उत्पाद मानुयल
कृषि और बागवानी के लिए पॉलीथीन पलवार फिल्म
IS 17216 : 2019 के अनुसार

PRODUCT MANUAL FOR
POLYETHYLENE MULCH FILM FOR AGRICULTURE AND HORTICULTURE
ACCORDING TO IS 17216 : 2019

भारतीय मानक ब्यूरो -विनियम की स्कीम (अनुरूपता मूल्यांकन)I के तहत यह उत्पाद मानुयल प्रमाणीकरण के प्रचलन मे रीति और पारदर्शिता के सुसंगता सुनिश्चित करने के लिए सभी क्षेत्रीयशाखा कार्यालयों एवं लाइसेन्स धारियों / द्वारा संदर्भ सामग्री केरूप मे उपयोग किया जाएगा। बीआईएस लाइसेन्सप्रमाण पत्र प्राप्त करने 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 17216 : 2019
	शीर्षक **Title**	:	**कृषि और बागवानी के लिए पॉलीथीन पलवार फिल्म** Polyethylene Mulch Film for Agriculture and Horticulture
	संशोधन संख्या **No. of Amendments**	:	01
2.	**नमुनाकरण दिशा निर्देश** **Sampling Guidelines:**		
a)	**कच्चा माल** **Raw material**	:	Each consignment of raw material shall conform to cl. 5.1.1 to 5.1.5 of IS 17216.
b)	**समूहिकरण दिशा निर्देश** **Grouping guidelines**	:	कृपया ANNEX –A देखें Please refer **ANNEX – A**
c)	**नमूने का परिमाण** **Sample Size**	:	20 m of film (Full Width) + 3 x 0.5 sq.m Service life test shall be done only on one factory sample in three years.
3.	**परीक्षण उपकरणो की सूची** **List of Test Equipment**	:	कृपया ANNEX –B देखें Please refer **ANNEX – B**
4.	**निरीक्षण व परीक्षण स्कीम** **Scheme of Inspection and Testing**	:	कृपया ANNEX –C देखें Please refer **ANNEX – C**
5.	**एक दिन में संभावित परीक्षण** **Possible tests in a day :**		

	i. Density (Resin) (Cl. 5.1.1) ii. Melt Flow Index (Resin) (Cl. 5.1.2) iii. Visual Appearance (Cl. 5.2.1) iv. Nominal Thickness (Cl. 5.3.1.1) v. Width (Cl. 5.3.1.2) vi. Carbon Black Content (Cl. 5.4) for Black Mulch Film vii. Ash Content (Cl. 5.4) for Black Mulch Film viii. Carbon Black Dispersion (Cl. 5.4) for Black Mulch Film	
6.	**लाइसेन्स का कार्यक्षेत्र/ Scope of the Licence:**	
	IS 17216 : 2019 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 17216 : 2019 as per the following scope:	
	उत्पाद का नाम **Name of the Product**	Polyethylene Mulch Films for Agriculture and Horticulture.
	Type	Non Reflective (Silver Black or White Black) polyethylene mulch films/ Reflective polyethylene mulch film.
	Nominal Film Thickness (Microns)	30 to 100
	Width (mm)	Upto…. (as per the manufacturing capability of the manufacturer)
	Service Life (Months)	3, 6, 12, 18, 24 and 36

ANNEX-A

TO PRODUCT MANUAL FOR POLYETHYLENE MULCH FILM FOR AGRICULTURE AND HORTICULTURE ACCORDING TO IS 17216 : 2019

GROUPING GUIDELINES

1. Classification of the product been based upon:

   i. **Type of film -** The product has been classified into two types of Polyethylene Mulch Films for Agriculture and Horticulture namely:
   (a) Non – Reflective Mulch Film.
   (b) Reflective Mulch Film.

   ii. Impact Strength of film: Based on Impact Strength, mulch films are divided into 5 thicknesses: 30, 40, 50, 75 and 100 µ. (The film may be manufactured in any thickness from 30 to 100 micron. The values for impact failure loads for intermediate thicknesses may be obtained by interpolation.)

