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Lundberg supplies state-of-the-art air pollution control technologies to industry with a complete line of Geoenergy® technologies. This includes the GeoTherm® II RTO, the E-Tube® Wet ESP, and wet scrubber systems. Since 1984, the Geoenergy technologies have solved difficult air emission control issues, while meeting demanding air quality regulations with unmatched availability and low operating costs.

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GEOTHERM® II REGENERATIVE THERMAL OXIDIZER (RTO)



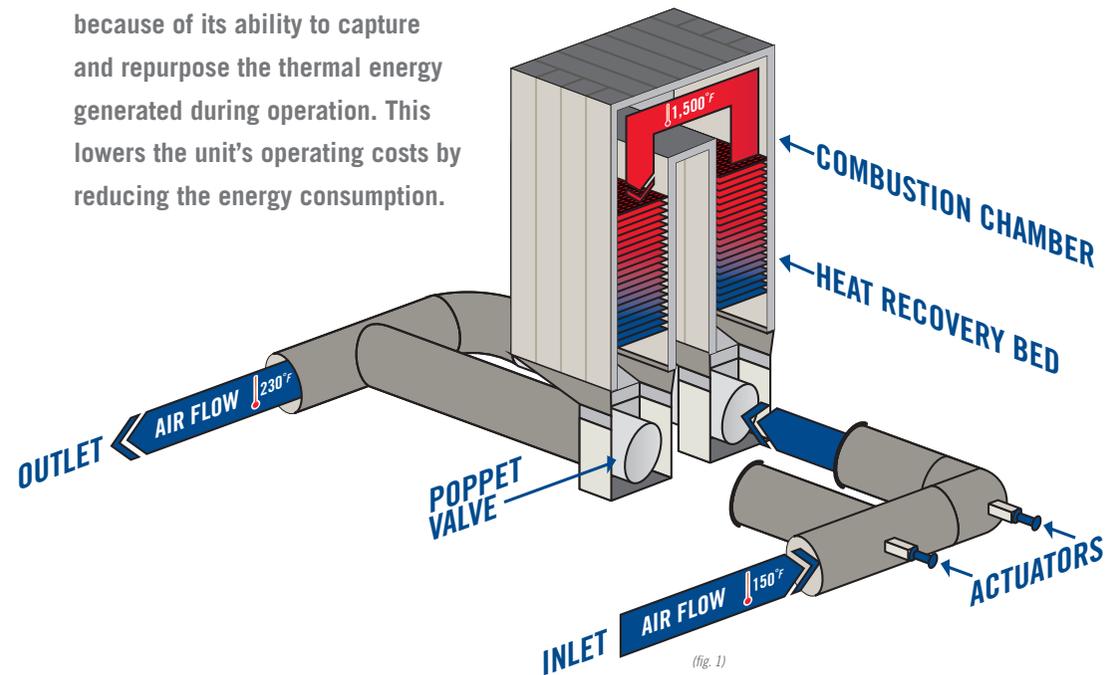
REGENERATIVE THERMAL OXIDIZERS (RTO)

EFFICIENT VOC ABATEMENT

Regenerative Thermal Oxidizers (RTOs) destroy Volatile Organic Compounds (VOCs), Hazardous Air Pollutants (HAPs), odors, and other organic substances from a variety of industrial process streams, while minimizing energy use and cost.

How RTOs work: VOC-laden process gas enters the RTO inlet manifold and then passes upwardly into a heat recovery chamber that contains ceramic media (see fig. 1). Here, the incoming gas is preheated before entering a combustion chamber. Inside the combustion chamber the gas is exposed to a high temperature to oxidize and destroy the VOCs. The purified gas then passes downward through the outlet heat recovery chamber where it releases its thermal energy as it passes through the ceramic media. Poppet valves are used to alternate the airflow direction into the heat recovery media beds to continue to store and release the heat added in the combustion chamber. This back-and-forth—regenerative—process minimizes the total heat added to the outlet gas stream to maximize thermal efficiency.

RTO technology is widely used because of its ability to capture and repurpose the thermal energy generated during operation. This lowers the unit's operating costs by reducing the energy consumption.



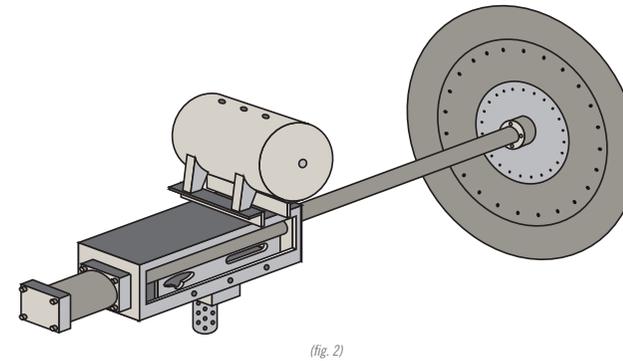
THE GEOTHERM® II RTO

SIMPLICITY MEETS PERFORMANCE

The GeoTherm® II RTO uses a simple, state-of-the-art design to achieve high thermal and destruction efficiencies. The unit is available in two-canister and multi-canister arrangements to provide the smallest footprint for a wide range of design flows (see fig. 4). The RTO units are available in forced draft or induced draft configurations with fast-acting poppet valves. Multiple heat recovery media options are available. The Geoenergy® team has the expertise to determine whether structured, monolithic or random-type media is the best fit for the application, while providing a low system pressure drop. The GeoTherm® II is capable of VOC destruction efficiencies of 99%+ and thermal efficiencies of up to 97%.

