

A photograph of a large agricultural field covered in blue and white plastic mulch. The mulch is laid out in neat rows, and a tree trunk is visible in the center of the field. The image is framed by a thick blue border.

*Avoiding Fabric Holes  
Caused by Needle Cuts  
and Other Variables*

*Source: New Cloth Market*

# Avoiding Fabric Holes Caused by Needle Cuts and Other Variables

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## Introduction

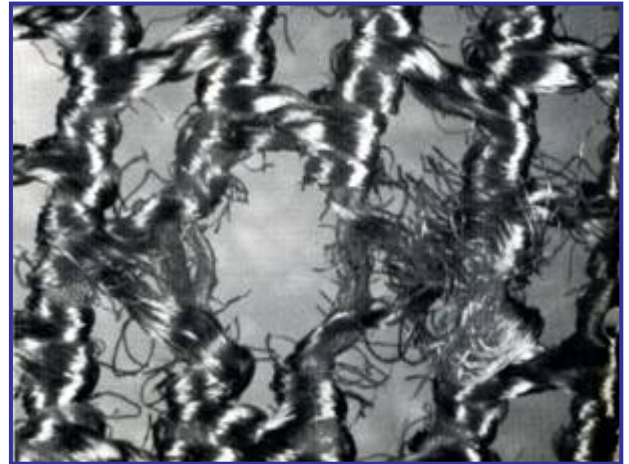
Needle cuts are a recurring problem in many apparel sewing plants and unfortunately there's little that can be done to remove them. Once the garment is in the consumer's hands the needle cuts can take an even more destructive route—turning into long runs. So just what causes these insidious little defects and how can they be avoided?

Needle cuts occur when the point of the needle penetrates the fabric and severs the fiber structure creating a hole or a run (see Image One).

The needle point is the part of the needle starting at the beginning of the top of the needle eye and ending at the needle's tip (see Image Two).

**Image One: Needle Cut**

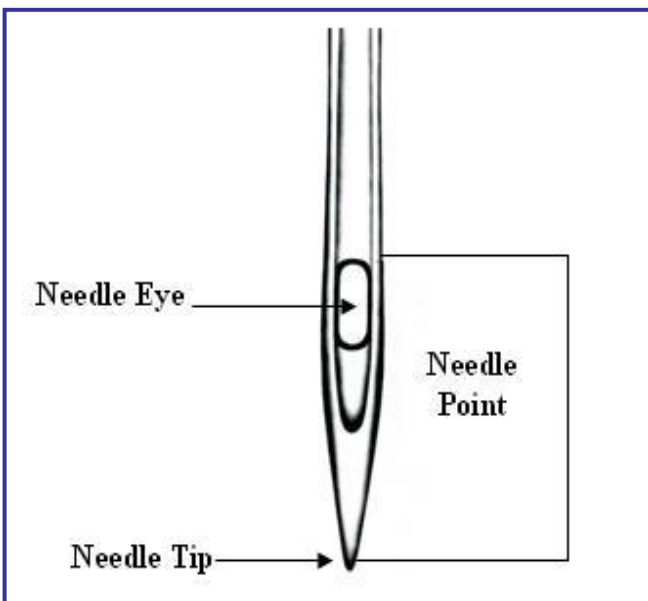
*Courtesy: Groz-Beckert®*



## Variables that Can Cause Needle Cuts

**Image Two: Needle Point**

*Courtesy: Groz-Beckert®*



Needle cuts can be caused by a variety of reasons. One of the most common causes of needle cuts is the presence of a burr or rough spot on the needle point.

When the needle penetrates the fabric the burr or rough spot severs the fibers. Burrs and rough spots are often not visually detectable and sometimes can't even be detected by feeling the needle. To remedy this situation the machine that is causing the needle cuts should be identified and the needle changed immediately.

Using the wrong needle for a specific fabric construction can also result in needle cuts. To accommodate different fabric constructions, needle points are manufactured in a variety of sizes and profiles (see Image Three).

If the needle point is too large for a specific fabric, the needle point can damage the fibers when the needle penetrates the material.

Using the wrong needle point profile may also damage the fibers in the fabric. The proper size and profile should be selected to accommodate the fabric construction being sewn.

### Other Sewing Machine Variables that Cause Fabric Holes







Not all holes and runs occurring around the area where the needle penetrates the fabric can be attributed to the point of the needle. It can be hard to determine whether a visual abnormality is a needle cut or a rupture caused by some other source.

