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ISO
7289

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Quick-action couplings with shut-off valves for gas welding, cutting and allied processes

iTeh STANDARD PREVIEW

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*Raccords rapides à obturation pour équipements pour soudage au gaz,
coupage et techniques connexes*

ISO 7289:1996

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Reference number
ISO 7289:1996(E)

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.

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.

International Standard ISO 7289 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, (Subcommittee SC 8, *Equipment for gas welding, cutting and allied processes*).

This second edition cancels and replaces the first edition (ISO 7289:1990), which has been technically revised.

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Introduction

Quick-action couplings with shut-off valves are used in equipment for gas welding, cutting and allied processes to connect the hoses used between the regulator and the torch, either to one another or to the regulators and the torches themselves.

These couplings are fitted with shut-off devices that interrupt the gas flow when the two elements are disconnected, so that coupling and uncoupling operations may be performed manually while the equipment is under pressure.

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Quick-action couplings with shut-off valves for gas welding, cutting and allied processes

1 Scope

This International Standard defines the specifications and the type tests for quick action couplings with shut-off valves. It applied to quick-action couplings used between the regulator and the torch in equipment for gas welding, cutting and allied processes.

This International Standard applies to cases where these couplings are used with hoses according to ISO 3821 or threaded unions according to ISO 3253.

and 2,5 MPa) — Plug connecting dimensions, specifications, application guidelines and testing.

ISO 9090:1989, *Gas tightness of equipment for gas welding and allied processes.*

ISO 9539:1988, *Materials for equipment used in gas welding, cutting and allied processes.*

2 Normative reference

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3253:1975, *Hose connections for equipment for welding, cutting and related processes.*

ISO 3821:1992, *Welding — Rubber hoses for welding, cutting and allied processes.*

ISO 5175:1987, *Equipment used in gas welding, cutting and allied processes — Safety devices for fuel gases and oxygen or compressed air — General specifications, requirements and tests.*

ISO 6150:1988, *Pneumatic fluid power — Cylindrical quick-action couplings for maximum working pressures of 10 bar, 16 bar and 25 bar (1 MPa, 1,6 MPa*

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 quick-action coupling with shut-off valve:

Device enabling rapid coupling or uncoupling of equipment and/or hoses under pressure, and preventing the mutual connection of two lines containing incompatible gases (e.g. oxygen and fuel gas).

3.2 element: One of two elements of a quick-action coupling system, male and female, the female element being fitted with an automatic shut-off system which prevents gas leakage when the two elements are uncoupled.

4 Types of coupling

This International Standard deals with three types of quick-action coupling with shut-off valves, according to the gases for which they are intended.

These three types are the following:

- a) type O — oxygen;
- b) type F — fuel gas;
- c) type N — other gases specific for welding processes.

5 Installation

The quick-action couplings with shut-off valves shall be installed so that the element with the shut-off device is located upstream in terms of the gas flow from the source.

6 Design requirements

6.1 Dimensions, non-interchangeability and interchangeability

In order to ensure that

- a) elements of different types, and

- b) elements of different types and couplings for compressed air (according to ISO 6150)

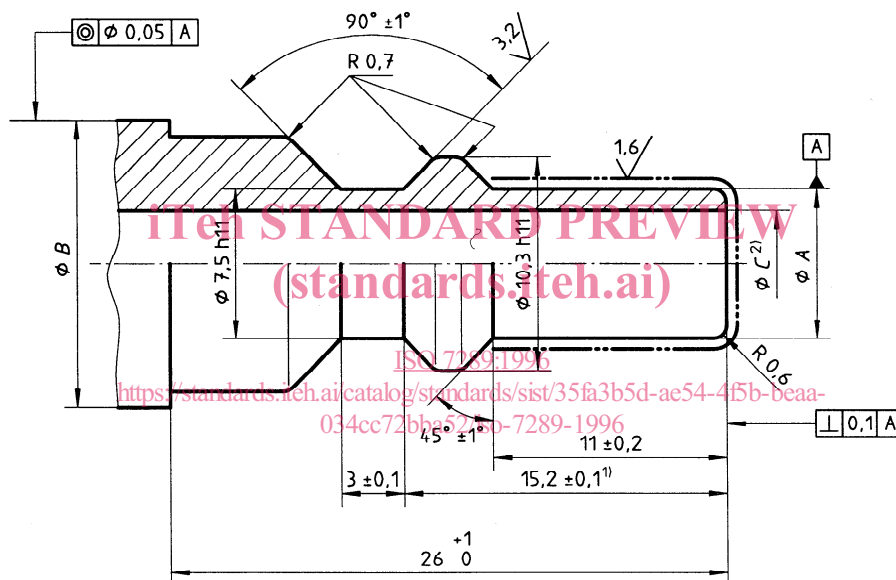
are not interchangeable, quick-action couplings with shut-off valves according to this International Standard shall have the dimensions specified in figure 1 and table 1 for couplings of types O, F and N.

