



**International  
Standard**

**ISO 7765-2**

**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*

**Third edition  
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# Contents

	Page
<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Principle</b> .....	<b>4</b>
<b>5 Apparatus</b> .....	<b>5</b>
5.1 General.....	5
5.2 Test device.....	5
5.2.1 General.....	5
5.2.2 Energy carrier.....	6
5.2.3 Striker.....	7
5.2.4 Clamping device.....	7
5.3 Instrument for measuring force and deflection.....	9
5.3.1 General.....	9
5.3.2 Force measurement sensor.....	9
5.3.3 Deflection measurement system.....	9
5.4 Thickness gauge.....	9
<b>6 Test specimens</b> .....	<b>9</b>
6.1 Sampling and preparation of test specimens.....	9
6.2 Number of test specimens.....	10
6.3 Conditioning of test specimens.....	10
<b>7 Procedure</b> .....	<b>10</b>
7.1 Test atmosphere.....	10
7.2 Measuring the thickness.....	10
7.3 Clamping the test specimen.....	10
7.4 Impact-penetration test.....	10
<b>8 Calculation and expression of results</b> .....	<b>11</b>
<b>9 Precision</b> .....	<b>12</b>
<b>10 Test report</b> .....	<b>12</b>
<b>Annex A (informative) General remarks</b> .....	<b>14</b>
<b>Bibliography</b> .....	<b>15</b>

## 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 document 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)).

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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*.

The third edition cancels and replaces the second edition (ISO 7765-2:2022), which has been technically revised.

The main changes were as follows:

- the normative references have been updated;
- corrections of the following errors:
  - the total penetration energy definition (see [3.4](#));
  - minimum sample frequency value (see [5.3.2](#)).

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](#) gives general remarks and 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 used 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>[4]</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*

ISO 7765-1, *Plastics film and sheeting — Determination of impact resistance by the free-falling dart method — Part 1: Staircase methods*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7765-1 and the following 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](#).