SLOVENSKI STANDARD

SIST EN 10325:2007

01-januar-2007

>Y_`U˧8 c`c]hYj˙dc j]ýUb4UbUdYhcgH]˙hY Yb4UˈnUfUX]˙hc d`cHbY˙cVXY˙Uj Yˈf6U_Y!<UfXYb]b[!bXYl Ł

Steel - Determination of yield strength increase by the effect of heat treatment [Bake-Hardening-Index]

Stahl - Bestimmung der Streckgrenzenerhöhung durch Wärmebehandlung (Bake-Hardening-Index)

Aciers - Détermination de l'augmentation de la limite apparente d'élasticité due a un traitement thermique (index de durcissement a la cuisson [Bake-hardening])

Ta slovenski standard je istoveten z: EN 10325:2006

ICS:

77.040.10	Mehansko preskušanje kovin	Mechanical testing of metals
77.080.20	Jekla	Steels

SIST EN 10325:2007   **en**

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 10325

August 2006

ICS 77.040.10; 71.080.20

English Version

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This European Standard was approved by CEN on 7 July 2006.

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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.

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

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Contents

Foreword

This document (EN 10325:2006) has been prepared by Technical Committee ECISS/TC 1 "Steel - Mechanical testing", 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of an identical text or by endorsement, at the latest by February 2007, and conflicting national standards shall be withdrawn at the latest by February 2007.

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

1 Scope

This document specifies the method for the determination of yield strength increase by the effect of heat treatment (Bake-Hardening-Index) for steel.

NOTE   This test is applied in particular, to steels showing a mechanism of bake hardening, which are specially intended for automotive industry.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 10002-1:2001, *Metallic materials — Tensile testing — Part 1: Method of test at ambient temperature*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 10002-1:2001 and the following apply.

NOTE   However it should be noted that in the context of this document, the term "yield strength" also covers 0,2 % proof strength in addition to its definition in EN 10002-1.

3.1 Bake-Hardening-Index
(BH_2) increase of yield strength between a reference condition after a 2 % plastic pre-strain and the condition obtained after a heat treatment simulating the usual industrial paint processes (see Figure 1)

