
**Metallic tube connections for fluid power
and general use — Test methods for
hydraulic fluid power connections**

*Raccords de tubes métalliques pour transmissions hydrauliques et
pneumatiques et applications générales — Méthodes d'essai pour
raccords pour transmissions hydrauliques*

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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 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 19879 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 4, *Connectors and similar products and components*.

This first edition of ISO 19879 cancels and replaces ISO 8434-5:1995, 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 within an enclosed circuit. Components must be designed to meet these requirements under varying conditions. Testing of components to meet performance requirements provides a basis of assurance for determining design application and for checking component compliance with the stated requirements.

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Metallic tube connections for fluid power and general use — Test methods for hydraulic fluid power connections

1 Scope

This International Standard specifies uniform methods for the testing and performance evaluation of metallic tube connections, stud ends for ports and flange connections for use in hydraulic fluid power applications. This International Standard does not apply to the testing of hydraulic quick-action couplings, which is covered by ISO 7241-2.

Tests outlined in this International Standard are independent of each other and document the method to follow for each test. See the appropriate component International Standard for which tests to conduct and for performance criteria.

For qualification of the connector, the minimum number of samples specified in this International Standard are tested, unless otherwise specified in the relevant connector standard or as agreed upon by the manufacturer and the user.

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2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 48, *Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 3448, *Industrial liquid lubricants — ISO viscosity classification*

ISO 3601-3, *Fluid power systems — O-rings — Part 3: Quality acceptance criteria*¹⁾

ISO 5598, *Fluid power systems and components — Vocabulary*¹⁾

ISO 6508 (all parts), *Metallic materials — Rockwell hardness test*

ISO 6605, *Hydraulic fluid power — Hoses and hose assemblies — Test methods*

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

3 Terms and definitions

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

1) Under revision.

4 General requirements

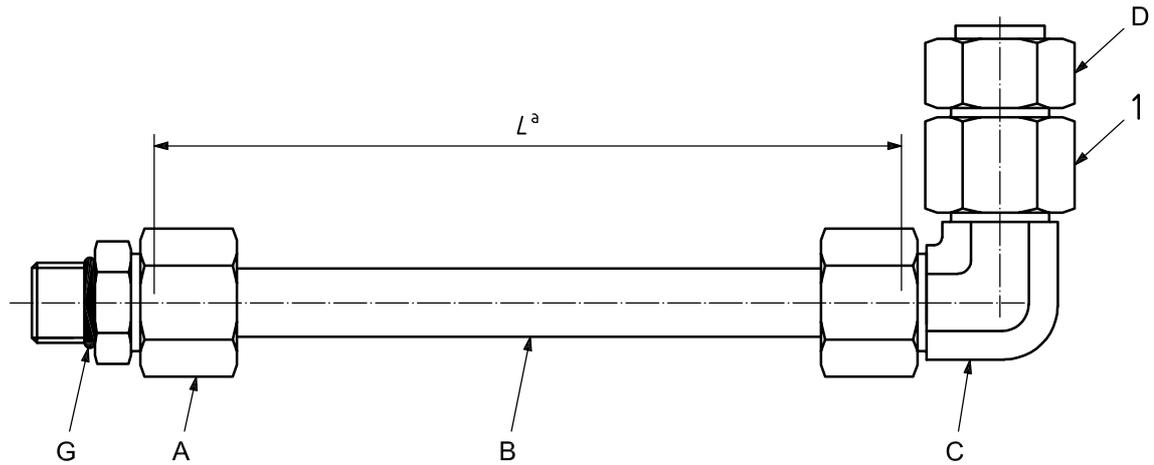
WARNING — Some of the tests described in this International Standard are considered hazardous. It is therefore essential that, in conducting these tests, all appropriate safety precautions be strictly adhered to. Attention is drawn to the danger of burst, fine jets (which can penetrate the skin) and energy release of expanding gases. To reduce the hazard of energy release, bleed air out of test specimens prior to pressure testing. Tests shall be set up and performed by properly trained personnel.

