SRI LANKA STANDARD 868 : 1989

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SPECIFICATION FOR

PRINTING PAPER AND WRITING PAPER

SRI LANKA STANDARDS INSTITUTION

SPECIFICATION FOR PRINTING PAPER AND WRITING PAPER

SLS 868 : 1989

(Attached AMD 259)

Gr. 6

SRI LANKA STANDARDS INSTITUTION
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Sri Lanka.

SRI LANKA STANDARD

SPECIFICATION FOR PRINTING PAPER AND WRITING PAPER

FOREWORD

This Sri Lanka Standard was authorized for adoption and publication by the Council of the Sri Lanka Standards Institution on 1989-12-14, after the draft, finalized by the Drafting Committee on Paper and Board, had been approved by the Chemicals Divisional Committee.

The requirements given in 5.1.3, 5.4 and 6.1 of this specification call for agreement between the manufacture and the purchaser.

All standard values in this specification are given in SI units.

For the purpose of deciding whether a particular requirement of this 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 the same as that of the specified value in this specification.

In the preparation of this specification the assistance obtained from the publications of the International Organization for Standardization, the Canadian Government Specification Board the Bureau of Indian Standards and the Technical Association for Pulp and Paper Industry, U.S.A. is gratefully acknowledged.

1 SCOPE

1.1 This specification prescribes the requirements and methods of sampling and test for printing paper and writing paper.

1.2 This specification does not cover requirements for newsprint.

2 REFERENCES

ISO 2470	Paper and board - Measurement of diffuse blue reflectance factor (ISO brightness).
ISO 2471	Paper and board - Determination of opacity (paper backing) - diffuse reflectance method.
ISO 5626	Paper - Determination of folding endurance.
ISO 6588	Paper, board and pulps - Determination of pH of aqueous extracts.
CS 3	Paper sizes.
CS 58	Permanent blue-black writing ink for dip-pens.
CS 102	Presentation of numerical values.
SLS 235	Untrimmed stock sizes of paper and paper board.

SLS 338 Determination of substance of paper and paper board.
SLS 339 Substances of paper and paper board.
SLS 428 Random sampling methods.
SLS 473 Testing of paper and board for water absorption - Cobb method.
SLS 474 Testing of paper and board for tensile strength.
SLS 681 Testing of paper and board for thickness of single sheets.
SLS 715 Rubber erasers.
SLS 808 Sampling of paper and board.

3 DEFINITIONS

For the purpose of this specification the following definitions shall apply:

3.1 **bank paper/bond paper** : A well sized, strong and durable paper with good surface characteristics.

3.2 **cartridge paper** : A well sized, strong paper generally free from fillers and having a rough surface free from fluffing.

3.3 **cream laid paper** : A well sized paper with laid lines.

3.4 **cream wove paper** : A well sized paper without laid lines.

3.5 **cross direction** : The direction in the plane of a paper at right angles to the machine direction (see 3.9).

3.6 **curl** : Deformation of a sheet of paper over all its surface which therefore tends to roll up on itself.

3.7 **feathering** : The irregular spread of ink on either side of a written character.

3.8 **ledger paper** : A well sized paper with laid lines and having good strength properties and erasability.

3.9 **machine direction** : The direction in a paper corresponding to the direction of travel of the web on the paper machine.

3.10 **offset printing paper** : A smooth well-sized paper intended for offset printing.

3.11 **white or coloured printing paper** : A white or coloured medium-sized paper intended for printing by any process other than lithography.

4 TYPES

This specification covers the following types of printing paper and writing paper.

4.1 Printing paper

a) Offset printing paper; and
b) White or Coloured printing paper.

4.2 Writing paper

a) Bank paper;
b) Bond paper;
c) Cartridge paper;
d) Cream laid paper;
e) Cream wove paper; and
f) Ledger paper.

