

Engineering Services

**Technical Standard
TS 0522**

**Allowable Pipe Size, Class and
Materials for Reticulation Water
Mains**

**Revision: 1.0
Date: 31 March 2017**

Copyright

This Standard is an intellectual property of the South Australian Water Corporation. It is copyright and all rights are reserved by SA Water. No part may be reproduced, copied or transmitted in any form or by any means without the express written permission of SA Water.

The information contained in this Standard is strictly for the private use of the intended recipient in relation to works or projects of SA Water.

This Standard has been prepared for SA Water's own internal use and SA Water makes no representation as to the quality, accuracy or suitability of the information for any other purpose.

Application & Interpretation of this Document

It is the responsibility of the users of this Standard to ensure that the application of information is appropriate and that any designs based on this Standard are fit for SA Water's purposes and comply with all relevant Australian Standards, Acts and regulations.

Users of this Standard accept sole responsibility for interpretation and use of the information contained in this Standard. Users should independently verify the accuracy, fitness for purpose and application of information contained in this Standard.

Only the current revision of this Standard should be used which is available for download from the SA Water website.

Significant/Major Changes Incorporated in This Edition

Nil.

This is the first issue of this Technical Standard TS 0522.

This Standard replaces Technical Guideline TG 105 - Allowable Pipe Size, Class and Materials for Water Mains.


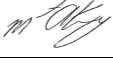

Document Controls

Revision History

Revision	Date	Author	Comments
1.0	31 March 2017	Tom Galek	

Template: Technical Standard Version 6.00, 10/05/2016

Approvers

Role	Signature and Date
Responsible Discipline Lead Tom Galek	31/03/2017 X  _____ Signer's Name Signed by: GA112117
Manager Engineering Technical Services Murat Aksoy	31/03/2017 X  _____ Signer's Name Signed by: AK003305
Senior Manager Engineering Services Richard Gray	10/04/2017 X  _____ Signer's Name Signed by: GR001964

Reviewers

Role	Name	Revision	Review Date
Principal Mechanical and Hydraulic Engineer	Mark Stephens		22 March 2017
Reticulation Infrastructure Specialist	Rob Pearce		30 March 2017

Contents

1	Introduction.....	5
1.1	Purpose	5
1.2	Glossary.....	5
1.3	References	5
1.3.1	Australian and International.....	5
1.3.2	SA Water Documents.....	6
1.4	Definitions.....	6
2	Scope.....	8
3	Allowable Pipe Pressure Rating	9
3.1	Standard Pipe Pressure Rating.....	9
3.2	Deviation from the Standard Pipe Pressure Rating	9
4	Allowable Pipe Sizes	9
4.1	PE Pipe	10
4.1.1	Reticulation Pipes Sizing	10
4.1.2	Connection Pipe Sizing.....	10
5	Minimum Allowable Main Sizes	10
5.1	Water Mains for Residential Areas	11
5.1.1	Cul-de-Sac Installation	11
5.1.2	Low and Medium Density Developments.....	11
5.1.3	High Density Developments	11
5.2	Water Mains for Commercial, Community Facility and Industrial Areas	11
6	Allowable Pipe Materials.....	12

List of figures

No table of figures entries found.

List of tables

No table of figures entries found.

<http://river.sawater.sa.gov.au/applications/bms/Corporate/Cool Buttons Quick Reference Guide.docx>
<http://river.sawater.sa.gov.au/applications/bms/Corporate/Cool Buttons User Guide.docx>

1 Introduction

SA Water is responsible for operation and maintenance of an extensive amount of engineering infrastructure, including water reticulation pipes.

This standard has been developed to assist in the design, construction, maintenance and management of this infrastructure.

1.1 Purpose

The purpose of this standard is to detail minimum requirements to ensure that assets covered by the scope of this standard are designed, constructed and maintained to consistent standards and attain the required asset life.

