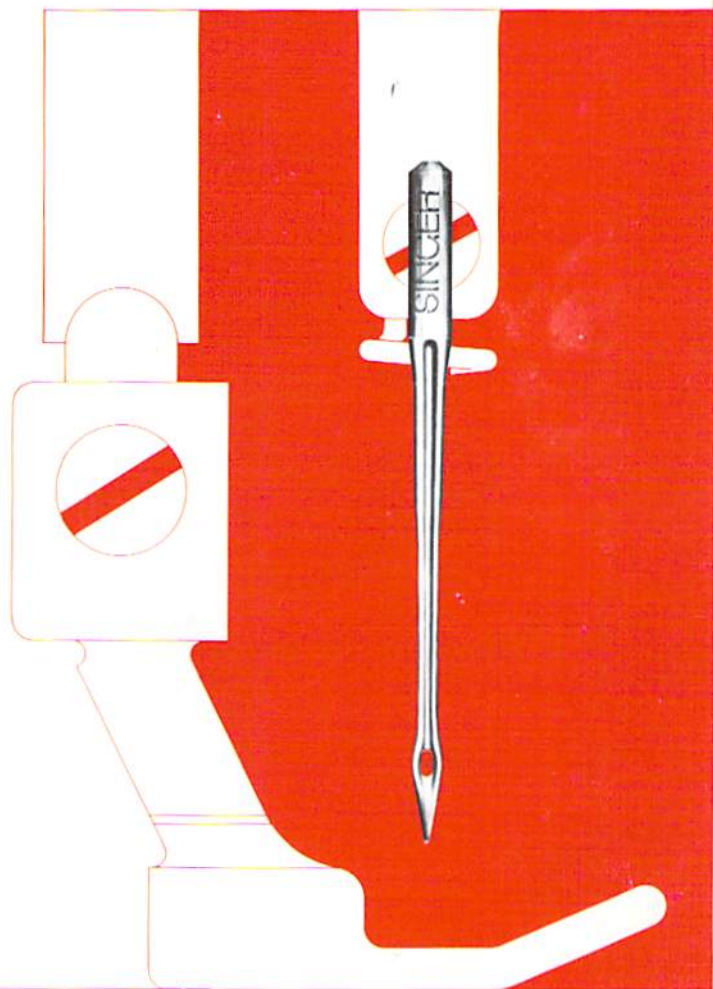


SINGER[®]

Information on Needles for Leather Sewing



SINGER/SNF
Spezialnadelfabrik GmbH
Bahnhofstr. 41-79
52146 Würselen

Telefon (02405) 609-0
Telefax (02405) 609 201
Teletex 2405400
Telex 17 2405400

SINGER Cutting Points

1. Introduction

Sewing machine needles with cutting points are mainly used to sew leather and other very dense materials (cardboard etc.). The cutting point is designed to overcome the relatively high force which is needed to penetrate the material. Additionally, the cutting point is able to produce a special seam appearance by using different point shapes.

There are numerous possibilities for making different point shapes and consequently the assortment of point shapes offered for the leather sewing industry is rather extensive. Generally, it is possible to meet all sewing requirements with 6 different point shapes. These basic point shapes are the round point, wedge point, reverse twist point, twist point, cross point and the triangular point.

The table below shows on the left the symbols and the abbreviations of the basic point shapes and on the right some variations of these basic point shapes. The arrow in the symbol demonstrates the direction of threading the needle.

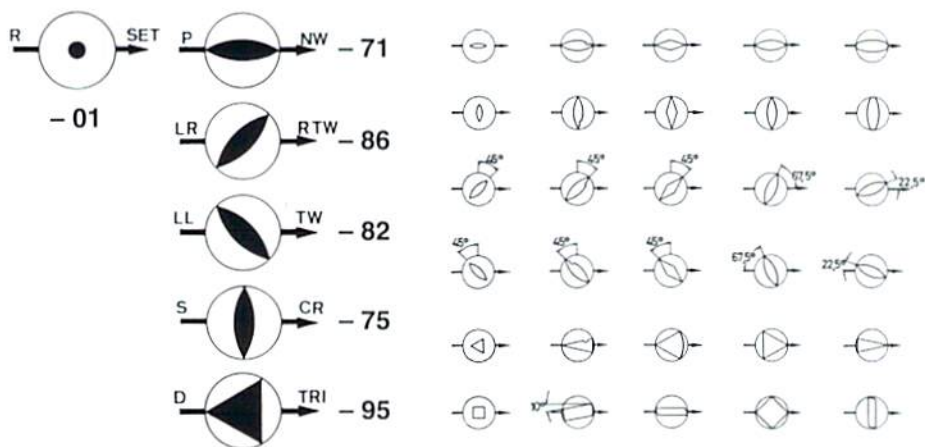


Fig. 1

In the following chapters of this booklet we will inform you in detail about the basic point shapes.

The cutting ability as well as the influence on the seam will be described because in practice these two factors determine the choice of the cutting point.

Furthermore you will find information about the retained strength of leather material depending on the influence of shape and cutting direction of the needle point. Hints for leather sewing as well as information about needle heat may help you to choose the right needle point for your kind of work.

