International Standard ISO 3545

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Steel tubes and tubular shaped accessories with circular cross-section — Symbols to be used in specifications

Tubes en acier et accessoires de forme tubulaire à section circulaire — Symboles à utiliser dans les spécifications

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Stanard ISO 3545 was developed by Technical Committee ISO/TC 5, *Metallic pipes and fittings*, and was circulated to the member bodies in June 1979.

It has been approved by the member bodies of the following countries :

Australia	France	Poland
Austria	Germany. F.R.	Romania
Belgium	India	South Africa, Rep. of
Brazil	Israel	Spain
Canada	Korea, Rep. of	Sweden
Chile	Mexico	Switzerland
Denmark	Netherlands	USSR
Egypt, Arab Rep. of	New Zealand	
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The member bodies of the following countries expressed disapproval of the document on technical grounds :

Czechoslovakia
Italy
United Kingdom
USA

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1 Scope and field of application

This International Standard defines the most common symbols with the aim of standardising and facilitating the use of terminology used in standards for steel tubes and associated products.

2 Fundamental symbols (see figure 1)

D = specified outside diameter

P = pressure

T = specified thickness

M = mass per unit length

3 Symbols for service conditions

DN = nominal size

PN = nominal pressure

PS = service pressure

TS = service temperature

4 Symbols for tolerances

See ISO 5252, *Steel tubes — Tolerance systems.*

5 Symbols for tests

5.1 Pressure test

PE = test pressure

S = stress which occurs in the metal during the test

5.2 Flattening test (see figure 4)

H = distance between the platens of the test machine

L = length of the test piece

K = constant factor of deformation for the formula :

$$H = \frac{(1 + K) \times T}{K + (T/D)}$$

5.3 Drift expanding test (see figure 5)

C = outside diameter of expansion

L = length of test piece before testing

5.4 Flanging test (see figure 6)

C = outside flange diameter

L = length of test piece before testing

6 Symbols for specifications

I = moment of inertia (second moment of area) $= \frac{\pi}{64}[D^4 - (D - 2T)^4]$*

Z = section modulus $= \frac{I}{D/2}$*

A = section $= \frac{\pi}{4}[D^2 - (D - 2T)^2]$**

R = radius of gyration $= \sqrt{\frac{I}{A}}$

B = diameter-thickness ratio $= \frac{D}{T}$

* The moment of inertia is calculated on the basis of any axis.

** This is a cross-sectional area which is perpendicular to the axis of the tube or the accessory.

O = ovality = difference between the maximum and the minimum outside diameter in the same cross-section divided by the outside diameter. The ovality is expressed as a percentage (see figure 2).

$$O = 100 \times \frac{D_{max} - D_{min}}{D}$$

E = eccentricity = difference between the maximum and the minimum thickness in the same cross-section divided by the thickness. The eccentricity is expressed as a percentage (see figure 3).

