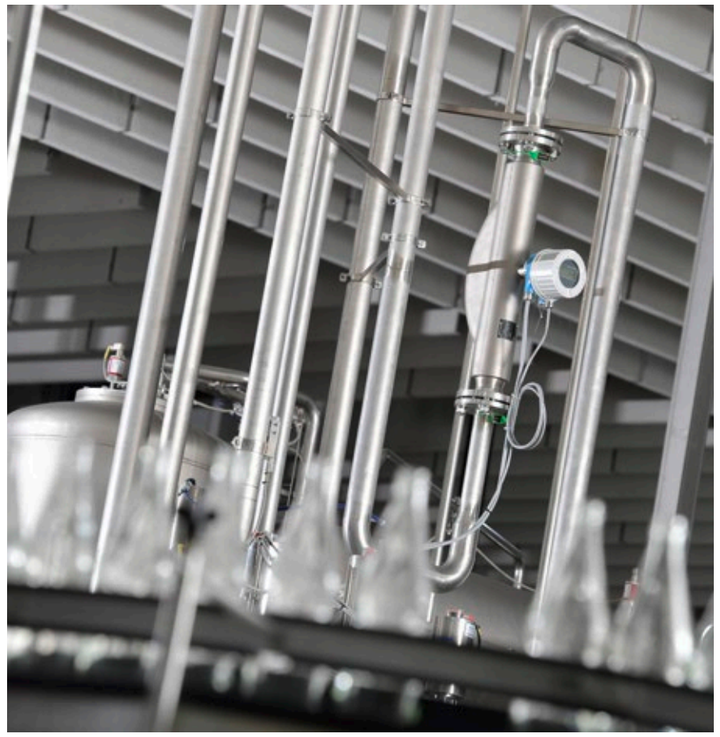
Consistent food quality and taste

Ensuring consistent product quality and uniform taste is a top priority in food processing. From precise dosing of the raw materials, to monitoring of all critical process parameters to ensure product safety, and comprehensive recording of the process parameter data - all of these aspects are crucial.
This can only be assured with highly-precise measurement instruments. While precision is crucial, repeatability is also key to ensuring reliable process conditions and stable product quality.

Inline quality measurement

Inline quality measurements reduce production downtime, off-spec products and manual sampling. They can reliably replace or supplement many of the offline measurements traditionally carried out in the lab. Moving from offline to inline measurements cuts labor costs by eliminating manual sampling and analysis and adds consistency by automating the measurement process. Inline measurements deliver results in real-time, allowing automation systems to continually adjust process parameters to optimize quality and increase throughput.

...in your soft drink production



Accurate concentration measurement

To ensure consistent quality of the end product, concentration can be measured in °Brix. This can be done directly in the process, using inline measurement technology. Permanent quality monitoring using real-time product data reduces time-consuming manual sampling and production downtimes. Endress+Hauser offers several options for inline density measurement such as in-pipe monitoring using Promass Coriolis flowmeters or in-tank monitoring with Vibronic density measurement systems.

130 billion liters of soft drinks are consumed worldwide every year.

The quality parameter: Color

One of the quality parameters for soft drinks is color. Color changes can occur from incorrect dilutions or incorrect dosing of raw materials. To ensure color consistency, optical systems can be used for inline quality monitoring and to detect color changes.

...in your beer production

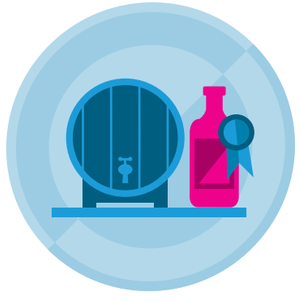
Global service support
When it comes to critical control points, properly installed measurement instrumentation ensures reliable operation. Our service experts, who are available around world, have the expertise and experience needed to safely integrate your instruments into your processes.

