

Australian/New Zealand Standard™

Water supply — Backflow prevention devices

Part 3: Field testing and maintenance of testable devices



AS/NZS 2845.3:2020

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- Australian Chamber of Commerce and Industry
- Australian Industry Group
- Backflow Prevention Association of Australia
- Department for Manufacturing, Innovation, Trade, Resources and Energy, SA
- Environment and Planning Directorate, ACT
- Master Plumbers Australia
- Master Plumbers, Gasfitters and Drainlayers New Zealand
- NSW Fair Trading
- Plastics Industry Pipe Association of Australia
- Plumbing Products Industry Group
- Queensland Brassware Association
- Victorian Building Authority
- Water New Zealand
- Water Services Association of Australia

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Part 3: Field testing and maintenance of testable devices

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Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee WS-023, *Backflow Prevention Devices for Water Supply*, to supersede AS 2845.3—2010.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand developed this Standard as a joint Australia/New Zealand Standard.

The objective of this Standard is to outline minimum requirements for the testing and maintenance of testable backflow prevention devices in the field.

This Standard is to be read in conjunction with the requirements of the relevant regulatory authority, and the manufacturer's instructions. The safety practices to be followed while performing field testing and maintenance work should comply with the applicable WH&S legislation and the relevant regulatory authority's procedures. The actions stipulated within this Standard are in addition to those requirements.

The terms “normative” and “informative” are used in Standards to define the application of the appendices 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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Water supply — Backflow prevention devices

Part 3: Field testing and maintenance of testable devices

Section 1 Scope and general

1.1 Scope

This Standard specifies requirements for field testing and maintenance of the following backflow prevention devices:

- (a) Registered break tank (RBT).
- (b) Registered air gap (RAG).
- (c) Pressure-type vacuum-breaker (PVB).
- (d) Spill resistant pressure vacuum-breaker (SPVB).
- (e) Reduce-pressure-zone device (RPZD).
- (f) Double check valve (DCV).
- (g) Reduced-pressure-detector assembly (RPDA).
- (h) Double check detector assembly (DCDA).
- (i) Single check valve (testable) (SCVT).
- (j) Single check detector assembly (testable) (SCDAT).
- (k) Atmospheric vacuum breakers (AVB).

NOTE Single check valve and single check detector assembly [Items (i) and (j)] do not apply to New Zealand).

1.2 Application

This Standard shall be read in conjunction with the manufacturer's instructions. The relevant legislation applies.

NOTE 1 Testable devices should only be used where there is a maintenance program for device registration and test certification.

NOTE 2 New Zealand requires backflow device installations to meet the New Zealand Building Code G12 and hazard identification requirements, regardless of any property compliance schedule set in place, or property type.

1.3 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document:

AS/NZS 2845.1, *Water supply—Backflow prevention devices, Part 1: Materials, design and performance requirements*

AS 2845.2, *Water supply—Backflow prevention devices, Part 2: Registered air gaps and registered break tanks*

AS/NZS 3500.0, *Plumbing and drainage, Part 0: Glossary of terms*

AS/NZS 3500.1, *Plumbing and drainage, Part 1: Water services*

AS ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

1.4 Terms and definitions

For the purpose of this Standard, the terms and definitions given in AS/NZS 2845.1, AS 2845.2 and AS/NZS 3500.0 and those below apply.

1.4.1

downstream

side where the water exits the backflow prevention device or where the water is moving to

Note 1 to entry: For example, the direction/outlet of the water flow or the side where the water will be going to.

1.4.2

field testing

operational checking (which may include measurements) to ascertain the level of performance of a backflow prevention device for the purpose of maintaining its specified performance

1.4.3

inspection

close and careful scrutiny of an item carried out either without dismantling or with partial dismantling, supplemented by means such as measurement, in order to arrive at a reliable conclusion as to the condition of an item

1.4.4

maintenance

regular routine technical and administrative actions, taken during an item's service life, aimed at retaining it in a state in which it can perform its required functions

1.4.5

shall

indicates that a statement is mandatory

1.4.6

should

indicates a recommendation

1.4.7

upstream

side where the water enters the backflow prevention device

Note 1 to entry: For example, the source/inlet of the water flow.

Section 2 Field testing and maintenance

2.1 Field testing

Field testing, which includes inspection, shall be carried out at the frequencies given in [Table 1](#) for the nominated backflow prevention devices, and shall be performed in accordance with the applicable test appendices stipulated in [Table 1](#).

Equipment used for the field testing kit of backflow prevention devices shall be annually calibrated to the Metrology Society of Australia MSA Test Method 1 or Method 2 using —

- (a) traceable equipment; or
- (b) a testing laboratory or facility in accordance with AS ISO/IEC 17025.

