

INTERNATIONAL  
STANDARD

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**Metallic materials — Tube — Flattening test**

*Matériaux métalliques — Tubes — Essai d'aplatissement*

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Reference number  
ISO 8492:1998(E)

## 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 8492 was prepared by Technical Committee ISO/TC 164, *Mechanical testing of metals*, Subcommittee SC 2, *Ductility testing*.

This second edition cancels and replaces the first edition (ISO 8492:1986), of which it constitutes a technical 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   |

<sup>a</sup> 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)].

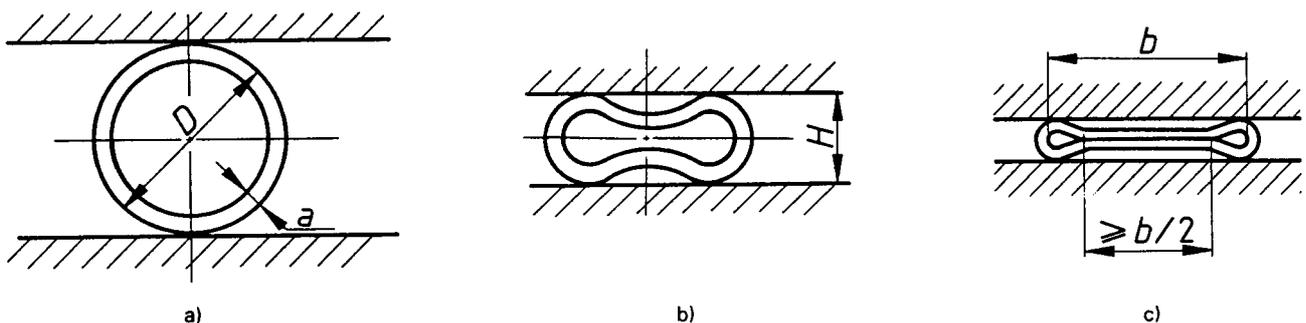


Figure 1

## 4 Testing equipment

**4.1 Test machine**, 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 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 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) 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;
- e) position of the weld, if relevant;
- f) result of the test.