Consistent quality in your fermentation process

The goal of fermentation is to produce alcohol. Based on the condition of the yeast, the oxygen supply level is controlled so that the yeast grows at an optimum rate. Reliable temperature measurement is key throughout the brewing process. Precision temperature sensors, combined with ultra-fast response times and a hygienic design, ensure optimal temperature control. (Apparent) Extract measurement with high accuracy in fermentation vessels using different Endress+Hauser technologies, ensure a stable fermentation process by permitting continuous adjustments.

Optimizing yield and quality of wort production in your brewhouse

The pH value in the mash and foundation water should be monitored to achieve optimum conditions and to complete the starch conversion. Non-glass pH sensors and retractable holders, combined with Memosens technology, guarantee the highest degree of reliability and accuracy.



1,96 billion hectoliters of beer were produced worldwide in 2017. Consistent and stable product quality is key for all breweries

Color based in-line detection

Breweries often produce a wide range of beer products. Maintaining a clear overview of the production process is a significant challenge. To ensure smooth production and reduce beer loss, where possible manufacturers must be able to automatically distinguish the individual varieties using inline methods. The measurements are performed with dual-channel photometers in order to analyze color absorbance according to EBC guidelines, which are then combined with conductivity measurements to identify the individual beer products.

Compliance to food safety and quality standards

Keeping our food safe in a globalized world

Calibration services
Regular calibration is essential to keep your process instrumentation in-spec. Endress+Hauser provides timely, traceable, and cost-effective services that are accompanied by clear and concise calibration certificates. From accurate on-site testing, to fully accredited laboratory calibration, we carry out and advise you on every aspect of instrument calibration to meet your all of your business needs.

Compliance to regulations and standards

Endress+Hauser meets global hygiene regulations for food safety with robust proven in-use products.
Our food safety concept consists of three main pillars:

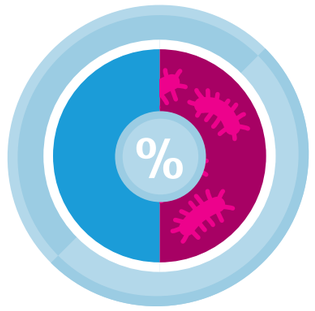
- Hygienic instrument design and construction
- Independent process measurement values to increase transparency and efficiency
- Compliance with regulations, standards and HACCP concepts

Food safety and public health

Much of the global population relies on others for its food supplies. Food is no longer purchased from farms, rather in retail stores.
To ensure a safe food supply chain, producers and their partners must implement safe production policies and procedures by following food regulations and standards to ensure food safety and public health on a global basis.

Hygienic design prevents contamination

Manufacturers need hygienic processes to avoid microbial, chemical and physical contamination of the food products and exposure to impurities. Incorporating a hygienic design into your production facilities can help prevent pest infestation, microbiological activity, product contamination caused by chemicals and particles, as well as facilitate cleaning and sanitation and preserve hygienic conditions.



50% of all recalls are caused by microbiological contamination. Hygienic design helps ensure food safety

