

CHAPTER 13

Fabric Finishes

EXAMINETHISISSUE

Finishing costs. As you'll learn in this chapter, finishes improve the appearance and performance of many fabrics.

Through technology, fabrics are gaining some amazing new capabilities. All of these special treatments contribute to the cost of garments and affect their care needs. Without them, of course, fabrics wouldn't be as colorful, comfortable, and useful.

What do you think?

As you read about finishes, decide which are most appealing to you. In your opinion, how do the costs compare with the benefits?

fabric, such as wrinkle resistance. See Fig. 13-1. Fabric finishes may be permanent or temporary. While a permanent finish lasts throughout the life of the fabric, a temporary finish may last through only one or two cleanings.

COLOR AND DESIGN FINISHES

When fabric first comes from the loom, the lack of color gives it the name **gray goods**. The fabric must be cleaned to remove any oils, resins, gums, or soil that would prevent a finish from penetrating the fabric. Manufacturers then alter the appearance of gray goods by dyeing or printing the fabric.

Dyeing Textiles

Dyes are compounds that penetrate and color fibers. They can color the entire fabric or create special designs. For centuries, natural dyes were obtained from plants, insects, shellfish, and minerals. The first synthetic dye was discovered by

WHEN FABRIC FIRST COMES FROM THE loom, it looks nothing like the finished fabric you see in a shirt, jacket, or towel. Many of the fabrics have no color; they are gray or off-white. The warp yarns may have been stiffened to withstand the strain of weaving. The fabric may be limp, fuzzy, dull, or very shiny. How then are fabrics transformed into the beautiful, colorful, and comfortable materials that you want to buy and wear? The answer is by adding finishes.

FINISHING PROCESSES

Finishes are any special treatments applied to improve a fabric's appearance, texture, or performance. Every fiber and fabric have certain favorable and unfavorable qualities. Finishes can be added to reduce the undesirable characteristics and improve the desirable ones.

Some finishes are added to create a specific design, such as a stripe or print. Other finishes offer a softer, firmer, or smoother hand. Many finishes add a specific property or quality to the

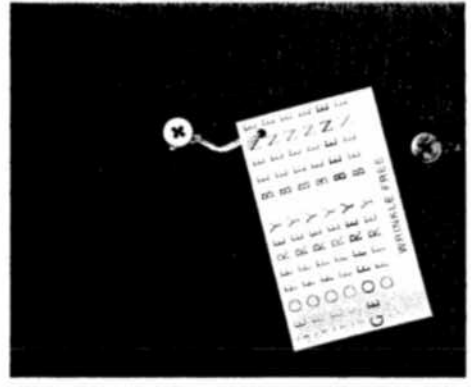
OBJECTIVES

- Explain the different dyeing processes.
- Describe common printing techniques.
- Explain how a fabric's texture can be changed.
- Identify finishes that improve a fabric's performance.

KEY TERMS

colorfast
eyes
finishes
gray goods
nap
printing

13-1 You can learn about the finish on a garment's fabric by reading the labels and hangtags.



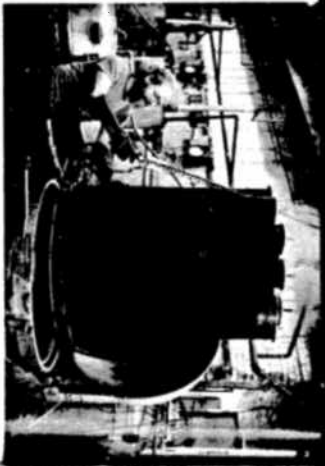
Fashion

ARTIFICIAL FINGER. Just as you run the fabric of a garment through your fingers to judge its hand, an evaluator does the same thing in industry. Textile researchers hope to replace such costly testing for manufacturers with an artificial finger. When this device contacts fabric, it sends electronic signals to a computer, providing information similar to what a human finger would feel. More objective evaluations may be made this way.

accident in 1856. Then a whole new industry developed for textiles.

Textile colorists are continually seeking better dyes for different fibers and blends. Today they use computers to develop exact formulas for dyeing different fibers a certain color.

