

PRODUCT FOCUS

PRODUCT INFORMATION

SERVICEHOUSE



Denim

The right needle for sewing denim

These days, jeans are much more than just work or leisure clothing. More and more demands have been placed on production methods since jeans entered the fashion world: the current focus is no longer just on wear resistance and stability or resilient materials and strong seams. Jeans are now available in many different qualities and designs, such as blended fabrics with cotton, Elastan and polyamide. In the fashion world production techniques are faced with a constant range of new challenges such as embroidery and appliqué.

In jeans production many different parameters have to be considered: the needle, thread, material and machine have to be precisely coordinated to each other in order to obtain a high-quality, fault-free product. In particular choosing the right needle helps to avoid sewing problems such as skip stitches, needle breakage or damage to the material. Sewing thick and heavy material und thick material layers places especially high demands on the sewing needle.

Product Focus Denim offers practical assistance to select the right needle. We will show you how to avoid sewing problems and to achieve the best possible results. This includes the use of special needle geometries, such as the SCHMETZ SERV 7, as well as recommendations for suitable point styles and the use of specially coated needles.

Our solutions for the denim industry

- SCHMETZ SERV 7 needle design
- SCHMETZ MR needle design
- SCHMETZ NIT coated needles
- SCHMETZ ball points “SES” and “SUK”
- SCHMETZ B-27 needle design
- SCHMETZ SERV 6 design for system UY 128 GAS
- SCHMETZ DBXK5 needle design

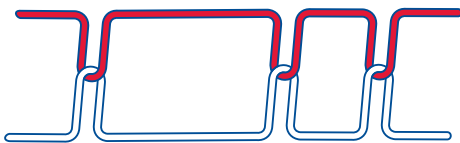
Typical sewing problems and how to resolve them

Denim is a robust, thick cotton fabric and needs a lot of care in the production process. Especially sewing of multiple layers of material at seam joining areas on the waistband as well as in the crotch or bottom hem places very high demands on the material and the needle.

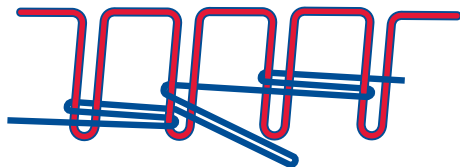
Typical problems in jeans production are:

- Skip stitches and needle breakage
- Skip stitches when using sewing automats
- Thermal damage
- Damage to the material

Sewing problem: Skip stitches and needle breakage



Skip stitch in double lockstitch



Skip stitch in double chain stitch

Causes of **skip stitches** in denim production are:

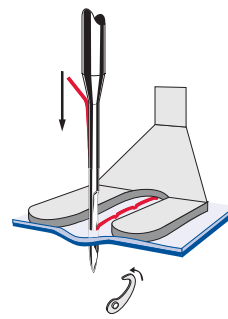
- **Different material heights (e.g. at the waistband)**
The thinner material layers flutter under the presser foot. The material layers that are not held by the presser foot are moving together with the upward stroke of the needle and thus reduce the needle thread loop. This prevents or reduces the loop formation to such an extent that the hook can no longer pick up the loop.

- **Cross seams**

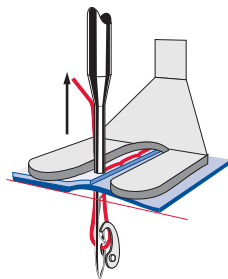
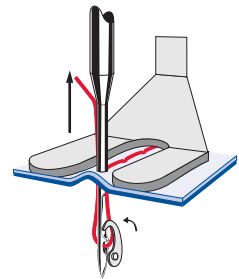
In this case the fluttering is caused by the transition between thick and thin (or thin and thick) material layers. Again the needle thread loop is reduced by the material layers that are no longer held by the presser foot, so that the hook cannot pick up the loop.

- **Deflection of the needle**

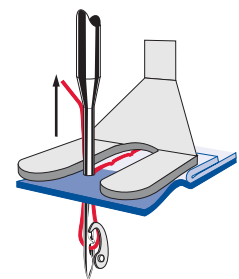
Another cause of skip stitches is deflection of the needle with extremely thick material layer transitions, which prevents the hook from picking up the loop.



