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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 18869

Hydraulic fluid power — Test methods for couplings actuated with or without tools

*Transmissions hydrauliques — Méthodes d'essai pour les
raccords actionné avec ou sans outils*

ICS: 23.100.01

ISO/TC 131/SC 4

Secretariat: **ANSI**

Voting begins on:
2025-10-20

Voting terminates on:
2026-01-12

This document has not been edited by the ISO Central Secretariat.

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document 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 18869:2017), which has been technically revised.

The main changes are as follows:

- In [Clause 4.2 Table 2](#) (Destructive/Non-destructive testing) it has been added together with the indication when possible re-use the parts after testing.
- In [Clause 19.1](#) it has been specified to perform the impulse test coupled assembled with hoses.

A list of all parts in the ISO 18869 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

In hydraulic fluid power systems, power is transmitted and controlled through a liquid under pressure within an enclosed circuit. Couplings are used to join or quickly separate fluid conductors. Quick-action couplings, as defined in ISO 5598, can be connected and disconnected without the use of tools. Other types of couplings require the use of tools for connection and disconnection.

Hydraulic fluid power — Test methods for couplings actuated with or without tools

1 Scope

This document specifies methods for testing and evaluating the performance of quick-action couplings for use in hydraulic fluid power applications. This document does not apply to the testing of tube connections, stud ends for ports and flange connections, which are covered by ISO 19879.

Test methods covered in this document are independent of each other and outline the method to follow for each test. See the respective connector standard for which tests to conduct and for performance requirements. It is not intended that all tests be carried out for every application; it is up to the user of this document to select the applicable tests.

For qualification of the coupling, the minimum number of samples specified in this document is to be tested, unless otherwise specified in the relevant coupling standard or as agreed upon by the parties involved.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 48-2, *Rubber, vulcanized or thermoplastic — Determination of hardness — Part 2: 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*

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

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

ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method*

ISO 6802, *Rubber or plastics hoses and hose assemblies — Hydraulic impulse test with flexing*

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

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1**quick-action coupling**

connector that can be connected and disconnected multiple times and relatively quickly

EXAMPLE Within 1 s to 30 s either with or without the use of tools.

Note 1 to entry: This connector can contain one or two automatic shut-off valves.

3.2**screw-to-connect coupling**

coupling that is designed to be connected and disconnected by more than one turn of one swivel element relatively to the other

3.3**coupling half**

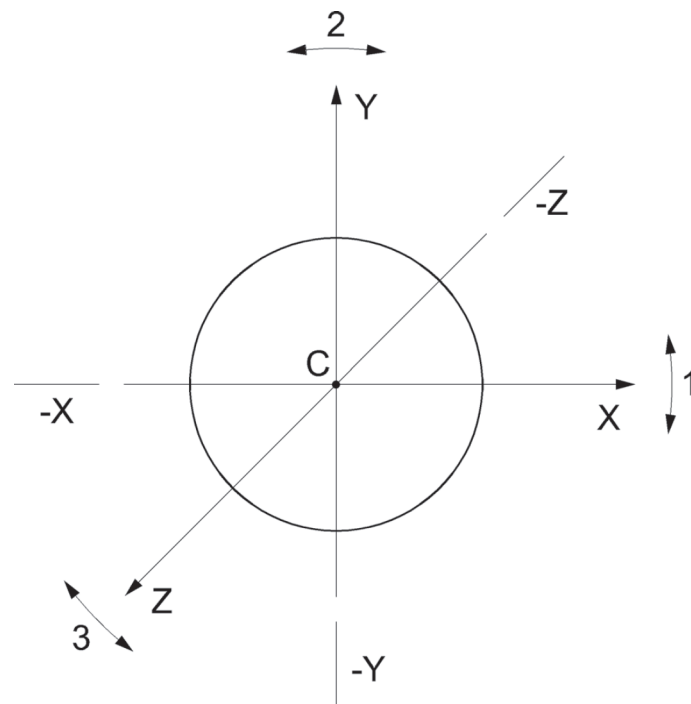
uncoupled part of a *quick-action coupling* (3.1)

Note 1 to entry: The terms “socket half” and “plug half” can be used to describe the two parts of the coupling.

3.4**misalignment**

maximum error in the space allowed between the axes of the two coupling halves, indicated in three dimensions and angles of rotation

Note 1 to entry: See [Figure 1](#).

**Key**

- | | |
|---|--|
| 1 | misalignment around C respect the X-axis |
| 2 | misalignment around C respect the Y-axis |
| 3 | misalignment around C respect the Z-axis |

Figure 1 — Illustration of indication of misalignment

3.5**side load**

load applied perpendicular to the axes of the coupling halves in the disconnected positions

Note 1 to entry: See [Figure B.1](#).

Note 2 to entry: The value of the side load is expressed in Newton (N).

3.6

maximum connect force

maximum force required to achieve complete engagement of the connection

3.7

minimum disconnect force

minimum force required to achieve complete disengagement of the connection

3.8

rated connect torque

torque required to achieve complete engagement of the connection

3.9

rated disconnect torque

torque required to achieve complete disengagement of the connection

4 Selection of test assemblies

4.1 Test assemblies (coupling assemblies to be tested) shall be selected to constitute a representative sample of a production lot in all respects: design, material, surface treatment, process, etc. All managerial controls necessary to maintain substantial similarity between test and production couplings shall be used.

4.2 For qualification testing, the number of test samples shall be taken from [Table 1](#).

NOTE The coupling size is based on the nominal hose size, in accordance with ISO 4397.