All descriptions of angles and directions mentioned in the next chapters are related to the following basic position of a needle: The needle is held with shank pointing to the viewer. Then the needle is turned so that the viewer looks onto the short groove or scarf. In this position the butt is the upper end of the needle and the point the lower end. All angles for the direction of the cutting edges are described in this position with the angle running clockwise.

2. Influence of the Leather regarding Seam Appearance

In Fig. 2 the structure of leather is shown. Two different layers can be seen, i.e. the upper papillary layer and the lower reticular layer.

Papillary layer

Reticular layer

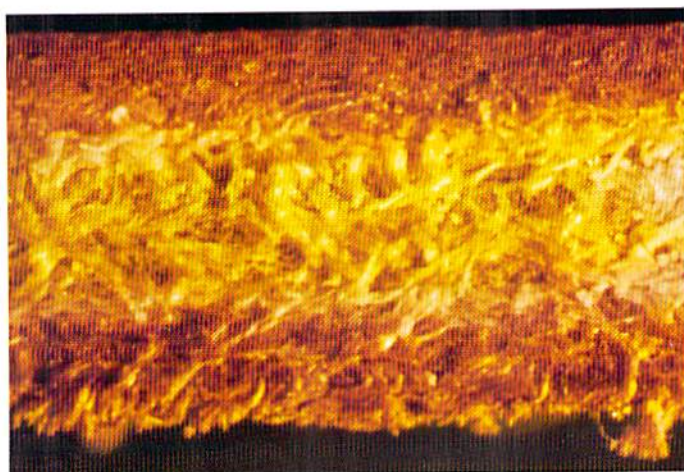


Fig. 2

The papillary layer and the part of the reticular layer just below this are the main influencing factors in the formation of the stitchhole and thus the seam appearance.

The structure, i.e. the fineness of the fibres and their density is determined by the number and size of hollow spaces (hair channels, perspiratory and sebaceous glands). When the papillary layer consists of many and large hollow spaces, the perforation is smaller and the stitchhole remains as formed without heavy ripping. The relatively loose structure enables the fibres displaced by the needle to give way.

Contrary to this, a finer and closer papillary layer is more subjected to ripping. The very close structure does not allow the fibres to give way and they therefore burst.

Thus, the structure of the papillary layer decisively influences the appearance and the wear of the sewn seam. Depending on the kind of structure the stitches will be drawn in or raised.

Due to its very loose structure the reticular layer has little influence on the perforation and the seam appearance. The thickness and the fibre density of this layer determine whether the stitchholes are open or closed.

The above statements quite clearly show the very complex process of leather sewing which is influenced by many different factors. A lot of experience is needed to control these different factors of influence and to manufacture a product which is agreeable regarding quality and design.

3. The Basic Point Shapes for Leather Sewing

a. The Round Point

The point of the needles is ground conical, the cone beginning at the lower area of the eye. The symbol for the round point is shown in Fig. 3. The arrow in the symbol indicates the threading direction. When the needle is used on machines which are threaded from front to back (zigzag-, chainstitch-machines), the symbol has to be turned by an angle of 90 degree.



Fig. 3

The SINGER point code of the round point needle is -01-, the short form is -R- or -Set-. The round point generally is the standard point shape. Therefore in most cases the needle system designation is written without any additional abbreviation.

The perforation and the seam appearance of two different leathers is shown in Fig. 4.



Fig. 4

Depending on the kind of leather the round point needle generates a straight or slightly diagonal stitch and the seam is raised. The stitches vary a little depending on the quality of the papillary layer.

Contrary to the cutting points the round point needle only widens the stitchhole. The stitchhole bursts according to the fineness and density of the papillary layer. Mostly, the perforations are damaged by the groove edges, the tear direction being determined by the weakest fibres immediately around the stitchhole.

b. The Wedge Point

The wedge point cutting edge is ground wedge-shaped parallel to the eye and has a lens-shaped cross-section. Fig. 5 shows the symbol of the wedge point.



Fig. 5

The SINGER point code for the wedge point needle is -71-, the abbreviation is -P- or -NW-. The perforation and the seam appearance of two different leathers is shown in Fig. 6.



Fig. 6

Depending on the kind of leather the wedge point generates a straight to slightly diagonal stitch. The seam is raised. The wedge point cuts the sewing material at right-angles to the sewing direction. Therefore a high number of stitches per inch can be produced with less loss in retained strength. This is one of the big advantages of the wedge point compared to other cutting points.

The fact that depth and direction of the openings determine the position of the thread, becomes clearly evident when looking at the seams obtained by the wedge point. Due to the position of the cutting edge to the needle grooves, the widening effect of the wedge point needle is somewhat greater than its cutting effect. The characteristics of the papillary layers of the various leathers finally decide the stitchhole formation and seam appearance.

If the papillary layer is of a fine and dense structure, then it bursts heavily. The more the tearing direction approaches an angle of 45 degree to the sewing direction, the more diagonal the seam is obtained. A relatively coarse and loose papillary layer, on the other hand, allows the fibres to be displaced by the needle, and less bursting occurs. The amount of burst stitchholes is small and the resulting seam is straight.

