

Tensile testing of metallic materials —

Part 3: Calibration of force proving instruments used for the verification of uniaxial testing machines

The European Standard EN 10002-3:1994 has the status of a
British Standard

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National foreword

This British Standard has been prepared under the direction of the Iron and Steel, and the Non-ferrous Metals Standards Policy Committees and is the English language version of EN 10002-3:1994 *Metallic materials — Tensile test — Part 3: Calibration of force proving instruments used for the verification of uniaxial testing machines*, published by the European Committee for Standardization (CEN).

It supersedes BS 1610-2:1985 which is withdrawn.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 16, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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English version

Metallic materials — Tensile test — Part 3: Calibration of force proving instruments used for the verification of uniaxial testing machines

Matériaux métalliques — Essai de traction —
Partie 3: Etalonnage des instruments de
mesure de force utilisés pour la vérification
des machines d'essais uniaxiaux

Metallische Werkstoffe — Zugversuch —
Teil 3: Kalibrierung der Kraftmeßgeräte für die
Prüfung von Prüfmaschinen mit einachsiger
Beanspruchung

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CEN

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

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Foreword

This European Standard was prepared by the Technical Committee ECISS/TC 1A, Mechanical and physical tests, the Secretariat of which is held by AFNOR.

It was submitted to the formal vote according to a decision of the Committee of Coordination (COCOR) of the European Committee for Iron and Steel Standardization.

It was approved and ratified by CEN 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of an identical text or by endorsement, at the latest by November 1994, and conflicting national standards shall be withdrawn at the latest by November 1994.

In accordance with 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 and United Kingdom.

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0 Introduction

The European Standard EN 10002 is valid for metallic materials and comprises the following parts:

- *Part 1: Metallic materials — Tensile test — Method of test (at ambient temperature);*
- *Part 2: Metallic materials — Tensile test — Verification of the force measuring system of tensile testing machines;*
- *Part 3: Metallic materials — Tensile test — Calibration of proving devices used for the verification of uniaxial testing machines;*
- *Part 4: Metallic materials — Tensile test — Verification of extensometers used in uniaxial testing;*
- *Part 5: Metallic materials — Tensile test — Method of test at elevated temperatures.*

1 Scope

This European Standard covers the calibration of force proving instruments used for the static verification of uniaxial testing machines (e.g. tensile testing machines) and describes a procedure for classifying these instruments. The force proving instrument is defined as being the whole assembly from the force transducer through to and including the indicator. This European Standard generally applies to force proving instruments in which the force is determined by measuring the elastic deformation of a loaded member or a quantity which is proportional to it.

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 10002-2, *Metallic materials — Tensile test — Verification of the force measuring system of the tensile testing machines.*

3 Principle

Calibration consists in applying forces to the loaded member which are precisely known and recording the data from the deflection-measuring system, which is considered as an integral part of the force proving instrument.

When an electrical measurement is made, the indicator may be replaced by an indicator that can be shown to have at least an equal uncertainty of measurement.

4 Characteristics of force proving instruments

4.1 Identification of the force proving instrument

All the elements of the force proving instrument (including the cables for electrical connection) shall be individually and uniquely identified, for example, by the name of the manufacturer, the model and the serial number. For the force transducer, the maximum working force shall be indicated.

4.2 Application of force

The force transducer and its loading parts shall be designed so as to ensure axial application of force, whether in tension or compression.

Examples of loading fittings are given in Annex A.

4.3 Measurement of deflection

Measurement of the deflection of the loaded member of the force transducer may be carried out by mechanical, electrical, optical or other means with an adequate accuracy and stability.

The type and the quality of the deflection-measuring system determine whether the force proving instrument is classified only for specific calibration forces or for interpolation (see clause 7).

Generally, the use of force proving instruments with dial gauges as a means of measuring the deflection is limited to the forces for which the instruments have been calibrated. In fact, the dial gauge if used over a long travel may contain large localized periodic errors which produce an uncertainty too great to permit interpolation between calibration forces. Nevertheless, it may be used for interpolation if the characteristics of the dial gauge have been determined previously, and if its periodic error has a negligible influence on the interpolation error of the force proving instrument.