International Standard ISO 489

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Plastics — Determination of the refractive index of transparent plastics

Plastiques — Détermination de l'indice de réfraction des plastiques transparents

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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 developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized 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.

International Standard ISO 489 was developed by Technical Committee ISO/TC 61, *Plastics.*

It was submitted directly to the ISO Council, in accordance with clause 6.11.2 of part 1 of the Directives for the technical work of ISO. It cancels and replaces ISO Recommendation R 489-1966, which had been approved by the member bodies of the following countries:

Australia
Austria
Belgium
Chile
Czechoslovakia
Finland
France
Germany, F.R.
Hungary
India
Italy
Japan
Netherlands
New Zealand
Poland
Portugal
Romania
South Africa, Rep. of
Spain
Sweden
Switzerland
United Kingdom
USA
USSR
Yugoslavia

No member body had expressed disapproval of the document.

Plastics — Determination of the refractive index of transparent plastics

1 Scope and field of application

1.1 This International Standard specifies two methods of test for determining the refractive index of transparent plastics, namely

Method A: Refractometric method for measuring the refractive index of transparent cast, moulded or sheet materials by means of a refractometer. The method is recommended when great accuracy is required. It is not applicable to powdered or granulated transparent materials.

Method B: Immersion method (Becke line phenomenon) for determining the refractive index of powdered or granulated transparent materials by means of a microscope and making use of the Becke line phenomenon. Monochromatic light should, in general, be used to avoid dispersion effects. The accuracy of this method is about the same as that of method A.

1.2 Refractive index is a fundamental property which can be used for the control of purity and composition, for the identification of materials and for the design of optical parts.

The change of refractive index with temperature may give an indication of transition points of materials.

2 Apparatus and materials

2.1 Method A

2.1.1 Abbe refractometer or any other refractometer that can be shown to give the same results.

2.1.2 Source of white light.

2.1.3 Contacting liquid (see 5.1).

2.2 Method B

2.2.1 Microscope, having a magnifying power of at least X 200, an 8 mm objective of good quality, and a centring substage condenser capable of being stopped down to a very narrow axial beam.

2.2.2 Immersion liquids, with different refractive indices (see 5.2).

3 Preparation of test specimens

3.1 Method A

The test specimens cut from the sample should be of such a size as will fit on the face of the fixed half of the refractometer prisms.

The following dimensions are convenient:

width	6 mm
length	12 mm
thickness	3 mm

For maximum accuracy the surface of the test specimen in contact with the prism should be quite flat and well polished. Satisfactory contact between the test specimen and the prism is indicated by the dividing line between the light and dark halves of the eyepiece field appearing sharp and straight. A second surface with a fair polish is prepared perpendicular to the first and on one end of the test specimen.

These two polished surfaces should intersect along a sharp line without a bevelled or rounded edge.

For anisotropic materials, see 5.3.

3.2 Method B

The sample consists of particles of the material to be examined, for example powder, granules, or chips. The particles should have linear dimensions sufficiently small and be so distributed as to permit simultaneous observation of approximately equal areas of the sample and surrounding in the field.

The thickness of the particles should be significantly less than the working distance of the microscope objective.