

**CASE  
STUDY**



**FBR Biological Wastewater Treatment in the Dairy Industry**

**Year:** 2009

**Project Location:** HELADOS ESTIU S.A. in Ribarroja, Valencia.

**Objectives:** Removal of organic load from the pre-treated wastewater for discharge of the effluent to the water collector. Adaptation to future needs and expansion of the facility.

**Installed Technologies:** Aeration tank for biological treatment; aeration system AQUAJET; coagulation-flocculation in-line system SIGMA PFL; flotation system SIGMA DAF FPAC-PWL; sludge thickening tank and sludge dewatering with centrifugal decanter; nutrients and chemical dosing equipment; control and automation systems.

**Capacity:** 264,000 GPD

<b>Pre-treated Wastewater Average Organic Load</b>	
<b>COD</b>	<b>BOD5</b>
4500 mg/L	2500 mg/L

<b>Efficiency of Full Treatment</b>	
<b>COD Removal</b>	<b>Treated Sludge Dry Matter Content</b>
90%	>50%

## Background

Helados ESTIU S.A. is a leader in ice cream production, and its wastewater at the Ribarroja facilities contains a VERY HIGH MASS LOAD. The facilities already had a pre-treatment, but the client wanted to install a biological treatment to eliminate the organic load required for discharge to the general collector.

SIGMA designed and installed our FBR system (flotation bio-reactor) consisting of an aeration reactor where aerobic biological treatment is carried out (this biological process consists of the transformation of the organic matter contained in the wastewater into microbial flocs by adsorption and agglomeration) and then the biomass is separated by flocculation and secondary clarification by a DAF unit (In this process biomass flocs are formed and separated by flotation with air micro-bubbles in a DAF FPAC-PWL unit. These unique systems obtain sludge with dry solids content 3 or 4 times higher than any conventional system).

In the SIGMA DAF FPAC-PWL flotation unit, water is clarified to meet discharge requirements. The sludge is partially recirculated to the biological reactor to maintain a stable biomass concentration and partially extracted as a purge. The addition of polyelectrolyte allows the generation of easily separable biomass flocs and provides a high concentration of biomass inside the reactor and, therefore, a higher performance than in other biological systems of suspended biomass.

The SIGMA DAF FPAC-PWL flotation system is a modular system that is easy to expand and has a high capacity to adapt to different biomass concentrations.

SIGMA completed the sludge treatment process by thickening and dewatering in a centrifugal decanter.

## Process diagram

