
**Plastics — Poly(phenylene ether)
(PPE) moulding and extrusion
materials —**

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

*Plastiques — Matériaux à base de poly(phénylène éther) (PPE) pour
moulage et extrusion —*

Partie 1: Système de désignation et base de spécification



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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.

This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*.

This first edition of ISO 20557-1 cancels and replaces ISO 28941-1:2008, which has been technically revised to introduce a new designation system.

The revised designation system is published under a new ISO number, as many existing documents refer to ISO 28941-1. If the existing ISO 28941-1 would be replaced by the new designation system, these documents would refer to the incorrect designation system.

The new designation system according to ISO 20557-1 is intended to replace gradually any designation system according to ISO 28941-1.

A list of all parts in the ISO 20557 series can be found on the ISO website.

Plastics — Poly(phenylene ether) (PPE) moulding and extrusion materials —

Part 1: Designation system and basis for specifications

1 Scope

This document establishes a system of designation for poly(phenylene ether) (PPE) thermoplastic materials, which can be used as the basis for specifications.

The types of poly(phenylene ether) (PPE) materials are differentiated from each other by a classification system based on appropriate levels of the designatory properties:

- a) temperature of deflection under load;
- b) melt volume-flow rate;
- c) Charpy notched impact strength;
- d) flammability;

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

This document is applicable to all PPE materials, including those modified with polystyrene or polyamide or other materials.

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

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 for a particular application and/or method of processing. If such additional properties are required, they are intended to be determined in accordance with the test methods specified in ISO 20557-2, if suitable.

In order to specify a thermoplastic material for a particular application or to ensure reproducible processing, the requirements are given in data block 5 (see [4.1](#)).

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 20557-2, *Plastics — Poly(phenylene ether) (PPE) 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:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

4 Designation system

4.1 General

The designation system for thermoplastics is based on the following standardized pattern:

Designation						
Description block (optional)	International Standard number block	Identity 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”, an identity block comprising the International Standard number and an individual-item block. For unambiguous coding, the individual-item block is subdivided into five data blocks comprising the following information:

- Data block 1: Identification of the plastic by its symbol PPE in accordance with ISO 1043-1 and information about the composition of the polymer (see 4.2).
- Data block 2: Fillers or reinforcing materials and their nominal content (see 4.3).
- 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 purposes of specifications, a fifth data block may be added containing additional 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, poly(phenylene ether) materials are identified by the symbol PPE, in accordance with ISO 1043-1, followed by a hyphen and a code-number giving additional information on the polymer, as specified in Table 1.

Table 1 — Code-numbers used for additional information in data block 1

Code-number	Material
1	PPE
2	PPE+PS
3	PPE+PA

Table 1 (continued)

Code-number	Material
4	PPE+another polymer not already given in this table
5	PPE+PS+another polymer not already given in this table
6	PPE+PP
7	PPE+PPS

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

Table 2 — 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	C	Chips, cuttings
		D	Powder
E	Clay		
		F	Fibre
G	Glass	G	Ground
		H	Whiskers
K	Calcium carbonate	K	Knitted fabric
L	ex. cellulose ^a	L	Layer
M	Mineral ^{a,b} , metal ^a	M	Mat (thick)
		N	Non-woven fabric (thin)
P	Mica ^a	P	Paper
Q	Silicon		
R	Aramid	R	Rovings
S	Synthetic organic ^a	S	Scales, flakes
T	Talc	T	Cord
		V	Veneer
W	Wood	W	Woven fabric
X	Not specified	X	Not specified
		Y	Yarn
Z	Others	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 fibre (GF) and 10 % mineral power (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 3.

