



APPLICATION NOTE Chemical Industry

Monitoring the flow of reference gas during oxygen analysis of vinyl chloride

- Analysis of oxygen content in the product flow
- Permanent flow measurement of nitrogen (N₂) as reference gas
- Process reliability thanks to flow alarm when limit value not reached

1. Background

A European chemical manufacturer produces vinyl chloride (VC) which is used as the base material in the production of thermoplastic polymers (PVC) and processed, for example, in the building and packaging industries. In the two-step manufacturing process, crude oil-based ethene is made to react by adding chlorine and the ethene is converted into VC with the help of oxygen through oxychlorination.

2. Measurement requirements

The oxygen content plays a special role in the production of VC. It determines the quality of the end product and the efficient conversion of the base substances during oxychlorination. In addition, with this highly combustible gas composition made up of ethene and oxygen, the oxygen concentration may not exceed the specified limit value for reasons of explosion prevention. An explosion here could cause considerable damage throughout the entire chemical plant. For this reason, the chemical specialist permanently monitors the product flows using an oxygen analyser according to the paramagnetic measuring principle. For the necessary amount of nitrogen to flow through the reference gas, the vinyl chloride producer requires reliable flow measurement and the right dosage of N₂. ATEX Ex approval is also mandatory

3. KROHNE solution

The chemical specialist uses the DK37 variable area flowmeter for the continuous measurement of the reference gas. The KROHNE instrument made of a metal cone is fitted with an electronic display and a dosing valve for flow control. The unit was provided in an intrinsically safe Ex-design.

The 4...20 mA signal output of the DK37 continuously monitors the flow of the reference gas. When the limit values set in the control system are not attained, the sample flow of vinyl chloride can quickly be interrupted and nitrogen inertisation started. If necessary, the customer can also raise or lower the flowrate of the reference medium at any time using the integrated dosing valve.



Nitrogen flow measurement with the DK 37

4. Customer benefits

The DK37 is a fundamental component of the entire production process for the customer. The production of vinyl chloride is only possible through reference gas measurement. The variable area flowmeter ensures that the chemical producer always has measurements for oxygen analysis and that he can also monitor the oxygen content of his vinyl chloride flow. In this way, the variable area flowmeter performs an important role in terms of hazard prevention in the production process and in the quality assurance of the end products.

For the customer, the DK37 is the reliable solution which, with a maximum measuring error of 2.5 percent of the measuring result, also measures with sufficient accuracy. The variable area flowmeter is the right instrument for the customer's compact analyser unit as it is permanently stable for use in extremely confined spaces.

5. Product used

DK37 Variable area flowmeter

- Reliable measurement and dosing of flows of liquid and gaseous products
- Approved for use in hazardous areas as per ATEX
- Electronic or mechanical indicator
- Accuracy: maximum measuring error of 2.5% of measured value
- SIL2-compliant limit switches / SIL1-compliant current output
- Operating pressures up to 130 bar / 1885 psi
- Process temperatures from -80 to +150°C / -112 to +302°F



Contact

Would you like further information about these or other applications?
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