

# Denim

Denim fabric, born in de Nims, France and adopted as a durable pant fabric in the 1849 California Gold Rush, is one of today's most recognized fabrics.

Denim's durability is due to the weave, called a twill weave. Twill weaves have great abrasion resistance, meaning the fabric will absorb a lot of friction before it breaks apart. The reason for such great durability is the way the yarns are woven together: one set of yarns floats over another 2-4 set of yarns at regular intervals to create a diagonal textured fabric surface. It is these yarn "floats" that absorb the abrasion. When the floating yarns are worn away, there are still more yarns underneath to hold the fabric together. Take a look at a pair of worn jeans, and look for places when the float yarns have worn away, exposing the white yarns underneath.

Denim has always been used for very durable outdoor work clothing. Because of its weight, rigidity, and thickness, denim is chosen for casual jackets, skirts, and jeans. Now that so many garment-finishing techniques are applied to denim, its use has broadened into different lifestyles. Denim apparel can command high prices, depending on the fit, finishing, and brand name. Denim is still mostly used for jackets and pants, with most attention focused on interesting jeans.

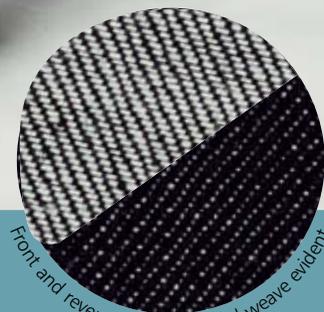
Spandex yarn is added to denim to make the denim elastic. Denim without spandex tends to "hold" the body. A 2-5% spandex blend with cotton will stretch the fabric over the body for a more comfortable fit.

## Strengths

- Highly durable fabric that can withstand abrasion.
- Once the garment has been washed, denim does not progressively shrink.
- Desirable textured surface.
- Universally recognized fabric.

## Weaknesses

- Poor colorfastness—color will bleed into laundry and rub off (crock) onto other surfaces.
- Denim stretches out, requiring hot water washing and drying to recover the fit.
- Creates thick layers of fabric when sewing.



Front and reverse sides; diagonal weave evident

## Distinctive features: Denim

**The character of the diagonal surface texture:** The twill line can follow upward to the right (right-hand twill) or upward to the left (left-hand twill) diagonal direction. In addition, the floating indigo surface yarns can float over 2, 3, or 4 yarns, giving them the names 2-by-1, 3-by-1, or 4-by-1 twill weave. All will function as a denim fabric, but the width and angle of the diagonal line will change: the more yarns floated over and the shallower diagonal direction, the more pronounced the diagonal lines. The fewer yarns floated over, and the steeper the diagonal direction, the less noticeable the diagonal lines.

**Indigo (dark navy) warp yarns and light color weft yarns:** The surface floating yarns are always indigo and show the diagonal texture, and when worn away reveal the light color yarns underneath. Denim is never one color. Such a fabric is called "drill" or "bull denim."

**Cotton fiber is most often used to produce denim:** However, hemp fiber is better suited to denim fabric due to its greater strength, lighter weight, better water absorption, and faster drying time. Denim produced with hemp fiber will use less water and energy in both production and care. There are new cottonizing methods for hemp now, so the feel of hemp fiber is almost indistinguishable from cotton.

**Resin treatments:** All denim fabrics are treated with a resin before leaving the textile mill. This resin, which makes the fabric very stiff, will eventually wash out.

## Types of denim

The recipes used in garment-washing jeans are considered intellectual property. Certain chemicals, hand applications, and machinery are used to achieve specific appearances and fabric hand, and the chemicals and procedures are closely guarded secrets by the manufacturers. These are the basic washes:



**Raw**  
Raw or "unwashed" denim requires the shortest washing time. Most of the dye is retained and softeners may be added to soften the resin finish.



**Medium**  
Chemicals for bleaching and softening are added; requires longer washing time until enough of the indigo dye bleeds out to achieve the medium blue.



**Light**  
Chemicals for bleaching and softening are added; requires longest washing time, with greater dye loss to achieve the light blue color.



**Turn up the volume**  
Denim has metamorphosed from work pants into even the most high-end garments. Used mostly in jeans and jackets, here Issey Miyake has used a particular wash "recipe" to create a worn look.

## ECO CONCERNS

Dyeing and garment-washing methods require that the waste water must be neutralized before re-entering local water supplies. As a further concern for the designer, denim washing is often done in countries where clean drinking water is not always available (despite being used in garment production).