



# **CARRA**

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## **DEPURAZIONI**

**COMPANY PROFILE**

## WATER IS A VERY PRECIOUS RESOURCE: OUR JOB IS TO TAKE CARE OF IT.



**CARRA** DEPURAZIONI designs and develops both primary and wastewater treatment plants. With over 40 years of experience it can offer economical and extremely efficient solutions to protect the environment, and can installate new plants or revamp existing ones.

**CARRA** DEPURAZIONI provides specific solutions for the treatment of civil and industrial wastewater in textile industry, food and beverage industry, tourism and resort, slaughterhouses and dairies, petrochemical industry and refineries, power generation, mining, alternative fuels production and many other industrial processes.

**All plants offered use state-of-the-art technology and are designed, built and tested by a team of technicians and engineers with expertise in hydraulic, electro-mechanical and chemical design.**

The great experience gained in water treatment plants allows Carra Depurazioni's plants to guarantee, even under the worst use conditions, compliance with the discharge limits required by current legislation.

## BASIC PRINCIPLES OF DESIGN:

- The correct treatment process is chosen based on the characteristics of the wastewater to be treated.
- The treatment plant must have the flexibility to handle easily the polluting flow variations. The
- The right degree of automation can assure a safe and simple plant running.
- Low environmental impact thanks to the chosen technologies.

The plants developed and designed by Carra Depurazioni are based on widely tested biological and chemical-physical technologies. Electro-mechanical equipment, instruments and materials are first quality, and can be chosen according to the Client requirements, so as to guarantee the maximum lifetime of the wastewater treatment plant.

## RESEARCH AND DEVELOPMENT

**CARRA DEPURAZIONI** has affiliated laboratories where specialised technicians, supported by top-quality instruments, analyse water samples so that the most suitable treatment can be chosen, and all the various stages of the purification process can be correctly designed.

## SERVICE AND ASSISTANCE

Once the plant is designed, built, installed and started up, Carra Depurazioni is able to provide adequate training to the customer's staff so that the plant can be run correctly, and also to provide a periodic check service on the state of the plant.



# SOME EXAMPLES OF OUR PRODUCTS AND INSTALLATIONS

## FILTRATION UNITS

**CARRA DEPURAZIONI** offers a wide range of filtration equipment types, ranging from:

### Sand filtration.

Retaining fine noncolloidal solid particles in suspension, which cause turbidity, giving the treated water the desired clarity. By providing an adequate dosage of 'in-line' coagulant, which promotes the aggregation of the fine substances present in the micro-flakes, they also allow the retention of most of the fine colloidal substances.

### Activated carbon filtration.

They are used to remove chlorine and free ozone, to remove bad tastes and odours from water, to adsorb organic macromolecules such as surfactants, tannins, hydrocarbons, solvents, pesticides and organic micropollutants present in water as a result of human agricultural or industrial activities.

### Pyrolusite filtration.

The fill used is a mixture of quartz sand and pyrolusite. Pyrolusite has the ability to oxidise Fe and Mn molecules that are then retained by the filter itself. To reactivate the pyrolusite surface, oxidising agents such as sodium hypochlorite or potassium permanganate are dosed online.



## CHEMICAL-PHYSICAL TREATMENT PLANTS

Chemical-physical treatment is typically used for industrial wastewater, where the pollutants are of inorganic origin or, in any case, where the pollutant load is difficult to biodegrade.

The water to be treated is sent to a reactor, where it is mixed with conditioning chemicals. These chemicals typically include a flocculant, a pH adjuster, and possibly a flocculation aid to thicken the sludge and improve its settling, along with the possible addition of a powdered activated carbon suspension to increase the reduction of the pollutant load. From the flocculation section, the resulting "sludge" flows to the sedimentation section. From there, the clarified water flows by gravity and can eventually be sent to a quartzite and activated carbon filtration-adsorption station.



## BIOLOGICAL TREATMENT PLANTS

A biological purification plant is the reproduction in small spaces of what normally occurs in nature. The purification mechanism is based on the degradation of organic substances by bacteria and microorganisms, using dissolved oxygen in the wastewater. This degradation takes place until it is reached a mineralised substance which is not susceptible to further decomposition. The oxygen required for biological degradation is obtained by diffusing compressed air into water (supplied by a blower), so as to ensure intimate contact of the oxygen with the incoming mass and the mixing and homogenisation of the slurry itself. In the aerobic environment, the bacterial colonies that form spontaneously purify the sewage and absorb the suspended substances that are flocculated and agglomerated together with the sludge. Separation of the water-sludge mixture takes place in the subsequent settling tank. This purification technique can be combined with various others (chemical-physical pre-treatment, filtration, ultrafiltration, etc.) to achieve a wastewater quality that can be reused if necessary.



## ULTRAFILTRATION UNITS

Ultrafiltration is a separation process obtained by using low-pressure membranes that separate particulate matter from the soluble component of the fluid (mainly water). Usually it is applied a transmembrane pressure between 0,5 and 5 bar. Ultrafiltration membranes have a pore size between 0,01 and 0,10  $\mu\text{m}$ , and have a high capacity to remove bacteria, some viruses and colloidal particles. The smaller the nominal pore size, the greater the capacity to remove substances.



## REVERSE OSMOSIS UNITS

Reverse osmosis is a process that occurs when a salt solution is brought into contact with a membrane permeable to water (but not to dissolved solids) at a pressure greater than the osmotic pressure of the solution itself. A solution with a salt content lower than the starting one (called permeate) will pass through the membrane, while a salt-rich solution (called concentrate) will be formed outside the membrane. The higher the value of the applied pressure, the greater the permeate flow. This type of treatment represents the best water filtration available technology.





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