



Alternatives for Preventing Pollution in the Surface Treatment Industry

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Video
English

Study
English
Castellano
Français

The REGIONAL ACTIVITY CENTRE FOR CLEANER PRODUCTION (RAC/CP) of the Mediterranean Action Plan has prepared this leaflet on pollution prevention in the surface treatment industry, with the aim of presenting alternatives for reducing and recycling at source and optimising the production processes in this sector.

The metal plating **industry** is mainly formed by small and medium-sized companies that develop an activity whose objective is to modify a surface's original structure, in order to provide it with conditions of resistance to external agents or to wear, a specific aesthetics, etc.

In the surface treatment **process**, the parts go through a series of baths (degreasing, pickling, electrolytic coating, etc.) and, between each of these baths, several rinses are carried out in order to prevent the pollution of the subsequent baths due to drag-out.

An important characteristic is the great variety of chemical products that are used in the processes and the traditionalism with which some of the surface treatments are carried out.

These two aspects mean that this industry has many **opportunities** for environmental improvement in its processes, especially with regard to preventing pollution at source.

EXAMPLES

GENERIC IMPROVEMENTS ON THE PROCESS LINE

■ A company:

	BENEFITS
Increased drainage time	65 % reduction of drag-out
Segregated waste flows	70 % saving in purification reagents
Lengthened life of baths	25 % saving in water consumption
Optimised the line	

Investment: 7,937 € **Saving:** 24,405 €/year **Pay-back period:** 4 months

IMPROVEMENTS IN RINSING

■ A company installed:

	BENEFITS
Contraflow water tanks	99 % saving on water consumption
Sealed water tanks	

Investment: 9,524 € **Saving:** 48,810 €/year **Pay-back period:** 2 months

IMPROVEMENTS IN COATING

■ A company replaced the cyanide zinc plating with a cyanide-free alkaline zinc:

Investment: 26,880 € **Saving:** 15,476 €/year **Pay-back period:** < 2 years

Mediterranean Action Plan

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Regional Activity Centre
for Cleaner Production



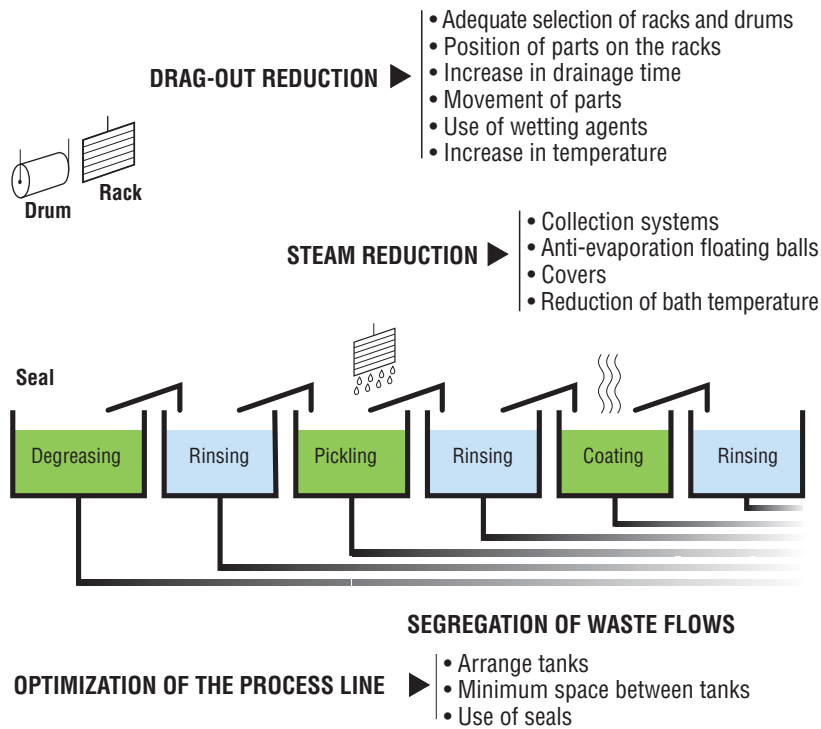
Ministry of the Environment
Spain



Government of Catalonia
Ministry of the Environment

Opportunities for preventing pollution at source and optimising the productive processes

GENERIC IMPROVEMENTS ON THE PROCESS LINE



IMPROVEMENTS IN RINSING

■ OPTIMIZATION OF RINSING TIME

- ▶ To prevent pollution in subsequent bath

■ AGITATION IN RINSING BATHS

- ▶ To reduce water consumption

■ SEALED WATER TANKS

- ▶ To reduce consumption of raw materials and water



IMPROVEMENTS IN DEGREASING

■ REPLACEMENT OF HALOGENATED SOLVENTS

- With ▶
- water-based degreasing agents
 - non-halogenated solvents

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IMPROVEMENTS IN COATING

■ CHROMIUM PLATING

REPLACEMENT OF Cr⁶⁺ ▶ With Cr³⁺

- RECOVERY OF THE CHROMIUM SOLUTION ▶
- By sealed water tanks connected to evaporators or ionic exchange resins.

■ ZINC PLATING

REPLACEMENT OF CYANIDE ZINC PLATING

- With ▶
- cyanide-free alkaline zinc
 - acid zinc

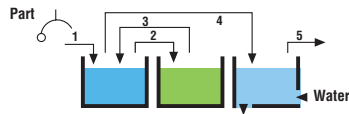
SEPARATING TANKS

To reduce consumption of raw materials and water



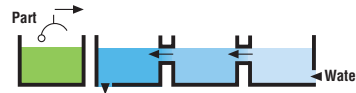
ECO RINSING

To reduce consumption of raw materials and water



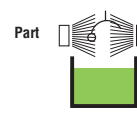
CONTRAFLOW WATER TANKS

To reduce water consumption



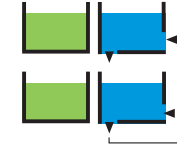
SPRINKLER RINSING

To reduce water consumption



SKIP TECHNIQUE

To reutilize rinsing water



SEPARATING TECHNIQUES

- Ionic exchange
- Inverse osmosis
- Ultrafiltration

To reduce consumption of water and raw materials

REDUCTION OF LOSSES AND RECOVERY OF SOLVENTS (halogenated or non-halogenated)

With ►

- sealed water tanks
- distillers

RECOVERY OF DEGREASING AGENTS

By ►

- decantation
- skimmers
- filtration
- centrifugation

REPLACEMENT OF CYANIDE ZINC PLATING

Use of cyanide-free zinc plating

COPPER PLATING

REPLACEMENT OF CYANIDE COPPER

► With copper sulphate bath in acid medium

ANODIZING

RECOVERY OF H₂SO₄

► By techniques of ionic retardation

CADMIUM PLATING

REPLACEMENT OF CADMIUM SOLUTIONS

By ►

- tinning
- silver plating
- zinc plating