4.1 Test assemblies

All components tested shall be in the final form, including annealed nuts, as required for brazed components. Unless otherwise specified in the respective connector standard, Type 1 test assemblies shall be as shown in Figure 1 for tube connections (for repeated assembly, leakage, proof, burst and cyclic endurance tests), and Type 2 test assemblies shall be as shown in Figure 2 for male stud ends (for leakage, proof and, if specified, burst and cyclic endurance tests). Alternatively, in order to test the connector to its full capability, use of the metallic tube may be omitted for burst and cyclic endurance tests, and different configurations with similar capability may be combined in a test assembly Type 3, as shown in Figure 3. Type 4 test assemblies for flange connectors shall be as shown in Figure 4. Test assemblies shall conform to the relevant requirements given in Table 1.

Table 1 — Requirements for test assemblies

Part code	Part name	Description and further information
A	Straight stud connector	The type of stud end, connector end and sealing method is optional but shall be recorded in the test report.
B	Metallic tube	The required tube wall thickness shall be selected according to the working pressure rating of the respective connector. The length of the tube shall be five times the tube outside diameter plus 50 mm.
C	Shaped connector, with swivel if applicable	—
D	Blanking end (cap or plug)	—
E	Shaped connector with adjustable stud end	—
F	Flange connector	—
G	Sealing	e.g. O-ring.



Key

- 1 swivel nut
- A straight stud connector
- B metallic tube
- C shaped connector
- D blanking end (cap or plug)
- G sealing, e.g. O-ring

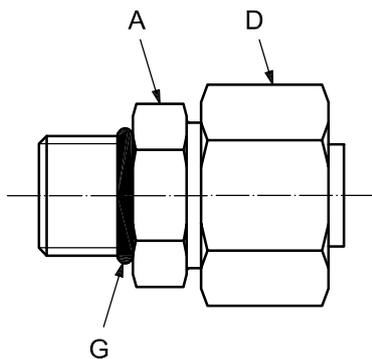
^a $L = 5 \times \text{the tube OD (in millimetres)} + 50 \text{ mm.}$

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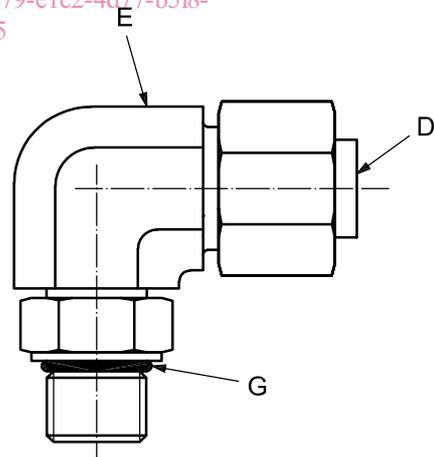
Figure 1 — Test assembly for tube connection — Type 1

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a) Non-adjustable stud end connection

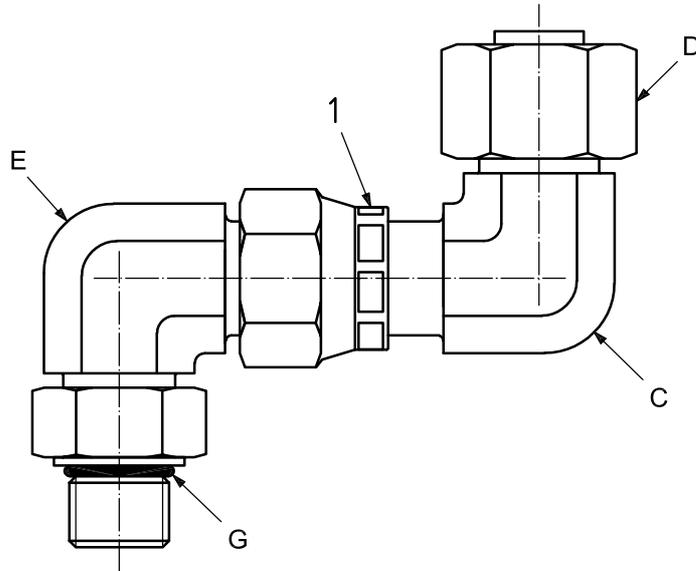


b) Adjustable stud end connection, with shaped connector, if applicable

Key

- A straight stud connector
- D blanking end (cap or plug)
- E shaped connector with adjustable stud end
- G sealing, e.g. O-ring

