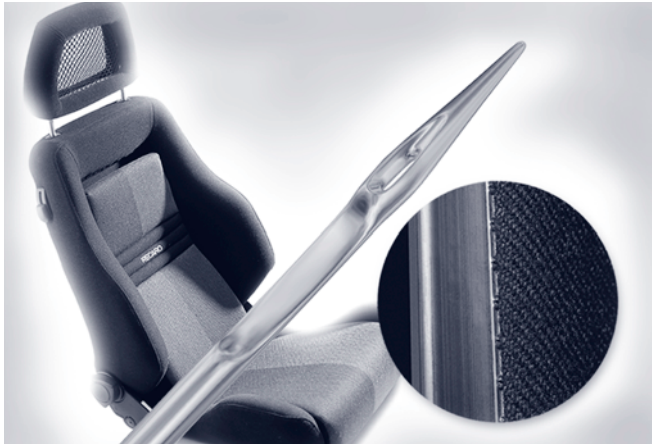


PRODUCT FOCUS

PRODUCT INFORMATION

SERVICEHOUSE



Seats for Motor Vehicles, Ships, Aircrafts and Trains

The right needle for the production of vehicle seats

Seats for motor vehicles, ships, aircrafts and trains have to fulfil many different requirements. A vehicle seat is not just a piece of furniture which is designed to satisfy fashion and the desire for comfort. Primarily, vehicle seats are technical safety products in which aspects such as flame and light resistance, expansion of the textile surface structure and resistance to shearing and abrasion play an important role. Consequently, the technical safety and functional quality of the seats is of prime importance in the manufacturing process.

In the manufacture of vehicle seats many parameters have to be considered: needle, thread, material and machine have to be coordinated precisely to each other to obtain a perfect and high-quality product. In particular choosing the right needle will help avoid sewing problems such as skip stitches, needle breakage or damage to the material. Sewing laminated materials, particularly in combination with plastics or cardboard and thick layers of materials, places high demands on the sewing needle.

The Product Focus "Seats for Motor Vehicles, Ships, Aircrafts and Trains" offers practical assistance to help you choose 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 points and the use of specially coated needles. Information about choosing the needle size is contained in Sewing Focus "Seats for Motor Vehicles, Ships, Aircrafts and Trains".

Our solutions for the vehicle seats industry

- SCHMETZ SERV 7 needle design
- SCHMETZ needles with special coating NIT and BLUKOLD
- SCHMETZ round and ball points "R", "SES", "SUK"
- SCHMETZ cutting points "D", "DH", "SD1", "LR", "LL", "S", "P", "PCL", "PCR"
- SCHMETZ 134-35 FL SERV 7 and 134-35 FK-E SERV 7 with flattened shank

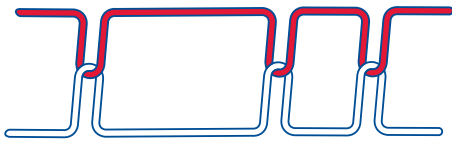
Typical sewing problems and how to resolve them

In the production of vehicle seats the main focus is on safety. Consistent quality of the end products is **the** decisive criterion. Quality assurance from the very first production phase is a direct benchmark for the final quality. The manufacture of vehicle seats demands a lot of care. Sewing with several layers of material and challenging material combinations place very high demands on the needle.

Typical problems in the production of vehicle seats include:

- Skip stitches and needle breakage
- Thermal damage
- Damage to the material

Sewing Problems: Skip stitches and needle breakage

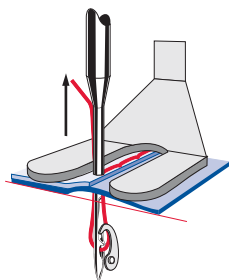


Skip stitch with double lockstitch

Causes of **skip stitches** in vehicle seats processing are:

- **Different heights of material layers**

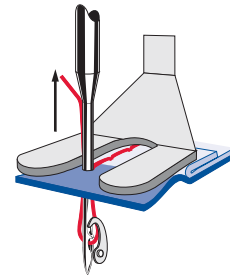
The thinner material layers flutter under the presser foot. The material layers that are not held by the presser foot are moving together with the upward stroke of the needle and thus reduce the needle thread loop. This prevents or reduces the loop formation to such an extent that the hook can no longer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



