

Water Supply and Sewerage Approved Products Manual 2024

Water Operations – Valves and Hydrants

Section W0 02

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Abbreviation	In full
AS	Australian Standard
AS/NZS	Australian / New Zealand Standard
WSA PS	Water Services Association Product Specification

1 Hydrants

Shall comply with the following standards and specification:

- AS 2419: Fire hydrant installations, Part 1: System design, installation and commissioning.
- AS/NZS 4087: Metallic flanges for waterworks purposes.
- WSA PS – 282: Hydrant and air valve isolator valves – Drinking water and non-drinking water supply.
- AS/NZS 4020: Testing of products for use in contact with drinking water.

Notes:

Hydrants are designed for use in the Northern Territory.

1.1 Screw down hydrant (underground)

Compliance	Size DN (mm)	Products	Manufacturers
AS 2419 AS/NZS 4087 WSA PS – 282 AS/NZS 4020	80		AVK (29/288) Derwent (Hydrant-NT-80)

1.2 Air release hydrant (underground)

Compliance	Size DN (mm)	Products	Manufacturers
AS 3952 WSA PS – 267 AS/NZS 4020	80		AVK (29/00-001)

2 Air Release

Shall comply with the following standards and specification:

- AS 4956: Air valves for water supply.
- WSA PS – 265: Air valves for pressure applications – Drinking water and non-drinking water supply.
- AS/NZS 4020: Testing of products for use in contact with drinking water.

Notes:

- Small orifice valves have a nominal inlet size of DN 15, 20 and 25.
- Large orifice valves have a nominal inlet size of DN 50, 80, 100, 150 and 200.
- Combination (double) air valves comprise of both a small orifice and large orifice air valve which can admit air to relieve vacuum pressure when draining.

2.1 Air valves

Compliance	Size DN (mm)	Products	Manufacturers
AS 4956	25		AVK – Series 851
WSA PS – 265	50		Bermad - Fox 3F
AS/NZS 4020	80		Ventomat RBX Series
	100		
	150		

Note: Air valve to be selected appropriately for application. Other brands can be considered and require approval from a Power and Water representative.

3 Water valves

3.1 Swing check/non-return valves

Shall comply with the following standards and specification:

- AS 4794: Non-return valves for waterworks purposes - Swing check and tilting disc.
- WSA PS – 264: Non-return (reflux) valves for pressure applications – Drinking water, non-drinking water supply and sewerage.
- AS/NZS 4020: Testing of products for use in contact with drinking water.

Notes:

All non-return valves shall be installed aboveground or in an underground pit for easy maintenance. These valves include the 'closed bush design' or the free-acting swing disc and/or valves with a lever and weight.

Compliance	Size DN (mm)	Products	Manufacturers
AS 4794 WSA PS – 264 AS/NZS 4020	150 225 300		AVK – Series 41 Sureflow (Viadux) Karon RSSC (Challenger)

3.2 Resilient seated gate valve

Shall comply with the following standards and specification:

- AS/NZS 2638.2: Gate valves for waterworks purposes, Part 2: Resilient seated.
- WSA PS – 260: Gate valves, resilient seated for pressure applications – Drinking water, non-drinking water supply and sewerage.
- AS/NZS 4020: Testing of products for use in contact with drinking water.

Notes:

- All sluice valves (resilient seated) used for water supply (potable/recycled) and for pressure/vacuum sewers shall be 'clockwise close' only.
- Minimum class 16 or pressure nominal 16 (PN16).
- Includes socket-socket, spigot-spigot, flange-flange arrangements for PVC series 2, ductile iron (DI) and cast iron (CI) pipes.
- Includes resilient seated valves with bypass.

Compliance	Size DN (mm)	Products	Manufacturers
AS/NZS 2638.2 WSA PS – 260 AS/NZS 4020	100 150 225 300		AVK – Series 57/90 Derwent Daemco DIMAX (Reece) Auslite III (Viadux)

3.3 Butterfly valve

Shall comply with the following standards and specification:

- AS 4795.2: Butterfly valves for waterworks purposes double flanged.
- WSA PS – 263: Butterfly valves for pressure applications – Drinking water and non-drinking water supply.
- AS/NZS 4020: Testing of products for use in contact with drinking water.

Notes:

- Body construction:
 - Double flanged style butterfly valves are generally preferred by Power and Water.
 - Wafer and Lugged style butterfly valves require approval from Power and Water.
- Butterfly valve selection to be supported by a hydraulic designer and approved by a Power and Water representative on a case by case basis.
- Minimum class 16 or pressure nominal 16 (PN16).
- Valves can be operated by hand wheel, lever handle, gear option and electric or pneumatic actuators to IP67 or IP68.
- Flanges to AS/NZS 4087.

Compliance	Type	Size DN (mm)	Products	Manufacturers
AS/NZS 4795.2 WSA PS – 263 AS/NZS 4020	Concentric	150 225 300		AVK – Series 813 Challenger – USSE

Compliance	Type	Size DN (mm)	Products	Manufacturers
AS/NZS 4795.2 WSA PS – 263 AS/NZS 4020	Double eccentric	225 300		AVK – Series 756 Challenger – BFD

4 Specifications

4.1 Orifice air valve

Shall comply with the following standard and specification:

- AS 4956:2017 – Air valves for water supply
- WSA PS – 265 – Air valves for pressure applications – drinking water and non-drinking water supply.

Design:

- Small orifice air valve:
A small orifice air valve releases air which accumulates during normal pipeline operation. As air accumulates in the chamber, the water level is depressed until loss of buoyancy brings the ball from its seating. Air is then discharged and the consequent rise in water level brings the ball up to reseal the outlet. The valve is not to close under air pressure alone. Where a ball seals against an orifice, the orifice is to be 2 mm minimum diameter. The orifice outlet is to be protected from outside contamination. The float is to withstand impact due to sudden closure without deformation. Floats are to have free movement to prevent intermediate arrest in the travel length. Seals, seats and floats are to be replaceable in the field without special tools.
- Large orifice air valve:
A large orifice air valve ventilates the pipeline during emptying and filling. When filling, air is exhausted to prevent restriction of the filling rate. When emptying, air is admitted to prevent high vacuum pressures developing. The orifice is nominally of the same size as the valve inlet. The valve is to remain open while discharging air or spray at maximum egress velocity and up to 20 kPa air pressure but immediately become positively closed by rising water under all conditions of pressure fluctuations. The valve is to be drip tight at a minimum pressure of 80 kPa. The valve is to be fitted with an anti-vortex device. The valve is to remain closed until the pipeline pressure falls below atmospheric. The float is to withstand impact due to sudden closure without deformation. A DN 20 lever operated stainless steel ball valve is to be connected to the valve body at a position that will allow complete draining when the isolating valve is closed. A cover plate is to be securely fixed above the orifice to prevent dirt or other material falling onto the float and seal area and to shield the float from direct sunlight. Floats are to have free movement to prevent intermediate arrest in the travel length. Seals, seats and floats are to be replaceable in the field without special tools.

Materials:

- Body and cover:
 - Grey cast iron grade AS 1830/T220 (class 14 only)
 - Ductile cast iron grade AS 1831/500-7 or 400-12
 - Gunmetal grade AS 1565/C83600 or C92410 (dezinc resistant to AS 2345)
 - Brass grade AS 1565/C85210 (arsenic inhibited).

