INTERNATIONAL STANDARD

ISO 11363-2

First edition
2010-05-15

Gas cylinders — 17E and 25E taper threads for connection of valves to gas cylinders —

Part 2: Inspection gauges

Bouteilles à gaz — Filetages coniques 17E et 25E pour le raccordement des robinets sur les bouteilles à gaz —

Partie 2: Calibres de contrôle

Reference number
ISO 11363-2:2010(E)

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Fax + 41 22 749 09 47
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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 11363-2 was prepared by Technical Committee ISO/TC 58, *Gas cylinders*, Subcommittee SC 2, *Cylinder fittings*.

This first edition of ISO 11363-2 cancels and replaces ISO 11116-2:1999 and ISO 11191:1997.

ISO 11363 consists of the following parts, under the general title *Gas cylinders — 17E and 25E taper threads for connection of valves to gas cylinders*:

— *Part 1: Specifications*

— *Part 2: Inspection gauges*

Introduction

Gas cylinders intended to contain compressed, liquefied or dissolved gas under pressure are fitted with accessories to allow release and refilling of gas. Hereinafter, the term “valve” will apply to such accessories.

The connection between cylinder and valve is obtained by assembly of two taper-threads (an external one on the valve stem and an internal one in the cylinder neck), both having the same nominal taper, thread pitch and thread profile.

Gas cylinders — 17E and 25E taper threads for connection of valves to gas cylinders —

Part 2: Inspection gauges

1 Scope

This part of ISO 11363 specifies types, dimensions and principles of use of gauges, to be used in conjunction with the taper threads specified in ISO 11363-1 (i.e. 17E and 25E threads).

It provides examples of calculations for thread gauge dimensions on the large end diameter (Annex A) and draws attention to the limitations of the gauging system specified (Annex B).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 11363-1, *Gas cylinders — 17E and 25E taper threads for connection of valves to gas cylinders — Part 1: Specifications*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11363-1 and the following apply.

3.1
check gauge
gauge for checking dimensional conformity of inspection gauges

NOTE This gauge is not used for gauging cylinder neck threads or valve stem threads.

3.2
inspection gauge
gauge used for the routine gauging of cylinder neck and valve stem threads

NOTE This gauge is not used for checking other gauges.

3.3
single-part gauge
gauge of sufficient length to contact the length of full form taper threads

NOTE These gauges are either plugs or rings, plain or threaded.

3.4
two-part gauge
gauge consisting of two separate inspection gauges, used in combination, where one is used to contact the large end of the taper cone and the other the small end

NOTE These sets of gauges are either plugs or rings, plain or threaded.

4 Requirements

4.1 Materials

All gauges shall be manufactured from material of suitable strength, stability and hardness.

