IS 9755 (2003): Textiles - High Density Polyethylene (HDPE) / Polypropylene (pp) Woven Sacks for Packing Fertilizers [TXD 23: Textile Materials made from Polyolefins]

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भारतीय मानक

वस्त्रादि — उर्वरकों की भराई के लिये उच्च घनत्व पोलीइथाइलीन (एच.डी.पी.ई.)/पोलीप्रोपाइलीन (पी.पी.) — विशिष्टि

(चौथा पुनरीक्षण)

Indian Standard

TEXTILES — HIGH DENSITY POLYETHYLENE (HDPE)/POLYPROPYLENE (PP) WOVEN SACKS FOR PACKING FERTILIZERS — SPECIFICATION

(Fourth Revision)

ICS 55.080: 65.080

BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

June 2003

Price Group 3

FOREWORD

This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Textile Materials Made from Polyolefins (Excluding Cordage) Sectional Committee had been approved by the Textile Division Council.

This standard was first published in the year 1981 and subsequently revised in 1985,1989 and 1999. This standard has been again revised to incorporate the following major changes:

a) To specify ultra voilet resistance test for polypropylene sacks, and

b) To include various amendments issued to earlier version of the standard.

The composition of the Committee responsible for formulation of this standard is given in Annex D.

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

Indian Standard

TEXTILES — HIGH DENSITY POLYETHYLENE (HDPE)/POLYPROPYLENE (PP) WOVEN SACKS FOR PACKING FERTILIZERS — SPECIFICATION

(Fourth Revision)

1 SCOPE

This standard prescribes the requirements of two types of HDPE/PP woven sacks suitable for packing fertilizers.

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 editions of the standards indicated in Annex A.

3 MANUFACTURE

3.1 Fabric

The fabric used in the manufacture of HDPE/PP woven sacks shall be woven from HDPE/PP tapes having width of 2.5 mm (*see* IS 6192 and IS 11197) and linear density of 111 tex (1 000 denier) for Type I and 99.9 tex (900 denier) for Type II sacks. The denier of HDPE/PP tape used in the manufacture of woven fabric/sacks shall be subject to the following tolerances:

a) 10 percent on individual value, and

b) 5 percent on average.

3.2 Sacks

The sacks shall be produced from material woven as a tube on a circular loom and cut to the required length.

3.2.1 The constructional particulars of fabric used for conversion into sacks shall be as given in Table 1.

3.3 Liner

If required by the buyer unlaminated sack shall be provided with a loose liner of LDPE/ LLDPE/HMHDPE. The width of the loose liner shall be minimum 20 mm more than the width of the sack. The thickness of the loose liner, when tested in accordance with **A-2** of IS 2508, shall be 70 µm ± 10 percent in case of LDPE/LLDPE and shall be 40 µm ± 10 percent in case of HMHDPE/HDPE.

3.3.1 The liner shall be free from pin holes, patches, tears, blisters and any other visible defects. The plastic material used for the liner shall be virgin.

3.3.2 The bottom seam of the loose liner shall be at least 10 mm from the bottom edge.

3.4 Lamination

If required by the buyer, the fabric woven on circular loom before manufacture into sacks may be laminated by coating with LDPE/LLDPE for HDPE sack and PP for PP sack of uniform thickness having mass of 23 g/m^2 ± 10 percent with a minimum overlap/overhang of 5 mm.

3.4.1 The plastic material used for the lamination of the sacks shall be virgin.

3.5 Seam

The stitching of bottom seam shall be done with two rows of chain stitches (*see* IS 10789). The two rows of stitches shall be separated from each other by about 5 mm and the outer stitch shall be approximately 8 mm from the outer edge of the sack. The stitching shall be done with single or double fold over seam to a depth of 25 mm, so that the stitches pass through a minimum of four layers of the fabric. The number of stitches/dm shall be 14 ± 2.

3.5.1 The material used for stitching shall be HDPE/ PP tape or any other thread suitable for the purpose, compatible to the product being packed in the sack. The stitching shall be uniform without any loose thread or knot.

3.6 Mouth of the Sack

The mouth of the sack shall be completely open and the edges shall not fray.

