

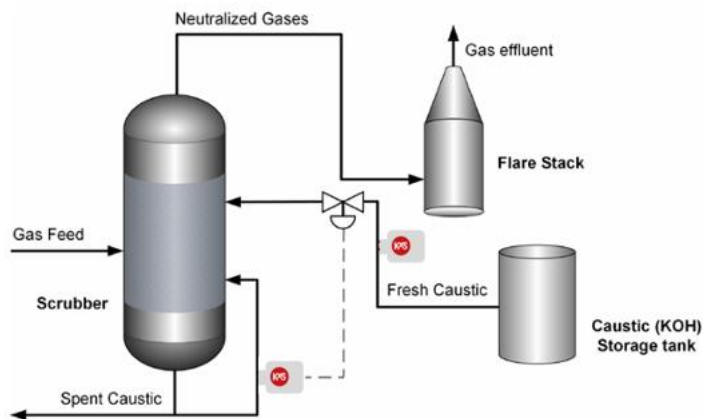


Gas processing and treatment

Acid gas scrubbing with Potassium hydroxide (KOH)

Benefits of R.I. measurement

- Continuous, real-time measurement eliminates the need for manual sampling and laboratory analysis.
- Stable and drift-free sensor is unaffected by bubbles, suspended oils, or process fluctuations.
- Enhanced safety ensures complete HF neutralization, preventing hazardous emissions.
- Accurate digital signal output provides precise and reliable process control.



Overview

The treatment of acidic gas emissions from industrial processes is essential to prevent environmental and safety hazards. Acidic gases are highly corrosive, posing a significant risk to infrastructure, equipment, and human health.

When exposed to air and moisture, these gases can cause extensive damage to buildings, vehicles, and processing plants. Moreover, direct contact with these gases can be harmful to human skin and respiratory systems. To mitigate these risks, industrial facilities implement strict control measures to neutralize acidic emissions effectively.

Refractive index measurement applications

One of the most common acidic gases requiring treatment is hydrofluoric acid (HF). HF is a byproduct of HF alkylation units and must be neutralized before being safely burned in a flare system. The presence of HF in flare stacks can lead to severe corrosion, and any unneutralized HF emissions pose a serious safety hazard.

Wet scrubbing is one of the most efficient and widely used methods for capturing acidic gases. In a wet scrubber, HF is removed by reacting it with a caustic solution, such as potassium hydroxide (KOH). KOH, a strong alkaline solution, effectively neutralizes HF, forming potassium fluoride (KF), which is highly soluble in

water. Once the HF has been fully neutralized, the treated gas can be safely directed to the flare stack for combustion.

Instrumentation and installation considerations

To ensure effective HF neutralization and optimal KOH concentration, the KxS Technologies Process refractometer is used for continuous in-line monitoring.

The refractometer is installed in two critical locations:

- Fresh KOH feed line: To verify the correct concentration of KOH before entering the scrubber.
- Spent KOH line: To monitor the remaining caustic strength and determine when replenishment is needed.

The refractometer provides real-time, precise concentration measurements, enabling automated control of fresh KOH dosing. This ensures that the scrubber maintains optimal alkali levels for complete acid neutralization, preventing HF from entering the flare.

By integrating the KxS Technologies refractometer into the KOH scrubbing process, industrial operators achieve improved process efficiency, enhanced safety, and reduced maintenance requirements. The in-line measurement capability guarantees optimal performance, ensuring compliance with stringent environmental and safety regulations.

KxS Technologies offers two refractometer model options, tailored for different material compatibility and installation requirements:

- The KxS DCM-10 with PFA (Perfluoroalkoxy) as wetted materials, is designed for applications requiring a non-metallic, chemically resistant sensor. It is an excellent choice for smaller process lines sizes of 1/4, 3/8, 1/2, 3/4, and 1 inch, using standard fittings.
- The KxS DCM-20 with Hastelloy C – 276 as wetted materials, is built for large pipelines and high-pressure applications in processes with aggressive chemical exposure, such as those involving HF and strong caustic solutions.