Different material heights

- **Cross seams**

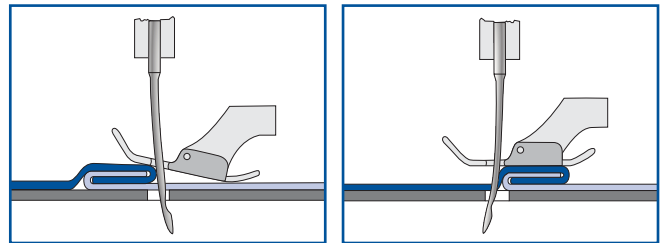
In this case the fluttering is caused by the transition between thick and thin (or thin and thick) material layers. Again, the needle thread loop is reduced by the material layers that are no longer held by the presser foot, so that the hook cannot catch the loop.



Cross seams

- **Needle deflection**

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.



Needle deflection – cause for skip stitches or even needle breakage

The cause of **needle breakage** in vehicle sets 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 penetration path. When the point of the needle comes into contact with the hook or other parts of the machine, the needle breaks.

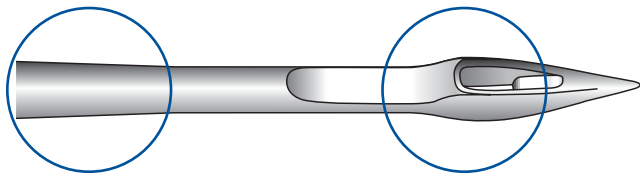
SCHMETZ Solution**Needles with special needle geometry:
SCHMETZ SERV 7 needle design**

The SERV 7 needle has:

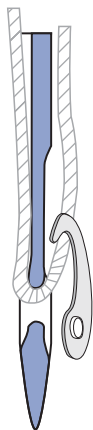
- A conically reinforced blade for higher needle stability and to prevent skip stitches
- An optimised scarf shape to form reliable loops and to prevent skip stitches even under extreme sewing conditions



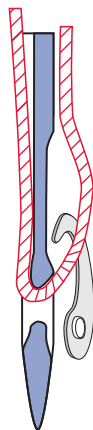
Standard



SERV 7



Standard



SERV 7

The optimised scarf 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. At the same time the stitches are more precise

due to the centred penetration. An “unsteady” seam is avoided. Skip-free sewing due to the optimised scarf 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 manufacture of vehicle seats:

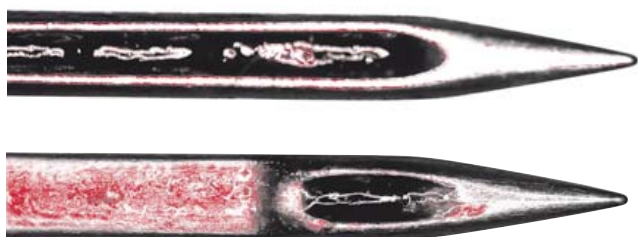
In the area of vehicle seats the SERV 7 design is used for

- Laminated textiles
- Material combinations, e.g. textile and plastic profiles, textile and cardboard
- Thick and thin layers of material
- Vehicle seat covers (car, aircraft, train, etc.)
- Headrests



Sewing Problem: Thermal damage

Generally it is not possible to sew at high speeds in seat production. With excessive sewing speed thermal damage occurs due to the materials' low melting points: melted material in the stitch hole, the melted material sticks to the needle groove and eye to the extent that the eye of the needle can completely close up (see Figure), which results in skip stitches and thread breakage. The reason for these problems is always that the sewing material components melt and adhere to the needle. As long as the needle is working, these residues on the needle remain pliable and drastically increase friction between the needle and the material being sewn. If the machine is stopped, the needle cools immediately and the melted residues become hard and make further use of the needle more and more difficult.



Melted residue on the groove and eye

SCHMETZ solution

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

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.

