



Information Bulletin

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Isolation valves in fire sprinkler and fire hydrant systems

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FIRE PROTECTION ASSOCIATION AUSTRALIA



Isolation valves in fire sprinkler and fire hydrant systems

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1.0 Purpose Statement

The purpose of this document is to inform practitioners and certifiers of the correct type of isolation (stop) valves required by Australian Standards to be installed for automatic fire sprinkler systems and fire hydrant systems.

Note: The terms “isolation valve”, “isolating valve” and “stop valve” are interchangeable with the different terms being used in different Australia Standards, different editions of the same standard and even in different places within the same standard.

2.0 Audience

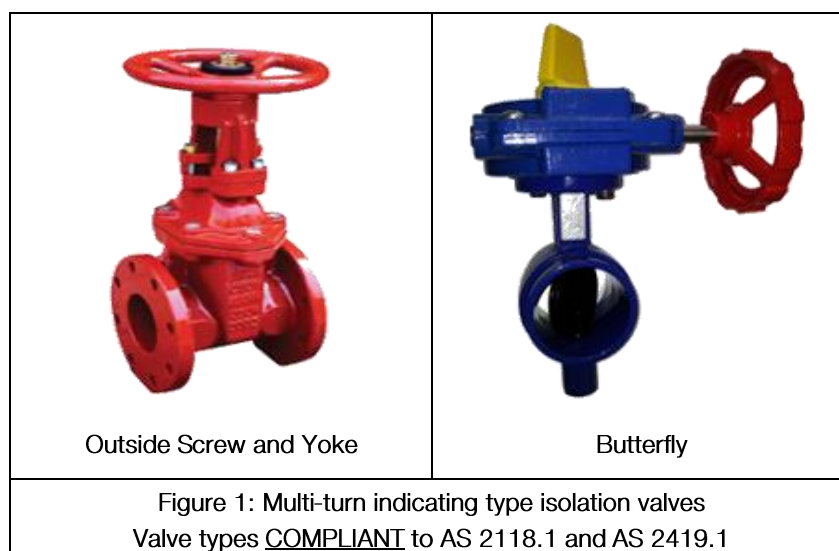
This Information Bulletin is intended for:

- (i) Companies that design, install, service (inspect and test) and maintain automatic fire sprinkler systems and fire hydrant systems
- (ii) Building owners and facility managers.

3.0 Issue

Australian Standards AS 2118.1 and AS 2419.1 require multi-turn indicating type isolation valves (refer to Figure 1 below) for automatic fire sprinkler systems and fire hydrant systems, respectively. These valves must be right handed—that is, to close the valve it must be turned clockwise. These valves can be of the flanged or roll grooved type.

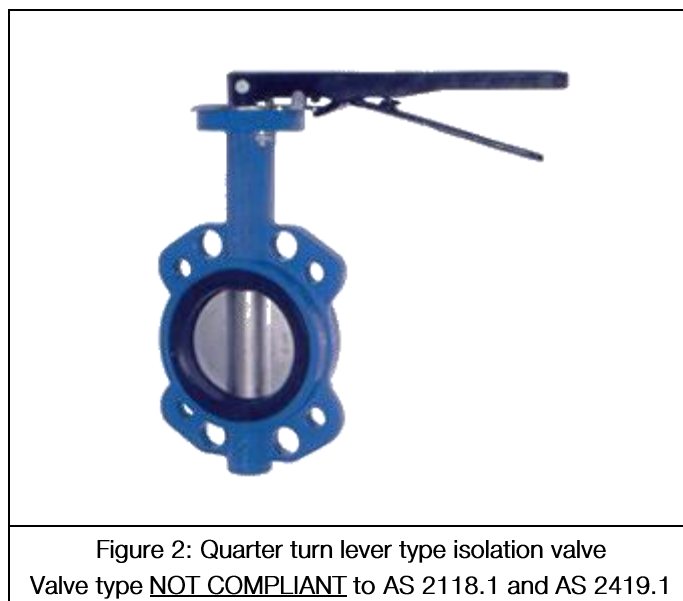
Multi-turn indicating type valves provide superior safety to the operator when closing a valve under high flow conditions as well as providing protection to the water supply pipework by reducing the possibility of water hammer shock.



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However, despite the requirements in these standards—and the benefits of these types of valves—quarter ($\frac{1}{4}$) turn lever type valves (refer to Figure 2) have been found to be installed on some automatic fire sprinkler systems and fire hydrant systems, particularly on either side of backflow prevention valves where the water supply is from town mains.



This Information Bulletin highlights the requirements within AS 2118.1 and AS 2419.1 for multi-turn indicating type isolation valves installed on automatic fire sprinkler systems and fire hydrant systems as well as the requirements of AS/NZS 3500.1 that relate to materials and products for these systems.

