DRY IRON SCRUBBER

Engineering a Safer World

FIXED-BED H2S REMOVAL FROM GAS BY IMPREGNATED IRON OXIDE MEDIA

Hydrogen sulphide in landfill gas, biogas, and associated gas corrodes compressors, engines, and instrumentation downstream, and low-to-moderate H2S streams, typically below 1,500–2,000 ppm inlet[E], still need dependable protection without the complexity of a chemical dosing system to operate and maintain.

The CRA Dry Iron Scrubber strips H2S from the gas stream by passing it down through a fixed bed of iron-oxide-impregnated media at a design superficial velocity of roughly 2–10 ft/min (0.01–0.05 m/s) and an empty-bed contact time of 60–300 seconds[L]. H2S reacts with the iron oxide to form iron sulphide, which stays trapped in the bed while a moisture conditioning point ahead of the media keeps the reaction active across fluctuating inlet loads.

Every vessel is fabricated in-house to ASME Section VIII Div. 1, with bed volume sized against the site's actual gas composition and H2S loading rather than a standard catalogue size, using a design media capacity of roughly 0.2–0.4 kg H2S removed per kg of media[L].

CRA ADVANTAGE

+ Simple Fixed-Bed Design, No Moving Parts	+ Optimal Design & Performance + Accomodate Special Requirements
+ Lower Cost Per Pound Of H2S Removed (media capacity ~0.2–0.4 kg H2S/kg)	+ On-Time Delivery + Responsive & Organized Team
+ Fast Media Change-Out (typical interval 4–16 weeks, load-dependent)	+ Stringent Quality Management + Fast Turnaround
+ No Liquid Waste Stream	+ Cost Effective Maintenance Packages + Long-Term CRA Support

APPLICATIONS

Supplied for H2S polishing and conditioning across landfill gas, biogas, and associated gas duty

+ Landfill Gas Polishing Ahead Of Flaring
+ Biogas Conditioning Ahead Of CHP Engines
+ Associated Gas Removal Ahead Of Compression
+ Pretreatment Ahead Of RNG Upgrading Membranes
+ Digester Gas Conditioning At WWTPs
+ Standalone Polishing Downstream Of Bulk Removal

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ISO 9001 QUALITY ASSURANCE MANAGEMENT

WORKING & PERFORMANCE

Engineering a Safer World

FIXED-BED IRON OXIDE MEDIA, CHANGED OUT THROUGH TOP OR SIDE PORTS

WORKING

+ Raw gas enters through a distributor plate sized to hold superficial velocity in the 2–10 ft/min design band, preventing channelling at the low end and excess pressure drop at the high end[L]

+ Gas passes down through the impregnated iron oxide media, where H2S reacts with the media to form iron sulphide, at an empty-bed contact time of 60–300 seconds[L]

+ A moisture conditioning point ahead of the bed keeps the media within its active reaction range

+ Conditioned gas exits below the outlet specification and routes to the downstream flare, engine, or upgrading skid

+ Once the bed is exhausted, spent media is removed through top or side access ports and replaced with fresh charge

FEATURES

+ Fixed Bed, No Moving Parts To Service

+ No Electrical Power Or Chemical Dosing

+ Tolerates Fluctuating Day-To-Day And Seasonal Loads

+ Top Or Side Access For Fast Change-Out

+ Dry Media Handling, No Liquid Waste

Bed volume and change-out interval are calculated against the site's actual H2S loading, not a standard catalogue size, using a design media capacity of roughly 0.2–0.4 kg H2S per kg of media[L].

TYPICAL DESIGN & PERFORMANCE PARAMETERS

Inlet H2S range	Typically below 1,500–2,000 ppm for single-stage economics; higher with staged beds[E]
Outlet H2S	<5–10 ppm achievable[E]
Removal efficiency	>99% while the bed is within its active capacity[E]
Media capacity	~0.2–0.4 kg H2S removed per kg of media (0.2–0.4 lb/lb); some formulations run higher under optimal moisture and temperature[L]
Superficial gas velocity	2–10 ft/min (0.01–0.05 m/s) design band[L]
Empty-bed contact time	60–300 seconds[L]
Minimum bed height	~3 m (10 ft) for H2S duty[L]
Pressure drop	0.5–2 psi per ft of bed depth (~11–45 kPa/m)[L]
Change-out interval	4–16 weeks typical, load-dependent[E]
Operating pressure	Near-atmospheric to a few barg[E]

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

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