SLOVENSKI STANDARD
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Fluidna tehnika - Pnevmatika - Cevnice valjev - Zahteve za neželezne kovinske cevi

Pneumatic fluid power systems -- Cylinder barrels -- Requirements for non-ferrous metallic tubes

Transmissions pneumatiques -- Tubes pour vérins -- Caractéristiques des tubes en métaux non ferreux

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ICS:

23.100.20	Hidravlični valji	Cylinders
77.150.01	Izdelki iz neželeznih kovin na splošno	Products of non-ferrous metals in general

SIST ISO 6537:1997 **en**

International Standard 6537

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Pneumatic fluid power systems — Cylinder barrels — Requirements for non-ferrous metallic tubes

Transmissions pneumatiques — Tubes pour vérins — Caractéristiques des tubes en métaux non ferreux

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Price based on 6 pages

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

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 Standard ISO 6537 was developed by Technical Committee ISO/TC 131, *Fluid power systems*, and was circulated to the member bodies in September 1981.

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

Australia	Hungary	South Africa, Rep. of
Austria	India	Sweden
Belgium	Ireland	Switzerland
Canada	Mexico	United Kingdom
China	Netherlands	USA
Egypt, Arab Rep. of	Norway	USSR
Finland	Poland	
Germany, F.R.	Romania	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

France
Japan

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Pneumatic fluid power systems — Cylinder barrels — Requirements for non-ferrous metallic tubes

0 Introduction

In pneumatic fluid power systems, power is transmitted and controlled through gas under pressure circulating within a circuit. One component of such systems is the fluid power cylinder. This is a device which converts power into linear mechanical force and motion. It consists of a movable element, i.e. a piston rod operating within a cylindrical bore.

For the majority of applications, tubing is specified in terms of outside diameter and thickness. For pneumatic fluid power cylinders, however, the important dimensions are bore diameter and thickness (taking account of the pressure rating).

This International Standard covers non-ferrous metallic pneumatic cylinder tubes.

1 Scope and field of application

1.1 This International Standard defines the mechanical properties, dimensional tolerances, surface finishes and technical delivery conditions of the following tubes and bores for pneumatic fluid power cylinders :

— round non-ferrous metallic tubes, seamless or welded type, in the as-drawn stress-relieved or fully heat-treated condition;

— bores, specially finished, with or without metal removal.

1.2 The tubes covered by this International Standard are intended for use as barrels in a wide variety of pneumatic cylinders.

NOTE — Brass and aluminium have been considered as a basis in this document but should not be considered the only materials suitable for such applications.

1.3 Annex A specifies the dimensions and tolerances on inside diameters for non-ferrous metallic pneumatic cylinder tubes.

1.4 Annex B provides a recommended method of ordering.

2 References

ISO 286/1, *ISO systems of limits and fits — Part 1 : General, tolerances and deviations.* [1]

ISO 468, *Surface roughness — Parameters, their values and general rules for specifying surfaces.*

ISO 3322, *Fluid power systems and components — Cylinders — Nominal pressures.*

ISO 5598, *Hydraulic and pneumatic fluid power — Vocabulary.* [2]

3 Definitions

For definitions of terms used, see ISO 5598.

4 Symbols

The following symbols are used in this International Standard :

D	=	nominal outside diameter of the tube
d	=	nominal inside diameter of the tube
a	=	nominal thickness of the tube
R_m [3]	=	tensile strength at ambient temperature

1) At present at the stage of draft. (Revision of ISO/R 286-1962.)

2) At present at the stage of draft.

3) Symbols for supplier and purchaser reference only.

