

# MedClean Propre Limpio


**No. 27**
**Pollution prevention case studies**

## Water and energy conservation in the textile sector

### Company background

El-Nasr Company for Spinning and Weaving (Mahalla El-Kobra, Egypt) is one of the largest public-sector textile factories in Egypt, with annual production of 52 million metres of fabric and around 7,000 employees. The main activities are spinning, weaving and wet processing.

Its annual production is approximately 8,000 tonnes of raw fabric, of which 20% are spun cotton yarns, 12% are polyester blend yarns and 68% is grey fabric.

### Industrial sector

Textile industry. Cotton and blended yarn fabrics.

### Environmental considerations

The main environmental problems in the textile sector are the high consumption of water, and thus considerable wastewater generation, as well as the high quantity of energy involved in all processes. This high consumption is due to great heat and steam losses, but also to the non-recirculation of water during the productive processes, as it is directly discharged to the sewer without reuse.

### Background

Within a SEAM Project an industrial audit of the company was carried out and various pollution prevention opportunities were identified, a description of the most important being:

1. Inadequate storage of the dyestuffs and the final fabric products reduced the dye shelf life of the former and caused soilage to the latter.
2. An inadequate insulation of the steam and hot water pipes entailed a great waste of heat.
3. The steam condensate from all departments went directly to the drain rather than being recirculated as feed water, causing unnecessary wastage of water.
4. Huge amounts of thermal energy were lost in the fuel gases of the boiler which are exhausted to air.
5. The discharge to the sewer of considerable amounts of hot effluent in the pre-treatment and dyeing departments caused great heat losses.
6. Huge quantities of the final washing water in the bleaching ranges were directly discharged without reuse.

### Summary of actions

Particular attention was paid to those improvements that could be carried out at low or no cost, as these are easy to implement and often entail significant savings.

It was found that the pre-treatment and dyeing departments offered the greatest potential for savings. The measures were mainly focused on water and energy conservation. The following actions were undertaken in this area:

1. Collection and reuse of steam condensate.
2. Upgrade insulation of steam and hot water network.

3. Counter current flow in the Kyoto range.
4. Installation of automatic shut-off valves in bleaching ranges.
5. Recycling of final washing water in the bleaching ranges.
6. Recovery of thermal energy and reuse of spent rinse water from yarn scouring and dyeing liquids.
7. Storage improvement (dyes and fabric).
8. Optimisation of chemical usage, by the substitution of some chemicals.

## Balances

### COST - BENEFIT RELATIONSHIP

Factory Department	Action	Capital & operation costs (€)	Yearly savings (€)	Payback period (months)
Measures already implemented				
All	Steam condensate recovery	13,203.0	39,638.3	< 4
	Upgrade insulation of steam and hot water networks	14,083.2	39,646.0	< 5
	Improve storage facilities	0	6,689.5	Immediate
	Optimise chemical usage	0	10,269.0	Immediate
Fabric Pre-treatment	Counter current flow in Kyoto range	12,909.6	65,064.4	< 3
<b>Subtotal</b>		40,195.8	161,307.2	< 3
Additional measures to be implemented				
Fabric Pre-treatment	Install automatic shut-off valves, Gaston County range	10,709.1	13,159.0	< 10
	Recycling final wash water	8,802.0	41,442.8	< 3
Yarn Dyeing	Heat recovery from hot liquors	23,472.0	31,443.7	< 9
<b>Subtotal</b>		42,983.1	86,045.4	< 6
<b>OVERALL COST - BENEFIT RELATIONSHIP</b>		83,178.9	247,352.6	4

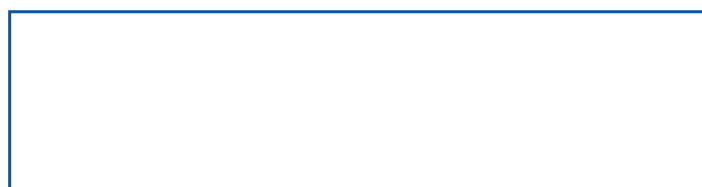
## Conclusions

The cleaner production measures implemented at the factory, consisting basically of insulation improvement, recirculation of water and steam, correct storage and the optimisation of chemical usage, led the company to a significant reduction in water consumption (20%) and wastewater generation (20%). Moreover, energy conservation was also satisfactorily achieved (5%) as well as chemical consumption reduction (5%) and fuel consumption (5%).

In addition, the actions undertaken were of low or no cost to the factory, thus implying considerable benefits for the company in a short payback period.

**NOTE: This case study seeks only to illustrate a pollution prevention example and should not be taken as a general recommendation.**

Case study presented by:  
**EE AA**  
 30 Hellwan  
 El Maadi - Cairo (Egypt)  
 Tf + (20 2) 375 34 41  
 Fax + (20 0) 378 42 85



Regional Activity Centre  
for Cleaner Production

Dr. Roux, 80  
 08017 Barcelona (Spain)  
 Tel. (+34) 93 553 87 90  
 Fax. (+34) 93 553 87 95  
 e-mail: [cleanpro@cprac.org](mailto:cleanpro@cprac.org)  
<http://www.cprac.org>