REGENERATIVE THERMAL OXIDATION

Possible applications

Regenerative thermal oxidizers are suitable for cleaning pollutant components that are combustible and that produce objectionable odors. If the pollutant burden of the exhaust air is low or only limited, external heat recovery is possible or desired, this process is superior to other thermal processes thanks to its very high internal heat recovery. Regenerative thermal oxidizers are used for exhaust air volumes greater than 2,000 Nm^3/h and pollutant concentrations up to approx. 10 g/Nm^3.

Various additional equipment can allow these systems to be used in almost all branches of industry:

- Hot-gas bypass for use in over-autothermal mode
- Use of special materials (e. g. stainless steel alloy) or special coatings for corrosive media
- Bake-out for cleaning deposits on regenerative heat exchange media
- Exhaust air preheating to reduce the relative humidity in the exhaust air inlet
- LEL control with controlled addition of fresh air for very high exhaust air concentrations
- Combination with fume scrubbers to eliminate acidic fume components, for example

Chemical and pharmaceutical industries, printing industry, coating industry, food industry, etc. – almost any sector can benefit from regenerative thermal oxidation.

The process

Regenerative thermal oxidizers use less primary energy compared to conventional air pollution control systems. This is achieved through the use of regenerative heat exchangers, which are highly efficient at using the energy contained in the hot exhaust gases to preheat the exhaust air to be treated. The heat exchanger consists of a ceramic heat storage material. The exhaust air to be treated flows through the hot storage material from bottom to top, heating up to nearly the combustion chamber temperature. A large part of the hydrocarbons are already oxidized here. The combustion chamber, by means of a burner, heats the exhaust air to the reaction temperature of approx 800 °C required for complete conversion. The hot treated air then flows from top to bottom through another part of the heat storage material and returns its heat to the storage material.

Thanks to the high level of internal heat recovery, the system functions "autothermally" above a pollutant concentration of approx. 1.5 g/Nm^3, i. e. the energy content of the pollutants suffices to operate the system without additional fuel (e. g. gas).

The different versions:
» **Ecopure**® RTO
» **Ecopure**® CTO
» **Ecopure**® RL
are briefly described in the following.

ADVANTAGES OF THE SYSTEM

» Low primary energy input, autothermal from approx. 1.5 g solvent/Nm^3
» Low operating costs
» Insusceptible to fluctuations in terms of pollutant concentration and type
» Different concepts permit universal use
» Additional external heat recovery possible

NOTES FOR OUR CUSTOMERS

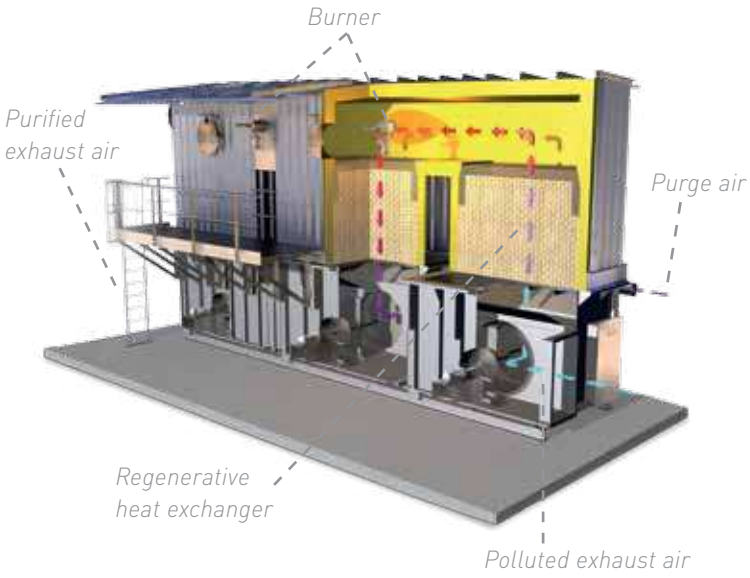
» System is heavy
» Max. pollutant concentration at system inlet 25 % LEL
» Susceptible to exhaust air containing silicon

Ecopure® RTO – VERSATILE AND ADAPTABLE

The Ecopure® RTO system

The **Ecopure®** RTO regenerative thermal air pollution control system is characterized by their cost-optimized, standardized and low-maintenance design. The modern process equipment of the **Ecopure®** RTO system permits efficient disposal of exhaust air containing solvents and odors, with a destruction efficiency of over 99.8 %. Diverse equipment options allow it to be used almost universally.

The **Ecopure®** RTO uses modern, standardized components such as low-NO_x burners, tight-closing and low-maintenance stainless steel valves, as well as highly efficient fans. The patented air ducting system ensures the best possible flow to the heat exchangers, combined with minimum space requirement and the greatest possible ease of maintenance.



The pre-assembly concept of the **Ecopure®** RTO systems minimizes installation and commissioning time.

Standard sizes are available as two- or three-tower systems, depending on the required destruction efficiency. The innovative RTO design also allows the number of heat exchanger tanks to be expanded in a modular manner to increase the capacity.