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 3 — Code-letters used in data block 3

Code-letter	Position 1	Code-letter	Positions 2 to 8
A	Adhesives	A	Processing stabilized
B	Blow moulding	B	Antiblocking
C	Calendering	C	Coloured
		D	Powder
E	Extrusion	E	Expandable
F	Extrusion of films	F	Special burning characteristics
G	General use	G	Granules
		G1	Pellets
		G3	Beads
H	Coating	H	Heat-ageing stabilized
K	Cable and wire coating	K	Metal deactivated
L	Monofilament extrusion	L	Light and weather stabilized
M	Moulding		
		N	Natural (no colour added)
		P	Impact modified
Q	Compression moulding	Q1	Plateable
R	Rotational moulding	R	Mould release agent
S	Sintering	S	Lubricated
T	Tape manufacture	T	Transparent
V	Thermoforming		
X	No indication	X	Cross-linkable
Y	Textile yarns, spinning	Y	Increased electrical conductivity
		Z	Antistatic

4.5 Data block 4

4.5.1 General

In this data block, the temperature of deflection under load is represented by the letter A or B followed by a three-figure code-number (see 4.5.2), the melt volume-flow rate by a two-figure code-number (see 4.5.3), the impact strength by a two-figure code-number (see 4.5.4) and the flammability by a combination of code-letters and code-numbers indicating the flammability category (see 4.5.5). 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 can be possible for currently available polymers.

4.5.2 Temperature of deflection under load

The temperature of deflection under load shall be determined in accordance with ISO 20557-2.

The possible values of the temperature of deflection under load at 1,8 MPa and 0,45 MPa are divided into 17 ranges, each represented by a letter followed by a three-figure code-number as specified in [Table 4](#) and [Table 5](#), respectively.

Table 4 — Ranges of temperature of deflection under load at 1,8 MPa in data block 4

Code-number	Range of temperature of deflection under load at 1,8 MPa °C
A050	>50
A060	>60
A070	>70
A080	>80
A090	>90
A100	>100
A110	>110
A120	>120
A130	>130
A140	>140
A150	>150
A160	>160
A170	>170
A180	>180
A190	>190
A200	>200
A210	>210

Table 5 — Ranges of temperature of deflection under load at 0,45 MPa in data block 4

Code-number	Range of temperature of deflection under load at 0,45 MPa °C
B050	>50
B060	>60
B070	>70
B080	>80
B090	>90
B100	>100
B110	>110
B120	>120
B130	>130
B140	>140
B150	>150
B160	>160
B170	>170
B180	>180
B190	>190
B200	>200
B210	>210

4.5.3 Melt volume-flow rate

The melt volume-flow rate shall be determined in accordance with ISO 20557-2. The measured value shall be rounded off to the nearest whole number and this whole number taken as the code-number. It will usually be a two-figure number. In cases when it is a single-figure number, the code-number shall be zero followed by the single-figure number.

EXAMPLE If the measured melt volume-flow rate is 5,1 cm³/10 min, the code-number will be 05.

4.5.4 Charpy notched impact strength

The Charpy notched impact strength shall be determined in accordance with ISO 20557-2.

The possible values of the Charpy notched impact strength are divided into eight ranges, each represented by a two-figure code-number as specified in [Table 6](#).

Table 6 — Ranges of Charpy notched impact strength in data block 4

Code-number	Range of Charpy notched impact strength kJ/m ²
00	<5
05	>5
10	>10
20	>20
30	>30
40	>40
50	>50
60	>60

4.5.5 Flammability

The flammability shall be determined in accordance with ISO 20557-2 at a thickness of 1,6 mm.

The possible flammability categories are represented by the code-letter/number combinations specified in [Table 7](#).