- Cover plate:
 - Corrosion resistant material
 - Cast metal cover with polymeric protective coating to AS/NZS 4158.
- Ball float:
 - Stainless steel grade AS 2837/304 or 316
 - Aluminium, nylon coated
 - Polymer of polypropylene, ABS or polycarbonate.
- Rigid seats:
 - Gunmetal grade AS 1565/C83600
 - Stainless steel grade AS 2074/H6C or ASTM A276/316
 - Gunmetal grade AS 1565/C92410
 - Brass grade AS 1565/C85210 (arsenic inhibited).
- Resilient seats:
 - Reinforced elastomer to BS 5292 as approved
 - Materials other than those in BS 5292 may be approved for CL 16 and 21.
- Float guides (support separate from body):
 - Gunmetal grade AS 1565/C83600 (dezincification resistant to AS 2345)
 - Stainless steel to grade ASTM A 276/304 or 316
 - Brass grade AS 1565/C85210
 - Arsenical brass grade AS 1568/259 or 486.
- Float levers and linkages etc:
 - Stainless steel grade ASTM A 276/304 or 316
 - Gunmetal grade A 1565/C92410
 - Brass AS 1565/C85210.
- Fasteners:
 - Stainless steel grade ASTM A276/316 or 304
- Flat gaskets:
 - Reinforced elastomer to BS 5292
 - Moulded elastomer to BS 5292
 - Materials other than those in BS 5292 may be approved for CL 16 and 21.
- O-rings:
 - Elastomers to AS 1646, durometer hardness 71 to 80.
- Screws etc:
 - Same material as item being fixed.
- Coating:
 - Complete polymeric coating of cast iron surfaces to AS/NZS 4158
 - Waterway coating to be continuous across surfaces for joint seals.

Material finish:

Castings are to be sound and free of laps, blowholes and pitting. Minor surfaces are to be rectified by fettling. Small surface imperfections not affecting function or performance are acceptable. Metal cracks and tears are not to be repaired. Internal and external surfaces (including floats) are to be free of fins, burrs and sharp edges.

Jointing:

- Flanged end:
 - To AS 4087 for new, to AS 2129 for existing. Bolt holes not to be tapped.
- Screwed end:
 - To AS 1722.1(BSP thread).
- Fasteners:
 - Bolts to AS/NZS 1111, Nuts to AS/NZS 1112, Washers to AS 1237.

Allowable operating pressure:

- PN16 1.6 MPa
- PN21 2.1 MPa.

Body ID markings:

- Manufacturer's name or trademark
- Working pressure (kPa)
- Valve type
- Body test pressure (kPa)
- Nominal size
- Traceability code
- Year of manufacture
- Place of manufacture – may be incorporated in traceability code.

Marking method:

To be cast-on in legible block type, 15 mm or more high and 3 mm or more projecting. Where casting not practicable, marking to be on stainless steel nameplate, attached to the body using stainless steel fasteners.

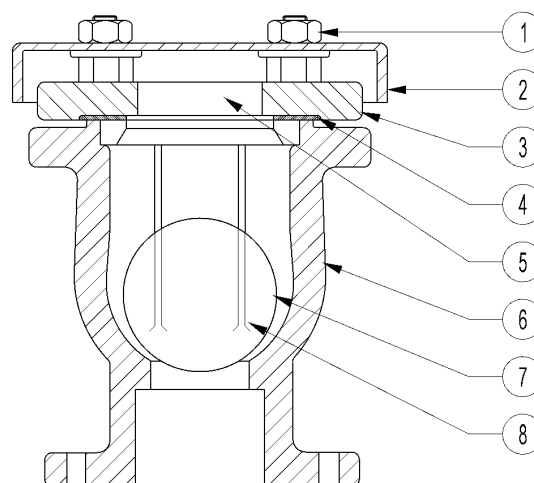


Figure 1: Orifice air valve.

Number	Components
1	Fasteners
2	Cover plate
3	Cover
4	Body
5	Body to cover seal
6	Orifice
7	Ball float
8	Ball float guides
9	Levers, linkages etc for float mechanism

4.2 Combination air valve

Shall comply with the following standard and specification:

- AS 4956:2017 - Air valves for water supply
- WSA PS – 265 – Air valves for pressure applications – drinking water and non-drinking water supply.

Design:

- Combination air valve:
The double air valve (or combination air valve) comprises both a small orifice air valve and a large orifice air valve. The small orifice air valve releases accumulated air during normal operation of a pressure pipeline and this increases pumping efficiencies and flow capabilities. The large orifice air valve ventilates the pipeline both during emptying to prevent high vacuum pressures developing and during filling to prevent restriction of the filling rate. Refer to specifications for small orifice air valves and large air valves for further design requirements.
- Combination air valve with isolating valve:
Same as a combination air valve but the isolating valve allows inspection and maintenance to be undertaken without the need to dewater the pipeline.

Materials:

- Body and cover:
 - Grey cast iron grade AS 1830/T220 (class 14 only)
 - Ductile cast iron grade AS 1831/500-7 or 400-12
 - Gunmetal grade AS 1565/C83600 or C92410 (dezinc resistant to AS 2345)
 - Brass grade AS 1565/C85210 (arsenic inhibited).
- Cover plate:
 - Corrosion resistant material
 - Cast metal cover with polymeric protective coating to AS/NZS 4158.

- Ball float:
 - Stainless steel grade AS 2837/304 or 316
 - Aluminium, nylon coated
 - Polymer of polypropylene, ABS or polycarbonate.
- Rigid seats:
 - Gunmetal grade AS 1565/C83600
 - Stainless steel grade AS 2074/H6C or ASTM A276/316
 - Gunmetal grade AS 1565/C92410
 - Brass grade AS 1565/C85210 (arsenic inhibited).
- Resilient seats:
 - Reinforced elastomer to BS 5292 as approved
 - Materials other than those in BS 5292 may be approved for CL 16 and 21.
- Float guides (support separate from body):
 - Gunmetal grade AS 1565/C83600 (dezincification resistant to AS 2345)
 - Stainless steel to grade ASTM A 276/304 or 316
 - Brass grade AS 1565/C85210
 - Arsenical brass grade AS 1568/259 or 486.
- Float levers and linkages etc:
 - Stainless steel grade ASTM A 276/304 or 316
 - Gunmetal grade A 1565/C92410
 - Brass AS 1565/C85210.
- Fasteners:
 - Stainless steel grade ASTM A276/316 or 304.
- Flat gaskets:
 - Reinforced elastomer to BS 5292
 - Moulded elastomer to BS 5292
 - Materials other than those in BS 5292 may be approved for CL 16 and 21.
- O-rings:
 - Elastomers to AS 1646, durometer hardness 71 to 80.
- Screws etc:
 - Same material as item being fixed.
- Coating:
 - Complete polymeric coating of cast iron surfaces to AS/NZS 4158
 - Waterway coating to be continuous across surfaces for joint seals.

Material finish:

Castings are to be sound and free of laps, blowholes and pitting. Minor surfaces are to be rectified by fettling. Small surface imperfections not affecting function or performance are acceptable. Metal cracks and tears are not to be repaired. Internal and external surfaces (including floats) are to be free of fins, burrs and sharp edges.

Jointing:

- Flanged end:
 - To AS 4087 for new, to AS 2129 for existing. Bolt holes not to be tapped.

- Screwed end:
 - To AS 1722.1(BSP thread).
- Fasteners:
 - Bolts to AS/NZS 1111, Nuts to AS/NZS 1112, Washers to AS 1237.

Allowable operating pressure:

- PN16 1.6 MPa
- PN21 2.1 MPa.

Body ID markings:

- Manufacturer's name or trademark
- Working pressure (kPa)
- Valve type
- Body test pressure (kPa)
- Nominal size
- Traceability code
- Year of manufacture
- Place of manufacture – may be incorporated in traceability code.

