
**Hydraulic fluid power — Cylinders —
Acceptance tests**

Transmissions hydrauliques — Vérins — Essais de réception

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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 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 10100 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 10100:1990), which has been technically revised.

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Introduction

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

One component of such a system is the hydraulic fluid power cylinder. This is a device that converts fluid 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.

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Hydraulic fluid power — Cylinders — Acceptance tests

1 Scope

This International Standard specifies acceptance and function tests for hydraulic fluid power cylinders.

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 4406:1999, *Hydraulic fluid power — Fluids — Method for coding the level of contamination by solid particles*.

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

ISO 6743-4:1999, *Lubricants, industrial oils and related products (class L) — Classification — Part 4: Family H (Hydraulic systems)*.

ISO 7745:1989, *Hydraulic fluid power — Fire-resistant (FR) fluids — Guidelines for use*.

3 Terms and definitions

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

4 Identity check

Record the following information about the cylinder to be tested:

- a) type;
- b) port size, type and orientation;
- c) if the cylinder contains cushions, verification of proper location and orientation of throttle screw(s);
- d) stroke length;
- e) model label;
- f) bore;
- g) rod diameter;
- h) piston rod extension and configuration;
- i) mounting type or style and, where applicable, position of the variable mounting surface.

5 Test conditions

5.1 Test fluid

A hydraulic oil (or other liquid on which the cylinder manufacturer and user have agreed) that conforms to ISO 6743-4 or ISO 7745 and is compatible with sealing materials used in the cylinder under test shall be the test medium.

5.2 Test fluid conditioning

5.2.1 General

The fluid used in the test circuit shall be conditioned according to 5.2.2 to 5.2.5, as applicable.

5.2.2 Contamination level

The contamination level of the fluid shall be 19/15 or —/19/15, expressed in accordance with ISO 4406:1999, or lower.

5.2.3 Special cases

For those applications that require a higher fluid cleanliness level, the fluid contamination level shall be agreed between the manufacturer and the purchaser.

5.2.4 Fluid temperature

The fluid temperature shall be maintained at between 15 °C and 45 °C.

5.2.5 Rust inhibitors

Rust inhibitors to prevent corrosion inside the cylinder may be added to the fluid, provided they are compatible with sealing materials used in the cylinder under test.

6 Test for leakage at low test pressure

6.1 Procedure

Cycle the cylinder at a minimum of 500 kPa [5 bar¹⁾] for cylinders with bores greater than 32 mm and at 1 000 kPa (10 bar) for cylinders with bores less than or equal to 32 mm, three or more times to the end positions. Pause at one of the end positions for a minimum of 10 s.

6.2 Sight test

- a) Verify the absence of vibration or crawling during the motion.
- b) When the piston has reached the maximum extension at end stroke, measure the overall stroke.
- c) Observe for fluid leakage on rod seal. When the test is over, any oil film present on the rod shall be insufficient to form either a drop or a ring of oil on the rod.
- d) Verify the absence of fluid leakage on all static seals.
- e) Verify the absence of fluid leakage on throttle screws or on check valves of end stroke cushion(s).

1) 1 bar = 0,1 MPa = 10⁵ Pa; 1 MPa = 1 N/mm²

- f) If any cylinder components are sealed by a weld, verify the absence of fluid leakage at the weld seam(s).
- g) If the cylinder incorporates a cushion or cushions and has throttle screws, the screws should be set to a slightly open position. Verify that the piston and rod assembly shows a deceleration effect before bottoming on to the cylinder end cap(s).

7 Piston seal leakage test

7.1 General

This test is required only if specified as such by the user.

7.2 Procedure

A test pressure equal to the cylinder's rated pressure or a test pressure as specified by the user shall be applied to the cylinder.

7.3 Sight test

Verify the absence of fluid leakage past piston seals.

8 Proof/external leakage test

8.1 Procedure

A test pressure of 1,5 times the cylinder's rated pressure or recommended operating pressure shall be applied alternately to both ends of the cylinder and held for 10 s.

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8.2 Sight test

- a) Verify the structural integrity of the cylinder.
- b) Verify the absence of fluid leakage on all static seals.
- c) Verify the absence of fluid leakage on throttle screws or on non-return valves (check valves) of end-of-stroke cushion(s), as applicable.
- d) If any cylinder components are sealed by a weld, verify the absence of fluid leakage at the weld seam(s).

9 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.

"Hydraulic cylinders tested in accordance with ISO 10100:2001, *Hydraulic fluid power — Cylinders — Acceptance tests.*"

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