SRI LANKA STANDARD 1129 : 1996

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SPECIFICATION FOR LEATHER FOR GARMENTS

SRI LANKA STANDARDS INSTITUTION

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SLS 1129 : 1996

Gr. 11

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Sri Lanka.

Sri Lanka Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

This standard does not purport to include all the necessary provisions of a contract.

Sri Lanka Standard
SPECIFICATION FOR LEATHER FOR GARMENTS

FOREWORD

This standard was approved by the Sectoral Committee on Textiles, Clothing and Leather and authorised for adoption and publication as a Sri Lanka Standard by the Council of the Sri Lanka Standards Institution on 1996-07-18.

Leather has been a high fashion garment material for centuries and fashion designers have used grain and suede leathers as an attractive clothing material for many design themes. Leather used for garments has to meet stringent requirements of the consumer for certain characteristics such as colour fastness, dimensional stability and cold crack resistance which are unique to apparatus only.

This standard has been prepared to help the leather industry for its problems in producing leather for new increasing markets with no defined standards of performance.

It has been observed that in certain foreign markets imperial units are still being used for marking area of leather. In such unavoidable circumstances, leather manufacturers, dealers or suppliers are requested to use imperial units, for example square feet in paranthesis in addition to equivalent SI units.

Guidelines for the determination of a compliance of a lot with the requirements of this standard based on statistical sampling and inspection are given in Appendix A.

For the purpose of deciding whether a particular requirement of the specification is complied with the final value, observed or calculated, expressing the result of a test or an analysis shall be rounded off in accordance with CS 102. The number of significant places retained in the rounded off value shall be same as that of the specified value in this specification.

In the preparation of this standard, the valuable assistance derived from the following publication is gratefully acknowledged.

IS 12718 : 1989 Indian Standard Leather for garments-Performance requirements.

1 SCOPE

This standard prescribes the requirements and methods of tests for leather to be used in the manufacture of garments.

2 REFERENCE

SLS	62	Method for determination of colour fastness to day light
CS	102	Presentation of numerical values
SLS	374	Standard atmospheric conditions for conditioning and testing
SLS	403	Leather-Laboratory samples location and identification
SLS	404 Part 1	Leather physical testing-measurement of thickness
SLS	404 Part 3	Leather physical testing-determination of tearing load
SLS	404 Part 8	Leather physical testing-determination of absorption of water
SLS	428	Random sampling methods
SLS	537 Part 2	Leather chemical testing - determination of pH value
SLS	537 Part 7	Leather chemical testing - determination of chromic oxide
SLS	623	Methods for testing the resistance of leather to surface fungal growth
SLS	1015	Glossary of terms for leather
SLS	1075	Colour fastness of leather to water
SLS	1076	Test for colour fastness of small samples of leather to dry cleaning solutions
SLS	1077	Test for adhesion of finish of leather
SLS	1078	Measurement of area of leather
SLS	1079	Test for colour fastness of leather to cycles of to-and-fro rubbing
SLS	1080	Test for colour fastness of leather to perspiration

3 TERMINOLOGY

3.1 For the purpose of this standard, the definitions given in SLS 1015 and the following shall apply.

3.1.1 *Cold crack temperature*: The highest temperature at which the finish of a leather will crack when the leather is folded quickly once, grain outwards.

4 TYPES OF LEATHER

The leather shall be one of the following types: Corrected grain, full grain, suede, splits, embossed and nubuck.

5 GRADING OF LEATHER

The leather shall be categorised into relevant grades as stipulated in Appendix C.

6 REQUIREMENTS

6.1 Material

6.1.1 The leather shall be prepared from well preserved hides and skins and suitably tanned.

6.1.2 Fungicides and other chemicals used to promote mildew resistance and to obtain soft and shining effects shall be non-toxic.

The material shall show no growth of mildew when examined after the completion of the test prescribed in SLS 623 and the rating of fungal growth after the test shall be not more than 1.

