



SLOVENSKI STANDARD
SIST EN ISO 12086-1:2000
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Plastics - Fluoropolymer dispersions and moulding and extrusion materials - Part 1:
Designation system and basis for specifications (ISO 12086-1:1995)

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Plastiques - Polymeres fluorés: dispersions et matériaux pour moulage et extrusion -
Partie 1: Systeme de désignation et base de spécification (ISO 12086-1:1995)

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83.080.20 Plastomeri Thermoplastic materials

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Plastics - Fluoropolymer dispersions and moulding and extrusion materials - Part 1: Designation system and basis for specifications (ISO 12086-1:1995)

Plastiques - Polymères fluorés: dispersions et matériaux pour moulage et extrusion - Partie 1: Système de désignation et base de spécification (ISO 12086-1:1995)

This European Standard was approved by CEN on 16 April 1999.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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EN ISO 12086-1:1999

Foreword

The text of the International Standard from Technical Committee ISO/TC 61 "Plastics" of the International Organization for Standardization (ISO) has been taken over as an European Standard by Technical Committee CEN/TC 249 "Plastics", the secretariat of which is held by IBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 1999, and conflicting national standards shall be withdrawn at the latest by November 1999.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

NOTE FROM CEN/CS: The foreword is susceptible to be amended on reception of the German language version. The confirmed or amended foreword, and when appropriate, the normative annex ZA for the references to international publications with their relevant European publications will be circulated with the German version.

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Endorsement notice

SIST EN ISO 12086-1:2000

The text of the International Standard ISO 12086-1:1995 has been approved by CEN as a European Standard without any modification.



INTERNATIONAL
STANDARD

ISO
12086-1

First edition
1995-12-15

**Plastics — Fluoropolymer dispersions and
moulding and extrusion materials —**

Part 1:

Designation system and basis for
specifications

[SIST EN ISO 12086-1:2000](https://standards.globalspec.com/std/12086-1-2000)

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*Plastiques — Polymères fluorés: dispersions et matériaux pour moulage
et extrusion —*

Partie 1: Système de désignation et base de spécification



Reference number
ISO 12086-1:1995(E)

ISO 12086-1:1995(E)

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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.

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 12086-1 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 1, *Terminology*.

ISO 12086 consists of the following parts, under the general title *Plastics — Fluoropolymer dispersions and moulding and extrusion materials*:

- *Part 1: Designation system and basis for specifications*
- *Part 2: Preparation of test specimens and determination of properties*

Annexes A and B form an integral part of this part of ISO 12086. Annexes C, D, E and F are for information only.

Plastics — Fluoropolymer dispersions and moulding and extrusion materials —

Part 1:

Designation system and basis for specifications

1 Scope

1.1 ISO 12086-1 establishes a system of designation for fluoropolymer materials that may be used as the basis for specifications. It covers the homopolymers and various copolymers of fluoromonomers used as dispersions and for moulding, extrusion, and other specialized applications. This part describes the designation system and provides codes and tables of values for the designatory properties. The designation system is applicable both to conventional thermoplastic fluoropolymers, processed by various techniques, and those materials that are processed by the unique operations required for the non-conventional thermoplastic polytetrafluoroethylene. The materials include both the fluorocarbon polymers and the various other fluoropolymers as virgin polymers or processed for reuse or recycling. This part of ISO 12086 also includes an extension of the designation system that provides a basis for specification of the materials. This basis for specification may be used to prepare specifications related to well defined applications. These specifications will use data blocks 1 to 4 and, if necessary, data block 5 as a complement, the last-mentioned data block containing the specific requirements in relation to the application. Fluoroelastomers are specifically excluded.