Table 1 — Number of test samples

Coupling nominal size	Number of samples
3,2	5
5	5
6,3	5
10	5
12,5	5
16	5
19 (20)	5
25	4
31,5	2
38 (40)	2
51 (50)	2

4.3 Conditions for re-use of test samples are indicated in [Table 2](#). Parts used for non-destructive testing can be used for further testing. Parts used for destructive testing shall not be tested further, used or returned to stock.

Table 2 — Conditions for re-use of test samples

Type of Test	Test Clause	Non-Destructive Testing	Destructive Testing
Connect force or torque test	7	X	
Disconnect force or torque test	8	X	
Leakage test	9	X	
Vacuum test	10	X	
Air inclusion test	11	X	
Fluid loss test	12	X	
Pressure drop (Δp) test	13	X	
Static pressure test ^a	14	X	
Specific temperature test	15	X	
Endurance test	16		X
Overtightening test for screw-to-connect couplings only	17		X
Burst test	18		X
Pressure impulse test without flexing	19		X
Pressure impulse test with flexing (for coupling assemblies only)	20		X
Rotating impulse test	21		X
Surge flow test – Long duration	22		X
Surge flow test –Short duration	23		X
Corrosion resistance test	24		X

^a In case that the specified static pressure is higher than the maximum working pressure the static pressure test shall be consider as a destructive testing.

5 General test conditions

5.1 Safety considerations

5.1.1 The following recommendations are not all inclusive and other pertinent regulations and considerations may apply.

5.1.2 Some of the tests described in this document are considered hazardous. It is therefore essential that, in conducting these tests, all appropriate safety precautions be strictly applied. In particular, attention is drawn to the following situations:

- a) bursting of the coupling or hose;
- b) fine jets, which can penetrate the skin;
- c) energy release caused by expanding gases;
- d) handling of objects at high and low temperatures;
- e) movement of actuators and metallic parts when attachments and the endurance test machine are used.

5.1.3 Tests shall be set up and performed by properly trained personnel.

5.1.4 To reduce the hazard of fluid injection, test assemblies shall be protected with adequate safeguards.

5.1.5 To reduce the hazard of energy release, air shall be bled from test assemblies before applying pressure.

5.1.6 To reduce the hazard of burns, test assemblies shall be handled with the appropriate tools.

5.1.7 To reduce the risk of injury to personnel, test equipment and test assemblies shall be protected with adequate safeguards, and moving automatic mechanisms shall not be operated manually.

5.1.8 Appropriate personal protective equipment shall be used at all times during testing.

5.2 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 with 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.

5.3 Torque

For all tests, connectors used in the test bench shall be assembled using the torque of the respective standard.

5.4 Test fluid and temperature

The test fluid shall have a maximum viscosity of ISO VG 32, in accordance with ISO 3448, unless otherwise specified. If not specified, tests shall be carried out at an ambient temperature from 20 °C to 35 °C.

5.5 Test pressure

The test pressure shall be as specified in the respective connector standard.

6 Test apparatus

6.1 Test blocks (used in impulse, burst, sliding-impulse and overtightening tests)

Test blocks shall be unpainted and have hardness between 35 HRC and 45 HRC in accordance with ISO 6508-1. If a test block has 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 time the port diameter.

6.2 Test seals

For all tests except for the overtightening test and unless otherwise specified, seals used in the ports shall be made from nitrile (NBR) rubber with a hardness of 90 IRHD $\pm$ 5 IRHD when measured in accordance with ISO 48-2. 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.

6.3 Measuring instruments

Measuring instruments used shall provide the accuracy given in [Table 3](#).

Table 3 — Required accuracy of instruments used to measure data

Parameter	Unit	Data accuracy (percentage of maximum measured value)
Flow rate	l/min	±3 %
Force	N	±3 %
Pressure and pressure drop	MPa	±3 %
Torque	N·m	±3 %
Volume (leakage)	ml	±1 %
Temperature	°C	±3 °C

7 Connect force or torque test

7.1 The instructions in [Annex B](#) on how to conduct this test shall be followed when internal pressure is present in the coupling

7.2 The coupling interfaces of the test assembly shall be lubricated with the test fluid. Insert the test assembly in a test fixture. Maintain the internal test pressure as specified in the respective connector standard or as agreed by the parties involved. Conduct the test using the parameters and procedures given in [Table 4](#).

Table 4 — Parameters and procedures for connect force and disconnect force test

Test parameter	Value of parameter and procedure
Test medium	As specified in Clause 5
Test pressure and temperature	As specified in Clause 5 or as specified in the respective connector standard or as agreed by the parties involved
Test ambient conditions	As specified in the respective connector standard or as agreed by the parties involved
Pass/fail criteria	Any mechanical damages compromising the capability to connect and disconnect shall be considered a test failure. Acceptable fluid loss and air inclusion should be as specified in the respective connector standard or as agreed by the parties involved. Any deviation shall be considered a test failure.

7.3 Apply a linear force or torque to the coupling half until complete connection occurs. During this operation, the locking mechanism may be operated manually, if necessary, to permit normal coupling of the halves.

7.4 Measure the connect force or connect torque or both, as appropriate.

7.5 Repeat the test for a total of five times on the same test assembly. Average the results of the five tests to determine the connect force or torque. Report the average in the test report. This value is the rated connect force or rated connect torque.

7.6 Report any failures identified in [Table 4](#) (e.g. damage, malfunction, leakage) in the test report.

8 Disconnect force or torque test

8.1 The instructions in [Annex B](#) on how to conduct this test shall be followed when internal pressure is present in the coupling