6.1.3 The leather shall not contain any prohibitive material as given in Appendix B.

6.1.4 If required, the leather of all types including grain, corrected grain, splits and sueded surfaces may be finished with applying a surface coating which is suitable for the type of end use, that is, washable, non-washable and dry cleanable, and it shall not affect the quality of the base leather during usage.

6.1.5 The leather shall be dyed to obtain required shades, which are agreed to upon between the purchaser and the supplier.

NOTE

Application of shades having dye-through effect will be preferable.

6.1.6 The leather shall not crack when folded grainside outward around a mandrel of 1.5 m diameter through an angle of 180^0.

6.2 Grade

The grade of the leather when determined by the method given in Appendix C shall be better than 3, unless otherwise agreed to between the purchaser and the supplier.

6.3 Thickness

6.3.1 The leather shall have a uniform thickness throughout and required thickness shall be agreed to between the purchaser and the supplier.

6.3.2 The thickness shall be measured by the method prescribed in part 1 of SLS 404 and the tolerance on agreed thickness shall be ± 0.1 mm.

6.4 Tolerance on area

The area of the leather when determined by the method prescribed in SLS 1078 shall be as agreed to between the purchaser and the supplier.

The tolerance permitted on area of each piece of leather shall be not more than 2.5 per cent.

6.5 Tear strength

The tear strength of leather when determined by the method prescribed in part 3 of SLS 404 shall be between 13 N and 17 N.

6.6 Water absorption

The water content when the leather is subjected to the test specified in part 8 of SLS 404 shall be not more than 14 per cent.

6.7 Water repellency

The leather when subjected to the test method prescribed in Appendix D shall not show any sign of stains or spots.

6.8 Colour fastness

The leather shall be fast to various agencies listed in Table 1 and the colour fastness ratings shall be in accordance with the requirements specified therein when tested by the corresponding test methods.

TABLE 1 - Colour fastness requirements

Sl No (1)	Requirement (2)	Rating (3)	Test method (4)
(i)	Colour fastness to light	4 min	SLS 62
(ii)	Colour fastness to rubbing		
	Wet rubbing (change in shade after 50 cycles)	3 min	SLS 1079
	Dry rubbing (change in shade after 200 cycles)	3 min	
(iii)	Colour fastness to perspiration* (change in shade and staining)	3 min	SLS 1080
(iv)	Colour fastness to water (change in shade and staining)	3 min	SLS 1075
(v)	Colour fastness to dry cleaning	3 min	SLS 1076

NOTE

* *Adjust the artificial perspiration solution to pH 5.0*

6.9 pH value

The pH value of leather when determined by the method prescribed in Part 2 of SLS 537 shall be between 3.5 and 9.0.

6.10 Chromic oxide content

The content of chromic oxide, (Cr_2O_3) in leather when determined by the method prescribed in Part 7 of SLS 537 shall be not more than 3 per cent.

6.11 Adhesion of finish to leather

The adhesion of finish to leather when determined by the method prescribed in SLS 1077 with test pieces of width 10 mm shall be not less than 2 N in dry condition and not less than 1 N in wet condition.

6.12 Fastness of finish to dry cleaning

When the leather is subjected to the method given in SLS 1076 the leather shall not show any significant change in appearance.

6.13 Dimensional stability to dry cleaning

The leather when subjected to the method of test prescribed in Appendix E, shall have an area shrinkage which is not more than 6 per cent. In case of extension, the maximum area shall be 3 per cent.

6.14 Cold crack temperature

When the leather is subjected to the test prescribed in Appendix F the maximum decrease of temperature at which the cracks can be observed shall be 5 ^{0}C.