The properties of NIT needles:

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

The advantages of the NIT coating:

- Because of its anti-adhesive properties, this coating is especially suitable for the production of vehicle seats with its high proportion of materials with synthetic fibres
- The outstanding low-friction properties help the needle penetrate thick and hard material 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
- The excellent corrosion resistance is especially useful for materials with highly aggressive finishes like flame retardant finish
- The NIT coating is particularly suitable for sewing requirements with a high level of abrasive wear

SCHMETZ BLUKOLD needles

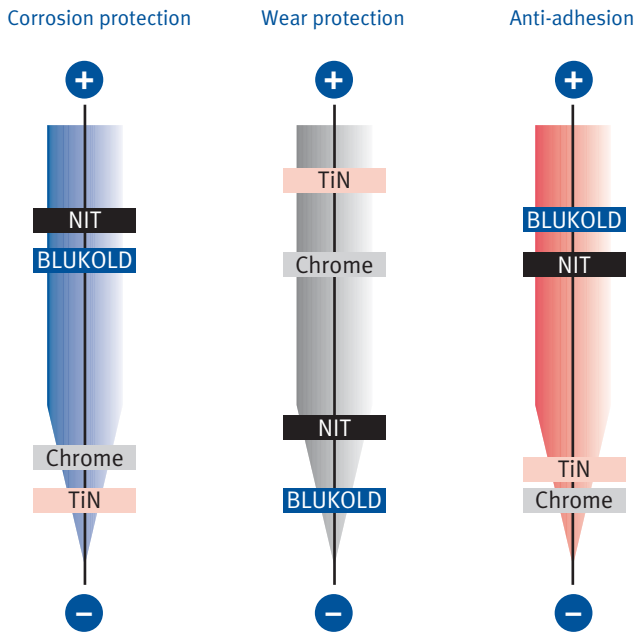
BLUKOLD needles have a roughened, phosphorated surface with a Teflon coating.

The advantages of the BLUKOLD coating:

- Like the NIT coating, this coating prevents residue adhering to the needle for much longer periods of time than with a standard chromium plated needle
- The needle remains clean for longer
- Skip stitches and thread breakage are much more seldom
- This allows a continuous sewing process

A comparison between the BLUKOLD and NIT coatings:

The anti-adhesive properties of the BLUKOLD coating are slightly better than those of the NIT coating; but the service life is slightly lower. Therefore, if abrasive materials are being sewn, it is better to use a needle with NIT coating (see figure).



Properties of needle coatings by comparison

NIT = Nickel-Teflon coating

BLUKOLD = conventional Teflon coating

TiN = Titanium nitride coating

Chrome = standard coating

Both Teflon coatings withstand flame retardant materials longer than any other needles or coatings on the market (e.g. titanium nitride). According to tests conducted in **SCHMETZ SERVICEHOUSE** it depends on the type of finishing if the NIT or BLUKOLD coating has a better performance. **SCHMETZ SERVICEHOUSE** will be pleased to advise you on the right choice of needle.

However, the needle temperature is **NOT** reduced when coated needles are used, which many people incorrectly assume. Synthetic materials are melted by the needle temperature in the area around the stitch hole if their melting point is exceeded, which can lead to material damage. But the needle itself remains free of sticky residue. Even if a coated needle is used, to avoid damaging the material due to friction and, consequently, to prevent needle temperatures becoming too high, the needle size must be co-ordinated to the material and the sewing speed may also have to be reduced.

It should be noted that if NIT or BLUKOLD needles are being used to sew light coloured material the needles should be “run-in” before they are used 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 co-

loured marks visible. This process changes the needle's appearance, which, however, has absolutely no effect on the needle's fitness for purpose or use.

Application of SCHMETZ NIT and BLUKOLD needles in the vehicle seats industry:

- Materials with flame retardant finishing
- Man-made materials
- Materials with a high man-made fibre content

Sewing Problem: Damage to the material

In vehicle seats production damage to the material is a frequent problem. Besides the use of too large needles for sewing, another main cause of damage is the use of unsuitable needle point styles.

