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From Fiber to Finish

Cooperative Extension South Dakota State University

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From Fiber to Finish

THE CLOTHING MARKET PLACE

Cooperative Extension Service
South Dakota State University
U.S. Department of Agriculture
FROM FIBER TO FINISH

Most of us have some understanding of the way a fabric will perform. Just based on past experience, we have some awareness of a fabric's durability, comfort, care, and appearance.

But there are bound to be fabrics that we've never tried. And constant changes in the textile industry mean we'll be seeing more and more improved fibers and blends on the market.

So how do we go about judging a fabric if we're unfamiliar with it? The answer is found in the combination of:

Fiber + Yarn + Fabric Construction + Finish

Together, these create the characteristics of a textile. By studying them, we can learn to judge a fabric's quality.

FACTS ABOUT FIBERS

Many of today's fabrics are fiber blends. This blending offers you the best characteristics of each fiber. But if you're considering a fiber blend, remember these points:

• For a fiber's characteristics to show up in a fabric, the fiber must make up at least 25 percent of that fabric—with these exceptions: nylon, as little as 15 percent will strengthen a blend

  spandex, even 2 percent will add elasticity

  decorative or textural effects may be added in small amounts

• To care for a blend, choose those care instructions that apply to the most delicate or heat-sensitive fiber in the blend.

. . . ABOUT YARNS

Yarns are made up of either:

short lengths (called staple fibers) which are spun or twisted together

or long, untwisted straight strands (called filaments).
Federal law requires that labels list the generic (or family) names of any fibers used in a garment. A trade name may also be listed. This is the company's name for a particular fiber.

Once you know the name of the fiber, you can study its characteristics in the chart below.

**FIBER**

<table>
<thead>
<tr>
<th>FIBER</th>
<th>Generic name (trade name examples)</th>
<th>Durability</th>
<th>Appearance</th>
<th>Comfort</th>
<th>Care</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Abrasion resistance</td>
<td>Sunlight resistance</td>
<td>Pilling resistance</td>
<td>Wrinkle resistance</td>
<td>Absorbency</td>
</tr>
<tr>
<td>NATURAL FIBERS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cotton</td>
<td>Good</td>
<td>Good</td>
<td>If pilling occurs, garments do not become unsightly as pills often break off</td>
<td>Low unless finish applied</td>
<td>Good</td>
</tr>
<tr>
<td>Linen (Flax)</td>
<td>Fair</td>
<td>Good</td>
<td>Low unless finish applied</td>
<td>Excellent</td>
<td>Handle carefully when washing since they are weaker when wet. Use neutral or slightly alkaline soap. Chlorine bleaches damage these fibers. Wool is damaged by dry heat, so use steam. Never wash wool in hot water.</td>
</tr>
<tr>
<td>Silk</td>
<td>Fair</td>
<td>Low</td>
<td>Good</td>
<td>Excellent</td>
<td>Iron or press at a low temperature. This fiber is weaker when wet. Avoid contact with nail polish remover.</td>
</tr>
<tr>
<td>Wool</td>
<td>Fair</td>
<td>Fair</td>
<td>Excellent</td>
<td>Good</td>
<td>Fair</td>
</tr>
<tr>
<td>SYNTHETIC FIBERS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acetate (Avisco, Celeperm, Chromspun, Estron)</td>
<td>Low</td>
<td>Good</td>
<td>Excellent</td>
<td>Good dry Poor wet</td>
<td>Fair</td>
</tr>
<tr>
<td>Acrylic (Acrlan, Creslan, Orlon, Zefran)</td>
<td>Fair</td>
<td>Excellent</td>
<td>Fair</td>
<td>Good</td>
<td>Low</td>
</tr>
<tr>
<td>Modacrylic (Dyrel Verel, SEF)</td>
<td>Fair</td>
<td>Excellent</td>
<td>Fair</td>
<td>Good</td>
<td>Low</td>
</tr>
<tr>
<td>Nylon (Antaron, Caprolan, Enkalure, Qiana)</td>
<td>Excellent</td>
<td>Fair</td>
<td>Low</td>
<td>Very good</td>
<td>Low</td>
</tr>
<tr>
<td>Olefin (Hercuion, Marvess)</td>
<td>Excellent</td>
<td>Good</td>
<td>Fair</td>
<td>Good</td>
<td>Low</td>
</tr>
<tr>
<td>Polyester (Dacron, Encron, Fortrel, Kodel, Trevira)</td>
<td>Good</td>
<td>Good</td>
<td>Low</td>
<td>Good-excellent</td>
<td>Low</td>
</tr>
<tr>
<td>Rayon (Avril, Fortisan, Zantrel)</td>
<td>Fair</td>
<td>Good</td>
<td>Excellent</td>
<td>Low unless finished</td>
<td>Excellent</td>
</tr>
<tr>
<td>Tri-acetate (Arnel)</td>
<td>Low</td>
<td>Low</td>
<td>Excellent</td>
<td>Very good</td>
<td>Low</td>
</tr>
<tr>
<td>Aramid (Nomex, Kevlar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Novoloid (Kynol)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vinyl/Vinyon combination fiber (Cordelan)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Filaments can be smooth, lustrous, and flat. Or they can be altered into a crimped, stretchy, dull, or soft condition through texturizing processes. Once texturized, the filaments can be cut into staple fibers.

