भारतीय मानक
Indian Standard

IS 14887 : 2014

वस्त्रादि — 50 किग्रा खाद्यान पैक करने के लिए उच्च घनत्व पोलीइथाइलीन (एच. डी. पी. ई.)/ पोलीप्रोपाइलीन (पी. पी.) के बुने हुए बोरे — विशिष्टि

(पहला पुनरीक्षण)

Textiles — High Density Polyethylene (HDPE) / Polypropylene (PP) Woven Sacks for Packaging of 50 kg Food Grains — Specification

(First Revision)

ICS 55.080; 65.080

© BIS 2014

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुरशाह ज़फर मार्ग, नई दिल्ली-110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI-110002
www.bis.org.in www.standardsbis.in

June 2014

Price Group 4

Scanned with CamScanner

FOREWORD

This Indian Standard (First 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 2000 and has been again revised again to incorporate the following major developments:

a) Twenty five kg woven sacks have been excluded from the scope of standard.
b) Requirement for breaking strength of the fabric before exposure to UV radiation and weathering has been modified.
c) Requirement for breaking strength of the bottom seam has been modified.
d) Method of test for UV radiation and weathering has been modified.
e) Requirement for ash content has been included.
f) Marking requirements has been modified to include the environment friendly recycling logo on the bags.
g) Sampling and criteria for conformity has been modified.

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

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.

Scanned with CamScanner

AMENDMENT NO. 3 JANUARY 2011
TO
IS 14887 : 2000 TEXTILES — HIGH DENSITY POLYETHYLENE (HDPE)/ POLYPROPYLENE (PP) WOVEN SACKS FOR PACKING 50 kg/25 kg FOODGRAINS — SPECIFICATION

[*Page* 2, *Table* 1, *col* 5, *Sl No.* (iii)] Substitute '≥ 6 percent' *for* '≥ 6 percent
≥ 3 percent'

Reprography Unit, BIS, New Delhi, India

Scanned with CamScanner

Indian Standard

TEXTILES — HIGH DENSITY POLYETHYLENE (HDPE)/ POLYPROPYLENE (PP) WOVEN SACKS FOR PACKAGING OF 50 kg FOOD GRAINS — SPECIFICATION

(First Revision)

1 SCOPE

This standard prescribes requirements of HDPE/PP woven sacks suitable for packaging all types of foodgrains (wheat, paddy, rice, pulses, millet, etc).

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 Raw Material

The high density polyethylene (HDPE) or polypropylene (PP) used for manufacture of tape shall confirm to the requirements specified in IS 10146 or IS 10910 respectively.

The raw material composition mix to be used for manufacturing of the HDPE/PP woven sacks shall be as agreed to between the buyer and the seller.

3.2 Fabric

The fabric used in the manufacture of HDPE/PP woven sacks shall be woven as a tube on circular looms from HDPE/PP tapes having width of 2.5 mm (tolerance of ± 10 percent) conforming to IS 6192 and IS 11197 respectively, and linear density of 111 tex (1 000 denier). The denier of HDPE/PP tape used in the manufacture of woven fabric/sacks shall be subjected to the following tolerances:

a) ± 10 percent on individual value, and

b) ± 5 percent on average.

The construction particulars of fabric shall be as given in Table 1. Also the construction particulars specified are expected to ensure aeration of foodgrains. The fabric shall be woven with anti-slip pattern (as given in Fig. 1) to avoid oozing of grains out of the sacks and for better stackability.

