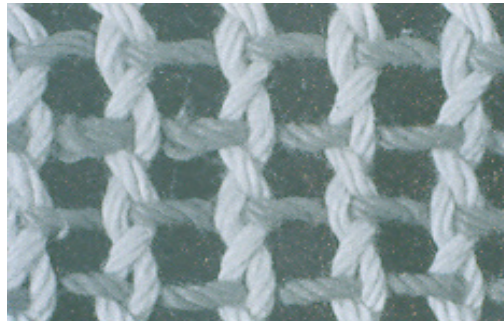
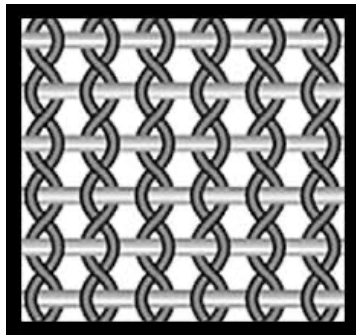


## **Fabric Structures: Leno weave, figure weave, slack tension weave, surface weave**

*Leno weave, figure weave, slack tension weave, and surface weave* are described in this section. The weaves are somewhat similar—manipulating warp or filling yarns to produce distinct fabrics.

### **Woven Structures: Leno Weave**

Leno Weave is sometimes called *gauze weave* or *true gauze weave*. The weave is structured with paired warp yarns that wrap around filling yarns to keep them in place while providing an open structure. If the filling yarns were spaced far apart in a plain weave—the yarns would slip out of place. Leno weave provides open, airy fabrics that can be used for curtains and draperies. Leno weave is also used to make insulating blankets by using fuzzy staple yarns that fill in the open spaces. The fuzzy yarns trap dead air space providing insulation. There are many variations besides the simple 2-paired warp yarns shown below.

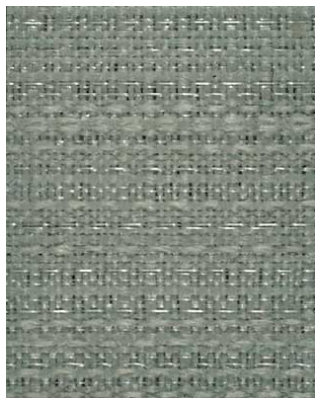


### **Woven Structures: Figure Weave**

*Figure weave* uses a variety of yarn interlacings and yarn floats to form texture, pattern, or “pictures.” There are four variations:

- Figure weave-imitation gauze
- Figure weave-crepe
- Figure weave-dobby
- Figure weave-Jacquard

*Figure weave-Imitation gauze* forms varied textures by controlling warp yarns to form interlacings and various float lengths. Compare it to “true leno weave” which uses a complex twisting of paired warp yarns. Typically, imitation gauze fabrics are made of staple yarns but might be a combination of staple and filament yarns. The weave is used for window casements, blankets and apparel.

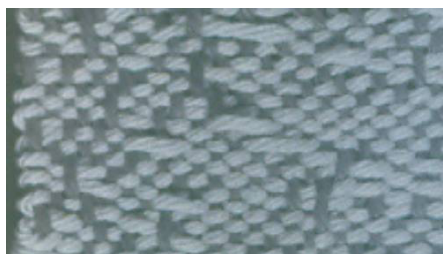


Left: imitation gauze fabric with staple & filament yarns

Right: imitation gauze fabric with figure weave & one section of leno weave

K LaBat collection

*Figure weave-crepe* produces a textured “pebbly” surface. Warp and filling interlacings “look” a random.



Demo of crepe weave



Crepe fabric



Crepe yarn

Fabric Names: crepe\*, granite cloth

\*Crepe fabric may also be made with plain weave using crepe yarns (twisty, crinkly yarns).

*Figure weave-dobby* forms geometric patterns in the fabric. The patterns may be textured (raised) or flat. The textured dobby weave fabrics are typically made of staple yarns, while the flat geometric patterns are made of filament yarns.

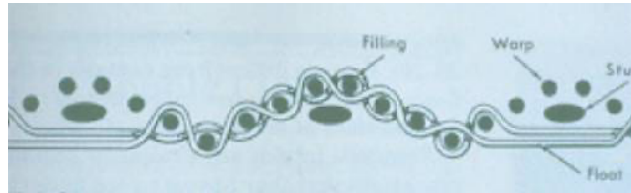
Dobby weave fabrics with raised texture and staple absorbent yarns (cotton) are often used for absorbent products. The yarns are absorbent and the extra surface area of the weave provides more absorbency.