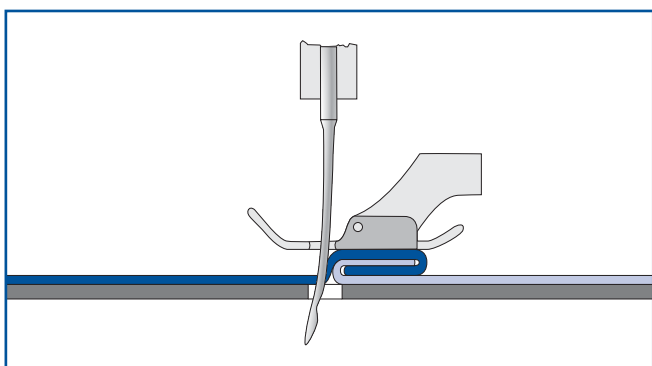
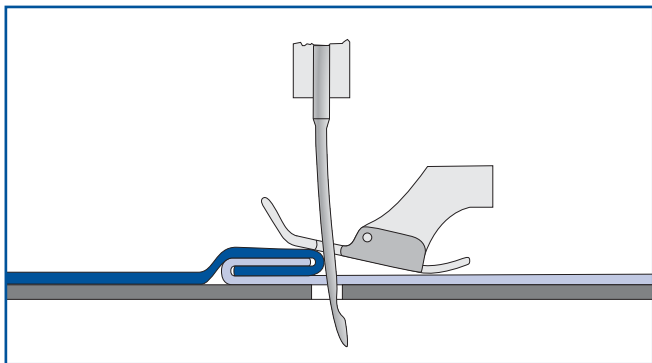
Material layers flutter



Different material heights



Cross seams



Needle deflection – cause for skip stitches or even needle breakage

The cause of **needle breakage** in jeans production is:

- **Extreme needle deflection**

With extremely thick material layer transitions, such as sewing over heavy cross seams, the needle is deflected from its correct piercing path. When the tip of the needle comes into contact with the hook or other parts of the machine the needle breaks.

SCHMETZ solution

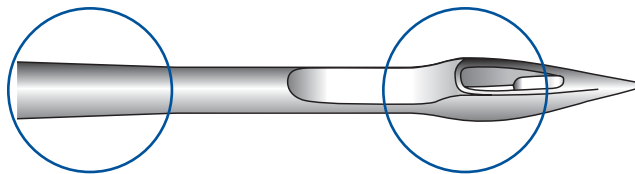
Needles with special needle geometry: SCHMETZ SERV 7 needles

The properties of SERV 7 needles:

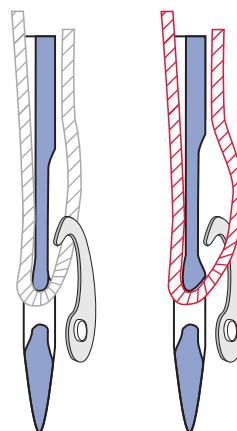
- A conically reinforced blade for higher needle stability and to prevent skip stitches
- An optimised scarf shape to form reliable loops and to prevent skip stitches even under extreme sewing conditions



Standard



SERV 7



Standard

SERV 7

The optimised scarf shape causes a wider loop to be formed so that the hook can catch the needle thread better. The stronger blade makes the needle more stable and reduces needle deflection to a great extent, even at high sewing speeds. This reduces needle breakage and thus gives the needles a longer lifetime. Skip-free sewing due to the optimised scarf shape leads to a remarkable increase in productivity and also improves the seam quality.