NOTE 1 For example, accreditation bodies which are signatories to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for testing laboratories may be able to offer accreditation against the requirements of AS ISO/IEC 17025. A listing of ILAC signatories is available from the ILAC website (www.ilac.org). In Australia and New Zealand, the National Association of Testing Authorities (NATA) and International Accreditation New Zealand (IANZ) are signatories to the ILAC MRA.

NOTE 2 AS ISO/IEC 17025 can apply to first-party (i.e. manufacturer or supplier), second-party (i.e. user or purchaser) or third-party testing laboratories and facilities.

NOTE 3 For MSA Test Method 1 or Method 2, the relevant test points should be 7, 10, 14, 20, 35, 50, 70 and 100 kPa.

NOTE 4 A typical test kit arrangement is shown in [Appendix B](#).

Table 1 — Test requirements

Device	Test appendix	Test frequency
Registered air gap (RAG)	Appendix A	After installation, maintenance or repair, and at intervals not exceeding 12 months
Registered break tank (RBT)	Appendix C	
Pressure-type vacuum-breaker (PVB)	Appendix D	
Spill resistant pressure vacuum-breaker (SPVB)	Appendix E	
Reduced-pressure-zone device (RPZD)	Appendix F	
Double check valve (DCV)	Appendix G	
Reduced-pressure-detector assembly (RPDA)	Appendix H	
Double check detector assembly (DCDA)	Appendix I	
Single check valve (testable) (SCVT)	Appendix J	
Single check detector assembly (testable) (SCDAT)	Appendix K	
Atmospheric vacuum breakers (AVB)		

2.2 Test report

2.2.1 General

As a minimum, a test report shall include the following:

- (a) Type of test including the following:
 - (i) Initial commissioning.
 - (ii) Annual test.
 - (iii) Retest.
 - (iv) Audit test.
- (b) Type and serial number of device.
- (c) Owner and property details.
- (d) Tester details.
- (e) Date of inspection.
- (f) Results of inspection and testing — pass/fail.
- (g) Test kit serial number.
- (h) Test kit calibration date.

- (i) Appendix the valve has been tested to.

NOTE 1 The relevant authority having jurisdiction should be contacted in advance to confirm the test report format required.

NOTE 2 An example of a typical format for reporting test results for registered air gaps and registered break tanks is given in [Appendix L](#).

NOTE 3 An example of a typical format for reporting inspection and maintenance for backflow prevention devices is given in [Appendix M](#).

2.2.2 Copies of test reports

A copy of the test report shall be retained and copies forwarded to the following:

- (a) Relevant authority having jurisdiction.
- (b) Owner of the device.

2.3 Acceptance criteria

The following acceptance test criteria shall be adopted:

- (a) *Registered air gap* — The measured air gap conforms with Table A.3, Appendix A of AS 2845.2—2010 (see [Appendix A](#)).
- (b) *Registered break tank* (see [Appendix A](#)):
 - (i) An overflow is fitted and not obstructed.
 - (ii) No bridging devices are installed.
 - (iii) The measured air gap conforms with Appendix A of AS 2845.2—2010.
 - (iv) The measured total height calculation conforms with Appendix A of AS 2845.2—2010.
- (c) *Pressure-type vacuum-breaker and spill-resistant pressure vacuum-breaker* (see [Figure C.1](#) of [Appendix C](#) and [Figure D.1](#) of [Appendix D](#)):
 - (i) The non-return valve measured differential pressure is 7 kPa or greater.
 - (ii) The air inlet valve opens at 7 kPa or greater.
 - (iii) Upstream and downstream isolating valves are watertight.
- (d) *Reduced pressure zone device (RPZD) and reduced-pressure-detector assembly (RPDA)* (see [Figure E.1](#) of [Appendix E](#) and [Figure G.1](#) of [Appendix G](#)):
 - (i) First check valve pressure differential is 35 kPa or greater.
 - (ii) Relieves to atmosphere at 14 kPa or greater.
 - (iii) Second check valve pressure differential is tight and 7 kPa or greater.
 - (iv) Main valve upstream and downstream isolating valves are watertight.
 - (v) For reduced-pressure detector assemblies, the sum of the main valve check valve pressure differential is greater than the bypass assembly pressure differentials.
- (e) *Single check valve (testable) (SCVT) and single check detector assembly (testable) (SCDAT)* (see [Figure I.1](#) of [Appendix I](#) and [Figure J.1](#) of [Appendix J](#)):
 - (i) Pressure differential of non-return valve is 7 kPa or greater.