$$E = 100 \times \frac{T_{max} - T_{min}}{T}$$

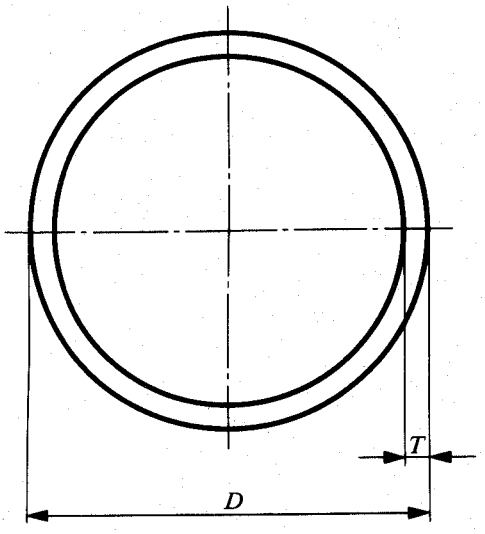

Figure 1

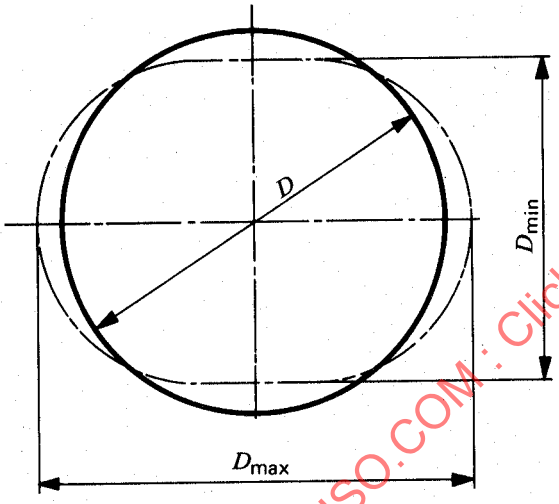

Figure 2

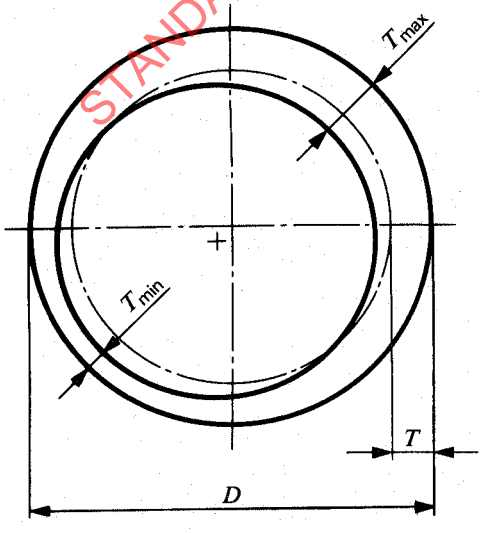

Figure 3

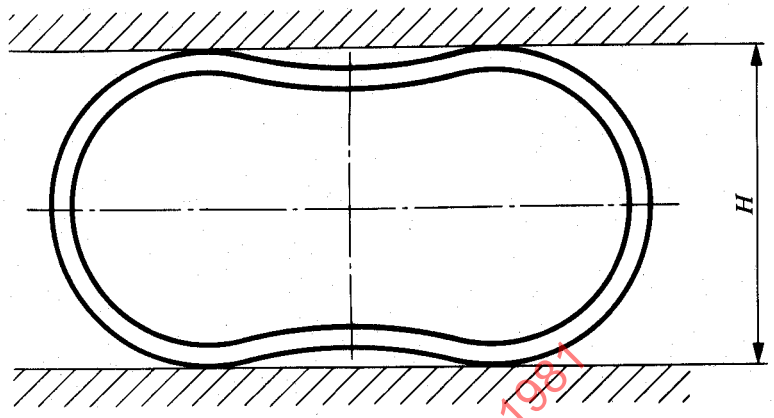

Figure 4

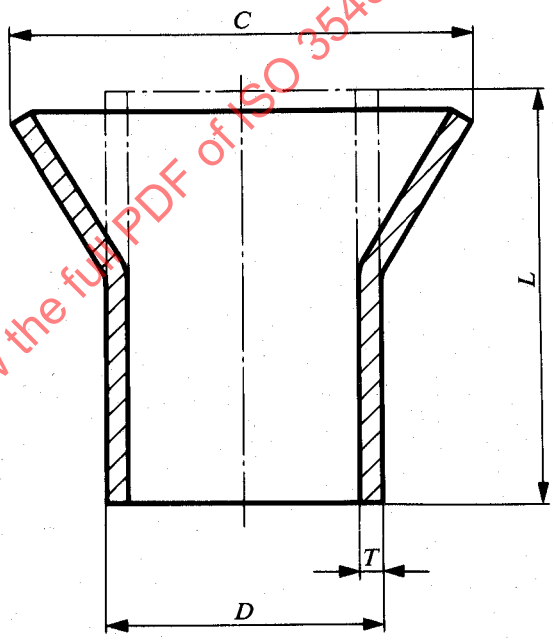

Figure 5

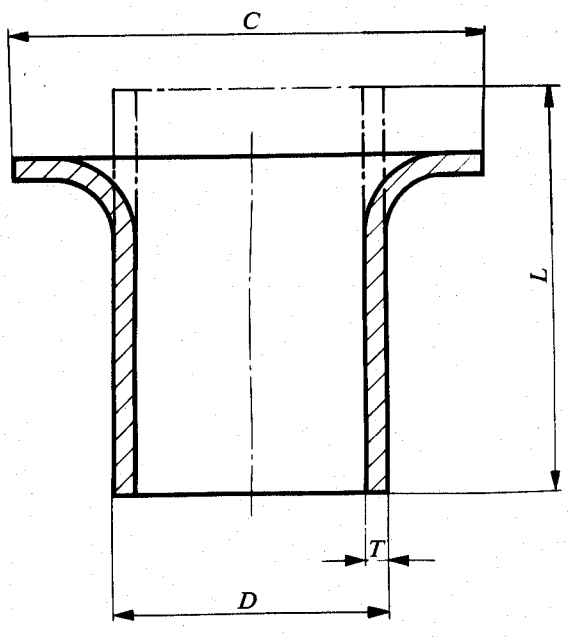

Figure 6