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**Plastics — Poly(vinyl alcohol) (PVAL)  
materials —**

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

*Plastiques — Matériaux en poly(alcool de vinyle) (PVAL) —  
Partie 1: Système de désignation et base de spécifications*



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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](http://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](http://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](http://www.iso.org/iso/foreword.html).

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

This second edition cancels and replaces the first edition (ISO 15023-1:2001), which has been technically revised.

A list of all parts in the ISO 15023 series can be found on the ISO website.

# Plastics — Poly(vinyl alcohol) (PVAL) materials —

## Part 1: Designation system and basis for specifications

### 1 Scope

This document establishes a system of designation for poly(vinyl alcohol) (PVAL) materials which may be used as the basis for specifications.

The types of poly(vinyl alcohol) (PVAL) materials are differentiated from each other by a classification system based on the designatory properties:

- a) degree of hydrolysis,
- b) viscosity of aqueous solution under defined conditions

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 poly(vinyl alcohol) (PVAL) materials with a degree of hydrolysis not less than 70 mol%.

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 may be required to specify a material. If such additional properties are required, they are intended to be determined in accordance with the test methods specified in ISO 15023-2, if suitable.

In order to designate a thermoplastic material to meet particular specifications, 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 472, *Plastics — Vocabulary*

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

ISO 15023-2:—<sup>1</sup>, *Plastics — Poly(vinyl alcohol) (PVAL) materials — Part 2: Determination of properties*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 472 apply.

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1) Under preparation. Stage at the time of publication: ISO/DIS 15023-2:2016.

# ISO 15023-1:2017(E)

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 <http://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)	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 five data blocks comprising the following information:

- Data block 1: Identification of the plastic by its abbreviated term, PVAL, in accordance with ISO 1043-1 (see [4.2](#)).
- Data block 2: Fillers or reinforcing materials and their nominal content (see [4.3](#)).
- Data block 3: Position 1: Intended application and/or method of processing (see [4.4](#)).  
Positions 2 to 8: Information about important properties, additives and colour (see [4.4](#)).
- Data block 4: Designatory properties (see [4.5](#)).
- Data block 5: For the purpose of specifications, the fifth data block contains appropriate 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 (,,).

Terminal commas may be omitted.

For part marking, the first two blocks of the designation are used, connected with a hyphen, and placed between the punctuation marks “>” and “<”, where no spaces are used between the codes.

### 4.2 Data block 1

In this data block, after the hyphen, poly(vinyl alcohol) polymers are identified by the symbol PVAL, in accordance with ISO 1043-1.

### 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 1](#). Subsequently (without a space), the mass content may be given by a two-figure code- number

in positions 3 and 4. The first figure-number is presented by 0 and the second figure-number is the figure of the mass content if the mass content of filler and/or reinforcing material is less than 10 %.

Mixtures of filler materials or forms may be indicated by combining the relevant codes using the sign “+” within parentheses followed by the total filler content outside the parenthesis. For example, a mixture of 25 % glass fibres (GF) and 10 % mineral powder (MD) is indicated by (GF+MD)35 or (GF25+MD10).

**Table 1 — Code-letters used for fillers and reinforcing materials in data block 2**

Code-letter	Material <sup>a</sup> (Position 1)	Code-letter	Form (Position 2)
<b>A</b>	Aramid <sup>b</sup>		
<b>B</b>	Boron	<b>B</b>	Beads, spheres, balls
<b>C</b>	Carbon	<b>C</b>	Chips, cuttings
		<b>CM</b>	Copped strand mat
<b>D</b>	Alumina trihydrate	<b>D</b>	Powder
<b>E</b>	Clay		
		<b>EM</b>	Endless strand mat
		<b>F</b>	Fibre
<b>G</b>	Glass	<b>G</b>	Ground
		<b>H</b>	Whiskers
<b>K</b>	Calcium carbonate	<b>K</b>	Knitted fabric
<b>L</b>	Cellulose	<b>L</b>	Layer
		<b>LF</b>	Long fibre
<b>M</b>	Mineral	<b>M</b>	Mat (thick)
<b>ME</b>	Metal <sup>c</sup>		
<b>N</b>	Natural organic (cotton sisal, hemp flax, etc.)	<b>N</b>	Non-woven fabric
		<b>NF</b>	Nano fibre
		<b>NT</b>	Nano tube
<b>P</b>	Mica	<b>P</b>	Paper
<b>Q</b>	Silicon compound		
<b>S</b>	Synthetic, organic (e.g. finely divided PTFE, polyimides or thermoset resins) <sup>d</sup>	<b>S</b>	Scales, flakes
<b>T</b>	Talc	<b>T</b>	Twisted or braided fabric, cord
		<b>V</b>	Veneer
<b>W</b>	Wood	<b>W</b>	Woven fabric
<b>X</b>	Not specified	<b>X</b>	Not specified
		<b>Y</b>	Yarn
<b>Z</b>	Others <sup>d</sup>	<b>Z</b>	Others <sup>d</sup>

<sup>a</sup> The materials may be further defined, for example, by their chemical symbols or by additional symbols defined in the relevant International Standard.