If, with certain sewing machines (zigzag- or chainstitch-machines), the needle has to be threaded from front to back, then the cutting direction of the wedge point is changed to cut parallel with the sewing direction. With the exception of special applications, in this case the wedge point needle should not be used because of the heavy decrease in retained strength when the number of stitches per inch is high.

Often, needles with twisted point grooves are used. Additional information will be stated after the description of the basic point shapes.

c. The Reverse Twist Point

The reverse twist point is wedge-shaped with the cutting edge turned at an angle of 135 degree in comparison to the wedge point. The cross-section is lens-shaped like the wedge point. Fig. 7 illustrates the symbol of the reverse twist point.



Fig. 7

The SINGER point code of the reverse twist point is -86-, the abbreviation is -LR- or -RTW-. The perforation and the seam appearance are shown in Fig. 8.

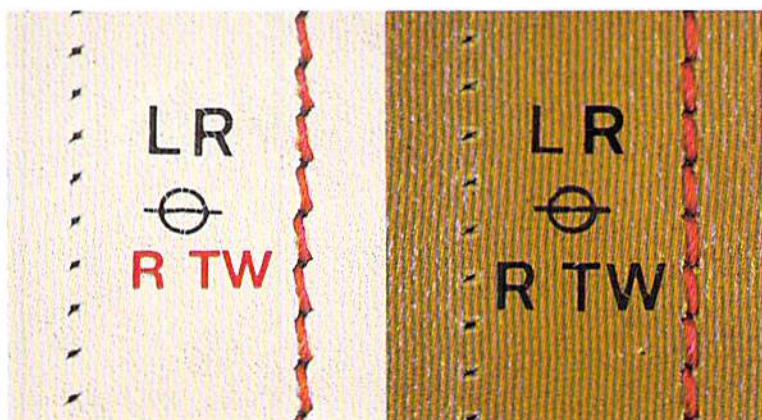


Fig. 8

Depending on the kind of leather the reverse twist point generates a more or less distinctive diagonal stitch. The seam is raised. The sewing material is cut at an angle of 45 degree to the right of the sewing direction. Due to these diagonal stitches the reverse twist point may be applied wherever decorative stiches are needed. With the exception of the wedge point the reverse twist point is the most used cutting point in leather sewing.

d. The Twist Point

The twist point is wedge-shaped with the cutting edge turned to an angle of 45 degree in comparison to the wedge point. The cross-section is lens-shaped. In Fig. 9 the symbol of the twist point is illustrated.



Fig. 9

The SINGER point code of the twist point is -82-, the abbreviation is -LL- or -TW-. Fig. 10 shows the perforation and the seam appearance of the twist point on two different leathers.



Fig. 10

Contrary to the reverse twist point the twist point generates a straight stitch. The seam is slightly drawn in. The sewing material is cut at an angle of 45 degree to the left of the sewing direction. The twist point can be applied wherever straight stitches are required without drastically decreasing the retained strength of the leather.

e. The Cross Point

The cross point is wedge-shaped transverse to the eye and has also a lens-shaped cross-section. Fig. 11 illustrates the symbol of the cross point.



Fig. 11

The SINGER point code of the cross point is -75-, the abbreviation is -S- or -CR-. Fig. 12 shows the perforation and the seam appearance.

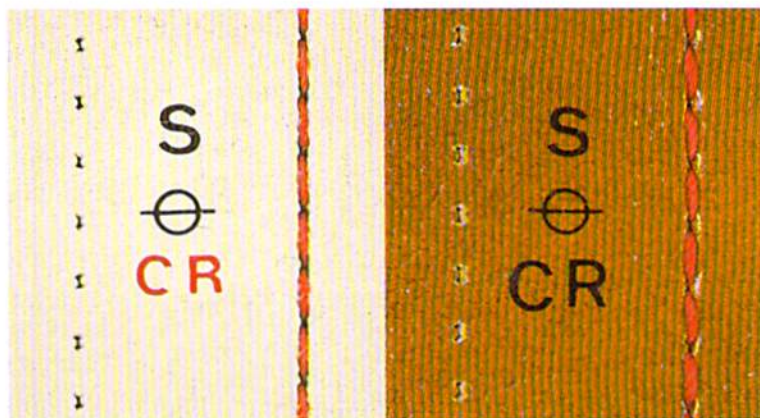


Fig. 12

The cross point cuts the leather in the sewing direction. Therefore it is able to generate exactly straight stitches. The seam is drawn in. The density of the stitches should not be too high because otherwise, due to the perforation in the sewing direction, the leather would be weakened heavily.

On sewing machines with the threading direction from front to back the cross point generates the stitches of a wedge point giving the possibility of high stitch density resulting in a very stressable seam.

f. The Triangular Point

The triangular point is ground on three sides, one cutting edge being on the long groove side of the needle. Fig. 13 illustrates the symbol of the triangular point.



Fig. 13

The SINGER point code of the triangular point is -95-, the abbreviation is -D- or -TRI-. The perforation and the seam appearance are shown in Fig. 14.



Fig. 14

The triangular point makes its longer incision in the sewing direction. Depending on the kind of leather it generates straight to slightly left stitches with the seam deeply drawn in.