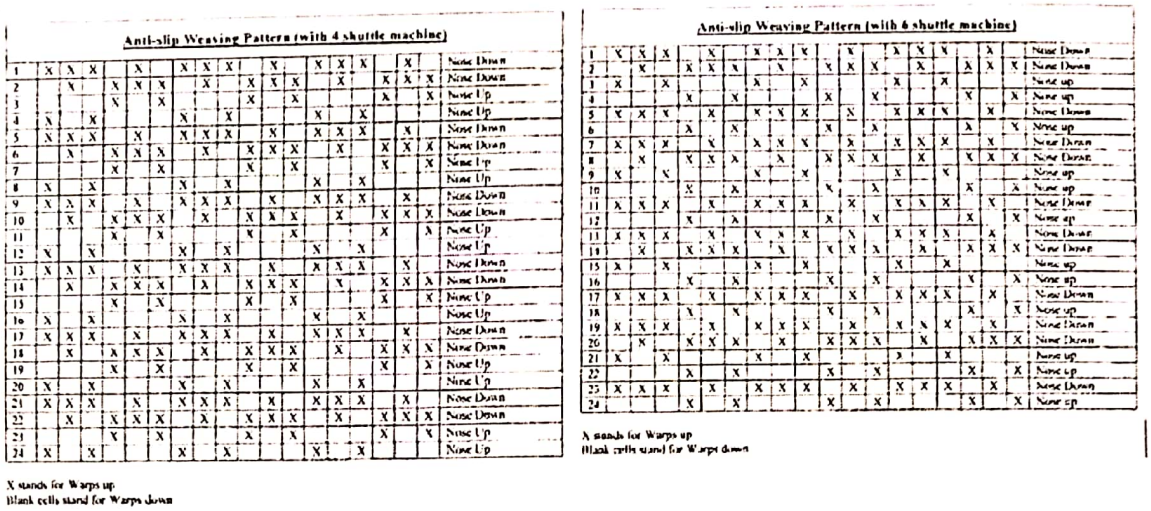


FIG. 1 ANTI-SLIP WEAVE PATTERN

Scanned with CamScanner

3.3 Sacks

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

3.3.1 *Bottom Seam*

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

The material used for stitching shall be UV stabilized HDPE/PP tape as used in the fabric or any other UV thread suitable for the purpose. The stitching shall be uniform without any loose thread or knot.

3.3.2 *Mouth*

The completely open mouth of the sack shall be hemmed with a fold of minimum 5 mm and tapes shall not fray.

3.4 Capacity

The sack shall have the nominal capacity of 50 kg.

4 REQUIREMENTS

4.1 Mass of Bale

The mass of bale of sacks (excluding packaging materials) shall be within ±3 percent of the mass calculated by multiplying the number of sacks with the mass of sack specified in Table 1.

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

5 PRINTING, PACKAGING AND MARKING

5.1 Printing on Sacks

The sacks shall be printed with food grade printing inks with identification mark of sack manufacturer along with the information as required by the buyer.

5.2 Packaging

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

Table 1 Requirements of HDPE/PP Woven Sacks for Packaging of Foodgrains
(*Clauses* 3.2, 4.1 *and* 4.2)

Sl No. (i)	Characteristic(s) (2)	Requirement(s) (3)	Tolerance (4)	Method of Test, Ref to (5)
i)	Capacity, kg	50	–	–
ii)	Dimensions in mm (*see* Notes 1 and 2)			Annex B
	a) Inside length	1 000	+ 20 mm	
	b) Inside width	570	– 10 mm	
iii)	Ends/dm	48	± 2	Annex B
iv)	Picks/dm	48	± 2	Annex B
v)	Mass of sack, g (*see* Note 3)	135	± 6%	IS 1964
vi)	Average breaking strength of fabric (revelled strip method, 325 mm × 70 mm)[1] *Min*, N[2] (kgf)			IS 1969 (Part 1)]
	a) Lengthwise	900 (91.8)	–	
	b) Widthwise	900 (91.8)	–	
vii)	Minimum breaking strength of bottom seam (revelled strip method), *Min*, N[2] (kgf)	400 (40.8)	–	IS 9030
viii)	Elongation at break of fabric, (revelled strip method), *Min*, percent :			IS 1969 (Part 1)
	a) Lengthwise	20	15 to 25	
	b) Widthwise	20	15 to 25	
ix)	Average breaking strength and elongation at break of UV stabilized HDPE/PP fabric after been exposed to UV radiation and weathering, *Min* (kgf)	50% of original strength	–	Annex C
x)	Ash content, *Max*, percent	2.2	–	Annex D

NOTES

1 The specified dimensions provide for optimum free space of minimum 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.

2 The HDPE/PP woven sacks of specified dimension are suitable for packaging of foodgrains such as wheat, paddy, rice. For packaging of other grains, the buyer and the seller may agree to the dimensions other than those specified above. The tolerances specified would apply on agreed dimensions. The mass of such sacks shall be calculated by the method given in Annex E. The Annex E is given for guidance only.

