Tomorrows Advanced Technology Available Today For Industrial Sewing Requirements and Demands
Sewing machine needles - Fundamentals

Overview – Types of needles for sewing machines

Groz– Beckert have around 3000 different types of sewing machine needles of various types available for each application and stitch type.

Needles for lockstitch and embroidery machines

Needles for chainstitch machines
Sewing machine needles - Fundamentals

Overview – Types of needles for sewing machines

Needles for Overlock machines

Needles for Blindstitch machines

Needles for AMF- machines
Sewing machine needles - Fundamentals

Overview – Types of needles for sewing machines

Needles for Linking machines

Needles for Bag-Closing machines

Needles and Awls for shoe machines
Sewing machine needles - Fundamentals

Factors which can influence the quality and productivity in a sewing plant

- Needle
- Thread
- Operator
- Machine
- Environment
- Material
- Know How
- Product Design
- Quality and Productivity depending on
Sewing machine needles - Fundamentals

> Decisions for the correct and ideal needle:

Several factors have to be taken into consideration before choosing the right needle:

- Material
- Fabric construction
- No. of layers
- Sewing thread size

**Decision for correct needle**

**Needle size**

- Choice depending on:
  - Material
  - Fabric construction
  - No. of layers

**Point style**

- Choice depending on:
  - Material
  - Fabric construction
  - Sewing thread size
  - Seam appearance (Leather)
Sewing machine needles - Fundamentals

**Needle point styles**

Groz-Beckert has different point styles available for every kind of material. There are Round point styles and Cutting point styles.

<table>
<thead>
<tr>
<th>Cutting Points</th>
<th>or</th>
<th>Round Points</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Cutting Point Needle" /></td>
<td><img src="image" alt="Round Point Needle" /></td>
<td></td>
</tr>
</tbody>
</table>

**Cutting point** needles are used mainly for leather to achieve a determined stitching appearance, like straight seams or slanted seams.

**Round point** styles can basically be used for all type of textile materials as well as for leathers.

Examples:
- Cutting Points: LR, LL, S, P, SD, DH, D
- Round Points: R, RG, FFG, FG, G, SKL
Sewing machine needles - Fundamentals

Major cloth point styles (Round and Ball points) - Overview

Round points

Ball points

Symbol

RS
R
RG
FFG/SES
FG/SUK
G
SKL

Alternative designations:

SPI, S-SET, R-SPI
Set
Q
SES, J Ball, BPL, L-Ball
SUK, B Ball, BPM, M-Ball
SKF, U Ball, H Ball
R-SKL
### Name of the point and symbol with threading direction:

<table>
<thead>
<tr>
<th>Point</th>
<th>Application</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>LR</td>
<td>Special application needle for 2-needle decorative seams</td>
<td>Decorative lockstitch seams in soft to medium-hard leather, virtually all common types of leather, twin lockstitch machines</td>
</tr>
<tr>
<td>SAN® 12 LR</td>
<td>Decorative lockstitch seams in soft to medium-hard leather, virtually all common types of leather</td>
<td>Shoes, leather garments, upholstered furniture, bags, belts, car seats</td>
</tr>
<tr>
<td>LL</td>
<td>Cuts the leather in the sewing direction at an angle below 45°, slanted to the left</td>
<td>Virtually all common types of leather, hard and thick leather, also suitable for boat hoists</td>
</tr>
<tr>
<td>D</td>
<td>Wide triple-edge cut in leather</td>
<td>Medium-hard and hard leather</td>
</tr>
<tr>
<td>DH</td>
<td>Medium triple-edge cut in leather</td>
<td>Straight seam</td>
</tr>
<tr>
<td>SD</td>
<td>Round point with polished triple cutting edges at the very end of the point</td>
<td>Straight seam</td>
</tr>
</tbody>
</table>

### Application:
- Decorative lockstitch seams in soft to medium-hard leather
- Virtually all common types of leather
- Twin lockstitch machines
Besides the standard chromium coating, GEBEDUR® has also needles in GEBEDUR®-version available.