NOTES

1 Additional requirements given in 6.11, 6.12 and 6.14 are applicable for grain leathers only.

*2 The dimensional changes allowed do not imply that garments in wear will have the tolerances specified in **6.13** after dry cleaning. It has been observed that leathers giving this degree of area change in the test when processed as garments by normal commercial procedures with re-oiling can be restored to their original dimensions.*

*3 Requirement given in **6.11** has been included to ensure that grain leathers which are in accordance with colour fastness to dry cleaning requirement specified in **6.8 (v)** do not comply with the standard if the dry cleaning procedure results in partial or complete loss of finish.*

7 MARKING

The leather shall be legibly marked on the flesh side of each piece with the area in square decimetres. In case where imperial measurements are used, area in square feet may be marked in paranthesis with square decimetre.

NOTES

1 The marking should not cause any disfiguration to the leather or migrate itself to the grain surface of the leather coming in contact with it.

2 Attention is drawn to the certification marking facilities offered by the Sri Lanka Standards Institution. See the inside back cover of this standard.

8 PACKING

8.1 The leather shall be packed as agreed to between the purchaser and the supplier.

8.2 Each package shall be provided with following information marked or labelled indelibly on it.

(a) Name and address of manufacturer ;
(b) Registered trade mark if any ;
(c) Number of pieces ;
(d) Thickness in mm ;
(e) Total area in square metre (square feet in paranthesis may also be given) ;
(f) Month and year of manufacture ; and
(g) Country of origin.

9 METHODS OF TEST

9.1 Tests for the requirements given in 6 shall be carried out as prescribed in the relevant Sri Lanka Standards given therein and Appendices B,C,D,E and F of this specification.

9.2 The conditioning and testing atmosphere shall be the standard atmosphere for conditioning and testing leather as defined in SLS 374 ie., a relative humidity of 65 ± 2 per cent and temperature of 27 ± 2 °C.

APPENDIX A
COMPLIANCE OF A LOT

The sampling scheme given in this Appendix should be applied where compliance of a lot to the requirements of this standard is to be assessed based on statistical sampling and inspection.

Where compliance with this standard is to be assured based on manufacturer's control systems coupled with type testing and check tests or any other procedure, an appropriate scheme of sampling and inspection should be adopted.

A.1 LOT

In any consignment all the pieces of leather of same type and same grade belonging to one batch of manufacture or supply shall constitute a lot.

A.2 SCAMPLE OF SAMPLING

A.2.1 Samples shall be tested from each lot for ascertaining conformity to the requirements of this specification.

A.2.2 The number of pieces of leather to be selected from a lot for testing shall be in accordance with Table 2.

TABLE 2 - Scale of sampling

Lot size (1)	No. of pieces to be selected (2)	Sub sample Size 1 (3)	Sub sample Size 2 (4)
Upto 150	10	3	2
151 to 280	15	5	3
281 to 500	20	8	3
501 to 1200	25	13	4
1201 and above	30	20	5

A.2.3 The pieces shall be selected at random and in order to ensure randomness of selection, tables of random numbers as given in SLS 428 shall be used

A.3 LOCATION FOR CUTTING OUT TEST PIECES

A.3.1 Test pieces from the pieces selected as in A.2.3 which may be categorized as whole hides and skins, sides and backs, bends (butts), shoulders and bellies (flanks) etc. shall be cut out for both physical and chemical testing as illustrated in Figures 1,2,3 & 4 of SLS 403.

A.3.2 Areas free from all kinds of obvious defects such as scratches and flay cuts shall be taken for testing. If the selected area as by A.3.1 is with defects, additional material can be taken from the area immediately adjacent to the sampling position.

A.4 NUMBER OF TESTS

A.4.1 Each package selected as in A.2.2 shall be inspected for packaging and marking requirements.

A.4.2 Each package of the sub sample 1 of size given as in column 3 of the Table 2 shall be tested for the requirements 6.1.2, 6.1.6, 6.2, 6.3 and 6.4

A.4.3 Each package of the sub sample 2 of size given as in column 4 of the Table 2 shall be tested for the requirements 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13 and 6.14.

NOTE

Test pieces shall be cut according to the methods given in A.3 for the tests given in A.4.2 and A.4.3

A.5 CRITERIA FOR CONFORMITY

A lot shall be declared as conforming to the requirements of this specification if the following conditions are satisfied.

