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**BS EN ISO 1133-2:2011**



BSI Standards Publication

# Plastics — Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics

Part 2: Method for materials sensitive to time-temperature history and/or moisture (ISO 1133-2:2011)

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This British Standard is the UK implementation of EN ISO 1133-2:2011. Together with BS EN ISO 1133-1:2011, it supersedes BS EN ISO 1133:2005 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/21, Testing of plastics.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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ISBN 978 0 580 63355 3

ICS 83.080.20

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 January 2012.

#### **Amendments issued since publication**

Date	Text affected
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## EUROPÄISCHE NORM

December 2011

ICS 83.080.20

Supersedes EN ISO 1133:2005

English Version

Plastics - Determination of the melt mass-flow rate (MFR) and  
melt volume-flow rate (MVR) of thermoplastics - Part 2: Method  
for materials sensitive to time-temperature history and/or  
moisture (ISO 1133-2:2011)

Plastiques - Détermination de l'indice de fluidité à chaud  
des thermoplastiques, en masse (MFR) et en volume  
(MVR) - Partie 2: Méthode pour les matériaux sensibles à  
l'historique temps-température et/ou à l'humidité (ISO  
1133-2:2011)

Kunststoffe - Bestimmung der Schmelze-Massefließrate  
(MFR) und der Schmelze-Volumenfließrate (MVR) von  
Thermoplasten - Teil 2: Verfahren für Materialien, die  
empfindlich gegen eine zeit- bzw. temperaturabhängige  
Vorgeschichte und/oder Feuchte sind (ISO 1133-2:2011)

This European Standard was approved by CEN on 30 November 2011.

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This European Standard exists 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 CEN-CENELEC Management Centre has the same status as the official versions.

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## Foreword

This document (EN ISO 1133-2:2011) has been prepared by Technical Committee ISO/TC 61 "Plastics" in collaboration with Technical Committee CEN/TC 249 "Plastics" the secretariat of which is held by NBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2012, and conflicting national standards shall be withdrawn at the latest by June 2012.

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

This document supersedes EN ISO 1133:2005.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

### Endorsement notice

The text of ISO 1133-2:2011 has been approved by CEN as a EN ISO 1133-2:2011 without any modification.

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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 1133-2 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 5, *Physical-chemical properties*.

ISO 1133 consists of the following parts, under the general title *Plastics — Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics*:

- *Part 1: Standard method*
- *Part 2: Method for materials sensitive to time-temperature history and/or moisture*

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## Introduction

This part of ISO 1133 provides a method that is appropriate to those materials that exhibit a high rheological sensitivity to the time-temperature history experienced by the sample during the test and/or moisture. For such materials, ISO 1133-1, which has less-tightly specified testing conditions than this part of ISO 1133, is considered to be unsuitable for obtaining data of an acceptable level of precision (i.e. at least equivalent to that obtained by ISO 1133-1 for stable materials). This part of ISO 1133 is considered to be particularly relevant for moisture sensitive materials.

The primary difference between this part of ISO 1133 and ISO 1133-1 is that this part of ISO 1133 specifies tighter tolerances on the temperature, time line, sample amount and pre-treatment, resulting in more reproducible and accurate measurements.

The accuracy of MVR determination of thermoplastic materials whose rheological behaviour is affected by phenomena such as hydrolysis and condensation is often significantly influenced by:

- moisture content and sample conditioning;
- sample handling;
- a small difference in temperature, i.e. the temperature variation in the cylinder with position and/or time;
- the total time that the material is exposed to the test temperature;
- the sample volume;
- sample form (shape and size — pellets, powder, flake, etc.);
- cleaning of the apparatus.

In order to obtain accurate repeatable and reproducible results, not only does the equipment need to meet the requirements specified in this part of ISO 1133, but also the material handling and test procedure need to be followed precisely and consistently, particularly with respect to those details mentioned above to which the results are sensitive. Minor deviations from the equipment requirements, procedure and/or sample handling can result in considerable loss of repeatability, reproducibility and accuracy of the measurement.

In general, the test conditions for determination of MVR and MFR values are specified in the material standard and shall be referred to prior to conducting tests. Test conditions for the determination of MVR and MFR of materials whose rheological behaviour is affected by hydrolysis, condensation or cross-linking during the measurement are in many cases not yet mentioned in the materials standards. Standards for these materials are likely to be revised or developed in the future. Where no relevant material standard exists or where no test conditions are specified, then the drying and test conditions should be agreed between the interested parties.

**NOTE** At the time of publication, there is no evidence to suggest that the use of this part of ISO 1133 for stable materials results in better precision in comparison with the use of ISO 1133-1.

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