Caused by the heavy cutting effect of the three cutting edges, the triangular point damages the leather quite considerably. Therefore the use of this point shape should be limited to sewing leathers which are heavy or difficult to penetrate. The triangular point can also be recommended to sew other heavy materials, e.g. cardboard or plastics and similar sewing materials.

g. Needles with Twisted Point Grooves

Various cutting point needles are also available with a twisted point groove. The twisted point groove starts at the lower end of the eye at the scarf side of the needle and runs either to the left or to the right side of the needle point. In the needle system designation it is marked with the additional letters -CL- or -CR-.

The purpose of the twisted point groove is to protect the needle thread against damage when the needle withdraws from the sewing good. The use of twisted point groove needles is particularey useful when sewing leathers which have a hard or tough papillary layer.

It should also be taken into account when using the twisted point groove needle on twin needle machines that they require different twisted point grooves for the right and for the left needle. For the commonly used machines with right-rotating hooks a left twist groove point is recommended for the right needle together with a right twist groove point for the left needle.

Cutting point needles with twisted point grooves decrease the retained strength of the leather more than the comparable needles without twisted point grooves.

h. Change of Threading Direction

The above statements are only valid for sewing machines which are threaded from left to right unless otherwise mentioned. When the needle is threaded from front to back the cutting actions of the different cutting points change. Fig. 15 illustrates this procedure.

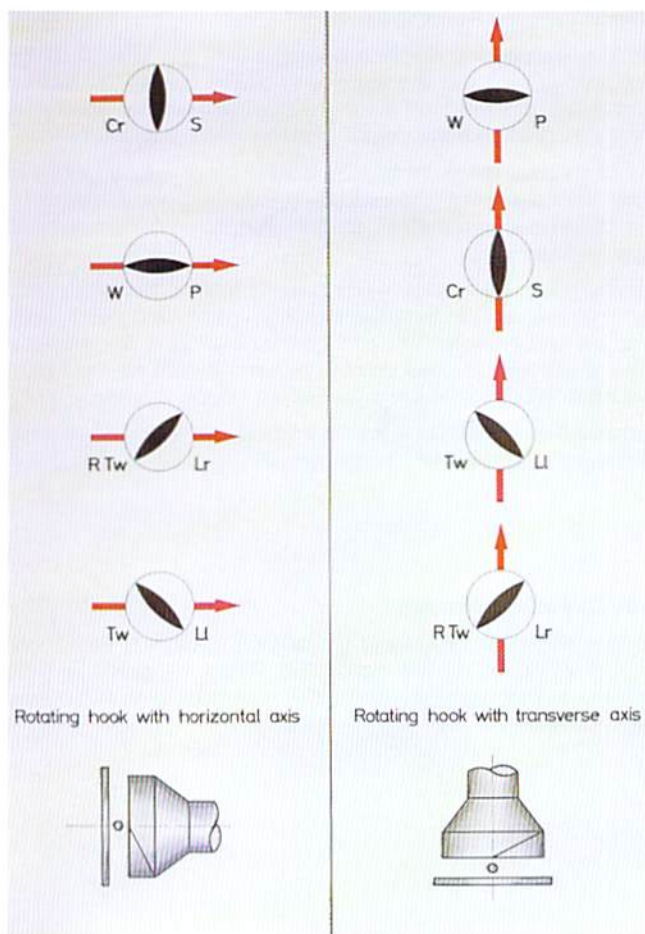


Fig. 15

The following Fig. 16 a. to f. show the perforation and the seam appearance of the basic cutting points for two different kinds of leather.



