
**Leather products ñ sewing needle
selection guideline**

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Foreword

This Ethiopian Standard has been prepared under the direction of Technical Committee for Leather and Leather Products(TC 74) and published by the Ethiopian Standards Agency (ESA).

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Acknowledgment has been made for the organization for its concern to contribute to the effort of national standardization.

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Leather products – sewing needle selection guideline

1. Scope

This standard covers requirements of needle bars for sewing leather and leather products.

2. Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ES 8239 Sewing machine needles – Fitting dimensions – Tolerances and combinations

ES ISO 14271 Method for Vickers hardness test for metallic materials

ES ISO 2768-1 General tolerances for dimensions and form and position. Part 1 General tolerances for linear and angular dimensions

3. Terms and definitions

3.1. The nomenclature shall be as indicated in Fig. 1.

4. Material

Needle bars shall be manufactured from any suitable steel which, after suitable heat treatment or hard chrome plating, fulfils the requirements as laid down in 5.

5. Hardness

The bearing surface of the needle bars shall be hard chrome plated to a minimum depth of 0.004mm or casehardened. The minimum hardness for case hardened needle bars shall be HV 450-500.

6. Dimensions

The main dimensions for needle bars shall be as given in Fig. 2.

7. Tolerances

7.1. The tolerances shall be as indicated in fig. 2

7.2. Tolerances on untoleranced dimensions shall be in accordance with medium class of ES ISO 2768 -1.

8. Workmanship and finish

The needle slot shall be machined to a fine finish and edges shall be free from burs, unevenness and other manufacturing defects.

9. Sampling

Unless otherwise agreed between the purchaser and the supplier, the sampling plan as given in Annex A shall be followed.

10. Testing

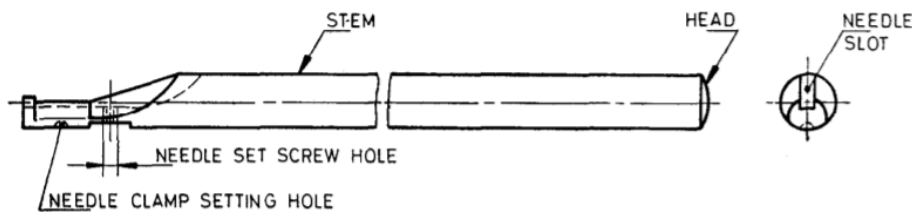
The needle bar, fitted with the master needle (see fig. 3) shall be held upon a fixed V-Block as indicated in Fig.4; the total indicator reading shall not exceed 0.08 mm when the needle bar is rotated with its pointer touching the uniform stem diameter of the master needle.

11. Marking

The needle bars may be marked with indication of the source of manufacture.

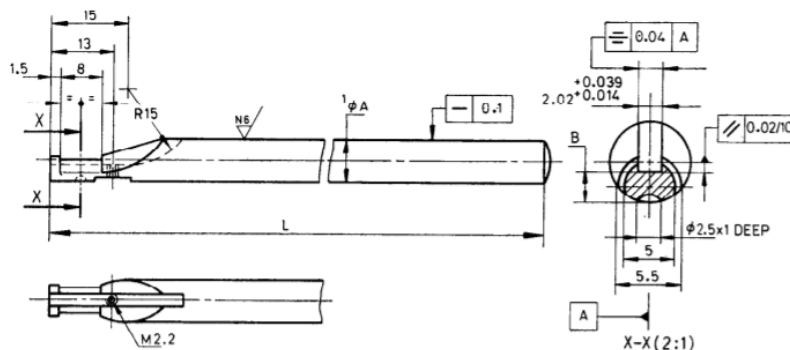
12. Packing

Each needle bar shall be given a suitable antirust coating and wrapped in polyethylene bags or sheets. The wrapped needle bars shall be securely packed in accordance with the best prevalent trade practice. Each package shall bear the manufacturer's name or trade mark, type and description of the content.



All dimensions in millimetres.

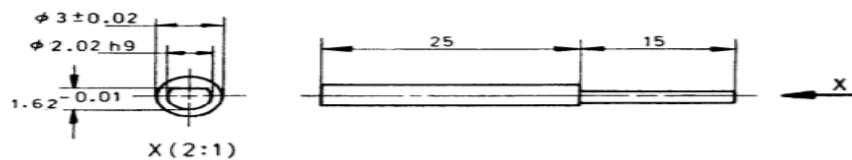
FIG. 1 NOMENCLATURE OF NEEDLE BAR FOR SEWING MACHINES



1) Alternative diameter 6.35 h6 (−0.009)

All dimensions in millimetres.

