

INTERNATIONAL  
STANDARD

**ISO**  
**1163-1**

Third edition  
1995-12-15

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**Plastics — Unplasticized poly(vinyl chloride) (PVC-U) moulding and extrusion materials —**

**Part 1:**

Designation system and basis for specifications

*Plastiques — Poly(chlorure de vinyle) non plastifié (PVC-U) pour moulage et extrusion —*

*Partie 1: Système de désignation et base de spécification*



Reference number  
ISO 1163-1:1995(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 1163-1 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*.

This third edition cancels and replaces the second edition (ISO 1163-1:1985), which has been technically revised. The main changes concern the code-numbers and ranges for the impact strength and modulus of elasticity in table 2.

ISO 1163 consists of the following parts, under the general title *Plastics — Unplasticized poly(vinyl chloride) (PVC-U) 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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Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

# Plastics — Unplasticized poly(vinyl chloride) (PVC-U) moulding and extrusion materials —

## Part 1:

## Designation system and basis for specifications

### 1 Scope

**1.1** This part of ISO 1163 establishes a system of designation for unplasticized PVC thermoplastic material which may be used as the basis for specifications.

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

- a) Vicat softening temperature
- b) impact strength (Charpy notched)
- c) modulus of elasticity

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 1163 is applicable to all unplasticized compositions of homopolymers and copolymers that contain at least 50 % (*m/m*) of vinyl chloride. It is also applicable to compositions containing chlorinated poly(vinyl chloride) and to compositions containing blends of one or more of the above-mentioned polymers, provided that the total amount of these polymers represents at least 50 % (*m/m*) of the polymer content of the composition.

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.

This part of ISO 1163 does not apply to cellular plastics.

**1.4** It is not intended to imply that materials having the same designation give necessarily the same performance. This part of ISO 1163 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 or processing.

If such additional properties are required, they may be determined in accordance with the test methods specified in part 2 of this International Standard, 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 clause 3, introductory paragraph).

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 1163. 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 1163 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 1043-1:1987, *Plastics — Symbols — Part 1: Basic polymers and their special characteristics*.

ISO 1163-2:1995, *Plastics — Unplasticized poly(vinyl chloride) (PVC-U) moulding and extrusion materials — Part 2: Preparation of test specimens and determination of properties*.

## 3 Designation and specification system

The designation and specification 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

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 PVC-U in accordance with ISO 1043-1 (see 3.1).
- Data block 2: Position 1: Intended application or method of processing (see 3.2).  
Positions 2 to 8: 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 their nominal content (not included in this part of ISO 1163).
- 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 (,,).

### 3.1 Data block 1

In this data block, after the hyphen, PVC-U plastics are identified by the symbol "PVC-U", in accordance with ISO 1043-1.

### 3.2 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 1.

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 1 — Code-letters used in data block 2**

Code-letter	Position 1	Code-letter	Positions 2 to 8
<b>B</b>	Blow moulding	<b>B</b>	Antiblocking
<b>C</b>	Calendering	<b>C</b>	Coloured
<b>D</b>	Disc manufacture	<b>D</b>	Powder dry blend
<b>E</b>	Extrusion	<b>E</b>	Expandable
<b>F</b>	Extrusion of films	<b>F</b>	Special burning characteristics
<b>G</b>	General use	<b>G</b>	Granules
<b>H</b>	Coating	<b>H</b>	Heat ageing stabilized
<b>L</b>	Monofilament extrusion	<b>L</b>	Light or weather stabilized
<b>M</b>	Injection moulding		
		<b>N</b>	Natural (no colour added)
		<b>P</b>	Impact modified
<b>Q</b>	Compression moulding		
<b>R</b>	Rotational moulding	<b>R</b>	Mould release agent
<b>S</b>	Sintering	<b>S</b>	Lubricated
<b>T</b>	Tape manufacture	<b>T</b>	Transparent
<b>V</b>	Thermoforming		
<b>X</b>	No indication		
		<b>Y</b>	Increased electrical conductivity
		<b>Z</b>	Antistatic

**Table 2 — Code-numbers used for designatory properties in data block 3**

Vicat softening temperature		Impact strength		Modulus of elasticity	
Code-number	Range °C	Code-number	Range kJ/m <sup>2</sup>	Code-number	Range MPa
<b>058</b>	≤ 60	<b>05</b>	≤ 10	<b>18</b>	≤ 2 000
<b>062</b>	> 60 but ≤ 64	<b>25</b>	> 10 but ≤ 40	<b>23</b>	> 2 000 but ≤ 2 500
<b>066</b>	> 64 but ≤ 68	<b>50</b>	> 40	<b>28</b>	> 2 500 but ≤ 3 000
<b>070</b>	> 68 but ≤ 72			<b>33</b>	> 3 000
<b>074</b>	> 72 but ≤ 76				
<b>078</b>	> 76 but ≤ 80				
<b>082</b>	> 80 but ≤ 84				
<b>086</b>	> 84 but ≤ 88				
<b>090</b>	> 88 but ≤ 92				
<b>094</b>	> 92 but ≤ 96				
<b>098</b>	> 96 but ≤ 100				
<b>102</b>	> 100 but ≤ 104				
<b>106</b>	> 104 but ≤ 108				
<b>110</b>	> 108 but ≤ 112				
<b>114</b>	> 112 but ≤ 116				
<b>118</b>	> 116 but ≤ 120				
<b>122</b>	> 120				

**3.3 Data block 3**

In this data block, the range of the Vicat softening temperature is represented by a 3-figure code-number (see 3.3.1), the range of the impact strength by a 2-figure code-number (see 3.3.2) and the range of the modulus of elasticity by a letter and a 2-figure code-number (see 3.3.3). 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 cell limit because of manufacturing tolerances, the designation is not affected.

