

भारतीय मानक मसौदा  
बोरों के लिए क्राफ्ट कागज़ और विस्तरणीय क्राफ्ट कागज़ —  
विशिष्टि  
( पहला पुनरीक्षण )

**Draft Indian Standard**  
Sack Kraft Paper and Extensible Kraft Paper — Specification  
( First Revision )

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ICS 55.080; 85.080

Paper Based Packaging Materials Sectional  
Committee, CHD 16

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#### FOREWORD

*(formal clauses to be added later)*

The sack kraft paper and the extensible kraft paper are used extensively in conversion of multiwall sack bags for packing carbon black, fertilizer, polyproducts, etc. It can withstand much more abuse than regular kraft before rupturing and tearing. Extensible kraft paper has proved its advantages over regular kraft for lamination with HDPE, jute, poly LDPE and other materials which have some elongation properties.

This standard was first published in 1990. Considering the recent technological advancements, the committee decided to revise this standard.

In this first revision, the following modifications are being made:

- The references clause is being updated;
- A new variety of Extensible Porous Sack Kraft Paper is being incorporated;
- Table 1 is being modified to incorporate requirements for Extensible Porous Sack Kraft Paper;
- Test methods for the requirements are being updates; and
- Packaging and marking clause is being modified.

This standard contains 4.2 which call for agreement between the purchaser and the supplier.

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*

**SACK KRAFT PAPER AND EXTENSIBLE KRAFT PAPER —  
SPECIFICATION**  
( *First Revision* )

## **1 SCOPE**

This standard prescribes the requirements and the methods of sampling and test for sack kraft paper and extensible kraft paper meant for the manufacture of industrial sacks/bags.

## **2 REFERENCES**

The standards listed in Annex A contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of these standards.

## **3 TERMINOLOGY**

For the purpose of this standard, the definitions given in IS 4661 (Part 4) and the following shall apply.

### **3.1 Natural Kraft**

It is a kraft paper made from unbleached sulphate pulp having a higher mechanical strength than ordinary kraft paper of similar grammage. To achieve higher strength, natural sack kraft paper would necessarily have a certain proportion of softwood furnish.

### **3.2 Extensible Kraft**

It is tough stretchable kraft paper having higher impact strength than natural sack kraft. The furnish can be 100 percent bamboo or a mixture of bamboo, agricultural residue and softwood or 100 percent softwood pulp depending on the end use.

### **3.3 Extensible Porous Sack Kraft Paper**

It is a type of kraft paper characterized by its high strength, flexibility, and extensibility, making it suitable for manufacturing sacks and bags that need to withstand significant stress and strain during handling and transportation. The porous nature of this paper allows for air permeability, which is essential for packaging products that require ventilation to maintain quality.

## **4 REQUIREMENTS**

### **4.1 Finish**

Essentially, unbleached kraft, the paper shall be of clean uniform surface, free from defects which may impair its utility. It shall be free from holes, creases, folds, waves and foreign matter.

### **4.2 Size and Tolerance on Size**

The size of the roll shall be as agreed to between the purchaser and the supplier.

**4.2.1** The variation in measurement of paper in reels shall be within  $\pm 0.5$  percent of declared value. Where 0.5 percent is less than 3 mm, the tolerance shall be  $\pm 3$  mm, and where 0.5 percent exceeds 5 mm, the tolerance shall be  $\pm 5$  mm (*see IS 1064*).

### 4.3 Substance

4.3.1 The substance of sack kraft paper and extensible kraft paper shall be as prescribed in IS 1060 (Part 5/Sec 5).

#### 4.3.2 Tolerance

A tolerance of  $\pm 5$  percent shall be permitted on the nominal substance when tested in accordance with IS 1060 (Part 5/Sec 5).

### 4.4 Joints

The edges of the rolls shall be clean and perpendicular to the axis of the roll. There shall not be more than 3 splices. The joint shall be clean ensuring that the glue does not penetrate to the other layers of the reel to avoid sticking and also strong enough to prevent the breakage of paper when run on a converting machine. The glued place shall be marked with a clear mark visible on both sides of the roll.

4.5 The material shall also conform to the requirements given in Table 1.

**Table 1 Requirements for Sack Kraft Paper and Extensible Sack Kraft Paper**

(Clauses 4.5 and 5.2)

SI No.	Characteristic	Requirements			Methods of Tests, Ref to	
		Natural Sack Kraft	Extensible Sack Kraft	Extensible Porous Sack Kraft Paper		
(1)	(2)	(3)	(4)	(5)	(6)	
i)	Moisture, percent		6.0 to 7.5	6.0 to 7.5	6.0 to 7.5	IS 6213 (Part 21)
ii)	Tensile index, Nm/g, <i>Min</i>	MD	65	50	50	IS 1060 (Part 5/ Sec 6)
		CD	30	30	30	
iii)	Elongation, percent <i>Min</i>	MD	1.9	6.0	6.0	IS 1060 (Part 5/ Sec 6)
		CD	4.0	5.0	5.0	
iv)	Burst index kPa.m <sup>2</sup> /g, <i>Min</i>	Dry	3.2	3.5	3.5	IS 1060 (Part 6/Sec 2)
		Wet	1.3	2.1	2.1	
v)	Tear index mNm <sup>2</sup> /g (avg. MD/CD ), <i>Min</i>		12.0	12.0	12.0	IS 1060 (Part 6/Sec 1)
vi)	Air permeability, s/100 ml, <i>Max</i>		25	25	7	Annex B
vii)	Tensile energy absorption, J/g, <i>Min</i>	MD	1.0	2.2	2.2	Annex C
		CD	0.9	1.5	1.5	
viii)	Ash, percent, <i>Max</i>		2	2		IS 1060 (Part 4/Sec 2)

