

**AS/NZS 3500.1:2018**



Australian/New Zealand Standard

# **Plumbing and drainage**

## **Part 1: Water services**

Superseding AS/NZS 3500.1:2015

**AS/NZS 3500.1:2018**



This joint Australian/New Zealand standard was prepared by joint Technical Committee WS-014, Plumbing and Drainage. It was approved on behalf of the Council of Standards Australia on 13 June 2018 and by the New Zealand Standards Approval Board on 2 May 2018.

This standard was published on 29 June 2018.

---

**The following are represented on Committee WS-014:**

Association of Hydraulic Services Consultants Australia  
Australian Building Codes Board  
Australian Industry Group  
Australian Stainless Steel Development Association  
International Copper Association of Australia  
Master Plumbers Australia  
Master Plumbers, Gasfitters and Drainlayers New Zealand  
Plastics Industry Pipe Association of Australia  
Plastics New Zealand  
Plumbers, Gasfitters and Drainlayers Board  
Plumbing Distributors Association of New Zealand  
Plumbing Products Industry Group  
Water New Zealand

---

**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 Standards may also be withdrawn.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 webshop in Australia at [www.saiglobal.com](http://www.saiglobal.com) or Standards New Zealand's website at [www.standards.govt.nz](http://www.standards.govt.nz).

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 organisation.

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 either the Chief Executive of Standards Australia or the New Zealand Standards Executive at the address shown on the title page.

---

*This standard was issued in draft form for comment as DR AS/NZS 3500.1:2017.*

---

Australian/New Zealand Standard

---

# Plumbing and drainage

## Part 1: Water services

---

First published as AS 3500.1—1990.

Second edition 1992.

Jointly revised and redesignated AS/NZS 3500.1.2:1998.

Jointly revised and redesignated AS/NZS 3500.1:2003.

Third edition 2018.

### **COPYRIGHT**

© Standards Australia Limited 2018

© The Crown in right of New Zealand, administered by the New Zealand Standards Executive 2018

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, unless otherwise permitted under the Copyright Act 1968 (Australia) or the Copyright Act 1994 (New Zealand).

Jointly published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001 and by Standards New Zealand, PO Box 1473, Wellington 6140.

ISBN (Print) 978-1-77673-443-6

ISBN (PDF) 978-1-77673-444-3

## PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee WS-014, Plumbing and Drainage, to supersede AS/NZS 3500.1:2015.

The objective of this Standard is to provide installers with Deemed to Satisfy solutions to comply with—

- (a) the National Construction Code of Australia (NCC), Volume Three, Plumbing Code of Australia (PCA); and
- (b) the New Zealand Building Code (Clause G12, Water Supplies).

This Standard is part of a series for plumbing and drainage, as follows:

### AS/NZS

3500	Plumbing and drainage
3500.0	Part 0: Glossary of terms
3500.1	Part 1: Water services (this Standard)
3500.2	Part 2: Sanitary plumbing and drainage
3500.3	Part 3: Stormwater drainage
3500.4	Part 4: Heated water systems

The objective of this revision is to update requirements relating to backflow prevention, plastic pipes in direct sunlight, circulatory heated water, non-drinking water and clarification for jointing methods.

Some materials and products used in a water service are provided with instructions for installation and use. Whilst not a requirement of this Standard, or acceptable as an alternative to the requirements of this Standard, conformance to these instructions generally ensures that—

- (i) the material or product is fit for the application;
- (ii) the performance of the system is not degraded;
- (iii) the durability of the material or product is not impaired; and
- (iv) the manufacturer's warranty remains valid.

## PROVISION FOR REVISION

This Standard necessarily deals with existing conditions, but is not intended to discourage innovation or to exclude materials, equipment and methods that may be developed in future. Revisions will be made from time to time in view of such developments and amendments to this Edition will be made only when absolutely necessary.

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.

Statements expressed in mandatory terms in notes to figures and tables are deemed to be requirements of this Standard.

