
**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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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
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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.

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.

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](#).

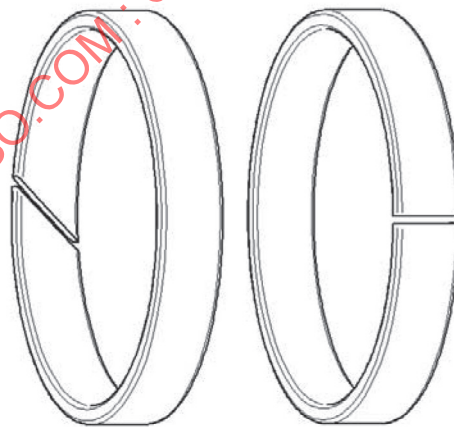


Figure 1 — Typical examples of rectangular-cut-section bearing rings with angle cut (left) and straight cut (right)

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

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 $0,6\text{ }\mu\text{m}$ for R_a and $2,4\text{ }\mu\text{m}$ 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

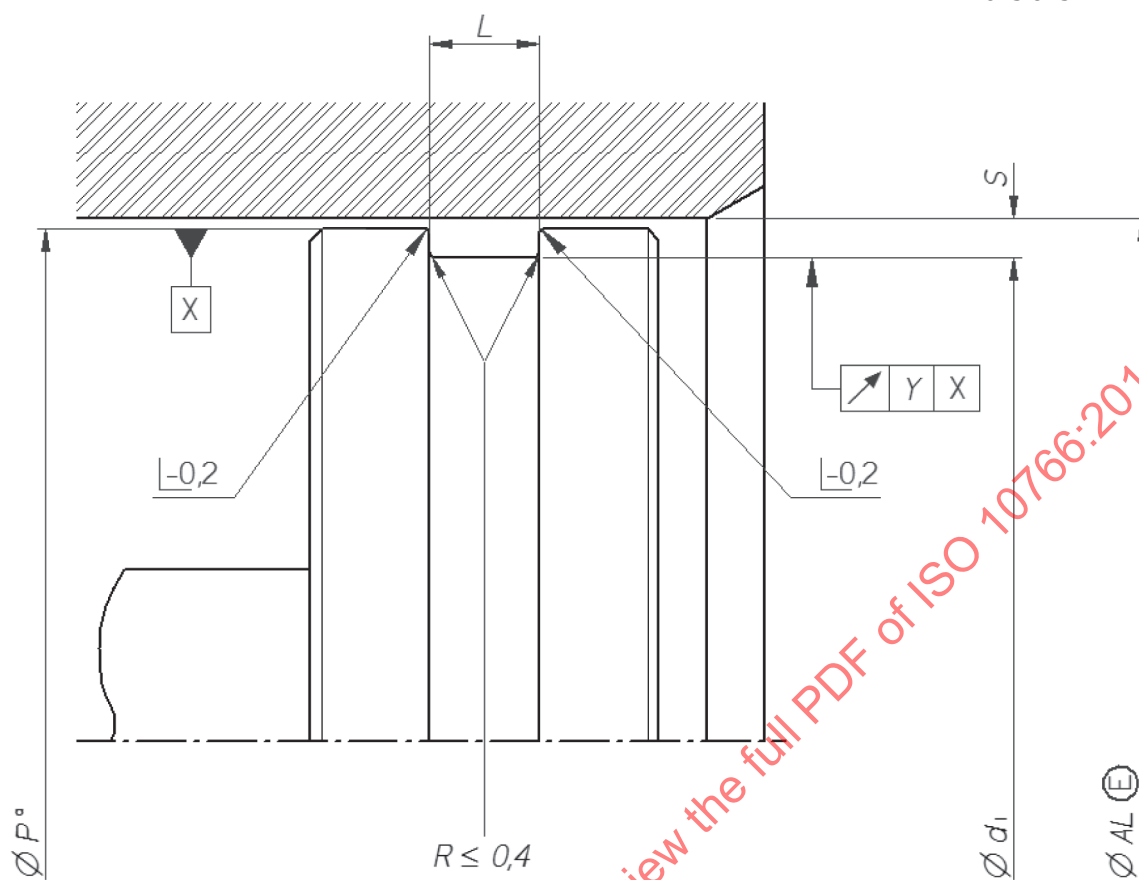
7 Dimensions of cut bearing ring housings

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. 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 $0,05\text{ mm}$.

