

SEQUENTIAL DIGESTER BIOGAS MIXING SYSTEM

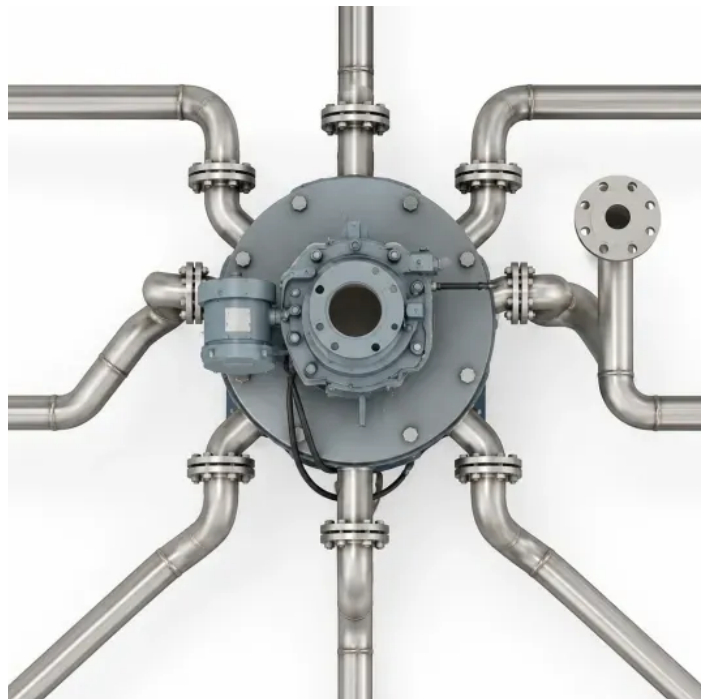


FULL-VOLUME DIGESTER MIXING WITHOUT SUBMERGED MECHANICAL EQUIPMENT

Stratification, scum layers, and dead zones inside a digester cut effective reactor volume and starve parts of the tank of fresh substrate. Mechanical agitators fix this with submerged impellers, but every bearing, seal, and shaft inside the slurry is a maintenance liability and a source of downtime.

CRA's Sequential Digester Biogas Mixing System draws biogas from the digester headspace through an external compressor and re-injects it through submerged lances in a timed sequence that rotates the circulation pattern across the full tank volume. A sequencing controller cycles injection between lance positions, eliminating stagnant zones and breaking up scum layers, with no mechanical equipment submerged in the slurry.

Field results across CRA installations show a 15-30% increase in biogas yield from improved substrate-bacteria contact, and the CRA x Adani Infra installation, three RCC digesters at 15 lances each, is tracking a 5-year ROI. Every system is engineered and manufactured in-house under the same ISO 9001, ASME, and CE-marked quality system that governs every CRA skid.



CRA ADVANTAGE

+ Higher Gas Yield (15-30% increase from uniform mixing)	+ Optimal Design & Performance + Accomodate Special Requirements
+ Controlled Circulation (sequenced injection, minimizes stagnant zones)	+ On-Time Delivery + Responsive & Organized Team
+ Low Maintenance And Reduced Downtime (zero submerged moving parts)	+ Stringent Quality Management + Fast Turnaround
+ Process Stability (improves pH balance, dilutes inhibitors, reduces foam/grit)	+ Cost Effective Maintenance Packages + Long-Term CRA Support

APPLICATIONS

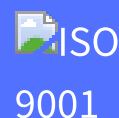
Supplied for full-volume digester mixing across biogas-to-power, upgrading pretreatment, and industrial digestion duty

- + Biogas To Power (CHP Units, Gensets)
- + Pre-Treatment For Upgrading Plants (RNG, Bio-CNG, Bio-LNG)
- + Landfill Gas Conditioning
- + Agricultural Waste Digestion
- + Wastewater Sludge Stabilization
- + Industrial Organic Waste Treatment

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WORKING & PERFORMANCE



TIME-SEQUENCED GAS INJECTION THROUGH SUBMERGED LANCES, ZERO MOVING PARTS

WORKING

- + An external compressor draws biogas from the digester headspace and pressurizes it for injection
- + Lances are positioned at calculated depths and angles to create controlled circulation across the entire digester volume
- + A sequencing controller cycles injection between lance positions, rotating the mixing pattern to eliminate stagnant zones and break up scum layers
- + Continuous rotation through the lance positions suspends solids and maintains uniform temperature and substrate distribution throughout the tank

WHY SEQUENTIAL GAS MIXING

- + 15-30% Higher Biogas Yield
- + Zero Submerged Moving Parts
- + Specific Mixing Power ~5-8 W/m³ Of Digester Volume^L
- + Targets >85% Active Working Volume^L
- + Lower Maintenance Than Mechanical Agitators

Lance count and placement scale with digester geometry; the CRA x Adani Infra installation runs 15 lances per digester across three RCC tanks, tracking a 5-year ROI.

TYPICAL DESIGN & PERFORMANCE PARAMETERS

Mixing principle	Gas recirculation, time-sequenced injection
Submerged moving parts	Zero
Primary moving component	External gas compressor
Biogas yield increase	15-30%
Specific mixing power	~5-8 W/m ³ of digester volume (EPA-benchmarked range for gas-injection mixing, consistent with independent field survey data) ^L
Target active volume	>85% of total digester volume ^L
Reference installation	CRA x Adani Infra, 3 RCC digesters, 15 lances per digester, 5-year ROI
Digestion outcome	Faster digestion, reduced VS content in effluent vs. unmixed or poorly mixed digesters

^L Published literature, sources on file. All other figures per CRA published product data.