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INTERNATIONAL STANDARD

ISO 15526-1

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Plastics — Polyketone (PK) moulding and extrusion materials —

Part 1: Designation system and basis for specifications

Plastiques — Polycétone (PK) 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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.

Attention is drawn to the possibility that some of the elements of this part of ISO 15526 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 15526-1 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*.

ISO 15526 consists of the following parts, under the general title *Plastics — Polyketone (PK) moulding and extrusion materials*:

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

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

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INTERNATIONAL STANDARD ISO 15526-1:2000(E)

Plastics — Polyketone (PK) moulding and extrusion materials — Part 1: Designation system and basis for specifications

1 Scope

1.1 This part of ISO 15526 establishes a system of designation for PK thermoplastic material which may be used as the basis for specifications. PK polymer chains are built up from regularly alternating olefinic units and keto groups. The olefinic units may be essentially all ethylene, or they may be, e.g., randomly distributed ethylene and propylene, butene or hexene.

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

a) melting temperature

b) melt volume-flow rate

c) temperature of deflection under load

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

1.3 This part of ISO 15526 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.

1.4 It is not intended to imply that materials having the same designation give necessarily the same performance. This part of ISO 15526 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 ISO 15526-2, if suitable.

1.5 In order to specify a thermoplastic material for a particular application or to ensure reproducible processing, additional requirements may be given in data block 5 (see 3.1).

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 15526. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 15526 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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

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

ISO 15526-2, *Plastics — Polyketone (PK) moulding and extrusion materials — Part 2: Preparation of test specimens and determination of properties.*

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3 Designation system

3.1 General

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 coding, the individual-item block is subdivided into 5 data blocks comprising the following information:

— Data block 1: Identification of the plastic by its symbol PK in accordance with ISO 1043-1 and information about the composition of the polymer (see 3.2).

— Data block 2: Position 1: intended application or method of processing (see 3.3).

Positions 2 to 8: important properties, additives and supplementary information (see 3.3).

— Data block 3: Designatory properties (see 3.4).

— Data block 4: Fillers or reinforcing materials and their nominal content (see 3.5).

— Data block 5: For the purpose of specifications, a fifth data block may be added containing additional information.

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 (,,).

3.2 Data block 1

In this data block, after the hyphen, polyketone plastics are identified by the symbol PK, in accordance with ISO 1043-1, followed by a hyphen and 1 or 2 code-letters stating the olefinic units in the chain, as specified in Table 1.

Table 1 — Code-letters used in data block 1 for giving additional information on the composition

Code-letter	Formula
	$-[CO-C_2H_4]_m-[CO-C_2H_3R]_n-$ in which the two types of olefinic group are distributed randomly throughout the molecule
E	R = H
EP	$R = CH_3$
EB	$R = C_2H_5$
EH	$R = C_4H_9$

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3.3 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 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 2

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	Platable
R	Rotational moulding	R	Mould release agent
S	Sintering	S	Lubricated
T	Tape manufacture	T	Transparent
V	Thermoforming		
X	No indication	X	Crosslinkable
Y	Textile yarns, spinning	Y	Increased electrical conductivity
		Z	Antistatic

3.4 Data block 3

3.4.1 General

In this data block, the range of the melting temperature is represented by a 3-figure code-number (see 3.4.2), the melt volume-flow rate by a code-letter followed by a 3-figure code-number (see 3.4.3) and the temperature of deflection under load by a 3-figure code-number (see 3.4.4). 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 may be possible for currently available polymers.

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3.4.2 Melting temperature

The melting temperature shall be determined in accordance with ISO 15526-2.

The possible values of the melting temperature are divided into 8 ranges, each represented by a 3-figure code number as specified in Table 3.

Table 3 — Ranges of the melting temperature in data block 3

Code-number	Range of melting temperature °C
190	$\leqslant$ 195
200	> 195 but $\leqslant$ 205
210	> 205 but $\leqslant$ 215
220	> 215 but $\leqslant$ 225
230	> 225 but $\leqslant$ 235
240	> 235 but $\leqslant$ 245
250	> 245 but $\leqslant$ 255
260	> 255

3.4.3 Melt volume-flow rate

The melt volume-flow rate shall be determined in accordance with ISO 15526-2, under the test conditions specified in Table 4.

