labom
MEASUREMENT TECHNOLOGY

Temperature Measurement in the Pharmaceutical Industry

Application:

Temperature Monitoring in the Sterilization Process

Temperature transmitter with field housing and PROFIBUS PA plug connector (patented measuring system)

In order to reduce the risk of contamination, critical hygiene regulations, such as the regular sterilization of the plant at temperatures above 121°C, govern the manufacture of drugs in the pharmaceutical industry. The resistance thermometer based on clamp-on technology from LABOM accurately regulates the temperature. The device has been designed for use in hygienic applications and is easy and inexpensive to install.

The „Right Medicine“ for Sterilization Processes

Non-Contact Measurement Reduces the Risk of Contamination with Microorganisms

The populations of industrialized nations may thank the tremendous advances in medicine and the availability of drugs for their longer life expectancies. In order to maintain high quality levels in automated production processes, drug manufacture must meet very stringent requirements that minimize the risk of contamination by microorganisms. The key to preventing contamination, is the regular cleaning and sterilizing of the plant. In the SIP process (Sterilization in Process), the plant is cleaned with vapor at 121°C to 135°C for a period of 15-30 minutes. The resistance thermometer based on clamp-on technology from LABOM accurately regulates the temperature. The device is also remarkable for its hygienic design; it is easy to install and operate; and comes at a very reasonable price.

The task: All parts supplied for plant have to be subjected to very stringent quality constraints to assure quality, to avoid costs arising from production outages, and to ensure they will function correctly under extremely tough operating conditions. Temperature measuring points must be hygienically designed: no contaminated accumulations must be allowed to occur; it must be possible to fully clean the devices; and they must meet the accuracy specifications of the plant operator. Although standard measuring devices with immersible sensors (invasive measuring devices) are accurate temperature measuring systems, they are a few significant disadvantages with them: they must be welded into the pipe systems, and the welds have to be polished and a record kept of them. This all adds up to increased costs and, still, there is a risk of particle accumulation at the most carefully welded joints. Remember: should inconsistent measurements occur with immersible sensors, the sensing points can only be modified at considerable cost. What's more, the devices can only be installed in piping of at least 10mm inside diameter, and the temperature sensor inserted in the pipe obstructs the fluid flow.

The solution: The resistance thermometer with clamp-on technology from LABOM measures the pipe temperature without having to interfere with the pipe (this applies to pipes with outside diameters greater than 4 mm). The best installation position for the thermometer with clamp-on technology to monitor the sterilization process can be found by simply re-clamping it on the pipe.

The resistance signal is transmitted via a PROFIBUS PA transmitter to a controller.

Customer benefits: Temperature can be measured by simply mounting the device on any existing pipe system. Temperature measurement takes places via a modified, fast-response Pt 100 measuring element, which is positioned and isolated by means of a pipe collar of heat-resistant plastic. A special silver temperature sensor, which is pressed against the pipe by means of a constant elastic force, is fitted in the measuring insert.
The temperature decoupling of the sensor from the housing and the good heat transmission between pipe system and sensor achieved with LABOM's resistance thermometer with clamp-on technology, lead to consistently good measurements – measurements, which are of the same standard as those achieved with immersible sensors with protective sleeve, or with inline measuring systems. The measuring device is held in place by a mounting device that positively guides and presses the insert with pre-defined elastic force against the pipe surface. Because the insert is always kept in the same installation position, all measurements taken are reproducible. The sensor can be replaced without removing the pipe collar. Since the measuring point is mechanically unaltered by recalibration or sensor replacement, it is an accurate, long-term measuring point.
Tests show that dead spaces (inaccessible/restricted areas such as nooks and crannies), seals, and protective sleeves in pipe systems are problematic, even if they comply with GMP (Good Manufacturing Practice) guidelines and FDA (Federal Drugs Administration) recommendations.

The resistance thermometer with clamp-on technology from LABOM fully meets the requirements for an ideal, hygienic measuring point: it is a non-contact device that does not disturb the process; it is extremely accurate; and delivers measurements that are of a constant and verifiable quality.

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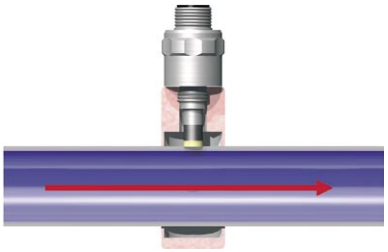
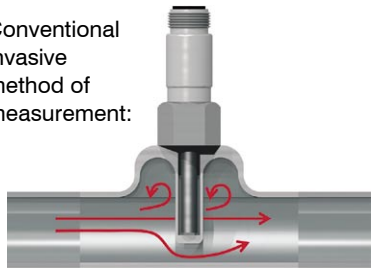
Clamp-on



- **no hard-to-clean 'dead pockets'**
- **very accurate**
- **easy to install without any welding**
- **no process interruption**

Conventional invasive method of measurement:



- welding adapter required
- obstructed flow in pipe
- high installation costs

DESCRIPTION OF DEVICE:

Resistance-Thermometer for Pipe Temperature Measurement with Clamp-On Technology, Model GA2610 (Data sheet **T4-028**)

- Adapted for all nominal pipe sizes
  Outside diameters: Ø 4 to Ø 57.0 mm
- Optimal silver temperature sensor,
  thermally isolated, PVDF insulation sleeve,
  influence of ambient temperature < 0.2 % / 10 K
- Measuring range; -20 °C to + 160 °C
- 1 x Pt 100 as per DIN 60751 Class A,
  Replaceable measuring insert
- Hygienic design as per EHEDG
- Integrated PROFIBUS PA transmitter
- Electrical connection; M 12 plug connector
- Response time:
  For example, for 13.5mm pipe outside diameter:
  T90 = 6 s, deviation from reference Pt 100: - 0.5 °C