

INTERNATIONAL STANDARD

ISO
7391-1

First edition
1987-07-01



INTERNATIONAL ORGANIZATION FOR STANDARDIZATION
ORGANISATION INTERNATIONALE DE NORMALISATION
МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ

Plastics — Polycarbonate moulding and extrusion materials —

Part 1: Designation

Plastiques — Matériaux polycarbonates pour moulage et extrusion —

Partie 1: Désignation

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Reference number
ISO 7391-1:1987 (E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7391-1 was prepared by Technical Committee ISO/TC 61, *Plastics*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Plastics — Polycarbonate moulding and extrusion materials —

Part 1: Designation

1 Scope and field of application

1.1 This part of ISO 7391 establishes a system of designation for polycarbonate (PC) thermoplastic material which may be used as the basis for specifications.

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

- a) viscosity number,
- b) melt flow rate,
- c) impact strength,

and information about intended application, method of processing, important properties, additives, colour and fillers.

1.3 This designation system is applicable to thermoplastic polyesters of carbonic acid and aromatic dihydroxy compounds. The polyester may be a homopolymer, a copolymer or a mixture of the two.

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

1.4 It is not intended to imply that materials having the same designation give necessarily the same performance. This part of ISO 7391 does not provide engineering data, performance data or data processing conditions which may be required to specify a material for a particular end-use application or method of processing.

If such additional properties are required, they shall be determined in accordance with the test methods specified in ISO 7391-2, if suitable.

1.5 In order to specify a thermoplastic material for a particular application or reproducible processing, additional requirements may be coded in Data Block 5 (see clause 3).

2 References

ISO 179, *Rigid plastics — Determination of Charpy impact strength of rigid materials.*

ISO 180, *Plastics — Determination of Izod impact strength of rigid materials.*

ISO 1043, *Plastics — Symbols and codes*

— *Part 1: Symbols for basic polymers and their special characteristics.*¹⁾

— *Part 2: Symbols for fillers and reinforcing materials.*²⁾

ISO 1133, *Plastics — Determination of the melt flow rate of thermoplastics.*

ISO 1628-4, *Plastics — Determination of viscosity number and limiting viscosity number — Part 4: Polycarbonate (PC) moulding and extrusion materials.*

ISO 7391-2, *Plastics — Polycarbonate moulding and extrusion materials — Part 2: Preparation of test specimens and determination of properties.*

1) At present at the stage of draft. (Partial revision of ISO 1043 : 1978.)

2) At present at the stage of draft.

3 Designation system

The designation system of thermoplastics is based on the following standardized pattern.

Designation						
Description Block (optional)	Identity Block					
	International Standard Number Block	Individual Item Block				Data Block 5
		Data Block 1	Data Block 2	Data Block 3	Data Block 4	
		1	2	3	4	5

It consists of an optional Description Block, reading Thermoplastics, and an Identity Block comprising the International Standard number and an Individual Item Block. For unambiguous coding the Individual Item Block is subdivided into four data blocks comprising the following information :

- No. 1: Identification of the plastic by its symbol PC, according to ISO 1043-1 (see 3.1).
- No. 2: Position 1: Intended application or method or processing (see 3.2).
Positions 2 to 4: Important properties, additives and supplementary information (see 3.2).
- No. 3: Designatory properties (see 3.3).
- No. 4: Fillers or reinforcing materials and their nominal content (see 3.4 and ISO 1043-2).

For the purpose of specifications, a fifth data block may be added containing additional information. The kind of information and its codes are not the subject of this part of ISO 7391.

The first character of the Individual Item Block shall be a hyphen. The four data blocks shall be separated from each other by a comma.

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

3.1 Data Block 1

In this data block, after a hyphen, polycarbonate plastics are identified by its symbol PC, according to ISO 1043-1.

3.2 Data Block 2

In this data block, information about intended application or method of processing is given in Position 1 and information about important properties, additives and colour in Positions 2 to 4. The codes are specified in table 1.

If information is presented in Positions 2 to 4 and no specific information is given in Position 1, the letter X shall be inserted in Position 1.

3.3 Data Block 3

In this data block, the viscosity number is coded by two figures (see 3.3.1), the melt flow rate by two figures (see 3.3.2) and the impact strength by one letter and one figure (see 3.3.3). The three codes are separated from each other by hyphens.

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

NOTE — Not all combinations of the designatory properties may be provided by currently available materials.

