

# Textile Finishing Processes


Lecture by

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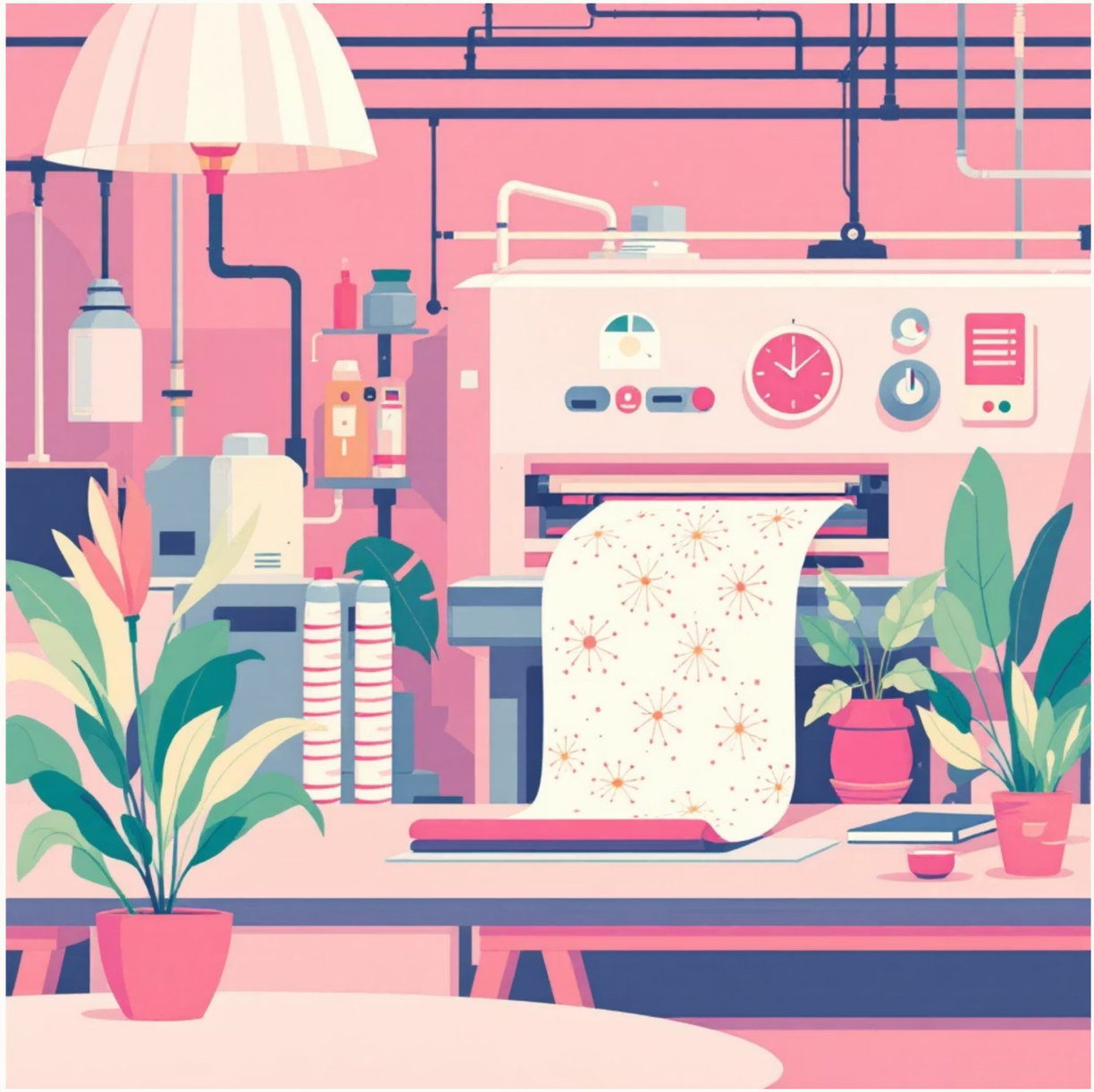
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# Textile Finishing

- Textile finishing transforms raw fabrics into market-ready products through chemical and mechanical processes.
- These treatments enhance aesthetic appeal, improve functional performance, and add value to textile materials.
- From basic calendaring to advanced nanotechnology applications, finishing determines the final quality, durability, and consumer satisfaction of textile products.