5 REQUIREMENTS

5.1 General

5.1.1 The printing paper and the writing paper shall be of uniform formation, evenly finished and free from ground wood pulp.

5.1.2 The printing paper shall lie flat or it shall have not more than a slight curl that can be overcome under normal operating conditions and that does not affect its end use.

5.1.3 The moisture content of the printing paper shall be suitable for use in press rooms under ambient atmospheric conditions. If required, the paper shall be conditioned for use as agreed to between the purchaser and the supplier.

5.2 Colour

There shall not be a perceptible variation in the colour of the sheets in a supply lot. If a reference sample is supplied, the colour of the paper shall closely match the supplied reference sample, visually.

5.3 Size

The printing paper and the writing paper shall be cut with clean edges to the sizes specified in 5.3.1 and 5.3.2.

5.3.1 The printing and the writing paper in the form of sheets shall be of A0, A1, A2, A3 and A4 sizes as specified in CS 3 and RA and SRA untrimmed sizes as specified in SLS 235.

5.3.2 The width of reels of printing paper and writing paper shall be of RA and SRA untrimmed sizes as specified in SLS 235.

5.4 **Grammage (substance)**

The grammage (substance) of printing paper and writing paper shall be as agreed to between the manufacturer and the purchaser in accordance with SLS 339. A tolerance of ± 5 per cent shall be permitted on the declared substance, when determined as given in SLS 338.

5.5 **Thickness**

A tolerance of ± 10 per cent shall be permitted on the declared thickness, if specified by the purchaser, when determined as given in SLS 681.

5.6 **Resistance to feathering**

The writing paper shall not show feathering, when determined as given in 8.1.

5.7 **Resistance to feathering after one erasure**

The surface of ledger paper shall not show feathering after one erasure when determined as given in 8.2.

5.8 **Other requirements**

The printing paper and the writing paper shall also comply with the requirements given in Table 1 when tested in accordance with the methods given in Column 9 of the table.

TABLE 1 - Requirements for printing paper and writing paper

Sl. No.	Characteristic	Requirement						Method of test (Ref. to relevant ISO, SLS Clause and appendix)
		white/ coloured printing	offset printing	Cartridge	cream laid/ cream wove	Bank/ Bond	Ledger	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	Tensile index, N.m/g							SLS 474 and 8.3
	a) Machine direction, min.	34.0	37.0	36.5	26.5	37.5	36.5	
	b) Cross direction, min.	19.5	20.0	20.0	20.0	24.5	20.0	
ii)	Water absorption (Cobb 60 value), g/m², max.	20	17	17	17	17	17	SLS 473
iii)	Brightness*, per cent, min.	70	70	70	70	70	70	ISO 2470
iv)	Opacity*, per cent, min.	80	80	80	80	80	80	ISO 2471
v)	pH value (hot extract), min.	5.0	5.0	4.8	4.8	4.8	4.8	ISO 6588

Sl. No.	Characteristic	Requirements						Methods of test (Ref. to relevant ISO, SLS Clause and appendix)
		white/ coloured printing	offset printing	Cartridge	cream laid/ cream wove	Bank/ Bond	Ledger	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
vi)	Folding endurance,							ISO 5626
	a) Machine direction, min	-	-	-	-	-	1.18	
	b) Cross direction, min.	-	-	-	-	-	1.00	
vii)	Wax pick (no pick on)	-	7A	-	-	-	-	Appendix A

* *Only for white paper.*

6 PACKAGING AND MARKING

6.1 Packaging

The printing paper and the writing paper shall be packed as agreed to between the manufacturer and the purchaser in reels or in reams of 500 sheets or half reams of 250 sheets in the case of A0 size or platized.

