INTERNATIONAL STANDARD

ISO 8135

Second edition
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Hydraulic fluid power — Single rod cylinders, 16 MPa (160 bar) medium and 25 MPa (250 bar) series — Tolerances

Transmissions hydrauliques — Vérins 16 MPa (160 bar) série moyenne et 25 MPa (250 bar), à simple tige — Tolérances

Reference numbe
ISO 8135:1999(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 8135 was prepared by Technical Committee ISO/TC 131, *Fluid power systems,* Subcommittee SC 3, *Cylinders*.

This second edition cancels and replaces the first edition (ISO 8135:1986), 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 fluid power 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 — Single rod cylinders, 16 MPa (160 bar) medium and 25 MPa (250 bar) series — Tolerances

1 Scope

This International Standard specifies dimensional tolerances for 16 MPa [160 bar[1)]] medium and 25 MPa (250 bar) series cylinders in accordance with ISO 6020-1 and ISO 6022, as required for interchangeability of commonly used hydraulic cylinders

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were 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 editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 4393:1978, *Fluid power systems and components — Cylinders — Basic series of piston strokes.*

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

ISO 6020-1:1998, *Hydraulic fluid power — Mounting dimensions for single rod cylinders, 16 MPa (160 bar) series — Part 1: Medium series.*

ISO 6022:1981, *Hydraulic fluid power — Single rod cylinders — Mounting dimensions — 250 bar (25 000 kPa) series.*

ISO 6099:1985, *Fluid power systems and components — Cylinders — Identification code for mounting dimensions and mounting types.*

3 Definitions

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

3.1
cylinder
device which converts fluid power into linear mechanical force and motion

3.2
cylinder bore
internal diameter of the cylinder

3.3
piston rod
element transmitting mechanical force and motion from the piston

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1) 1 bar = 0,1 MPa = 10^5 Pa; 1 MPa = 1 N/mm^2.

4 Tolerances

4.1 Tolerances for piston strokes

4.1.1 The nominal strokes shall be selected from the recommended values given in ISO 4393.

4.1.2 The tolerances on piston strokes shall be as given in table 1.

4.2 Tolerances for mounting dimensions

See table 2 for mounting dimension tolerances that are dependent on stroke, and table 3 for mounting dimension tolerances that are independent of stroke.

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:

"Tolerances selected in accordance with ISO 8135:1999, *Hydraulic fluid power — Single rod cylinders, 16 MPa (160 bar) medium and 25 MPa (250 bar) series — Tolerances*."

Table 1 — Tolerances on piston strokes

Values in millimetres

Nominal stroke	Tolerance
stroke ⩽ 1 250	$^{+2}_{0}$
1 250 < stroke ⩽ 3 150	$^{+5}_{0}$
3 150 < stroke ⩽ 8 000	$^{+8}_{0}$

Table 2 — Mounting dimension tolerances that are dependent on stroke

Values in millimetres

Code for mounting dimensions[1)]	*Y*	*PJ* [2)]	*WF*	*WC*	*W*	*XS*	*SS* [2)]	*XC* [2)]
Code for mounting types[1)]	basic	basic	basic	MF3	MF1	MS2	MS2	MP3
Nominal stroke	**Tolerances**							
stroke ⩽ 1 250	± 2	± 1,5	± 2	± 2	± 2	± 2	± 1,5	± 1,5
1 250 < stroke ⩽ 3 150	± 4	± 3	± 4	± 4	± 4	± 4	± 3	± 3
3 150 < stroke ⩽ 8 000	± 8	± 5	± 8	± 8	± 8	± 8	± 5	± 5

Code for mounting dimensions[1)]	*XD* [2)]	*XO* [2)]	*XN* [2)]	*XV*	*ZJ* [2)]	*ZP/ZF* [2)]	*ZB* [2)]
Code for mounting types[1)]	MP4	MP5	MP6	MT4	basic	MF2 MF4	MF1 MF3 MF4
Nominal stroke	**Tolerances**						
stroke ⩽ 1 250	± 1,5	± 1,5	± 1,5	± 2	± 1,5	± 1,5	
1 250 < stroke ⩽ 3 150	± 3	± 3	± 3	± 4	± 3	± 3	max.
3 150 < stroke ⩽ 8 000	± 5	± 5	± 5	± 8	± 5	± 5	

1) See ISO 6099

2) Length including stroke. Stroke tolerances from table 1 shall not be added to the tolerances in table 2.

Table 3 — Mounting dimension tolerances that are independent of stroke

Values in millimetres

Code for mounting dimensions[1)]	*A*	*VE*	*D*	*VD*	*FB*	*B/BA*	*UF*	*TF*	*R*	*E*	*UC*
Code for mounting type[1)]	basic	basic	basic	MF1 MF3	MF1 MF2 MF3 MF4	MF1 MF2 MF3 MF4	MF1 MF2	MF1 MF2	MF1 MF2	MF1 MF2	MF3 MF4
Tolerances											
	max.	max.	max.	min.	H13	H8/f8	max.	js13	js13	max.	max.

Code for mounting dimensions[1)]	*CX*	*CD*	*EX/ EW*	*MR/ MS*	*L/LT*	*S*	*SB*	*TS*	*US*	*TE*	*ST*
Code for mounting type[1)]	MP5 MP6	MP3 MP4	MP3 MP4 MP5 MP6	MP3 MP4 MP5 MP6	MP3 MP4 MP5 MP6	MS2	MS2	MS2	MS2	MS2	MS2
Tolerances											
	H7	H9	h12	max.	min.	js13	H13	js13	max.	js13	max.

Code for mounting dimensions[1)]	*EH*	*LH*	*TD*	*TL*	*TM*	*FC*	*OH*	*Z*
Code for mounting type[1)]	MS2	MS2	MT4	MT4	MT4	MF3 MF4	basic	MP5 MP6
Tolerances								
	max.	h10	f8	js13	h14	js13	js17	min.
1) See ISO 6099.								

Annex A
(informative)

Bibliography

[1] ISO 286-1:1988, *ISO system of limits and fits — Part 1: Bases of tolerances, deviations and fits*.

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

[3] ISO 3320:1987, *Fluid power systems and components — Cylinder bores and piston rod diameters — Metric series.*