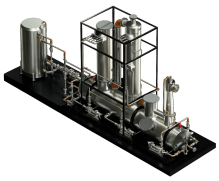
GAS SCRUBBERS

Engineering a Safer World

CHEMICAL · BIO-REGENERATIVE · BIOLOGICAL DRY IRON OXIDE · ACTIVATED CARBON

Hydrogen sulphide in biogas, landfill gas and process gas corrodes engines, compressors, pipework and heat exchangers, and puts emission limits out of reach. CRA builds five scrubber types for that duty, each matched to the inlet H2S range, the gas flow and the utilities available at site.

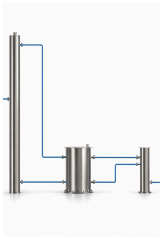
The Chemical Scrubber handles fluctuating loads with caustic dosing, the Bio-Regenerative Scrubber recovers sulphur and recycles its own reagent, the Biological Scrubber works without chemicals at any stage, the Dry Iron Scrubber gives fixed-bed protection with no liquid waste, and the Activated Carbon Scrubber polishes the gas to trace levels.



CHEMICAL SCRUBBER

Inlet 50 – 20,000+ ppm

Caustic dosing matched to real-time H2S load



BIO-REGENERATIVE SCRUBBER

High-load duty

Closed loop, sulphur recovered as elemental sulphur

BIOLOGICAL SCRUBBER

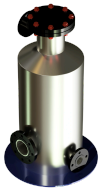
Customisable to 10 ppm

Bio-trickling filter, no chemicals at any stage

DRY IRON SCRUBBER

Inlet below 1,500 – 2,000 ppm

Fixed bed of iron oxide media, no liquid waste



ACTIVATED CARBON SCRUBBER

Polishing to trace levels

Impregnated carbon bed for final H2S, VOC and siloxane removal

SELECTION

+ Below 2,000 ppm — Dry Iron or Carbon
+ Variable load — Chemical
+ High load, sulphur recovery — Bio-Regenerative
+ No chemicals, high flow — Biological

APPLICATIONS + Biogas + Landfill Gas + Producer Gas + Sour Gas + Odour & VOC Control

ALSO FROM CRA

Gas Line Accessories
Enclosed Flare / Thermal Oxidizers
Incinerators
Flame Arrestors
Open Elevated Flares
Biogas Upgrading
LFG / Biogas to CNG
Pressure Vacuum Relief Valves
Biogas to Power
Gas Conditioners & Dehumidifiers
Digesters
Gas Holders

CRA
7, Sector 140A
Noida, UP, 201304

Learn more at www.cra.energy

contact@cra.energy
0120 415 6787 · +91 85060 09433

ISO 9001

CHEMICAL & BIO-REGENERATIVE

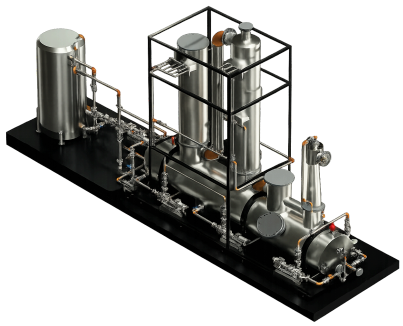
Engineering a Safer World

CHEMICAL SCRUBBER

Caustic absorption · inlet 50 – 20,000+ ppm · outlet <5–10 ppm

H2S loads in raw biogas rarely hold steady. Feedstock changes, flow surges and seasonal swings push concentration well above design levels, and a scrubber sized only for average conditions lets slugs of untreated gas through to the CHP or flare.

Raw biogas passes counter-current through a packed bed or spray tower against a circulating sodium hydroxide solution, typically 5–20% w/w. Dosing is matched automatically to the real-time H2S load, and outlet gas is monitored continuously before it moves downstream.



FEATURES

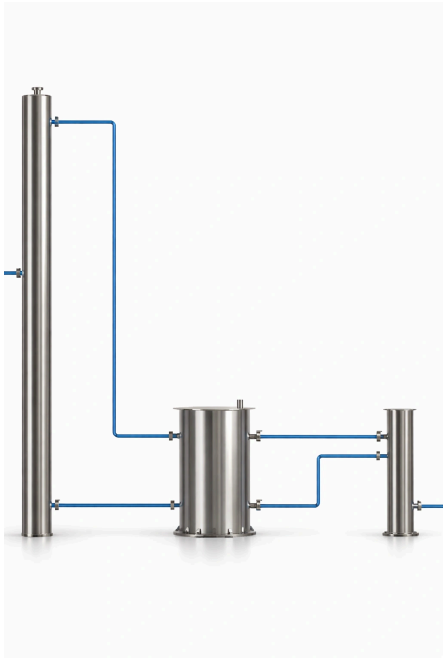
+ Handles Fluctuating Flow Or Load
+ Deep H2S Removal To <5–10 ppm
+ Single-Loop Or Dual-Loop Design
+ Automated Makeup And Blowdown
+ Customised MOC For Gas Composition
+ 100+ Scrubbers Supplied

BIO-REGENERATIVE SCRUBBER

Closed-loop alkaline absorption · biological regeneration · sulphur recovery

H2S is absorbed in a counter-current alkaline scrubber, then the sulphide-laden liquor passes to a biological regeneration stage where sulphur-oxidising bacteria convert it to elemental sulphur and restore the solution's alkalinity before it recirculates to the absorber.