4.0 Requirements of AS 2118.1, AS 2419.1 and AS/NZS 3500.1

4.1 Requirements of AS 2118.1

There are two editions of AS 2118.1:

- AS 2118.1-1999, *Automatic fire sprinkler systems - General requirements*
- AS 2118.1-2006, *Automatic fire sprinkler systems - General systems*

AS 2118.1-1999 is the edition currently referenced by the Deemed-to-Satisfy Provisions (Prescriptive Solution) of the Building Code of Australia (BCA)—Volumes 1 and 2 of the National Construction Code (NCC). The more recent version—AS 2118.1-2006—is not referenced by the BCA; however, it may be adopted using an Alternative Solution (Performance Solution).

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The relevant requirements of each edition are as follows:

1. AS 2118.1-1999

Clause 8.2 covers stop valves (i.e. isolation valves, see note under 1.0) and includes 8.2.1 as follows:

All stop valves (except those fitted by the water authorities on the branches from a town main) shall comply with the requirements of AS 4118.1.6...

It is clause 2.1 of AS 4118.1.6 that states that:

Stop valves shall be of the multi-turn type and shall be right handed, i.e. they shall be so constructed that to close the valve and the wheel shall be turned clockwise. Valves shall have a rising spindle, stem or indicator flag which is readily visible and shall not be covered.

...

Valves shall comply with the requirements of AS 1628 [Water supply – Metallic gate, globe and non-return valves] and AS 3579.

Note: AS 3579-1993, *Cast iron wedge gate valves for general purposes* was withdrawn on 4 June 2004 and superseded by the 2002 edition of AS 2638 Parts 1 & 2, *Gate valves for waterworks purposes – Resilient seated*. The 2002 editions were subsequently superseded by the 2011 editions.

2. AS 2118.1-2006

The 2006 edition of AS 2118.1 includes the same requirements as the 1999 edition with the addition that Clause 8.2.1 in AS 2118.1-2006 also requires all stop valves to be of the “self-indicating type”.

Note: In addition to the above requirements in regards to isolation valves (stop valves) on the water supply, it should also be highlighted that—as stated in Clause 4.4.3 of AS 2118.1-1999—sprinkler systems also require a booster assembly. This booster assembly may, or may not, incorporate a backflow prevention device and isolation valves on either side. This is not explicitly highlighted in either edition of AS 2118.1 but AS 2118.1-2006 Clause 4.5.4 does state the fire brigade booster connection shall conform to the requirements of AS 2419.1 and AS 2419.1 details this in Clause 9.4.

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4.2 Requirements of AS 2419.1

The requirements of above-ground isolating valves are covered in Clause 8.5.8 of AS 2419.1-2005 which states that:

Above-ground installed isolating valves shall be full-flow outside screw and yoke wheel gate valves of the indicating type or low torque wheel-operated multi-turn post indicator ball or butterfly valves...

Clause 8.5.9 of AS 2419.1-2005 covers below-ground isolating valves and requires these to conform to Clause 8.5.8 or “be key-operated sluice valves complying with AS 2638”.

4.3 Requirements of AS/NZS 3500.1-2003

The design and installation of fire services must comply with AS/NZS 3500.1-2003. Section 6 of AS/NZS 3500.1-2003 refers to fire services, with Clause 6.3 stating:

Materials and products used in fire service installations shall be—

- (a) subject to the limits on the use of material or product specified in Section 2 and the relevant Standard covering the fire service...*

As such, since isolation valves are a ‘product’ they should (as per 6.3) meet the requirements of AS/NZS 3500.1-2003 and the relevant standard for the applicable fire service—AS 2118.1 or AS 2419.1.

Note: AS/NZS 3500.1-2015 has recently been published, in which ‘Materials and Products’ are now detailed in Clause 6.2. This version has not yet been adopted by the Plumbing Code of Australia. However, it may have been directly adopted upon publication by State or Territory legislation. You should refer to your relevant state building and plumbing legislation to determine which version of AS/NZS 3500.1 is now relevant for your State or Territory.

4.3.1 Backflow prevention and resilient seated isolation valves

All water type fire services (automatic fire sprinkler systems, fire hydrant systems and the like) require backflow prevention of some type in accordance with Section 4 of AS/NZS 3500.1-2003. Depending on the hazard rating and potential form of cross-connection the required backflow prevention device may need to be a Double-Check Valve assembly (DCV). A DCV is designated in Section 4 to be a ‘Registered Testable Device’.

If the backflow prevention device required is a DCV—or other Testable Device—then the isolation valves immediately upstream and downstream

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of the Testable Device must not only comply with the respective standard for the fire service, it must also be resilient seated in accordance with Clause 4.6.1(d) of AS/NZS 3500.1-2003.

Careful consideration during design and installation needs to be carried out to correctly determine the type of backflow prevention device necessary to comply with AS/NZS 3500.1-2003.

