



Manually operated gas valves



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Australian Standard®

Manually operated gas valves

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PREFACE

This Standard was prepared by Standards Australia Committee, AG-013, Components used for Gas Appliances and Equipment, to supersede AS 4617—2004, *Manual shut of gas valves*.

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 manually operated valves.

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

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

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

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STANDARDS AUSTRALIA

Australian Standard

Manually operated gas valves

SECTION 1 SCOPE, CLASSIFICATION AND
DEFINITIONS

1.1 SCOPE

This Standard specifies the minimum safety and performance requirements for manually operated valves up to 200 mm nominal size for use on—

- (a) natural gas (NG);
- (b) simulated natural gas (SNG);
- (c) town gas (TG);
- (d) tempered liquefied petroleum gas (TLP); and
- (e) liquefied petroleum gas (LPG) in vapour phase.

1.2 APPLICATION

Conformance of a manually operated valve with these requirements does not indicate that it is acceptable for use without supplemental tests in its intended application.

NOTE: Requirements for manual shut-off valves incorporated in a combination control are published in AS 4624. Requirements for cylinder valves are published in AS 2473 series.

1.3 NORMATIVE REFERENCES

The following documents are referenced in this Standard:

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

AS	
2136	Method for detecting the susceptibility of copper and its alloys to stress corrosion cracking using the mercurous nitrate test
AS/NZS	
5601	Gas installations (series)
ISO	
4437	Plastics piping systems for the supply of gaseous fuels—Polyethylene (PE)
4437-4	Part 4: Valves
6957	Copper alloys—Ammonia test for stress corrosion resistance
EN	
1555	Plastics piping systems for the supply of gaseous fuels—Polyethylene (PE)
1555-4	Part 4: Valves

1.4 CLASSIFICATION

Manually operated valves shall be one of the following types:

- (a) Type 1—Isolating valves as follows:
 - (i) Valves providing for isolation of an appliance, installation or part thereof.
 - (ii) With a $\frac{1}{4}$ turn operation from fully open to fully closed.
 - (iii) With a two-port construction.
 - (iv) Metallic construction, e.g. ball, butterfly and plug, laboratory gas valve.
 - (v) With a minimum rated working pressure of 14 kPa.
- (b) Type 2—Appliance control valves, e.g. rail cock.
- (c) Type 3—Polyethylene valves as follows:
 - (i) Valves of polyethylene construction for underground use ONLY.
 - (ii) A two-port construction with a maximum rated working pressure of 1050 kPa and an operating temperature between -20°C and $+40^{\circ}\text{C}$.
- (d) Type 4—Special purpose valves, e.g. change over valves, gate valves, needle valves, test point, multi-port, valves that do not fully shut off.

NOTES:

- 1 For multifunction or combination valves refer to AS 4624.
- 2 For Type 2 or Type 4 the inclusion of an ignition device only does not constitute a multifunction or combination control.

1.5 DEFINITIONS

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

1.5.1 Combination gas control

An assembly of two or more different control functions in a single body.

NOTE: Also known as multifunctional valves.

1.5.2 Gas

A combustible fuel gas.

1.5.2.1 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).

1.5.2.2 Natural gas (NG)

A hydrocarbon gas, consisting mainly of methane.

1.5.2.3 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.

1.5.2.4 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.

1.5.2.5 Town gas (TG)

A gas manufactured from coal or petroleum feedstocks.

1.5.3 Manually operated valve

A valve that is manually operated.

1.5.4 May

Indicates the existence of an option.

1.5.5 Metric Standard Conditions (MSC)

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

1.5.6 Rated working pressure

The maximum allowable inlet pressure specified by the manufacturer.

1.5.7 Self-latching gas valve

A gas valve with a built-in safety catch, which locks automatically when the valve is closed, whereby a separate and distinct movement is required to unlock before the valve can be opened.

1.5.8 Shall

Indicates that a statement is mandatory.

1.5.9 Should

Indicates a recommendation.

1.5.10 Shut-off valve

A valve that shuts off completely the supply of gas.

1.5.11 Single action

Where 'ON' to 'OFF' is achieved through a single movement and is not able to be locked or latched in any position.

1.5.12 Valve

A device for the purpose of controlling or shutting off flow.