Notes used in this Standard are of an advisory nature only and are used to provide explanation or guidance to the user on recommended considerations or technical procedures, or to provide an informative cross-reference to other documents or publications. Notes to clauses in this Standard do not form a mandatory part for compliance with this Standard.

*This Standard includes a commentary on some of the clauses. The commentary directly follows the relevant clause, is designated by 'C' preceding the clause number and is printed in italics in a box. The commentary is for information and guidance and does not form part of the Standard.*

## CONTENTS

	<i>Page</i>
<b>SECTION 1 SCOPE AND GENERAL</b>	
1.1 SCOPE.....	7
1.2 APPLICATION .....	7
1.3 NORMATIVE REFERENCES .....	7
1.4 DEFINITIONS.....	10
1.5 ABBREVIATIONS .....	10
1.6 EQUIVALENT PIPE SIZES.....	11
1.7 FACILITIES FOR PEOPLE WITH DISABILITIES .....	11
1.8 TERMITE MANAGEMENT .....	11
<b>SECTION 2 MATERIALS AND PRODUCTS</b>	
2.1 SCOPE OF SECTION .....	13
2.2 AUTHORIZATION.....	13
2.3 SELECTION AND USE OF MATERIALS AND PRODUCTS .....	13
2.4 LIMITATIONS ON USE OF PIPES AND FITTINGS .....	13
2.5 SAFE-TRAYS AND WASTE PIPES .....	15
2.6 JOINTS.....	15
2.7 CONCRETE AND MORTAR .....	15
2.8 MISCELLANEOUS MATERIALS .....	16
2.9 BACKFLOW PREVENTION DEVICES .....	16
<b>SECTION 3 SIZING OF WATER SERVICES</b>	
3.1 SCOPE OF SECTION .....	17
3.2 FLOW REQUIREMENTS.....	17
3.3 PRESSURE REQUIREMENTS.....	20
3.4 VELOCITY REQUIREMENTS .....	21
3.5 PIPE SIZE LIMITATIONS.....	21
<b>SECTION 4 CROSS-CONNECTION CONTROL AND BACKFLOW PREVENTION</b>	
4.1 SCOPE OF SECTION .....	22
4.2 PROTECTION OF WATER SUPPLIES .....	22
4.3 CROSS-CONNECTION HAZARD RATING .....	22
4.4 PROVISION OF BACKFLOW PREVENTION DEVICES.....	23
4.5 SUITABILITY OF DEVICES FOR HAZARDS .....	27
4.6 INSTALLATION OF BACKFLOW PREVENTION DEVICES .....	27
<b>SECTION 5 INSTALLATION OF COLD WATER SERVICES</b>	
5.1 SCOPE OF SECTION .....	32
5.2 PROXIMITY TO OTHER SERVICES.....	32
5.3 ISOLATING VALVES.....	34
5.4 LOCATION OF PIPING .....	36
5.5 METHODS OF JOINTING .....	41
5.6 SUPPORT AND FIXING ABOVE GROUND .....	43
5.7 STANDPIPES.....	45
5.8 ANCHORAGE BELOW GROUND .....	45
5.9 DEPTH OF COVER .....	47
5.10 BEDDING AND BACKFILL .....	47
5.11 INSTALLATION IN CONTAMINATED AREAS.....	48
5.12 CORROSIVE AREAS .....	48
5.13 PIPES IN WATER-CHARGED OR FILLED GROUND .....	48
5.14 OPEN CHANNELS OR WATERCOURSES .....	49

