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International Standard



1163/1

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**Plastics — Unplasticized compounds of homopolymers  
and copolymers of vinyl chloride —  
Part 1: Designation**

*Plastiques — Compositions non plastifiées d'homopolymères et de copolymères de chlorure de vinyle — Partie 1: Désignation*

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**Descriptors** : plastics, homopolymers, copolymers, vinyl chloride, unplasticized polyvinyl chloride, designation.

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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 1163/1 was prepared by Technical Committee ISO/TC 61, *Plastics*.

International Standard ISO 1163/1 was first published in 1980. This second edition cancels and replaces the first edition, of which it constitutes a technical revision.

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.

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# Plastics — Unplasticized compounds of homopolymers and copolymers of vinyl chloride — Part 1: Designation

## 1 Scope and field of application

**1.1** This part of ISO 1163 establishes a system of designation for thermoplastic materials composed of unplasticized compounds of homopolymers and copolymers of vinyl chloride (PVC-U), which may be used as the basis for specifications.

**1.2** The types of PVC-U compounds 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 information about physical form, intended application, method of processing, important properties, additives and colour.

**1.3** This designation system is applicable to unplasticized compounds of polymers of vinyl chloride based on homopolymers of vinyl chloride, copolymers with at least 50 % (*m/m*) of vinyl chloride, or chlorinated poly(vinyl chloride), or mixtures of such polymers with one another or with other polymers, the principal ingredient being a polymer of vinyl chloride.

It applies to materials ready for normal use in the form of powder (dry blend), granules or pellets and to materials unmodified and modified by colourants, additives, etc.

This International Standard 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 or method of processing.

If such additional properties are required, they shall be determined in accordance with the test methods specified in ISO 1163/2, 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 178, *Plastics — Determination of flexural properties of rigid plastics.*

ISO 179, *Plastics — Determination of Charpy impact strength of rigid materials.*

ISO 306, *Plastics — Determination of the Vicat softening temperature of thermoplastics.*

ISO 527, *Plastics — Determination of tensile properties.*

ISO 1043, *Plastics — Symbols and codes*

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

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

ISO 1163/2, *Plastics — Unplasticized compounds of homopolymers and copolymers of vinyl chloride — Part 2: Preparation of test specimens and determination of properties.*

<sup>1)</sup> At present at the stage of draft. (Partial revision of ISO 1043-1978.)

### 3 Designation system

The designation system of thermoplastics is based on the following standardized pattern<sup>1)</sup>.

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 PVC-U, according to ISO 1043/1.
- 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 (not included in this particular designation).

For the purpose of specifications, a fifth data block may be added containing additional information. The kind of information and its code are not the subject of this part of ISO 1163.

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 compound is identified by the symbol PVC-U, according to ISO 1043/1.

#### 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 the form of the material (D or G), important properties, additives and colour in Positions 2 to 4. The codes are specified in table 1.

Table 1 — Codes used in Data Block 2

Code	Position 1	Code	Positions 2 to 4
B	Blow moulding	B	Antiblocking
C	Calendering	C	Coloured
D	Disc manufacturer	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		
L	Monofilament extrusion	L	Light and /or weather stabilized
M	Injection moulding		
		N	Natural (not coloured)
		O	No indication
		P	Impact modified
Q	Compression moulding		
R	Rotational moulding	R	Moulding release agent
S	Powder coating or sintering	S	Lubricated
T	Tape manufacturer	T	Improved transparency
V	Thermoforming		
X	No indication	Y	Increased electrical conductivity
		Z	Antistatic

1) See ISO 1043/2.

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 Vicat softening temperature is coded by three digits (see 3.3.1); then, separated by a hyphen, the range for impact strength (Charpy notched) is coded by two digits (see 3.3.2); then, separated by a hyphen, the range for the modulus of elasticity is coded by one letter and two digits (see 3.3.3).

If a property 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** The Vicat softening temperature shall be determined according to ISO 306 (method B) and coded by three digits, as specified in table 2.

**3.3.2** The impact strength (Charpy notched) shall be determined according to ISO 179 (2C) with test specimens prepared according to ISO 1163/2 and coded by two digits, as specified in table 2.

