

# **The Complete Technology Book on Textile Spinning, Weaving, Finishing and Printing (3rd Revised Edition)**

**Author:-** NIIR Board of Consultants & Engineers

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Textile industry is one of the few basic industries, which is characterised as a necessary component of human life. One may classify it as a more glamorous industry, but whatever it is, it provides with the basic requirement called clothes. Spinning is the process of converting cotton or manmade fibre into yarn to be used for weaving and knitting. Weaving is a method of textile production in which two distinct sets of yarns or threads are interlaced at right angles to form a fabric or cloth. Finishing refers to the processes that convert the woven or knitted cloth into a usable material. Printing is the process of applying colour to fabric in definite patterns or designs.

The textile industry occupies an important position in the total volume of merchandise trade across countries. Developing countries account for little over two-third of world exports in textiles and clothing. It is the second largest employer after agriculture, providing employment to over 45 million people directly and 60 million people indirectly. The future for the textile industry looks promising, buoyed by both strong domestic consumption as well as export demand.

This book is based on the latest technology involved in textile industry, which describes the processes available at the spinning and fabric forming stages coupled with the complexities of the finishing and colouration processes to the production of wide ranges of products.

The major contents of the book are dyeing of textile materials, principles of spinning, process preparatory to spinning, principles of weaving, textile chemicals, yarn preparation, weaving and woven fabrics, knitting and knit fabrics, nonconventional fabrics, cellulose, mixed fibers, printing compositions, printing processes, transfer dyes, transfer inks etc. It describes the manufacturing processes and photographs of plant & machinery with supplier's contact details.

It will be a standard reference book for professionals, entrepreneurs, textile mill owners, those studying and researching in this important area and others interested in the field of textile industry.

## **1. THE DYEING OF TEXTILE MATERIALS**

Mordants

Assistants

Dyestuffs  
Indigo  
The Ingrain Dyes  
Water Used in Dyeing  
Interdependence of Processes  
Processes Preliminary to Dyeing  
Wool Scouring  
"Boiling-off" Silk  
Cotton Bleaching  
Wool Dyeing Processes  
Dyeing of Loose Wool  
Slubbing (Silver)  
Yarn Dyeing  
Piece Dyeing  
"Woaded Colours"  
Blacks on Wool  
Dark Blues, Greens, and Browns on Wool  
Cotton Dyeing Processes  
Fast Blacks on Cotton  
Fast Colours on Cotton  
Basic Colours on Cotton  
Dyeing of Mercerized Cotton  
Union Dyeing Processes  
Silk Dyeing Processes  
The Dyeing of Artificial Silk  
Colour Matching  
Fastness Properties of Dyes

## 2. THE PRINCIPLES OF SPINNING

Long Fibre Spinning  
Short Fibre Spinning

## 3. PROCESS PREPARATORY TO SPINNING

Four Methods of Preparing Vegetable Fibres for Spinning  
Four Methods of Preparing Animal Fibres for Spinning  
Two Methods of Silk Preparation  
Typical Example of the Method of  
Preparing and Spinning  
A Textile Material (China-grass or Ramie)  
Preparatory Machines  
The Cotton Gin  
The Washing or Scouring Machine  
The Dryer  
The Cotton Scutcher  
The Flax Scutcher  
The Backwasher  
The Preparing Gill-box  
The Carder  
The Dresser  
The Comb  
The Drawing-box  
The Cone Drawing-box.  
The French Drawing-box

#### 4. THE PRINCIPLES OF WEAVING

Group-unit Weaving

Shedding

Picking

Beating-up

Letting-off and Taking-up

The Boxing Mechanism

The Stop-rod and Loose-reed Mechanism

The Weft-fork Mechanism

The Warp-stop Mechanism

The Spooling or Shuttling Mechanism

#### 5. THE PRINCIPLES OF DESIGNING AND COLOURING

Materials

Interlacing

The Use of Point-paper

Colour

Figure Designing

#### 6. THE PRINCIPLES OF FINISHING

Finishing Processes and Machines

Mending, Knotting and Burling

Scouring

Milling

Crabbing

Steaming

Dyeing

Washing-off

Drying

Tentering

Brushing and Raising

Cropping or Cutting

Singeing

Pressing

Calendering

Schreincring

Filling

Conditioning

Waterproofing

General Notes

#### 7. TEXTILE CHEMICALS

Indian Demand

Demand for Bleaching Agents

Textile Bleach Formulation

Industry Trends and Success Factors

Outlook and Opportunities

Fluorescent Whitening Agent

Sector of Applications

Usage Pattern

Industry Trends and Success Factors

Outlook and Opportunity  
Flame Retardants  
Halogenated Compounds  
Non Halogenated Compounds  
Application  
Sector of Applications  
Bleaching Agents  
Use of Various Bleaching Agents on  
Textile Fibres  
Hydrogen Peroxide  
Sodium Hydrosulphite (Hydros)  
Sodium Hypochlorite  
Application and Formulations  
Bleaching Assistants  
Chelating Agents  
Fatty Alcohol Ethoxylate  
Carboxy Methyl Cellulose  
Demand  
Acrylates  
Industry Trends and Success Factors  
Pattern of Use and Formulation - Starch/  
Modified-Starch  
The Spin Finish Compositions for Polyester and Polyamide Yarn  
White Oil  
Industry Trends and Success Factors  
Warp Sizes  
Sector of Applications for Sizing Agents  
Filament Yarns  
Staple or Spun Yarn  
Starch/Modified Starch  
Demand  
Polyvinyl Alcohol  
Operations Involved in the Use of the  
Textile Chemicals  
Classification of Textile Chemicals  
Classification Based on Use Pattern  
Group Classification  
Yarn Lubricants  
Spin Finishing Agent

