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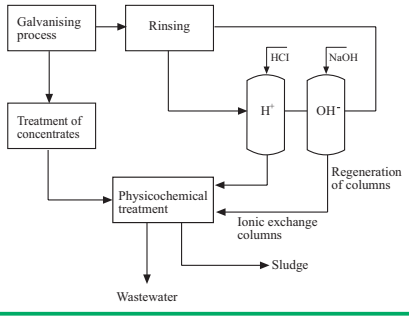
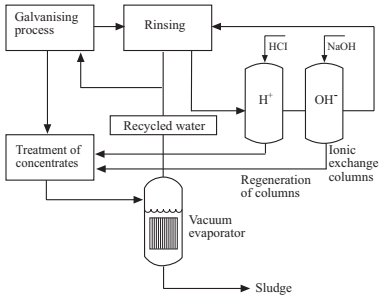
Regional Activity Centre for Cleaner Production

MINISTERIO DE MEDIO AMBIENTE

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

No. 5 Examples of waste and admission minimisation initiatives

Waste minimisation in a chemical nickel plating process

Company	ELECTROLESS HARD COAT, SA (Lliçà de Vall - Spain)
Industrial sector	Treatment of metallic surfaces
Environmental considerations	The galvanic bath industry is, potentially, a source of residue and wastewater with a high concentration of heavy metals. On the other hand, the galvanic process requires substantial flows of water in the washing and rinsing phases, due to which, if no effort is made toward rationalisation, the consumption of this resource, as well as the effluents that are generated, can be considerable.
Background	The decisive factor that led ELECTROLESS HARD COAT (ELHCO) to carry out this project was the cost it had to withstand, with regard to the management of the waste generated and the wastewater treatment, as well as the chemical products consumed throughout the process. Two additional relevant factors were the possibility of reaching practically zero discharge —with the resulting reduction in treatment fees— and the important savings in water obtained.
Summary of actions	Carried out in 1995, the aim of this modification was to recycle the effluent from the different stages of the galvanising process. With the new installation, all the effluents, including those resulting from the regeneration of ionic exchange resins and those originating from degreasing operations, are stored in one single concentrates tank, whence they are fed into a vacuum evaporator powered by a heat pump. This unit produces high-quality distilled water and a number of sludges, which are decanted, filtered in a press filter and dried. Thus, with this process, almost everything is recycled, since the only waste that is finally produced, and in lower quantities than with a physicochemical treatment, is the appropriately dried sludge.
Diagrams	**PREVIOUS PROCESS**  **NEW PROCESS** 

Balances

		Previous process	New process
Material and energy balances			
	Energy	**37,500 kWh/year**	**125,000 kWh/year**
	Water (*)	**6,200 m^3/year**	**approx. 0 m^3/year**
	Raw materials and materials	**66 t/year**	**5.5 t/year**
Waste generation		**12 t/year**	**6 t/year**
Economic balance			
	Staff	**24,138 USD/year**	**4,827.6 USD/year**
	Water	**3,793 USD/year**	**Negligible**
	Electrical energy	**4,138 USD/year**	**13,793 USD/year**
	Products and minerals	**11,724.2 USD/year**	**827.6 USD/year**
	Maintenance	**1,380 USD/year**	**345 USD/year**
	Environmental management	**6,621 USD/year**	**345 USD/year**
Total Cost		**51,794 USD/year**	**20,138 USD/year**
Investment			**USD186,207**
Payback period			**6 years**

(*) 200 m^3/year are of distilled water

Conclusions

The waste minimisation project carried out by ELHCO has succeeded in significantly reducing the quantity of sludges generated, and has almost completely eliminated wastewater discharge. Consequently, it has been possible to reduce contamination significantly. This aspect results in substantial savings in environmental management costs for the company.

The savings in water obtained with this new installation must also be taken into consideration, as well as the low conductivity of the water that is recycled back into the galvanisation process, a characteristic which can improve the quality in the covering of metallic parts.

The operation of this installation shows that companies in the galvanic bath sector can offer a high-quality, competitive service using non-contaminating process with low water consumption.

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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