Figure 2 — Test assembly for stud end — Type 2

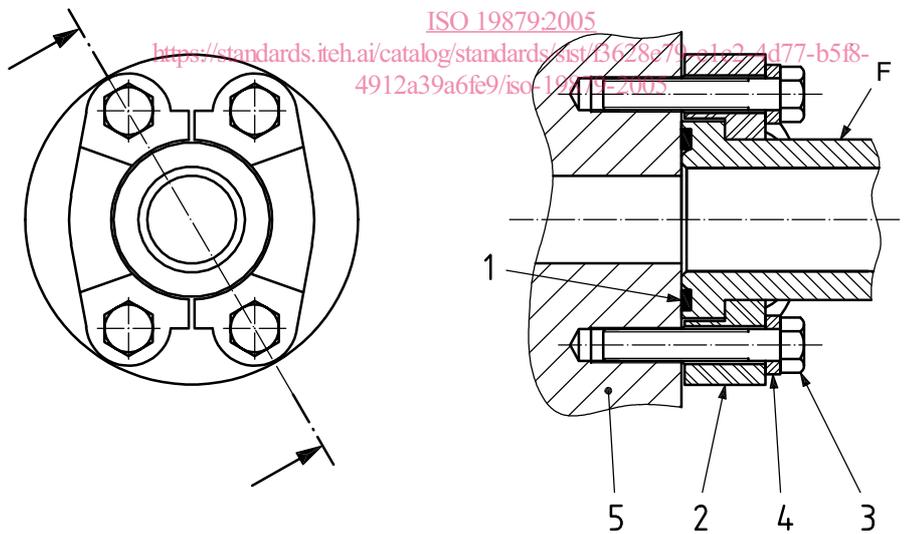


Key

- 1 swivel nut
- C shaped connector with swivel
- D blanking end (cap or plug)
- E shaped connector with adjustable stud end
- G sealing, e.g. O-ring

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Figure 3 — Alternate connector capability test assembly without tube — Type 3



Key

- 1 O-ring seal
- 2 split-flange clamp
- 3 screw
- 4 washer
- 5 test adapter
- F flange connector
- a This end capped or plugged.

Figure 4 — Test assembly for flange connectors — Type 4

4.2 Test equipment

4.2.1 Test block

Test blocks shall be unplated and have a hardness between 35 HRC and 45 HRC in accordance with ISO 6508. For a test block with multiple ports, the distance between the centrelines of test ports shall be a minimum of 1,5 times the port diameter. The distance between the port centreline and the edge of the test block shall be a minimum of 1 times the port diameter.

4.2.2 Test seals

For all tests, except for the overtightening test and unless otherwise specified, seals shall be nitrile (NBR) rubber with a hardness of (90 ± 5) IHRD when measured in accordance with ISO 48. Seals shall conform to their respective dimensional requirements, and O-rings shall meet or exceed the quality requirements for grade N (general purpose) of ISO 3601-3, if applicable.

4.3 Procedure

4.3.1 Thread lubrication

For all tests, on connectors made of carbon steel and for testing only, threads and contact surfaces shall be lubricated prior to application of torque using a hydraulic fluid with a viscosity of ISO VG 32 in accordance with ISO 3448. For connectors made of materials other than carbon steel, the manufacturer's recommendation for thread lubrication shall be followed.

4.3.2 Torque

For all tests, except the repeated assembly and overtightening tests, tube connections and stud ends shall be tested at the required minimum torques or number of hex flats or turns from finger-tight position given in the respective connector standard, if specified. Otherwise, they shall be tested at the minimum torque values or number of hex flats or turns from finger-tight position supplied by the manufacturer. For test assembly Type 2 and Type 3, adjustable stud torques shall be applied after being backed out one full turn from finger-tight, in order to test correctly the worst possible actual assembly conditions.

4.3.3 Temperature

For all tests, the temperature of the hydraulic fluid shall be between 15 °C and 80 °C, unless otherwise specified in the respective connector standard.

4.4 Test report

Test results and test conditions shall be reported on the test data form given in Annex A.

NOTE ISO/TR 11340 provides a method of reporting leakage.