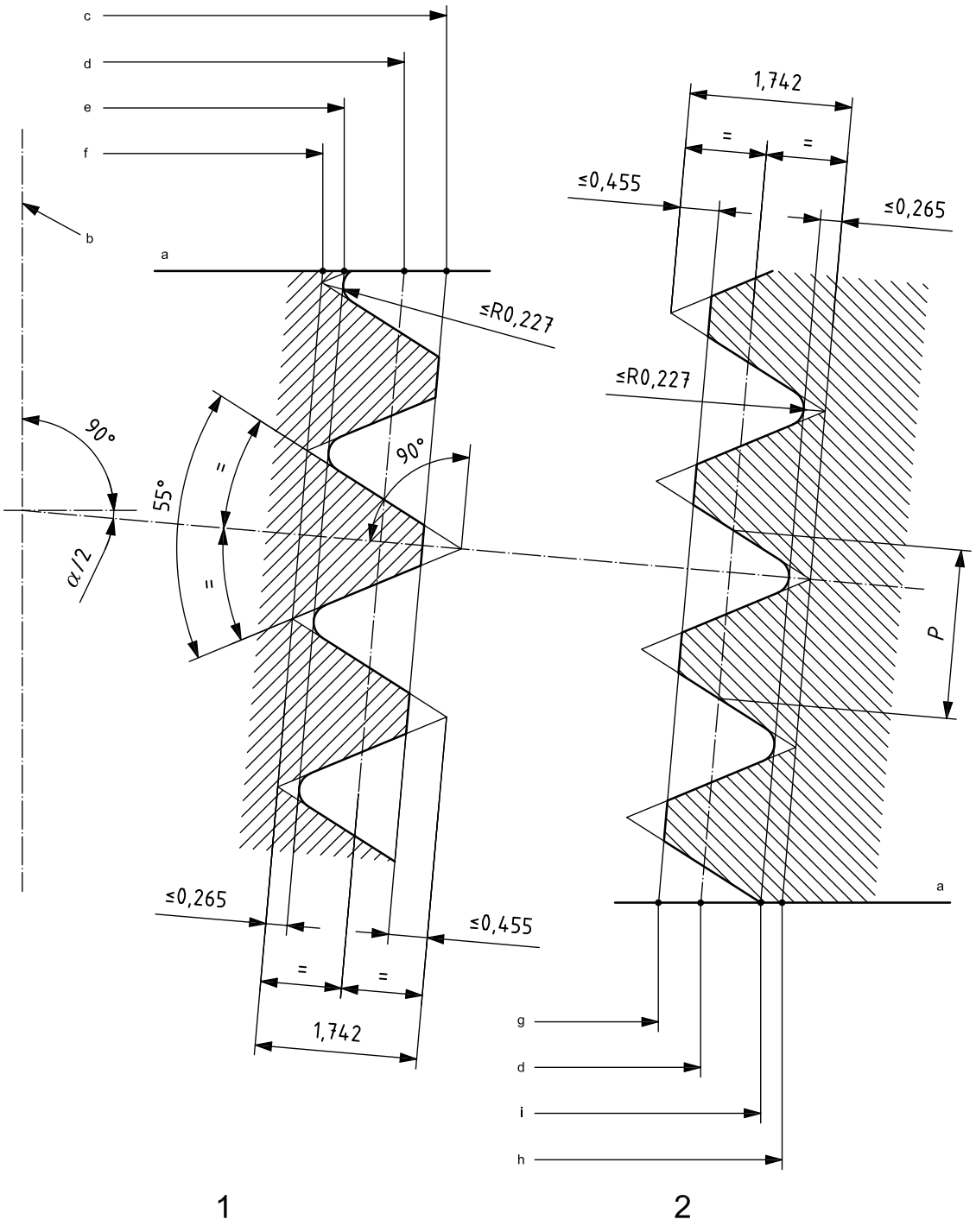
4.2 Thread profile

The thread profile of threaded inspection and check gauges shall be as shown in Figure 1.

The thread profile is a British Standard Whitworth (BSW)[1)] form with a 55° angle (see Figure 1).

1) A coarse thread devised and standardized in 1841 by British engineer Sir Joseph Whitworth (1803-87). It has an angle of thread of 55° and ranges in size from 1/16 in to 2 1/2 in. It is used in many types of engineering throughout the world, although in the UK its use is now being superseded by the ISO metric system (ISO 68-1).

Dimensions in millimetres



Key

P pitch

1 plug gauge thread profile

2 ring gauge thread profile

a Gauge plane.

b Thread axis.

c Major diameter.

d Pitch diameter.

e Maximum minor diameter.

f Minimum minor diameter.

g Minor diameter.

h Maximum major diameter.

i Minimum major diameter.

Figure 1 — Thread profiles

4.3 Thread handedness

The thread shall be a right-hand thread, such that it moves away from an observer when rotated clockwise.

4.4 Taper

The nominal values for the taper are the following.

— Taper ratio: 3/25.

— Taper angle: 6° 52′.

— Taper slope: 12 %.

4.5 Pitch, P

The nominal pitch is 1,814 mm (derived from $\frac{25,4}{14}$ mm) (see Figure 1).

5 Gauge dimensions

The following dimensional requirements apply to gauges shown in Figure 2 to Figure 15, inclusive.

All dimensions are given in millimetres.

Tolerances for specified dimensions on all gauges are:

— all lengths, ± 0,01 mm;

— diameters of inspection gauges, ± 0,01 mm;

— diameters of check gauges, $^{-0,01\,\mathrm{mm}}_{-0,02\,\mathrm{mm}}$.

For threaded gauges, only pitch diameters are specified. For minor and major diameters see Figure 1.

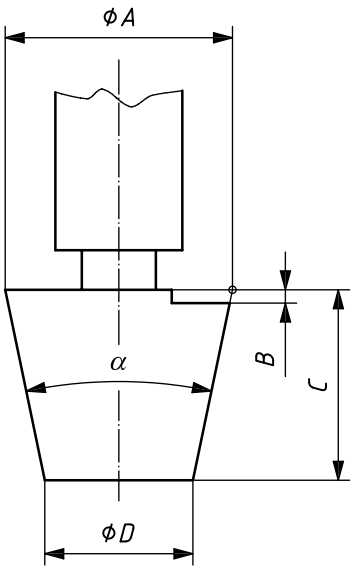
Unspecified dimensions shall be chosen by the manufacturer of the gauges.