The dimensions and fabrication details not specified in figure 1 and table 1 are left to the discretion of the manufacturer, with the proviso that quick-action couplings with shut-off valves of the same type shall be interchangeable, regardless of their manufacturer.

6.2 Configuration

The shut-off system shall be located in the female element of the quick-action coupling.

Dimensions and tolerances of coaxiality and perpendicularity in millimetres, surface roughness values in micrometres



- 1) The minimum hardness of the male element surface is 270 HV 10 over a minimum length of 15,2 mm.
- 2) The internal diameter C shall be observed over a minimum length of 20 mm.

Figure 1 — Dimensions of male element

Table 1 — Dimensions of male element

Dimensions in millimetres

Gas	Type	A h10	B h10	C JS13
Oxygen	O	6,8	12,8	4,5
Fuel gas	F	7,3	12,3	5
Other gases specific for welding processes	N	6,3	13,3	4

NOTE — Diameter C shall be observed over a length of 20 mm.

6.3 Coupling and uncoupling

The choice of the means of coupling and uncoupling is left to the discretion of the manufacturer.

Coupling and uncoupling shall be achieved with ease and shall not require the use of tools. It shall not be possible to disengage the two elements by

- a) a simple rotation of one element against the other, or
- b) the application of a longitudinal traction force of less than 1 kN.

Under normal service conditions, as defined by the manufacturer, no undesired uncoupling shall occur.

The opening and closure of the shut-off system shall occur automatically.

6.4 Connections

The outside-threaded connections shall conform with the specifications given in ISO 3253. A right-hand thread shall be used for couplings of types O and N and a left-hand thread shall be used for couplings of type F.

6.5 Materials

The materials used for the construction of these couplings shall conform with the requirements given in ISO 9539.

6.6 Surface protection of the male element

Unless otherwise protected from external damage by mechanical means, the male element shall be constructed from material of a surface hardness not less than 270 HV 10. (This specification refers to the surface hardness of the standardized external profile over a length of 15,2 mm.)

7 Working requirements

7.1 Pressure resistance

Quick-action couplings with shut-off valves shall be designed for a maximum working pressure of 2 MPa (20 bar). When tested under the conditions given in 9.2, they shall withstand

- a) a test pressure of 4 MPa (40 bar) without permanent deformation, and
- b) a test pressure of 6 MPa (60 bar) without rupture.

7.2 Gas tightness

7.2.1 General requirements

The general requirements for gas tightness given in ISO 9090 shall be satisfied.

7.2.2 Specific requirements

During tests performed according to 9.3, the measured leakage rate, in both the coupled and the uncoupled positions, shall not exceed 10 cm³/h.

7.3 Pressure drop

At the nominal pressure p_n and the nominal flow rate q_{Vn} specified by the manufacturer, the pressure loss introduced by the quick-action coupling with shut-off valve shall not exceed 10 % of p_n specified value.

7.4 Resistance to flame flash-back

After having been submitted to one flash-back in accordance with the conditions specified in 9.4, quick-action couplings with shut-off valves shall continue to conform with the requirements specified in 7.2.

7.5 Resistance to tensile load

When tested under the conditions specified in 9.5, the quick-action couplings with shut-off valves shall

- a) remain suitable for normal service and fulfil the test requirements specified in this International Standard, after having been submitted to an axial load of 600 N, and
- b) remain coupled and gas tight after having been submitted to an axial load of 1 kN.

