Performance monitoring and readjustment visit report on

IRIS Fabrics Ltd.

Programme on Water Saving in the Textile and Garment Industries (WaSaTex)

german cooperation
DEUTSCHE ZUSAMMENARBEIT

Implemented by:
giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Reed Consultancy
Engineering Sustainability

Performance monitoring and readjustment visit

Visit Date: 21 December 2023

1. Factory Information

1.1 Contact person:

Name	Designation	Contact information
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1.2 WaSaTex Implementation Team:

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1.3 Machines

Type	No. of machines
Knit Dyeing	25
Finishing	6
Other machines	4

1.4 Processes

- Knit Dyeing
- Finishing
- Printing

2. Observations

There are many options to reduce the consumption of process water. Many options exist for process modification for knit dyeing and taking corrective action measures for finishing, printing, and utility sections. Detailed recommendations for process modification, liquor ratio optimization, and other areas have been mentioned in Section 3.

It was observed during the field visit that batch-wise water consumption for the dyeing machines was not recorded which makes it difficult to get the actual water consumption data for the batches of particular colours. Process steps for dyeing dark, medium, and light colours can be modified to reduce water consumption. It was also observed that liquor for Fong's and Canlar dyeing machines was 1:7, and for Brazzoli dyeing machines it was 1:5.5. There are options to reduce the liquor ratio and increase machine loading percentage to save water use in dyeing.

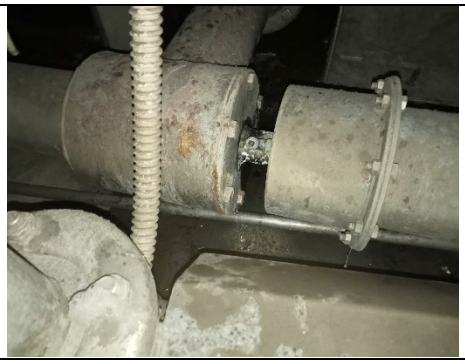
	
Leakages at the soft water lifting pumps	Leakages in the steam pipes of a dyeing machine
	
Leakages in a water pipe in the stenter machine	Hosepipe used for slitting machine cleaning kept open

Figure 1 Glimpse of some observations during the factory visit

The water flow in the fabric-wetting bath of the stenter machine could not be controlled as there is not any control valve which causes overuse of water. Some leakages were observed

in the water-carrying pipes in the dyeing floors, soft water lifting pumps, and steam-carrying pipes. Water in the slitting machine can be reduced by optimizing the use of nozzles in the shower and optimizing the use of water in machine cleaning by using nozzles and valves in the hose pipes. The visiting also noticed a lack of awareness among the workers on the use of water in machine cleaning with hose pipes as well as in printing screen cleaning.

A robust monitoring system needs to be implemented by metering water consumption for the dyeing, printing, slitting, and stenter machines individually to compare with the benchmark, set targets, and track improvements.

3. Improvement Options for Process Water Reduction

The improvement suggestions for water reduction are focused more on process water.

Factory Name:	**IRIS Fabrics Ltd.**		
Area/ Section	**Process/ Operation**	**Point of Concern**	**Action Measure**
Fabric Dyeing	Cotton dyeing	Process steps for reactive dyeing of knit fabric with bio-scouring can be modified	Conduct loading and pre-treatment (scouring and bio-polishing together) in the same bath. No hot loading is needed.
			Kill the enzymes and add 1-1.5 gm/L NaOH (if necessary) to remove Neps and run for 20 minutes at 90°C and then drain
			Fill and hot wash at 80°C X 10 mins and drain and drain (If NaOH is added)
			Fill and carry out dyeing and drain
			Fill and carry out block wash at 70°C X 10 mins and drain
			Fill and carry out wash run at 65°C X 10 mins and drain
			Fill and carry out wash run at 65°C X 10 mins and drain (if necessary, based on pH)
			Fill and add a *special soaping agent* that also neutralizes the fabric without any acid wash
			Fill and carry out hot wash at 80°C X 10 mins and drain
			Fill and carry out block wash at 60°C X 8 mins and drain
			Carry out fixing and softening if necessary
		Process steps for reactive dyeing with peroxide pre-treatment can be modified	Conduct loading, pre-treatment and drain
			Carry out normal hot wash at 80°C X 10 mins and drain
			Fill and carry out acid, peroxide killing (PC), kill enzyme, and drain
			Fill and carry out dyeing and drain
			Fill and carry out block wash at 70°C X 10 mins and drain
			Fill and carry out wash run at 65°C X 10 mins and drain (not required for pale to medium colours)