Fig. 16a

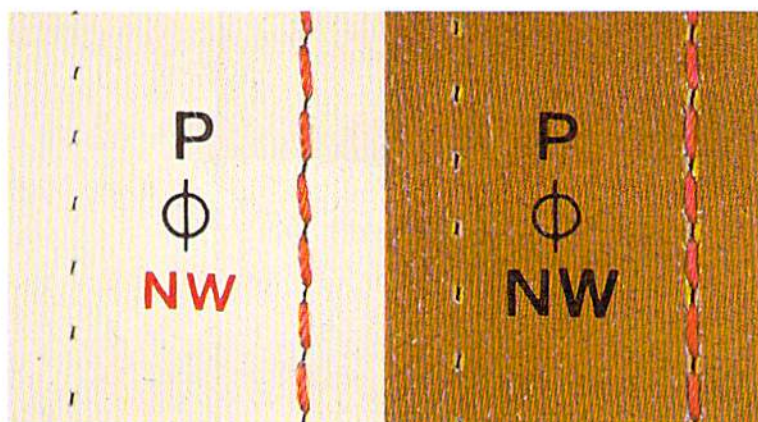


Fig. 16b

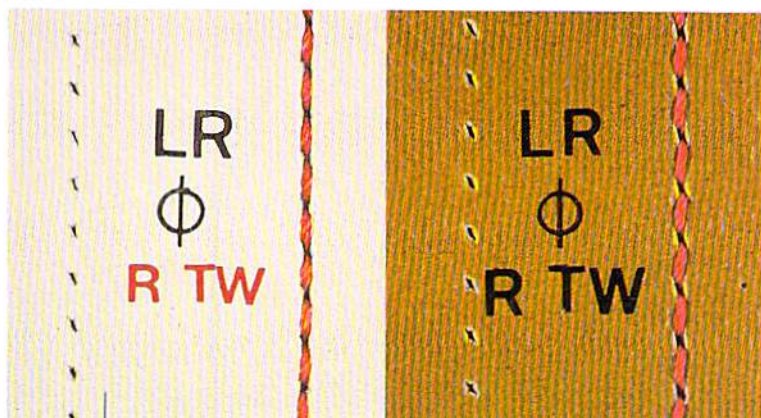


Fig. 16c

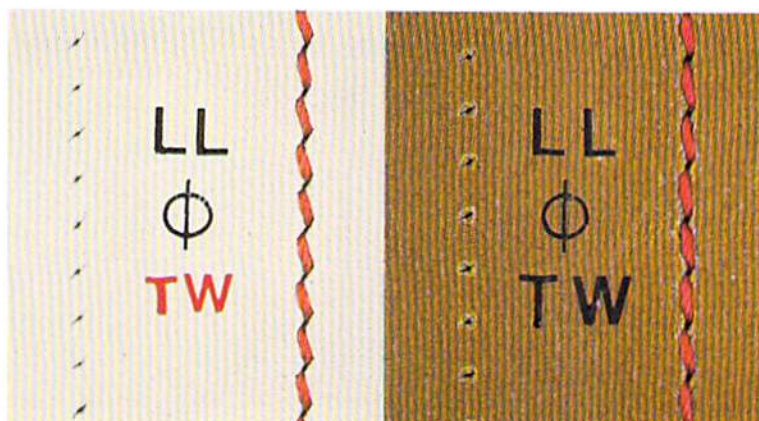


Fig. 16d



Fig. 16e

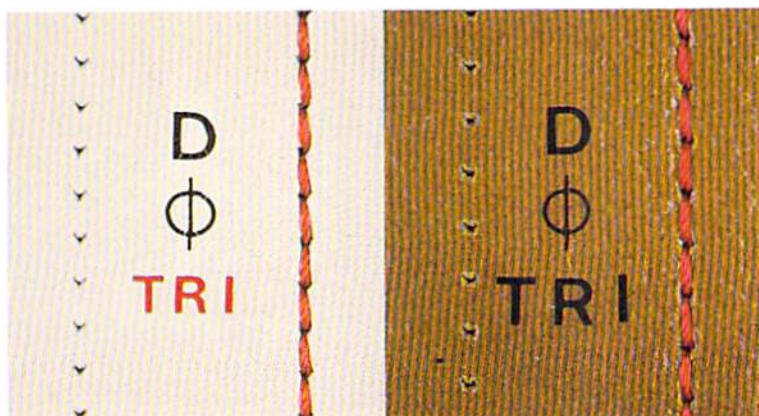


Fig. 16f

4. Loss of Retained Strength during Sewing

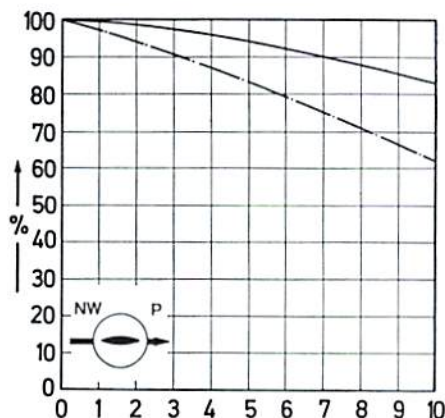
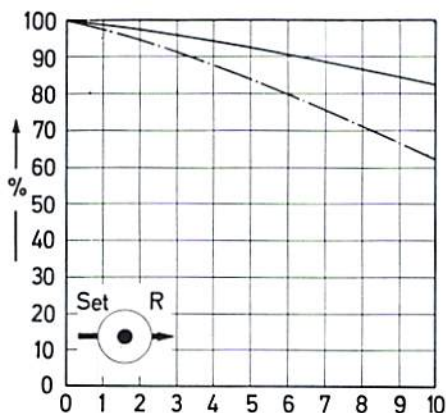
The quality of every seam depends on different influencing factors which finally also determine the appearance of the finished product.

There is no doubt that the seams of a shoe are stressed more than the seams of leather garment. Therefore special attention should be made to the choice of the material and to the manufacturing. For every material and for every seam the sewing thread as well as stitch type, needle point shape, needle size and stitch length are important factors influencing the seam appearance and the durability of the seam.

As already mentioned, the leather is weakened to a certain degree depending on the kind of cutting point in use. But the loss of retained strength can be minimized by the choice of the right cutting point and the right needle size. The third important factor which has to be taken into consideration is the density of stitches, i.e. the number of stitches per inch.

For these three parameters the following diagrams have been evaluated in our sewing lab which show the losses of retained strength for two different needle sizes in relation to the density of stitches and to the kind of cutting point. The diagrams are valid for calf leather. The losses for cowhide and kid leather are about 5% below the values of calf leather.

The continuous line indicates the retained strength of needle size 70/10, the broken line shows the curve of needle size 100/16.