6 Inspection gauges

6.1 Gauges for cylinder neck thread

6.1.1 Single-part plug gauges

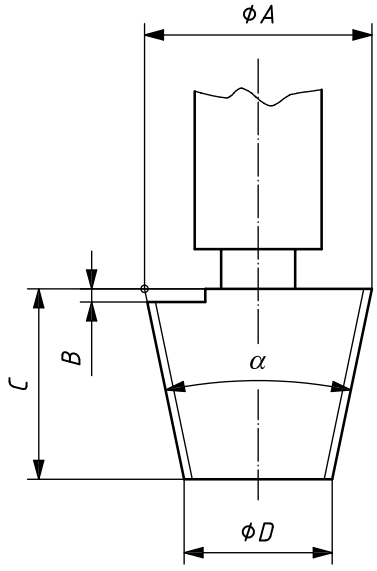
Dimensions in millimetres



Key

Thread	17E	25E
A	16,876	25,476
B	1	1
C	17	22
D	14,836	22,836

Figure 2 — Plain plug gauge for minor diameters "l-1"

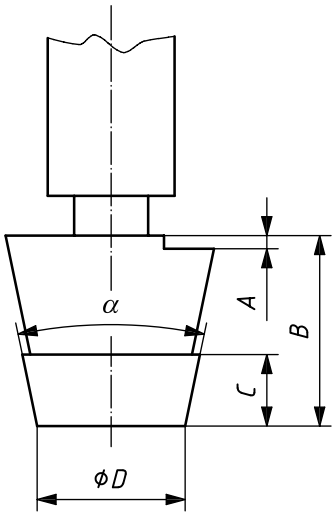


Thread	17E	25E
A	18,038	26,638
B	1	1
C	17	22
D	15,998	23,998

Figure 3 — Threaded plug gauge for pitch diameters "l-2"

6.1.2 Two-part plug gauges, small end diameter

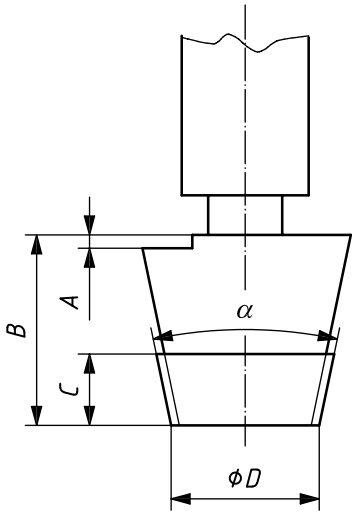
Dimensions in millimetres



Key

Thread	17E	25E
A	1	1
B	17	22
C	8	8
D	14,836	22,836

Figure 4 — Plain plug gauge for minor diameters "l-3**"**

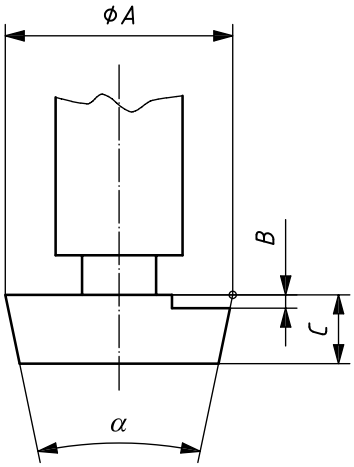


Thread	17E	25E
A	1	1
B	17	22
C	8	8
D	15,998	23,998

Figure 5 — Threaded plug gauge for pitch diameters "l-4**"**

6.1.3 Two-part plug gauges, large end diameter

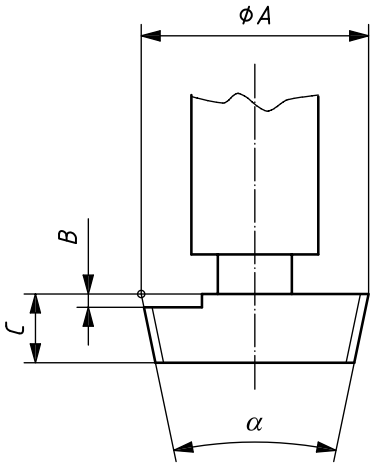
Dimensions in millimetres



Key

Thread	17E	25E
A	16,876	25,476
B	1	1
C	8	8

Figure 6 — Plain plug gauge for minor diameters "I-5**"**



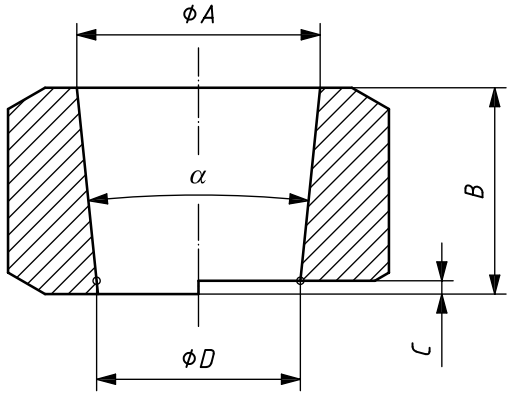
Thread	17E	25E
A	18,038	26,638
B	1	1
C	8	8

