



Textile Effluent Treatment, India

Model: Q-SEP 6008

Flow Rate: 12 m³/hr

Total Q-SEP Membranes: 4

Feed Water: Tertiary treated textile effluent

Project Overview

Jayshree Textiles is a cotton yarn dyeing and fabric bleaching company located in Erode, Tamil Nadu, India. Jayshree's dyeing and bleaching unit produces about 250 kilo liters per day (KLD) of wastewater. This textile effluent contains considerable amounts of hazardous pollutants - recalcitrant organic, colored, toxicant, surfactant and chlorinated compounds and salts, as well as the presence of heavy metals.

Environmental regulations have made mandatory the treatment of textile effluent before allowing it to flow into the natural ecological system. The lack of fresh water availability has also necessitated that wastewater be treated for recycle and reuse for Jayshree's textile process.

To treat their wastewater, Jayshree initially installed conventional pretreatment consisting of coagulation and flocculation to take care of the suspended solids. After the pretreatment, a conventional biological process was implemented for biological oxygen demand (BOD) & chemical oxygen demand (COD) removal. The final treated effluent after clarification was taken through filtration followed by an ultrafiltration

(UF) and reverse osmosis (RO) system. The RO treated water was then recycled and reused for textile processing.

The feed water to the UF system was tertiary treated textile effluent. The UF plant was configured with another manufacturer's membranes and was designed for an output capacity of 12m³/hr. A crossflow of 5m³/hr was being carried out to reduce the impact on the membrane due to the challenging water which was prone to fouling.

The Challenge

The client encountered issues with the ultrafiltration membrane system soon after initial installation.

Textile wastewaters are characterized by extreme fluctuations in many parameters such as BOD, COD, pH, color and salinity. At Jayshree Textiles, the UF feed water - secondary treated effluent - had higher than expected BOD and COD, with BOD in the range of 50-150 ppm and COD in the range of 400-700 ppm.

Project Profile

The UF membranes installed were not able to perform under the load of such harsh waters. They began fouling quickly and the SDI started rising beyond 5 from the third month following commissioning onwards. Frequent cleaning of the UF and RO systems was required, resulting in increased downtimes. The membranes were unable to adequately treat the water and meet the expected performance criteria.

The situation deteriorated to such an extent that CIP was being done every other day resulting in a drop in permeate flow to as low as 6-7 m³/hr and a rise in turbidity and SDI at the outlet. Jayshree was extremely dissatisfied with the performance of the membranes and the support they were getting from the supplier, so they decided to explore other UF options to solve the problem.

The Solution

The client found QUA Q-SEP[®] hollow fiber UF membranes to be the most suitable and robust solution for their polluted effluent. Q-SEP, with its Cloud Point Precipitation technology, ensures a high pore density along the length of the fiber and a uniform narrow pore size distribution in the membrane, and has proven to be extremely effective with challenging effluents and with achieving the desired SDI.

Jayshree decided to replace the other manufacturer's membranes with 4 Q-SEP 6008 with a cross flow design to handle the challenging water.

Q-SEP's narrow pore size distribution allows the membrane to produce water with a low silt density index (SDI). The lower product SDI leads to less frequent and easier cleaning of downstream RO membranes.

The performance of the Q SEP[®] membrane on tertiary treated textile waste recycle application has been very encouraging. The Q-SEP ultrafiltration system was installed for pretreatment to the RO system, to safeguard the RO membranes from fouling due to fine colloidal impurities, and the system has been running successfully for the last two years.

The feed water COD to the Q-SEP membranes has been constantly high over the 2 years, in the range of 400 ppm

to 770 ppm. Despite this, the permeate flow of the UF system has been consistently maintained at 12 m³/hr on a day to day basis without any loss in gross output, and the cross flow rate has been consistently maintained. Chemically Enhanced Backwash is effective at helping maintain the transmembrane pressure within range. The product water turbidity has been consistently less than 0.1 NTU on all days and SDI has been less than 3 since Q-SEP has been in operation. This superior water quality effectively meets the RO membrane inlet requirement with a low operating cost. Q-SEP Ultrafiltration allows Jayshree to have a successful, long-term solution for their textile process water.

Q-SEP Performance

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The Q-SEP ultrafiltration system was installed for pretreatment to the RO system, to safeguard the RO membranes from fouling due to fine colloidal impurities, and the system has been running successfully for the last two years.

The Q-SEP feed water COD has been constantly high over the 2 years, in the range of 400 ppm to 770 ppm. Despite this, the permeate flow of the UF system has been consistently maintained at 12 m³/hr on a day to day basis without any loss in gross output, and the cross flow has been maintained at 5 m³/hr. The feed pressure has been maintained between 0.4 bar to 2.0 bar, with the CEB being done whenever the pressure reaches 2.0 bar which usually happens once in the day. CEB is being carried out once every day with sodium hypo chlorite + NaoH and HCL. The turbidity and COD is being tested almost every alternate day by the client. The product water turbidity has been consistently less than 0.1 NTU on all days and SDI less than 3 for the entire 2 years since Q-Sep has been in operation. This effectively meets the RO membrane inlet requirement.

The above results make it quite evident that Q-SEP[®] is very effectively treating the textile waste producing superior product water quality at low operating cost.