



Case Study

# Biological wastewater treatment FBR in malt processing industry

**Year:** 2011

**Project location** Cargill facilities in Villaverde, Madrid.

**Objectives**

- Meeting the discharge limits by law
- Possibility of adaptation to the future necessities and production process expansion

**Installed technologies** a screening and homogenization system; a biological aerated reactor with JET aeration systems and nutrients dosing system; a coagulation-flocculation system SIGMA PLF with polyelectrolyte dosing system; a FBR clarification system SIGMA DAF FPAC-120; full sludge treatment with thickening tank and centrifuge decanter. Instrumentation, control systems and automation of the entire process.

**Capacity** 1000 m<sup>3</sup>/día

Wastewater characteristics			
DQO	DBO5	NTK	Total P
4000 mg/L	2000 mg/L	100 mg/L	20 mg/L

Efficiency			
COD removal	BOD5 removal	TKN removal	Total P removal
> 75%	> 75%	> 50%	> 50%

### Background

Cargill is a world leader in the production of food, agricultural products and services. Within the food sector, malt processing is one of its specialties. The malt processing industry uses large amounts of water for washing and processing both its intermediate and final products, which allows it to obtain optimal qualities. These water is characterized by high **biodegradability**, which allows applying **biological treatments** with very high efficiencies.

SIGMA designs and installs a FBR process ('flotation bio-reactor') consisting of an aeration reactor where 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 a separation of the biomass by flocculation and secondary clarification by DAF flotation (in this process biomass flocs are formed that will be separated by flotation with air micro-bubbles in a DAF FPAC-120 equipment. With these special equipment, sludge with a dry solids content 3 or 4 times higher than any conventional system is achieved)

In the SIGMA DAF flotation equipment, perfectly clarified water is obtained that can be discharged in compliance with the discharge requirements and a sludge that will be partly recirculated to the biological reactor to maintain a stable biomass concentration and partly extracted as a purge. The addition of polyelectrolyte to the clarification system allows the generation of easily separable biomass flocs in addition to providing a high concentration of biomass inside the reactor and therefore a higher performance than in other biological systems of suspended biomass.

In addition, SIGMA designs and installs the treatment of sludge generated by dewatering and decantation using a centrifuge.

### Process diagram

