Treatment technologies for VOCs
Cabycal is a cutting-edge innovation engineering firm which designs, develops and manufactures facilities for surface treatment and coating systems for the industry.
Among its products, Cabycal develops state-of-the-art systems for the treatment of emissions and gas waste for different sectors.

The technological solutions offered by Cabycal help companies to comply with the demanding European environmental legislation developed in terms of treatment and control of emissions and polluting waste released into the atmosphere.
Cabycal offers a **global service** that goes from the study of the client needs and the **design of the technological solution** until the **start-up**, going through the **manufacture** and **assembly** of the determined system.
Industry production processes generate Volatile Organic Compounds VOCs. Regulations require to treat them before being released into the atmosphere to reduce their polluting effect.

Thermal oxidation systems are among the most efficient technologies for the treatment of gas emissions of VOCs.
Thermal oxidation is a process that transforms polluting compounds into products with a reduced environmental impact through the following reaction:

\[ \text{COVs} + \text{O}_2 + \text{Energy} = \text{CO}_2 + \text{H}_2\text{O} + \text{Heat} \]

This combustion reaction takes place under the appropriate conditions of temperature, turbulence and time.
Depending on the needs of each process, the activation energy necessary to carry out the reaction and the generated heat can be recovered by means of heat exchange units.
Direct Thermal Oxidizer (TO)

Recuperative Thermal Oxidizer

Regenerative Thermal Oxidizer (RTO)

Catalytic Oxidation

VOC Concentration Systems
Direct Thermal Oxidizer

Ideal treatment technology for continuous or discontinuous processes with high VOC loads.

- Load >15% LEL
- No heat recovery.
- VOC removal efficiency >99%.
- Low maintenance.
- Quick start-up.
Recuperative Thermal Oxidizer

• Suitable for industrial processes that require the use of the energy generated during oxidation.

• Heat recovery units using thermal fluid, hot air, hot water or steam.

• Ideal system for high concentrations of VOCs and low flow rates.
Recuperative Thermal Oxidizer

- Operating range 1.000 - 50.000 Nm$^3$/h
- Load 15-25% LEL
- Heat exchange efficiency 50-65%
- VOC removal efficiency >99%
Regenerative Thermal Oxidizer

- Suitable for *industrial processes* where there is no requirement for secondary use of the energy *generated* in the oxidation of gases.

- High efficiency heat exchange units of ceramic material.
Regenerative Thermal Oxidizer

- Ideal system for low concentrations of VOCs and high flow rates.

- Higher concentrations: possibility of incorporating heat recovery units "hot gas by-pass" directly from the combustion chamber to heat thermal fluid, water or air.
Regenerative Thermal Oxidizer

- Operation range 10,000 - 150,000 Nm³/h [2-3-5 towers]
- Load <15% LEL [1-10 g/m³]
- Auto-thermal point ≈ [1.5-2 g/m³]
- Ceramic heat exchange efficiency >95%
- VOC removal efficiency >98% [2 towers] >99.5% [3 towers]
- Low operating costs for high flow rates and low concentrations.
Catalytic Oxidation

- In this process the oxidation of the polluting products is carried out using a catalyst, thus reducing the activation energy necessary to carry out the reaction.
- Suitable for technological solutions with heat recovery and regenerative type.
- Recuperative Catalytic Oxidizer
- Regenerative Catalytic Oxidizer
- Ideal technology for low concentrations of VOCs and low flow rates.
Catalytic Oxidation

- Operation range 1,000 - 20,000 Nm³/h
- Reduction of operating cost due to the decrease in operating temperature.
- Compact systems due to the shorter residence time required.
VOC Concentration Systems

- The concentration systems allow reducing the volume of air to be treated by proportionally increasing the concentration of VOCs through adsorption / desorption processes on zeolite.

- Once concentrated, the air is sent to a thermal oxidation equipment for its treatment.

- Technology applied for very high flows and low concentrations of VOCs.
VOC Concentration Systems

- Concentration ratio 1/6 – 1/20
- Reduction of investment and operating costs.
REFERENCE PROJECTS

Location: Vitoria (Spain)
Technology: Zeolite wheel+ RTO
Flowrate: 35,000 Nm3/h + 5,000 Nm3/h
REFERENCE PROJECTS

Location: Épila (Spain)
Technology: RTO
Flowrate: 14,000 Nm3/h
REFERENCE PROJECTS

FAGOR

Location: Tafalla (Spain)
Technology: RCO
Flowrate: 10,000 Nm3/h
Location: Liria (Spain)
Technology: Zeolite wheel + RTO
Flowrate: 90,000 Nm³/h + 8,000 Nm³/h
Location: Pobla de Vallbona (Spain)
Technology: Zeolite wheel + RTO
Flowrate: 90,000 Nm³/h + 8,000 Nm³/h
Location: Burntwood (England)
Technology: RCO
Flowrate: 9.000 Nm³/h
**Location:** Gernika (Spain)

**Technology:** RCO

**Flowrate:** 12,000 Nm$^3$/h
Location: Gernika (Spain)
Technology: RTO
Flowrate: 12,000 Nm³/h
Cabycal S.L.
C/ Doctor Fleming, 16
P. I. El Bobalar
C.P. 46970 Alaquas
Valencia
SPAIN
T. +34 96 150 86 19
info@cabycal.com

Cabycal Coating Technology S. R.L. C.V.
Pº de la Reforma, 222 Tower 1 Floor 1 Int. 100
Colonia Juárez, C.P. 06600
Mexico City
MEXICO
T. +52 55 1253 7264
mexico@cabycal.com
Monterrey branch office
M. +521 (81) 1030 52 38
rdelaisla@cabycal.com

www.cabycal.com