2. Considering the above, following Guidelines shall be followed for GoL/Inclusion:

   i. One sample of lowest thickness and one sample of highest thickness of film, shall be drawn and tested for all requirements to cover all polyethylene films of thickness within that range.

   ii. Separate samples of both reflective and non-reflective mulch film types shall be tested to cover both types.

   iii. Separate sample of both black film and non-black film shall be tested to cover both types of non-reflective mulch films in the scope of licence.

   iv. Separate sample of both Silver Black mulch film and White Black mulch film shall be tested to cover both the types of Reflective Mulch Film.

3. The Scope of the licence may be restricted based upon the manufacturing capabilities of the manufacturer.

4. During the operation of the licence, it shall be ensured that all types/sizes covered in the licence are drawn for independent testing on rotation over a period of time.

ANNEX B

TO PRODUCT MANUAL FOR POLYETHYLENE MULCH FILM FOR AGRICULTURE AND HORTICULTURE ACCORDING TO IS 17216 : 2019

List of Test Equipment

Major test equipment essentially required to test as per the Indian Standard

Sl. No.	Tests used in with Clause Reference	Test Equipment
1.	Density Cl. 5.1.1	(i) Pycnometer (ii) Balance (iii) Beaker (iv) Thermometer (v) Distilled or Deionized Water
2.	Melt Flow Index Cl. 5.1.2	(i) Melt flow index tester having Cylinder and piston arrangement and fitted with Temperature Control System and timer. (ii) Removable Load (iii)Weighing Balance
3.	Thickness of the Film Cl. 5.3.1.1	(i) Dead Weight Dial Micrometer with flat anvil of 6 mm diameter or larger. (ii) Air conditioner in laboratory
4.	Width of the film Cl. 5.3.1.2	Steel Scale or Steel Tape
5.	Impact Strength Cl. 5.3.2	(i) Impact Strength Test Apparatus with specimen clamp (ii) Electromagnet (iii) Dart head of different mass (iv) Micrometer (v) Humidity Chamber
6.	Tensile Strength at Break and Elongation Cl. 5.3.3 and 5.3.4	(i)Tensile Testing Machine with extension recorder. (ii) Humidity Chamber
7.	Coefficient of Friction Cl. 5.3.5	(i) Coefficient of Friction test set up with horizontal test table and a sled. (ii) Weighing balance (iii) Driving mechanism for relative motion between the sled and the test table (iv) Humidity Chamber
8.	Elmendorf Tear Strength Cl. 5.3.6	(i) Elmendorf Tear Resistance Tester (ii) Humidity Chamber
9.	Opacity Cl. 5.3.7	(i) Opacity tester/ Hazemeter (ii) Humidity Chamber

10.	Carbon Black percent and Ash Content percent Cl. 5.4 (for black PE mulch film)	(i) Combustion boats made of porcelain or silica, having minimum dimensions of 75 mm length, 9 mm width & 8 mm height. (ii) Combustion tube made of hard glass of approximately 30 mm diameter and 400± 50mm length. (iii) Gas Flow Meter (iv) Thermometer (in the range 250^0C to 550^0C) (v) Furnace – To accommodate the combustion tube and to give temperatures up to at least 500^0C (vi) Nitrogen gas Cylinder with flow meter for controlling flow of nitrogen within 1.7± 0.3 liters per minute. (vii) Desiccator, Trichloroethylene & solid carbon dioxide, Fume Hood (ix) Analytical balance or equivalent, capable of weighing to the nearest 0.1 mg.
11.	Carbon black dispersion Cl. 5.4 (for black PE mulch film)	(i) Hot Plate (ii) Projection Microscope with 100/200 times magnification (iii) Microscope slides
12.	Service Life Cl. 5.5	(i) Xenon arc Weatherometer or UV Weatherometer (ii) Tensile testing machine
13.	Solar Reflectance Cl. 5.6 (for Reflective Mulch Film)	UV-VIS-NIR spectrophotometer with integrated sphere

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

ANNEX C

SCHEME OF INSPECTION AND TESTING FOR POLYETHYLENE MULCH FILMS FOR AGRICULTURE AND HORTICULTURE —ACCORDING TO IS 17216 : 2019

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 methods 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 Polyethylene mulch films, provided always that the product to which this mark is thus applied, conform to every requirement of the specification.