3.7 Capacity

The sack shall have the nominal capacity of 25 to 50 kg as decided by the buyer.

4 REQUIREMENTS

4.1 The sacks shall conform to the requirements specified in Table 1.

4.2 UV Resistance

The PP woven fabric of sack shall be made out of

Table 1 Requirements of HDPE/PP Woven Sacks for Packing Fertilizers

(*Clauses* 3.2.1 *and* 4.1)

Sl No.	Characteristic	Requirement		Tolerance	Method of Test, Ref to IS No.
		Type I	Type II		
(1)	(2)	(3)	(4)	(5)	(6)
i)	Dimensions (mm):				IS 1954
	a) Length	As agreed to between the buyer and the seller	As agreed to between the buyer and the seller	+ 20 mm − 10 mm	
	b) Width	As agreed to between the buyer and the seller	As agreed to between the buyer and the seller	+ 20 mm − 10 mm	
ii)	Ends per dm	40	40	± 2	IS 1963
iii)	Picks per dm	40	40	± 2	IS 1963
iv)	Mass of fabric, g/m^2	88	79	± 6%	IS 1964
v)	Average breaking strength of fabric, *Min* [Ravelled strip method, 325 mm × 70 mm[1], N[2] (kgf)]:				IS 1969
	a) Length-wise	680 (69)	600 (61)	—	
	b) Width-wise	850 (87)	700 (71)	—	
vi)	Minimum breaking strength of bottom seam (Strip method), *Min* N[2] (kgf)	310 (32)	310 (32)	—	IS 9030
vii)	Elongation at break of fabric (Ravelled strip method), percent:				IS 1969
	a) Length-wise	20	20	±5	
	b) Width-wise	20	20	±5	

NOTES

1 The sacks having width of less than 600 mm shall satisfy the requirements for Type II sacks.

2 The suitable size (inside dimensions) of sacks of 50 kg capacity for low bulk density materials, such as urea is 610 mm × 920 mm and for high bulk density material, such as super phosphate is 610 mm × 750 mm. These dimensions provide for optimum free space of minimum of 20 percent of length when measured along the surface of the fabric from mouth-stitch line of the sacks, up to the surface level of contents.

3 Tolerance on length and width are subject to the condition that inside area of the sack shall remain equal to the inside area of specified dimensions.

[1] Width after ravelling = 50 mm and gauge length = 200 mm.
[2] 1 N = 0.102 kgf (approximately).

UV stabilized material and shall have at least 50 percent of the original breaking strength when tested after the same has been exposed to UV radiation and weathering as per the method given in Annex B.

4.3 Mass

The mass of the sack shall be as agreed to between the buyer and the seller or as declared by the manufacturer subject to the following tolerances:

		Tolerance
a)	On a bale of 500 sacks (excluding packing material) :	± 3 percent
b)	On an individual sack :	± 6 percent

4.3.1 The method of calculating the mass of the sacks is given in Annex C for guidance.

5 PRINTING, PACKING AND MARKING

5.1 Printing

The sacks shall be printed with the information as required by the buyer using suitable inks by flexography.

5.2 Packing

The sacks shall be packed to form a bale using a layer of HDPE/PP woven fabric and suitably secured. The bale shall contain 500 sacks and multiple thereof.

5.3 Marking

The bales shall be marked with the following information:

a) Name of the manufacturer,
b) Type and size of sacks,
c) Number of sacks,
d) Gross weight,
e) Net weight, and
f) Month and year of manufacture.

5.4 BIS Certification Marking

Each bale containing HDPE/PP sacks may also be marked with the Standard Mark.

5.4.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and rules and regulations made thereunder. The details of the conditions under which the licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6 SAMPLING AND CRITERIA FOR CONFORMITY

6.1 Prior to test, the specimens shall be conditioned to moisture equilibrium from dry side in the standard atmosphere of 65 ± 2 percent relative humidity and 27 ± 2°C temperature as laid down in IS 6359.

6.2 In any consignment, all the sacks of the same construction shall be grouped together to constitute a lot.

6.3 The conformity of the lot to the requirements of the standard shall be determined on the basis of the test carried out on the samples selected from it.