# Classification of Textile Finishes

## Aesthetic Finishes

Enhance visual and tactile appeal

- Calendaring for smoothness
- Embossing for texture
- Mercerization for luster
- Napping for softness

## Functional Finishes

Add performance properties

- Water repellency
- Flame retardancy
- Antimicrobial treatment
- UV protection

## Special Finishes

Create unique characteristics

- Easy-care properties
- Soil release
- Anti-static treatment
- Anti Odor application

# Primary Objectives of Finishing

01

### Enhance Aesthetics

Improve appearance through luster, smoothness, texture, and hand feel to meet consumer preferences and fashion trends.

02

### Improve Performance

Add functional properties like wrinkle resistance, water repellency, durability, and dimensional stability for end-use requirements.

03

### Increase Marketability

Create value-added products that command premium prices and satisfy specific market segments or technical applications.

04

### Ensure Quality Standards

Meet industry specifications, maintain consistency across production batches, and comply with regulatory requirements.



# Calendaring Processes: A Comparative Overview

**Calendaring is a finishing process that uses heat and pressure to modify the surface of textile fabrics. This card provides a detailed comparison of four primary calendaring types, outlining their mechanisms, benefits, drawbacks, and real-world applications for fashion technology students.**

| | | | |
|---|---|---|---|
| **Simple Calendaring** | **Basic smoothing, flattening, reduced thickness** | **Fabric passes between smooth, heated rollers under pressure. Minimal surface alteration beyond compression.** | **General fabric preparation, bed linens, industrial textiles** |
| **Friction Calendaring** | **High-gloss, polished, lustrous surface** | **Fabric passes between rollers moving at different speeds, creating a rubbing action and high friction.** | **Rainwear, artificial leather, linings, chintz fabrics** |
| **Embossing** | **Imparts 3D decorative patterns and textures** | **One roller is engraved with a pattern; fabric is pressed between it and a smooth roller under heat and pressure.** | **Upholstery, decorative textiles, fashion apparel with textured finishes** |
| **Schreiner Calendaring** | **Silk-like luster, soft hand feel, increased opacity** | **Fabric passes over a finely etched roller (diagonal lines) at an angle, creating many small points of contact.** | **Synthetic fabrics (e.g., nylon, polyester), imitation silk, lingerie, innerwear** |

# Simple Calendaring Process

A fundamental process that uses heated rollers to press fabric, resulting in a smoother, flatter surface.

Mechanism: Basic pressure and heat application through steel rollers.

Process parameters: Temperature 150-180°C, moderate pressure.

### Advantages:

- Cost-effective and widely applicable
- Provides basic smoothness and flattening
- Enhances fabric handle and drape

### Disadvantages:

- Limited luster enhancement compared to other methods
- Effects are often temporary and can diminish with washing

### Applications:

- Basic cotton fabrics
- Everyday textiles
- Lining materials





# Friction Calendaring Process

**Achieves a high-gloss finish by passing fabric between rollers moving at different speeds, creating a polishing effect.**

**Mechanism: Differential roller speeds create friction and polishing action.**
**Process parameters: Temperature 180-200°C, high pressure, differential speeds.**

## Advantages:

- Produces a high-gloss and lustrous finish
- Enhanced appearance with durable effects
- Improved aesthetic appeal for specific products

## Disadvantages:

- Higher energy consumption due to differential roller speeds
- Potential for fabric damage or streaking at very high speeds

## Applications:

- Luxury fabrics
- Formal wear and evening attire
- Decorative textiles and upholstery

# Embossing Calendaring Process

**Involves using engraved rollers to press a three-dimensional pattern onto the fabric surface, adding texture and design.**