3 The mass of sack is based on fabrics weighing 106 g/m².

[1] Width after ravelling = 50 mm, Gauge length = 200 mm.
[2] 1 N = 0.102 kgf (approx).

Scanned with CamScanner

bale shall contain 500 sacks or 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;
f) Month and year of manufacture;
g) Identification mark
h) Any other information as required by the law in force.

NOTE — Each sack shall be compulsorily marked with visible recycling logo as given below at a space on bottom of the bag compatible with the art work of the buyer for printing the sack and on the bale.



5.4 BIS Certification Marking

The sacks may also be marked with the Standard Mark.

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

6 ATMOSPHERIC CONDITIONS FOR CONDITIONING AND TESTING

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.

7 SAMPLING AND CRITERIA FOR CONFORMITY

7.1 Lot

All the sacks of the same construction in a consignment shall be grouped together to constitute a lot.

7.2 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.

7.3 The number of samples to be selected depends on the size of the lot and the number of bales to be sampled shall be in accordance with col 2 and col 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, and shall be in accordance with col 5 of Table 2 for breaking strength of fabric before exposing to UV radiation, breaking strength of bottom seam and percent elongation at break requirements. The samples should be selected in accordance with col 6 of Table 2 for determination of ash content and also breaking strength of fabric after UV radiation exposure.

7.4 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 of the sample size subject to rounding off the fraction to next higher integer.
b) None of the sack or bale of 500 sacks weighs 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, higher weight can be accepted.
c) The average breaking strength of fabric in both lengthwise and widthwise is not less than the value specified and none of the individual

Table 2 Sample Size and Criteria for Conformity
(*Clause* 7.3)

Sl No.	No. of HDPE/PP Sacks in a Lot	No. of Bales to be Sampled	Sample Size for Visual Inspection, Dimensions, Ends, Picks and Mass Requirements	Sample Size for Breaking Strength of HDPE/PP Fabric before Exposing to UV Radiation, Breaking Strength of Seam and Elongation at Break Requirements	Sample Size for Breaking Strength of HDPE/PP Fabric after Exposing to UV Radiation Requirement and Ash Content
(1)	(2)	(3)	(4)	(5)	(6)
i)	Up to 25 000	3	12	8	1
ii)	25 001 to 50 000	5	20	10	2
iii)	50 001 to 100 000	8	32	13	3
iv)	100 001 and above	12	48	18	4

Scanned with CamScanner

bag value is more than 10 percent below the specified value. The samples selected for breaking strength tests shall be free from defects in visual inspection, dimensions, ends, picks and mass requirements.

d) The average breaking strength of fabric at bottom seam is not less than the value specified and none of the individual bag value is more than 10 percent below the specified value. The samples selected for breaking strength tests shall be free from defects in visual inspection, dimensions, ends, picks and mass requirements and test carried on the center portion

e) None of the HDPE/PP sack samples after exposing to UV radiation and weathering shall have breaking strength less than 50 percent of the original value.

f) None of the sample sacks shall have percentage elongation and ash content outside the specified range.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
1964 : 2001	Textiles — Methods for determination of mass per unit length and mass per area of fabrics (*second revision*)
1969 (Part 1) : 2009	Textiles — Tensile properties of fabrics — Determination of maximum force and elongation at maximum force : Part 1 Strip method (*third 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*)
10146 : 1982	Specification of polyethylene for its safe use in contact to foodstuffs, pharmaceuticals and drinking water
10910 : 1984	Polypropylene and its copolymer for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
11197 : 1985	Specification for monoaxially oriented polypropylene tapes

ANNEX B

[*Table* 1, *Sl No.* (ii, iii, iv)]

METHOD OF TEST FOR LENGTH, WIDTH, ENDS AND PICKS PER DECIMETRE

B-1 METHOD OF TEST FOR LENGTH AND WIDTH

B-1.1 Lay each sack as selected in Table 2, flat on a table. Render it free from creases and wrinkles and measures the inside length (l) and width (w) about the middle to the nearest 0.5 cm.

B-2 METHOD OF TEST FOR ENDS AND PICKS PER DECIMETRE

B–2.1 Count the ends and picks at two places of each sack as selected in Table 2, with a suitable gauge measuring 5 cm. Care should be taken to avoid counting same set of warp or weft threads more than once. Determine the average ends/dm and picks/dm of each sack under test.