Figure 7 — Threaded plug gauge for pitch diameters "I-6**"**

6.2 Gauges for valve stem thread

6.2.1 Single-part ring gauges

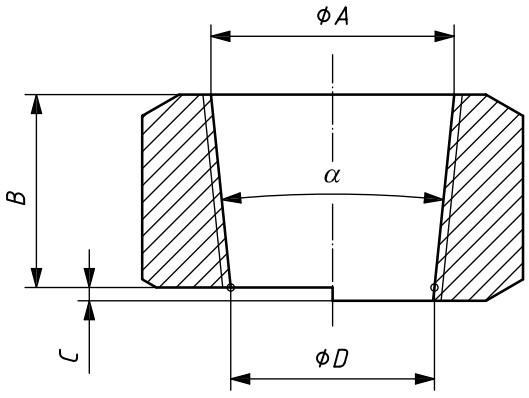
Dimensions in millimetres



Key

Thread	17E	25E
A	19,80	28,8
B	21	26
C	1	1
D	17,40	25,8

Figure 8 — Plain ring gauge for major diameters "I-7**"**

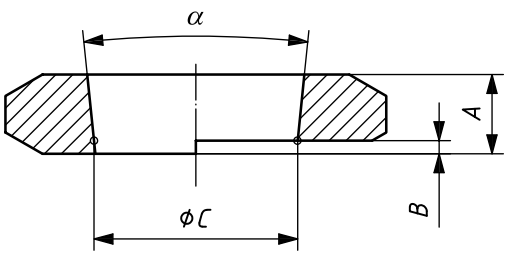


Thread	17E	25E
A	18,638	27,638
B	21	26
C	1	1
D	16,238	24,638

Figure 9 — Threaded ring gauge for pitch diameters "I-8**"**

6.2.2 Two-part ring gauges, small end diameter

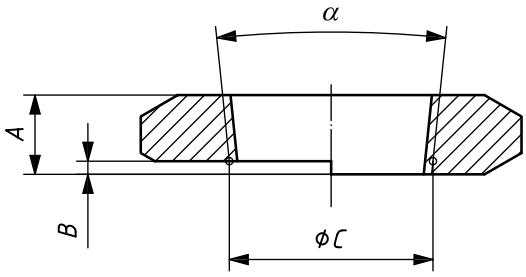
Dimensions in millimetres



Key

Thread	17E	25E
A	8	8
B	1	1
C	17,40	25,8

Figure 10 — Plain ring gauge for major diameters "I-9**"**

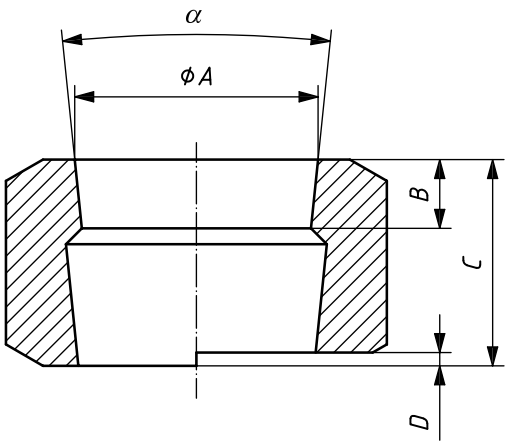


Thread	17E	25E
A	8	8
B	1	1
C	16,238	24,638

Figure 11 — Threaded ring gauge for pitch diameters "I-10**"**

6.2.3 Two-part ring gauges, large end diameter

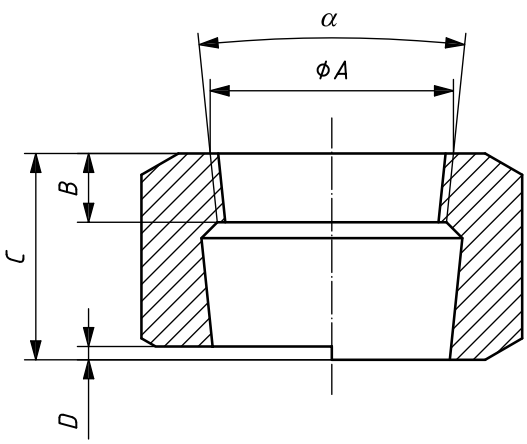
Dimensions in millimetres



Key

Thread	17E	25E
A	19,8	28,8
B	8	8
C	21	26
D	1	1

Figure 12 — Plain ring gauge for major diameters "I-11**"**