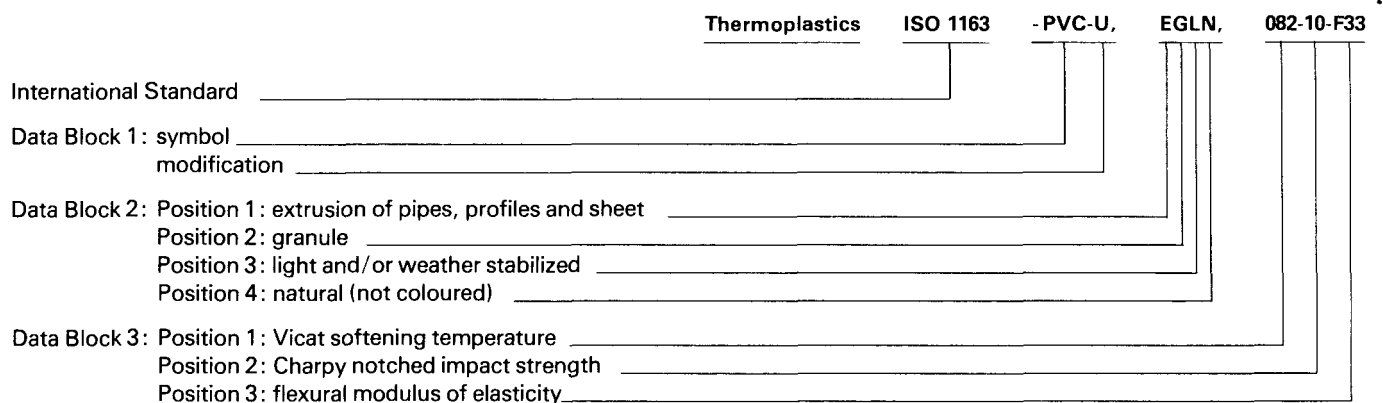
**3.3.3** The modulus of elasticity shall be determined according to ISO 527 or ISO 178 with test specimens prepared according to ISO 1163/2 and coded by the letter T (tension, ISO 527) or F (flexure, ISO 178) and two digits, as specified in table 2.

**Table 2 – Cell codes and cell ranges for Vicat softening temperature, impact strength and modulus of elasticity in Data Block 3**

Vicat softening temperature code	Impact strength		Modulus of elasticity	
	Code	Range kJ/m <sup>2</sup>	Code T or F	Range MPa
Three digits for the Vicat softening temperature (for example 082 for a value of 82 °C, with a tolerance of ± 2 °C)	03	< 5	18	> 1 500 to 2 000
	10	> 5 to 20	23	> 2 000 to 2 500
	10	> 5 to 20	28	> 2 500 to 3 000
	20	> 20	33	> 3 000

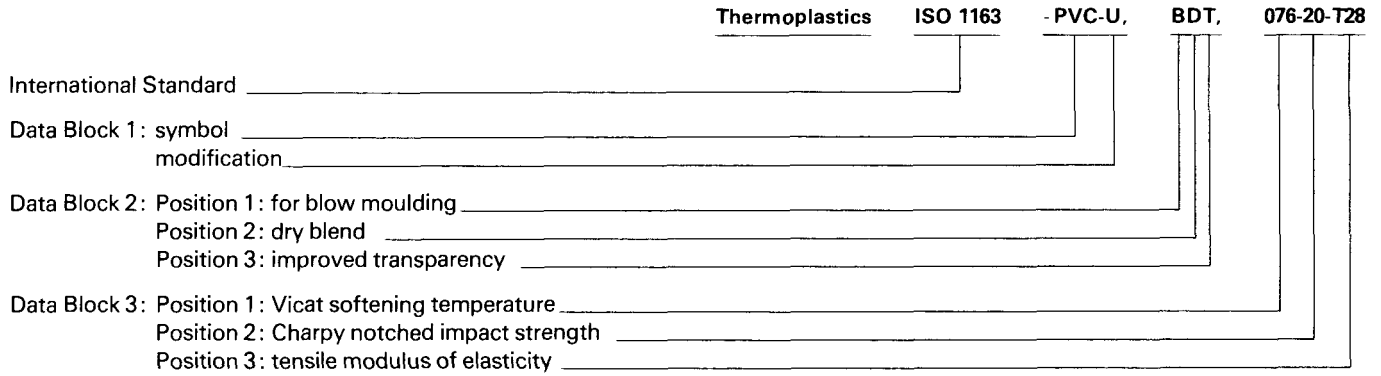
**4 Coding examples**

**4.1** An unplasticized compound of a polymer of vinyl chloride (PVC-U), for the extrusion of pipes, profiles and sheets (E), having the physical form of a granule (G), light and/or weather stabilized (L), natural (not coloured) (N), with a Vicat softening temperature VST/B/50 of 82 °C (082), Charpy notched impact strength,  $a_k$ , of 8 kJ/m<sup>2</sup> (10) and a flexural modulus of elasticity of 3 700 MPa (F33), would be designated:



**Designation:** ISO 1163-PVC-U,EGLN,082-10-F33

4.2 An unplasticized compound of a polymer of vinyl chloride (PVC-U), for blow moulding (B), having the physical form of a dry blend (D) with improved transparency (T), a Vicat softening temperature VST/B/50 of 76 °C (076), a Charpy notched impact strength,  $a_k$ , of 25 kJ/m<sup>2</sup> (20), and a tensile modulus of elasticity of 2 670 MPa (T28), would be designated:



**Designation:** ISO 1163-PVC-U,BDT,076-20-T28

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