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Plastics — Polystyrene (PS) moulding and extrusion materials —

Part 1: Designation system and basis for specifications

Plastiques — Polystyrène (PS) pour moulage et extrusion —

Partie 1: Système de désignation et base de spécifications

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 249, *Plastics,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This first edition ISO 24022-1 cancels and replaces ISO 1622-1:2012, which has been technically revised to introduce a new designation system.

The main changes compared to the previous edition are as follows:

— in Clause 2, reference to ISO 1622-2 has been replaced by ISO 24022-2;

— Clause 3 has been added and subsequent clauses have been renumbered.

A list of all parts in the ISO 24022 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Plastics — Polystyrene (PS) moulding and extrusion materials —

Part 1:
Designation system and basis for specifications

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

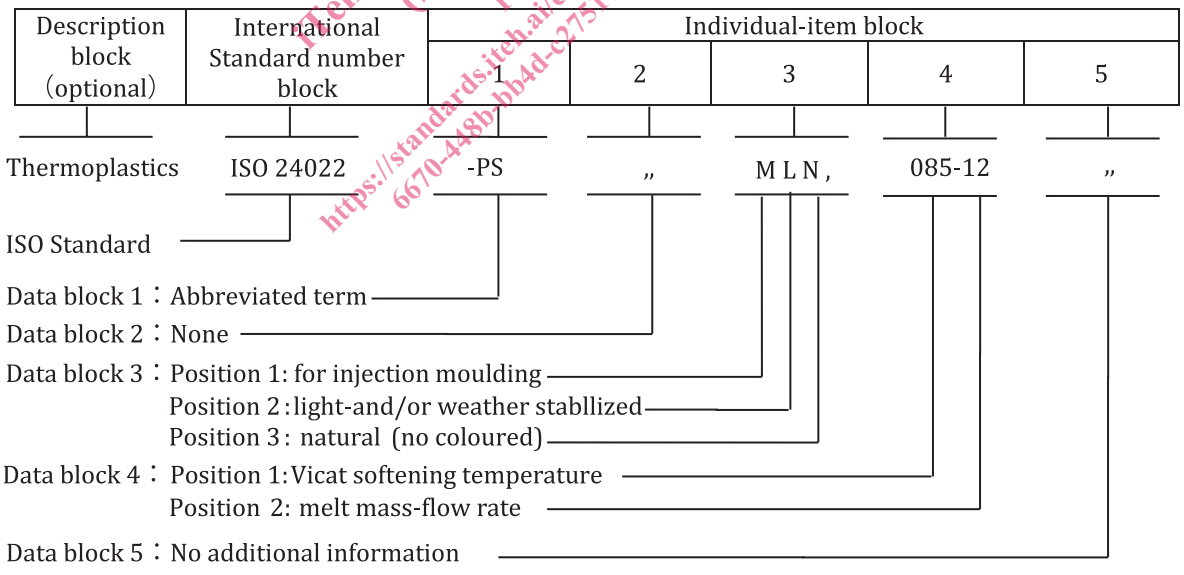
4.6 Data block 5

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 <