TYPE	Ecopure® RTO (AS 2- OR 3-TOWER SYSTEMS)									
	3010	3015	3020	3025	3030	3035	3040	3050	3060	3080
Typical exhaust air volume range in Nm^3/h approx.	9,000 – 16,000	14,000 – 20,000	19,000 – 27,000	22,000 – 31,000	26,000 – 36,000	30,000 – 41,000	36,000 – 50,000	47,000 – 65,000	55,000 – 76,000	70,000 – 98,000

Exhaust air volumes >100,000 Nm^3/h are realized by modular expansion of the number of tanks.

Ecopure® CTO – DESIGNED FOR LOW AIR VOLUMES

The **Ecopure®** CTO system

A "Lean Line" concept based on the **Ecopure®** RTO was developed especially for industrial operations with lower exhaust air volumes. The result is the compact **Ecopure®** CTO system, designed for lower exhaust air flow rates and minimizes investment and operating costs.

Mechanically and electrically, the **Ecopure®** CTO is completely pre-assembled and skid mounted. The system arrives onsite "ready to connect" and can be installed at in a 1/2 day.

After installation of the CTO, only exhaust and clean gas ductwork and operating facilities for gas, compressed air, and electrical power have to be connected before commissioning.

Our special **Ecopure®** Compact Thermal Oxidizer (CTO) can be transported in one piece, prefabricated and installed.

Another benefit of our **Ecopure®** CTO System is the small dimension. Due to this unique feature the system is perfect for production sites with limited space.

The **Ecopure®** CTO system is available in three sizes with cleaning capacities from approx. 5,000 to approx. 19,000 Nm^3/h exhaust air.

Each size is available both as an especially economical two-tower version and as a three-tower version for higher cleaning efficiency.

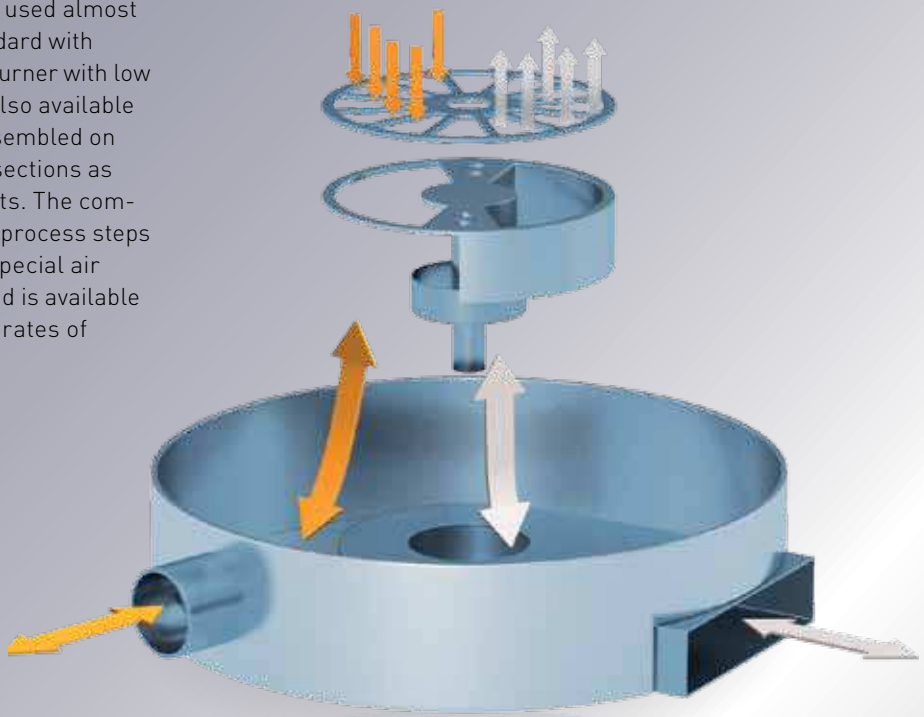
TYPE	Ecopure® CTO		
	3008	3012	3016
Typical exhaust air volume range in Nm^3/h approx.	5,000 – 10,000	10,000 – 14,000	14,000 – 19,000

Ecopure® RL – THE RTO WITH THE SINGLE ROTARY VALVE

The **Ecopure®** RL RTO system

The **Ecopure®** RL RTO is unique in having a single special rotary valve with state-of-the-art process equipment in a robust and rugged design. It is used particularly in situations with little available space.

Diverse equipment variants also allow it to be used almost universally. The **Ecopure®** RL is equipped standard with state-of-the-art burner control technology, a burner with low NO_x emissions and an exhaust air fan that is also available as a treated-air fan. The RL system is pre-assembled on transportation frames and shipped in as few sections as possible for reduced installation time and costs. The compact, standardized **Ecopure®** RL, in which the process steps are realized in only one tower thanks to the special air ducting system via a rotating diverter valve, and is available in various sizes for disposing of volume flow rates of 90,000 – 125,000 Nm^3/h.



TYPE	Ecopure® RL										
	RL5	RL10	RL15	RL20	RL25	RL30	RL35	RL40	RL50	RL60	RL80
Exhaust air volume range in Nm^3/h approx.	2,000 – 8,000	8,000 – 16,000	15,000 – 24,000	22,000 – 32,000	30,000 – 40,000	39,000 – 48,000	47,000 – 55,000	54,000 – 64,000	63,000 – 80,000	75,000 – 95,000	90,000 – 125,000