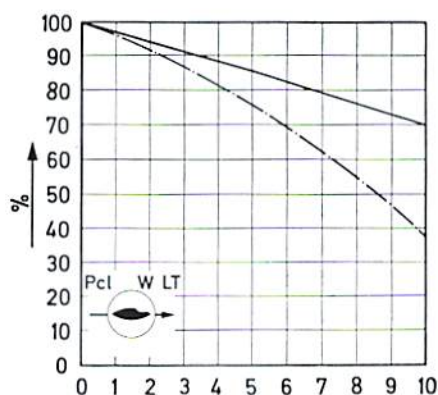
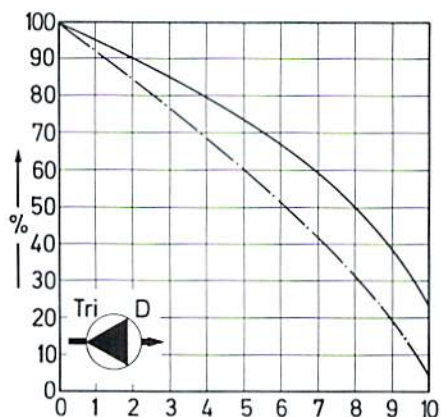
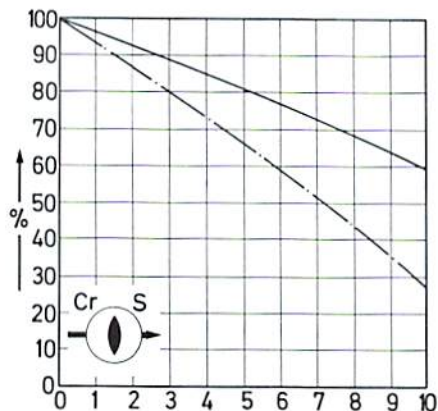
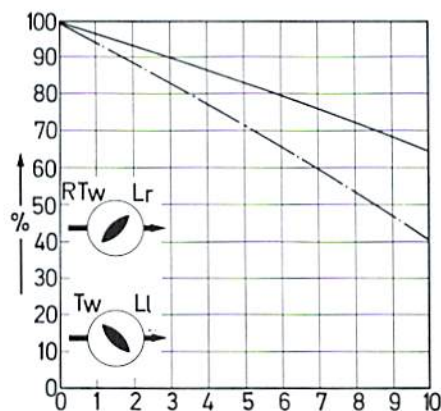


Fig. 17

The intention of these diagrams is to have ready assistance to choose the right conditions for a certain application in order to be able to produce a high quality seam.

5. Needle Heat

Every sewing process causes a certain amount of heat which is generated in the needle by the friction with the sewing material. This increase of temperature depends greatly on the sewing speed, the needle size and on characteristics of the sewing material. Furthermore also the lubrication of the sewing thread is of great influence on the needle temperature.

For modern polyester threads the softening point at which plastic deformation and the connected damage of the thread occurs is in the range of 230-240 degree C. But also the needle temperatures reached during sewing have almost the same range. Fig. 18 illustrates different thread breakages as they will be experienced in practise.



Mechanical Breakage

Breakage by Melting
and Mechanical
Destruction

Melted Thread

Fig. 18

Intensive investigations have been carried out in the SINGER sewing lab concerning the needle temperature. The temperature in the needle is measured during the sewing process without touching the needle.

Naturally, the needle with round point is generating the highest temperature in the needle during leather sewing because this needle is only widening the stitch hole. In that case an increased friction is caused between needle and sewing material. The measurements have been carried out under the following conditions:

Sewing material	: 1 ply of leather
Sewing speed	: 2000 stitches/min
Needle size	: Nm 80/12

The temperatures measured in the round point needle are indicated below:

Calf leather	: 240° C
Cowhide	: 230° C
Kid leather	: 210° C

If these values are set to 100% for the round point needle, the temperatures for needles with cutting points will decrease to the following percentages:

Wedge point	- 5 % to 95 %
Reverse twist point	- 11 % to 89 %
Twist point	- 11 % to 89 %
Cross point	- 14 % to 86 %
Triangular point	- 21 % to 79 %

When sewing synthetic leather the use of cutting points only slightly influences needle heating. Even the difference in temperature between the round point and the triangular point is small and may be neglected. The reason is that the synthetic materials are very elastic and close very tightly around the needle blade during the penetration of the needle.

6. General

The production program of the SINGER Spezialnadelfabrik GmbH includes the needle systems of all leading sewing machine manufacturers. Additionally, new developments for special applications can be carried out. Over 70 years of experience in manufacturing sewing machine needles and the steady readiness for technical innovations enable us to react very flexible to the wishes of our customers. For the solution of sewing problems our technical customer's service is offering its help at any time. With the help of our sewing lab equipped with modern sewing machines and advanced electronic measuring devices each sewing problem will be investigated in order to find an individual solution.

Enquiries are welcome under the following address:

SINGER/SNF
Spezialnadelfabrik GmbH
Bahnhofstr. 41-79
52146 Würselen
Telefone (02405) 609-0
Telefax (02405) 609 201
Teletex 2405400
Telex 17 2405400

Also additional information and sample needles are available at the above address. Any assistance of our technical customer's service will be free of charge.



