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Plastics and ebonite — Determination of temperature of deflection under load

Plastiques et ébonite — Détermination de la température de fléchissement sous charge

Reference number
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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 75 was prepared by Technical Committee ISO/TC 61, *Plastics*.

This second edition cancels and replaces the first edition (ISO 75 : 1974), of which it constitutes a technical revision.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Plastics and ebonite — Determination of temperature of deflection under load

1 Scope and field of application

1.1 This International Standard specifies two methods for the determination of the temperature of deflection under load (bending stress) of plastics and ebonite:

- Method A, using a nominal surface stress of 1,80 MPa;
- Method B, using a nominal surface stress of 0,45 MPa.

1.2 The methods specified are only applicable to materials that are rigid at room temperature, and are suitable for assessing the behaviour of plastics and ebonite at elevated temperature under load at a specified rate of temperature increase. The results obtained do not necessarily represent maximum use temperatures, because in practice essential factors such as time, loading conditions and nominal surface stress may differ from the testing conditions.

1.3 The methods are more reproducible with amorphous plastics than with semi-crystalline ones and are not recommended for testing laminates. With some materials, it may be necessary to anneal the test specimens to obtain reliable results.

2 References

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

ISO 293, *Plastics — Compression moulding test specimens of thermoplastic materials.*

ISO 294, *Plastics — Injection moulding test specimens of thermoplastic materials.*

ISO 295, *Plastics — Compression moulding test specimens of thermosetting materials.*

ISO 2818, *Plastics — Preparation of test specimens by machining.*

ISO 3167, *Plastics — Preparation and use of multipurpose test specimens.*

3 Principle

Determination of the temperature at which a specified deflection occurs when a standard test specimen of plastics or ebonite is subjected to bending stress producing one of the nominal surface stresses given in 1.1, when the temperature is raised at a uniform rate.

4 Apparatus

4.1 Means of application of bending stress.

The apparatus shall be constructed essentially as shown in the figure. It consists of a rigid metal frame in which a rod can move freely vertically. The rod is provided with a weight-carrying plate and a loading nose. The base of the frame is fitted with test specimen supports; these and the vertical members of the frame are made of metal having the same coefficient of linear expansion as the rod.

The test specimen supports consist of cylindrical-shaped metal pieces 100 ± 2 mm apart (see the figure), with their lines of contact in a horizontal plane, fitted to the base of the frame in such a way that the vertical force applied to the test specimen by the loading nose is midway between them. The edges of the supports are parallel to the loading nose and at right angles to the length direction of a test specimen placed symmetrically between them. The contact edges of the supports and the loading nose are rounded to a radius of $3,0 \pm 0,2$ mm and shall be longer than the thickness of the test specimen.

Unless vertical parts of the apparatus have the same coefficient of linear expansion, the differential change in the length of these parts introduces an error in the reading of the apparent deflection of the test specimen. A blank test shall be made on each apparatus using a test specimen made of rigid material having a low coefficient of expansion.¹⁾ The temperature ranges to be used shall be covered and a correction term determined for each temperature. If the correction term is 0,010 mm or greater, its algebraic sign shall be noted and the term applied to each test by adding it algebraically to the reading of apparent deflection of the test specimen.

4.2 Heating bath, containing a suitable liquid in which the test specimen can be immersed to a depth of at least 50 mm.

1) Invar and borosilicate glass have been found suitable for this purpose.