



SLOVENSKI STANDARD
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Kovinski materiali - Preskus trdote po Rockwellu - 1. del: Preskusna metoda (skale A, B, C, D, E, F, G, H, K, N, T) (ISO 6508-1:1999)

Metallc materials - Rockwell hardness test - Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T) (ISO 6508-1:1999)

Metallische Werkstoffe - Härteprüfung nach Rockwell (Skalen A, B, C, D, E, F, G, H, K, N, T) - Teil 1: Prüfverfahren (ISO 6508-1:1999)

Matériaux métalliques - Essai de dureté Rockwell - Partie 1: Méthode d'essai (échelles A, B, C, D, E, F, G, H, K, N, T) (ISO 6508-1:1999)

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 6508-1

September 1999

ICS 77.040.10

English version

**Metallic materials - Rockwell hardness test - Part 1: Test method
(scales A, B, C, D, E, F, G, H, K, N, T) (ISO 6508-1:1999)**

Matériaux métalliques - Essai de dureté Rockwell - Partie 1:
Méthode d'essai (échelles A, B, C, D, E, F, G, H, K, N, T)
(ISO 6508-1:1999)

Metallische Werkstoffe - Härteprüfung nach Rockwell
(Skalen A, B, C, D, E, F, G, H, K, N, T) - Teil 1:
Prüfverfahren (ISO 6508-1:1999)

This European Standard was approved by CEN on 8 July 1999.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. 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.

This European Standard exists 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.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

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Foreword

The text of the International Standard ISO 6508-1:1999 has been prepared by Technical Committee ISO/TC 164 "Mechanical testing of metals" in collaboration with Technical Committee ECISS/TC 1 "Steel testing", the secretariat of which is held by AFNOR.

This European Standard supersedes EN 10109-1:1994.

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 March 2000, and conflicting national standards shall be withdrawn at the latest by March 2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

NOTE FROM CEN/CS: The foreword is susceptible to be amended on reception of the German language version. The confirmed or amended foreword, and when appropriate, the normative annex ZA for the references to international publications with their relevant European publications will be circulated with the German version.

Endorsement notice

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The text of the International Standard ISO 6508-1:1999 was approved by CEN as a European Standard without any modification.

INTERNATIONAL STANDARD

ISO
6508-1

First edition
1999-09-01

Metallic materials — Rockwell hardness test —

Part 1:

Test method (scales A, B, C, D, E, F, G, H, K,
N, T)

iTeh STANDARD PREVIEW

Matériaux métalliques — Essai de dureté Rockwell —

Partie 1: Méthode d'essai (échelles A, B, C, D, E, F, G, H, K, N, T)

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Reference number
ISO 6508-1:1999(E)

ISO 6508-1:1999(E)

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard 6508-1 was prepared by the Technical Committee ISO/TC 164, *Mechanical testing of metals*, Subcommittee SC 3, *Hardness testing*.

This first edition of ISO 6508-1 cancels and replaces ISO 6508:1986 and ISO 1024:1989, of which it constitutes a technical revision as follows:

- Combination of the two different International Standards for the different scales (ISO 6508:1986 and ISO 1024:1989) into this part of ISO 6508.
- Addition of clause 8 concerning the accuracy of the test results.
- Addition of annex A concerning the conventional HR30Tm test for thin products.
- Addition of annex E concerning a procedure for a periodic check of the testing machines by users.
- Addition of annex F concerning notes on diamond indenters.
- Addition of a hardmetal ball as indenter.

ISO 6508 consists of the following parts, under the general title *Metallic materials — Rockwell hardness test*:

- *Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)*
- *Part 2: Verification and calibration of testing machines (scales A, B, C, D, E, F, G, H, K, N, T)*
- *Part 3: Calibration of reference blocks (scales A, B, C, D, E, F, G, H, K, N, T)*

Annexes A, B, C and D form a normative part of this part of ISO 6508. Annexes E and F are for information only.

Introduction

The force values in this part of ISO 6508 were calculated from kilogram force values. They were introduced before the SI-system was adopted. It was decided to keep the values based on the old units for this part of ISO 6508 but for the next revision it will be necessary to consider the advantage of introducing rounded values of test force and the consequence on the hardness scales.

Attention is drawn to the fact that in this part of ISO 6508, the use of hardmetal balls as indenters is equivalent to the use of steel balls; however, it is indicated that the measurements made with the two ball types give different results.

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Metallic materials — Rockwell hardness test —

Part 1:

Test method (scales A, B, C, D, E, F, G, H, K, N, T)

1 Scope

This part of ISO 6508 specifies the method for Rockwell and Rockwell superficial hardness tests (scales and field of application in accordance with Table 1) for metallic materials.

For specific materials and/or products, other specific International Standards apply (for instance ISO 3738-1 and ISO 4498-1).

NOTE For certain materials, the fields of application may be narrower than those indicated.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this part of ISO 6508. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 6508 are encouraged to investigate the possibility of applying the most recent edition of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 6508-2:1999, *Metallic materials — Rockwell hardness test — Part 2: Verification and calibration of testing machines (scales A, B, C, D, E, F, G, H, K, N, T)*.

3 Principle

Forcing an indenter (diamond cone, steel or hardmetal ball) into the surface of a test piece in two steps under specified conditions (see clause 7). Measuring the permanent depth h of indentation under preliminary test force after removal of additional test force.

From the value of h and the two constant numbers N and S (see Table 2), the Rockwell hardness is calculated following the formula:

$$\text{Rockwell hardness} = N - \frac{h}{S}$$

4 Symbols and designations

See Tables 1 and 2 and Figure 1.