GEBEDUR® needles are coated with “titanium nitride”, which have a much higher hardness in comparison to a chromium coating. This leads to the following advantage:

- Much higher wear resistance in the point area.
- Higher life cycle time and therefore less needle consumption.
Common sewing problems in different application areas

Material damages

Seam appearance
SAN – Special Application Needles

Special application needles are designed to solve specific problems in various applications segments. They have compared to standard needles some different constructive features to increase the process security in the specific application segment.

Examples:

**LC**  Loop Control Technology.

**SAN 10/SAN 10 XS** - needles are designed to be gentle on the material.

**SAN 6** - needles for sewing jeans, work wear, and even some technical textiles.

**SAN 5** - needles for the processing of technical textiles. For example, safety belts, Airbags.

**SAN 12** - needles for uniform decorative seams in automotive and the upholstery segment.

**MR**  MULTI-RANGE needles with high reliability with multi-directional seams.

**SAN 1** - needles for multi-head embroidery machines – 3D embroidery

my.groz-beckert.com/sewing
LC – Loop Control

Innovative Technology for the perfect loop

LoopControl® with lockstitch

With conventional geometry

Sewing of very dense or very hard materials leads to crushing of the thread between the sewing fabric and the scarf edge during the needle down stroke.

Mit LoopControl® geometry

The improved LoopControl® geometry of the shaft and scarf edge provides greater protection of the thread and reduces the load on the thread when it passes over the scarf edge.

Result:
Better thread protection and reliable loop formation; Reduction of skipped stitches and torn threads (due to poor loop formation) even in critical applications

With particularly thick multi-filament threads, there is also a risk of the threads getting hooked on the edge of the scarf edge:
- Over twisting of the thread above the sewing fabric and partial untwisting of the thread below the needle plate
- Negative effects of this twist shifting on loop formation
LC – Loop Control

Innovative Technology for the perfect loop

LoopControl® for chain stitch

With conventional geometry

On 2 to 4 needle chain stitching machines, the needle closest to the looper forms the smallest needle thread loop – due to the short needle rise. Machines which are set to a tight stitch formation or are using textured sewing thread tend to produce skipped stitches.

With LoopControl® geometry

Improved geometry of the shaft and scarf and larger eye in comparison to the needle thickness: Processing of textured sewing threads is improved.

Result:

In combination with the correct machine settings, LoopControl® chain stitching needles form clean and stable loops, even with tight stitch formation and when using textured yarns.

Advantages of the LoopControl® geometry at a glance

- Perfect loop formation
- Reduced risk of skipped stitches
- Optimal protection of the thread and sewing fabric
- High needle strength
- Low needle deflection
- Improved seam appearance
- Higher process stability
Special application needles
SAN® 10 and SAN® 10 XS

Sewing machine needles which are gentle on the material, for ultrafine knit and woven fabrics

Special application needle SAN® 10: optimal for high quality at a high output

The advantages at a glance:
- Higher seam quality, yet gentle on the material
- Processing of the most delicate materials
- Ability to use thicker threads with the same needle thickness (large eye)
- Increased productivity

Groz-Beckert recommends this product for:
- Sewing fabric which is easily damaged, special fine knit fabrics
- Delicate sewing fabric which can only be processed at reduced speeds and with very thin needles
- Processing of textured yarns and elastic yarns
- The use of multi-needle machines

Special application needle SAN® 10 XS: optimal for ultrafine and special materials

The additional advantages at a glance:
- Maximum protection of the material
- Smallest possible needle holes
- Processing of extremely delicate materials

Groz-Beckert recommends this product for:
- Sewing fabric which is extremely susceptible to damage, special fine and ultrafine knit and woven fabrics
- Extremely delicate sewing fabric which can only be processed at reduced speeds and with the thinnest of needles
- Sewing fabric with a tendency to develop large needle holes
Selection guide for SAN® 10 and SAN® 10 XS

The sawability is affected by the:
- equipment
- fabric quality
- room climate
- material fineness

![Displacement cross-section in the eye section of SAN® 10 and SAN® 10 XS in comparison to a standard needle](image)