Marking method:

To be cast-on in legible block type, 15 mm or more high and 3 mm or more projecting. Where casting not practicable, marking to be on stainless steel nameplate, attached to the body using stainless steel fasteners.

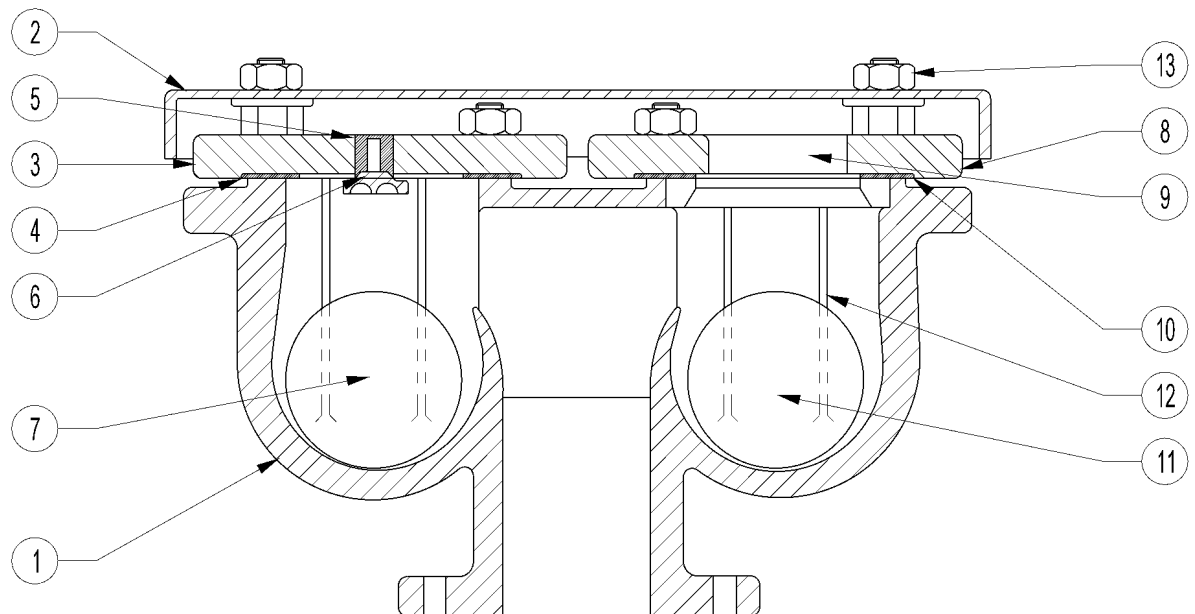


Figure 2: Combination air valve.

Number	Components
1	Body
2	Cover plate* (or dust cover)
3	Cover (small orifice valve)
4	Body to cover seal – flat gasket or O-ring (small orifice valve)
5	Small orifice plug disc
6	Small orifice plug
7	Ball float (small orifice valve)
8	Cover (large orifice valve)
9	Large orifice
10	Body to cover seal – flat gasket or O-ring (large orifice valve)
11	Ball float (large orifice valve)
12	Ball float guides
13	Fasteners
14	Levers, linkages etc for float mechanisms (not shown)

Note: For components with a * – some valve designs have a cover plate only covering the large orifice air valve with a cap over the small orifice valve outlet for external contamination protection.

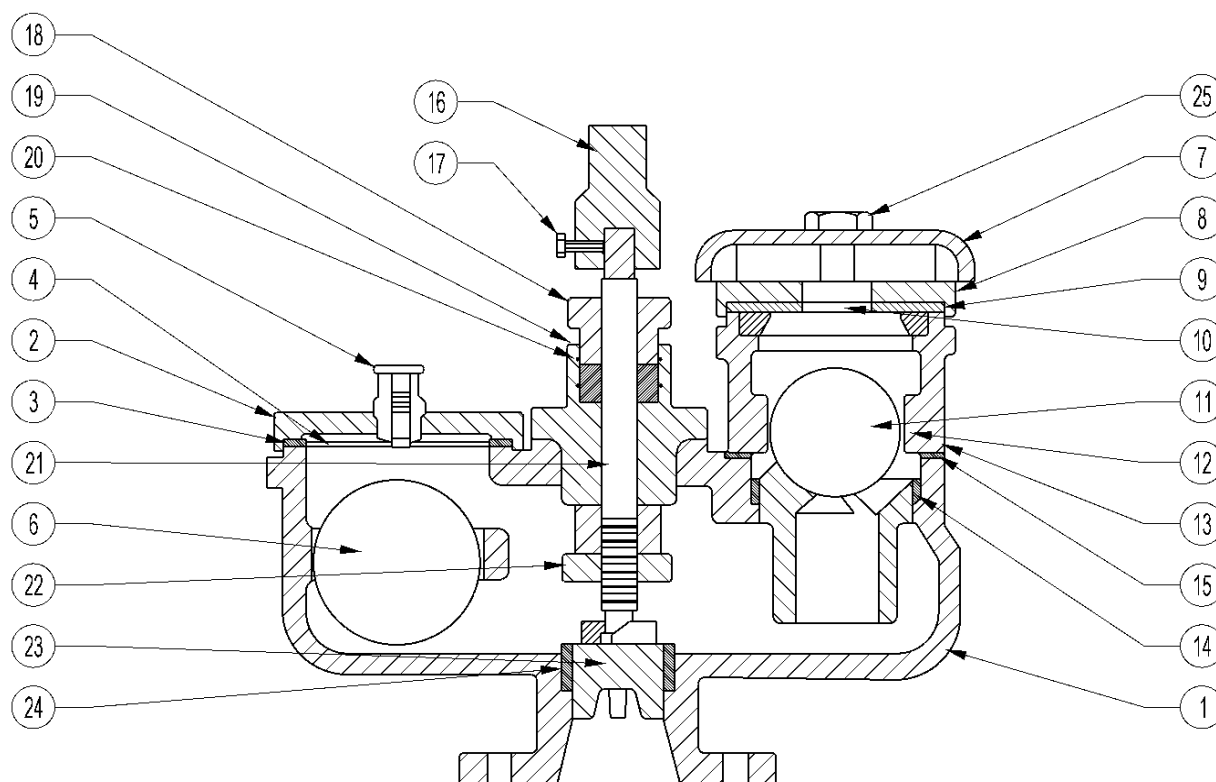


Figure 3: Combination air valve with isolating valve.

Number	Components
1	Body
2	Cover (small orifice valve)
3	Seal – flat gasket or O-ring (small orifice valve)
4	Small orifice plug disc
5	Small orifice plug
6	Ball float (small orifice valve)
7	Dust cover (large orifice valve)
8	Cover (large orifice valve)
9	Large orifice
10	Seal – flat gasket or O-ring (large orifice valve)
11	Ball float (large orifice valve)
12	Body extension cage (large orifice valve)*
13	Body extension (large orifice valve)*
14	Body extension gasket (large orifice valve)*
15	Body extension cage gasket (large orifice valve)*
16	Cap (isolating valve)
17	Cap screw (isolating valve)
18	Cover (isolating valve)
19	Cover gasket (isolating valve)
20	O-rings (isolating valve)
21	Spindle (isolating valve)
22	Spindle nut (isolating valve)
23	Valve (isolating valve)
24	Body seat ring (isolating valve)
25	Fasteners

Note: For components with a * – some manufacturers do not include these components in their valve design.