**Mechanism: Engraved steel rollers imprint patterns through pressure and heat.**

**Process parameters: Temperature 160-190°C, high pressure, specialized engraved rollers.**

## Advantages:

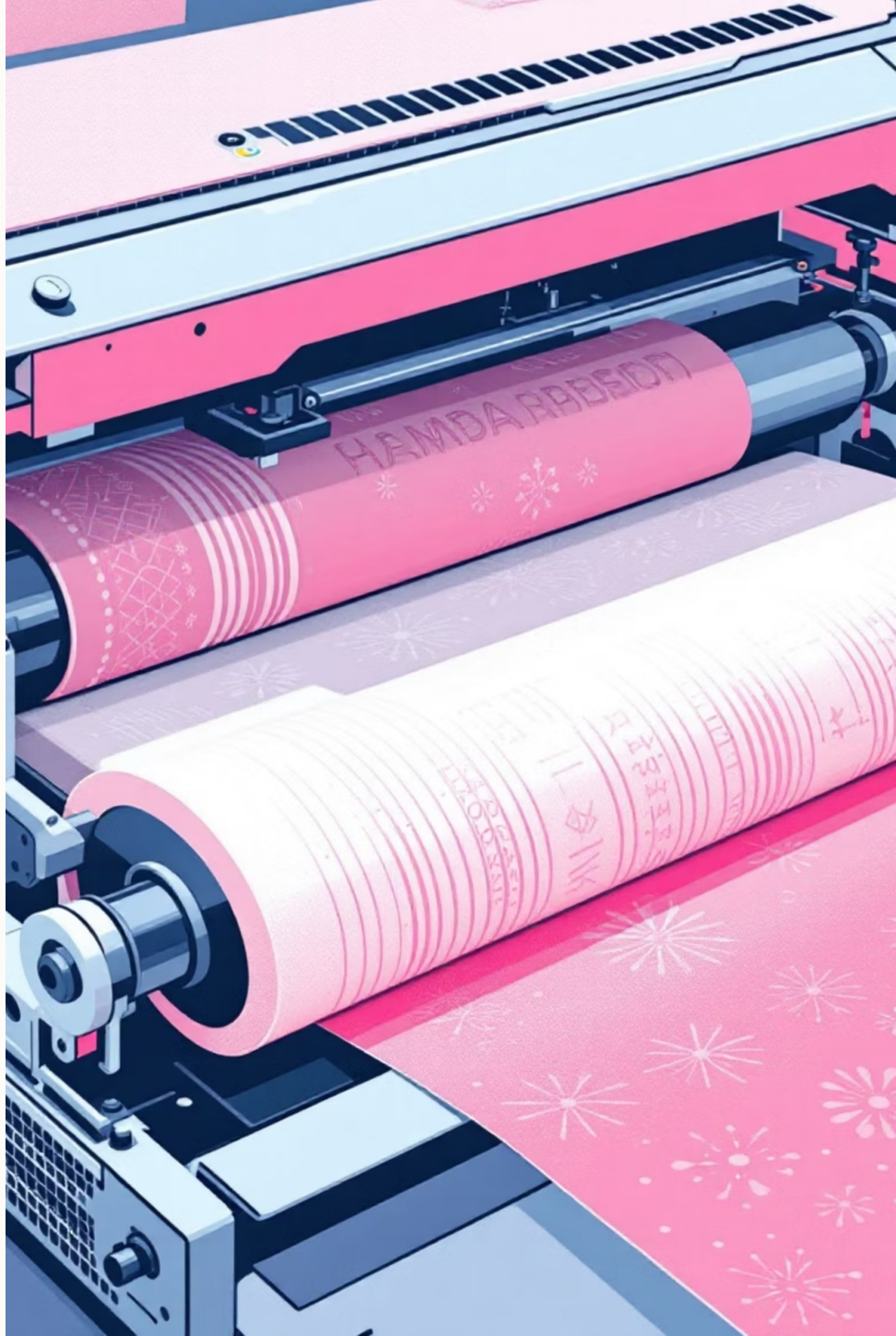
- Creates distinct decorative patterns and textures
- Adds significant value and aesthetic variety to fabrics
- Can mimic complex woven or embroidered designs

