Petrochemical Application Note
Caustic Wet Scrubbing Gas Abatement

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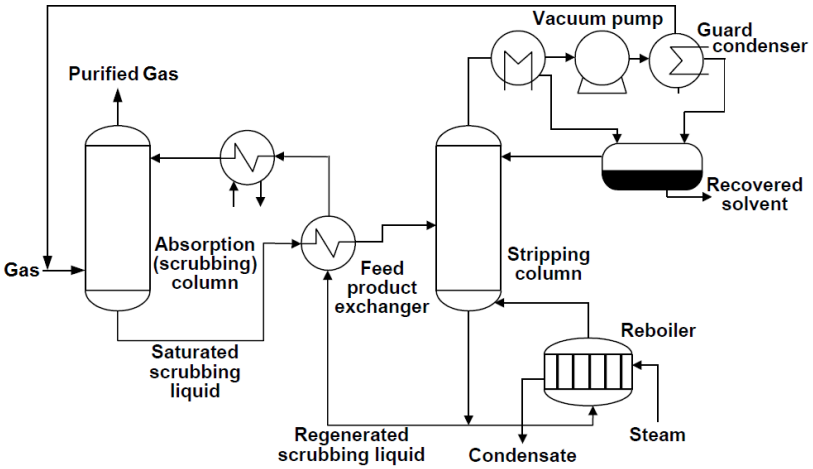
Application Overview

Caustic wet scrubbers use an alkaline water-based solution to capture contaminants from waste gas. Different caustic solutions are used depending on the specific contaminant. Scrubbers are designed to ensure effective contaminant removal while efficiently controlling the chemistry conditions.

Contaminant & Scrubber Solution Examples

- Sulfur Dioxide (Calcium Hydroxide)
- Hydrogen Sulfide (Sodium Hydroxide)
- Carbon Dioxide (Sodium Hydroxide)
- Chlorine (Sodium Hydroxide)
- Hydrogen Cyanide (Sodium Hydroxide)
- Fluorine (Potassium Hydroxide)
- Hydrogen Fluoride (Potassium Hydroxide)

Scrubbing solutions are selected based on the matrix in order to minimize biproduct creation and to ensure high solubility for the contaminants.



Simplified Scrubber Process Flow Diagram

Operational Challenges

Most plants monitor pH instead of caustic strength. Without knowing the true buffer capacity, pH swings can affect absorption efficiency. This requires expensive high caustic dosing to be safe. Standard in-line pH sensors will break, get coated, or have a short lifespan due to the harsh caustic conditions of the scrubber. pH sensors are also often not installed close enough to the chemical injection system causing readings to be inaccurate.

Carbon dioxide absorption increases caustic consumption and leads to carbonate and bicabronate formation that can precipitate. These salts stick to metal surfaces and do not easily dissolve by raising the sample temperature.

Poor quality caustic or water can cause spent caustic to have corrosive iron sulfide that creates scaling issues.

Sulfide precipitation can only be avoided if pH, caustic strength, and scrubber temperature are under control.

Final product purity is critical for commercial viability. This is difficult if only period manual grab sampling is used for process control.

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Liquid Monitoring

Caustic Strength & Spent Caustic
- Optimize Gas Absorption

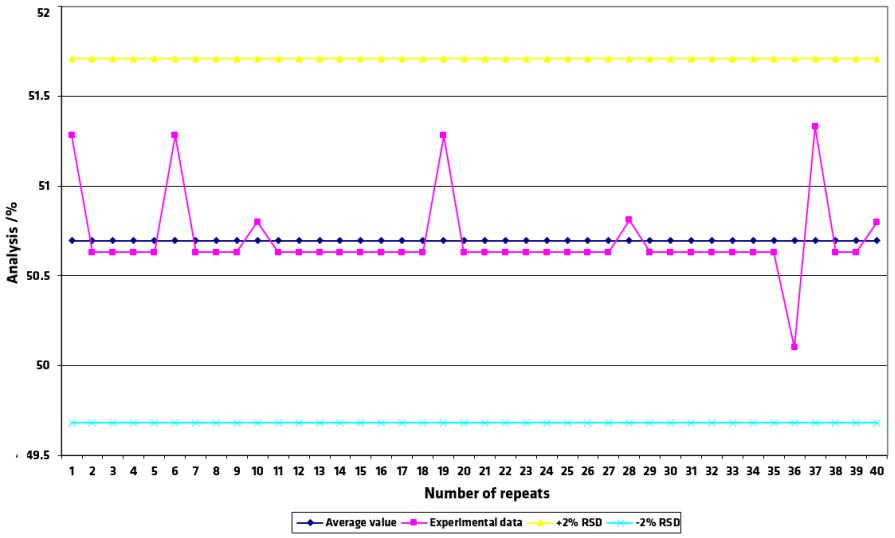
Carbonate
- Understand Effects of CO_2 Absorption

Specific Contaminant (eg. H_2S)
- Ensure Effective Removal From Gas

Sulfide
- Avoid Precipitation Issues

Metals (eg. Iron, Chloride)
- Identify Corrosion From Upstream Units

Performance Guaranteed



Caustic & Carbonate Analysis With < ± 2% f.s. Repeatability by Acid-Base Titration

Online Benefits
- Identify & Avoid Expensive Process Upsets
- Continuously Maintain Optimal Chemistry
- Minimize Manual Sampling & Testing Errors
- Precise Dosing Saves Raw Material Costs
- Optimize Environmental Compliance

AccuSeries-LPA Advantage
- Certified ATEX / IECEx Zone 2 *Without* a Purge
- Compatible Components Minimize Maintenance
- % Calibration Ranges for Thorough Reporting
- Multi-Parameter & Multi-Stream for Fast ROI
- ± 2% f.s. Process Control Accuracy

Galvanic Difference
- 35+ Years of Experience in Difficult Applications
- Global Sales, Consumables, & Service Support
- Custom Engineering to Customer Requirements
- Methods of Analysis to Match Laboratory SOP
- One-Stop-Shop for Gas & Liquid Online Analyzers



AccuSeries-LPA Wet-Chemistry Online Analyzer

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