4.3 Underground hydrant

Shall comply with the following standard and specification:

- AS 2419.1:2021 – Fire hydrant installations System design, installation and commissioning
- WSA PS – 282 – Hydrant and air valve isolator valves – drinking water and non-drinking water supply.

Design:

The screw down hydrant to BS 750 is installed underground. The hydrant is to be controlled by an internal screw rising stem. The spindle is to be toroidal ring sealing using two seals and seals are to be replaceable with the hydrant under pressure and fully closed. The cover is to bolt or screw on to the body. The hydrant is to have either a captive or loose jumper valve faced with a resilient material. Operation is to be manual using a removable ring key/bar. The hydrant is to be clockwise closing. A drain boss on the hydrant outlet side is not required. The hydrant is to deliver not less than 34 L/s at a constant pressure of 172 kPa.

Materials:

- Body, cover, spindle cap and spindle cap screw:
 - Ductile cast iron grade, 370/17, 420/12, 500/7 or 600/3 to BS 2789 or AS 1831
 - Grey cast iron grade 220, 260, 300, 350, 400 to BS 1452 or AS 1830.
- Spindle seal housing:
 - Gunmetal grade AS 1565/C85210 or C83600 or grade BS 2874/CZ132 and dezincification resistant to AS 2345 or equivalent.
- Spindle (or stem):
 - Stainless steel to BS 970 or ASTM A276 with chromium content $\geq 15\%$
 - High tensile brass grade CZ 132 to BS 2872 or BS 2874
 - Aluminium bronze grade CA 104 to BS 2874.
- Jumper valve (or plug or stopper):
 - Ductile cast iron grade 400-12 or 500-7 to BS 2789 or AS 1831.
- Jumper valve seal or coating:
 - Approved elastomer to AS1646 or BS 6920 or EN 681.
- Seat ring:
 - Gunmetal grade BS 1400/LG2 or grade AS 1565/C85210 or C83600 and dezincification resistant to AS 2345 or equivalent
 - High tensile brass grade CZ 132 to BS 2872 or BS 2874
 - Die cast brass grade DCB 1 to BS 1400
 - Aluminium bronze grade CA 104 to BS 2874.
- Screwed outlet:
 - Gunmetal grade BS 1400/LG2 or grade AS 1565/C85210 or C83600 and dezincification resistant to AS 2345 or equivalent (Power and Water spec limits materials to gunmetal whereas BS 750 allows other materials).
- Outlet cap:
 - Gunmetal grade AS 1565/C85210 or C83600 (dezinc. resistant to AS 2345)
 - Polyethylene.
- Outlet cap securing:
 - Galvanised steel, plastic coated strap and aluminium clamps or equivalent
 - Chain and clamps of approved materials.
- Fasteners:
 - Stainless steel grade 316 to ASTM A 276 or BS 970 (where exposed)
 - Alloy steel/zinc coated steel to BS 7374 (where not exposed)
 - Gaskets Reinforced elastomers to AS 1646.
- O-ring seals:
 - Elastomers to AS 1646 or to BS 6920/BS 4518.
- Coating for cast iron (not threads):
 - Cold applied bitumen to BS 3416, type 1 or 2 or hot applied bitumen to BS 4147 type 1 grade C (non-preferred)
 - Complete polymeric coat to AS/NZS 4158 or WIS 4-52-01.

Connections:

- Inlet:
 - Flanged end of DN 80 to:
 - AS 4087 Figure B for class 16
 - AS 2129 Table C or
 - BS 10 Table C/E.
- Outlet:
 - Screwed end of DN 65 with external clockwise round thread of 12.7 mm pitch (2.5 inches x 2TPI) to BS 750 Figure 3. End to be fitted with blank cap or plug, attached to the body with a suitable lug, S-hook and chain or equivalent.

Markings:

- Manufacturer's name or trademark on body
 - Body material designation.
- Nominal size
 - The British Standard number i.e. BS 750 (if conformance to standard claimable).
- Year of manufacture
 - Product certification mark, e.g. Kitemark (if product certification obtained).

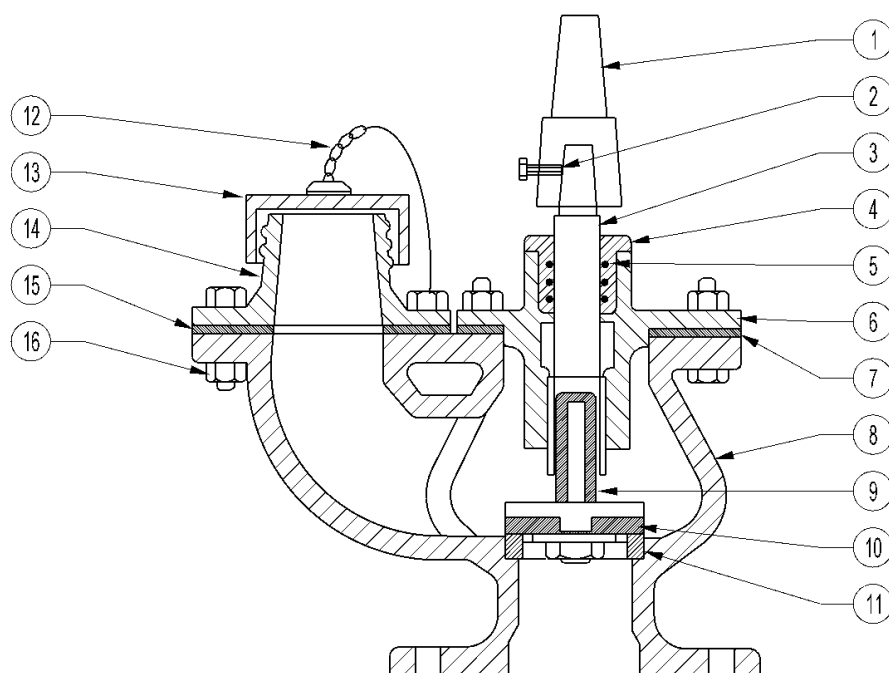


Figure 4: Underground hydrant suitable for Northern Territory.

Number	Components
1	Spindle cap (or stem cap)
2	Spindle cap screw (or stem cap screw)
3	Spindle(or stem)
4	Spindle seal housing
5	O-rings
6	Cover1
7	Cover gasket
8	Body
9	Jumper valve (or seal valve or plug or stopper)
10	Jumper seal
11	Body seat ring
12	Chain
13	Screwed outlet cap
14	Screwed outlet1
15	Screwed outlet gasket
16	Fasteners

4.4 Swing check/non-return valve

Shall comply with the following standard and specification:

- AS 49794:2001 – Non-return valves for waterworks purposes—Swing check and tilting disc
- WSA PS – 264 – Non-return (reflux) valves for pressure applications – drinking water, non-drinking water supply and sewerage.

Design:

Swing check valves allow flow in one direction and can be used in both horizontal and vertical piping. Swing check valves have a hinged gate like disc, sealing against a tilted seating face. The sealing disc is held open by fluid flow. The disc is to seat by its own weight and is to stop reverse flow immediately forward flow ceases. External adjustable lever counterweights can be fitted to extended hinge pins for greater surety of sealing. Flow area through valve not to be less than area of circular body end ports. Disc to have minor movement of position at 1.5 to 4 m/s flow. Cover, disc and hinge to be removable in the field. Seat rings to be fixed to the body or disc by threading or mechanical deformation. A stop is to limit disc travel and prevent disc oscillation at flows above recommended minimum. Fit lever arm and weight where the valve has an extended hinge pin. Lever weight to have alternative key locations or other provision for both horizontal and vertical piping. Lever weights to provide maximum closing torque when valve fully open. Valves exceeding 25 kg to have lifting devices. Castings to be sound and free of laps, blowholes and pitting. Surfaces to be free of burrs, fins and sharp edges. Coated edges to be 3 mm min radius. Position indicators to have permanent marking of 'OPEN' and 'CLOSE' in lettering 5 mm or larger.

