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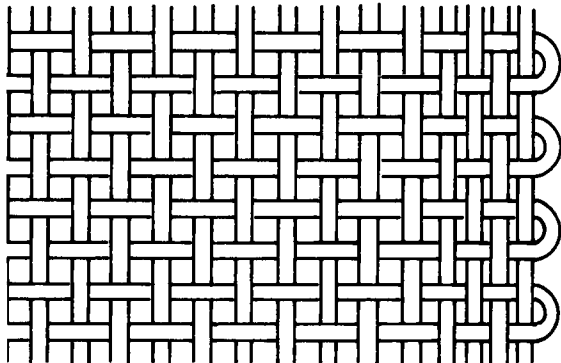
# The Structure of Woven, Knit, and Other Fabrics

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There are many methods for using fibers or yarns to produce textile fabrics. Some of the oldest methods of fabric construction include weaving, knitting, felting, lacemaking, and braiding. The newer methods include bonded fibers, laminated, and coated fabrics. Many different fibers are used to make the yarns of woven, knit, and other fabrics. Without first being made into yarns, some fibers are directly used to make non-woven fabrics. Some fibers, and the yarns made from them, are more suitable to certain fabric constructions than other fibers. Since the structure of the fabric affects its appearance, handling, and behavior, you should be able to recognize the difference between the more common fabric construction methods.

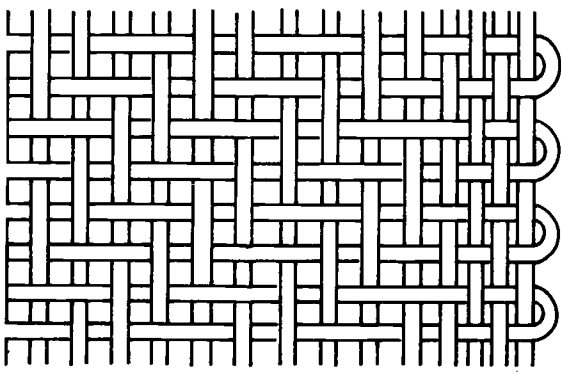
## WOVEN FABRICS



Plain weave

Woven fabrics are produced by inserting one set of yarns (weft) at right angles to another set (warp) that is held taut. The warp yarns are stronger and less flexible than the weft yarns. The warp extends the entire length of a piece of fabric and is called the lengthwise yarn direction or lengthwise grain. The weft threads weave back and forth from side to side (the selvages). The weft is called the crosswise yarn direction or cross grain.

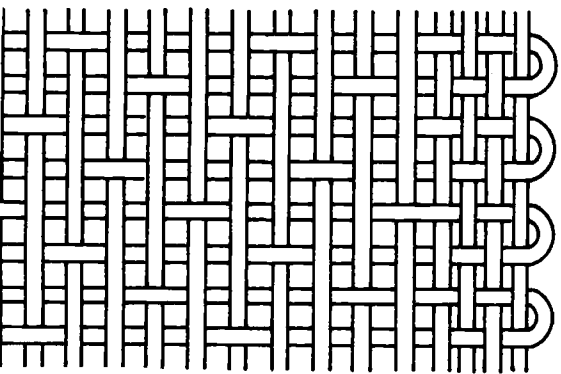
The plain weave is frequently used because it produces a strong, firm fabric. The fiber used in the yarn, the diameter of the yarn, and the tightness of twist as well as the spacing between yarns are ways to vary a plain weave fabric. Lightweight, plain weave fabrics include chiffon, voile, and organdy. Medium weight, plain weave fabrics include muslin and gingham. Heavy weight, plain weave fabrics include duck, canvas, and burlap.