FIG. 2 DIMENSIONS FOR NEEDLE BAR



All dimensions in millimetres.

FIG. 3 DIMENSIONS FOR MASTER NEEDLE

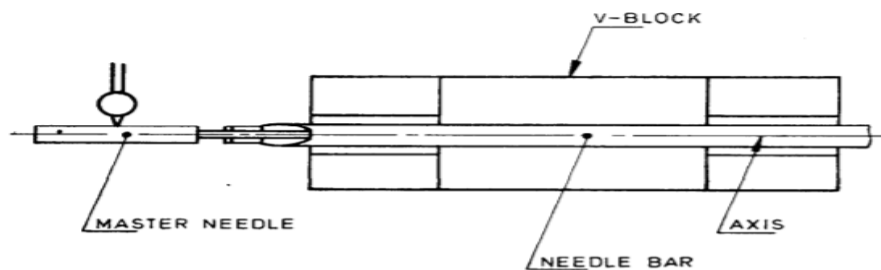


FIG. 4 TEST SET UP FOR NEEDLE BAR

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Annex A

(Normative)

Table 1 Scale of sampling and permissible number of defects

No. of needle bars in the lot	For dimensions and tolerances workmanship and finish and test		Sample size for harness
	Sample size	Permissible no. of defectives	
Up to 15	5	0	2
16 to 40	8	0	3
41 to 110	13	0	3
111 to 300	20	1	5
301 to 500	32	1	6
501 to 800	50	2	8
801 to 1300	80	3	10
1301 and above	125	5	15

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Annex B

(Normative)

The needle should make holes in the material which are as small as possible and close up again. This, among other things, requires a small needle diameter. On the other hand, however, most leathers offer a considerably stronger resistance to the penetrating needle than fabrics. For this, as strong a needle as possible is required. A larger needle size is also required when thicker sewing threads are used, particularly for fancy stitching on leather, to ensure that the needle eye is large enough to accommodate the thicker sewing threads. The needle size should therefore be chosen, so that it matches the sewing threads selected. Then again, there are the various types of leather. From the most delicate kid leather to all kinds of patent, nappa and suede leather and strong buff leather, one has different varieties each with its characteristic properties. Considering the wide variety of leathers, as well as the fact that frequently cardboard or plastic stiffeners should be sewn with leather, it is practically impossible to make a general recommendation on the most suitable needle sizes.

Selection of the suitable needle point for sewing leather

Determining the outcomes for the appearance of the seam, when sewing leathers and other materials having a similarly uniform structure, is the shape of the needle point. It can be rounded or provided with cutting edges.

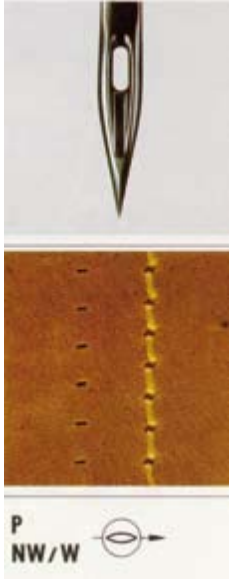
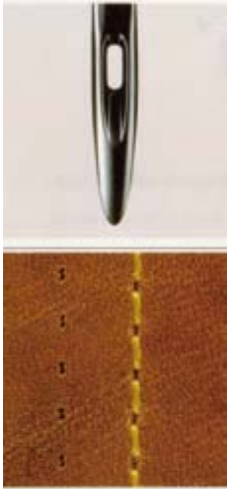
Because of their low coefficient of friction, points with cutting edges are ordinarily preferred as far as the sewing of leather is concerned.

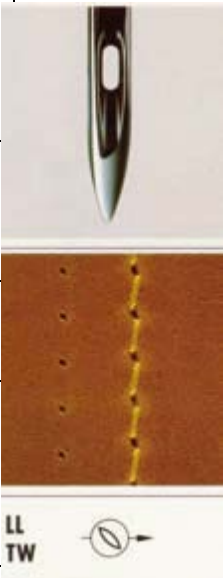
However, round points will always be employed when leather is sewn together with textiles. In the latter case, before employing needles with cutting points, it shall be established whether or not the woven or knitted fabric will be cut.

