



Limited flexibility connectors for gas



This Australian Standard® was prepared by Committee AG-013, Components used for Gas Appliances and Equipment. It was approved on behalf of the Council of Standards Australia on 18 April 2018.

This Standard was published on 4 May 2018.

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 - Engineers Australia
 - Gas Appliance Manufacturers Association of Australia
 - Gas Association of New Zealand
 - Gas Energy Australia
 - Gas Technical Regulators Committee
 - LPG Association of New Zealand
 - Master Plumbers and Mechanical Services Association of Australia, Vic.
 - National Association of Testing Authorities Australia
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This Standard was issued in draft form for comment as DR AS 4631:2017.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

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Australian Standard®

Limited flexibility connectors for gas

Originated as AG 216—1993.
Revised and redesignated as AS 4631—2005.
Second edition 2018.

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Published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001, Australia

ISBN 978 1 76072 053 7

PREFACE

This Standard was prepared by Standards Australia Committee AG-013, Components used for Gas Appliances and Equipment, to supersede AS 4631—2005, *Limited flexibility connectors for gas*.

The objective of this Standard is to provide manufacturers, designers, regulatory authorities, testing laboratories and similar organizations with uniform minimum requirements for the safety, performance and use of limited flexibility connectors for gas.

This Standard should not be regarded as a design specification or as an instruction manual.

In its preparation, consideration has been given to—

- (a) continuity of satisfactory operation;
- (b) the prevention of fire hazards, and explosions;
- (c) the prevention of injury to persons or property;
- (d) gas rules and regulations now in force; and
- (e) relevant international Standards.

The terms ‘normative’ and ‘informative’ are used in a Standard to define the application of the appendices or annexes to which they apply. A ‘normative’ appendix or annex is an integral part of a Standard, whereas an ‘informative’ appendix or annex is only for information and guidance.

Statements expressed in mandatory terms in notes to tables and figures are deemed to be requirements of this Standard. Notes that appear in the main text of this Standard provide information only.

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STANDARDS AUSTRALIA

Australian Standard

Limited flexibility connectors for gas

SECTION 1 SCOPE AND DEFINITIONS

1.1 SCOPE

This Standard specifies the minimum safety and performance requirements for limited flexibility connectors for use on natural gas (NG), simulated natural gas (SNG), town gas (TG), tempered liquefied petroleum gas (TLP) and liquefied petroleum gas (LPG) (liquid and vapour phases).

This Standard is not applicable for direct connection from a gas cylinder to services, including changeover valves and regulators (i.e. pigtails). Refer to AS/NZS 1596.

1.2 NORMATIVE REFERENCES

AS

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

4627 Quick-connect devices for gas

AS/NZS

5601 Gas installations (all parts)

AS/ISO

7 Pipe threads where pressure-tight joints are made on the threads

7.1 Part 1: Dimensions, tolerances and designation

ISO

6957 Copper alloys—Ammonia test for stress corrosion resistance

1.3 DEFINITIONS

1.3.1 Gas

A combustible fuel gas which may be one of the following:

1.3.1.1 Liquefied petroleum gas (LPG)

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

1.3.1.2 Natural gas (NG)

A hydrocarbon gas, consisting mainly of methane.

1.3.1.3 Simulated natural gas (SNG)

A gas comprising a mixture of LPG and air, in the approximate proportions of 55% gas and 45% air for commercial propane.

1.3.1.4 Tempered liquefied petroleum gas (TLP)

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

1.3.1.5 Town gas (TG)

A gas manufactured from coal or petroleum feedstocks.

1.3.2 Limited flexibility connector

An assembly of semi-rigid or annular pipe with permanently attached end fittings, which may be lined for smooth bore applications.

1.3.3 Metric standard conditions (MSC)

An absolute temperature of 288.15 K (15°C) and an absolute pressure of 101.325 kPa.

1.3.4 May

Indicates the existence of an option.

1.3.5 Quick-connect device

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

1.3.6 Rated working pressure

The maximum allowable inlet pressure specified by the manufacturer, with a minimum value of 14 kPa.

