



**condorchem
envitech**

AIR TREATMENT

Solutions and Technologies

Condorchem Envitech is an environmental engineering company that offers turn-key solutions for:

VOC's treatment

Odor treatment

NOx abatement

We offer our clients comprehensive environmental project solutions, covering the following services:



DESIGN



INSTALLATION



START UP



MAINTENANCE

We have carried out more than 500 projects in over 20 countries all over the world.

RIOGUASS

 **RosRoca**

 **danosa**

 **SENER**

ABENGOA



 **SUZUKI**

 **EXIDE**

 **DSM**

ABENER

 **acciona**
energia

 **TSK**

SOME OF OUR PROJECTS



Ouarzazate CSP Plant

Morocco - 2015

Activated carbon filters within HTF (Heat Transfer Fluid) ullage system.



Mojave CSP Plant

USA - 2013

Activated carbon filters within HTF (Heat Transfer Fluid) ullage system.



Ros Roca Envirotech

Germany - 2012

Regenerative thermal oxidation to treat exhausted air from biogas upgrading.



Rioglass Solar

Spain - 2007

Three chamber Regenerative thermal oxidation for the treatment of VOC's generated in the liquid painting process.



Exide

Spain - 2016

Scrubber Envisorb 50/60 for the abatement of sulfuric acid emissions.

VOC's TREATMENT

The emission of VOCs is one of the greatest environmental problems today. They are responsible, on mixing with NO_x, for forming the photochemical smog. Moreover, they cause harmful effects on human health and on natural ecosystems due to their toxicity. On the other hand, they are odoriferous substances, a fact that has a very negative effect on the environment of the industry that emits them.

From the biggest project to the smallest details, our extensive process and equipment knowledge allows Condorchem Envitech to meet specific project needs for a wide range of industries.

At Condorchem Envitech our engineers will work with a client and thoroughly study their operation to provide the proper technology selection and all the necessary support services needed to satisfy both present and future requirements for a wide range of industry needs.



OUR TECHNOLOGIES FOR VOC's TREATMENT

We provide both, destructive and non-destructive technologies, for VOC treatment in any industrial sector.

We are experts in designing the most efficient processes for the elimination of Volatile Organic Compounds, which will depend on different factors; airflow being treated and its variability, VOC concentration in the air and its variability, availability of space, etc.

Among the most competitive techniques that Condorchem Envitech designs and installs to treat VOC emissions are:

Process	Pollutants										
	Dust	Heavy Metals		Acid Gases		NOx	CO	CO2	Dioxin Furan	VOC	Odours
		Particulate	Gaseous	HCl, HF, HBr, HI	SOx						
Cyclones	■										
Venturi Scrubbers	■■	■■	■■	■■					■		■■
Sleeve-Bag Filters	■■■	■■■							■		
ESP Filters	■■■	■■									
Dry Scrubbers	■■■	■■■	■	■■	■				■		
Wet Scrubbers	■■■	■■■	■■	■■■	■■■			■■■	■		■
Selective catalytic reduction (SCR)						■■			■■■		
Thermal Oxidation							■■■			■■■	■■
Catalytic Oxidation							■■■			■■■	■■
Chemical Absorption	■■	■■	■	■■■			■■	■■			■■■
Adsorption			■■■	■	■		■	■	■■■	■■■	■■■
Photo-Oxidation						■■■				■■	■■■
Condensation										■■	
Bio-Filtration										■■	■■■

