

All About Needles

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Introduction

The central feature of any sewing machine is the needle or needles. Very many needle types (systems) have been developed over time to ensure each sewing machine that uses them performs at its best.

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Needle systems may be introduced for a number of reasons such as the introduction of new or specialised fabrics, new sewing machinery or even increases in machine speed.

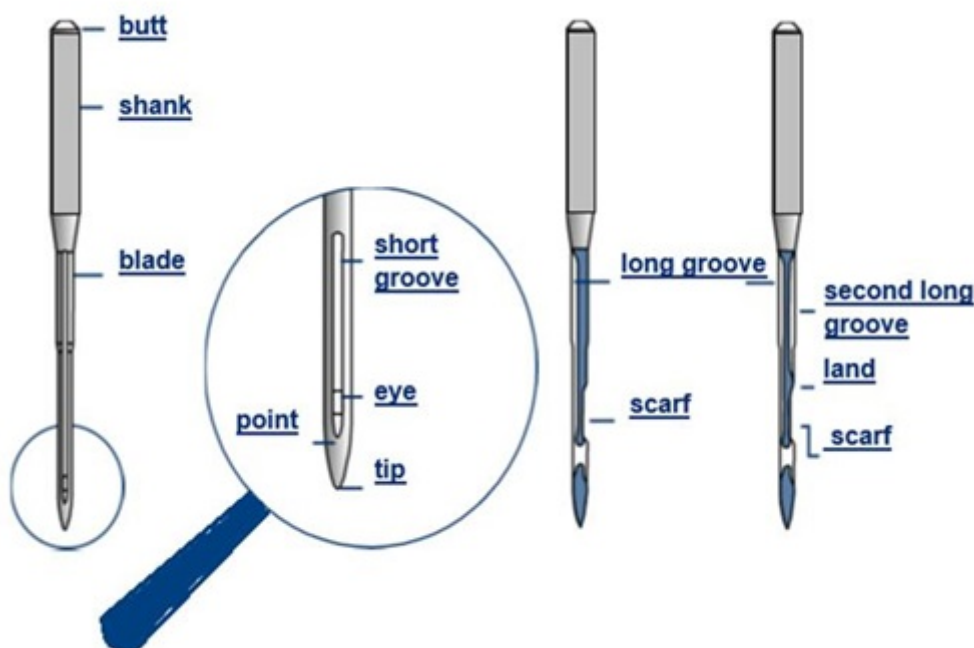
Each needle system (needle type) will typically have between 6-8 sizes available, and in the more popular systems there can be up to 15 sizes, with each of these needles systems and sizes being available in a range of different needle points.

The following guide has been put together to help gain a better understanding of sewing machine needles.

The basic functions of a needle

- 1 To create a passage in the material for the thread to pass through.
- 2 To carry the needle thread through the material and form a loop which can be picked up by the hook or looper mechanism.
- 3 To pass the needle thread through the loop formed by the looper mechanism on machines other than lockstitch.

Needle Parts: Physical characteristics



A needle has various parts to execute different functions during the sewing operation as follows: ✕

- Butt – The shaped top end which facilitates insertion into the needle bar/clamp
- Shank – The thicker part of the needle held by the needle clamp or the needle set screw. It supports the needle as a whole by providing additional strength
- Shoulder – The intermediate section between the shank and the blade
- Blade – The needle portion extends from the shank to the eye. This is subjected to the greatest amount of friction and hence heat when it passes through the material
- Long groove(s) – It is present in one side of the needle blade for the convenience of the needle thread from the take-up device and provides a protective channel in which the thread is drawn down through the material during stitch formation
- Short groove – It is formed on the other side of long groove, towards the shuttle, hook, or looper and it assists in throwing the loop of needle thread
- Eye – The eye of the needle is present in the bottom end of the blade. Needle thread allowed through this eye is taken to the bottom area
- Scarf (Clearance) – It is a clearance cut in the needle blade just above the eye to permit a closer setting of the shuttle, hook, or looper to the needle
- Point – The point of the needle is shaped to provide the most suitable penetration of the material being sewn according to its nature and the desired stitch effect
- Tip – The extreme tip shape, in combination with the point defines penetration performance
- Other variants – Most needles are constructed using these features but there are a number of exceptions. Some of which may have been developed to overcome specific seaming issues or simply designed to meet the machine requirements

Needle Identification

A sewing machine needle is identified with three parameters and they are:

- System
- Point
- Size

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System

A needle system defines the dimensions of a needle to suit the machine type. Depending on the machine and its stitch type, the needle is designed with variations in length of blade, shank thickness, type of eye etc. It is advisable to check with the machine manufacturer for suitability of needle system to machine.