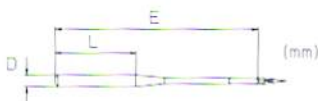
Needle Group for Leather Stitching – Needles with Cutting Points

Cat.No.	Other Designation	Point Style
1955-71	PF x 134 P	NW  Narrow Wedge P, Ps
1955-75	PF x 134 KS	N CR  Narrow Cross S, Ss
1955-82	PF x 134 LL	TW  Twist LL, Lls
1955-86	PF x 134 LR	R TW  Reverse Twist LR, Lrs
6777-71	PF x 134 PCL	NW  Narrow Wedge P, Ps



available in all common sizes

System Designations



D = 2,00 134 P, 135 x 8 NW
E = 33,9
L = 14,0 → 110/18
11,2 120/20 →



D = 2,00 134 P, 135 x 8 CR
E = 33,9
L = 14,0 → 110/18
11,2 120/20 →



D = 2,00 134 LL, 135 x 8 TW
E = 33,9
L = 14,0 → 110/18
11,2 120/20 →



D = 2,00 134 LR, 135 x 8 R TW
E = 33,9
L = 14,0 → 110/18
11,2 120/20 →



D = 2,00 134 PCL
E = 33,9
L = 14,0 → 110/18
11,2 120/20 →



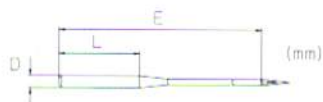
Needle Group for Leather Stitching – Needles with Cutting Points

Cat.No.	Other Designation	Point Style
6778-71	PF x 134 PCR	NW  Narrow Wedge P, Ps
6778-82	PF x 134 LL	TW  Twist LL, Ls
2047-71	PF x 34 P	NW  Narrow Wedge P, Ps
2047-82	TF x 2	TW  Twist LL, Lls
2047-86	TF x 2 LR	R TW  Reverse Twist LR, Lrs
2170-71	TF x 4	NW  Narrow Wedge P, Ps



available in all common sizes

System Designations



D = 2,00
E = 33,9
L = 14,0 → 110/18
11,2 120/20 →

134 PCR



D = 2,00
E = 33,9
L = 14,0 → 110/18
11,2 120/20 →

134 LL CR



D = 1,63 → 110/18
2,00 120/20 →
E = 33,9
L = 14,0 → 110/18
11,2 120/20 →

16 x 2 NW, 34 P, 287 P



D = 1,63 → 110/18
2,00 120/20 →
E = 33,9
L = 14,0 → 110/18
11,2 120/20 →

16 x 2 TW, 34 LL, 287 LL



D = 1,63 → 110/18
2,00 120/20 →
E = 33,9
L = 14,0 → 110/18
11,2 120/20 →

16 x 2 R TW, 34 LR,
287 L



D = 1,63 → 110/18
2,00 120/20 →
E = 33,9
L = 14,0 → 110/18
11,2 120/20 →

16 x 4 NW, 34 PCL,
287 PCL



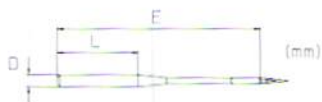
Needle Group for Leather Stitching – Needles with Cutting Points

Cat.No.	Other Designation	Point Style
2210-71	TF x 6	NW  Narrow Wedge P, Ps
1575-71		NW  Narrow Wedge P, Ps
1575-86		R TW  Reverse Twist LR, Lrs
3355-71	DP x 16	NW  Narrow Wedge P, Ps
3355-82	DP x 16 N	TW  Twist LL, Lls
3355-86	DP x 16 LR DP x 17 LR	R TW  Reverse Twist LR, Lrs



available in all common sizes

System Designations



D = 1,63 → 110/18 16 x 6 NW, 34 PCR,
2,00 120/20 → 287 PCR
E = 33,9
L = 14,0 → 110/18
11,2 120/20 →



D = 1,63 16 x 246 NW, 34 H PCL
E = 33,9
L = 14,0



D = 1,63 16 x 246 R TW, 34 H LR CL
E = 33,9
L = 14,0



D = 2,00 135 x 16 NW
E = 38,9
L = 14,8 → 110/18
12,7 120/20 →



D = 2,00 135 x 16 TW
E = 38,9
L = 14,8 → 110/18
12,7 120/20 →



D = 2,00 135 x 16 R TW
E = 38,9
L = 14,8 → 110/18
12,7 120/20 →



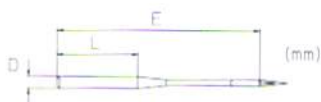
Needle Group for Leather Stitching – Needles with Cutting Points

Cat.No.	Other Designation	Point Style
3355-95	DP x 16 D	TRI  Triangular D
7225-71	DP x 35 P	NW  Narrow Wedge P, Ps
7225-86	DP x 35 LR	R TW  Reverse Twist LR, Lrs
3741-82	DI x 4	TW  Twist LL, Lls
3741-86	DI x 4 LR	R TW  Reverse Twist LR, Lrs



available in all common sizes

System Designations



D = 2,00 135 x 16 TRI
E = 38,9
L = 14,8 → 110/18
12,7 120/20 →



D = 2,00 134-35 P
E = 38,1
L = 14,0 → 110/18
13,5 120/20 →



D = 2,00 134-35 LR
E = 38,1
L = 14,0 → 110/18
13,5 120/20 →



D = 1,98 332 LL, 29 x 4 TW
E = 38,9
L = 15,2 → 90/14
12,7 100/16 →



D = 1,98 332 LR, 29 x 4 R TW
E = 38,9
L = 15,2 → 90/14
12,7 100/16 →



Needle Group for Leather Stitching – Needles with Cutting Points

Cat.No.

