

# INGEOBRAS, A COMMITMENT TO PLANT MANUFACTURING THANKS TO THE USE OF FILTRALITE®.

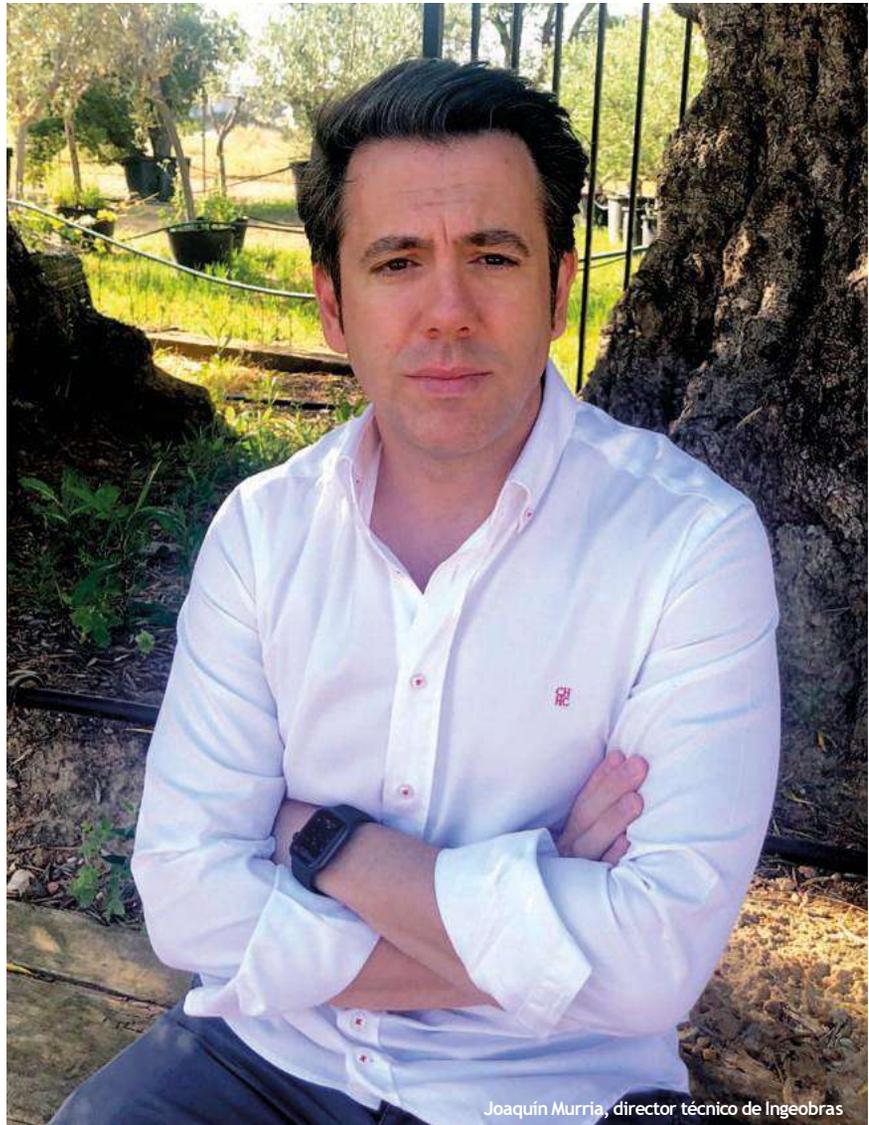
**This company from Zaragoza has given a new twist to the manufacture of compact plants for the treatment of all types of water, with a disruptive approach. They propose alternatives with lower CAPEX and OPEX and take advantage of the treatment properties provided by Filtralite®.**

---

Ingeobras has been working in water engineering since 2005; the company introduced an intensive R&D approach in 2014 with the aim of implementing new technologies for water treatment. These technologies are based on materials manufactured by Filtralite® (Saint-Gobain). It is a technological approach that relies on alternative systems to membranes or ion exchange resins. Part of the secret of Ingeobras' treatment technology lies in taking advantage of the properties of the different types of Filtralite®.

