



Quick-connect devices for gas



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 - Engineers Australia
 - Gas Appliance Manufacturers Association of Australia
 - Gas Association of New Zealand
 - Gas Energy Australia
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 - LPG Association of New Zealand
 - Master Plumbers and Mechanical Services Association of Australia, Vic.
 - National Association of Testing Authorities Australia
-

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Australian Standard[®]

Quick-connect devices for gas

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PREFACE

This Standard was prepared by the Standards Australia Committee, AG-013, Components used for Gas Appliances and Equipment, to supersede AS 4627—2005, *Quick-connect devices for gas*.

This Standard incorporates Amendment No. 1 (October 2020). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

A1 | Amendment No. 1 to this Standard was prepared by the Committee AG-013 to expand the scope of the Standard to include Type 27 quick-connect devices.

The principal changes from the 2005 edition are the following:

- (a) Change in rated working pressure of type 1 quick-connect devices to 14 kPa to align with AS/NZS 1869 Class A and Class B hose assemblies.
- (b) Marking requirements of quick-connect devices incorporated in a hose assembly.
- (c) Definitions and general editorial changes.

The objective of this Standard is to provide uniform minimum requirements for the safety and performance of quick-connect devices.

This Standard should not be regarded as a design specification or as an instruction manual. Consideration has been given to—

- (i) continuity of satisfactory operation;
- (ii) the prevention of fire hazards, and explosions;
- (iii) the prevention of injury to persons or property;
- (iv) gas rules and regulations now in force; and
- (v) relevant International Standards.

AS/NZS 5601 (series), *Gas installations*, provides essential requirements and means of compliance for gas installations.

The term ‘normative’ has been used in this Standard to define the application of the appendix to which it applies. A ‘normative’ appendix is an integral part of a Standard.

Statements expressed in mandatory terms in notes to figures are deemed to be requirements of this Standard.

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STANDARDS AUSTRALIA

Australian Standard

Quick-connect devices for gas

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements and test methods for quick-connect devices up to 50 mm size for use on natural gas (NG), simulated natural gas (SNG), town gas (TG), tempered liquefied petroleum gas (TLP) and liquefied petroleum gas in vapour phase (LP Gas).

Appendix A sets out the figures that are referred to in this Standard.

Appendix B sets out the methods of tests (M.O.T.s) to demonstrate conformity with requirements of this Standard.

NOTE: The test method titles include a M.O.T. number which indicates the Clause(s) in which the test criteria are located.

1.2 CLASSIFICATION

The quick-connect device shall be classified according to type.

A1 | Four types of quick-connect device shall be as follows:

- (a) *Type 1*—A quick-connect device permitting gas flow only when the mating parts are connected, with a rated working pressure of 14 kPa, consisting of a plug and socket which may be approved and used separately. The Type 1 plug shall conform to the dimensions shown in Figure A1. The Type 1 socket shall be compatible with the plug shown in Figure A1.

NOTE: Commonly known as bayonet fitting.

- (b) *Type 2*—A quick-connect device with safety shut off permitting gas flow only when the mating parts are connected, with a minimum rated working pressure of 14 kPa.

- (c) *Type 3*—A quick-connect device without shut off, with a minimum rated working pressure of 14 kPa.

- A1 | (d) *Type 27*—A quick-connect device with a minimum working pressure of 2640 kPa, incorporating thermal protection and designed to connect to a cylinder valve fitted with outlet connection Type 27 from AS 2473.2.

