

Australian/New Zealand Standard™

**Gate valves for waterworks purposes**

**Part 1: Metal seated**



## **AS/NZS 2638.1:2011**

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee WS-022, Valves for Water Supply Purposes. It was approved on behalf of the Council of Standards Australia on 22 March 2011 and on behalf of the Council of Standards New Zealand on 13 May 2011.  
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The following are represented on Committee WS-022:

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Australian Industry Group  
Australian Stainless Steel Development Association  
Australian Water Association  
Engineers Australia  
Institute of Instrumentation, Control and Automation Australia  
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# Australian/New Zealand Standard™

## Gate valves for waterworks purposes

### Part 1: Metal seated

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## PREFACE

This Standard was prepared by the Joint Standards Australia/New Zealand Committee WS-022, Valves for Water Supply Purposes, to supersede AS 2638.1—2002.

*This Standard incorporates Amendment No. 1 (August 2017). 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 | The objective of this Standard is to specify requirements for PN 16 and PN 35 metal-bodied gate valves for waterworks purposes.

This revision includes the following changes:

- (a) Incorporation of integral bypass arrangements for sizes DN 450 to DN 900.
- (b) Alignment with AS 2638.2 terminologies.
- (c) Inclusion of alternative materials.
- (d) A statement that gate valves are not designed for throttling purposes.
- (e) The thread standard has been changed to DIN 103 or ASME B1.5 as B202 has been withdrawn. Trapezoidal threads are recognized as an equivalent to ACME threads.

Statements expressed in mandatory terms in notes to 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/STANDARDS NEW ZEALAND

**Australian/New Zealand Standard**  
**Gate valves for waterworks purposes**

**Part 1: Metal seated**

## SECTION 1 SCOPE AND GENERAL

**1.1 SCOPE**

This Standard specifies requirements for PN 16 and PN 35 solid gate metal-bodied metal-seated gate valves for waterworks purposes, with a maximum operating temperature of 40°C. This Standard is applicable to the following versions:

- (a) Valves of nominal sizes DN 80 to DN 900 with inside screw and non-rising spindle design, operated by a removable key, with or without a gearbox, for buried applications.
- (b) Valves of nominal size DN 80 to DN 900 with inside screw and non-rising spindle design, operated by a handwheel, with or without a gearbox, for above-ground applications.
- (c) Valves of nominal size DN 80 to DN 300 with outside screw and rising spindle design, operated by a handwheel, for above-ground applications where the position of the gate is required to be visible.
- (d) Valves of nominal sizes DN 450 to DN 900 with an integral bypass arrangement.

NOTE: The design criteria of the valve and fasteners should be based on a minimum life expectancy of 50 years.

**1.2 APPLICATION**

- A1 | Means for demonstrating conformity with this Standard shall be in accordance with Appendix A.

**1.3 NORMATIVE REFERENCES**

The following are the normative documents referenced in this Standard.

## AS

- |           |                                                                                      |
|-----------|--------------------------------------------------------------------------------------|
| 1111      | ISO metric hexagon commercial bolts and screws                                       |
| 1111.1    | Part 1: Product grade C—Bolts                                                        |
| 1111.2    | Part 2: Product grade C—Screws                                                       |
| 1442      | Carbon steels and carbon-manganese steels—Hot rolled bars and semi-finished products |
| 1565      | Copper and copper alloys—Ingots and castings                                         |
| 1646      | Elastomeric seals for waterworks purposes                                            |
| 1683      | Methods of test for elastomers                                                       |
| 1683.15.1 | Part 15.1: International rubber hardness                                             |
| 1831      | Ductile cast iron                                                                    |

|      |                                                                       |
|------|-----------------------------------------------------------------------|
| AS   |                                                                       |
| 1939 | Degrees of protection provided by enclosures for electrical equipment |
| 2317 | Collared eyebolts                                                     |
| 2345 | Dezincification resistance of copper alloys                           |
| 2938 | Gears—Spur and helical—Guide to specification and rating              |

