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No. 44
Pollution prevention case studies

Reduction of the liquor ratio in a textile company

Company background

The company is located in the region of Denizli (Turkey). It is a relatively modern company, which operates as a commission dyer. Its main activity is cotton textile wet processing. The main type of fabric processed is mostly cotton (up to 80-85% of its total production), although processes of man-made fabrics also take place.

Industrial sector Textile industry

Environmental considerations

The “liquor ratio” (LR) is a very important parameter since it strongly influences the amount of water, energy and chemicals used in every stage of the textile processing where batch-wise operations are employed. The value of LR is powerful in highlighting the company’s potentials for significant improvements, both from economic and environmental angles.

Background

The improvement of the “liquor ratio” can be achieved through the use of cleaner technologies in the process.

Thus a reduction of LR from 1:9 to 1:7 can be obtained by changing the conditions in which the process is carried out. Nevertheless, in order to achieve a reduction from 1:9 to 1:4, the company had to buy a new machine.

Summary of actions

The company had “overflow” machines having a total capacity of 2,900 kg. The replacement of these machines by ULLR (Ultra Low Liquor Ratio) type jets (with the following capacities: 3 of 600 kg, 2 of 300 kg and 3 of 150 kg) allowed for the achievement of the desired improvement.

Balances

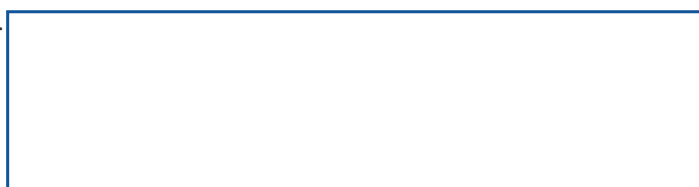
	Old process	New process
Material balances		
Energy consumption (MJ/year)	71,692,991	42,116,218
Water consumption (m ³ /year)	239,526	106,456
Raw material consumption (t/year)	1,589	706
Wastewater generated (m ³ /year)	198,806	88,358
Waste generated (kg/year)	42,493	42,493
Economic balance		
Cost of energy consumption (€/year)	671,014	394,785
Cost of water consumption (€/year)	218,482	97,211
Cost of raw material consumption (€/year)	343,818	153,067
Cost of wastewater treatment (€/year)	38,308	17,029
Cost of waste management (€/year)	3,550	3,550
Other costs		
Annual total cost (€)	1,275,172	665,642
Investment (ULLR-type jets)		968,629
Annual savings (€)		609,530
Payback period		20 months

Conclusions

The reduction of the bath ratio from 1:9 to 1:4 allows saving as much as 55% of water. The annual saving, in this case, is €609,530 which represents 4.4% of the total cost if we consider it as the added costs of water, energy and chemicals used in wet processes.

NOTE: This case study seeks only to illustrate a pollution prevention example and should not be taken as a general recommendation.

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