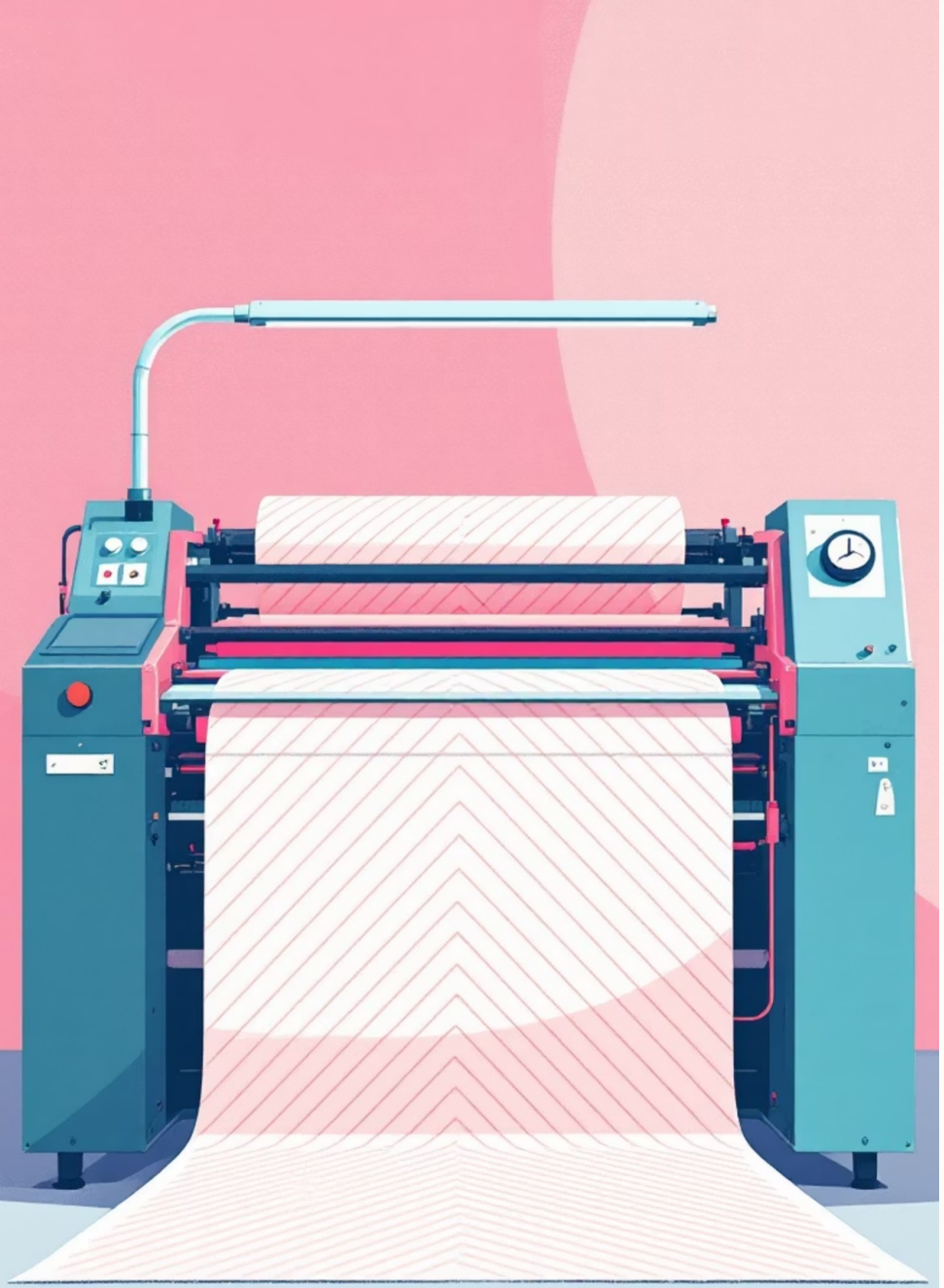
## Disadvantages:

- Pattern limitations based on roller engravings
- Higher setup costs due to specialized engraved rollers
- Potential for fabric weakening or distortion if not carefully controlled

## Applications:

- Upholstery and home furnishings
- Decorative fabrics and wall coverings
- Fashion textiles (synthetic leather, velvet effects)





# Schreiner Calendaring Process

Uses a roller engraved with fine, parallel diagonal lines to produce a subtle, silk-like luster and soft hand feel.

Mechanism: Fine diagonal line engravings create micro-texture for silk-like appearance.

Process parameters: Temperature 170-200°C, precise pressure control, specialized diagonal-line engraved rollers.