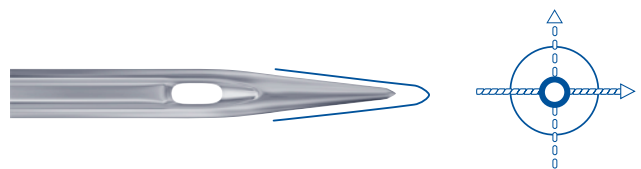
SCHMETZ solution

Special point styles:

Round and ball points “R”, “SES”, “SUK”

Normal round point “R“

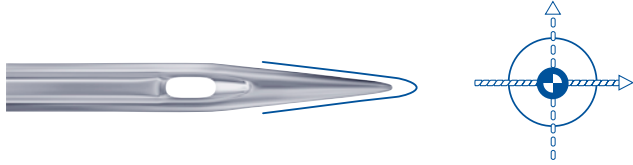
The normal round point “R“ is characterised by the slim, conical shape. It is the standard point shape with a wide range of uses.



However, if damage occurs as a result of piercing fabric threads, especially in knitted articles, it is recommended to use the light ball point “SES“ or the medium ball point “SUK“.

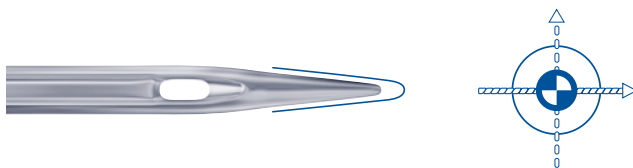
Light ball point "SES"

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



Medium ball point "SUK":

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

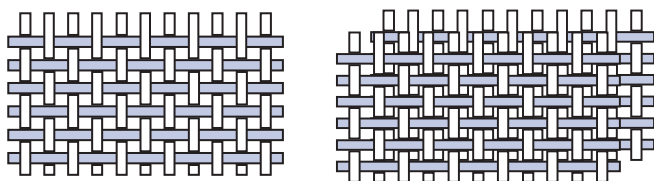


The advantages of the ball points "SES" and "SUK":

- 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 space 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

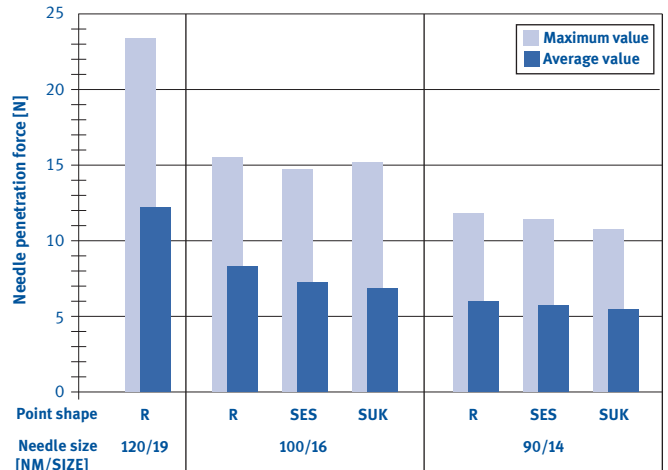
Multi-layer textile

If a fabric thread is "pierced", either the entire thread or several fibres are damaged. This damage may not be recognisable with the bare eye. But with mechanical stress 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 are.

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 using the needle system 134 (DPx5) as an example

Average value of 5 measurements, 50 stitches each; foam laminated knitwear with textile bottom, single layer; sewing speed 2,500 stitches/minute



Penetration forces of different needle sizes and point shapes

A comparison of different needle sizes shows that the penetration forces of thinner needles are much lower. This correlates with less damage to the material and, due to the lower friction, also minimises thermal damage. The penetration forces of ball points are also less than those of normal round points.

Application of round and ball points in the vehicle seats industry:

- The "R" point is generally used for woven fabrics and foam backing
- Use the "R" point when material combinations are being sewn and a compromise has to be found in regard to the shape of the point
- Another area of application of the "R" point is sewing of leather qualities, which can be pierced with the normal round point without any problem
- The "SES" or "SUK" ball points are generally used for knitted fabrics or velour and foam backing
- The "SES" point is suitable for fine to medium knitwear and foam backing
- The "SUK" point is suitable for coarse knitwear and foam backing

Advice:

We recommend to replace the needles after each shift change – or at shorter intervals if they are subjected to a lot of stress – in order to prevent material damage caused by defective needle points.



Damaged needle point

SCHMETZ Tip:

You get smaller stitch holes and less material damage with the same needle stability if you choose one needle size less in the SERV 7 design instead of a standard needle.