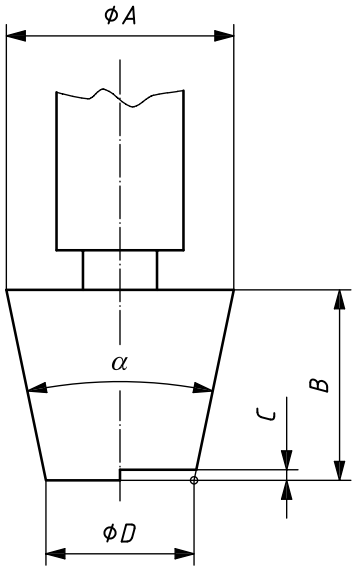


Thread	17E	25E
A	18,638	27,638
B	8	8
C	21	26
D	1	1

Figure 13 — Threaded ring gauge for pitch diameters "I-12**"**

7 Check gauges

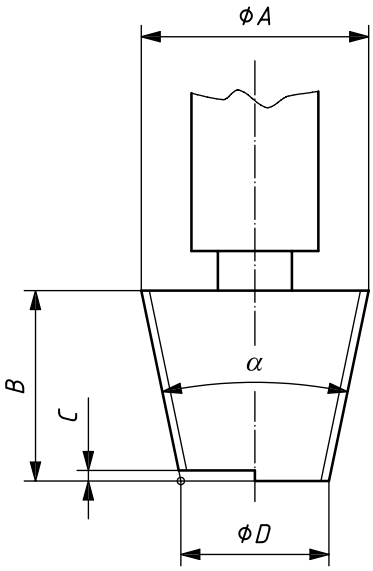
Dimensions in millimetres



Key

Thread	17E	25E
A	19,80	28,8
B	20	25
C	0,25	0,25
D	17,40	25,8

Figure 14 — Plain plug check gauge "M-1**"**



Thread	17E	25E
A	18,638	27,638
B	20	25
C	0,25	0,25
D	16,238	24,638

Figure 15 — Threaded plug check gauge "M-2**"**

8 Use of inspection gauges

8.1 Plain gauges

Plain gauges shall be lightly pressed into position or over the thread being gauged. Care shall be taken not to use undue force.

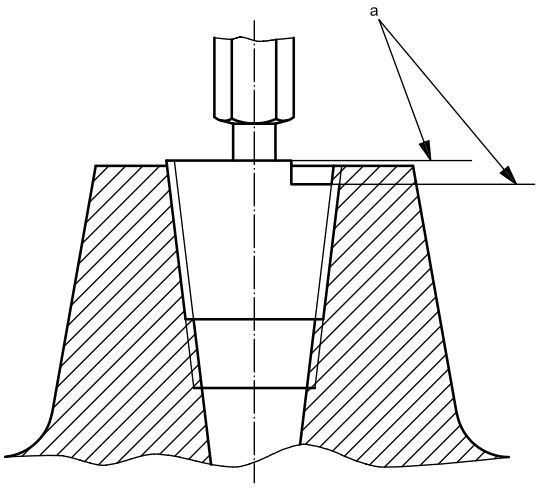
8.2 Threaded plug gauges

Threaded plug gauges shall be screwed into, or over, the thread being gauged. Care shall be taken not to use undue force.

8.3 Accept or reject criteria using plug gauges

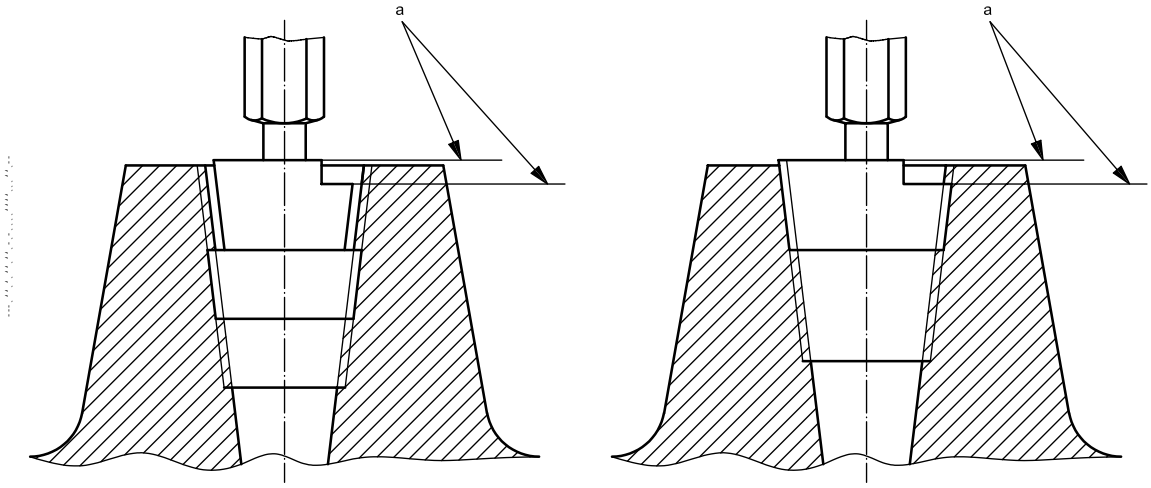
Thread acceptability is determined by the position of the plane at the mouth of the cylinder neck relative to the test surfaces of the gauge.

