BS ISO 10766:2014

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Hydraulic fluid power — Cylinders — Housing dimensions for rectangular-section-cut bearing rings for pistons and rods

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee MCE/11, Fluid seals and their housings.

A list of organizations represented on this committee can be obtained on request to its secretary.

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INTERNATIONAL STANDARD

ISO 10766

Third edition
2014-09-01

Hydraulic fluid power — Cylinders — Housing dimensions for rectangular-section-cut bearing rings for pistons and rods

Transmissions hydrauliques — Vérins — Dimensions de logements de dispositifs de guidage à section rectangulaire pour pistons et tiges de piston

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Foreword

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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

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 131, *Fluid power systems*, Subcommittee SC 7, *Sealing devices*.

This third edition cancels and replaces the second edition (ISO 10766:2006), Clauses 1, 2, 5, 6 and 8, Tables 2 and 3 and Figures 1, 2 and 3 of which have been technically revised.

INTERNATIONAL STANDARD ISO 10766:2014(E)

Hydraulic fluid power — Cylinders — Housing dimensions for rectangular-section-cut bearing rings for pistons and rods

1 Scope

This International Standard specifies the preferred range of nominal dimensions and associated tolerances for a series of hydraulic cylinder piston and rod housings for rectangular-section-cut bearing rings, of the type shown in Clause 5, for applications in the following range of dimensions:

— for cylinders with bores of 16 mm to 500 mm, inclusive;

— for rods with diameters of 12 mm to 450 mm, inclusive.

This International Standard does not give details of cut bearing ring design, because the manner of construction of cut bearing rings varies with each manufacturer.

The design material of cut bearing rings is determined by conditions such as the temperature, pressure and side load on the cylinder to which they are fitted.

2 Normative references

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

ISO 286-2, *Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes — Part 2: Tables of standard tolerance classes and limit deviations for holes and shafts*

ISO 3320, *Fluid power systems and components — Cylinder bores and piston rod diameters and area ratios — Metric series*

ISO 3274, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Nominal characteristics of contact (stylus) instruments*

ISO 4287, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters*

ISO 5597, *Hydraulic fluid power — Cylinders — Dimensions and tolerances of housings for single-acting piston and rod seals in reciprocating applications*

ISO 5598, *Fluid power systems and components — Vocabulary*

ISO 6099, *Fluid power systems and components — Cylinders — Identification code for mounting dimensions and mounting types*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5598 apply.

4 Symbols

The following letter codes and symbols are used in this International Standard.

AL[1)] outside diameter (bore diameter) of the bearing housing (see Figure 2)

D_1 outside diameter (groove diameter) of the bearing housing (see Figure 3)

d_1 inside diameter (groove diameter) of the bearing housing (see Figure 2)

MM[1)] inside diameter (rod diameter) of the bearing housing (see Figure 3)

G internal diameter of the gland (see Figure 3)

L axial length of the housing (see Figures 2 and 3)

P outside diameter of the piston head (see Figure 2)

S radial depth of the housing (see Figures 2 and 3)

$$S = \frac{AL - d_1}{2}$$

for pistons (see Figure 2)

$$S = \frac{D_1 - MM}{2}$$

for rods (see Figure 3)

X reference surface

Y maximum run-out tolerance

5 Typical examples of rectangular-cut-section bearing rings

Typical examples are shown in Figure 1.

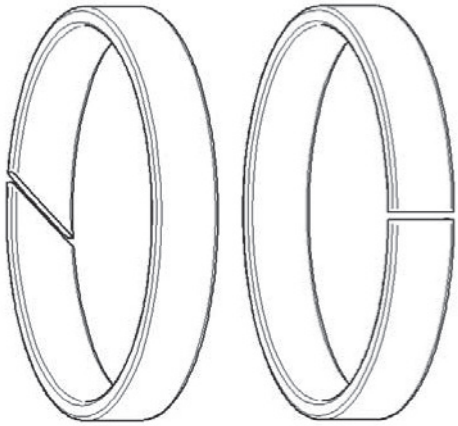


Figure 1 — Typical examples of rectangular-cut-section bearing rings with angle cut (left) and straight cut (right)

1) Letter codes are in accordance with ISO 6099.

6 General requirements

6.1 Corners

All sharp edges and burrs shall be removed from corners of supporting surfaces and shall be rounded or chamfered.

6.2 Surface finish

6.2.1 The value of requirements *Ra* and *Rt* (see ISO 4287) for the surface finish of the bearing ring housing should not exceed 3,2 µm for *Ra* and 16 µm for *Rt*.

