

# Prevent grain dust ignition in bulk tanks & silos

## and guarantee the safety of plant personnel and assets

### Benefits at a glance

- Automatic monitoring of the measured temperature value every second mitigates the risks of explosion
- Continuous operation and process availability can be ensured thanks to the robust design and low maintenance requirements
- Increased availability of the process equipment by preventing maintenance process shutdowns
- Reliable temperature profile measurement to detect hotspots and mitigate risks
- Potential savings in reduction of non-quality products by doing a cross-reference measurement before the grain is sent to production



**Robust and highly reliable multipoint temperature measurement secures plant and personnel safety in the storage of raw material grain silos. Endress+Hauser solution for bulk tanks and silos helps to prevent product degradation, ensures product quality and helps customers to stay compliant with industry regulations by offering a global stock overview at any time from anywhere.**

**The challenge** Development of a temperature monitoring solution for an application in the food industry, monitoring multiple silos of a single location plant. The customer needed precise measurement of three temperature points per silo filled with organic products such as roasted coffee beans, to identify a temperature increase above the defined limits in advance and to ensure consistent product quality.

This posed four main application challenges:

- Process temperature from +60°C to +80°C (140°F to 176°F)
- Environment with clouds of dust that could adhere to the probe
- Lateral load caused by movement of the coffee beans
- Small sized beans could build up at the measurement probe and cause inaccuracy or detachment of the sensor

**Our solution** A special design is required due to the hazardous application and the need for a special coating material of the measurement probe. The iTHERM MultiSens TMS31 is a customized multipoint thermometer for demanding applications. Its design is adaptable to the customer's application, guaranteeing high performance and durability. And, having only a single entry point reduces the required

efforts for installation and creates fewer interferences with the thermal insulation.

Many solutions in the market use electrochemical sensors to detect ignition only when it happens but not before. To solve this problem, we use the Memograph RSG45 advanced data manager with Ethernet IP output for seamless communication to the client's control system.

The temperature signals are handled by two temperature transmitters via HART and integrated for each silo. These diagnostic functions guarantee the prevention of risks before happening.

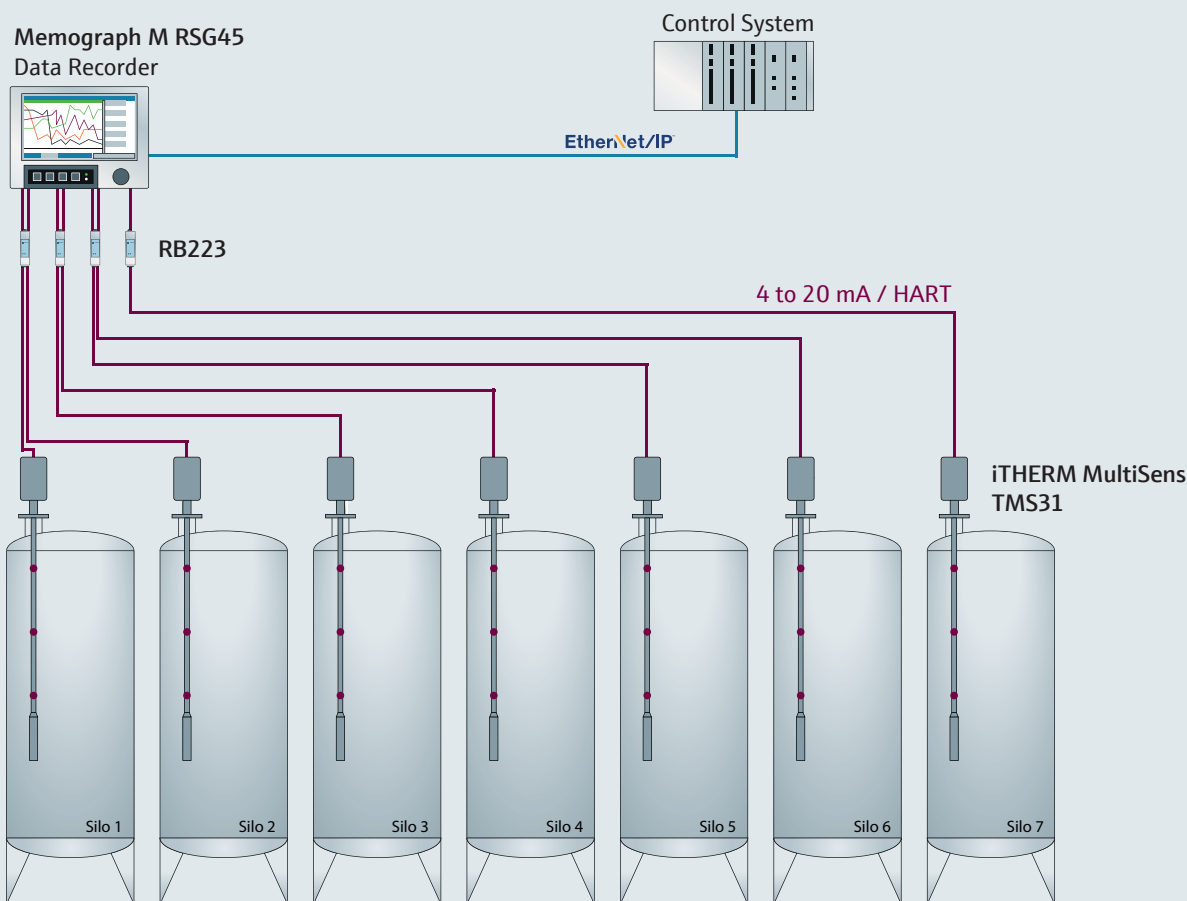
#### Our solution specifications meet all customer requirements:

- Dependable measurement independent from bean size
- ATEX II 2GD Ex e IIC / Ex ia Ga IIC Ex tb IIIC Db T6/T5/T4 approval
- Adherence in the presence of dust clouds and bean incrustation is avoided thanks to the silicone/PTFE coating resistant to high temperatures +105°C (221 °F)
- Process temperature range: -60°C to +105°C (-71°F to 221°F)
- Shock and vibration resistant RTD sensor: up to 3G / 10 to 500 Hz according to IEC 60751
- Ambient temperature: -40°C to +85°C (-40°F to 185°F)

#### Result

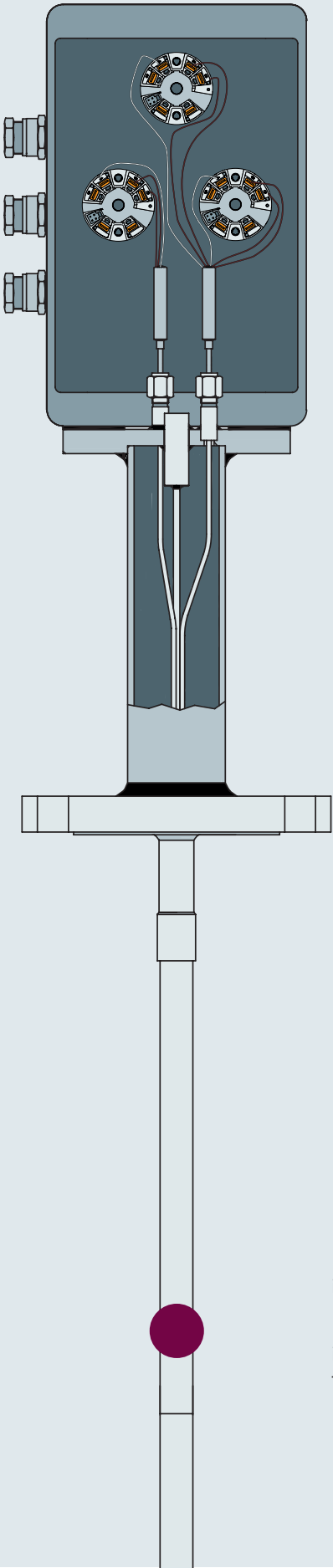
- Accurate and highly reliable multipoint temperature measurement
- Robust and low-maintenance devices for measurement and data processing
- Simple integration with less use of wiring to the control system
- Increased plant, personnel and process safety

#### System architecture



Conceptual architecture for the multipoint temperature measurement in seven silos

iTHERM MultiSens  
TMS31



insert length of 4.5 meters (14.7 ft)

individual placement of three  
temperature measurement points

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