To meet acceptability, when using a plug gauge, this plane shall be flush with, or fall between, the test surfaces of the gauge when the gauge is fitted to the thread (see Figures 16 and 17).



a Test surface.

Figure 16 — Use of single-part plug gauge



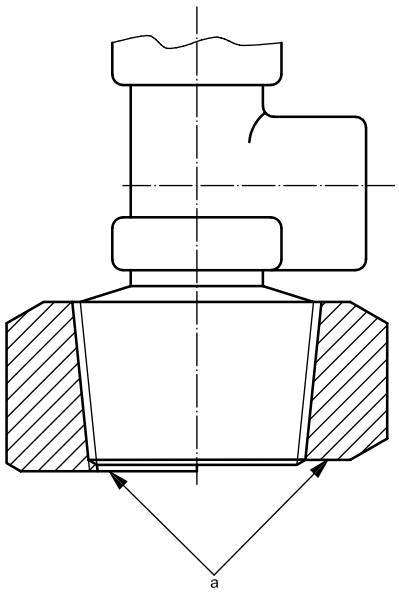
a Test surface.

Figure 17 — Use of two-part plug gauge

8.4 Accept or reject criteria using ring gauges

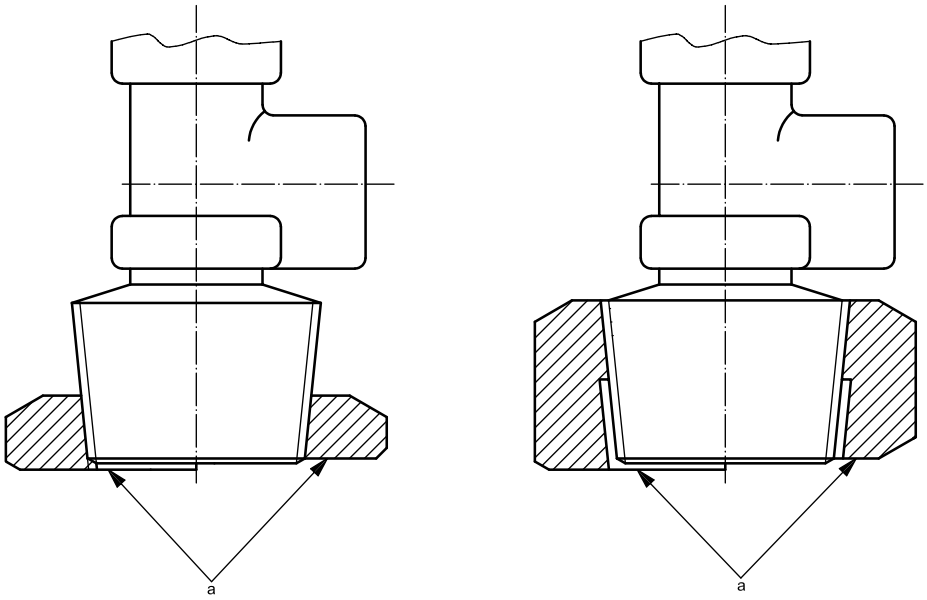
Thread acceptability is determined by the position of the plane at the flat small end of the stem cone base relative to the test surfaces of the gauge.

To meet acceptability, when using a ring gauge, this plane shall be flush with, or fall between, the test surfaces of the gauge when the gauge is fitted to the thread (see Figures 18 and 19).



a Test surface.

Figure 18 — Use of single-part ring gauge



a Test surface.

Figure 19 — Use of two-part ring gauge

9 Verification of inspection gauges

9.1 General

During use inspection gauges will wear and can be damaged. The user shall ensure that the gauges are checked regularly to confirm that they remain within the specified dimensions. Frequency of checks required will depend upon usage and shall be the responsibility of the user.

9.2 Plug gauges

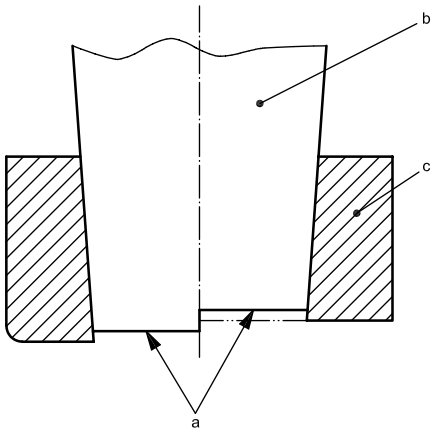
Verification of inspection plug gauges shall be carried out directly, using optical or other suitable equipment.