A.5.1 Each package when inspected as in A.4.1 satisfies relevant marking and packaging requirements.

A.5.2 Each test piece when tested as in A.4.2 and A.4.3 satisfies the relevant requirements.

APPENDIX B
PROHIBITIVE MATERIALS TO LEATHER

4-Aminodiphenyl
Benzidine
4-Chloro-o-toluidine
2-Naphthylamine
0-Aminoazotoluol
2-Amonl-4-nitrotoluol
p-Chloranilline
2,4-Diaminoanlcol
4,4-Diaminodiphenylmethen
3,3-Dichlorbenzindine
3.3-Dimethyloxybenzidine
3,3-Dimethylbenzidine
3,3- Dimethyl - 4,4 diaminodiphenylmethan
p-Kresidin
4,4-Methylen-bis-(2-chloranilin)
4,4-Oxydianilin
4,4-Thiodianlin
0-Toluidin
2,4-Toluylendiamin
2,4,5-Trimethylanilin
Penta chloro phenates (P.C.P)
Hexa Valant Cromium, more than 2 ppm as Cr^{vi}

APPENDIX C
GUIDELINES FOR GRADING OF LEATHER

C.1 SCOPE

This method provides guidelines to classify different types of leather in finished or semi-finished stage into different grades based on their cutting value.

The cutting value of leather is agreed upon between the purchaser and the supplier and is entirely dependent on the extent of spread in leather.

C.2 DEFINITIONS

C.2.1 *Cutting value* : The total defect free area of leather against the total area of the leather, in per centage.

C.3 PROCEDURE

C.3.1 Finished leather or semi-finished leather, if required by the purchaser, are only considered for grading.

C.3.2 First lay the leather piece flat on a smooth surface and remove all wrinkles so as the piece of leather to prevail evenly on the surface and by suitable means measure the total area of leather. A suitable measuring instrument with an accuracy of ± 2 per cent is recommended for this purpose.

C.3.3 First examine the piece of leather, both sides for defects, which can affect the serviceability and usability of the product being manufactured, like holes, flay cuts and remove those areas from the leather. Measure such defective areas, as described in C.3.5.

C.3.4 After removing defective areas as in C.3.3, examine both sides of the piece of leather again for other defects listed in C.4. Measure the areas which can affect the piece of leather by the same method as done in C.3.5.

C.3.5 Mark defective areas observed on each side of leather on the grain side by colour chalk. Measure the total area represented by all defects by suitable means. In case of dispute between interested parties or where more accuracy of measurements are required, use a square ruled transparent (flexi glass) sheet of sufficient area having squares of 1/10 square feet or 100 square centimetres. Place the transparent sheet over any defective area on the leather and trace it onto the sheet by chalk. Then move onto other defect and take the area represented by it onto the sheet, likewise fill the squares, if possible one after the other, in the sheet to measure all defective areas appeared in leather. Finally calculate the total area covered by defects in square feet or square decimetre.

C.3.6 As agreed upon between the purchaser and the supplier, the defects which can be available on the piece of leather may be given more or less consideration, depending on the extent and depth of defects.
For example, a purchaser who is needing larger pieces for manufacturing certain products may give much consideration to defects like brand marks, holes in the butt, flay cuts etc. and in turn that particular piece of leather might produce less cutting value.

C.3.7 Calculate the cutting value/usable area of leather using the following ;

$$\text{Cutting value or usable area ; per cent} = \frac{(A - A_1)}{(A)} \times 100$$

Where,

A is the total area of piece of leather in square feet or square decimetre
A_1 is the total areas represented by the defects observed as in C.3.3 and C.3.4, in square feet or square decimetre

C.3.8 Classify the pieces of leather as given in Table 3

TABLE 3 : Grading of Leather

Grade	Usable area, Per cent
1	100
2	between 90 and 99
3	between 80 and 89
4	between 70 and 79
R	between 60 and 69
D	between 50 and 59
E	between 40 and 49
F	39 and below

C.4 Defects in Leather

The following common defects may be observed in leather :

(a) scratches or blemishes in the grain ;
(b) brand marks ;
(c) growth marks ;
(d) warbles and tick marks ;
(e) holes ;
(f) thorn marks and pock marks ;
(g) stain marks ;
(h) loose grain ;
(i) hair slips ;
(j) flaying cuts ;
(k) poor trimming ; and
(l) process defects.