<sup>b</sup> Aramid was previously defined by the symbol “R”, but “A” is in common use.

<sup>c</sup> In the case of metals (ME), the type(s) of metal shall be indicated by means of the relevant chemical symbol(s).

<sup>d</sup> A specific material may be further defined.

#### 4.4 Data block 3

In this data block, information about the 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 3**

Code-letter	Position 1	Code-letter	Position 2 to 8
<b>A</b>	Adhesives	<b>A</b>	Processing stabilized
<b>B</b>	Blow moulding	<b>B</b>	Antiblocking
<b>B1</b>	Extrusion blow moulding		
<b>B2</b>	Injection blow moulding		
<b>C</b>	Calendaring	<b>C</b>	Coloured
		<b>D</b>	Powder
<b>E</b>	Extrusion		
<b>F</b>	Films	<b>F</b>	Special burning characteristics
<b>G</b>	General use	<b>G</b>	Granules
		<b>G<sub>1</sub></b>	Pellets
		<b>G<sub>2</sub></b>	Lentils
		<b>G<sub>3</sub></b>	Beads
<b>H</b>	Coating	<b>H</b>	Heat-ageing stabilized
		<b>K<sub>1</sub></b>	Anticorrosive agent
		<b>K<sub>2</sub></b>	Fungus proof
		<b>K<sub>3</sub></b>	Antifoaming agent
<b>L</b>	Monofilament extrusion	<b>L</b>	Light stabilized
<b>M</b>	Moulding		
<b>N</b>	Emulsification	<b>N</b>	Natural (no colour added)
		<b>P</b>	Impact modified
		<b>R</b>	Mould release agent
		<b>S</b>	Lubricated
<b>V</b>	Thermoforming	<b>V</b>	Heat shrinkable
		<b>W</b>	Stabilized against hydrolysis
<b>X</b>	No indication	<b>X</b>	Crosslinkable
<b>Y</b>	Textile yarns, spinning	<b>Y</b>	Increased electrical conductivity
		<b>Z</b>	Antistatic

## 4.5 Data block 4

### 4.5.1 General

In this data block, the degree of hydrolysis is represented by a three-figure code-number (see 4.5.2), the viscosity is represented by a two- or three-figure code-number (see 4.5.3).

If a property value falls on or near a range limit, the manufacturer shall state which range will designate the material. If subsequent individual 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 materials.

### 4.5.2 Degree of hydrolysis

The degree of hydrolysis shall be determined in accordance with ISO 15023-2:—, Annex D.



The possible values of the degree of hydrolysis are divided into 13 ranges, each represented by a three-figure code-number as specified in [Table 3](#).

**Table 3 — Code-numbers used for the degree of hydrolysis in data block 4**

Code-number	Range of hydrolysis value mol%
100	≥99
099	≥98 but <99
097	≥96 but <98
095	≥94 but <96
093	≥92 but <94
091	≥90 but <92
089	≥88 but <90
087	≥86 but <88
085	≥84 but <86
083	≥82 but <84
081	≥80 but <82
077	≥75 but <80
073	≥70 but <75

#### 4.5.3 Viscosity of 4 % aqueous solution

The viscosity of a 4 % aqueous solution shall be determined in accordance with ISO 15023-2:—, Annex E.

The possible values of the viscosity are divided into 24 ranges, each represented by a two- or three-figure code-number specified in [Table 4](#).

