

Structures: Twill Weave and Satin Weave

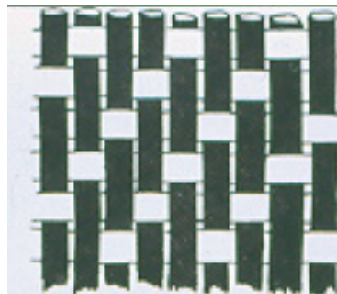
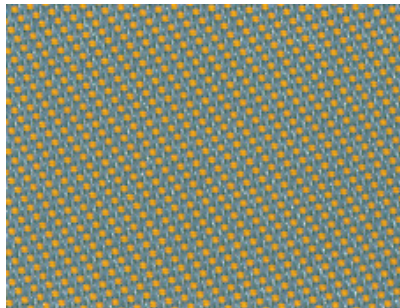
Twill weave and *satin weave* are described in this section. They are similar because “floats” are used as features. A float is a yarn from one direction (warp or filling) that passes over more than one yarn of the opposite direction. In a *plain weave* filling and warp yarns interlace at every intersection.

Woven Structures: Twill Weave

Twill Weave

Twill Weave uses interlacings of warp and filling yarns to form a diagonal pattern. A “shift” of interlacings produces short yarn “floats” where the yarn floats over more than one yarn. The twill pattern can be visually prominent by using: 1) different color warp and filling yarns, 2) high twist yarns, or 3) plied yarns. The twill line can be either right-hand or left-hand. Right-hand twill, often called “Z-twill,” features diagonal lines that run from the bottom left to the top right of the fabric. Introduced by Levi’s for denim it is generally tighter and more compact. True denim is structured with twill weave using cotton warp yarns dyed with indigo dye and filling yarns of undyed natural cotton. The sample (below left) is an upholstery fabric using contrasting warp and filling single filament yarns in a left-hand twill resulting in a strong, durable fabric with a distinct appearance.

The illustration (below right) shows a typical twill weave interlacing in right-hand twill.



Photos:
Left: left-hand twill
Right: right-hand twill

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Twill Weave characteristics (depending on other variables and yarn count):

- Fewer interlacings (compared to plain weave)
- Allows more yarns per inch as floating yarns can be squeezed together
- Compact yarn results (all other variables equal)
 - Strong
 - Sturdy
 - Durable
 - May be very heavy

Twill weave fabric name examples:

- Cotton or cotton-like fibers: denim, chino
- Wool or wool-like fibers: gabardine, serge, upholstery twill
- Silk or silk-like fibers: lining twill

Twill weave variations with the twill pattern reversing left to right, right to left.



Fabric Name: houndstooth
Wool houndstooth fabric & natural woven straw. Hat designer: Mr. John
Photo Courtesy of the Goldstein Museum of Design, University of Minnesota

See all views at:

<https://goldsteincollection.rediscoverysoftware.com/mDetail.aspx?rID=1981.150.002&db=objects&dir=GOLDSTEIN>

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Fabric Name: herringbone
Geoffrey Beene wool suit
Photo Courtesy of the Goldstein Museum of Design, University of Minnesota

See all views at:

Go to the link to see the Geoffrey Beene suit
<https://goldsteincollection.rediscoverysoftware.com/mDetail.aspx?rID=1997.042.008a-b&db=objects&dir=GOLDSTEIN>

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Woven Structures: Satin Weave

Satin Weave

Satin weave is characterized by medium to long “floats” that make it possible to compact yarns closely making a dense weave. Floats can be in warp or filling direction.

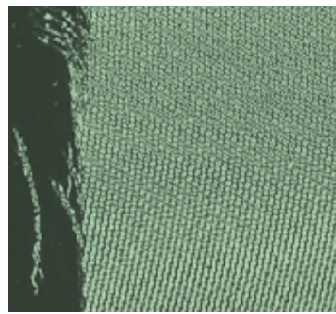
Satin Weave—floats in warp (length) direction

The fabric name “satin” and garments made of satin fabrics—ball gowns, etc.—are the typical image of satin weave fabrics and products. Satin fabric is made with *satin weave* with floats in the warp direction and typically filament yarns to give a smooth surface. Satin weave warp direction is also used for garment linings—the smooth surface makes slipping in and out of a jacket or coat easy.



1925 satin dress with attached painted velvet wrap by Paul Poiret, Paris

Source: Photographer for the Rhode Island School of Design Museum of Art, CC0, via Wikimedia Commons
https://commons.wikimedia.org/wiki/File:C1925_green_satin_dress_with_attached_painted_velvet_wrap_by_Paul_Poiret,_Paris._03.jpg
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Satin floats—
warp direction
K. LaBat
photos

Satin Weave (warp floats) characteristics (depending on other variables and yarn count):

- Filament yarns (natural or manufactured fibers)
- Reflect light—can be the “glow” of silk—recall silk fibers have triangular cross-sections.
- Drapes in long (lengthwise) folds
- Low abrasion resistance—long floats on the surface may snag

Satin Weave—floats in filling (cross) direction

The most common fabric made with satin weave—filling floats is “sateen”.

Typical Characteristics:

- Staple fiber yarns
- Often mercerized cotton
- Soft sheen
- More crosswise bulk on drape resulting in a full crosswise volume

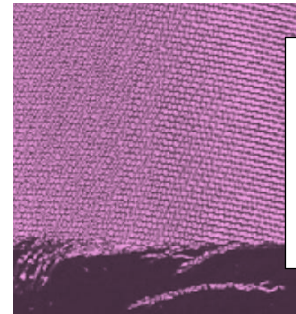


Black cotton sateen pencil skirt.
Designer 1990's: Yves Saint
Laurent

Photo courtesy of the Goldstein
Museum of Design, University of
Minnesota

<https://goldsteincollection.rediscoveryssoftware.com/mDetail.aspx?rlD=2017.001.016a-b&db=objects&dir=GOLDSTEIN>

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Sateen
floats—filling
direction

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photos

Satin weave fabric names:

Silk or silk-like fibers (warp direction floats): satin, drapery satin, “antique” satin, charmeuse

Cotton or cotton-like fibers (filling direction floats): sateen, chino

Additional fabric name example

Crepe-backed satin: places floats on the “back” (one side) of the fabric—the floats are made of crepe yarns so give a crepe (textured pebbly) look and feel to one side of the fabric.

Next section on *Pile Weave*, *Leno Weave*, *Slack Tension Weave*