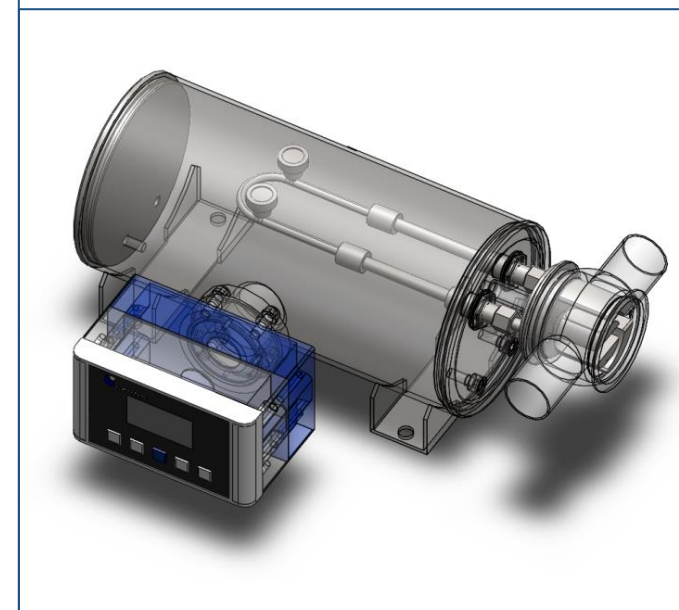


Concentration Measurement of Methanol and Formaldehyde

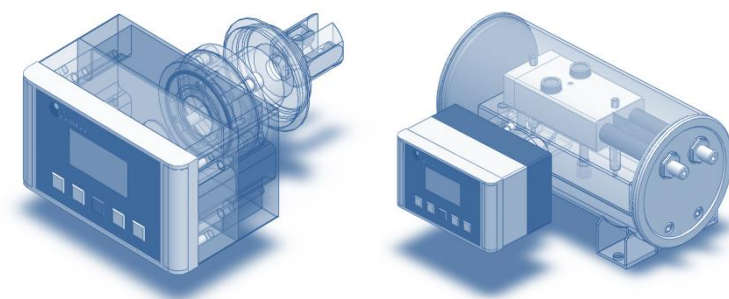
Application Report



Automated
process skids
and high precision
sensors from a
single source.
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Centec is a privately owned group of companies. With a focus on the processing industries, we are rapidly growing in the major world markets. We have a global sales and service structure, with our own subsidiaries and a network of qualified distributors. Our international operations include mechanical, electrical and process automation engineering, with skid manufacture and pipework fabrication; as well as our own switch cabinet production. This infrastructure allows efficient logistics, short lead times and strict adherence to delivery deadlines. The quality of our products is excellent, so is the price-performance ratio.



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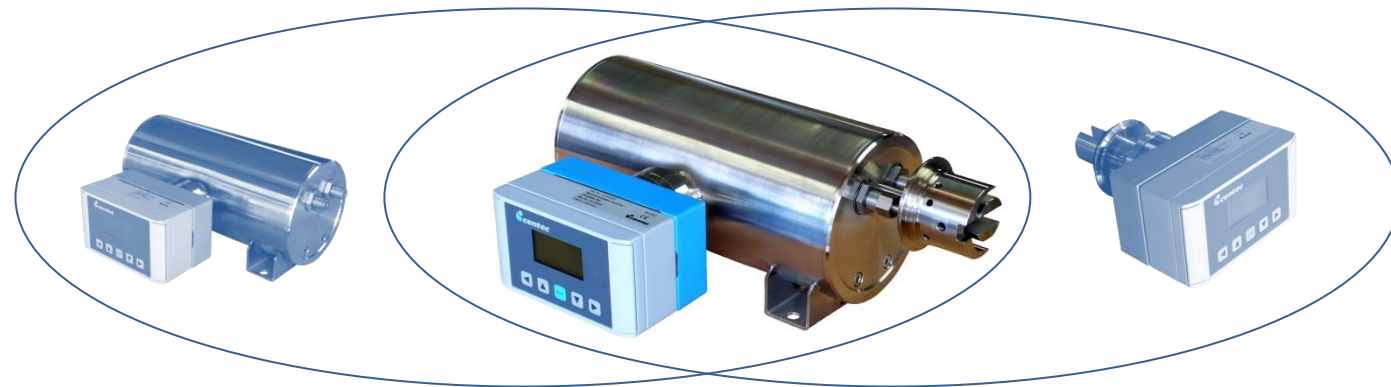
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Description of the Application and Measurement Principle

Formaldehyde (CH₂O) is a common precursor to more complex compounds and materials. It is found in many products, including resins and adhesives, permanent press fabric treatments, tissue preservatives, lawn fertilizers, cosmetics and disinfectants. Formaldehyde is produced industrially by the catalytic oxidation of methanol (CH₄O): $\text{CH}_4\text{O} + \frac{1}{2} \text{O}_2 > \text{CH}_2\text{O} + \text{H}_2\text{O}$. The concentrations of the 3-component-system consisting of water, CH₄O and CH₂O are determined with highest precision based on combined density and sound velocity measurement.

For density measurement, the liquid flows through a U-shaped tube. While the tube is electronically excited to oscillate at resonance, the oscillation frequency is observed. Any change in the fluid density has an impact on the detected signal and can thus be identified. At the same time, the speed of a sound pulse between a transmitter and a receiver is measured. The sound pulse is created by piezo-elements and moves perpendicular to the product flow. Based on the correlation between concentration and density resp. sound velocity, the concentration of the 3-component liquid is calculated.



COMBITEC
Transmitter Version

- Available as Transmitter Version with Local Display and as Sensor
- Highly Precise and Fast Determination of the Concentration
- Based on Density and Sound Velocity Measurement
- Applicable for a Huge Number of Liquids in Various Industries
- Short Response Time and Excellent Long-Term Stability
- Hygienic Execution, Full CIP Capability, Maintenance Free
- Outstanding Price-Performance-Ratio

Technical Data COMBITEC

Measuring Range	
Density	0 - 3 g/cm ³
Sound Velocity	400 - 3.000 m/s
Accuracy	
Density	± 0,0001 g/cm ³
Sound Velocity	± 0,05 m/s
Repeatability	
Density	± 0,0001 g/cm ³
Sound Velocity	± 0,01 m/s
Response Time	≤ 1 s
Pressure of Operation	max. 16 bar
Temperature of Operation	- 25 - + 125 °C
Temperature Compensation	Pt1000
Material	1.4404/AISI 316L; Hastelloy C276; Monel 400; Incoloy 825; others on request compatible to Varivent©
Connections	Inline-Housings DN40 - DN150; others on request
Input	10 x digital (24 VDC) &
Transmitter Version	2 x analog (4 - 20 mA)
Output	5 x digital (24 VDC) &
Transmitter Version	2 x analog (4 - 20 mA)
Profibus DP	
Transmitter Version	option
Sensor (w/o local display)	standard
Enclosure Rating	IP65
Power Supply	24 VDC