	<i>Page</i>
5.15 PRIVATE EASEMENTS.....	49
5.16 DRY SERVICES .....	49
5.17 PROTECTION AGAINST FREEZING.....	49
5.18 IDENTIFICATION OF PIPING .....	51
5.19 TEMPERATURE CONTROL DEVICES.....	51
5.20 BUSHFIRE ZONES .....	51
<b>SECTION 6 FIRE SERVICES</b>	
6.1 SCOPE OF SECTION .....	52
6.2 MATERIALS AND PRODUCTS.....	52
6.3 INSTALLATION .....	52
6.4 WATER STORAGE TANKS .....	53
6.5 IDENTIFICATION.....	53
<b>SECTION 7 IRRIGATION AND LAWN WATERING SYSTEMS</b>	
7.1 SCOPE OF SECTION .....	54
7.2 SYSTEM TYPES.....	54
7.3 BACKFLOW PROTECTION REQUIREMENTS.....	54
7.4 MATERIALS.....	54
<b>SECTION 8 WATER STORAGE TANKS</b>	
8.1 SCOPE OF SECTION .....	60
8.2 PURPOSE OF TANKS.....	60
8.3 DESIGN AND INSTALLATION REQUIREMENTS.....	60
8.4 TANK DESIGN.....	61
8.5 INLET PIPING .....	66
8.6 OUTLET PIPING .....	66
8.7 SLUDGE VALVES .....	66
8.8 SAFE-TRAY .....	67
8.9 MARKING OF TANKS .....	67
<b>SECTION 9 NON-DRINKING WATER SERVICES</b>	
9.1 SCOPE OF SECTION .....	68
9.2 MATERIALS AND PRODUCTS.....	68
9.3 INSTALLATION REQUIREMENTS.....	68
9.4 CROSS-CONNECTION CONTROL.....	70
9.5 TEMPORARY BYPASS .....	70
9.6 IDENTIFICATION OF NON-DRINKING WATER SERVICES.....	70
9.7 NON-DRINKING WATER OUTLETS.....	71
9.8 TESTING AND COMMISSIONING A NON-DRINKING WATER SERVICE .....	72
<b>SECTION 10 TREATED GREYWATER SERVICES</b>	
10.1 SCOPE OF SECTION .....	74
10.2 MATERIALS AND PRODUCTS.....	74
10.3 CROSS-CONNECTION CONTROL.....	74
10.4 INSTALLATION .....	74
<b>SECTION 11 WATER FOR SANITARY FLUSHING</b>	
11.1 SCOPE OF SECTION .....	75
11.2 GENERAL.....	75
11.3 WATER CLOSET .....	75
11.4 URINALS.....	75
11.5 INSTALLATION OF CISTERNS .....	75

	<i>Page</i>
11.6 FLUSH VALVES SUPPLIED FROM BREAK TANKS .....	76
11.7 FLUSH PIPES AND WATER FLOW DISTRIBUTION .....	76
11.8 PRESSURE RATIO VALVES .....	77
11.9 FLUSH VALVES CONNECTED TO THE DRINKING WATER SERVICE .....	79
<b>SECTION 12 INSTALLATION OF WATER SUPPLY TO SPECIFIED FIXTURES</b>	
12.1 SCOPE OF SECTION .....	80
12.2 BIDET, BIDETTE AND TOILET SEAT DOUCHE .....	80
<b>SECTION 13 PUMPS</b>	
13.1 SCOPE OF SECTION .....	81
13.2 GENERAL.....	81
13.3 CONTROL OF PUMPS.....	81
13.4 INSTALLATION OF PUMPS.....	81
13.5 BOOSTER PUMPS .....	81
<b>SECTION 14 WATER REQUIREMENTS FOR HAEMODIALYSIS MACHINES</b>	
14.1 SCOPE OF SECTION .....	82
14.2 CONNECTION TO THE WATER SERVICE.....	82
14.3 MAINTENANCE OF FLOW RATE .....	82
14.4 WATER METERS.....	82
<b>SECTION 15 PROPERTY WATER METERS</b>	
15.1 SCOPE OF SECTION .....	83
15.2 LOCATION OF WATER METERS .....	83
15.3 INSTALLATION INSIDE BUILDINGS.....	83
15.4 INSTALLATION BELOW GROUND .....	83
15.5 PROTECTION FROM MECHANICAL DAMAGE.....	83
15.6 FROST PROTECTION.....	83
<b>SECTION 16 INSTALLATION OF WATER SUPPLY SYSTEM FROM RAINWATER TANKS</b>	
16.1 SCOPE OF SECTION .....	84
16.2 PIPES, VALVES AND FITTINGS.....	84
16.3 INSTALLATION .....	84
16.4 PROTECTION OF OTHER WATER SUPPLIES FROM RAINWATER .....	86
16.5 TESTING AND COMMISSIONING A RAINWATER SYSTEM .....	87
<b>SECTION 17 MULTI-UNIT DEVELOPMENTS</b>	
17.1 SCOPE OF SECTION .....	88
17.2 METHODS OF DESIGN AND INSTALLATION .....	88
17.3 DIVISION OF DEVELOPMENT .....	88
17.4 RING MAINS AND FLUSHING POINTS.....	88
17.5 FIRE SERVICES .....	88
<b>SECTION 18 TESTING AND COMMISSIONING</b>	
18.1 SCOPE OF SECTION .....	89
18.2 FLUSHING.....	89
18.3 TESTING.....	89
18.4 CLEANING AND DISINFECTION OF DRINKING WATER STORAGE TANKS .....	89
18.5 DISINFECTION OF WATER SERVICES .....	89
18.6 COMMISSIONING .....	89

