

NRDC Responsible Sourcing Initiative

Efficiency Improvements that Prevent
Pollution and
Save Money

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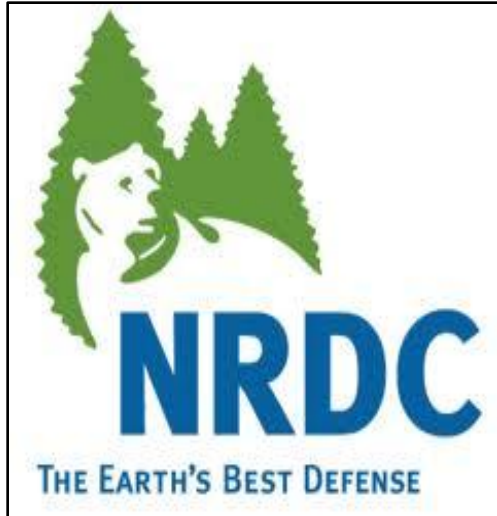
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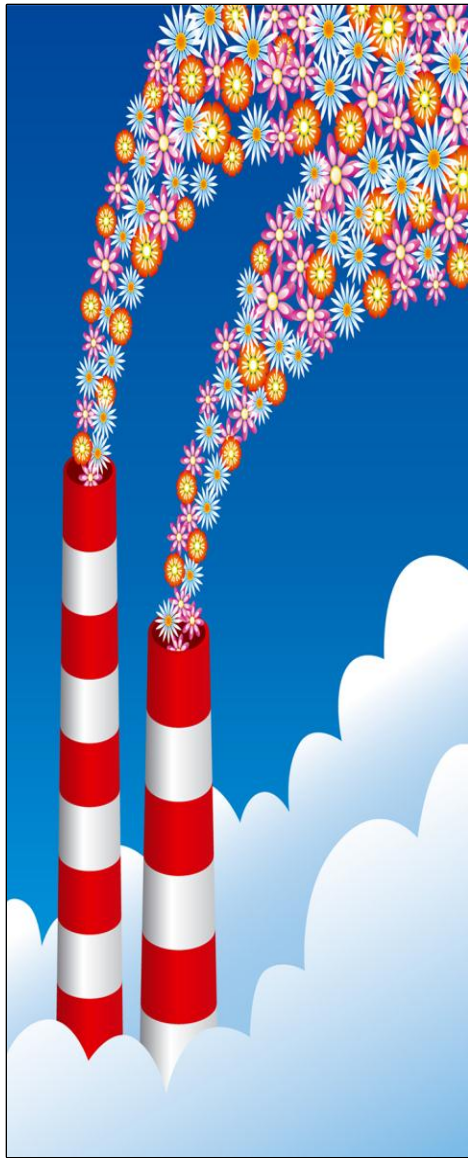
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Thanks to NRDC



- Thank to NRDC (Natural Resources Defense Council) for providing this information
- For more information visit their website – www.nrdc.org/





Responsible Sourcing Initiative

Dramatically improve
environmental performance of
factories in China using cost saving
production efficiency
improvements



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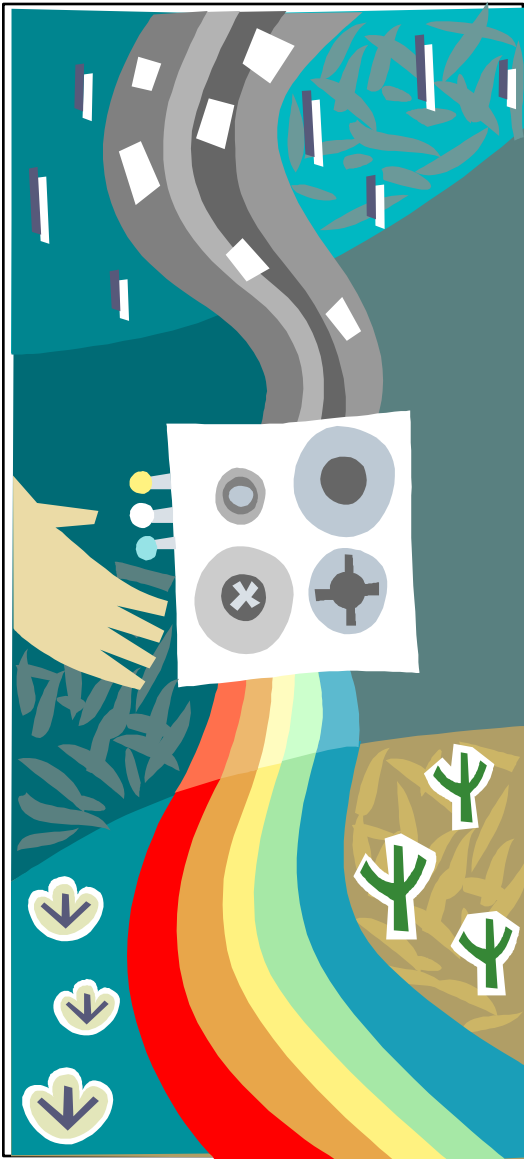
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Pollution prevention v. pollution control

