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Indian Standard
SPECIFICATION FOR
PROTECTIVE LEATHER CLOTHING

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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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Indian Standard

SPECIFICATION FOR

PROTECTIVE LEATHER CLOTHING

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(Continued on page 11)

Indian Standard

SPECIFICATION FOR PROTECTIVE LEATHER CLOTHING

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 29 May 1971, after the draft finalized by the Leather Sectional Committee had been approved by the Chemical Division Council.

0.2 This Indian Standard prescribes the general requirements for protective clothings other than gloves and safety footwear. Requirements for gloves and footwear are covered in IS : 2573-1963*, IS : 2574-1963†, IS : 2575-1963‡ and IS : 3737-1967§. The specification does not deal with any particular design, but deals with essential aspects of design and construction from the users point of view.

0.3 This standard contains clauses 5.2 and 6.1 which call for agreement between the purchaser and the supplier.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960||. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and tests for protective clothings made from leather. It applies to jackets, capes, sleeves, aprons, spats and leggings.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 1640-1960¶ shall apply.

*Specification for leather gauntlets for welders.

†Specification for leather gauntlets for workers in iron and steel industry.

‡Specification for leather mittens for workers in iron and steel industry.

§Specification for leather safety boots for workers in heavy metal industries.

||Rules for rounding off numerical values (*revised*).

¶Glossary of terms relating to hides, skins and leather.

3. MATERIAL

3.1 Leather — The leather used in the manufacture of protective clothing shall comply with the following requirements.

3.1.1 The leather shall be soft, pliable, free from pinholes and other visible defects or loose fibres which could adversely affect its serviceability and strength.

3.1.2 The leather shall not be treated as to obscure defects or be stained with compounds of iron which would make it wrought under humid conditions.

3.1.3 The leather shall not crack when folded grain side outward around a mandrel of 1.5 mm diameter through an angle of 180°.

3.1.4 Thickness — Thickness of the leather shall be specified by the purchaser within the range of 1 to 2 mm. The tolerance on specified thickness shall be ± 0.1 mm.

3.1.5 The leather shall comply with the requirements given below for the specific tannages.

3.1.5.1 Chrome tanned leather — The leather shall be soft, pliable chrome tanned cow or buffalo hides, tanned with basic chromium salts. Retaining with either vegetable or sytan or other mineral salts shall be permissible, provided the leather otherwise complies with the specified requirements. Flesh splits of 1.2 to 2.0 mm thickness may also be used. The material shall comply with the following requirements given in Table 1.

3.1.5.2 Vegetable tanned leather — The leather shall be soft, pliable, vegetable tanned conforming to the requirements prescribed for Type 2 of IS : 3840-1966*.

3.2 Metal Fasteners and Rivets — The metal fasteners and rivets shall be of corrosion resistant material or shall be treated to provide protection equivalent in performance to that of hot-dip galvanizing. Metal fasteners and rivets shall not be incorporated in protective equipment in a manner that allows them to come in contact with skin.

3.3 Straps — The straps shall be of the quick release type and positive in action.

3.4 Threads — The threads shall be inherently fire-resistant or be so treated that it shall not smoulder back along the seam when ignited. The

*Specification for lining leather.

threads of following construction shall be used:

- a) 25/3 ply linen thread or cotton sewing thread conforming to variety No. 38 of IS : 1720-1969* for stitching leather cloth.
- b) 18/3 ply linen thread or cotton sewing thread conforming to variety No. 36 of IS : 1720-1969*.

TABLE 1 REQUIREMENTS FOR LEATHER

(Clause 3.1.5.1)

Sl. No.	CHARACTERISTIC	REQUIREMENT	METHODS OF TEST, REF TO
(1)	(2)	(3)	(4)
i)	Petroleum hydrocarbon solvent (40/60), extractives, percent	3 to 20	LC 4 of IS : 582-1969*
ii)	Chromium content, percent, <i>Min</i> (for chrome tanned leather)	2.5	LC 10 of IS : 582-1969*
iii)	pH of aqueous extract	Not below 3.5	LC 18 of IS : 582-1969*
iv)	Double hole stitchtear strength, kg/cm thickness, <i>Min</i>	50	LP 8 of IS : 5914-1970†
v)	Shrinkage in water at 90°C for one minute	Shall not be more than 5 percent of the original area of leather which has been wetted initially	
vi)	Water vapour permeability, kg/cm ² /h, <i>Min</i>	12	LP 21 of IS : 5914-1970†
vii)	Heat resistance	No burning of leather or finishes after 10 minutes at 170°C	Appendix A of this Standard

*Methods of chemical testing of leather (*revised*).