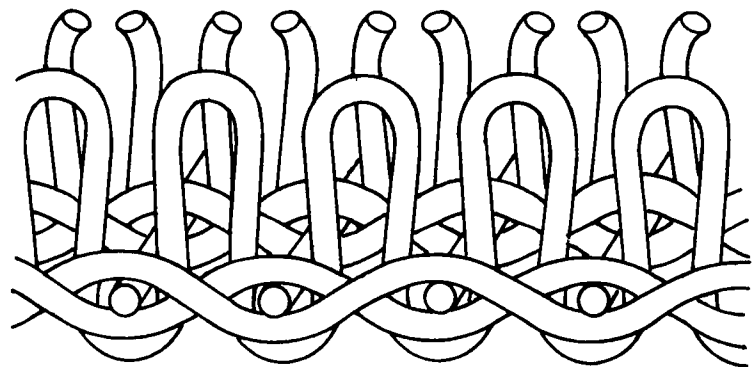
Twill weave

Yarns may be interlaced in various weave patterns to give different fabric appearances. These various weave patterns also affect the handling and behavior of the fabric. Popular weave variations include *twill*, *satin* and sateen, and *pile* fabrics such as velvet, velveteen, terry, and corduroy.

When buying woven fabrics, check to see that the lengthwise yarns (warp) and crosswise yarns (weft) are at right angles to each other. Most of today's fabrics have finishes that will not allow you to straighten or square the yarn intersections if it was not done during manufacturing.

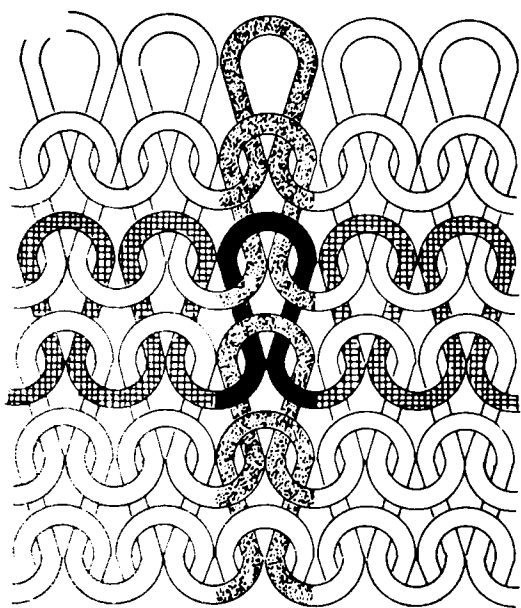


Satin weave

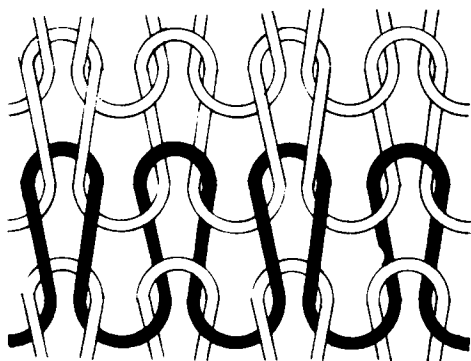


Pile weave with both cut and uncut loops

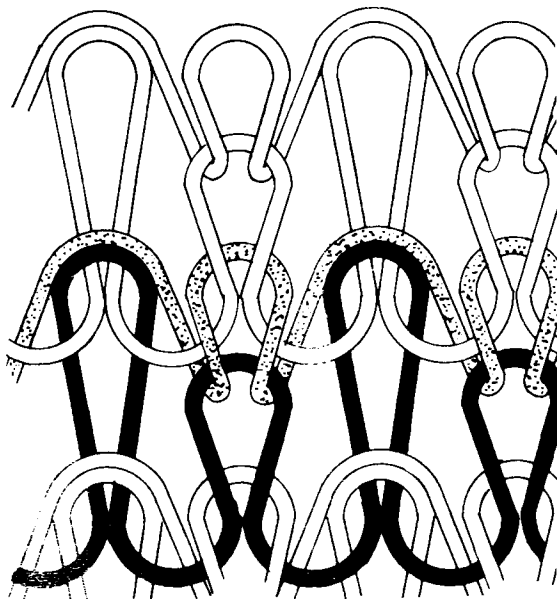
## KNIT FABRICS



Single knit



1x1 rib knit



Double knit

Knit fabrics are produced by a series of interlocking loops or stitches. There are two main categories of knitting—weft knitting and warp knitting.

