भारतीय मानक

Indian Standard

IS 2267 (Part 1) : 2024
ISO 24022-1 : 2020

(*Superseding IS 2267 : 1995*)

पॉलीस्टाइरीन (पीएस) मोल्डिंग और एक्सट्रूज़न सामग्री

भाग 1 अभिनाम प्रणाली और विशिष्टियों के लिए आधार

(तीसरा पुनरीक्षण)

Polystyrene (PS) Moulding and Extrusion Materials

Part 1 Designation System and Basis for Specification

(Third Revision)

ICS 83.080.20

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April 2024 **Price Group 7**

Plastics Sectional Committee, PCD 12

NATIONAL FOREWORD

This Indian Standard (Part 1) (Third Revision) which is identical to ISO 24022-1 : 2020 'Plastics — Polystyrene (PS) moulding and extrusion materials — Part 1: Designation system and basis for specifications' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Plastics Sectional Committee and approval of the Petroleum, Coal and Related Products Division Council.

This standard was first published in 1962 and subsequently revised in 1972 and 1995. This revision has been undertaken to align it with latest version of ISO 24022-1 : 2020 and ISO 24022-2 : 2020. As the ISO standard is available in two parts, the Committee decided to bifurcate the standards, as given below:

Part 1 Designation system and basis for specifications
Part 2 Preparation of test specimens and determination of properties

The text of ISO standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'; and

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to the following International Standard for which Indian Standard also exists. The corresponding Indian Standard which is to be substituted in its place is listed below along with its degree of equivalence for the edition indicated.

International Standard	Corresponding Indian Standard	*Degree of Equivalence*
ISO 24022-2 Plastics — Polystyrene (PS) moulding and extrusion materials — Part 2: Preparation of test specimens and determination of properties	IS 2267 (Part 2) : 2024/ ISO 24022-2 : 2020 Plastics — Polystyrene (PS) moulding and extrusion materials — Part 2: Preparation of test specimens and determination of properties	Identical

The Committee has reviewed the provisions of the following International Standards referred in this adopted standard and has decided that they are acceptable for use in conjunction with this standard:

International Standard	*Title*
ISO 1043-1	Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics
ISO 1043-2	Plastics — Symbols and abbreviated terms — Part 2: Fillers and reinforcing materials

The standard makes a reference to the BIS Certification Marking of the product. Details of which are given in National Annex A. This Standard also makes a reference to the additional requirements for food contact application, packing and marking and sampling, details of which are given in National Annex B.

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Indian Standard

POLYSTYRENE (PS) MOULDING AND EXTRUSION MATERIALS

PART 1 DESIGNATION SYSTEM AND BASIS FOR SPECIFICATIONS

(Third Revision)

1 Scope

This document establishes a system of designation for polystyrene thermoplastic material, which can be used as the basis for specifications.

The types of polystyrene plastics are differentiated from each other by a classification system based on appropriate levels of the designatory properties:

a) Vicat softening temperature, and

b) melt mass-flow rate.

and on information about the intended application and/or method of processing, important properties, additives and colorants, fillers and reinforcing materials.

This document is applicable to all amorphous polystyrene homopolymers. It applies to materials ready for normal use, unmodified or modified by colorants, additives, fillers, etc.

This document does not apply to expanded polystyrene, styrene copolymers, homopolymers of substituted styrene or those modified with other polymers such as elastomers.

It is not intended to imply that materials having the same designation give necessarily the same performance. This document does not provide engineering data, performance data or data on processing conditions which might be required to specify a material for a particular application and/or method of processing.

If such additional properties are required, they are determined in accordance with the test methods specified in ISO 24022-2, if suitable.

