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Draft Indian Standard

BOOKBINDING LEATHER — SPECIFICATION

(First Revision)

(ICS 59.140.35)

Leather, Tanning Materials and Allied Products, CHD 17

Last Date for Comments: 09.04.2024

FOREWORD

(Formal clause shall be added later)

The use of leather for bookbinding purposes is quite old. It is preferred to cloth or paper largely because of its greater resistance to wear and tear in handling and consequently there is a greater shelf life for leather bound books.

With the rapid expansion and growth of libraries and reading rooms as well as the reading habits of people in our country, the demand for leather bound books has also increased tremendously. Apart from this, in view of the location of libraries in all types of climates, and in differently polluted atmospheres of industrial towns and in laboratories, the demand for good quality leather for bookbinding purposes cannot be over emphasized.

Bookbinding leather, as it is required to preserve costly and, at times, invaluable records and books, is in fact a choice material. Among many other requirements it has to be damp-proof, resistant to mildew and insect attack and should withstand rough handling. At the same time the eye appeal of bookbinding leather cannot be overlooked.

Realizing the importance of this type of leather, this standard was first published in 1964. This revision has been taken up in order to bring out the standard in latest style and format of the Indian Standards. The relevant clauses and test methods have been added and the references have been updated.

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: 2022. 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Draft Indian Standard

BOOKBINDING LEATHER — SPECIFICATION

(First Revision)

1 SCOPE

This standard prescribes the requirements and the methods of tests for vegetable, chrome and chrome-vegetable combination tanned bookbinding leather.

2 REFERENCES

The Indian Standards listed in Annex A contain provision, which through reference in this text constitute provisions of this Indian Standard. At the time of publication, by editions indicated were valid. All standards are subject to revision; investigate the possibility of applying the most recent editions of the Indian Standards indicated in Annex A.

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 1640 shall apply.

4 REQUIREMENTS

4.1 Raw Material — The raw material shall be of good quality sheep, goat or calf skin or cow hide, free from grain defects and insect damages.

4.2 Tanning — The hides and skins may preferably be tanned wholly with vegetable tanning materials using maximum tannins of pyrogallol group in the blend; or it may be chrome tanned or chrome-vegetable combination tanned with or without the use of syntans.

4.3 Appearance and Finish — The leather shall be of uniform thickness and shall be finished with full grain in fast colours. The leather shall not be treated with any compound of iron, copper or other similar types of metallic compounds. They shall be suitably treated with iron sequestering agents or with organic salts, like acetate, citrate and lactate or with both, depending on the tannage so as to prevent rotting.

4.4 Treatment to Promote Mould Resistance — The leather shall be given suitable anti-mildew treatment, so as to show no growth (*see* Note) of mildew in excess of what has been agreed upon between the purchaser and the supplier, when examined visually or otherwise, after the completion of the test prescribed in **LB : 2 of IS 6191**.

NOTE — According to the trade practice, the growth of mildew in the test may be defined as vigorous, moderate, slight, very slight or nil. Depending upon the needs, the assessment of the mildew test shall be as agreed to between the purchaser and the supplier. Attempts are being made to state the extent of mildew growth unambiguously.

4.5 Resistance to Perspiration — The material shall be resistant to perspiration.

4.5.1 The material shall be considered as resistant to perspiration if it is assessed good or very good, when examined after completion of test prescribed in **IS 6191(Part 6)**

4.6 Resistance to Ageing — The leather shall retain its shape and show no crackiness or crumbling, when examined after completion of the test prescribed in **Annex-B**.

4.7 Chemical Requirements — The bookbinding leather shall comply with chemical requirements given in Table 1.

Table 1 Chemical Requirements of Bookbinding Leather

(Clause 4.7)

Sl No.	Characteristic	Requirements	Method of Test, Ref To	
			IS 582	IS 16296
(1)	(2)	(3)	(4)	(5)
i.	Oils and fats, percent by weight, <i>Max</i>	5.0 to 8.0	LC 8	—
ii.	Water soluble matter, percent by weight, <i>Max</i>	6.0	Part 2	—

iii.	Insoluble ash, percent by weight, <i>Max:</i>	1.0	Part 3	—
	a) Vegetable tannage	5.0		
	b) Full-chrome tannage, or of chrome-vegetable combination tannage			
iv.	pH of water solubles, <i>Min</i>	4.5	Part 9	—
v.	Hide substance, percent by weight	45.0 to 55.0	Part 12	—
vi.	Degree of tannage for vegetable tanned leather	50.0 to 60.0	LC 21	—
vii.	Iron	To pass the test	Part 6/Sec1 or Part 6/Sec 2	—
viii.	Copper	To pass the test	Part 6/Sec1 or Part 6/Sec 2	—
ix.	Chrome Content(as Cr ₂ O ₃),percent by mass, <i>Min</i> :		Part 10/Sec1 or	Part 2
	a) Full chrome tannage	3.0	Part 10/Sec 3	
	b)Chrome and vegetable combination tannage	2.0	Part 10/Sec 4	

