



उत्पाद मानुयल
रैखिक अल्प घनत्व पोलिइथाईलीन
(एल एल डी पी ई) फिल्में IS 14500 : 1998 के अनुसार

PRODUCT MANUAL
FOR LINEAR LOW-DENSITY POLYETHYLENE (LLDPE) FILMS
ACCORDING TO IS 14500 : 1998

भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम की स्कीम-I के तहत यह उत्पाद मानुयल प्रमाणीकरण के प्रचलन में रीति और पारदर्शिता के सुसंगत सुनिश्चित करने के लिए सभी क्षेत्रीय शाखा कार्यालयों एवं लाइसेंस धारियों / प्रमाण पत्र प्राप्त क/द्वारा संदर्भ सामग्री के रूप में उपयोग किया जाएगा। बीआईएस लाइसेंसरने के इच्छुक भावी आवेदकों द्वारा भी इस दस्तावेज़ का उपयोग किया जा सकता है।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

1.	उत्पाद Product	:	IS 14500 : 1998
	शीर्षक Title:	:	रैखिक अल्प घनत्व पोलिइथाईलीन (एल एल डी पी ई) फिल्में Linear Low-Density Polyethylene (LLDPE) Films - Specification
	संशोधन संख्या No. of Amendments	:	01
2.	नमूनाकरण दिशा निर्देश Sampling Guidelines:		
a)	कच्चा माल Raw material	:	Raw Material shall meet the requirements specified in Clause 4 of IS 14500.
b)	समूहिकरण दिशा निर्देश Grouping guidelines	:	कृपया Annex-A देखें As per ANNEX – A
c)	नमूने का परिमाण Sample Size:	:	-Minimum 10 Sq. m with full width.
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	कृपया Annex-B देखें Please see ANNEX –B
4.	निरीक्षण व परीक्षण स्कीम Scheme of Inspection and Testing	:	कृपया Annex-C देखें Please see ANNEX –C
5.	एक दिन में संभावित परीक्षण Possible tests in a day:	:	
5.	i. Appearance, Cl 6.1.1 ii. Film Form, Cl 6.1.2 iii. Odour, Cl 6.1.3 iv. Density, Cl 6.1.4 v. Dimensional requirements, Cl 6.2 vi. Yield Tolerance, Cl 6.3		
6.	लाइसेंस का कार्यक्षेत्र / Scope of the Licence :		

IS 14500 : 1998 के अनुसार मानक मुहर का उपयोग करने के लिए लाइसेन्स निम्नलिखित कार्यक्षेत्र के लिए प्रदान किया जाता है Licence is granted to use Standard Mark as per IS 14500 : 1998 with the following scope:	
उत्पाद का नाम Name of the Product	Linear Low-Density Polyethylene (LLDPE) Films
Nominal thickness	10 to 100 microns
Film Class	Class designation as per Cl 5.2
Colour	Black/ Other than Black/ Natural
Application	Food contact/ Non-food contact
Nominal width range	 mm

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New Delhi – 110002

ANNEX-A

**TO PRODUCT MANUAL
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GROUPING GUIDELINES

1. The film shall be classified according to
 - a) Impact strength, optical and slip properties. Each class of sample shall be designated by a set of three numerals. The first one will indicate impact strength, second one optical property and the third slip property. Whenever numeral '0' is used, it shall mean the material has not been tested for that particular property.
 - b) Nominal Thickness from 10 to 100 micron are covered in scope of standard.
 - c) Nominal width.
 - d) Colour of the film.
2. For impact strength, numeral '1' shall indicate low impact strength, numeral '2' medium impact strength and numeral '3' high impact strength. For optical properties the numeral '1' shall mean high haze, numeral '2' medium haze and numeral '3' low haze. For slip property numeral '1' shall denote no slip, numeral '2' low slip, numeral '3' medium slip and numeral '4' high slip.
3. Considering the above, LINEAR LOW-DENSITY POLYETHYLENE (LLDPE) FILMS are categorized into the following groups based on Class Designation:

Impact strength	1 (Low)	2 (Medium)	3 (High)	-
Optical property	1 (Low film clarity)	2 (Medium Film Clarity)	3 (High Film Clarity)	-
Slip property	1 (No slip)	2 (Low slip)	3 (Medium slip)	4 (High Slip)

4. For GoL/CSoL, in order to cover the complete variety applied, sample(s) of any thickness & width may be drawn and tested for all requirements in a manner so as to cover the highest-Class Designations applied for each of the above parameters for example if firm offers samples with class designation 302, 100, 224, 104, 132, 222 then three samples of Class designation 302 having high impact strength, 224 having high slip and 132 having low haze (high film clarity) should be selected for testing to cover all the applied class designations.
5. If black colour film is tested, the other colours as agreed between purchaser and supplier may also be allowed.
6. Test for Carbon Black Content is applicable only to Black colour films. When the film is meant for food contact applications the compound including master batch shall also comply with the requirements of IS 16738 and IS 10146.
7. The Firm shall declare the varieties of LINEAR LOW-DENSITY POLYETHYLENE (LLDPE) FILMS intended to be covered in the Licence. The Scope of Licence may be restricted based on the Manufacturing and Testing capabilities of the Manufacturer.
8. During the operation of the Licence, BO shall ensure that all the Grade Designations, Types and Sizes covered in the Licence are tested in rotation, to the extent possible.