Note: You should always consult the local water supply authority for advice on any specific requirements they may have in addition to those detailed in this bulletin.

4.4 Plumbing Code of Australia and Watermark Scheme

In addition to the relevant installation standards, all isolation valves for fire services (sprinklers, hydrants and the like) are required to comply with the Plumbing Code of Australia (PCA). Parts A2.1 and A2.2 of the PCA detail the 'Suitability of Materials and Products' and 'Evidence of Suitability', respectively.

Part A2.1 states that products detailed within Table A2.1—such as water supply valves and valve accessories—must be certified, authorised & comply with Part G1. In addition, they must also comply with AS/NZS 4020-2005, *Testing of products for use in contact with drinking water*. Table A2.1 details the water supply valves and valve accessories for fire protection which require Certification.

As detailed in Part G1, a material or product requiring Watermark Certification must obtain this Certification through the Watermark Certification Scheme. This includes certain water supply valves and valve accessories required for wet type fire protection systems.

5.0 Conclusion

From the above mentioned Australian Standards and Plumbing Code of Australia, FPA Australia concludes the following:

1. Isolation valves for automatic fire sprinkler systems and fire hydrant systems must comply with AS 2118.1 and AS 2419.1, respectively. They must also comply with AS/NZS 3500.1.
2. All isolation valves from the point of connection up to and including the isolation valve immediately downstream of the backflow prevention device must have Level 1 Watermark Certification.
3. Isolation valves upstream and downstream of any testable backflow prevention device must be resilient seated.

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4. AS 2118.1 (both the 1999 and 2006 editions) and AS 2419.1 clearly state the requirement for multi-turn indicating type isolation valves.
5. Quarter ($\frac{1}{4}$) turn lever type isolation valves do not comply with AS 2118.1 or AS 2419.1 and therefore, they are not permitted to be installed on automatic fire sprinkler systems or fire hydrant systems.

Note: The PCA 2015 defines the 'point of connection' for a water service as:

(d) for a water service means the point where the service pipe within the premises connects to the Network Utility Operator's property service or to an alternative water supply system.

You should always refer to the current edition of the PCA for this definition as it may differ between editions.

6.0 Recommendations

FPA Australia makes the following recommendations:

1. Type of isolation valves for automatic fire sprinkler system and fire hydrant system

- Isolation valves installed on any AS 2118.1 automatic fire sprinkler system or AS 2419.1 fire hydrant system must be of the multi-turn indicating type and all isolation valves from the point of connection up to and including the isolation valve immediately downstream of the backflow prevention device must have Level 1 Watermark Certification.
- Designers, certifiers and building surveyors must ensure that all isolation valves specified, installed, certified or approved for use on a AS 2118.1 fire sprinkler system or AS 2419.1 fire hydrant system are of the multi-turn indicating type and all isolation valves from the point of connection up to and including the isolation valve immediately downstream of the backflow prevention device must be Level 1 Watermark Certified.
- Building owners should request their fire protection service providers confirm if their existing or proposed automatic fire sprinkler system or fire hydrant system incorporate quarter ($\frac{1}{4}$) turn lever type isolation valves, and
- Fire protection service providers should detail and record the installation of quarter ($\frac{1}{4}$) turn lever type isolation valves on automatic fire sprinkler systems or fire hydrant systems as a 'Non-Conformance' in accordance with AS 1851-2012.

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2. Isolation Valves for Testable Backflow Prevention Devices

Isolation valves installed immediately upstream and downstream of any testable backflow prevention device must:

- Comply with the requirements of AS 2118.1 and AS 2419.1 for the fire service,
- Be resilient seated in accordance with Clause 4.6.1 of AS/NZS 3500.1, and
- Have Level 1 Watermark Certification.

7.0 References

1. Australian Standard AS 2118.1-1999, *Automatic fire sprinkler systems—General requirements* – Published by Standards Australia International Ltd.
2. Australian Standard AS 2118.1-2006, *Automatic fire sprinkler systems—General requirements* – Published by Standards Australia International Ltd.
3. Australian Standard AS 2419.1-2005, *Fire hydrant installations - System design, installation and commissioning*– Published by Standards Australia International Ltd.
4. Australian Standard AS 4118.1.6-1995, *Fire sprinkler systems - Components - Stop valves and non-return valves* – Published by Standards Australia International Ltd.
5. Australian/New Zealand Standard AS/NZS 3500.1-2003, *Plumbing and drainage - Water services* – Published by Standards Australia International Ltd.
6. National Construction Code Series 2015 – Volume One, Building Code of Australia: Class 2 to Class 9 Buildings – Published by the Australian Building Codes Board, Canberra, Australia.
7. National Construction Code Series 2015 – Volume Three, Plumbing Code of Australia – Published by the Australian Building Codes Board, Canberra, Australia.

8.0 Disclaimer

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