Caustic monitoring in acid gas scrubbers
PIR3502 Multiwave process photometer

Reliable monitoring of caustic concentration in acid gas scrubbers.

Measurement made easy

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PIR3502
IR process photometer

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Introduction
The measurement of caustic concentration in chlorine or acid gas scrubbers is required for safe operation of the scrubber. Hydrochloric acid (HCl), hydrofluoric acid (HF), phosgene ($COCl_2$), chlorine (Cl_2) and hydrogen sulfide (H_2S) are examples of acid gases that are removed in caustic scrubbers. Caustic aqueous solutions of sodium hydroxide or potassium hydroxide are commonly used in acid gas scrubbers. The fast response time of the PIR3502 Multiwave process photometer allows for quick remedial action when upsets occur in the scrubber.

Benefits
Fast and accurate control of the caustic concentration provides the following benefits in the operation of the scrubber:
• Protection from environmental problems by avoiding the release of chlorine or acid gas from the scrubber vent
• Reduce consumption of caustic by allowing operation at lower caustic concentration
• Lower concentrations of caustic reduces corrosion of equipment and longer times between rebuilds

The Analyzer
The ABB PIR3502 photometer is a multiple channel filter photometer, which can accommodate up to eight different optical filters. The analyzer ratios the energy from the analytical wavelength filters to the reference wavelength filter. The caustic analyzer utilizes optical filters in the Near Infrared (NIR) region of the electromagnetic spectrum. The calibration of the Multiwave photometer uses a matrix algorithm that allows for the compensation of interfering components in the analysis. The PIR3502 photometer has established an excellent reputation for reliable and stable performance in on-line process control applications.

To vent

Caustic
Scrubber

Return

Sample
Conditioning
system

Sample in

Chlorine or acid gas
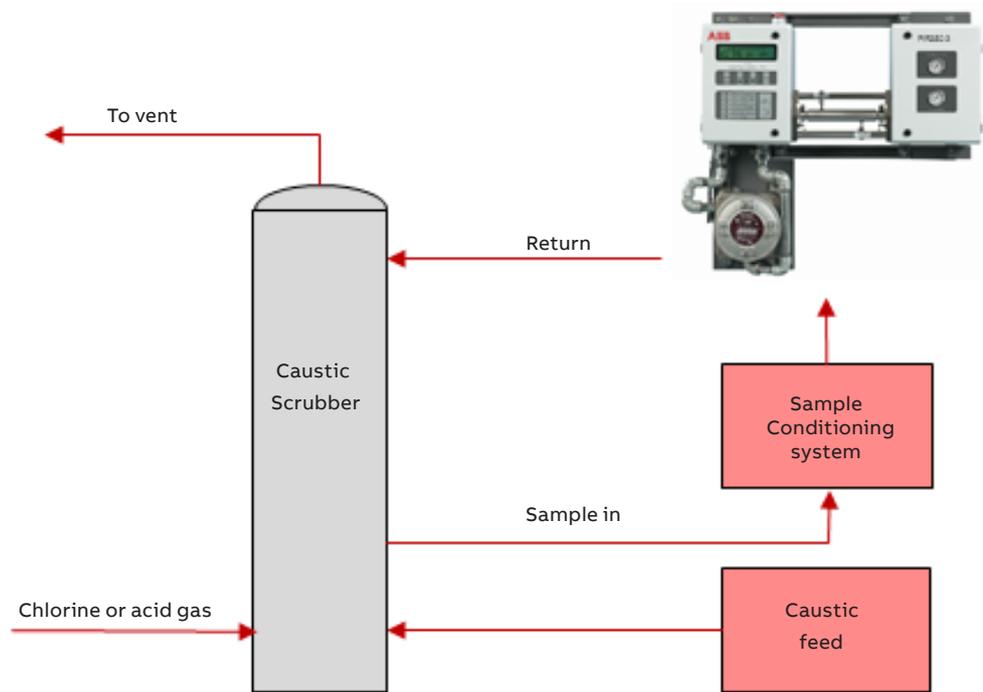
Caustic
feed

Discussion
The caustic concentration in acid gas scrubbers is typically controlled between 3 to 10% by weight. The normal range for the caustic analyzers is 0 to 15%. Care must be taken to avoid interference problems from carbonate, chloride and hypochlorite salts that may be present in the caustic streams.

Compensation for these interfering components is accomplished by the judicious selection of measure and reference wavelength optical filters for the Multiwave photometer. The careful selection of optical filters also allows for the compensation of sample temperature fluctuations on the caustic analysis.

Also, ABB can provide sample handling systems for the Multiwave caustic analyzer. The PIR3502 photometer provides a continuous analysis without any consumables such as the reagents required for

an online titrator. An important consideration for this application is to use filtration technology that prevents plugging of the sample cell by salts present in the scrubber.

Conclusions
The ABB PIR3502 Multiwave process photometer provides for the reliable monitoring of caustic concentration in acid gas scrubber streams. It provides an accurate analysis by compensating for interferences from carbonate and chloride salts that build up in the scrubber solution. The fast response time of the ABB Multiwave photometer allows for fast remedial action when an upset occurs in the caustic scrubber.