APPENDIX D
METHOD OF TEST FOR WATER REPELLENCY

D.1 PROCEDURE

Lay the leather test piece on a smooth and flat surface with grain side up. Sprinkle a few drops of distilled water on the surface of leather and allow the water drop to rest for 10 minutes. Take out the leather and remove the water drops by shaking the test piece. Lay the leather test piece again on the flat surface and observe for any stains or spots left over by distilled water drops.

D.2 RESULTS

The leather shall be considered to have passed the requirement for water repellency if no stains or spots are observed on the test piece surface.

APPENDIX E
DIMENSIONAL STABILITY TO DRY CLEANING

E.1 PRINCIPLE

E.1.1 Conditioned leathers are marked and measured, subjected to a dry cleaning procedure, followed by an appropriated finishing procedure. They are afterwards conditioned and measured. The dimensional change is expressed as a percentage of the original dimensions.

E.2 REAGENTS

E.2.1 **Tetrachloroethylene**, Dry Cleaning Grade

E.2.2 **Sorbitan Mono-Oleate**

E.3 APPARATUS

E.3.1 **Dry Cleaning Machine**, shall consist of a commercial rotating cage-type, totally enclosed, machine for use with tetrachloroethylene. The diameter of the rotating cage shall be not less than 600 mm and not more than 1080 mm. Its depth shall be not less than 300 mm. It shall be fitted with three or four lifters. The speed shall be such as to give a radial acceleration of between 0.5 g_n and 0.8 g_n for cleaning and between 60 g_n and 120 g_n for extraction [see Note 1 under E.8.1 (g)]. The machine shall be equipped with a thermometer for the measurement of solvent temperature. The machine shall have suitable facilities permitting the emulsion to be introduced gradually into the solvent between the cage and the casting, below the level of the solvent, in such a way that it does not fall directly on to the load. The machine shall be equipped with temperature control of either the incoming or the outgoing air during the drying cycle. [For general guidance, see Note 2 under E.8.1 (g)].

E.3.2 **Apparatus for applying appropriate finishing treatment to the test specimen.**

E.3.3 **Make-weights consisting of cleaning textile pieces or garments**, shall be white or a light colour and consist of approximately 80 per cent wool and 20 per cent cotton or viscose.

E.3.4 **Means of marking the test specimen**, pen and indelible ink or other suitable marking device can be used.

E.3.5 **Stable measuring** scale of dimensions, suitable for the article being tested, graduated in millimetres.

E.3.6 **A smooth flat surface**, of such dimensions that the article being tested can be laid flat for measurement.

E.4 ATMOSPHERES FOR CONDITIONING AND TESTING.

E.4.1 **For pre-conditioning**, an atmosphere of relative humidity not more than 10 per cent and of temperature not greater than 50 ^{0}C.

E.4.2 **For conditioning and measuring**, the standard atmosphere for leathers, that is relative humidity of 65 ± 2 per cent and temperature of 27 ± 2^{0}C.

E.5 PREPARATION OF TEST PIECES AND MAKE-WEIGHTS

E.5.1 When testing leather pieces, lay out the piece without tension on a flat, smooth surface, taking care to see that it is free from wrinkles and creases. Make three pairs of marks, each at least 250 mm apart, along the length and three similar pairs of marks along the width of the leather.

E.5.2 Condition the test piece and make-weight in the standard atmosphere for testing leather for at least 24 hours.