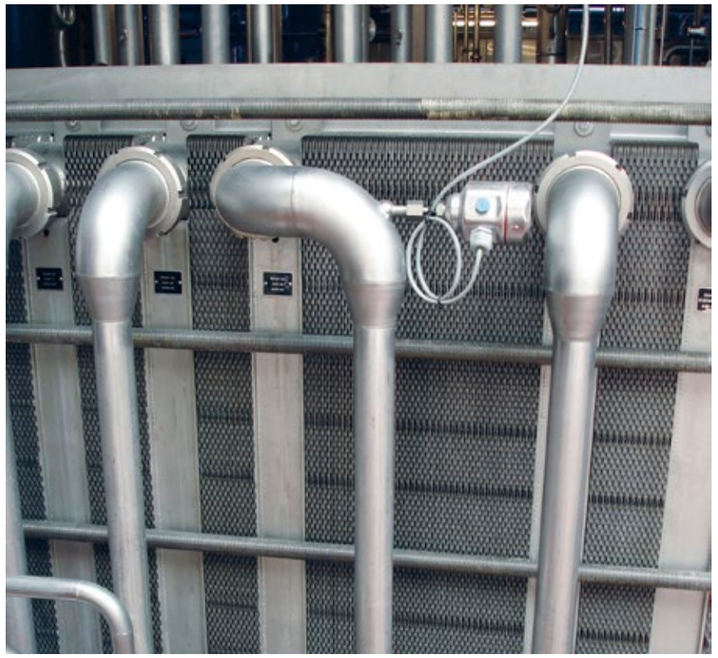
Demands to process equipment

Our entire hygienic product offering fulfills the food & beverage industry's hygiene requirements. Endress+Hauser's food industry portfolio, which complies with 3-A and EHEDG, utilizes GRAS materials (Generally Recognized as Safe) approved by the FDA and listed in EN1935/2004. The instruments are available with hygienic process connections.

...in your dairy production

Pasteurization

Thermal processing is of utmost importance for production, consumer safety and efficiency. Thermal processing controls are highly regulated according to local standards. Critical control points in the pasteurization process are temperature, flow velocity and differential pressure across the heat exchanger, all of which must be sealed and connected to regulatory-approved controls.

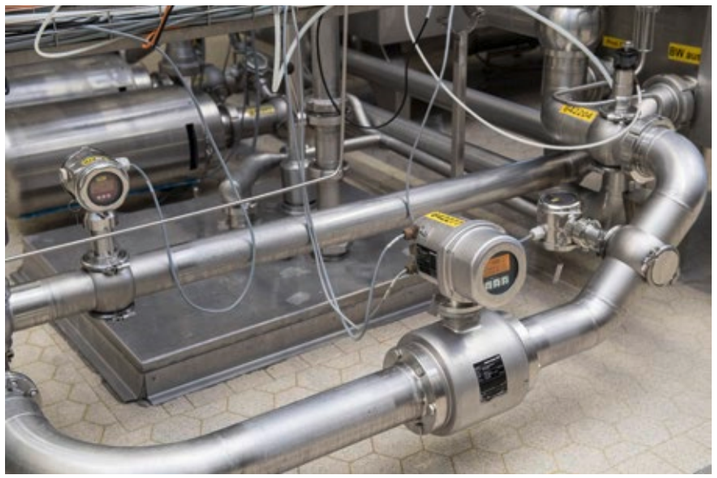


Fast temperature signals improve heating control

Endress+Hauser boasts the world's fastest temperature sensor for hygienic processes. iTherm QuickSens supplies the correct temperature value three times faster than any other sensor, as the t90 time shows. The accurate and fast measurements prevent wasted energy and keep the product from being exposed to more thermal stress than necessary. By relying on this technology, you can improve product quality and lower your costs.

Flow velocity in thermal processing

Accurate flow velocity measurement ensure the right amount of heat is applied in order to achieve reliable results. The electromagnetic flowmeter carries the main burden of flow measurement in dairy operations and plays a critical role in thermal processing. The Proline Promag H sensor features integrated temperature and conductivity measurements that broaden the installation scope. In addition, the Heartbeat technology features verification and diagnostic functions that simplify maintenance and extend calibration intervals.



Differential pressure across the heat exchanger

Heat exchangers are used to keep raw milk products from coming in contact with or being mixed into the pasteurized product. Monitoring the differential pressure across the heat exchanger is critical, reliably done using two Cerabar pressure transmitters. The pressure must be higher on the pasteurized side to ensure that raw milk do not enter the pasteurized side in case of a pinhole leak in the heat exchanger.

Innovative measuring technologies
Endress+Hauser takes pride in being one of the most innovative companies in the process automation industry. We currently own approximately 7,500 patents and patent applications. This figure is no coincidence, given that we reinvest more than 7 percent of our revenues into R&D.

Reliable data management

Seamless data recording is key to product traceability. It enables targeted monitoring and optimization of your production process. The recorded process values are clearly displayed and stored using data managers from Endress+Hauser. The data is protected by restricting the access and requiring electronic signatures (in accordance with FDA 21 CFR, Part 11).