Materials:

- Body and cover:
 - Ductile cast iron grade AS 1831/400-12.
- Disc with integral facing ring or partial disc encapsulation:
 - Copper alloy grade AS 1565/C83600 (dezinc. resistant to AS 2345).
- Disc with separate facing ring or full disc encapsulation:
 - Ductile cast iron grade AS 1831/400-12
 - Grey cast iron grade AS 1830/T220
 - Ductile cast iron grade AS 1831/500-7 or 370/17.
- Disc encapsulation:
 - EPDM or Nitrile rubber to AS 1646.2.
- Disc facing and body seat ring:
 - Copper alloy grade AS 1565/C83600 (dezinc. resistant to AS 2345)
 - Stainless steel grade ASTM A276/316
 - Flaked graphite austenitic CI grade L-Ni Cu Cr 1563 AS/NZS 1833
 - Copper alloy grade AS 1565/C92410 or C85210 arsenic inhibited.
- Hinge:
 - Ductile cast iron grade AS 1831/400-12
 - Grey cast iron grade AS 1830/T220
 - Copper alloy grade AS 1565/C83600 (dezinc. resistant to AS 2345).
- Hinge pin, hinge to disc connection, washer split pin and plug:
 - Stainless steel grade ASTM A276/316
 - Stainless steel grade ASTM A276/431
 - Copper alloy grade A 1567/C48600 or C35200 (plug only).
- Cover fasteners:
 - Stainless steel grade ASTM A276/316
 - Carbon steel grade AS/NZS 1111/4.6 (where completely isolated).
- Cover gasket:
 - EPDM rubber to AS 1646.2.
- O-ring:
 - EPDM rubber (65-75 IRHD) to AS 1646.2.
- Gland and bearing:
 - Copper alloy grade AS/NZS 1567/486
 - Copper alloy grade AS 1565/C83600.
- Lever arm:
 - Ductile cast iron grade AS 1831/400-12
 - Structural steel grade AS 3679.1/250.
- Lever weight:
 - Grey cast iron grade AS 1830/T220.
- Inner/outer surfaces:
 - Approved polymeric coating to AS/NZS 4158.
- External attachments:
 - Hot-dip galvanised or polymeric coating to AS/NZS 4158.

- Flange joint bolts:
 - Stainless steel grade ASTM A276/316.

Connections:

- Flanges to AS 4087, at right angles to and concentric with the bore axis. Do not tap bolt holes.

Valve length (to flange faces):

Nominal size DN	Length (mm)
80	260
100	330
150	410
200	540
225	610
250	640
300	700
375	820
450	970
500	1070
600	1220
750	1400

Body ID markings:

- Manufacturer's name or mark
- Class of valve
- Nominal size
- Arrows on body to indicate direction of flow
- Year of manufacture
- Number of Australian Standard i.e. AS 4794
- Body material designation (i.e. D.I.)
- Product certification mark e.g. StandardsMark.

Use limits:

- When conveying highly aggressive (low pH) water, use valves with resilient seated discs.
- Do not install immediately adjacent to a pump discharge.

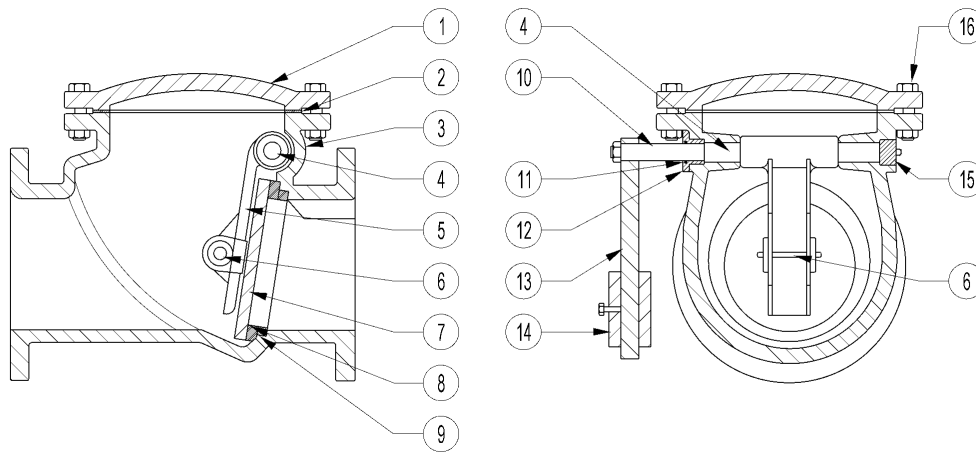


Figure 5: Non-return valve.

Number	Components
1	Cover
2	Cover gasket
3	Body
4	Hinge pin
5	Hinge
6	Disc pin
7	Disc
8	Disc facing ring
9	Body seat ring
10	Hinge pin extension
11	O-ring
12	Plug gland
13	Lever arm
14	Lever weight
15	Plug
16	Fasteners

4.5 Resilient seated gate valve

Shall comply with the following standard and specification:

- AS/NZS 2638.2:2011 – Gate valves for waterworks purposes - resilient seated
- WSA PS – 260 – Gate Valves, resilient seated for pressure applications – drinking water, non-drinking water supply and sewerage

Design:

A valve sealed by a metal gate, which has complete rubber coating or, where the gate metal is corrosion resistant, has rubber coating on sealing surfaces. Valve is to be controlled by an inside screw non-rising stem. Gate is to align using an integral guide system. Gate is to raise clear of the valve's internal diameter. When the gate is in the closed position, there shall be full engagement of the spindle and nut. Components are to be elastomeric sealed. Components are able to be disassembled and assembled in the field. Spindle seals (2 minimum) are able to be replaced under maximum allowable operating pressures with valve fully open. Foreign matter is to be excluded using a restrained wiper ring above spindle seals. Supporting feet are to be cast on the body. Operation is to be manual by either removable ring key/bar or hand wheel. Cap is to be removable where key operated. Valves are to be clockwise closing. Valves over 25 kg are to have lifting devices. AS 2638.2 only covers PN16 valves.

Materials:

- Body, bonnet and seal retainer housing:
 - Ductile cast iron grade AS 1831/400-15 min.
- Spindle:
 - Stainless steel ASTM A276 grades 316, 316L or 431 or DIN 17440 X2CrNiMo 17132.
- Spindle seal retainer:
 - Gunmetal grade AS 1565/C83600 (dezinc. Resistant to AS 2345) or BS 2872/BS 2784 grade CZ132.
- Gate nut:
 - Gunmetal grade AS 1565/C83600 (dezinc. Resistant to AS 2345) or BS 2872/BS 2874 grade CZ132.
- Gate:
 - Gunmetal grade AS 1565/C83600 (dezinc. Resistant to AS 2345) or BS 2872 grade CZ132
 - Ductile cast iron grade AS 1831/400-15 min.
- Gate coating:
 - Elastomer to AS 1646 and SP15.
- Cap and hand wheel:
 - Ductile cast iron grade AS 1831/400-15 min.
- Fasteners:
 - Stainless steel grade ASTM A276 grade 316 (where exposed)
 - Carbon steel grade AS/NZS 1111/4.6 min (where unexposed).
- Coating:
 - Complete polymeric coating of body/bonnet to AS/NZS 4158.
- Gaskets:
 - EPDM elastomer to AS 1646.
- O-rings:
 - Nitrile elastomer to AS 1646, hardness 65-75 IRHD.