In order to specify a thermoplastic material for a particular application or to ensure reproducible processing, additional requirements can be given in data block 5 (see 4.6).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1043-1, *Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics*

ISO 1043-2, *Plastics — Symbols and abbreviated terms — Part 2: Fillers and reinforcing materials*

ISO 24022-2, *Plastics — Polystyrene (PS) moulding and extrusion materials — Part 2: Preparation of test specimens and determination of properties*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Designation system

4.1 General

The designation system for thermoplastics is based on the following standardized pattern:

Designation						
Description block (optional)	Identity block					
	International Standard number block	Individual-item block				
		Data block 1	Data block 2	Data block 3	Data block 4	Data block 5

The designation consists of an optional designation block, reading “Thermoplastics”, and an identity block comprising the International Standard number and an individual-item block. For unambiguous designation, the individual-item block is subdivided into five data blocks comprising the following information.

Data block 1: Identification of the plastic by its abbreviated term (PS) in accordance with ISO 1043-1 (see 4.2).

Data block 2: Fillers or reinforcing materials and their nominal content (see 4.3).

Data block 3: Position 1: Intended application or method of processing (see 4.4).

Positions 2 to 8: Important properties, additives and supplementary information (see 4.4).

Data block 4: Designatory properties (see 4.5).

Data block 5: For the purpose of alternative specifications and indicating additional material characteristics, a fifth data block may be added containing additional information (see 4.6).

The first character of the individual-item block shall be a hyphen. The data blocks shall be separated from each other by commas.

If a data block is not used, this shall be indicated by doubling the separation sign, i.e. by two commas (,,).

4.2 Data block 1

In this data block, after the hyphen, polystyrene plastics are identified by the abbreviated term “PS”, in accordance with ISO 1043-1.

4.3 Data block 2

In this data block, the type of filler and/or reinforcing material is represented by a single code-letter in position 1 and its physical form by a second code-letter in position 2, the code-letters being as specified in Table 1 (in accordance with ISO 1043-2). For the filler material of metal, it is represented by a two-

code-letter in position 1. Subsequently, the mass content may be given by a two-figure-number in position 3 and 4. The first figure-number is presented by 0 and the second figure-number is the figure of the mass content if the mass content of filler and/or reinforcing material is less than 10 %.

Mixtures of filler materials or forms may be indicated by combining the relevant codes using the sign "+" within parentheses followed by the total filler content outside the parenthesis. For example, a mixture of 25 % glass fibres (GF) and 10 % mineral powder (MD) would be indicated by (GF+MD) 35 or (GF25+MD10).

Table 1 — Code-letters for fillers and reinforcing materials in data block 2

Code-letter	Material (Position 1)		Form (Position 2)
B	Boron	B	Beads, spheres, balls
C	Carbon[a]		
		D	Fines, powder
		F	Fibre
G	Glass	G	Ground
		H	Whiskers
K	Calcium carbonate		
L	Cellulose		
M	Mineral[a]		
ME	Metal[b]		
S	Synthetic organic[a]	S	Flakes
T	Talcum		
X	Not specified	X	Not specified
Z	Others[a]	Z	Others

[a] These materials may be identified after the code-letter, e.g. by chemical symbol or additional codes to be agreed upon.

[b] The type of metal shall be identified by means of the relevant chemical symbol (s) after the mass content. For example, steel whiskers may be designated "MEH05Fe".

4.4 Data block 3

In this data block, information about the intended application and/or method of processing is given in position 1and information about important properties, additives and colour in positions 2 to 8. The code-letters used are specified in Table 2.

If information is presented in positions 2 to 8 and no specific information is given in position 1, the letter X shall be inserted in position 1.

Table 2 — Code-letters used in data block 3

Code-letter	Position 1	Code-letter	Positions 2 to 8
		A	Processing stabilized
		C	Coloured
		D	Powder
E	Extrusion	E	Expandable
F	Extrusion of films	F	Special burning characteristics
G	General use		
		L	Light-and/or weather-stabilized
M	Moulding		

Table 2 *(continued)*

Code-letter	Position 1	Code-letter	Positions 2 to 8
		N	Natural (no colour added)
		R	Mould release agent
		S	Lubricated
X	No indication		
		Z	Antistatic

4.5 Data block 4

4.5.1 General

In this data block, the range of the Vicat softening temperature is represented by a three-figure code-number (see 4.5.2) and the range of the melt mass-flow rate by a two-figure code-number (see 4.5.3). The code numbers are separated from each other by hyphens.