Various “pique” fabrics: dobby weave--  
raised textures, with staple yarns

Illustration of dobby weave on edge

K LaBat collection



Fabric names: huck toweling, pique’, waffle pique’, honeycomb pique’, birdseye pique (also called diaper pique’)

Dobby weave fabrics structured with filament yarns (silk or synthetic) and a flat surface are used for “fancy” goods like “shirtings.” Dobby weave shirtings are often made of white filament yarns—the floats in different directions and lengths reflect differently emphasizing the pattern. Dobby weave shirtings may also use different colored yarns to emphasize the pattern.



1910 shirtwaist of white & red striped madras.

Source: Goldstein Museum of Design,  
University of Minnesota

For additional views:

<https://goldsteincollection.rediscoverysoftware.com/mDetail.aspx?rID=1959.001.019&db=objects&dir=GOLDSTEIN>

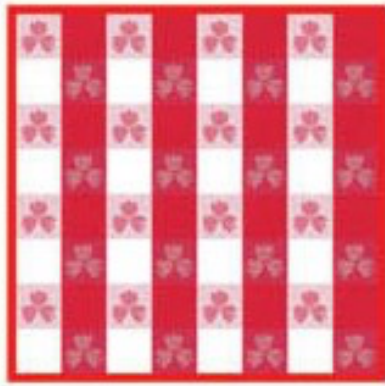
Retrieved: June 2, 2026

Fabric names: white-on-white shirting, “Madras” shirting (not to be confused with Madras plaid, a plaid fabric made with dyed yarns that often purposely “bleed” giving a soft, hazy effect).

*Figure Weave- Jacquard* is a complex structure that can be used for geometric or floral patterns or to “paint” a picture.

Figure weave-Jacquard, staple yarns

- Small motif -example red and white “Italian” tablecloth
- Large motif (often white-on-white or one-color yarns)-example: Damask tablecloth



Left: small motif “Italian tablecloth:

Below: Damask linen tablecloths

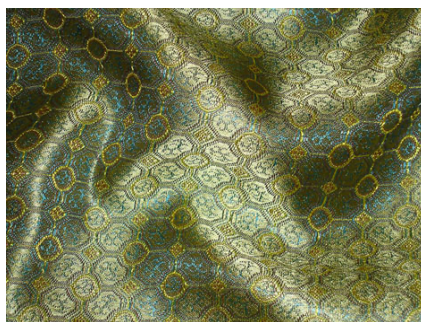
K LaBat collection



Damask fabrics—staple or short filament (linen):

- Upholstery, tablecloths, apparel
- First produced in Damascus, Syria
- Fine linen Damask was later produced in Belfast, Ireland

Figure weave-Jacquard, filament yarns



- One color or limited colors
- Motif created by reflection on warp and filling yarns
- Often floral motifs
- Usually, filament yarns but can be staple yarns



Bias cut brown brocade bodice and over skirt and brown satin under skirt, 1885-1886, Gift of Minnesota Historical Society.

Source Goldstein Museum of Design, University of Minnesota.

For additional Views and details go to:

<https://goldsteincollection.rediscoverysoftware.com/mDetail.aspx?rID=1961.003.006&db=objects&dir=GOLDSTEIN>

Retrieved: June 1, 2026

## Tapestry

Jacquard woven fabrics that “paint” a picture are often called “tapestry”; however fabrics named “tapestry” may be constructed with jacquard weave (warp yarns provide the pattern and color). “True tapestry weave” is more often used for expensive wall hangings or for art pieces. “True tapestry” motifs are formed with filling yarns crafted into stationary warp yarns.



Tapestry weaver hand-weaving colored filling yarns into natural colored warp yarns on a horizontal loom.

Nishijin Textile Center, Kyoto, Japan (photo K. LaBat)



Exhibition—Unicorn: The Mythical Beast in Art, Muse'e de Cluny (March 26-July 26). Courtesy of Sayn-Wittgenstein Fine Art, New York, private collection.

