


1  **Fabric**

Chapter 7

2  **Fibers**

- ⊙The raw materials from which fabrics are made
- ⊙Content affects aesthetics, comfort, durability, shape & appearance retention, ease of care, and performance characteristics, & cost

3  **Natural Fibers**


- ⊙Protein Fibers: Silk, wool, animal fibers
- ⊙Cellulosic fibers: Cotton, linen, ramie, hemp, plant fibers

4  **Manufactured Fibers**

- ⊙Regenerated Fibers: rayon, lyocell, acetate, triacetate, regenerated cellulose
- ⊙Synthetics: nylon, polyester, acrylic, modacrylic, olefin, spandex, petroleum products
- ⊙Miscellaneous: rubber, metallic

5  **Fiber Properties**


- ⊙Fiber Length: Staple vs. Filament
- ⊙Fiber shape & Surface Contour
- ⊙Fiber Size: denier, tex

6  **Fiber Content of Fabric**


- ⊙Consumers often make assumptions about the performance of fabric based on fiber content
- ⊙Relationship of fabric to other components of garment also affects performance
- ⊙Must determine proper care instructions for garment by testing all garment components and their interaction in the finished garment

7  **Yarns**


- ⊙Spun vs. Filament
- ⊙Carded vs. Combed
- ⊙Woolen vs. Worsted
- ⊙Smooth filament vs. bulk continuous filament
- ⊙Plied and Fancy yarns
- ⊙Yarn Twist: low to high twist
- ⊙Yarn Size: fine to coarse

8  **Fabric Structure**








- ⊙Structure affects hand, luster, stretch, breathability, strength, abrasion resistance
- ⊙Wovens
  - Plain Weave
  - Twill Weave
  - Satin Weave
  - Variations









9  **Fabric Structure**











- ⊙Knits: stretch but can lose shape
- ⊙Filling knits
  - Majority of apparel knits
  - Single Knits: Jersey
  - Double knits: Interlock, rib knit
- ⊙Warp knits
  - Tricot, Raschel

10  **Fabric Structure**

- ⊙Other Structures:
  - Fiberwebs or Nonwovens
  - Bonded or Laminated fabrics
  - Film fabrics
  - Lace
  - Quilted Fabrics

- Flocked Fabrics
- 11  **Color and Applied Design**
  - ⊙ Dyestuffs – types of dyes
  - ⊙ Dye Applications: solution/fiber dyeing, yarn-dyed, piece-dyed, garment dyeing
  - ⊙ Printing: quality, registration, alignment
    - Discharge, screen printing, direct roller, heat-transfer, digital printing
  - ⊙ Finishes: mechanical and chemical
- 12  **Fabric Performance**
  - ⊙ Fabric choice basis needs to include the design of the garment, intended end use, season, trends, consumer preferences, const limitations, target market
  - ⊙ Fabrics for the entire line must be viewed w/ an eye to how well they work together
    - Color Story
    - Balance of basic & novelty, solids & patterns, fabric weights, textures
- 13  **Fabric Choice/Buying**
  - ⊙ Stock Yardage vs. Customized fabrics
  - ⊙ Establishing fabric specifications
  - ⊙ May use ASTM specifications
  - ⊙ Consider how it affects Ease of Production
  - ⊙ Quality of fabric (# of Defects)
- 14  **Defects**
  - ⊙ Mill Flaws: broken, knotted, or thick ends and picks, barré, foreign material, spots, soil, and holes
  - ⊙ Bowing, skewing, shading, printing errors
  - ⊙ Verification of put-up (amount of fabric)
  - ⊙ Mills FLAG defects
  - ⊙ Major vs. minor defects
  - ⊙ Placement of flaws in low-visibility areas
  - ⊙ Four Point System of fabric grading
- 15  **Aesthetic Performance**
  - ⊙ Color & Pattern
    - Hue, chroma (intensity), value
  - ⊙ Color Consistency
    - Within garment or ensemble or line
    - Dye lots and shade lots
  - ⊙ Shading
    - Dichroism: napped fabrics
    - Metamerism: problems when trying to match different fibers
- 16  **Aesthetic Performance**
  - ⊙ Luster: dull, matte, diffused, shiny, lustrous
  - ⊙ Opacity: opaque, translucent
  - ⊙ Hand
    - Drapability: limp, crisp...
    - Compressibility: soft, hard...
    - Extensibility: stretchy, nonstretchy
    - Resilience: springy, limp
    - Density: compact, loose/open
    - Surface contour/texture: rough, smooth
    - Thermal character: cool, warm
- 17  **Functional Performance**
  - ⊙ Refers to utility and durability of a garment
  - ⊙ Utility:
    - Shape retention, appearance, comfort, ease of care, safety