1.3 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

2136 Method for detecting the susceptibility of copper and its alloys to stress corrosion cracking using the mercurous nitrate test

A1 | 2473 Valves for compressed gas cylinders

2473.1 Part 1: Specifications, type testing, and manufacturing tests and inspections

2473.2 Part 2: Outlet connections (threaded) and stem (inlet) threads

3688 Water supply and gas systems—Metallic fittings and end connectors

A1	AS/NZS	
	1869	Hose and hose assemblies for liquefied petroleum gases (LP Gas), natural gas and town gas
	ISO	
	6957	Copper alloys—Ammonia test for stress corrosion resistance
	ANSI	
	Z21.81	Cylinder connection devices (also published as CSA 6.25:R2015)
	UL	
	2061	Standard for adapters and cylinder connection devices for portable LP-Gas cylinder assemblies

1.4 DEFINITIONS

For the purposes of this Standard, the following definitions apply:

1.4.1 Bayonet fitting

A Type 1 quick-connect device designed for attachment so that the gas is turned on only when the male part is inserted and secured in a lock-fit recess and gas will not flow when the male part is removed.

1.4.2 Gas

A combustible fuel gas.

1.4.2.1 Liquefied petroleum gas (LP Gas)

A gas composed predominantly of any of the following hydrocarbons, or any combination of them: propane, propene (propylene), butane, butene (butylene).

1.4.2.2 Natural gas (NG)

A hydrocarbon gas, consisting mainly of methane.

1.4.2.3 Simulated natural gas (SNG)

A gas comprising a mixture of LP Gas and air, in the approximate proportions of 55% LP Gas and 45% air.

1.4.2.4 Tempered liquefied petroleum gas (TLP)

A gas comprising a mixture of LP Gas and air, in the approximate proportions of 27% gas and 73% air, for commercial propane.

1.4.2.5 Town gas (TG)

A gas manufactured from coal or petroleum feedstocks.

1.4.3 Hose

A flexible tube or pipe of multiple construction.

1.4.4 Hose assembly

A flexible tube or pipe complete with end couplings.

1.4.5 Quick-connect device

A two-part mating plug and socket assembly for connecting a gas appliance or installation to a supply of gas without the use of tools.

1.4.6 Rated working pressure

The maximum allowable inlet pressure specified by the manufacturer.

A1 | 1.4.7 Type 27 connection

A quick-connect device designed to mate with the external thread of a cylinder valve fitted with outlet connection Type 27 from AS 2473.2.

SECTION 2 DESIGN AND CONSTRUCTION

2.1 MATERIALS

2.1.101 General

Materials used for component parts of quick-connect devices shall be in accordance with applicable Australian Standards or their equivalent.

2.1.1 Continuity of satisfactory operation

Materials used in the construction of a quick-connect device shall be such that continuity of satisfactory operation can be expected during normal usage within the manufacturer's specification.

2.1.2 Suitability of materials for conditions of use

Materials and finishes, including dressings and lubricants, used in the construction, shall be suitable for the conditions of use (e.g. corrosion, temperature and handling).

2.1.3 Materials in contact with gas

Materials in contact with the gas, including dressings, lubricants and jointing compounds, shall be suitable for use with all gases.

2.1.4 Melting point of metallic materials

The quick-connect device body(s), valve plugs, related structural components and retaining devices shall be made of metallic materials with a melting point not less than 430°C.

For Type 27 quick-connect devices the retaining device shall not be metallic.

2.1.5 Brass parts

Brass parts shall be resistant to stress-corrosion cracking when tested in accordance with ISO 6957 or AS 2136.

2.1.6 [Text deleted]

2.2 CONSTRUCTION

2.2.1 Continuity of satisfactory operation

The construction of a quick-connect device shall ensure the continued safe operation of the unit during usage within the manufacturer's specification.

2.2.2 Castings and hot pressings

All castings and hot pressings shall be clean and sound, free from laps, blow holes and pitting and all surfaces not machine finished shall be clean, smooth and free from sand.

2.2.3 Sealing of porous castings or cracks

Porous castings or cracks in gas-carrying parts shall not be sealed other than by an accepted method for the impregnation of castings, e.g. vacuum impregnation.

2.2.4 Assembled device to be clean

The assembled quick-connect device shall not contain dirt, casting sand, swarf or other foreign matter. There shall be no excess diaphragm dressing or jointing compound in the device.

2.2.5 Accidental displacement of parts

Every part of a quick-connect device shall be secure against accidental displacement and shall be constructed to maintain a fixed relationship between essential parts under normal and reasonable conditions of handling and usage so as to ensure continued performance in accordance with this Standard.

