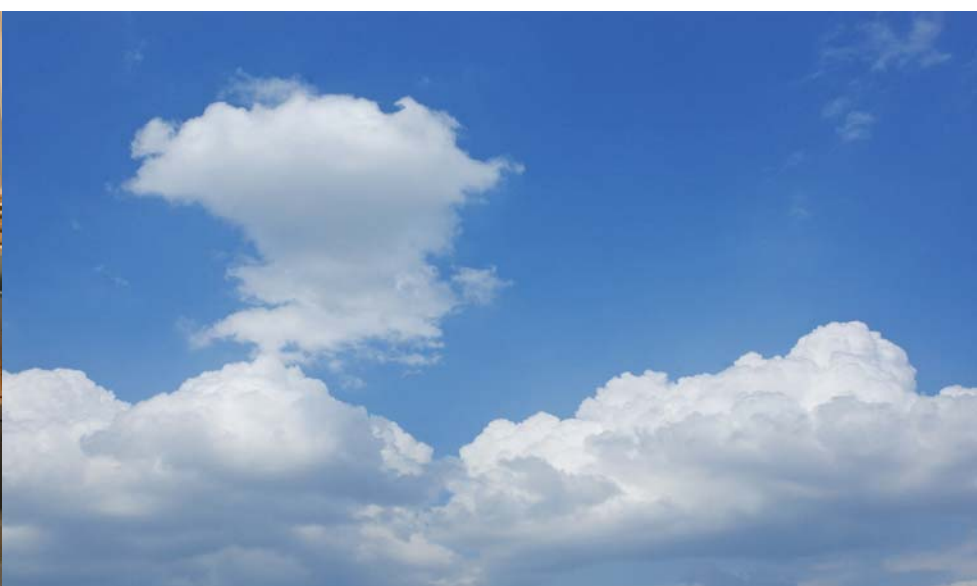


Volatile Organic Compounds Reduction Technologies



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Recuperative thermal oxidation

Installations for Volatile Organic Compounds (VOC's) reduction by means of thermal oxidation designed and manufactured by KALFRISA guarantee an optimum efficiency, thanks to the appropriate selection of temperature, residence time and mixture turbulence.

■ THERMAL OXIDATION CHAMBERS

■ VALORIZATION OF ELIMINATED ORGANIC COMPOUNDS



Thermal oxidation chamber

Flow	Oxidation chamber temperature	Preheating of gases to clean
500 - 30.000 Nm ³ /h	750 - 1.200 °C	up to 600 °C

Installations of thermal oxidation can incorporate:

- Thermal oil heaters
- Preheaters of polluted gases
- Process air heaters
- Steam generators
- Water heaters

Oxidation devices allow the destruction of residual liquids directly in the flame, so using its thermal energy.



Regenerative thermal oxidation



Regenerative preheating

VOC's cleaning system with a highly efficient preheating of polluted gases.

Applications:

Automotive industry
Graphic and flexographic industries
Packing manufacturing
Food industry
Wood coatings

It is essentially made of an oxidation chamber with two or more thermal exchangers. Accumulative masses made of ceramic material (regenerators) heat the polluted air almost up to the reaction temperature.

The additional thermal energy required to guarantee the oxidation is supplied by polluted substances or an auxiliary fuel.

■ **SPECIFIC DESIGN
FOR EACH
INSTALLATION**

■ **95% EFFICIENCY
IN HEAT EXCHANGE**

■ **REDUCED ENERGY
CONSUMPTION**

Flow	Organic pollutants concentration	Reaction temperature	Autothermal working *
5.000 - 250.000 Nm ³ /h	up to 10 g/Nm ³	800 - 1.000 °C	from 1,7 g/Nm ³

* No additional fuel required



Ceramic fiber
internal covering



VOC'S CONCENTRATION

ZEOLITE ROTARY BED

When VOC's content in emissions is very low and volume of polluted air high, it is usually very profitable to make a previous concentration of polluted gases flow. This concentration is made in a zeolite rotary bed. Concentrated gases are cleaned in a thermal oxidation system before they are exhausted to the atmosphere with low energy consumption.



integral service of engineering, installation and maintenance

GASES CLEANING AND ENERGY VALORIZATION

VOC's thermal oxidation processes can generate secondary substances in a quantity superior to what is allowed by environmental legislation.

KALFRISA makes cleaning installations that can incorporate **NOx reduction and dry, semi-dry or wet neutralization of acid gases devices.**

The addition of activated carbon in the gaseous current and its later filtering assure the retention of dioxines and heavy metals.

Thermal oxidation systems supplied by KALFRISA usually incorporate elements for **heat recovery** of oxidated gases:

- Pre-heaters of gases to clean or combustion air
- Steam or hot water boilers
- Thermal fluid generators



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