In yard goods and garments, you'll find these differences:

**spun yarns**
- to a point, the tighter the twist, the stronger the spun yarn

**filaments**
- generally, filaments are smoother and more lustrous than spun yarns
• filaments are stronger than spun yarns of the same diameter and fiber

texturized yarns add:
• stretch
• bulk
• absorption
• breathability

... ABOUT FABRICS

If we compare different types of fabric structures, we'll find that:

In wovens,
• those fabrics with greater compactness (or more interlacing) of yarn:
  will last longer,
  will be firmer,
  will repel both wind and water,
  and won't sag or snag as easily.
• those fabrics with fewer yarns:
  will be more flexible,
  will be softer and easier to drape,
  will have a greater chance of raveling,
  and will be less repellent to wind and water.

In knits,
• the knit-loop structure creates a fabric which, when compared to others:
  will have greater stretch and resiliency,
  will have a soft, draping effect,
  will have added bulk,
  and will be more likely to sag and snag.
• the smaller the knit loop, the greater the fabric's durability.
• double knits hold their shape better than single knits made with comparable yarn, and warp knits, such as tricot, don't sag as easily as single jersey knits.

In laces,
• the knotted and twisted yarns create an open-pore structure which, when compared to other fabrics:
  is weaker,
  loses its shape more easily,
  has less body,
  and snags more easily.

In non-wovens and felt,
• fiber matting gives you a fabric with thickness,
  stiffness,
  low-strength,
  and no stretch.

In films (like vinyls),
• the non-fibrous structure:
  helps repel dirt and water,
  is easy to clean,
  is stiff,
  and is not breathable.
• strength may depend upon the thickness of the vinyl and whether it's supported by a fabric base.

... ABOUT FINISHES

You can find out more about a fabric's finish by reading the label that accompanies the yard goods or garment. Although manufacturers aren't required to do so, they usually will make a note of any finishes applied to their products. These include:

• shrink-resistant finishes. These control fabric shrinkage, either by chemical or mechanical means. To find out just how much you can expect a garment or fabric to shrink, look for a listing of the amount of "residual shrinkage" (2 percent shrinkage is considered acceptable in wovens and 5 percent in knits).
• durable press finishes, which help fabric resist wrinkling.
• soil-release finishes, which make oily stains easier to remove.
• stain-resistant finishes, which help fabric resist staining.
• flame-resistant finishes, which reduce the risk of flammability.
• anti-static finishes, which reduce clinging.
• antiseptic finishes, which make fabric resistant to bacteria and prevent damage and decay from perspiration.
• water-repellent finishes, which enable fabric to shed water.
• waterproof finishes, which prevent any penetration of air or water.