A1 | **‘Text deleted’**

|       |                                                                                   |
|-------|-----------------------------------------------------------------------------------|
| HB    |                                                                                   |
| 18.28 | Conformity assessment—Guidance on a third-party certification system for products |

AS/NZS

|      |                                                                                       |
|------|---------------------------------------------------------------------------------------|
| 1252 | High strength steel bolts with associated nuts and washers for structural engineering |
| 1567 | Copper and copper alloys—Wrought rods, bars and sections                              |
| 1568 | Copper and copper alloys—Forging stock and forgings                                   |
| 1594 | Hot-rolled steel flat products                                                        |
| 2280 | Ductile iron pressure pipes and fittings                                              |
| 4020 | Testing of products for use in contact with drinking water                            |

A1 | 4087 Metallic flanges for water works purposes

|      |                                                                                      |
|------|--------------------------------------------------------------------------------------|
| 4158 | Thermal-bonded polymeric coatings on valves and fittings for water industry purposes |
|------|--------------------------------------------------------------------------------------|

A1 | AS ISO/IEC

|       |                                                                                 |
|-------|---------------------------------------------------------------------------------|
| 17025 | General requirements for the competence of testing and calibration laboratories |
|-------|---------------------------------------------------------------------------------|

DIN

|     |                                               |
|-----|-----------------------------------------------|
| 103 | ISO Metric Trapezoidal Screw Thread; Profiles |
|-----|-----------------------------------------------|

ISO

|      |                                                                                                                                     |
|------|-------------------------------------------------------------------------------------------------------------------------------------|
| 1083 | Spheroidal graphite cast irons—Classification                                                                                       |
| 4288 | Geometrical Product Specifications (GPS)—Surface texture: Profile method—Rules and procedures for the assessment of surface texture |
| 5210 | Industrial valves—multi-turn actuator attachments                                                                                   |

ASTM

|         |                                                   |
|---------|---------------------------------------------------|
| A276-10 | Specification for Stainless Steel Bars and Shapes |
|---------|---------------------------------------------------|

A1 | A743 Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application

EN

|         |                                                                                                                                                                     |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1982    | Copper and copper alloys—Ingots and castings                                                                                                                        |
| 10088   | Stainless steels                                                                                                                                                    |
| 10088-3 | Part 3: Technical delivery conditions for semi-finished products, bars, rods, wire, sections and bright products of corrosion resisting steels for general purposes |
| 12164   | Copper and copper alloys—Rod for free machining purposes                                                                                                            |
| 12420   | Copper and copper alloys—Forgings                                                                                                                                   |

## 1.4 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

### 1.4.1 Allowable operating pressure (AOP)

The allowable internal pressure, excluding surge, that a component can safely withstand in service.

### 1.4.2 Allowable site test pressure (ASTP)

The maximum internal hydrostatic pressure that can be applied on site to a component in a newly installed pipeline.

### 1.4.3

‘Text deleted’

### 1.4.4 Bulkhead test

A test where the testing machine provides external restraint to make a watertight joint at each end of the valve.

### 1.4.5 Bypass arrangement

A smaller diameter valve coupled directly to a larger diameter valve with appropriate pipework to allow water to bypass the larger valve when closed. The bypass is utilized when filling a pipeline, to minimize risk of structural damage to its components, or to reduce operating torque when opening the large valve by equalizing pressure across the gate.

### 1.4.6 Coating

A corrosion-inhibiting medium applied to the surface of a valve.

### 1.4.7 Coating defect

A detectible weakness or discontinuity in a coating, which deems it to be suspect in its ability to protect the substrate from corrosion during its normal service life.

### 1.4.8 Distortion

Any permanent deformation.

### 1.4.9 DN (nominal size)

An alphanumeric designation of size for components of a pipework system, which is used for reference purposes. It comprises the letters DN followed by a dimensionless whole number, which is indirectly related to the physical size, in millimetres, of the bore or outside diameter of the end connections.