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 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, 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 B4 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.

2.2 CONSTRUCTION

2.2.1 Continuity of satisfactory operation

Construction shall ensure continued safe operation 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. 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 valves to be clean

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

2.2.5 Accidental displacement of parts

Every part shall be secure against accidental displacement. Every part 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 conformance with this Standard.

2.2.6 Attachment of knobs, handles, dials and pointers

Knobs, handles, movable dials and pointers, where supplied, shall be securely attached to their spindles.

2.2.7 Springs

Springs shall be resistant to corrosion. The coils of a helical spring shall not overlap at any position during the operation of the valve.

2.2.8 Securing of parts together

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

2.2.9 Sharp edges

Exposed parts in the installed position shall be free from sharp edges that may cause damage or injury.

2.2.10 Valves incorporating a means of ignition

Where a means of ignition is incorporated with a valve, the valve shall be sufficiently robust to prevent distortion or damage in performing this additional operation.

2.2.11 Means of limiting the travel of manual valves

The means of limiting the travel of a manual valve shall be such that it cannot be displaced or damaged.

2.2.12 Holes for assembly or mounting

Holes intended for the assembly of parts or for mounting shall not open into gasways. Holes shall provide a minimum wall thickness of 1 mm from gasways.

2.2.13 Permanent sealing of non-functional holes

Non-functional holes used for manufacture and which form a passage between gasways and the atmosphere shall be permanently sealed by mechanical means.

2.2.14 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 thread-forming screws shall be limited to malleable materials. The application shall not result in deformation or cracking of the component.

2.2.15 Application of lubricant or sealant

Valves with a rated working pressure exceeding 14 kPa, which require the addition of lubricant or sealant to maintain gas tightness, shall be capable of having this added without dismantling the valve.

2.2.16 Adjustments by the user

The tightening of a gland or any other adjustment shall not permanently affect the ability of the valve to meet the performance requirements of this Standard.

2.3 DESIGN

2.3.1 Components requiring servicing

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

2.3.2 Connections

With the exception of a valve supplied with special purpose fittings for a specific application the connections shall be in accordance with AS/NZS 5601 series.

2.3.3 Operation of valves

2.3.3.1 *Types 1 and 3*

Valves shall close in a clockwise direction and only have positive stops at the 'OFF' and 'FULL ON' positions.

2.3.3.2 *Type 2*

Valves shall have a positive stop or detent for the 'OFF' and 'FULL ON' positions and may include variable flow control.

Valves shall close in a clockwise direction and have a positive stop at the 'OFF' position except those Type 2 valves where two separate functions are controlled by one valve.

2.3.3.3 *Type 4*

Shall function in accordance with the manufacturer's specifications.

2.3.4 Valve spindles

The valve spindle shall remain captive throughout its entire range of travel.

2.3.5 Mechanical parts

Mechanical parts such as screws and nuts, shall not loosen in the operation of the valve.

2.3.6 Lubricant or sealant

Application of lubricant or sealant shall not affect the flow of gas in any way.

2.3.7 'OFF' position

Types 1 and 3 valves with integral or permanently attached levers or 'T' handles shall have the plane of the lever or handle at right angles to the direction of gas flow when the valve is in the 'OFF' position.

Where no handle is fitted an indicator showing the position of the valve shall be fitted.

2.3.8 Means of compensating for wear

Valves shall be provided with means of compensating for wear and shall have adequate clearances for this to operate.

2.3.9 Valves with associated electrical device

Where a valve has an associated electrical device, the electrical device shall conform to an applicable standard.

2.3.10 Type 1 valves

2.3.10.1 *Metallic materials*

The valve body(s), valve plugs, related structural components and retaining devices shall be made of metallic materials.

2.3.10.2 *Angle between the fully open and fully closed positions*

The valve operation shall travel through 90° and be gas tight from 85°. The operating lever or handle shall be attached to the valve so that it cannot be incorrectly assembled.

2.3.11 Type 2 valves

2.3.11.1 *Metallic materials*

The valve body(s), valve plugs, related structural components and retaining devices shall be made of metallic materials.

2.3.11.2 *Turndown*

The reduced flow position, if any, shall be placed either after the fully open position or between the open and the closed position.

The operation of the valve shall be limited by a fixed stop at the reduced flow rate position.

