Needles – What the Home Sewer Needs to Know

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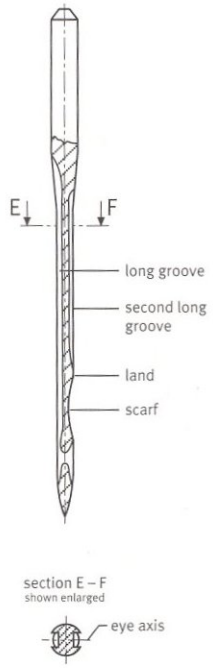
The Right Needle for Every Application

One of the questions we are most frequently asked is "What type of needle should I use?" Another is "What do the numbering systems mean?" We hope this document will help shed some light on this somewhat obscure subject.

Needle Types

The type of needle needed for sewing on knits is much different from the type that will perform well with tightly woven cotton.

The sewing machine needle is made up of various basic elements that are configured into different needle designs to suit specific applications. The basic elements are the shank, the blade with one or two grooves, and the point with the eye.



Shank: The main variables affecting the home sewer are diameter (needle size) and flexibility (amount of deflection). The size of the needle determines the size hole that is made in the fabric and how big the eye can be (40% of the diameter of the needle). Thicker threads will require larger needles.

Deflection is a factor when sewing thick, dense, and heavy fabrics and many layers of fabric. A 'Denim' needle is made to be more rigid, and to deflect less when going through these fabrics.

There are one or two grooves on the back of the shaft, and usually the front as well. When the 'hook' comes up from the bobbin case to catch the needle thread, it catches the thread from the groove on the back of the needle.

Blade: Features on the needle blade include the 'scarf,' which is the indention about the eye of the needle.

Point with eye: There are several types of points, as well as different eye designs, for particular applications.

Changing Times

Until the advent of synthetic knits in the 1950s and 1960s, needles generally had a sharp point. When home sewers began sewing on knit and double-knit fabrics in the '60s and '70s with sewing machine needles designed for cotton, they often found that their fabric snagged and/or developed 'runs' near the seams. For this reason, a more rounded point or 'Ball-Point' needle was developed. Instead of piercing and damaging the fiber, the ball point allows the needle to part the fibers to form the stitch.

In the last few decades, the new owner of a home sewing machine would most likely find their machine equipped from the factory with a 'Universal' needle. A Universal needle is not as rounded as a ball-point, but more rounded than a 'Sharp.' The intent of the Universal needle is to be able to sew on the widest possible variety of fabrics with a single needle. Many home sewers do not change their needles on a regular basis, so the Universal needle seems a good compromise from that standpoint. Many sewing machine technicians have stories about original needles still being on a machine after several years – or decades – of sewing! *Your results will be better when you match a specific needle to the task at hand whenever possible.*

Needle Sizing Systems

With the development of many different specialized industrial machines in the 20th century, as many as 4,000 different needle systems were developed with each system being made in up to 15 different sizes. Because there was no standardization, it often happened that the same basic needle type had various designations. In May 1953 a metric size designation under the abbreviation **NM** was introduced to replace the 40 or so different size designations in use at that time. This **"Number Metric"** indicates the diameter of the needle blade in hundredths of a millimeter measured above the scarf or the short groove, but not at any reinforced part of the blade. **A sewing machine needle with a blade diameter of 0.80 mm therefore corresponds to NM 80 and a needle with a blade diameter of 1.30 mm to NM 130.**

In the United States, we commonly see needles labeled with two measurements separated by a slash. The first number is the old Singer needle sizing standard, the second number is the NM designation. A 12/80 needle is simply the same needle measured by two different systems.

The general needle system in use for household sewing machines is the system 130/705 H. The international system designation is also 130/705 H (H = Hohlkehle in German, meaning 'with scarf'). Also, 'Zwei' is two and 'Drei' is three in German, to explain the 'ZWI' and 'DRI' in the needle numbering of double and triple needles.

Household needles of system 130/705 H all have a flattened shank for perfect positioning of the needle in the needle bar and in relation to the point of the hook. This system of needle fits nearly every machine manufactured for home use in the last forty years.

NEEDLES FOR HOME SEWING MACHINES (fig a)

Schmetz manufactures a broad range of needles in system 130/705 H. The following table explains the specific fields of application.

Note that many household needles are color coded on the shank of the needle. We have included color coding where applicable for easy identification of needles.