2.2.6 Springs

Springs shall be resistant to corrosion. The ends of a helical spring shall be flat and in a plane perpendicular to the axis of the spring. The coils of a cylindrical helical spring shall not be able to overlap.

2.2.7 Securing of parts

Adhesives shall not be used for securing parts together without additional mechanical fixing means, except for labels.

2.2.8 Sharp edges

The constituent parts of a quick-connect device shall be free from sharp edges that may cause damage or injury.

2.2.9 Operating travel

The operating travel of a quick-connect device shall be limited by fixed non-removable stops.

2.2.10 Holes for assembly or mounting

Holes for screws, pins, etc., intended for the assembly of parts or for mounting of a quick-connect device shall not open into gasways and shall provide a minimum wall thickness of 1 mm from gasways.

2.2.11 Permanent sealing of non-functional holes

Non-functional holes used for manufacture of a quick-connect device that form a passage between gasways and the atmosphere shall be permanently sealed by mechanical means.

2.2.12 Self-tapping screws

Self-tapping screws, other than those that form a fully swaged machine type thread, shall not be used to secure together the external joint of a gas-carrying component that may be removed in servicing. The application of self-forming screws shall be limited to malleable materials and shall not result in deformation or cracking of the component.

2.2.13 Application of sealant

Parts that require the addition of sealant to maintain gas tightness shall be capable of having the sealant added without dismantling the quick-connect device.

2.2.14 Construction of parts not covered by this Standard

The construction of parts not covered by this Standard shall be in accordance with reasonable concepts of safety, substantiality and durability. The general assembly shall be of a neat and workmanlike character with all parts well fitted.

2.2.15 Tightening of a gland or any other adjustments

The quick-connect device shall be so constructed that the tightening of a gland or any other adjustment shall not destroy the ability of the device to meet this Standard.

2.2.16 Incorrect assembly

The construction of a quick-connect device shall be such that the mating parts cannot be assembled incorrectly.

2.3 DESIGN

2.3.1 Type 1 quick-connect devices

Type 1 quick-connect device interfaces shall be in accordance with Figure A1(a) and A1(b).

A1

2.3.101 Type 27 quick-connect devices

Type 27 quick-connect device interface shall be in accordance with Figure A5(B). This Standard is applicable for the appliance part only.

NOTES:

- 1 The cylinder portion of the connection is found in outlet connection Type 27 in AS 2473.2.
- 2 Figure A5(A) is provided for reference only.

2.3.2 Components requiring servicing

Components requiring servicing during normal use shall be accessible and shall be manufactured so that parts cannot be incorrectly assembled.

2.3.3 Special tools not required for servicing or replacement

Special tools beyond those normally carried by service personnel shall not be required for field servicing or replacing a quick-connect device.

2.3.4 Connections

With the exception of a quick-connect device, which is an integral part of the end fitting for a hose or which is supplied with special purpose fittings for a specific appliance, any piping connections of the quick-connect device shall be in accordance with an approved standard and, if threaded, shall be provided with spanner flats.

2.3.5 Type 1 quick-connect device plug

The plug of a Type 1 quick-connect device shall be an integral part of the end fittings for a hose of 10 mm or 15 mm nominal size.

2.3.6 Quick-connect device as an integral part of the end fittings of a hose

A quick-connect device that is an integral part of the end fittings for a hose shall meet the appropriate requirements of AS/NZS 1869. In this case the marking requirements of Clause 2.4 do not apply.

A1

2.3.102 Type 27 quick-connect device as an integral part of an assembly other than a hose

Clause 2.4 is not applicable for Type 27 quick-connect devices that are an integral part of an assembly, provided the complete assembly is identified with the marking requirements of Clause 2.4.

2.3.7 No leakage during connection or disconnection

Type 1 and Type 2 quick-connect devices shall be designed such that leakage from the supply side shall not occur during connection and disconnection of the mating parts or when the mating parts are only partially joined.