## 6 PACKING AND MARKING

## 6.1 Packing

**6.1.1** The paper shall be marketed in rolls. It shall be wound on a hollow cylindrical core made in one continuous length. The core shall be rigid and smooth made of paper, card board or other suitable material. The bore of the core should not have any bulges and burrs and should be concentric to the axis.

**6.1.2** The length of the core shall not exceed the width of the paper, its inner diameter shall be  $(76 \pm 2)$  mm and its thickness approximately 10 mm.

**6.1.3** Each end of the core shall be closed with a plug made of wood, plastic or other suitable material. The plug shall be firmly secured to the core. In the center of the plug shall be a hole of approximately 15 mm diameter. During winding, the paper shall be kept stretched sufficiently tight to prevent the formation of creases.

**6.1.4.** Each paper reel has to be packed with Thick Polyethylene Coated Paper and Edge Guard to protect the reels from absorbing moisture and damage during transportation and storage.

## 6.2 Marking

**6.2.1** Each reel shall be marked with the following particulars:

- a) Size and substance of the paper;
- b) Name and type of the material;
- c) Indication of source of manufacture;
- d) Batch number or lot number in code or otherwise; and
- e) Month and year of manufacture;

### 6.2.2 *BIS Certification Marking*

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions 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.

## 5 SCALE OF SAMPLING AND CRITERIA FOR CONFORMITY

### 5.1 Sampling

The paper shall be sampled in accordance with IS 1060 (Part 1).

### 5.2 Number of Tests

From each of the packets, selected from the lot (*see 5.1*), the paper shall be taken out at random. These sheets shall constitute the sample. The sheets selected shall first be tested for general requirements given in **4.1**. One test piece shall be cut, from each sheet selected and tested for each of the characteristics mentioned in **4.2** and Table 1. A sheet not meeting the requirements for any one or more characteristics shall be considered as defective.

### 5.3 Criteria for Conformity

A lot shall be declared as conforming to all the requirements of this specification if the number of defective sheets found does not exceed the acceptance number. This acceptance number shall depend upon the size of the sample and shall be zero if the size is less than 13 and one if it is greater than or equal to 13.

## ANNEX A

(Clause 2)

## LIST OF REFERRED STANDARDS

<i>IS No</i>	<i>Title</i>
IS 1060	Methods of sampling and test for paper and allied products:
(Part 1) : 2022	Test methods for general purpose
(Part 4/Sec 2) : 2018	Methods of test for paper, board and pulps Section 2 Determination of residue (ash) on ignition at 525 °C
(Part 5)	Methods of test for paper and board
(Sec 5) : 2021/ISO 536 : 2019	Determination of grammage ( <i>first revision</i> )
(Sec 6) : 2014/ ISO 1924-2 : 2008	Determination of tensile properties — Constant rate of elongation method (20 mm/min)
(Part 6)	Methods of test for paper
(Sec 1) : 2014/ ISO 1974 : 2012	Determination of tearing resistance — Elmendorf method
(Sec 2) : 2024/ ISO 2758 : 2014	Determination of bursting strength of paper ( <i>first revision</i> )
IS 4661 (Part 4) : 2022 / ISO 4046- 4:2016	Paper, board, pulps and related terms — Vocabulary: Part 4 Paper and board grades and converted products
IS 6213 (Part 21): 2019/ ISO 638 : 2008	Methods of test for pulp: Part 21 Paper, board and pulps — Determination of dry matter content — Oven-drying method ( <i>first revision</i> )

**Annex B**

[Table 1, Item (vi)]

**DETERMINATION OF AIR PERMEABILITY****A-1 SCOPE**

Covers procedure for determining the resistance of relatively porous papers to the passage of air.

**A-2 APPARATUS**

**A-2.1** The apparatus shall consist of an outer cylinder that is partly filled with oil, and an inner cylinder, having an open or closed top, sliding freely in the outer cylinder. Air pressure for the test shall be provided by the weight of the inner cylinder. The apparatus shall be arranged to furnish air pressure to the specimen, held between clamping plates having a circular orifice with an area of 6.4 cm<sup>2</sup>. The clamping plates may form the top of the inner cylinder, or may be mounted in the base of the apparatus, the latter construction being preferable. An elastic gasket shall be attached to the clamping plate on the side exposed to air pressure, and the paper specimen shall be held in contact with the gasket when clamped for test. The purpose of the gasket is to prevent leakage of air between the surface of the paper and the clamping plate.