6.4 The number of bales to be selected depends on the size of the lot and shall be in accordance with col 2 and 3 of Table 2. The number of sacks to be selected from the bales sampled shall be in accordance with col 4 of Table 2 for visual inspection, dimensions, ends, picks and mass requirements shall be in accordance with col 5 of Table 2 for breaking load of fabric, seam and percent elongation at break requirements.

6.5 Criteria for Conformity

The lot shall be considered as conforming to the requirements of the standard if the following conditions are satisfied:

a) The number of defective sacks in case of visual inspections, ends, picks and dimensions is up to 10 percent the sample size after rounding off the fraction to next higher integer.
b) None of the sack or bale of 500 sacks weigh less than the respective lower specified limit after allowing tolerance of ± 6 percent on individual sack and ± 3 percent on a bale of 500 sacks (*see* **4.3**).
c) The average breaking load of fabric is not less than the value specified and none of the individual values is more than 10 percent below the specified value. The test for the laminated sack shall be carried out on centre portion of the sack as well as at lamination joint.
d) The seam strength of none of the sacks is less than the specified value.
e) None of the PP sacks samples after exposing to UV radiation and weathering shall have breaking strength less than 50 percent of the original breaking strength.

Table 2 Sample Size and Criteria for Conformity

(*Clause* 6.4)

Sl No.	No. of Bales in Lot	No. of Bales to be Sampled	Sample Size for Visual Inspection, Dimensions, Ends, Picks and Mass Requirements	Sample Size for Breaking Strength of Fabrics Before and After Exposing to UV Radiation, Breaking Strength of Seam and Elongation at Break Requirements
(1)	(2)	(3)	(4)	(5)
i)	Up to 25	3	13	8
ii)	26 to 50	5	20	8
iii)	51 to 100	8	32	13
iv)	100 and above	12	50	20

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
1954 : 1990	Determination of length and width of woven fabrics — Methods (*second revision*)
1963 : 1981	Methods for determination of threads per unit length in woven fabrics (*second revision*)
1964 : 2001	Textiles — Methods for determination of mass per unit length and mass per unit area of fabrics (*second revision*)
1969 : 1985	Methods for determination of breaking load and elongation of woven textile fabrics (*second revision*)
2508 : 1984	Specification for low density polyethylene films (*second revision*)
6192 : 1994	Textiles — Monoaxially oriented high density polyethylene tapes — Specification (*second revision*)
6359 : 1971	Method for conditioning of textiles
9030 : 1979	Method for determination of seam strength of jute fabrics including their laminates
10789 : 2000	Textiles — Stitch types — Classification and terminology (*first revision*)
11197 : 1985	Monoaxially oriented polypropylene tapes

ANNEX B

(*Clause* 4.2)

UV RESISTANCE TEST

B-1 To determine the effect of UV radiation and weathering on the breaking strength of the PP woven fabric, the same shall be exposed as follows.

B-2 TEST CONDITIONS

The test shall be carried out with fluorescent UV — B lamp. The duration of the test shall be 144 h (that is 6 days). The test cycle shall be 8 h at 60 ± 3°C with UV radiation alternating with 4 h at 50 ± 3°C condensation.

B-3 TEST PROCEDURE

Specimens are alternately exposed to ultra violet light alone and to condensation repeatedly. Condensation is produced by exposing the test surface to a heated saturated mixture of air and water vapour, while the reverse side of the test specimen is exposed to the cooling influence of ambient room air.

ANNEX C

(*Clause* 4.3.1)

METHOD FOR CALCULATION OF MASS OF SACKS

C-1 CALCULATION OF MASS OF SACKS

C-1.1 Total mass of sacks comprises of:

a) Mass of fabric,

b) Mass of stitching tape or threads, and

c) Mass of lamination.

