INTERNATIONAL STANDARD

ISO 2580-1

Fourth edition
2000-12-15

Plastics —Acrylonitrile/butadiene/styrene (ABS) moulding and extrusion materials —

Part 1: Designation system and basis for specifications

Plastiques — Acrylonitrile/butadiène/styrène (ABS) pour moulage et extrusion —

Partie 1: Système de désignation et base de spécifications

Reference number
ISO 2580-1:2000(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 2580 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 2580-1 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*.

This fourth edition cancels and replaces the third edition (ISO 2580-1:1997), which has been technically revised.

ISO 2580 consists of the following parts, under the general title *Plastics — Acrylonitrile/butadiene/styrene (ABS) moulding and extrusion materials*:

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

— *Part 2: Preparation of test specimens and determination of properties*

Plastics — Acrylonitrile/butadiene/styrene (ABS) moulding and extrusion materials —

Part 1:
Designation system and basis for specifications

1 Scope

1.1 This part of ISO 2580 establishes a system of designation for acrylonitrile/butadiene/styrene (ABS) thermoplastic materials, which may be used as the basis for specifications.

1.2 The types of ABS 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) Izod impact strength

d) flexural modulus

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

1.3 This part of ISO 2580 is applicable to all acrylonitrile/butadiene/styrene materials (in which the styrene component may be styrene itself and/or an alkyl-substituted styrene), consisting of a continuous phase based mainly on copolymers of styrene (and/or an alkyl-substituted styrene) and acrylonitrile, a dispersed elastomeric phase based mainly on polybutadiene, and other components in such quantities as specified in data block 1.

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

This part of ISO 2580 does not apply to materials

— with an Izod impact strength of less than 3 kJ/m^2;

— containing less than 40 % by mass of butadiene in the elastomer of the elastomeric phase;

— containing less than 10 % by mass of acrylonitrile in the continuous phase.

1.4 It is not intended to imply that materials having the same designation give necessarily the same performance. This part of ISO 2580 does not provide engineering data, performance data or data on processing conditions which may be required to specify a material for a particular application and/or method of processing.

If such additional properties are required, they shall be determined in accordance with the test methods specified in part 2 of this International Standard, if suitable.

1.5 In order to specify a thermoplastic material for a particular application or to ensure reproducible processing, additional requirements may be given in data block 5 (see 3.1).

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 2580. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 2580 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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

ISO 1043-2:2000, *Plastics — Symbols and abbreviated terms — Part 2: Fillers and reinforcing materials.*

ISO 2580-2:1994, *Plastics — Acrylonitrile/butadiene/styrene (ABS) 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 the symbol ABS in accordance with ISO 1043-1 and information about the composition of the polymer (see 3.2).

— Data block 2: Position 1: Intended application and/or method of processing (see 3.3).

Positions 2 to 8: Important properties, additives and supplementary information (see 3.3).

— Data block 3: Designatory properties (see 3.4).

— Data block 4: Fillers or reinforcing materials and their nominal content (see 3.5).

— Data block 5: For the purpose of specifications, a fifth data block may 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.

1) To be published. (Revision of ISO 1043-1:1997)

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, acrylonitrile/butadiene/styrene plastics are identified by the symbol ABS in accordance with ISO 1043-1, and, after a space, the composition is indicated by a single-figure code-number as specified in Table 1.

Table 1 — Code-numbers used in data block 1 to indicate the composition

Code-number	Composition
0	Monomers other than acrylonitrile, butadiene and styrene (and/or alkyl-substituted styrene) are not incorporated in such quantity as to exceed 5 % by mass of the plastic.
1	Monomers other than acrylonitrile, butadiene and styrene (and/or alkyl-substituted styrene) are incorporated in such quantity as to exceed 5 % by mass but less than 30 % by mass of the plastic.
2	Polymers other than those based on acrylonitrile, butadiene and styrene (and/or alkyl-substituted styrene) are incorporated in a quantity less than 30 % by mass of the plastic and in such a manner that styrene-acrylonitrile copolymer (SAN) is the matrix with other polymers dispersed therein.

The monomers incorporated are represented by the code-letters specified in Table 2.