## Advantages:

- Imparts a unique silk-like appearance and soft texture
- Provides a premium feel without the cost of silk
- Enhanced depth and richness of color

## Disadvantages:

- Requires specialized equipment and precisely engraved rollers
- Higher processing costs compared to simple calendaring
- Limited to certain fabric types (synthetics, blends) that can hold the effect

## Applications:

- Synthetic silk alternatives (polyester, nylon)
- High-end fashion fabrics and linings
- Luxury textiles where a soft, shimmering finish is desired

# Heat Setting Technology

## Purpose

Stabilizes thermoplastic fibers (polyester, nylon) by relaxing internal stresses and fixing dimensional properties at elevated temperatures.

## Process

Fabric heated to 180-220°C in stenters or autoclaves, held at temperature, then rapidly cooled to lock molecular structure in relaxed state.

## Benefits

Eliminates shrinkage, improves wrinkle recovery, enhances dimensional stability, and prepares fabric for subsequent dyeing or printing operations.

Heat setting is crucial for synthetic fabrics in garment production, ensuring shape retention during laundering and wear. Temperature and time must be precisely controlled to avoid fabric degradation.

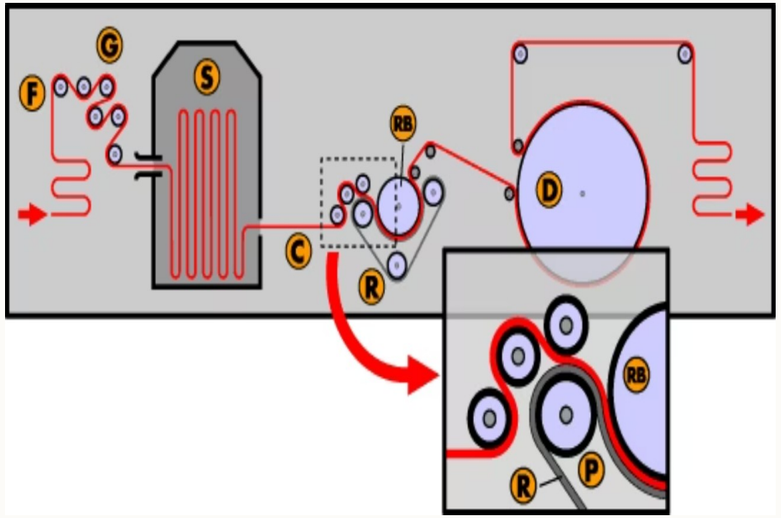




# Shrinkage Control Methods

## Compressive Shrinkage: The Sanforizing Process

**Compressive shrinkage, primarily achieved through the Sanforizing process, is a critical method for stabilizing fabrics, especially cotton and cotton-blend materials. This mechanical treatment ensures that the fabric's dimensions are fixed, significantly reducing the residual shrinkage that would otherwise occur during washing and wear.**




The Sanforizing process effectively compresses the fabric mechanically, removing internal stresses and setting its dimensions to a pre-determined, stable state. This method is widely adopted in apparel manufacturing to deliver garments with excellent shape retention and consumer satisfaction.

