REGENERATIVE THERMAL OXIDIZER

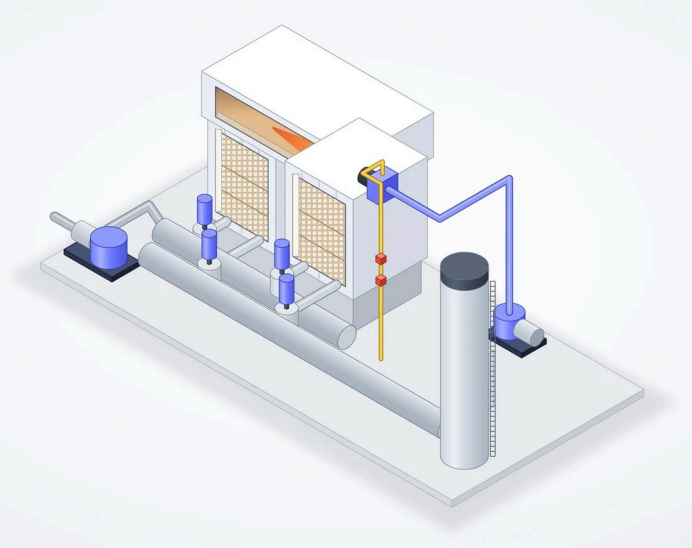
Engineering a Safer World

MAXIMIZE ENERGY, MINIMIZE EMISSIONS WITH REGENERATIVE THERMAL OXIDIZERS

Continuous-duty VOC control at large flow volumes turns fuel cost into the dominant line item over an oxidizer's operating life. A technology that discards exhaust heat instead of reusing it compounds that cost year after year, especially at the flow rates biogas, chemical, and petrochemical processes run around the clock.

CRA's Regenerative Thermal Oxidizer (RTO) runs process gas through two or three ceramic media beds that alternate roles on a timed cycle: one bed preheats incoming gas using heat stored from the previous cycle, while the other captures heat from the outgoing exhaust. The preheated gas combusts in the central chamber at up to 815°C, with a minimum residence time of 0.8 to 1.0 seconds ensuring VOCs and HAPs fully oxidize. Once the absorbing bed has taken on sufficient heat, a valve reverses flow direction so the two beds swap roles, sustaining continuous preheating and up to 97% heat recovery.

CRA has engineered RTOs for chemical, petrochemical, and biogas duty for over 30 years, in-house from design through fabrication, under the same ISO 9001 quality system that governs every CRA skid.



CRA ADVANTAGE

+ Superior Energy Recovery (Recovers up to 97% of energy from exhaust gases, slashing auxiliary fuel needs)	+ Optimal Design & Performance + Accomodate Special Requirements
+ Low Operating Costs (Minimal fuel usage and automated controls drive down lifetime operating expenses)	+ On-Time Delivery + Responsive & Organized Team
+ Rapid Thermal Cycling (Fast media bed switching for seamless turndown and stable performance during process variations)	+ Stringent Quality Management + Fast Turnaround
+ Lower Thermal Stress (Preheated inlet gas stabilizes combustion temperatures, extending refractory life)	+ Cost Effective Maintenance Packages + Long-Term CRA Support

APPLICATIONS

Supplied for high-flow, continuous-duty VOC and HAP destruction across chemical, petrochemical, and biogas processes

+ Halogenated Hydrocarbons
+ Inert And Nitrogen-Blanketed Streams
+ Acid Gas
+ Liquid Waste
+ Landfill And Biogas Streams
+ Emergency And Upset Flows

CRA
7, Sector 140A
Noida, UP, 201304

Learn more at www.cra.energy

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

ISO 9001 QUALITY ASSURANCE MANAGEMENT

©Combustion Research Associates

WORKING & PERFORMANCE

CRA
Engineering a Safer World

TWO OR THREE CERAMIC BEDS TRADE ROLES TO HOLD HEAT RECOVERY NEAR 97%

WORKING

+ Incoming process gas enters through a ceramic bed already holding heat from the previous cycle, raising it to near combustion temperature before the chamber

+ The preheated gas combusts in the central chamber at up to 815°C, with 0.8-1.0 seconds minimum residence time for complete VOC/HAP oxidation

+ Hot exhaust gas passes through the second ceramic bed, depositing combustion heat into the media for use in the next cycle

+ A valve reverses gas flow direction once the second bed has absorbed sufficient heat, so the two beds swap roles and sustain continuous preheating

+ Flow-directing valves cycle roughly every 120-480 seconds depending on system design, with three-bed configurations adding a purge chamber to limit untreated gas carryover during switching[L]

RTO AT A GLANCE

+ Heat Recovery: Up To 97%

+ VOC/HAP Destruction: Up To 99%

+ Operating Temp: Up To 815°C

+ Thermal Efficiency: Up To 95%

+ Bed Configuration: Two Or Three Ceramic Media Beds

A recuperative unit suits moderate continuous flows better; an RTO earns its higher capital cost at high-flow, long-duty-cycle operations where fuel cost dominates lifecycle economics.

TYPICAL DESIGN & PERFORMANCE PARAMETERS

Heat recovery	Up to 97%
VOC/HAP destruction	Up to 99%
Operating temperature	Up to 815°C (1,500°F)
Thermal efficiency	Up to 95%
Residence time	0.8-1.0 seconds minimum
Bed configuration	Two or three ceramic media beds
Flow-reversal cycle time	Typically 120-480 seconds (roughly 2-8 minutes), design-dependent[L]
Ceramic media service life	Structured media 5-10 years, random/saddle media 15-20 years, application-dependent[L]
Applicable standard	NFPA 86, governs burner management and valve/purge sequencing[L]

Figures per CRA published product data; items marked with a superscript L are drawn from published industry literature.

CRA
7, Sector 140A
Noida, UP, 201304

Learn more at www.cra.energy

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

ISO 9001 QUALITY ASSURANCE MANAGEMENT

©Combustion Research Associates