### 1.4.10 Effective length

Overall length of a valve measured along its centre-line, excluding the depth of any sockets.

### 1.4.11 Face to face dimensions

The distance between the two planes perpendicular to the valve axis located at the extremities of the body end ports.

### 1.4.12 Free end test

A test where the valve ends are blanked off so that the axial hydraulic force is not externally restrained. This simulates a valve in a terminal position held rigidly at one end only.

### 1.4.13

‘Text deleted’

#### **1.4.14 Maximum allowable gearbox input torque**

The maximum allowable input torque that can be applied to a gearbox so that the output torque does not exceed the minimum strength test torque.

#### **1.4.15 Maximum allowable operating pressure (MAOP)**

The maximum internal pressure, including surge, that a component can safely withstand in service.

#### **1.4.16 Maximum functional test torque**

The maximum allowable torque to operate an ungeared gate valve at fully unbalanced allowable operating pressure, not including the cracking torque.

#### **1.4.17 Maximum operator input torque**

The purchaser-specified maximum operator input torque required to operate the valve or gearbox, not including cracking the valve.

#### **1.4.18 Maximum possible input torque**

The maximum torque that can be applied practicably by an operator, either manually or by mechanical means.

#### **1.4.19 Maximum operating temperature**

The maximum permitted temperature (40°C) of the medium being conducted through the valve.

#### **1.4.20 Minimum strength test torque**

The maximum input torque that an ungeared sluice valve is designed to withstand.

#### **1.4.21 Pressure classification (PN)**

A classification of valves by a PN number based on the allowable operating pressure (AOP) expressed in hundreds of kilopascals.

#### **1.4.22 Production batch**

A1 | Schedule of products of the same type, nominal diameter and wall thickness with identical dimensional characteristics manufactured from the same material. The production batch is defined by the manufacturer.

#### **1.4.23 Non-rising spindle design**

A valve design where the gate is attached to the spindle with a threaded nut such that, as the gate moves from closed to open position, the spindle does not rise during operation.

#### **1.4.24 Rising spindle design**

A valve design where the gate is fixed to the spindle such that, as the gate moves from closed to open position, the spindle rises during operation.

#### **1.4.25**

A1 | 'Text deleted'

#### **1.4.26 Sampling plan**

A specific plan that indicates the number of units of components or assemblies to be inspected.

**1.4.27 Type test**

A test or series of tests directed towards approval of a design, conducted to determine if an item is capable of meeting the requirements of the product Standard and which is done once and repeated only after a change in design, materials, method or place of manufacture or as otherwise nominated in the product Standard.

A1

**1.4.28**

‘Text deleted’

**1.4.29**

‘Text deleted’

**1.4.30 Production test**

A test performed by the manufacturer on a batch of components, which has to be satisfactorily completed before the batch can be released.

**1.4.31 Seal retainer housing**

Component that houses the spindle seal retainer to ensure it is accurately fixed in position.

**1.4.32 Spindle seal retainer**

Component that is in direct contact with the spindle seals to ensure they are retained.

**1.5 DESIGNATION OF SIZE**

Valve size shall be designated by the nominal size as follows: DN 80, DN 100, DN 150, DN 200, DN 225, DN 250, DN 300, DN 350, DN 375, DN 400, DN 450, DN 500, DN 600, DN 700, DN 750, DN 800 and DN 900.

**1.6 ALLOWABLE PRESSURES**

A1

The allowable pressures shall be in accordance with Table 1.1. Pressures shall be only applied with the gate in the fully open position.

**TABLE 1.1**  
**ALLOWABLE PRESSURES**

| PN | AOP<br>kPa | MAOP<br>(see Note 1)<br>kPa | ASTP<br>kPa |
|----|------------|-----------------------------|-------------|
| 16 | 1600       | 1920                        | 2000        |
| 35 | 3500       | 4200                        | 4375        |

NOTE: Seat leakage may occur at MAOPs; however, structural damage should not occur.

