SLOVENSKI STANDARD
SIST ISO 7181:1997

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Fluidna tehnika - Hidravlika - Valji - Razmerja delovnih ploščin (batne in batnične strani valja

Hydraulic fluid power -- Cylinders -- Bore and rod area ratios

Transmissions hydrauliques -- Vérins -- Rapports entre surfaces d'alésage et de tige

Ta slovenski standard je istoveten z: ISO 7181:1991

ICS:

23.100.20 Hidravlični valji Cylinders

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INTERNATIONAL STANDARD

ISO 7181

Second edition
1991-10-01

Hydraulic fluid power — Cylinders — Bore and rod area ratios

Transmissions hydrauliques — Vérins — Rapports entre surfaces d'alésage et de tige

Reference number
ISO 7181:1991(E)

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.

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.

International Standard ISO 7181 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Sub-Committee SC 3, *Cylinders*.

This second edition cancels and replaces the first edition (ISO 7181:1982), which has been technically revised.

Annex A of this International Standard is for information only.

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Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit.

One component of such systems is the hydraulic cylinder. This is a device which converts power into linear mechanical force and motion. It consists of a movable element, i.e. a piston and piston rod, operating within a cylindrical bore.

Hydraulic fluid power — Cylinders — Bore and rod area ratios

1 Scope

This International Standard specifies for each pair of diameters (AL = cylinder bore; MM = piston rod diameter) of hydraulic cylinders a corresponding standard ratio φ between the useful areas A_1 and A_2.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

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

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 5598 apply.

4 Area ratios

Dimensions are shown on figure 1 and given in table 1.

NOTES

1 For each pair of diameters (AL, MM) there is a corresponding ratio φ between the useful areas A_1 and A_2.

$$A_1 = \frac{\pi}{4} AL^2$$

$$A_2 = \frac{\pi}{4} \left(AL^2 - MM^2\right)$$

2 Table 1 gives, for guidance, for each value of AL those standard values of MM that give ratios φ approximately equal to one of the following preferred numbers:

1,06 — 1,12 — 1,25 — 1,4 — 1,6 — 2 — 2,5 — 5

3 Moreover, for each pair (AL, MM), table 1 gives calculated values of A_1 and A_2 and the corresponding effective value of φ.

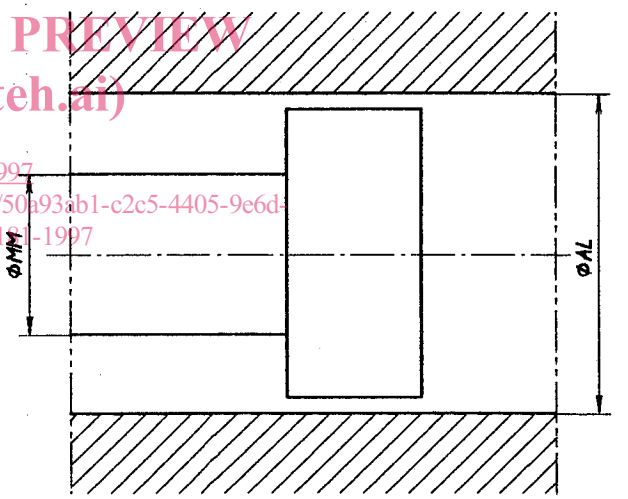

Figure 1

5 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:

"Hydraulic cylinder area ratios conform to ISO 7181, *Hydraulic fluid power — Cylinders — Bore and rod area ratios*."

