INTERNATIONAL STANDARD

ISO 7792-1

Second edition
1995-10-01

Plastics — Poly(alkylene terephthalate) moulding and extrusion materials —

Part 1:
Designation system and basis for specifications

Plastiques — Poly(alkylène téréphtalates) pour moulage et extrusion — Partie 1: Système de désignation et base de spécification

Reference number
ISO 7792-1:1995(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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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.

International Standard ISO 7792-1 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*.

This second edition cancels and replaces the first edition (ISO 7792-1:1985) and includes the following changes:

The tensile modulus of elasticity has been included as a second designatory property and the text has been brought into accordance with the revised frame text for designation standards.

ISO 7792 consists of the following parts, under the general title *Plastics — Poly(alkylene terephthalate) moulding and extrusion materials*:

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

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

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Plastics — Poly(alkylene terephthalate) moulding and extrusion materials —

Part 1:
Designation system and basis for specifications

1 Scope

1.1 This part of ISO 7792 establishes a system of designation for poly(alkylene terephthalate) thermoplastic material, which may be used as the basis for specifications.

1.2 The types of poly(alkylene terephthalate) plastic are differentiated from each other by a classification system based on appropriate levels of the designatory properties

a) viscosity number

b) tensile modulus of elasticity

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

1.3 This part of ISO 7792 is applicable to poly(ethylene terephthalate) (PET) and poly(butylene terephthalate) (PBT).

It applies to materials ready for normal use in the form of powder, granules or pellets, unmodified or 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 7792 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 This basis for specifications may be used to prepare specifications related to well defined applications. These specifications will use data blocks 1 to 4 and, if necessary, data block 5 as a complement, the last-mentioned data block containing the specific requirements in relation to the application.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 7792. At the time of publication, the editions indicated were valid. All standards are subject to revision, and

parties to agreements based on this part of ISO 7792 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 527-1:1993, *Plastics — Determination of tensile properties — Part 1: General principles.*

ISO 527-2:1993, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics.*

ISO 1043-1:1987, *Plastics — Symbols — Part 1: Basic polymers and their special characteristics.*

ISO 1043-2:1988, *Plastics — Symbols — Part 2: Fillers and reinforcing materials.*

ISO 1628-5:1986, *Plastics — Determination of viscosity number and limiting viscosity number — Part 5: Poly(alkylene terephthalates).*

ISO 7792-2:1988, *Plastics — Polyalkylene terephthalates — Part 2: Preparation of test specimens and determination of properties.*

ASTM D 4507-93a, *Specification for thermoplastic polyester (TPES) materials.*

3 Designation system

The designation system for thermoplastics is based on the following standardized 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 5 data blocks comprising the following information:

- Data block 1: Identification of the plastic by its symbol PET or PBT in accordance with ISO 1043-1 (see 3.1).
- Data block 2: Position 1: Intended application or method of processing (see 3.2).

  Positions 2 to 8: Important properties, additives and supplementary information (see 3.2).
- Data block 3: Designatory properties (see 3.3).
- Data block 4: Fillers or reinforcing materials and their nominal content (see 3.4).
- Data block 5: Information required for specification purposes. The use of data block 5 converts the designation to a specification. Only information listed in data block 5 becomes part of the specification requirements.

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 (,,).

3.1 Data block 1

In this data block, after the hyphen, poly(alkylene terephthalate) plastics are identified using the symbols "PET" or "PBT" in accordance with ISO 1043-1.

3.2 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 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	Adhesive	A	Processing stabilized
B	Blow moulding	B	Antiblocking
C	Calendering	C	Coloured
D	Disc manufacture	D	Powder
E	Extrusion	E	Expandable
F	Extrusion of films	F	Special burning characteristics
G	General use	G	Granules
H	Coating	H	Heat-ageing stabilized
K	Cable and wire coating	L	Light or weather stabilized
L	Monofilament extrusion	M	Nucleated
M	Moulding	N	Natural (no colour added)
R	Rotational moulding	P	Impact modified
S	Sintering	R	Mould release agent
X	No indication	S	Lubricated
		T	Transparent
		W	Stabilized against hydrolysis
		Z	Antistatic

3.3 Data block 3

In this data block, viscosity number is represented by a 2-figure code-number (see 3.3.1) and tensile modulus of elasticity by a 3-figure code-number (see 3.3.2). The 2 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 will designate the material. If subsequent individual test values lie on, or on either side of, the range limit because of manufacturing tolerances, the designation is not affected.