Joaquín Murria, technical director of Ingeobras: "In 2014 we realised the immense potential of Filtralite® as a replacement for traditional filter materials. This was our starting point to improve OPEX in existing plants by simply replacing sand, or to increase production capacity without increasing footprint. From there we moved on to an in-depth study of biofiltration without aeration with Filtralite® acting as a carrier for the Nitrate removal

**Part of the secret of Ingeobras' treatment technology lies in harnessing the properties of the different types of Filtralite®.**



Joaquín Murria, director técnico de Ingeobras

# INNOVATION COMPACT PLANTS

in drinking water, a growing problem in our country. This was the origin of the Puremust-SN® technology". Ingeobras is focused on the design and construction of high efficiency biofilters, with low footprint and reduced operating costs. Biofilters are systems capable of eliminating biologically degradable pollutants with great flexibility, both in terms of concentrations and flow rates, and with a high level of specificity. The classic lines of development of biofiltration are the removal of nitrogen in the form of both nitrates and ammonium, as well as BOD, nitrates and ammonia.

at high and low concentrations. This type of submerged, fixed-bed biofilters operate via the formation of a biofilm on a carrier with very particular properties.

The operational success of this technology is based on three pillars: the carrier material Filtralite®, a thorough understanding of the biofiltration process and a very precise inoculum selection, mainly in drinking and industrial water.

The filter media manufactured by Saint Gobain, Filtralite® Pure & Clean is the key to the functioning of a biological filter. The material has a very high specific surface area (>1500 m<sup>2</sup>/m<sup>3</sup>), enormous porosity and optimum surface characteristics for biofilm generation (adhesion, resistance, durability of the medium, Ph...). Filtralite® Pure is colonised by a selected biofilm, generating a nitrogen or BOD removal rate per unit volume of installed bedding far superior to any other filler.

Ingeobras has taken the engineering of its biofilters to the next level of optimisation, based on existing knowledge in biofiltration with Filtralite® and making a significant effort and investment in R&D&I.

The innovation and development work has achieved a twofold objective. On the one hand, the space requirements for treatment have been drastically reduced, resulting in lower investment costs. On the other hand, a drastic reduction in the operating costs of the process due to the amount of nutrients and reagents to be dosed, thanks to a very high level of parameterisation and process control..

**"In 2014 we realised the immense potential of Filtralite® as a replacement for traditional filter media. traditional filter media"**

Detalle de la Superficie porosa de Filtralite® Pure.



3D plan of the compact plant, nutrient removal process of a WWTP.

The reduction of treatment surfaces and the optimisation and automation of biofiltration treatment have enabled Ingeobras to make the leap towards the development of containerised biofiltration solutions, also for medium flows and water with high pollutant loads. In addition to the classic line of engineering for the construction of treatment plants in civil works, the company has created a new line of business focused on the ad-hoc manufacture of plants in containers, to solve very specific cases anywhere in the world.

Joaquín Murria: "We detected the need, especially in industrial and small and medium-sized municipalities, to develop containerised solutions, mainly because of the need to reduce execution time as much as possible, minimising space and investment costs. Our experience in civil engineering plant design and the impressive results already achieved with our Filtralite® plants were the starting point for this line of business.

**Ingeobras focuses on the construction of high efficiency biofilters with low footprint and low operating costs.**

Ingeobras manages a portfolio of containerised solutions based on Filtralite® filter media, for the treatment of both urban/industrial wastewater and drinking water, with different types of systems that can be combined with each other, among the most outstanding containerised treatment solutions are: ammoniacal nitrogen, nitrates, sulphates, arsenic, iron, manganese, organic matter, phosphorus, fluorides, heavy metals, among others.