To ensure that all water supply pipes installed in SA Water's infrastructure achieve the required economic life span of 100 years, it is critical that the appropriate pipe types are selected for each application.

SA Water has for operational and maintenance purposes determined all acceptable pipe sizes, material types and their minimum allowable pressure rating (PN) to be installed in SA Water's water reticulation systems.

SA Water's water reticulation systems include nominal pipe size range from DN 63 to DN 375.

Pipes above this size range are transmission mains. For pipes above this size range the selection and use of pipe material within the networks shall be based on individual design, including hydraulic requirements and the mechanical behaviour of the pipe under operational conditions.

1.2 Glossary

The following glossary items are used in this document:

Term	Description
DICL	Ductile Iron Cement Lined
SCL	Steel Cement Lined
PE	Polyethylene (material type PE100)
PVC-M	Polyvinyl Chloride Modified Series 2
PVC-O	Polyvinyl Chloride Oriented Series 2
SA Water	South Australian Water Corporation
TG	SA Water Technical Guideline
TS	SA Water Technical Standard
WSAA	Water Services Association of Australia

1.3 References

1.3.1 Australian and International

The following table identifies Australian and International standards and other similar documents

which are relevant for assets installed in SA Water's water reticulation systems:

Number	Title
AS 1281	Cement mortar lining of steel pipes and fittings
AS 1579	Arc-welded steel pipes and fittings for water and waste-water
AS 2032	Code of practice for the installation of PVC pipe systems
AS 2033	Installation of polyethylene pipe systems
AS 2280	Ductile iron pipes and fittings
AS 2566.2:2002	Buried flexible pipelines – Part 2: Installation
AS 4130	Polyethylene (PE) pipes for pressure applications
AS 4441	Oriented PVC (PVC-O) pipes for pressure applications
AS 4765	Modified PVC (PVC-M) pipes for pressure applications
WSA 01	Polyethylene Pipeline Code
WSA 03	Water Supply Code of Australia
WSA PS 200	Ductile iron pipes for water supply
WSA PS 203	Steel pipe for water supply
WSA PS 207	Polyethylene (PE) pipe for water supply
WSA PS 208	Polyethylene (PE) pressure fittings for water supply - moulded
WSA PS 209	PVC-M pipe for water supply
WSA PS 210	PVC-O pipe for water supply
WSA PS 211	PVC-U pipe for water supply

1.3.2 SA Water Documents

The following table identifies the SA Water standards and other similar documents which are relevant for assets installed in SA Water's water reticulation systems:

Number	Title
TS 0503	Authorised Products – Water Systems

1.4 Definitions

The following definitions are applicable to this document:

Term	Description
SA Water's Representative	The SA Water representative with delegated authority under a Contract or engagement, including (as applicable): <ul style="list-style-type: none"> • Superintendent's Representative (e.g. AS 4300 & AS 2124 etc.) • SA Water Project Manager • SA Water nominated contact person
Responsible Discipline Lead	The engineering discipline expert responsible for TS 0522 defined on page 3

Term	Description
	(via SA Water's Representative)

2 Scope

This document specifies all acceptable pipe sizes, materials and their minimum allowable pressure rating which are authorised by SA Water for new installations within:

- Drinking water systems, and,
- Non-Drinking water systems

up to a maximum size of DN 375.

Should a Developer project contain any product of diameter larger than DN 375, specific approval from SA Water's Representative will be required for the works to be undertaken by means of the Developer Agreement Formal Instrument.

The Developer's Consultant or Contractor shall provide the SA Water Representative with data sheets / manufacturer information for **all** products larger than DN 375.

SA Water will review the information provided and advice regarding the suitability of the product.

Note:

Full details of Authorised Products for Water Systems are available in SA Water Technical Standard TS 0503.

3 Allowable Pipe Pressure Rating

3.1 Standard Pipe Pressure Rating

SA Water specifies Series 2, **PN 16** rated pipe as a minimum standard for use within its Drinking Water and Non Drinking Water reticulation networks for the majority of installations.