- (ii) Main valve upstream and downstream isolating valves are watertight.
- (iii) For single check detector assemblies, the main inline valve is to have a differential pressure greater than the bypass assembly pressure differentials.

NOTE SCVT and SCDAT is not applicable to New Zealand.

- (f) *Double check valve (DCV) and double check detector assembly (DCDA)* (see [Figure F.1](#) of [Appendix F](#) and [Figure H.1](#) of [Appendix H](#)):
 - (i) Pressure differential of each check valve is 7 kPa or greater.
 - (ii) Main valve upstream and downstream isolating valves are watertight.
 - (iii) For double check detector assemblies, the sum of the main valve check valve pressure differentials is greater than the bypass assembly pressure differentials.
- (g) *Atmospheric vacuum breaker (AVB)* — The movement of the air inlet valve from visual inspection (see [Figure K.1](#) and [Appendix K](#)).

2.4 Field maintenance

Repairs to maintain devices shall be undertaken as soon as practicable when a device is known to have failed. During repairs, the same level of protection shall be maintained or the affected section of the water supply system shut down.

NOTE 1 Parts used in maintenance should be as specified by the manufacturer(s).

After repairs are completed, entrapped air shall be bled off in accordance with manufacturer's instructions.

NOTE 2 This prevents possible damage to the device.

Field testing in accordance with [Clause 2.1](#) shall be performed after any repair.

NOTE 3 The owner of the assembly or the owner's agent should be notified that the water supply will be isolated during the test procedure. Special arrangements may be required so that interruptions to services will not create an inconvenience to the user. Where a fire service is to be isolated, the responsible person or organization should be notified.

NOTE 4 If the tester suspects the integrity of the isolating valves is comprised, it would be prudent to request the owner or his agent to operate the isolating valves, at least in the first instance.

2.5 Workplace Health and Safety (WHS) requirements

When field-testing or maintaining backflow prevention devices, all WHS requirements, including electrical safety precautions, shall be complied with.

Appendix A (normative)

Field testing of registered air gaps and registered break tanks

A.1 Scope

This Appendix sets out the method for testing registered air gaps and registered break tanks.

A.2 Principle

Measurement of water level is taken and the system inspected for correct configuration.

A.3 Apparatus

A measuring device is required, e.g. a ruler.

A.4 Procedure

A.4.1 Registered air gaps

The procedure shall be as follows:

- (a) Measure and record the distance from the spill level to the outlet of the water service.
- (b) Check the air gap conforms with Table 4.6.3.2 (Minimum air gap) and Figure G.1 of AS/NZS 3500.1:2018.

A.4.2 Registered break tanks

The procedure shall be as follows:

- (a) Check the break tank has an overflow fitted below the level of the inlet.
- (b) Inspect overflow for any obstructions.
- (c) Check there is no bridging device between the outlet of the water supply or float control valve and the water in the tank.
- (d) Record the size of the inlet orifice to tank and calculate cross-sectional area for the overflow.
- (e) Measure and record the height (h) of water above the invert of the overflow, in millimetres. Height (h) shall conform with the requirements of AS 2845.2.

A.5 Test report

See [Clause 2.2](#) for reporting requirements.

Appendix B (informative)

Test kit arrangement for mechanical backflow prevention devices

[Figure B.1](#) shows a typical test kit arrangement for mechanical backflow prevention devices.

