

Woollen Spinning, Weaving, Knitting, Dyeing, Bleaching and Printing Technology Handbook

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Spinning is a major industry; it is part of the textile manufacturing process where three types of fibre are converted into yarn, then fabric, then textiles. The textiles are then fabricated into clothes or other artifacts. The fundamental operations for the stocks of fibers from which a woollen yarn is made are opening, cleaning, mixing, forming a slubbing or roving and finally thinning the roving to the required yarn number and twisting it to produce a yarn possessing the requirements for subsequent processing such as warping, winding, weaving, finishing and dyeing. These demands vary with the different conditions confronted in manufacturing but include the following features: strength, elasticity, uniformity in weight per unit length and even distribution of twist. Woollen spinning involves three principal operations, irrespective of whether the mule or the frame or ring spinner is used, namely: Drafting, final drawing out, Twisting, or insertion of twist, Winding on, or packaging. Weaving constitutes the actual production of cloth or fabric, i.e., to combine the essentially one dimensional textile structure thread or yarn in such a way as to result in an essentially two dimensional structure of cloth of certain appearance, hand and strength. Knitting is the art and science of constructing a fabric by inter lacing loops, there are two types of knitting: warp and weft knitting. In recent years whole new classes of dyes such as fiber reactive, disperse, cationic basic, neutral dyeing premetalized have been discovered and produced for the dyeing of the natural and new synthetic, hydrophobic fibers. Bleaching improves whiteness by removing natural coloration and remaining trace impurities from the cotton; the degree of bleaching necessary is determined by the required whiteness and absorbency. Cotton being a vegetable fibre will be bleached using an oxidizing agent, such as dilute sodium hypochlorite or dilute hydrogen peroxide. If the fabric is to be dyed a deep shade, then lower levels of bleaching are acceptable, for example. However, for white bed sheetings and medical applications, the highest levels of whiteness and absorbency are essential. Wool fiber production technology necessitates full understanding of its growth, pristine structure, physical, chemical and functional properties as well as processes involving manufacture of textile fibers.

Some of the fundamentals of the book are woollen spinning, atmospheric conditions in wool manufacturing, Bradford system top gilling or top finishing, the principle of weaving, woollen and worsted weaves, knitting, the changing outlook of the knitting industry, influence of fiber fineness on quantity of dye required, altering the affinity of the wool fiber for dyes, dyeing of yarn according to the packing system, special wool finishes, water repellent, stain resistant treatments for worsted and woollen fabrics, the printing of wool piece goods, lustering of wool fabrics, fluorochemicals, mothproofing etc.

The present book is of its own kind which covers woollen spinning; knitting, dyeing, bleaching

and printing, special wool finishes etc. This is an important reference book for wool technologists, scientists, new entrepreneurs, research scholars and all others related to this field.