Point

A needle point is classified broadly into two types:

- 1 Round, set or cloth points
- 2 Cutting or leather points

Round Point Needles

There are believed to be around twenty different round points available out of these six are in common use.

Round Point Needles - Applications:

- Slim Set Point also referred to as acute round point (SPI)
This point is used for dense woven fabrics as it causes less damage, helps set a straighter stitch and minimizes seam pucker.
Commonly used for microfibre and densely woven fabrics, coated materials, topstitching of collars and cuffs in shirts.
- Set Cloth Point also referred to as normal round point (R)
This point is used for normal fabrics with standard seams as it pushes the yarn to the side.
- Light Ball Point (SES)
This point is used for sewing lightweight knitted fabric. It is sometimes used for fine denim and light, densely woven material to avoid damaging the material.
- Medium Ball Point (SUK)

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This point is used for sewing medium weight knitted fabric. It is also used for medium to

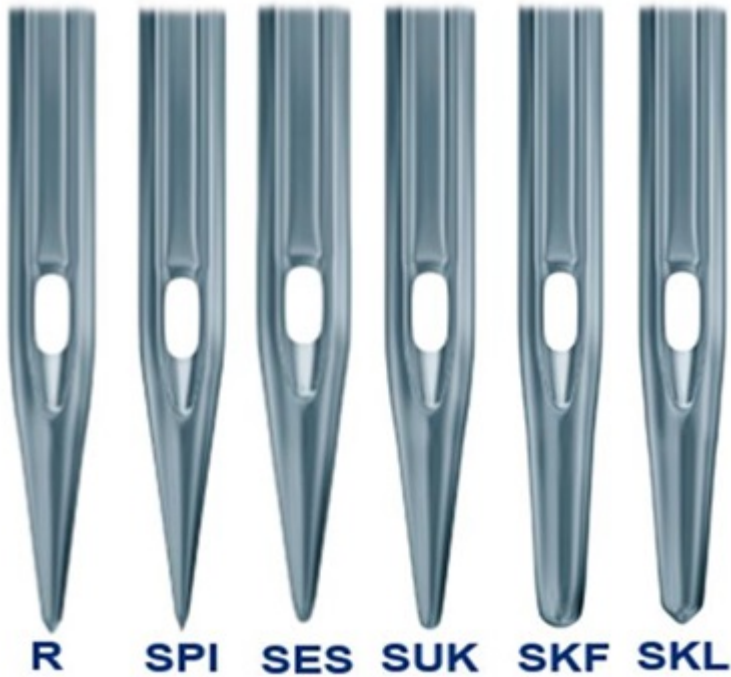
coarse denims, particularly sand-washed and stonewashed grades.

- Heavy Ball Point (SKF)

This point is used for coarse knitwear and for sewing dense woven elastic (it won't push the elastic yarn through).

- Special ball point (SKL)

Used for medium to course elastic materials with covered elastomeric threads and very coarse knitwear.