If a property value falls on or near a range limit, the manufacturer shall state which range will designate the material. If subsequent individual test values lie on, or on either side of, the limit because of manufacturing tolerances, the designation is not affected.

NOTE Not all combinations of the values of the designatory properties can be provided for currently available polymers.

4.5.2 Vicat softening temperature

The Vicat softening temperature shall be determined in accordance with ISO 24022-2.

The possible values of Vicat softening temperature are divided into 5 ranges, each represented by a three figure code-number as specified in Table 3.

Table 3 — Ranges of Vicat softening temperature in data block 4

Code-number	Range of Vicat softening temperature °C
075	≤ 80
085	> 80but ≤ 90
095	> 90 but ≤ 100
105	> 100 but ≤ 110
115	> 110

4.5.3 Melt mass-flow rate

The melt mass-flow rate shall be determined in accordance with ISO 24022-2.

The possible values of melt mass-flow rate are divided into 5 ranges, each represented by a two-figure code-number as specified in Table 4.

Table 4 — Ranges of melt mass-flow rate in data block 4

Code-number	Range of melt mass-flow rate (MFR) g/10 min
03	≤ 4
06	> 4 but ≤ 8
12	> 8 but ≤ 16
24	> 16 but ≤ 32
48	> 32

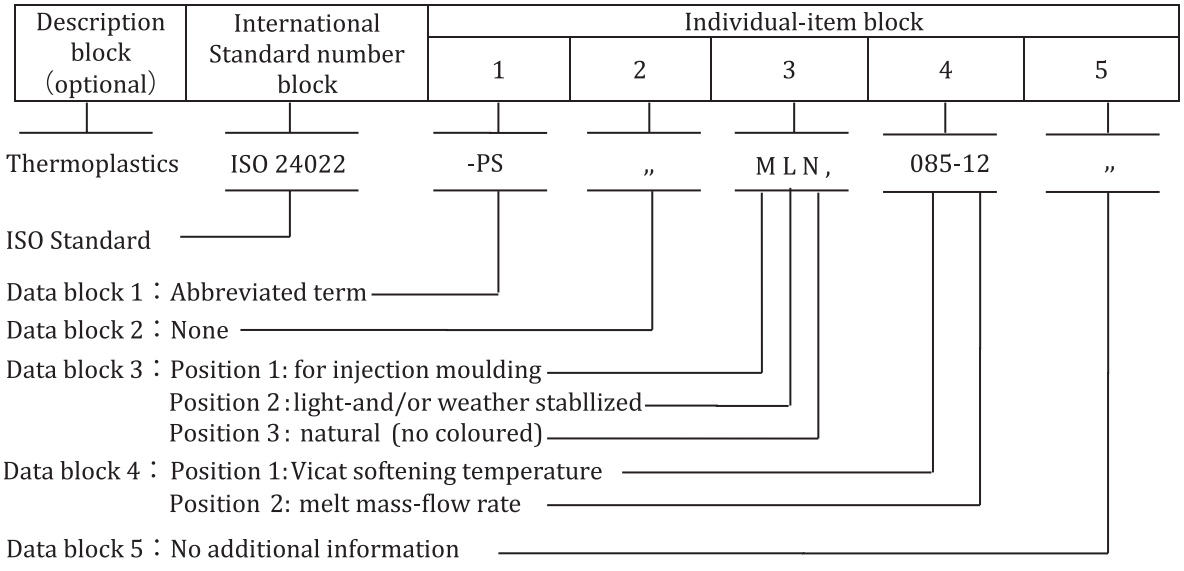
4.6 Data block 5

Indication of additional requirements in this optional data block is linking the ISO designation and specification given in this document to an alternative national specification for a particular application. This may be done, for example, by reference to a suitable national standard or to a standard-like, generally established specification.