			Fill and carry out wash run 65°C X 10 mins and drain (if necessary, based on pH)
			Fill and add a *special soaping agent* that also neutralizes the fabric without any acid wash
			Fill and carry out hot wash at 80°C X 10 mins (for pale to medium colours, it is 70°C X 10 mins) and drain
			Fill and carry out block wash at 60 °C X 8 mins (not required for pale to medium colours)
			Carry out fixing and softening, if necessary
		Process steps for white dyeing of cotton can be modified	Fill and carry out the white process and drain
			Fill and carry out wash run at 90°C X 15 mins and drain
			Fill and carry out wash run at 60°C X 10 mins and drain
			Fill and carry out neutralization, peroxide killing (if necessary), and bio polishing process and drain
			Carry out wash at 50°C X 10 mins and drain
			Fill and carry out softening (if necessary)
	Polyester dyeing	Process steps for non-white dyeing of polyester fabrics with disperse dyes can be modified	Fill and carry out polyester dyeing and acid-based reduction and drain
			Fill and carry out the 2nd reduction, if necessary, for the dark colours
			Fill and run at 70°C X 10 mins and drain
			Fill and acid (if necessary) and run at 60°C X 10 mins and drain
		Process steps for dyeing cotton-polyester blend fabrics can be modified	Fill and carry out polyester dyeing and acid-based reduction and drain
			Fill and wash run at 60°C X 10 mins and drain
			Fill and carry out cotton dyeing and drain
			Fill and carry out block wash at 70°C X 10 mins and drain
			Fill and carry out wash run at 65°C X 10 mins and drain (not required for pale to medium colours)
			Fill and carry out wash run at 65°C X 10 mins and drain (if necessary, based on pH)
			Fill and add a *special soaping agent* that also neutralizes the fabric without any acid wash
			Fill and carry out hot wash at 75°C X 10 mins (for pale to medium colours, it is 70°C X 10 mins) and drain

			Fill and carry out block wash at 60°C X 8 mins (not required for pale colours)
			Carry out fixing and softening, if necessary
	General	General practices for knit fabric dyeing can be improved	Try with M:L ratio = 1:6.5 in Fong's and Canlar machines and M:L ratio = 1:5 in Brazzoli machines
			Options for the reuse of washing baths need to be implemented
			The number of reprocessing needs to be reduced
			Machine planning should be based on colours so that machine wash can be reduced
			Improve RFT% (Both lab to bulk and bulk to bulk)
			Selection of the right process for the right product to get the maximum outcome
			Proceed with bio-scouring for medium to dark colours
			Loading hot or wash is not necessary for dyeing
			Utilizing the maximum loading capacity of the machines
			For turquoise colour and other special cases, two soaping steps are recommended to use
			Batch-wise water consumption need to be monitored and recorded for each dyeing machines
Finishing	Slitting machine	Cleaning water use can be reduced	Optimizing the number of shower nozzles to make use of the optimum amount of water
			Using the optimum amount of water with hose pipe nozzles and valves during machine wash
			Reusing the water released from the J-box of the slitting machine
			Monitoring the water use through metering to set targets and track improvement
	Stenter machine	Water use can be reduced in machine cleaning and fabric wetting	Using the optimum amount of water with hose pipe nozzles and valves during machine cleaning
			Optimize the water use for fabric wetting in the stenter machine by setting a valve to the water supply system to control the flow

			Monitoring the water use through metering to set targets and track improvement
Printing	Screen washing	Water use in screen washing can be reduced	Using hose pipes with nozzle and valves to ensure optimum use of water during screen cleaning
			Creating awareness, monitoring workers for unnecessary water use for screen wash, and monitoring the water use through metering
Utility	Boiler	Condensate recovery percentage can be improved	Repair the leakages in the steam-carrying pipes
	Soft water	Soft water use can be reduced	Repair the leakages in water-carrying pipes and machines across the production floors
			Avoid using good-quality soft water in areas such as floor cleaning, hand or face washing, etc.
			Ensure 100% cooling water recovery by avoiding water draining and repairing all leakages in the recovery system