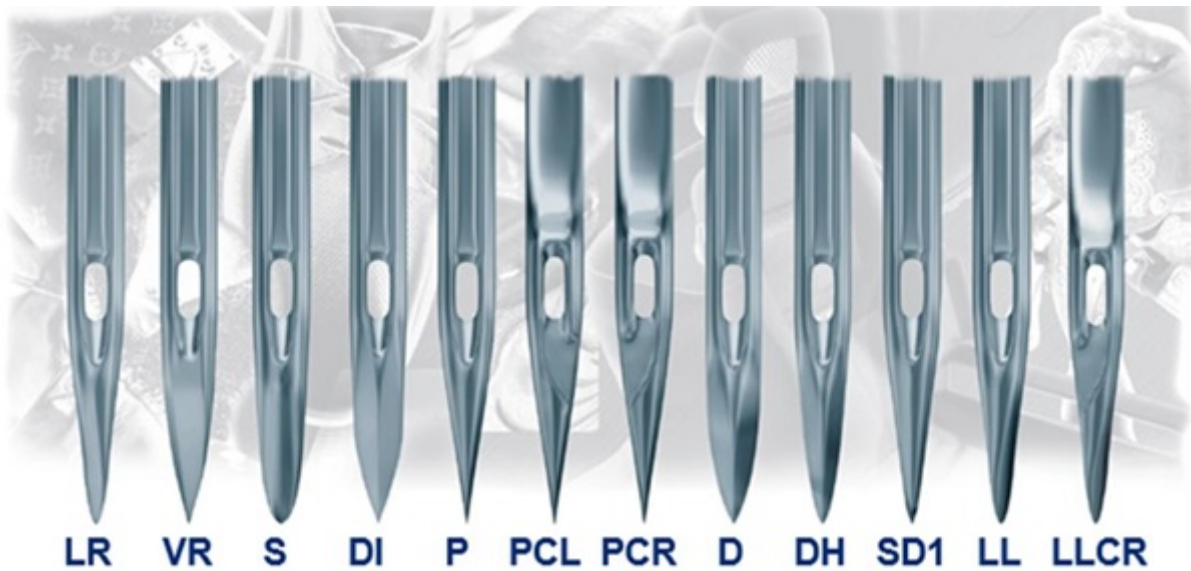
Cutting Point Needles

Cutting point needles have sharp tips like blades. These tips are available with a wide variety of cross-sectional shapes such as lens, rounded, triangular and square. They can be used while sewing dense, non-fabric based material. They pierce the material more readily than the round point types thereby generating less needle heat. There are a large number of cutting points of which around 11 are in regular use.

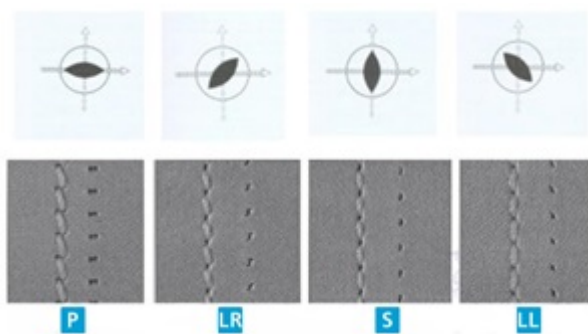
Cutting Points Overview

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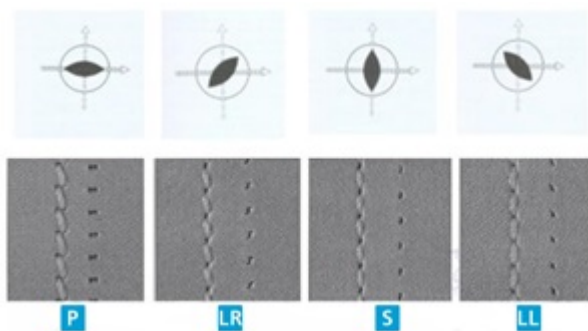




Cutting points spear



Cutting point wedges



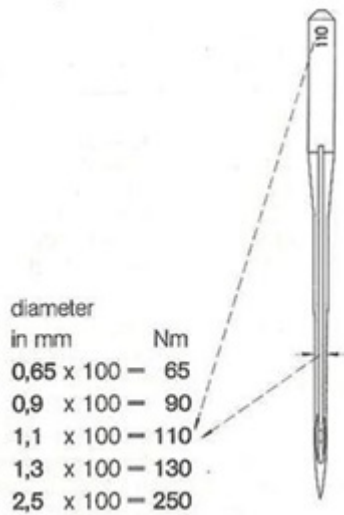
Needle Size / Thickness

The size of a needle is generally represented in one of two ways (although there are others). One method is by a number metric (Nm). This represents the diameter of the needle blade in hundredths of a millimetre measured just above the scarf but not at any reinforced part of the blade. For example, a Nm 110 needle is 1.1 millimetre in diameter, while a Nm 50 needle is half a millimetre in diameter.