1.3.7 Shall

Indicates that a statement is mandatory.

1.3.8 Should

Indicates a recommendation.

SECTION 2 DESIGN AND CONSTRUCTION

2.1 MATERIALS

2.1.1 Continuity of satisfactory operation

Materials used in the construction shall be such that continuity of safe and satisfactory operation can be expected during normal usage within the manufacturer's specifications.

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, handling).

2.1.3 Materials in contact with gas

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

2.1.4 Melting point of metallic materials

Metallic materials shall have a melting point not less than 430°C.

Conformance shall be assessed by testing in accordance with the method in Clause B3 of Appendix B.

2.1.5 Copper containing alloys

Components made of copper containing alloys shall be resistant to stress corrosion cracking when tested in accordance with ISO 6957 or AS 2136.

2.1.6 Component parts materials selected to appropriate Standards

Alloys used for component parts shall conform to appropriate Australian Standards or their equivalent.

2.2 CONSTRUCTION

2.2.1 Continuity of satisfactory operation

Construction shall ensure continued safe operation during usage within the manufacturer's specifications.

2.2.2 Sharp edges

Any accessible part(s) shall be free from sharp edges that may cause damage or injury when installed.

2.2.3 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.

2.2.4 End fittings

End fittings of limited flexibility connectors shall—

- (a) be attached in such a manner that they cannot be removed without destroying the connector;
- (b) not be attached by means of soft soldering; and
- (c) be threaded or flanged, or shall be part of the quick-connect device or union.

2.2.5 Threaded end fittings with spanner flats

Screwed end fittings shall be provided with spanner flats. The design of these fittings shall be such that the assembly can be secured at one end without the necessity of turning the metal connector relative to its mating piece.

2.2.6 Threaded end fittings

Threaded end fittings that are not part of a union and which are intended for connection to gas pipe or the gas appliance shall conform to AS ISO 7.1 or equivalent.

Thread types shall be as permitted in AS/NZS 5601 for the intended application.

2.2.7 Quick connect device

Quick-connect device end fittings shall meet the requirements of AS 4627.

2.3 BORE DIMENSIONS

The internal diameter of a limited flexibility connector shall not be less than 98%, or greater than 106%, of its nominal size designation.

2.4 MARKINGS

2.4.1 General

Markings shall be provided and shall include:

- (a) Manufacturer's name or trademark.
- (b) Model designation.
- (c) Rated working pressure, marked in accordance with Appendix C.
- (d) Nominal bore in millimetres.
- (e) Date of manufacture or serial number.
- (f) Compliance number.

2.4.2 Durability of markings

Limited flexibility connectors shall be clearly and durably marked. Markings may be inscribed on a durable label or sleeve that shall be securely fixed to the connector.

Conformance shall be assessed by testing in accordance with the method in Clause B4 of Appendix B.

SECTION 3 PERFORMANCE REQUIREMENTS

3.1 RATED WORKING PRESSURE

Limited flexibility connectors shall have a minimum rated working pressure of 14 kPa.

3.2 HYDROSTATIC STRENGTH

Limited flexibility connectors shall withstand a minimum hydrostatic pressure of four times the rated working pressure for 1 min without bursting or any indication of failure or dislodgement of the end fittings.

Conformance shall be assessed by testing in accordance with the method in Clause B5 of Appendix B.

3.3 PROOF PRESSURE

After being subjected to the hydrostatic strength test of Clause 3.2 limited flexibility connectors shall not exceed a leakage rate of 1 mL/min when subjected to twice the rated working pressure.

Conformance shall be assessed by testing in accordance with the method in Clause B6 of Appendix B.

3.4 MINIMUM FLOW CAPACITY

3.4.1 Pressure drop

The pressure drop of a limited flexibility connector with a length between end fittings of 1 m shall not exceed 50 Pa at standard conditions and air flow rates as shown in Table 3.1.

Conformance shall be assessed by testing in accordance with the method in Clause B7 of Appendix B.