2.3.8 Force required to cause escape of gas

Type 1 and Type 2 quick-connect devices shall be designed so that when disconnected, gas leakage cannot occur by manual manipulation or by the external application of simple tools. Should such a simple tool be inserted into a recess of the device, the force to cause gas leakage from the supply side shall be no less than 25 N.

The gas shut off part of the device shall reseal properly after being opened manually.

2.3.9 Mating parts—Correct assembly

- A1 | The mating parts of Type 2, Type 3 and Type 27 quick-connect devices shall not be capable of being mated with a Type 1 plug or socket unless, when mated, the assembly will meet the requirements for a Type 1 device.
- The mating parts of Type 1, Type 2 and Type 3 quick-connect devices shall not be capable of being mated with a Type 27 connection.
- Adaptors shall not be used to change between different types of quick-connect devices.

2.4 MARKINGS

The quick-connect device shall be provided with clear and durable markings and such markings shall include the following:

- (a) Manufacturer's name or trademark.
- (b) Model designation.
- (c) Date of manufacture or serial number.
- (d) Rated working pressure, in accordance with Appendix C.
- A1 | (e) Direction of flow, except Type 3 and Type 27.
- (f) Type (required on both parts).
- A1 | The part of a quick-connect device that is an end fitting of an assembly in accordance with Clause 2.3.5 or Clause 2.3.6 shall be exempt from this Clause.

When tested in accordance with M.O.T. 2.4 (see Appendix B, Paragraph B3), the markings and self-adhesive labels shall maintain good legibility of markings and adhesion of labels throughout the tests.

SECTION 3 PERFORMANCE REQUIREMENTS

3.1 SATISFACTORY PERFORMANCE OVER DECLARED TEMPERATURE RANGE

The performance of the quick-connect device shall be satisfactory over the manufacturer's declared temperature range, which shall be at least 0°C–60°C.

3.2 GAS LEAKAGE

3.2.1 Hydrostatic safety test

For all quick-connect devices with the rated working pressure in excess of 1050 kPa shall be tested in accordance with M.O.T. 3.2.1 (see Appendix B, Paragraph B4), hydrostatic safety test and shall provide no evidence of fracture, deformation or loss of operation prior to performing the external leakage test in accordance with M.O.T. 3.2.1.1.

3.2.2 External leakage

A1

For Type 1, 2 and 3, the external leakage from the body of a quick-connect device shall not exceed 1 mL/min at all internal air pressures up to 1.5 times the rated working pressure with any valve opened and closed, when tested in accordance with M.O.T. 3.2.2 (see Appendix B Paragraph B5).

For Type 27, the external leakage from the body shall not be detectable by visual examination at all internal air pressures up to 3300 kPa when tested in accordance with M.O.T. 3.2.101 (see Appendix B Paragraph B14).

3.2.3 Internal leakage

When tested in accordance with M.O.T. 3.2.3 (see Appendix B, Paragraph B6), the leakage past each closed valve of the quick-connect device with safety shut off shall not exceed the value specified in Table 3.1 at all inlet air pressures up to 1.5 times the rated working pressure and with the outlet open to atmospheric pressure.

TABLE 3.1
INTERNAL LEAKAGE RATE

Connection size mm	Before any other test mL/min	After completion of other tests mL/min
Up to and including 25	1	2
Above 25 up to and including 50	1	4

A1

3.3 FLOW CONDITIONS

3.3.1 Pressure loss

When tested in accordance with M.O.T. 3.3.1 (see Appendix B Paragraph B7), the pressure loss/flow rate shall be as follows:

- (a) For a Type 1 quick-connect socket with a flow of 1 m³/h of air, pressure loss shall not exceed 25 Pa with the standard test plugs connected (see Figure A1).
- (b) For a hose assembly in accordance with the requirements in AS/NZS 1869, incorporating a Type 1 quick-connect plug with 1500 mm of hose between end fittings, pressure loss shall not exceed—
 - (i) 65 Pa for a hose up to, and including, 10 mm I.D. with a flow rate of 0.65 m³/h of air; or

- A1 (ii) 50 Pa for a hose larger than 10 mm I.D. with a flow rate of 1.00 m³/h of air.
- (c) For Type 2 and Type 3 quick-connect devices, pressure loss shall not be less than that declared by the manufacturer for a given flow rate.
- (d) Type 27 quick-connect devices shall have a minimum flow rate of 2.1 m³/h of air at an inlet pressure of 400 kPa.

