
**Metallic materials — Tube —
Flattening test**

Matériaux métalliques — Tubes — Essai d'aplatissement

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

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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. www.iso.org/directives

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The committee responsible for this document is ISO/TC 164, *Mechanical testing of metals*, Subcommittee SC 2, *Ductility testing*.

This third edition cancels and replaces the second edition (ISO 8492:1998), of which it constitutes a minor revision.

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Metallic materials — Tube — Flattening test

1 Scope

This International 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 reveal the defects in the tubes.

This International Standard is applicable to tubes having an outside diameter no greater than 600 mm and a thickness no greater than 15 % of the outside diameter. The range of the outside diameter or thickness, for which this International Standard is applicable, may be more exactly specified in the relevant product standard.

2 Symbols, designations and units

Symbols, designations and units for the flattening test are given in [Table 1](#) and are shown in [Figure 1](#).

Table 1

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

^a The symbol T is also used in steel tube standards.

3 Principle

Flattening the end of a tube or a test piece of specified length, 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 [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 standard [see [Figure 1 c](#)].

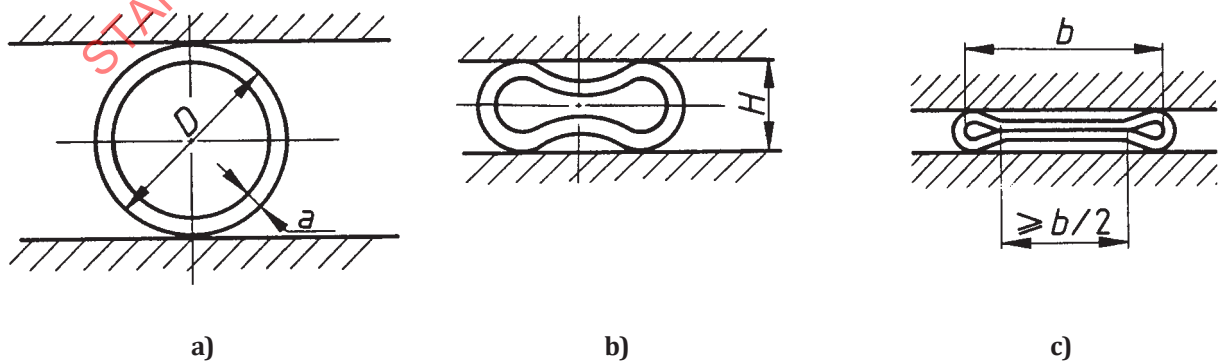


Figure 1

4 Testing equipment

The **test machine** is capable of flattening the test piece to the prescribed distance H between two plane, parallel, rigid platens.

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

5 Test piece

5.1 The length of a test piece shall be no less than 10 mm and no 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.

5.2 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. The cut shall be at a distance from the end of the tube equal to the length of the test piece.

6 Procedure

6.1 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 $23\text{ °C} \pm 5\text{ °C}$.

6.2 Place the test piece between two platens.

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

6.4 Flatten the test piece by moving the platens in a direction perpendicular to the longitudinal axis of the tube.

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

6.6 Interpretation of the flattening test shall be carried out in accordance with the requirements of the relevant product standard. When these requirements are not specified, the test piece shall be considered to have passed the test if no cracks are visible without the use of magnifying aids. Slight cracking at the edges shall not be considered a cause for rejection.

7 Test report

A test report shall be provided when so specified in the relevant product standard. In this case, the test report shall include at least the following information:

- a) a reference to this International Standard, i.e. ISO 8492;
- b) identification of the test piece;
- c) dimensions of the test piece;
- d) distance between platens under load (H);
- e) position of the weld, if relevant;
- f) result of the test.