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Waste Water Treatment Plant Galapagar-Torrelodones (ES)

In Galapagar-Torrelodones (ES) Filtralite® Clean has been purifying urban waste water in an area integrated into the Natura 2000 Network for more than 15 years.

The **WWTP of Galapagar-Torrelodones** owned by the Canal de Isabel II, and currently the facility's operator, is located in the **Natura 2000 Network**. The Natura 2000 Network is European area of environmental protection which aims to protect biodiversity. Specifically, it is part of the SCI category “Site of Community Importance” within the Guadarrama river basin; pouring its final effluent to the river itself. Both Galapagar and Torrelodeones were the only towns that poured directly into the river, with the aggravation of being located very close to the **Guadarrama Natural Park**, area with threatened flora and fauna.

Therefore, the effluent discharge, sludge management and odor generation **standards are highly demanding** and it was necessary to design an efficient purification technology, with high performance which implies the **lowest possible environmental impact**.

The Wastewater Treatment Plant of Galapagar-Torrelodones was built in 2002 by Degrémont initially to treat a flow of 15,000 m³/day, with technology parameters and design philosophy aligned with the high requirement of purification required. In 2014, work

was carried out to expand the plant - by Cadagua - in order to treat **a flow of 22,500 m³/day**, the treatment plant capable of eliminating the pollutant load of an equivalent population of 90,000 inhabitants.

This plant is an excellent reference as a compact solution, confined in a deodorized building and completely **integrated architecturally into the landscape**. It incorporates a biofiltration process, in its secondary treatment, in which its heart is the filter media, **Filtralite® Clean**.

The biofiltration system with **Filtralite® Clean**, biofiltration in a fixed bed, **replaces conventional biological treatments** of the activated sludge type. **Filtralite® Clean** acts as a carrier for the growth of a biofilm, made up of selective bacteria, which specifically way bacteria carry out the biocenosis of urban wastewater pollutants (Organic Matter and Nitrogen in its different forms). Filtralite® has a huge specific surface which increases contact time and has particular surface properties that allow the growth of the biofilm efficiently. Furthermore the biofilm's performance recovery is outstanding after a vigorous hydro-pneumatic backwash.

The treatment line of the Galapagar-Torrelozones WWTP is composed of a primary and secondary phases, the different stages of the process are the following:

1. Raw water elevation.
2. Pretreatment (roughing and de-sanding).
3. Dosage of reagents + lamellar primary sedimentation.
4. **Two stages of biofiltration.** The first consists of an **anoxic denitrification** in a set of 6 biofilters. The second biofiltration focuses on **removal of organic matter and nitrification aerobically** also in a set of 6 biofilters. There is a recirculation of the effluent from the second phase to the first one in order to provide organic matter to the denitrification process.
5. Sludge treatment (stabilization with lime + centrifuges).

The advantages of biofiltration are clear compared to other conventional biological treatments and have been shown during more than 15 years of the WWTP operation. Its good performance has also been the basis for the WWTP extension in 2015 with the same biofiltration technology and using Filtralite® Clean. The strengths of biofiltration versus other biological treatments are the following:

- ✓ **Space reduction**, due to three factors: elimination of the secondary decanting not required in the process, high performance per unit area due to the high specific surface area of Filtralite®, high hydraulic load. Reductions of up to 80% in surface in plant design can be attained.
- ✓ **Reduction of odors and noise**, thanks to the compact nature of this technology filters can be easily covered inside a building, minimizing its impact. Likewise, the hydraulic plug of the filter upper part (it is about up-flow systems) reduces the generation of odors.
- ✓ **Recirculation and reduction of flocculants consumption**, through the recirculation of the sludge the amount of flocculants used is reduced and the necessary contact times are diminished also.
- ✓ **Efficient compliance with the requirement of effluent quality**, there is a 30% reduction in the use of disinfectants after biological treatment.
- ✓ **There is no risk of loss of the biomass**, since it is fixed to Filtralite® Clean and only comes off with backwashings.
- ✓ **Quick start of the treatment**, the biofiltration reaches high yields in a few days so it is ideally operative to provide services to fluctuating populations.
- ✓ **Simplified operations and maintenance**, the biological control variables are simplified.
- ✓ **Modular and easy to automate construction**, comparable to the filter sets of a Drinking Water Treatment plant.
- ✓ **Reduction of the operating process costs.**

In conclusion, Canal de Isabel II has been operating this WWTP for more than 15 years with a biofiltration system using Filtralite® Clean technology, **successfully fulfilling the regulation of discharges and integrating the plant in an area with environmental protection regulations**, the Natura 2000 Network.

Filtralite® facts:

Type of Facility: Waste Water Treatment Plant

Water treated: Urban Residual Water

Treatment Line:

- Primary: Roughing and de-sanding.
- Secondary: Coagulation-Flocculation, Decantation, Bio-filtration with Filtralite® Clean.
- Sludge treatment line (stabilization with lime + centrifugation)

Flow: 22.500 m³/day

Type of Filtralite®:

- Filtralite® Clean HR 3-6 in anoxic denitrifying Biofilter
- Filtralite® Clean HC 2,5-5 in the Biofilter of carbonaceous matter and nitrification removal.