3.1 PACKING – Manual for installation, marking hole and lying of mulch film should be provided by the manufacturer with each roll. Mulch film may also be supplied with ready holes as agreed between manufacturer and supplier.

3.2 MARKING – Each roll/folded Polyethylene mulch film shall be marked legibly on every meter either brand name or company name and BIS Licence No. CM/L_____. Printed label has to be fixed on the roll with the details provided under clause 6.2 of IS 17216 and 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, all Quantity of Mulch Film of same variety and same thickness produced from the same consignment of raw material under similar condition of manufacturing in a day shall constitute a control unit.

5. LEVELS OF CONTROL-The tests as indicated in column 1 of Table 1and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

5.1 All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark.

6. REJECTION-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)		
Cl.	**Requirements**	**Test Method Cl. Ref.**	**Test Method IS**	**Test equipment requirement R: required (or) S: Sub-contracting permitted**	**No of Samples**	**Frequency**	**Remarks**
MATERIAL							
5.1.1	Density	-	IS 13360 (Part 3/Sec 10)	R	One	Each Consignment	
5.1.2	Melt Flow Index	-	IS 13360 (Part 4/Sec 1)	R	One	Each Consignment	
5.1.3 & 5.1.5	Master batch and UV Stabilizer	5.1.3 5.1.5	IS 17216	Undertaking regarding conformity to cl. 5.1.3 & 5.1.5 shall be obtained from the manufacturer.			
5.1.4	Carbon Black in Master batch	5.1.4	IS 17216	S	One	Each Consignment	If test certificate of carbon black master batch manufacturer is available, no further testing is required.
MULCH FILM							
5.2.1	Visual Appearance	5.2.1	IS 17216	R	Six	Each control unit	
5.2.2	Film Form	5.2.2	IS 17216	R	Six	Each control unit	
5.2.3	Colour	5.2.3	IS 17216	R	Six	Each control unit	
5.2.4	Odour	5.2.4	IS 17216	R	Six	Each control unit	
5.3.1.1	Tolerance on thickness	5.3.1.1	IS 17216	R	Two	Every control unit	
5.3.1.2	Tolerance on width	5.3.1.2	IS 17216	R	Two	Every control unit	
5.3.2	Impact Strength		Method A of IS 13360 (Part 5/Sec 6)	R	Three	Every control unit	
5.3.3	Tensile Strength at break	-	IS 13360 (Part 5/Sec 3)	R	Three	Every Control Unit	
5.3.4	Elongation at break	-	IS 13360 (Part 5/Sec 3)	R	Three	Every Control Unit	

5.3.5	Coefficient of Friction	-	IS 13360 (Part 11/Sec 1)	R	Three	Every Control Unit	
5.3.6	Elmendorf Tear Strength	-	IS 13360 (Part 5/Sec 23)	R	Six	Every Control Unit	Three samples each for Machine direction and transverse direction
5.3.7	Opacity	-	IS 13360 (Part 9/Sec 5)	R	Three	Every Control Unit	
5.4	i) Carbon Black ii) Ash Content iii) Carbon Black Dispersion	Annex A Annex A 16	IS 17216 IS 17216 IS 2530	R -do- -do-	One -do- -do-	Every Control Unit	One sample for each test, applicable only to Black Polyethylene Film
5.5	Service Life	Annex D	IS 17216	S	One factory sample in three years		
5.6	Solar Reflectance	Annex E	IS 17216	S	One sample of each variety	Once in a year	Applicable only to Reflective type Mulch Film

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 for approval by BO Head.