



**PRODUCT MANUAL FOR  
CLADDING FILMS FOR GREENHOUSE/POLYHOUSE - SPECIFICATIONS  
ACCORDING TO IS 15827:2019**

*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.	<b>Product</b>	:	IS 15827:2019
	<b>Title</b>	:	Cladding Films for Greenhouse/Polyhouse - Specifications.
	<b>No. of Amendments</b>	:	Nil
2.	<b>Sampling Guidelines:</b>		
a)	<b>Raw material</b>	:	No specific requirement
b)	<b>Grouping Guidelines</b>	:	Please refer Annex A
c)	<b>Sample Size</b>	:	Minimum Length of 10m <b>in full width</b>
3.	<b>List of Test Equipment</b>	:	Please refer ANNEX B
4.	<b>Scheme of Inspection and Testing</b>	:	Please refer ANNEX C
5.	<b>Possible tests in a day</b>	:	Appearance, Determination of Width. Tests as per Table 2 (Sl. Nos. i to viii) <i>[subject to the availability of pre-conditioned samples]</i>
6.	<b>Scope of the Licence :</b>		
	Licence is granted to use the Standard Mark as per IS 15827:2019, with the following scope:		
	Name of the product	Cladding Films for Greenhouse / Polyhouse.	
	Type of Film	A / B / C / D / E / F <i>[as per Table 1 of IS 15827:2019]</i>	
	Durability/Irradiance Class	A / B / C / D / E / F <i>[as per Cl. 6.2 &amp; Table 3 of IS 15827:2019]</i>	
	Size	Upto Max. Width <i>[as per specifications of the available manufacturing facilities]</i>	

**ANNEX A**

**Grouping Guidelines**

1. Classification of the product been based upon:

i) **Type of the Films as per minimum diffusion** - The product has been classified into 6 types as per Table 1, based on use and minimum diffusion i.e. Type F has the highest minimum diffusion (70%) and Type A has the lowest minimum diffusion (20%).

ii) **Durability/Irradiance Class** – The product has been classified into 6 classes as per Table 3, based on minimum duration of exposure for the Resistance to Artificial Weathering test as per Cl. 7.5

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

iii) **One sample of the highest minimum diffusion and one sample of the lowest minimum diffusion, as per Table 1, shall be drawn and tested for all requirements except Resistance to Artificial Weathering test as per Cl. 7.5, for each Durability/Irradiance Class, to cover all the types of cladding films within that range for minimum diffusion.**

iv) **Further, Resistance to Artificial Weathering test as per Cl. 7.5 shall be carried out on any one sample for each Durability/Irradiance Class, from all the types offered by the Applicant/Licensee.**

**For example, if one sample of Type A and one sample of Type F, both of Durability/Irradiance Class A are drawn and tested for all requirements except resistance to Artificial Weathering test as per Cl. 7.5, and one sample out of the two is also tested for Resistance to Artificial Weathering test as per Cl. 7.5, the scope of licence may cover Types A to F and Durability/Irradiance Class A.**

3. The Scope of the Licence in terms of the maximum width of the films, may be restricted based upon the Manufacturing and Testing capabilities of the manufacturer.

4. During the operation of the Licence, it shall be ensured that all the varieties covered in the Licence are tested in rotation, to the best extent possible.

**ANNEX B**

**List of Test Equipment**

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

Test Equipment	Test with Clause Ref. No. of IS 15827:2019	Range	LC
A. Visual	Appearance as per Cl. 6.1 and 7.1	NA	NA
B. Flat Surface, Length about 10m x Width as per the sample width, at the least.	Width as per Cl. 7.2	NA	NA
C. Scale or Measuring Tape		As per the Width of the Film (In general: Scale: 0 – 1m, Tape: 0 - 15/30m)	1mm
D. Tensile Testing Machine E. Air Conditioner F. Humidity Chamber	i. Tensile Strength at Break (MD) ii. Tensile Strength at Break (TD) iii. Elongation at Break (MD) iv. Elongation at Break (TD)  Mechanical Properties as per Cl. 6.3 and Table 2 (Sl. Nos. i to iv).	0 – 100 kgf  0 – 100 deg C 0 – 100 % RH	0.01 kgf  1deg C 1 % RH
G. Dart Impact Tester with Vacuum Pump fitted with Vacuum Gauge and with Loads of denominations 15,30,45,50,60,90, 180 & 300 gms. H. Air Conditioner I. Humidity Chamber	Dart Drop Test on Flat Sheet, Method B.  Mechanical Properties as per Cl. 6.3 and Table 2 (Sl. No. v).	Height 0 – 1500 mm  0 – 100 deg C 0 – 100 % RH	NA  1 deg C 1 % RH
J. Haze Meter with Light Transmittance Detector	i. Total Visible Light Transmittance ii. Haze	Transmittance 0 – 100 %  Haze	0.01 %  0.01%

