

The HOT topic in Beverage Production

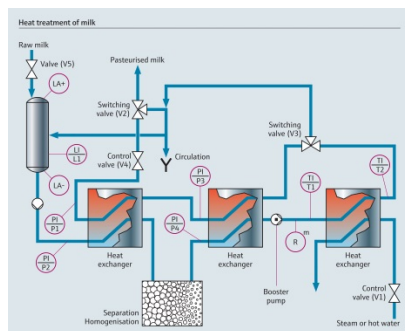
Who will have the last word?

Louis Pasteur was a French biologist and chemist renowned for his discoveries of the principles of vaccination, microbial fermentation and pasteurisation. He is remembered for his remarkable breakthroughs in the causes and prevention of diseases. Pasteur's research showed that the growth of micro-organisms was responsible for spoiling beverages, such as beer, wine and milk. With this established, he invented a process in which liquids such as milk, were heated to a temperature between 60 and 100 °C. Pasteur patented the process to fight diseases. The method became known as pasteurisation, and was soon applied to beer and milk.



“Gentlemen, it is the microbes who will have the last word”... *Louis Pasteur.*

Today nearly every liquid sold in stores are pasteurised to prevent the growth of bacteria and the potential for illness due to these unwanted microorganisms. Milk is one of the most susceptible liquids to this and only pasteurised milk is considered safe by the FDA. Pasteurisation of milk results in at least 95 - 99% of the bacteria and micro-organisms present (pathogenic germs) being destroyed.



A typical pasteurisation process for milk

Raw milk is passed from the accumulation tank into the pre-settling tank. To maintain constant pressure on the suction side of the pump, the milk is kept above a minimum level in the pre-settling tank. By means of level switches and valves, the fill level is maintained as to prevent any air intake. The Liquipoint FTW33 uses a new sensor technology offering the advantages of reliability and automatic build-up compensation, even in the presence of foam or bubbles. No onsite calibration is required and the unit is installed without the need for any special tools. The transmitter design is very compact and free of angles and edges, a real flush-mounted sensor design, to ensure process and product quality is not affected. Even heavy wash-downs are no trouble for the IP69K rated sensor.



FTW33

If during heat treatment the product flow needs to be recycled (where heating is made inadequate or if contamination is present in the heat exchanger), then the milk is often fed into the pre-settling tank, forcing the product to flow in a closed circuit until the error is rectified. From the pre-settling tank, the milk is passed into the pasteuriser. In heat exchanger 1, the raw milk is pre-heated to approximately 55°C. It is then fed to the separator and homogeniser, and then proceeded into heat exchanger 3, where it is heated to the pasteurisation temperature (>72°C). In the heat retaining section, the milk is kept hot at the corresponding temperature for the required time, forcing it to flow at a constant rate through a given pipe length. Heat treatment time is determined by flow velocity and the pipe length. An electromagnetic flow meter is well suited to precisely measure the flow rate of the milk. The Promag H is a multivariable measurement for flow, measuring volume flow, temperature, conductivity, mass flow, corrected volume flow and corrected conductivity. The measuring principle is virtually independent of pressure, density, temperature and viscosity. Time-saving local operation without additional software and hardware is available via the integrated web server. The innovative Heartbeat Technology also allows online verifications to be done on demand as often as needed.



Promag H100

The Pt100 temperature sensor (T1) and valve 1, control the heat exchanger temperature. The Pt 100 sensor (T2) at the outlet of the heat exchanging section also monitors the temperature in order to ensure that the required temperature prevails in the entire the heating section. If the heat exchanger temperature falls below the required temperature, then safety valve 3 switches and directs the incorrectly treated milk into a circuit or back into the pre-settling tank. Specially designed, fast reacting, accurate temperature sensors must be used for this task. The temperature measurement and control is of extreme importance and has a direct impact on the taste and quality of the milk. A lower temperature can result in the risk of microbiological contamination and therefore a risk to the consumers' health. Specially designed for use in hygienic applications within the Food & Beverage industry, the iTHERM QuickSens is the fastest temperature sensor in the world, with the quickest response times (t90s: 1.5 s). The TM411 (iTHERM QuickSens & QuickNeck technology), allows for quicker detection and faster reactions on temperature changes. The innovative technology also allows for shorter immersion lengths compared to standard inserts. The TM411 has the best long-term stability and combined with simple and fast recalibration via QuickNeck, results in time and cost savings.



TM411

Once the milk has been pasteurised, it is then passed to the heat exchangers 1 and 2, where it is cooled down to 4°C. An electronic differential pressure transmitter can be used to calculate the differential pressure. The Deltabar FMD72, eliminates the typical problems of conventional differential pressure systems. The problems most frequently associated with oil-filled capillaries are; unreliable measured values due to temperature changes, leaks or condensate. The FMD72 provides precise measurement and also facilitates reliable and safe process control. Production downtimes due to unexpected maintenance of capillaries are no longer a concern, as the system is completely electronic.

The differential pressure, together with the temperatures and flow rates can all be recorded on a data acquisition system. The advanced Memograph M is a flexible and powerful system for organising process values and allows perfect monitoring and registration of all the process parameters in a glance. The measured process values are clearly presented on the display and logged safely, monitored against limit values, and analysed. Via common communication protocols, the measured and calculated values can be easily communicated to higher-level systems and individual plant modules can be interconnected. The tamper-proof data storage and personalised access authorisation with electronic signature (FDA 21 CFR 11), allows for high data security.



Memograph RSG45

For more information, please visit: http://bit.ly/Endress_pasteurisation

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