



**PLASTICS-THERMOPLASTIC POLYURETHANES FOR MOULDING AND EXTRUSION
- PART 1 – DESIGNATION SYSTEM AND SPECIFICATIONS
17397(Part -1):2022 के अनुसार**

**PRODUCT MANUAL FOR
PLASTICS-THERMOPLASTIC POLYURETHANES FOR MOULDING AND EXTRUSION-
PART 1 – DESIGNATION SYSTEM AND SPECIFICATIONS
ACCORDING TO IS 17397(Part -1):2022**

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम, 2018 की योजना- I के तहत प्रमाणन के संचालन में अभ्यास और पारदर्शिता के संचालन में पारदर्शिता सुनिश्चित करने के लिए इस उत्पाद मैनुअल का उपयोग सभी क्षेत्रीय / शाखा कार्यालयों और लाइसेंसधारियों द्वारा संदर्भ सामग्री के रूप में किया जाएगा। दस्तावेज़ का उपयोग बीआईएस प्रमाणन लाइसेंस/प्रमाणपत्र प्राप्त करने के इच्छुक संभावित आवेदकों द्वारा भी 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 17397(Part 1):2022
	शीर्षक Title	:	Plastics-Thermoplastic Polyurethanes for Moulding and Extrusion- Part 1 – Designation System and Specifications
	संशोधन संख्या No. of amendments	:	NIL
2.	नमूनाकरण दिशा निर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	No specific requirement
b)	समूहिकरण दिशा निर्देश Grouping Guidelines	:	कृपया Annex-A देखें Please refer ANNEX-A

c)	नमूने का परिमाण Sample Size	:	Not Applicable
3.	परीक्षण उपकरणों 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) Hardness ii) Tensile modulus of elasticity		
6.	लाइसेन्स का कार्यक्षेत्र / Scope of the Licence:		
	IS 17397 (Part1): 2022 के अनुसार मानक महुँर का उपयोग करने के लिए लाइसेन्स निम्नलिखित कार्यक्षेत्र के लिए प्रदान लकया जाता है Licence is granted to use standard Mark as per IS 17397(Part 1):2022 with the following scope:		
	उत्पाद का नाम Name of the product	Plastics-Thermoplastic Polyurethanes for Moulding and Extrusion- Part 1 – Designation System and Specifications	
	Designation/ Classification	Designation of thermoplastic material as per Cl. 4.1 of IS 17397(Part 1):2022 For eg. – Thermoplastics IS 17397 (Part 1) – TPU – ARET–,,–GN–35X–,,	
	Additional Requirements/ Properties	Suitable for/Not suitable for product used in contact with food stuff, Pharmaceuticals and drinking water (Cl. 6.3)	

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ANNEX-A

GROUPING GUIDELINES

1. The manufacturer shall declare, in their application for considering grant of licence and/or change in scope of licence, each designation code which they intend to cover in the scope of the licence. The Scope of Licence may be restricted based on the Manufacturing and testing capabilities of the Manufacturer.
2. For considering grant of licence and/or change in scope of licence, the following grouping shall be considered:

Data Block	Details of Data Block	Sample to be drawn/tested pertaining to each data block
Data block 1	Indian Standard no.	----
Data block 2	Type and composition of thermoplastic polyurethane (TPU)	Thermoplastic polyurethanes consist of a block copolymer of alternating hard and soft segments with urethane chemical linkages in the hard blocks and ether, ester, or carbonate linkages or mixtures of them in the soft blocks. The “TPU” group is sub-categorized into groups according to the linkages in the soft blocks as per Cl. 4.2.2 of IS 17397(Part-1):2022. The manufacturer may declare the subcategories which he intends to cover in the scope of their licence. Sample may be tested from any one of the subcategories to cover all the subcategories. However, the identification of the subcategories by the above-mentioned symbols is optional.
Data block 3	Type of filler and/or reinforcing material	a) Manufacturer shall declare type of filler and/or reinforcing material and their physical forms intended to be covered in the scope of licence as per Cl. 4.2.3 for each combination. b) Samples of material with each type of filler or reinforcing material / flame retardant material in any one physical form intended to be covered in the scope of licence shall be tested
Data Block 4	Application and method of processing, additives, supplementary information, and other characteristic	Manufacturer shall declare intended applications or Method of processing represented by a code letter, followed by code-letters describing additives, supplementary information, and other characteristics intended to be covered in the scope of licence as per Table 2 for each combination. (This is only to be provided as information to BIS

