

Fabric Structures: non-woven

This section describes non-woven structures—the oldest and newest methods of making fabrics. As review, recall there are three main structures:

Woven fabric: interlacing of 2 sets of yarns at right angles

Knit fabric: inter-looping yarns, horizontally or vertically

Non-woven fabric: structures that are neither woven nor non-woven

Textile Structure Categories & Subcategories

Wovens		Knits		Non-wovens
Basic Weaves	Complex Weaves	Filling (weft) Knits	Warp Knits	
Plain Plain-basket Plain-rib Twill Satin	Leno Slack Tension Pile Figure: Dobby Jacquard Gauze Crepe Double Surface: Spot Swivel Lappet	Single: Plain Jersey Jersey variation Jacquard jersey Purl Double: Plain double Jacquard double Interlock Sliver (pile)	Tricot Raschel: Lace Net Sliver (pile)	Multiple methods that are neither woven nor knitted

Non-woven Fabrics: Introduction

Non-woven fabrics are made with the oldest method (felted wool) and some of the newest methods. The term “non-woven” was developed by industry to encompass fabric structures that are neither woven nor knitted. Non-woven technologies are the fastest growing production methods for fabrics. The methods are generally cheaper and more efficient to product than wovens or knits. As a sewist you are probably familiar with two non-woven structures—felt (wool fiber or synthetic fiber) and non-woven interfacings.

This section describes some of the methods used to make fabrics that are used by sewists and crafters.

Many non-wovens are made using 3 basic steps:

- Select the fiber(s)
- Form the fiber into a web
- Bond the web

Bonding is described when used for the methods described below. Bonding can be mechanical like needle punching, heat applied, or chemical.

Select the fiber(s). Wool felt is fiber-formed. The selected fiber must be wool or at least 80% wool with 20% other fiber. Wool is necessary to allow the natural “felting” property of wool. Review the fibers section on wool to recall how wool entangles to form felt. A mat of wool fiber is “bonded” through mechanical agitation, moisture and heat—and often a type of chemical like detergent (alkali) aides the process.

Newer non-woven fiber formed fabrics use either filament fibers for strength or staple fibers (especially cellulosics) for absorption and/or insulation.

Form the web. There are 4 methods of forming the fiber web:

- Dry-laid
- Wet-laid
- Spun-bonded
- Spun-laced

Carding is the basic *dry-laid method* of forming a fiber web. The fibers can be oriented in the length direction, the cross direction, or in random order. The fiber web often must be bonded. Dry-laid fibers are used for absorbency, insulation, or padding.



Carding a fiber web. Lengthwise direction orientation of fibers.

K. LaBat collection.

Random orientation of fibers that are not flattened or bonded can make a fabric with dead-air space—a good insulator. Insulation is enhanced when the fiber batt is sandwiched between tight-weave fabrics with little “breathability” further trapping air.



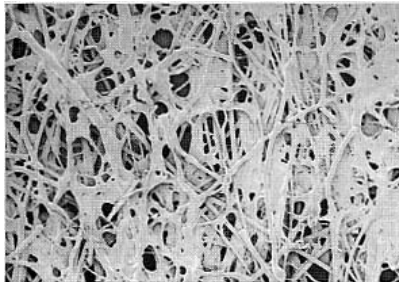
Puffer jacket by Rick Owens, July 2023.

Attribution: Premeditated Chaos, CC BY-SA 4.0
<<https://creativecommons.org/licenses/by-sa/4.0/>>, via
Wikimedia Commons

https://upload.wikimedia.org/wikipedia/commons/4/44/Puffers_1_-_Rick_Owens_a.jpg

Retrieved: July 27, 2026

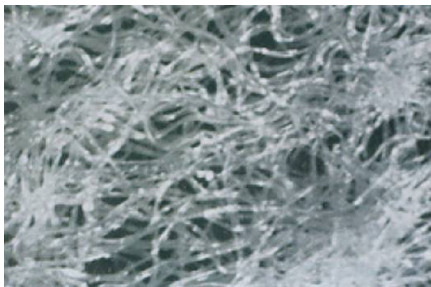
The *wet-laid fiber web* formation method is much like the paper-making process. Fibers are combined in a water solution. The wet web is spread on a screen and moisture is drained away. The surface is flat and uniform and can be strong and absorbent (depending on fiber type). The web may require bonding.