Five different methods are used for dyeing. See Fig. 13-2. With *stock dyeing*, natural fibers can be dyed before they're spun into yarns. This permits the spinning of tweed and multicolored yarns. *Solution dyeing* is used when manufactured fibers are produced. Dye is added to the liquid solution that goes through the spinnerets. The color becomes a permanent part of the manufactured fiber. In *yarn dyeing*, the yarns are dyed before



13-3 Here, yarns are dyed before they are woven into fabric. Most dyes are mixed by computer to produce uniform colors.

weaving or knitting. See Fig. 13-3. This is used for plaids, checks, and stripes. In *piece dyeing*, fabric is dyed after weaving or knitting. Manufacturers store undyed fabric and then dye it a specific color. With *garment dyeing*, the fabric is cut and sewn into the finished product. Then the entire garment or item is dyed.

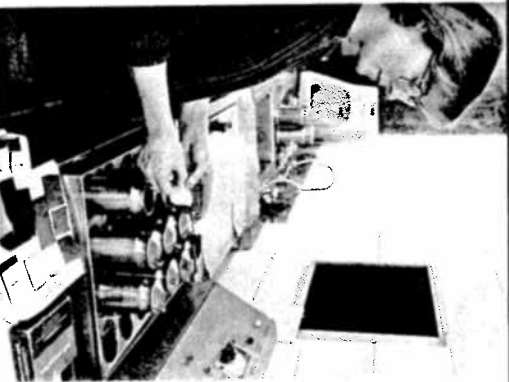
Colorfastness

Buying a bright green shirt only to have it fade to a dull green is disappointing. If the shirt had been **colorfast**, however, the fabric color wouldn't have changed. Whether washed or exposed to chlorine or sunlight, a colorfast fabric doesn't fade. The fastness of the color depends on the type of dye, the chemical structure of the fiber, and the method of application. See Fig. 13-4.

Most dyes aren't colorfast to everything. Some are more affected by washing, dry cleaning, sunlight, or perspiration. Some dyes may crack, or rub off onto your skin or other clothing.

Always read the label or hangtag for information about colorfastness. You can't tell how stable a color is by looking at the fabric.

Manufacturers select dyes that are most suitable to the fiber content and the intended use of a fabric. Children's clothes and sportswear, for example, need to hold their color through many washings. For draperies, upholstery, and carpets,



13-4 This textile lab technician is testing the colorfastness of dyes.

fastness to sunlight is important. Swimwear needs to be colorfast with exposure to sunlight, washing, and chlorine.

On the other hand, some fabrics are designed to fade or bleed. Many buyers like the denim jeans that are meant to lighten when washed. Madras, a woven plaid fabric, is supposed to bleed so the plaid becomes softer and less distinct.

Printing Textiles

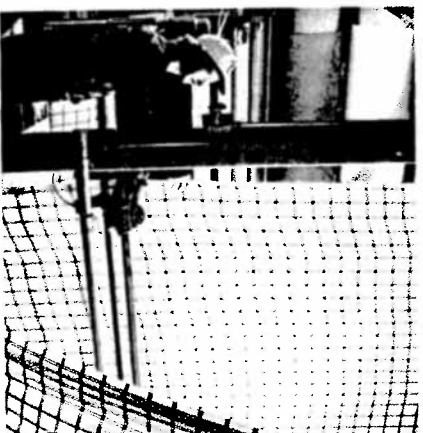
What makes a fabric beautiful? For many people it's the design. Through **printing**, color is transferred to the surface of a fabric to form a pattern. Fabrics can be printed in a number of ways. Some printing techniques are very old and still used by crafts people today. The textile industry, however, uses high-speed, electronic machines for textile printing. See Fig. 13-5. Some specialty fabrics, such as scarves and evening gowns, may be printed by hand.

Four of the most common printing methods are screen, rotary screen, roller, and heat transfer

Other methods, which you can try yourself, are tie-dyeing and painting. See page 238.

- **Screen printing.** With this method, fabric or metal mesh screens are stretched on frames. A separate screen is prepared for each color in the design. Once the design is traced onto a screen, all areas that aren't part of the color to be printed are blocked out with a special coating. The colors are then pressed through the screens onto the fabric, using a squeegee or roller. Large designs, especially those used on fabrics for home furnishings, can be printed this way.

- **Roller printing.** A roller printing press contains circular rollers, or printing plates, one for each color in a design. Each roller is chemically etched with the pattern part for a particular color, leaving high and low areas on the rollers. The raised sections of the roller pick up the desired color. As the fabric passes through the press and makes contact with the raised sections of each roller, the pattern prints. The different areas of color combine to form the completed design.



13-5 Fabric patterns can be designed by computer and automatically programmed into the printing press.

13-2 What dyeing method do you think was used for this fabric?

