
**Porušitveno preskušanje zvarnih spojev na kovinskih materialih -
Preskus trdote - 1. del: Preskus trdote na obločno varjenih spojih
(prevzet standard EN 1043-1:1995 z metodo platnice)**

Destructive tests on welds in metallic materials - Hardness testing - Part
1: Hardness test on arc welded joints

iTeh STANDARD PREVIEW

Essais destructifs des soudures sur matériaux métalliques - Essai de
dureté - Partie 1: Essai de dureté des assemblages soudés à l'arc

Zerstörende Prüfung an Schweißnähten an metallischen Werkstoffen -
Härteprüfung - Teil 1: Härteprüfung für Lichtbogenschweißverbindungen

Deskriptorji: varjenje, zvarni spoji, kovina, preskus trdote, trdote po Vickersu

ICS 25.160.40

Referenčna številka
SIST EN 1043-1:1998 ((sl),de)

Nadaljevanje na straneh od II do III in od 1 do 20

NACIONALNI UVOD

Standard SIST EN 1043-1 ((sl),de), Porušitveno preskušanje zvarnih spojev na kovinskih materialih - Preskus trdote - 1. del: Preskus trdote na obločno varjenih spojih, prva izdaja, 1998, ima status slovenskega standarda in je z metodo platnice prevzet evropski standard EN 1043-1 (de), Zerstörende Prüfung an Schweißnähten an metallischen Werkstoffen - Härteprüfung - Teil 1: Härteprüfung für Lichtbogenschweißverbindungen, 1995-12-00.

NACIONALNI PREDGOVOR

Evropski standard EN 1043-1:1995 je pripravil tehnični odbor Evropskega komiteja za standardizacijo CEN/TC 121 Varjenje.

Pripravo tega standarda sta CEN poverila Evropska komisija in Evropsko združenje za prosto trgovino. Ta evropski standard ustreza bistvenim zahtevam evropske direktive 97/23/EEC.

Odločitev za prevzem tega standarda po metodi platnice je dne 1997-05-14 sprejel tehnični odbor USM/TC VAR Varjenje.

Ta slovenski standard je dne 1998-03-03 odobril direktor USM.

ZVEZE S STANDARDI

S prevzemom tega evropskega standarda veljajo za omejeni namen referenčnih standardov vsi standardi, navedeni v izvorniku, razen standardov, ki so že sprejeti v nacionalno standardizacijo:

- SIST EN 1043-2:1998 ((sl),de)** Porušitveno preskušanje zvarnih spojev na kovinskih materialih - Preskus trdote - 2. del: Preskus mikrotrdote na zvarnih spojih
<https://standards.iteh.ai/catalog/standards/sist/33a9b60e-c946-43c7-87ff-a89c291e15f9/standard/en-1043-2-1998>
- SIST EN 10003-1:1996 ((sl),en)** Kovinski materiali - Preskus trdote po Brinellu - 1. del: Metoda preskušanja
- SIST ISO 6507-1:1995 ((sl),en)** Kovinska gradiva - Preskus trdote - Preskus trdote po Vickersu - 1. del: HV 5 do HV 100
- SIST ISO 6507-2:1995 ((sl),en)** Kovinska gradiva - Preskus trdote - Preskus trdote po Vickersu - 2. del: HV 0,2 do manj kot HV 5

OPOMBI

- Povsod, kjer se v besedilu standarda uporablja izraz evropski standard, v SIST EN 1043-1:1998 to pomeni slovenski standard.
- Nacionalni uvod in nacionalni predgovor nista sestavni del standarda.

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Descriptors: welded, welded joints, metals, hardness tests, vickers hardness

English version

**Destructive tests on welds in metallic materials -
Hardness testing - Part 1: Hardness test on arc
welded joints**

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métalliques - Essai de dureté - Partie 1: Essai
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Zerstörende Prüfung an Schweißnähten an
metallischen Werkstoffen - Härteprüfung - Teil
1: Härteprüfung für
Lichtbogenschweißverbindungen

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This European Standard was approved by CEN on 1995-11-24. 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.

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

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Foreword

This European Standard has been prepared by the Technical Committee CEN/TC 121 "Welding" of which the secretariat is held by DS.

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 June 1996, and conflicting national standards shall be withdrawn at the latest by June 1996.

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

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1 Scope

This standard specifies hardness tests on transverse sections of arc welded joints of metallic materials. It covers Vickers hardness tests in accordance with ISO 6507-1, normally with test loads of 49 N or 98 N (HV 5 or HV 10).

However, the principles may be applied to Brinell hardness testing (with appropriate testing loads of HB 2,5/15,625 or HB 1/2,5) in accordance with EN 10003-1 and micro hardness testing in accordance with ISO 6507-2 and EN 1043-2.

Testing should be carried out to ensure that the highest and the lowest level of hardness of both parent metal and weld metal is determined.