- It's all about efficiency: time, material, water, energy
- Production improvements, work is done on the factory line, NOT at the treatment plant
- Reduces water and waste loading
- Reduces energy use
- **Saves money**





Collaboration with Retailers and Brands

- Created collaborative group:
 - The Gap
 - H&M
 - Levi Strauss & Co.
 - Nike
 - Wal-Mart
 - Li & Fung
- Searched for key opportunities for improvement





Our Work So Far

- Initial fact finding at about a dozen fabric mills and dye houses
- In-depth opportunity assessments at five fabric mills/ dye houses
- Creation of Best Practices Guide



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Ten Best Practices

- Water savings up to 24%
- Energy (fuel) savings up to 31%
- Electricity savings up to 3%
- Others options for factories ready for more



Best Practices for Water

Practice		Savings (m3 /ton fabric)	% Savings (rounded)
Leak detection, preventive maintenance, improved housekeeping		4 – 7.6	2 - 5%
Reuse of cooling water	From singeing	3.2 – 7.4	2 - 5%
	From air compressor	3.89	2%
	From pre-shrink	1.44	1%
Reuse of condensate		3.8 – 6.0	2 - 3 %
Reuse of process water	From bleaching	6.47	4%
	From mercerizing	4.54	3%

Best Practices for Energy

Practice	Savings (kg coal/ton fabric)	% savings (rounded)
Recover heat from hot rinse water	61.1-320	2-12%
Prescreen coal	79.5	3%
Maintain steam traps	72-128	1-5%
Recover heat from smokestack	65	1%
Insulate pipes, valves, and flanges	0.2-38	0.01-0.5%
Energy savings from leak detection, preventive maintenance, improved cleaning	47-340	1.5-5%
Energy savings from the reuse of cooling waters	67-92	1.6-1.8%
Energy savings from the reuse condensate	55-86	0.8-3.2%

Success Story:

Redbud Fabric Dye House

	NRDC 10 Best Practices	Water Saved (tons per day)	Coal Saved (tons per day)	Upfront Cost (US \$)	Monthly Savings (US \$)	Payback Period
	Leak detection, preventive maintenance					
1	Reuse cooling water from preshrink	48		775	485	50 day
2	Reuse condensate (from dryers and singeing)	242	8.42	38,000	24,150	48 day
3	Reuse process water (from bleach pretreatment, mercerizing, & rinsing)	552	1.72	37,000	47,600*	24 day
	Recycle heat from hot rinse water					
	Prescreen coal					
	Maintain steam traps					
	Insulate pipes, valves, and flanges					
	Recover heat from smokestack					
	Optimize compressed air system					
	Totals from Best Practices	842	10.14	75,775	72,235	32 day
	Percentage reduction	34%	13%			

*Includes savings of \$37,000/monthly alkali purchases



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Ready for More...

- **Process Improvements**

- Undertake a failure analysis when things go wrong
- Standardize optimal methods and recipes
- Substitute enzymes technology in bleaching pretreatment
- Investigate opportunities to reduce salt in individual reactive dyeing recipes
- Increase reliance on higher fixation dyes
- Improve machine utilization
- Schedule colors to minimize extensive cleaning between each batch
- Monitor continuously to check whether implementation of improvements is in place



Right First-time Dyeing



adidas
GROUP

carhartt

ESPRIT

THE GYMBOREE
Corporation

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new balance

Pentland

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What Are Some Causes?

- Inconsistent sources of light
- No quality control on dye pigments
- Poor use of color matching instrumentation
- Dyes weighed inaccurately
- Scoops not dedicated to colors
- Dye batches mixed one batch at a time
- Poor temperature and pH control
- Use of low quality domestic dyes



Next Steps

- Disseminate and promote findings
- Use findings to inform supplier policies