When visual abnormalities in the fabric occur during sewing, the obvious interferences should be checked—burrs and rough spots on the needle point and improper needle selection. If the visual abnormalities continue to persist, other possible causes should be investigated.

The sewing needle is composed of a needle point which tapers out to create the blade, widening further into the shoulder and finally the shank. The shank is fitted into the needle holder (see Image Four).

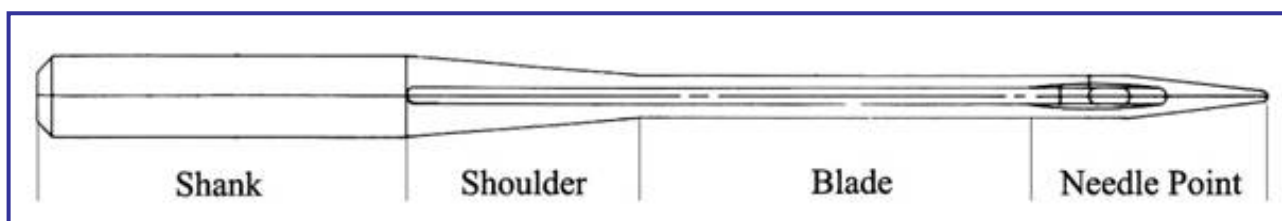
### Image Three: Different Needle Point Profiles

Courtesy: Groz-Beckert®

Profile	Description
	Acute round point
	Normal round point
	Light ball point
	Medium ball point
	Special ball point
	Heavy ball point

### Image Four: Needle Parts

Courtesy: Groz-Beckert®



If the diameter of the working part of the blade (the part that penetrates the fabric) is too large, a rupture can occur. To avoid damage to the fibers by the needle blade, the smallest possible needle size should be used.

When sewing thick fabric, the shoulder may also penetrate the fabric and rupture fibers. When this happens a longer needle should be used. However, careful attention should be paid to needle length. Longer needles tend to break and bend more readily than shorter needles.

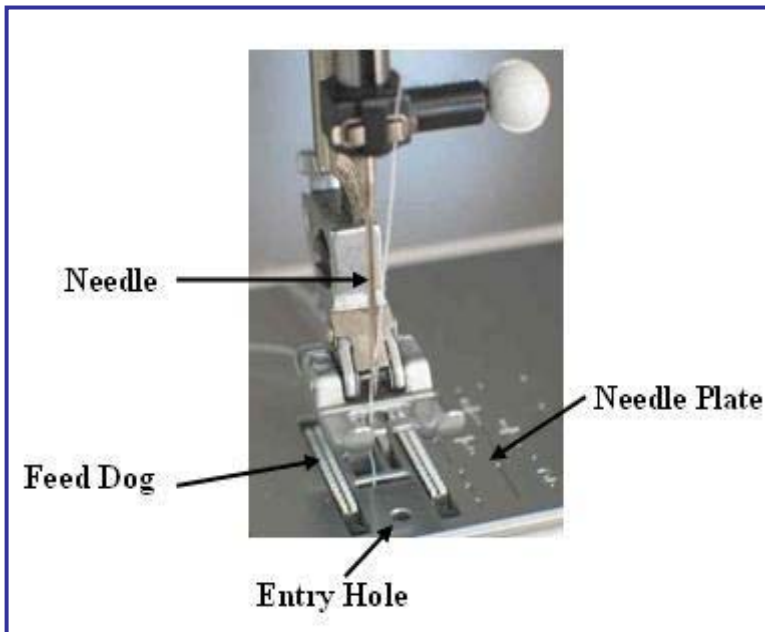
Many sewing machines which produce the commonly used overedge stitch use a straight needle. In an ideal set-up the needle path should be perfectly perpendicular to the plane of the fabric. However, often there is an angularity between the needle and the plane of the

fabric—sometimes as high as 20 degrees. The angularity, even if it is small, can create a sawing action on the fabric caused by both the needle's surface and the sewing thread. The sawing action can sever the fibers and result in a hole. A thread lubricant can be applied to minimize the friction generated by the sawing action of the needle blade and sewing thread on the material's fiber structure.

When sewing knit fabric constructions, a curved needle machine is often used. As the needle penetrates the fabric the sewing thread and the needle's surface can abrade the fabric. In this case a thread lubricant can also help remedy the situation.

**Image Five**

*Courtesy: Groz-Beckert®*



The occurrence of fabric pinching can also result in holes. The fabric can get caught or pinched between the needle and the entry hole in the needle plate (see Image Five).