The advantages of the SERV 7 needle design:

- Reduced needle deflection
- Reduced needle breakage
- Prevents skip stitches
- Precise piercing
- Reduced downtime
- High productivity
- Reduced wear on machine parts (hook, needle plate, etc.)
- Reduced production costs

Application in the denim industry:

In denim production, use the corresponding needle in SERV 7 design for all seams that place a particular stress on the needle, such as

- Inner leg seams
- Yoke seams
- Cross seams
- Hems
- Bar tacks on belt loops
- Attaching pockets
- Seat seams
- Waistbands
- Different heights of material layers

Sewing problem:

Skip stitches when using sewing automats

In the denim industry sewing automats are often used for such tasks as sewing pockets. These automats are able to create multidirectional seams at a constant high speed. However, problems with skip stitches can occur as the hook does not always catch the needle thread loop securely. Another frequent problem is an unattractive seam caused by the sewing thread untwisting during the sewing process.

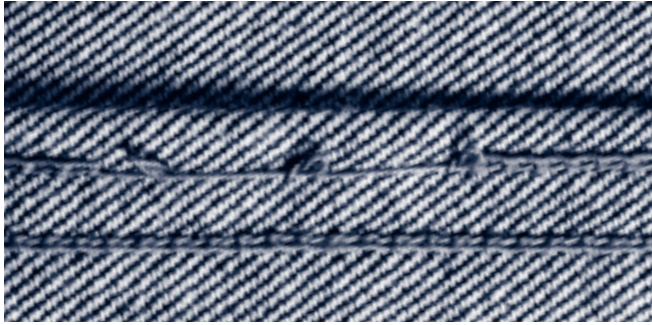
SCHMETZ solution

**Needles with special needle geometry:
SCHMETZ MR needles**

To prevent skip stitches with automat sewn seams the use of a SCHMETZ MR needle is recommended. MR stands for **Multi Range** and means that an MR size usually covers two conventional needle sizes. MR needles are available from SCHMETZ in the sizes MR 2.5 to MR 6.0. The table shows a comparison between MR sizes and conventional sizes:

MR size	NM range	SIZE range
MR 2.0	65-70	9-10
MR 2.5	75-80	11-12
MR 3.0	85-90	13-14
MR 3.5	95-100	15-16
MR 4.0	105-110	17-18
MR 4.5	120	19
MR 5.0	125-130	20-21
MR 6.0	140-160	22-23





Typical skip stitches in denim production

SCHMETZ MR needles have the following special properties compared to standard needles:

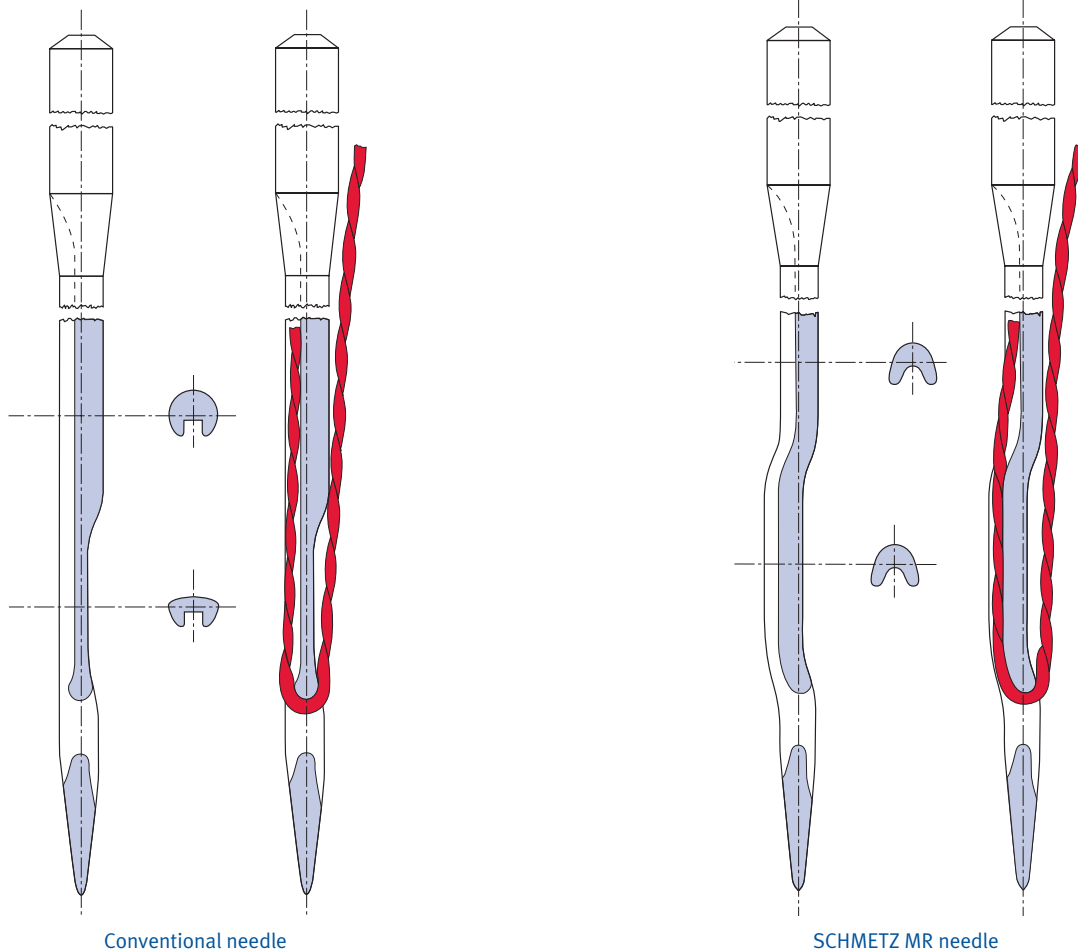
- Extremely long and deep scarf
- The long groove runs at full depth for the complete length of the needle blade right down to the eye
- The scarf area has the same needle cross section as the upper blade area