9.3 Ring gauges

Verification of inspection ring gauges cannot be carried out directly; check plug gauges shall be used, as specified in 9.4.

9.4 Use of check plug gauges

The plain check plug gauge shall be placed into the plain inspection ring gauge and the threaded check plug gauge shall be screwed into the threaded inspection ring gauge. The inner stepped surface of the inspection ring gauge test surface shall be flush with, or within, either of the two test surfaces of the check gauge (see Figure 20). Undue force shall not be used.



a Test surface.

b Check plug gauge.

c Inspection ring gauge.

Figure 20 — Use of check plug gauges

10 Identification

10.1 Inspection gauges

Inspection gauges that conform to this International Standard shall be identified by the following information:

— "ISO 11363";

— "25E" or "17E" as appropriate;

— "I-n" (where n is the appropriate number of the gauge, as shown in Figures 2 to 13, e.g. "I-3").

10.2 Check gauges

Check gauges shall be identified by the following information:

— “ISO 11363”;

— “25E” or “17E” as appropriate;

— “M-n” (where n is the appropriate number of the gauge, as shown in Figures 14 and 15, e.g. “M-2”).

Annex A
(informative)

Examples of calculation for thread gauge dimensions on the large end diameter

A.1 General

In the following examples the mid allowable value for pitch diameter is used. In practice the true pitch diameter is determined and used for calculation.

All dimensions are given in millimetres.

A.2 Threaded plug gauge "I-2" according to Figure 3

A.2.1 25E threaded plug gauge "I-2" according to Figure 3

Thread profile in accordance with Figure 1.

Pitch diameter: 26,638; tolerance ± 0,01.

Major diameter: 26,638 + 1,742 – (2 × 0,455) = 27,47; tolerance ± 0,01.

Minor diameter, theoretical, crest (minor diameter – minimum dimension): 26,638 – 1,742 = 24,896.

Minor diameter – maximum dimension: 26,638 – 1,742 + (2 × 0,265) = 25,426.

A.2.2 17E threaded plug gauge "I-2" according to Figure 3

Thread profile in accordance with Figure 1.

Pitch diameter: 18,038; tolerance ± 0,01.

Major diameter: 18,038 + 1,742 – (2 × 0,455) = 18,87; tolerance ± 0,01.

Minor diameter, theoretical, crest (minor diameter – minimum dimension): 18,038 – 1,742 = 16,296.

Minor diameter – maximum dimension: 18,038 – 1,742 + (2 × 0,265) = 16,826.

A.3 Threaded ring gauge "I-8" according to Figure 9

A.3.1 25E threaded ring gauge "I-8" according to Figure 9

Thread profile in accordance with Figure 1.

Pitch diameter: 27,638; tolerance ± 0,01.

Minor diameter: 27,638 – 1,742 + (2 × 0,455) = 26,806; tolerance ± 0,01.

Major diameter, theoretical, crest (major diameter – maximum dimension): 27,638 + 1,742 = 29,38.

Major diameter – minimum dimension: 27,638 + 1,742 – (2 × 0,265) = 28,85.

A.3.2 17E threaded ring gauge "I-8" according to Figure 9

Thread profile in accordance with Figure 1.

Pitch diameter: 18,638; tolerance ± 0,01.

Minor diameter: 18,638 – 1,742 + (2 × 0,455) = 17,806; tolerance ± 0,01.

Major diameter, theoretical, crest (major diameter – maximum dimension): 18,638 + 1,742 = 20,38.

Major diameter – minimum dimension: 18,638 + 1,742 – (2 × 0,265) = 19,85.

A.4 Threaded check gauge "M-2" according to Figure 15

A.4.1 25E threaded check gauge "M-2" according to Figure 15

Thread profile in accordance with Figure 1.

Pitch diameter: 27,638; tolerance: $^{-0,01}_{-0,02}$

Major diameter: 27,638 + 1,742 – (2 × 0,455) = 28,47; tolerance: $^{-0,01}_{-0,02}$

Minor diameter, theoretical, crest (minor diameter – minimum dimension): 27,638 – 1,742 = 25,896.

Minor diameter – maximum dimension: 27,638 – 1,742 + (2 × 0,265) = 26,426.

A.4.2 17E threaded check gauge "M-2" according to Figure 15

Thread profile in accordance with Figure 1.

Pitch diameter: 18,638; tolerance: $^{-0,01}_{-0,02}$

Major diameter: 18,638 + 1,742 – (2 × 0,455) = 19,47; tolerance: $^{-0,01}_{-0,02}$

Minor diameter, theoretical, crest (minor diameter – minimum dimension): 18,638 – 1,742 = 16,896.

