Case Study

Wastewater treatment and reuse from the Textile Industry: biological treatment, DAF Technology and tertiary treatment. Case COLORTEX.

Year 2008

Project location Textile Factory COLORTEX, Valencia.

Objectives Design and installation of a wastewater treatment plant to obtain very high quality water for reuse in the process, in addition to compliance with the discharge directives.

Installed equipment
- Upflow sludge blanket filter biological reactor.
- In-line flocculation equipment PFL-140.
- Clarifier SIGMA DAF FPAC-160.
- Sand filter (tertiary treatment).
- Thermal drying (sludge treatment)

Capacity 150 m$^3$/h.

<table>
<thead>
<tr>
<th>Wastewater characteristics: OPAQUE BLACK COLOUR</th>
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<tr>
<td>COD (mg/L)</td>
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<td>------------</td>
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<td>4073</td>
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<th>Removal performance</th>
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<tr>
<td>COD</td>
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<td>95%</td>
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Wastewater from the textile industry is characterized by a high content of suspended solids, COD, colour and turbidity. There is a growing need for water reuse, which involves the removal of these contaminants through the use of high performance technology. SIGMA designs intensive and effective treatment processes that include advanced technologies to meet the quality requirements for reuse. In the case of COLORTEX, SIGMA designs the complete treatment of wastewater that enables its reuse and discharge, complying with administrative requirements.

The treatment consists of:

**Upflow sludge blanket filter biological reactor:** the unique inverted cone-shaped design allows the formation of a sludge filter, and allows for much more effective sludge and water separation than with a common settler. Filtration by sludge blanket allows the execution of all transformation processes in the same reactor, such as activation, nitrification, denitrification and dephosphorization. Reduces the space required and leads to low operating and maintenance costs.

**In-line flocculation equipment PFL-140:** this physicochemical system is applied to the effluent from the biological reactor. In the PFL system, the processes of coagulation, flocculation, demulsification, precipitation and pH control are carried out under defined and extremely controlled conditions. Its advantages are: no maintenance cost, no moving parts, high quality materials and durability, no need for additional energy input, uniform floc formation, compact, total control of the process conditions. The reagent dosage is established by Jar-Test with samples of the water at the exit of the biological reactor. In the case of COLORTEX, a cationic polyelectrolyte is applied.

**Clarifier SIGMA DAF FPAC-160:** this system is a low height cross flow separator. The injection of air microbubbles allows the separation of the flocs formed in the PFL and obtaining a clarified effluent free of suspended solids, turbidity and color. The FPAC system allows the treatment of water with a high load of solids, it is a compact system, it includes a unique sludge dewatering and separation system allowing a sludge concentration of up to 5%, it requires low maintenance and is easy to operate. These systems can be designed exclusively for each type of effluent.

**Sand filter:** it is applied as a tertiary treatment for the reuse of water in the production process. These filters make it possible to achieve optimal qualities of the treated water for its reincorporation as a raw material in the textile process. It is a robust, high-resistance and quality equipment, it includes a control panel that allows easy handling. With a tertiary treatment, a zero discharge is achieved and the conversion of a waste into a resource.

The sludge treatment by **thermal drying** is also designed with a high efficiency cyclonic spiral system. This technology allows drying, condensing, dehydration and sterilization for absolute final dryness.

The treatment designed and installed by SIGMA achieves COD removal performance of 95%, removal of suspended solids of 95% and removal of turbidity and colour of 90%.