6.2.2 The surface finish for the working surface (bore or rod) against which the bearing ring operates is usually dictated by the requirements of any associated seal (in accordance with, for example, ISO 5597), but it should preferably not exceed 0,6 µm for *Ra* and 2,4 µm for *Rt*.

Where surface roughness measurements are taken, it is recommended that instruments complying with ISO 3274, including an electric wave filter, be used.

6.3 Nominal housing dimensions

Nominal dimensions of the rectangular-section housings shall be in accordance with the dimensions given in Table 1.

Table 1 — Nominal dimensions of rectangular-section housings

Dimensions in millimetres

L	4	5,6	9,7	15	25	
S	1,55	2,5	2,5	2,5	2,5	4

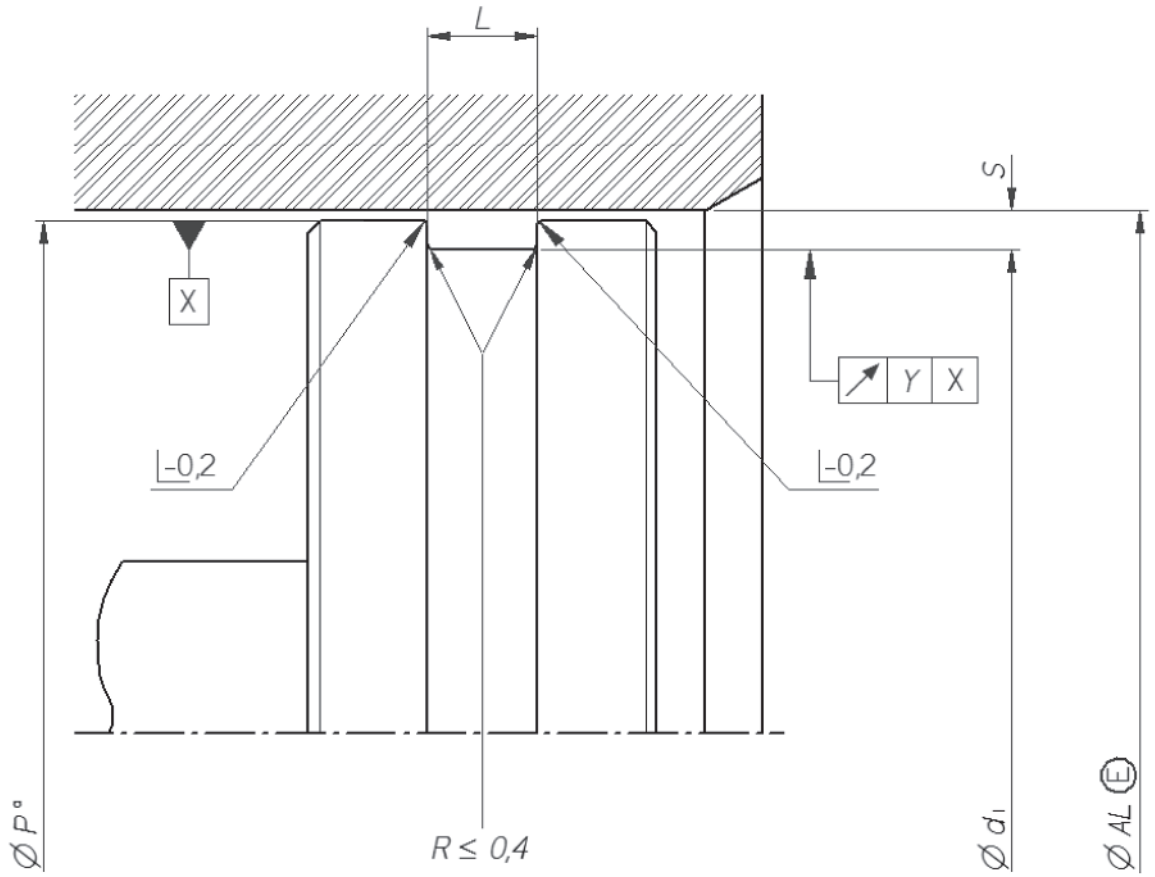
7 Dimensions of cut bearing ring housings

7.1 Dimensions of housings for pistons

Cut bearing ring housings for pistons shall be in accordance with Figure 2 and Table 2. For tolerances, the requirements given in Clause 8 shall apply. The cylinder bores, *AL*, are in accordance with the preferred sizes of ISO 3320.