†Methods of physical testing of leather.

4. DESIGN AND CONSTRUCTION

4.1 Because of the risk of any molten metal passing through the openings or being retained by the protective clothing, garments shall be designed and constructed to comply with the following requirements:

Pockets — where pockets are provided, they shall be internal, opening inside the garment.

*Specification for cotton sewing thread.

- Cuffs* — turn-back cuffs shall not be used.
- Neck* — jackets shall be capable of being fastened to give protection to the neck.
- Fastening* — fastening shall be secure. They shall permit quick removal of the clothing in case of emergency.
- Stitching* — leather clothing shall be stitched with 25/3 ply linen thread or cotton sewing thread conforming to variety No. 38 of IS : 1720-1969*. Straps, buckles and thongs shall be attached to clothing by riveting and/or with 18/3 ply linen thread or cotton sewing thread conforming to variety No. 36 of IS : 1720-1969*. The clothing shall be securely stitched using stitches of the lock-stitch type with not less than 24 and not more than 32 stitches per decimetre. All ends of seams shall be secured by lock-stitching or by riveting.

4.2 In addition to the requirements prescribed in 4.1, individual clothings shall comply with the following:

- Capes* — Capes to protect the necks, shoulders, upper back and upper chest of the wearer shall be provided, either with or without sleeves. Capes shall be made of leather, conforming to the requirements prescribed in 3.1, in one size (see Fig. 1) with minimum dimensions as given below:

Front length, neck to bottom edge	177.8 mm
Back length, neck to bottom edge	152.4 mm
Front width across chest	508.0 mm
Front width across shoulders	304.8 mm

The sleeves shall be of the following dimensions:

Inside length	457.2 mm
Outside length	304.8 mm

- Jackets* — The jackets may be provided with or without sleeves and shall be made from leather as specified in 3.1. Recommended minimum dimensions of jackets are given in Table 2.

TABLE 2 RECOMMENDED MINIMUM DIMENSIONS OF JACKETS

(All dimensions in millimetres)

TYPE	SLEEVE LENGTH UNDER ARM	CHEST MEASUREMENT	BACK LENGTH VARIABLES AS TO PATTERN LENGTH FROM NECK TO BOTTOM EDGE	
			Short Pattern	Long Pattern
(1)	(2)	(3)	(4)	(5)
Small	445	915	560	760
Medium	460	1 220	610	815
Large	495	1 375	635	840

*Specification for cotton sewing thread.



IA Without Sleeves



IB With Sleeves

FIG. 1 TYPICAL CAPE

Sleeves — These shall be made from leather (*see 3.1*) and shall be provided with the following dimensions (*see Fig. 2*):

Outside length — 350 to 600 mm in steps of 50 mm.

Sleeves may be supported by straps or similar fittings or by knitted bands which shall be covered externally by the same leather as that of the sleeves.

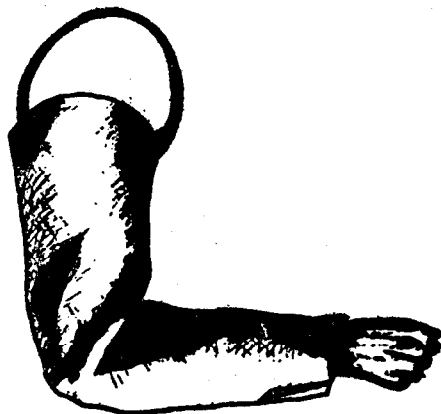


FIG. 2 TYPICAL SLEEVE

Aprons — These shall be made from leather (see 3.1). The body of the apron shall be in one piece without joints. The recommended minimum dimensions of aprons are given in Table 3.

