International Standard 7246

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Pipes and fittings of acrylonitrile/styrene/acrylester (ASA) — General specification for moulding and extrusion materials

Tubes et raccords en acrylonitrile/styrène/ester acrylique (ASA) — Spécifications générales de la matière pour le moulage et l'extrusion

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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 7246 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*.

Pipes and fittings of acrylonitrile/styrene/acrylester (ASA) — General specification for moulding and extrusion materials

0 Introduction

In Technical Committee ISO/TC 138, the work on standardization of plastics pipes and fittings for the transport of fluids is split up with respect to the field of application for which the pipes and fittings are intended. Inherent in this is the risk of lack of coordination between the standards proposed by the different sub-committees. The system of designation used closely follows that of TC 61, *Plastics*.

It was therefore necessary to prepare a document giving an overall view of characteristics to be considered when writing or revising standards. Some of these characteristics may be more important to certain applications than to others.

Similarly, there may be applications for which stricter requirements are necessary. This has led to the principle of the present document in which a list of characteristics and the relevant test methods for acrylonitrile/styrene/acrylester (ASA) materials suitable for the manufacture of pipes and fittings are given and in which the requirements for those characteristics may differ according to the proposed application of the pipes and fittings.

1 Scope and field of application

This International Standard establishes a general specification for acrylonitrile/styrene (or substituted styrene)/acrylester for pipes and fittings.

The values given shall not be used for design purposes.

This International Standard does not apply to

a) materials containing less than 20 % acrylonitrile in the continuous phase;

b) materials containing more than 5 % of another comonomer or polymer in the continuous phase;

c) materials containing flame retardants;

d) materials containing fibres.

2 References

ISO 178, *Plastics — Determination of flexural properties of rigid plastics.*

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

ISO 180, *Plastics — Determination of Izod impact strength of rigid materials.*

ISO 291, *Plastics — Standard atmospheres for conditioning and testing.*

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

ISO 1133, *Plastics — Determination of the melt flow rate of thermoplastics.*

ISO 2557/2, *Plastics — Amorphous thermoplastic moulding materials — Preparation of test specimens with a defined level of shrinkage — Part 2 : Test specimens in the form of rectangular plates (Injection moulding).*

ISO 2580/1, *Plastics — Acrylonitrile-butadiene-styrene (ABS) moulding and extrusion materials — Part 1 : Designation.*

ISO 2580/2, *Plastics — Acrylonitrile-butadiene-styrene (ABS) moulding and extrusion materials — Part 2 : Determination of properties.*

3 Definition

ASA plastics : Two-phase system in which the continuous phase consists of copolymers of styrene and/or substituted styrene and acrylonitrile, and the dispersed elastomeric phase is based on a polymer or copolymer of an acrylester as the impact modifier.

4 System of designation

4.1 The properties chosen to designate (ASA) plastics are

a) acrylonitrile content in the continuous phase;

b) Vicat softening temperature;

c) melt flow rate;

d) Izod or notched Charpy impact strength;

e) flexural modulus.

These properties are also the most suitable for the identification and classification of ASA plastics for pipes and fittings.

Example :

Pipes ISO 7246-ASA 1*, E-C, 95-08-150 I, ABCD

A : VST ⩾ 90 °C
B : MFR ⩽ 10 g/600 s
C : Izod ⩾ 150 J/m
D : FM ⩾ 1,5 GPa

Fittings ISO 7246-ASA 1*, E-M, 95-15-150 I, ABCD

A : VST ⩾ 90 °C
B : MFR ⩽ 20 g/600 s
C : Izod ⩾ 150 J/m
D : FM ⩾ 1,5 GPa

4.2 The properties selected for this method of designation are not necessarily adequate for predicting the behaviour of a material in use.

Therefore, other properties are or may be necessary to specify materials for particular applications.

General properties of ASA plastics which may be useful in this respect are shown in clause 7.

4.3 The classification is applicable to compounded materials ready for normal use, containing colorants and additives for normal processing.

4.4 This designation does not imply that different materials are always compatible with each other if they have the same designation.

5 General specification

5.1 The table shows in detail the requirements that define ASA plastics for pipes and fittings and lists the physical properties together with the appropriate test method.

5.2 Other characteristic general properties of ASA plastics for pipes and fittings are given in clause 8.

5.3 The average results of the test shall conform to the tabulated requirements. Other properties needed for a particular application may be identified with the method of determination (for example, by selection from clause 7), and agreed between the interested parties.

Table — Characteristics of ASA plastics suitable for the manufacture of pipes and fittings

Property	Test method	Specimen size mm	Units	Requirements
Acrylonitrile content in the continuous phase	Kjeldahl (see the annex of ISO 2580/1)		%	> 20
Vicat softening temperature at 49,05 N load	ISO 306 (see the annex)		°C	⩾ 90
Melt flow rate	ISO 1133[1], but at 220 °C and 10 kg load (see the annex)		g/600 s	⩽ 10 pipes ⩽ 20 injection moulded fittings
Izod impact (I) or notched Charpy impact (C)	ISO 180 ISO 179	63,5 × 12,7 × 6,35 50 × 6 × 4	J/m kJ/m²	⩾ 150 ⩾ 10
Flexural modulus	ISO 178	80 × 10 × 4 or 20 h × 2,5 h × h	GPa	⩾ 1,50

1) Die diameter : 2,090 to 2,100 mm.

* 1 denotes 10 to 30 % (m/m) of acrylonitrile; this specification requires more than 20 % (m/m) of acrylonitrile.

6 Detailed requirements

The detailed requirements for test specimens and test conditions are in accordance with the requirements of ISO 2580/1 and ISO 2580/2.

7 General properties of ASA plastics for pipes and fittings

There are other properties of plastics for pipes and fittings which may be specified for particular applications, as follows :

— tensile properties;

— tensile impact strength;

— indentation hardness;

— falling weight impact;

— low temperature impact;

— torsional modulus/temperature;

— short- and long-term burst strength at different temperatures with water;

— short- and long-term burst strength at different temperatures with chemicals;

— creep;

— reversion;

— water absorption;

— thermal ageing;

— weathering;

— stress cracking resistance.

Where no International Standard exists, the test method shall be agreed between the interested parties.

8 General characteristics of ASA plastics for pipes and fittings

The general characteristics are as follows :

— mean density	$\approx 1{,}06\ g/cm^3$
— coefficient of expansion	$\approx 0{,}8 \times 10^{-4}\ K^{-1}$
— heat conductivity	$\approx 0{,}17\ W/(m \cdot K)$
— surface resistivity	$> 10^{12}\ \Omega$

Annex

Drying of test specimens

(This annex is an integral part of the standard.)

A.1 Principle

Before the determination of the Vicat softening temperature and the melt flow rate, the test specimens or pellets shall be pre-dried.

A.2 Procedure

Pre-dry test specimens and pellets for the determination of the melt flow rate and Vicat softening temperature for at least two hours in an air-circulating oven at 90 ± 2 °C.

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