INTERNATIONAL STANDARD

ISO 7241-2

Second edition
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Hydraulic fluid power — Quick-action couplings —

Part 2: Test methods

Transmissions hydrauliques — Raccords rapides —
Partie 2: Méthodes d'essai

Reference number
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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 part of ISO 7241 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 7241-2 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 4, *Connectors and similar products and components*.

This second edition cancels and replaces the first edition (ISO 7241-2:1986), which has been technically revised.

ISO 7241 consists of the following parts, under the general title *Hydraulic fluid power — Quick-action couplings*:

— *Part 1: Dimensions and requirements*

— *Part 2: Test methods*

Annex A forms a normative part of this part of ISO 7241.

Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit. Quick-action couplings are used to quickly join or separate fluid conductors, without the use of tools or special devices.

Hydraulic fluid power — Quick-action couplings —

Part 2:
Test methods

1 Scope

This part of ISO 7241 specifies different test methods which could be applied to quick-action couplings.

NOTE Users of this part ISO 7241 may select only the tests applicable to their needs. It is not intended that all tests be carried out for every application.

This part of ISO 7241 is applicable to male and female coupling halves, complete couplings, couplings with and without sealing means when uncoupled, and couplings that are connected and disconnected by a linear and/or rotational motion.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 7241. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 7241 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 3448, *Industrial liquid lubricants — ISO viscosity classification.*

ISO 4397, *Fluid power systems and components — Connectors and associated components — Nominal outside diameters of tubes and nominal inside diameters of hoses.*

ISO 4411, *Hydraulic fluid power — Valves — Determination of pressure differential/flow characteristics.*

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

ISO 6803, *Rubber or plastics hoses and hose assemblies — Hydraulic-pressure impulse test without flexing.*

ISO 7241-1, *Hydraulic fluid power — Quick-action couplings — Part 1: Dimensions and requirements.*

3 Terms and definitions

For the purposes of this part of ISO 7241, the terms and definitions given in ISO 5598 and the following apply.

3.1
coupling size designation
designation that refers to the nominal inside diameter of the hose, in accordance with ISO 4397, that is recommended for use with the coupling

4 Selection and examination of test samples

Coupling assemblies selected shall constitute a representative sample of a production lot in all respects: design, material, surface treatment, process, etc.

5 Test apparatus

5.1 The apparatus shown in Figures 1 to 7 shall be used.

5.2 Apparatus capable of providing test result data accuracy in accordance with clause 22 shall be used.

6 Test conditions

6.1 Tests shall be carried out at an ambient temperature of 20 °C to 35 °C, unless otherwise specified.

6.2 Tests shall be carried out using a fluid of ISO VG 32, in accordance with ISO 3448 (i.e. having a viscosity of 28,8 mm^2/s to 35,2 mm^2/s at 40 °C).

7 Connect force test

7.1 Lubricate the coupling interfaces with the test fluid. Insert the coupling in a test fixture. Maintain the internal test pressure, i.e. the maximum internal pressure as specified in ISO 7241-1.

7.2 Apply a linear force and/or torque to the coupling half until complete connection occurs.

NOTE During this operation, the locking mechanism may be operated manually, if necessary, to permit normal coupling of the halves.

7.3 Measure the connecting force and/or torque, as appropriate.

7.4 Repeat the test a total of five times on the same test coupling. Average the results of the five tests to determine the connect force or torque. Report the average connect force or torque in the test report.

7.5 Report any conditions of damage or malfunction in the test report.

8 Disconnect force test

8.1 Lubricate the coupling interfaces with the test fluid. Insert the coupling in a test fixture. Maintain the internal test pressure, i.e. the maximum operating pressure specified in ISO 7241-1, and/or the prevailing flow conditions.

8.2 Apply linear force and/or torque to the retaining mechanism of the coupling until disconnection occurs. Measure the disconnect force and/or torque.

8.3 Repeat the test for five disconnections on the same test coupling. Average the test results of the five tests to determine the disconnect force and/or torque. Report the average of the results in the test report.