Valve length (to flange faces)

Nominal size DN	Height ¹ (mm max)	Effective Length ² (mm)
80	400	203
100	450	229
150	520	267
200	630	292
225	660	305
250	750	330
300	825	356
375	985	381
450	1145	432
500	1270	457
600	1560	508
750	1900	610

1 – Height is from centre of waterway to top of pipe

2 – Effective length is to outermost face of flanges, tolerance of ± 2 mm for DN 80 to 300, ± 3 mm for DN350 to 750.

Allowable operating pressure:

Pressure nominal 16 (PN16) or 16MPa.

Operation markings:

- Cap and hand wheel
 - Marked 'CLOSE' with an arrow showing clockwise closure. End of cap and centre of hand wheel to have mark of red ink, paint or clip-in disc to indicate clockwise closure visible from a distance of at least 3 m.

Body markings:

- Manufacturer's name or trademark
- Class of valve
- Nominal size
- Number of the Australian Standard i.e. AS 2638.2
- Year of manufacture
- Product certification mark e.g. StandardsMark
- Traceability code
- Place of manufacture – may be incorporated in traceability code.

Body marking method:

Lettering to be as large as practicable but not less than 6 mm high for DN 80-150, 10 mm high for sizes DN 200-300, 20 mm high for sizes DN 350-600 and 25 mm high for sizes DN 700-750.

Use limits:

- Not permitted for greater than DN 600.
- Not permitted for high unbalanced heads, flow control or throttling.
- Not suitable for scour installations.

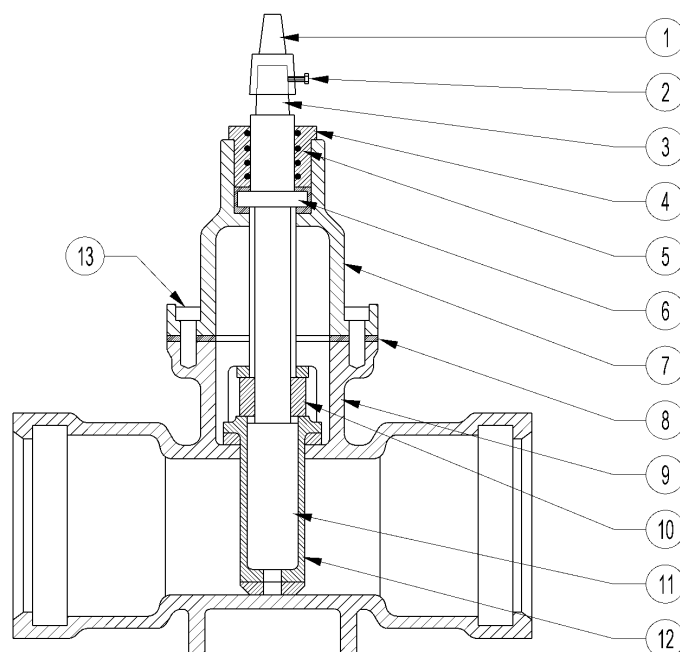


Figure 6: Resilient seated gate valve.

Number	Components
1	Spindle (stem) cap
2	Spindle (stem) cap screw ¹
3	Spindle (stem)
4	Spindle (stem) seal nut or retainer
5	O-rings
6	Thrust collar
7	Bonnet (cover)
8	Cover/body seal
9	Body
10	Gate nut
11	Gate
12	Gate encapsulation
13	Fasteners ¹

1 – Manufacturer's design variant.

4.6 Double flanged butterfly valve

Shall comply with the following standard and specification:

- AS 4795.2:2011 – Butterfly valves for waterworks purposes double flanged
- WSA PS – 263 – Butterfly valves for pressure applications – drinking water and non-drinking water supply.

Design:

Doubled flanged butterfly have a flange each end. Double flanged butterfly valves include wafer butterfly valves having a flange each end (U-section valves) which do not require each bolt to pass through both of the pipe flanges and both of the valve flanges. The butterfly valve can be used to modulate or stop flow. When used as stop valves, the valve is to be designed to allow installation with the shaft horizontal and the disc opening in the direction of flow from the bottom. Except for buried installations, valves are to be fitted with a position indicator to show the degree of opening, clearly readable from the operating position. Trunnion bearings are to be self-lubricating with corrosion resistant metal backing. The body is to incorporate lifting attachments, capable of lifting the completely assembled valve (i.e. with actuator). Valves are to have thrust arrangements to counter side axial forces and to keep the disc central when operating the valve. Valves are to be operable by hand held portable actuators. Valves are to have mounting feet and drilled holes for anchor bolts. Castings are to be free of laps, blowholes and pitting. Shafts are to be of the “stub” or “through” types as specified.

Seal design:

- Seal on disc and seal in body:
 - Seal is to be retained by a clamp ring with positive mechanical locking, socketed or countersunk retaining screws. The clamp ring is to be in sections for DN 750 and larger to facilitate seal replacement without valve removal from the pipeline. The disc edge (and for seal in body, the body adjoining the seal facing) are to have corrosion and erosion resistance properties at least equivalent to Stainless Steel grade 316. For seal in body, fasteners for seat rings or disc clamping rings in cast iron components are to have a sealant or thread seal to protect from water ingress.
- Seal on body:
 - Seal is to be replaceable and retained by a bed groove. Seal is to form the entire wetted bore surface and wrap around the flange faces (i.e. envelope type). Seal is to incorporate integral O-rings for sealing against mating flanges.

Materials:

- Body:
 - Ductile cast iron grade AS 1831/500-7 or 400-12
 - Grey cast iron grade AS 1830/T220
 - Flake graphite austenitic cast iron AS1833/L-Ni Cr 202 or L-Ni Cr 1563
 - Steel (cast) to AS 2074/250
 - Steel (fabricated) grade AS 3678/250.

- Disc (seal on body, seal on disc):
 - Ductile cast iron grade AS 1831/500-7 or 400-12
 - Grey cast iron grade AS 1830/T220
 - Flake graphite austenitic cast iron grade AS1833/L-Ni Cr 202 or L-Ni Cr 1563
 - Aluminium bronze grade AS 1565/C95810 (lead content 4.5% max)
 - Steel (cast) to AS 2074/250
 - Steel (fabricated) grade AS 3678/250.
- Disc (seal in body):
 - Aluminium bronze grade AS 1565/C95810
 - Stainless steel grade ASTM A351/316
 - Shaft and shaft extension: Stainless steel grade ASTM A276/431, 316 or 304
 - Monel (trademark) to ASTM B164.
- Clamp ring:
 - Stainless steel grade ASTM A480/316
 - Gunmetal grade AS 1565/C92410 (lead content 4.5% max).
- Shear pins:
 - Stainless steel grade ASTM A276/431 hard chrome plated or 316.
- Fasteners:
 - Stainless steel grade ASTM A480/316.
- Coating:
 - Complete polymeric coating to AS/NZS 4158.
- Flat gasket:
 - Reinforced elastomer to BS 5292.
- Seals:
 - Elastomers to AS 1646, hardness 71 to 80 to BS 903 method N.

Connection:

Flanges to AS 4087 (\leq DN 750) and AS 2129 ($>$ DN 750). Flange gaskets and flange bolting to AS 4087. Machine or spot face flange backs for satisfactory bearing of bolts and nuts. Tapped holes may be used where through bolting is not possible.