7.6 Resistance to radial loads

When tested under the conditions specified in 9.6, the quick-action couplings with shut-off valves shall

- a) remain suitable for normal service and fulfil the test requirements specified in this International Standard, after having been submitted to a radial load of 1 kN, and
- b) remain coupled and gas tight after having been submitted to a radial load of 2 kN.

7.7 Endurance

When tested under the conditions specified in 9.7, the quick-action couplings with shut-off valves shall remain gas tight after they have been submitted to a minimum of 1 000 coupling/uncoupling cycles at the maximum working pressure (see 7.1).

7.8 Other function

In cases where a quick-action coupling with shut-off valve is associated with any other function than those specified in this International Standard, it shall comply with the requirements of clauses 6 and 7 and shall then be tested in accordance with clauses 8 and 9 after it has met the requirements necessary to perform the other function.

8 General test conditions

8.1 General

The tests described below are type tests. Unless otherwise specified, they shall be performed at an ambient temperature of $(23 \pm 2) \text{ }^\circ\text{C}$ using oil-free

air or nitrogen. The pressure resistance test shall be performed under hydraulic pressure.

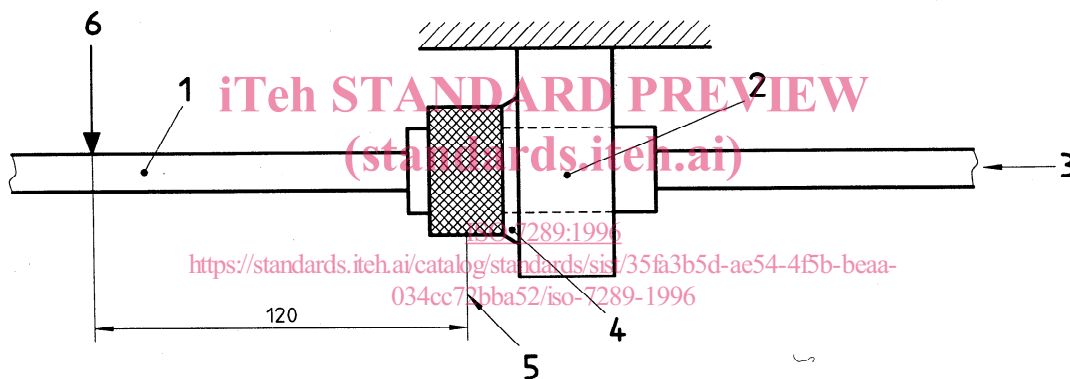
Eight samples of the quick-action couplings with shut-off valves shall be tested. The two elements of each of these samples shall be carefully marked to ensure that all tests are performed using the same pair of elements.

Figures 2, 3 and 4 show the principle of the tensile load test and examples of the test rigs for gas tightness and resistance to radial loads.

8.2 Test sequence

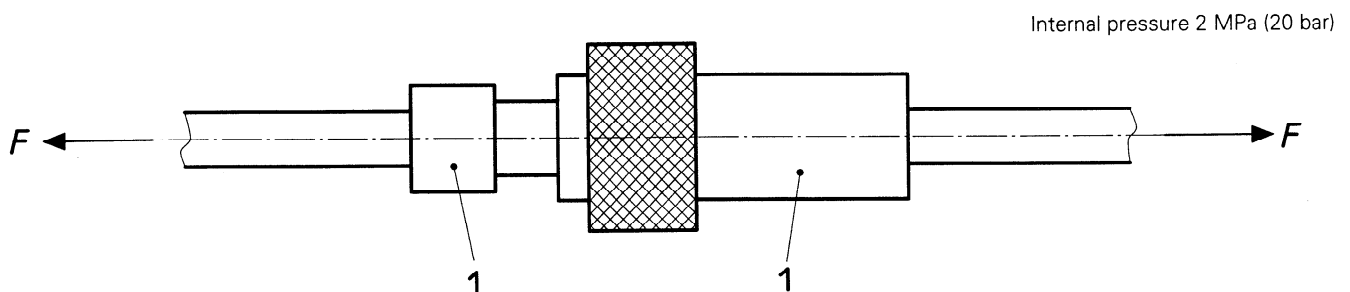
Each of the eight samples shall be submitted to the tests described in clause 9, as indicated by the crosses in table 2. The tests shall be performed in the sequence shown in table 2 with the test series being performed in alphabetical order; one sample shall be used for each test series A, B and C and five samples shall be used for test series D.