Table 4 — Test conditions used for determination of melt volume-flow rate

Code-letter	Test temperature °C	Nominal load kg
A	240	2,16
B	250	2,16
C	260	2,16
D	270	2,16
E	240	5
F	250	5
G	260	5
H	270	5

The possible values of the melt volume-flow rate are divided into 12 ranges, each represented by a 3-figure code number as specified in Table 5. The test conditions used shall be indicated by a single code letter, as specified in Table 4, immediately preceding the code number indicating the range.

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Table 5 — Ranges of melt volume-flow rate in data block 3

Code-number	Range of MVR $cm^3/10$ min
000	$\leqslant$ 0,10
001	> 0,10 but $\leqslant$ 0,20
003	> 0,20 but $\leqslant$ 0,40
006	> 0,40 but $\leqslant$ 0,80
012	> 0,80 but $\leqslant$ 1,5
022	> 1,5 but $\leqslant$ 3,0
045	> 3,0 but $\leqslant$ 6,0
090	> 6,0 but $\leqslant$ 12
200	> 12 but $\leqslant$ 25
400	> 25 but $\leqslant$ 50
700	> 50 but $\leqslant$ 100
999	> 100

3.4.4 Temperature of deflection under load

The temperature of deflection under load shall be determined in accordance with ISO 15526-2.

The possible values of the temperature of deflection under load at 1,8 MPa are divided into 21 ranges, each represented by a 3-figure code number as specified in Table 6.

Table 6 — Ranges of temperature of deflection under load at 1,8 MPa in data block 3

Code-number	Range of temperature °C
060	$\leqslant$ 60
070	> 60 but $\leqslant$ 70
080	> 70 but $\leqslant$ 80
090	> 80 but $\leqslant$ 90
100	> 90 but $\leqslant$ 100
110	> 100 but $\leqslant$ 110
120	> 110 but $\leqslant$ 120
130	> 120 but $\leqslant$ 130
140	> 130 but $\leqslant$ 140
150	> 140 but $\leqslant$ 150
160	> 150 but $\leqslant$ 160
170	> 160 but $\leqslant$ 170
180	> 170 but $\leqslant$ 180
190	> 180 but $\leqslant$ 190
200	> 190 but $\leqslant$ 200
210	> 200 but $\leqslant$ 210
220	> 210 but $\leqslant$ 220
230	> 220 but $\leqslant$ 230
240	> 230 but $\leqslant$ 240
250	> 240 but $\leqslant$ 250
260	> 250

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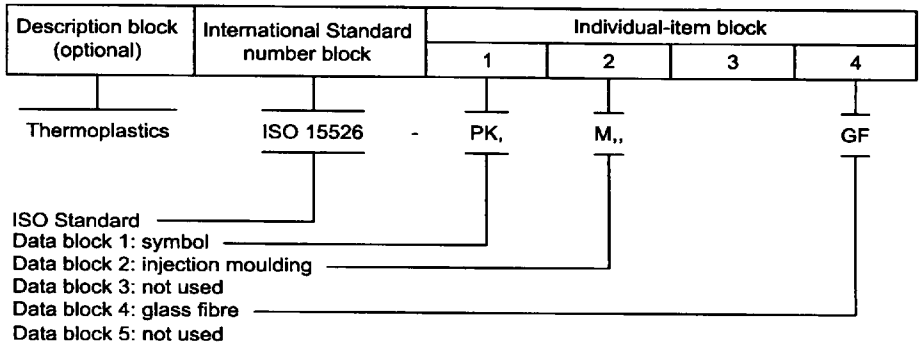
4 Examples of designations