## Sanforizing Machine in Operation

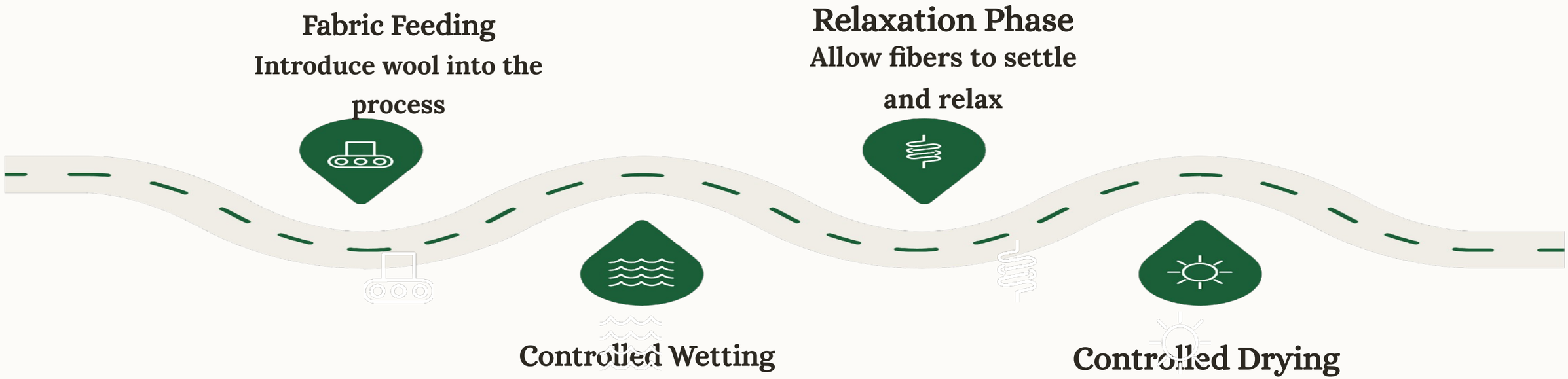



### Key Benefits

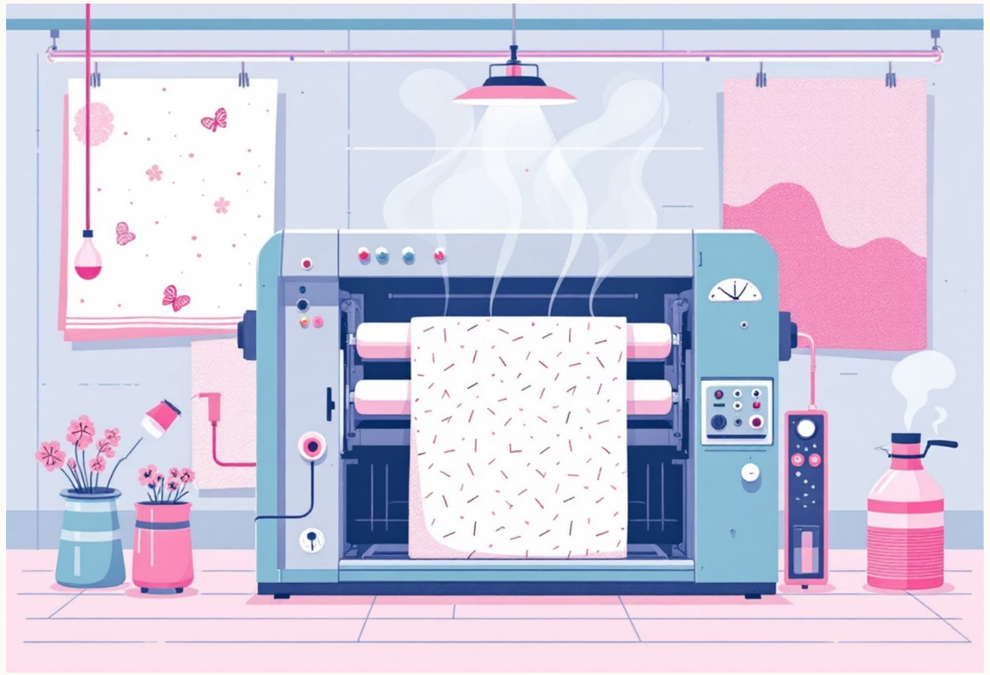
- Reduces residual shrinkage to less than 1%
- Improves dimensional stability for cotton and blends
- Enhances fabric handle and drape
- Prepares fabric for cutting and garment assembly

# Relaxation Shrinkage: The London Shrinking Process

Relaxation shrinkage, primarily achieved through the London Shrinking process, is a controlled wetting and drying method specifically designed for wool fabrics. This process allows the wool fibers to relax from tensions introduced during manufacturing, stabilizing the fabric and preventing significant shrinkage in subsequent washing and wear.



The London Shrinking process ensures that woolens and worsteds achieve their natura dimensions, leading to better garment fit and longevity. It's a gentle yet effective method to prepare delicate wool fabrics for tailoring and use.



## Key Benefits

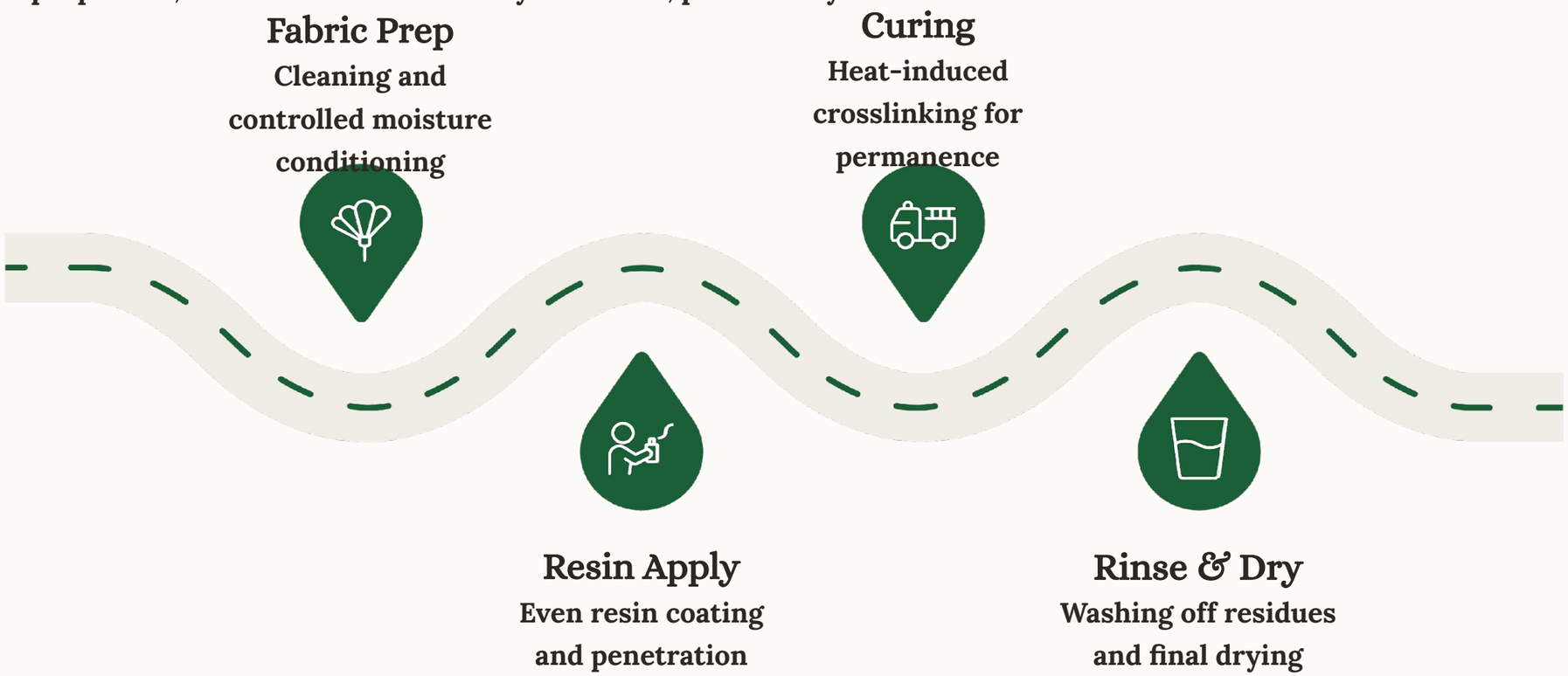
- Removes processing tensions from fibers
- Allows fibers to return to their natural relaxed state
- Improves dimensional stability of wool fabrics
- Prepares wool for precise garment construction

## Applications

Primarily used for high-quality woolens and worsteds before garment construction, ensuring stability and preventing post-manufacturing shrinkage.

# Chemical Shrinkage Control: Resin Treatment Process

**Resin treatment is a chemical crosslinking method that forms bonds between cellulose chains. This process is designed to impart permanent shrinkage resistance, easy-care properties, and dimensional stability to fabrics, particularly cotton and cotton-blend materials.**




## Key Benefits

- Permanent shrinkage resistance
- Easy-care properties
- Dimensional stability

## Applications

- Cotton and cotton-blend fabrics
- Easy-care garments
- Permanent press textiles

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# Specialized Finishes for Wool

## Chlorination Treatment

Oxidizes wool fiber scales using chlorine or chlorine-releasing agents, reducing felting tendency and improving washability. Creates machine-washable wool products.

## Polymer Application

Thin polymer coating encapsulates fibers, masking scales and preventing interlocking during agitation. Hercosett and similar processes enable superwash wool certification.

## Enzyme Treatment

Proteolytic enzymes selectively remove or modify scale edges, providing shrink resistance with minimal fiber damage. Environmentally friendlier alternative to chlorination.



Wool finishing also includes moth-proofing, flame retardancy, and anti-pilling treatments to enhance performance and longevity of woolen garments and textiles.