Scanned with CamScanner

ANNEX C

[*Table* 1, *Sl No.* (ix)]

UV RESISTANCE TEST

C-1 To determine the effect of UV radiation and weathering on the breaking strength, the HDPE/PP woven fabric shall be exposed as given in C-2 and C-3.

C-2 TEST CONDITION

The test shall be carried out with fluorescent UV– lamp Type B (313 nm or its equivalent).

The duration of the test shall be 192 h (that is, eight days) in continuous mode.

The test cycle shall be: 8 h at 60 ± 3°C with UV-radiation alternating with 4 h at 50 ± 3°C with condensation. Irradiance level throughout the test shall be maintained at 0.63 (+0.04 /-0) W/m².

C-3 TEST PROCEDURE

C-3.1 Determine the original average breaking strength of fabric as per the test method specified in IS 1969 (Part 1).

C-3.2 Expose the specimens alternately to ultraviolet light and condensation in respective test cycle in continuous mode for total 192 h.

The type of fluorescent UV lamp, the timing of the UV and condensation exposure and the temperature of the UV exposure and condensation shall be specified in C-2.

C-3.3 Determine the average breaking strength of the fabric separately after UV exposure as mentioned above.

C-3.4 Determine the percent retention of original strength as follows:

$$\text{Percent retention of original breaking strength} = \frac{b}{a} \times 100$$

where

a = average breaking strength before UV exposure as obtained in **C-3.1**

b = average breaking strength after UV exposure as obtained in **C-3.3**.

NOTES

1 The UV source is an array of fluorescent lamps (with lamp emission concentrated in the UV range).

2 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 D

[*Table* 1, *Sl No.* (x)]

DETERMINATION OF ASH CONTENT

D-1 PRINCIPLE

The procedure is used to find out the inorganic residue in raffia tape/fabric sample by ashing it in a muffle furnace. A weighed amount of tape/fabric sample is heated to 550°C. The polymer sample (organic portion) is burnt at 550°C until constant mass of inorganic matter is obtained. The residue (inorganic matter) is reported in terms of percentage ash content in a given sample.

D-2 APPARATUS

D-2.1 Weighing balance accurate to 0.001 g.

D-2.2 Silica crucibles (sufficient volume to accommodate 30 g of sample in such a way that level of the sample after filling the crucible does not cross half the height of crucible).

D-2.3 **Bunsen Burner**

D-2.4 **Silica Triangle and Tripod**

D-2.5 **Muffle Furnace** (capable of being controlled thermostatically at 550°C ± 10°C).

D-2.6 Desicator containing an effective drying agent (for example, silica gel) that does not react chemically with ash components.

D-2.7 **Gloves and Crucible Holder**

D-3 SAFETY

D-3.1 Burn the sample in an effectively ventilated hood.

D-3.2 Keep the hood closed and do not inhale the fumes of combustion.

Scanned with CamScanner

D-3.3 Wear gloves and use sample (crucible) holder, to introduce crucible in the furnace.

D-3.4 Sample should be folded properly to accommodate it in silica crucible.

D-4 PROCEDURE

D-4.1 Heat the clean crucible at 550°C ± 10°C for 10 to 15 min and cool it in a desicator.

D-4.2 Weigh the empty crucible to nearest 0.001 g.

D-4.3 Weigh 30 ± 2 g of raffia tape/fabric sample in the crucible (nearest to 0.001 g).

D-4.4 Heat the crucible directly on burner so that the sample burns slowly and loss of ash is avoided. Continue burning until no more smoke is evolved.

D-4.5 Transfer the crucible in the muffle furnace, which is already maintained at approx. 550°C and keep the crucible inside for about 2 h.

D-4.6 Remove the crucible from the furnace and cool it to the room temperature in a desicator. Weigh it and record the weight to accuracy of 0.001 g.

D-4.7 Keep the crucible in the muffle furnace for another half an hour, cool in a desicator and weigh again. Repeat the procedure until constant mass is obtained.