To avoid fabric pinching, the hole in the needle plate should be one and a half times the diameter of the needle blade. The needle should also be positioned so that the point penetrates the hole directly in the center. If the needle is off to one side it may rub on the plate, creating a burr or rough spot on the needle point.

On new machines the throat plate can have either a drilled or countersunk configuration (see Image Six).

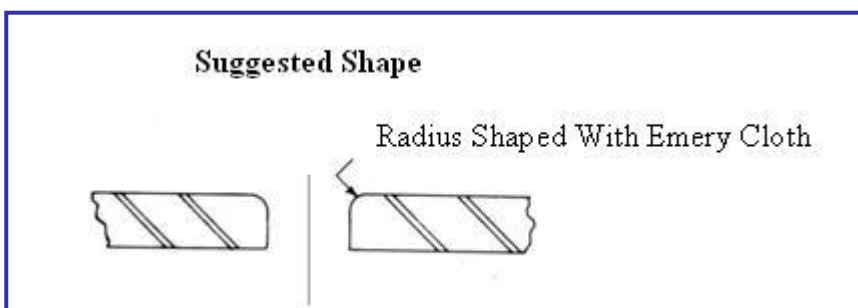
**Image Six**

*Courtesy: Groz-Beckert®*



**Image Seven**

*Courtesy: Groz-Beckert®*



In some cases the fabric can become pinched between the needle and the surface of the throat plate. To eliminate pinching, the edges of the throat plate should be beveled so the fabric has the freedom to be manipulated as the needle enters the hole. The edges

of the throat plate can be beveled using an emery cord or tape (see Image Seven). However, it is important to note that excessive beveling can cause skipped stitches.

The teeth of the feed dog can also cause holes in the fabric. The teeth of the feed dog move in an elliptical motion—carrying the fabric into the sewing zone (refer to Image Five). The teeth sharpness should be selected according to the fabric type. If the teeth are too sharp, fibers can be severed. In addition, if the feed dog is offset or adjusted improperly to suit the fabric type and stitch length, the fabric can be pinched or caught between the feed dog and the needle plate, creating a hole.

### **Holes Attributed to Variables other than the Sewing Machine Parts**

Holes created in fabric during sewing can also be caused by variables other than the sewing machine itself. Other variables that can cause holes include brittle and weak fabric, improper fabric handling by machine operators and poor machine maintenance.

Brittle fabric is susceptible to damage during sewing. There are a number of variables that can cause fabric to become brittle.

It has been observed by industry professionals that dark colored fabrics have more of a propensity to get needle holes than lighter colored fabrics. When dyeing dark colors some dye classes can make the fabric brittle, specifically direct and sulfur dyes.

When direct dyes are used to dye fabrics dark shades an after treatment is required to help fix the dye and improve the wash-fastness. The after treatment can make the fabric brittle. When sulphur dyes are used to dye fabrics, especially a black shade, an after wash process is necessary. If the after wash process is incorrectly performed, the fabric can experience tendering (loss of strength) during prolonged storage.

Fabrics can become brittle if the humidity in the plant is not carefully controlled. Arid environments dry out fabric making the fibers more susceptible to breakage. In this event, a fabric softener can be applied to the fabric. There are a variety of softeners. However, some softeners can adversely affect the strength of the fabric, therefore softeners should be carefully selected.

Holes in the fabric can also be attributed to improper fabric handling by the sewing operators. While manipulating the material, operators sometimes pull the fabric too tight—putting the yarns in the fabric in an elongated state. In this taut state the yarns do not have the ability to move out of the way of the needle point which can potentially damage the fibers upon penetration.

Regular and thorough machine maintenance will also help to avoid unwanted holes in the fabric. Lint and dirt in a sewing machine can change the path of the sewing needle. If the path of the needle is deflected it can come in contact with other machine parts, resulting in needle damage.

Once needle cuts occur in the fabric, there is little that can be done to get rid of them. The best solution is to take preventative steps by choosing the right needle, ensuring proper machine adjustments and conducting regular machine maintenance. If holes continue to appear it is imperative to look for other potential culprits to get rid of holes as quickly as possible!

## References

- Groz-Beckert. Needles of High Precision Sewing Manual
- Jack Nienke, Manager of Industry Services, [TC]<sup>2</sup>
- Len Farias, Cotton Incorporated
- Schmetz Needles. Technical Advice for Sewing Textiles

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**Image Courtesy:** [apinnick.wordpress.com](http://apinnick.wordpress.com)