NEEDLE SYSTEM	EXPLANATION/APPLICATION	AVAILABLE SIZES
130/705 **H**	(No colour coding) Universal needle; slightly rounded point for almost all fabric types.	60,65,70,75,80, 90,100,110,120
130/705 **H-E**	**RED** **E** = Embroidery Large eye for special-effect or metallic embroidery threads. Light ball point to avoid shredding or cutting previously laid down stitches when overstitching.	75,90
130/705 **H-J**	**BLUE** **J** = Jeans More rigid shank for less deflection. Used for heavy/dense fabrics like denim and canvas, and for machine quilting on dense fabric sandwiches. Acute round point (sharp point) creates straight stitch when piecing.	70,80,90,100,1 10

NEEDLE SYSTEM	EXPLANATION/APPLICATION	AVAILABLE SIZES
130/705 **H-M**	**PURPLE** **M** = Microfibre, silk, foils Acute round point (sharp point). With M needles it is also possible to sew silk without puckered seams.	60,70,80,90
130/705 **H-Q**	**GREEN** **Q** = Quilting (patchwork) Needles for quilting and patchwork; slightly rounded point to allow for more flexibility in fabric types without changing needle.	75,90
130/705 **H-S**	**YELLOW** **S** = Stretch For elastic materials, t-shirt knits (jersey), knitted and warp knits. Medium ball point.	75,90
130/705 **H SUK**	(No colour coding) **SUK** = Medium ball point, knitted fabrics, Lycra, etc.	70,80,90,100
130/705 **H-E ZWI NE 2,0**	Twin needle with large eye (see 130/705 **H-E**); distance between points = 2.0mm	75
130/705 **H-E ZWI NE 3,0**	Twin needle with large eye (see 130/705 **H-E**); distance between points = 3.0mm	75
130/705 **H-J ZWI NE 4,0**	Twin needle for jeans (see 130/705 **H-J**); distance between points = 4.0mm	100
130/705 **H-S ZWI NE 2,5**	Twin needle for elastic materials (see 130/705 **H-S**); distance between points = 2.5mm	75
130/705 **H ZWI NE 1,6**	Twin needle with universal point (see 130/705 **H**); distance between points = 1.6mm	70,80
130/705 **H ZWI NE 2,0**	Twin needle with universal point (see 130/705 **H**); distance between points = 2.0mm	80
130/705 **H ZWI NE 2,5**	Twin needle with universal point (see 130/705 **H**); distance between points = 2.5mm	80
130/705 **H ZWI NE 3,0**	Twin needle with universal point (see 130/705 **H**); distance between points = 3.0mm	90
130/705 **H ZWI NE 4,0**	Twin needle with universal point (see 130/705 **H**); distance between points = 4.0mm	80,90,100
130/705 **H ZWI BR NE 6,0**	Twin needle with very widely space points; e.g. for waistband sewing, with universal point (see 130/705 **H**); distance between points = 6.0mm	100
130/705 **H ZWI BR NE 8,0**	Twin needle with very widely space points; e.g. for waistband sewing, with universal point (see 130/705 **H**); distance between points = 8.0mm	100
130/705 **H DRI NE 2,5**	Triple needles; distance between points = 2.5mm	80

NEEDLE SYSTEM	EXPLANATION/APPLICATION	AVAILABLE SIZES
130/705 **H DRI NE 3,0**	Triple needles; distance between points = 3.0mm	80
130/705 **H WING**	Wing needle for decorative hemstitch seams.	100,120
130/705 **H ZWIHO**	1x Wing needle + 1x Universal needle as twin needle.	100
130/705 **H LL**	Needle with cutting point for sewing leather. Cutting point with left twist for sewing leather or leather-like materials. Due to the angle of incision, this needle point produces a stitch formation inclined slightly to the left and is particularly suited to decorative seams.	70,80,90,100,110,120
130 **N** or 130 **MET**	Needle for replacing missing stitches, or needle for metallic embroidery threads. Also called TOPSTITCH needles. Topstitch and metallic needles are identical. They have a very long eye in relation to the needle size. The length of the eye is longer than in the Universal needle system 130/705 H and remains a 2mm constant in all sizes.	80,90,100
130/705 **H SPR**	Spring needle for embroidery without presser foot. It is used for embroidering in a frame without a presser foot. This enables freehand sewing of customized patterns on a household sewing machine. The spring assumes the function of the presser foot, i.e. the material is pressed down and thus the problem of "arching up" is avoided.	80

NEEDLES FOR HOUSEHOLD OVERLOCK MACHINES (fig b)