6.2 Marking

Each reel or ream of printing paper and writing paper shall be marked legibly and indelibly with the following:

a) Type of paper;
b) Grammage (substance), in grams per square metre;
c) Size of paper, in the case of reams;
d) Width, external diameter of reel and internal diameter of core, in millimetres in the case of reels;
e) Colour of paper;
f) Machine direction of paper in the case of reams, marked by the letter "M" placed after the relevant dimension or by an arrow or combination of both and the words "Long Grain" (see Note) or "Short Grain" as appropriate;

NOTE

The terms "Long Grain" and "Short Grain" indicate that the machine direction is along the longer dimension of a sheet of paper and that the machine direction is along the shorter dimension of a sheet of paper, respectively. These terms are widely used in the printing industry.

g) Name and address of the manufacturer and/or supplier and country of origin;
h) Registered trade mark, if any;
j) Mass of reel or ream excluding the wrapper, in kilograms; and
k) Batch or code number.

7 SAMPLING

7.1 A representative sample of printing paper or writing paper shall be selected in accordance with the relevant clauses of SLS 808.

7.2 The number of sheets to be selected from the reams selected as in 6.1 of SLS 808 : 1988 shall be in accordance with Table 2.

7.3 In case of reels, a sufficient number of sheets shall be selected from the reels selected as in 6.1 of SLS 808 : 1988. The number of specimens to be cut from the sheets so selected shall be in accordance with Table 2.

TABLE 2 - Scheme for selection of sheets or specimens

Number of reams or reels in the lot (1)	Number of sheets or specimens to be selected (2)
100 or less	60
101 to 500	120
501 and above	180

7.4 Number of tests

7.4.1 Each ream or reel selected as in 6.1 of SLS 808 : 1988 shall be inspected for packaging and marking requirements.

7.4.2 The sheets or specimens selected as in 7.2 or 7.3 shall be divided into three equal parts.

7.4.2.1 The sheets or specimens in one part obtained as in 7.4.2 shall be tested individually for the following requirements:

a) Colour;
b) Size;
c) Grammage (substance); and
d) Thickness (only if specified).

7.4.2.2 Five sheets or specimens shall be selected from the sheets or specimens tested as in 7.4.2.1 and tested individually for resistance to feathering and resistance to feathering after one erasure.

7.4.2.3 Five sheets or specimens shall be selected from sheets or specimens tested as in 7.4.2.1 and tested for pF value.

7.4.2.4 Half the sheets or specimens of another part obtained as in 7.4.2 shall be individually tested for tensile index and the sheets or specimens of the other half shall be individually tested for Cobb value, brightness and opacity.

7.4.2.5 Half the sheets or specimens of the remaining part shall be individually tested for folding endurance and the sheets or specimens in the other half shall be individually tested for wax pick.

8 METHODS OF TEST

Tests shall be carried out in accordance with 8.1, 8.2, 8.3 and Appendix A of this specification, ISO 2470, ISO 2471, ISO 5626, ISO 6588, SLS 338, SLS 473, SLS 474, and SLS 681.

8.1 Determination of resistance to feathering

Write with a steel nibbed dip-pen using standard reference ink as given in the Appendix of CS 58 : 1969, ten groups of five letters each on the paper. Examine the letters for freedom from feathering. In the case of ledger paper reserve the paper for the determination of resistance to feathering after one erasure.

8.2 Determination of resistance to feathering after one erasure

Erase manually two groups of letters in the sheet of ledger paper reserved from the determination of resistance to feathering (see 8.1) with Type 3 rubber eraser conforming to SLS 715 manually until all the letters have been erased completely. Write with a steel nibbed dip-pen using standard reference ink as given in the Appendix of CS 58 : 1969, five letters on the each erased surface. Examine the letters for freedom from feathering.

8.3 Tensile index

Tensile index shall be calculated as follows from the tensile strength values determined as given in SLS 474

$$Y = \frac{S}{g} \times 10^3$$

where,

Y is the tensile index in machine direction or cross direction, in newton metres per gram;
S is the tensile strength in machine direction or cross direction, in kilonewtons per metre; and
g is the grammage (substance), in grams per square metre.