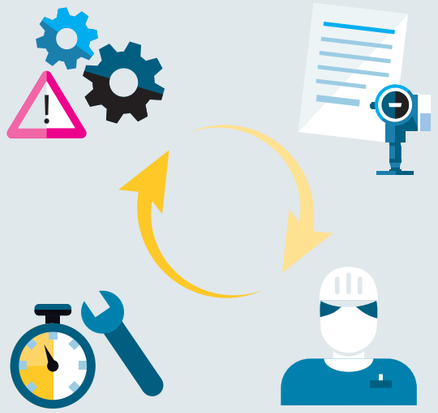
Ensure high plant availability

Save time and cost by running smart and efficient through information driven operations

Installed Base Analysis
Step-by-step towards preventive maintenance

Our Installed Base Analysis service helps you make the right maintenance decisions based on the available resources and the needs of the process.

- Reduced complexity of the installed base
- Identification of obsolete plant documentation
- Optimized maintenance schedule that reflects your critical measuring points, level of available expertise and required support
- Spare parts standardization
- Migration plan for critical measurement points



Up to **40%** savings in your spare part inventory by instrument standardization

Reduce costs with instrument standardization

Whether it involves a new installation or a modernization project, selecting and designing the right instrumentation is a major challenge for food producers. Companies must take into account the latest developments and regulations with respect to hygienic design, food safety and quality. Ensuring high plant availability calls for a high degree of industry and application knowledge.

Project concept and planning

Involving all participants at the right time is a key condition for successful completion of a project. Professional communication and execution is especially important at the beginning. Clear guidelines between all partners – from project owner to system manufacturer - ensure a smooth-running project.

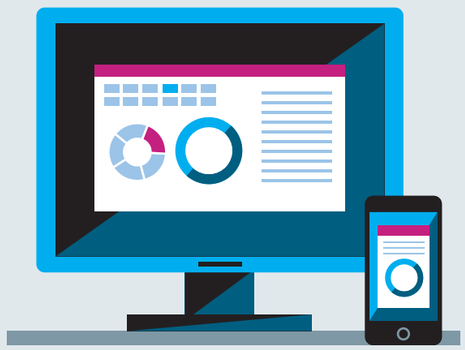
Selecting and designing the right measurement instruments requires a considerable amount of time and resources.

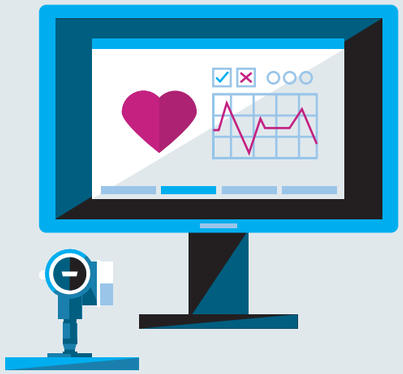
Standardizing the instrumentation significantly reduces this complexity and offers even more potential:

- Faster time-to-market through reduced commissioning acceptance time
- On-going operational cost savings such as simplified calibrations
- Lower spare parts inventory
- Reduced training efforts
- Increased plant availability by utilizing advanced diagnostics and integration tools

IIoT – Digitalization

The Industrial Internet of Things or IIoT is one of the important topics in the food and beverage industry. You can take the first step towards this digital future with Endress+Hauser right now. We empower you to optimize your productivity and efficiency by leveraging with our world-class measuring instruments. To provide you with more transparency and insights on your key business processes, we developed a set of apps (web apps and smartphone apps). These applications are making use of the data collected from the field and thanks to intelligent algorithms they translate data into valuable information for you.





Heartbeat Technology
Thanks to the Heartbeat Technology, measurement points can be easily verified without interrupting your processes. As the devices continuously diagnose themselves, test cycles can be extended. The self-diagnostic functions of our instruments not only increase the reliability and safety of critical control points, but also support your documentation by automatically generated reports. These reports provide precise instructions for necessary maintenance procedures. Furthermore, the process and device parameters can be used to optimize your maintenance efforts and your processes.

