

Master Training Program on Water (Water Supply, In-house Processing, End-of-Pipe) in Textile and Garment factories

Promotion of Sustainability in the Textile and Garment Industry in Asia - FABRIC

Day 1: Presentation 4

Checking of Parameters – Step towards RFT

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Contents

More details on RFT

- ✓ Lab to Bulk and Bulk to bulk

Processing parameters

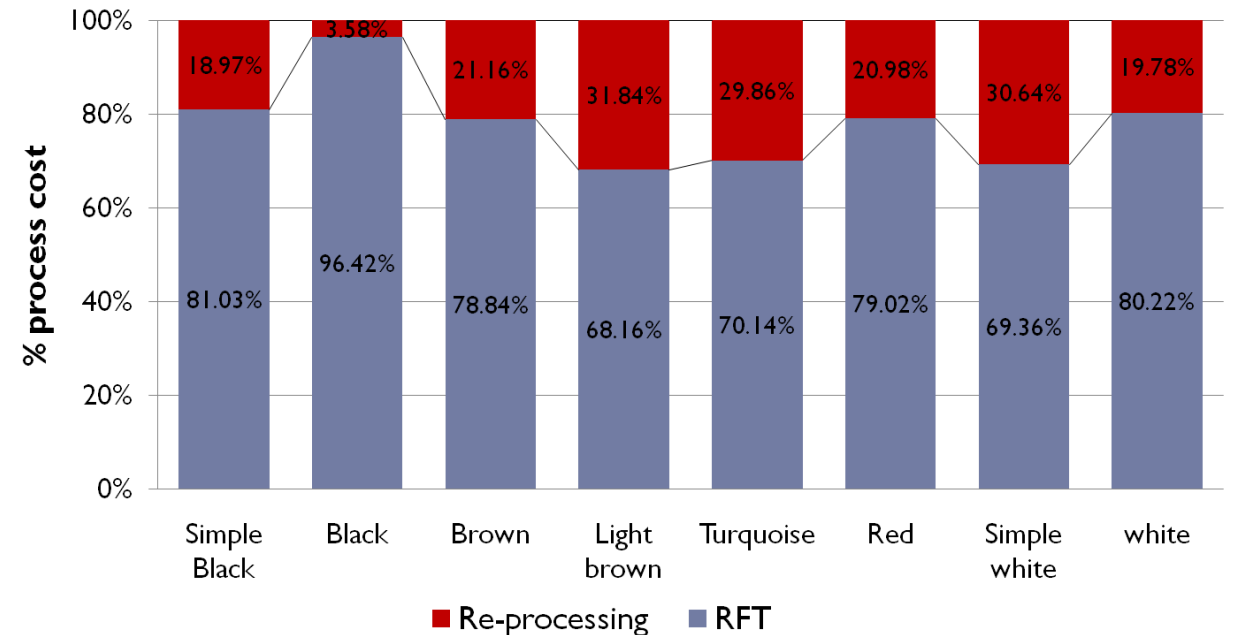
- ✓ Common parameters
- ✓ Batch vs semi-continuous/continuous

Sensors' performances

RFT (Right first time)

Right first time (RFT)

- Improve productivity
- Reduce water consumption
- Reduce chemical consumption
- Increase profitability
- Ensure smooth operation



Source: Mohammad Abbas Uddin 2009

What Could be different?

- **Mechanical restrictions, and the agitation speeds of the dyebaths**
- **Substrate:**
 - ✓ Labdip fabric and bulk fabric
 - ✓ Original fabric weight is less due to the scouring/Bio-polishing loss
- **Dyes and Chemicals**
 - ✓ Lab sample and bulk dyes in store
 - ✓ Strength
 - ✓ Moisture content: Lump formation?

Lab to bulk RFT

What Could be different?

Process consistency

- ✓ Water quality
- ✓ liquor ratio
- ✓ Weight measurement: Human error?
- ✓ Alkali dosing in the lab
- ✓ Dyeing parameters

Lab to bulk RFT

What could be be done

- **Substrate:**
 - ✓ Fabric dyed in laboratory and bulk should be same
 - ✓ Adjust wt. of Labdip fabric according to wt. loss in bulk (4-8%)
- **Dyes and Chemicals**
 - ✓ Purity of dyes: Insoluble matters and moisture
 - ✓ Quality checking of Lab dyes and bulk dyes: Dyeing in identical condition, check colour
 - ✓ Use / change dyes and chemical with a same strength
 - ✓ Check solubility of dyes

Lab to bulk RFT

What could be be done

- **Process consistency**
 - ✓ Frequent checking of water
 - ✓ Liquor ratio: As close as possible
 - ✓ Alkali solution must be made to the reference pot
 - ✓ Check weigh system
 - ✓ Use the exact lab recipe for first bulks OR adjust lab recipes prior to 1st bulk are based on empirically proven correlation factors
 - ✓ Bulk dyeing and use the same recipe to do lab dyeing
 - ✓ Update Batch card
- **Reduce multiple sampling stages in dyeing**
- **Create a formal failure analysis procedure**
- **Use an automated dispenser, Central dyehouse controller**