The advantages of the MR needle design:

- Wide space in the scarf area for the hook to pick up the loop, which prevents skip stitches even on critical materials
- Optimum thread protection and functional thread guidance due to the deep long groove for the full length of the needle blade, which prevents the thread from untwisting and creates a better seam appearance
- The needle has increased buckling strength due to the same cross section in the blade and scarf area, which in turn leads to less needle breakage

Application in the denim industry:

- Mainly in multidirectional sewing with automatic machinery, e.g. decorative stitching on jeans pockets or attaching pockets
- To prevent needle breakage caused by heavy and dense material



Conventional needle

SCHMETZ MR needle

Sewing problem:
Thermal damage

The sewing of several layers of tight fabric, for example when closing the inner leg seam, is a particularly critical step in the production of jeans. The result can be thermal damage in blended fabrics with synthetic fibres due to the friction energy that is released at the needle blade when sewing speed is high. High needle temperatures may cause thread breakage of synthetic sewing threads, smearing of the needle and damage to the material because of melted material at the stitch hole.

SCHMETZ solution

Needles with special coating:
SCHMETZ NIT (Nickel-Teflon®) needles

Technical progress now enables special surfaces with new functionalities to be manufactured. In currentless nickel plating, also known as chemical nickel plating, PTFE (polytetrafluorethylene, also known by the brand name of Teflon®) is dispersed in the electrolyte solution and then deposits on the needles together with the nickel-phosphorus layer.



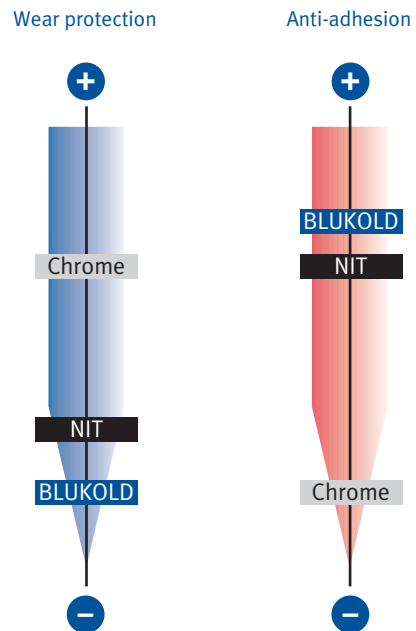
NIT-surface

The properties of NIT coated needles:

- Especially smooth, low-friction surface
- Similar anti-adhesive behaviour to conventional Teflon coating but more abrasion resistance
- Even coating thickness over the entire needle surface
- Very resistant to corrosion

