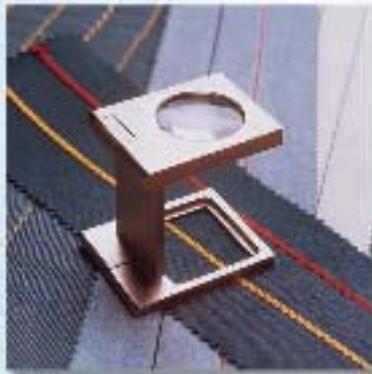




Service & Technik
Information for the sewing industry



Prevention of
seam pucker



Prevention of seam pucker

Fine fabrics are often difficult to sew. The biggest problem here is seam pucker. While sewing or after a short while thereafter, the material along the seams starts to look a bit rippled. Remedying the pucker by ironing or pressing is usually a temporary solution. After first laundering at the latest, the pucker is back.

In order to choose the right measures to prevent seam pucker, it is necessary to analyse the bad seams first. Basically, there are three types of pucker:

1. Tension pucker

2. Feed pucker

3. Displacement pucker

Depending on the characteristics of the material, one or more pucker types may occur at the same time. Glossy fabrics are prone to feed pucker, tightly woven fabrics to displacement pucker, and very fine and light fabrics often show tension puckering along the seams. Preventive measures and remedies are different for each type of pucker. Each type requires different preventive measures. The first step towards improving seams should therefore be a close examination of the puckering and its causes. The second step will then be to thoroughly choose specific and suitable remedies.

1. Tension pucker



Identification: symmetric pucker to the left and right of the seam; pucker is gone after thread is clipped between adjacent needle penetrations

Cause: Excess thread tension

There is too much tension in the seam thread thus causing light, thin material to pucker. The main cause for this problem is that the sewing machine thread tension is set too high. Besides this, there are other factors that can cause or increase excess thread tension.

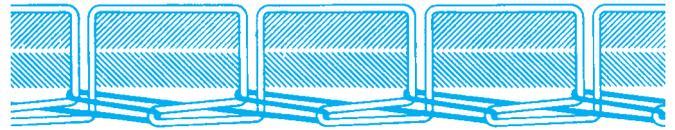
- High thread tension of either the needle or bobbin thread causes an unfavourable thread balance between needle and bobbin thread.



Unfavourable thread balance with lockstitch: needle thread tension set too high or bobbin thread tension too low

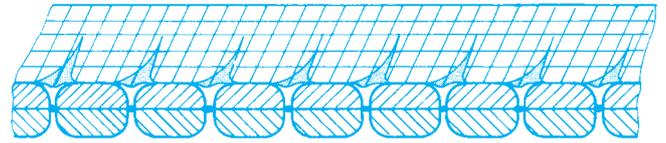


Unfavourable thread balance with lockstitch: bobbin thread tension set too high or needle thread tension too low

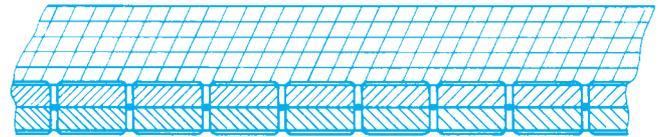


Unfavourable thread balance with double chainstitch: bobbin thread tension too high or needle thread tension too low

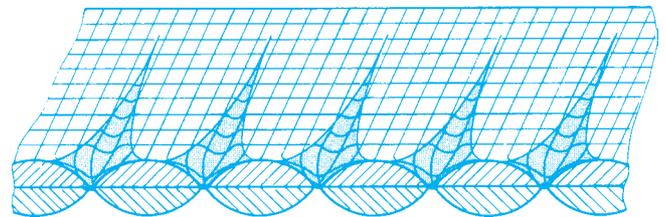
- Excess stitch length – increases tension between the stitches.



Thread position approximating reality



Idealised theoretical lockstitch seam



Effects of tension between the stitches with a too long, meaning unfavourable, stitch length

- Bobbin threads wound too tightly in lockstitch machines – causes the thread to stretch. After sewing, it will return to its original unstretched condition. The result will be puckering along the seams.

Solution:

- As a rule, the thread tensions of the needle and bobbin threads must be set as low as possible. Rule of thumb: "As low as possible, as high as necessary".

On lockstitch machines, the bobbin thread tension is first set as low as possible; the needle thread tension is then adjusted.

A good stitch control requires a certain minimum amount of tension in the thread. Therefore, with extremely thin and delicate fabrics, slight puckering often cannot be avoided completely.

- Checking the thread tensions regularly is recommended. Besides manual checks (requires trained and experienced staff), we especially recommend the use of thread tension gauges. Suitable here are the simple and cheap spring balances, or thread tension gauges that have been specifically developed for this purpose.

For sewing **fine** fabrics, you can use the following thread tension values for a **rough** calculation:

lockstitch machines, high-speed sewing machine, 2-ply sewing
 Needle thread < 70 cN
 Bobbin thread adapted, (< 30 cN)

Sewing systems usually require higher thread tension.