R_{eL} [1] = lower yield stress (aluminium only)

$R_{p(0,2)}$ [1] = 0,2 % proof stress (this figure will be used if the yield stress is not clearly indicated)

S_o [1] = cross-sectional area of gauge length

A [2] = elongation after fracture on gauge length = 5,65 $\sqrt{S_o}$

R_a = arithmetical mean deviation from the mean line of the profile; roughness parameter (see ISO 468)

R_{ma} = maximum height of the profile; roughness parameter (see ISO 468)

5 Manufacture of base tubes

5.1 Manufacturing process

5.1.1 Use seamless base tubes without special finishing, supplied stress-relieved, annealed, or in fully heat-treated condition.

5.1.2 For tubes of welded construction, supply with special finishing.

5.2 Mechanical and chemical properties

5.2.1 At the discretion of the manufacturer, or unless otherwise agreed to at the time of order, supply the tubes in the heat-treated condition necessary to achieve the mechanical properties.

5.2.2 When brass tubing is used, stress-relieve it after the final drawing operation.

5.2.3 The alloy and metallurgic condition are chosen by the technical departments of the tube manufacturer and cylinder manufacturer together, to ensure mechanical and chemical properties suited to the conditions of use of the cylinder.

5.3 Finishing

The finishing process required to achieve the bore tolerances and surface finishes covered by this International Standard is subject to agreement between supplier and purchaser.

6 Pressures

6.1 Limit the normal operating pressure of pneumatic cylinders in general to 25 bar (2 500 kPa) in the standard range, i.e. 6,3 — 10 — 16 — 25 bar (630 — 1 000 — 1 600 — 2 500 kPa) (see ISO 3322).

6.2 Use the permissible pressures as determined by the cylinder manufacturer in line with the established technology of the trade and applying the safety factors set by the regulations or standards which are in force.

7 Temperature

Utilize a working temperature range as determined by the manufacturer, but which is at least within the range of − 40 and + 100 °C.

8 Tolerances

8.1 Ordering

Refer to annex B for the method of ordering.

8.2 Inside diameter

8.2.1 Four classes of tolerances are recognized, H11, H12, H13 and H14, in accordance with ISO 286 (see annex A).

8.2.2 The bore tolerances include all possible deformations of the internal cylinder such as ovality, lobing, etc. with the exception of straightness faults.

8.2.3 At the request of the purchaser, special tolerances are subject to agreement between purchaser and supplier if the material is stress-relieved.

8.3 Thickness and eccentricity

8.3.1 The thickness measured at any cross-section along the tube length shall not vary from the mean thickness as shown in the table below.

Table 1 — Mean thickness and eccentricity

Thickness, mm a	Tolerances %
$0,5 < a \leqslant 1$ $1 < a \leqslant 2$ $2 < a \leqslant 3$ $a > 3$	± 10

NOTE — This table includes the eccentricity between inside and outside diameters.

8.3.2 When the inside and outside diameters are specified, maintain the tolerance on the outside diameter to ensure the minimum and maximum wall thickness as determined in the table above, anywhere along the tube.

8.4 Straightness

8.4.1 The measure of straightness is defined in this International Standard as the maximum deviation that can be measured with feeler gauges between the tube and a straight edge of 1 000 mm length resting on the outside surface of the tube and parallel to its axis.

1) Symbols for supplier and purchaser reference only.

2) Elongation on 5,65 $\sqrt{S_o}$ for tubes with a wall thickness of 3 mm and thinner, and on 50 mm for tubes with thicker walls (aluminium only).

8.4.2 As an alternative to 8.4.1, support the tubes by two rollers placed at intervals of 1 000 mm and measure their maximum deviation from the straight while the tubes are being rotated.

NOTE — Applying this method, the deviation from straightness is half the value of the total indicator reading (TIR).

8.4.3 For tubes 1 000 mm and longer, measure the deviation over 1 000 mm lengths set at consecutive intervals of 500 mm starting at one end.

8.4.4 For tubes longer than 1 000 mm, ensure that the deviation is not greater than 1/1 000.

8.4.5 Measure tubes up to and including 1 000 mm long over their entire length, and with deviations not exceeding values deduced from figure 1.

