

Urban Wastewater Treatment Plant in Brozas - Cáceres

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Location	Brozas (Cáceres)
Customer	Junta de Extremadura
Starting Construction date	23 September 2003
Construction period	36 months
Capacity	14,000 m³/day
Population	5,800 e.i.

The Brozas wastewater treatment plant is located in the town of the same name in the province of Cáceres. To be more specific, it is 30 kilometres from the city of Cáceres on the road to Portugal.

It was designed for a population of 5,800 equivalent inhabitants and to treat a flow of 3,744 m³/day.

The characteristics of water are:

	Input	Outlet
DBO ₅	280 mg/l	> 25 mg/l
SS	220 mg/l	> 35 mg/l
NTK	44 mg/l	> 15 mg/l
Phosphorous	10 mg/l	> 2 mg/l
Sludge production		332.5 kg/day

A prolonged aeration treatment system was installed. The purpose of the job was to build a network of 400 and 500 diameter wastewater pipes to collect the water and convey it to the plant with a total length of 7,888 meters. The material used for channelling the water is corrugated polyethylene for sewage systems.

The water line

The wastewater is led through the pipeline by means of gravity. At the inlet there is a gate to close off the solids pit where heavy material settles out for removal and a spillway leading to the plant's general bypass.

At the entrance to the WWTP is the solids pit where the waste material that settles is removed by a clamshell suspended from a system of pulleys and unloaded into a 4 m³ container.

The water then passes along a channel fit with a ladder type screen with 3 mm openings that unloads onto a conveyor screw leading to a 700 litre container. This channel can be cut off directing the wastewater through another canal with a 30 mm screen that has to be cleaned manually.

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From these channels, the water goes along the grit removal channel that has a sand pump and a system for removing oil and grease from the water's surface. These residues are sent to a sand classifier and a grease concentrator respectively. Furthermore, to promote demulsification, aeration is provided by a system of large bubble diffusers and two 100 m³/h blowers (one on stand-by) that control their flow by means of frequency variator. In order to by-pass the grit removal tank, there is a DN-300 mm pipe with a gate valve.

The water passes a flow meter and electrovalve to control the flow to be treated. The exceeding flow passes over the overflow weir at the end of the grit removal channel unit after which there is a by-pass to the next treatment stage.

There are two carrousel type biological reactors, each with a 3 Kw current accelerator and aeration by small bubble type diffusers transmitting to the liquid the air flow produced by three 550 m³/h rotating plunger type blowers (one on stand-by). The recirculated sludge is added in the chamber where the flow is directed to the biological reactors. The amount foreseen is 150% of the input flow. This is also where the Cl₃Fe is added to eliminate phosphorous.

After the biological treatment, the water passes to gravity settling tanks with 9 meters diameter. There is also a hopper for the floating elements removed before sending them to the grease concentrator while the sludge is collected in a pit for recirculation and the sludge in excess is pumped away.

Finally, the clarified water passes through an electromagnetic flow meter to the chlorination chamber where sodium hypochlorite is added.

Sludge line

The sludge treatment line starts at the collecting pit where three sludge recirculation pumps and two excess sludge pumps are installed (one of each type in stand-by). The excess sludge is sent to a gravity type thickener unit, the runoff from which is sent to the emptying pit. The sludge extracted from the thickener by helicoidally screw conveyor to two 4 m³/h spinners. The dehydrated sludge is taken by screw conveyor pump to a 20 m³ hopper. The plant is provided with a emptying pit that receives overflows from the different units. This pit has two 18 m³/h pumps that return the liquid to the head of the plant.

The auxiliary installations include compressed air unit, industrial water unit with pressure system in order to use the plant's treated water, activated charcoal deodorization unit that takes in air from the thickening stage, spinning room and room where the raw water arrives with a capacity to treat 4,250 m³/h.

The control building is separated from the industrial building. It contains the staff facilities as well as the control room and laboratory.