

International Standard



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Plastics — Ethylene/vinyl acetate copolymer thermoplastics (E/VAC) — Part 1: Designation

Plastiques — Thermoplastiques à base de copolymères éthylène/acétate de vinyle (E/VAC) — Partie 1: Désignation

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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.

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 4613/1 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 — Ethylene/vinyl acetate copolymer thermoplastics (E/VAC) — Part 1: Designation

1 Scope and field of application

1.1 This part of ISO 4613 establishes a system of designation for ethylene/vinyl acetate copolymer (E/VAC) thermoplastic materials which may be used as the basis for specifications.

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

- a) vinyl acetate content,
- b) melt flow rate,

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

1.3 This designation system is applicable to all ethylene/vinyl acetate copolymers containing from > 3 to 50 % (m/m) (approximately 25 % molar) of vinyl acetate. 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 4613 does not provide engineering data, performance data or data on processing conditions which may be required to specify a material for a particular application or method of processing.

If such additional properties are required, they shall be determined in accordance with the test methods specified in ISO 4613/2, 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 1043, *Plastics — Symbols and codes*

— *Part 1: Symbols for basic polymers and their modifications, and for plasticizers.*¹⁾

— *Part 2: Codes for designations of polymers by a data-block system.*¹⁾

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

ISO 4613/2, *Plastics — Ethylene/vinyl acetate copolymer thermoplastics (E/VAC) — Part 2: Preparation of test specimens and determination of properties.*²⁾

ISO 8985, *Plastics — Ethylene/vinyl acetate copolymers — Determination of the vinyl acetate content.*

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.¹⁾

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	

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 E/VAC, according to ISO 1043/1, and its vinyl acetate content (see 3.1)
- No. 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).
- No. 3: Designatory properties (see 3.3).
- No. 4: Fillers or reinforcing materials and their nominal content (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 4613.

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, the plastic is identified by its symbol E/VAC according to ISO 1043/1 and, after a space, the vinyl acetate content is coded by two figures, as specified in table 1.

The vinyl acetate content, expressed as a percentage by mass, shall be determined in accordance with ISO 8985, and calculated to two significant figures. The vinyl acetate content is classified by seven cells, each cell being coded by two figures as specified in table 1.

**Table 1 — Cell codes and cell ranges
for vinyl acetate (VAC) content in Data Block 1**

Code	VAC content % (m/m)
03	> 3 to 5
08	> 5 to 10
13	> 10 to 15
18	> 15 to 20
25	> 20 to 30
35	> 30 to 40
45	> 40 to 50

1) See ISO 1043/2.

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 2.

Table 2 — Codes used in Data Block 2

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

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 range of the melt flow rate is coded by one letter and three figures (see 3.3.1).

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 either side of, the cell limit because of manufacturing tolerances, the designation is not affected.

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

3.3.1 Melt flow rate

The melt flow rate (MFR) shall be determined according to ISO 1133, condition No. 4, at a temperature of 190 °C with a load of 2,16 kg. For materials having a MFR more than 100 g/10 min when tested at the above condition, a temperature of 150 °C and a load of 2,16 kg shall be used. When the MFR measured at this latter test condition is still more than 100 g/10 min, a temperature of 125 °C and a load of 0,325 kg are recommended.

The MFR is classified by 11 cells and coded by three figures, as specified in table 3. The test conditions used are coded by one letter, as specified in table 4, in front of the cell code.

**Table 3 — Cell codes and cell ranges
for melt flow rate (MFR) in Data Block 3**

Code	MFR range g/10 min
000	< 0,10
001	> 0,10 to 0,20
003	> 0,20 to 0,40
006	> 0,40 to 0,80
012	> 0,80 to 1,5
022	> 1,5 to 3,0
045	> 3,0 to 6,0
090	> 6,0 to 12
200	> 12 to 25
400	> 25 to 50
700	> 50

**Table 4 — Code for test conditions used
in determining (MFR)**

Code	Temperature °C	Nominal load kg
D	190	2,16
B	150	2,16
Z	125	0,325

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 5), if requested. Subsequently (without space) the mass content may be given by two figures in Positions 3 and 4, as specified in table 6.

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

Code	Material (Position 1)	Code	Form (Position 2)
A	Asbestos	B	Balls, beads, spheres
B	Boron	D	Powder; dry blend
C	Carbon ¹⁾	F	Fibre
G	Glass	G	Granules; ground
K	Chalk (CaCO ₃)	H	Whisker
L	Cellulose ¹⁾	S	Scales; splittings
M	Mineral ¹⁾ ; metal ²⁾	X	Not specified
S	Organic synthetic ¹⁾	Z	Others
T	Talcum		
W	Wood ¹⁾		
X	Not specified		
Z	Others ¹⁾		

1) These materials may be defined after Position 4 of 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 copper (Cu) powder is specified MDOOCU.