

1  **Chapter 15**

Other Fabrication Methods

2  **Fabric from Solution**

- › Film
 - › Solution extruded through slit or cast on hot drum.
 - › Fabrics: hot and clammy unless porous
 - › Uniform in appearance and quality
 - › May be embossed to resemble leather
 - › Water and air impermeable
 - › Soil resistant
 - › Weak and stiff

3  **Film Types**

- › Vinyl films stiffen with dry cleaning and cold.
- › Polyurethane films are washable and dry cleanable.
- › Do not stiffen in cold weather.

4  **Plain (Nonreinforced Film)**


- › Smooth, Firm and Dense

5  **Film Types**


- › Expanded film: Softer, plumper, more drapeable, weaker, less abrasion resistant; less impermeable to air and water.
- › Supported films (coated fabrics): Film attached to woven, knit, or nonwoven fabric. (Note: yarns to right from woven support fabric.)

6  **Fabric from Solutions**

- › Foam:
 - › Airy, springy, and lightweight
 - › Weak depending on type and weight/thickness
 - › Lofty; stiff; warm
 - › Padding for upholstery, mattresses, and carpeting











7  **Fabrics from Fibers**











- › Fabrics from Fibers
 - › Nonwoven (fiberweb) structures: textile sheet structures made from fibrous webs bonded through use of resins, thermal fusion, or mechanical means
 - › Properties controlled by fiber content, fiber arrangement, and bonding mechanism
 - › Web production, fabric production, bonding mechanism

8  **Nonwoven Methods**

- › Dry-laid: Fibers arranged in random or oriented arrangement; wipes, wicks, quilt backing, laminating/coating base fabrics.
- › Wet-laid: Fibers arranged from slurry of fibers and water; laminating/coating bases, wipes, roofing substrate.
- › Spun-bonded: Lay continuous filaments on conveyer belt, fused, heat/pressure bonded; carpet backing, geotextiles, envelopes, filters, protective apparel.

9  **Nonwoven Methods**

- › Hydroentangled (spun-laced): Similar to spun-bonded, water jets create pattern; apparel and furnishings.
- ›
- › Melt-blown: Extruded, broken into short fibers by high speed air, collected on conveyor belt, and bonded; hospital-medical uses; battery separators.
- ›
- 10  **Bonding Mechanisms**
 - › Needling or needle punched: Barbed needles mechanically interlock fibers.
 - ›
 - ›
 - ›
 - › Chemical adhesive: Glues fiber together.
 - › Heat: Melts fibers together at overlap.
- 11  **Needle-Punch Process**
- 12  **Other Fiber Web Structures**
 - › Fiberfill: batting, wadding, and fiberfill
 - › Characteristics: resilient, lightweight, resist shifting
 - › Types: polyester, down, and others
 - › Fusible fiberwebs
 - › Felt: fibers interlocked; no grain, does not fray or ravel; stiff; weak; craft and industrial uses
- 13  **Other Fabric from Fibers**
 - › Net-like structures: Extrude one or more fiber-forming polymers as a film or network of ligaments.
 - › Tubular net for packaging fruit and vegetables, agricultural nets, and fencing
- 14  **Fabrics from Yarns**
 - › Braid: Yarns interlaced lengthwise & diagonally; flat or 3-D; good elongation, pliable, curve around edges; apparel trim, furnishings, & industrial goods.
 - ›
- 15  **Fabrics from Yarns**
 - › Lace: Intermeshed yarns with open space between/around solid areas.
 - › Woven, knit, crocheted, netted, bobbin, etc.
 - › Classified by technique & appearance
- 16  **Lace**
 - › Hand or machine process
 - › Leaver's lace or schiffli embroidery
 - › Cordonnet or re-embroidered lace with yarn or cord outlining design
 - ›
- 17  **Lace Quality**
 - › Based on yarn fineness, closeness of ground, and design intricacy
- 18  **Fabrics from Fabrics**
 - › Composite fabrics: Combine several structures into a single structure.
 - › Advantages: Interesting texture; light weight & warm; more body; less wrinkling; quick to produce; stable if well done.
 - › Disadvantages: May separate, off-grain; differential shrinkage; sags; bulky; stiff.
- 19  **Composite Fabrics**
 - › Coated fabrics: Combine characteristics of film with textile fabric; film attached by

- › lamination (film adhered to fabric by melting)
- › calendaring (film hot calendered onto fabric)
- › coating (fluid hot film applied by knife or roll)
- › other methods
- › Poromeric fabrics: Very fine, microporous polymer on surface; water vapor permeable; waterproof; windproof, breathable.
- 20  **Composite Fabrics (cont.)**
 - › Suede-like fabrics: Needlepunched fabrics of microfibers combined with resin coating and nonfibrous polyurethane.
 - › Tufted: Yarn stitched onto fabric to create pile-like look. Usually back-coated to lock yarns in place.
 - › Upholstery: imitation velvet types
 - › Carpet: most common type on market; gauge, face weight, and grin-through (related to tuft density)
- 21  **Tufted Carpet**
- 22  **Composite Fabrics**
 - › Laminated (bonded): Adhere one or two fabric layers (see coating methods); lightweight, off-grain, differential shrinkage, delamination, glue bleed, or stiffness problems.
 - › Stitch bonded or knit-through: Warp knitting machines use needles to interlace fibers or yarns to lock inlaid yarns in place.
- 23  **Composite Fabrics**
 - › Quilted: Two layers of fabric with fiberweb combined; bulky, warm, decorative.
 - › Thread quilting: type of stitch & length affect durability
 - › Pinsonic: ultrasonics fuse thermoplastic layers together
 - › Chemical adhesives in pattern for quilted effect
- 24  **Composite Fabrics**
 - › Supported scrim structures
 - › Lightweight nylon scrim sandwiched between two foam layers, fibers adhered to one or both foam layers; cheap, easy care, durable
 - › Fiber-reinforced material: fibers added to resins, metals, or ceramics to improve performance
- 25  **Leather**
 - › Tanned skin/hide of mammal, reptile, fish, bird.
 - › Skin varies in quality, thickness, and grain.
 - › Classification based on animal source.
 - › Tanning: Chemical finish to make skin pliable, water and rot resistant.
 - › Other processes: Bleach, dye, emboss, print, glaze, board, etc.
 - › Care: Leather cleaning method.
- 26  **Leather Cross Section**
- 27  **Leather Types**
 - › Splitting: top grain, first split, and second split
 - › Suede: brushed
 - › Grain sueded leather (nubuk) napped on grain side
- 28  **Split Leather**
- 29  **Fur**
 - › Skin with hair attached
 - › Quality varies
 - › Characteristics: minimal shedding, firmly attached hairs; soft; pliable; odor-free; long & lustrous guard hair with dense, full underhairs

› Care: furrier method; special storage required