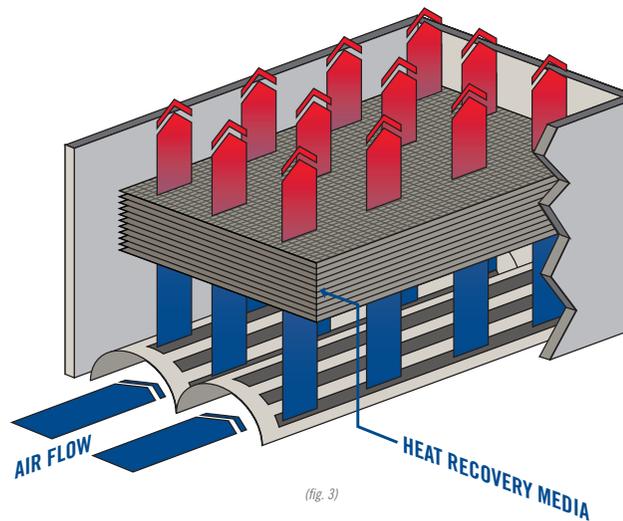
Fast-Acting Poppet Valves

Fast-acting poppet valves are an ultra-simple and highly efficient feature of the GeoTherm® II RTO. The poppet valve is used to quickly divert process gas flow between the RTO inlet and outlet manifolds with a minimum of gas bypass. Gas leakage across the valve is also greatly minimized by a proprietary disc design that provides a greater than 99% gas seal. The simplicity of this feature also means that maintenance is straightforward and manageable by any operation. (see fig. 2)

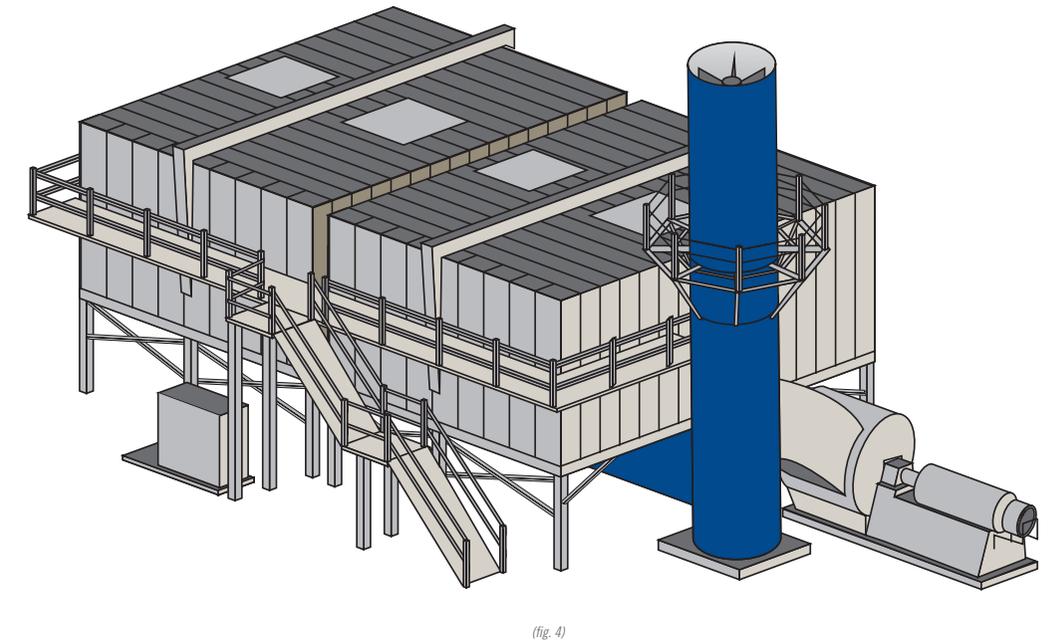


Advanced Cold Face Design

The cold face in the GeoTherm® II RTO supports the heat recovery chamber media and provides proper gas flow distribution with specialized airflow distribution tubes. The distribution tubes are manufactured with gas distribution slots and various other features dependent on the media type. The material of construction for each process application is custom selected by the experienced Geoenergy® team of engineers (see fig. 3).



Some applications require filtration of particulate matter before the process gas is treated in the RTO. The Geoenergy® E-Tube® Wet Electrostatic Precipitator (wet ESP) is the industry-leading device for this pre-cleaning. The E-Tube® reduces filterable particulate matter to prevent the heat recovery media beds in the RTO from plugging and degrading due to chemical attack.



Multiple Heat Exchange Media Options

The GeoTherm® II RTO is designed to accommodate structured, monolithic, and random-type heat recovery media. In each application the Geoenergy® team evaluates the pressure drop, particulate content, and corrosive nature of the gas stream to select a heat exchange media that provides the best economic and operational performance.

The Lundberg Difference

For nearly 80 years, our engineers have proudly carried the Lundberg name, analytically applying technologies to industry and helping our clients find solutions and adapt to changing technologies and emissions requirements. Today, we continue that tradition, offering complete engineering, project management, and construction services, as well as comprehensive aftermarket service and spare parts supply.

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