SA Water requires a 100 year asset life for new water mains. This requirement is consistent with WSA 03, Table 1.2 and the requirements of majority of Australian Water Authorities.

3.2 Deviation from the Standard Pipe Pressure Rating

Where appropriate, SA Water may authorise the use of a higher rated pipe.

This is rare and may be applicable for Capital Project based applications where a fixed supply pressure is known.

4 Allowable Pipe Sizes

SA Water nominal pipe sizes for new water reticulation installations are:

- OD 63 (Polyethylene pipe in cul-de-sacs only)
- DN 100
- DN 150
- DN 200
- DN 250
- DN 300, and
- DN 375

Above this size, pipe design should be based on hydraulic requirements.

4.1 PE Pipe

4.1.1 Reticulation Pipes Sizing

Polyethylene pipe (which is specified on the true outside diameter) has an equivalent size range as follows:

Standard Pipe Size	PE Pipe Equivalent
DN 50	OD 63
DN 100	OD 125
DN 150	OD 180
DN 200	OD 250
DN 250	OD 315
	PE pipes with diameters larger than OD 315 shall require specific SA Water approval.

4.1.2 Connection Pipe Sizing

PE pipe is also used for property service connections (main to meter) in 25 mm, 40 mm, 50 mm and 63 mm sizes

Connection Pipe Size	PE Pipe Equivalent
DN 20	OD 25
DN 25	OD 25
DN 40	OD 50
DN 50	OD 63

5 Minimum Allowable Main Sizes

SA Water minimum main sizes are consistent with WSA 03-2011. Refer WSA 03–2011, Table 3.1.

Minimum pipe diameters have been established to ensure adequate flow rates and residual pressure, including a contribution to basic firefighting capability.

The following pipe sizes have been assessed as **the minimum** acceptable for use within SA Water's water supply network:

5.1 Water Mains for Residential Areas

5.1.1 Cul-de-Sac Installation

- OD 63 PE pipe in cul-de-sacs

Note:

- Length and maximum number of properties to be served shall be compliant with Table 5.1 WSA 03-2011
- This option is not considered to have fire firefighting capability. Consequently the maximum distance between any allotment and nearest fire hydrant must be less than 80 metres

5.1.2 Low and Medium Density Developments

- DN 100 pipe

5.1.3 High Density Developments

5.1.3.1 Residential buildings \geq 4 storeys

- DN 150 pipe

5.1.3.2 Residential buildings \geq 8 storeys

- DN 200 pipe

5.2 Water Mains for Commercial, Community Facility and Industrial Areas

- DN 150 pipe

6 Allowable Pipe Materials

The following pipe materials have been assessed as acceptable for use within SA Water's water reticulation network:

- Polyvinylchloride – Modified (PVC-M) Series 2
- Polyvinylchloride – Oriented (PVC-O) Series 2
- Polyethylene (PE) - Material PE100
- Steel Cement Lined (SCL) (Sintacote external coating)
- Ductile Iron Cement Lined (DICL) (refer **Notes** below)

The preferred pipe material applications are as follows:

- Water Mains > DN100:
 - PVC-M, PVC-O, PE, SCL and DICL,
- Water Mains < DN 100:
 - PE pipe
- Property Connections:
 - PE pipe

Notes:

- Where pipework is installed in a part of the network where the dynamic pressure response is confirmed by SA Water as significant PVC-M, PVC-O and PE pipes are preferred, while DICL must not be used without SA Water permission (as DICL pipes can raise the wave speed increasing the potential for local surge pressure).
- The factors relating to damage to pipe during installation, soil loads and fittings, must be accounted for in the construction specification and practices to avoid premature shortening of the service life of the PVC-M, PVC-O and PE pipes due to fatigue propagation from scratches, notches, cuts and other defects in the pipe walls after installation.