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Plastics — Methyl methacrylate-acrylonitrile-butadiene-styrene (MABS) moulding and extrusion materials —

Part 1: Designation system and basis for specifications

Plastiques — Matériaux plastique (méthacrylate de méthyle)-acrylonitrile-butadiène-styrène (MABS) pour moulage et extrusion —

Partie 1: Système de désignation et base de spécifications

Reference number
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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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*.

This first edition of ISO 19066-1 cancels and replaces ISO 10366-1:2002, which has been technically revised to introduce a new designation system.

The revised designation system is published under a new ISO number, as many existing documents refer to ISO 10366-1. If the existing ISO 10366-1 would be replaced by the new designation system, these documents would refer to the incorrect designation system.

In order to give users time to switch from ISO 10366-1 to ISO 19066-1, ISO 10366-1 needs to be phased out in 5 to 10 years. During this period, ISO 10366-2 will effectively be Part 2 of this International Standard.

ISO 19066 consists of the following parts, under the general title *Plastics — Methyl methacrylate-acrylonitrile-butadiene-styrene (MABS) moulding and extrusion materials*:

— *Part 1: Designation system and basis for specifications*

Introduction

ISO 10366-1:2002 is complex and does not fit with daily practice anymore. In practice ISO 1043 and ISO 11469 are, in combination, 'improperly' being used as a designation system for, e.g. marking. The aim of this International Standard is to simplify the data block system and to connect more to ISO 1043 and ISO 11469, where the first two blocks are used for generic identification and marking of products.

Plastics — Methyl methacrylate-acrylonitrile-butadiene-styrene (MABS) moulding and extrusion materials —

Part 1: Designation system and basis for specifications

1 Scope

This part of ISO 19066 establishes a system of designation for methyl methacrylate-acrylonitrile-butadiene-styrene (MABS) moulding and extrusion materials, which can be used as the basis for specifications.

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

a) Vicat softening temperature,

b) melt volume-flow rate,

c) Charpy notched impact strength, and

d) tensile modulus,

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

This part of ISO 19066 is applicable to all methyl methacrylate-acrylonitrile-butadiene-styrene materials consisting of a continuous phase based mainly on copolymers of styrene (and/or an alkyl-substituted styrene), acrylonitrile and methyl methacrylate, and a dispersed elastomeric phase based on butadiene.

It applies to MABS materials ready for normal use in the form of powder, granules, or pellets, unmodified or modified by colorants, additives, fillers, etc.

It is not intended to imply that materials having the same designation give necessarily the same performance. This part of ISO 19066 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 will be determined in accordance with the test methods specified in ISO 10366-2, 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 3.1).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 10366-2:2003, *Plastics — Methyl methacrylate-acrylonitrile-butadiene-styrene (MABS) moulding and extrusion materials — Part 2: Preparation of test specimens and determination of properties*

3 Designation system

3.1 General

The designation system for thermoplastics is based on the following standard 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 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 abbreviated term MABS in accordance with ISO 1043-1 and information about the composition of the polymer (see 3.2).

Data block 2: Fillers or reinforcing materials and their nominal content (see 3.3).

Data block 3: Position 1: Intended application and/or method of processing (see 3.4).

Positions 2 to 8: Important properties, additives, and supplementary information (see 3.4).

Data block 4: Designatory properties (see 3.5).

Data block 5: For the purpose of specifications, a fifth data block can be added containing additional information (see 3.6).

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

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

3.2 Data block 1

In this data block, after the hyphen, the plastic is identified by its abbreviated term (MABS) in accordance with ISO 1043-1, followed by a hyphen and a single code letter giving additional information on the composition as specified in Table 1.

Table 1 — Code letters used for additional information on the composition in data block 1

Code letter	Range of AN content % by mass	Range of MMA content % by mass
A	<30	>10 but ≤50
B	<30	>50 but ≤80
C	≥30	>10 but ≤50
D	≥30	>50

For the purposes of this part of ISO 19066, the AN content of the continuous phase shall be determined in accordance with ISO 10366-2:2003, Annex A.