1. WOOLLEN SPINNING

Mule Spinning

The Self-acting Mule

The Operations of Mule Spinning

General Mechanical Details

Production of a Mule

Standspinner

Woollen Ring Frame Spinning

Reduced Balloonâ€”Balloonless Spinning

Main Technical Data

Twisting or Yarn Folding

Woollen Yarn Calculations

Woollen Yarns

Yarn Number and Wool Grade

Yarn Strength

Wool Blends with Man-made Fibers

Atmospheric Conditions in Wool Manufacturing

2. WORSTED TOPMAKING

Worsted Carding

Geelong Converter

Backwashing

Dryers

Top Steaming and Aging

Oiling

Gilling or Preparing

Worsted Combing

Combs and Combing

Bradford Worsted Combing

Principle of Combing

Punch or Ball Winding

Operation of the Noble Comb

Parts of the Noble Comb

Production of Noble Comb

Control of Noble Combing

Bradford System Top Gilling or Top Finishing

Can Gillbox or Conditioner

Top Gillbox or Top Baller

French Worsted Combing

Working Principle of the French Comb

French Finish Gilling

Noils

Amount and Type of Noils

Tow-to-Top Conversion Systems

Stretch-breaking Methods

Cutting Methods

3. THE PRINCIPLE OF WEAVING

The Essential Motions of a Loom

Details of Principal Components of Weaving Machinery

Shedding or Harness Motion
Let-off Motion
The Take-up Motion
Full Width Temples
Picking Motion
The Shuttle
Automatic Stop Motions and Controls
Warp Stop Motions
Weft Stop Motion
Protection Stop Motions
Weft Pirn Feeler Devices
Box Motion
Automatic Filling Replenishment and Multi-colour Weaving
Box Loader System
Unifil
Pirnless Weaving
The Sulzer Weaving Machine
Other Development in Weaving Machines
4. WOOLLEN AND WORSTED WEAVES
Methods of Describing Weaves
Use of Design Paper
The Plain Weave
Derivatives of the Plain Weave
The Twill Weave
Balanced or Even Twills
Effect of Yarn Twist on Twill
Steep and Reclining Twills
Pointed and Herringbone Twills
Broken or Reversed Twills
Corkscrew Twills
Inter-locking and Offset Twills
Undulating Twills
Diversified, Combination, and Fancy Twills
The Satin Weave
The Crepe Weaves
The Bedford and other Corded Weaves
Backed and Double Cloths
Filling-backed Cloths
Warp-backed Cloths
Double Cloths
Montagnacs, Chinchillas, and Felts
Triple Cloths
Plushes and Velvets
Filling Plushes
Warp Plushes
Practical Fundamentals of Fabrication and Design
Construction in Commercial Fabrics
Maximum Textures of Special Type of Fabrics
Relative Constructions of New Fabrics
5. KNITTING
Principles of Stitch Formation
Weft Knitting Machines
Plain, Rib, and Purl Stitches

Tuck and Miss Stitch Fabrics
Special Knitted Fabric Design Effects
The Changing Outlook of the Knitting Industry
6. DYEING, BLEACHING AND PRINTING
Modern Dyestuffs
Designation of Dyes
Trade Names
Letter Designations
Abbreviations and Percentages
Index Numbers
Theory of Dyeing
Wool Dyes
Acid Dyes
Chrome dyes
Metal-complex Dyes
Metal-complex Dyes
Vat Dyes
Solubilized Vat Dyes
Reactive Dyes
Influence of Fiber Fineness on Quantity of Dye Required
Some Sources of Faulty Dyeing
Tippy Dyeing
Scouring
Wetting Out
Mixed Stocks
Carbonizing and Neutralizing
Sun-bleached Yarns and Fabrics
Lime in Pulled Wools
Effects of Faulty Steaming
Matching Shades
Conditioning Samples before Matching
Feeding Dyes
Ring Dyeing
Excessive Crocking
Chlorinated Wool
Metal Contaminants
Stripping Dyed Wool
Abrasion Marks
Boiler Compounds
Machine and Spinning Oils
The Matching of Shades
Matching and Shade Control by Instruments
Low Temperature Dyeing
Irga Solvent Process
Collins Process
C.S.T.R.O. Process
Chrome Dyes
Acid Milling and 1:1 Metal-complex Dyes
Reactive Dyes
The Dyeing of Wool at High Temperatures
Ultrasonic Dyeing
Pad Dyeing Methods
Cibaphasol Technique

Irga Pad Process
C.S.I.R.O. Methods
Altering the Affinity of the Wool Fiber for Dyes
Decreasing the Affinity of Wool for Dyes
Increasing the Affinity of Wool for Dyes
Bicoloured Tippy Dyeing
Dyeing Wool Mixtures
Wool and Silk Mixtures
Wool and Vegetable Fiber Mixtures
Wool and Man-made Fiber Mixtures
Wool Dyeing Machinery
Construction of Dyeing Machines
Loose-stock Dyeing Machinery
Top or Slubbing Dyeing Machinery
Pot or Can Dyeing Machinery
Continuous Top Dyeing
The Machine Built by Fleissner
Segardâ€™Serracant Tunnel Equipment
Ilma Range
Konrad Peter Range
General Experiences
Yarn-dyeing Machinery
Dyeing of Yarn According to the Packing System
Dyeing of Yarn According to the Hanging System
Dyeing of Yarn According to the Spindle System
Machines for Drying of the Dyed Materials
Hank Dryers
Piece-dyeing Machinery
Jet Dyeing Machines
Beam Dyeing
The Pad-roll Piece Dyeing Machine
Continuous Woollen Piece Dyeing
Bleaching Wool
Hydrogen Peroxide Bleach
Peroxide â€™Dye-inâ€™ Bleach
Hydrosulfite Bleach
Double Bleach
Continuous Process
Potassium Permanganate Bleach
Bisulfite Bleach
Sodium Chlorite Bleach
Optical Bleaching Wool
Bleaching and Dyeing in One Bath
Effect of Stabilizers
Anti-yellowing Treatment
Vigoureux or Melange Printing
The Printing of Wool Piece Goods
Pretreatment
Acid Dyes
Basic Dyes
Direct Dyes
Vat Deys
Soluble Vat Dyes

Oxidation Colours

Spray Printing

7. SPECIAL WOOL FINISHES

Introduction

Flat Setting

Setting with Monoethanolamine Sulfite Solutions

Permanent Press

Lustering of Wool Fabrics

Luster on Pile Fabrics

Mechanism

Luster on Clear Finished Worsteds

Stretch Fabrics

Stretch Yarns

Inducing Yarn Crimp during Weaving

Yarn Crimp Development, Interchange and Chemical Setting

Finishing Helanca Ski Cloth

Water Repellent, Stain Resistant Treatments for Worsted and Woollen Fabrics

Silicones

Chromium Compounds

Fluorochemicals

Mothproofing

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