NOTE 1 Not all the combinations of the values of the designatory properties are provided by currently available polymers.

3.3.1 Viscosity number

The viscosity number shall be determined in accordance with ISO 1628-5, using 50/50 phenol/1,2-dichlorobenzene for PET and *m*-cresol for PBT.

The possible values of viscosity number are divided into 8 ranges for PET and into 6 ranges for PBT, each represented by a 2-figure code-number as specified in table 2.

Table 2 — Code-numbers used for viscosity number in data block 3

Plastic	Code-number	Range of viscosity number (ml/g)
PET	**06**	⩽ 60
	07	> 60 but ⩽ 70
	08	> 70 but ⩽ 80
	09	> 80 but ⩽ 90
	10	> 90 but ⩽ 100
	11	> 100 but ⩽ 120
	13	> 120 but ⩽ 140
	15	> 140
PBT	**08**	⩽ 90
	10	> 90 but ⩽ 110
	12	> 110 but ⩽ 130
	14	> 130 but ⩽ 150
	16	> 150 but ⩽ 170
	18	> 170

3.3.2 Tensile modulus of elasticity

The tensile modulus of elasticity shall be determined in accordance with ISO 527-1 and ISO 527-2.

The possible values of tensile modulus of elasticity are divided into 23 ranges, each represented by a 3-figure code-number as specified in table 3.

Table 3 — Code-numbers used for tensile modulus of elasticity in data block 3

Code-number	Range of tensile modulus of elasticity (MPa)
001	⩽ 150
002	> 150 but ⩽ 250
003	> 250 but ⩽ 350
004	> 350 but ⩽ 450
005	> 450 but ⩽ 600
007	> 600 but ⩽ 800
010	> 800 but ⩽ 1 500
020	> 1 500 but ⩽ 2 500
030	> 2 500 but ⩽ 3 500
040	> 3 500 but ⩽ 4 500
050	> 4 500 but ⩽ 5 500
060	> 5 500 but ⩽ 6 500
070	> 6 500 but ⩽ 7 500
080	> 7 500 but ⩽ 8 500
090	> 8 500 but ⩽ 9 500
100	> 9 500 but ⩽ 10 500
110	> 10 500 but ⩽ 11 500
120	> 11 500 but ⩽ 13 500
140	> 13 500 but ⩽ 15 500
160	> 15 500 but ⩽ 17 500
190	> 17 500 but ⩽ 20 500
220	> 20 500 but ⩽ 23 500
250	> 23 500

3.4 Data block 4

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 4. Subsequently (without a space), the mass content may be given by a 2-figure number in positions 3 and 4.

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).

Table 4 — 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[1]	**D**	Powder
G	Glass	**F**	Fibre
K	Calcium carbonate	**G**	Ground
M	Mineral, metal[1,2]	**H**	Whiskers
S	Synthetic, organic[1]	**X**	Not specified
T	Talc	**Z**	Others
X	Not specified		
Z	Others[1]		

1) These materials may be further defined by their chemical symbol, for example, or additional symbols defined in ISO 1043-2 or by additional symbols agreed between the interested parties.

2) Metal fillers shall be identified by their chemical symbol after the mass content.