NOTE — Calculation of requirements of characteristics (i),(ii), (iii),(v), and (vi) are done on 14 percent moisture basis.

4.8 Physical Requirements —

4.8.1 The bookbinding leather shall also comply with the requirements given in Table 2.

Table 2 Physical Requirements for Bookbinding Leather

(Clause 4.8.1)

Sl No.	Characteristic	Requirements	Methods Of Test, Ref To	
			Cl No. in IS 5914	Cl or Annex in this Standard
(1)	(2)	(3)	(4)	(5)
i.	Thickness, mm:		LP: 1	—
	a) Range	0.7 to 0.9		
	b) Tolerance on individual thickness within the range	- 0.1		
ii.	Grain strength (lastometer), kg/cm thickness, <i>Min</i>	300.0	—	Annex C
iii.	Tearing strength, kg/cm thickness, <i>Min</i>	8.0	LC : 7	—

4.8.2 Colour Fastness

4.8.2.1 *Fastness to dry rubbing*— the bookbinding leather shall have fastness to dry rubbing of Grade 3 after 256 revolutions when tested in accordance with LF:9 of IS 6191.

4.8.2.2 *Fastness to wet rubbing*— the bookbinding leather shall have fastness to wet rubbing of Grade 3 after 128 revolutions when tested in accordance with LF: 9 of IS 6191.

4.8.3 Grain strength (folding test)

Fold the leather through 180 one hundred times repeatedly and continuously taking care that the folding each time is at the same place. No grain crack shall occur at the fold.

4.8.4 Standard Atmospheric conditions for physical testing

Unless otherwise required by the particular method of test. The test specimens shall be conditioned to a moisture equilibrium in an atmosphere of (65 ± 2) percent relative humidity and temperature of (27 ± 2) °C and, if possible, tested in that atmosphere or soon after removal from that atmosphere.

4.8.5 Quality of Reagents

Unless specified otherwise, pure chemicals (*see* Note) and distilled water *see* IS 1070 shall be employed in tests.

NOTE — 'Pure chemical' shall mean chemicals that do not contain impurities which affect the result of analysis

5 MARKING AND PACKING

5.1 The area of the leather shall be clearly marked on the flesh side on each piece.

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

5.3 The leather shall be marked with the name of manufacturer. Recognized trade-mark, if any, number of pieces of leather, month and year of manufacture.

5.4 BIS Certification Marking

The product may also be marked with Standard Mark.

5.4.1 The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provision of the *Bureau of Indian Standards Act, 2016* and the rules and regulations framed there under, and the products may be marked with the standard mark

ANNEX A

(Clause 2)

LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>
IS 196 : 1966	Atmospheric conditions for testing (<i>first revision</i>)
IS 265 : 2021	Hydrochloric acid specification (<i>fifth revision</i>)
IS 285 : 2021	Laundry soaps — specification (<i>fourth revision</i>)
IS 532 : 2006	Bicycle tube valves and valve - Tubing - Specification (<i>third revision</i>)
IS 582 : 1970	Methods of chemical testing of leather (<i>first revision</i>)
Part 2 : 2018	Determination of volatile matter (<i>second revision</i>)
Part 3 : 2017	determination of sulphated total ash and sulphated water - Insoluble ash (<i>second revision</i>)
Part 6	Determination of metal content section
Sec 1 : 2018	Extractable metals
Sec 2 : 2018	Total metal content
Part 9 : 2022	N-methyl-2-pyrrolidone NMP in leather
Part 10	Determination of chromic oxide content
Sec 1 : 2022	Quantification by titration
Sec 3 : 2022	Quantification by atomic absorption spectrometry
Sec 4 : 2022	Quantification by inductively coupled plasma (ICP)
Part 12 : 2022	Determination of nitrogen content and hide substance Titrimetric method