Low efficient

Efficient

Highly efficient

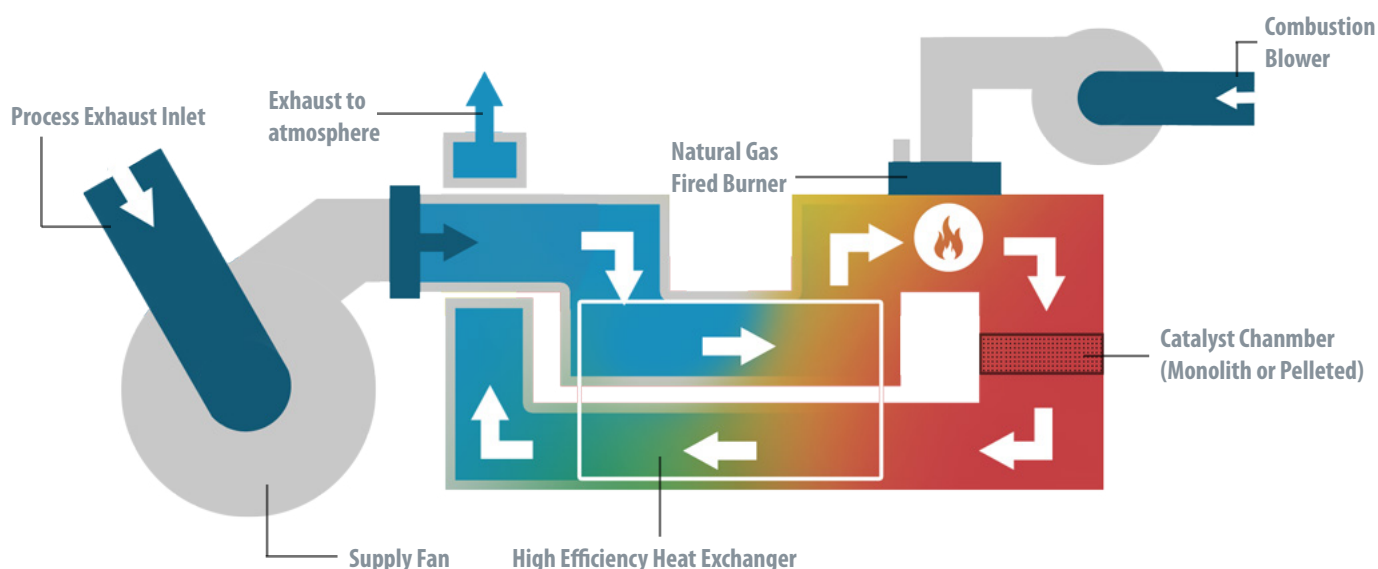
CATALYTIC OXIDATION

Catalytic Oxidizers from Condorchem Envitech are designed to destroy air pollutants and volatile organic compounds in air from process exhaust streams at temperatures ranging from 260°C (500°F) to 345°C (650°F). Catalytic oxidizers utilize a high-efficiency counter-flow plate type heat exchanger. Oxidation is achieved as VOC emissions pass through a heated bed of precious metal catalyst.

The basic design concept of catalytic oxidation is to utilize an industrial grade catalyst to promote the chemical reaction at lower temperatures as compared to thermal oxidation. The air pollutant is mixed with oxygen, heated to an elevated temperature and passed through a catalyst, thus destroying the pollutant in the air stream by converting it to CO₂, H₂O and heat. The rate of reaction is controlled by the temperature of the catalyst chamber and the amount of time that the pollutant spends within the catalyst itself. Catalytic oxidation commonly requires less energy to operate due to lower operating temperatures.

Advantages

- Low operating costs with low air pollutant concentrations
- Low maintenance costs
- Ease of operation
- Ease of install