Minor diameter – maximum dimension: 18,638 – 1,742 + (2 × 0,265) = 17,426.

Annex B
(informative)

Limitation of gauging system

The purpose of this annex is to draw attention to the limitations of the gauging system specified in this International Standard.

Taper threads are more difficult to gauge than parallel threads. It is not practical to provide a gauging system which will gauge all aspects of a taper thread.

The gauging system specified in this International Standard is considered the minimum practical gauging to verify dimensions of a taper thread.

In this International Standard, two types of gauges are specified. Normally the two-part gauges will provide better accuracy but are more complicated to use. Newly-machined, unused threads should be in conformity to the requirements of the two-part gauging system (see 3.4). However, the manufacturer of the valve thread or the cylinder thread may for the reason of simplifying the checking process use the single-part gauging system (see 3.3) provided the confidence level of its manufacturing process is showing full conformity to the two-part gauge dimension requirements. This conformity requirement should be regularly validated as part of the quality assurance system.

The following aspects of taper threads are amongst those not covered by this International Standard:

— out-of-tolerance on minor diameter on the valve stem;

— out-of-tolerance on major diameter on the cylinder neck;

— ovality on threads;

— die withdrawal lines;

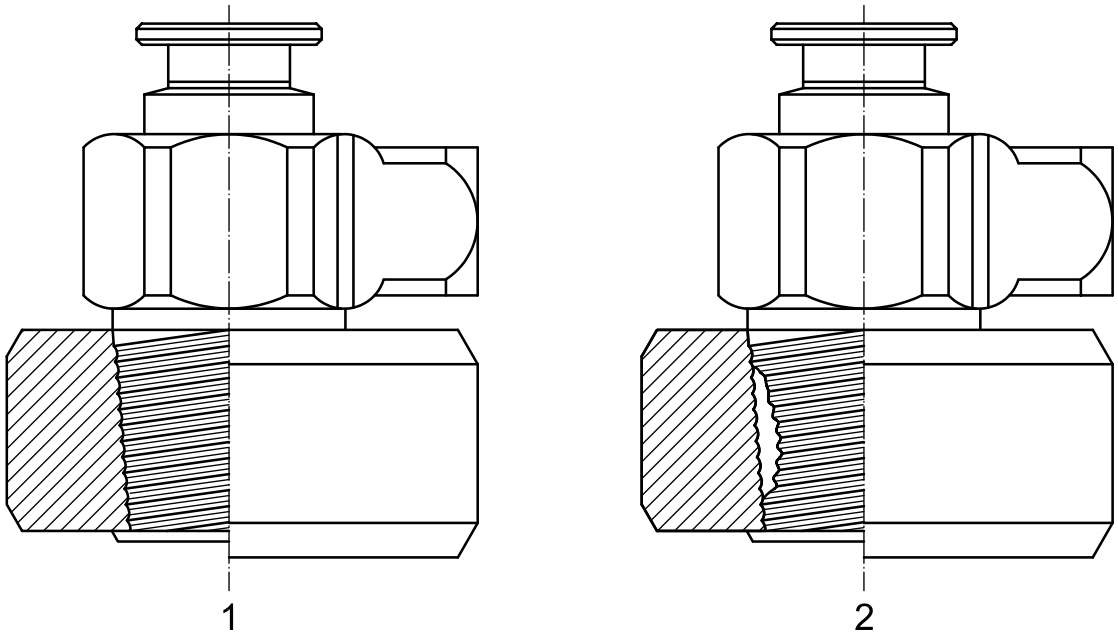
— surface finish;

— “waisting” of the taper form (see Figure B.1).

Any of the above could cause difficulties in achieving a gas tight seal in service.

If difficulties are experienced in service, it is recommended that additional gauging and/or inspection techniques are used to investigate the above aspects. Optical techniques (visual inspection) can often be used.

Another useful inspection technique which can be applied to valve stem threads is to modify a pair of single-part ring gauges (see 6.2.1) by removing a 90° segment. This allows visual examination of the thread for mating with the gauge and is effective in highlighting waisting or other errors in the taper form. Examples of this type of gauge are given in Figure B.1.



Key

1 correct form

2 waisting of thread

Figure B.1 — taper threads

Bibliography

[1] ISO 68-1, *ISO general purpose screw threads — Basic profile — Part 1: Metric screw threads*

[2] ISO 11116-2:1999, *Gas cylinders — 17E taper thread for connection of valves to gas cylinders — Part 2: Inspection gauges*

[3] ISO 11191:1997, *Gas cylinders — 25E taper thread for connection of valves to gas cylinders — Inspection gauges*

ICS 23.020.30

Price based on 18 pages