Table 1 — Rockwell scales

Rockwell hardness scale	Hardness symbol ^a	Type of indenter mm	Preliminary test force	Additional test force	Total test force	Field of application (Rockwell hardness test)
			F_0 N	F_1 N	F N	
A	HRA	Diamond cone	98,07	490,3	588,4	20 HRA to 88 HRA
B	HRB	Ball 1,587 5 mm	98,07	882,6	980,7	20 HRB to 100 HRB
C	HRC	Diamond cone	98,07	1 373	1 471	20 HRC to 70 HRC
D	HRD	Diamond cone	98,07	882,6	980,7	40 HRD to 77 HRD
E	HRE	Ball 3,175 mm	98,07	882,6	980,7	70 HRE to 100 HRE
F	HRF	Ball 1,587 5 mm	98,07	490,3	588,4	60 HRF to 100 HRF
G	HRG	Ball 1,587 5 mm	98,07	1 373	1 471	30 HRG to 94 HRG
H	HRH	Ball 3,175 mm	98,07	490,3	588,4	80 HRH to 100 HRH
K	HRK	Ball 3,175 mm	98,07	1 373	1 471	40 HRK to 100 HRK
15N	HR15N	Diamond cone	29,42	117,7	147,1	70 HR15N to 94 HR15N
30N	HR30N	Diamond cone	29,42	264,8	294,2	42 HR30N to 86 HR30N
45N	HR45N	Diamond cone	29,42	411,9	441,3	20 HR45N to 77 HR45N
15T	HR15T	Ball 1,587 5 mm	29,42	117,7	147,1	67 HR15T to 93 HR15T
30T	HR30T	Ball 1,587 5 mm	29,42	264,8	294,2	29 HR30T to 82 HR30T
45T	HR45T	Ball 1,587 5 mm	29,42	411,9	441,3	10 HR45T to 72 HR45T

^a For the scales using the ball indenters, the hardness symbol is to be completed with "S", if the steel ball indenter is used and with "W", if the hardmetal ball is used.

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Table 2 — Symbols and designations

Symbol	Designation	Unit
F_0	Preliminary test force	N
F_1	Additional test force	N
F	Total test force	N
S	Scale unit, specific to the scale	mm
N	Number, specific to the scale	
h	Permanent depth of indentation under preliminary test force after removal of additional test force (permanent indentation depth)	mm
HRA HRC HRD	Rockwell hardness = $100 - \frac{h}{0,002}$	
HRB HRE HRF HRG HRH HRK	Rockwell hardness = $130 - \frac{h}{0,002}$	
HRN HRT	Rockwell hardness = $100 - \frac{h}{0,001}$	

4.1 The Rockwell hardness for the scales A, C and D is denoted by the symbol HR preceded by the hardness value and completed by a letter indicating the scale.

EXAMPLE 59 HRC = Rockwell hardness of 59, measured on the C scale.

4.2 The Rockwell hardness for the scales B, E, F, G, H and K is denoted by the symbol HR preceded by the hardness value and completed by a letter indicating the scale and a letter for the applied type of ball indenter (S for steel and W for hardmetal).

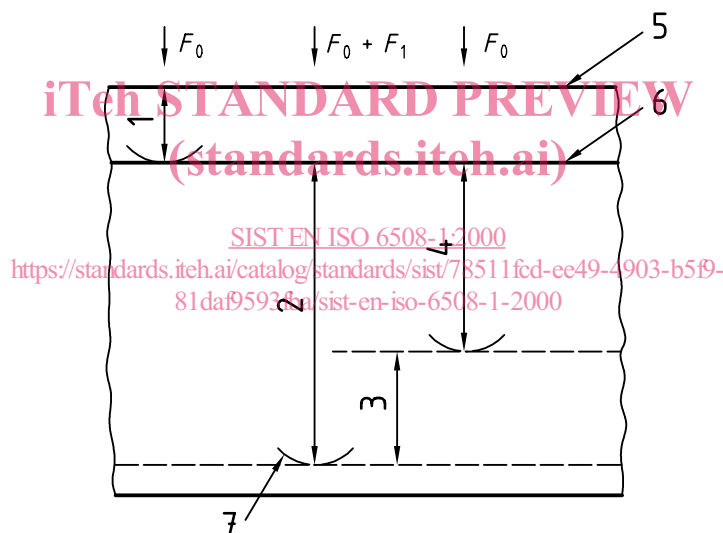
EXAMPLE 60 HRBW = Rockwell hardness of 60, measured on the B scale with a hardmetal ball indenter.

4.3 The Rockwell superficial hardness for the N scale is denoted by the symbol HR preceded by the hardness value and followed by a number (representing the total test force) and the letter N indicating the scale.

EXAMPLE 70 HR30N = Rockwell superficial hardness of 70 measured on the 30 N scale with a total test force of 294,2 N.

4.4 The Rockwell superficial hardness for the T scale is denoted by the symbol HR preceded by the hardness value and followed by a number (representing the total test force) and the letter T indicating the scale and followed by a letter for the applied type of the ball indenter (S for steel and W for hardmetal).

EXAMPLE 40 HR30TS = Rockwell superficial hardness of 40 measured on the 30 T scale with a total test force of 294,2 N and with a steel ball indenter.



Key

- | | |
|--|-----------------------------------|
| 1 Indentation depth by preliminary force F_0 | 5 Surface of specimen |
| 2 Indentation depth by additional test force F_1 | 6 Reference plane for measurement |
| 3 Elastic recovery just after removal of additional test force F_1 | 7 Position of indenter |
| 4 Permanent indentation depth h | |

Figure 1 — Rockwell principle diagram

5 Testing machine

5.1 Testing machine, capable of applying predetermined forces as shown in Table 1 and in accordance with ISO 6508-2.

5.2 Conical diamond indenter, in accordance with ISO 6508-2 with an angle of 120° and radius of curvature at the tip of 0,2 mm.