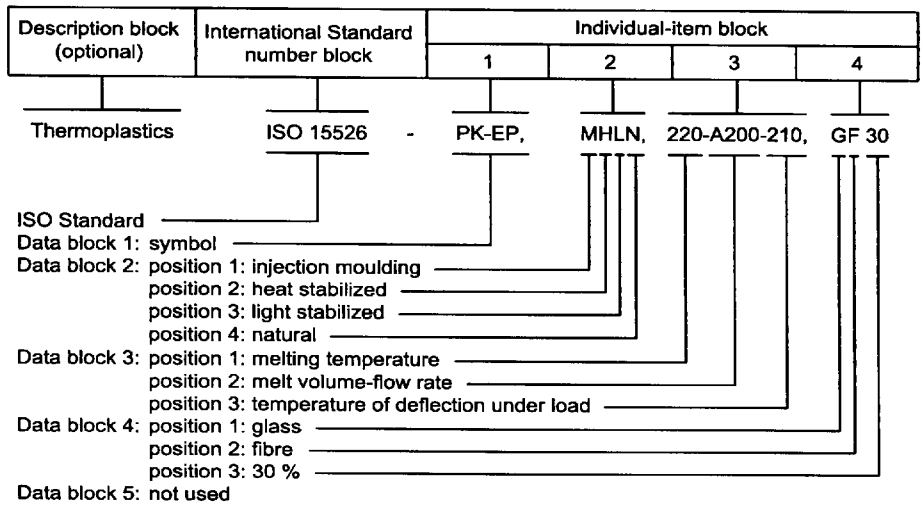
4.1 Designation only

A polyketone moulding and extrusion material (PK) intended for injection moulding (M) with glass fibre (GF), would be designated:



Designation: ISO 15526-PK,M,,GF

A polyketone moulding and extrusion material (PK), built up from keto, ethylene and propylene groups (EP), intended for injection moulding (M), being heat stabilized (H), light stabilized (L) and natural (N), having a melting temperature of 220 °C (220), a melt volume-flow rate of 20 $cm^3/10$ min at a temperature of 240 °C and a load of 2,16 kg (A200) and a temperature of deflection under load of 210 °C (210), reinforced with 30 % glass fibre (GF30), would be designated:



Designation: ISO 15526-PK-EP,MHLN,220-A200-210,GF30
or in shortened form: ISO 15526-PK-EP,,GF30

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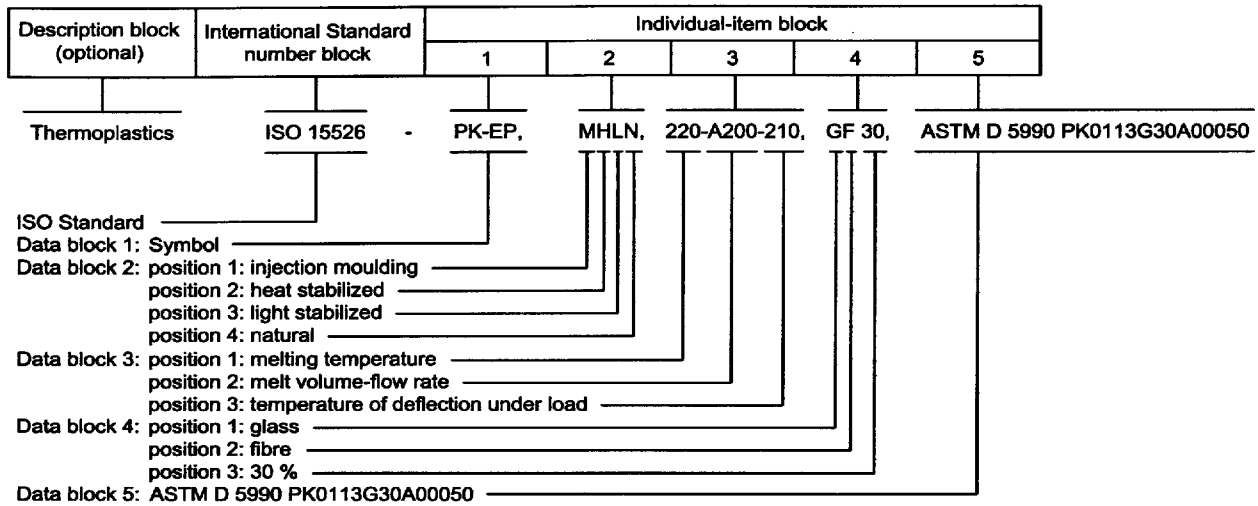
4.2 Designation transformed into a specification

A polyketone moulding and extrusion material (PK), built up from keto, ethylene and propylene groups (EP), intended for injection moulding (M), being heat stabilized (H), light stabilized (L) and natural (N), having a melting temperature of 220 °C (220), a melt volume-flow rate of 20 $cm^3/10$ min at a temperature of 240 °C and a load of 2,16 kg (A200) and a temperature of deflection under load of 210 °C (210), reinforced with 30 % glass fibre (GF30) and meeting the requirements of ASTM D 5990, would be specified:



Specification: ISO 15526-PK-EP,MHLN220-A200-210,GF30.ASTM D 5990 PK0113G30A00050

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