E.5.3 Lay the test piece out as detailed in E.5.1 and measure the distance between marks to the nearest millimetre. Make all measurements in the standard atmosphere for conditioning and testing leathers.

E.6 PROCEDURE

E.6.1 The total mass of the complete load shall be 50 ± 2 kg for each cubic metre of the volume of the cage. Ensure that the test piece(s) do not weigh more than 10 per cent of the total load, the remainder consisting of make-weights unless the test piece(s) as such weigh(s) more. When loaded into the machine, the piece(s) and the make-weights shall be in equilibrium with the standard atmosphere for testing leathers. Equilibrium is deemed to be attained after exposure for 24 hours.

E.6.2 Place the conditioned load in the machine and introduce tetrachloroethylene containing 1 g/l of sorbitan mono-oleate so that the liquor ratio, calculated on the volume of solvent in the cage and casing is 6.5 ± 0.5 litre for each kilogram of load (This corresponds to a solvent level of approximately 30 per cent of the cage diameter). Maintain the solvent at 30 ± 3^{0}C throughout the cleaning operation.

E.6.3 Prepare an emulsion by mixing one part (by volume) of the sorbitant mono-oleate with three parts of tetrachloroethylene and then adding two parts of water (by stirring). Start the machine with the filter circuit shut off, and slowly (over a period of not less than 2 minutes and not more than 12 minutes) add an amount of emulsion, corresponding to 2 per cent of water calculated on the mass of the load, to the machine between the inner and outer cages below the level of the solvent.

E.6.4 Keep the machine running for 15 minutes after switching it on. Do not use the filter circuit for the duration of the test.

E.6.5 Drain the solvent and centrifugally extract the solvent from the load for 2 minutes (at least 1 minute at full extraction speed).

E.6.6 Introduce pure dry solvent at the same liquor ratio (See E.6.2) and rinse for 5 minutes. Drain and extract again for 3 minutes (at least 2 minutes at full extraction speed).

E.6.7 Dry the load in the machine by tumbling in circulating warm air for an appropriate time, preferably using an automatic solvent dryness control. Either the outlet air temperature shall not exceed 60 ^{0}C, or the inlet temperature shall not exceed 80 ^{0}C. After drying, blow air at ambient temperature through the rotating load for 3 to 5 minutes.

E.6.8 Immediately take the test piece(s) from the machine. Place garments individually on hangers and place fabric specimens on a flat surface, for not less than 30 minutes before finishing.

NOTE

If additional information on stability to dry cleaning only is required, condition and re-measure the test piece at this stage before completing the test and include details of this procedure in the report.

E.6.9 Carry out a finishing treatment by the method appropriate for the type of garments or fabric under test [See Note 3 under E.8.1 (g)]. In most cases, this will involve pressing on a garment (steam) press supplied with steam at a pressure of 370 to 490 kPa (over pressure) ; or on a steam/air garment former for 5 to 20 seconds followed by drying with warm air for 5 to 20 seconds.

E.6.10 Condition the test piece as detailed in E.5.2 and measure to the nearest millimetre each test piece using the procedure referred to in E.5.3

E.7 CALCULATION AND EXPRESSION OF RESULTS

E.7.1 Calculate the average dimensional changes along the length and width of leather test pieces separately or in the principal dimensions of a garment. Express dimensional changes as a percentage rounded to the nearest 0.1 per cent, using a minus sign to indicate shrinkage and a plus sign to indicate an increase in dimensions.

E.8 TEST REPORT

E.8.1 Report the following information :

a) Whether the procedure for normal materials or the procedure for sensitive materials was conducted ;
b) Results obtained according to E.7.1 ;
c) Number of treatments given ;
d) Details of finishing treatment used, stating nil if this is appropriate :
e) Details of dimensions of the garment or fabric specimen ;
f) Percentage by mass of test piece(s) in the load, add the type of articles comprising the make-weights ; and
g) Maximum inlet or outlet air temperature during drying.

