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Title: Draft EN 10325 EN 10325 Steel - Determination of yield strength increase by the effect of heat treatment (Bake-Hardening-Index)

Supersession information: If you are aware of a current national standard which may be affected, please notify the secretary (contact details below).

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Introduction

This draft standard is based on European discussions in which the UK took an active part. Your comments on this draft are welcome and will assist in the preparation of the consequent British Standard. If no comments are received to the contrary, then the UK will approve this draft and implement it as a British Standard. Comment is particularly welcome on national, legislative or similar deviations that may be necessary.

Even if this draft standard is not approved by the UK, if it receives the necessary support in Europe, the UK will be obliged to publish the official English Language text unchanged as a British Standard and to withdraw any conflicting standard.

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Draft no:	Project no.: 1998/XXXXX	DPC no.: 98/XXXXXX
Short title:	Commentator:	Date:

Clause/ subclause	Paragraph/ Figure/ Table	Type of comment (General/ technical/editorial)	Comment (with rationale)	Proposed change
3.1	1st definition	Editorial	Definition is ambiguous and needs clarifying.	Amend to read '... so that the mains connector to which no connection ...'
6.4	2nd paragraph	Technical	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.

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ICS

English version

Steel - Determination of yield strength increase by the effect of heat treatment (Bake-Hardening-Index)

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

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee ECISS/TC 1.

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Foreword

This document has been prepared by ECISS /TC 1, "Steels - Mechanical testing", the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

1 Scope

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

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.

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

3 Terms and definitions

For the purpose of this standard, the following term and definition shall apply:

3.1

Bake-Hardening-Index (BH₂)

increase of yield strength by heat treatment following the usual industrial painting process. Yield strength increase by heat treatment after plastic prestraining of 2 % (see Figure1).

4 Test pieces

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

5 Testing conditions

The tensile test shall be performed according to annex A of EN 10002-1. The testing rate given in EN 10002-1 for the beginning of the tensile test is only to be increased after the determination of R_{eL} or $R_{p0,2}$. During prestraining of the test pieces the testing rate has to keep constant up to a plastic prestrain of 2 % as well. All tensile tests have to be performed with the same actual testing rate.

6 Heat treatment conditions

The test piece temperature of 170 °C must be achieved within seven minutes. The heat treatment time ($20 \pm 0,5$) minutes commences when a test piece temperature of 168 °C is achieved. The heat treatment equipment to be used shall be capable of keeping the established test piece temperature (170 °C) at a precision of ± 2 K. The temperature measuring device must have a resolution not more than 1 K with a measuring uncertainty of ± 2 K maximum. After holding time the test piece is air cooled down to room temperature.

prEN 10325:2002 (E)**7 Determination of Bake-Hardening-Index (BH₂)**

The BH₂-Index is the difference between the proof strength $R_{p2,0}$ of a 2 % plastically strained test piece (E-modulus of steel 200 000 MPa) and the lower yield strength R_{eL} or the proof strength $R_{p0,2}$ of the same test piece after an additional heat treatment at 170 °C with a holding time of 20 minutes. Determining R_{eL} or $R_{p0,2}$ after heat treatment the cross sectional area of the test piece after plastically prestraining is used.

$$BH_2 = R_{eL} \text{ (or } R_{p0,2} \text{) (after heat treatment) - } R_{p2} \text{ (after prestraining)} \quad (1)$$

8 Test report

8.1 If testing of BH₂ is carried out in combination with the conventional test according to EN 10002-1, the Bake-Hardening-Indices are to be added to the test report.

8.2 If testing of BH₂ is carried out separately, the test report shall contain the following information at least:

- a) reference to this European Standard;
- b) identification of the test piece;
- c) location and direction of sampling;
- d) test result.

1
2
3
4

Key

- 1 stress
- 2 strain
- 3 plastic prestraining of 2 %
- 4 tensile test after heat treatment at the same test piece

Figure 1 — Illustration of the determination of BH_2

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