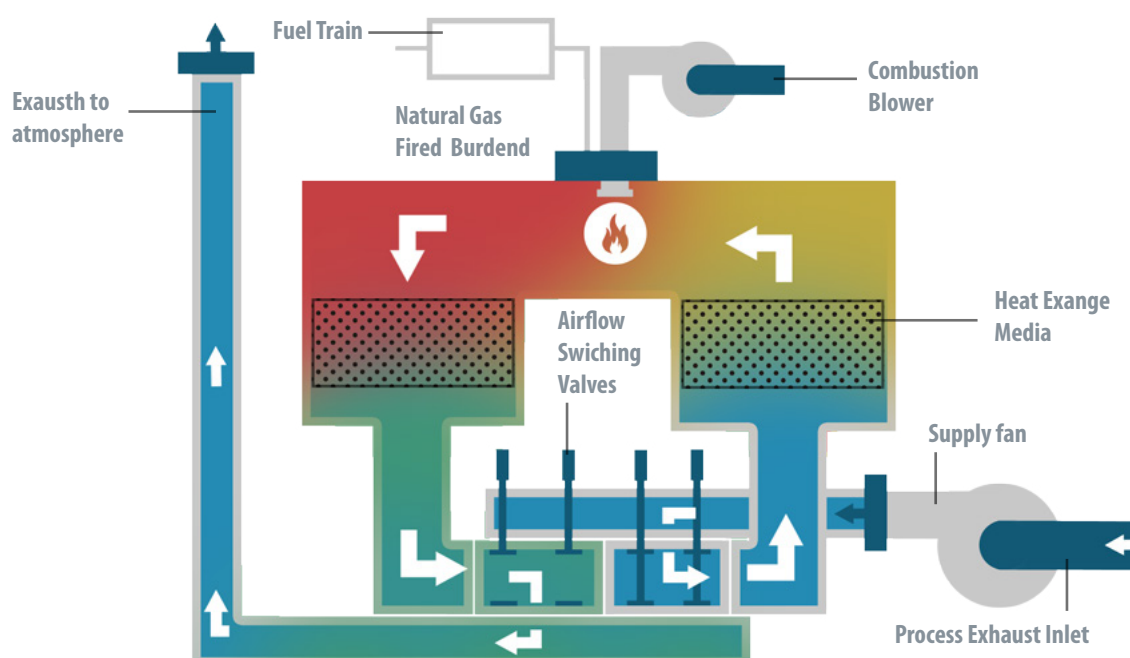
REGENERATIVE THERMAL OXIDATION

Regenerative Thermal Oxidizers from Condorchem Envitech are designed to destroy air pollutants emitted from process exhaust streams at temperatures ranging from 815°C (1,500 F) to 980°C (1,800 F). This VOC abatement technology utilizes ceramic media packed into vertical canisters as a high-efficiency heat exchanger. High temperature thermal oxidation is achieved as pollutants pass through the ceramic media, are mixed, and held at elevated temperatures in the combustion chamber.

The basic design concept of thermal oxidization is to promote a chemical reaction of the air pollutant with oxygen at elevated temperatures. This reaction destroys the VOC emission in the air stream by converting it to CO₂, H₂O and heat. The rate of reaction is controlled by three-(3) interdependent and critical factors; time, temperature and turbulence.

Advantages

- Moderate capital cost
- Low operating costs with low air pollutant concentrations
- Very high thermal heat recovery
- Capable of high inlet temperatures



VOC's treatment TECHNOLOGIES

SCRUBBERS

Our scrubbers are used to remove dust particles and industrial gases; in particular, they are very efficient for small particles, and hazardous and corrosive gases.

The scrubber is composed of a centrifugal lung able to separate solid parts from liquid parts through a constriction in the middle section of the tower.

The variation in diameter is based on the physical principle whereby the pressure of a fluid current increases with a decrease in speed. This change in pressure allows the solid particle pollutants transported in industrial fumes to fall.

At the top of the scrubber there are nozzles that vaporise water, which subsequently collects the precipitated particles in the tower, causing them to flow into a cistern for their collection.

Condorchem Envitech's scrubbers have been successfully applied in the following sectors: methane-related, food industry, chemical industry, tanneries, foundries, sludge drying, purification stations, waste treatment plants, food processing industry.

Advantages

- Can handle flammable and explosive dusts with little risk.
- Provides gas absorption and dust collection in a single unit.
- Provides cooling of hot gases.
- Compact; can often be retrofitted into existing collection systems.
- Corrosive gases and dusts can be neutralized.
- Modular system for easy and flexible installation