Requirements for cutting effects and seam appearance

In vehicle seat production composite materials are often used – such as laminated material together with plastic profiles and also leather. This is where needles with cutting points are recommended. These special needles pierce the material easier because of their cutting properties with reduced needle temperature. SCHMETZ offers a large range of different cutting points. The choice of the optimum point style depends on the thickness of the material, the type and function of the seam as well as the intended appearance of the seam. The incision and seam appearance vary depending on whether the cross section of the cutting edge has a lens-shaped, diamond or triangular shape. Another aspect is whether the cutting edge is across, at an angle or in the sewing direction.

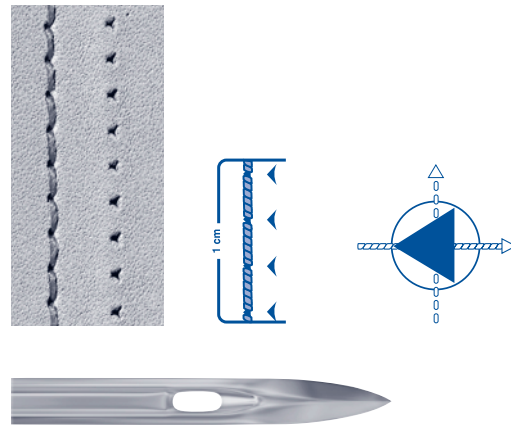
SCHMETZ Solution**Special cutting points**

Cutting points “D”, “DH” and “SD1”

SCHMETZ offers three different types of triangular cutting points with graduated cutting effects for vehicle seat production. All three create a seam with straight stitches.

Triangular point “D”

The triangular point “D” has a symmetrical, triangular cross-section.



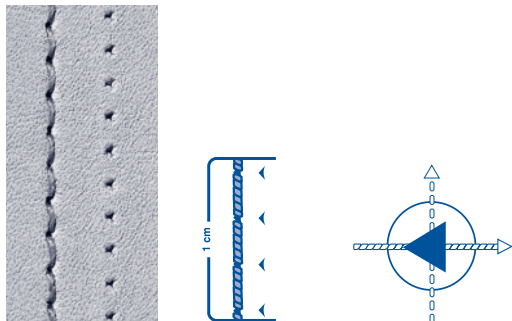
The advantages of the “D” point:

- Excellent cutting effect almost to the full diameter of the needle
- Best cutting effect of all conventional cutting points
- Because of its symmetrical, triangular shape the needle is hardly deflected at all and therefore the seam is well centred and runs straight
- Easier penetration of leather than with round points

However, the star-shaped incision created by the “D” point can never be completely filled by the sewing thread. The stitch hole remains visible in the material

Half triangular point “DH”

The half triangular point “DH” is a cutting point with a symmetrical, triangular cross-section, but smaller than the “D” point.

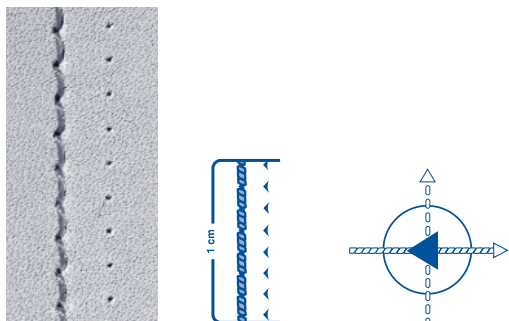


The advantages of the “DH” point:

- As opposed to the "D" point, as the name would suggest, the "DH" point has less of a cutting effect than the “D” point, but more cutting effect than the “SD1” point
- But here, too, the symmetrical, triangular shape ensures a well centred penetration, which creates a straight, neat seam

Round point with small triangular tip ”SD1“

The round point with small triangular tip ”SD1“ is a compromise between the normal round point “R” and a cutting point, which only creates a very small, triangular incision.



