FINAL
DRAFT

INTERNATIONAL
STANDARD

**ISO/FDIS
24026-1**

ISO/TC **61**/SC **9**

Secretariat: KATS

Voting begins on:
2020-02-24

Voting terminates on:
2020-04-20

Plastics — Poly(methyl methacrylate) (PMMA) moulding and extrusion materials —

Part 1:
Designation system and basis for specifications

Plastiques — Matériaux à base de poly(méthacrylate de méthyle) (PMMA) pour moulage et extrusion —

Partie 1: Système de désignation et base de spécifications

ISO/CEN PARALLEL PROCESSING

Reference number
ISO/FDIS 24026-1:2020(E)

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Published in Switzerland

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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 of ISO 24026-1 cancels and replaces ISO 8257-1:1998, which has been technically revised.

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

— the normative references have been updated;

— in Clause 3, terms and definitions have been added;

— the position of data block has been changed.

A list of all parts in the ISO 24026 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 — Poly(methyl methacrylate) (PMMA) moulding and extrusion materials —

Part 1:
Designation system and basis for specifications

1 Scope

This document establishes a system of designation for poly(methyl methacrylate) (PMMA) thermoplastic material, which can be used as the basis for specifications.

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

a) Vicat softening temperature;

b) melt mass-flow rate;

c) viscosity number (optional);

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

This document is applicable to all poly(methyl methacrylate) homopolymers and to copolymers of methyl methacrylate (MMA) containing at least a mass percentage of 80 % of MMA and not more than a mass percentage of 20 % of acrylic esters or other monomers.

This document applies to materials ready for normal use in the form of beads, granules and pellets and to materials unmodified or modified by colorants, additives, etc. It does not apply to PMMA modified with 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, if suitable, determined using the test methods specified in ISO 24026-2.

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 4.1).

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 24026-2, *Plastics — Poly(methyl methacrylate) (PMMA) 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 standard pattern.

Designation						
Designation 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 description 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 symbol PMMA in accordance with ISO 1043-1 (see 4.2).

Data block 2: Fillers or reinforcing materials and their nominal content (not included in this document) (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, a fifth data block may be added containing additional information.

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, poly(methyl methacrylate) plastics are identified by the symbol "PMMA", in accordance with ISO 1043-1.

4.3 Data block 2

This data block, employed to represent filler and/or reinforcing materials, is not used in this document.

4.4 Data block 3

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

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 1 — Code-letters used in data block 2

Code-letter	Position 1	Code-letter	Positions 2 to 8
		A	Processing stabilized
		C	Coloured[b]
D	Disc manufacture[a]	D	Beads[c]
E	Extrusion of tubes, profiles and sheet	E	Expandable
F	Extrusion of films	F	Special burning characteristics
G	General use	G	Pellets, granules[c]
H	Coating	H	Heat-ageing stabilized
L	Monofilament extrusion	L	Light and/or weather stabilized
M	Injection moulding		
		N	Natural (not coloured)
Q	Compression moulding		
R	Rotational moulding	R	Moulding release agent
S	Powder coating or sintering	S	Lubricated
		T	Controlled transparency
X	No indication		
		Z	Antistatic

[a] In this document, video disc manufacture.

[b] C1 = coloured but transparent[b] C2 = coloured and non-transparent.

[c] For the correct definition of beads, pellets and granules, see ISO 472.

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), the melt mass-flow rate by a three-figure code-number (see 4.5.3) and, optionally, the viscosity number by a two-figure code-number (see 4.5.4). The two (or three) code-numbers, are separated from each other by a hyphen.

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

NOTE Not all the combinations of values of the designatory properties are available with currently offered polymers.

4.5.2 Vicat softening temperature

The Vicat softening temperature shall be determined in accordance with ISO 24026-2.

The possible values of the Vicat softening temperature (VST) are divided into eight ranges, each represented by a three-figure code-number, as specified in Table 2.

Table 2 — Code-numbers used for Vicat softening temperature in data block 3

Code-number	Range of VST °C
076	≤ 80
084	> 80 but ≤ 88
092	> 88 but ≤ 96
100	> 96 but ≤ 104
108	> 104 but ≤ 112
116	> 112 but ≤ 120
124	> 120 but ≤ 128
132	> 128

4.5.3 Melt flow rate

The melt mass-flow rate (MFR) shall be determined in accordance with ISO 24026-2.