1.2 Fluoropolymers are long-chain homopolymers and copolymers of fluoromonomers. Fluoropolymers can be modified with small amounts of different fluoromonomers. In general, provided the polymer is not modified with more than five percent by mass of modifying fluoromonomer(s), it can be classed as the base polymer. PVDF is classed as the base polymer when it is modified during polymerization with up to two percent by mass of additional fluoromonomer(s) in the polymer structure. For PTFE, up to one percent by mass of a modifying comonomer is the limit for the material to be classed as polytetrafluoroethylene. A general discussion of members of the fluoropolymer family is included in informative annex C. This part of ISO 12086 is particularly concerned with, but is not limited to, the materials listed in 4.2. The accepted abbreviated term for each material is included in 4.2.

1.3 The various types of fluoropolymer are differentiated from each other by a classification system based on the fluoropolymer genus and appropriate levels of the designatory properties, along with information about basic polymer parameters, intended application or method of processing, important properties, additives, colorants, fillers, and reinforcing materials. Designatory properties for each fluoropolymer are selected from the general list in 5.3 and those properties to be designated for each fluoropolymer are listed in 5.6 and in normative annexes A and B.

1.4 Provision is made for designation of materials involved in reuse and recycling of the fluoropolymers covered by this part of ISO 12086. A set of designatory properties is provided for reprocessed PTFE because of its special requirements. For non-virgin conventional thermoplastic fluoropolymers, the same designatory properties as used for virgin materials shall be used with inclusion of the code Z1, Z2 or Z3 in data block 1 as specified in table 1.

1.5 It is not intended to imply that materials having the same designation necessarily give the same performance. The converse also should be emphasized, i.e. materials with different designations may be suitable for use in the same application. ISO 12086-1 does not provide engineering data, performance data, or processing conditions which may be required to specify materials for particular end-use applications (see the discussion on use of data block 5 in clauses 5 and 7). If such additional properties are required, they shall be determined in accordance with the test methods specified in ISO 12086-2, if suitable.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 12086. 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 12086 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 472:1988, *Plastics — Vocabulary*.

ISO 527-1:1993, *Plastics — Determination of tensile properties — Part 1: General principles*.

ISO 527-2:1993, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics*.

ISO 842:1984, *Raw materials for paints and varnishes — Sampling*.

ISO 1043-1:1987, *Plastics — Symbols — Part 1: Basic polymers and their special characteristics*.

ISO 1043-2:1988, *Plastics — Symbols — Part 2: Fillers and reinforcing materials*.

ISO 1133:1991, *Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics*.

ISO 1183:1987, *Plastics — Methods for determining the density and relative density of non-cellular plastics*.

ISO 12086-2:1995, *Plastics — Fluoropolymer dispersions and moulding and extrusion materials — Part 2: Preparation of test specimens and determination of properties*.

ASTM D 1430-91a, *Specification for polychlorotrifluoroethylene (PCTFE) plastics*.

ASTM D 1600-93, *Terminology for abbreviated terms relating to plastics*.

ASTM D 3222-91a, *Specification for unmodified poly(vinylidene fluoride) (PVDF) molding, extrusion, and coating materials*.

ASTM D 3418-83(1988), *Test method for transition temperatures of polymers by thermal analysis*.

ASTM D 3892-93, *Practice for packaging/packing of plastics*.

ASTM D 4591-93a, *Test method for determining temperatures and heats of transitions of fluoropolymers by differential scanning calorimetry*.

ASTM D 4895-91a, *Specification for polytetrafluoroethylene (PTFE) resins produced from dispersion*.

3 Definitions

3.1 The terminology given in ISO 472 is applicable to this part of ISO 12086, except for terms defined in 3.2. The terms listed in 3.1.1 to 3.1.3 are repeated from ISO 472 to be sure there is no misunderstanding.

3.1.1 dispersion: A heterogeneous system in which a finely divided material is distributed in another material.

3.1.2 fluoroplastic: A plastic based on polymers made with monomers containing one or more atoms of fluorine, or copolymers of such monomers with other monomers, the fluoromonomer(s) being in the greatest amount by mass.

3.1.3 latex: A colloidal aqueous dispersion of a polymeric material.

