

AS 4198:2022



STANDARDS
Australia



Precast concrete access and maintenance chambers for sewerage applications



This is a preview. [Click here to purchase the full publication.](#)

AS 4198:2022

This Australian Standard ® was prepared by WS-006, Concrete Pipes. It was approved on behalf of the Council of Standards Australia on 4 March 2022.

This Standard was published on 18 March 2022.

The following are represented on Committee WS-006:

- Australian Chamber of Commerce and Industry
- Australian Institute of Building
- Austroads
- Concrete Institute of Australia
- Concrete Pipe Association of Australasia
- Engineers Australia
- National Precast Concrete Association Australia
- University of New South Wales
- Water Services Association of Australia

Additional Interests

- Auckland Council
- Business New Zealand
- Concrete New Zealand Precast

This Standard was issued in draft form for comment as DR AS 4198:2020.

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:

www.standards.org.au

ISBN 978 1 76113 685 6

This is a preview. [Click here to purchase the full publication.](#)

Precast concrete access and maintenance chambers for sewerage applications

First published as AS 4198—1994.
Second edition 2022.

© Standards Australia Limited 2022

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 (Cth).

Preface

This Standard was prepared by the Standards Australia Committee WS-006, Concrete Pipes, to supersede AS 4198:1994, *Precast concrete access chambers for sewerage applications*.

The objective of this Standard is to provide a performance-based document for precast concrete access and maintenance chambers.

The major changes in this edition are as follows:

- (a) Durability has been enhanced with additional requirements covering reinforcement and concrete materials, as well as production, placement and curing of concrete. This edition also introduces a new exposure classification for chambers in sewer applications.
- (b) Precast concrete maintenance chambers have been incorporated into this Standard.
- (c) An increase in the maximum depth of chambers and the maximum nominal diameter of chambers and an increase in the maximum diameter of connecting pipes. Additional testing requirements and test methods have been included that accompany these changes in diameter and depth.
- (d) Updates to the load testing requirements to accommodate larger diameter chambers and also changes in road traffic loading from AS 5100.2:2017.
- (e) A new informative appendix has been added to provide guidance on the installation of precast access and maintenance chamber systems.

Statements in alphabetical superscript footnotes in tables expressed in mandatory terms are deemed to be requirements of this document. Other notes are only for information and guidance.

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.

Contents

Preface	ii
Introduction	vi
Section 1 Scope and general	1
1.1 Scope.....	1
1.2 Normative references	1
1.3 Terms and definitions.....	3
Section 2 Component structure, manufacture and materials	11
2.1 General.....	11
2.2 Exposure classification	13
2.2.1 Exposure classification for internal environments	13
2.2.2 Exposure classification of the external environment.....	14
2.3 Concrete materials	15
2.3.1 Cementitious materials	15
2.3.2 Cementitious material for concrete	16
2.3.3 Aggregates	17
2.3.4 Water	17
2.3.5 Admixtures.....	17
2.3.6 Reinforcement.....	17
2.3.7 Synthetic fibres.....	17
2.3.8 Restrictions on chemical content	18
2.3.9 Minimum cementitious material content, maximum water / cementitious material ratio, and maximum water absorption value	18
2.3.10 Alternative concrete mixes	18
2.4 Cover to reinforcement.....	19
2.4.1 General.....	19
2.4.2 Cover to reinforcement for internal environment	19
2.4.3 Cover to reinforcement to the external environment	20
2.4.4 Cover to reinforcement for mating surfaces of joints between components.....	21
2.4.5 Additional concrete requirements for internal and external environments.....	21
2.5 Manufacturing processes, and concrete production, placement and curing	22
2.5.1 Manufacturing processes.....	22
2.5.2 Concrete batching	23
2.5.3 Concrete placing.....	23
2.5.4 Curing.....	24
2.6 Concrete quality control testing	25
2.6.1 Machine-made concrete testing.....	25
2.6.2 Wet cast concrete and automated SCC cast concrete testing.....	26
2.7 Elastomeric seals.....	27
2.7.1 General.....	27
2.7.2 Mastic sealants.....	27
2.7.3 Other materials.....	27
Section 3 Manufacture, workmanship and finish	28
3.1 General.....	28
3.2 Test loads for proof and ultimate load testing.....	28
3.2.1 General.....	28
3.2.2 Vertical load testing requirements	28
3.2.3 Horizontal load testing requirements (shaft components only)	29
3.3 Dimensions and tolerances.....	30
3.3.1 Internal diameter of shafts.....	30
3.3.2 Access cover clear opening sizes.....	30
3.4 Measurement of the dimensions.....	30
3.4.1 Straightness.....	30
3.4.2 Squareness of ends.....	30