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

<i>AL</i>	<i>d</i> ₁	<i>L</i>	<i>S</i>		<i>AL</i>	<i>d</i> ₁	<i>L</i>	<i>S</i>
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			320 ^a	312	25	
63	58	5,6					15	2,5
		9,7					25	
		15			360 ^a	352	25	4
80	75	5,6					15	2,5
		9,7					25	
		15			400 ^a	392	25	4
100	95	5,6					15	2,5
		9,7					25	
		15			450 ^a	442	25	4
125	120	9,7					15	2,5
		15					25	
		25			500 ^a	492	25	4
140	135	9,7					15	2,5
		15					25	
		25					25	
^a Multiple bearings can be required to resist the side loads on the cylinder.								

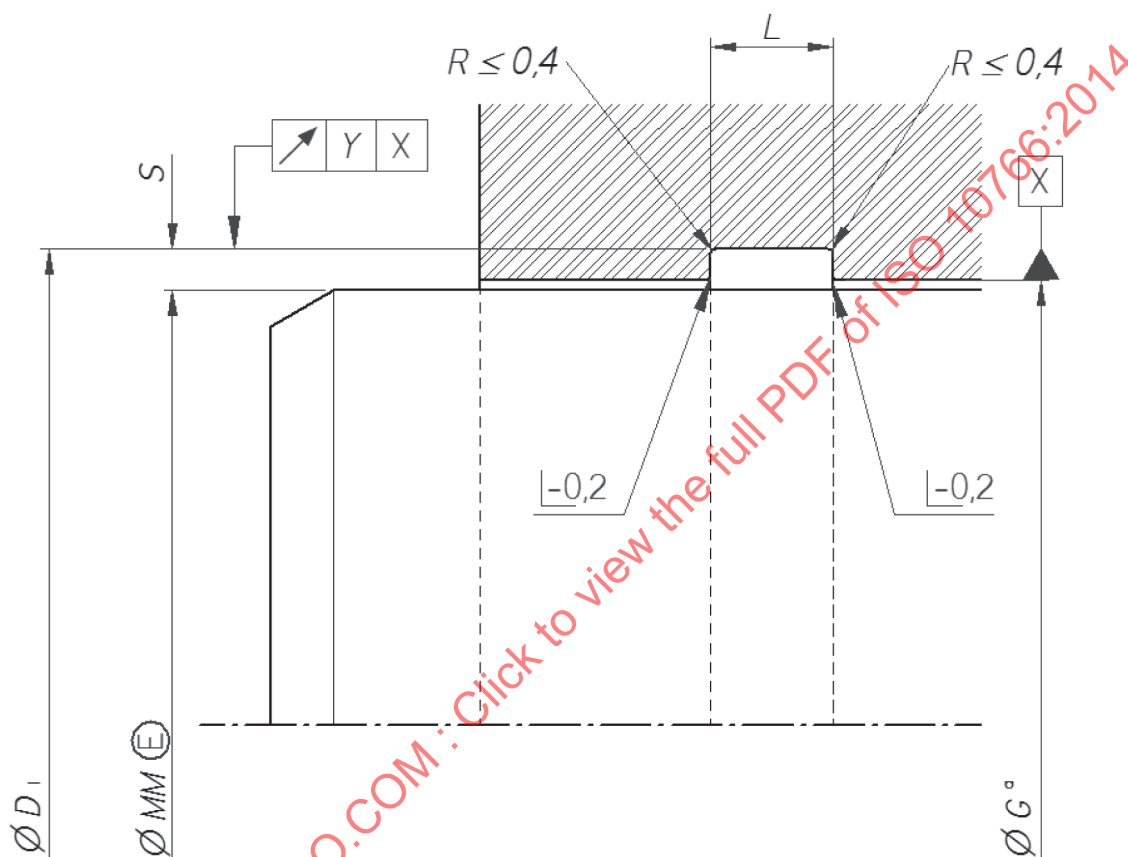
^a Multiple bearings can be required to resist the side loads on the cylinder.

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	5,6	2,5	125	130	9,7		
	30					15		
28	31,1	4	2,5	140	145	9,7		
	33	5,6				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				15		
45	50	5,6		220 ^a	225	15		
		9,7				25		
		15				15		
50	55	5,6		250 ^a	255	15		
		9,7				25		
		15				15		
56	61	5,6		280 ^a	285	15		
		9,7	25					
		15	25					
63	68	5,6	320 ^a	325	15			
		9,7			25			
		15			25			
70	75	5,6	360 ^a	365	15			
		9,7			25			
		15			25			
80	85	5,6	400 ^a	405	25			
		9,7			25			
		15			25			
90	95	9,7	450 ^a	455	25			
		15			25			
		25			25			

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

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