

Australian/New Zealand Standard™

**Water supply—Backflow prevention
devices**

**Part 1: Materials, design and
performance requirements**



AS/NZS 2845.1:2010

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee WS-023, Backflow Prevention Devices for Water Supply. It was approved on behalf of the Council of Standards Australia on 24 May 2010 and on behalf of the Council of Standards New Zealand on 28 May 2010. This Standard was published on 30 June 2010.

The following are represented on Committee WS-023:

ACT Planning and Land Authority
Australian Industry Group
Master Plumbers Association of NSW
Master Plumbers, Gasfitters and Drainlayers New Zealand
Plastics Industry Pipe Association of Australia
Plumbing Products Industry Group
Queensland Brassware Industry Advisory Panel
South Australian Water Corporation
Sydney Water Corporation
Water New Zealand
Water Services Association of Australia

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about joint Australian/New Zealand Standards can be found by visiting the Standards Web Shop at www.saiglobal.com.au or Standards New Zealand web site at www.standards.co.nz and looking up the relevant Standard in the on-line catalogue.

For more frequent listings or notification of revisions, amendments and withdrawals, Standards Australia and Standards New Zealand offer a number of update options. For information about these services, users should contact their respective national Standards organization.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Please address your comments to the Chief Executive of either Standards Australia or Standards New Zealand at the address shown on the back cover.

This Standard was issued in draft form for comment as DR 10003.

Australian/New Zealand Standard™

Water supply—Backflow prevention devices

Part 1: Materials, design and performance requirements

Originated as AS 2845—1986.
AS 2845—1986 revised and redesignated AS 2845.1—1991.
Second edition 1995.
AS 2845.1—1995 jointly revised and redesignated AS/NZS 2845.1:1998.
Second edition 2010.

COPYRIGHT

© Standards Australia/Standards New Zealand

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher.

Jointly published by Standards Australia, GPO Box 476, Sydney, NSW 2001 and Standards New Zealand, Private Bag 2439, Wellington 6140

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee WS-0023, Backflow Prevention Devices for Water Supply, to supersede AS/NZS 2845.1:1998.

The objective of this Standard is to provide health and safety and protection of the environment by providing suitable devices that qualify with established type testing.

This Standard does not include all types of backflow prevention devices currently on the market. It includes only those which at the time of publication were considered to be most relevant to the protection of drinking water supplies.

This revision includes amendments and requirements for additional devices arising from industry requirements.

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.

Illustrations used in this Standard are diagrammatic only and have been chosen without prejudice.

CONTENTS

	<i>Page</i>
SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE	9
1.2 APPLICATION	9
1.3 NORMATIVE REFERENCES	10
1.4 DEFINITIONS	10
1.5 TESTING APPARATUS, TESTING SEQUENCE AND INSTRUMENTATION	11
1.6 DESIGNATION OF SIZE	11
1.7 CLASSIFICATION	12
1.8 ALLOWABLE PRESSURES AND FLOW VELOCITIES	12
SECTION 2 MATERIALS	
2.1 GENERAL	13
2.2 STAINLESS STEEL	13
2.3 FILLER METALS	13
2.4 NICKEL-COPPER-IRON.....	13
2.5 FERROUS MATERIALS	14
2.6 COPPER.....	14
2.7 COPPER ALLOYS.....	14
2.8 ALUMINIUM ALLOYS	14
2.9 CORROSION-RESISTANT METALLIC MATERIALS	14
2.10 ELASTOMERIC MATERIALS	15
2.11 PLASTICS.....	15
SECTION 3 COMMON DESIGN AND PERFORMANCE REQUIREMENTS	
3.1 GENERAL	16
3.2 EFFECT ON WATER	16
3.3 PRESSURE AND TEMPERATURE RANGES	16
3.4 DESIGN	16
3.5 END CONNECTIONS	17
3.6 VALVE SEATINGS.....	17
3.7 STRUCTURAL TESTS.....	17
3.8 SAMPLING AND FREQUENCY PLANS.....	18
SECTION 4 ATMOSPHERIC VACUUM BREAKER (AVB)	
4.1 GENERAL	19
4.2 APPLICATION	19
4.3 COMPONENTS	19
4.4 SPECIFIC DESIGN REQUIREMENTS.....	19
4.5 PERFORMANCE TESTS	20
4.6 SAMPLING AND FREQUENCY PLANS.....	21
SECTION 5 HOSE CONNECTION VACUUM BREAKER (HCVB)	
5.1 GENERAL	22
5.2 APPLICATION	22
5.3 COMPONENTS	22
5.4 SPECIFIC DESIGN REQUIREMENTS.....	22
5.5 PERFORMANCE TESTS	23
5.6 SAMPLING AND FREQUENCY PLANS.....	24

