

MedClean Propre Limpio Mediterranean



Regional Activity Centre
for Cleaner Production



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

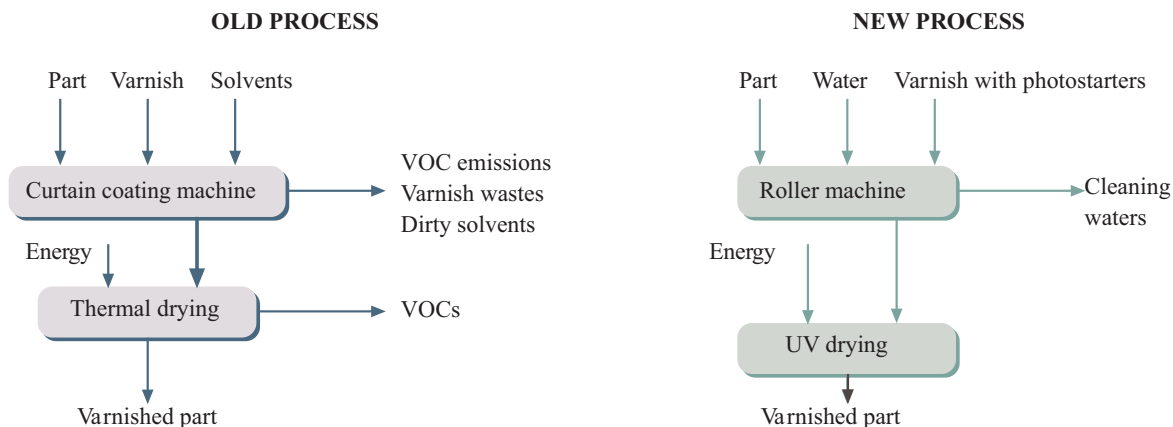
No. 64

Pollution prevention case studies

Changing of the installation of varnish application and drying of wood parts

| | |
|-------------------------------------|---|
| Company | Sillería Vergés, SA, Tortellà (Spain). |
| Industrial sector | Wood and furniture sector. |
| Environmental considerations | <p>The company Sillería Vergés, SA manufactures wooden tables and chairs, amongst other pieces of furniture. During the manufacture process, the parts first go through the dyeing phase, followed by the finishing phase in which varnish is applied. This last coat is applied by a curtain coating machine and the varnished parts are then introduced in a hot air tunnel to dry. This varnishing operation can be repeated according to the type of part and finishing required.</p> <p>The products used in the varnishing process are solvent-based and the machine used is batchoperated and therefore always requires a minimum quantity of varnish for a smooth application. Once the product is applied to the parts, the machine is cleaned using a solvent and, in order to prevent varnish residue incrustations, the machine is left full of solvent.</p> <p>This technology led to the emission of volatile organic compounds (VOCs) and the generation of wastes from excess varnish and dirty solvents.</p> |
| Background | <p>As explained above, the company produced waste from used varnish and dirty cleaning solvent wastes. In 2003, a plan was outlined to minimise the generation of these residues, while introducing some modifications to optimise the production process.</p> <p>Actions were based on the following measures:</p> <ul style="list-style-type: none"> • To reduce varnish consumption. • To reduce solvent consumption. • To reduce the quantity of varnish and solvent residues. • To reduce VOC emissions to air. |
| Summary of actions | <p>The project consists of:</p> <ul style="list-style-type: none"> • Installing a continuous varnish application line and roller conveyor. • Changing solvent-based products for aqueous-based products. • Drying or fixing the varnish using UV lamps. <p>The use of this type of product based on acrylic acid esters and photostarters (aqueous-based) presents many advantages when compared to traditional systems, as it makes it possible to eliminate the use of solvents, reuse excess machine product, use water for cleaning operations, minimise the amount of product consumed and dry the parts without heat and in less time, in a matter of seconds; this also guarantees that there is no loss of quality in the handling of the parts painted.</p> |

Diagram of the process



Balances

Balance of materials

| | Old process | New process |
|--|-------------|-------------|
| Varnish consumption (t/y) | 14.4 | 2.0 |
| Solvent consumption (t/y) | 5.7 | 0.3 |
| Cleaning water consumption (m ³ /y) | 0.0 | 95 |
| Varnish wastes (kg/y) | 3,300 | 150 |
| Solvent wastes (kg/y) | 5,100 | 50 |

Economic balance

| | | |
|--|--------|--------|
| Cost of varnish with photostarter purchase (€/y) | 18,079 | 11,900 |
| Cost of solvents purchase (€/y) | 6,625 | 1,450 |
| Cost of water purchase (€/y) | 0 | 28 |
| Cost of varnish waste management (€/y) | 1,782 | 92 |
| Cost of solvent waste management (€/y) | 4,581 | 100 |
| Cost of cleaning water management (€/y) | 0 | 570 |
| Energy cost (€/y) | 1,815 | 1,002 |

Savings and expenses

| | | |
|---|--|-------|
| Savings in varnish purchase (€/y) | | 6,179 |
| Savings in solvent purchase | | 5,175 |
| Savings in varnish waste management (€/y) | | 1,690 |
| Savings in solvent waste management (€/y) | | 4,581 |
| Energy savings (€/y) | | 813 |

Total savings (€/y)

17,740

Investment in installations (€/y)

Investment payback

1.8 years

Conclusions

Through the implementation of this project the company achieved a reduction of 12.4 t/y in varnish waste, 5.4 t/y in finished solvent waste, 17.8 t/y in raw material consumption, 813 €/y in energy consumption and associated emissions to air; 100% of VOC emissions to air have been eliminated.

These at-source pollution prevention actions are the result of the company's environmental policy included in the continual improvement programme that was started in 2000. During that year, the company carried out a Minimisation Opportunities Environmental Diagnostic (MOED) jointly with the Centre for the Enterprise and the Environment (CEMA) aimed at identifying at source pollution minimisation opportunities.

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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