
International Standard



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Plastics — Styrene/acrylonitrile (SAN) copolymer moulding and extrusion materials — Part 1 : Designation

Plastiques — Matières à mouler et à extruder à base de copolymère de styrène et d'acrylonitrile (SAN) — Partie 1 : Désignation

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Foreword

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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.

International Standard ISO 4894/1 was developed by Technical Committee ISO/TC 61, *Plastics*, and was circulated to the member bodies in February 1978.

It has been approved by the member bodies of the following countries :

Australia	Hungary	Romania
Austria	India	South Africa, Rep. of
Belgium	Iran	Spain
Bulgaria	Italy	Sweden
Canada	Japan	Switzerland
Czechoslovakia	Korea, Rep. of	Turkey
Egypt, Arab Rep. of	Mexico	USA
Finland	Netherlands	USSR
Germany, F.R.	Poland	Yugoslavia

The member bodies of the following countries expressed disapproval of the document on technical grounds :

France
United Kingdom

Plastics — Styrene/acrylonitrile (SAN) copolymer moulding and extrusion materials — Part 1 : Designation

1 Scope and field of application

1.1 This International Standard specifies a method of designation and the general requirements for styrene/acrylonitrile (SAN) moulding and extrusion materials.

1.2 Major types of styrene/acrylonitrile (SAN) moulding and extrusion materials are differentiated from one another by appropriate levels of selected specific properties. SAN itself is described by selected general characteristics for reference purposes.

1.3 These types are uncoloured or coloured materials comprising copolymers of styrene and/or substituted styrene [at least 50 % (m/m) in the resinous phase] with acrylonitrile of between 10 and 50 % (m/m). Lubricants, plasticizers, antioxidants and other additives may be present but are not further specified here.

1.4 Other properties may be necessary to specify materials for particular purposes.

2 References

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

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

ISO 1133, *Thermoplastics — Determination of the melt flow rate.*¹⁾

ISO 1656, *Raw natural rubber and natural rubber latex — Determination of nitrogen.*

ISO 2561, *Plastics — Determination of residual styrene monomer in polystyrene by gas chromatography.*

4581, *Plastics — Styrene acrylonitrile copolymers — Determination of residual acrylonitrile monomer — Gas chromatography method.*²⁾

ISO 4894/2, *Plastics — Styrene/acrylonitrile (SAN) copolymer moulding and extrusion materials — Part 2 : Determination of properties.*²⁾

3 Designation

3.1 Materials are identified as "SAN" (to indicate styrene/acrylonitrile copolymer). The individual range or "cell" values for softening temperature, melt flow rate and acrylonitrile content are indicated by a two-digit number and a letter; for example, according to 4.2, a material of

— Vicat softening temperature 101 °C,

— melt flow rate 6 g/10 min, and

— acrylonitrile content 25 % (m/m)

would be designated "SAN 32 B".

3.2 The "cell" system of classification provides the means of close characterization of materials. However, the existence of any given sequence of numbers and letter is no guarantee that such a combination of properties would be possible in practice.

3.3 The designation is applicable to materials ready for normal use, for example containing colourants and additives for normal processing. However, their presence can affect properties in such a way that the products may have a different designation from the material without colourants or additives, in which case this must be stated.

NOTES

1 The residual monomers are principally styrene and acrylonitrile. The residual styrene monomer may be determined by the method specified in ISO 2561. A method for the determination of residual acrylonitrile monomer will form the subject of ISO 4581. Restriction of residual monomer may be required for certain purposes, such as food packaging, subject to appropriate national regulations.

2 "SAN" materials are available, ready for processing, in a variety of particle shapes and sizes; some particles are of simple geometric shapes, and others are irregular. The dimensions are usually in the range 1 to 4 mm.

1) At present at the stage of draft. (Revision of ISO/R 1133.)

2) At present at the stage of draft.

4 General requirements

4.1 System of designation

4.1.1 The requirements that define a "SAN" material and the properties used to classify these materials are given in 4.2, together with the appropriate test methods. The granules used for the preparation of the test specimens shall be predried as prescribed in ISO 4894/2.

4.1.2 Average results of tests shall conform to the requirements of (4.2). If these results fall on the borderline between two cells, the material shall be classified by the manufacturer.

4.1.3 Only those tests characteristic of type shall be used to establish conformity of a material to type. Other properties needed for a particular purpose may be identified, methods for their determination being specified in ISO 4894/2. Routine inspection shall be limited to those properties required to identify the material to the satisfaction of the purchaser.

4.2 Principal properties

4.2.1 Bound acrylonitrile content

The bound acrylonitrile content, determined by the Kjeldahl method specified in ISO 1656, is designated by a letter as follows :

- A : 10 to 20 % (m/m);
- B : > 20, up to 30 % (m/m);
- C : > 30, up to 50 % (m/m).

4.2.2 Vicat softening temperature

See the table.

4.2.3 Melt flow rate

See the table.

4.3 Secondary properties

Other properties may be similarly described, with limiting values, and may be measured, when required for specific applications. If a method is described in ISO 4894/2, that method shall be used.

Table

Principal properties	Test method	Units	Limiting values			
			Designation number			
			1	2	3	4
Vicat softening temperature	ISO 306 (B/50 °C/h)	°C	< 90	90 to 100	> 100 to 110	> 110
Melt flow rate	ISO 1133, but at 220 °C and 98 N (10 kgf) load	g/10 min	< 5	5 to 10	> 10 to 20	> 20

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5 Conditioning

Moulded test specimens shall be allowed to cool, after moulding, in a desiccator to 23 ± 2 °C. In case of dispute, specimens and granules shall be placed for 4 h in an oven at 80 °C and then cooled in a desiccator to 23 ± 2 °C and left there until tested.

NOTE — The test specimens shall be prepared as specified in ISO 4894/2.