The advantages of the NIT coating:

- Because of its anti-adhesive properties, this coating is especially suitable for use on denim material with a high proportion of synthetic fibres (such as Elastane)
- The outstanding low-friction properties help the needle penetrate hard material such as denim much easier
- The sewing thread also slides through the eye much easier, which protects the thread much better and causes much less lint to adhere to the needle
- This coating is particularly suitable for sewing requirements with a high level of abrasive wear like heavy, hard denim, e.g. 16 oz. or black denim
- The excellent corrosion resistance is especially useful for special-finish materials
- Due to their higher abrasion resistance, needles with a NIT coating are more suitable for denim production than needles with a conventional Teflon-coating (BLUKOLD)



Properties of needle coatings by comparison

- NIT = Nickel-Teflon-coating
- Chrome = standard coating
- BLUKOLD = conventional Teflon-coating

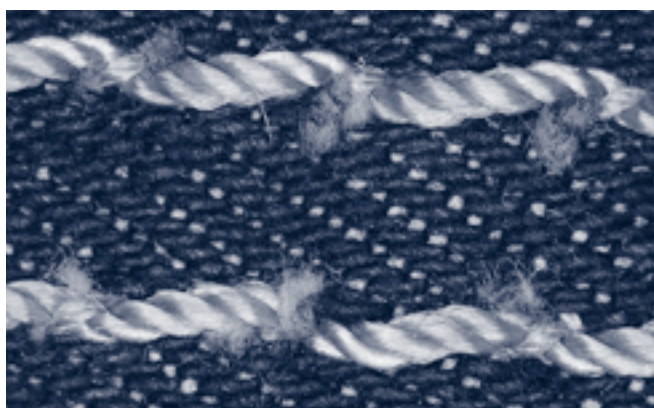
Application in the denim industry:

- For heavy and hard materials, e.g. black denim
- For denim material with a high proportion of synthetic fibres, e.g. polyester, Elastane
- For denim material with special prints or special finish
- With thick sewing threads
- With polyester sewing threads

When processing light coloured materials, attention is drawn to the necessity of “running-in” the needles before using them in production. This means that the external layer is chafed off during the needle motion by the fabric over a seam length of approx. 50 cm leaving coloured marks visible. This “running-in” does not, however, have any detrimental effect on the fitness for purpose or use.

Sewing problem: Damage to the material

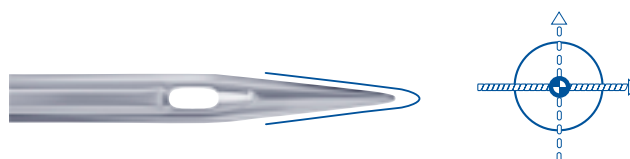
In jeans production damage to the material is a frequent problem – especially after the seams are put to high mechanical stress, such as in industrial washing processes like sand or stone washing. Besides the use of too large needles for sewing, another main cause of damage is the use of unsuitable needle point styles.



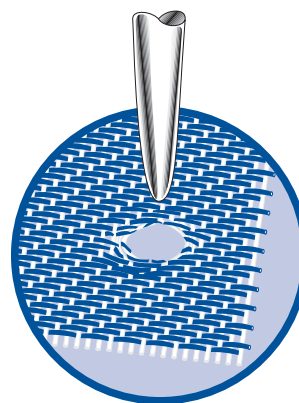
Material damage

SCHMETZ solution

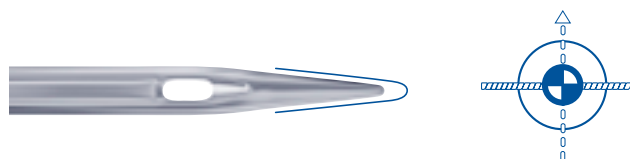
Special point styles: Ball points “SES” and “SUK”

Light ball point “SES”

The light ball point displaces the fabric threads and thus directly pierces the spaces between them and avoids damaging the textile.