HOW TO

CREATE PRINTED FABRIC

Machines print fabric with colors and designs, but you can too. Painting and tie-dyeing are popular hand-printing techniques that produce beautiful results. Both can be done on flat fabric or finished garments.

Painting Fabric

Fabric paints include glitter, glow-in-the-dark, flat, and three-dimensional. Brush-on paints give a soft look. Squeeze-tube paints provide an outline effect. Marker paints are easy to use. Follow these guidelines:

- Check paint instructions for fabric recommendations. Many paints work best on cotton and polyester blends.
- Wash the fabric, but don't use a fabric softener.
- For a work surface, cover a piece of cardboard with a plastic trash bag or dry cleaner's bag. Place the covered cardboard inside the garment to prevent paint from seeping through to the reverse side. Hold the cardboard in place on the inside of the garment with masking tape.
- Follow the paint manufacturer's instructions for garment care. Waiting at least 48 hours before laundering a newly painted fabric is typical.



Tie-Dye Patterns

Different patterns result from the way you tie fabric.

- **Large sunburst pattern.** Pull up the center section of fabric and space the ties a few inches apart down the length of the fabric.
- **Small designs.** Space the ties evenly around the fabric.
- **Special effect.** Push the center of each loop through to the other side before tying.
- **Wide band.** Use many strings or rubber bands close together.



Tie-Dyeing Fabric

To tie-dye, fabric is bound with string or rubber bands in certain places, then dipped into dye. The dye doesn't penetrate the spots where the fabric is held tightly together. After dyeing the first color, the fabric can be released and dipped in a different color. Repeating creates more complicated designs. Fabrics made of 100-percent cotton work best, but a blend of cotton and polyester can be used successfully.

Exploring Hand-Printing

Try painting or tie-dyeing a T-shirt. Create your own original design or use an existing one for inspiration.

- **Rotary screen printing.** This method combines the advantages of screen printing and roller printing. It's faster than screen printing and can produce more than 3,500 yards per hour. The rotary screens, made from metal foil, are less costly than the copper engraved rollers used in roller printing.
- **Heat-transfer printing.** With this method, designs, insignias, and words are transferred onto fabric. First, a paper pattern for the design is printed with heat-sensitive dyes. The design appears in reverse on the pattern. When the pattern is placed face down on the fabric and heat is applied, the design transfers to the fabric. See Fig. 13-6.

TEXTURE AND PERFORMANCE FINISHES

A pair of jeans may be comfortable enough to wear all day long. A party dress has a sheen that sparkles in the moonlight. A shirt goes right from the dryer to the hanger, with no need for ironing. All of these result from special fabric finishes that affect both texture and performance, making garments more enjoyable to wear.

Texture Finishes

Most fabrics have some type of finish that improves surface texture and hand. Additional

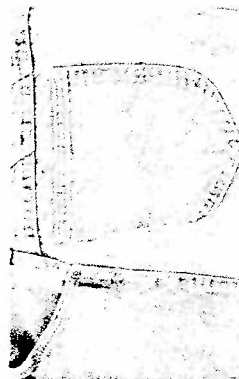
benefits are improving the comfort and performance of the fabrics.

- **Calendering.** Fabric passes between two heated rollers that smooth the fabric and improve the luster.
- **Glazing.** A resin is applied during calendering to produce a high polish or glaze on the surface of the fabric. Chintz is a glazed fabric.
- **Embossing.** Fabric is given a raised design on the surface when it's calendered with rollers engraved with the design.
- **Ciré (suh-RAY).** A super-glossy finish is obtained by applying wax or some other substance before calendering. Ciré nylon is sometimes used for lightweight jackets.
- **Moiré (mwah-RAY).** A watered or wavy pattern is obtained by calendering two layers of fabric slightly off grain. Moiré fabric is used for eveningwear.
- **Napping.** Rotating wire brushes raise the short fiber ends of staple yarns to create a soft and fuzzy surface called nap. The nap looks different when viewed from different directions. Flannel is a napped fabric. See # 484.
- **Stone washing and acid washing.** Pumice stones, sometimes dampened with an oxidizing bleach, are added to a mass-production, laundering process. They provide the abrasion that makes denim garments appear worn and partially faded. The garments also become softer and more comfortable to wear. See Fig. 13-7.

13-6 Transfer printing uses heat to switch a design from the paper to the fabric. How does the design on the pattern compare to the finished design?



13-7 Many people like the look and feel of stone-washed jeans.