Scenario: Repeat dyeing

- Short Interval
 - ✓ Differences in the degree of pretreatment such as scouring,
 - ✓ Fluctuations in the water quality
 - ✓ Inappropriate dye selection
- Long Interval:
- Change in Dyeing Machine
- Differences in the weight of the fabric
- Changes in Liquor ratio
- Change in Dyes/Chemical combination
- Change of dye lot: Strength change

What could be be done

- Proper Planning
- Use enzyme/chemicals in proper condition and applicable to broad range
- Use dyes with high reproducibility
- Use compatible dyes in chemicals
- Check s.g., pH of the dyebath
- Create a formal failure analysis procedure
- Use an automated dispenser, Central dyehouse controller

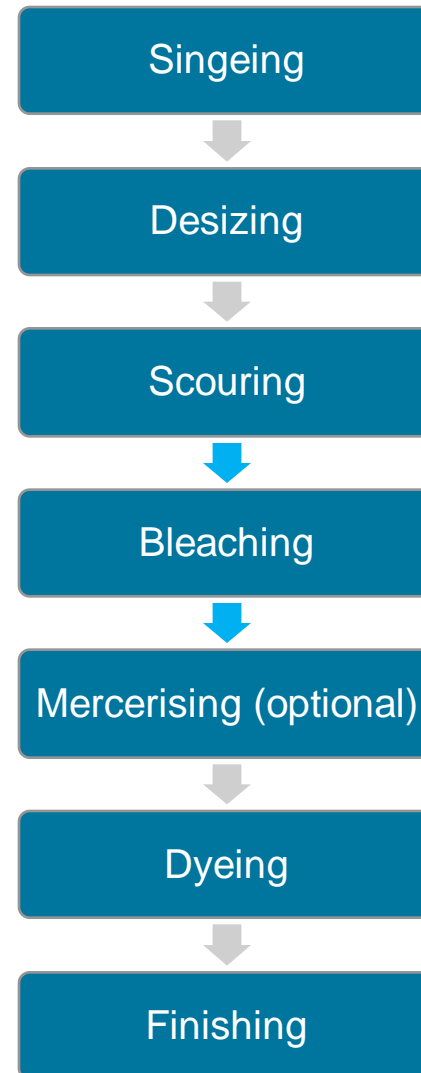
Textile Wet Processing

- **Textile dyeing – Batch vs Continuous**
 - ✓ Pre-treatment
 - ✓ Dyeing
 - ✓ Finishing
- **Garments washing**
- **Other dyeing**
 - ✓ Yarn dyeing
 - ✓ Fibre dyeing
 - ✓ Accessories dyeing

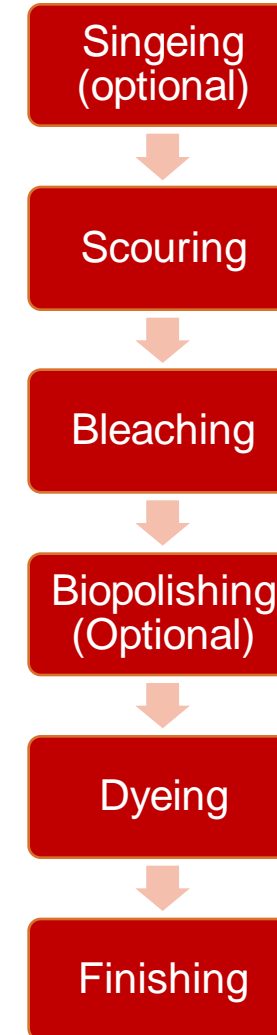
Pretreatment

- Desizing
- Scouring
- Washing
- Bleaching
- Biopolishing
- Heat setting
- Singeing

