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9988-1

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Plastics — Polyoxymethylene (POM) moulding and extrusion materials —

Part 1: Designation

*Plastiques — Thermoplastiques à base de polyoxyméthylène (POM) pour
moulage et extrusion —*

Partie 1: Désignation



Reference number
ISO 9988-1:1991(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 9988-1 was prepared by Technical Committee ISO/TC 61, *Plastics*.

ISO 9988 consists of the following parts, under the general title *Plastics — Polyoxymethylene (POM) moulding and extrusion materials*:

- *Part 1: Designation*
- *Part 2: Preparation of test specimens and determination of properties*

Plastics — Polyoxymethylene (POM) moulding and extrusion materials —

Part 1: Designation

1 Scope

1.1 This part of ISO 9988 establishes a system of designation for polyoxymethylene (POM) thermoplastic materials, which may be used as the basis for specifications.

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

- a) tensile/flexural modulus,
- b) melt flow rate,

and on information about basic polymer parameters, intended application, method of processing, important properties, additives, colour, fillers and reinforcing materials.

1.3 This designation system is applicable to all polyoxymethylene homopolymers and to copolymers of polyoxymethylene and blends of polymers containing polyoxymethylene.

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 necessarily give the same performance. This part of ISO 9988 does not provide engineering data, performance data or data on processing conditions which may be required to specify materials for particular end-use applications.

If such additional properties are required, they should be determined in accordance with the test methods specified in part 2 of ISO 9988.

1.5 In order to specify a thermoplastic material for a particular application or a method of reproducible processing, additional requirements may be specified in data block 5 (see clause 3).

1.6 Polyoxymethylene materials are thermoplastic materials composed principally of long-chain synthetic homopolymers and copolymers of formaldehyde. The repeating unit in the molecular chain is $(\text{CH}_2\text{O})_n$ as an integral part of the main polymer chain resulting from polymerization of formaldehyde.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 9988. 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 9988 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 178:1975, *Plastics — Determination of flexural properties of rigid plastics*.

ISO/R 527:1966, *Plastics — Determination of tensile properties*.

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 1133:1981, *Plastics — Determination of the melt flow rate of thermoplastics*.

ISO 9988-2:—¹⁾, *Plastics — Polyoxymethylene (POM) moulding and extrusion materials — Part 2: Preparation of test specimens and determination of properties*.

3 Designation system

The designation system for thermoplastics is based on the standardized pattern given in figure 1.

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 4 data blocks comprising the following information:

- Data Block 1: Identification of the plastic by its symbol (POM) and information about the polymerization process and polymer composition (see 3.1).
- Data Block 2: Position 1: Intended application or method of processing (see 3.2).
Positions 2 to 4: 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 the nominal content thereof (see 3.4).

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 9988.

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.

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, the plastic is identified by its symbol (POM) (see 1.3) in accordance with ISO 1043-1 and, after a hyphen, the supplementary information about the polymerization process and polymer composition, as specified in table 1.

Table 1 — Symbols used to indicate polymer structure in Data Block 1

Symbol	Structure
POM-H	Homopolymer
POM-K	Copolymer

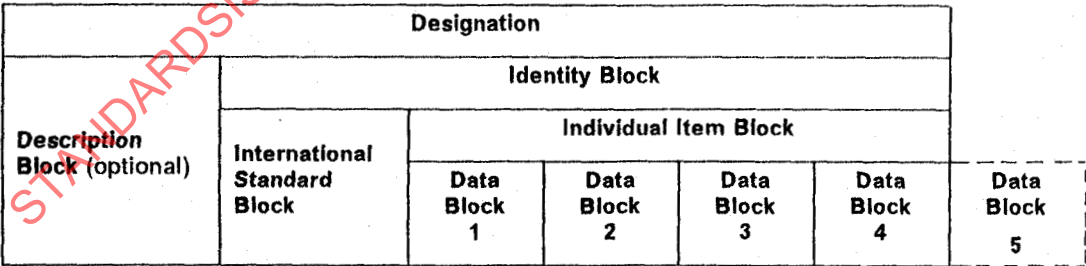


Figure 1 — Data block designation system

1) To be published.

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 code-letters used are specified in table 2.

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 melt flow rate is represented by a two-figure code-number (see 3.3.1) and the tensile/flexural modulus by a two-figure code-number (see 3.3.2). The two 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 either side of, the range limit because of manufacturing tolerances, the designation is not affected.

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

3.3.1 Melt flow rate

The melt flow rate (MFR) shall be determined in accordance with ISO 1133, using set of test conditions No. 1 (temperature 190 °C, load 2,6 kg).

The possible values of the MFR are divided into seven ranges, each represented by a two-figure code-number, as specified in table 3.

Table 2 — Code-letters used in Data Block 2

Code-letter	Position 1	Positions 2 to 4
A	Blow moulding	Process stabilized
B		
C		Coloured
D		Powder (dry blend)
E	Extrusion of pipes, profiles and sheet	
F	Extrusion of film	
G	General use	Pellets; granules
H	Coating	Heat-ageing stabilized
L	Monofilament extrusion	Light and/or weather stabilized
M	Injection moulding	
N		Natural (not coloured)
O		No indication
P		Impact modified
R	Rotational moulding	Mould release agent
S	Powder coating or sintering	Lubricated
W		Stabilized against hydrolysis
X	No indication	
Y		Increased electrical conductivity
Z		Antistatic

Table 3 — Code-numbers used for melt flow rate in Data Block 3

Code-number	MFR range g/10 min
01	≤ 4
02	> 4 to ≤ 7
03	> 7 to ≤ 11
04	> 11 to ≤ 16
05	> 16 to ≤ 35
06	> 35 to ≤ 60
07	> 60

3.3.2 Tensile/flexural modulus

The tensile/flexural modulus shall be determined in the dry state as specified in ISO/R 527 or ISO 178 under the conditions laid down in ISO 9988-2. It is coded by three digits according to table 4.

The possible values of the tensile/flexural modulus are divided into three ranges, each represented by a three figure code-number, as specified in table 4.

The tensile modulus and flexural modulus are used interchangeably. Tests have indicated a difference in values of less than 5 % in most cases. For this reason, and in this use, both values are considered equivalent.

Table 4 — Codes used for tensile flexural modulus in Data Block 3

Code-number	Tensile/flexural modulus range MPa
001	≤ 2 250
002	> 2 250 to 4 000
003	> 4 000

3.4 Data Block 4

In this data block, the type of filler or reinforcing material is represented by one code-letter in position 1 and its physical form by a second letter in position 2 (see table 5 and ISO 1043-2), if requested. Subsequently (without a space), the mass content may be given as a two-figure number in positions 3 and 4.

Mixtures of materials and/or forms are designated by combining their codes by the sign "+"; for example, a mixture of 25 % (m/m) glass fibres (GF)

and 15 % (m/m) mineral powder (MD) would be designated: GF25 + MD15.

Table 5 — Coding system for fillers and reinforcing materials in Data Block 4

Code-letter	Material (Position 1)	Form (Position 2)
B	Carbon	Balls, beads, spheres
C		Powder; flour
D		
F		Fibre
G	Glass	Ground
H		Whiskers
K		Not specified
M	Chalk (CaCO ₃)	
R	Mineral	
S	Aramid	
X	Synthetic organic	Not specified
	Not specified	

4 Example of designation

A polyoxymethylene homopolymer (POM-H), intended for injection moulding (M), with mould release agent (R), natural (not coloured) (N), having a melt flow rate of 2,1 g/10 min (01) and a tensile/flexural modulus of 2010 MPa (001), would be designated:

