

## Fabric Structures: pile weave, double weave

*Pile weave* and *double weave* are described in this section. The weaves are somewhat similar—manipulating additional yarns or warp yarns to produce the fabrics.

### Woven Structures: Pile Weave

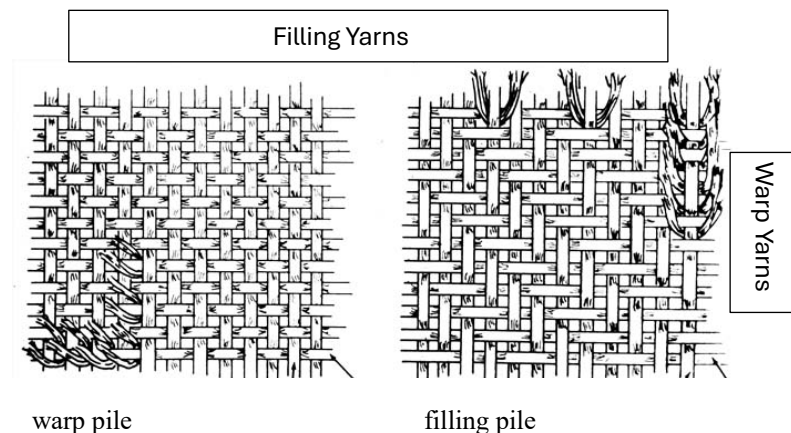
#### Pile Weave

*Pile Weave* has a “fuzzy” (pile) surface. Some fabric name examples are velvet, velveteen and corduroy.

Pile weave is structured with three “sets” of yarns:

- 1 set: Warp “ground” yarns
- 2d set: Filling “ground” yarns
- 3<sup>rd</sup> set: Pile yarns

One set of warp yarns and one set of filling yarns form the fabric base (ground) to hold the third set of yarns that form the pile of the fabric. The pile may be formed with additional warp yarns or additional filling yarns.



The pile is formed using one of two methods:

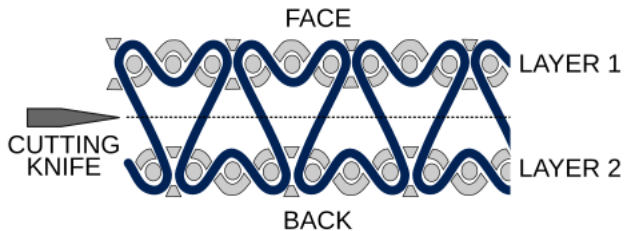
- double weave split
- over-wire

#### Double Weave Split Method

The double weave split method forms two layers of fabric that are held together with yarns that “weave” back and forth from top layer to bottom layer. That “sandwich filling” yarn forms the pile when the two layers are cut (split) apart.

## VELVET

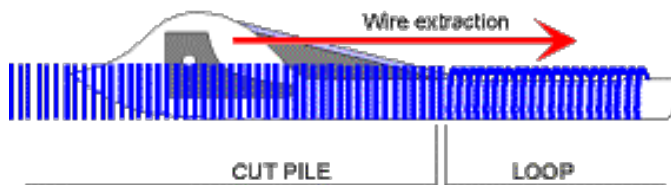
Face-to-face method of weaving  
A knife cuts through the middle during weaving to produce two layers of velvet cloth



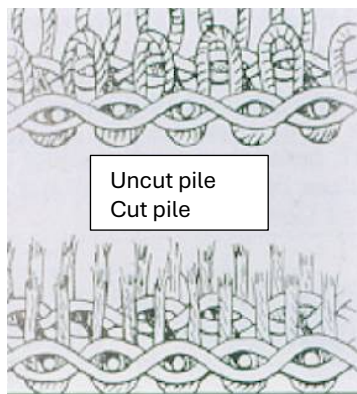
Velvet made with double weave-warp  
Source: Vlad Singer, CC0, via Wikimedia Commons  
[https://commons.wikimedia.org/wiki/File:Velvet\\_warp.svg](https://commons.wikimedia.org/wiki/File:Velvet_warp.svg)  
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### Over Wire Method

For the over wire method, one layer of fabric is woven with an extra yarn forming an uncut pile (loops intact). A “wire” holds the loops at an even height—then the loops are cut.



How cut pile is made on a velvet weaving machine  
Source: Flemish Weaver, CC BY-SA 3.0  
<<https://creativecommons.org/licenses/by-sa/3.0/>>, via Wikimedia Commons  
[https://commons.wikimedia.org/wiki/File:Wire\\_extraction.gif](https://commons.wikimedia.org/wiki/File:Wire_extraction.gif)  
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Pile direction can be either warp (lengthwise) or filling (cross-wise)



Detail of bodice and skirt, 1960-69. Velveteen ground: black bodice, brown skirt with border prints. Designer Emilio Pucci

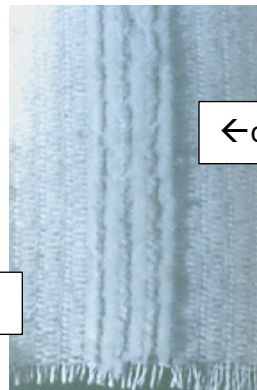
Source: Goldstein Museum of Design, University of Minnesota

For whole garment views and details go to:

<https://goldsteincollection.rediscoverysoftware.com/mDetail.aspx?rID=1980.098.116a-b&db=objects&dir=GOLDSTEIN>

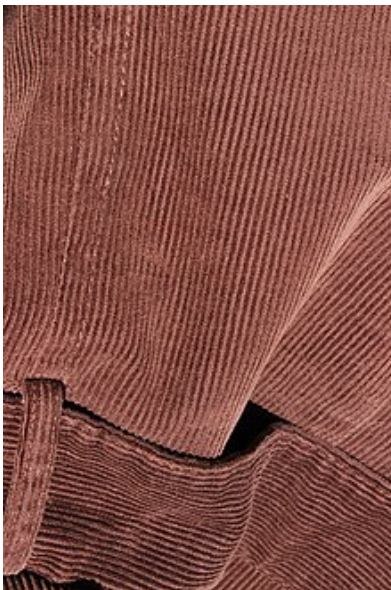
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Corduroy fabric has distinct “ridges” in the lengthwise direction. Those ridges are formed with filling floats. Some of the floats are cut (pile) while others are left uncut (flat areas).



← cut floats forming the ridges

Uncut floats forming flat areas→



Corduroy—detail of a brown cotton jacket

Source: Anna reg, CC BY-SA 3.0 AT

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[https://commons.wikimedia.org/wiki/File:Cordjacke\\_detail.jpg](https://commons.wikimedia.org/wiki/File:Cordjacke_detail.jpg)

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### *Warp Pile Weave Characteristics*

- Cut pile (fuzzy) on one side or uncut pile (loops) on one side
- Soft drape in lengthwise direction
- Soft tactile sense on pile side
- Cut pile direction affects shade appearance (light in one direction and darker in the other)
  - With pile in “up” direction, shade is darker; in “down” direction it is lighter  
Decide which appearance you want
  - Then—Use one-direction pile pattern lay-out to avoid shade differences in parts of the finished piece—or use shade direction differences as a design element

*Warp pile weave fabric name examples: velvet, terrycloth, velour, freizé*

*Filling pile weave fabric name examples: velveteen, corduroy*

Note: the similarities in fabric names: velvet and satin (warp structures), velveteen and sateen (filling structures)

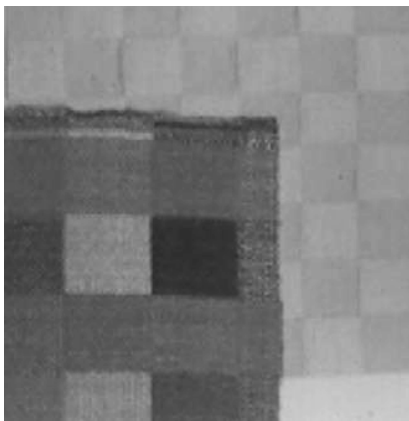
### **Woven Structures: Double Weave**

#### Double Weave

*Double weave is structured with either:*

- 4 sets of yarns
  - or
- 3 sets of yarns
  - or
- 5 sets of yarns

Four sets of yarns are used to make reversible double cloths for a visual color effect. You can see one set of yarns in one color on one side of the fabric with the other set in another color can be seen on the other side. Think of a reversible checkerboard—a square on one side is red, the same square area on the other side is black. Look at the square to the left and the colors reverse.



Four sets can also be used to provide texture. The structure on the back side is tight in some areas to form puckers on the face side.

Fabric name examples: matelassé, brocatelle



Silk cape, silk satin, matalassé double cloth. 1701-1800.  
Palais Galliera, musée de la Mode de la Ville de Paris  
Source: Anonyme, CC0, via Wikimedia Commons  
[https://commons.wikimedia.org/wiki/File:Cape,\\_1920.1.1998\(5\).jpg](https://commons.wikimedia.org/wiki/File:Cape,_1920.1.1998(5).jpg)  
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Double weave with three sets of yarns can be made with one warp set and two filling sets OR two warp sets and one filling set.

Three set examples:

- Double-sided satin ribbon



Double-sided satin ribbon is made with two warp sets—  
The luxurious ribbon has shiny floats on both sides of the ribbon

- Some woven blankets are made with two filling sets to provide more warmth.



Hand woven wool double weave blanket, Auckland War Museum (Tamaki Paenga Hira), Auckland, New Zealand  
<https://www.aucklandmuseum.com/>  
Source: Auckland Museum, CC BY 4.0  
<<https://creativecommons.org/licenses/by/4.0/>>, via Wikimedia Commons  
[https://commons.wikimedia.org/wiki/File:Blanket\\_\(AM\\_807\\_5-1\).jpg](https://commons.wikimedia.org/wiki/File:Blanket_(AM_807_5-1).jpg)

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Double weave formed with five sets of yarns forms two layers of cloth (separate) that are joined by interlacing the two layers with the 5<sup>th</sup> set of yarns. Some coat fabrics are woven with five sets making them reversible and providing extra warmth.



Reversible camel and hot pink wool coat  
Design Bill Blass, 1980-1985  
Photo courtesy of the Goldstein Museum of Design  
<https://goldsteincollection.rediscoverysoftware.com/mDetail.aspx?rID=1996.004.022a-b&db=objects&dir=GOLDSTEIN>  
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Next section: leno weave and slack-tension weave