9 CRITERIA FOR CONFORMITY

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

9.1 Each ream or reel inspected as in 7.4.1 satisfies the relevant requirements.

9.2 Each sheet or specimen tested as in 7.4.2.1 satisfies the requirements for colour and size.

9.3 The values of the expressions $\bar{x}$ - 1.5s (see Notes) and $\bar{x}$ + 1.5s calculated using the test results on grammage and thickness lie between the relevant specification limits.

NOTES

1. *Mean ($\bar{x}$) = The sum of values of the observations divided by the number of observations.*

2. *Standard deviation(s) = The positive square root of the quotient obtained by dividing the sum of squares of the deviations of the observations from their mean by one less than the number of observations in the sample.*

9.4 Each sheet or specimen tested as in 7.4.2.2 satisfies the relevant requirements.

9.5 The values of the expression $\bar{x}$ - 1.5s calculated using the test results on tensile index, brightness, opacity and pH value are greater than or equal to the relevant specification limits.

9.6 The value of the expression $\bar{x}$ + 1.5s calculated using the test results on Cobb value is less than or equal to the relevant specification limit.

9.7 Each sheet or specimen tested as in 7.4.2.5 satisfies the relevant requirements.

APPENDIX A
DETERMINATION OF WAX PICK

A.1 APPARATUS AND MATERIALS

A.1.1 *Smooth wooden work surface*

A.1.2 *Standard paper testing wax,* 7A stick

NOTE

Waxes are available in a series with graded adhesive powers. Waxes are numbered from 2A to 26A. Each higher numbered wax in the series is more adhesive than the previous one.

A.1.3 *Heating device,* Bunsen burner or alcohol lamp.

A.1.4 *Wooden block,* of about 90 mm x 40 mm x 10 mm and having a hole of about 30 mm diameter at the centre.

A.2 TEST PIECES

Cut test pieces of about 100 mm x 100 mm from sheets or specimens of paper.

A.3 PROCEDURE

A.3.1 Condition the test pieces at a temperature of 27 $\pm$ 1 ^{o}C and 65 $\pm$ 3 per cent relative humidity for a period not less than 4 hours.

A.3.2 Place a test piece (A.2) on the work surface (A.1.1). Clean the end of 7A wax stick (A.1.2) with a sharp blade or if necessary by melting off any paper or coating residue. Heat the end of the wax stick over an alcohol or low gas flame (A.1.3), rotating the stick slowly until several drops of melted wax have fallen. Do not let the wax stick catch fire.

Quickly place the melted end of the wax stick on the surface of the test piece with firm, but not undue, pressure so that the end spreads out to about 20 mm diameter. Withdraw the fingers immediately allowing the wax stick to stand vertically on the paper. Allow the wax to cool for 15 minutes.

Place the wooden block (A.1.4) with the hole over the wax stick, so that it protrudes through the hole. Press the block down firmly with one hand and, with the other, pull the wax stick from the test piece with a quick jerk at right angles to the paper surface.

Examine the contact surfaces of the wax stick and the test piece for freedom from pick (see Note).

Carryout the determination on one side of half the test pieces and on the other side of the remaining half.

NOTE

A pick occurs when the surface of the test piece blisters, breaks or lifts and/or paper or coating substances adhere to the surface of wax.

AMENDMENT NO. 1 TO SLS 868: 1989
SPECIFICATION FOR PRINTING PAPER AND WRITING PAPER

SRI LANKA STANDARDS INSTITUTION

AMD NO. 259

Amendment No. 1 approved on 2000-02-10 to
SLS 868:1989 - SPECIFICATION FOR PRINTING PAPER AND WRITING PAPER

Page 7

Clause 6.1 Packaging

Include the following sentence at the end of the paragraph.

"Tolerance of ±1% in the number of sheets shall be permitted".

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SRI LANKA STANDARDS INSTITUTION

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.

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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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