

International Standard



974

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Plastics — Determination of the brittleness temperature by impact

Plastiques — Détermination de la température de fragilité au choc

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (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 set up 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 974 was developed by Technical Committee ISO/TC 61, *Plastics*.

It was submitted directly to the ISO Council, in accordance with clause 5.10.1 of part 1 of the Directives for the technical work of ISO. It cancels and replaces ISO Recommendation R 974-1969, which had been approved by the member bodies of the following countries :

Australia	Finland	Netherlands
Austria	Greece	New Zealand
Belgium	Hungary	Romania
Canada	India	Spain
Chile	Ireland	Sweden
Colombia	Israel	Turkey
Czechoslovakia	Italy	United Kingdom
Egypt, Arab Rep. of	Japan	USA

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

France
Germany, F. R.
Switzerland
USSR

Plastics — Determination of the brittleness temperature by impact

1 Scope and field of application

1.1 This International Standard specifies a method for the determination of the temperature at which plastics that are not rigid at normal ambient temperature exhibit brittle failure under specified conditions of deformation. A supplementary technique uses notched specimens and these show brittle failure at a much higher temperature. The method takes account of the statistical nature of brittle failure and makes provision for the testing of sufficient specimens to permit calculation of the brittleness temperature on a statistical basis.

1.2 The “brittleness temperature” test was originally developed to measure the temperature at which a polymer ceased to be flexible and became “glasslike”. Because of the statistical nature of these failures, “brittleness temperature” is now defined as given in 3.1. The method specified in this International Standard establishes the temperatures at which there is a 50 % chance of failure in unnotched or notched specimens. It has been found useful for specification purposes, although it does not necessarily relate to the lowest temperature at which the material may be used, since the basic polymer brittleness will be modified by any orientation produced during fabrication, by thermal history, and by the stress system applied, especially by the rate of impact. The typical precision of $\pm 5\text{ }^{\circ}\text{C}$ should be recognized in establishing values used in material specifications.

2 References

ISO 175, *Plastics — Determination of the effects of liquid chemicals including water*.

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

3 Definitions

3.1 brittleness temperature : The temperature at which there is a 50 % probability of failure in a specimen when tested by the method specified. It may be designated t_{50} .

3.2 testing speed : The relative velocity between the striking edge of the test apparatus and a test specimen held in the specimen clamp.

4 Principle

Bending a cantilever specimen through 90° around a mandrel of specified radius, at a constant testing speed in an inert medium, the temperature of which is accurately known and precisely controlled.