

Methods of testing

Plastics —

**Part 9: Sampling and test specimen
preparation —**

**Method 911: Injection moulding of
multipurpose thermosetting test
specimens**

ICS 83.080.10

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee PRI/42, Fibre reinforced thermosetting plastics and prepregs, upon which the following bodies were represented:

- British Plastics Federation
- Chemical Industries Association
- Department of the Environment (Building Research Establishment)
- Department of Trade and Industry (National Physical Laboratory)
- Electrical and Electronic Insulation Association (BEAMA Ltd.)
- European Resin Manufacturers' Association
- Ministry of Defence
- Motor Industry Association
- Rapra Technology Ltd.
- Society of Motor Manufacturers and Traders

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National foreword

This British Standard has been prepared by Technical Committee PRI/42, and is identical with ISO 10724:1994, published by the International Organization for Standardization (ISO).

NOTE International and European Standards as well as overseas standards, are available from Customer Services, BSI, 389 Chiswick High Road, London, W4 4AL

Cross-reference

International standard	Corresponding British Standard
ISO 3167:1993	BS 2782 <i>Methods of testing plastics</i> Part 9: <i>Sampling and test specimen preparation</i> Method 931A:1993 <i>Preparation and use of multipurpose test specimens</i> (Identical)

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 10, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Introduction

In the injection-moulding process, there are many factors that influence the properties of mouldings and the numerical values of test results. The thermal and mechanical properties of test specimens are strongly dependent on the conditions of the moulding process. Precise definition of the essential parameters of the moulding process is the basic requirement for ensuring reproducible operating conditions.

It is important to define the moulding conditions and to take into consideration the correlation between the properties of thermosetting materials and related parameters in the moulding process.

The specimens processed by injection moulding can have differences in orientation of reinforcement fibres and curing. These phenomena can cause scatter in the numerical values of properties. Residual stress as a result of the curing and cooling process can produce the same effect. Due to the crosslinking of thermosets, molecular orientation is of less influence on mechanical properties than it is for thermoplastics.

1 Scope

This International Standard describes the general principles to be followed for injection moulding test specimens of thermosetting materials. It provides a basis for establishing reproducible moulding conditions. Its purpose is to promote uniformity in describing the various essential parameters of the moulding operation, and also to establish uniform practice in reporting test conditions. The exact conditions required to prepare test specimens in a defined and reproducible way will vary for each material, mould and injection machine. These conditions must be agreed upon between the interested parties, when they do not form a part of the relevant International Standard.

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 3167:1993, *Plastics — Multipurpose test specimens*.

3 Definitions

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

3.1

mould-surface temperature

the average temperature of the mould-cavity surface, measured at several points on each half of the mould cavity after the system has attained thermal equilibrium and immediately after opening the mould

3.2

temperature of the plasticized material

the temperature of the plasticized material as measured in a free shot

3.3

injection pressure

the maximum pressure applied to the plastic material in front of the screw during the injection time (see Figure 1)

3.4

hold pressure

the pressure applied to the plastic material in front of the screw during the hold time

3.5 Moulding cycle

The complete sequence of operations in the moulding process required for the production of one set of test specimens (see Figure 1).

A moulding cycle consists of the following time intervals:

3.5.1

injection time

the time interval from the beginning of screw forward movement until the mould cavity is filled

3.5.2

hold time; dwell time

the time interval from the time the mould cavity is filled until the screw begins to move back

3.5.3

cure time

the time interval from the end of injection until the mould starts to open

3.5.4

mould open time

the time interval beginning at the instant the mould starts to open, including the removal of the moulding, until the mould is closed again