Wet-laid fiber web.

K. LaBat collection.

Spun-bonded webs are formed by randomly “drizzling” thermoplastic fibers onto a flat surface. The thermoplastic fibers cool to form the web. No additional bonding is needed to hold the fiber web together. Sewists and crafters are familiar with “non-woven” interfacings using this method. Because the fibers are in random order there is no directional layout for patterns—no warp and filling directions. The fabrics are strong and stable with little or no stretch.



Spun-bonded fiber web.

K. LaBat collection.

Some product applications for spun-bonded fabrics include apparel interfacings, wall coverings, filters like coffee filters, and protective apparel.



Woman's paper mini-dress of spun-bonded polyester. Paper dresses were a short-lived trend in the late 1960's. Missouri Historical Society.

https://upload.wikimedia.org/wikipedia/commons/7/7f/Woman%27s_Paper_Mini-Dress_-_DPLA_-_908038c2c77f385e09116edad296a00e_%28page_4%29.jpg

Retrieved: July 29, 2026.

3-M developed a method of making an insulating fiber web that mimics “down insulation” making a very thin yet insulating fabric. The *melt-blown method* shatters extruded fibers as the fibers are extruded. The filament fibers are hit with a shot of air which produces micro-fibers used for thin insulating fabric layers branded Thinsulate™



Red Wing brown leather ankle boots with Thinsulate™ insulation. Goldstein Museum of Design. Go to link for more information.

<https://goldsteincollection.rediscoverysoftware.com/mDetail.aspx?rID=2008.020.a-b&db=objects&dir=GOLDSTEIN>

Retrieved: July 30, 2026

Spun-laced fabrics are made by bonding a web of fibers with water jets forced through the web to “hydroentangle” the fibers. Water jets can be arranged in a pattern to make a “lace-like” fabric. Spun-laced fabrics are used for feminine hygiene products and disposable wipes.



Spun-laced fabric swatch.

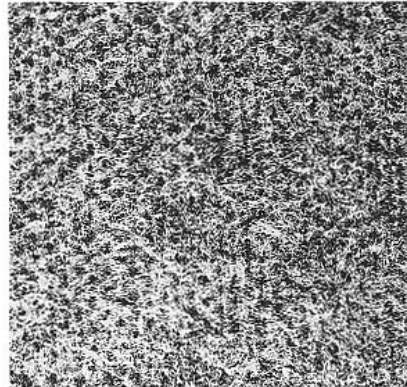
K. LaBat collection.

Needle punch fabrics are formed with barbed needles “punching” into a dense web of fibers to entangle the fibers. Crafters are familiar with “faux felt”—felt made with the needle punch

<https://drkrinfabricprof.com>

method. “Faux felt” is typically made from polyester fibers or acrylic fibers. It’s less expensive than “true” wool felt. Like wool felt, there is no grain direction. Clues to determine if felt is “real” or “faux”:

- Real felt is made of at least 80% wool.
- “Faux” felt is made of a synthetic fiber. Needle holes may be obvious.



Barbed needles “punching” into a batt of fibers (left).

Needle punch swatch—note the visible punch holes.

K. LaBat collection.

Some “faux suede” fabrics are made with the needle punch method. Ultra-suede™ the tradename for a fabric that mimics animal suede. It’s made of 80% microfiber polyester and non-fibrous polyurethane or a plant-based binder. Look for nap direction differences when laying out patterns on “faux suede” fabric.



Ultrasuede dress by Roy Halston, 1970-1980. See link for more views. Goldstein Museum of Design.

<https://goldsteincollection.rediscoverysoftware.com/mDetail.aspx?rID=2009.041.012&db=objects&dir=GOLDSTEIN>

Retrieved: August 1, 2026.

Characteristics of Non-wovens:

- No warp or filling direction
- Less expensive than wovens or knitteds

Next Section on *Finishes*.