Displacement of textile threads

Medium ball point “SUK”

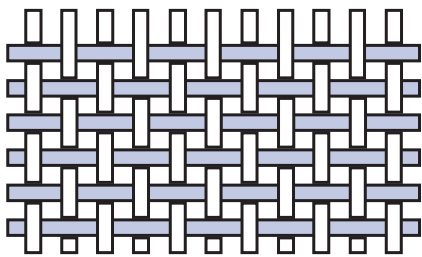
The medium ball point “SUK” is more rounded than the small ball point “SES”. This increases the displacement effect.

The advantages of the ball points “SES” and “SUK”:

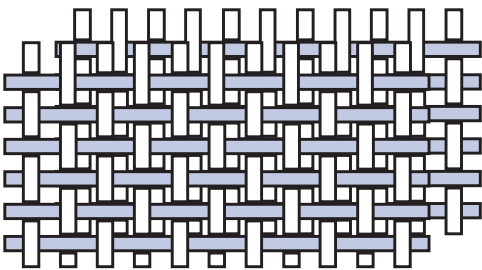
- Increased displacement effect compared to the “R” point
- Less penetration force than the “R” point

The denser the fabric and the more layers which have to be sewn together, the less room there is for the needle to pierce between the fabric threads and the higher the risk of the needle “piercing” a fabric thread.

Changes in the textile structure with single and multi-layer textiles



Single-layer textile



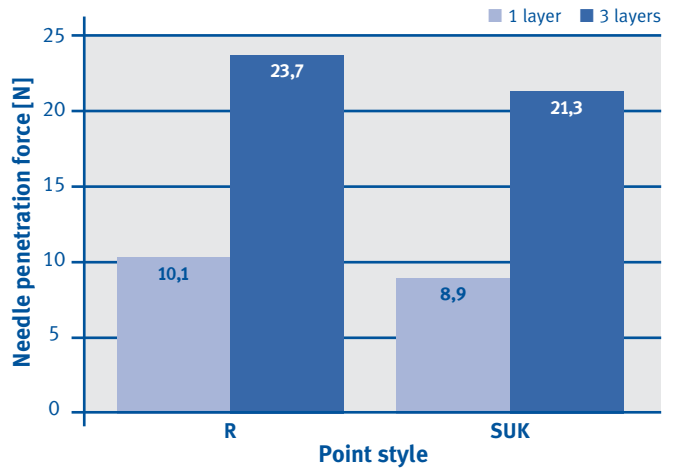
Multi-layer textile

If a fabric thread is “pierced” either the entire thread or several fibres are damaged. This damage may not be recognizable with the bare eye. But with mechanical stress, especially industrial washing processes, this damage becomes worse and more obvious. Therefore the displacement effect of the ball point is more effective and important the smaller the gaps between the individual fabric threads.

Another “side effect” of piercing the gaps between the fabric threads is reduced penetration force, which results in less needle breakage especially when many layers of material are being sewn.

Measuring of needle penetration force, taking needle system 134 (DPX5) as example:

Mean values out of 5 measurements, 50 stitches each; denim fabric 14 oz., 1 and 3 plies; sewing speed 3,000 stitches/minute; needle size NM/SIZE 120/19



A comparison of the point styles “R” and “SUK” shows a remarkable drop of the needle penetration force when using a needle with medium ball point on one ply of material. With three plies of material the difference is even more.

Less penetration force correlates with less damage of the fabric.

Practical test:

A simple test that anyone can carry out: take a 2-layer and a 4-6-layer piece of thick firm denim, an NM/SIZE 120/19 needle with a normal round point “R” and an NM/SIZE 120/19 needle with medium ball point “SUK”. Now pierce the material layers with the “R” point and the “SUK” point alternately. You will see that you are able to pierce the 2 layers much easier with both types of needle. But when you pierce the 4 – 6 layers you will notice a marked difference between the two needle point styles: to pierce all the layers you have to use a lot more force with the “R” point than with the “SUK” point.

Application in the denim industry:

The light or medium ball point should be used for all seams in denim production. They are available in almost all needle systems.

