

# Application Note

## Calibration of sanitary sensors

### Food Processing and Pharmaceutical Industries

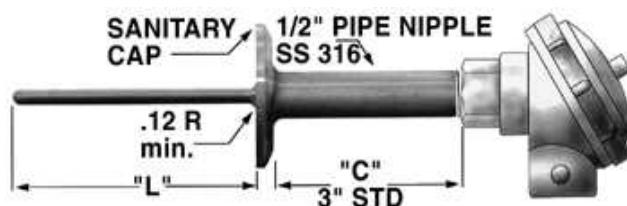
The food processing industry processes and manufactures a wide variety of foods including dairy, fruits and vegetables, and poultry. The pharmaceutical industry is primarily engaged in manufacturing biological and medicinal products.

### Background

The food processing and pharmaceutical industries are heavily regulated by government agencies such as the FDA. These agencies require companies to have manufacturing processes that include regular temperature monitoring according to traceable temperature standards. The food processing and pharmaceutical industries use sanitary triclamp sensors to regulate and check various process temperatures.

Critical applications in these industries, including food processing, pharmaceutical product development, and pharmaceutical product sterilization, are very dependent on temperature. The food processing and pharmaceutical industries use sanitary triclamp sensors to monitor temperature in various processes. The triclamp sensor's housing allows it to be clamped and sealed inside storage tanks, pipelines, and freezers.

### Picture of sanitary triclamp probe



### Temperature Measurement Critical to these Industries

Temperature is a critical factor in the processing and storage of food products. The FDA requires compliance with traceable temperature standards in the processing, storing, and transporting of food products. Temperature ranges vary from  $-45^{\circ}\text{C}$  to  $212^{\circ}\text{C}$ , but most applications fall between  $-20^{\circ}\text{C}$  to  $150^{\circ}\text{C}$ . Food products are spoiled when taken outside allowable temperature ranges set by the FDA. Required accuracy varies for different processes, but the typical range is  $\pm 2^{\circ}\text{C}$  to  $\pm 0.1^{\circ}\text{C}$ .

In pharmaceutical applications, temperature is critical in preserving, freeze drying, storing, manufacturing, and sterilizing pharmaceutical products. Sanitary triclamp sensors are used in many industrial pharmaceutical processes that require accuracies of  $\pm 1^{\circ}\text{C}$  to  $\pm 0.1^{\circ}\text{C}$ .

### Applicable National and International Standards

The FDA has a number of regulations and procedures that require companies to use traceable temperature measurement equipment in calibrating sanitary triclamp sensors.

## Customer Profile

Grimmway Farms is the world's largest producer of baby carrots. The company requires a method to calibrate their process thermometers and verify refrigeration temperatures. Company technicians use the Model 7103 Micro-Bath to calibrate their sanitary triclamp sensors because it allows for short immersion depth (many of these sensors are 2" to 3") and capacity for the large triclamp cap (typically 2" dia.). Display accuracy is suitable for calibration of most triclamp sensors. Grimmway Farms purchased the Model 1521 LLK Handheld Thermometer and Model 5627 Precision Industrial PRT to obtain tighter tolerances.

## Hart Equipment Supplied to Grimmway Farms

- 7103 Micro-Bath (with Model 9317 Carrying Case)
- 1521 LLK Handheld Thermometer (with Model 9318 Hard Carrying Case)
- 5627-9 Precision Industrial PRT

## Potential Customers

- Pharmaceutical and food processing plants
- Calibration houses servicing the pharmaceutical and food industries
- Sensor manufacturers of sanitary sensors

## Competitive information

Jofra/Ametek claims to have a solution for calibration of sanitary triclamp sensors (see [http://ametek.synkron3.uni2.dk/graphics/administrator/Accessory\\_sheets/AS-CP-2201-US.pdf](http://ametek.synkron3.uni2.dk/graphics/administrator/Accessory_sheets/AS-CP-2201-US.pdf)).

Jofra's solution requires customers to purchase a custom insert, a reference probe, and the company's most expensive drywell (ATC series). This package can cost up to nine thousand dollars. Hart Micro-Baths offer the most correct way to calibrate sanitary triclamp sensors. Companies can also increase overall performance by using a Hart controller and liquid medium in calibrating these sensors. Micro-Baths eliminate air gap from the heated medium and the sensor. In addition, unlike dry-wells, Micro-Baths can accommodate different shaped sensors.