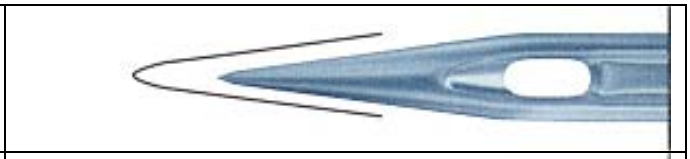
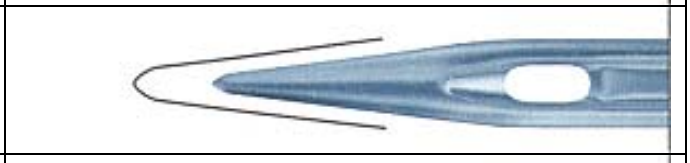
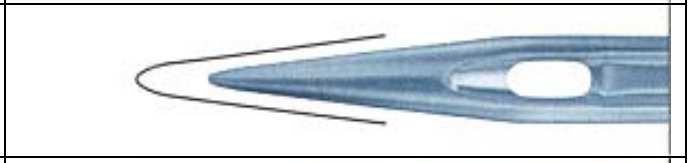
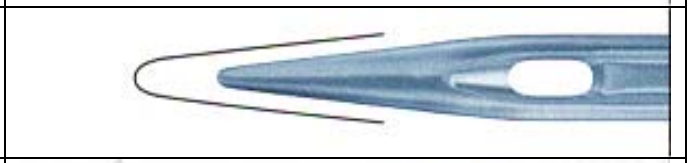
For household overlock machines, different needle systems are used depending on the manufacturer of the machine. The following table gives a summary of all needle systems for household overlock machines.

It should be remembered that four different needle system designations may apply to a single, identical needle configuration. *The individual needles are also available in different point forms, which are not listed here*.

NEEDLE SYSTEM	EXPLANATION/APPLICATION	AVAILABLE SIZES
B-27 DCX27 MY 1023 UY 191 GS		55,60,65,70,75, 80,85,90,100, 110,120,130, 140,150
BLX1	With SES point (light ball point)	75,80,90
BLX4N JLX2		75,90
DCX1 81X1 82X1 DMX1		50,60,65,70,75, 80,85,90,100, 110,120,125, 130
DCX1F		75,90
ELX705		80,90
HAX1 **SP** 15X1 SP	**ORANGE** **SP** = Super Stretch for elastic materials, knitted fabrics; with medium ball point	75,90
JLX1		90
130/705 H SY 2020 HAX1 15X1 H	With slightly rounded point	60,65,70,75, 80,90,100,110, 120,130
SY 2053 16X71		70,80,90
SY 2054 16X75		70,80,90

NEEDLE POINTS (fig c)

For better understanding of how the needle points vary, see the images below:

Acute round point	
Normal round point	
Light ball point	
Medium ball point	
LL twist point	

Choosing the correct size needle

Now that we know what all those numbers mean, what does that mean from a practical perspective when we are trying to choose what size needle to use? Although our needles are standardized, our thread is not.

Currently, thread is measured in three different systems. The system used for cotton has been a 'fixed weight' system, meaning that length of cotton yarn weighs a certain amount. In addition, cotton thread is manufactured in 2 and 3-ply threads. Thus you will see a designation of '50/3' or '60/2' on a spool of cotton thread. The first number is the 'weight'; the second is the number of plies. A 50/3 thread will be heavier than a 50/2 thread. In a fixed weight system, the higher the number, the finer the yarn. A 30 weight 2 ply thread is thicker than a 60 weight 2 ply thread.

This system was applied somewhat erroneously to polyester threads when they were first developed. It was meant to provide a frame of reference that the home sewer could use to tell what size thread they were buying in relation to the cotton thread they had used in the past.

There is also a fixed-length system, which is generally applied to continuous filament threads, such as silk thread. It means that a fixed weight of a fiber will equal a variable length of fiber. Higher denier threads are thicker, lower are thinner.

The only reliable method for measuring thickness of thread is the TEX system, but at this point it is not used widely in thread marketed to the home sewer. The TEX system is a standardized system of measuring the diameter of the yarn and can be certified by a laboratory.

Most companies rely on a 'weight' measurement, and what one company calls a certain weight will not be the same as the same weight from another company, even when number of plies or 'count' is added. The various measuring systems are so obscure and difficult to understand to the layperson that often the 'TEX' of a thread is assumed to be the 'weight'.

Okay, so what do we do? If you use a thread frequently, you probably know what needle works best for it. Here are some hints for matching needle to thread size:

The Slide Test

Thread a machine needle onto a length of thread. Hold the thread out in front of you horizontally. Tilt one end to a 45-degree angle. If the needle slides easily down the thread, you are close. If the needle won't move, try a larger needle. If the needle just flies down the thread, try a smaller one.

Use the smallest needle that will work.

If your needle is larger than it needs to be, you're not only inflicting more abuse on your fabric than necessary, but you are actually causing more wear on the thread. The more extra room the thread has to flop around in the eye, the hard it is on the thread.

Change your needle often.

We honestly do not recommend this just so we can sell more needles! A needle that has been used for 8 hours of actual stitching has penetrated fabric many thousands of times, depending on how fast you are running your machine. The tiny tip of that needle eventually wears out, even on the best quality needle. A dull needle damages fabric and causes skipped stitches, broken thread, and lots of frustration. WHEN IN DOUBT, SWAP IT OUT!

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I would like to express my gratitude to Mr. Rolando Bohlemann of the Schmetz Co. for providing the technical specifications and images used in this article.