Detail from Unicorn and Stag, circa 1500, wool and silk

Source: Oursana

Circle of Flemish Region, CC0, via Wikimedia Commons

[https://commons.wikimedia.org/wiki/File:Tapestry\\_Unicorn\\_Stag.jpg](https://commons.wikimedia.org/wiki/File:Tapestry_Unicorn_Stag.jpg)

Retrieved: June 5, 2026

## The Jacquard Loom

The Jacquard loom is used to weave complex structures. It is often thought of as the first computer, because the traditional looms use “punch” cards to “program” the weave (see multiple punch cards used to program a green silk and gold brocade fabric at the Nishijin Textile Center Kyoto, Japan. Punch card codes are made of “0”s and “1”s like computer coding. A visit to the center is a delight. [https://nishijin.or.jp/eng/nishijin\\_textile\\_center1/](https://nishijin.or.jp/eng/nishijin_textile_center1/) (Retrieved June 6, 2026)



Brocade weaving on a Jacquard loom, Nishijin Textile Center, Kyoto, Japan (photo: K. LaBat)

## **Woven Structures: Slack Tension Weave**

*Slack Tension Weave* uses loose or “slack” warp yarns alternating with warp yarns under tension. The best fabric example is *seersucker*. The variation in lengthwise stripes is emphasized by using different colored yarns—often in pastels. Seersucker fabric can also be made with a chemical process—lines of caustic soda are printed in lengthwise stripes on cotton fabric. The caustic soda puckers the fabric. A heat-set method can be used on thermoplastic fiber fabrics to also make “fake seersucker.” The pucker pattern is heat embossed on the fabric—a quick inexpensive method, but it doesn’t provide the same tactile aesthetic as slack-tension weave with cotton yarns.

<https://drkrinfabricprof.com>



Left: seersucker

Right: terrycloth sample with  
slack warp yarns pulled to  
remove loops

K LaBat collection

*Terrycloth* can be structured with slack tension weave. The loops in the terrycloth are warp yarns that are on loose or slack tension. An easy test for this structure is to pull a few yarns at the bottom of a fabric sample—the looped yarn will pull “flat” and long yarns hang at the bottom of the sample. Caution—this test also destroys the fabric sample. *Terrycloth* can also be made with *pile weave*.

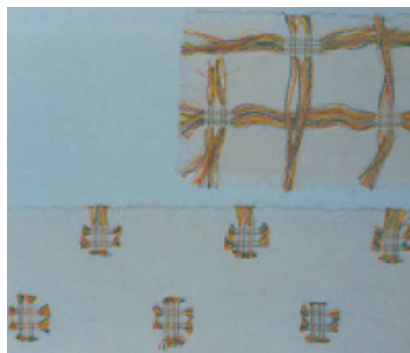
### Woven Structures: Surface Weave

*Woven-Surface Design (Surface Weave)* uses additional warp or filling yarns to add a motif to typically plain weave background. The motifs occur in the weave—it is not an “embroidery” that is added after the fabric is woven.

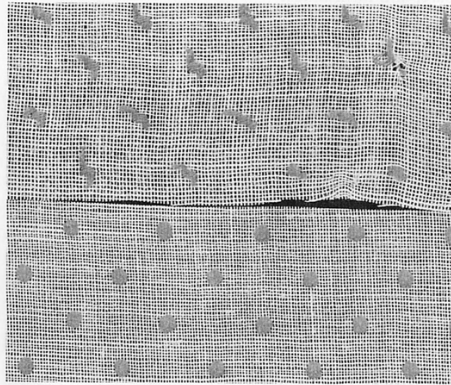
Woven surface designs include three types:

- Woven-surface-spot
- Woven-surface-swivel
- Woven-surface-lappet

*Woven-surface-spot* is the most common with warp or filling yarns forming the motif. The “extra” yarn does not “wrap” around the other yarns. The extra yarn may have uncut floats (called “unclipped spot”) or cut floats. A typical warp float cut fabric is called “eyelash” because the clipped yarns top and bottom of the motif look like eyelashes.



*Woven-surface-swivel* uses extra filling yarn that wraps around the warp within in one shed—it “swivels” around the yarn. The weave was used to create. “true dotted Swiss”—a fabric rarely seen today. Dotted Swiss fabric today is made by using a flocking method to “glue” small tufts of fibers to a plain weave fabric.

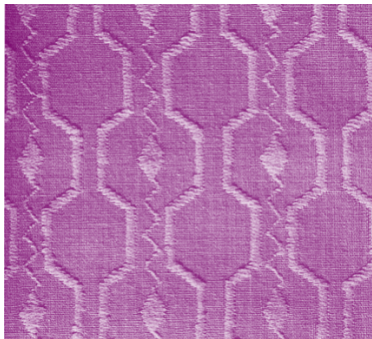


Top: “true dotted Swiss” fabric  
made with the woven-surface-  
swivel method

Bottom: flocked dotted Swiss  
fabric

K LaBat collection

*Woven-surface-lappet* structured with an extra yarn that “climbs” in the warp direction. The weave is often used to produce vine or leaf motifs.



This section has described the more complex weaves producing varied patterns and textures.

The next section describes knitted structures.