8.4 Report any condition of damage or malfunction in the test report.

9 Leakage test

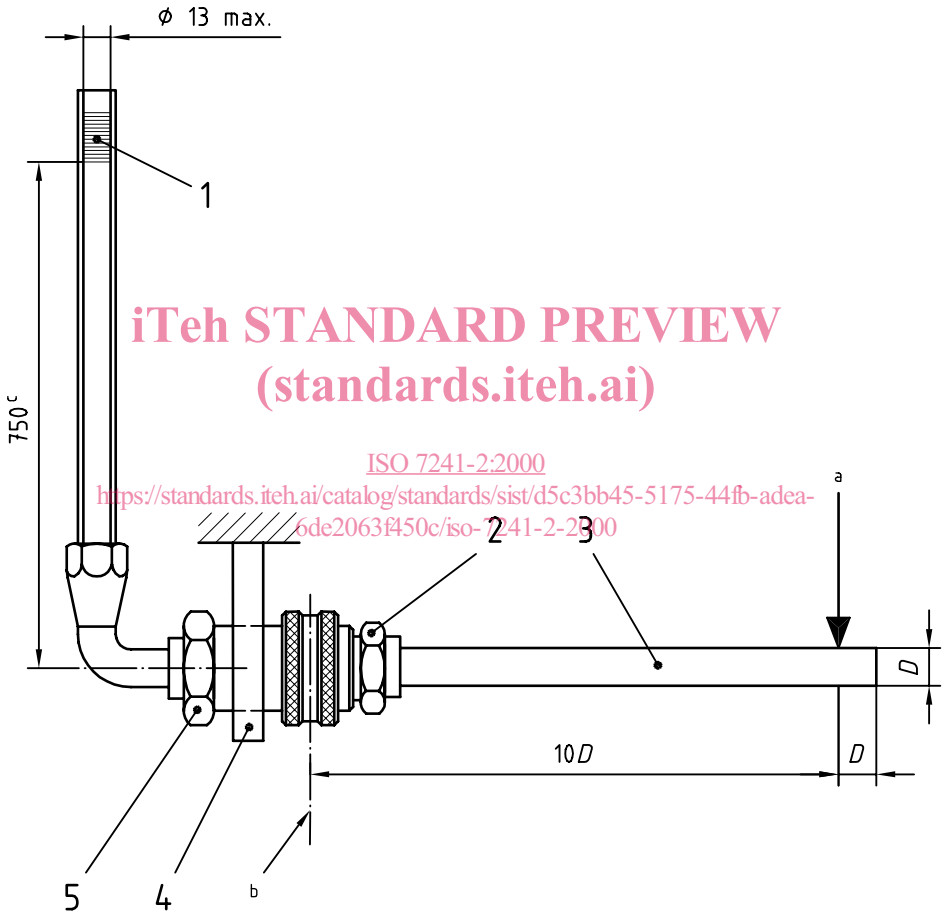
9.1 Low pressure, coupled

9.1.1 Insert the coupling assembly in a test apparatus. Fill the test apparatus with test fluid (see 6.2) to a fluid column height of 750 mm. Apply a 50 N load perpendicular to the coupling centreline at a distance of 10*D* from the axis of the gauge balls of the locking device (see Figure 1), where *D* equals the nominal inside diameter of the hose, in accordance with ISO 4397, that is recommended for use with the coupling.

9.1.2 Measure the drop in column height over a minimum test period of 30 min. Calculate the leakage rate in millilitres per hour.

9.1.3 Report the leakage rate in the test report.

Dimensions in millimetres



D = nominal size of the coupling, in millimetres

Key

1 Column with top portion graduated for measurement
2 Male coupling half
3 Steel rod connected to the male coupling half not held in the fixture
4 Fixture to hold the female coupling half
5 Female coupling half

a 50 N load perpendicular to coupling centreline
b Centreline of locking device
c Fluid column height

Figure 1 — Low-pressure leakage test apparatus (coupled)

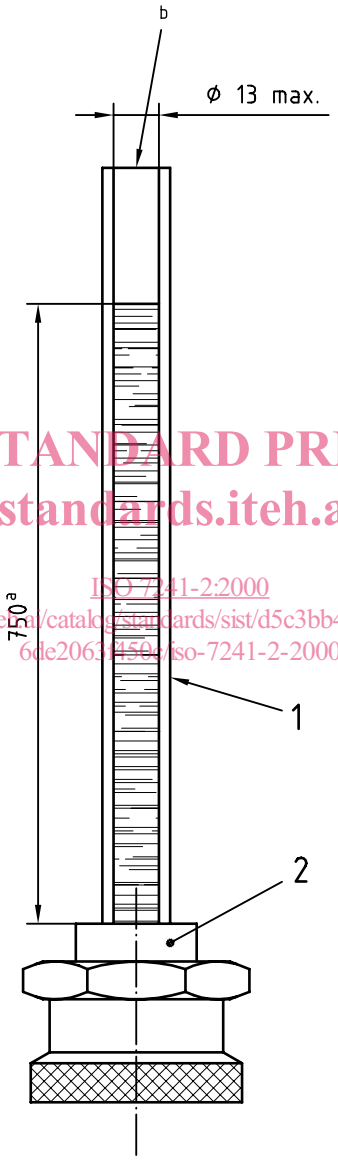
9.2 Low pressure, uncoupled (valved only)

9.2.1 Insert each coupling half in a test apparatus. Fill the test apparatus with test fluid (see 6.2) to a fluid column height of 750 mm (see Figure 2).

