

BIOGAS CHEMICAL H₂S SCRUBBER

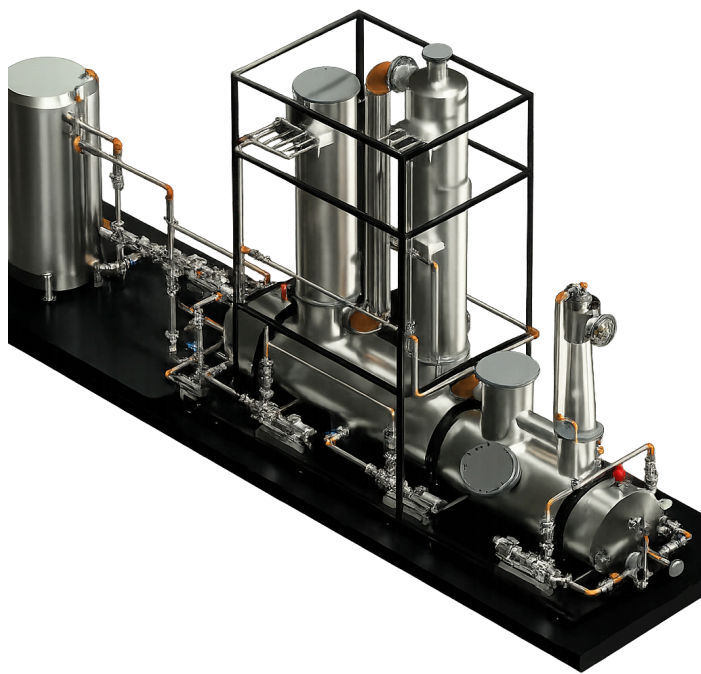


CAUSTIC H₂S REMOVAL FROM BIOGAS BY CIRCULATING NaOH SOLUTION

Hydrogen sulphide loads in raw biogas rarely hold steady. Digester feedstock changes, flow surges, and seasonal swings can push H₂S concentration well above design levels, from a typical baseline of 200–2,000 ppm up to spikes beyond 5,000 ppm and, in high-sulphur feedstocks, past 20,000 ppm^L. A scrubber sized only for average conditions lets slugs of untreated gas through to the CHP or flare.

The CRA Biogas Chemical Scrubber removes H₂S by passing raw biogas counter-current through a packed bed or spray tower against a continuously circulating sodium hydroxide (NaOH) solution, typically dosed at 5–20% w/w^E. H₂S reacts with the alkali to form sodium sulphide at a stoichiometric ratio of 2.35 kg NaOH per kg H₂S removed^C, and the dosing rate is matched automatically to the real-time H₂S load entering the system, with a practical excess of 15–20% over stoichiometric to hold outlet levels below target^E.

CRA has supplied more than 100 chemical scrubbers for biogas and process gas duty worldwide, each engineered to the site's actual inlet H₂S range rather than a generic sizing chart, and built under the same ISO 9001 quality system that governs every CRA skid.



CRA ADVANTAGE

+ High Efficiency Under Variable Load (turndown roughly 5:1–10:1)	+ Optimal Design & Performance + Accomodate Special Requirements
+ Protects Critical Downstream Equipment (outlet held below 5–10 ppm H ₂ S)	+ On-Time Delivery + Responsive & Organized Team
+ Odour Elimination At The Source (>99% single-pass removal efficiency)	+ Stringent Quality Management + Fast Turnaround
+ Modular, Scalable Configuration (single-stage to roughly 20,000 ppm inlet, multi-stage beyond)	+ Cost Effective Maintenance Packages + Long-Term CRA Support

APPLICATIONS

Supplied for H₂S and acid gas removal across biogas, landfill, and process gas duty

- + Landfill Waste Gas Treatment
- + Organic Sulphur Compound Removal
- + Odour Control From Anaerobic Digestion
- + Renewable Natural Gas (RNG) Upgrading
- + BioCNG Production
- + Multi-Stage Acid Gas Removal

CRA
7, Sector 140A
Noida, UP, 201304

Learn more at www.cra.energy

✉ contact@cra.energy

☎ 0120 415 6787 • +91 85060 09433



©Combustion Research Associates

WORKING & PERFORMANCE



CAUSTIC SCRUBBING IN A SINGLE PACKED COLUMN, AUTOMATED NaOH DOSING

WORKING

- + Biogas enters the packed column counter-current to a continuously circulating NaOH solution, held at pH 9–11 by the dosing controller^E
- + H₂S reacts with the alkali in the liquid film to form sodium sulphide, which leaves with the spent liquor
- + Dosing rate is adjusted automatically to match the real-time H₂S load entering the system, at roughly 2.7–2.9 kg NaOH per kg H₂S removed including practical excess^{C/E}
- + Outlet gas is monitored continuously to confirm it meets the required ppm target before it moves downstream

WHY CHEMICAL SCRUBBING

- + Handles Fluctuating Flow Or Load (turndown ~5:1–10:1)^E
- + Deep H₂S Removal, Down To <5–10 ppm
- + Simple Single-Loop Or Dual-Loop Design
- + Automated Makeup And Blowdown
- + Protects Compressors And Membranes

NaOH usage scales with the dosing controller, keeping reagent consumption matched to actual inlet H₂S load, typically 2.7–2.9 kg NaOH per kg H₂S removed at 15–20% excess over the 2.35 kg/kg stoichiometric minimum^{C/E}.

TYPICAL DESIGN & PERFORMANCE PARAMETERS

Inlet H ₂ S range	50 – 20,000+ ppm, application-dependent ^L
Outlet H ₂ S (guarantee)	<5–10 ppm
Removal efficiency	>99%, up to 99.9% at high NaOH excess ^L
NaOH solution strength	5–20% w/w circulating ^E
NaOH consumption	2.35 kg/kg H ₂ S stoichiometric minimum; 2.7–2.9 kg/kg practical at 15–20% excess ^{C/E}
Liquid to gas ratio (L/G)	0.3–3 L NaOH solution per Nm ³ biogas ^L
Operating pH	9–11, controller-maintained ^E
Operating pressure	Near-atmospheric to 1 barg for biogas duty; higher on request ^E
Operating temperature	Ambient to 40°C ^E
Turndown ratio	5:1 to 10:1 ^E

^C Calculated from reaction stoichiometry · ^L Published literature, sources on file · ^E CRA engineering estimate, pending sign-off

CRA
7, Sector 140A
Noida, UP, 201304

Learn more at www.cra.energy

✉ contact@cra.energy

☎ 0120 415 6787 · +91 85060 09433



©Combustion Research Associates