

Metallic materials — Tube — Flattening test

The European Standard EN 10233:1993 has the status of a
British Standard

UDC 669.462:620.177

Cooperating organizations

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Switzerland	Association suisse de normalisation
United Kingdom	British Standards Institution

This British Standard, having been prepared under the direction of the Iron and Steel and the Non-ferrous Metals Standards Policy Committees, was published under the authority of the Standards Board and comes into effect on 15 May 1994

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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 10233:1993 *Metallic materials — Tube — Flattening test*, published by the European Committee for Standardization (CEN). No British Standard is superseded.

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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 4, 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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Descriptors: Metal tubes, mechanical tests, flattening tests, defects

English version

Metallic materials — Tube — Flattening test

Matériaux métalliques — Tubes —
Essai d'aplatissement

Metallische Werkstoffe — Rohr
Ringfaltversuch

This European Standard was approved by CEN on 1993-10-25. 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.

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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

Foreword

This European Standard has been prepared by sub-committee ECISS/TC 29, the secretariat of which has been allocated to the United Kingdom (BSI).

No meeting of the sub-committee has been held but the following countries voted positively by the PQ-procedure on the acceptability of the reference document as a European Standard: Belgium, Denmark, Finland, Germany, Greece, Italy, Netherlands, Norway, Spain, Sweden, Switzerland and the United Kingdom. France voted negatively.

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 April 1994, and conflicting national standards shall be withdrawn at the latest by April 1994.

In accordance with the CEN/CENELEC Internal Regulations, 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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Introduction

This standard is based on ISO 8492:1986 *Metallic materials — Tube — Flattening test* which has been editorially changed in the light of the comments received. The scope of the standard has been amended to include tubes having an outside diameter not greater than 600 mm. Figure b) has been replaced by one from DIN 50136 and minor changes have been made to clause 6 “Test piece”. The usage of symbols has been aligned with the requirements of ISO 3545-1:1989.

1 Scope

This European Standard specifies a method for determining the ability of metallic tubes of circular cross-section to undergo plastic deformation by flattening. It may also be used to show up defects in the tubes.

The standard is applicable to tubes having an outside diameter not greater than 600 mm and a thickness not greater than 15 % of the outside diameter. The range of the outside diameter, or thickness, for which this European Standard is applicable could be more exactly specified in the relevant product standard.

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.

ISO 3545-1:1989, *Steel tubes and fittings — Symbols for use in specifications — Part 1: Tubes and tubular accessories with circular cross-section*.

3 Principle

Flattening a test piece at the end of a tube or cut from a tube, in a direction perpendicular to the longitudinal axis of the tube until the distance between platens measured under load in the direction of flattening, reaches a value specified in the relevant product standard [see Figure 1 a) and Figure 1 b)].

In the case of close flattening, the internal surfaces of the test piece shall be in contact over at least half of the internal width b of the flattened test piece [see Figure 1 c)].

4 Symbols, descriptions and units

Symbols, descriptions and units for the flattening test are in accordance with ISO 3545-1:1989 and are given in Figure 1 and Table 1.

Table 1 — Symbols, descriptions and units

Symbol	Description	Unit
D	Outside diameter of the tube	mm
T	Wall thickness of the tube	mm
b	Inside width of the flattened test piece	mm
L	Length of the test piece	mm
H	Distance between platens measured under load	mm

5 Testing equipment

5.1 The machine used for the test shall be able to flatten the test piece to the prescribed distance H between two plane, parallel, rigid platens.

5.2 The width of the platens shall exceed the width of the test piece after flattening i.e. at least $1,6D$, and the length of the platens shall extend over the whole length of the test piece.

6 Test piece

6.1 The length of a test piece shall be not less than 10 mm nor more than 100 mm. The edges of the test piece may be rounded by filing or chamfered by other methods.

NOTE Non-rounded or non-chamfered edges are permissible if the test result meets the test requirements.

6.2 When the test is carried out on the end of a full-length tube, the tube shall be cut at right angles to the axis of the tube to a depth of at least 80 % of the tube outside diameter.

7 Procedure

7.1 In general, the test shall be carried out at ambient temperature within the limits of 10 °C to 35 °C. The test carried out under controlled conditions shall be made at a temperature of (23 ± 5) °C.