9.2.2 Measure the drop in column height over a test period of 30 min. Calculate the leakage rate in millilitres per hour.

9.2.3 Report the leakage rate in the test report.

Dimensions in millimetres



Key

1 Column with top portion graduated for measurement

2 Coupling half (male or female half) test component

a Fluid column height

b Open top

Figure 2 — Low-pressure leakage test apparatus (uncoupled half)

9.3 Maximum operating pressure, coupled

9.3.1 Purge internal air from the circuit. Pressurize the coupling assembly, with the test fluid, at maximum operating pressure as specified in ISO 7241-1.

9.3.2 Observe leakage over a test period of 30 min, while maintaining maximum operating pressure. Collect and measure the leakage in a graduated measuring flask. Calculate the leakage rate, in millilitres per hour.

9.3.3 Report the leakage rate in the test report.

9.4 Maximum operating pressure, uncoupled (valved only)

9.4.1 Purge internal air from the circuit. Pressurize each coupling half, with the test fluid, at maximum operating pressure as specified in ISO 7241-1.

9.4.2 Observe leakage over a test period of 30 min, while maintaining maximum operating pressure. Collect and measure the leakage for each coupling half in a graduated measuring flask. Calculate the leakage rate, in millilitres per hour.

9.4.3 Report the leakage rate in the test report.

10 Extreme temperature test

10.1 Maximum operating temperature exposure, coupled

10.1.1 Fill the coupling assembly with test fluid and subject the assembly to the maximum operating temperature for at least 6 h. The coupling shall be internally vented to atmosphere during temperature adjustment.

10.1.2 Allow the coupling to cool to ambient temperature. Disconnect and reconnect the coupling. Determine the leakage rate in accordance with 9.1 and 9.3.

10.1.3 Report the leakage rate in the test report.

10.2 Maximum operating temperature exposure, uncoupled (valved only)

10.2.1 Fill the coupling halves with test fluid and subject the halves to the maximum operating temperature for at least 6 h.

10.2.2 Allow the coupling half to cool to ambient temperature and actuate the valves five times manually to separate the valve seal from the sealing surface. Determine the leakage rate in accordance with 9.2 and 9.4.

10.2.3 Report the leakage rate in the test report.

10.3 Maximum operating temperature service, coupled

NOTE This procedure requires testing at the maximum operating temperature.

10.3.1 Fill the coupling assembly with test fluid and subject the assembly to the maximum operating temperature for at least 6 h. The coupling shall be internally vented to atmosphere during temperature adjustment.

10.3.2 Determine the leakage rate at maximum operating temperature in accordance with 9.1 and 9.3.

10.3.3 Report the leakage rate in the test report.

10.4 Maximum operating temperature service, uncoupled (valved only)

NOTE This procedure requires testing at the maximum operating temperature.

10.4.1 Fill the coupling halves with test fluid and subject the halves to the maximum operating temperature for at least 6 h.

10.4.2 Determine the leakage rate at maximum operating temperature in accordance with 9.2 and 9.4.

10.4.3 Report the leakage rate in the test report.

10.5 Minimum operating temperature, coupled

10.5.1 Fill the coupling assembly with test fluid and subject the assembly to the minimum operating temperature for at least 4 h.

10.5.2 Determine the leakage rate at minimum operating temperature in accordance with 9.1 and 9.3.

10.5.3 Report the leakage rate in the test report.

10.6 Minimum operating temperature, uncoupled (valved only)

10.6.1 Fill the coupling halves with the test fluid and subject the halves to the minimum operating temperature for at least 4 h.

10.6.2 Actuate the valves five times manually to separate the valve seal from the sealing surface. Determine the leakage rate at minimum operating temperature in accordance with 9.2 and 9.4.

10.6.3 Report the leakage rate in the test report.

11 Pressure impulse test

11.1 Test coupling

Because the pressure impulse test is a destructive test, a new coupling shall be used. The coupling tested shall not be used for any further testing.

11.2 Coupled test

11.2.1 Connect the coupling assembly to a test apparatus capable of producing pressure impulses, as shown in ISO 6803:1994, Figure 1, which diagrams the pressure pulse cycle. Adjust the test pressure to 133 % of the rated pressure.

11.2.2 Adjust the test apparatus so that a pressure-time cycle corresponding to the curve shown within the shaded area of ISO 6803:1994, Figure 1 is obtained.

11.2.3 Conduct the specified number of test cycles at a uniform cycle rate of 0,5 Hz to 1 Hz.

11.2.4 Uncouple and couple the test coupling assembly a minimum of one time at intervals of 10 000 cycles throughout the test.

11.2.5 Record any evidence of binding or malfunction.

11.2.6 Determine the leakage rate in accordance with 9.1 and 9.3.

11.2.7 Report the leakage rate and the number of test cycles in the test report.