
**Plastics — Thermomechanical analysis
(TMA) —**

**Part 3:
Determination of penetration temperature**

Plastiques — Analyse thermomécanique (TMA) —

Partie 3: Détermination de la température de pénétration



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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 3.

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 part of ISO 11359 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 11359-3 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 5, *Physical-chemical properties*.

ISO 11359 consists of the following parts, under the general title *Plastics — Thermomechanical analysis (TMA)*:

- Part 1: *General principles*
- Part 2: *Determination of coefficient of linear thermal expansion and glass transition temperature*
- Part 3: *Determination of penetration temperature*

Plastics — Thermomechanical analysis (TMA) —

Part 3:

Determination of penetration temperature

1 Scope

This part of ISO 11359 specifies a method for the determination of the penetration temperature of thermoplastics using thermomechanical analysis.

NOTE This method can also be used to measure the softening temperature.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 11359. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 11359 are encouraged to investigate the possibility of applying the most recent editions of the normative documents 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 472, *Plastics — Vocabulary*

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

ISO 11359-1, *Plastics — Thermomechanical analysis (TMA) — Part 1: General principles*

ISO 11359-2, *Plastics — Thermomechanical analysis (TMA) — Part 2: Determination of coefficient of linear thermal expansion and glass transition temperature*

3 Terms and definitions

For the purposes of this part of ISO 11359, the terms and definitions given in ISO 11359-1 and the following apply.

3.1

penetration mode

TMA mode used to measure the displacement of a penetration probe brought about by the softening of the test specimen

3.2

penetration temperature

temperature at which an abrupt probe displacement takes place during penetration mode TMA

4 Principle

The temperature at which the probe of a TMA apparatus begins to penetrate or change its rate of penetration is determined under a defined load when the temperature is raised at a constant rate.