
**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

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 10766 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 7, *Sealing devices*.

This second edition cancels and replaces the first edition (ISO 10766:1996), Clause 9 and Figures 2 and 3 of which have been technically revised.

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 360 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 and any incorporated anti-extrusion component are determined by conditions such as temperature and pressure.

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 286-2:1988, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts*

ISO 4287:1997, *Geometrical Product Specification (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters*

ISO 5598:1985, *Fluid power systems and components — Vocabulary*

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)

$$S = \frac{AL - d_1}{2} \text{ for pistons (see Figure 2)}$$

$$S = \frac{D_1 - MM}{2} \text{ for rods (see Figure 3)}$$

5 Typical example of a rectangular-cut-section bearing ring

A typical example is shown in Figure 1.

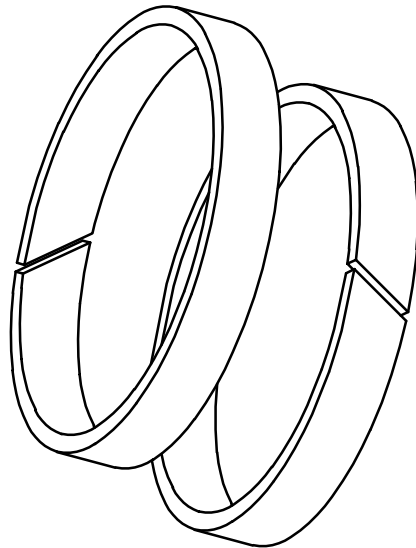


Figure 1 — Typical example of a rectangular-cut-section bearing ring

1) Taken from 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.

6.2 Surface finish

5.2.1 The value of requirements R_a and R_t (see ISO 4287) for the surface finish of the bearing ring housing should not exceed $3,2 \mu\text{m}$ for R_a and $16 \mu\text{m}$ for R_t .

5.2.2 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, but it should preferably not exceed $0,6 \mu\text{m}$ for R_a and $2,4 \mu\text{m}$ for R_t .

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

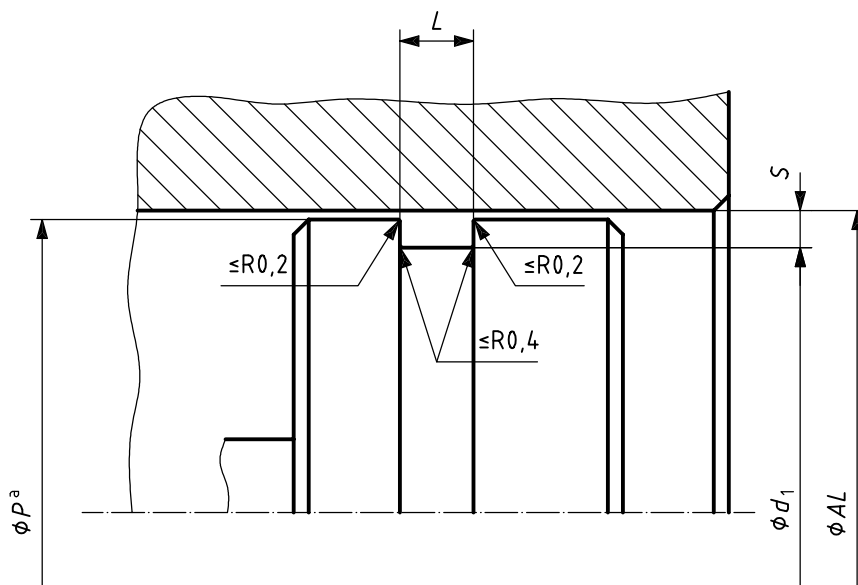
7 Dimensions of cut bearing ring housings

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.

Several bearing rings can be fitted into multiple grooves, if necessary, to meet the required length.

Dimensions in millimetres



^a See Clause 9.