**A-2.2** The gasket shall consist of a thin, elastic, oil-resistant, non-oxidizing material, having a smooth surface. The inside diameter of the gasket shall be 28.60 mm and the outside diameter 34.95 mm. To align and protect the gasket in use it shall be cemented with shellac into a groove machined in the clamping plate. This groove shall be concentric with the aperture in the opposite orifice plate. It shall be 28.65 mm in inside diameter and 0.50 mm in depth. Its outside diameter may be 35.20 mm for convenience in inserting and attaching the gasket.

**A-2.3** The outer cylinder shall be 250 mm high and shall have an internal diameter of 82.5 mm. It shall be equipped with four bars, each 190 mm in length, 2.40 mm in width and thickness mounted vertically and equidistantly on the inner surface of the outer cylinder to act as guide tracks for the movable cylinder.

**A-2.4** The movable inner cylinder shall be graduated in units of 50 ml and shall have a total range of 350 ml. It shall be 250 mm high, and shall have an external diameter of 76 mm and an internal diameter of 74 mm. It shall weigh 567 g ± 1.0 g.

**A-2.5** The oil used with the apparatus shall be a lubricating oil having a viscosity of 60 to 70 Saybolt Universal at 37.8 °C, and a flash point of not less than 135 °C.

NOTE — A light spindle oil is suitable for this purpose. Oil is used in preference to water because it does not affect the moisture content of the sample nor does it affect the aluminium inner cylinder. The oil should not contain essential oil or other easily volatile oil, and for that reason a minimum flash test is specified.

**A-3 TEST SPECIMEN**

**A-3.1** Ten test specimens shall be cut from the sample, each approximately 50 mm in width, 125 mm in length, except that specimens of any size larger than 50 mm in both directions may be used in the apparatus having the clamp in the base.

**A-3.2** The test specimens shall be conditioned as prescribed in IS 1060 (Part 1)

**A-4 CALIBRATION OF APPARATUS**

**A-4.1** The apparatus shall be tested for air leakage by clamping a thin piece of smooth, hard surface, airtight material, such as metal foil or cellophane, between the orifice plates as prescribed in **A-5**. The leakage shall not exceed 50 ml in 5 h.

**A-5 PROCEDURE**

**A-5.1** Place the apparatus on a level surface so that the cylinders are vertical. Fill the outer cylinder with oil to a depth of approximately 125 mm as indicated by a ring marked on the inner surface of the cylinder.

**A-5.2** If using the instrument having the clamp in the top of the inner cylinder, raise the inner cylinder, hold it in a raised position with one hand, clamp the specimen between the clamping plates; then lower the cylinder and allow it to float in the oil.

**A-5.3** If using the instrument having the clamp in the base, first raise the cylinder until its top rim is supported by the catch, clamp the specimen between the clamping plates then gently lower the inner cylinder until it floats.

**A-5.4** When a steady movement of the inner cylinder has been attained, measure with a stopwatch, or other timing device, the number of seconds required for the first two consecutive 50 ml intervals to pass the rim of the outer cylinder, starting at the zero mark. In cases where it is not possible to obtain a steady movement of the inner cylinder before the zero mark is reached, the test may be started at the 50 ml mark.

## A-6 REPORT

**A-6.1** The average maximum and minimum number of seconds required for the displacement of 100 ml of air through an area of 6.4 cm<sup>2</sup>, obtained by testing at least five specimens with the left side up and five specimens with the wire side up.

## Annex C

[Table 1, Item (vii)]

### DETERMINATION OF TENSILE ENERGY ABSORPTION

#### B-1 PROCEDURE

**B-1.1** Set the clamps to an initial test span of  $(200 \pm 10)$  mm. The rate of separation of the jaws should be 25 mm per minute. Select the full scale reading, if possible, so that breaking force can be read in upper three-fourth of scale.

**B-1.2** Align and clamp the specimen first in the upper jaw, and after carefully removing any noticeable slack, in the lower jaw. Avoid touching the test area with the fingers. Use a clamping pressure so that neither slippage nor damage to the specimen occurs.

**B-1.3** Test 10 specimens in each principal direction. Record the integrator reading or use the planimeter to determine the area under the load elongation curve from zero load to the breaking load.

**B-1.4** Reject any determination in which the test specimen slips in the jaws or breaks within 5 mm of clamping area, or shows evidence of uneven stressing across its width. If more than 20 percent of specimens for a given sample are rejected, all readings obtained for that sample should be rejected.

#### B-2 CALCULATIONS

**B-2.1** Calculate from the recorded values, the average integrator or planimeter values for each test in each principal direction. Also determine the range or standard deviation in each case.

**B-2.2** Multiply the average integrator or planimeter value by the factor for the equipment and settings used to obtain the area under the load elongation curve (*see* Note) in joules. Calculate the tensile energy absorption as follows:

$$TEA = 100 A/L W$$

where

$TEA$  = tensile energy absorption in J/m<sup>2</sup>;

$A$  = area under load elongation curve in J;

$L$  = initial test span in cm; and



$W$  = specimen width in cm.

NOTE — The 'area under the load-elongation curve' is the area between the curve and the elongation axis.