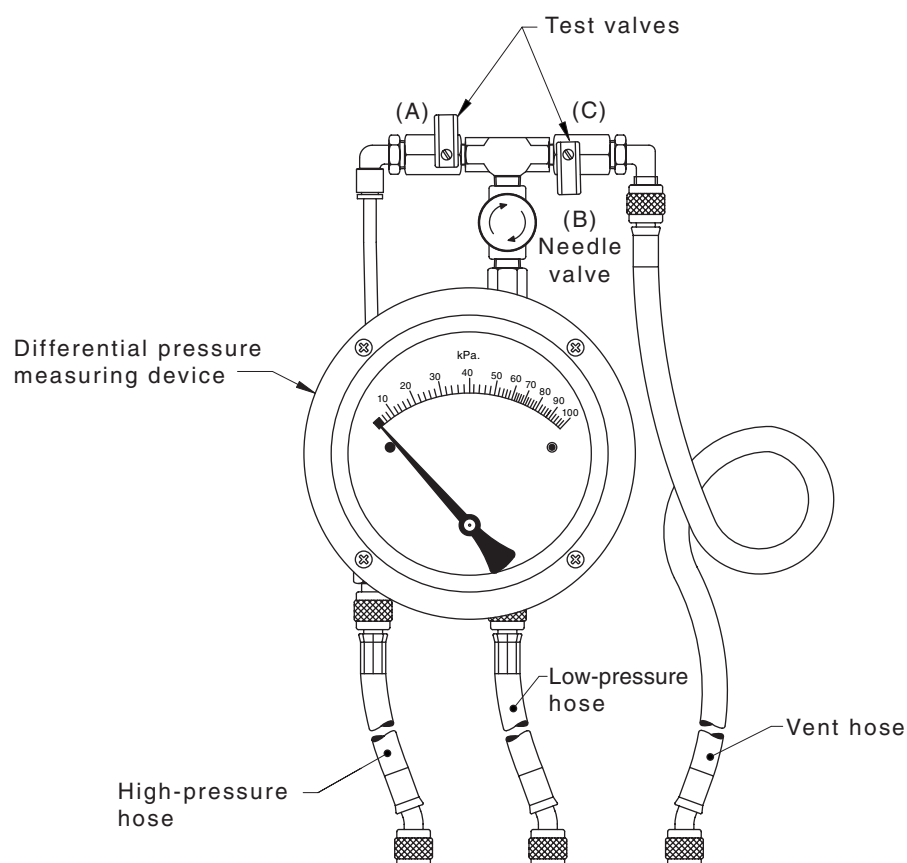


Figure B.1 — Typical test kit arrangement for mechanical backflow prevention devices

Appendix C (normative)

Field testing of pressure-type vacuum-breaker backflow prevention device

C.1 Scope

This Appendix sets out the method for field testing pressure-type vacuum-breaker and spill resistant pressure vacuum-breaker backflow prevention devices.

C.2 Apparatus

A typical test kit is shown in [Appendix B](#).

C.3 Procedure

For references to valves A, B and C see [Appendix B](#). For references to taps and valves 1 to 5 see [Figure C.1](#).

The procedure shall be as follows:

(a) *Test preparation:*

- (i) Check, and if necessary, open upstream isolating valve (4).
- (ii) Close downstream isolating valve (5).
- (iii) In sequence open and close each test taps (1) and (2) to flush out any impurities.
- (iv) Ensure test kit valve (A) is open, (B) is closed and (C) is closed.

(b) *To test the upstream and downstream isolating valves:*

- (i) Connect high-pressure hose to test tap (2).
- (ii) Slowly open test tap (2) and vent water through the vent hose.
- (iii) Open test kit valve (C) and (B); this will eliminate all air from the test kit.
- (iv) Close test kit valve (C) and (B).
- (v) Close upstream isolating valve (4).

NOTE The differential gauge will indicate a high reading.

- (vi) Slowly open test kit valve (B) and drop the gauge pressure (needle) by a visible amount (to observe pressure rise or fall).

- (vii) Close test kit valve (B).

- (viii) Observe the differential gauge as follows:

- If the gauge fails to drop, the upstream isolating valve (4) is leaking. If the pressure on the gauge is rising, the downstream isolating valve (5) is leaking. Leakage invalidates the test results. Faulty upstream and downstream isolating valves shall be repaired or replaced. The test shall be repeated.

- Test kit and hose shall be held at the same level as the SVB during the test.
- Clean line strainer where fitted.

(c) *To test the air inlet valve:*

- (i) Remove air port shield (3).
- (ii) Slowly open test kit valve (B). Observe the pressure differential gauge and air inlet valve. Record the reading of the pressure differential gauge when the air inlet valve begins opening.

If a reading below 7 kPa is indicated, the air inlet valve shall be deemed to be faulty. The valve shall be repaired or replaced. The test shall be repeated.
- (iii) Close test tap (2) and disconnect high-pressure hose from test tap (2).
- (iv) Open upstream isolating valve (4). Ensure test kit valves (A) and (B) are closed, while (C) is open.

(d) *To test the non-return valve:*

- (i) Connect —
 - the high-pressure hose (A) of the test kit to test tap (1); and
 - the low-pressure hose (B) of the test kit to test tap (2).
- (ii) Open test taps (1) and (2).
- (iii) Open test kit valve (A) and bleed water through the vent hose.
- (iv) Close test kit valve (A).
- (v) Slowly open test kit needle valve (B) and bleed water through the vent valve hose (this eliminates air from the system).
- (vi) Slowly close test kit needle valve (B).
- (vii) Observe and record the reading on the differential pressure gauge.

If a reading below 7 kPa is indicated, the non-return valve shall be deemed to be faulty. The valve shall be repaired or replaced. The test shall be repeated.
- (viii) Close test taps (1) and (2) and open test kit valves (A) and (B). Disconnect the test kit hoses.
- (ix) Replace air port shield (3). Open downstream isolating valve (5). This restores the device to operating condition.