## SECTION 2 MATERIALS AND COMPONENTS

### 2.1 MATERIALS

A1

Table 2.1 lists the basic material requirements for the manufacture of valve components. Alternative materials are allowable, provided they are equivalent in performance and corrosion resistance. Acceptable alternative materials are listed in Appendix C.

NOTE: For further information on material equivalence, refer to the Water Services Association of Australia (WSAA).

### 2.2 COPPER ALLOY COMPONENTS

Valve components of copper alloy shall be in accordance with AS 1565, AS/NZS 1567, AS/NZS 1568 or international equivalent Standards and shall be dezincification-resistant in accordance with AS 2345.

### 2.3 CONTAMINATION OF WATER

Components in contact with drinking water shall comply with AS/NZS 4020.

A scaling factor of 0.01 shall be applied, except for the microbiological growth test where a factor of 0.33 shall be applied.

A1

### 2.4 SEALS

Seals shall be made of materials in accordance with AS 1646 and are not injuriously affected by the fluid, temperature or environmental conditions to which the seals will be subjected to in service.

A1

**TABLE 2.1**  
**BASIC MATERIAL REQUIREMENTS FOR METAL-SEATED VALVES**

| Component                                           | PN 16              |                      |                     | PN 35              |             |                     |
|-----------------------------------------------------|--------------------|----------------------|---------------------|--------------------|-------------|---------------------|
|                                                     | Material           | Standard             | Min. grade          | Material           | Standard    | Min. grade          |
| Body                                                | Ductile cast iron* | AS 1831              | ISO 1083/JS/400–15† | Ductile cast iron* | AS 1831     | ISO 1083/JS/400–15† |
| Bonnet and seal retainer housing (where applicable) | Ductile cast iron* | AS 1831              | ISO 1083/JS/400–15† | Ductile cast iron* | AS 1831     | ISO 1083/JS/400–15† |
| Bypass fittings                                     | Ductile cast iron* | AS 1831              | ISO 1083/JS/400–15† | Ductile cast iron* | AS 1831     | ISO 1083/JS/400–15† |
| Spindle seal retainer                               | Copper alloy‡      | AS 1565              | C83600              | Copper alloy‡      | AS 1565     | C83600              |
| Gate                                                |                    |                      |                     |                    |             |                     |
| With integral facing rings                          | Copper alloy‡      | AS 1565              | C83600              | Copper alloy‡      | AS 1565     | C83600              |
| With separate facing rings                          | Ductile cast iron* | AS 1831              | ISO 1083/JS/400–15† | Ductile cast iron* | AS 1831     | ISO 1083/JS/400–15† |
| Gate nut                                            | Copper alloy‡      | AS 1565              | C83600              | Copper alloy‡      | AS 1565     | C83600              |
| Seat rings                                          | Copper alloy‡      | AS 1565              | C83600              | Copper alloy‡      | AS 1565     | C83600              |
| Spindle                                             | Stainless steel‡   | ASTM A276            | 316                 | Stainless steel‡   | ASTM A276   | 431                 |
| Spindle cap and handwheel                           | Ductile cast iron* | AS 1831              | ISO 1083/JS/400–15† | Ductile cast iron* | AS 1831     | ISO 1083/JS/400–15† |
| Fasteners                                           | Carbon steel       | AS/NZS 1111 (series) | 4.6                 | Carbon steel       | AS/NZS 1252 | 8.8                 |
|                                                     | Stainless steel‡   | ASTM A276            | 316                 |                    |             |                     |
| Gaskets                                             | Synthetic rubber   | AS 1646              | EPDM                | Synthetic rubber   | AS 1646     | EPDM                |
| Seals                                               | Synthetic rubber   | AS 1646              | 65–75 IRHD          | Synthetic rubber   | AS 1646     | 65–75 IRHD          |
|                                                     |                    |                      | Nitrile             |                    |             | Nitrile             |

\* To be coated in accordance with Section 4.

† Higher tensile strength ductile irons in accordance with AS 1831 are acceptable.

‡ Deemed corrosion-resistant for the purposes of this Standard.

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