**WEFT KNITTING** is similar to hand knitting: The yarn moves horizontally across the fabric and loops are made one at a time. The fabric is constructed as these horizontal rows of knit loops, or courses, are added on top of each other. Each vertical line of loops is called a wale.

**SINGLE KNIT OR JERSEY** or, in handknitting, stockinette has knit loops facing only one side of the fabric. It is a fairly elastic fabric with each side having a different appearance: the face shows the V of the knit loop while the back shows the horizontal part of the loop. Single knits have the greatest stretch in the crosswise direction and are generally used in casual semifitted clothing; however, they lack the stretch recovery of some of the other knits. Single knit fabrics should therefore be checked for both stretch and recovery. Coordinate single knits with patterns designed for knits on the basis of stretch.

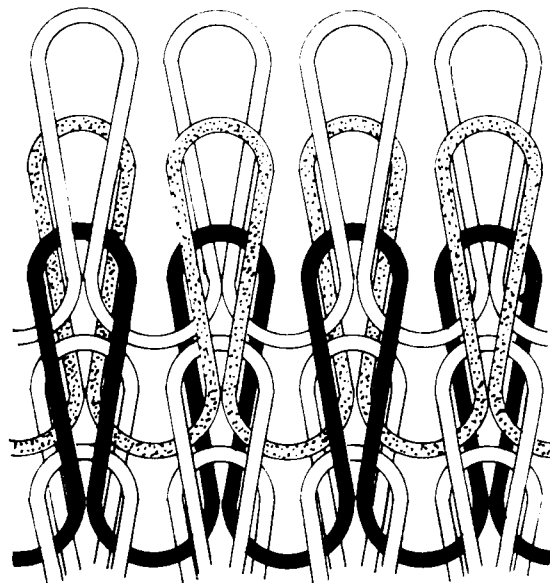
**RIB KNIT** has loop wales that alternate to face opposite sides of the fabric. The fabric has a similar appearance on each side. The stretchiness of a rib knit fabric depends on the number of knit loops that face each direction. Rib knit fabrics are bulkier but have better recovery from stretch than other single knits. The amount of stretch in a rib knit should be compared with the stretch gauge found on patterns designed for stretch knits. This ability to stretch and recover influences the fit and the construction of the garment.

**DOUBLE KNIT** fabrics are weft knits produced by machines with two sets of needles and additional sets of yarns. Double knits are variations of the rib stitch, so they may look similar on both sides of the fabric. Double knits are generally run-resistant, firmer, less stretchy, and more stable than single knits, but are as bulky or bulkier than rib knits. Double knits generally provide more insulation because of the double set of yarns and the air pockets formed between the yarns.

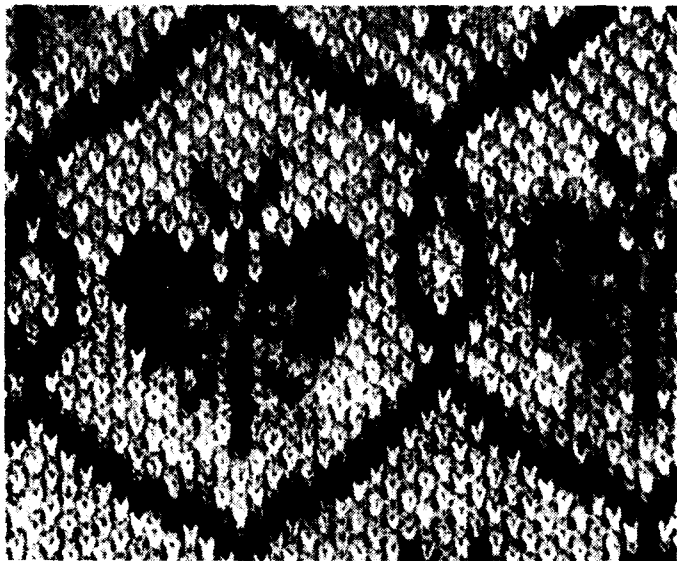
Double knits frequently are coordinated with patterns suitable for woven fabrics rather than patterns intended for stretchy knits. The stretch and recovery of a double knit should be compared to the stretch gauge found on some patterns.

