

BIOGAS ENCLOSED FLARE



CONTROLLED BIOGAS COMBUSTION FOR SAFETY, BACKUP, AND REGULATORY COMPLIANCE

Biogas plants generate surplus gas during normal operation, and larger volumes during upsets, maintenance, or emergency relief. Without a flare rated for the full range, from minimum turndown to peak emergency load, that gas either vents untreated or forces a shutdown.

CRA's Biogas Enclosed Flare burns surplus, off-spec, or emergency biogas in a refractory-lined chamber at 760-1100°C for more than 0.3 seconds residence time, holding CO below 50 ppm, unburned hydrocarbons below 10 ppm, and opacity below 5%. Integrated pilots maintain a standing flame, and an automated control system modulates gas flow across a 4:1 to 10:1 turndown ratio, while flame detection, high-temperature shutdown, and pressure monitoring run as independent safety interlocks.

Regulatory minimums call for >98% methane destruction; CRA-manufactured flares are engineered to exceed 99.5%. Flaring 1 kg of CH₄ converts it to 2.75 kg of CO₂ instead of releasing 28 kg of CO₂-equivalent as vented methane, a 90% reduction in warming impact, and every unit is sized for 125-150% of expected utilization to absorb load swings without derating.



CRA ADVANTAGE

+ Safe Gas Disposal (controlled destruction, prevents hazardous accumulation)	+ Optimal Design & Performance + Accomodate Special Requirements
+ Handles Variable Biogas Quality (20-80% CH ₄ operating range)	+ On-Time Delivery + Responsive & Organized Team
+ High Destruction Efficiency (>99.5% CH ₄ /VOC destruction vs. >98% regulatory minimum)	+ Stringent Quality Management + Fast Turnaround
+ Automated & Unattended Operation (>99% uptime)	+ Cost Effective Maintenance Packages + Long-Term CRA Support

APPLICATIONS

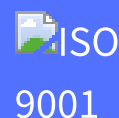
Supplied for safe combustion of surplus, off-spec, and emergency biogas across landfill, wastewater, and digester duty

- + Digester Gas From Anaerobic Digestion
- + Landfill Gas And Low-BTU Biogas
- + Off-Spec Biogas Or RNG
- + Emergency Relief And System Upset Events
- + Vent And Purge Gas Streams
- + Start-Up, Shutdown & Maintenance Flaring

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WORKING & PERFORMANCE



ENCLOSED CHAMBER COMBUSTION, ZERO VISIBLE FLAME, FULLY AUTOMATED TURNDOWN

WORKING

- + Biogas enters through a calibrated control valve and mixes with combustion air inside the refractory-lined chamber
- + Integrated pilots maintain a standing flame at 760-1100°C, sufficient for >99.5% destruction efficiency
- + An automated control system modulates gas flow across a 4:1 to 10:1 turndown range, from minimum load to peak emergency flow
- + Flame detection, high-temperature shutdown, and pressure monitoring operate as independent safety interlocks
- + Exhaust exits through a stack at low temperature once combustion is complete, holding CO below 50 ppm and opacity below 5%

WHY ENCLOSED FLARING

- + >99.5% CH₄/VOC Destruction Efficiency
- + Zero Visible Flame, Low Radiant Heat
- + 4:1 To 10:1 Turndown Ratio
- + Sized For 125-150% Of Utilization Capacity
- + >99% Automated Uptime

Typical all-in operating cost for a 500 Nm³/hr unit runs \$5,000-16,000/year (pilot fuel, assist air, and power combined), against a refractory service life of 5-10 years.

TYPICAL DESIGN & PERFORMANCE PARAMETERS

Destruction efficiency	>98% regulatory minimum; CRA-manufactured units >99.5%
Combustion temperature	760-1100°C
Residence time	>0.3 sec
CO in exhaust	<50 ppm
Unburned hydrocarbons	<10 ppm
Opacity	<5%
Methane operating range	20-80% CH ₄
Turndown ratio	4:1 to 10:1
Sizing margin	125-150% of expected utilization
GHG conversion	1 kg CH ₄ flared = 2.75 kg CO ₂ , vs. 28 kg CO ₂ -eq if vented (90% reduction)
Opex, 500 Nm ³ /hr reference	Pilot fuel \$2-7K/yr, assist air \$2-9K/yr, power \$400-1,750/yr, total \$5-16K/yr
Maintenance cadence	Daily flame check, monthly burner inspection, quarterly sensor cleaning, annual full inspection; refractory life 5-10 years
Uptime	>99% availability
Field reference range	800-1,900 Nm ³ /hr flow, 98->99% DRE, API 537/521 compliance

Figures per CRA published product data; field reference range from CRA project case studies.

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