SLOVENSKI STANDARD
oSIST prEN ISO 75-1:2019

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Polimerni materiali - Ugotavljanje temperature upogiba pod obremenitvijo - 1. del: Splošna preskusna metoda (ISO/DIS 75-1:2019)

Plastics - Determination of temperature of deflection under load - Part 1: General test method (ISO/DIS 75-1:2019)

Kunststoffe - Bestimmung der Wärmeformbeständigkeitstemperatur - Teil 1: Allgemeines Prüfverfahren (ISO/DIS 75-1:2019)

Plastiques - Détermination de la température de fléchissement sous charge - Partie 1: Méthode d'essai générale (ISO/DIS 75-1:2019)

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Plastics — Determination of temperature of deflection under load —

Part 1: General test method

Plastiques — Détermination de la température de fléchissement sous charge —

Partie 1: Méthode d'essai générale

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 75-1 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 2, *Mechanical properties*.

This third edition cancels and replaces the second edition (ISO 75-1:2013), which has been technically revised.

Main issues of the revision are:

— Specification for the temperature difference between the middle and the ends of the test specimens has been removed

— Specification for the position of the tip of the temperature sensor has been widened

— Editorial changes

ISO 75 consists of the following parts, under the general title *Plastics — Determination of temperature of deflection under load*:

— *Part 1: General test method*

— *Part 2: Plastics and ebonite*

— *Part 3: High-strength thermosetting laminates and long-fibre-reinforced plastics*

Introduction

The first editions of this part of ISO 75 and ISO 75-2 described three methods (A, B and C) using different test loads and two specimen positions, edgewise and flatwise. For testing in the flatwise position, test specimens with dimensions 80 mm × 10 mm × 4 mm were required. These can be moulded directly or machined from the central section of the multipurpose test specimen (see ISO 20753).

The previous (i.e. second) editions of this part of ISO 75 and ISO 75-2 specified the flatwise test position as preferred, while still allowing testing in the edgewise position with the test conditions given in Annex A until the next revision of this part of ISO 75 and ISO 75-2, as agreed in ISO/TC 61/SC 2/WG 5. Therefore, with this revision, the edgewise test position will be removed.

At the time of publication, technical development of testing instruments made instruments based on a fluidized bed or air ovens available. These are especially advantageous for use at temperatures at which the common silicone oil-based heat transfer fluids reach their limit of thermal stability. The fluidized bed and air oven methods of heat transfer are introduced in this part of ISO 75.

An additional precision statement covering the new heating methods is introduced in ISO 75-2.

Plastics — Determination of temperature of deflection under load —

Part 1: General test method

1 Scope

1.1 This part of ISO 75 gives a general test method for the determination of the temperature of deflection under load (flexural stress under three-point loading) of plastics. Different types of test specimen and different constant loads are defined to suit different types of material.

1.2 ISO 75-2 gives specific requirements for plastics (including filled plastics and fibre-reinforced plastics in which the fibre length, prior to processing, is up to 7,5 mm) and ebonite, while ISO 75-3 gives specific requirements for high-strength thermosetting laminates and long-fibre-reinforced plastics in which the fibre length is greater than 7,5 mm.

1.3 The methods specified are suitable for assessing the relative behaviour of different types of material at elevated temperature under load at a specified rate of temperature increase. The results obtained do not necessarily represent maximum applicable temperatures because in practice essential factors, such as time, loading conditions and nominal surface stress, can differ from the test conditions. True comparability of data can only be achieved for materials having the same room-temperature flexural modulus.

1.4 The methods specify preferred dimensions for the test specimens.

1.5 Data obtained using the test methods described are not intended to be used to predict actual end-use performance. The data are not intended for design analysis or prediction of the endurance of materials at elevated temperatures.

1.6 This method is commonly known as the HDT test (heat deflection test or heat distortion test), although there is no official document using this designation.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 75-2, *Plastics — Determination of temperature of deflection under load — Part 2: Plastics and ebonite*

ISO 75-3, *Plastics — Determination of temperature of deflection under load — Part 3: High-strength thermosetting laminates and long-fibre-reinforced plastics*

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

ISO 16012, *Plastics — Determination of linear dimensions of test specimens*

ISO 20753, *Plastics — Test specimens*

IEC 60584-1, *Thermocouples-Part 1: EMF specifications and tolerances*

ASTM E608/E608M-13, *Standard Specification for Mineral-Insulated, Metal-Sheathed Base Metal Thermocouples*

ASTM E1137/E1137M-08*(2014), Standard Specification for Industrial Platinum Resistance Thermometers*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
flexural strain
ε_f
nominal fractional change in length of an element of the outer surface of the test specimen at midspan

Note 1 to entry: It is expressed as a dimensionless ratio or a percentage (%).

3.2
flexural strain increase
$\Delta\varepsilon_f$ specified increase in flexural strain that takes place during heating

Note 1 to entry: It is expressed as a percentage (%).

3.3
deflection
s
distance over which the top or bottom surface of the test specimen at midspan deviates during flexure from its original position

Note 1 to entry: It is expressed in millimetres (mm).

3.4
standard deflection
Δs increase in deflection corresponding to the flexural strain increase, $\Delta\varepsilon_f$, at the surface of the test specimen, and which is specified in ISO 75-2 or ISO 75-3

Note 1 to entry: It is expressed in millimetres (mm) [see 8.3, Formula (4)].

3.5
flexural stress
σ_f
nominal stress at the outer surface of the test specimen at midspan

Note 1 to entry: It is expressed in megapascals (MPa).

3.6
load
F
force, applied to the test specimen at midspan, which results in a defined flexural stress

Note 1 to entry: It is expressed in newtons (N) [see 8.1, Formulae (1) to (3)].

3.7
temperature of deflection under load
T_f
temperature at which the deflection of the test specimen reaches the standard deflection as the temperature is increased

Note 1 to entry: It is expressed in degrees Celsius (°C).