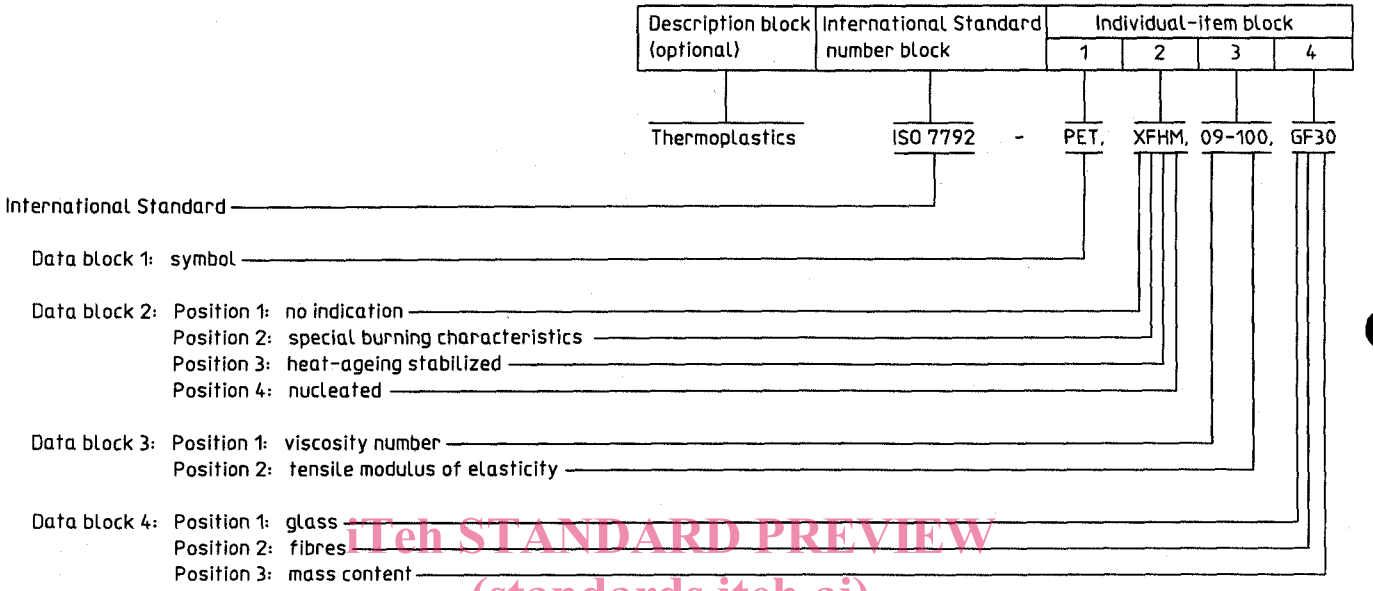
3.5 Data block 5

Indication of 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.

4 Examples of designations

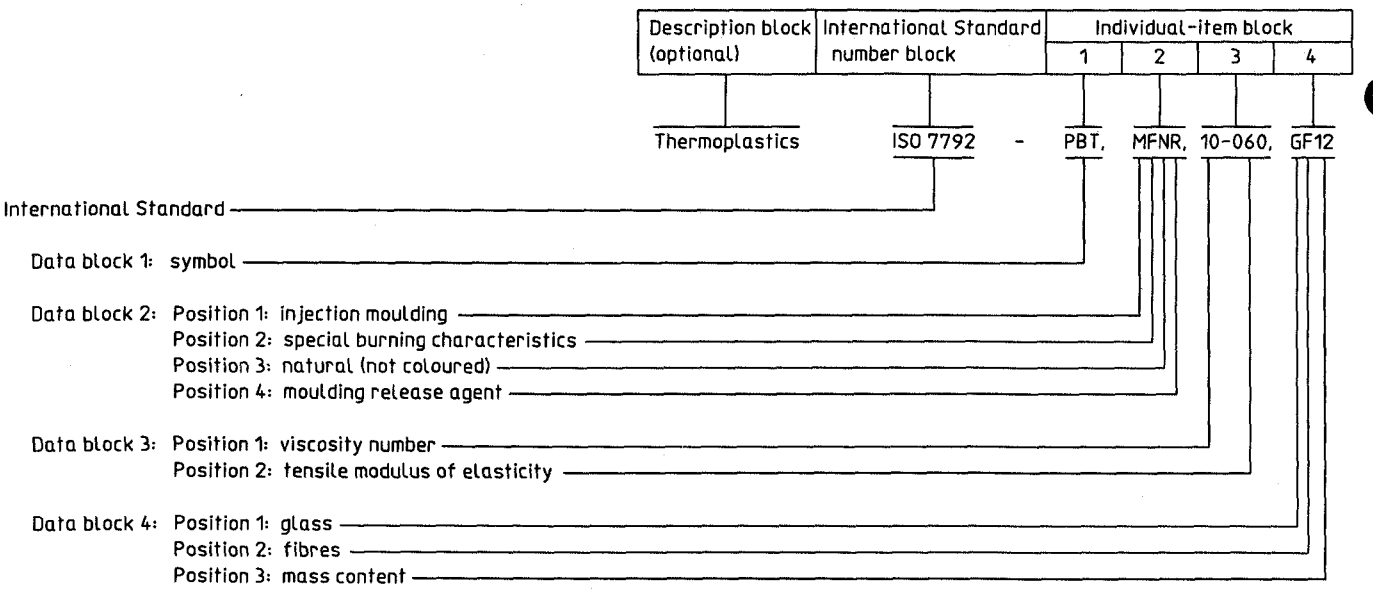
4.1 Designation only

A poly(ethylene terephthalate) thermoplastic material (PET), with special burning characteristics (F), stabilized against heat ageing (H), with a nucleating agent (M), having a viscosity number of 85 ml/g (09) and a tensile modulus of elasticity of 10 300 MPa (100), and reinforced by a nominal glass fibre content of 30 % (*m/m*) (GF30), would be designated:



Designation: ISO 7792-PET,XFHM,09-100,GF30

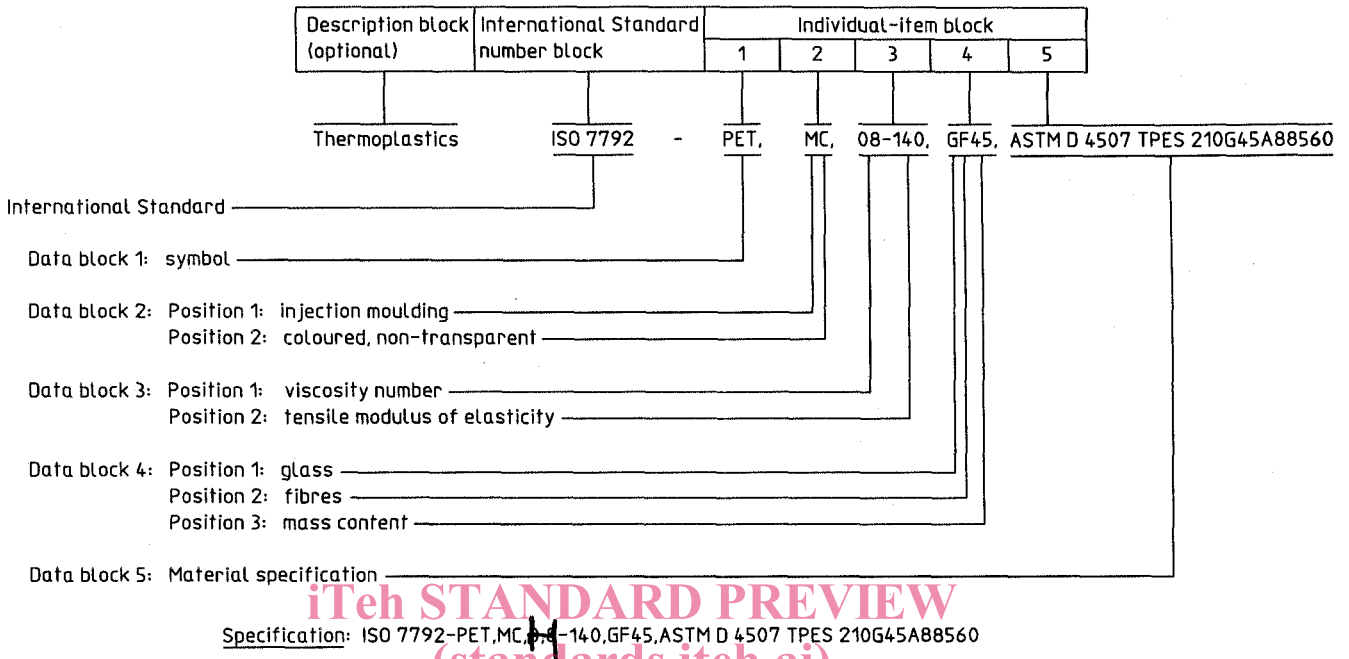
A poly(butylene terephthalate) thermoplastic material (PBT) for injection moulding (M), with special burning characteristics (F), natural (no colour added) (N), provided with a mould release agent (R), having a viscosity number of 96 ml/g (10) and a tensile modulus of elasticity of 5 900 MPa (060), and reinforced with 12 % (*m/m*) of glass fibres (GF12), would be designated:



Designation: ISO 7792-PBT,MFNR,10-060,GF12
or in shortened form: ISO 7792-PBT,,,GF12

4.2 Designation transformed into a specification

A poly(ethylene terephthalate) thermoplastic material (PET) for injection moulding (M), coloured (C), having a viscosity number of 75 (08) and a tensile modulus of elasticity of 13 800 MPa (140), reinforced with 45 % (*m/m*) of glass fibres (GF45) and meeting the requirements of the specification ASTM D 4507 TPES 210G45A88560, would be specified:



Specification: ISO 7792-PET,MC,08-140,GF45,ASTM D 4507 TPES 210G45A88560