**Table 4 — Code-numbers used for the viscosity in data block 4**

Code-number	Range of viscosity mPa·s
01	≤2
03	>2 but ≤4
05	>4 but ≤6
07	>6 but ≤8
09	>8 but ≤10
11	>10 but ≤12
13	>12 but ≤14
15	>14 but ≤16
17	>16 but ≤18
19	>18 but ≤20
22	>20 but ≤24
26	>24 but ≤28
30	>28 but ≤32
34	>32 but ≤36
38	>36 but ≤40
42	>40 but ≤45
47	>45 but ≤50
52	>50 but ≤55

Table 4 (continued)

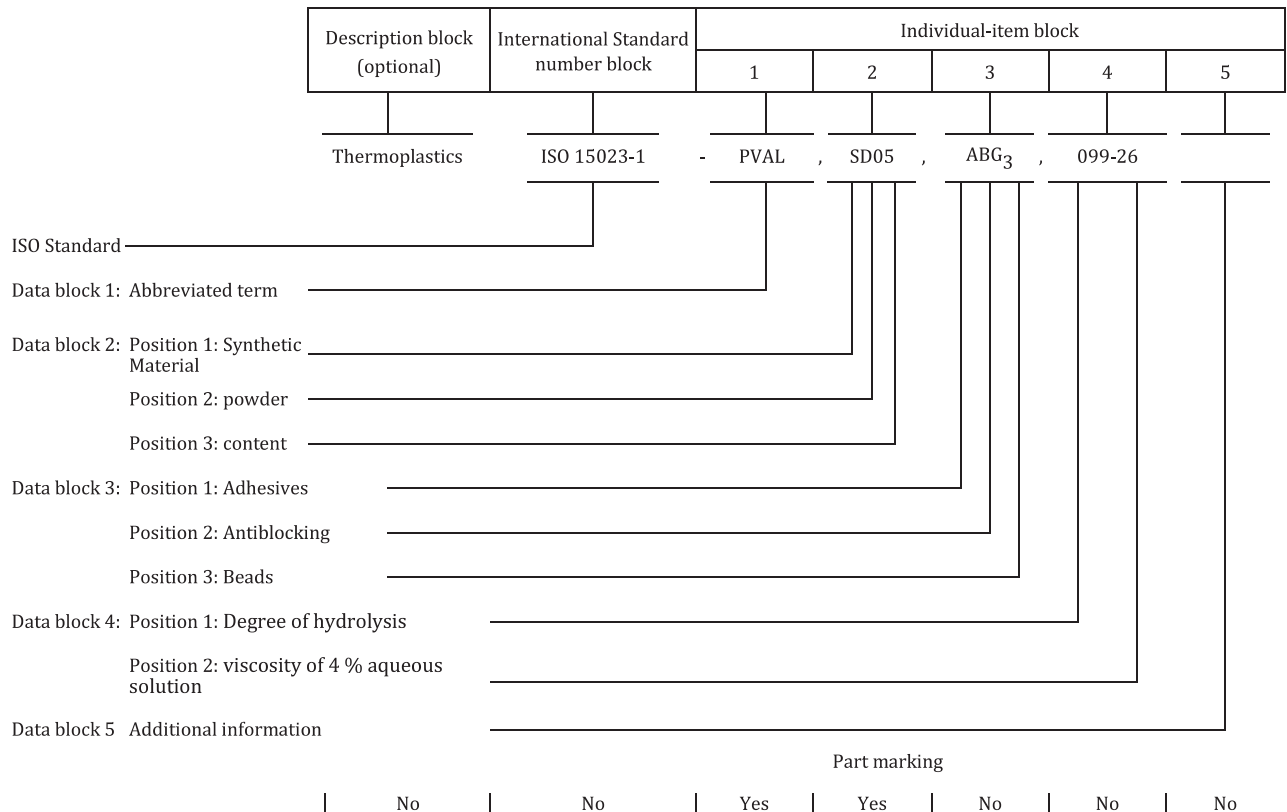
Code-number	Range of viscosity mPa·s
57	>55 but ≤60
65	>60 but ≤70
75	>70 but ≤80
85	>80 but ≤90
95	>90 but ≤100
150	>100 but ≤150
175	>150 but ≤200
200	>200

4.6 Data block 5

Indication of additional requirements in this data block transforms the designation of a material into a specification for a particular material. 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

A thermoplastic poly(vinyl alcohol) (PVAL) material filled with synthetic material (S) powder (D) and a filler content of 5 % (per mass) (05), intended for adhesives (A), antiblocking (B) and beads (G<sub>3</sub>), and with degree of hydrolysis of 98 mol% (099) and the viscosity of 4 % aqueous solution of 25 mPa·s (26), with no additional information, would be designated:



Designation: Thermoplastics ISO 15023-1-PVAL,SD05,ABG<sub>3</sub>,099-26

Or: ISO 15023-1-PVAL,SD05,ABG<sub>3</sub>,099-26

Part marking: >PVAL SD05<

## Bibliography

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