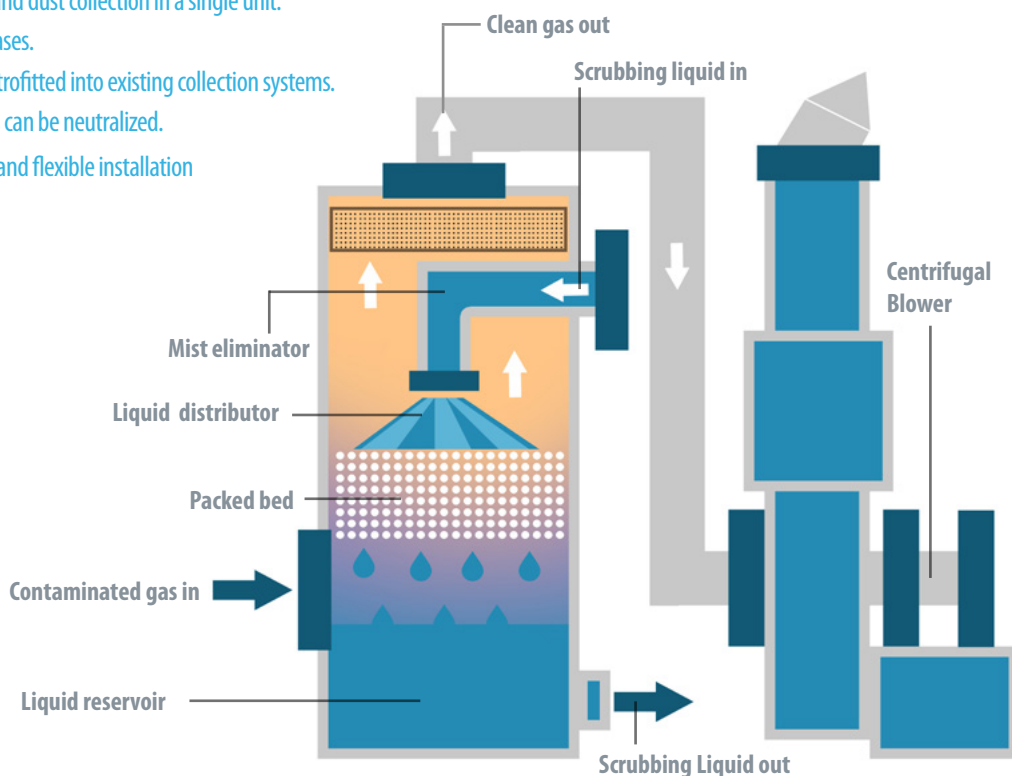




PHOTO-OXIDATION

Condorchem Envitech's Lightclean system uses a photocatalyst, activated by ultra-violet light energy, to remove pollution.

VOC's, NOx and Odors are broken down into less harmful compounds.

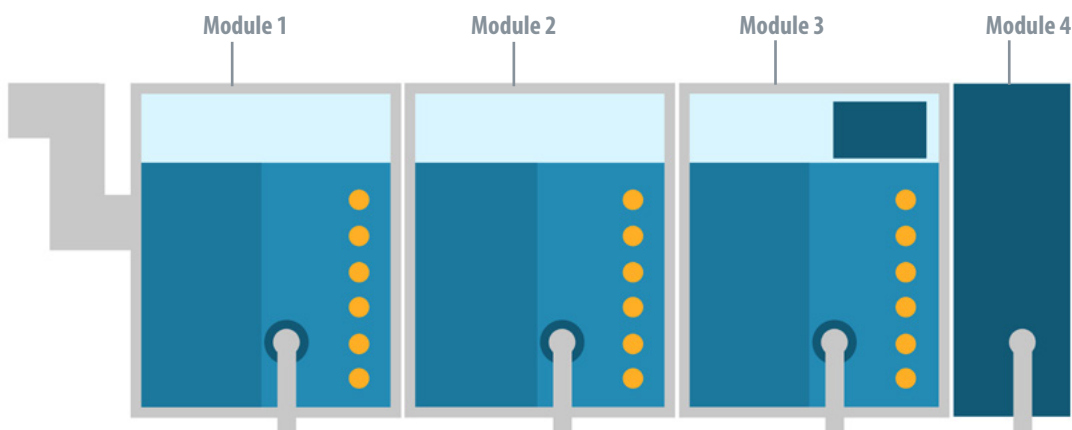
The system works in the same way as natural chemical reactions but they are artificially created in an enclosure through which pollutants are made to flow.

Free radicals are generated by catalysts held in cartridges. They attack the pollutants as they pass through.

This low energy system has very little air resistance compared with carbon filtration and does not require the same level of maintenance, material replacement or monitoring as these more complex control systems.

Advantages

- Removes smell and pollution from industry emissions
- Low operating costs
- Instant response to variable loads
- Energy efficient
- No or little pressure drop, no static filters
- No consumables
- No waste products
- No added chemicals or detergents
- Replaces existing infrastructures, e.g. chimneys
- Modular system for easy and flexible installation



TECHNOLOGIES

ACTIVATED CARBON FILTERS

Condorchem Envitech offers and supplies different types of high-performance activated carbon filters, including mobile filters.