Needles with Cutting Points for Sewing Leather

The effect of cutting points reduces the relatively high resistance with which the leather counters the penetrating needle. Moreover, the appearance of the seam is influenced by the position and shape of the cutting point. There are 5 different cutting points which are sufficient to fulfil all of the leather industry's requirements with regard to the seam appearance as indicated in table 1.

Table 2: Needles with cutting points for sewing leather

Needle point		Application	Samples
Wedge point (W/P)	Point Design	It is ground in the shape of a wedge The cutting edge is parallel to the threading direction	 P NW/W
	Resultant Stitch Hole	Cuts leather at right angles to the sewing direction.	
	Seam Appearance	The sewing thread is drawn on at an inclined position pointing slightly to the left. The thread lies on the leather like a bead.	
	Strength Loss	Of the 5 different cutting points, the Wedge Point results in the smallest strength loss.	
	Needle Heating	If the needle heating with a round point is taken as 100%, the needle temperature is reduced by approx. 5% when using wedge point.	
	Notes on Application	Produces seams of high strength despite high stitch density.	
Cross point (CR/S)	Point Design	It is ground in the form of a wedge. The cutting Edge is positioned at an angle of 90 degrees to the threading direction.	
	Resultant Stitch Hole	Cuts leather in the direction of the seam.	
	Seam Appearance	The sewing thread is drawn straight and particularly strongly into the stitch holes.	

Needle point		Application	Samples
	Strength Loss	Only the Triangular Point results in a greater strength loss than the cross point. If the needle heating with a round point is taken as	
	Needle Heating	100%, the needle temperature reduced by 15% when using cross point.	
	Notes on Application	Produces straight seams with a well drawn-in thread. Do not select a high stitch density.	
Twist point (TW/LL)	Point Design	It is ground in the form of a wedge. The cutting edge is positioned at an angle of 315 degrees to the threading direction.	
	Resultant Stitch Hole	The leather is cut from top left bottom right, as seen in the direction of transportation.	
	Seam Appearance	The sewing thread is drawn straight into the stitch holes.	
	Strength Loss	The strength loss when using a twist point corresponds to the Strength loss which results from the use of Reverse Twist Point.	
	Needle Heating	If the needle heating with a round point is taken as 100%, the needle temperature is reduced by approx. 10% when using a Twist Point.	
	Notes on Application	The Twist Point produces a straight seam with drawn in sewing threads. The shape of the point enables straight seam with a higher stitch density than is attainable with the cross point.	
Reverse twist point (RTW/LR)	Point Design	It is ground in the form of a Wedge. The cutting edge is Positioned at an angle of 45	

Needle point		Application	Samples
		degrees to the threading direction.	
	Resultant Stitch Hole	The leather is cut from top right to bottom left, as seen in the direction of transportation.	
	Seam Appearance	The sewing thread is drawn into the stitch hole diagonally, from top left to bottom right.	
	Strength Loss	The strength loss when using Reverse Twist Point is between the Wedge point and the Cross point.	
	Needle Heating	If the needle heating with a round point is taken as 100%, the need temperature is reduced by approx. 10% using Reverse Twist Point.	
	Notes on Application	Needles with a Reverse Twist Point are used to attain decorative effects, on account of the inclined angle of the sewing thread	
Triangular point (TRI/D)	Point Design	It has 3 cutting edges. One of the cutting edges is parallel to the threading direction, while the other two are at an angle of 90 degrees to the threading direction.	
	Resultant Stitch Hole	The triangular point cuts the leather strongly in the direction transportation and slightly less right angles to the direction transportation.	
	Seam Appearance	The sewing thread is drawn strongly into the stitch holes, at a very slight inclination pointing the left.	

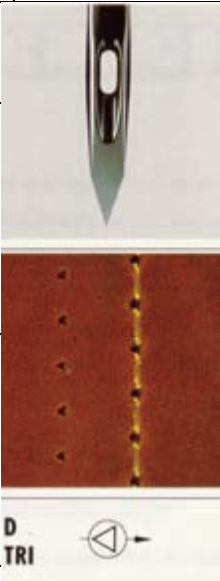
Needle point		Application	Samples
			
	Strength Loss	The triangular point has the greatest cutting effect and leads the highest strength losses of types of leather according to the number of stitches per cm.	
	Needle Heating	If the needle heating with a round point is taken as 100%, the needle temperature is reduced by approx. 20% when using a triangular point.	
	Notes on Application	Needles with a triangular point should be used on thick hard leathers. In due consideration the strength loss which results from the use of the triangular point, it is of vital importance to select an appropriate number stitches per cm.	