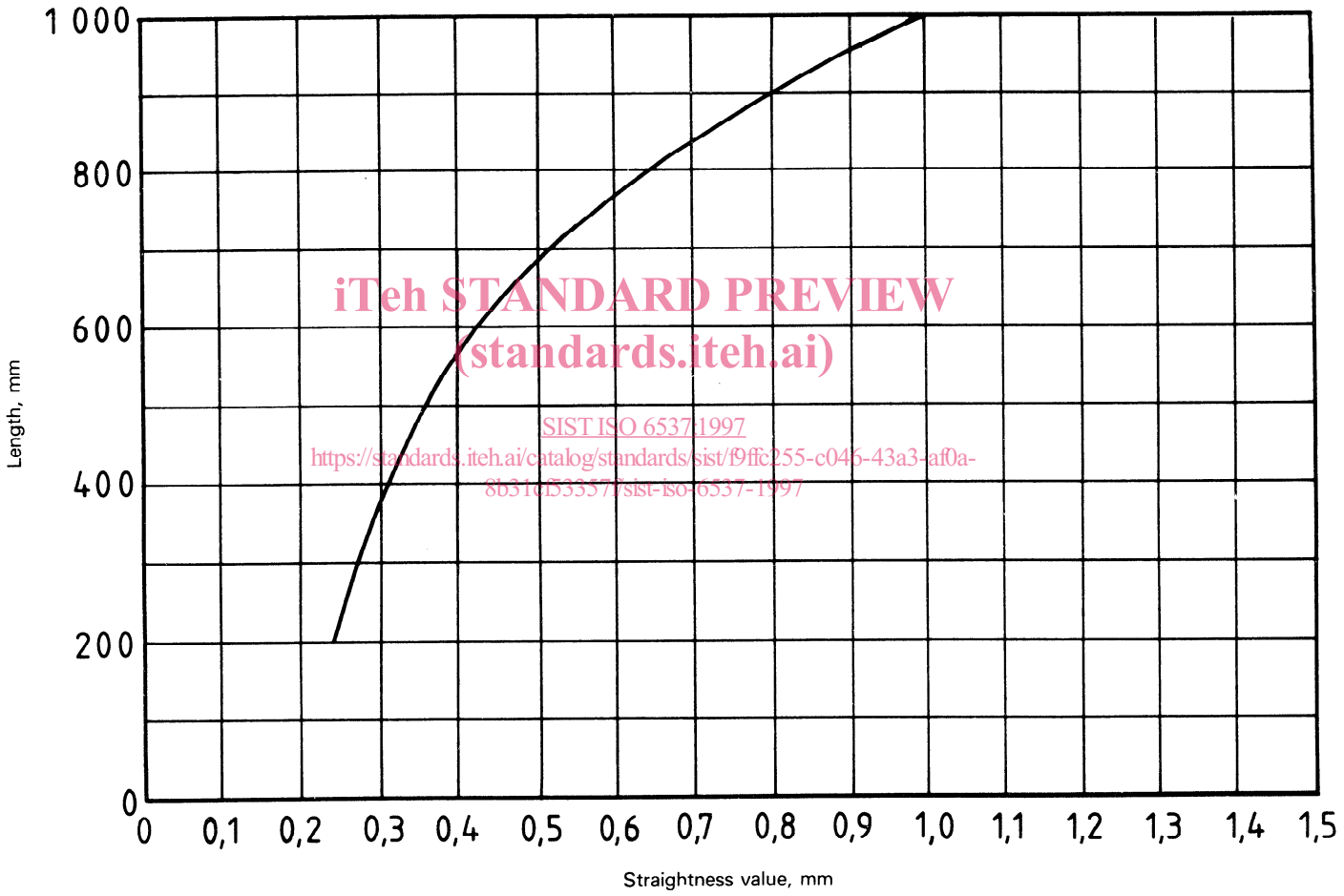

Figure — Permissible deviation from straightness : tubes shorter than 1 000 mm