- Extremely critical materials should be processed with the lowest possible thread tension values of no more than 40 cN. The maximum thread tension values also depend on the condition, maintenance and care of the sewing machines.

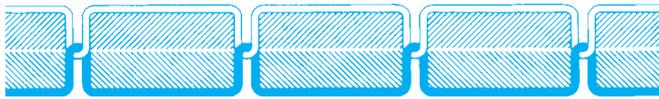


Thread tension gauge and spring balance for checking thread tensions on sewing machines

- Winding the under-thread bobbin for lockstitch machines must be carried out very carefully and with very low tension.
- Through regular visual checks one can ensure and maintain an exact thread balance between needle and bobbin thread.



Correct thread balance for lockstitch: the lockstitch seam is perfectly balanced, if the loop of needle and bobbin threads is positioned in the centre of the fabric.



Correct thread balance for double chainstitch: the thread tension on double chainstitch machines is set correctly when the needle thread forms a pointed loop on the underside of the fabric through which the looper thread can easily be pulled when unpicking the seam.

- Stretching the fabric under the presser foot manually can also help to avoid tension puckering. The thread tension also has an effect on already finished seams. Stitches formed last are also affected by the thread tension through the thread take-up lever. Good control of the material can thus favourably influence seam quality. Due to their specific features, some of the newly developed machines (for example, top driven roller feed machines), make fabric stretching unnecessary. Anyway, this measure should be used only if it is the last resort for ensuring a smooth and even seam.

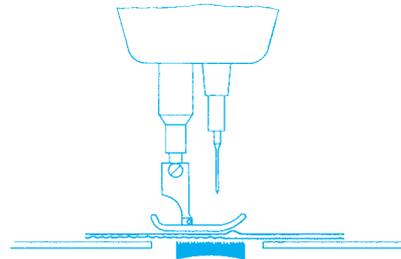
2. Feed pucker



Identification: puckering asymmetrical to the seam
(Fabric is rippled and uneven on one side of the seam only)

Cause: Sewing two equal pieces of fabric, which appear different in length after sewing.

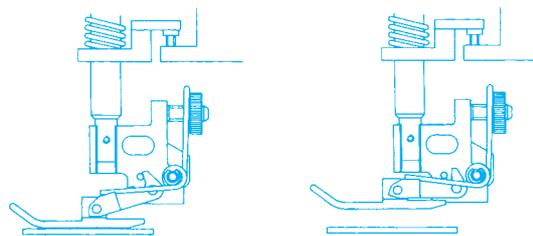
The common drop feed transport mechanism only applies force on the underside of the two plies of fabric. Transport of the top ply takes place only through friction between the two plies. This leads to feed pucker, especially with smooth, glossy fabrics. This effect is increased if the presser pressure is set too high.



Schematic representation of how feed pucker is caused

Solution:

- Set fabric pressing force as low as possible. Apply just enough pressure to ensure an even transport of the material.
- Adjust the lift of the feed dog so that the teeth protrude only slightly above the stitch plate.
- Use fine-toothed, plastic-coated feed dogs with good adhesion.
- Replace worn feed dogs (rounded teeth).
- Use Teflon presser feet.
- Use the transport system that suits the type of work process best (for example, needle, roller, or tongue top feeders).
- Stretch material manually in front of and behind the needle.
- In the case of multiple stitching, sew in one direction only.
- Reduce the maximum sewing speed.
- Use a floating presser foot: With this system, only the sewing foot itself – and not the entire presser foot system – has to be moved together with the feed dog lift. This makes it possible to work with a much lower pressure. This method also allows much higher sewing speeds, because of the much lower inertia of the moving parts.



Floating presser foot

3. Displacement pucker



Identification: symmetric pucker at the left and right of the seam; pucker remains visible after thread is clipped between adjacent needle penetrations

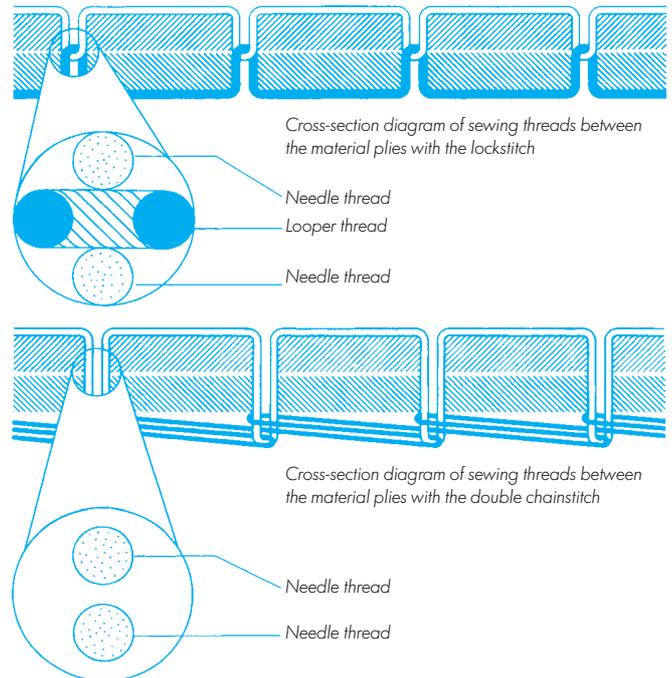
Cause: Displacement of individual warp or weft threads by needle penetration and sewing threads.

