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**Plastics film and sheeting —  
Determination of impact resistance by  
the free-falling dart method —**

**Part 2:  
Instrumented puncture test**

*Film et feuille de plastiques — Détermination de la résistance au choc  
par la méthode par chute libre de projectile —*

*Partie 2: Essai avec appareil de perforation*





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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 11, *Products*.

This second edition cancels and replaces the first edition (ISO 7765-2:1994), which has been technically revised.

The main changes are as follows:

- impact failure definition has been added (3.7);
- the list of clamping devices and techniques has been updated (5.2.4);
- the force measurement (5.3) has been aligned with the ISO 6603-2 method;
- the calculation clause (Clause 8) has been aligned with the ISO 6603-2 method;
- test report requirements (Clause 10) have been improved.

A list of all parts in the ISO 7765 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

The impact-penetration test described in the ISO 7765 series is used for the assessment of plastic films and thin sheets (hereinafter referred to as films) under an impact stress applied at right angles to the plane of the film.

ISO 7765-1 can be used if it is sufficient to characterize the impact behaviour of the film by an impact failure energy. This document is used if a force-deformation or a force-time diagram, recorded at practically constant velocity of the striker, is necessary for characterization of the impact behaviour.

[Annex A](#) of is for information only.

# Plastics film and sheeting — Determination of impact resistance by the free-falling dart method —

## Part 2: Instrumented puncture test

### 1 Scope

This document specifies a test method for the determination of puncture impact properties of a plastic film using instruments for measuring force and deflection. It is applicable if a force-deflection or force-time diagram, recorded at nominally constant striker velocity, is required for detailed characterization of the impact behaviour. This test method is also required when a small number of test specimens are available, and the staircase method described in the ISO 7765-1 cannot be applied.

The test method is applicable to films of up to 1 mm thickness and makes it possible to compare impact-penetration forces, biaxial deformabilities and energy-absorption capacities of films. Also, the transition region between brittle and tough behaviour of the film under the conditions of testing can be determined by varying the temperature or the penetration velocity or the relative humidity<sup>[1]</sup>.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 4593, *Plastics — Film and sheeting — Determination of thickness by mechanical scanning*

### 3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <https://www.electropedia.org/>

#### 3.1

##### peak force

$F_M$

maximum force exerted by the striker in the direction of impact during the test

Note 1 to entry: See [Figures 1](#) to [3](#).