The design premise of all containerised systems is common. Fully automated and remotely connected equipment, with low CAPEX and OPEX, operating fully autonomously and fully sensorised to generate massive amounts of data that serve as the basis for future developments and technologies.

As a successful case example of one of these container plant developments, the following containerised treatment plant is presented, which combines two serial treatment steps with a final recirculation.

The plant is intended to treat excess nutrients from an existing WWTP that treats wastewater from a mining camp in southern Ecuador. La instalación está sometida a exigentes estándares de depuración del IFC (International Finance Corporation) que establecen una salida.

The plant is subject to stringent IFC (International Finance Corporation) purification standards that set total nitrogen and phosphorus outputs below 10 mg/l and 2 mg/l respectively.

The plant has been designed for a flow rate of 150 m<sup>3</sup>/day from the secondary settling of the current WWTP. At the water line level, it consists of a pre-filtration with Filtralite® Pure NC 1.5-2.5, to laminate SS peaks. This is followed by intense anoxic denitrification in three pressurised filters filled with Filtra- lite® Clean HC 2. Denitrification, with addition of organic matter, in addition to the remaining BOD in the wastewater, is fully automated with NO<sub>3</sub><sup>-</sup>, ORP, Ph, flow and PLC-controlled probes. This approach is very similar to the nitrate abatement plants that Ingeobras builds for the treatment of well water in drinking water with high NO<sub>3</sub>-concentration levels.

Finally, the water is treated in a nitrifying biofilter on a bed of Filtralite® HC 2.5-5, with the addition of alkalinity, for the elimination of ammoniacal nitrogen. The plant is designed to be able to treat 200 mg/l of NO<sub>3</sub> and 60 mg/l of NH<sub>4</sub><sup>+</sup>, in compliance with the 10 mg/l of total nitrogen at the outlet. It has a recirculation of up to 200% of the flow rate to give it a great elasticity of flow rates and variable inlet concentrations. Likewise, this process consumes more than 6 mg/l of phosphorus to comply with the IFC standard.



Image of the interior of a compact plant, nutrient removal process of a WWTP.

Like all installations of this type manufactured by Ingeobras, the entire treatment line is sensorised, operates automatically and sends all analytical and performance data to a central server.

The installation met a number of milestones in terms of planning and execution, from project definition to delivery to the port in less than five weeks. The commissioning consists of a plug&play and a start-up of the biological systems on site. In addition to remote monitoring, there is a complete transfer of operational and maintenance knowledge to the end user during the commissioning phase.

According to Joaquín Murria, "the objective of this type of system is that our customers practically forget about the installation, and that it does all the work autonomously, with a minimum O&M requirement. Only reagent recharging and basic preventive maintenance are required.

Our customers are usually in industrial activities or are small municipalities and water treatment is not their main focus, so the design of our plants is as robust as possible and as simple as possible. We really like the idea that rather than a water plant what we provide is a digitised and connected machine, with a very refined biological process, and powered by Filtralite®".

The demand for this type of solution is growing. Ingeobras has a diversified customer portfolio in Spain, Europe and Latin America. The cost of transporting containers has a low weight in the price of the final solution, the centralisation of manufacturing in Zaragoza achieves a reduction in the cost of components and the generation of economies of scale.

Joaquín Murria, "it is exciting to see the degree of diversity of clients, both by type, industrial or municipal, and by geographical location, with whom we work. After many years in this sector, we feel, on the one hand, a greater level of

awareness and improvement of processes in many countries, which I understand is also due to new regulatory frameworks. The effort to supply and treat water to rural populations in LATAM is remarkable".

In conclusion, this interesting technological project by Ingeobras, backed by Filtralite® (Saint-Gobain) technology, opens up a window of opportunity for those end-users or service providers in search of alternative "plug & play" treatment solutions to solve a wide range of problems, with low CAPEX and OPEX.

**Ingeobras manages a portfolio of containerised solutions based on Filtralite® filter media, for the treatment of water treatment**