ANNEX – B
TO PRODUCT MANUAL
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List of Test Equipment

Major test equipment required to test as per the Indian Standard

Sl. No.	Tests used in with Clause Reference	Test Equipment
1.	Environmental Conditions	Controller cum indicator for temp. and humidity with air-conditioners, humidifiers and heaters
2.	Density (Clause 6.1.4)	Test Equipment list as per Method A — Immersion method i. Analytical balance least Count 0.1 mg ii. Immersion vessel iii. Stationary support like pan straddle iv. Thermometer v. Wire- of diameter less than 0.5 mm vi. Sinkers vii. Pycnometer viii. Distilled water ix. Liquid bath x. Immersion liquid For methods B – Liquid pycnometer method i. Balance accurate to 0.1 mg ii. Stationary support iii. Pycnometer iv. Liquid bath v. Dessicator, connected to a vacuum system vi. Immersion liquid For Method C – Titration method i. Liquid bath ii. Glass cylinder, capacity 250 ml iii. Thermometer iv. Volumetric flask, capacity 100 ml v. Flat-tipped glass rod stirrer vi. Burette vii. Immersion liquids
3.	Dimensional Requirement (Clause 6.2.2)	i. Dead weight dial Micrometer, Least count 0.001 mm or Dial thickness gauge ii. Measuring tape
1.	Yield Tolerance (Clause 6.3)	i. Dead weight Micrometer /Dial thickness gauge, ii. Weighing Balance iii. Density test as above

iv.	Dart Impact Strength (Clause 6.4.1)	i. Falling Dart Impact Tester as per fig.1 of IS 13360 (Part 5/ Sec 6) for Method A or B ii. Electromagnet iii. Micrometer iv. Positioning device v. Cushioning and shielding device vi. Collar vii. Darts vii. Specimen Clamp viii. Incremental weights.
6.	Haze (Clause 6.4.2)	i. Gloss meter, ii. Standard Glossy Surface, OR Haze Meter,
7.	Slip (Clause 6.4.3)	i. Moving Table apparatus for determination of Coefficient of friction as per Fig. 1 of IS 13360 (Part 11/ Sec 1). ii. Sled iii. Load cell capable of recording the force upto +/-2 % accuracy v. Reinforcement plate vi. Spring vii. Double-faced adhesive tape viii. Felt ix. Arrangement of conditioning- specimens
8.	Tensile Strength and elongation at Break (Clause 6.4.4 and 6.4.5)	i. Tensile machine as per Cl. 5 of IS 13360 (Part 5/ Sec 3) : capable of maintaining required test speeds ii. Extensometer iii. Grip iv. Die, arrangement for sample preparation and v. Conditioning.

The above list is indicative only and may not be treated as exhaustive.

ANNEX- C

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SCHEME OF INSPECTION AND TESTING

1. LABORATORY - A laboratory shall be maintained, which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the method given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipment.

2. TEST RECORDS – The manufacturer shall maintain test records for the tests carried out to establish conformity.

3. PACKING AND MARKING – The Standard Mark as given in the schedule of the licence, shall be marked on each roll/folded film as the case may be; provided always that the material to which this mark is thus applied conforms to every requirement of the specification.

3.1 Packing and Marking shall be done as per clause 7 of IS 14500. In addition, the following shall be legibly marked on each roll/folded film:

- i) BIS Licence Number (CM/L.....) and
- ii) BIS website details i.e. For details of BIS certification please visit www.bis.gov.in

4. CONTROL UNIT - For the purpose of this scheme, the total quantity of polyethylene films of the same type produced from the same consignment of raw material, in one day shall constitute a control unit.

5. LEVELS OF CONTROL - The tests as indicate in Table 1 and at the levels of controls specified therein, shall be carried out on the whole production of the factory which is covered by this scheme and appropriate records and charts maintained in accordance with item 2 above.

5.1 All the production which conforms to the Indian Standard and covered under the scope of this licence shall be marked with the Standard Mark.

6. REJECTIONS - Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

TABLE 1
LEVELS OF CONTROL

(1)				(2)	(3)		
TEST DETAILS				Test equipment requirement R: required (or) S: Sub- contracting permitted	LEVELS OF CONTROL		
Clause	Requirements	Test Method Cl. Ref.	Test Method IS		No. of samples	Frequency	Remarks
4,4.1,4.2	Material Requirement	----	IS 14500 When the film is meant for food contact application the compound shall also comply with the requirements of IS 16738 and IS 10146	S	One	Each Batch in a consignment	In case test certificate for each batch is received along with the consignment of the raw materials further testing is not necessary.
6.1.1	Appearance	6.1.1	IS 14500	R	Six	Each control unit	
6.1.2	Film Form	6.1.2	-do-	R	Six	-do-	
6.1.3	Odour	6.1.3	-do-	R	Six	-do-	
6.1.4	Density	6.1.4 5	-do- IS 13360 (Part 3/Sec 10)	R	Two	-do-	
6.2	Dimensional requirements						
6.2.2	Tolerance on Thickness	Annex-A	IS 2508	R	Six	-do-	
6.2.3	Tolerance on Width	6.2.3	IS 14500	R	Two	-do-	
6.3	Yield Tolerance	Annex B	IS 10889	R	Two	-do-	
6.4.1	Impact Strength (Falling Dart)	8	IS 13360 (Part 5/Sec 6)	R	One	-do-	
6.4.2	Haze	6	IS 13360 (Part 9/Sec 5)	R	Two	-do-	

6.4.3	Slip	8.1	IS 13360 (Part 11/Sec 1)	R	One	Every seventh Control Unit	
6.4.4	Tensile strength at break a) Machine direction (MD) b) Transverse direction (TD)	-	IS 13360 (Part 5/Sec 3)	R	Two	Each control unit	
6.4.5	Elongation at Break	-	IS 13360 (Part 5/Sec 3)	R	Two	-do-	

Note 1: Whether test equipment is required or sub-contracting is permitted in column 2 shall be decided by the Bureau and shall be mandatory. Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau

Note 2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification to the Head BO for approval.