		and has no bearing on the testing)												
Data block 5	Designatory properties													
	Hardness	Manufacturer shall declare the Range of Hardness (≤ 7 to > 77) and corresponding code number as per Table 3 being manufactured and intended to be covered in the licence The hardness code numbers are divided in to three groups as below. <table border="1"> <tr> <th>Group</th><th>Hardness group</th><th>Code numbers</th></tr> <tr> <td>Group 1</td><td>Too flexible</td><td>05 and 10</td></tr> <tr> <td>Group 2</td><td>Very Flexible</td><td>15 to 45</td></tr> <tr> <td>Group 3</td><td>Flexible and Rigid</td><td>50 to 80</td></tr> </table> At least one sample from each group shall be tested for covering the entire group	Group	Hardness group	Code numbers	Group 1	Too flexible	05 and 10	Group 2	Very Flexible	15 to 45	Group 3	Flexible and Rigid	50 to 80
Group	Hardness group	Code numbers												
Group 1	Too flexible	05 and 10												
Group 2	Very Flexible	15 to 45												
Group 3	Flexible and Rigid	50 to 80												
	Tensile modulus of elasticity	Manufacturer shall declare the Range of Modulus(002 to 999) and corresponding code number as per Table 4 being manufactured and intended to be covered in the licence For Tensile Modulus of elasticity, the code numbers are divided into 3 groups as below <table border="1"> <tr> <th>Group</th><th>Tensile modulus group</th><th>Code numbers</th></tr> <tr> <td>Group 1</td><td>Too flexible</td><td>002 and 006</td></tr> <tr> <td>Group 2</td><td>Very Flexible</td><td>008 to 075</td></tr> <tr> <td>Group 3</td><td>Flexible and Rigid</td><td>200 to 999</td></tr> </table> At least one sample from each group shall be tested for covering the entire group	Group	Tensile modulus group	Code numbers	Group 1	Too flexible	002 and 006	Group 2	Very Flexible	008 to 075	Group 3	Flexible and Rigid	200 to 999
Group	Tensile modulus group	Code numbers												
Group 1	Too flexible	002 and 006												
Group 2	Very Flexible	008 to 075												
Group 3	Flexible and Rigid	200 to 999												
Data block 6 (Optional)	Additional requirements	Manufacturer may declare additional requirements intended to be covered in the scope of licence as per clause 4.2.6 of IS 17397 (Part1): 2022 for each combination. (This is only to be provided as information to BIS and has no bearing on the testing												

- Further, if product used for moulding or extrusion articles in contact with foodstuffs, pharmaceuticals and drinking water is intended to be covered in the scope of licence, samples (s) selected for testing as para 2 above shall also be tested for Special Requirements of Polymer Used for Molding or Extrusion Articles in Contact with Food Stuffs, Pharmaceutical and Drinking Water as per Cl. 6.3.1 of IS 17397(P-1):2022
- However, for the purpose of addition of new grades in the scope of licence, Licensees who already have Special Requirements of Polymer Used for Molding or Extrusion Articles in Contact with Food Stuffs, Pharmaceutical and Drinking Water covered in the scope of their licence need not submit evidence of conformity to these requirements again subject to confirmation that there is no change the chemical composition and manufacturing process

5. Scope of licence shall be restricted based on the manufacturing and testing facilities available.
6. During the operation of the Licence, BO shall ensure that all the varieties covered in the Licence are tested in rotation, to the extent possible.

ANNEX-B

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	For sample preparation	Injection Molding Machine with moulds with suitable arrangement for heating
2	Hardness test; Cl. 4.2.5.1 and 6.1	Shore A durometer and/or Shore D durometer consisting of Presser foot, Indenter, Indicating device, Calibrated spring (As per IS 13360 (Part 5/Sec 11))
3	Tensile modulus of elasticity test; Cl. 4.2.5.2 and 6.2	Tensile testing machine with suitable grips force indicator/recorder, Force indicator, Strain indicator, Extensometer/strain gauges with minimum accuracy of 1% of gauge length. (IS 13360 (Part 5/Sec 1)/ IS 13360 (Part 5/Sec 2)/ IS 13360 (Part 5/Sec 3)/IS 13360 (Part 5/Sec 25)/ ISO 527-5)
4	For monitoring of temperature and humidity	Thermometer and Hygrometer Or Dry and wet bulb thermometer
5	For maintaining laboratory temperature	Air conditioner

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 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 and implement a calibration plan for the test equipment.

2. **TEST RECORD**- 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 incorporated legibly and indelibly on each package of Thermoplastic Polyurethane provided always that the material so marked conforms to each requirement of the specification.

3.1 The material shall be packed in suitable form of packing as agreed to between the purchaser and supplier as per provisions of clause 7.1 of IS 17397(Part-1): 2022.

3.2 The information as mentioned under clause 7.2.1 of IS 17397(Part-1):2022 shall be legibly and indelibly marked on each bag and/or unit package, whichever is smallest in size. In addition, the following shall be incorporated on each bag and/or unit package:

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, entire quantity of material of same designation extruded continuously in a line over a period of one day or part thereof shall constitute a control unit.

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

6. **STORAGE, AND HYGIENIC CONDITIONS**: Plastics materials intended for food contact use shall be stored separately from other materials in closed, properly identified containers as per provisions of clause 6.3.1.3.1 and clause 6.3.1.3.2 of IS 17397(Part-1):2022. Adequate standards of hygiene shall be maintained at all times and plant operators and storemen shall be trained in proper hygienic practices as per provisions of clause 6.3.1.3.3 of IS 17397(Part-1): 2022.

7. **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.

TABLE1
LEVELS OF CONTROL

(1)				(2)	(3)		
Test Details				Test equipment requirement R:required (or) S:Sub- Contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
4.2.5.1 and 6.1	Hardness	--	IS 13360(Part 5/Sec 11)	R	One	Each control unit	
4.2.5.2 and 6.2	Tensile modulus of elasticity	---	IS 13360 (Part 5/Sec 1)/ IS 13360 (Part 5/Sec 2)/ IS 13360 (Part 5/Sec 3)/ IS 13360 (Part 5/Sec 25)/ ISO 527-5	R	One	Each control unit	If applicable
6.3.1.1	Pigments and colourants		IS 9833	S	One	When there is any change in chemical composition and/or manufacturing processes	For coloured material used for food packaging application
6.3.1.2	Overall migration		IS 9845	S	One	-do-	-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 empaneled 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 Thermoplastic Polyurethane is in granular form, the test piece may be moulded.