5 Examples of designations

5.1 Example 1

A polystyrene moulding and extrusion material (PS), intended for injection moulding (M), light- and/or weather stabilized (L), natural (not coloured) (N), with a Vicat softening temperature of 84 °C (085) and a melt mass-flow rate of 9,0 g/10 min (12), would be designated:

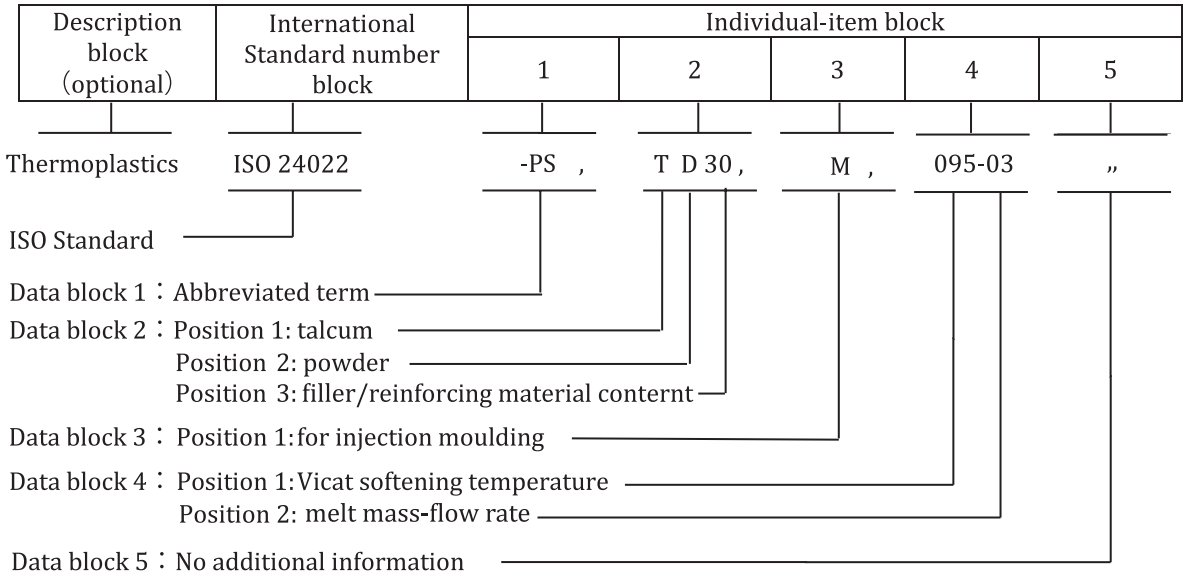


Designation: Thermoplastics ISO 24022-PS,,MLN,085-12,,or
ISO 24022-PS,,MLN,085-12,,or
ISO 24022-PS,,MLN,085-12

Part marking: > PS <

5.2 Example 2

A polystyrene moulding and extrusion material (PS), a mixture of 30 % talcum powder (TD), intended for injection moulding (M), with a Vicat softening temperature of 91 °C (095) and a melt mass-flowrate of 3,5 g/10 min (03), would be designated:



Designation: Thermoplastics ISO 24022-PS,TD30,M,095-03,,or
ISO 24022-PS, TD30,M,095-03,,or
ISO 24022-PS, TD30,M,095-03

Part marking: > PS,TD30 <

National Annex A

(National Foreword)

A-1 BIS CERTIFICATION MARKING

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

National Annex B

(National Foreword)

B-1 SPECIAL REQUIREMENTS OF POLYMER USED FOR MOULDING OR EXTRUSION ARTICLES IN CONTACT WITH FOOD STUFFS, PHARMACEUTICAL AND DRINKING WATER

When the products are used in contact with foodstuffs, pharmaceuticals and drinking water, its requirements with respect to the material shall also be met as per IS 10142.

