International Standard 6602

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Plastics — Determination of flexural creep by three-point loading

Plastiques — Détermination du fluage en flexion par sollicitation en trois points

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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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

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Plastics — Determination of flexural creep by three-point loading

1 Scope and field of application

1.1 This International Standard describes a method for determining the flexural creep of plastics in the form of standard test specimens under defined conditions such as pre-treatment, temperature and humidity. It applies only to a simple freely supported beam, loaded at mid-span (three-point loading test).

1.2 The method is suitable for use with rigid and semi-rigid (see ISO 472 for definitions) non-reinforced, filled and fibre-reinforced plastic materials in the form of rectangular bars moulded directly, or cut from sheets or moulded shapes.

NOTE — The method may be unsuitable for certain fibre-reinforced materials whose fibre orientation is not symmetrical with the loading direction.

1.3 The method may not be suitable for determining the flexural creep of rigid cellular plastics and attention is drawn to ISO 1209.

1.4 The method may provide data for quality control, quality assurance and for research and development.

1.5 Flexural creep may vary significantly with differences in specimen preparation and dimensions and the testing environment. Consequently, where precise comparative results are required, these factors must be carefully controlled.

1.6 If flexural properties are to be used for engineering design purposes, the sensitivity of plastic materials necessitates testing over a broad range of stress, time and environment.

2 References

ISO 178, *Plastics — Determination of flexural properties of rigid plastics.*

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

ISO 472, *Plastics — Vocabulary.*

ISO 899, *Plastics — Determination of tensile creep.*

ISO 1209, *Rigid cellular plastics — Rigid bending test.*

3 Definitions

For the purpose of this International Standard, the following definitions apply:

3.1 creep: The increase of strain with time, when a constant stress is applied. It is expressed by the time-dependent strain resulting from a constant stress.

3.2 flexural stress, σ: The maximum nominal surface stress in the section of the test specimen at mid-span. It is calculated according to the relationship given in 7.1.2.

3.3 deflection, $d(t)$: The distance over which the top or bottom surface of the test specimen at mid-span has deviated during flexure from its position before application of the test load.

3.4 flexural creep strain, $\varepsilon(t)$: The maximum nominal strain in the surface of the test specimen produced by the applied stress at any given time during a creep test, calculated as in 7.1.3.

3.5 flexural creep modulus, $E(t)$: The ratio of applied flexural stress to flexural creep strain, calculated as in 7.1.1.

4 Apparatus

The testing apparatus shall consist of the following components (see figure 1):

4.1 Test rack

A suitable rigid rack shall be used which provides free support of specimens at both ends on a span equal to (16 ± 1) times the thickness (height) of the specimen. Sufficient space must be allowed below the specimens for dead-weight loading at mid-span. The test rack shall be level.

NOTE — In some cases it may be necessary to use a test rack with a span greater than 17 times the thickness (height) of the test specimen (see the note in 6.2).