Several bearing rings can be fitted into multiple grooves, if necessary, to meet the required length. The maximum run out tolerance between the separate bearing groove diameters, d_1, shall be 0,05 mm.

Dimensions in millimetres



Key

[a] See Clause 9.

NOTE 1 Maximum run-out tolerance $Y = 0{,}05$.

Figure 2 — Cut bearing ring housing for pistons

Table 2 — Dimensions of cut bearing ring housings for pistons

Dimensions in millimetres

AL	d_1	*L*	*S*		*AL*	d_1	*L*	*S*
16	11	5,6	2,5		160	155	9,7	2,5
	12,9	4	1,55				15	
20	15	5,6	2,5				25	
	16,9	4	1,55		180	175	9,7	
25	20	5,6	2,5				15	
	21,9	4	1,55				25	
32	27	5,6	2,5		200	195	9,7	
		9,7					15	
	28,9	4,0	1,55				25	
40	35	5,6	2,5		220	215	9,7	
		9,7					15	
	36,9	4	1,55				25	
50	45	5,6	2,5		250	245	9,7	
		9,7					15	
	46,9	4	1,55				25	
60	55	5,6	2,5		280 [a]	272	25	4
		9,7				275	15	2,5
		15					25	
63	58	5,6			320 [a]	312	25	4
		9,7				315	15	2,5
		15					25	
80	75	5,6			360 [a]	352	25	4
		9,7				355	15	2,5
		15					25	
100	95	5,6			400 [a]	392	25	4
		9,7				395	15	2,5
		15					25	
125	120	9,7			450 [a]	442	25	4
		15				445	15	2,5
		25					25	
140	135	9,7			500 [a]	492	25	4
		15				495	15	2,5
		25					25	

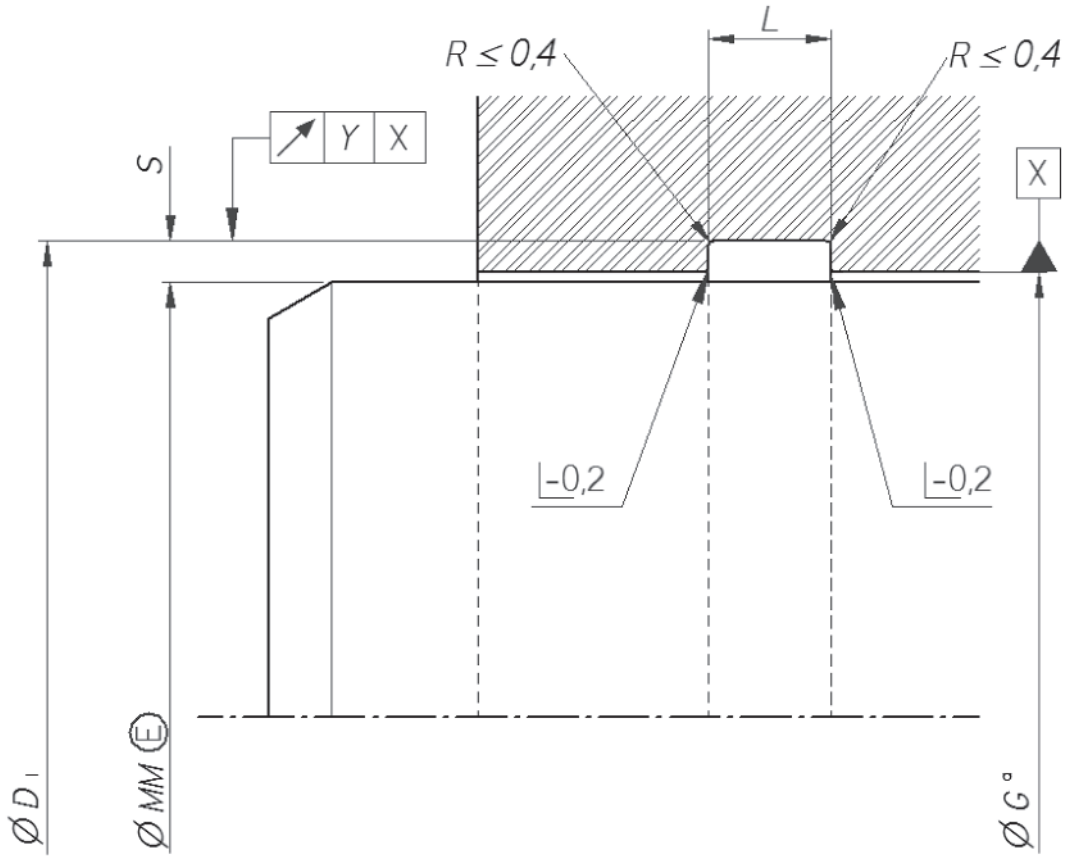
[a] Multiple bearings can be required to resist the side loads on the cylinder.