SECTION 6 DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP)	
6.1 GENERAL	25
6.2 APPLICATION	25
6.3 COMPONENTS	25
6.4 SPECIFIC DESIGN REQUIREMENTS	25
6.5 PERFORMANCE TESTS	26
6.6 SAMPLING AND FREQUENCY PLANS	27
SECTION 7 DUAL CHECK VALVE (DUAL CV)	
7.1 GENERAL	28
7.2 APPLICATION	28
7.3 COMPONENTS	28
7.4 PERFORMANCE TESTS	28
7.5 SAMPLING AND FREQUENCY PLANS	29
SECTION 8 DUAL CHECK VALVE WITH INTERMEDIATE VENT (Du CV)	
8.1 GENERAL	30
8.2 APPLICATION	30
8.3 COMPONENTS	30
8.4 SPECIFIC DESIGN REQUIREMENTS	30
8.5 PERFORMANCE TESTS	31
8.6 SAMPLING AND FREQUENCY PLANS	31
SECTION 9 PRESSURE TYPE VACUUM BREAKER (PVB)	
9.1 GENERAL	32
9.2 APPLICATION	32
9.3 COMPONENTS	32
9.4 SPECIFIC DESIGN REQUIREMENTS	33
9.5 PERFORMANCE TESTS	33
9.6 SAMPLING AND FREQUENCY PLANS	34
SECTION 10 DOUBLE CHECK VALVE (DCV)	
10.1 GENERAL	35
10.2 APPLICATION	35
10.3 COMPONENTS	35
10.4 SPECIFIC DESIGN REQUIREMENTS	35
10.5 PERFORMANCE TESTS	35
10.6 SAMPLING AND FREQUENCY PLANS	36
SECTION 11 DOUBLE CHECK DETECTOR ASSEMBLY (DCDA)	
11.1 GENERAL	37
11.2 APPLICATION	37
11.3 COMPONENTS	37
11.4 PERFORMANCE TEST	37
11.5 SAMPLING AND FREQUENCY PLANS	38
SECTION 12 REDUCED PRESSURE ZONE DEVICE (RPZD)	
12.1 GENERAL	39
12.2 APPLICATION	39
12.3 COMPONENTS	39
12.4 SPECIFIC DESIGN REQUIREMENTS	40
12.5 PERFORMANCE TESTS	40
12.6 SAMPLING AND FREQUENCY PLANS	42

	<i>Page</i>
SECTION 13 REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA)	
13.1 GENERAL	43
13.2 APPLICATION	43
13.3 COMPONENTS	43
13.4 PERFORMANCE TEST.....	43
13.5 SAMPLING AND FREQUENCY PLANS.....	44
SECTION 14 SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB)	
14.1 GENERAL	45
14.2 APPLICATION	45
14.3 COMPONENTS	45
14.4 SPECIFIC DESIGN REQUIREMENTS.....	46
14.5 PERFORMANCE TESTS	46
14.6 SAMPLING AND FREQUENCY PLANS.....	47
SECTION 15 BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC)	
15.1 GENERAL	48
15.2 APPLICATION	48
15.3 COMPONENTS	48
15.4 SPECIFIC DESIGN REQUIREMENTS.....	49
15.5 PERFORMANCE TESTS	49
15.6 SAMPLING AND FREQUENCY PLANS.....	50
SECTION 16 PIPE INTERRUPTER DEVICE (PID)	
16.1 GENERAL	51
16.2 APPLICATION	51
16.3 COMPONENTS—AIR INLETS	51
16.4 SPECIFIC DESIGN REQUIREMENTS.....	51
16.5 PERFORMANCE TEST.....	52
16.6 SAMPLING AND FREQUENCY PLANS.....	52
SECTION 17 SINGLE CHECK VALVE (TESTABLE) (SCVT)	
17.1 GENERAL	53
17.2 APPLICATION	53
17.3 COMPONENTS	53
17.4 SPECIFIC DESIGN REQUIREMENTS	53
17.5 PERFORMANCE TESTS	53
17.6 SAMPLING AND FREQUENCY PLANS.....	54
SECTION 18 SINGLE CHECK DETECTOR ASSEMBLY (TESTABLE) (SCDAT)	
18.1 GENERAL	55
18.2 APPLICATION	55
18.3 COMPONENTS	55
18.4 PERFORMANCE TESTS	56
18.5 SAMPLING AND FREQUENCY PLANS.....	56
SECTION 19 MARKING AND PACKAGING	
19.1 MARKING	57
19.2 PACKAGING.....	57

