

# MedClean iterranean Propre Limpio



Regional Activity Centre  
for Cleaner Production



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Pollution prevention case studies

## Solvent replacement with osmosis water in viscosity adjustment of inks

<b>Company background</b>	Masa Decor, SA (Sant Pere de Vilamajor, Spain)
<b>Industrial sector</b>	Printing and allied industries. Printing by rotogravure.
<b>Environmental considerations</b>	<p>The company performs printing with organic inks. Printing is mainly made carried out on paper and PVC for producing decorative material.</p> <p>The printing system used by Masa Decor is rotogravure, where the support is printed by direct contact with a metallic cylinder, where the message to be printed is engraved forming small cells of low relief that retain the ink. In the printing process, the metallic cylinder is soaked with the ink from the inkpots of the machines and a knife extracts the remains. Thus, ink remains only on the cells engraved on the cylinder. When the printing support, either paper or PVC, makes contact with the cylinder, the printed form is transferred to the printing support.</p>
<b>Background</b>	<p>The company carried out a Minimisation Opportunities Environmental Diagnosis (MOED), where some pollution prevention opportunities were detected, among others: reduction of solvent emissions as well as control of viscosity and of the colour of the inks in order to reduce remains in the printing process.</p> <p>Masa Decor uses water-based inks for printing on paper. The formulation of colours for each printing is prepared from inks of basic colours, ink remains from previous impressions, ink remains from cleaning the inkpots in the machine itself, solvents and additives. The validation of color is made by means of a colorimeter that contains a library with a large range of colours.</p>
<b>Summary of actions</b>	<p>In the first stage of the project and to reduce the amount of emissions of Volatile Organic Compounds into the atmosphere when printing, the company contacted the ink supplier in order to modify the ink formulation. After a year and a half of research, the supplier was able to develop a varnish, component of the inks, by reducing the ethanol content of the varnish from 35% to 0.3% with the resulting reduction of solvent emissions.</p> <p>Furthermore, the inks used in the printing process contain a variable proportion of alcohol-based solvent (mixture of 35% water, 43% ethanol and 22% metoxipropanol). This solvent was also used to adjust the viscosity, to clean the machine and to prepare the inks from production remains.</p> <p>In the second phase of the project, thanks to the new formulation of the varnish contained in the inks, Masa Decor replaced the alcohol-based solvent with osmosis water. During the year 2000, 98.6 tons of alcohol-based solvent were consumed, which resulted in the emission of 64 tons of solvent into the atmosphere during the printing processes. With the use of the new solvent (osmosis water), those consumptions and emissions have been eliminated. These data underline the importance of this improvement from the environmental and economic point of view.</p>

## Photos of the installation



Close-up of a printing body



In the background, the printing line and in the foreground, the mobile inks

### Balances

	Old process	New process
<b>Material balance</b>		
Solvent consumption for viscosity adjustment (t/y)	98.6	0.0
Consumption of osmosis water (t/y)	0.0	55.0
Emissions of VOCs into the atmosphere from ethanol contained in the varnish of the inks (t/y)	427.0	4.0
Emissions of VOCs into the atmosphere from solvent for adjusting the viscosity (t/y)	64.0	0.0
<b>Economic balance</b>		
Solvent consumption for viscosity adjustment (€/y)	99,800	0
Consumption of osmosis water (€/y)	0	25
Total cost (€/y)	99,800	25
<b>Savings (€/y)</b>		99,775
<b>Investment (€)</b>		0
<b>Payback period</b>		Immediate

### Conclusions

For carrying out this action, Masa Decor did not have to invest in specific machinery and obtained an approximate reduction of 75% of VOC emissions generated during the printing process. In order to achieve that, the company worked jointly with the supplier to replace the alcohol-based solvent with osmosis water in the operations of viscosity adjustment and ink preparation.

**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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