The advantages of the “SD1” point:

- It cuts only around 10 % of the stitch hole, 90 % is displaced due to the round cross-section of the upper point shape. In practical terms only the surface of the leather is cut cleanly and the rest of the hole is displaced
- Less deflection than the normal round point “R”
- Very gentle cut of the material
- Here also, the symmetrical, triangular shape ensures a centred penetration, which creates a straight seam

SCHMETZ Tip:

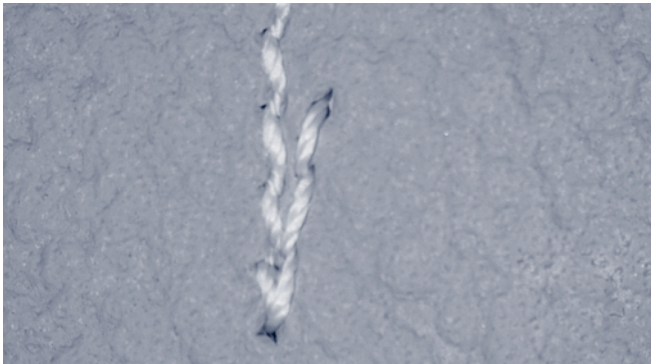
If high needle stability is required we recommend the “SD1” point in combination with the SCHMETZ SERV 7 design. The reinforcement of the blade minimises needle breakage and the hump scarf prevents skip stitches.

Application of the cutting points “D”, “DH” and “SD1” in the vehicle seats industry:

- For seams where straight stitches are desired all three types of triangular cutting points are used
- Needles with a triangular cutting point “D” are used where dry, hard leather has to be sewn successfully and economically and especially in combination with plastic profile or cardboard, if the plastic or cardboard is particularly solid. The stitch density should not exceed 3 – 4 stitches/cm
- The half triangular point “DH” is used often to sew material combinations of textile or leather and plastic profile or cardboard. Recommended stitch density: not less than 3 – 4 stitches/cm
- The round point with small triangular tip “SD1” is suitable for sewing material combinations with softer plastic material. A stitch density of up to 6 – 8 stitches/cm is possible
- The “SD1” is especially suitable for multidirectional sewing of leather, because the stitch appearance remains the same in all sewing directions

- The harder the material to be sewn the more cutting effect is necessary:
 “SD1” point: approx. 10 % cutting effect
 “DH” point: approx. 50 % cutting effect
 “D” point: approx. 90 % cutting effect

Note: The more the cutting effect increases, the more you are faced with damage to the sewing thread or material with starting and finishing bar tacks. The bar tacks should not be on the seamline but at a slight angle to the seam.



Bar tack at a slight angle to the seam with increasing cutting effect of the needle

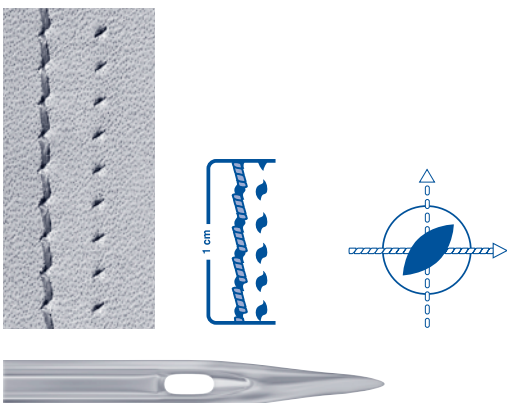
Cutting points “LR”, “LL”, “S”, “P”, “PCL” and “PCR”

These point styles are suitable for all kinds of leather used in the vehicle seats industry.

The main reason to use one of these cutting points is to create a special seam appearance.

Reverse twist point “LR”

The reverse twist point “LR” has a lens-shaped cross-section that cuts the material at a 45° angle to the sewing direction.

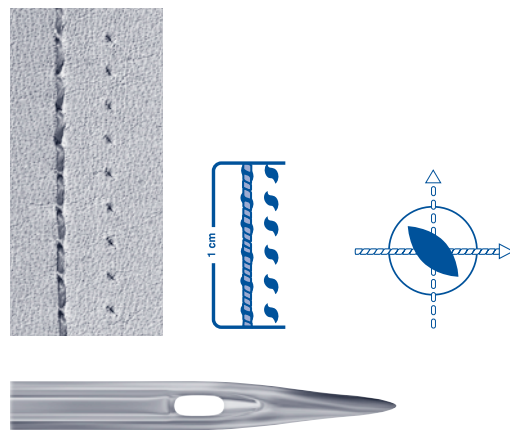


The advantages of the “LR” point:

- The stitches are slightly inclined to the left
- The sewing thread lies between the incisions on the surface of the material

Narrow twist point “LL”

The “LL” narrow twist point cuts the material with its lens shaped cross-section at an angle of 135° to the sewing direction. The incisions are exactly opposite to the “LR” point.