Table 2 — Code-letters used in data block 1 for monomers

Code-letter	Monomer
A	Acrylate
M	Maleic anhydride and other anhydrides
P	N-Phenylmaleimide and other maleimides
X	Other/unspecified

3.3 Data block 2

In this data block, information about intended application and/or method of processing is given in position 1 and information about important properties, additives and colour in positions 2 to 8. The code-letters used are specified in Table 3.

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

Table 3 — Code-letters used in data block 2

Code-letter	Position 1	Code-letter	Positions 2 to 8
		A	Processing stabilized
		B	Antiblocking
		C	Coloured
E	Extrusion		
F	Extrusion of films	**F**	Special burning characteristics
G	General use	**G**	Granules
		H	Heat-ageing stabilized
		L	Light or weather stabilized
M	Moulding		
		N	Natural (no colour added)
		P	Powder
		R	Mould release agent
		S	Lubricated
X	No indication		
		Z	Antistatic

3.4 Data block 3

3.4.1 General

In this data block, the range of the Vicat softening temperature is represented by a three-figure code-number (see 3.4.2), the range of the melt volume-flow rate by a two-figure code-number (see 3.4.3), the range of the Izod impact strength by a two-figure code-number (see 3.4.4) and the range of the flexural modulus by a two-figure code-number (see 3.4.5). 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 may be possible for currently available materials.

3.4.2 Vicat softening temperature

The Vicat softening temperature (VST) shall be determined in accordance with ISO 2580-2.

The possible values of the VST are divided into six 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 3

Code-number	Range of Vicat softening temperature °C
085	⩽ 90
095	> 90 but ⩽ 100
105	> 100 but ⩽ 110
115	> 110 but ⩽ 120
125	> 120 but ⩽ 130
135	> 130

3.4.3 Melt volume-flow rate (MVR)

The MVR shall be determined in accordance with ISO 2580-2. 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 five 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 3

Code-number	Range of melt volume-flow rate (MVR) cm^3/10 min
04	⩽ 5
08	> 5 but ⩽ 10
15	> 10 but ⩽ 20
30	> 20 but ⩽ 40
50	> 40

3.4.4 Izod impact strength

The Izod impact strength shall be determined in accordance with ISO 2580-2.

The possible values of the Izod 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 Izod impact strength in data block 3

Code-number	Range of Izod impact strength kJ/m²
05	⩾ 3 but ⩽ 6
09	> 6 but ⩽ 12
16	> 12 but ⩽ 20
25	> 20 but ⩽ 30
35	> 30

3.4.5 Flexural modulus

The flexural modulus shall be determined in accordance with ISO 2580-2.

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

Table 7 — Code-numbers for flexural modulus in data block 3

Code-number	Range of flexural modulus MPa
15	⩽ 1 800
20	> 1 800 but ⩽ 2 300
25	> 2 300 but ⩽ 2 800
30	> 2 800

3.5 Data block 4

In this data block, if required, 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 8. Subsequently (without a space), the content by mass may be given by a two-digit number in position 3.

Table 8 — Code-letters for fillers and reinforcing materials in data block 4

Code-letter	Material	Code-letter	Form
B	Boron	**B**	Beads, spheres, balls
C	Carbon [a]		
		D	Powder, dry blend
		F	Fibre
G	Glass	**G**	Granules, ground
		H	Whiskers
K	Chalk		
M	Mineral [a, b], Metal [a]		
		S	Scales, flakes
T	Talc		
X	Not specified	**X**	Not specified
Z	Others [b]	**Z**	Others

[a] These materials may be further defined by their chemical symbol, for example, or additional symbols defined in the relevant International Standard. In the case of metals (M), it is essential to indicate the type of metal by means of its chemical symbol.

[b] Mineral fillers should be designated more precisely if a symbol is available.

Mixtures of materials and/or forms may be indicated by combining the relevant codes using the sign "+" and placing the whole between parentheses. For example, a mixture of 25 % glass fibres (GF) and 8 % mineral powder (MD) would be indicated by (GF25+MD08).

3.6 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 standard-like, generally established specification.