- The light ball point “SES” is mainly suited for light or fine jeans materials and for stretch jeans
- The medium ball point “SUK” is suitable for medium to coarse denim materials. The “SUK” point is the best point for stone and sand-washed jeans (especially in large needle sizes)

SCHMETZ information**Special needle systems in the denim industry****SCHMETZ B-27/DCX27
(SCHMETZ Canu 03:36)**

Most overlock machines used in the denim industry need the B-27 needle system.

Did you know that only the SCHMETZ B-27 has SERV 7 properties as standard? That means that the B-27 from SCHMETZ has the following properties:

- A blade reinforcement of around 15 % of the needle's thickness as standard
- In the thinner needle sizes up to NM/SIZE 90/14 the needle blade is even conical, which makes the needle extremely resistant to bending
- A hump between the eye and the scarf to ensure a wider sewing thread loop

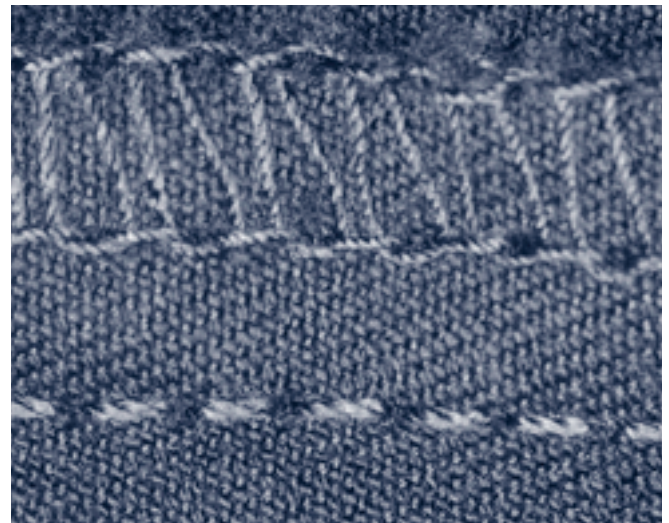
This needle system is available from SCHMETZ with a normal round point “R”, light ball point “SES” or medium ball point “SUK” from NM/SIZE 55/6 to NM/SIZE 140/22.

The advantages of the SCHMETZ B-27:

- Especially suitable for high sewing speeds due to high bending resistance
- The hump scarf guarantees excellent sewing without skip stitches, which translates into outstanding stitch accuracy and high-quality seams

Application of the SCHMETZ B-27 in the denim industry:

For all overlock machines which require the needle system B-27/DCX27.



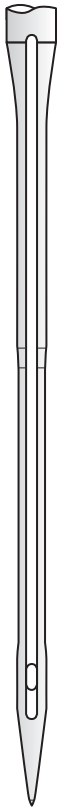
Overlock seam

SCHMETZ SERV 6 design for UY 128 GAS

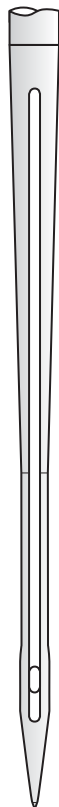
The SCHMETZ SERV 6 needle was developed in co-operation with a well-known denim manufacturer.

The special features of this needle design are:

- Conical blade with no taper between the blade and the shank
- Hump between the eye and the scarf



UY 128 GAS



UY 128 GAS SERV 6

The advantages of the UY 128 GAS SERV 6:

- Due to the conical blade extreme bending resistance compared to the conventional UY 128 GAS
- The high bending resistance prevents deflection and ensures precise stitches
- Less needle breakage
- Less damage to machines and machine parts
- Reduces skip stitches, because the hump between the eye and the scarf extends the loop so that the hook can catch it easily

All in all the SCHMETZ SERV 6 needle design guarantees excellent stitch accuracy and high-quality seams.