C-1.1.1 Calculate the mass of sacks with the help of the following formulae as the case may be:

a) Mass of tubular fabric:

i) Single fold stitching
$= (L + 30\text{ mm}) \times 2W \times M \times 10^{-6}$

ii) Double fold stitching
$= (L + 55\text{ mm}) \times 2W \times M \times 10^{-6}$

b) Mass of stitching tape or thread
$= L_1 \times T \times 10^{-6}$

c) Mass of lamination:

i) Single fold stitching
$= (L + 30\text{ mm}) \times 2(W + 5\text{ mm}) \times M_1 \times 10^{-6}$

ii) Double fold stitching
$= (L + 55\text{ mm}) \times 2(W + 5\text{ mm}) \times M_1 \times 10^{-6}$

where

L = length of sack, in mm;

L_1 = approximate length of stitching tape or thread, in mm;

W = width of sack, in mm;

M = mass of fabric, in g/m^2;

T = linear density of stitching tape in tex; and

M_1 = mass of lamination in g/m^2.

ANNEX D

(*Foreword*)

COMMITTEE COMPOSITION

Textile Materials Made from Polyolefins (Excluding Cordage) Sectional Committee, TX 23

Organization	*Representative(s)*
Bajaj Plastics Ltd, Nagpur	SHRI VINOD K. BAJAJ (***Chairman***)
	SHRI K. N. BAISWAR (*Alternate*)
All India Flat Tape Manufacturer's Association, Bangalore	SHRI LALIT K. TULSYAN
	SHRI R. SWAMINATHAN (*Alternate*)
Dwarkadas Velji Talpatriwala, Mumbai	SHRI HARISH V. THAKKAR
Gas Authority of India Ltd, New Delhi	SHRI A. K. RAY
	SHRI M. KHANDELWAL (*Alternate*)
Gilt Pack Ltd, Indore	SHRI JITESH AGRAWAL
	SHRI SAURABH KALANI (*Alternate*)
Gujarat Heavy Chemicals Ltd, Junagarh, Gujarat	SHRI R. S. PANDEY
	SHRI R. K. GANDHI (*Alternate*)
Gujarat Narmada Valley Fertilizers Co Ltd, Narmadanagar	SHRI B. M. SHARMA
	SHRI G. M. PATEL (*Alternate*)
Haldia Petro Chemicals Ltd, Kolkata	SHRI AMITAVA SANYAL
	SHRI RAJ K. DATTA (*Alternate*)
Indian Petrochemicals Limited, Vadodara	SHRI J. B. KAMATH
	SHRI V. C. FRANCIS (*Alternate*)

(*Continued on page* 6)

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Organization	*Representative(s)*
Indian Sugar and General Industry Export Import Corporation Ltd, New Delhi	SHRI S. S. SIROHI
Indian Sugar Mills Association, New Delhi	SHRI K. K. SHARMA
Larsen and Toubro Ltd, Mumbai	SHRI D. S. PATWARDHAN SHRI R. P. SOOCHAK (*Alternate*)
Moneeto Plastic Fab Pvt Ltd, Mumbai	SHRI S. K. PACHISIA SHRI NARESH R. MEHTA (*Alternate*)
National Council for Cement and Building Materials, New Delhi	DR C. RAJKUMAR SHRI S. N. MEHROTRA (*Alternate*)
National Federation of Co-operative Factories Ltd, New Delhi	SHRI VINAY KUMAR SHRI S. S. SIROHI (*Alternate*)
National Organic Chemical Industries Limited, Mumbai	SHRI V. K. SHARMA
Plastic Woven Sacks Manufacturer's Association, New Delhi	SHRI MANOJ AGARWAL DR ALOK SABOO (*Alternate*)
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Southern Petrochemical Industries Corporation Ltd, Chennai	SHRI S. VIJEYAKUMAR SHRI AZARIAH WINSTON (*Alternate*)
The All India Plastics Manufacturer's Association, Mumbai	SHRI R. K. TIBREWALA SHRI VIJAY B. BOOLANI (*Alternate*)
The Associated Cement Companies Ltd, Mumbai	SHRI D. K. SETT
The Fertilizer Association of India, New Delhi	DR S. K. SAXENA DR R. K. TEWATIA (*Alternate*)
Vijay Chemicals and Plastics Pvt Ltd, Vadodara	SHRI V. SREENIVASAN SHRI N. SREENIVASAN (*Alternate*)
BIS Directorate General	SHRI P. BHATNAGAR, Director and Head (TXD) [Representing Director General (*Ex-officio*)]

Member Secretary
SHRI B. L. BHARATI
Joint Director (TXD), BIS

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act,* 1986 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards : Monthly Additions'.

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