D-5 CALCULATIONS

$$\text{Percent ash content} \frac{\text{Weight of ash}}{\text{Weight of raffia fabric or tape sample}} \times 100$$

ANNEX E

(*Table* 1, *Note* 2)

METHOD FOR CALCULATION OF MASS OF SACKS

E-1 Total mass of sacks comprises of:

a) Mass of fabric, and

b) Mass of stitching tape or thread.

E-1.1 Calculate the mass of sacks with the help of the following formula as the case may be:

a) Mass of the fabric:

1) Mass of tubular fabric (double fold stitching)

$$G = (L + 55) \times 2W \times M \times 10^{-6}$$

b) Mass of stitching tape or thread

$$G_t = (L_1 \times T) \times 10^{-6}$$

where

G = mass of sack, in g;

G_t = mass of tape or thread, in g;

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; and

T = linear density of stitching tape, in tex.

Scanned with CamScanner

AMENDMENT NO. 1 MAY 2016
TO
IS 14887 : 2014 TEXTILES — HIGH DENSITY POLYETHYLENE (HDPE) / POLYPROPYLENE (PP) WOVEN SACKS FOR PACKAGING OF 50 kg FOOD GRAINS — SPECIFICATION

(First Revision)

(*Page* 3, *clause* 7.1) — Substitute the following for the existing clause:

'7.1 Lot

All the PP/HDPE woven sacks packed in bales of the same construction produced under similar conditions of production and delivered to a buyer shall be grouped together to constitute a lot.'

(*Page* 3, *Table* 2) — Substitute the following for the existing table:

Table 2 Sample Size and Criteria for Conformity
(*Clause* 7.3)

Sl No.	No. of HDPE/PP Sacks in a Lot	No. of Bales to be Sampled	Sample Size for Visual Inspection, Dimensions, Ends, Picks and Mass Requirements	Sample Size for Breaking Strength of HDPE/PP Fabric Before Exposing to UV- Radiation, Breaking Strength of Seam and Elongation at Break Requirements	Sample Size for Breaking Strength of HDPE/PP Fabric after Exposing to UV Radiation Requirement and Ash Content
(1)	(2)	(3)	(4)	(5)	(6)
i)	Up to 25 000	3	12	8	1
ii)	25 001 to 50 000	5	20	10	2
iii)	50 001 to 100 000	8	32	13	3
iv)	100 001 to 250 000	12	48	18	4

NOTE — If the number of the bales in a consignment exceeds 500, the same shall be split into number of lots each comprising maximum of 500 bales (1 Bale = 500 sacks).

(*Page* 5, *clause* D-2.2, *line* 2) — Substitute '3 g' *for* '30 g'.

(*Page* 6, *clause* D-4.3, *line* 1) — Substitute '3 g' *for* '30 ± 2 g'

(CED 23)

Publication Unit, BIS, New Delhi, India

Scanned with CamScanner

AMENDMENT NO. 2 SEPTEMBER 2017
TO
IS 14887 : 2014 TEXTILES — HIGH DENSITY POLYETHYLENE (HDPE)/ POLYPROPYLENE (PP) WOVEN SACKS FOR PACKAGING OF 50kg FOOD GRAINS — SPECIFICATION

(First Revision)

[Page 2, *Table* 1, *Sl No.* (vi)] — Delete.

[Page 2, *Table* 1, *Sl No.* (viii) *and* (ix)] — Substitute the following for the existing:

Sl No.	Characteristic(s)	Requirement(s)	Tolerance	Method of Test, Ref to
(1)	(2)	(3)	(4)	(5)
(vi)	Elongation at break of fabric, (Bevelled strip method), percent			IS 1969 (Part 1)
	a) Lengthwise	15 to 25	—	
	b) Widthwise	15 to 25	—	
(ix)	Breaking strength of fabric after exposure to UV radiation and weathering, *Min*	50 percent of original strength		Annex C

[Page 5, *clause* D-1, *lines* 4 *and* 5) — Substitute '590°C' *for* '550°C'.

[Page 5, *clause* D-2.5, *line* 2) — Substitute '590°C' *for* '550°C'.

[Page 6, *clause* D-4.1, *line* 1) — Substitute '590°C' *for* '550°C'.

[Page 6, *clause* D-4.5, *line* 2) — Substitute '590°C' *for* '550°C'.

(TXD 23)

Publication Unit, BIS, New Delhi, India

Scanned with CamScanner