**SAN® 10 and SAN® 10 XS in the production program**

<table>
<thead>
<tr>
<th>Needle system</th>
<th>Size range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>55</td>
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<tr>
<td>DBx1 SAN® 10/1730E SAN® 10 FG</td>
<td>*</td>
</tr>
<tr>
<td>DBx1 SAN® 10/1733 SAN® 10 R</td>
<td>*</td>
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<tr>
<td>DBx1 SAN® 10 XS FG</td>
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<tr>
<td>R77 SAN® 10/1111 SAN® 10 FG</td>
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</tr>
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<tr>
<td>R267 SAN® 10 FG</td>
<td>*</td>
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<tr>
<td>R267 SAN® 10 XS FG</td>
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</tr>
<tr>
<td>R85 SAN® 10 FG</td>
<td>*</td>
</tr>
<tr>
<td>R85 SAN® 10 XS FG</td>
<td>*</td>
</tr>
<tr>
<td>R85 SAN® 10/101653 SAN® 10 FG</td>
<td>*</td>
</tr>
</tbody>
</table>

**Definition of fine and ultrafine fabric qualities**

The fineness (E) of knit fabrics indicates the mesh count (number of needles) per inch. The term thread count is used for woven fabrics. This indicates how many warp and weft threads are used per inch.

- **Knit fabric – woof knitting**
  - Fineness (E)
    - Standard: 18–24
    - Fine: 25–42
    - Ultrafine: 43–93

- **Knit fabric – warp knitting**
  - Fineness (E)
    - Standard: 22–59
    - Fine: 60–80
    - Ultrafine: 81–300

- **Woven fabrics**
  - Thread count: Warps / Wilts per inch
    - 10–60
    - 100–200
    - 200–300

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SAN 6 – Special Application Needles

Developed for processing of Jeans fabrics, as well as for delicate weave fabrics applied in the production of jackets, trousers, coats, and even some technical textiles.
SAN – Special Application needles

Special Application Needle “SAN® 6” from Groz-Beckert

+ High needle stability due to a special blade geometry!

Blade profile
The conical blade and the newly designed scarf cross-section give the Groz-Beckert SAN® 6 GEBedur® a higher bending resistance of 20 - 40% in comparison to the standard needle.

Scarf and blade profile prevent needle breakage, skip stitches and thread breakage. The looper point is protected.
New Innovative design

**Special Application Needle “SAN® 5.2” from Groz-Beckert**

- Two sided chamfer for maximum hook protection and loop pick up security
- Reinforced blade for maximum stability
SAN – Special Application needles

**Special Application Needle “SAN® 5.2“ from Groz-Beckert**

- Two sided point groove for optimized thread guidance at multidirectional sewing operations
- Bigger needle eye allowing the use of thicker threads.
SAN – Special Application needles

Special Application Needle “SAN® 5.2”

Application examples

Airbags | Car seats | Upholstered furniture | Protective clothing | Sun protection systems

The benefits of the SAN® 5.2 needle at a glance:
- Increased needle stability due to special shank reinforcement
- Optimized loop engagement provides a greater safeguard against skipped stitches
- Gentle handling of the sown fabric
- Uniform seam appearance
- Use of thicker sewing threads without changing the needle thickness
- High protection against needle wear through the use of GEBEDUR® coating
- Increased productivity
- Reduced production costs

* Groz-Beckert GEBEDUR® needles are coated with titanium nitride, lending them a greater degree of hardness than standard needles. Particularly in the point and eye area, they offer improved protection against wear and damage, resulting in a consistently high seam quality and a longer needle service life.

The SAN® 5.2 supply range
The conventional SAN® 5 needle supply range will be gradually replaced and extended by the SAN® 5.2. The following initial range is available at short notice (precise delivery period on request):

<table>
<thead>
<tr>
<th>Needle system</th>
<th>110</th>
<th>120</th>
<th>130</th>
<th>140</th>
<th>160</th>
<th>100</th>
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<tr>
<td>134-35 SAN® 5.2 GEBEDUR®</td>
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<tr>
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<tr>
<td>126x17 SAN® 5.2 GEBEDUR®</td>
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<tr>
<td>126x17 SAN® 5.2 FFG GEBEDUR®</td>
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</tbody>
</table>
The special application needle SAN® 12

For the perfect appearance of 2-needle seams

Potential problems creating 2-needle decorative seams

When two adjacent seams are produced at the same time on 2-needle machines, the left and right needles should ideally have the same seam appearance. The differences in the threading direction and loop pick-up between the left and right needle can result in a different appearance of the two seams. This can occur both on seams with a slanted stitch formation (LR cutting point) and on seams with straight stitch formation (S cutting point).