The possible values of the MFR are divided into six ranges, each represented by a three-figure code-number, as specified in Table 3.

Table 3 — Code-numbers used for melt flow rate in data block 3

Code-number	Range of MFR g/10 min
005	≤ 1
015	> 1 but ≤ 2
030	> 2 but ≤ 4
060	> 4 but ≤ 8
120	> 8 but ≤ 16
240	> 16

4.5.4 Viscosity number (optional)

If required, the viscosity number (VN) shall be determined in accordance with ISO 24026-2.

The possible values of the viscosity number are divided into six ranges, each represented by a two-figure code-number, as specified in Table 4.

Table 4 — Code-numbers used for viscosity number in data block 3

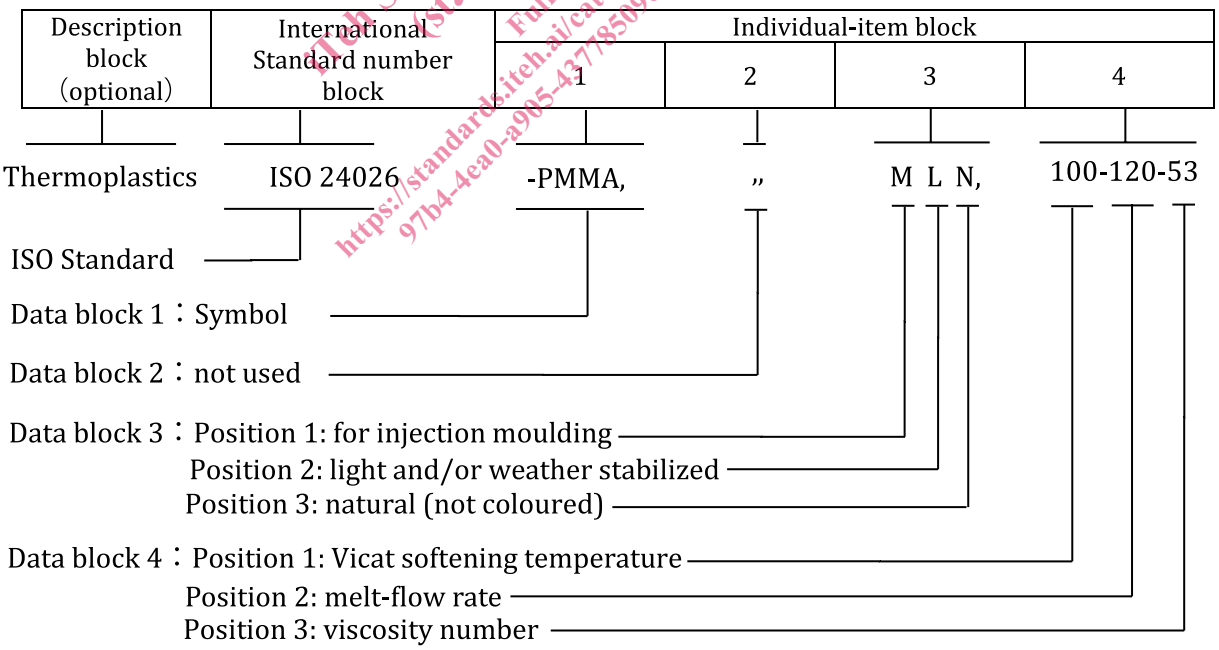
Code-number	Range of VN ml/g (optional)
43	≤ 48
53	> 48 but ≤ 58
63	> 58 but ≤ 68
73	> 68 but ≤ 78
83	> 78 but ≤ 88
93	> 88

4.6 Data block 5

Indication of additional requirements in this optional data block is a way of transforming the designation of a material into a specification for a particular application. This may be done for example by reference to a suitable national standard or to a generally established specification.

5 Examples of designations

A PMMA intended for injection-moulding material (M), light stabilized (L), natural (not coloured) (N), with a Vicat softening temperature of 101 °C (100), a melt flow rate of 10 g/10 min (120) and a viscosity number of 50 ml/g (53), would be designated:



Designation: (Thermoplastics) ISO 24026-PMMA,,MLN,100-120-53