SECTION 20 MANUFACTURER'S DATA

20.1	INSTALLATION INSTRUCTIONS	58
20.2	MAINTENANCE INSTRUCTIONS	58

APPENDICES

A	MEANS FOR DEMONSTRATING COMPLIANCE WITH THIS STANDARD	59
B	NORMATIVE DOCUMENTS	83
C	TESTING APPARATUS, TEST SEQUENCE AND INSTRUMENTATION REQUIREMENTS.....	85
D	TORQUE TEST ON SCREWED-IN END DEVICES	91
E	TEST FOR ABILITY TO WITHSTAND CONTINUOUS PRESSURE— DEVICES INTENDED FOR HEATED WATER APPLICATIONS	93
F	POSITIVE PRESSURE TEST.....	94
G	REVERSE PRESSURE TEST.....	95
H	AIR PORT OPENING AREA TEST—ATMOSPHERIC VACUUM BREAKER (AVB), PRESSURE TYPE VACUUM BREAKER (PVB) , SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB), AND PIPE INTERRUPTER DEVICE (PID).....	97
I	WATER RISE TEST—ATMOSPHERIC VACUUM BREAKER (AVB), PRESSURE TYPE VACUUM BREAKER (PVB) AND SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB).....	99
J	ENDURANCE TEST—ATMOSPHERIC VACUUM BREAKER (AVB)	101
K	RATED FLOW AND PRESSURE LOSS TEST	103
L	VENTILATION VALVE LEAKAGE TEST—ATMOSPHERIC VACUUM BREAKER (AVB).....	104
M	DETERMINATION OF CRITICAL LEVEL—ATMOSPHERIC VACUUM BREAKER (AVB), PRESSURE-TYPE VACUUM BREAKER (PVB) AND SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB)	105
N	TEST FOR LEAKAGE FROM AIR PORTS—HOSE CONNECTION VACUUM BREAKER (HCVB) AND DUAL CHECK VALVE WITH INTERMEDIATE VENT (Du CV)	107
O	TEST FOR RESISTANCE TO BENDING—HOSE CONNECTION VACUUM BREAKER (HCVB).....	108
P	TEST FOR RESISTANCE AND RELIEF OF BACKPRESSURE—HOSE CONNECTION VACUUM BREAKER (HCVB).....	109
Q	BACKPRESSURE TEST—HOSE CONNECTION VACUUM BREAKER (HCVB)	110
R	TEST FOR BACK-SIPHONAGE—HOSE CONNECTION VACUUM BREAKER (HCVB) AND DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP).....	111
S	TEST FOR RATED WATER FLOW CAPACITY AND PRESSURE LOSS— HOSE CONNECTION VACUUM BREAKER (HCVB).....	112
T	ENDURANCE TEST—HOSE CONNECTION VACUUM BREAKER (HCVB)	113
U	NON-RETURN VALVE CLOSING PRESSURE TEST	114
V	TEST FOR LEAKAGE FROM AIR PORTS—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP)AND BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC).....	116
W	TEST FOR BACKFLOW THROUGH UPSTREAM NON-RETURN VALVE— DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP)AND BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC).....	117