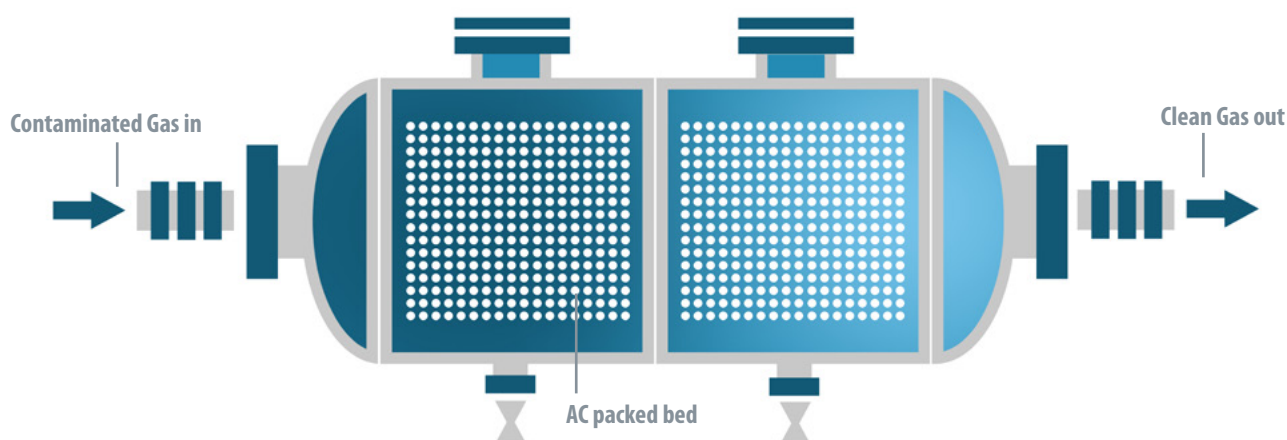
Activated carbon is a non-hazardous carbon-bearing product with a porous structure and a very large internal surface area. The chemical structure of activated carbon can be defined as a crude form of graphite, with a random amorphous structure that is highly porous over a range of pore sizes, from visible cavities and gaps to those of molecular dimensions.

Treatment with activated carbon is based primarily on the phenomenon known as adsorption, in which molecules of a liquid or gas adhere to an external or internal surface of a solid substance. Activated carbon has a very large internal surface area which makes it highly suitable for adsorption.

Advantages

- Great ease of use: simple to connect and start up – Plug & Play
- Designed as a transportable tank and activated carbon filter so used and new activated carbon need not be handled on site
- Compact units to deal with a wide variety of flows and concentrations
- No maintenance costs, not sensitive to capex.
- Modular system for easy and flexible installation

STANDARD AC FILTERS





Condorchem Envitech is one of the world's leading companies in the treatment of volatile organic compounds in Concentrated Solar Power (CSP) plants. 25% of the plants installed worldwide have our solutions for the treatment of VOC generated in their ullage system. Some of our main references, as of March 2017, are:

- | | | |
|---------------------------------|----------------------------|-----------------------------|
| ■ Mojave (USA) | ■ Olivenza (Spain) | ■ Shagaya (Kuwait) |
| ■ Solana (USA) | ■ La Florida (Spain) | ■ Kathu (South Africa) |
| ■ Helios 1 (Spain) | ■ La Dehesa (Spain) | ■ Ilanga (South Africa) |
| ■ Helios 2 (Spain) | ■ Bokpoort (South Africa) | ■ Duba Green (Saudi Arabia) |
| ■ Ouarzazate – Noor I (Morocco) | ■ Borges (Spain) | ■ Atacama (Chili) |
| ■ Noor II (Morocco) | ■ Soluz Guzmán (Spain) | |
| ■ Morón (Spain) | ■ Enerstar Villena (Spain) | |

NO_x ABATEMENT

Although most NO_x is produced naturally, an important fraction of NO_x is due to anthropogenic processes, the most important artificial sources being transport (70%) and industry (25%). The industrial processes responsible for generating the largest quantities of NO_x are those concerned with energy production, the burning of coal, oil, and natural gas, and electroplating and metal etching processes. NO and NO₂ are formed in processes during which temperatures higher than 1200 °C are reached in the presence of atmospheric nitrogen and oxygen.