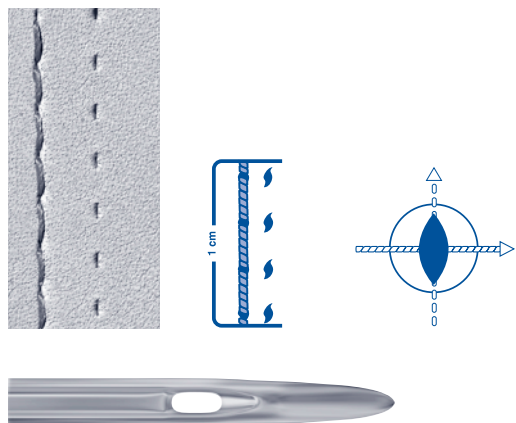


The advantages of the “LL” point:

- If “LL” points are used on machines where the needle is inserted from the left, this produces seams in which the sewing thread runs relatively straight between the incisions but is not very regular
- The seam is slightly drawn in
- The incisions are seldom completely filled by the sewing thread
- Because of the cutting angle the leather is less easily perforated than if a narrow cross point “S” is used. Consequently, the stitch density can be slightly increased to 5 – 6 stitches/cm. This makes a stronger seam
- As opposed to the “S” point, the sewing thread lies slightly on the surface of the material

Narrow cross point “S”

The narrow cross point “S” has a lens-shaped cross-section and creates an incision in the sewing direction.

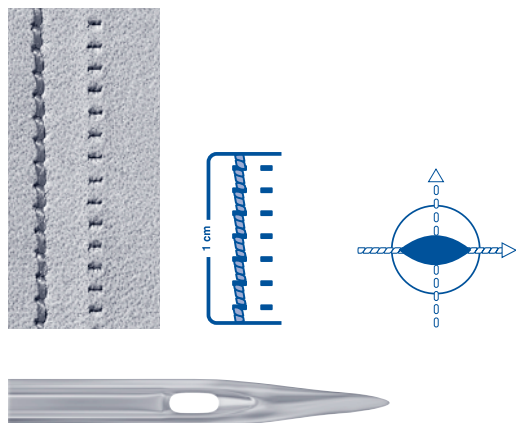


The advantages of the “S” point:

- It produces a very straight seam line
- The sewing thread is drawn into the leather

Narrow wedge point “P”

The narrow wedge point “P” has a lens-shaped cross-section which creates an incision across the seam direction.

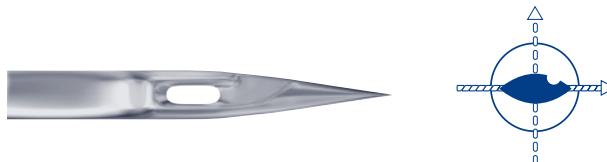


The advantages of the “P” point:

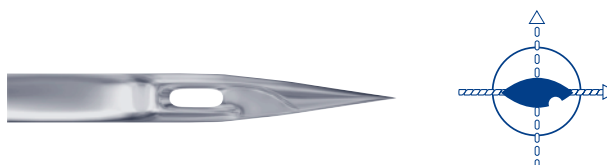
- Small stitch lengths result in a very fine seam with a string-of-pearls effect which – used as a visible seam – has a very decorative effect
- High stitch density of 6 – 8 stitches/cm is possible with no risk of perforation
- High seam strength can be achieved

Narrow wedge points “PCL” and “PCR”

SCHMETZ offers the narrow wedge points in two other variants, “PCL” and “PCR”. The special feature is their twisted groove below the eye.