NOTE   The heat treatment of simulation is specified in 8.2.
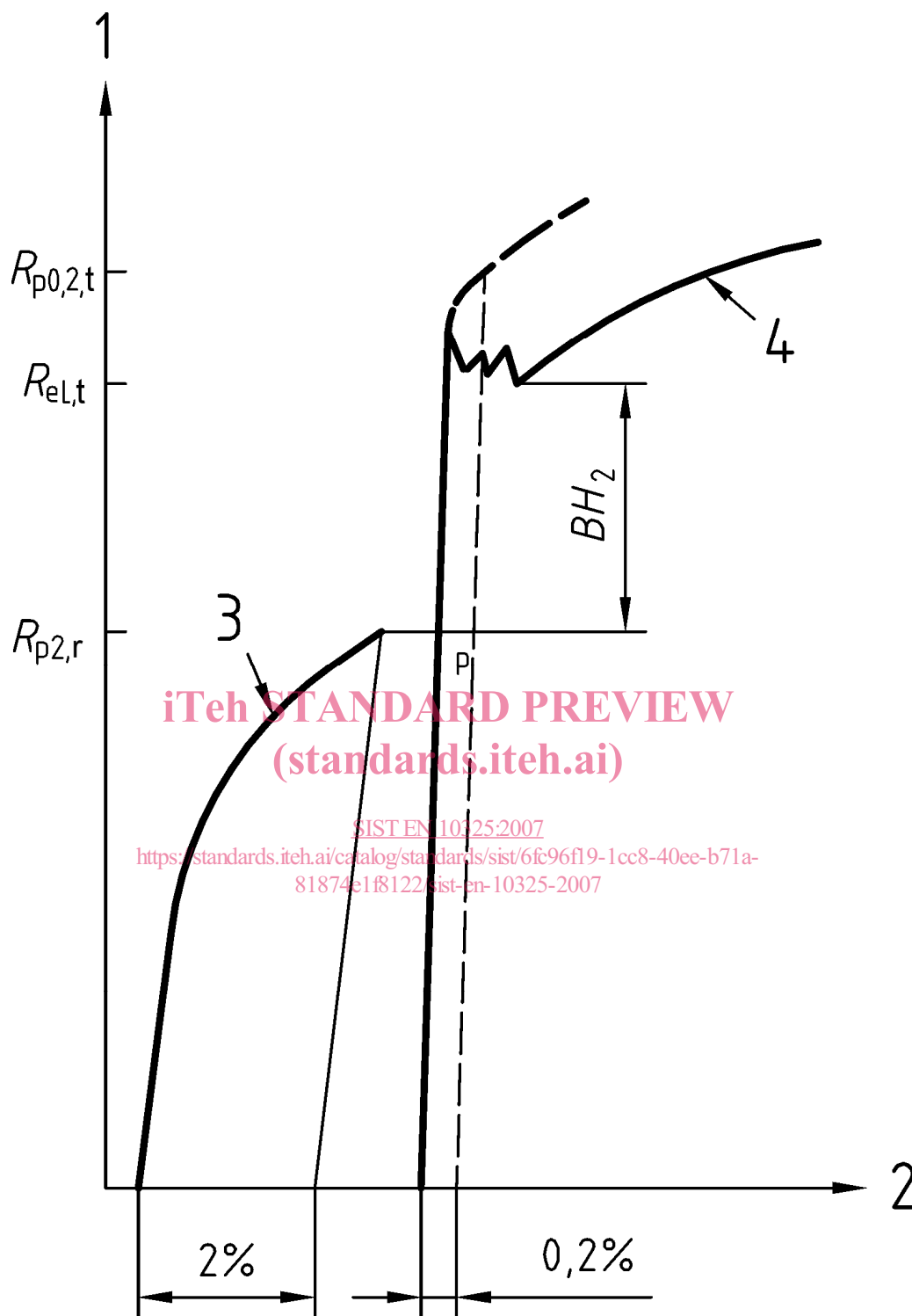
Key

1   Stress

2   Strain

3   Application of a 2 % plastic pre-strain

4   Tensile test after heat treatment on the same test piece

Figure 1 — Illustration of the determination of BH_2

4   Symbols and designations

The symbols used in this document and the corresponding designations are given in Table 1.

Table 1 — Symbols and designations

Symbol	Unit	Designation
$R_{p2,r}$	MPa [a]	Stress corresponding to a 2 % plastic prestrain measured on the test piece
$R_{eL,t}$	MPa	Lower yield strength measured on the test piece initially prestrained at 2 % and then heat treated
$R_{p0,2,t}$	MPa	0,2 % proof strength measured on the test piece initially prestrained at 2 % and then heat treated
BH_2	MPa	Bake-Hardening-Index
[a] 1 MPa = 1 N/mm².		

5   Principle

The test determines an index giving the increase of yield strength of a test piece submitted to a 2 % plastic pre-strain, then to a specified heat treatment.

6   Test equipment

The test equipment shall be in accordance with EN 10002-1.

7   Test pieces

The test pieces shall be according to EN 10002-1.

8   Testing procedure

8.1   Testing conditions

The tensile test shall be performed according to Annex A of EN 10002-1:2001. The testing rate given in EN 10002-1 for the beginning of the tensile test, shall only be increased after the determination of R_{eL} or $R_{p0,2}$. During the pre-straining of the test pieces, the testing rate shall be kept constant up to a plastic pre-strain of $(2 \pm 0,05)$ %. All tensile tests used to characterize a steel shall be performed with the same actual testing rate.

8.2   Heat treatment conditions

A test piece temperature of 170 °C shall be achieved within 7 min. The heat treatment time of $(20 \pm 0,5)$ min commences when a test piece temperature of 168 °C is achieved. The heat treatment equipment used shall be capable of keeping the prescribed test piece temperature (i.e. 170 °C) at ± 2 °C. The temperature measuring device shall have a resolution of no more than 1 °C with a maximum measuring uncertainty of ± 2 °C. After the holding time, the test piece shall be air cooled to room temperature, i.e. (23 ± 5) °C.