A common type of double knit is the *interlock*. This is a rib knit made with a double set of yarns giving a smooth surface on both sides. Because interlocks have a smooth surface, they frequently have printed designs. Interlocks are less stretchy than single rib knits, but more stretchy than other double knits. They can run in one direction. Interlock knits should be compared to a stretch gauge for pattern coordination.

There are many variations of double knit structures including pique, Ponte di Roma, blister stitch, crepe stitch, and jacquard or pattern.



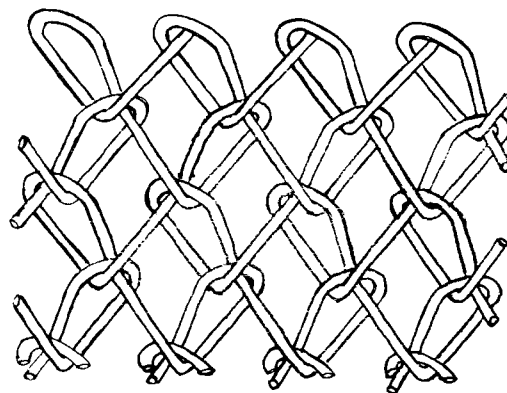
Interlock



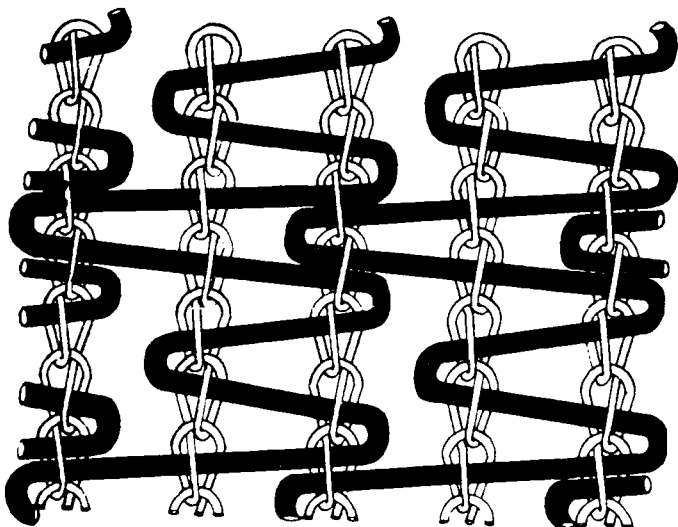
Jacquard or pattern

**WARP KNITTING** uses many more yarns than weft knitting. Each warp yarn is guided by a machine needle and follows a zigzag course through the fabric length. Thus, warp knitting produces a durable, run-proof, flatter, and less bulky fabric than weft knitting. The elasticity, firmness, and stability of the fabric may vary.

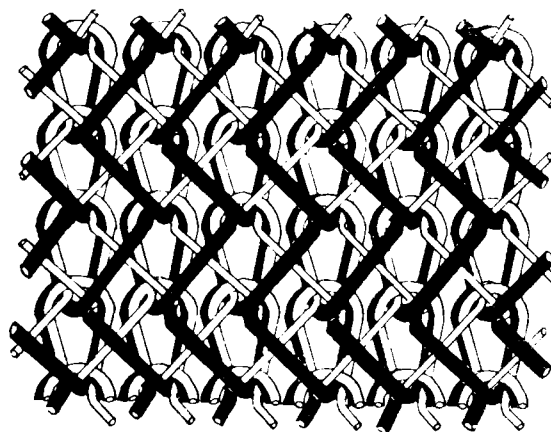
*Tricot* and *raschel* are types of warp knitting. Tricot is made with two sets of yarns. It has fine vertical wales on the face and a fine herringbone rib on the back side. Raschel is a versatile type of warp knitting that ranges from lacy patterns to fur-like cloth.



