

INTERNATIONAL  
STANDARD

**ISO**  
**4581**

Second edition  
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**Plastics — Styrene/acrylonitrile  
copolymers — Determination of residual  
acrylonitrile monomer content — Gas  
chromatography method**

*Plastiques — Copolymères styrène/acrylonitrile — Dosage de  
l'acrylonitrile monomère résiduel — Méthode par chromatographie en  
phase gazeuse*



Reference number  
ISO 4581:1994(E)

## 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 4581 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 5, *Physical-chemical properties*.

This second edition cancels and replaces the first edition (ISO 4581:1987), the annex of which has been technically revised.

Annex A forms an integral part of this International Standard.

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# Plastics — Styrene/acrylonitrile copolymers — Determination of residual acrylonitrile monomer content — Gas chromatography method

## 1 Scope

This International Standard specifies a method for determining the content of residual acrylonitrile monomer in styrene/acrylonitrile copolymers and blends by gas chromatography. Bearing in mind that gas chromatography offers a wide range of possible conditions, the method specified in this International Standard is that shown to have been suitable in practice.

## 2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 2561:1974, *Plastics — Determination of residual styrene monomer in polystyrene by gas chromatography*.

## 3 Principle

A test portion is dissolved in dimethylformamide and a small volume of the solution injected into a gas chromatograph equipped with flame ionization detector to separate and detect the volatile components. The solvent contains a known amount of propionitrile or acetonitrile as an internal standard for quantitative evaluation. With this method, a lower detection limit of the order of 3 parts per million (ppm) of acrylonitrile in the copolymer may be expected. To obtain a lower

detection limit of the order of 0,3 ppm to 0,4 ppm, an alternative method is specified in annex A. In this method, the test portion is dissolved in propanediol-(1,2)-carbonate, and the solution is injected into a gas chromatograph equipped with a thermionic nitrogen detector. The solution also contains propionitrile as an internal standard.

## 4 Reagents

During the analysis, use only reagents of recognized analytical grade. Special safety precautions shall be observed when handling the following reagents, especially acrylonitrile.

**4.1 Dimethylformamide**, of purity such that no impurity peaks occur within the range of retention times of the substances to be determined.

### 4.2 Propionitrile.

**Acetonitrile** may be used as internal standard instead of propionitrile, if it has been shown that the same results are obtained.

### 4.3 Acrylonitrile.

## 5 Apparatus

Ordinary laboratory apparatus, plus the following:

**5.1 Gas chromatograph**, with flame ionization detector and recorder.

### Gas-chromatographic operating conditions

Column: Stainless-steel or glass tubing, 1 m to 2 m length, 3 mm to 4 mm internal diameter is recommended. The column shall be packed with