Dimensions in millimetres



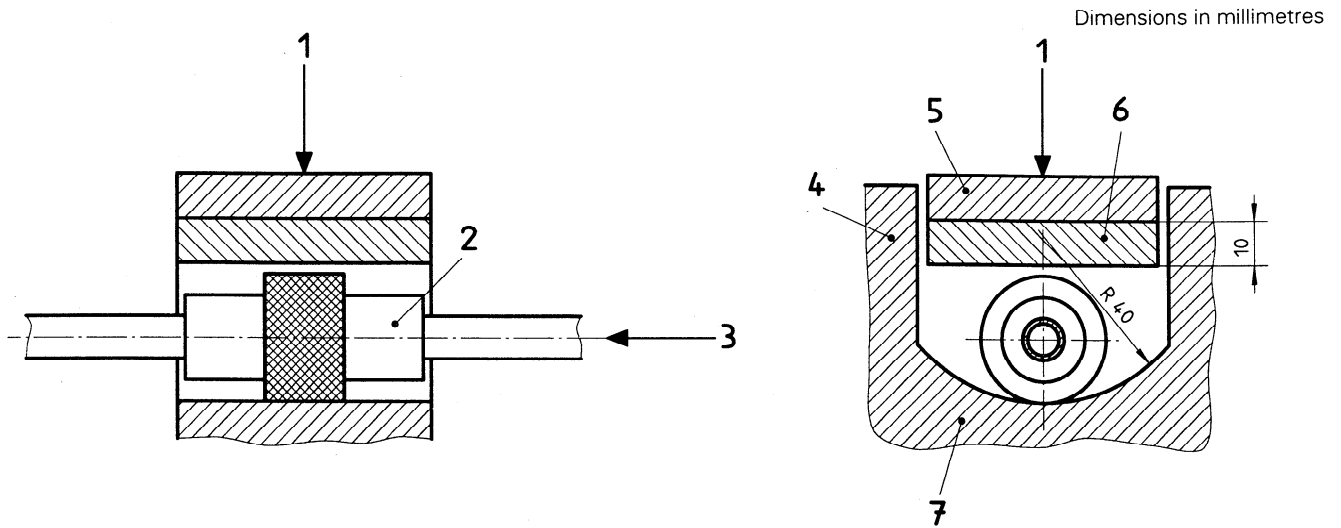
- Key**
- 1 Rod connected to the male element
 - 2 Fixture to hold female element
 - 3 Pressure [2 MPa (20 bar); 0,2 MPa (2 bar)]
 - 4 Coupled test coupling
 - 5 Centreline of locking device
 - 6 40 N load perpendicular to the coupling centreline

Figure 2 — Test rig for the gas tightness test in the coupled position



- Key**
- 1 Threaded or tapped parts
 - F Tensile load

Figure 3 — Principle of the tensile load test



Key

- 1 Load
- 2 Coupling to be tested
- 3 Gas-flow at a pressure of 2 MPa (20 bar)
- 4 Support
- 5 Loading counter plate
- 6 Rubber plate (chloroprene; Shore hardness 80 IRHD)
- 7 Steel base of the support

Figure 4 — Rig for testing under radial loads

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Table 2 — Test sequence and test series

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Test sequence	Subclauses		Test series			
	Requirements	Test	A	B	C	D
Pressure resistance	7.1	9.2	X			
Interchangeability	6.1	8.3		X		
Gas tightness	7.2	9.3		X	X	X
Pressure drop	7.3					X
Flame flash-back	7.4	9.4				X
Tensile load	600 N	7.5 a)				X
	1 kN	7.5 b)		X		
Radial load	1 kN	7.6 a)				X
	2 kN	7.6 b)			X	
Endurance	7.7	9.7				X
Gas tightness	7.2	9.3		X	X	X