TABLE 3.1
AIR FLOW RATE

Nominal bore mm	Air flow rate m ³ /h
5.0	0.04
6.3	0.06
8.0	0.25
10.0	0.57
12.5	1.0
16.0	1.2
20.0	2.3
25.0	4.7
31.5	10.0
40.0	15.0
50.0	29.0
63.0	35.0
80.0	45.0

3.4.2 Pressure drop due to kinking

When the limited flexibility connector is looped and has a 5 kg mass suspended from the free end, the pressure drop through the connector shall not be more than 60 Pa above the pressure drop determined for the same sample following assessment for Clause 3.4.1.

When the limited flexibility connector is unloaded and straightened the pressure drop through the connector shall not be more than 10 Pa above the pressure drop determined in Clause 3.4.1.

Conformance shall be assessed by testing in accordance with the method in Clause B8 of Appendix B.

The requirements of this clause are deemed satisfied if the connector cannot be retained in a loop.

3.5 RESISTANCE TO PULL

A limited flexibility connector shall satisfy Clause 3.3 following the application of a longitudinal force equal to the value listed in Table 3.2, for 10 minutes.

Conformance shall be assessed by testing in accordance with the method in Clause B9 of Appendix B.

TABLE 3.2
PULLING FORCE

Nominal bore mm	Pulling Force Applied N
≤10.0	600
12.5	750
16.0	960
20.0	1200
25.0	1500
31.5	1890
40.0	2400
50.0	3000
63.0	3780
80.0	4800

NOTE: The Pulling Force Applied is equal to 60 times the nominal bore in mm, except for limited flexibility connectors of 10 mm or lesser nominal bore where the Pulling Force Applied is 600N.

3.6 RESISTANCE TO CRUSHING

The pressure drop through a limited flexibility connector which is being subjected to a force of 340 N applied over a length of 25 mm for 1 min and through which an air flow rate as specified in Clause 3.4.1 is passed, shall not be more than 30 Pa above the pressure drop determined for the same connector and the same flow rate before it was subjected to the crushing force.

Conformance shall be assessed by testing in accordance with the method in Clause B10 of Appendix B.

At the completion of testing in accordance with the method in Clause B10 of Appendix B, the limited flexibility connector shall remain gas tight in accordance with Clause 3.3.

3.7 RESISTANCE TO TEMPERATURE—GAS TIGHTNESS AFTER EXPOSURE TO HIGH TEMPERATURE

A limited flexibility connector shall show no signs of leakage or deformation after being subjected to a temperature of 125°C for 24 h or that specified by the manufacturer, whichever is the higher.

Conformance shall be assessed by testing in accordance with the method in Clause B11 of Appendix B.

3.8 FLAME PROPAGATION AND RESISTANCE

A limited flexibility connector shall not propagate a flame more than 50 mm in either direction or have its gasway penetrated when exposed to a flame.

Conformance shall be assessed by testing in accordance with the method in Clause B12 of Appendix B.

3.9 RESISTANCE TO GAS

Limited flexibility connectors shall be resistant to deterioration from all gas.

Conformance shall be assessed by testing in accordance with the methods in Clause B13 and Clause B14 of Appendix B.

For limited flexibility connectors incorporating non-metallic materials within the gasway, conformance shall be assessed by testing in accordance with the method in Clause B15 of Appendix B.

3.10 FLEXIBILITY

3.10.1 Cycling test through arc of 180°

Limited flexibility connectors shall show no sign of leakage when tested to Clause 3.3, and no indication of failure, after being subjected to 30 cycles through an arc of +90° to -90°, that is, each cycle is through an arc of 180° and back again to the starting position.

Conformance shall be assessed by testing in accordance with the method in Clause B16 of Appendix B.

3.10.2 Cycling test with pull force

Limited flexibility connectors shall show no sign of leakage when tested to Clause 3.3, and no indication of failure, when supported rigidly at one end and subjected to 30 pulls of a force of 30 N at 90° to the other end.

Conformance shall be assessed by testing in accordance with the method in Clause B17 of Appendix B.