



NSAI
Standards

Irish Standard
I.S. EN ISO 14577-2:2015

Metallic materials - Instrumented indentation test for hardness and materials parameters - Part 2: Verification and calibration of testing machines (ISO 14577-2:2015)

I.S. EN ISO 14577-2:2015

Incorporating amendments/corrigenda/National Annexes issued since publication:

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**Metallic materials - Instrumented indentation test for hardness
and materials parameters - Part 2: Verification and calibration of
testing machines (ISO 14577-2:2015)**

Matériaux métalliques - Essai de pénétration instrumenté
pour la détermination de la dureté et de paramètres des
matériaux - Partie 2: Vérification et étalonnage des
machines d'essai (ISO 14577-2:2015)

Metallische Werkstoffe - Instrumentierte Eindringprüfung
zur Bestimmung der Härte und anderer Werkstoffparameter
- Teil 2: Überprüfung und Kalibrierung der Prüfmaschinen
(ISO 14577-2:2015)

This European Standard was approved by CEN on 16 April 2015.

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EN ISO 14577-2:2015 (E)

Contents

	Page
European foreword	3

European foreword

This document (EN ISO 14577-2:2015) has been prepared by Technical Committee ISO/TC 164 “Mechanical testing of metals” in collaboration with Technical Committee ECISS/TC 101 “Test methods for steel (other than chemical analysis)” the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2016, and conflicting national standards shall be withdrawn at the latest by January 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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Endorsement notice

The text of ISO 14577-2:2015 has been approved by CEN as EN ISO 14577-2:2015 without any modification.

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**INTERNATIONAL
STANDARD**

**ISO
14577-2**

Second edition
2015-07-15

**Metallic materials — Instrumented
indentation test for hardness and
materials parameters —**

**Part 2:
Verification and calibration of
testing machines**

*Matériaux métalliques — Essai de pénétration instrumenté pour la
détermination de la dureté et de paramètres des matériaux —*

Partie 2: Vérification et étalonnage des machines d'essai



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Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 General conditions	1
3.1 Preparation.....	1
3.2 Functional installation.....	1
3.3 Indenter.....	2
3.4 Application of the test force.....	2
4 Direct verification and calibration	2
4.1 General.....	2
4.2 Calibration of the test force.....	2
4.3 Calibration of the displacement measuring device.....	3
4.4 Verification and calibration of the machine compliance.....	4
4.4.1 General.....	4
4.4.2 Procedure.....	4
4.5 Calibration and verification of the indenter.....	5
4.5.1 General.....	5
4.5.2 Vickers indenter.....	5
4.5.3 Berkovich, modified Berkovich, and corner cube indenters.....	7
4.5.4 Hard metal ball indenters.....	8
4.5.5 Spherical tipped conical indenters.....	9
4.6 Verification of the indenter area function.....	10
4.6.1 General.....	10
4.6.2 Procedure.....	10
4.7 Verification of the testing cycle.....	10
5 Indirect verification	11
5.1 General.....	11
5.2 Procedure.....	12
6 Intervals between calibrations and verifications	14
6.1 Direct verification and calibration.....	14
6.2 Indirect verification.....	15
6.3 Routine checking.....	15
7 Verification report/Calibration certificate	15
Annex A (informative) Example of an indenter holder	16
Annex B (normative) Procedures for determination of indenter area function	17
Annex C (informative) Examples for the documentation of the results of indirect verification	19
Annex D (normative) Machine compliance calibration procedure	21
Bibliography	25

ISO 14577-2:2015(E)

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 164, *Mechanical testing of metals*, Subcommittee SC 3, *Hardness testing*.

This second edition cancels and replaces the first edition (ISO 14577-2:2002), which has been technically revised.

ISO 14577 consists of the following parts, under the general title *Metallic materials — Instrumented indentation test for hardness and materials parameters*:

- *Part 1: Test method*
- *Part 2: Verification and calibration of testing machines*
- *Part 3: Calibration of reference blocks*
- *Part 4: Test method for metallic and non-metallic coatings*

Introduction

Hardness has typically been defined as the resistance of a material to permanent penetration by another harder material. The results obtained when performing Rockwell, Vickers, and Brinell tests are determined after the test force has been removed. Therefore, the effect of elastic deformation under the indenter has been ignored.

ISO 14577 (all parts) has been prepared to enable the user to evaluate the indentation of materials by considering both the force and displacement during plastic and elastic deformation. By monitoring the complete cycle of increasing and removal of the test force, hardness values equivalent to traditional hardness values can be determined. More significantly, additional properties of the material, such as its indentation modulus and elasto-plastic hardness, can also be determined. All these values can be calculated without the need to measure the indent optically. Furthermore, by a variety of techniques, the instrumented indentation test allows to record hardness and modulus depth profiles within a, probably complex, indentation cycle.

ISO 14577 (all parts) has been written to allow a wide variety of post test data analysis.

Metallic materials — Instrumented indentation test for hardness and materials parameters —

Part 2: Verification and calibration of testing machines

1 Scope

This part of ISO 14577 specifies the method of verification and calibration of testing machines for carrying out the instrumented indentation test in accordance with ISO 14577-1:2015.

It describes a direct verification method for checking the main functions of the testing machine and an indirect verification method suitable for the determination of the repeatability of the testing machine. There is a requirement that the indirect method be used in addition to the direct method and for the periodic routine checking of the testing machine in service.

It is a requirement that the indirect method of verification of the testing machine be carried out independently for each test method.

This part of ISO 14577 is also applicable for transportable testing machines.

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 376, *Metallic materials — Calibration of force-proving instruments used for the verification of uniaxial testing machines*

ISO 3878, *Hardmetals — Vickers hardness test*

ISO 14577-1:2015, *Metallic materials — Instrumented indentation test for hardness and materials parameters — Part 1: Test method*

ISO 14577-3, *Metallic materials — Instrumented indentation test for hardness and materials parameters — Part 3: Calibration of reference blocks*

3 General conditions

3.1 Preparation

The machine shall be designed in such a way that it can be verified.

Before verification and calibration of the testing machine, it shall be checked to ensure that the conditions laid down in [3.2](#) to [3.4](#) are met.

3.2 Functional installation

The testing machine shall be configured to operate in compliance with and shall be installed in an environment that meets the requirements of this part of ISO 14577, ISO 14577-1:2015, and, where applicable, ISO 14577-3. The testing machine shall be protected from vibrations. For testing in the

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