Aeration stays inside the bioreactor loop and never contacts the product gas. The closed loop cuts reagent consumption by up to 70% against conventional caustic scrubbing and recovers most of the removed sulphur in saleable form.



FEATURES

+ Deep Removal At High Inlet Loads
+ Up To 70% Lower Reagent Use
+ Elemental Sulphur Recovered
+ No Sulphide Liquor To Truck Away
+ Aeration Isolated From Product Gas
+ Skid Mounted, ISO 9001 Built

CRA
7, Sector 140A
Noida, UP, 201304

Learn more at www.cra.energy

contact@cra.energy
0120 415 6787 · +91 85060 09433

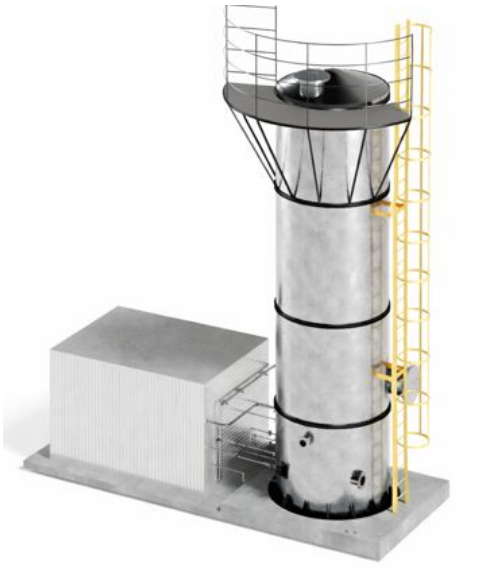
ISO 9001

BIOLOGICAL & DRY IRON

CRA
Engineering a Safer World

BIOLOGICAL SCRUBBER

Bio-trickling filter · no chemicals at any stage · customisable to 10 ppm



Raw biogas passes through a packed column irrigated with water and nutrients, where sulphur bacteria (thiobacillus) oxidise the H2S. The main reduction product is sulphuric acid, with a small proportion of elementary sulphur, and the process is customisable to achieve 10 ppm H2S at outlet.

Manufactured under technological collaboration with M/s S & H Umweltengineering, Germany, these bio-trickling filters are installed at more than 200 locations for H2S, VOC and odour control. Suited to sites with high gas flow and a waste water facility available for the sulphate discharge.

FEATURES

+ No Chemicals At Any Stage
+ Customisable To 10 ppm Outlet
+ German Technology, 200+ Installations
+ Suits High Gas Flow Sites
+ VOC & Odour Control Duty
+ Reduced CHP Maintenance

DRY IRON SCRUBBER

Fixed bed of iron oxide media · no dosing, no liquid waste · ASME Section VIII Div. 1

Low-to-moderate H2S streams, typically below 1,500–2,000 ppm inlet, still need dependable protection without a chemical dosing system to operate and maintain.

Gas passes down through a fixed bed of iron-oxide-impregnated media, where H2S reacts to form iron sulphide that stays trapped in the bed. A moisture conditioning point ahead of the media keeps the reaction active across fluctuating inlet loads, and bed volume is sized to the site's actual gas composition and H2S loading.

FEATURES

+ Fixed Bed, No Moving Parts
+ No Power Or Chemical Dosing
+ No Liquid Waste Stream
+ Top Or Side Access For Change-Out
+ Tolerates Day-To-Day Load Swings
+ Vessels Fabricated In-House

CRA
7, Sector 140A
Noida, UP, 201304

Learn more at www.cra.energy

contact@cra.energy
0120 415 6787 · +91 85060 09433

ISO 9001

ACTIVATED CARBON

CRA
Engineering a Safer World

ACTIVATED CARBON SCRUBBER

Impregnated carbon bed · polishing duty · H2S, VOC and siloxane removal

Gas engines, upgrading membranes and CNG trains need the last traces of H2S, siloxanes and volatile organics taken out after bulk removal. The Activated Carbon Scrubber is the polishing stage for that duty, and is also used on its own where the inlet load is already low.

Gas passes through a fixed bed of impregnated or catalytic activated carbon, where H2S is adsorbed and oxidised on the carbon surface. Vessels are supplied single or in lead-lag pairs so the lead bed can be changed out while the line keeps running, and media is selected against the site's gas composition and moisture.

FEATURES

+ Trace-Level Polishing Duty
+ Removes VOC & Siloxanes
+ Lead-Lag Pairs, No Shutdown
+ No Power Or Chemical Dosing
+ Dry Media, No Liquid Waste
+ Media Selected To Gas Analysis

SELECTING A SCRUBBER

Scrubber	Typical inlet H2S	Consumable	Waste stream
Chemical	50 – 20,000+ ppm	Caustic (NaOH)	Spent liquor bleed
Bio-Regenerative	High load duty	Makeup only, up to 70% less	Elemental sulphur, recovered
Biological	High gas flow sites	Water & nutrients	Sulphate liquor to WWTP
Dry Iron	Below 1,500 – 2,000 ppm	Iron oxide media	Spent media, dry
Activated Carbon	Polishing, trace levels	Impregnated carbon	Spent media, dry

ENQUIRY DATA + Gas composition + Flow rate, Nm^3/hr + Inlet H2S + Required outlet + Utilities at site

CRA
7, Sector 140A
Noida, UP, 201304

Learn more at www.cra.energy

contact@cra.energy
0120 415 6787 · +91 85060 09433

ISO 9001