As all nitrogen oxides are contaminants, their emission has a particularly important effect on the environment. The main effects for which they are responsible include destruction of stratospheric ozone, contribution to the greenhouse effect, production of acid rain and generation of photochemical smog.

As a result, it is essential, above all, to minimize their production and then to eliminate those nitrogen oxides whose generation cannot be prevented.





DeNOx RECOVERY®

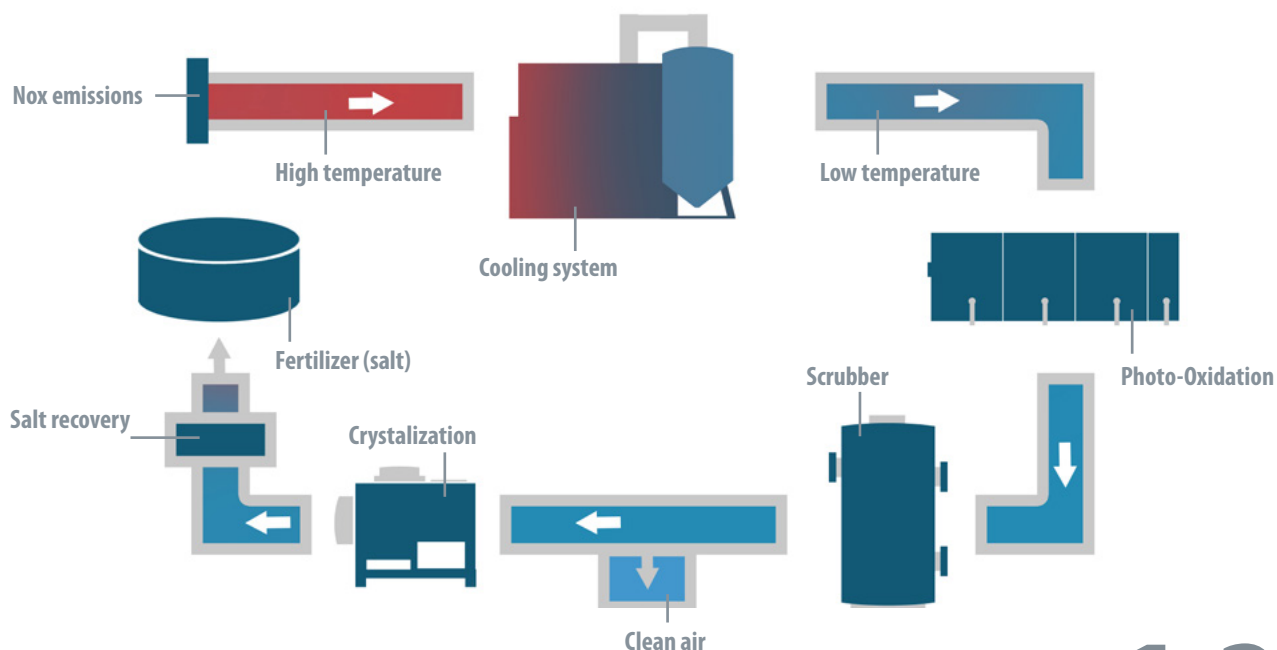
DeNOx Recovery® is a process for NOx emissions treatment. The process is divided into 4 stages:

- Cooling System. The exhaust gas from the storage tank is cooled down to aim a reasonable temperature for the next process.
- Photo-oxidation. NOx oxidize during the gas phase by the combination of UV lamps and ozone.
- Scrubbers. NOx are captured and neutralized by contact with a water washing solution.
- Crystallization. The NOx neutralized in the water crystallizes to give salts that can be recovered and commercialized.

The result of the process is an emission free of NOx that can be released directly into the atmosphere, as well as the recovery of salts, that are created from the same emissions.

Advantages

- >99% of NOx reduction.
- Salts recovery.
- Chemical wastes elimination.
- No hazardous compounds are released into the atmosphere.