NOTE 1 Not all combinations of the values of designatory properties are provided in currently available polymers.

**3.3.1 Vicat softening temperature**

The Vicat softening temperature shall be determined in accordance with ISO 1163-2.

The possible values of Vicat softening temperature are represented by a 3-figure code-number as specified in table 2.

**3.3.2 Impact strength**

The impact strength (Charpy notched) shall be determined in accordance with ISO 1163-2.

The possible values of impact strength are divided into 3 ranges, each represented by a 2-figure code-number as specified in table 2.

**3.3.3 Modulus of elasticity**

The modulus of elasticity shall be determined in accordance with ISO 1163-2.

The possible values of modulus of elasticity are divided into 4 ranges, each represented by a 2-figure code-number as specified in table 2. The fact that it is a tensile modulus shall be indicated by the code-letter T (tension) immediately preceding the code-number indicating the range.

**3.4 Data block 4**

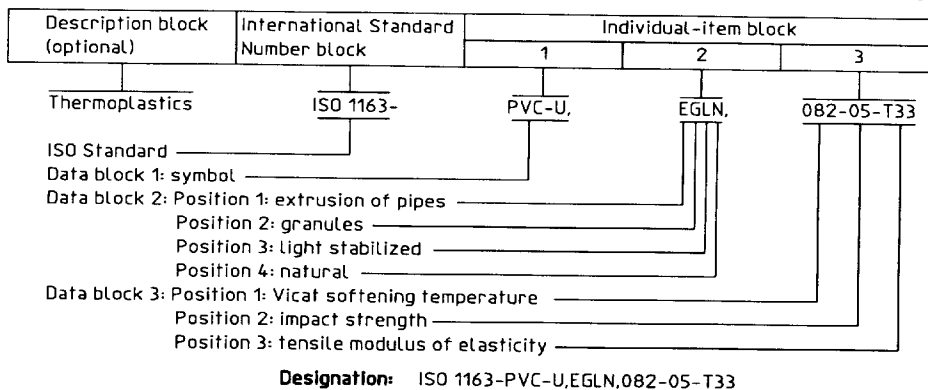
Not included in this part of ISO 1163.

**3.5 Data block 5**

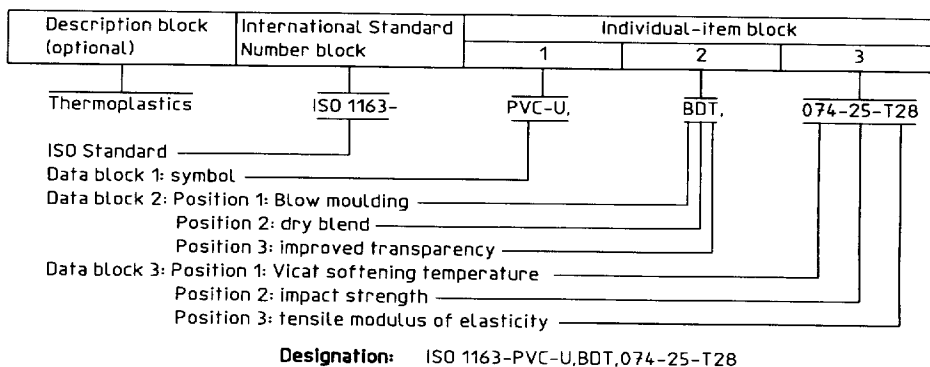
Indication of additional requirements in this optional data block is a way of transforming the designation of a material into a specification for a particular application. This may be done for example by reference to a suitable national standard or to a standard-like, generally established specification.

**4 Examples of designations**

An unplasticized-PVC thermoplastic material (PVC-U), intended for the extrusion of pipes (E), in the form of a granular material (G), light stabilized (L), natural (N), with a Vicat softening temperature of 82 °C (082), an impact strength of 8 kJ/m<sup>2</sup> (05) and a tensile modulus of elasticity of 3 700 MPa (T33) would be designated:



An unplasticized-PVC thermoplastic material (PVC-U), intended for blow moulding (B), in the form of a dry blend (D) with improved transparency (T), a Vicat softening temperature of 74 °C (074), an impact strength of 25 kJ/m<sup>2</sup> (25) and a tensile modulus of elasticity of 2 670 MPa (T28) would be designated:



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**ICS 83.080.20**

**Descriptors:** plastics, thermoplastic resins, moulding materials, extrusion materials, vinyl chloride, unplasticized polyvinyl chloride, specifications, data blocks, designation.

Price based on 5 pages

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