INTERNATIONAL STANDARD

ISO 12086-1

Second edition
2006-02-15

Plastics — Fluoropolymer dispersions and moulding and extrusion materials —

Part 1: Designation system and basis for specifications

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

Partie 1: Système de désignation et base de spécification

Reference number
ISO 12086-1:2006(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 12086-1 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 9, *Thermoplastic materials*.

This second edition cancels and replaces the first edition (ISO 12086-1:1995), which has been technically revised.

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*

Plastics — Fluoropolymer dispersions and moulding and extrusion materials —

Part 1: Designation system and basis for specifications

1 Scope

1.1 This part of ISO 12086 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 of ISO 12086 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. As explained in Clause 5, 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 fluoromonomers 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 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 5.4, and those properties to be designated for each fluoropolymer are listed in 5.7 and in 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 are 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 should also be emphasized, i.e. materials with different designations may be suitable for use in the same application. This part of ISO 12086 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 can be determined in accordance with the test methods specified in ISO 12086-2, if suitable.

2 Normative references

The following referenced documents are indispensable for the application 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 527-2, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics*

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

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

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

ISO 1183-1, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pyknometer method and titration method*

ISO 1183-2, *Plastics — Methods for determining the density of non-cellular plastics — Part 2: Density gradient column method*

ISO 12000, *Plastics/rubber — Polymer dispersions and rubber latices (natural and synthetic) — Definitions and review of test methods*

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

ASTM D 1430, *Standard Classification System for Polychlorotrifluoroethylene (PCTFE) Plastics*

ASTM D 1600, *Standard Terminology for Abbreviated Terms Relating to Plastics*

ASTM D 3222, *Standard Specification for Unmodified Poly(Vinylidene Fluoride) (PVDF) Molding, Extrusion and Coating Materials*

ASTM D 3418, *Standard Test Method for Transition Temperatures of Polymers by Differential Scanning Calorimetry*

ASTM D 3892, *Standard Practice for Packaging/Packing of Plastics*

ASTM D 4591, *Standard Test Method for Determining Temperatures and Heats of Transitions of Fluoropolymers by Differential Scanning Calorimetry*

ASTM D 4895, *Standard Specification for Polytetrafluoroethylene (PTFE) Resin Produced from Dispersion*

ASTM D 5033, *Standard Guide for Development of ASTM Standards Relating to Recycling and Use of Recycled Plastics*