The MMA content of the compound shall be determined by measurement of the oxygen content.

3.3 Data block 2

In this data block, the type of filler and/or reinforcing material is represented by a one 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 2 in accordance with ISO 1043-2. Subsequently (without a space), the mass content can be given by a two-figure number. If the mass content of filler and/or reinforcing material is less than 10 %, the first figure number of the figure is presented by 0 and the second figure, of the mass content.

Mixtures of filler materials or forms can 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 2 — Code letters for fillers and reinforcing materials in data block 2

Code letter	Material (Position 1)	Form (Position 2)
B	boron	beads, spheres, balls
C	carbon[a]	
D		fines, powder
F		fibre
G	glass	ground
H		whiskers
K	calcium carbonate	
L	cellulose	
M	mineral[a]	
ME	metal[b]	
S	synthetic organic[a]	flakes
T	talcum	
X	not specified	not specified
Z	others[a]	others

[a] These materials can 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 can be designated "MEH05Fe".

3.4 Data block 3

In this data block, information about the method of processing is represented by a code letter, followed by code letters about additives, supplementary information, and other characteristics. The code letters used are specified in Table 3.

If no specific information is given on the method of processing, the letter X shall be used as the first code letter.

Table 3 — Code letters used in data block 3

Code letter	First letter	Letters 2 to 8
A		processing stabilized
B	blow moulding	antiblocking
C	calendering	coloured
D		powder
E	extrusion	expandable
F	extrusion of films	special burning characteristics
G	general use	granules
H		heat stabilized
K	cable and wire coating	metal deactivated
L	monofilament extrusion	light stabilized
M	moulding	nucleated
N		natural (no colour added)
P		impact modified
Q	compression moulding	
R	rotational moulding	mould release agent
S	sintering	lubricated
T	tape manufacture	transparent
X	no indication	
Y		increased electrical conductivity
Z		antistatic

3.5 Data block 4

3.5.1 General

In this data block, the range of Vicat softening temperature is represented by a three-figure code number (see 3.5.2), the range of melt volume flow rate by a two-figure code number (see 3.5.3), the range of Charpy notched impact strength by a two-figure code number (see 3.5.4), and the range of tensile modulus by a two-figure code number (see 3.5.5). The four 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 possible for currently available materials.

3.5.2 Vicat softening temperature

The Vicat softening temperature (VST) shall be determined in accordance with ISO 10366-2, using test specimens moulded from dry material and stored in a desiccator at 23 °C ± 2 °C until tested.

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

Table 4 — Code numbers for Vicat softening temperature in data block 4

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

3.5.3 Melt volume flow rate

The melt volume flow rate (MVR) shall be determined in accordance with ISO 10366-2. The material for the determination of the MVR shall be conditioned for 4 h at 80 °C ± 2 °C and then stored in a dessicator at 23 °C ± 2 °C until tested.

The possible values of the MVR are divided into four ranges, each represented by a two-figure code number as specified in Table 5.

Table 5 — Code numbers for melt volume-flow rate in data block 4
(measured at 220 °C/10 kg)

Code number	Range of melt volume-flow rate cm^3/10 min
04	≤5
08	>5 but ≤10
15	>10 but ≤20
25	>20

3.5.4 Charpy notched impact strength

The Charpy notched impact strength shall be determined in accordance with ISO 10366-2.

The possible values of the Charpy notched impact strength are divided into five ranges, each represented by a two-figure code number as specified in Table 6.

Table 6 — Code numbers for Charpy notched impact strength in data block 4

Code number	Range of Charpy notched impact strength kJ/m^2
04	≥3 but ≤7
09	>7 but ≤14
16	>14 but ≤23
25	>23 but ≤35
35	>35

3.5.5 Tensile modulus

The tensile modulus shall be determined in accordance with ISO 10366-2.

The possible values of the tensile modulus are divided into four ranges, each represented by a two-figure code number as specified in Table 7.