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The thickness of the blade below is 1.1mm wide which is shown in Nm as 110.



The alternative standard needle sizing method is the Singer/Asia numbering system sometimes referred to as the American system that uses a number that represents a size.

Below shows these Nm and Singer comparisons along with a number of other size references.

Comparison of Equivalent Needle Sizes

Singer	Metric (Nm)	Union Special	Lewis	Merrow	W&G New No.	459R	292 Bonis
3	35	-	-	-	-	22	-
4	40	-	-	-	-	21	22
5	45	-	-	-	-	20	21
6	50	-	-	-	-	19	20
7	55	22	-	0	22	18	18
8	60	-	2	0	24	17	16
9	65	25	-	0	25	16	14
10	70	27	2.5	1	27	15	13
11	75	029/030	-	-	30	14	12

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Singer	Metric (Nm)	Union Special	Lewis	Merrow	W&G New No.	459R	292 Bonis
12	80	32	3	2	32	13	11
13	85	34	-	-	-	-	10
14	90	36	3.5	3	36	12	9
15	95	38	-	-	-	-	-
16	100	40	4	4	40	11	7
17	105	42	-	-	-	-	-
18	110	44	4.5	5	44	10	6
19	120	047/048	5	6	48	9	4
20	125	49	-	-	49	-	-
21	130	-	-	7	52	8	3
22	140	54	5.5	-	-	7	2
22.5	150	60	6	8	-	6	1
23	160	-	-	-	-	-	0
23.5	170	67	-	9	-	-	-
24	180	78	7	-	-	-	-
25	200	079/080	-	10	-	-	-
26	230	90	-	-	-	-	-
27	250	100	-	-	-	-	-
28	280	110	-	-	-	-	-
29	300	120	-	-	-	-	-
30	330	-	-	-	-	-	-
31	350	140	-	-	-	-	-

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Singer	Metric (Nm)	Union Special	Lewis	Merrow	W&G New No.	459R	292 Bonis
32	380	-	-	-	-	-	-
32.5	400	156	-	-	-	-	-

Determining the Right Needle for a Thread

Here's a quick way to determine if the thread and the sewing machine needle are compatible:

- 1 Take half a metre of the thread being used on the machine and thread it through the eye of a loose needle.
- 2 Hold the thread vertically with the needle at the top.
 - If the needle is too big, it will drop to the bottom of the thread
 - If the needle is too small, it will stick at the top of the thread
 - If the needle is the right size, it will slowly spiral to the bottom of the thread

However, a larger-than-normal needle may have to be used to penetrate thicker fabric, or stitch over the top of pronounced or bulky seams.

Common Problems and Solutions

Reason	Solution
Usage of a poor quality needle	Use good quality branded needles
Pulling the fabric as you sew	This puts stress on the needle and bends it out of place; so, care should be taken to ensure the cloth isn't pulled
The needle doesn't go in properly	Check your manual and make sure it is inserted properly in the machine

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Reason	Solution
The needle is too delicate for the fabric	Use heavy gauge needles for sewing heavier fabrics like denim
The presser foot is loose	It will cause the needle to hit the foot and bend, so there should be a screw you can tighten the foot with

Sewing machine needles can break during sewing and some of the common reasons for breakage are mentioned below, along with the possible solutions:

Needle Checklist

Inserting a New Needle

- Always ensure the needle is the correct needle system for the sewing machine
- Make sure the needle size / eye fits the thread size being used
- Make sure the needle is pushed all the way into the needle holder
- Ensure that the angle of the needle is correct
- After inserting a needle in the machine turn the machine hand wheel manually to make sure the needle isn't contacting any parts

Checking a Needle that is already in a Machine

- Is the needle inserted correctly?
- Is the needle contacting any machine parts?
- Is the needle bent?
- Is the eye rough or blocked with melted fibre?
- Is the point damaged?
- When in doubt change the needle!

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