Body ID markings:

- Manufacturer's name or mark
- An arrow denoting essential flow direction if applicable
- Nominal valve size
- The number of this standard, i.e. AS 4795
- Year of manufacture
- Serial number
- Class of valve
- Gear ratio.

Body marking method:

Cast-on lettering as large as practicable but not less than 6 mm high for DN 80-150, 10 mm high for sizes DN 200-300, 20 mm high for sizes DN 350-600 and 25 mm high for sizes DN 700-2000.

Nameplate marking method:

Where unable to cast on markings, use engraved stainless steel nameplate securely attached to a raised pad on the body using stainless steel fixings and clearly visible after installation.

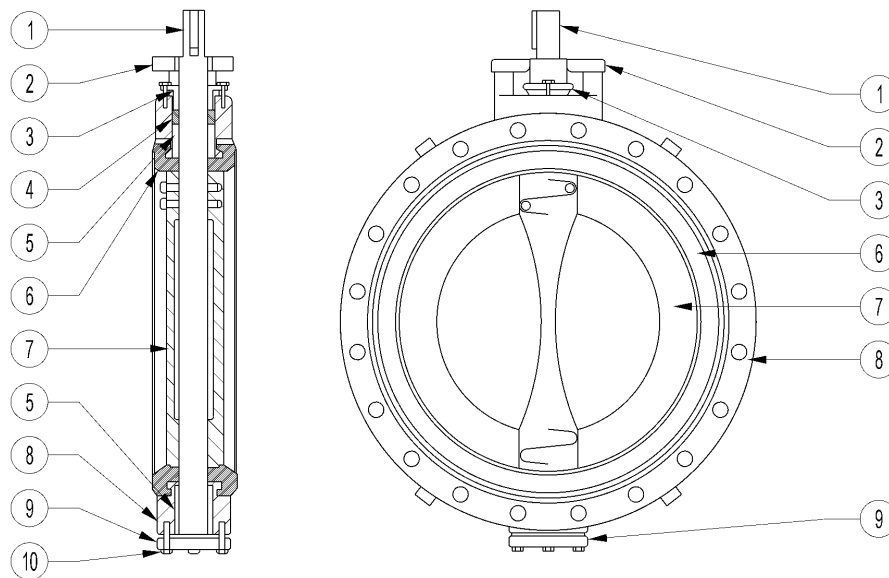


Figure 7: Double flanged butterfly valve.

Number	Components
1	Shaft (or stem)
2	Actuator mounting pad or flange
3	Packing gland (or stem seal retainer)
4	Packing (or stem seal)
5	Bearing (or bushing)
6	Seat (or disc seal)
7	Disc
8	Body with double flange
9	Bottom plate
10	Fasteners
11	Shear pins (or taper pins)

4.7 Flangeless butterfly valve

Shall comply with the following standard and specification:

- AS 4795.1:2011 – Butterfly valves for waterworks purposes wafer and lugged
- WSA PS – 263 – Butterfly valves for pressure applications – drinking water and non-drinking water supply.

Design:

Flangeless butterfly valves are held in place by the pipe flanges each side of the valve. The butterfly valve can be used to modulate or stop flow. When used as stop valves, the valve is to be designed to allow installation with the shaft horizontal and the disc opening in the direction of flow from the bottom. Except for buried installations, valves are to be fitted with a position indicator to show the degree of opening, clearly readable from the operating position. Trunnion bearings are to be self-lubricating with corrosion resistant metal backing. The body is to incorporate lifting attachments, capable of lifting the completely assembled valve (i.e. with actuator). Valves are to have thrust arrangements to counter side axial forces and to keep the disc central when operating the valve. Valves are to be operable by hand held portable actuators. Valves are to have mounting feet and drilled holes for anchor bolts. Castings are to be free of laps, blowholes and pitting. Shafts are to be of the “stub” or “through” types as specified.

Seal design:

- Seal on disc and seal in body:
 - Seal is to be retained by a clamp ring with positive mechanical locking, socketed or countersunk retaining screws. The clamp ring is to be in sections for DN 750 and larger to facilitate seal replacement without valve removal from the pipeline. The disc edge (and for seal in body, the body adjoining the seal facing) are to have corrosion and erosion resistance properties at least equivalent to SS grade 316. For seal in body, fasteners for seat rings or disc clamping rings in cast iron components are to have a sealant or thread seal to protect from water ingress.
- Seal on body:
 - Seal is to be replaceable and retained by a bed groove. Seal is to form the entire wetted bore surface and wrap around the flange faces (i.e. envelope type). Seal is to incorporate integral O-rings for sealing against mating flanges.

Materials:

- Body:
 - Ductile cast iron grade AS 1831/500-7 or 400-12
 - Grey cast iron grade AS 1830/T220
 - Flake graphite austenitic cast iron AS1833/L-Ni Cr 202 or L-Ni Cr 1563
 - Steel (cast) to AS 2074/250
 - Steel (fabricated) grade AS 3678/250.

- Disc (seal on body, seal on disc):
 - Ductile cast iron grade AS 1831/500-7 or 400-12
 - Grey cast iron grade AS 1830/T220
 - Flake graphite austenitic cast iron grade AS1833/L-Ni Cr 202 or L-Ni Cr 1563
 - Aluminium bronze grade AS 1565/C95810 (lead content 4.5% max)
 - Steel (cast) to AS 2074/250
 - Steel (fabricated) grade AS 3678/250.
- Disc (seal in body):
 - Aluminium bronze grade AS 1565/C95810
 - Stainless steel grade ASTM A351/316
 - Shaft and shaft extension: Stainless steel grade ASTM A276/431, 316 or 304
 - Monel (trademark) to ASTM B164.
- Clamp ring:
 - Stainless steel grade ASTM A480/316
 - Gunmetal grade AS 1565/C92410 (lead content 4.5% max).
- Shear pins:
 - Stainless steel grade ASTM A276/431 hard chrome plated or 316.
- Fasteners:
 - Stainless steel grade ASTM A480/316.
- Coating:
 - Complete polymeric coating to AS/NZS 4158.
- Flat gasket:
 - Reinforced elastomer to BS 5292.
- Seals:
 - Elastomers to AS 1646, hardness 71 to 80 to BS 903 method N.

Body ID markings:

- Manufacturer's name or mark
- An arrow denoting essential flow direction if applicable
- Nominal valve size
- Serial number
- Year of manufacture
- Gear ratio
- Class of valve.

Body marking method:

Cast-on lettering as large as practicable but not less than 6 mm high for DN 80-150, 10 mm high for sizes DN 200-300, 20 mm high for sizes DN 350-600 and 25 mm high for sizes DN 700-2000.

Nameplate marking method:

Where unable to cast on markings, use engraved stainless steel nameplate securely attached to a raised pad on the body using stainless steel fixings and clearly visible after installation.

Use limits:

Only use in sizes less than DN 600.

