

# Snowy Technical Standards

**SHL-MEC-104**

**Valves**

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## 1. Executive Summary

This standard is intended to provide guidance for the selection and purchasing of valves for Snowy Hydro's operations. This standard is not fully comprehensive, for further guidance refer to the relevant Snowy Hydro Technical Specialist.

## 2. Scope

To maintain consistency this Snowy Standard specifies the general valve details to be used in all operational plant across the scheme.

### 2.1. Applicable Standards

AS 1940	Australian Standard – The storage and handling of flammable and combustible liquids.
AS 2129	Australian Standard – Flanges for pipes, valves and fittings.
AS 3500	Australian National Plumbing and Drainage Code
AS 3814	Australian Standard – Industrial and commercial gas fired appliances
AS 4617	Australian Standard – Manual shut off gas valves.
AS 4629	Australian Standard – Automatic shut off gas valves and gas vent valves
AS/NZS 5601	Australian / New Zealand Standard – Gas Installations
AS 5612	Australian Standard – Butterfly valves for general service.

## 3. Definitions

<b>Technical Specialist</b>	The relevant Snowy Hydro Asset Engineer
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## 4. Technical Requirements

### 4.1. General

Supplied valves must be new unless specified otherwise.

Valves must be of a nominal size not less than the pipe to which it is fitted unless specified otherwise.

The working parts of all valves 300 NB and above must be replaceable. Replaceable working parts should also

be considered for smaller valves.

All parts in contact with air or water must be painted with two coats of two pack epoxy coating unless they are made from corrosion resistant material.

As far as practicable, all valves for similar service must be of the same make and type and be interchangeable.

Valves must be certified by the manufacturer as being suitable for the intended duty (fluid, temperature, pressure). Valves and actuators must be suitable for the intended operating environment.

Butterfly valves for general purposes must comply with the requirements of AS 5162.

All valves must be pressure tested prior to installation. The test pressure must be 1.5 x the working pressure and must be maintained for 30 minutes to prove the valves are drip tight. A test certificate must be provided.

#### 4.2. Seals and Seats

Seals and seats must be positively fixed so that they cannot become loose in service. It is not acceptable to fix seals and seats by an interference fit only, whether expanded after fitting or not.

For large or specialised valves, the seals, seats and other working parts should be of ample proportions and of suitable combinations of materials to ensure that galling, galvanic action and undue wear will not occur under any conditions of service including unbalanced opening and closing. Where sliding can occur between metal faces, their hardness must differ by at least 50 Brinell unless otherwise approved by the Technical Specialist.

#### 4.3. Flanges/Connectors

Valves greater than 50 NB must be flanged type valves. Valves up to and including 50 NB may have screwed ends. Valves should not be welded to pipes or fittings.

Flanged type valves must comply with AS 2129 unless otherwise approved by the Technical Specialist. Flanges must have a pressure rating suitable for the system pressure and temperature.

#### 4.4. Operating Mechanisms

Isolating valves must have position indicators and a means of locking in the open and closed positions.

All hand-wheel operated valves must close by clockwise rotation of the hand-wheels. Hand wheels must be marked to show the direction of closing.

Valve hand-wheels must be located conveniently for access and operation and in general within the range 1.0 m to 1.6 m above floor level. If necessary to achieve this, extended spindles and headstocks must be provided. Headstocks must not be supported on floor plates.

All hand-wheel operated valves must be capable of being opened and closed against their maximum working pressure fully unbalanced with a force at the hand-wheel not exceeding 130 N. If necessary to achieve this, reduction gearing, ball or roller bearings or oversize hand-wheels must be provided.

Unless otherwise approved, all power operated valves must also be capable of hand operation. If providing hand-wheels for this purpose, they must not rotate when the valve is operated by power.

#### 4.5. Materials

In the case of all valves for working pressures of 1720 kPa and above, the components directly subject to fluid pressure including the closing member must be steel.

Where used in copper piping, valves must be bronze valves (with components not subject to dezincification).

#### 4.6. Water Systems

Gate valves must be used to isolate all connections directly off the penstocks.

Valves subject to direct penstock pressure must have a rated pressure greater than or equal to the penstock design pressure (which takes into account hydraulic shock during load rejection).

Note: Refer to Appendix A for penstock design pressures.

Valves for use in potable water systems must comply with the relevant Australian Standards, including AS 3500 National plumbing and drainage code.

Flanged connections must be assembled in accordance with the recommendations of Water Services Association of Australia publication WSA 109, Flange Gaskets and O-rings, Appendix E, Flanged Joints.

#### 4.7. Hydraulic/Oil Systems

Valves for hydraulic fluid power systems must comply with the requirements of AS 2671.

Valves up to and including 100 NB must be quarter turn ball valves.

Valve bodies must be CF8M or equivalent stainless steel.

All valves must incorporate a locking device as per 4.4.

All valves must be minimum 6,900 kPa (1,000 psi) rated unless otherwise agreed by the Technical Specialist.

Galvanised or zinc coated components must not be used at any point in an oil system.

Valves greater than 50 NB must be flanged to AS2129. Valves up to and including 50 NB may have BSPT threaded connections or ISO hydraulic flange connections.

“Swagelok™” valves, or an approved equivalent, may be used for valve sizes up to and including 25 NB.

#### 4.8. Air Systems

All shut off valves must be quarter turn ball valves

#### 4.9. Gas Systems

Manual shut off gas valves must be of the quarter turn type and must comply with the requirements of AS 4617.

Automatic shut off valves and vent valves must comply with the requirements of AS 4629.

Valves forming part of an appliance (e.g. part of the gas turbine) must meet the original appliance manufacturer's requirements.

The selection and application of gas valves and the design of gas valve trains must comply with the

requirements of AS 3814 Industrial Gas Fired Appliances and AS/NZS 5601 Gas Installations and any other requirements set by the state gas regulator.

Actuators on valves installed in hazardous areas must be suitable for use in the relevant hazardous zone, i.e. must have the appropriate EX rating.

## 5. References

- AS 1940 Australian Standard – The storage and handling of flammable and combustible liquids.
- AS 2129 Australian Standard – Flanges for pipes, valves and fittings.
- AS 3500 Australian National Plumbing and Drainage Code
- AS 3814 Australian Standard – Industrial and commercial gas fired appliances
- AS 4617 Australian Standard – Manual shut off gas valves.
- AS 4629 Australian Standard – Automatic shut off gas valves and gas vent valves
- AS/NZS 5601 Australian / New Zealand Standard – Gas Installations
- AS 5612 Australian Standard – Butterfly valves for general service.
- WSA 109 Water Services Association of Australia – Flange Gaskets and O-rings

## APPENDIX A - PENSTOCK DESIGN PRESSURES

<i>Location</i>	<i>Pressure Pipeline Design Pressure</i>	<i>Reference source (TRIM document)</i>	<i>Reference source (drawing number)</i>
Tumut 1 Power Station	4 210 kPa	AAA-5728	---
Tumut 2 Power Station	3 680 kPa	AAA-5275	---
Tumut 3 Power Station	2 380 kPa	---	C-34937
Blowering Power Station	1 420 kPa	AAA-5197	---
Guthega Power Station	4 520 kPa	---	MP-M1B-344/1
Murray 1 PS Units 1 - 2	8 210 kPa	---	C-28011D
Murray 1 PS Units 3 - 10	7 040 kPa	---	C-24701A
Murray 2 Power Station	5 450 kPa	---	C-30004B
Jindabyne Pumping Station	2 770 kPa	---	C-31240B