

Model 4650 H₂S in Lean Amine Analyzer

The Need

Amine regeneration costs consume massive amounts of energy, much wasted due to over-stripping. Energy use can be dramatically minimized by accurate and reliable analysis of the residual H₂S in lean amine.

Method of Analysis

The Model 4650 measures the concentration of residual H₂S in the lean amine stream exiting the steam-stripping column. The sample enters the analyzer through a bypass filter system that removes all solid particulates from the amine. The amine stream continually flows through the measurement sample cell where it is analyzed by the UV photometer. The sample is returned to the process at a low pressure point which ensures sample flow.

This application presents a real analytical challenge due to the low H₂S concentrations and the varying presence of numerous, interfering additives and corrosive compounds. The AMETEK Model 4650 solves this problem by using the amine itself as a zero fluid through a unique and clever process.

A quantity of the amine is diverted and then isolated in a small 'zero cell' reservoir. This sample of amine solution is then conditioned through a proprietary vacuum boiling system to remove all H₂S. Periodically, the sample stream to the analyzer will be blocked and the H₂S-free amine from the 'zero cell' is shunted back through the measurement cell. The photometer then zeroes itself and performs a span check before returning to the sampling mode.

The problematic 'background' of the amine is thereby completely characterized enabling the analyzer to accurately measure the concentration of residual H₂S in the lean amine sample stream.

The resulting analysis is independent of solvent type, concentration, or any entrained degradation products. Any solvent used in this type of plant can be analyzed satisfactorily. The Model 4650 provides continuous analysis enabling closed-loop feedback control of the stripping process. Energy waste due to over-stripping can be eliminated.

The unique AMETEK split-beam, single cell UV analyzer is highly stable and essentially drift-free. This rugged analyzer has no moving parts and a wide tolerance for varying ambient

conditions. The system uses a filtration system field-proven to give reliable operation in excess of one year.

Features and Benefits

- Reduced regenerator steam consumption by operating with residual H₂S that ensures specification sweet gas instead of over-stripping to provide a safety margin
- Reduced amine loss through carry-over
- Reduced plant corrosion
- Reliable, proven UV absorption technology
- A system designed for unattended operation
- Reduced steam consumption



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Performance Specifications

Range: Typically 0 to 1 g/L; others available

Repeatability: ±1% full scale

Accuracy: ±4% full scale

Outputs

Two (2) 4 to 20mA, linear, isolated, 600-ohm load

One (1) digital, common fail-safe alarm for system fault

One (1) digital input for remote auto-calibration

One (1) RS-485 serial port

Ambient Temperature: -7°C to 50°C (20°F to 120°F)

Utilities Requirements

2kVA, all worldwide power supplies acceptable

Instrument air at 70 to 700 kPa (10 to 100 psig), greater than sample return pressure at 4 m³/hr (120 ft³/hr)

Clean water at 70 to 350 kPa (10 to 50 psig) greater than sample return pressure at 60 L/hr

Electrical Classification Options:

CE

The analyzer's Field Unit is designed for use in NEC/CEC Class I, Division 2, Groups A,B,C,D, T6 to T4 areas. Optional versions are available for Class I, Division 1, Group C, D or ATEX II 2 G IIC T3 areas.

The analyzer's Controller is designated for use in Class I, Division 2, Groups A, B, C, D areas. It may be supplied in an ATEX II 2 G EEx d IIC T6 enclosure on special order.

The analyzer's power supply is only suitable for non-hazardous and Class I, Division 2 area installations.

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One of a family of innovative process analyzer solutions from AMETEK Process Instruments.
Specifications subject to change without notice.

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