Other Designation

Point Style

4950-82

DD x 2

TW



Twist
LL, Lls

4950-86

DD x 2 LR

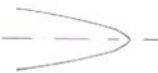
R TW



Reverse Twist
LR, Lrs



NEEDLE POINTS OF UNION SPECIAL NEEDLE SYSTEMS

Norm	Profile	Remarks
SPI		very acute round point
		normal round point
SES		light ball point
SUK		medium ball point
SKL		special ball point

SCHMETZ Number Metric Nm	Union Special
40	
45	
50	
55	022
60	
65	025
70	027
75	029
80	032
85	
90	036
100	040
110	044
120	048
125	049
130	
140	054
150	060
160	
170	067
180	073
200	080

System	Point
UY 101 GS	—
UY 106 GHS, GLS	SUK
UY 106 GS	—
UY 106 GS SES	SES
UY 108 GHS	SUK
UY 108 GKS	—
UY 108 GKS SES	SES
UY 108 GS	—
UY 108 GS SES	SES
UY 109 GS	—
UY 110 GAS, GS	—
UY 110 GS SES	SES
UY 113 GHS	SES
UY 113 GS	—
UY 113 GS SES	SES
UY 113 GS SUK	SUK
UY 118 GAS	—
UY 118 GAS SES	SES
UY 118 GAS SUK	SUK
UY 118 GBS	—
UY 118 GBS SES	SES
UY 118 GHS	SUK
UY 118 GKS	—
UY 120 GHS	SUK
UY 120 GS	—
UY 121 GBS	SUK
UY 121 GBS SES	SES
UY 121 GHS	SUK
UY 121 GS	—
UY 121 GS SES	SES
UY 121 GUS	SUK
UY 121 GWS	SES
UY 124 GS	—

System	Point
UY 126 GHS	SUK
UY 126 GS	—
UY 128 GAS	—
UY 128 GAS KSP	—
UY 128 GAS KSP SES	SES
UY 128 GAS SES	SES
UY 128 GBS	SUK
UY 128 GCS	—
UY 128 GHS	SUK
UY 128 GLS	SUK
UY 128 GS	—
UY 128 GS SES	SES
UY 128 GS SUK	SUK
UY 130 GS	—
UY 130 GS SES	SES
UY 130 GS SUK	SUK
UY 133 GS	—
UY 133 GS SES	SES
UY 143 GS	—
UY 147 GS	—
UY 150 GAS, GS	—
UY 150 GS SPI	SPI
UY 154 FGS	SES
UY 154 GAS	SPI
UY 154 GAS SKL	SKL
UY 154 GBS, GCS	SPI
UY 154 GCS SES	SES
UY 154 GDS	SPI
UY 154 GFS, GHS, GJS	SUK
UY 155 GAS	—
UY 158 GHS	SUK
UY 158 GJS	SPI
UY 158 GJS SES	SES

System	Point
UY 161 GS	—
UY 163 GAS	—
UY 163 GAS SES	SES
UY 174 GS	—
UY 180 GAS	—
UY 180 GLS, GNS	SUK
UY 180 GPS	—
UY 180 GPS SES	SES
UY 180 GS	—
UY 180 GS SES	SES
UY 180 GVS	—
UY 180 GXS	SUK
UY 180 GYS	—
UY 180 GYS SES	SES
UY 180 L	SUK
UY 183 GCS	SES
UY 183 GHS, GNS	SUK
UY 183 GS	—
UY 183 GXS	SUK
UY 183 GYS	—
UY 203 GS	—
UY 204 GS	—
UY 207 GS SES	SES
UY 208 GS SES	SES
UY 8021 GS	—
UY 8021 GS SES	SES
UY 8021 GS SUK	SUK
UY 8454 GAS, GS	SPI
UY 8454 GAS SES	SES
UY 8454 GAS SUK	SUK
UY 8454 GS SES	SES
UY 8454 GS SKL	SKL
UY 8454 GS SUK	SUK
UY 8455 GS	SPI
UY 8456 GS	SPI

FERD. SCHMETZ GMBH

P.O. BOX 1140 · D-5120 HERZOGENRATH
 TEL. (024 06) 85-0 · TELEFAX (024 06) 852 22/3
 TELEX 8 329 544 schm d



available in all common sizes

System Designations



328 LL, 214 x 2 TW

D = 2,00 → 140/22
 2,30 160/23 → 180/24
 2,50 200/25 →

E = 52,0

L = 21,8 → 110/18



21,3 120/20 → 140/22
 19,3 160/23 → 180/24
 18,3 200/25 → 230/26
 16,8 280/27 → 300/29

328 LR, 214 x 2 R TW

D = 2,00 → 140/22
 2,30 160/23 → 180/24
 2,50 200/25 →

E = 52,0

L = 21,8 → 110/18



21,3 120/20 → 140/22
 19,3 160/23 → 180/24
 18,3 200/25 → 230/26
 16,8 280/27 → 300/29



Quality Needles to fit
all Makes of Machine



Nr. 09.93



*A Trademark of The SINGER Company