Woven fabric processing sequence



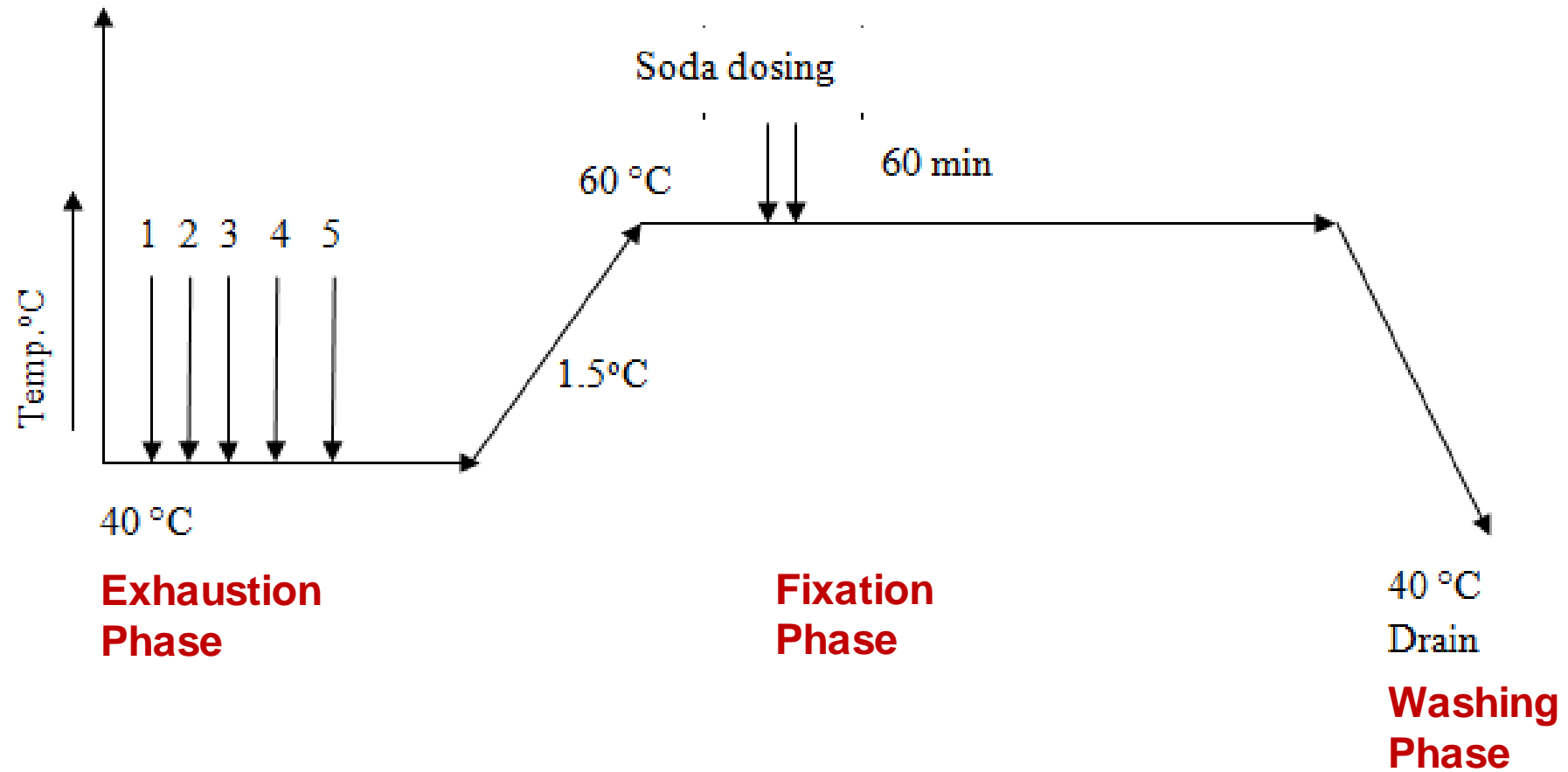
Knit fabric processing sequence



Textile dyeing

Substrate	Machine	Production	Fabric	Pressure	Substrate	Dyes
Natural: Cotton/Wool/Silk	Vat	Batch	Knit	Open	Fibre	Natural
Synthetic / manmade	Jig	Continuous	Woven	Closed vessel	Yarn	Reactive/metal complex
Blend	Jet/	Semi- Continuous	Twill/Denim	High pressure	Garments	Acid/Basic

Dyeing Curve



Textile Finishing

- Drying, compacting/sanforizing, heatsetting
- Basic – Softening, dry finish
- Functional Finish – Antimicrobial, wrinkle resistant, moisture management



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Wet processing parameters

- **Common parameters**
 - ✓ Water Hardness
 - ✓ pH
 - ✓ Temperature
- **Batch dyeing**
 - ✓ Liquor ratio
 - ✓ Pressure
 - ✓ Electrolytes
- **Continuous/Semi-continuous dyeing**
 - ✓ Pick up speed
 - ✓ Pickup percentage

- **Fabric : liquor: : 1:?**
 - ✓ Wt/wt
 - ✓ Chemical concentration g/L
 - ✓ Dyestuff % of the materials (fabrics/Yarn)

- **pH of the bath**
 - ✓ Depends on the process
 - ✓ Adjusted by acids/alkalis
 - ✓ Wash off after use

- **Hardness of the water**

- ✓ Depends on the process
- ✓ Adjusted by WTP
- ✓ Adjusted in the bath (by adding sequestering agents)

- **Temperature of the bath**
 - ✓ Depends on the process
 - ✓ Adjusted by adding steam/hot water/ heat exchanger

- **Pressure of the bath**
 - ✓ Depends on the process
 - ✓ Adjusted by compressor

- **Electrolytes of the bath**
 - ✓ Depends on the process
 - ✓ Adjusted by salt/soda
- **Measured by either TDS meter or Baume hydrometer**

Pick-up speed

- **Pick-up speed of the dyes**
 - ✓ Depends on the process/fabrics
 - ✓ Adjusted by overflow / reel speed / chemicals

Checking the sensors' performances

- Sense the parameters
- Automatic / manual decision making tool
- Regular maintenance is a must
- Always replace with the best quality (if necessary)

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