...in your sugar production

Innovative, robust and easy-to-clean technologies

Sugar production is a cost-sensitive business. Robust, durable and high-quality process instruments are of utmost importance because they optimize performance, ensure consistent quality and increase plant availability.
One of the most challenging applications in sugar production is the level measurement in the evaporator. A low clarified juice level can damage an entire batch and cause an unscheduled outage. Radar technology mounted in a bypass system ensures robust, stable and reliable level monitoring.
Harsh production environments and cleaning processes frequently damage the differential pressure system in evaporators. A reliable one-to-one replacement is our innovative electronic differential pressure system with a ceramic cell offering maximum robustness, abrasion and vacuum resistance.

Keeping pH within safe limits and °Brix on high level

The optimal pH range in the crystallization process is 6.5 to 7.0, which ensures top-quality end products. Given the low ionic strength of the water mixed with sugar, we recommend our ISFET or Ceramax digital non-glass sensors that feature the Memosens technology.
Syrup is produced in the evaporation phase with about 65° Brix. Apart from the main task of measuring mass flow and density, the Promass Coriolis flowmeter also performs a highly-precise in-line analysis of the °Brix concentration. This new flowmeter platform organizes clear, standardized diagnostic notifications using the Endress+Hauser Heartbeat technology, which enables predictive maintenance while supplying proof of reliability and process safety.

...in your edible oil production

Temperature control in the refining process

During refining, impurities are removed from the raw oil using chemical or physical processes. Temperature control is critical to avoid solidification.
To guarantee an efficient process , the temperature can be monitored with the innovative iTHERM TrustSens self-calibrating temperature sensor. Saturated steam is added to the process to maintain a constant temperature of up to 150°C. Our Prowirl F 200 vortex flowmeter measures the amount and quality of the steam with superior accuracy.

Vacuum-proof pressure measurement in the deodorization process

Deodorization of edible oils removes unwanted volatile components. High temperatures and vacuum are key indicators in such processes. Ceramic measuring cells are a proven method for maintaining a proper vacuum during the process. They guarantee a high degree of system safety thanks to the vacuum-proof ceramic membrane and built-in breakage detection. Our shock-proof Cerabar S pressure transmitter features the longest life cycle and highest degree of accuracy.

Solutions to improve productivity while lowering your costs
Optimize your systems and processes with solutions tailored to your needs. With the combination of reliable instruments and systems combined with services addressing your needs we help you to overcome your challenges. Benefit from the complete offering from consulting, shared requirements analysis, commissioning and service during operation. We make use of existing information effectively and integrate the data consistently into your IT systems to optimize your processes.

Resource conservation

Feed the world with minimal food, energy and water waste in production

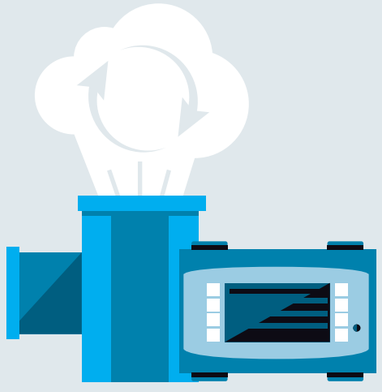
Reduce product loss and costs

As raw material and energy costs rise, asset utilization within food and beverage plants becomes even more crucial. Inline instrumentation provides accurate real-time data from critical process points for monitoring and control, thus helping reduce cleaning time, energy and detergents while providing full traceability without interrupting production.

30% Savings on cleaning agent costs by ensuring correct detergent strength and phase separation

Efficiency in steam generation and steam distribution

Steam powers industrial applications around the world. Steam is sustainable, efficient and ecological, but its production and use are demanding. Benefit from our expertise, which helps you to boost the energy efficiency in your steam generation and -distribution with reliable process data such as the exact steam quality. Therefore our extensive range of measurement instrumentation, services and integrated steam solutions complies with relevant norms and regulations.



