98% VOC Destruction Efficiency
95% Heat recovery Saves on Supplemental Fuel Costs
Structured Ceramic Heat Sink Minimizes Fouling Due to Particulates
Proprietary Single Valve Operation Eliminates Sequencing Problems
Turnkey System Design & Manufacture
REGENERATIVE THERMAL OXIDIZER
Operating Principle

TWO CHAMBER RTO WITH SCRUBBER (on right)
Turner EnviroLogic’s REGENERATIVE THERMAL OXIDIZER (RTO) has application where VOC and HAP concentrations are very low. The high heat recovery capabilities of our RTO make it a cost-effective solution to air emissions problems such as destruction of VOC’s and HAP’s as well as for odor and smoke control.

The Turner EnviroLogic REGENERATIVE THERMAL OXIDIZER utilizes a proprietary 4-way switching valve that alternately directs the incoming airstream to either of two heat recovery chambers. Each chamber is filled with ceramic heat sink media to the necessary depth to provide from 80% to 95% heat recovery. Heat recovery chambers are lined with ceramic fiber refractory materials to retain heat. Higher heat recovery means greater fuel savings, especially for very low VOC concentrations. VOC destruction efficiencies up to 98% are possible. Higher destruction efficiencies are available by adding additional chambers.

A Programmable Logic Controller controls the switching valve operation, oxidizer monitoring and auxiliary functions while the burner sequencing is performed by an automatic microprocessor-based flame relay. Gas train is pre-piped; Factory Mutual approved, with IRI compliance available as an option. A multi-stage turbo blower is used for the supply of combustion air, which is pulled from the incoming airstream to further minimize fuel usage.

Materials of construction are carefully selected to withstand a wide variety of chemicals and solvents including chlorinated and/or halogenated compounds. Packed bed scrubbers are also available from Turner EnviroLogic for acid gas scrubbing and exhaust gas discharged from the RTO.

Volatile Organic Compounds (VOC’s) and Hazardous Air Pollutants (HAP’s) are destroyed in the Regenerative Thermal Oxidizer (RTO) by elevating the gas stream temperature to 1,500° F for a minimum retention time of
one second. Auxiliary fuel usage, to supplement the VOC’s inherent heat of combustion, is minimized since the RTO is capable of recovering up to 95% of the heat needed for VOC destruction efficiencies as high as 98%.

SEQUENCE OF OPERATION:

1. VOC laden air enters the RTO where a proprietary switching valve directs the air to one of two heat recovery chambers.

2. Air passes up through the recovery chamber that is filled with a ceramic heat sink media.

3. VOC’s are destroyed in the combustion chamber where an auxiliary fuel burner raises the gas temperature to 1,500 °F. Temperature is held for a minimum retention time of one second, destroying the VOC’s.

4. Cleaned air then passes down through the second heat recovery chamber where up to 95% of the combustion heat is recovered.

5. Cooled air, with up to 98% of the VOC’s destroyed is directed to the outlet of the RTO through the proprietary switching valve.

6. A PLC controls the timing of the proprietary switching valve to periodically reverse the air flow through the RTO.

7. VOC laden air is diverted to the heat recovery chamber passing through the ceramic heat sink media that has been heated during the previous cycle. The media gives up most of its heat to the air thus pre-heating the VOC laden air.

8. VOC’s in the air, that is now pre-heated to near the light-off temperature, are destroyed in the combustion chamber as in the previous cycle. Minimal auxiliary fuel is required since the air is pre-heated.

9. Cleaned air passed down through the second heat recovery chamber where it gives up its heat to the ceramic media in preparation for the next cycle of the RTO.