ODOR TREATMENT

The odors generated from industrial activities can pose both environmental and health problems, especially when emissions occur close to residential areas. The social demand for cleaner, odor-free air, has spurred the development of increasingly restrictive regulations concerning harmful gas emissions into the atmosphere. Thus, companies are obligated to seek solutions for gas purification and reduction of odors they emit.

The emission of unpleasant odors can come from a variety of industrial activities, although some industries are more likely to generate odors due to the "raw materials" with which they work. These industries include animal products, food, farming, paper, chemical or waste management.

While necessary precautions are often observed in processes to help reduce and eliminate odors, in many cases, these measures can prove insufficient. Therefore, additional technology for odor reduction must be implemented.





BIOFILTERS

There are different kind of biological systems. They are recently been classified in three main families: biofilters, biotrickling filters and bioscrubbers.

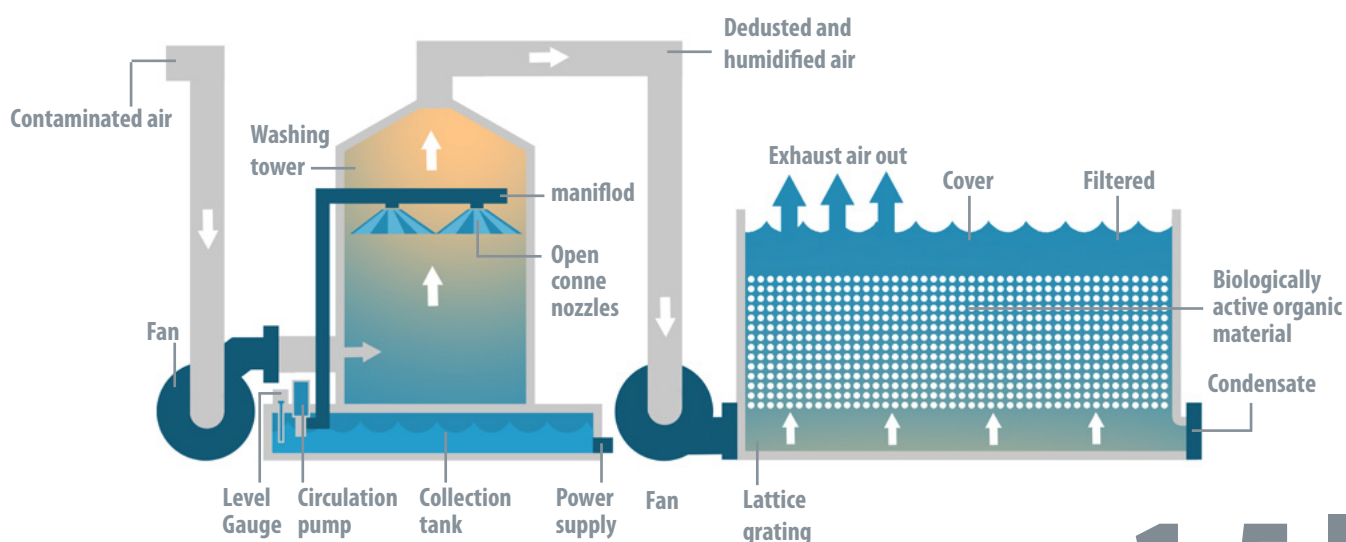
By studying the main features of every specific applications, Condorchem Envitech is able to propose the best process with the lowest utility and operating costs.

The biological systems operate by transferring polluted substances from air to water (absorption) where they are converted (oxidized) by bacteria into carbon dioxide, water and minerals salt.

Compared to traditional systems of abatement (chemical scrubber, activated carbon, thermal oxidation) the biological process has a low environmental impact (no consumption of chemical's, pollutant are really converted and biologically treated without build up on treatment media with very low energy consumption) and low operating costs due to simplicity of process.

Advantages

- Biofiltration has a very high odor and VOC removal efficiency.
- The biofiltration process results in a complete decomposition of the pollutants, creating no hazardous byproducts.
- Biotech biofilters are practically maintenance free.
- Biofilters have low investment and operation costs.
- All in all, biofiltration has been accepted by residents and regulators as an environmentally friendly and cost-effective odor and air pollution control technology.





**Visit our website to know
our contact details and sales
offices.**

www.condorchem.com