BSI Standards Publication

Metallic materials — Sheet and strip — Determination of biaxial stress-strain curve by means of bulge test with optical measuring systems

bsi.

National foreword

This British Standard is the UK implementation of EN ISO 16808:2022. It is identical to ISO 16808:2022. It supersedes BS EN ISO 16808:2014, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ISE/101/1, Uniaxial and Ductility Testing.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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English Version

Metallic materials - Sheet and strip - Determination of biaxial stress-strain curve by means of bulge test with optical measuring systems (ISO 16808:2022)

Matériaux métalliques - Tôles et bandes - Détermination de la courbe contrainte-déformation biaxiale au moyen de l'essai de gonflement hydraulique avec systèmes de mesure optiques (ISO 16808:2022)

Metallische Werkstoffe - Blech und Band - Bestimmung der biaxialen Spannung/Dehnung-Kurve durch einen hydraulischen Tiefungsversuch mit optischen Messsystemen (ISO 16808:2022)

This European Standard was approved by CEN on 18 April 2022.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN ISO 16808:2022) has been prepared by Technical Committee ISO/TC 164 "Mechanical testing of metals" in collaboration with Technical Committee CEN/TC 459/SC 1 “Test methods for steel (other than chemical analysis)” 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of an identical text or by endorsement, at the latest by November 2022, and conflicting national standards shall be withdrawn at the latest by November 2022.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 16808:2014.

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Endorsement notice

The text of ISO 16808:2022 has been approved by CEN as EN ISO 16808:2022 without any modification.

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 164, *Mechanical testing of metals*, Subcommittee SC 2, *Ductility testing,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 459/SC 1, *Test methods for steel (other than chemical analysis),* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 16808:2014), of which it constitutes a minor revision. The changes are as follows:

— the designation of r_{1_100} in Table 1 has been modified;

— the title of Figure A.4 has been modified;

— Formula (B.2) has been modified;

— Annex A has been deleted and other annexes have been renumbered accordingly;

— the status of Annex A (formerly Annex B) has been changed to informative;

— minor editorial changes have been made to align with ISO/IEC Directives Part 2, 2021.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Metallic materials — Sheet and strip — Determination of biaxial stress-strain curve by means of bulge test with optical measuring systems

1 Scope

This document specifies a method for determination of the biaxial stress-strain curve of metallic sheets having a thickness below 3 mm in pure stretch forming without significant friction influence. In comparison with tensile test results, higher strain values can be achieved.

NOTE In this document, the term "biaxial stress-strain curve" is used for simplification. In principle, in the test the "biaxial true stress-true strain curve" is determined.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Symbols and abbreviated terms

The symbols and designations used are given in Table 1.

Table 1

Symbol	Designation	Unit
d_{die}	Diameter of the die (inner)	mm
d_{BH}	Diameter of the blank holder (inner)	mm
R_1	Radius of the die (inner)	mm
h	Height of the drawn blank (outer surface)	mm
t_0	Initial thickness of the sheet (blank)	mm
t	Actual thickness of the sheet	mm
p	Pressure in the chamber	MPa
rms	Standard deviation (root mean square)	-
ρ	Radius of curvature	mm
r_1	Surface radius for determining curvature	mm
r_2	Surface radius for determining strain	mm
r_{1_100}	Surface radius to determine curvature with a diameter of 100 mm	mm
a_i, b_i	Coefficients for response surface	-