NOTES

1 The radial acceleration is calculated according to the following formula :

$$\frac{5.6\, n^2\, d}{1\,000\,000\,0}\, g_n$$

Where,

n = Number or revolutions per minute,
d = Diameter of rotating cage in millimetres, and
g_n = Standard acceleration of free fall (9.81 m/s^2).

2 *When using commercial dry cleaning equipment, official regulations and normal safety precautions should be observed.*

3 *The dimensional changes allowed do not imply that garments in wear will have this tolerance after dry cleaning. Experiments have shown that leathers giving the degree of area changes in the test when processed as garment by normal commercial procedures with reoiling can be restored to their original dimensions.*

APPENDIX F
METHOD FOR DETERMINATION OF COLD CRACK TEMPERATURE

F.1 APPARATUS, MATERIAL AND METHODS

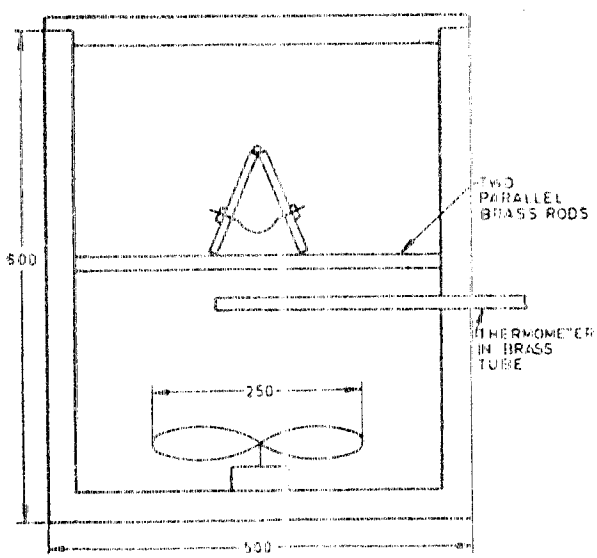
F.1.1 Refrigerated cabinet (See Fig 1)

The dimensions of the cabinet are not critical but the dimensions 500 mm x 300 mm x 600 mm have been found suitable. It is essential that the cabinet has forced air circulation.

If a deep freeze cabinet is used, it is again essential to incorporate a fan air movement over the test pieces and a thermostat to maintain the required temperature.

NOTE

In Fig. 1 this is provided by a fan set at the bottom of the cabinet. Cooling can be provided either by solid carbon dioxide placed in triangular trays in the corners of the cabinet or by an independent cooling unit so that the air is forced in near the base of the cabinet and exhausted near the top. Temperature is controlled in the first case by intermittent manual switching of fan to maintain the required temperature. In the latter case, a thermostat can be incorporated in the effluent air stream and set to the required temperature.

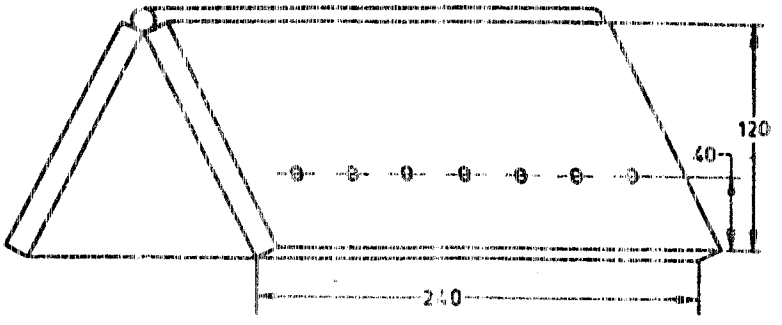


(All dimensions in millimetres)

Fig. 1 - Refrigerated Cabinet

F.1.2 Hinged apparatus for mounting the test pieces (See Fig. 2)

It shall be provided with holes of 5 mm diameter set 40 mm in from the free edge. These are countersunk on the inside so that the fixing screws for the samples fit flush with the surface and the apparatus can be closed flat. The position of the samples in the open position is shown in Fig. 3 and that in the closed position in Fig. 4. This enables the cracks (if any) to be examined. The hinged apparatus is placed on two parallel brass rods 125 mm apart as shown in Fig. 1. Between the brass rods, at the same level, a thermometer is placed in brass tube for safety. This can be read externally.



