INTERNATIONAL STANDARD

ISO 8494

Third edition
2013-11-15

Metallic materials — Tube — Flanging test

Matériaux métalliques — Tubes — Essai de rabattement de collerette

Reference number
ISO 8494:2013(E)

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

Published in Switzerland

Contents

Page

Foreword

IISO (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. www.iso.org/directives

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received. www.iso.org/patents

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 8494:1998), of which it constitutes a minor revision.

Metallic materials — Tube — Flanging test

1 Scope

This International Standard specifies a method for determining the ability of metallic tubes of circular cross-section to undergo plastic deformation during flange formation.

This International Standard is intended for tubes having an outside diameter no greater than 150 mm and a wall thickness no greater than 10 mm, although the range of diameters or wall thickness for which this International Standard is applicable may be more exactly specified in the relevant product standard.

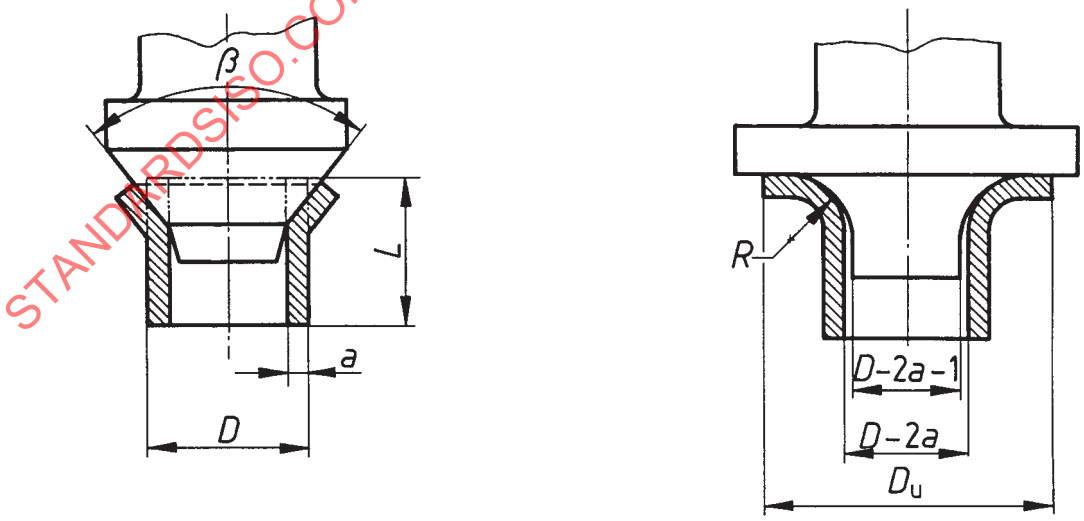
2 Symbols, designations and units

Symbols, designations and units for the flanging test of tubes are given in Table 1 and are shown in Figure 1.

Table 1

Symbol	Designation	Unit
a [a]	Wall thickness of the tube	mm
D	Original outside diameter of the tube	mm
D_u	Maximum outside diameter of the flange	mm
L	Length of the test piece before the test	mm
R	Corner radius of the flanging tool	mm
b	Angle of the conical mandrel	degree

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



a) b)

Figure 1

3 Principle

Forming of a flange on the end of a test piece cut from the tube, in a plane perpendicular to the axis of the tube, until the external diameter of the flange reaches the value specified in the relevant product standard.

4 Testing equipment

4.1 **Variable-speed press** or **universal testing machine**.

4.2 **Forming equipment**, made of polished material of sufficient hardness, consisting of

a) a conical mandrel having a suitable angle (generally 90°);

b) a flanging tool having

— a cylindrical end of a diameter 1 mm less than the inside diameter of the tube,

— a flat concentric portion, perpendicular to the axis of the flanging tool, and having a diameter no less than the required diameter of the flange;

c) a supporting die, which may be used to support the tube during the formation of the flange.

5 Test piece

5.1 The length of the test piece shall be approximately 1,5*D*. The test piece may be shorter provided that the remaining cylindrical part of the test piece after flanging is at least 0,5*D*.

5.2 Both ends of the test piece shall be in the plane perpendicular to the axis of the tube. The edges of the end to be tested 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.

5.3 When welded tubes are subjected to the test, the internal welded flash may be removed.

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 °C ± 5 °C.

6.2 Preform the test piece by forcing the conical mandrel into one end of the test piece until the diameter of the drifted test piece is such that a flange having the specified diameter (D_u) can be formed [see Figure 1 a)].

6.3 Remove the conical mandrel and, if the piece is not already cracked, replace it with the flanging tool [see Figure 1 b)].

6.4 Form the flange by applying axial force to the test piece until the drifted portion has formed a flange of the required diameter perpendicular to the axis of the test piece.

6.5 The conical mandrel may be lubricated. The conical mandrel shall not rotate relative to the test piece during the test.

6.6 In case of dispute, the rate of movement of the forming tools shall not exceed 50 mm/min.