K. Humidity Chamber	Mechanical Properties as per Cl. 6.3 and Table 2 (Sl. No. vi & vii).	0 – 100 % 0 – 100 deg C 0 – 100 % RH	1 deg C 1 % RH
L. Tensile Testing Machine	Tear Strength	0 – 100 kgf	0.01 kgf
M. Air Conditioner N. Humidity Chamber	Mechanical Properties as per Cl. 6.3 and Table 2 (Sl. No. viii).	0 – 100 deg C 0 – 100 % RH	1deg C 1 % RH
O. Tensile Testing Machine P. Air Conditioner	Elongation under Steady Load (Creep Test) as per Cl. 7.3	0 – 300 kgf	0.1 kgf
Q. Fourier Transform Infrared Spectroscopy (FTIR) or Infrared Spectrophotometer with a Recorder	IR Effectiveness – Barrier Against Thermic Radiation as per Cl. 7.4	Wavelength 7 micron – 13 micron Transmittance 0 – 100 %	NA 0.01%
R. Analytical Balance or Planimeter		NA	0.1 mg
S. Xenon Arc Light Source with Double Filter Borosilicate	Resistance to Artificial Weathering as per Cl. 6.2, 7.5 and Table 3	NA	NA
T. Tensile Testing Machine		0 – 100 kgf	0.01 kgf
U. Air Conditioner V. Timer		NA	1 sec

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

**ANNEX C**

**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 methods given in the specification.

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

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

**3. LABELLING AND MARKING** – The Standard Mark, as given in the Schedule of the licence, shall be indelibly marked along the edges on every meter of film provided always that material so marked conform to requirements of the specification.

**3.1** Labelling and Marking shall be done as per the provisions of the Indian Standard. In addition, the following shall be incorporated on each roll of film or on a packing slip or sticker:

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

**4. CONTROL UNIT** – All films of the same type and the same durability/irradiation class made out of similar batch of raw materials and under similar conditions, during a continuous production period of 48 hrs shall constitute a control unit.

**5. LEVELS OF CONTROL** - The tests as indicated in column 1 of Table 1 and 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. 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**

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Method			No. of Sample	Frequency	Remarks
		Clause	Reference				
6.1 & 7.1	Appearance	7.1	IS 15827:2019	R	One	Each Roll	NA
7.2	Determination of Width	7.2	IS 15827:2019	R	One	Each Control Unit	
6.3	Tensile Strength (MD & TD) and Elongation (MD & TD)		IS 13360 (Part 5/Sec 3)	R	Three	Each Control Unit	Pre-conditioning necessary.
6.3	Dart Drop Test on Flat Sheet		IS 13360 (Part 5/Sec 6)	R	Three	Each Control Unit	Pre-conditioning necessary.
6.3	Total Visible Light Transmittance		IS 13360 (Part 9/Sec 5)	R	One	Each Control Unit	Pre-conditioning necessary.
6.3	Haze		IS 13360 (Part 9/Sec 5)	R	One	Each Control Unit	Pre-conditioning necessary.
6.3	Tear Strength		IS 13360 (Part 5/Sec 10)	R	Three	Each Control Unit	Pre-conditioning necessary.
6.3	Thermicity IR Effectiveness		IS 15827:2019	S	One	Once in Six Months	
7.3	Elongation under Steady Load (Creep Test)	7.3	IS 15827:2019	S	As agreed between purchaser and supplier		IS does not specify any limits/requirements for this test

7.5	Resistance to Artificial Weathering	7.5 & Table 3	IS 15827:2019	S	One	Once in Three Years	
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Note-1: 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.

Note-3: If there is a failure in any test, appropriate steps shall be taken for rectifying the cause of the defect in subsequent samples and record of the same is maintained. Marking shall be resumed after ascertaining that the cause of the defect has been rectified and the product is meeting the requirements of the standard.