The extent of displacement depends on the density of the fabric and the way it is woven, as well as on the needle and thread thicknesses. Very fine and specially treated (easy care) fabrics allow only very limited lateral displacement of the weft or warp threads. Displacement pucker occurs quite often these days because of the popular tightly-woven micro-fibre fabrics. Due to their structure, canvas type fabrics in general tend to pucker more than sateen or twill type fabrics.

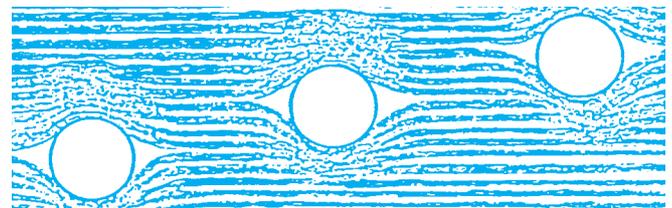
Solution:

- Use the finest possible needle for a given thread size. Using a smaller needle size by Nm 5 will often visibly improve results. For practical reasons, the smallest possible needle size will most likely be a needle size Nm 65 (diameter of 0.65 mm); only very exceptional situations will allow a needle size Nm 60.
- Use special needle points and blade forms for tightly woven materials.
- Use double chainstitches (stitch type 401) for joining seams where possible. Due to the seam construction (thread looping on the material underside) this stitch type displaces less warp and weft threads.

Comparison of lockstitch to double chainstitch: space requirements of the sewing threads in the fabric



- Use the optimal stitch density settings.
- Use the smallest possible thread size for the intended use and required seam strength.
- Make the seam line run at an angle to the warp direction. As early as in the design phase or when the material is being cut, make sure that all the cutting edges are in warp direction (at an angle of 5-10 degrees to the thread direction).



With a diagonal seam, the fabric thread displacement spreads on several warp and weft threads

- Rotate the cutting plan by 90° so that the thread direction is in line with the weft direction. Often the thread density of the fabric is much lower in weft direction, and a seam running in this direction therefore causes less puckering.

Irrespective of the pucker type, the use of high-quality polyester or cotton/polyester sewing threads is of great importance for ensuring even seams. With its products SABA^c, RASANT and SERAFIL, AMANN offers the ideal threads for sewing fabrics, which tend to seam puckering. A wide product range with the most different ticket no. allows optimal adjustment of materials and sewing threads – best conditions to avoid seam puckering.

4. Troubleshooting checklist

Pucker Effects	Tension pucker	Feed pucker	Displacement pucker
Visible Effects	Puckering on both sides symmetrical to the seam	Asymmetrical puckering on the top or bottom side of the fabric	Puckering on both sides, symmetrical to the seam (same visible effect as for tension pucker)
Causes	<ul style="list-style-type: none"> • Thread tension too high (thread too tight in the seam) • Incorrect thread balance • Wrong type of sewing thread 	One-sided or uneven application of force by the feed dog to the fabric layers, resulting in non-uniform feed of the fabric layers while sewing	Needle thickness too great and/or sewing thread too thick?
Solution	<p>Is the right quality sewing thread grade and size being used?</p> <p>Are the needle- and under threads set to the lowest possible tension?</p> <p>Is the tension with which the bobbin thread is wound as low as possible?</p> <p>Is the thread balance between the needle and under thread correct?</p> <p>Is the seam quality improved by manual guiding the fabric?</p>	<p>Has the pressure of the presser foot been reduced as far as possible?</p> <p>Are finely toothed feed dogs being used (approx. 10 teeth/cm)?</p> <p>Does the use of a floating presser foot improve the seam quality?</p> <p>Is it possible to use machines with combined feed systems (Differential transport-puller)?</p>	<p>Are the machines correctly set and is the right needle thickness selected for the type of fabric and thread which are being used?</p> <p>Is the relationship between the needle plate hole and the needle thickness correct?</p> <p>Has the optimum stitch density been set?</p> <p>Is the puckering reduced by changing from lockstitch to double chainstitch?</p> <p>Is a needle with the correctly shaped tip being used (SPI-SANI)?</p>
	<p>Select the right sewing thread thickness, the needle thickness and a fine feed dog, according to the fabric being used, taking into account the required seam strength.</p> <p>Regular inspection and maintenance of the sewing machine and regular needle replacements.</p>		



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All facts and figures are intended exclusively for your information
All recommendations presuppose adjustment of the sewing conditions
to the appropriate sewing fabric.