7.2 Place the test piece between two platens.

7.3 Ensure that the weld of the welded tubes is in position as required by the relevant product standard.

7.4 Flatten the test piece by moving the platens in a direction perpendicular to the longitudinal axis of the tube (see clause 3).

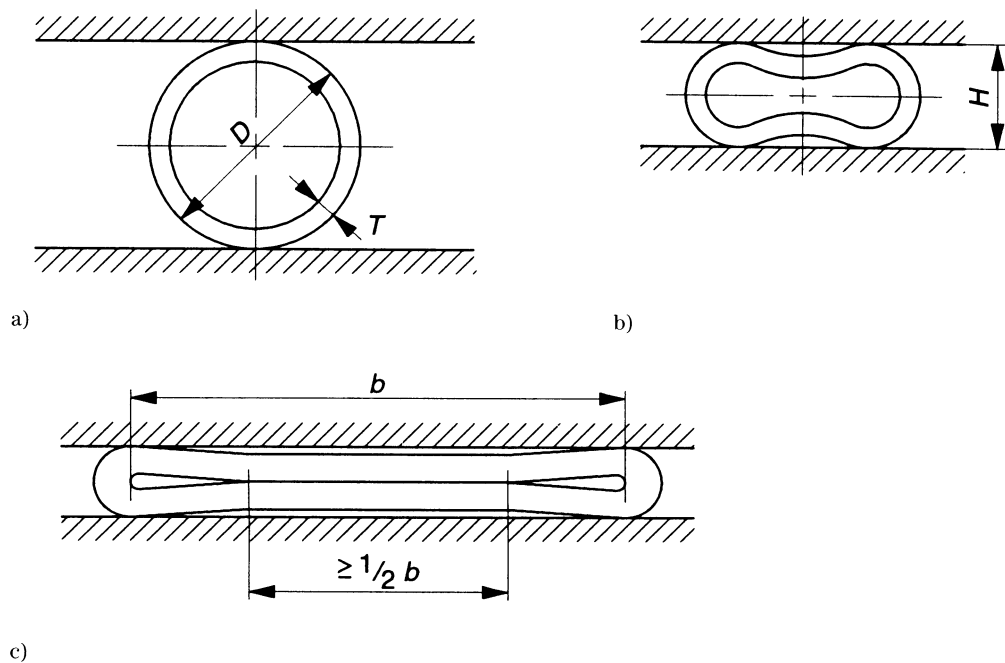


Figure 1 — Symbols for flattening test

7.5 In case of dispute, the rate of movement of the platens shall not exceed 25 mm/min.

7.6 Interpretation of the flattening test shall be carried out according to the requirements of the relevant product standard. When these requirements are not specified, absence of cracks visible without the use of magnifying aids shall be considered as evidence that the test piece passed the test. Slight premature failure at the edges shall not be considered cause for rejection.

8 Test report

8.1 A test report shall be provided when so specified in the relevant product standard.

8.2 The test report shall include at least the following information:

- a) reference to this European Standard;
- b) identification of the test piece;
- c) dimensions of the test piece;
- d) degree of flattening;
- e) position of the weld;
- f) result of the test.

National annex NA (informative)

Committees responsible

The United Kingdom participation in the preparation of this European Standard was entrusted by the Iron and Steel Standards Policy Committee (ISM/-) and the Non-ferrous Metals Standards Policy Committee (NFM/-) to Technical Committee ISM/NFM/4 upon which the following bodies were represented:

AEA Technology
Aluminium Federation
British Non-ferrous Metals Federation
British Railways Board
British Steel Industry
Copper Development Association
Department of Trade and Industry (National Measurement Accreditation Service)
Department of Trade and Industry (National Physical Laboratory)
ERA Technology Ltd.
GAMBICA (BEAMA Ltd.)
Institute of Materials
Light Metal Founders' Association
Ministry of Defence
Society of British Aerospace Companies Limited
University College London
Welding Institute

The following body was also represented in the drafting of the standard, through subcommittees and panels:

British Welded Steel Tube Association

BSI — British Standards Institution

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