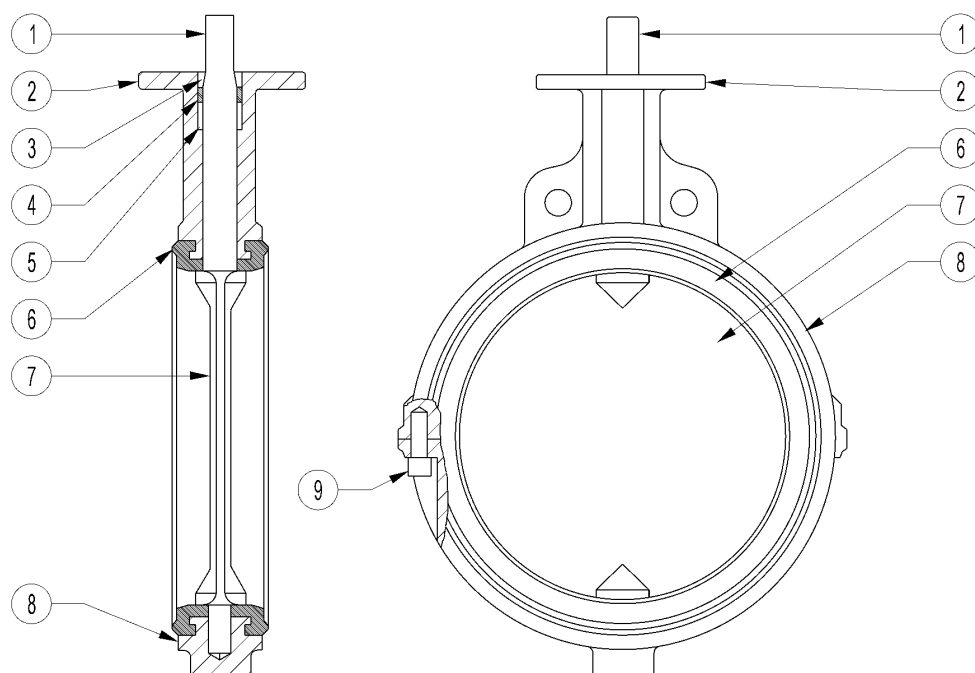


Figure 8: Flangeless butterfly valve seal on body type.

Number	Components
1	Shaft (or stem)
2	Actuator mounting pad or flange
3	Packing gland (or stem seal retainer)
4	Packing (or stem seal)
5	Bearing (or bushing)
6	Seat (or disc seal)
7	Disc
8	Body without flanges
9	Fasteners

4.8 Lugged or single flange butterfly valve

Shall comply with the following standard and specification:

- AS 4795.2:2011 – Butterfly valves for waterworks purposes wafer and lugged
- WSA PS – 263 – Butterfly valves for pressure applications – drinking water and non-drinking water supply.

Design:

Single flange butterfly valves are designed for clamping between pipe flanges using through bolting. The body has a single flange or flange lugs and individual bolts pass both through the valve flange and the adjacent pipe flanges. The butterfly valve consists of a circular shaped sealing disc which pivots about a within the cylindrical bore of the valve body. A quarter turn rotation of the disc opens and closes the valve. When fully opened, there is little pressure loss as the only flow restriction is the thickness of the disc. The valve can be used for flow control. The resilient seal is to be adjustable and replaceable without removing the valve from the pipeline or dismantling the actuator, disc or shaft. Resilient seals are to be secured by socketed or countersunk retaining screws with positive mechanical locking. Body seals are to cover the entire wetted surface and wrap around the flange faces and incorporate a raised seal. Trunnion bearings are to be self-lubricating with corrosion resistant metal backing. Lifting attachments capable of lifting the completely assembled valve (i.e. with actuator) are to be incorporated in the body.

Materials:

- Body:
 - Ductile cast iron grade AS 1831/500-7 or 400-12.
 - Grey cast iron grade AS 1830/T220
 - Flake graphite austenitic cast iron AS1833/L-Ni Cr 202 or L-Ni Cr 1563.
- Disc (seal on disc):
 - Ductile cast iron grade AS 1831/500-7 or 400-12
 - Grey cast iron grade AS 1830/T220
 - Flake graphite austenitic cast iron grade AS1833/L-Ni Cr 202 or L-Ni Cr 1563
 - Aluminium bronze grade AS 1565/C95810
 - Steel (cast) to AS 2074
 - Steel (fabricated) grade AS 3678/250.
- Disc (seal on body):
 - Aluminium bronze grade AS 1565/C95810
 - Stainless steel grade AS 2837/316
- Shaft:
 - Stainless steel grade AS 2837/431 or 316.
- Shear pins:
 - Stainless steel grade AS 2837/431, hard chrome plated.
- Fasteners:
 - Stainless steel grade AS 2837/316.
- Coating:
 - Bitumen paint, cold applied or polymer full envelopment.

- Seals:
 - Elastomers to AS 1646.

Body markings:

- Manufacturer's name or mark
- An arrow denoting essential flow direction if applicable
- Nominal valve size
- Serial number
- Year of manufacture
- Gear ratio
- Class of valve.

Body marking method:

Cast-on lettering as large as practicable but not less than 6 mm high for DN 80-150, 10 mm high for sizes DN 200-300, 20 mm high for sizes DN 350-600 and 25 mm high for sizes DN 700-2000.

Nameplate marking:

Where unable to cast on markings, use engraved stainless steel nameplate securely attached to a raised pad on the body using stainless steel fixings and clearly visible after installation.

Use limits:

Only for use in sizes DN 600 and larger.

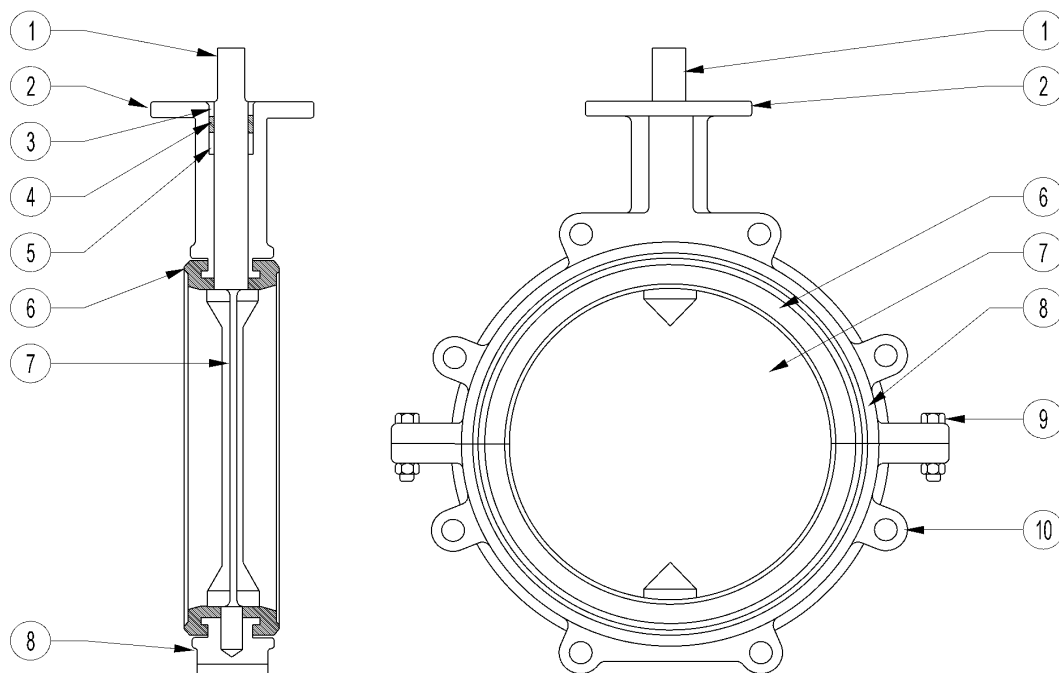


Figure 9: Lugged or single flanged butterfly valve seal on body type.

Number	Components
1	Shaft (or stem)
2	Actuator mounting pad or flange
3	Packing gland (or stem seal retainer)
4	Packing (or stem seal)
5	Bearing (or bushing)
6	Seat (or disc seal)
7	Disc
8	Body with bolt lugs
9	Fasteners
10	Bolt lugs

Contact

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