



## APPLICATION NOTE Chemical

### Variable area flow measurement in an analyser container

- Gas measurement for monitoring chemical plants
- Checking air intakes for the detection of phosgene
- Monitoring measurement, reference and purging gas for oxygen analysers

#### 1. Background

A leading technology company designs and builds custom analyser containers for the chemical and pharmaceutical industries. These all-in-one solutions are used to monitor gases in process plants where they indicate leaks or the discharging of highly toxic media, among other things. In addition to monitoring plant safety, the analyser containers are used to continually check product quality.

#### 2. Measurement requirements

The technology company designs analyser containers for chemical companies that process phosgene. The turnkey units comprise three gas monitoring devices that register the discharge of highly toxic phosgene via air intakes and can trigger an alarm for immediate phosgene neutralisation. Reliable and cost-efficient measuring devices are required to check the function of the pumps that supply the gas monitoring systems with intake air. These devices monitor the continuous flow measurement of minimal air quantities.

Three oxygen analysers are also part of the container and are used to analyse the product flows. Flow measurements help guarantee constant sample flows to the analysers. In addition, the oxygen analysers need a consistent supply of clean reference gas and – to avoid hazardous atmospheres – they need to be purged with inert gas. Both gas flows must be technically measured to guarantee function and safety. Only ATEX approved measuring instruments can be considered as technical solutions.



Reference gas and inert gas measurement with DK37 and DK34

## 3. KROHNE solution

KROHNE supplied a variety of variable area flowmeters to equip the analyser container. All of the measuring instruments were supplied in Ex versions. The customer installed a total of 12 type DK800 flowmeters to measure the flow of the gas samples to detect phosgene. The floats with glass cones are particularly well suited to the measurement of extremely small gas quantities, as is required with this gas detection. The measuring devices use a needle valve to provide freely adjustable flow. The DK800 devices use limit switches to control the flow of the gas to the gas monitoring devices – and thus also to control pump function. If the value is too low, the measuring instruments send an alarm to the control room.



Monitoring intake air with the DK800

Three type DK37 flowmeters were also installed. They are used to monitor the amount of sample gas that flows into the oxygen analysers. The flow rate is output via an electronic display and transferred to the control room via linear current output (4...20 mA) in 2-wire technology. 3 DK37 devices were also used to measure the reference gas. 9 DK34 flowmeters were installed to measure the purging gas. The sturdy all-metal measuring devices monitor the nitrogen flow used to purge the housing of the oxygen analyser to neutralise it.

## 4. Customer benefits

The variable area flowmeters are an important prerequisite for reliable, error-free analyser operation. The measuring instruments ensure that the measurement, reference and purging gas are always available in the right quantity for gas analysis. Indirectly, the DK devices also ensure that in the event of a phosgene leak, an ammonia wall can be built up to neutralise it as soon as possible. The measuring devices are also a fundamental component in making the monitoring of product quality and safety possible in the first place. If, for example, the reference gas fails, the oxygen analysis cannot be carried out at all. The measuring instruments also prevent the creation of an explosive atmosphere within the oxygen analysers. With the help of KROHNE devices, the technology company meets all of the requirements of its end customers for a fully functional and safe all-in-one system.

## 5. Product used

### DK37 Variable area flowmeter

- For the measurement and dosing of flows (liquids and gases)
- Approvals for hazardous areas: ATEX, NEPSI

### DK34 Variable area flowmeter

- For the measurement of extremely low flows (liquids and gases)
- Approvals for hazardous areas: ATEX, IECEx, FM, NEPSI

### DK800 Variable area flowmeter

- For the monitoring of extremely small volumes and fine dosing
- Use in hazardous areas (ATEX approval)



## Contact

Would you like further information about these or other applications?  
Do you require technical advice for your application?  
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