...in your CIP process

Concentration measurement

To ensure optimal performance of cleaning in place systems, the detergent concentration must be monitored during cleaning (in the loop), as well as in the makeup tank. This can be done with conductivity measurements, which require the least amount of maintenance and calibration and use less energy, chemicals and water. We offer multiple conductivity sensor/transmitter options designed specifically for CIP applications.

Phase separation

Know exactly what is in the line and remove the guesswork. Transition sensors determine when each phase of the CIP cycle ends and the next should begin. Conductivity, optical turbidity or pH sensors are used to determine if product residues or rinse water remain in the line, because the CIP process can be started only if there are no product residues after the first rinse cycle. Fast response is critical in order to reduce product and water loss and save valuable time.

Temperature measurement

With cleaning in place processes, temperatures have to be closely monitored at various points to ensure a balance between cleaning effectiveness and energy consumption. And because temperature is viewed as a critical control point, calibration is frequently required. The QuickNeck technology from Endress+Hauser simplifies this step.

Flow measurement

Flow measurement is fundamental for an efficient CIP system. The desired scrubbing effect is achieved by ensuring a strong turbulent flow. The Promag H series is designed to handle aggressive chemicals at elevated temperatures and higher than normal vibration caused by turbulent flow. These flowmeters also include temperature and conductivity interfaces, in addition to flow value, which are available via 4-20mA, Ethernet I/P or Profinet.

References

Instrumentation for a progressive dairy company project

Customer challenge:
With this new plant, the challenge for MILEI involved replacing the technology across the entire system, improving quality and manufacturing new whey and milk products, while increasing capacity and efficiency at the same time. MILEI was aware from the start that the biggest challenge was harmonization of the measurement technology and hygiene standards across all of the system partners. That meant finding a competent partner capable of tackling all of these challenges.

Our solution:
Endress+Hauser was involved in the project as early as the planning phase. Given our reputation as an expert partner and complete supplier with extensive industry and application know-how, MILEI outsourced the "instrument standardization" project to Endress+Hauser. This ensured the installation of the right instrumentation solutions for hygiene-sensitive areas, while providing standard measurement technology across all equipment providers wherever possible.

Customer benefit:
- Lower spare parts inventory
- Reduced commissioning times
- Reduced training efforts

Reliable sugar manufacturing process

Customer challenge:
Sugar manufacturing is a seasonable business. Each year, the Schweizer Zucker AG operates three around-the-clock shifts to process the sugar beets within a roughly 100 day timeframe from late September to late December. The employees and the measurement instruments work under extremely tough conditions during this three-month production period. Given that an interruption to production costs 4,000 Euro per hour, production reliability and plant availability are the highest priority.

Our solution:
The broad and proven product portfolio from Endress+Hauser ensures the operation of each important step in the sugar production process, from loading the sugar beets into storage, to extraction, evaporation and crystallization. The measurement instruments reliably capture and evaluate data relevant to the process. The measurement instruments feature a robust design that ensures flawless operation not only in production, but also during the subsequent cleaning and maintenance phase.

Customer benefit:
- Reduced outage
- High plant availability

Speed and accuracy to meet your quality demands

Customer challenge:
Both very accurate temperature control and very fast response to temperature changes are vital for the efficient and safe production of bacterial cultures, which are used for sour milk products such as yoghurt and other types of food. During the UHT (Ultra High Temperature) treatment, the temperature must be kept above 139 °C (282°F), otherwise, the production batch may need to be destroyed in the worst case scenario.

Our solution:
CHR HANSEN conducted extensive testing of the iTHERM TM411 temperature sensor with convincing results. The unparalleled response time allows continuous process monitoring and enables a constant temperature to be maintained within a very small range.

Customer benefit:
- Additional CIP cleaning is not required after recalibration
- Reduced maintenance costs

... and how can we help to improve your processes?
Visit us at www.endress.com/food-beverage

www.addresses.endress.com

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Endress+Hauser

People for Process Automation