Quality standards are met! Hygienic measurement technology in the beverage industry

In the beverage industry, strict hygiene regulations apply for production to consistently produce beverages at a uniform standard of quality. Contamination with undesired microorganisms signifies a considerable loss in quality and can lead to health risks for the consumer. A special hygienic design is therefore required for sensors in beverage production.

Temperature, pressure, and conductivity are frequently recorded measurands when manufacturing beverages. These must be monitored and regulated for many processes to ensure uniform product quality. However, the temperature probes and pressure transmitters required for measuring are subject to various requirements in the individual areas of beverage production. Several of these measuring instruments are presented in the following.

General requirements for measuring points

In the food industry, measuring devices with particular requirements are used. One such requirement focuses on the materials from which these measuring devices are made. The materials must be non-hazardous to health if the parts made from them come into direct contact with food. In addition, special regulations and standards exist. Examples are the EU framework regulation for consumer products ("Regulation [EC] No. 1935/2004 on materials and articles intended to come into contact with food" or "Regulation EC No. 2023/2006 on good manufacturing practice for materials and articles intended to come into contact with food"), the EHEDG standards, the 3A, and the FDA.

For instance, JUMO generally uses 316L stainless steel with a surface roughness of ≤ 0.8 μ for sensors used in the beverage industry. If plastic is required for sensors (e.g. for the inductive performance measurement cells), the FDA-compliant PEEK is useful. If seals are required, the FDA-compliant material is also used in this case.

Specific regulations also apply for the connection of sensors with the production plant – known as the process connection. These regulations focus particularly on its cleaning capability: if the process connection is difficult to clean, remaining pollutants can contaminate the next batch. An important aspect of effective cleaning is not only the choice of the correct connection, but also its correct insertion. For this purpose regulations and standards also exist which were developed by the EHEDG and other organizations.

JUMO offers an EHEDG-certified adapter system for different sensors that meets the requirements of the beverage industry. The modular system can be used for a variety of measuring devices and offers a wide range of process connection adapters such as VARIOVENT® clamps, aseptic fittings, welding sockets, and orbital welding sleeves. As a result, the measuring device can be mounted and dismounted as often as required. Thanks to simple installation, cleaning, and repair processes, the plant downtime and the consequential relevant costs are minimized.

![PEKA adapter system](https://example.com/peka.png)

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Temperature sensors

In the beverage industry, RTD temperature probes equipped with Pt100 measuring sensors have become established. The advantages of the devices lie in their high durability and the good reproducibility of the electrical features. For the electronic system, high-grade stainless steel heads are used with protection type IP67. Different devices are available for various application areas. The JUMO Dtrans T100 is ideal for measuring points that are difficult to reach and that offer little room for the measuring device. It is available with all current process connections and can be used with or without transducers.

![Temperature sensors](image)

For instance, if the user measures the temperature in a milk cooling tank and wishes to display it directly on site while simultaneously wanting to activate cooling during temperature excess, then the JUMO DELOS T is the ideal device. It is a temperature switch with a display and analog output. The illuminated temperature display can be rotated as required, so that the DELOS T can also be installed above the head. In the event of an alarm, the illuminated temperature display will switch from amber to red.

Pressure sensors

For pressure measuring devices, sensors and transducers always form a unit. Piezoresistive sensors are usually used as pressure sensors. They are therefore highly ideal for typical measuring ranges in the food industry (0 to 100 mbar – 0 to 25 bar). Standard devices are intended for use with medium temperatures between –30 and +120 °C.

For CIP (Cleaning in Place) plants and sterilization plants, hygienic process connections are available for medium temperatures of up to 200 °C. The accuracy of pressure sensors is crucial for the quality assurance of the production process.

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GEA Westfalia Separator Group GmbH
Werner-Habig-Straße 1, 59302 Oelde, Germany
Phone: +49 2522 77-0, Fax: +49 2522 77-2089
ws.info@gea.com, www.gea.com

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transmitters is essentially specified through their deviation from the characteristic line and the medium temperature. For the electrical connection, different solutions are available depending on the required protection type. A cable socket in accordance with DIN EN 17 5301 is sufficient for compliance with the IP65 protection type. In order to fulfill the IP67 protection type, a connection with a fixed connecting cable or an M12 round plug is used.

The JUMO tecLine Ci conductivity sensor with an integrated, rapidly reacting temperature probe is ideal for this measurement and for conductivity measurement in production plants. It records the conductivity as well as the process temperature. The overall construction of the sensor conforms to EHEDG standards. The joint and gap-free design as well as the high quality of the finish meet the highest standards for aseptic processes. The body material is made out of FDA-compliant PEEK (polyether ketone) in a quality that is approved for food use. Some versions can be supplied with an EHEDG certificate.

The sensor is primarily designed for use in technical facilities of the food and beverage industry. As the sensor measures inductively, it is practically maintenance-free compared to the conductive measurement method. Deposits and grease/oil films on the surface of the sensor have no effect on measuring accuracy.

**Summary**

A plant constructed in accordance with hygiene considerations – and which is equipped with measurement technology that also corresponds to hygiene regulations – allows the beverage producers to work economically and efficiently in different areas.

JUMO makes an active contribution to reducing costs in the food industry with its measurement technology. Relevant topics such as applied materials, process connections, and the installation of measurement technology are and will be always the top priority to fulfill industry requirement.

**Author:**

Dipl.-Ing. Christina Hoffmann  
Market Segment Manager  
Pharma and Food  
JUMO GmbH & Co. KG  
www.jumo.de