Table 3: Needle and sewing threads relationship

s.no	Needle size		Thread size ticket	Ply
	Matric	Singer		
1	60	8	80	2
2	65	9	80	2
3	70	10	60	2
4	75	11	60	2
5	80	12	60	2
6	85	13	60	2
7	90	14	40	3
8	95	15	40	3
9	100	16	40	3
10	110	18	20/30	6
11	120	19	20	6
12	130	21	15	9
13	140	22	15	9

s.no	Needle size		Thread size ticket	Ply
14	150	23	10	14
15	160	24	8	16
16	170	26	8	16

Table 4: Thread used to upper material, lining and bobbin

Upper threads		Lining and bobbin threads	
Ply	Thread no.	Ply	Thread no.
2	60	2	80
3	40	02-Mar	60
4	30	3	40
6	30	3	40
9	15	6	20
12	10	9	15
16	8	12	10
32	6	16	

Table 5: Needle and thread relationship in sewing leather products

s.no	Thread	Ticket no.	Singer	Metric
01	Continuous filaments nylon bonde and twisted	80	12-14	80-90
		60	14-16	90-100
		40	16-18	100-110
		20	18-20	110-120
02	Core spun polyester cotton	75	12-14	80-90
		50	14-16	90-100
		36	16-18	100-110
		20/18	18-20	110-120
03	Continuous filament polyester	70	11-13	75-85
		65	11-13	75-85
		50	13-15	85-95
		36	15-17	95-105
		16	18-20	110-120
		14	20	120-130

Table 6. Twisted Industrial Sewing Thread and Needle Number Relationship**Notes:** *nylon thread* is more durable and expensive than *polyester thread*

polyester			Nylon		
Ticket Numbers	Ply	Needle Numbers	Ticket Numbers	Ply	Needle Numbers
180	2	60/70	80	3	80/90
120	3	70/80	60	3	90/100
120s	2	80/90	60s	2	90/100
80	3	80/90	40	3	90/100
60	3	90/110	30	3	100/110
40	3	100/110	20	3	120/130
30	3	120/130	15	3	160/200
20	3	120/130	10	3	160/200
17	3	160			
15	3	160/200			
10	3	160/200			
8	3	140/180			
5	3	160/200			

Table 7: Needle Threads and Materials Combination Relationship

S.NO	LEATHER	THICKNESS	STITCHING TYPE	THREAD	NEEDLE
	Softy/hard	1-1.3mm	Normal	Tkt no. 40, upper Tkt no. 60, bobbin	134LR90,100 134 D 80,90
	Softy/hard	1.4-1.8mm	Normal	Tkt no. 40, upper Tkt no. 60, bobbin	134LR100,110 134VR 100
	Softy/hard	0.4-1mm	Fine	Tkt no. 60, upper Tkt no. 60, bobbin	134LR80,90 134 D 80
	Softy/hard	1.4-1.8mm	Decorative	Tkt no. 15, upper Tkt no. 20, bobbin	134LR40 134VR140,150
	Softy/hard	1-1.3mm	Back seam French Binding	Tkt no. 40, upper Tkt no. 60, bobbin	134PCL80,90
	Softy/hard	1.4-1.8mm	U- binding	Tkt no. 40, upper Tkt no. 60, bobbin	134-135 90,100,110
	Softy/hard	1.4-1.8mm	Heavy thread Normal	Tkt no. 20, upper no. 40, bobbin	134LR130 134 D 130

Organization and Objectives

The Ethiopian Standards Agency (ESA) is the national standards body of Ethiopia established in 2010 based on regulation No. 193/2010. ESA is established due to the restructuring of Quality and Standards Authority of Ethiopia (QSAE) which was established in 1998.

ESA's objectives are:-

- ❖ Develop Ethiopian standards and establish a system that enable to check whether goods and services are in compliance with the required standards,
- ❖ Facilitate the country's technology transfer through the use of standards,
- ❖ Develop national standards for local products and services so as to make them competitive in the international market.

Ethiopian Standards

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ESA, representing Ethiopia, is a member of the International Organization for Standardization (ISO), and Codex Alimentarius Commission (CODEX). It also maintains close working relations with the international Electro-technical Commission (IEC) and American Society for Testing and Materials (ASTM). It is a founding member of the African Regional Organization for standardization (ARSO).

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