3.2 For the purposes of this part of ISO 12086, the following additional definitions apply.

3.2.1 amorphous: Noncrystalline, or devoid of regular structure.

3.2.2 bulk density: The mass (in grams) per litre of material, measured under the conditions of the test.

3.2.3 copolymer: A polymer formed from two or more types of monomer.

3.2.4 emulsion polymer (as it applies to fluoropolymer materials): Material isolated from its polymerization medium as a colloidal aqueous dispersion of the polymer solids.

NOTE 1 This definition, used in the fluoropolymer industry, is similar to that for "latex" in ISO 472 and is quite different from the definition for "emulsion" in ISO 472.

3.2.5 fluorocarbon plastic: A plastic based on polymers made from perfluoromonomers only.

3.2.6 fluoroelastomer: An elastomer based on polymers made from monomers containing one or more atoms of fluorine, or copolymers of such monomers with other monomers, the fluoromonomer(s) being in the greatest amount by mass.

3.2.7 fluoropolymer: Synonymous with *fluoroplastic* (see 3.1.2).

3.2.8 melt-processible: Capable of being processed by, for example, injection moulding, screw extrusion, and other operations typically used with thermoplastics.

3.2.9 preforming: Compacting powdered PTFE material under pressure in a mould to produce a solid object, called a preform, that is capable of being handled.

NOTE 2 With PTFE, "moulding" and "compaction" are terms used interchangeably with "preforming".

3.2.10 presintered resin: Resin that has been treated thermally at or above the melting point of the resin at atmospheric pressure without having been previously preformed.

3.2.11 reprocessed plastic: Material from the manufacture of semifinished forms of fluoropolymers that has been converted to a form suitable for further use.

NOTES

3 This material is often referred to as byproduct from processing.

4 Related definitions are presented in ASTM D 5033-90, *Guide for the development of standards relating to the proper use of recycled plastics*.

3.2.12 sintering: A thermal treatment during which the material is melted and recrystallized by cooling, with coalescence occurring during the treatment.

3.2.13 standard specific gravity (SSG): The specific gravity of a specimen of PTFE material preformed, sintered, and cooled through the crystallization point at a rate of 1 °C per minute in accordance with the appropriate sintering schedule as described in ISO 12086-2.

NOTE 5 The SSG of unmodified PTFE is inversely related to its molecular mass.

3.2.14 suspension polymer: A polymer isolated from its liquid polymerization medium as a solid having a particle size well above colloidal dimensions.

3.2.15 zero-strength time (ZST): A measure of the relative molecular mass of PCTFE.

4 Abbreviated terms and symbols

4.1 The abbreviated terms given in ISO 1043-1 and ISO 1043-2 are applicable to this part of ISO 12086.

4.2 This part of ISO 12086 is particularly concerned with, but is not limited to, the materials listed below (there are minor differences from ISO 1043-1 and ISO 1043-2 that reflect current usage of the terms and abbreviated terms):

PTFE	polytetrafluoroethylene
PFA	perfluoro(alkoxy alkane)
FEP	perfluoro(ethylene-propene) copolymer
EFEP	ethylene-tetrafluoroethylene-hexafluoropropene copolymer
TFE/PDD	tetrafluoroethylene-perfluoro(dioxole) copolymer
VDF/HFP	vinylidene fluoride-hexafluoropropene copolymer
VDF/TFE	vinylidene fluoride-tetrafluoroethylene copolymer
VDF/TFE/HFP	vinylidene fluoride-tetrafluoroethylene-hexafluoropropene copolymer
ETFE	ethylene-tetrafluoroethylene copolymer
PVDF	poly(vinylidene fluoride)
VDF/CTFE	vinylidene fluoride-chlorotrifluoroethylene copolymer
PCTFE	polychlorotrifluoroethylene
PVF	poly(vinyl fluoride)
ECTFE	ethylene-chlorotrifluoroethylene copolymer