

INTERNATIONAL STANDARD

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Plastics — Unsaturated polyester and epoxy resins — Determination of overall volume shrinkage

*Plastiques — Résines d'époxydes et de polyesters non saturés —
Détermination du retrait global en volume*

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Reference number
ISO 3521:1997(E)

Foreword

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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.

International Standard ISO 3521 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 12, *Thermosetting materials*.

This second edition cancels and replaces the first edition (ISO 3521:1976), of which it constitutes a technical revision.

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Plastics — Unsaturated polyester and epoxy resins — Determination of overall volume shrinkage

1 Scope

This International Standard specifies a method for the determination of the overall volume shrinkage of unsaturated polyester and epoxy resins.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1675:1985, *Plastics — Liquid resins — Determination of density by the pyknometer method*.

3 Definition

For the purposes of this International Standard, the following definition applies.

3.1 overall volume shrinkage: The sum of the shrinkage during curing and the shrinkage after curing of a casting when cooled to ambient temperature.

4 Principle

The overall volume shrinkage is calculated from the specific gravity of a last specimen before and after curing.

First, the specific gravity of the resin composition is determined

- at the initial temperature of mixing of the components, excluding the initiators normally added to unsaturated polyesters (see 6.1.3, note 1);
- at 23 °C after curing and conditioning of the last specimen.

The overall volume shrinkage is then calculated as a percentage of the change in the specific gravity before and after curing, as follows:

$$\text{Overall volume shrinkage} = \frac{\text{Uncured specific gravity} - \text{Cured specific gravity}}{\text{Uncured specific gravity}} \times 100$$