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Pneumatic fluid power — Cylinders — Final examination and acceptance criteria

Transmissions pneumatiques — Vérins — Critères de réception et de vérification finale

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 10099 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 10099:1990), which has been technically revised.

Introduction

In pneumatic fluid power systems, power is transmitted and controlled through a gas under pressure within a circuit.

One component of such systems is the pneumatic 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.

Pneumatic fluid power — Cylinders — Final examination and acceptance criteria

1 Scope

This International Standard specifies functional tests for a final examination and the acceptance criteria for double-acting pneumatic cylinders with a single-rod used in pneumatic fluid power systems.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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

ISO 8778, *Pneumatic fluid power — Standard reference atmosphere*.

3 Terms and definitions

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

4 Identity check

The following features shall be assured by means of quality assurance practices carried out either at final assembly or, earlier, in the manufacturing process:

— type;

— stroke length;

— overall length;

— model label;

— bore;

— piston rod protrusion and thread diameter;

— magnetic operation;

— mounting dimensions (including trunnion position);

— correct cushion option or options;

— port type(s), location(s) and size(s).

5 Functional tests at ⩽ 150 kPa [1,5 bar[1)]]

With the cushion-adjusting device, if any, fully open, cycle the cylinder. Breakaway and full-stroke movement shall occur in both directions and the rod shall extend and retract smoothly. Carry out the tests with the cylinder in the horizontal position.

6 Leakage tests at 150 kPa (1,5 bar) and 630 kPa (6,3 bar)

6.1 After a cycling a few times, apply air at 150 kPa (1,5 bar) and then at 630 kPa (6,3 bar) to the rear port, venting the opposite port to atmosphere. Ensure that the checking method and measurement devices are suitable for recording the total leakage at the rear cylinder chamber, summarizing all leakage at all critical points:

a) front port;

b) joint between rear end cap and tube;

c) around rear cushion adjusting device and around non-return valve, if any;

d) porosity in rear end cap;

e) any other external joints.

The leakage shall not exceed the values given in Table 1.

6.2 After cycling a few times, apply air at 150 kPa (1,5 bar) and then at 630 kPa (6,3 bar) to the front port, venting the opposite port to atmosphere. Ensure that the checking method and measurement devices are suitable for recording the total leakage at the front cylinder chamber, summarizing all leakage at all critical points:

a) rear port;

b) joint between front end cap and tube;

c) around front cushion adjusting device and around non-return valve, if any;

d) porosity in front end cap;

e) any other external joints;

f) around piston rod nose seal;

g) joint between front end cap and bearing.

The leakage shall not exceed the value given in the Table 1.

6.3 If special limitations on leakage are specified by customers, the amount of leakage and the test method shall be agreed between the customer and the manufacturer.

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

Table 1 — Maximum leakage of a cylinder chamber

Cylinder bore (mm)	8, 10, 12	16, 20, 25	32, 40, 50	63, 80, 100	125, 160, 200	250, 320
Leak rate (dm^3/h ANR) [a]	0,6	0,8	1,2	2	3	5
[a] See ISO 8778.						

7 Cushioning test at 630 kPa (6,3 bar) (applicable to cushioned cylinder only)

Adjust the cushion-adjusting device to apply effective cushioning and cycle the cylinder at 630 kPa (6,3 bar). The piston rod shall be effectively decelerated before it reaches the end of stroke in both directions.

8 Identification statement (Reference to this International Standard)

It is strongly recommended that manufacturers use the following statement in test reports, catalogues and sales literature when electing to comply with this International Standard:

"Acceptance test for pneumatic cylinders in accordance with ISO 10099:2001, *Pneumatic fluid power cylinder — Final examination and acceptance criteria*".

Bibliography

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

[2] ISO 4414:1998, *Pneumatic fluid power — General rules relating to systems*.

[3] ISO 6430:1992, *Pneumatic fluid power — Single rod cylinders, 1 000 kPa (10 bar) series, with integral mountings, bores from 32 mm to 250 mm — Mounting dimensions*.

[4] ISO 6431:1992, *Pneumatic fluid power — Single rod cylinders, 1 000 kPa (10 bar) series, with detachable mountings, bores from 32 mm to 320 mm — Mounting dimensions*.

[5] ISO 6432:1985, *Pneumatic fluid power — Single rod cylinders — 10 bar (1 000 kPa) series — Bores from 8 to 25 mm — Mounting dimensions*.