3.3.2 Excess flow valve

For Type 27 quick-connect devices the excess flow valve shall activate to limit the flow of gas before 2.83 m³/h flow is exceeded at 690 kPa inlet pressure.

Conformance shall be assessed by testing in accordance with M.O.T. 3.3.2 and 3.3.3 (see Appendix B Paragraph B15).

3.3.3 Excess flow valve—Performance in the activated state

For Type 27 quick-connect devices, when the excess flow valve is in the activated position, the flow shall be less than—

- (a) 0.28 m³/h at any pressure less than 690 kPa inlet pressure; and
- (b) 0.45 m³/h at 1700 kPa inlet pressure.

The excess flow valve shall activate before the pressure differential exceeds 103 kPa.

Conformance shall be assessed by testing in accordance with M.O.T. 3.3.2 and 3.3.3 (see Appendix B Paragraph B15).

3.4 MECHANICAL STRENGTH

3.4.1 Resistance to applied torque

When tested in accordance with M.O.T. 3.4.1 (see Appendix B, Paragraph B8), quick-connect devices shall withstand the torque specified in Table 3.2 without loss of operation, permanent deformation or leakage.

- A1 For Type 27 quick-connect devices this Clause is not applicable.

TABLE 3.2
TORQUE VALUE

Nominal size mm	Torque Nm
6	15
8	20
10	35
15	50
20	75
25	90
32	105
40	115
50	135

3.4.2 Resistance to applied bending moments

When tested in accordance with M.O.T. 3.4.2 (see Appendix B, Paragraph B9), quick-connect devices shall withstand the bending moment specified in Table 3.3 loss of operation, permanent deformation or leakage.

A1

For Type 27 quick connect devices, three samples shall be used with an applied bending moment of 5.7 Nm. With the cylinder valve connection portion held rigidly, the bending moment shall be applied at 0°, 90°, 180° and 270°, repeating the moment three times.

The reference point for the moment shall be the mating face between the cylinder connection and the retaining nut.

After the application of the bending moment, each sample shall be subject to the external leakage test (M.O.T. 3.2.2, Appendix B Paragraph B5), external leakage test—Type 27 (M.O.T. 3.2.101, Appendix B Paragraph B14), internal leakage test (M.O.T. 3.2.3, Appendix B Paragraph B6) and hydrostatic safety test (M.O.T. 3.2.1, Appendix B Paragraph B4) when applicable.

TABLE 3.3
BENDING MOMENT

Nominal size mm	Bending moment Nm
6	25
8	35
10	70
15	105
20	225
25	340
32	475
40	610
50	1100

3.4.3 Resistance to impact

When tested in accordance with M.O.T. 3.4.3 (see Appendix B, Paragraph B10), quick-connect devices shall withstand an impact of 100 Nm without loss of operation, permanent deformation or leakage.

A1

For Type 27 quick-connect devices this Clause is not applicable.

3.4.4 Drop test

A1

The male connector of a Type 1 and the appliance connector of a Type 27 quick-connect device after being subjected to 25 drops from a height of 1 m onto a concrete surface shall—

- (a) be in accordance with the leakage requirements in Clause 3.2; and
- (b) show no signs of loss operation or permanent deformation.

3.4.5 Manual effort to connect or disconnect

When tested in accordance with M.O.T. 3.4.5–3.4.6 (see Appendix B, Paragraph B11) the maximum continuous torque or force required to connect or disconnect a quick-connect device or to open fully or close a valve within the device shall not exceed the values given in Table 3.4.