Figure 2 — Cut bearing ring housing for pistons

Table 2 — Dimensions of cut bearing ring housings for pistons

Dimensions in millimetres

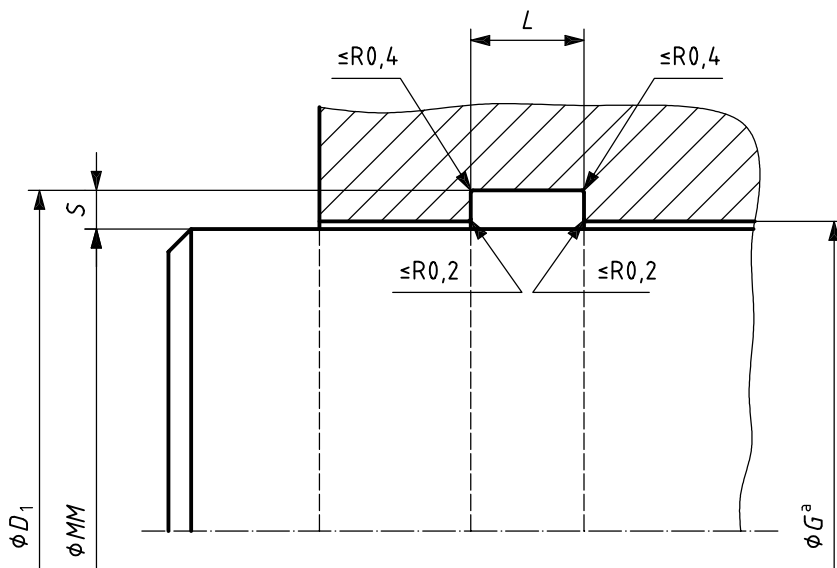
<i>AL</i>	<i>d</i> ₁	<i>L</i>	<i>S</i>
16	11	5,6	2,5
	12,9	4	1,55
20	15	5,6	2,5
	16,9	4	1,55
25	20	5,6	2,5
	21,9	4	1,55
32	27	5,6	2,5
	28,9	4	1,55
40	35	5,6	2,5
	36,9	4	1,55
50	45	5,6	2,5
	46,9	4	1,55
63	58	5,6	2,5
		9,7	
80	75	5,6	
		9,7	
100	95	5,6	
		9,7	
125	120	5,6	
		9,7	
140	135	9,7	
		15	
160	155	9,7	
		15	
180	175	9,7	
		15	

<i>AL</i>	<i>d</i> ₁	<i>L</i>	<i>S</i>	
200	195	9,7	2,5	
		15		
220	215	9,7		
		15		
250	245	9,7		
		15		
280	275	15		
		25		
	272	25		4
320	315	15		2,5
		25		
	312	25		4
360	355	15	2,5	
		25		
	352	25	4	
400	395	15	2,5	
		25		
	392	25	4	
450	445	15	2,5	
		25		
	442	25	4	
500	495	15	2,5	
		25		
	492	25	4	

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.

Several bearing rings can be fitted into multiple grooves, if necessary, to meet the required length.



a See Clause 9.

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
12	15,1	4	1,55
14	17,1	4	
16	19,1	4	
18	21,1	4	
20	23,1	4	
22	25,1	4	
25	28,1	4	2,5
	30	5,6	
28	31,1	4	1,55
	33	5,6	
32	37	5,6	2,5
		9,7	
36	41	5,6	
		9,7	
40	45	5,6	
		9,7	
45	50	5,6	
		9,7	
50	55	5,6	
		9,7	
56	61	5,6	
		9,7	
63	68	5,6	
		9,7	
70	75	5,6	
		9,7	
80	85	9,7	
		15	
90	95	9,7	
		15	

MM	D ₁	L	S
100	105	9,7	2,5
		15	
110	115	9,7	
		15	
125	130	9,7	
		15	
140	145	9,7	
		15	
160	165	9,7	
		15	
180	185	9,7	
		15	
200	205	15	
		25	
220	225	15	
		25	
250	255	15	
		25	
280	285	15	
		25	
280	288	25	4
	320	325	15
25			
320	328	25	4
		360	365
25			
360	368	25	4

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	≤ 115 mm	$\begin{matrix} +0,05 \\ 0 \end{matrix}$
	> 115 mm	$\begin{matrix} +0,08 \\ 0 \end{matrix}$
G	See Clause 9	
d_1	≤ 100 mm	$\begin{matrix} 0 \\ -0,05 \end{matrix}$
	> 100 mm	$\begin{matrix} 0 \\ -0,08 \end{matrix}$
L	$\begin{matrix} +0,2 \\ 0 \end{matrix}$	
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 10766:2006, *Hydraulic fluid power — Cylinders — Housing dimensions for rectangular-section-cut bearing rings for pistons and rods.*”

Bibliography

- [1] ISO 286-1:1988, *ISO system of limits and fits — Part 1: Bases of tolerances, deviations and fits*
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- [7] ISO 6099:2001, *Fluid power systems and components — Cylinders — Identification code for mounting dimensions and mounting types*

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