
**Plastics — Polycarbonate (PC)
moulding and extrusion materials —
Part 1:
Designation system and basis for
specification**

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*Plastiques — Matériaux à base de polycarbonate (PC) pour moulage
et extrusion —
Partie 1: Système de désignation et base de spécifications*

ISO 21305-1:2019

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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 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 the following URL: www.iso.org/iso/foreword.html. (standards.iteh.ai)

This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*. <https://standards.iteh.ai/catalog/standards/sist/4961960-a187-4201-8756-ISO-21305-1:2019>

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.

This first edition of ISO 21305-1 cancels and replaces ISO 7391-1:2006, which has been technically revised to introduce a new designation system.

A list of all parts in the ISO 21305 series can be found on the ISO website.

Plastics — Polycarbonate (PC) moulding and extrusion materials —

Part 1: Designation system and basis for specification

1 Scope

This document establishes a system of designation for polycarbonate (PC) moulding and extrusion materials, which can be used as the basis for specifications.

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

- a) melt volume-flow rate;
- b) Charpy notched impact strength;

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

This document is applicable to all polycarbonate homopolymers and copolymers. It applies to unmodified materials ready for normal use and materials modified, for example, by colorants, additives, fillers, reinforcing materials, and polymer modifiers.

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 can be required to specify a material. If such additional properties are required, they are intended to be determined in accordance with the test methods specified ISO 21305-2, if suitable.

In order to designate a thermoplastic material to meet particular specifications, the requirements are 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 21305-2, *Plastics — Polycarbonate (PC) 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						
Thermoplastics (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 (PC) in accordance with ISO 1043-1 and information about the composition of the polymer (see 4.2).
- Data block 2: Position 1: Fillers or reinforcing materials.
Position 2: Physical form of the material (see 4.3).
Position 3 and 4: Mass content.
- 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 specifications, a fifth data block contains appropriate 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, the plastic is identified by its abbreviated term “PC”, in accordance with ISO 1043-1 and, after a space, a symbol indicating the composition as specified in Table 1 or Table 2.

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. Subsequently (without a space), the mass content may be given by a two-figure number in positions 3 and 4.

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

Code-letter	Material	Code-letter	Form
B	Boron	B	Beads, spheres, balls
C	Carbon ^a		
		D	Powder
		F	Fibre
G	Glass	G	Ground
		H	Whiskers
K	Calcium carbonate		
M	Mineral ^{a,b} , metal ^a		
S	Synthetic, organic ^a	S	Scales, flakes
T	Talc		
X	Not specified	X	Not specified
Z	Others ^a	Z	Others ^a

^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 shall 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 10 % mineral powder (MD) would be indicated by (GF25+MD10).

4.4 Data block 3

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 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
B	Blow moulding	B	Antiblocking
		C	Coloured
D	Disc manufacture		
E	Extrusion	E	Expandable
F	Extrusion of films	F	Special burning characteristics
G	General use	G	Granules
H	Coating	H	Heat ageing stabilized
L	Monofilament extrusion	L	Light or weather stabilized
M	Injection moulding		
		N	Natural (no colour added)
		P	Impact modified
Q	Compression moulding		
R	Rotational moulding	R	Mould release agent
S	Sintering	S	Lubricated
T	Tape manufacture	T	Transparent
V	Thermoforming		

Table 2 (continued)

Code-letter	Position 1	Code-letter	Positions 2 to 8
		W	Stabilized against hydrolysis
X	No indication	X	Crosslinkable
		Y	Increased electrical conductivity
		Z	Antistatic

4.5 Data block 4

4.5.1 Designatory properties

In this data block, the range of the melt volume-flow rate by a two-figure code-number (see 4.5.2) and the range of the Charpy impact strength by a single-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 have to be provided for currently available polymers.

4.5.2 Melt volume-flow rate

The melt volume-flow rate (MVR) shall be determined in accordance with ISO 21305-2.

The possible values of melt volume-flow rate are divided into five ranges, each represented by a two-figure code-number as specified in Table 3.

Table 3 — Ranges of melt volume-flow rate in data block 4

Code-number	Range of melt volume-flow rate (MVR) cm ³ /10 min
03	≤2,8
05	>2,8 but ≤5,7
09	>5,7 but ≤11,4
18	>11,4 but ≤22,7
24	>22,7

4.5.3 Charpy notched impact strength

The Charpy impact strength (notched) shall be determined in accordance with ISO 21305-2.

The possible values of Charpy notched impact strength are divided into six ranges, each represented by a single-figure code-number as specified in Table 4.

Table 4 — Ranges of Charpy impact strength in data block 4

Code-number	Range of Charpy impact strength (notched) kJ/m ²
0	≤10
1	>10 but ≤30
3	>30 but ≤50

Table 4 (continued)

Code-number	Range of Charpy impact strength (notched) kJ/m ²
5	>50 but ≤70
7	>70 but ≤90
9	>90

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 standard-like, generally established specification.

5 Examples of designations

5.1 Designation only

A polycarbonate thermoplastic material (PC) intended for injection moulding (M), light or weather stabilized (L) and with a mould release agent (R), a melt volume-flow rate (MVR) of 9,5 cm³/10 min (09) and a Charpy impact strength (notched) of 35 kJ/m² (3), will be designated:

Designation: ISO 21305-PC,X,MLR,09-3

A polycarbonate thermoplastic material (PC) for general use (G), with special burning characteristics (F) and a melt volume-flow rate (MVR) of 5,5 cm³/10 min (05), a Charpy impact strength (notched) of 35 kJ/m² (3) and a glass (G) fibre (F) content of 30 % (30), will be designated:

Designation: ISO 21305-PC,GF30,GF05-3

5.2 Designation transformed into a specification

A polycarbonate thermoplastics material (PC) intended for extrusion (E), with special burning characteristics (F) and a melt volume-flow rate (MVR) of 4,5 cm³/10 min (05) and a Charpy impact strength (notched) of 95 kJ/m² (9), as well as the additional requirement to meet the FAR, Part 25, Amdt. 25-72; Appendix F, Part 1; Paragraph (a) (1) (i) test, will be designated:

Specification: ISO 21305-PC,X,EF,05-9,FAR,Part 25;App. F, PL. 1; §(a)(1)(i)