- ⊙Durability:
    - Strength, abrasion resistance, resistance to degradation
- 18  **Dimensional Stability**
  - ⊙Ability of fabric and garments to maintain their original shape and size
  - ⊙Elongation and Elasticity
    - Elongation – stretches
    - Elasticity – recovers
    - Generally desirable in knits but not wovens
  - ⊙Shrinkage
    - Relaxation shrinkage vs. felting shrinkage
    - Happens in 1<sup>st</sup> few washes usually – mostly drying
  - ⊙Toque and Skew, Bow
- 19  **Appearance Retention**
  - ⊙Colorfastness
    - Fading, crocking, bleeding, yellowing
  - ⊙Wrinkle Resistance
    - Synthetics vs. naturals, proteins vs. cellulose
  - ⊙Snag and Pill Resistance
    - More accepted in knits
  - ⊙Heat Resistance
    - Thermoplastics
    - Heat setting
- 20  **Comfort**
  - ⊙Weight, hand, extensibility, insulation, and absorbency/wicking ability
  - ⊙Comfort stretch vs. power stretch
  - ⊙Insulation
    - Fabric's ability to breathe
    - A CLO (way to measure insulative value)
  - ⊙Moisture Transfer
    - Absorbency, wicking ability, moisture retention, static cling
- 21  **Ease of Care**
  - ⊙Fabric's effect on the care of garment
  - ⊙The tendency to resist soiling and wrinkling
  - ⊙Affects ultimate cost to consumer
- 22  **Safety**
  - ⊙Flame resistance (includes all garment elements)
  - ⊙Ability to reflect light
  - ⊙UV protection
- 23  **Strength**
  - ⊙Tensile strength or tenacity
  - ⊙Tear Strength
  - ⊙Bursting Strength
- 24  **Abrasion Strength**
  - ⊙Amount of rubbing action a fabric can withstand
  - ⊙Yarn slippage
- 25  **Resistance to Degradation**
  - ⊙Chemical resistance
  - ⊙Launderability
  - ⊙Dry-cleanability
  - ⊙Insect resistance
  - ⊙Mildew resistance
  - ⊙Sunlight resistance

- ⊙ Fume fading resistance
- 26  **Fabric Performance Testing**
  - ⊙ Use standardized tests – often from ASTM or AATCC
  - ⊙ Includes tests for
    - Count, weight, shrinkage, tensile or bursting strength, crocking, lightfastness, garment washability
    - Many tests conducted under controlled conditions
- 27  **Count or Gauge**
  - ⊙ Thread count: the number of ends and picks or total number of yarns per square inch of woven fabric
  - ⊙ Cut or gauge refers to the number of loops per square inch of knit fabric
  - ⊙ Affects the tightness of the weave, the look, feel, insulation, and absorption properties of the cloth
- 28  **Weight**
  - ⊙ Ounces per square yard
  - ⊙ Top weights: lightweight fabrics for shirts, tops, dresses
  - ⊙ Bottom weights: heavier fabrics for making pant, skirts, coats, bottoms
  - ⊙ Mid weights: a sometimes used division between top and bottom
  - ⊙ Weight is an excellent clue to garment cost and quality when comparing similar garments
- 29  **Shrinkage Testing**
  - ⊙ Performed in washing machines
  - ⊙ Usually 3-5 washes
- 30  **Strength**
  - ⊙ Tensile strength tests on woven cloth
  - ⊙ Bursting strength on knitted cloth
  - ⊙ Needs vary according to garment type and end use
- 31  **Crocking**
  - ⊙ Determines the likelihood that dyes/inks will rub off and transfer to other surfaces
  - ⊙ Under both wet and dry conditions
- 32  **Lightfastness**
  - ⊙ Measured by simulated fading in a large machine called a weatherometer or fadeometer
  - ⊙ Amount of color loss
- 33  **Washability**
  - ⊙ Primarily performed on garments, not fabric
  - ⊙ Both on prototypes and production garments
- 34  **Leather**
  - ⊙ Tanned or preserved skin or hide from an animal
  - ⊙ Genuine leather or top grain vs. splits vs. suede
  - ⊙ Unblemished hides most attractive most costly
  - ⊙ Garments often require special piecing and construction techniques
- 35  **Fur**
  - ⊙ Animal skin or hide with the hair still attached
  - ⊙ Valued for warmth and beauty
  - ⊙ Primarily from ranch-raised animals
  - ⊙ Requires special construction techniques
  - ⊙ Fully-let-out fur garments are the most expensive
  - ⊙ Skin-on-skin are least expensive