B-2 PACKING AND MARKING

B-2.1 Packing

The material shall be packed in suitable form of packing, as agreed to between the purchaser and the supplier.

B-2.2 Marking

Each bag and/or unit package whichever is smallest in size that is being delivered to the customer shall be clearly marked with the following:

a) Name and type of the material;

b) Designation code;

c) Net mass of the material;

d) Batch number/lot number;

e) Month and year of manufacture of the material;

NOTE — Batch number/Lot number may reflect month and year of manufacture of the material. If not, it has to be printed separately as mentioned in e).

f) Name of the manufacturer and trademark, if any; and

g) Any other statutory requirements.

B-3 SAMPLING

B-3.1 General Requirements of Sampling

B-3.1.1 Sample shall not be taken in an exposed place.

B-3.1.2 The sampling instrument, which shall be made of glass, stainless steel or any other material on which polystyrene moulding material has no action, shall be clean and dry.

B-3.1.3 Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the container selected for sampling from adventitious contamination.

B-3.1.4 To draw a representative sample, the contents of each container selected for sampling shall be mixed as thoroughly as possible by suitable means.

B-3.1.5 The samples shall be placed in suitable, clean, dry, air-tight sheet metal or glass containers on which the material has no action.

B-3.1.6 Each sample container shall be sealed air-tight with a stopper after filling and marked with full details of sampling, the date of sampling and the month and year of manufacture of the material.

B-3.2 Scale of Sampling

B-3.2.1 Lot

All the containers in a single consignment of the material drawn from a single batch of manufacture shall constitute a lot. If a consignment is declared or known to consist of different batches of manufacture, the batches shall be marked separately and the groups of containers in each batch shall constitute separate lots.

B-3.2.2 A number of containers, consisting 10 percent of the containers in a lot but not less than 3 containers in any case, shall be selected at random from a lot for the purpose of drawing samples for test (*see* IS 4905).

B-3.3 Test Samples and Referee Sample

B-3.3.1 *Preparation*

To prepare a set of test samples, draw with an appropriate sampling instrument, from freshly opened containers which have been selected for sampling, an equal number of scoopfuls of material from any point at least 75 mm below the surface and 75 mm above the bottom of large containers, and firm any point at least 25 mm below the surface and 25 mm above the bottom of small containers. The sample prepared by mixing the portions from each container shall be not less than eight times the quantity which is estimated to be required for carrying out all the tests. Divide this composite sample into the required number of reduced samples. Each set of these reduced samples shall constitute the test sample.

B-3.3.2 Three sets of test samples, each pot less than twice the quantity required for the purpose of testing, representative of each selected container (*see* **B-3.3.1**) shall be transferred immediately to thoroughly dried containers, which shall be sealed airtight with an appropriate stopper. These containers shall be marked with all the particulars of sampling given under **B-3.1.6**. One set of the test samples shall be sent to the purchaser and one to the supplier.

B-3.3.3 *Referee Sample*

The third set of the test samples, bearing the seals of the purchaser and the supplier shall constitute the referee sample, to be used in case of dispute between the purchaser and the supplier. It shall be kept at a place agreed to between the purchaser and the supplier.

B-3.4 Test for Acceptance

B-3.4.1 *Examination and Tests*

The purchaser may examine and test separately samples from each of the lots (*see* **B-3.2.1**) for compliance with the requirements of the standard, or he may prepare for the purpose of such examination and at any stage of the progress of the examination, a composite sample representing the whole of the consignment, by mixing the test samples.

(*Continued from second cover*)

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 : 2022 'Rules for rounding off numerical values (*second revision*).' The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

This Indian Standard has been developed from Doc No.: PCD 12 (23102).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Published by BIS, New Delhi