TABLE 3 RECOMMENDED MINIMUM DIMENSIONS OF APRONS

(Clause 4.2)

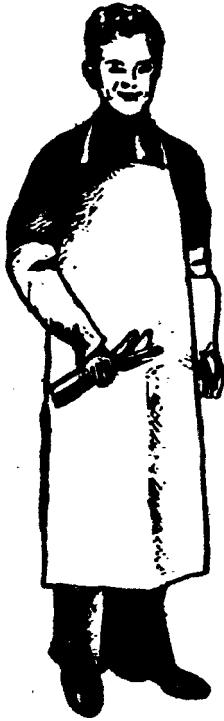
OVERALL LENGTH OF APRON MEASURED FROM THE BIB	WIDTH OF APRON MEASURED AT WAIST
(1)	(2)
mm	mm
900	600
990	660
1 070	760

Aprons may be full- or split-skirt type (see Fig. 3).

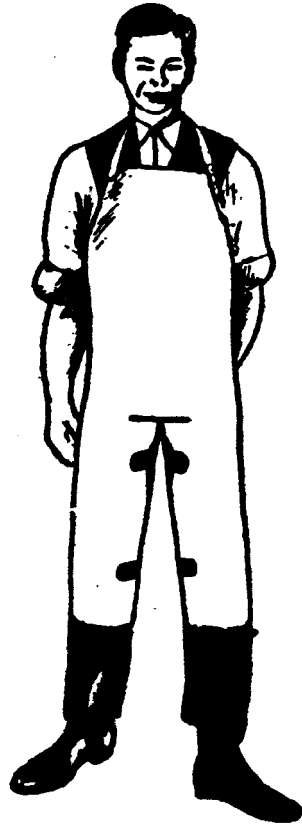
Gaiters — Gaiters shall be made conforming to IS: 2472-1969*.

Skull Caps — These shall be made from leather conforming to the requirements prescribed in 3.1 in not less than four sections, with turned seams. The caps shall be provided in one size but shall be laced permit adjustment.

*Specification for protective gaiters.



3A Full-Skirt Type



3B Split-Skirt Type

FIG. 3 TYPICAL APRON

5. MARKING

5.1 The protective clothing shall be marked legibly and indelibly with the following:

- a) Manufacturer's name;
- b) Trade-mark, if any;
- c) Size, wherever necessary; and
- d) Date of manufacture.

5.2 Packing — The material shall be individually wrapped in polyethylene sheets or packed in covers unless otherwise agreed to between the purchaser and the supplier.

6. SAMPLING AND CRITERIA FOR CONFORMITY

6.1 For the purpose of ascertaining conformity of a lot to this specification, the scale of sampling and criteria for conformity shall be as agreed to between the purchaser and the supplier for individual items.

A P P E N D I X A

[Table 1, Item (vii)]

HEAT RESISTANCE TEST

A-1. PROCEDURE

A-1.1 Cut small test pieces measuring approximately 5 cm square area. Condition them to a moisture equilibrium in an atmosphere of 65 ± 2 percent relative humidity and temperature of $27 \pm 2^\circ\text{C}$ (see IS : 196-1966*) and transfer them to an air oven maintained at $170 \pm 2^\circ\text{C}$ and keep for exactly 10 minutes.

A-1.2 Assessment — The test piece shall not show any burning, peeling or cracking of leather or finish, apparent discolouration and change in area from the original.

*Atmospheric conditions for testing (revised).

(Continued from page 2)

Panel for Protective Leather Clothing (Excluding Safety
Footwear), CDC 16 : P6

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TO
IS 6153 : 1971 SPECIFICATION FOR PROTECTIVE
LEATHER CLOTHING — SPECIFICATION

[*Page 5, Table 1, Sl No. (i) and (ii), col 2*] — Insert the following text after the existing text at both the places:

‘on moisture free basis’

[*Page 5, Table 1, Sl No. (vi), col 2*] — Substitute ‘ $\text{mg/cm}^2/\text{h}$ ’ for ‘ $\text{kg/cm}^2/\text{h}$ ’.

(CHD 017)