

# INTERNATIONAL STANDARD

**ISO**  
**5252**

Second edition  
1991-02-15

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## Steel tubes — Tolerance systems

*Tubes en acier — Systèmes de tolérances*



Reference number  
ISO 5252:1991(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 5252 was prepared by Technical Committee ISO/TC 5, *Ferrous metal pipes and metallic fittings*.

This second edition cancels and replaces the first edition (ISO 5252:1977), the standardized tolerances on thickness of which have been technically revised.

## Introduction

This International Standard groups together the majority of the tolerances on dimensions used by ISO/TC 5/SC 1 in the drawing up of its International Standards concerning steel tubes.

It is intended for use as a basic document by all ISO technical committees concerned with the standardization of steel tubes.

It cannot, therefore, be used as a standard for the definition of a product.

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## Steel tubes — Tolerance systems

### 1 Scope

This International Standard establishes the tolerance systems to be used for the standardization of steel tubes (product standards).

### 2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 286-1:1988, *ISO system of limits and fits — Part 1: Bases of tolerances, deviations and fits*.

### 3 Definitions

For the purposes of this International Standard, the definitions of the terms "size tolerance", "deviation" and "nominal size" given in ISO 286-1 and the following definitions apply.

**3.1 proportional tolerance:** Tolerance where the deviations with respect to the nominal size are specified as a percentage of the size.

#### EXAMPLE

Proportional tolerance applied to a thickness

$$6,3 \text{ mm} \pm 12,5 \%$$

**3.2 absolute tolerance:** Tolerance where the deviations with respect to the nominal size are specified in the form of a value expressed in the units of the size.

#### EXAMPLE

Absolute tolerance applied to a diameter

$$30 \text{ mm} \pm 0,5 \text{ mm}$$

**3.3 joint tolerance:** Tolerance where one of the deviations is given in the proportional system and the other in the absolute system.

#### EXAMPLE

Joint tolerance applied to a thickness

$$2,9 \text{ mm} \begin{matrix} +0,5 \text{ mm} \\ -15 \% \end{matrix}$$

**3.4 unilateral tolerance:** Tolerance where the deviation is wholly positive or wholly negative.

#### EXAMPLE

Unilateral tolerance applied to a length

$$6\,000 \text{ mm} \begin{matrix} +10 \text{ mm} \\ 0 \end{matrix}$$

**3.5 bilateral tolerance:** Tolerance where the deviations are of opposite signs.

**3.6 symmetrical tolerance:** Bilateral tolerance where the deviations, expressed in the same unit, are equal.

#### EXAMPLE

Symmetrical tolerance applied to a diameter

$$168,3 \text{ mm} \pm 1 \%$$

**3.7 asymmetrical tolerance:** Bilateral tolerance where the deviations, expressed in the same unit, are unequal.

#### EXAMPLE

Asymmetrical tolerance applied to a thickness

$$12,5 \text{ mm} \begin{matrix} +15,0 \% \\ -12,5 \% \end{matrix}$$

## 4 Use of tolerances

**4.1** The tolerances used in product standards should be selected from this International Standard although the use of a tolerance specific to a particular product is not excluded.

**4.2** The choice and the combination of the different proposed tolerances should be the subject of a careful examination. Among other factors, consideration should be given to the tube manufacturing process, the intended use and dimensions of the tubes and the methods and instruments employed for the checking of product conformity with specifications.

**4.3** Unilateral or bilateral tolerances may be used, but the use of symmetrical tolerances is recommended.

For most product standards for steel tubes, the proportional tolerance is the most suitable.

The use of a joint tolerance is allowed.

## 5 Outside diameter

**5.1** The five classes of proportional tolerances shown in table 1 are standardized.

Table 1

| Tolerance class | Tolerance on outside diameter          |
|-----------------|----------------------------------------|
| D0              | $\pm 2\%$<br>with $\pm 1$ mm min.      |
| D1              | $\pm 1,5\%$<br>with $\pm 0,75$ mm min. |
| D2              | $\pm 1\%$<br>with $\pm 0,5$ mm min.    |
| D3              | $\pm 0,75\%$<br>with $\pm 0,3$ mm min. |
| D4              | $\pm 0,5\%$<br>with $\pm 0,1$ mm min.  |

**5.2** If not otherwise stated in the product standard, the tolerance on ovality is included in the tolerance on outside diameter.

**5.3** For particular applications, for example for the diameter of precision tubes, the use of an absolute tolerance is necessary. In such cases, this tolerance shall be stated clearly and precisely for each diameter covered by the product standard. In case of

doubt about the tolerance on an intermediate diameter, the tolerance on the next larger size applies.

### EXAMPLE

If in a product standard a table similar to table 2 appears, the tolerance for a diameter of 32 mm, between diameters 30 mm and 35 mm, is  $\pm 0,25$  mm.

Table 2

| Outside diameter<br>mm | Tolerance<br>mm |
|------------------------|-----------------|
| 30                     | $\pm 0,2$       |
| 35                     | $\pm 0,25$      |

## 6 Thickness

**6.1** The ten classes of proportional tolerances shown in table 3 are standardized.

**6.2** If not otherwise stated in the product standard, the tolerance on eccentricity is included in the thickness tolerance.

**6.3** For particular applications, for example for heat-exchanger tubes, the unilateral tolerance system is usually adopted.

## 7 Length

### 7.1 General

Four types of length, defined in 7.2.1 to 7.2.4, are standardized. The product standard shall specify the type or types applicable and shall define the tolerances to be applied.

### 7.2 Types of standardized length

#### 7.2.1 Random length

The random length is defined of necessity by a minimum and a maximum length. By definition the difference between these lengths may not be less than 2 m.

#### EXAMPLES

10 m to 15 m  
4 m to 7 m

This range of lengths may be supplemented by the indication of a percentage of shorter tubes, whose length shall be not less than a third limiting value.