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Regional Activity Centre for Cleaner Production

MINISTERIO DE MEDIO AMBIENTE

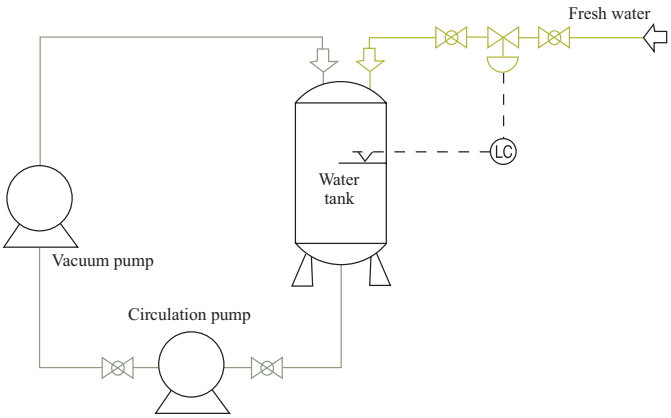
Generalitat de Catalunya
Government of Catalonia
Department of the Environment and Housing

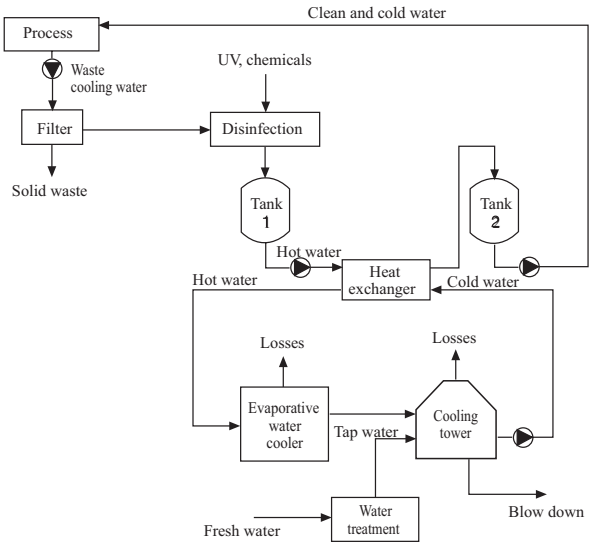
No. 81 Pollution prevention case studies

Minimisation of water consumption in a canning industry

Company	A small vegetable processing plant with 60 employees that produces 10 different products in glass jars and tin cans.
Industrial sector	Food. Canning industry.
Environmental considerations	The company produces canning products in acetic acid solution or brine (red beet, cucumbers, green pepper, sweet pepper, mixed vegetables, olives, turnips, onions, corn, mushrooms and red pepper sauce). The company takes water from public water works and consumes it for drinking, for product washing, for steam production, for cooling and for process solution preparation.
Background	The process steps depend on the type of product. In general the following steps are common to all processes: raw material reception, sorting and grading, washing and solution preparing, filling, thermal treatment, labelling and storage. Through process analysis all water consumers were determined, and a flow sheet with a detailed water balance was drawn up. It detected high water consumption that could be minimised through the implementation of minimisation options obtained after the implementation of a water minimisation methodology.
Summary of the initiative	The following wastewater minimisation options were detected: 1. Reuse of the tightening water for a vacuum pump. The vacuum needed for the product-filling machine is produced in a centrifugal vacuum pump which requires tightening water. The filling machine consumes 9.5% of fresh water, which is after being used is released into the sewer as wastewater. This type of wastewater does not contain any impurities and can be reused. It can be collected in a small volume tank with the circulating pump and sent back into the vacuum pump. 2. Recycling of the cooling water. Cooling water is produced in the pasteuriser, the autoclave and in the sealing machine. The waste cooling water reaches a maximum temperature of 40 ºC, but usually does not exceed 25ºC. Half of the processes are batch processes (sterilisation in autoclaves), while the rest are continuous (pasteurisation and sealing). There is no possibility of recovering low temperature heat. Recycling of the cooling water was proposed. The cooling system consists of a water preparation unit, a primary cooling system (two water tanks, pipes, filter, disinfector, pumps and heat exchanger) and a secondary cooling system with a cooling tower, an evaporative water cooler, a pump, a water softener and pipes. 3. Minimisation of the floor washing water. Floor washing water represents 5% of the total consumption. Hoses without water flow control were used. A low pressure washing system was proposed. The washing unit uses warm water and the appropriate chemicals.

Scheme of the process





Recycling of the cooling water scheme

Balances	Old process	New process
Balance of materials		
Consumption of cooling water (option 2)	19,395 m^3/y	8,533.80 m^3/y
Consumption of process water (option 1 and 3)	7,058 m^3/y	4,207.65 m^3/y
Water savings		46.6 %
Economic balance		
Saving in water consumption (option 1)		2,053.8 €/y
Saving in water consumption (option 2)		7,393.5 €/y
Saving in water consumption (option 3)		1,026.9 €/y
Total savings		**10,474.18 €/y**
Total investment		**€ 79,398**
Payback period		**7.5 years**

Conclusions

After evaluating the different alternatives detected, the company decided to immediately implement alternative number 3 (Minimisation of the floor washing water). The other two alternatives will be applied when the variation in water prices and taxes makes them feasible.

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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