

# MedClean Propre Limpio



Regional Activity Centre  
for Cleaner Production



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Pollution prevention case studies

## Combining preparatory processes. A low-cost high-productivity solution

### Company background

Misr Beida Dyers Company is a public company in Kafr El-Dawar, Alexandria. The factory treats, dyes, prints and finishes cotton fabrics and cotton/synthetic blends; processes yarns; scours and dyes wool “tops” and produces absorbent cotton.

Giza Spinning, Weaving, Dyeing and Garments Co. is a private company located at Kafr Hakeim in Giza, Egypt. The factory processes and manufactures cotton and polyester/cotton garments, as well as finished fabrics.

### Industrial sector

Textile industry.

### Environmental considerations

Desizing, scouring and bleaching were undertaken as three separate steps in the preparatory stages for textile wet processing.

The warp threads were normally sized in order to increase their tensile strength and reduce fibre breakage during weaving; the size could then be removed thanks to desizing. Scouring, a process carried out to remove impurities that are present in cotton, was done with sodium hydroxide, which produced strongly alkaline effluents (around pH 12.5) with high organic loads.

Because of the use of sodium hypochlorite (a toxic and hazardous chemical) during the bleaching process, there was a strong odour of chlorine and worker safety concerns associated with its handling. Furthermore, there was high steam, energy and water consumption.

### Background

Several pollution prevention opportunities were identified in the desizing, scouring and bleaching processes.

### Summary of actions

The implemented cleaner production option consisted of adopting combined processing. In Misr Beida Dyers, several production trials were conducted to improve efficiency and combine the desizing and scouring process:

- Concentrations and rates at which chemicals were added were varied as well as the temperature, number and timing of washes.
- Two hot washes were eliminated from the half bleaching process.
- More expensive chemicals were phased out and replaced with ammonium persulphate and Egyptol.

In Giza Spinning and Weaving, through chemical substitution and process optimisation, it was possible to combine the scouring and bleaching processes and to phase out the use of sodium hypochlorite.

Stages were optimised for greater productivity and financial savings as outlined below:

- Two hot washes and one cold wash were eliminated from the half bleaching process.
- One hot wash, two cold washes and three flotation rinses were eliminated from the full bleaching process.
- Reuse of the bleaching bath for the optical brightening step in the full bleaching process.
- Hydrogen peroxide was used to substitute sodium hypochlorite.

## Balances

Savings	Giza Spinning & Weaving		Misr Beida Dyers
	Half bleach	Full bleach	Half bleach
Cost of chemicals	(25%)	(14%)	(1%)
Water consumption	59%	61%	30%
Steam consumption	40%	15%	27%
Electricity consumption	53%	27%	19%
Cost of labour	53%	27%	19%
Processing time	4 hours	5 hours	2 hours
<b>Savings in operating costs</b>	€20,712.02		€20,555.70
<b>Net benefit on increased production capacity</b>	€23,177.97		
<b>Total annual benefits</b>	€64,445.7		

*Note: figures in brackets indicate an increase in cost.*

## Conclusions

At Giza Spinning and Weaving, processing time has been considerably shortened in the half bleaching process and enabled production to be increased by 40%. Sodium hypochlorite has been phased out of the bleaching process. As a result, worker conditions and safety have improved and the amount of halogenated organic hydrocarbons (AOX) in the final effluent has been minimised. Water and energy consumption has also been reduced.

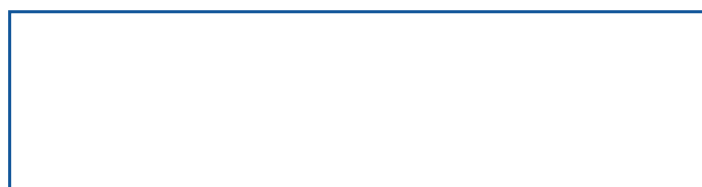
At Misr Beida Dyers, there was a reduction in water, energy and steam consumption and the processing cycle was shortened by 2 hours (18% reduction in processing time).

In both companies, apart from the environmental benefits, there have been other improvements in productivity and in fabric quality.

As regards economic costs and savings, the increase in chemical costs before and after was offset by savings in utilities and labour. Therefore, no capital expenditure was necessary for implementation and the benefits were immediate.

**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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