Single bar tricot



Raschel

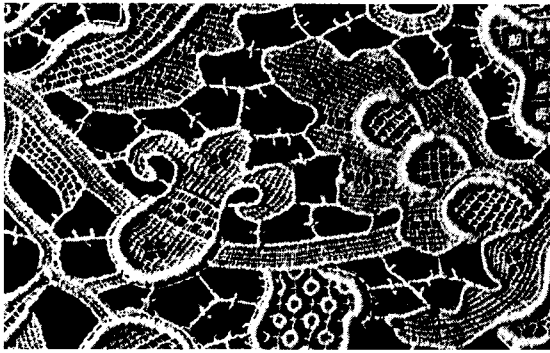


Double bar tricot

## OTHER STRUCTURES

**FELT** is a matting together of wool or hair fibers sometimes blended with certain man-made fibers. Felting is done by applying heat, moisture, and pressure to a web of tangled fiber. Felt does not ravel and does not have a yarn direction or grain. Felt is not durable as a garment fabric, but is frequently used in decorative projects for home furnishings and individualized clothing.

**BONDED FIBER** is a non-woven fabric made from a web of man-made fibers held together by a resin, heat, and pressure, or needle punching with barbed needles. Bonded fiber fabrics retain their shape and resist wrinkles and shrinkage. Their strength and durability depend on the materials and processes used in manufacture. Bonded fiber fabrics may have no stretch, stretch in one direction, or stretch in any direction. They are frequently used as interfacing fabrics and should be carefully coordinated with fashion fabrics.



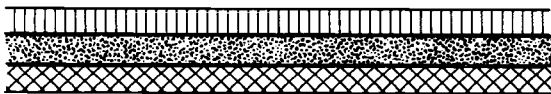
**LACE** is the twisting, intertwining, and sometimes knotting of threads around each other to form a mesh of holes and pattern. Lace ranges from simple nets to complex floral patterns and from narrow width trims to dress-width yardage. Lace yardage may have a one-way design which requires purchasing additional fabric and following the pattern layout for a napped fabric. Patterns for garments of lace should have a minimum of darts and design details. The design of the lace must be matched and frequently special use is made of the lace design as part of the garment style. Delicate lace fabrics require special handling and garment construction.



Fabric—fabric



Fabric—foam



Fabric—foam—fabric

**LAMINATED FABRICS**, sometimes called bonded fabrics, are two or more layers of material joined together. A laminated fabric may be a bond of fabric to fabric, fabric to foam, or a combination of fabric, foam, and fabric. Fabrics are laminated to increase warmth, reduce cost, improve handling, reduce shrinkage, and to increase the uses of the fabric. The quality of a laminated fabric depends on careful on-grain and durable lamination. Carefully consider the use and purpose when selecting laminated fabrics and check for an even and thorough lamination. These fabrics should be coordinated with patterns with simple styling and loose fit.

**COATED FABRICS** have a woven or knitted base cloth to which a polyvinylchloride or resin coating is applied. These fabrics can be given numerous surface treatments to simulate different leather looks. Fabrics also may be coated to make them water and weather resistant. Coated fabrics cannot be eased so patterns with simple lines should be selected and tested for smoothness of construction.

*Prepared by Ardis W. Koester, Extension textiles and clothing specialist, Oregon State University Extension Service. Illustrations of knitted fabrics are courtesy of the National Knitted Outerwear Association.*



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