IS 1070 : 2023	Reagent grade water specification (<i>fourth revision</i>)
IS 1640 : 2007	Glossary of terms relating to hides, skins and leather (<i>first revision</i>)
IS 6191 : 1971	Method of micro - biological colour fastness and microscopical tests for leather
Part 6 : 2023	Colour Fastness to Perspiration
IS 16296 Part 2 : 2014	Leather - chemical determination of chromic oxide content: Part 2 quantification by colorimetric determination

ANNEX B
(Clause 4.6)

TEST FOR ASSESSING RESISTANCE TO AGEING

C-1 OUTLINE OF THE METHOD

The leather is subjected to accelerated oxidation by exposing it to hydrogen peroxide under acidic conditions, and the visible deterioration of leather, if any, reported at the end of the test.

C -2 REAGENTS

C -2.1 Standard Sulphuric Acid — approximately 1.0 N.

C -2.2 Hydrogen Peroxide — ten volumes strength.

C -3 PROCEDURE

C -3.1 Place a piece of leather, 16 cm² and weighing from 2 to 5 g, on a glass plate and Evenly treat it with sulphuric acid in the proportion of 1 ml of acid per gram of air-dry leather. This proportion is just enough to damp the leather (moisture content now about 65 percent) and to give it, when air dried, a sulphuric acid content of 5 percent. Allow the leather to dry at laboratory temperature, all the acid being absorbed and equilibrium with atmosphere gained in the course of 24 hours. Now add hydrogen peroxide evenly by drops in the proportion of 0.6 ml/g of leather. In the case of very thin leathers (weighing, say, 2 g or less) this proportion of hydrogen peroxide is not enough to damp the whole square Evenly and the amount is increased to 1 ml/g of leather. Allow the damp piece to dry by leaving for 24 hours; then give a further daily dosage usually up to 6 days.

C -4 RESULT

At the end of 7 days, the pieces shall show no sign of visible crackiness, crumpling or any other deformity in shape.

ANNEX C
(Clause 4.8)

MEASUREMENT OF GRAIN STRENGTH (LASTOMETER METHOD)

B-1 OUTLINE OF THE METHOD

Circular leather discs of measured thickness are subjected to a load through a mechanism for thrusting a spherical ball to the point of rupture of grain and the load determined.

B -2 APPARATUS

B -2.1 Circular Metal Discs — Two circular metal discs having an opening in the middle; the outer disc with 2.22 cm as the diameter of the opening and the inner one with 1.45 cm as the diameter of the opening to hold the leather specimen. It should be possible to apply the load by turning these discs clockwise.

B -2.2 Metal Rod — A metal rod with a spherical head (0.64 cm diameter) which presses against the flesh side of the leather sample.

B -2.3 Steel Spring (Graph Spring) — The other end of the metal rod (*see B-2.2*) rests against one side of a flat steel spring.

B -2.4 Thickness Gauge — The other side of the steel spring (*see B-2.3*) presses against the foot of a thickness gauge.

B -2.5 Calibration Graph — Straight line graphs, calibrated with load in kg against gauge reading.

NOTE — These are usually supplied by the manufacturers of instruments.

B -2.6 Plane Mirror — A means to observe the image of the grain side of the leather specimen as the load is being applied, till the crackiness is noticed.

B -2.7 Mechanism — The thrust produced by the leather specimen is conveyed to the flat steel spring through the spherical head and metal rod. As the elastic properties of the steel spring are known, the bending of the steel spring is measured by the thickness gauge which could then be related to the load required to bend it through this extent.

B -3 SPECIMEN

B -3.1 The specimen required for test is a circular sample of leather (46 cm diameter) with two notches on the circumference diametrically opposite to each other.

B -4 PROCEDURE

B -4.1 The thickness at the middle of the leather specimen is measured by a thickness gauge. It is then held in between the two metal discs with the flesh side adjacent to the ball so that it is possible to see the grain surface from the outside. The load is gradually and slowly increased by turning the discs till a crack appears on the grain, as observed in the mirror. At this point the reading on the dial of the thickness gauge is noted. With the aid of the calibration graph, the thickness gauge is translated into load values.

B -5 RESULT

B -5.1 Calculate the strength of the grain as follows:

$$\text{Strength of grain, kg/cm thickness} = \frac{L}{t}$$

Where,

L = load in kg at the time of first appearance of crack in the grain of the leather disc,

t = thickness in cm of the leather disc at the middle.