The type and extent of testing is as specified by the relevant application standard or by agreement between the contracting parties.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- prEN 1043-2** Destructive test on welds in metallic materials - Hardness testing - Part 2: Micro hardness testing
SIST EN 1043-1:1998
- EN 10003-1** Metallic materials - Brinell hardness test - Part 1: Test method
standards.iteh.ai/catalog/standards/sist/379160e-94643-7-87f-a89a994ca859/sist-en-1043-1-1998
- ISO 6507-1** Metallic materials - Hardness test - Vickers test - Part 1 : HV 5 to HV 100
- ISO 6507-2** Metallic materials - Hardness test - Vickers test - Part 2 : HV 0,2 to less than HV 5

3 Principle

Hardness testing shall be carried out in accordance with ISO 6507-1, ISO 6507-2 or EN 10003-1.

The hardness tests may be carried out in the form of rows of indentations, R, or as individual indentations, E.

When types of weld are not shown in the examples in figures 1 and 2, the test procedure shall be appropriate to the welded joint.

Unless otherwise specified, the test shall be carried out at ambient temperature (23 ± 5) °C.

4 Denominations and symbols

The denominations and symbols to be used are specified in table 1 and represented on figures 1 to 8.

Table 1 : Denominations and symbols

| Symbol | Denomination | Unit |
|--|---|------|
| E | Individual indentation | |
| R | Row of indentation | |
| HV | Vickers hardness | 1) |
| HB | Brinell hardness | 2) |
| L | Distance between the centrepoint of the indentations in heat affected zone | mm |
| H | Distance of rows of indentations from the reference line (surface or fusion line) | mm |
| t | Thickness of test specimen | mm |
| 1) The unit of symbolisation for Vickers hardness is given in ISO 6507-1 or ISO 6507-2. 2) The unit of symbolisation for Brinell hardness is given in EN 10003-1. | | |

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5 Preparation of test specimens

The preparation of the test specimen shall be in accordance with ISO 6507-1, ISO 6507-2 or EN 10003-1.

A cross-section of test piece shall be taken by mechanical cutting, usually transverse to the welded joint.

This operation and the subsequent preparation of the surface shall be carried out carefully so that the hardness of the surface to be tested is not affected metallurgically.

The surface to be tested shall be properly prepared and preferably etched, so that accurate measurements of the diagonal of the indentations can be achieved in the different zones of the welded joint.

6 Test procedure

6.1 Rows of indentations (R)

Figures 1 to 7 give examples of hardness indentations made in rows including the distance from the surface so that these rows or parts of them permit an assessment of the welded joint. If required by the contracting parties, additional rows of indentations and/or different locations may be made. The location shall be stated in the test report.

In metals such as aluminium, copper and their alloys, the rows on the root-side of butt welds (see figure 2a) can not be necessary. Typical rows for T-joints in these materials are given in figure 2.

The number and spacing of indentations shall be sufficient to define hardened or softened regions due to welding. The recommended distance between the centrepoint of the indentations in the heat affected zone (HAZ) is given in table 2.

NOTE 1 : Table 2 also applies with the Brinell testing using the same distances provided appropriate loads are used.

Sufficient indentations shall be made to ensure that unaffected parent metal is tested. In the weld metal, the distance between indentations shall be selected and checked so that the results obtained will enable assessment of the welded joint to be made.

For metals which harden in the HAZ as a result of welding, two additional indentations in the HAZ shall be made at a distance of $\leq 0,5$ mm between the centrepoint of the indentation and the fusion line (see figures 3 to 7).

For other joint configurations or metals (e.g. austenitic steels) special requirements can be given by the relevant application standard or by agreement between the contracting parties.

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Table 2 : Recommended distance, L, between the centrepoint of the indentations in the heat affected zone (HAZ)

| Hardness symbol | Recommended distance between indentations L ¹⁾ mm | |
|---|---|------------------------------------|
| | Ferrous metals ²⁾ | Aluminium, copper and their alloys |
| HV 5 | 0,7 | 2,5 to 5 |
| HV 10 | 1 | 3 to 5 |
| HB 1-2,5 | not applicable | 2,5 to 5 |
| HB 2,5/15,625 | not applicable | 3 to 5 |
| 1) The distance of any indentation from the previous indentation shall not be less than the value allowed for the previous indentation by ISO 6507-1. | | |
| 2) Excluding austenitic steels. | | |

NOTE 2 : For electroslag welds, the loads of table 2 may be used. Rows of indentations for electroslag welds can be made similar to figure 1a.

6.2 Individual indentations (E)

Figure 8 shows typical areas for the location of individual indentations. The series 1-4 gives the information about the unaffected parent metal, the series 5-10 refers to the HAZ and the series 11-14 to the weld metal. Otherwise, the location of the indentation can be determined on the basis of metallographic examination.

To prevent the influence of deformation caused by an indentation, the minimum distance between the centrepoint of individual indentations in any direction shall not be less than 2,5 times the mean diagonal of the nearest adjacent indentation.

For metals which harden in the HAZ as a result of welding, at least one indentation shall be made in the HAZ at a distance of $\leq 0,5$ mm between the centrepoint of the indentation and the fusion line.

For testing with individual indentations, the areas shall be numbered as shown in figure 8.

7 Test results

The hardness values shall be recorded in relation to the position of the indentation.

8 Test report

A test report is required. The information to be recorded is listed in annexes A and B.

The use of the format given in annexes A and B is recommended.

Other formats may be used provided they contain all the required information. Additional information may be required by the relevant application standard or by agreement between the contracting parties.