Table 7 — Code-letter/number combinations used for flammability in data block 4

Code-letter/number combination	Flammability category
HB40	HB40
HB75	HB75
V2	V-2
V1	V-1
V0	V-0

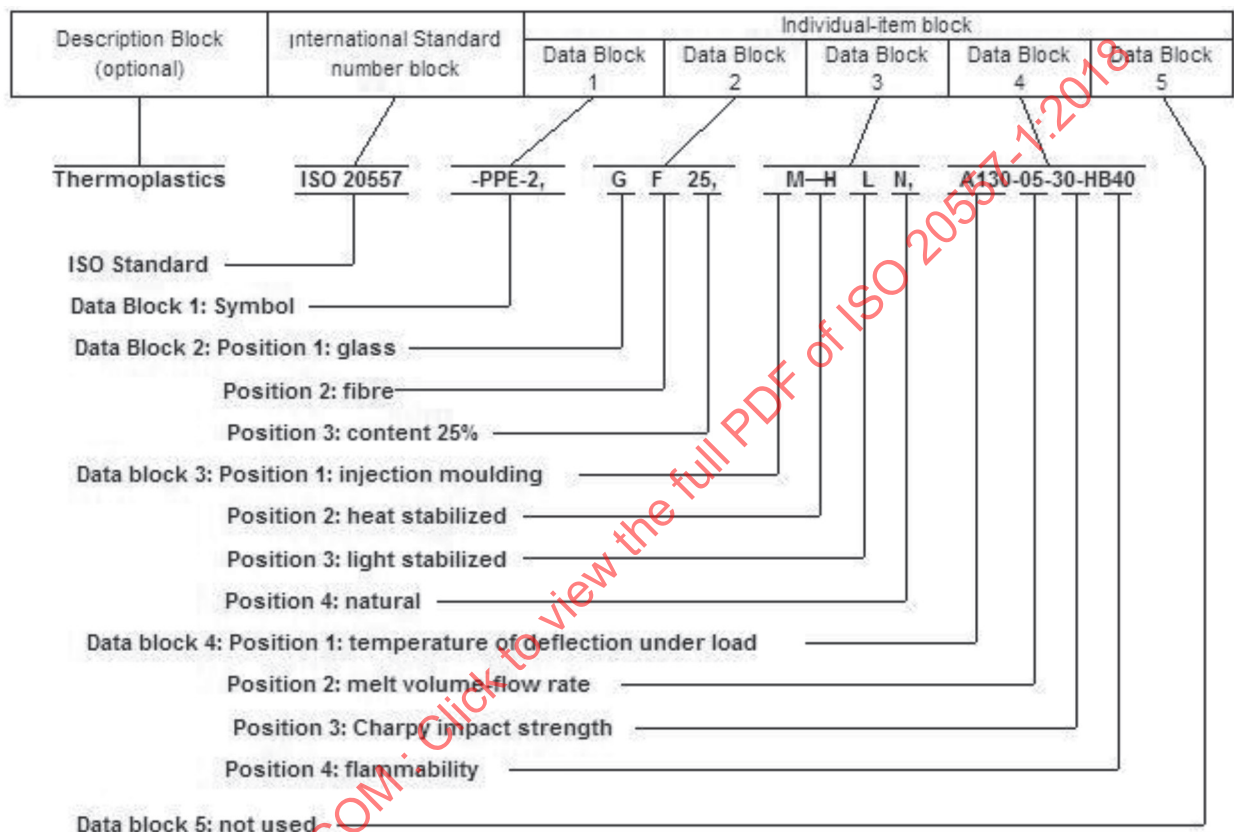
4.6 Data block 5

Indication of additional requirements in this 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 poly(phenylene ether) moulding and extrusion material (PPE), modified with PS (2), intended for injection moulding (M), being heat stabilized (H), light stabilized (L) and natural (N), having a temperature of deflection under load at 1,8 MPa of 130 °C (A130), a melt volume-flow rate of 5 cm³/10 min (05), a Charpy notched impact strength of 35 kJ/m² (30) and a flammability of HB40 (HB40), and reinforced with 25 % of glass fibre (GF25), would be designated:



Designation:

ISO 20557-PPE-2, GF25, MHLN, A130-05-30-HB40

or

Thermoplastics ISO 20557-PPE-2, GF25, MHLN, A130-05-30-HB40