- **Mercerization.** This finish gives cotton added luster, strength, and drapability. It also improves the fiber's affinity for dye. Fabrics and yarns are treated with a caustic soda or lye solution. This is one of the few finishes applied before dyeing.
- **Sizing.** Starches or resins are added to the fabric for extra body. Sizing is usually only a temporary finish.

Performance Finishes

Sometimes a fabric's performance results from the fibers used. For even better performance, however, many different finishes are applied to fabrics. Read care labels and follow manufacturer's recommendations so that a fabric's finish is not diminished or destroyed.

- **Antibacterial or antiseptic.** This finish checks the growth of bacteria and fungi, such as mold and mildew. Germs that cause odor, disease, and infection are reduced or even prevented. Brand names include Sanitized® and Pacific®.
- **Antistatic.** Some fabrics cling due to static electricity. By absorbing small amounts of moisture from the air, this finish reduces the fabric dryness that causes static electricity.
- **Crease-resistant.** Commonly known as CRE, these resin finishes help fabrics resist wrinkling. They are most often applied to fabrics made from fibers that wrinkle easily, including cotton, rayon, and flax.

- **Durable press.** This is a descriptive term for garments that maintain a pressed appearance despite repeated washings and wearings. Through heat setting, resin curing, or an ammonia process, the fabric fibers are stabilized. The fabric resists wrinkling during wear, and the garment maintains its shape, pleats, and creases. When washed and dried by machine, the garment needs little or no ironing. Any wrinkles tend to flatten or disappear after the garment hangs for a while. Apparel made of 100 percent cotton and treated by this process may be described as "wrinkle free," "wrinkle-resistant," or "no iron."

In advertisements and articles, you may see the term permanent press used, especially for cotton and polyester blends. Fabric experts prefer the term durable press. This means that with proper care, the fabric or garment will not followed, however, some wrinkling may occur. The word permanent implies that wrinkling never occurs.

Flame-resistant and flame-retardant

These finishes reduce flaming and burning in fabrics that have been exposed to a flame or high heat. They are used on children's sleepwear and other clothing. See Fig. 13-8. Special care may be needed to maintain the finish.

- **Mothproof.** To repel moths and other fiber-eating insects, this finish is widely used on wool fibers. It's added when fabric is dyed.
- **Shrinkage control.** These finishes don't guarantee that no shrinkage will occur. Instead, shrinkage should be minimal, even after repeated launderings. The term Sanforized® assures that the fabric won't shrink more than one percent in washing. Washable wool fabrics have been treated to prevent shrinkage when laundered as directed on the label. If a fabric is labeled as preshrunk, a shrinkage process has been applied. **see p 490**

13-3 Federal law requires flame-retardant fabrics for children's sleepwear.



Trends in TECHNOLOGY

What's new in fabric finishes? The latest developments are fascinating.

- **Nonstick garments.** A Teflon® surface on fabrics helps repel dirt and water, making it useful for outerwear. The finish forms a molecular bond with the fiber. Teflon® yarns in socks and hosiery reduce friction between sock and skin.
- **Speed enhancement.** Competitive swimmers like the neck-to-ankle bodysuits that improve performance. One specially designed fabric is a Lycra® spandex blend that is fed through compression rollers to make it thinner and lighter.



• **Soil release.** Fabrics made from manufactured fibers or finish often retain soil and oily stains. With soil-release finishes, dirt and stains remove more easily from fabrics. Most are durable through 40 or 50 launderings.

• **Water- and stain-repellent.** These finishes help fabrics repel water- and oil-based stains. The yarns are coated with a chemical that resists water and other liquids. Drops remain on the fabric surface in a small bead rather than being absorbed immediately, as shown on page 242. Because the repellent is applied to the yarns, rather than the whole fabric, the fabric remains porous so air and body moisture can pass through. The fabrics, however, eventually become wet. The repel-

»HIGH-PERFORMANCE FINISHES

Heating the fabric provides a smooth, flat finish. Finally, the fabric is coated with a water-repellent finish that minimizes drag.

- **Sun protection.** Some fabric finishes shield from prolonged exposure to the sun. A special chemical technology reduces penetration by harmful ultraviolet rays. For fabrics without this protection, you can get a laundry detergent that adds UV protective chemicals when clothes are washed.
- **Allergy protection.** Eventually, an anti-dust-mite fabric impregnated with a small amount of a special pesticide may be available. Potential uses are sheets, pillowcases, and quilts.