2.3.12 **Type 3 valves**

2.3.12.1 *Design and performance*

Type 3 valves shall conform to either ISO 4437-4 or EN 1555-4.

For applications upstream of the consumer meter assembly (within the distribution network), a network-specific operating device may be used rather than the standard 50 ± 0.5 , -0 mm (40 ± 2 mm depth) square socket.

2.3.12.2 *Rated working pressure*

Type 3 valves shall have a rated working pressure of no greater than 1050 kPa.

2.3.13 **Type 4 valves**

2.3.13.1 *Metallic materials*

The valve body(s), valve plugs, related structural components and retaining devices shall be made of metallic materials.

2.3.13.2 *Valve operating device*

The operating device shall be permanently attached to the valve so that it cannot be incorrectly assembled.

2.3.13.3 *Valve operation*

Type 4 valves shall not be classified as Type 1, Type 2, or Type 3.

Type 4 valves may—

- (a) require single or multiple actions of one or more devices to operate;
- (b) not fully isolate the flow of gas in the closed position;
- (c) include multiple intermediate stops between maximum and minimum flow positions; and
- (d) be operated by rotating action or by push button or lever.

2.4 **MARKINGS**

2.4.1 **General**

Markings shall be provided and include the following:

- (a) Manufacturer's name or trademark.
- (b) Model designation.
- (c) Date of manufacture or serial number or batch number.
- (d) Rated working pressure marked in accordance with Appendix C.
- (e) Direction of flow, if necessary.

NOTES: The colour of a Type 1 valve handle may be one of the following:

- 1 Yellow—Valves for gas use only.
- 2 Green—Valves with dual approval for gas and water use.

2.4.2 Marking of electrical connections

Electrical connections shall be clearly and durably marked and identified, if applicable.

2.4.3 Durability of markings

Markings shall remain legible, durable and permanently attached throughout the life of the valve.

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

2.5 INSTRUCTIONS

Instructions shall be available in English and include the following:

- (a) Details of assembly and/or adjustments to be carried out by installer.
- (b) Fault diagnosis and servicing.
- (c) Model designation(s) and alternative forms.
- (d) Mounting limitations.
- (e) Size and rated working pressure.
- (f) Temperature limitations.
- (g) Type of valve.
- (h) Method of operation, adjustments and applications.

The following shall be included, if applicable:

- (i) Bypass rate.
- (ii) Electrical ratings, i.e. voltage, frequency, current.
- (iii) Flow rate for a given pressure loss.
- (iv) Thread or flange specifications, if applicable, or jointing procedure in accordance with the relevant Standard.
- (v) Type of lubricant and/or sealant.
- (vi) Wiring diagram showing external connections.

SECTION 3 PERFORMANCE REQUIREMENTS

3.1 GENERAL

Section 3 applies to valves classified as Type 1, Type 2 or Type 4.

NOTE: Performance requirements for Type 3 valves are in accordance with ISO 4437-4 or EN 1555-4, in accordance with Clause 2.3.12.

3.2 OPERATING CONDITIONS

3.2.1 Performance in all mounting positions

Conformance with this Standard shall not be compromised by alignment of the valve to any mounting position specified.

3.2.2 Operating temperature range

The minimum operating temperature range shall be 0°C to 60°C.

3.3 LEAKAGE

3.3.1 Hydrostatic safety test

A valve with rated working pressure in excess of 1050 kPa shall show no evidence of fracture, deformation or loss of operation when subjected to a hydrostatic safety test of 1.5 times the rated working pressure.

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

3.3.2 External leakage

The external leakage from the body shall not exceed 1 mL/min at all internal pressures up to 1.5 times the rated working pressure or 14.0 kPa, whichever is the greater, with the valve open and closed.

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

3.3.3 Internal leakage

The leakage past the closed valve shall not exceed the value specified in Table 3.1 at all inlet pressures up to 1.5 times the rated working pressure or 14.0 kPa, whichever is the greater, and with the outlet open to atmospheric pressure.

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

TABLE 3.1
PERMISSIBLE INTERNAL LEAKAGE

Permissible internal leakage in mL/min (corrected to MSC)		
Nominal size mm	Before testing	After testing
Up to and including 25	1	2
Above 25	1	4