(All dimensions in millimetres)

Fig. 2 - Hinged apparatus

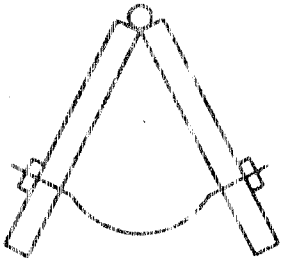
F.1.3 Test pieces of leather which measure 90 mm x 12.5 mm with a 5 mm hole punched 5 mm from each end of the sample are taken for testing.

F.2 PROCEDURE

F.2.1 Cut eight test pieces of the leather, one to be tested at each temperature from + 5 ^{0}C to - 30 ^{0}C at 5 ^{0}C intervals.

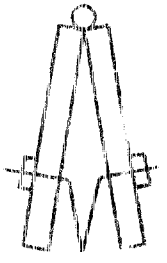
F.2.2 Fix the test piece in the hinged apparatus. If more than one leather is to be tested at the same time in the hinged apparatus, ensure that all leathers are of approximately the same thickness. Thicker test pieces will prevent the thinner one from being folded flat.

F.2.3 With the hinged apparatus in the open position, place it on the brass rods with the open part facing downwards (See Fig. 3). Close the refrigerated cabinet and run until the temperature is +5 ^{0}C. Maintain this temperature for 5 minutes. This is the minimum time with air movement which is required for the sample to reach equilibrium in a refrigerated cabinet. Then open the cabinet and snap shut the hinged apparatus by hand inside the cabinet. Remove the apparatus from the cabinet and examine the test piece for cracks. If the test piece has not cracked replace it by a further test piece and replace the apparatus in the cabinet. Lower the temperature to 0^{0}C and maintain for 5 minutes before snapping shut once more. Repeat the test at -5, -10, -15, -20, -25 and - 30^{0}C or until the finish shows cracks. The lowest temperature that can be conveniently reached is -30^{0}C.



(All dimensions in millimetres)

Fig. 3 - Hinged apparatus (open position)



(All dimensions in millimetres)

Fig. 4 - Hinged apparatus (closed position)

F.3 EXPRESSION OF RESULTS

F.3.1 Record the highest temperature at which the finish cracks and report it as the cold crack temperature.

NOTE

Some finishes do not show straight line cracks. Some show small fine crack, and their examination with a magnifying glass may be desirable. If a test piece has very fine cracks initially, the end point may not be clear or may be missed.

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The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Science & Technology.

The principal objects of the Institution as set out in the Act are to prepare standards and promote their adoption, to provide facilities for examination and testing of products, to operate a Certification Marks Scheme, to certify the quality of products meant for local consumption or exports and to promote standardization and quality control by educational, consultancy and research activity.

The Institution is financed by Government grants, and by the income from the sale of its publications and other services offered for Industry and Business Sector. Financial and administrative control is vested in a Council appointed in accordance with the provisions of the Act.

The development and formulation of National Standards is carried out by Technical Experts and representatives of other interest groups, assisted by the permanent officers of the Institution. These Technical Committees are appointed under the purview of the Sectoral Committees which in turn are appointed by the Council. The Sectoral Committees give the final Technical approval for the Draft National Standards prior to the approval by the Council of the SLSI.

All members of the Technical and Sectoral Committees render their services in an honorary capacity. In this process the Institution endeavours to ensure adequate representation of all view points.

In the International field the Institution represents Sri Lanka in the International Organization for Standardization (ISO), and participates in such fields of standardization as are of special interest to Sri Lanka.

Printed at the Sri Lanka Standards Institution, 17, Victoria Place, Elvitigala Mawatha, Colombo 08.

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