Precise density and concentration measurement of spirits, alcopops or ethanol in tanks or pipelines in hazardous areas

Relevant for: Beverage Industry

With the explosion-proof Inline Pump 300 Ex d it is now possible to measure the density and concentration of flammable fluids with high precision in potentially explosive atmospheres in tanks and in pipelines with fluctuating flow rates.

Figure 1: L-Com 5500 Ex d with Inline Pump 300 Ex d

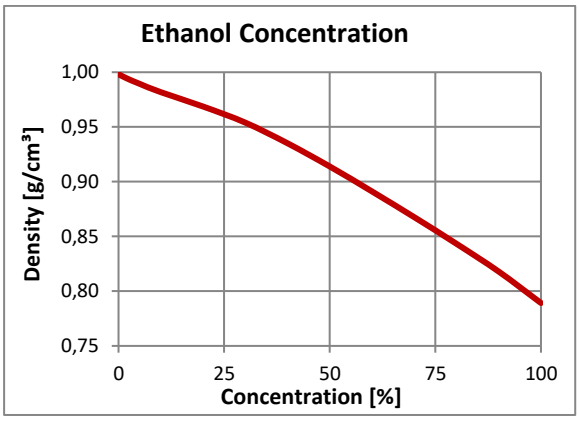

Figure 2: Ethanol Concentration Measurement with Density

1 Operation in hazardous areas

The new integrated sample pump ***Inline Pump 300 Ex d*** allows highly accurate measurement of concentrations in tanks or pipes in potentially explosive atmospheres.

The process sensor L-Dens 7500 Ex d in combination with the Inline Pump 300 Ex d provides an accuracy of 0.05 kg/m³ over the entire concentration range of a product even under extreme flow conditions.

The pump is integrated in the sensor system and does not require any additional control, which saves costs and installation efforts. The integrated dry-running protection and the robust design ensure a safe and long service life of the Inline Pump 300 Ex d.

The concentration of spirits, alcopops or ethanol in storage tanks or in the line can be measured and monitored by the Inline Pump 300 Ex d in combination with the well-proven and highly accurate process sensors **L-Dens 7500 Ex d** or **L-Com 5500 Ex d**.

Figure 2 shows as an example the perfect correlation between density and ethanol concentration from 0 to 100%.

1.1 Pipeline installation

Beside highest precision, easy integration was always a development focus from Anton Paar.

With the modular design of the Anton Paar sensor systems, a wide range of installation options is possible. Flow conditions in the pipe or special installation requirements can be ignored. The Inline Pump 300 Ex d always provides a constant flow through the sensor, even under stop-and-go or fluctuating flow conditions in the main line.

Figure 3: Installation via Inline Pump 300 Ex d into a pipeline

1.2 Tank installation

So far, highly accurate density and concentration measurement in a tank has been a complex and costly topic, as a bypass with a pump has been required. The pump needs to be controlled and monitored also with regard to the requirements in the hazardous area. Now, Anton Paar delivers a complete system which is easy to integrate. It consists of a precise process sensor in combination with the new Inline Pump 300 Ex d as well as the control unit for the pump.

As soon as the measurement is started, the integrated sample pump will deliver sufficient flow throw the sensor.

Figure 4: Tank installation via Inline Pump 300 Ex d

2 Advantages over other measuring principles

For tank installations in hazardous areas the Anton Paar process sensors L-Dens 7400/7500 Ex d or L-Com 5500 Ex d in combination with the new Inline Pump 300 Ex d have an accuracy up to 20 times higher than comparable fork-type process instruments.

Easy to integrate into any pipe diameter and independent from flow conditions, the Inline Pump 300 Ex d is a perfect alternative to huge Coriolis sensors which, in addition, do not reach the accuracy of the Anton Paar sensors.

The minimal energy consumption and the integrated control of the pump in the evaluation unit allow an easy and cost-effective use of the entire system.

3 Technical details of the Inline Pump 300 Ex d

Ambient temperature	-25 °C to 60 °C
Process temperature	-25 °C to 80 °C
Pressure absolute	1 bar to 50 bar for process temperature up to 70 °C 1 bar to 16 bar for process temperature up to 80 °C
Viscosity	min. 0.35 mPas; max. 20 mPas
Wetted parts	1.4404, SSiC, WC

Explosion protection:

- **ATEX**
  Pump unit: II 2G Ex h IIB T4 Gb
  DC motor: II 2G Ex db IIB T4 Gb
- **IECEx**
  Inline Pump 300 Ex d: Ex h IIB T4 Gb
  DC motor: Ex db IIB T4 Gb
- **CSA/UL/FM**
  DC motor: Class I Division 1 Gr CD T4
  Class I Zone 1 AEx db IIB T4 Gb
  Ex db IIB T4 Gb

4 Benefits

A tank or pipe installation with the Inline Pump 300 Ex d is the perfect solution to ensure a suitable constant flow through the sensor with minimum space requirements and installation efforts.

Benefits of our new Inline Pump 300 Ex d:

- Ex-approved measuring system for tank and pipe installation
- Robust IP 66 housing made of stainless steel
- Integrated dry-running protection
- Highly accurate process measurement independent from flow conditions
- No cost-intensive bypass or pump control needed

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