	<i>Page</i>	
X	VENTILATION VALVE OPENING PRESSURE TEST—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP) AND BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC).....	119
Y	TEST FOR BACK-SIPHONAGE UNDER BACKPRESSURE—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP).....	120
Z	TESTING INSTALLATION FOR TESTS OF APPENDICES E, F, K, L, M, S AND AA.....	121
AA	TEST FOR FLOW RATE AT LOW SUPPLY PRESSURE—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP).....	122
BB	ENDURANCE TEST—DUAL CHECK VALVE WITH ATMOSPHERIC PORT (DCAP).....	123
CC	ENDURANCE TEST—DOUBLE CHECK VALVE (DCA), DUAL CHECK VALVE (Dual CV), DUAL CHECK VALVE WITH INTERMEDIATE VENT (Du CV), DOUBLE CHECK DETECTOR ASSEMBLY (DCDA), SINGLE CHECK VALVE (TESTABLE) (SCVT) AND SINGLE CHECK DETECTOR ASSEMBLY (TESTABLE) (SCDAT).....	124
DD	BACK-SIPHONAGE TEST—DUAL CHECK VALVE WITH INTERMEDIATE VENT (Du CV).....	126
EE	VENTILATION VALVE OPENING PRESSURE TEST—PRESSURE TYPE VACUUM BREAKER (PVB) AND SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB).....	128
FF	ENDURANCE TEST—PRESSURE-TYPE VACUUM BREAKER (PVB) AND SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB).....	130
GG	INTERMEDIATE CHAMBER PRESSURE TEST—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA).....	131
HH	DETERMINATION OF SUPPLY PRESSURE AT WHICH PRESSURE IN THE INTERMEDIATE CHAMBER BECOMES ATMOSPHERIC—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA).....	133
II	DETERMINATION OF INTERMEDIATE CHAMBER PRESSURE UNDER BACKPRESSURE CONDITIONS WHEN THE SUPPLY PRESSURE IS 14 kPa OR GREATER—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA).....	135
JJ	DETERMINATION OF INTERMEDIATE CHAMBER PRESSURE UNDER BACKPRESSURE CONDITIONS WHEN THE SUPPLY PRESSURE IS LESS THAN 14 kPa—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA).....	137
KK	DETERMINATION OF PRESSURE DIFFERENTIAL AT WHICH RELIEF VALVE COMMENCES TO OPEN—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA).....	139
LL	TEST FOR EFFECT OF SUPPLY PRESSURE FLUCTUATION ON DISCHARGE FROM RELIEF VALVE—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA).....	141
MM	BACK-SIPHONAGE TEST—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA).....	142
NN	BACKPRESSURE TEST—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPDA).....	144
OO	ENDURANCE TEST—REDUCED PRESSURE ZONE DEVICE (RPZD) AND REDUCED PRESSURE DETECTOR ASSEMBLY (RPZA).....	146

	<i>Page</i>
PP STICTION TEST—RESILIENT SEAT MATERIAL	147
QQ AIR PORT ENTRY SEALING TEST—SPILL-RESISTANT PRESSURE VACUUM BREAKER (SPVB).....	150
RR BACK-SIPHONAGE TEST—BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC).....	152
SS ENDURANCE TEST—BEVERAGE DISPENSER DUAL CHECK VALVE WITH ATMOSPHERIC PORT (BDDC).....	154
TT REQUIREMENTS SPECIFIC TO PLASTICS MATERIALS FOR DEVICE BODIES	155

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard
Water supply—Backflow prevention devices

Part 1: Materials, design and performance requirements

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements for the materials, design, performance and testing of mechanical backflow prevention devices that are used for the protection of water supplies.

This Standard covers backflow prevention devices classified as PN 10, PN 12 or PN 16, of the following types:

- (a) Atmospheric vacuum breaker (AVB).
- (b) Hose connection vacuum breaker (HCVB).
- (c) Dual check valve with atmospheric port (DCAP).
- (d) Dual check valve (Dual CV).
- (e) Dual check valve with intermediate vent (Du CV).
- (f) Pressure-type vacuum breaker (PVB).
- (g) Double check valve (DCV).
- (h) Double check detector assembly (DCDA).
- (i) Reduced pressure zone device (RPZD).
- (j) Reduced pressure detector assembly (RPDA).
- (k) Spill-resistant pressure vacuum breaker (SPVB).
- (l) Beverage dispenser dual check valve with atmospheric port (BDDC).
- (m) Pipe interrupter device (PID).
- (n) Single check valve (testable) (SCVT).
- (o) Single check detector assembly testable (SCDAT).

NOTE: Unless otherwise specified, the nominal size of a device is determined by the inlet connection.

1.2 APPLICATION

The means for demonstrating compliance with this Standard for the purposes of the Watermark Certification Scheme shall be in accordance with Appendix A.

All backflow prevention devices shall comply with Sections 1 to 3, and 19. Each backflow prevention device type shall comply with the relevant Section as follows:

- Section 4 Atmospheric vacuum breaker (AVB).
- Section 5 Hose connection vacuum breaker (HCVB).
- Section 6 Dual check valve with atmospheric port (DCAP).
- Section 7 Dual check valve (Dual CV).