3.4.3	Shaft diameter	31
3.4.4	Wall thickness	32
3.4.5	Effective length	32
3.4.6	Slab thickness	33
3.5	Workmanship and finish	33
3.5.1	General	33
3.5.2	Joints	33
3.5.3	Reinforcement	33
3.5.4	Cover	33
3.5.5	Classification of defects	34
3.6	Marking	35
3.7	Handling and storage	36
3.7.1	General	36
3.7.2	Lifting inserts	36
3.7.3	Unreinforced access and maintenance chamber components	36
Section 4	Step irons and ladders	37
4.1	General	37
4.2	Materials	37
4.3	Performance testing of installed step irons	38
4.4	Step-up and step-down limitations	38
4.4.1	Step-up	38
4.4.2	Step-down	38
Section 5	Access covers and frames	40
5.1	General	40
5.2	Surface finish	40
5.3	Design of lifting keyholes	40
Section 6	Sampling and testing of access and maintenance chamber components	41
6.1	General	41
6.1.1	Facilities for sampling and testing	41
6.1.2	Testing procedures	41
6.1.3	Testing	42
6.2	Type testing	45
6.2.1	General	45
6.2.2	Manufacture	45
6.2.3	Test specimens	45
6.3	Routine testing	45
6.3.1	General	45
6.3.2	Sampling	45
6.3.3	Testing	45
6.4	Test requirements	45
6.4.1	Ultimate load	45
6.4.2	Proof load	45
6.4.3	Cover to reinforcement	46
6.4.4	Water absorption	46
6.4.5	Hydrostatic testing of shafts and base units	46
6.4.6	Hydrostatic testing of joints	46
6.4.7	Vacuum testing of shafts and base units	46
6.4.8	Vacuum testing of joints	47
6.4.9	Hydrostatic testing of the base to pipe joints	47
6.4.10	Dimensional accuracy	47
6.4.11	Step irons	47
Appendix A	(normative) Product conformity	48
Appendix B	(informative) Information exchange between manufacturer and purchaser	53
Appendix C	(normative) Methods for load testing of access and maintenance chamber components	55

Appendix D (normative) Method for cover testing of reinforced precast concrete access and maintenance chamber components	72
Appendix E (normative) Method for water absorption testing.....	74
Appendix F (normative) Method for hydrostatic testing of a shaft section.....	78
Appendix G (normative) Method for hydrostatic testing of a shaft assembly joint.....	81
Appendix H (normative) Method for load testing of step irons and ladders.....	84
Appendix I (informative) Guide to determining exposure classification.....	86
Appendix J (normative) Method for vacuum testing of a shaft section	88
Appendix K (normative) Method for vacuum testing of a jointed shaft assembly.....	91
Appendix L (informative) Method for leak testing of a base to pipe joint seal.....	94
Appendix M (informative) Installation	98
Appendix N (normative) Accelerated curing of wet-cast concrete components.....	102
Bibliography	105

Introduction

This Standard was prepared by the Standards Australia Committee WS-006, Concrete Pipes, as a performance-based document for precast concrete access and maintenance chambers.

It was prepared to address advances in current practice, the age of the previous publication of AS 4198 and proposals from industry to move towards greater use of product performance testing. This Standard specifies product performance requirements and excludes normative installation procedures. However, this Standard provides an informative procedure for installation. For further guidelines on recommended installation procedures, reference should be made to the relevant published literature of access and maintenance chamber manufacturers, asset owners, asset owner industry associations and, where appropriate, regulatory authorities.

The in-service life of a precast concrete access or maintenance chamber is dependent on the manufacture, application and installation conditions. This Standard intends that for such installations, service life of 100 years could be expected when components are manufactured in accordance with and installed as recommended by this Standard in the environments defined in this Standard. Components subject to other environments should be assessed for suitability using appropriate engineering judgement. The Standard specifies requirements for concrete access cover assemblies and excludes requirements for metal and polymeric access cover assemblies. The use of some blended cement and chemical admixtures in concrete components is addressed by the Standard.

This document specifically addresses sewerage applications but may also be relevant to drainage, stormwater and other conveyance applications.

Australian Standard®

Precast concrete access and maintenance chambers for sewerage applications

Section 1 Scope and general

1.1 Scope

This Standard describes performance requirements for circular precast concrete access and maintenance chambers systems including chamber materials, component manufacture and quality control. It also describes methods of sampling and testing of precast concrete components manufactured in accordance with the Standard.