INVESTIGATION ACTIVITY
One manufacturer coats fabric to make it change color according to your mood. Find other examples of how finishes are expanding the functions of fabric.

lent finish may need renewal when the garment is dry-cleaned. In addition to clothing, these finishes are often used on table linens and upholstery fabrics. A widely used repellent is Scotchgard®.

• **Waterproof.** These finishes keep the fabric and the wearer dry. Waterproof fabrics have been coated or treated so that no water penetrates. Since the fabric has been made nonporous, it may be uncomfortable to wear. New, microporous, waterproof finishes allow body moisture to escape, while not allowing water to penetrate. Gore-Tex® is a widely used, breathable, waterproof fabric.

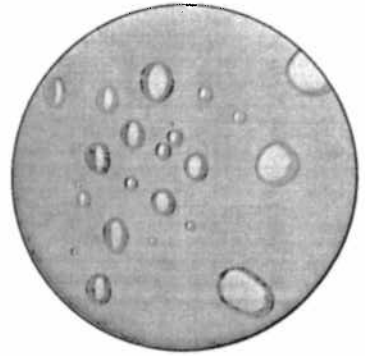
Review

CHAPTER SUMMARY

- Finishes are applied to improve a fabric's appearance, texture, and performance.
- Some finishes are permanent and some are temporary.
- Some finishes add color or designs to fibers or fabrics.
- Texture finishes change a fabric's look, feel, and hand.
- Performance finishes make fabrics easier to care for and more useful.
- Some finishes can be diminished or destroyed by improper fabric care.

USING KEY TERMS

Working with a partner, list the Key Terms in a column on a sheet of paper. For each Key Term, point out ways that it is demonstrated in the fabrics you see around you. Note specific examples. Which Key Term will have no examples? Why?



RECALLING THE FACTS

1. What is the difference between a permanent and a temporary finish?
2. Why are gray goods cleaned before finishing?
3. Name and describe five dyeing processes.
4. When is coloring added in stock dyeing? In piece dyeing?
5. Do colorfast fabrics ever fade? Explain.
6. How are screens used in screen printing?
7. What are the advantages of rotary screen printing, compared to other methods?
8. How are glazing and ciré similar and different?
9. How is a fabric texture changed in embossing? In napping?
10. Why are fabrics mercerized before dyeing?
11. What are the benefits of applying a durable-press finish?
12. What is the difference between water-repellent and waterproof?
13. How has technology improved water-proof finishes?

and Activities

THINKING CRITICALLY

1. Why do you think a temporary finish might be added to a fabric?
2. What finishes would be most useful for a pair of sweat socks? Why?
3. Why is it useful to know the type of finishes applied to a garment when shopping for clothes?

APPLYING KNOWLEDGE

1. **Finishes and care.** Bring in examples of fabric descriptions and care instructions from fabric bolts. Share and discuss these in class. What relationships can you see between certain finishes and the care needs of the fabric?
2. **Choosing finishes.** Cut a shirt shape from a large note card or draw one on paper. Decide what type of shirt this will be. Then choose a fiber content and finishes that suit the garment's use. Explain your choices to the class.
3. **Colorfast testing.** Dip unused fabric samples in hot water. Observe swatches for color loss. What conclusions can you draw about colors, fabrics, and colorfastness? Record your results and conclusions in a chart.

4. **Water repellency.** Collect different types of outdoor apparel, including sweatshirts, jackets, windbreakers, and umbrellas. Using an eyedropper or small measuring spoon, place droplets of water on each item. How does the water behave on each article? How long does it take for any water to be absorbed? Summarize your observations in a short paper.
5. **Name research.** Using library resources, find out how some generic and trade names for finishes, including mercerized and Sanforized®, were chosen.

CREATIVE SOLUTIONS

You're helping a friend choose a fabric to make a Western-style shirt. The pattern shows the shirt made with blocks of fabric in different colors. As the two of you look at solids and prints that might look good together in the shirt, your friend mentions that different blocks of red, black, and white would look great. Then your friend remembers a formerly owned red shirt that turned the wash water pink.

Think Creatively

If the red and black dyes in the fabric your friend likes aren't colorfast, they might run on the white after the shirt is made and washed. What should your friend do?

Clothing

FASHION, FABRICS & CONSTR

**Clothing,
Society &
the Fashion World**
From Fashion
History to Today's
Fashion Industry



Clothing

FASHION, FABRICS & CONST

Mc
Graw
Hill
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