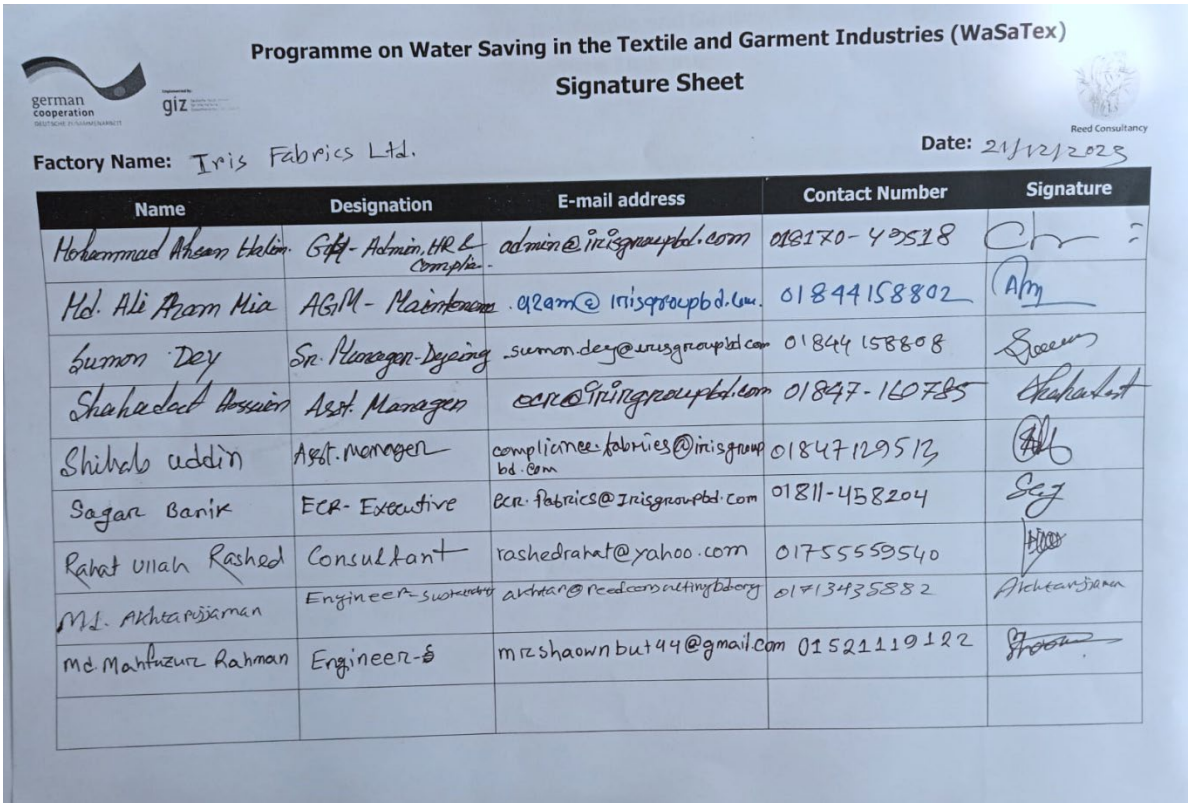
Resources References:

- Schönberger, H.; Ullah, S., Water efficiency in textile finishing industries – Best practices on water saving in textile finishing industries, GIZ GmbH (2021), https://asiagarmenthub.net/resources
- Best Available Techniques Reference Document for the Textiles Industry (2003) and the revised document (2022), https://eippcb.jrc.ec.europa.eu/reference
- Schönberger, H.; Schäfer, T., Best Available Techniques in Textile Industry, UBA-Texte 14/03 (2003), https://www.umweltbundesamt.de/sites/default/files/medien/publikation/long/2274.pdf

4. Annexes

4.1 Visiting Photos

4.2 Signature sheets



Programme on Water Saving in the Textile and Garment Industries (WaSaTex)

Signature Sheet

Reed Consultancy

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