Table 1 — Bore and rod area ratios

Diameters in millimetres
Areas in square centimetres

φ[1]	AL	25	32	40	50	63	80	(90)	100	(110)	125	(140)	160	(180)	200	(220)	250	(280)	320	(360)	400	(450)	500
≈	A_1	4,91	8,04	12,6	19,6	31,2	50,3	63,6	78,5	95	123	154	201	254	314	380	491	616	804	1 018	1 257	1 590	1 963
1,06	MM				12	16	20	22	25	28	32	36	40	45	50	56	63	70	80	90	100	110	125
	A_2				18,5	29,2	47,1	59,8	73,6	88,9	115	144	188	239	295	355	460	577	754	954	1 178	1 495	1 841
	φ				1,06	1,07	1,07	1,06	1,07	1,07	1,07	1,07	1,07	1,07	1,07	1,07	1,07	1,07	1,07	1,07	1,07	1,06	1,07
1,12	MM			12	16	20	25	28	32	36	40	45	50	56	63	70	80	90	100	110	125	140	160
	A_2			11,4	17,6	28,0	45,4	57,5	70,5	84,9	110	138	181	230	283	342	441	552	726	923	1 134	1 436	1 762
	φ			1,10	1,11	1,11	1,11	1,11	1,11	1,12	1,11	1,12	1,11	1,11	1,11	1,11	1,11	1,12	1,11	1,10	1,11	1,11	1,11
1,25	MM	12	14	18	22	28	36	40	45	50	56	63	70	80	90	100	110	125	140	160	180	200	220
	A_2	3,78	6,50	10,0	15,8	25,0	40,1	51,1	62,6	75,4	98,1	123	163	204	251	302	396	493	650	817	1 002	1 276	1 583
	φ	1,30	1,24	1,25	1,24	1,25	1,25	1,25	1,25	1,26	1,25	1,25	1,24	1,25	1,25	1,26	1,24	1,25	1,24	1,25	1,25	1,25	1,24
1,4	MM	14	18	22	28	36	45	50	56	63	70	80	90	100	110	125	140	160	180	200	220	250	280
	A_2	3,37	5,50	8,77	13,5	21	34,4	44	53,9	63,9	84,2	104	137	176	219	257	337	415	550	704	877	1 100	1 348
	φ	1,46	1,46	1,43	1,46	1,48	1,46	1,45	1,46	1,49	1,46	1,48	1,46	1,45	1,43	1,48	1,46	1,48	1,46	1,45	1,43	1,45	1,46
1,6	MM	16	20	25	32	40	50	56	63	70	80	90	100	110	125	140	160	180	200	220	250	280	320
	A_2	2,90	4,90	7,66	11,6	18,6	30,6	39	47,4	56,5	72,5	90,3	123	159	191	226	290	361	490	638	766	975	1 159
	φ	1,69	1,64	1,64	1,69	1,68	1,64	1,63	1,66	1,68	1,69	1,70	1,64	1,60	1,64	1,68	1,69	1,70	1,64	1,60	1,64	1,63	1,69
2	MM	18	22	28	36	45	56	63	70	80	90	100	110	125	140	160	180	200	220	250	280	320	360
	A_2	2,36	4,24	6,41	9,46	15,3	25,6	32,4	40,1	44,8	59,1	75,4	106	132	160	179	236	302	424	527	641	786	946
	φ	2,08	1,90	1,96	2,08	2,04	1,96	1,96	1,96	2,12	2,08	2,04	1,90	1,93	1,96	2,12	2,08	2,04	1,90	1,93	1,96	2,02	2,08
2,5	MM	20	25	32	40	50	63	70	80	90	100	110	125	140	160	180	200	220	250	280	320	360	400
	A_2	1,77	3,13	4,52	7,07	11,5	19,1	25,1	28,3	31,4	44,2	58,9	78,3	101	113	126	177	236	313	402	452	573	707
	φ	2,78	2,57	2,78	2,78	2,70	2,63	2,53	2,78	3,03	2,78	2,61	2,57	2,53	2,78	3,03	2,78	2,61	2,57	2,53	2,78	2,78	2,78
5	MM				45	56	70	80	90	100	110	125	140	160	180	200	220	250	280	320	360	400	450
	A_2				3,73	6,54	11,8	13,35	14,9	16,5	27,7	31,2	47,1	53,4	60	66	111	125	188	214	239	334	373
	φ				5,26	4,76	4,27	4,76	5,26	5,76	4,43	4,93	4,27	4,76	5,26	5,76	4,43	4,93	4,27	4,76	5,26	4,76	5,26

NOTE — Values in parentheses are non-preferred values and should be used only for special applications.

1) $\varphi = \frac{A_1}{A_2}$ $\quad A_1 = \frac{\pi}{4} AL^2$ $\quad A_2 = \frac{\pi}{4}\left(AL^2 - MM^2\right)$