Solution

An improved seam appearance is achieved on both the SAN® 12 LR and the SAN® 12 S needle by aligning the cutting geometry precisely using a special shank surface. This results in uniform seams with both slanted or straight stitch formation.

Using the SAN® 12 LR:

- For more uniform and matching appearance of the seams using slanted stitch formation
- Use only on the right needle

Using the SAN® 12 S:

- For more uniform and matching appearance of the seams using straight stitch formation
- Use on both needles
Results can vary, depending on kind of leather and foam bonding.
Special features of the MR needle

**Stability:**
Thanks to its special blade and scarf geometry, the MR needle is extremely resistant to bending (deflection resistance). This gives it a very high level of stability over its entire working range.

**Thread protection:**
The very deep and long shaped scarf allows for very tight adjustment of the looper to the needle. The deep thread groove which extends to the eye area guarantees optimal protection of the thread.

**Cross-section at eye center:**
When penetrating the material, the needle reaches its maximum penetration forces in this needle area. These forces increase disproportionally as the displacement cross-section increases. The MR needle was designed so that its penetration force in the eye area is less than that of a standard needle.

**Thread loading:**
When changing the sewing direction, the sewing thread is pulled out over the needle in different directions. During its downward stroke, the needle slides along the tensioned sewing thread. This can result in changes in the thread twist, and consequently to negative loop formation.
Loop formation:
The special asymmetrical shaped thread sliding area inside the eye of the MR needle guarantees stable loop formation even under unfavourable sewing conditions. This eliminates the possibility of unfavorable loop formation (*) and thread twist.

Thread pick-up:
Difficult sewing operations can result in the thread unwinding during loop formation. Single yarns or filaments can be caught on and torn off by the hook point. The risk of unwinding is reduced by the special thread guiding of the MR needle. Its extreme scarf depth permits very tight hook point adjustment, resulting in optimum loop pick-up reliability.

The MR product range:

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<tr>
<th>GB designation</th>
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<th>2.5</th>
<th>3.0</th>
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</table>

The advantages of the MR needle at a glance:
- Allows extremely tight adjustment of the hook to the needle
- High immunity to skipped stitches
- Less thread splicing
- Less thread breakage
- Optimal protection of the sewing fabric
- High productivity thanks to reduced machine downtime
- Reduced production costs
NEEDLES FOR SINGLE- AND MULTIHEAD EMBROIDERY

Variations of the DB x K5

The original needle for single- and multihead embroidery

The needle system DB x K5 was especially developed for the use in modern high performance machines. During research and development the following points had to be considered:

- Reduction of skipped stitches and thread breakage
- Maximum protection of thread and material
- Safe thread loop pick up
- Best universal point style
- Eliminate looping
- Optimum stitch fill (no gaps)

The features and applications of the DB x K5

<table>
<thead>
<tr>
<th>Shank length</th>
<th>Point style</th>
<th>Coating</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short</td>
<td>RG (Standard)</td>
<td>Chrome</td>
<td>Standard needle for all common applications</td>
</tr>
<tr>
<td></td>
<td>RG (Standard)</td>
<td>Titanium Nitride</td>
<td>Needle with high stability and resistance against wear, universal applications</td>
</tr>
<tr>
<td></td>
<td>RG (Standard)</td>
<td>Chrome</td>
<td>Needle for certain embroidery machines and deep penetration applications (for example three-dimensional embroidery)</td>
</tr>
</tbody>
</table>

Stability comparison of the standard DB x K5 and its variations

Essentially the needle system DB x K5 has the highest stability. The bending resistance of the standard needle is higher than any of the other needle systems used in the embroidery industry.

The SAN 1° GEBEDEUR®, with its special design and a titanium nitride coating, offers highest stability and maximum resistance against wear.

The blade design of the “KK” version corresponds to the standard DB x K5 needle. However, due to its shorter shank, bending resistance is lower.

With today’s machines in the field of single and multihead embroidery there is no limit to creativity. This is also the reason why during the past years the variety of different embroidery materials has increased rapidly.

