

BS ISO 17541:2014



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Plastics — Quantitative evaluation of scratch-induced damage and scratch visibility

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National foreword

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A list of organizations represented on this committee can be obtained on request to its secretary.

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Plastics — Quantitative evaluation of scratch-induced damage and scratch visibility

*Plastiques — Évaluation quantitative des dommages induits par
rayure et visibilité des rayures*



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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).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 61, *Plastics*, Subcommittee SC 2, *Mechanical properties*.

Plastics — Quantitative evaluation of scratch-induced damage and scratch visibility

1 Scope

This International Standard deals with quantitative evaluation of scratch-induced damage and scratch visibility in polymers.

This International Standard specifies two methods to assess scratch damage and scratch visibility expressed by three colour coordinates of a 3-D colour model.

Method A uses a scratch tip capable of area-contact or line-contact with material surfaces under a constant load condition. It is represented by scratch damage index (SDI).

Method B uses a scratch tip capable of line-contact under a linearly increasing load condition. It is represented by scratch visibility index (SVI).

The methods are suitable for use with coated and uncoated thermoplastic and thermosetting moulding materials.

The methods specify the preferred dimensions of testing specimens and the preferred scratch-tip geometry.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 294-1, *Plastics — Injection moulding of test specimens of thermoplastic materials — Part 1: General principles, and moulding of multipurpose and bar test specimens*

ISO 294-2, *Plastics — Injection moulding of test specimens of thermoplastic materials — Part 2: Small tensile bars*

ISO 294-3, *Plastics — Injection moulding of test specimens of thermoplastic materials — Part 3: Small plates*

ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method*

ISO 19252, *Plastics — Determination of scratch properties*

ISO 20753, *Plastics — Test specimens*

3 Terms and definitions

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

3.1

scratch

visual surface damage such as cutting and whitening, which is generated by sliding of the scratch tip over the surface of the test specimen under defined conditions

3.2
normal force

F_n
load applied by the scratch tip in a direction perpendicular to the material surface

Note 1 to entry: It is expressed in newtons.

3.3
tangential force

F_t
load applied by the scratch tip in a horizontal direction on the material surface

Note 1 to entry: It is expressed in newtons.

3.4
scratch path

connected line of scratch damage induced on the material surface by the scratch tip

3.5
whitening

visual damage which is generated on the material surface along the scratch path such as micro-cracking, crazing, voiding, and debonding

3.6
single-damage

SD
simple surface damage which is generated in a single direction on the material surface

3.7
multiple-damage

MD
latticed damages which are generated in two perpendicular, horizontal directions on the material surface

3.8
scratch force

F_s
resultant force applied to the material surface as the summation of the normal and tangential force vectors

Note 1 to entry: It is expressed in newtons.

3.9
scratch strength

S_s
scratch force per unit contact area of area-contact scratch tip

Note 1 to entry: It is expressed in newtons per square millimetre.

3.10
scratch resistance

R_s
scratch force per unit contact length of line-contact scratch tip

Note 1 to entry: It is expressed in newtons per millimetre.

3.11
degree of scratch damage

ΔD
euclidean distance between the color coordinates of the scratched and unscratched surfaces