## 8. GLOBAL SCENARIO FOR TEXTILE CHEMICALS

Consumption Pattern of Textile Chemicals  
Estimated Global Market for Textile  
Chemicals  
Estimated Markets for Textile Chemicals in the Asia-pacific Region (2001)  
Estimated Consumption of Textile Chemical in Different Regions  
Categories of Textile Chemicals Value  
(In Millions of Dollars)  
Us Market for Textile Chemicals  
Industry Trends and Success Factors  
Outlook and Opportunities

Oxalic Acid  
Polyethylene Glycol  
Applications in Textile Industry  
Silicone Oil/ Silicone Emulsion  
Indian Demand for Silicone Oil/ Emulsion in  
Textile Sector  
Industry Trends and Successful Factor  
Outlook and Opportunities  
Emeu/Dmdheu  
Industry Trends and Success Factors  
Sulphur Black  
Industry Trends and Outlook  
Textile Enzymes  
Cellulase/Amylase  
Classification of Thickening Agent  
Pigment Binders  
Guar Gum  
Sodium Alginate  
Sodium/Zinc Formaldehyde Sulphoxylate  
Styrene Butadiene Rubber - Lattices  
Formaldehyde Based Resins  
Industry Trends and Outlook  
Indian Scenario  
Consumption Pattern of Flame Retardent  
Printing Auxiliary

## 9. YARN PREPARATION

Introduction  
Winding  
Quill Winding  
Warping  
Slashing or Warp Sizing  
Drawing-In and Tying-In

## 10. WEAVING AND WOVEN FABRICS

Introduction  
Woven Fabrics  
Plain Weave  
Rib Weaves  
Basket Weaves  
Twill Weaves  
Satin Weaves  
Drawing-In Draft, Chain and Reed Plans  
Cover Factor  
Other Terms Related to Single Fabrics  
Weaving  
Shedding  
Filling Insertion  
Beat-up  
Warp and Fabric Control  
The Weaving Cycle  
Woven Fabric Production  
Secondary Mechanisms (Motions) In A

- Power Loom
- Warp Stop Motions
- Filling Stop Motions
- Warp Protector Motion
- Selvage Motion
- Box Motion
- Automatic Filling Transfer
- Shuttleless Looms
- Introduction
- Rapier Looms
- Projectile (Gripper) Looms
- Fluid Jet Looms
- New Weaving Technologies - Multiple
- Shed Looms
- Filling Accumulation Systems
- Modification of the Salvege

## 11. KNITTING AND KNIT FABRICS

- Introduction
- Knitting Elements
- Needles and Knitting Action
- Sinkers
- Weft Knitting
  - Single Knitting
- Single Knit Fabrics
- Double Knitting
- Double Knit Fabrics
- Purl Knit Fabrics
- Knit, Tuck and Float Loops
- Weft Knit Design
- Stitch Notation
- Weft Knit Fabrics
- Weft Knitted Fabric Production
- Warp Knitting
- Introduction
- Major Machine Classification
- Knitting Elements
- Warp Knitting Action
- Comparison between Tricot and Raschel
- Warp Knit Design
- Point Paper Notation
- Single Bar Fabric
- Two Bar Fabrics
- Warp Knit Fabric Production

## 12. NONCONVENTIONAL FABRICS

- Introduction
- Nonwoven Systems and Fabrics
- Chemically or Adhesively Bonded Fabrics
- Mechanically Bonded Fabrics
- Tufting
- Flocking
- Laminated and Bonded Fabrics

Wet Adhesive Bonding  
Foam Flame Bonding

### 13. SYNTHETIC SUBSTRATES

Anthraquinones  
Diverse synthetic substrates  
Monoazo Dyestuffs  
Water-Insoluble Monoazo Dyestuffs  
Mixture of Monoazo Dyestuffs for  
Polyesters  
Azo Containing Compounds  
Water-Soluble Disazo Dyestuffs for  
Polyamides  
Gold and Orange Prints on Polyamides  
Azocoumarinic Dyes for Hydrophobia  
Synthetics  
Dyestuffs Tolerant to Temperature and pH  
Variations  
Printing of Nickel-Containing Polyolefins