This Standard applies to precast concrete access and maintenance chamber components manufactured from steel reinforced, synthetic fibre reinforced or unreinforced concrete that are intended for use in buried sewerage systems. Access chambers conforming to the requirements of this Standard are suitable for a maximum depth to invert of 9 m and to a typical connected pipe diameter not larger than DN750. Similarly, maintenance chambers are suitable for a maximum depth of 6 m and a connecting pipe diameter of not more than DN300.

For other circumstances where depths are greater than 9 m, then specific design matters should be addressed between the designer and the manufacturer.

NOTE 1 Information on means for demonstrating conformity to this Standard is given in [Appendix A](#).

NOTE 2 Guidance on the information to be exchanged by purchaser and manufacturer at the time of an access or maintenance chamber product enquiry or order is given in [Appendix B](#).

NOTE 3 Special design considerations, including high water table, buoyancy uplift resistance, chamber depths greater than 9 m and connected pipes that exceed 750 mm in diameter should be addressed by negotiation between the parties.

NOTE 4 Guidance on the installation of precast access and maintenance chamber systems, including excavation, foundation preparation, placing of units, backfilling, compaction and *in situ* testing is provided in an informative [Appendix M](#).

This Standard does not provide for the following:

- (a) Requirements for cast *in situ* concrete components.
- (b) Ladders that are supplied and installed *in situ*.
- (c) Plastics maintenance shafts.

1.2 Normative references

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

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

AS 1012.1, *Methods of testing concrete, Method 1: Sampling of fresh concrete*

AS 1012.3.5, *Methods of testing concrete, Method 3.5: Determination of properties related to the consistency of concrete — Slump flow, T500 and J-ring test*

AS 1012.8.1, *Methods of testing concrete, Method 8.1: Method for making and curing concrete — Compression and indirect tensile test specimens*

AS 1012.9, *Methods of testing concrete, Method 9: Compressive strength tests — Concrete, mortar and grout specimens*

AS 1012.12.1, *Methods of testing concrete, Method 12.1: Determination of mass per unit volume of hardened concrete — Rapid measuring method*

AS 1012.20.1, *Methods of testing concrete, Method 20.1: Determination of chloride and sulfate in hardened concrete and aggregates — Nitric acid extraction method*

AS 1141.2, *Methods for sampling and testing aggregates, Method 2: Basic testing equipment*

AS 1141.5, *Methods for sampling and testing aggregates, Method 5: Particle density and water absorption of fine aggregate*

AS 1141.6.1, *Methods for sampling and testing aggregates, Method 6.1: Particle density and water absorption of coarse aggregate — Weighing-in-water method*

AS 1141.6.2, *Methods for sampling and testing aggregates, Method 6.2: Particle density and water absorption of coarse aggregate — Pycnometer method*

AS 1141.60.1, *Methods for sampling and testing aggregates, Method 60.1: Potential alkali-silica reactivity — Accelerated mortar bar method*

AS 1141.60.2, *Methods for sampling and testing aggregates, Method 60.2: Potential alkali-silica reactivity — Concrete prism method*

AS 1379, *Specification and supply of concrete*

AS 1478.1, *Chemical admixtures for concrete, mortar and grout, Part 1: Admixtures for concrete*

AS 1646, *Elastomeric seals for waterworks purposes*

AS 1657, *Fixed platforms, walkways, stairways and ladders — Design, construction and installation*

AS 2193, *Calibration and classification of force-measuring systems*

AS 2758.1, *Aggregates and rock for engineering purposes, Part 1: Concrete aggregates*

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

AS 3582.2, *Supplementary cementitious materials, Part 2: Slag — Ground granulated blast-furnace*

AS 3799, *Liquid membrane-forming curing compounds for concrete*

AS 3850, *Prefabricated concrete elements (series)*

AS 3972, *General purpose and blended cements*

AS 3996, *Access covers and grates*

AS 4586, *Slip resistance classification of new pedestrian surface materials*

AS 4663, *Slip resistance measurement of existing pedestrian surfaces*

AS 5100.2, *Bridge design, Part 2: Design loads*

AS 5100.5, *Bridge design, Part 5: Concrete*

AS/NZS 1554.3, *Structural steel welding, Part 3: Welding of reinforcing steel*

AS/NZS 3582.1, *Supplementary cementitious materials, Part 1: Fly ash*

AS/NZS 3582.3, *Supplementary cementitious materials, Part 3: Amorphous silica*