Table 1 — Codes used in Data Block 2

Code	Position 1	Code	Positions 2 to 4
B	Blow moulding	A	Processing stabilized
D	Disc manufacture	B	Antiblocking
E	Extrusion of pipes, profiles and sheet	C	Coloured
F	Extrusion of film and thin sheeting	E	Expandable
G	General use	F	Special burning characteristics
H	Coating	G	Pellets, granules
K	Cable and wire coating	H	Heat-ageing stabilized
L	Monofilament extrusion	L	Light and/or weather stabilized
M	Injection moulding	N	Natural (not coloured)
Q	Compression moulding	O	No indication
R	Rotational moulding	P	Impact modified
S	Powder coating or sintering	R	Moulding release agent
T	Tape manufacture	S	Lubricated
V	Thermoforming	T	Improved transparency
X	No indication	W	Stabilized against hydrolysis
		X	Crosslinkable
		Y	Increased electrical conductivity
		Z	Antistatic

3.3.1 Viscosity number

The viscosity number shall be determined according to ISO 1628-4 and coded by two figures, as specified in table 2.

3.3.2 Melt flow rate

The melt flow rate shall be determined according to ISO 1133, at a test temperature of 300 °C with a load of 1,2 kg, and coded by two figures, as specified in table 2.

3.3.3 Impact strength¹⁾

3.3.3.1 The Charpy impact strength shall be determined according to ISO 179, using the type 1 test specimen (80 mm × 10 mm × 4 mm) with type A notch (V-notch, method 1 A) for unfilled materials and the type 1 test specimen unnotched for filled materials (method 1 D). The Charpy impact strength is coded by one letter and one figure, as specified in table 2.

3.3.3.2 The Izod impact strength shall be determined according to ISO 180, using the type 1 test specimen and type A notch (method 1 A) and coded by one letter and one figure, as specified in table 2.

Table 2 — Cell codes and cell ranges for viscosity number, melt flow rate and impact strength in Data Block 3

Viscosity number		Melt flow rate (IF 300/1,2)		Charpy impact strength unnotched		Charpy impact strength notched*		Izod impact strength	
Code	Range ml/g	Code	Range g/10 min	Code	Range kJ/m ²	Code	Range kJ/m ²	Code	Range kJ/m ²
46	< 46	03	< 3	A0	< 10	B0	< 8	C0	< 10
49	> 46 to 52	05	> 3 to 6	A1	> 10 to 30	B1	> 8 to 16	C1	> 10 to 30
55	> 52 to 58	09	> 6 to 12	A3	> 30 to 50	B3	> 16 to 24	C3	> 30 to 50
61	> 58 to 64	18	> 12 to 24	A5	> 50 to 70	B5	> 24 to 32	C5	> 50 to 70
67	> 64 to 70	24	> 24	A7	> 70 to 90	B7	> 32 to 40	C7	> 70 to 90
70	> 70			A9	> 90	B9	> 40	C9	> 90

* For non-reinforced types only.

1) The Charpy impact test is preferred for the designation of polycarbonate thermoplastic materials.

3.4 Data Block 4

In this data block, the type of filler or reinforcing material is coded by one letter in Position 1 and its physical form by a second letter in Position 2 (see table 3), if requested. Subsequently (without space) the mass content may be given by two figures in Positions 3 and 4, as specified in table 4.

Mixtures of materials or forms may be indicated in parentheses by combining the relevant codes by the sign "+"; for example a mixture of 25 % (m/m) glass fibres (GF) and 10 % (m/m) mineral powder (MD) can be indicated by (G + M) in Position 1, (F + D) in Position 2 and (25 + 10) in Positions 3 and 4.

Table 3 — Coding system for fillers and reinforcing materials in Data Block 4

Code	Material (Position 1)	Code	Form (Position 2)
B	Boron	B	Balls, beads, spheres
C	Carbon ¹⁾	D	Powder
G	Glass	F	Fibre
K	Chalk (CaCO ₃)	G	Ground (ground fibres also)
M	Mineral ¹⁾ , metal ²⁾	H	Whisker
S	Organic synthetics ¹⁾	S	Scale, flake
T	Talcum	X	Not specified
X	Not specified	Z	Others
Z	Others ¹⁾		

1) These materials may be defined after the data block, for example by chemical symbol or additional codes to be agreed upon.

2) Metal filler shall be identified by chemical symbol after the mass content; for example steel whiskers are specified as MH00FE.

Table 4 — Coding system for the mass content in Data Block 4

Code	Mass content % (m/m) (Positions 3 and 4)
05	< 7,5
10	> 7,5 to 12,5
15	> 12,5 to 17,5
20	> 17,5 to 22,5
25	> 22,5 to 27,5
30	> 27,5 to 32,5
35	> 32,5 to 37,5
40	> 37,5 to 42,5
45	> 42,5 to 47,5
50	> 47,5 to 55
60	> 55 to 65
70	> 65 to 75
80	> 75 to 85
90	> 85