SPAIN

Med Clean Propre Limpio Terraneum

UNEP

Regional Activity Centre for Cleaner Production

MINISTERIO DE MEDIO AMBIENTE

Generalitat de Catalunya
Government of Catalonia
Department of the Environment and Housing

No. 36 Pollution prevention case studies

Recovery of final product and improved cleaning processes

Company background	HIPERTIN, S.A. (Barberà del Vallès, Spain)
Industrial sector	Chemical. Cosmetics manufacture (production of peroxide hair dye).
Environmental considerations	In the case of this company, the reactors where the dye phases were mixed (which had a conical bottom) were shut down and emptied out once the mixing was done. However, there was some residue left on the bottom of the reactor. Before having them cleaned, they were left open for one day. Due to the characteristics of the oxygenated dyestuff, contact with the air promoted fast oxidation and hardening of the product. As a result, a huge amount of water was required for cleaning. Because of the oxidation and the location of the washout valve, 3 kg of finished product were lost as wastewater in every cleaning operation and for each reactor. In addition, refrigeration of reactors necessary throughout the dye manufacturing process, was achieved by means of an inside-cooling coil, which was connected to an open water circuit.
Background	The enterprise decided to carry out a Minimisation Opportunities Environmental Diagnosis (MOED), in order to find alternatives that would enable the following goals to be reached: • Reduction of water consumption, both in the reactor cleaning processes and in the refrigeration circuit. • Reduction of final product losses due to incomplete draining of the reactor and its oxidation after contact with the air. • Reduction of the pollutant load discharged and the volume of effluent to be treated.
Summary of actions	a) The drainage system has been improved by keeping the mixer working during the operation and by raising temperature. This favours evacuation of the product, which can be recovered and consequently, does not reach wastewater. b) The cleaning system is now being carried out immediately after draining, in order to avoid excessive oxidation, by using high temperature and high-pressure systems. c) As for the water used for final cleaning, it is stored in order to be used as raw materials in other stages of the cleaning process. As a consequence, water consumption has been reduced even further. d) The water circuit has been closed thanks to the installation of cold equipment that enables the continuous reuse of water.

Reactors where dyes are mixed

Balances

	Old process	New process
- Water consumption*	2,177.7 m³/y	40 m³/y
- Production per unit of raw material	97/100 t/t	99/100 t/t
- Wastewater generation**	2,177.7 m³/y	0 m³/y
- Savings in water consumption***		€13,688.05
- Productivity increase and reduction of losses		€54,091.09
- Savings in waste treatment cost		€13,674.23
Investment		€ 66,111.33
Payback period		14 months

* The water added to the product, which is constant, is not considered.

** The 40 m^3 that are currently generated are managed as liquid waste.

*** Includes savings in consumption, treatment and taxes.

Conclusions

The actions implemented and the good housekeeping practices applied have meant a significant reduction in the wastewater coming from the reactor cleaning processes. Furthermore, an authorised manager nowadays manages wastewater.

Due to the closure of the refrigeration circuit and the optimisation of the cleaning processes, for the same process, the enterprise now requires only 2% of the water previously consumed (the water added to the product is not considered) and there has been no significant increase in energy consumption.

On the other hand, the recovery and the trading of some of the product that remained in the reactor has meant important savings that enable the enterprise to target new environmental improvement projects, such as the installation of a vacuum evaporator for the liquid waste that requires management after cleaning.

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

Regional Activity Centre for Cleaner Production
Dr. Roux, 80
08017 Barcelona (Spain)
Tel. (+34) 93 553 87 90
Fax. (+34) 93 553 87 95
e-mail: cleanpro@cprac.org
http://www.cprac.org