## APPENDICES

A	EQUIVALENT PIPE SIZES.....	90
B	ACCEPTABLE PIPES AND FITTINGS .....	93
C	SIZING METHOD FOR SUPPLY PIPING FOR DWELLINGS.....	94
D	SIZING OF PIPING FOR DWELLINGS .....	103
E	EXAMPLES OF POTENTIAL CROSS-CONNECTIONS .....	106
F	TYPES OF BACKFLOW PROTECTION .....	108
G	STORAGE TANKS—INFLOW AND OVERFLOW .....	117
H	CLEANING AND DISINFECTION OF STORAGE TANKS .....	119
I	DISINFECTION OF WATER SERVICES.....	121
BIBLIOGRAPHY.....		122



# STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

## Australian/New Zealand Standard Plumbing and drainage

### Part 1: Water services

## SECTION 1 SCOPE AND GENERAL

### 1.1 SCOPE

This Standard specifies requirements for the design, installation and commissioning of cold water services from a point of connection to the points of discharge, and non-drinking water from a point of connection to the points of discharge. It applies to new installations as well as alterations, additions and repairs to existing installations.

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

#### NOTES:

- 1 The requirements for heated water services are set out in AS/NZS 3500.4.
- 2 See Figure 1.1 for typical installation of a property service and water service.

### 1.2 APPLICATION

#### 1.2.1 Australia

This Standard shall be read in conjunction with the National Construction Code (NCC), Volume Three, the Plumbing Code of Australia (PCA) in Australia.

Where alternative Australian or New Zealand standards are referenced (e.g. AS 1345) the Australian Standard shall be used for Australia.

For Australia, this Standard does not preclude the use of any design or method of installation, provided the completed system and installation meet the performance requirements of the NCC, as appropriate.

#### 1.2.2 New Zealand

This Standard shall be read in conjunction with the New Zealand Building Code in New Zealand. This Standard may be used for compliance with the New Zealand Building Code Paragraph G12, Water Supplies.

Where alternative New Zealand standards are referenced (e.g. NZS 5807) the New Zealand Standard shall be used for New Zealand.

### 1.3 NORMATIVE REFERENCES

The following are the normative documents referenced in this Standard:

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

#### AS

1074	Steel tubes and tubulars for ordinary service
1172	Water closets (WCs)
1172.1	Part 1: Pans
1172.2	Part 2: Flushing devices and cistern inlet and outlet valves



## **AS/NZS 3500.1:2018 Plumbing and drainage Part 1: Water services**

This is a free sample only.

Purchase the full publication here:

<https://shop.standards.govt.nz/catalog/3500.1%3A2018%28AS%7CNZS%29/view>

Or contact Standards New Zealand using one of the following methods.

**Freephone:** 0800 782 632 (New Zealand)

**Phone:** +64 3 943 4259

**Email:** [enquiries@standards.govt.nz](mailto:enquiries@standards.govt.nz)