PCL: Narrow wedge point with left twisted point groove



PCR: Narrow wedge point with right twisted point groove

The advantages of the “PCL” and “PCR” points:

- The groove acts as a thread protection. It offers the thread space and protects it from being squeezed by the groove and eye edges or on the cutting edge when the needle exits the material being sewn

Application of the cutting points “LR”, “LL”, “S”, “P”, “PCL” and “PCR” in the vehicle seats industry:

- These point styles are suitable for all kinds of leather used in the vehicle seats industry
- The “LR” point is used when a decorative seam appearance is desired with stitches slightly inclined to the left. The “LR” is the most used needle point for decorative stitching. A stitch density of up to 5 – 6 stitches/cm is possible
- The “LL” creates a stronger seam than the “S” point with straight stitches that are slightly drawn in. The stitches are slightly more irregular than those of an “S” point. A stitch density of 5 – 6 stitches/cm is possible
- The “S” point produces a very straight seam line. The sewing thread is drawn into the leather. The “S” point is used often to create coarse decorative seams where thick sewing threads and large stitch lengths are used. Due to the incision in seam direction the stitch density should not be less than 3 – 4 stitches/cm to prevent seam perforation
- The “P” point is used for seams that are subject to great strain. A stitch density of 6 – 8 stitches/cm is possible

- The “PCL” and “PCR” should be selected to protect the sewing thread if strong, hard leather is being sewn. The “PCL” must always be used where the needles are threaded from the left. The “PCR” is used particularly as a left needle in two-needle machines

Advice:

Depending on the material structure and the number of layers, round or ball points should be used for mainly textile materials. When the needle penetrates the material the textile threads are gently pushed aside. Cutting points are mainly suitable for leather, but also for different material requirements – as a compromise solution to sew material combinations of textile and plastic or cardboard. However, it must be considered that the cutting point will damage the textile components of the material.

For optimum choice the point style should be adjusted individually in tests on the specific material or material mix and the specific processing technique.

SCHMETZ SERVICEHOUSE will be pleased to advise you on the right choice of needle.

SCHMETZ Information

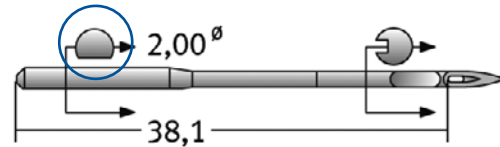
Special needle systems in the vehicle seats industry

134-35 FL SERV 7 and 134-35 FK-E SERV 7

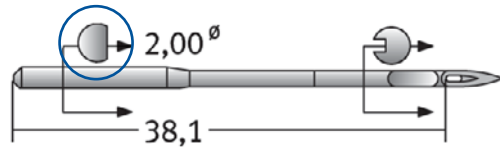
SCHMETZ has a special variant of the 134-35 needle system, which is most commonly used in seat production: the flat shank range. These needles have the prefix FL or FK-E and are supplied in a SERV 7 design.

Advantages of the 134-35 FL SERV 7 and 134-35 FK-E SERV 7:

- The flattened shank ensures that the needle is always fixed in exactly the same position in the needle bar and that it cannot be inserted at an angle



134-35 FL SERV 7



134-35 FK-E SERV 7

Position of the flattened shank

Application of the 134-35 FL SERV 7 and 134-35 FK-E SERV 7 in the vehicle seats industry:

- The flattened shank ensures the required reproducibility and that the seams are produced with a consistent high quality

If you require special needle sizes or point shapes please talk to your SCHMETZ office.

Our advice

This Product Focus offers a selection of needles with especially beneficial properties for the production of vehicle seats. You will find the most frequently used SCHMETZ needle systems for sewing vehicle seat 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 vehicle seats?
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.

Our range of service:

Company name
Attention
Position
Address
Postcode/City
Country
Phone
Fax
E-Mail

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SAMPLE NEEDLES

Sample needles, tips and information

DOCUMENTED SEWING REPORTS

Sewing reports tailored to match your sewing goods as well as solutions for your complex sewing demands

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Express consulting by phone, fax or e-mail

INFORMATION

SEWING FOCUS

Sewing information for special industries and applications

PRODUCT FOCUS

Product information for special industries and applications

GUIDE TO SEWING TECHNIQUES

Manual for sewing industry

TRAINING/SYMPOSIUM

TRAINING-ON-SITE

Industry specific training including the latest information on needles, threads, machines and applications

SYMPOSIUM

Interdisciplinary knowledge sharing and exchange of expertise for skilled sewing industry staff