### 14. NATURAL AND SYNTHETIC SUBSTRATES

Anthraquinones  
Polyfluoro Acid Anthraquinone Dyestuffs for  
Polyamides  
Fibre Reactive Anthraquinone Compounds  
Aminoanthraquinone Reactive Disperse  
Dyes  
Azo Compounds  
Naphthylene and Tetrahydronaphthylene- containing Azo Dyestuffs  
Monoazo Dyestuff Containing Fiber-  
Reactive Group  
Cold Water soluble Acid Dye Compositions  
Polyvalent Metal and Azo-Barbituric Acid  
Anionic and Cationic Dyes  
Fluid and Stable Dispersions of Anionic  
Dyes  
Heterocyclic Cationic Dyestuffs  
Water-soluble Quaternary Ammonium  
Phenylazo Cationic Dyes

### 15. CELLULOSICS

Reactive Dyes  
Organic Dye with Phosphonic Acid  
Monofluoride  
Aminonaphthyl Azobenzene Vinyl Reactive  
Dyes  
Phthalocyanine Reactive Dyestuffs  
Water-Soluble Fiber-Reactive Dyestuffs  
Disperse Dyes  
Fixation with Aliphatic Alcohols, Amines, or  
Aminoalcohols  
Azo Dyes having Substituted 2, 6-Diaminopyrrole

## 16. MIXED FIBERS

Polyester and Wool

Tone-in-Tone Dyeing of Polyester-Wool  
Blend

Cellulosics and Synthetic Polyamides

Marked Reactive Dyestuff

Swellable Cellulosics and Synthetics

Ethoxylated Condensate of Monocarboxylic  
Acid and Hydroxyalkylamine

Water-soluble Solvent and Swelling Agent

Disazo Dyes Derived from Amino-pyrazole

Unformed Disperse Dye and Swelling Agent

Cellulosics and Synthetics

Unformed Disperse Dye with Reactive Dye

Textile Treated with Epoxy-group-containing  
Compounds

Impregnation with an Aqueous  
Composition

Blends of Natural and Synthetic Fibers

## 17. PRINTING COMPOSITIONS

Printing Pastes with Developing Dyes

Improved Base Printing Process

Formic Acid as Developing Medium for  
Azo Dyes

Auxiliary Agents in Print Formulations

Hydroxyalkyl Carboxyalkyl Cellulose

Thickening Agent

Sodium Cellulose Sulfate as Thickening and Acid Fixing Agent

Additive for Pigmentary Printing Pastes

Salts of Diaryl Ether Sulfonic Acids

Carrier for Cationic Dyes

Dye Carrier Comprising Phenyl Cyclohexane and Derivatives

## 18. PRINTING PROCESSES

Fixation

Fixation with Vapor of Organic Solvent

Dyestuffs for Methylene Chloride Fixation  
Processes

Improved Fixation of Reactive Dyes on  
Cellulose Fibers

Continuous Dyeing and Printing of Piece  
Goods

Printing Heavy Pile Fabrics with Powder  
Preparations

Improved Alignment of Printed Patterns

Uniform Heat-setting of Continuous Synthet  
Filament Groups

Voluminous Substrate Rolled up with



Foramed Dye  
Continuous Printing Process by Direct Liqui  
Film Transfer Method for Printing and Flocking  
Simultaneously  
Sprayed Carriers for Continuous Print  
Fixation

## 19. TRANSFER DYES

Anthraquinones  
Anthraquinone Ink Formulation  
Anthraquinone Dyes for Synthetics  
Deep Yellow Colors on Polyesters  
Indolenine Methines for Acid-modified  
Synthetics  
Heterocyclic Naphthalene Derivatives  
Printing Polyacrylonitriles with Disperse  
Dyes  
Disperse Dyes Containing Carboxylic Acid  
Groups  
Hydrolyzable Silyl-substituted Dyestuffs  
Nitroacridone Dyestuffs  
Heat Transfer Black Dyestuff A  
Heat Transfer Black Dyestuff B  
Dyestuff Combinations for Long-Pile  
Fabrics

## 20. TRANSFER INKS

Organic Base  
Cationic Dyes in Organic Solvents  
Carbinol Base of Cationic Dyestuff as  
Dyestuff Intermediate  
These Inks are characterized in that they contain at Least  
Sublimable Dyestuff Base on Acid-Modified  
Fibres  
Aqueous and Oil in Water  
Aqueous Preparations of Sparingly Soluble  
Dyestuffs  
Organic-aqueous Printing Inks  
Water-dilutable Transfer Ink Compositions  
Dry Preparation  
Hot-Melt and Hot-Stamp Inks  
Hot-Melt Ink Composition  
N-Methoxymethylated Nylon Copolymer for  
Hot-Stamp Ink  
Production of Transfer Paper by Rotary  
Screen Printing  
Transfer Inks for Household Use  
Inks of High Filler Content  
UV-curable Inks For Offset-printing  
Transfers

## 21. PHOTOGRAPHS OF PLANT & MACHINERY WITH SUPPLIER'S CONTACT DETAILS

## About NIIR

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**NIIR PROJECT CONSULTANCY SERVICES**, 106-E, Kamla Nagar, New Delhi-110007, India.  
Email: [npcs.india@gmail.com](mailto:npcs.india@gmail.com) Website: [NIIR.org](http://NIIR.org)

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