

**Plastid. Kõvaduse määramine. Osa 2:
Rockwelli kõvadus**

Plastics - Determination of hardness - Part 2:
Rockwell hardness

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 2039-2:2000 sisaldab Euroopa standardi EN ISO 2039-2:1999 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 11.01.2000 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 2039-2:2000 consists of the English text of the European standard EN ISO 2039-2:1999.</p> <p>This document is endorsed on 11.01.2000 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala: This part of ISO 2039 specifies af method for determining the indentation hardness of plastics by means of the Rockwell hardness tester using the Rockwell M, L and R hardness scales</p>	<p>Scope: This part of ISO 2039 specifies af method for determining the indentation hardness of plastics by means of the Rockwell hardness tester using the Rockwell M, L and R hardness scales</p>
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ICS 83.080.10

Võtmesõnad: determination, hardness tests, mechanical tests, plastics, rockwell hardness, tests

English version

Plastics – Determination of hardness

**Part 2: Rockwell hardness
(ISO 2039-2 : 1987)**

Plastiques – Détermination de la
dureté – Partie 2: Dureté Rockwell
(ISO 2039-2 : 1987)

Kunststoffe – Bestimmung der
Härte – Teil 2: Rockwellhärte
(ISO 2039-2 : 1987)

This European Standard was approved by CEN on 1999-05-06.

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

International Standard

ISO 2039-2 : 1987 Plastics – Determination of hardness – Part 2: Rockwell hardness, which was prepared by ISO/TC 61 'Plastics' of the International Organization for Standardization, has been adopted by Technical Committee CEN/TC 249 'Plastics', the Secretariat of which is held by IBN, as a European Standard.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by December 1999 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard:

Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 2039-2 : 1987 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to international publications are listed in Annex ZA (normative).

1 Scope and field of application

1.1 This part of ISO 2039 specifies a method for determining the indentation hardness of plastics by means of the Rockwell hardness tester using the Rockwell M, L and R hardness scales.

1.2 A Rockwell hardness number is directly related to the indentation hardness of a plastic material; the higher the Rockwell hardness number, the harder the material. Due to a short overlap of Rockwell hardness scales by this procedure, two different Rockwell hardness numbers of different scales may be obtained on the same material, both of which may be technically correct.

1.3 For materials having high creep and recovery, the time-factors involved in application of the major and minor loads have a considerable effect on the results of the measurements.

1.4 An alternative method of using the apparatus to give hardness on the Rockwell- α hardness scale is specified in the annex which shows how this scale may be related to the hardness measurement of ISO 2039-1.

2 References

ISO 48, *Rubber, vulcanized — Determination of hardness (Hardness between 10 and 100 IRHD)*.¹⁾

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

ISO 868, *Plastics — Determination of indentation hardness by means of a durometer (Shore hardness)*.

ISO 2039-1, *Plastics — Determination of hardness — Part 1: Ball indentation method*.

3 Principle

3.1 This is a method for determining hardness in which a constant minor load is applied to a steel ball resting on the material to be tested, followed by application of a major load,

and then followed by a return to the same minor load, all at specified limits for times of loading. The actual measurement is based on the total depth of penetration, minus the elastic recovery after a fixed time following removal of the major load, minus the penetration resulting from the minor load. The Rockwell hardness number is derived from the net increase in depth of impression as the load on an indenter is increased from a fixed minor load to a major load and then returned to the same minor load.

3.2 Each Rockwell hardness scale division represents 0,002 mm vertical movement of the indenter. In practice, the Rockwell hardness number is derived from the following relationship :

$$HR = 130 - e$$

where

HR is the Rockwell hardness number;

e is the depth of impression after removal of the major load, in units of 0,002 mm.

NOTE — This relationship only holds for the E, M, L and R scales.

4 Apparatus

4.1 The apparatus is a standard Rockwell hardness tester which comprises essentially

- a **rigid frame** supporting an adjustable platform fitted with a plate at least 50 mm in diameter to support the test specimen;
- an **indenter** with its associated fittings;
- a **device** for applying the appropriate loads to the indenter without impact.

4.2 The indenter comprises a polished hardened steel ball which rolls freely in its housing. The ball shall not deform during the test or show damage after a test. The diameter of the indenter depends upon the Rockwell scale in use (see 4.5).

1) At present at the stage of draft. (Revision of ISO 48: 1979, ISO 1400: 1975 and ISO 1818: 1975.)