Application in the denim industry:

- Especially suitable for use with very heavy materials such as 16 oz. denim
- For sewing over thick areas and for different layer thicknesses, such as inseams
- Particularly suitable for high sewing speeds

For embroidery and appliqué

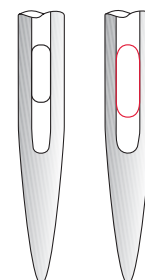
While jeans used to be worn almost exclusively as work or leisure wear, over the last decades they have increasingly entered the world of high fashion. This has led to a situation where embroidery is used more often in denim production. Problems occur frequently when special embroidery threads are used, such as special effect threads like Lurex or thick embroidery threads. Needle deflection with densely embroidered motifs also causes difficulties. An embroidery needle has to fulfil these requirements and also be able to handle denim material.

SCHMETZ information

SCHMETZ DBXK5 for embroidery and appliqué

The SCHMETZ DBXK5 has the following features:

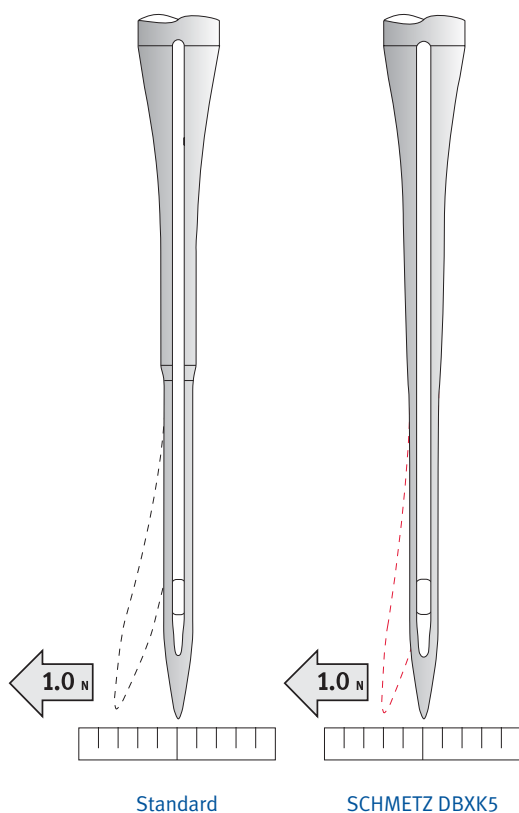
- The eye is 2 NM bigger in relation to the needle size, that means, for example, in an NM/SIZE 70/10 needle the eye corresponds to that of a needle size NM/SIZE 90/14
- Hump between the eye and the scarf, like the SERV 7 design
- Conical blade



Standard

SCHMETZ DBXK5

SCHMETZ special embroidery eye in comparison to a standard needle



Less deflection of SCHMETZ DBXK5 due to the conical blade

The advantages of the SCHMETZ DBXK5:

- The bigger eye reduces friction and minimises damages to the embroidery thread
- Minimisation of thread breakage
- Decrease of skip stitches, because the optimised hump scarf allows better loop formation
- The conical blade prevents deflection, especially with very densely embroidered patterns
- Less needle breakage and thus a longer durability of the needles
- Less downtime for the machines
- Reduction of damage to machine parts such as the tip of the hook and the throat plate
- Very precise border lines due to straight penetration

SCHMETZ tip:

Embroidery of denim material with the SCHMETZ “SUK” point avoids damage to the embroidery thread at small distances between stitches.

Application in the denim industry:

The SCHMETZ DBXK5 is suitable for standard embroidery without any additional requirements.

For special requirements we will be happy to advise you about other versions of the DBXK5 with extra properties to those mentioned above:

- SCHMETZ DBXK5 SERV 6
- SCHMETZ DBXK5 SERV 8

Our advice

This Product Focus offers a selection of needles with especially beneficial properties for denim production. You will find the most frequently used SCHMETZ needle systems for denim production in the enclosed needle list. The experts from **SCHMETZ SERVICEHOUSE** will be pleased to advise you on the right choice of needle.

**Challenge us –
let us show our competence!**

Form to copy and fax: + 49 (0) 24 06 / 85-186

Do you have further questions about sewing denim?
Would you like support in solving your individual sewing problem?
Would you like recommendations on needle selection and sewability of your fabrics in advance of production?
Challenge the SERVICEHOUSE experts and take advantage of our offer.

We will be pleased to send you information.

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Manual for sewing industry

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SYMPOSIUM

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