

**Plastid. Sulamisomaduste määramine  
(sulamistemperatuur või sulamise  
temperatuuriintervall) poolkristallilistel  
polümeeridel**

Plastics - Determination of melting behaviour  
(melting temperature or melting range) of semi-  
crystalline polymers by capillary tube and polarizing-  
microscope methods

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 3146:2000 sisaldab Euroopa standardi EN ISO 3146:2000 + AC:2002 + AC:2003 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 15.11.2000 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 3146:2000 consists of the English text of the European standard EN ISO 3146:2000 + AC:2002 + AC:2003.</p> <p>This document is endorsed on 15.11.2000 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
--	---

<p><b>Käsitlusala:</b> Standard määrab kindlaks kaks meetodit poolkristalliliste polümeeride sulamisomaduste hindamiseks.</p>	<p><b>Scope:</b></p>
---	----------------------

**ICS** 83.080.01

**Võtmesõnad:**

English version

Plastics

Determination of melting behaviour (melting temperature  
or melting range) of semi-crystalline polymers by  
capillary tube and polarizing-microscope methods  
(ISO 3146 : 2000)

Plastiques – Détermination du  
comportement à la fusion (température  
de fusion ou plage de températures de  
fusion) des polymères semi-cristallins  
par méthodes du tube capillaire et du  
microscope polarisant  
(ISO 3146 : 2000)

Kunststoffe – Bestimmung des  
Schmelzverhaltens (Schmelztemperatur  
oder Schmelzbereich) von teilkristallinen  
Polymeren im Kapillarrohr- und  
Polarisationsmikroskop-Verfahren  
(ISO 3146 : 2000)

This European Standard was approved by CEN on 2000-04-09.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

**CEN**

European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

Management Centre: rue de Stassart 36, B-1050 Brussels

Foreword

International Standard

ISO 3146 : 2000 Plastics – Determination of melting behaviour (melting temperature or melting range) of semi-crystalline polymers by capillary tube and polarizing-microscope methods,

which was prepared by ISO/TC 61 ‘Plastics’ of the International Organization for Standardization, has been adopted by Technical Committee CEN/TC 249 ‘Plastics’, the Secretariat of which is held by IBN, as a European Standard.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by December 2000 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard:

Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 3146 : 2000 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to international publications are listed in Annex ZA (normative).

Contents

Page

1	Scope .....	3
2	Normative reference .....	3
3	Terms and definitions .....	3
4	Method A — Capillary tube .....	4
5	Method B — Polarizing microscope .....	7

Introduction

The melting behaviour of a crystalline or semi-crystalline polymer is a structure-sensitive property.

In polymers, a sharp melting point, such as is observed for low molecular mass substances, usually does not occur; instead a melting temperature range is observed on heating, from the first change of shape of the solid particles to the transformation into a highly viscous or viscoelastic liquid, with accompanying disappearance of the crystalline phase. The melting range depends upon a number of parameters, such as molecular mass, molecular mass distribution, per cent crystallinity, and thermodynamic properties.

It may also depend on the previous thermal history of the specimens. The lower or upper limit of the melting range, or its average value, is sometimes conventionally referred to as the “melting temperature”.

## 1 Scope

This International Standard specifies two methods for evaluating the melting behaviour of semi-crystalline polymers.

Melting temperatures determined by the different methods usually differ by several kelvins for the reasons explained in the introduction.

### Method A: Capillary tube

This method is based on the changes in shape of the polymer. It is applicable to all semi-crystalline polymers and their compounds.

NOTE 1 Method A may also be useful for the evaluation of the softening of non-crystalline solids.

### Method B: Polarizing microscope

This method is based on changes in the optical properties of the polymer. It is applicable to polymers containing a birefringent crystalline phase. It may not be suitable for plastics compounds containing pigments and/or other additives which could interfere with the birefringence of the polymeric crystalline zone.

NOTE 2 Another method applicable to semi-crystalline polymers is described in ISO 11357-3:1999, *Plastics — Differential scanning calorimetry (DSC) — Part 3: Determination of temperature and enthalpy of melting and crystallization*.

## 2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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

## 3 Terms and definitions

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

### 3.1

#### **semi-crystalline polymer**

polymer containing both crystalline and amorphous phases which may be present in varying proportions