Especially three-dimensional embroidery, embroidery on leather and technical textiles with different layers of material and coatings, combined with high machine speeds, is in many cases an extreme challenge for the embroidery machine needle.

With this needle, Groz-Beckert can meet all these challenges. The SAN 1° GEBEDEUR® needle was developed specifically for multihead embroidery machines. It offers the highest bending resistance on the market and ensures for a perfect stitch result.

In design and precision Groz-Beckert embroidery machine needles have adopted the requirements of the market.

Market requirements are:

- Optimum embroidery appearance
- High functional safety
- Reduced needle breakage
- Reduced thread breakage
- Reduced machine downtime
- High production efficiency
### Needles for Single- and Multihead Embroidery

**Program Single- and Multihead Embroidery Needles:**

*Will be extended when required*

<table>
<thead>
<tr>
<th>DB Designation</th>
<th>Point</th>
<th>Surface</th>
<th>Size range</th>
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<tbody>
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### 3-D Embroidery

In order to achieve the 3-D effect from foam material, it is positioned on the embroidery base before being overstitched. The adhesion and the foam material leads to higher friction, not to mention the variety of thickness the needle has to contend with. In addition these embroidery designs often have to traverse panel seams in cape. Therefore the many forces placed upon the needle (and embroidery threads) can and do vary in the extreme. For this sort of application the embroidery needles need to fulfill the following requirements:

- **Lower penetration force**
  - Material protection
  - Raise (highest) stability
  - Eliminate skipped stitches
  - Reduced needle breakage
  - Precise embroidery fill

High resistance against wear
- Long lifetime

**Besides Groz-Beckert's standard DBxK5 needle, these demands are further reduced as problem areas by using the DBxK5 SAN1 GEBEDUR®.**

#### Removal of foam material

After overstitching, the foam material is taken away from the embroidery. Any remaining parts of the foam material are removed carefully from the embroidered design.

#### The three-dimensional embroidery result

Now, the 3-D image is available. An acceptable result is only achieved with precise stitching. Thread is covering the foam material without gaps and no stitches looped. The material must not be damaged and the 3-D effect must be uniform.
Customer portal – the online platform for Groz-Beckert 5-star support

Supply, Solutions, Service, Superiority, Sustainability. With its comprehensive 5-star support, Sewing®, Groz-Beckert is providing a decisive advantage for the sewing industry. Alongside support for every stage before, during and after the sewing process and wide-ranging other forms of assistance, the development of the online customer portal is an expression of Groz-Beckert’s consistent customer focus. Alongside the new product catalog which facilitates the search process and identification of sewing machine needles, the online shop is also available around the clock.

This means that sewing machine needles can be ordered at any time directly from the manufacturer. In the NetDoctor and Wiki-Sewing areas, you will also find helpful information, animated films, industry knowledge and much more.

Why not come on in and take a look around – to experience a new dimension in sewing.

Register now at: my.groz-beckert.com/sewing
The benefits of the Groz-Beckert customer portal at a glance:

- Order placement possible 24 hours/7 days a week.
- Faster, simpler purchase order process using the online product catalog, direct input of material numbers, purchase order templates or the excel upload.
- Shopping lists for collective orders and purchase order templates for series orders can be saved and reused.
- Information on the availability, delivery periods and prices of required products.
- The customer cockpit provides information about the most important key indicators relating to the ordered products.

How online ordering works

Four functions – one aim

1. Ordering using the product catalog
   In the online product catalog, you will be able to quickly and reliably find the products you are looking for using different filters or by directly entering the needle number.

2. Direct ordering
   Using the direct ordering facility, you can enter the needle number and quantity directly in the system. Here, multiple inputs are possible with any optional number of article item numbers.

3. Ordering using the excel upload
   Orders encompassing a number of items can be quickly and simply placed using the upload function.

4. Order templates
   Repeat orders can be stored as individually configured order templates. This does away with the need for repeated entry of the required products, further simplifying the order process.

Other customer portal content

Helpful information in the WIKI sewing area

- Fundamental knowledge on needles and stitch formations
- Product information: Specific characteristics and special features of different needle types

Animated films of stitch formation:

- Lockstitch (301)
- Chainstitch (401)
- Overlock (504)
- Coverstitch (605)
Thank you very much for your attention!