7.2 Dimensions of housings for rods

Cut bearing ring housings for rods shall be in accordance with Figure 3 and Table 3. For tolerances, the requirements given in Clause 8 shall apply. The rod diameters, *MM*, are in accordance with the preferred sizes of ISO 3320.

Several bearing rings can be fitted into multiple grooves, if necessary, to meet the required length. The maximum run out tolerance between the separate bearing groove diameters, D_1, shall be 0,05 mm.

Dimensions in millimetres



Key

a See Clause 9.

NOTE 1 Maximum run-out tolerance $Y = 0,05$.

Figure 3 — Cut bearing ring housing for rods

Table 3 — Dimensions of cut bearing ring housings for rods

Dimensions in millimetres

MM	D_1	*L*	*S*		*MM*	D_1	*L*	*S*
12	15,1	4	1,55		100	105	9,7	2,5
14	17,1						15	
16	19,1						25	
18	21,1				110	115	9,7	
20	23,1						15	
22	25,1						25	
25	28,1				125	130	9,7	
	30	5,6	2,5				15	
		9,7					25	
28	31,1	4	1,55		140	145	9,7	
	33	5,6	2,5				15	
		9,7					25	
32	37	5,6			160	165	9,7	
		9,7					15	
		15					25	
36	41	5,6			180	185	9,7	
		9,7					15	
		15					25	
40	45	5,6			200 [a]	205	15	
		9,7					25	
		15			220 [a]	225	15	
45	50	5,6					25	
		9,7			250 [a]	255	15	
		15					25	
50	55	5,6			280 [a]	285	15	
		9,7					25	
		15				288	25	4
56	61	5,6			320 [a]	325	15	2,5
		9,7					25	
		15				328	25	4
63	68	5,6	2,5		360 [a]	365	15	2,5
		9,7					25	
		15				368	25	4
70	75	5,6			400 [a]	405	25	2,5
		9,7				408	25	4
		15			450 [a]	455	25	2,5
80	85	9,7				458	25	4
		15						
		25						
90	95	9,7						
		15						
		25						

[a] Multiple bearings can be required to resist the side loads on the cylinder.

8 Tolerances

The dimensions of housings for cut bearing rings shall be within the limits given in Table 4.

Table 4 — Tolerances for dimensions of cut bearing ring housings

Tolerances in millimetres

Dimension	Limits
AL	No more than H10 (see ISO 286-2)
D_1	H8/H9 (see ISO 286-2)
G	See Clause 9
d_1	f8/f9 (see ISO 286-2)
L	$^{+0,2}_{0}$
MM	Usually related to seal requirements, but typically f8 to h9 (see ISO 286-2)
P	See Clause 9
S	Nominal size only

9 Diametral clearance

The diametral clearance for piston applications is the difference between diameters *AL* and *P* (see Figure 2). It may be further increased by the expansion of the cylinder that results from internal pressure.

The diametral clearance for rod applications is the difference between diameters *G* and *MM* (see Figure 3).

This diametral clearance controls the extrusion gap for any associated seal, either mounted to the piston, or fitted to the gland in a rod application.

It is recommended that details concerning diameter *P* or *G* are the subject of consultation between the housing designer and bearing ring manufacturer, taking account of the bearing ring material and the operating conditions.

10 **Identification statement** (Reference to this International Standard)

Use the following statement in test reports, catalogues and sales literature when electing to comply with this International Standard:

"Housings for rectangular-section-cut bearings rings for pistons and rods conform to ISO 10766:2014, *Hydraulic fluid power — Cylinders — Housing dimensions for rectangular-section-cut bearing rings for pistons and rods.*"

Bibliography

[1] ISO 1101, *Geometrical product specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

[2] ISO 4288, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture*

[3] ISO 6020-1, *Hydraulic fluid power — Mounting dimensions for single rod cylinders, 16 MPa (160 bar) series — Part 1: Medium series*

[4] ISO 6022, *Hydraulic fluid power — Mounting dimensions for single rod cylinders, 25 MPa (250 bar) series*

[5] ISO 8015, *Geometrical product specifications (GPS) — Fundamentals — Concepts, principles and rules*

[6] ISO 13715, *Technical drawings — Edges of undefined shape — Vocabulary and indications*

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