



Engineering

Technical Standard

TS 0631 - Fine Materials for Pipe Embedment

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Significant/Major Changes Incorporated in This Edition

This is the first issue of this Technical Standard under the new numbering format. The original version of this document was last published in 2015 with the name of Packing Sand for Pipe Laying and Trench Fill (TS 4). The major changes in this revision are listed in the following table:

Section No. in TS 0631	Section No. in TS 4	Changes
TS 0631 – 4 to 5 and 9	TS 4 - 3 to 5	Updated to include three embedment material types: <ul style="list-style-type: none"> • TS0631 a: Sand embedment material (previously TS 4 sand) • TS0631 b: Sand embedment material (alternative) • TS0631 c: Fine crushed rock embedment material (alternative) Note: TS 0631 a sand embedment sand (previously TS4 sand) is still the primary material to be used.
TS 0631 – 3	N/A	Added limitations section to clarify embedment material covered by this standard.
TS 0631 – 6	N/A	Added section to specify where the three embedment materials now presented in this standard can be used.
TS 0631 – 7 to 8	N/A	Added to clarify requirements for product certification and supplier's quality management system.
TS 0631 - 9	TS 4 - 5	Added minimum frequency for testing.
TS 0631 - 10	N/A	Added basis for acceptance of material.
TS 0631 – Appendix A	TS 4 – Appendix A	Removed previous Appendix A (pH testing of Soil – Colorimetric Method) and replaced with schedule of Hold Points, Witness Points and Records.





Document Controls

Revision History

Revision	Date	Author	Comments
1.0	3/11/2015	B Harris	First Issue of TS 4
2.0	28/10/2021	Moji Kan & WSP Australia for SA Water	Major Revision

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Contents

1	Introduction	6
1.1	Purpose	6
1.2	Glossary	6
1.3	References	7
1.3.1	Australian and International	7
1.3.2	SA Water Documents.....	7
1.4	Definitions	8
2	Scope	9
3	Limitations	10
4	Quality of Material	11
5	Material Requirements	12
5.1	TS 0631a Sand Embedment Material (Former TS 4 Sand)	12
5.2	Alternative Embedment Materials	14
5.2.1	TS0631b Sand Embedment Material (Alternative).....	14
5.2.2	TS 0631c Fine Crushed Rock Embedment Material (Alternative)	16
5.3	Use of Recycled Products as Fine Embedment Materials	18
6	Applicable Use of TS 0631 Embedment Materials	19
6.1	General.....	19
6.2	Correspondence of Embedment Type with Pipe Type	20
7	Product Certification	21
8	Supplier's Quality Management System	22
9	Samples and Testing	23
10	Acceptance of Material	25
11	Rejection	26
Appendix A : Schedules of Hold Points, Witness Points, and Identified Records 27		
A1	Schedule of Hold Points and Witness Points	27
A2	Schedule of Identified Records	27

List of figures

Figure 1: Terminology of buried flexible pipelines, modified after AS 2566.1	9
Figure 2: TS 0631a Sand Embedment Material – Particle Size Distribution Requirements. 13	
Figure 3: TS 0631b Sand Embedment Material (Alternative) – Particle Size Distribution Requirements	15
Figure 4: TS 0631c Fine Crushed Rock Embedment Material (Alternative) – Particle Size Distribution Requirements	17

List of tables

Table 1: TS 0631a Sand Embedment Material Requirements	12
Table 2: TS 0631b Sand Embedment Material (Alternative) Requirements	14
Table 3: TS 0631c Fine Crushed Rock Embedment Material (Alternative) Requirements	16
Table 4: Embedment Type vs. Applicable Pipe Materials.....	20
Table 5: TS 0631a Sand Embedment Material Minimum Frequency of Testing	23
Table 6: TS 0631b Sand Embedment Material (Alternative) Minimum Frequency of Testing	24
Table 7: TS 0631c Fine Crushed Rock Embedment Material Minimum Frequency of Testing	24

1 Introduction

SA Water is responsible for operation and maintenance of an extensive amount of engineering infrastructure.

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

SA Water have undertaken literature reviews, desktop studies and a laboratory investigation programme to support the updates that have been made to this revision of the Technical Standard.

1.1 Purpose

The purpose of this standard is to detail minimum requirements for fine cohesionless material used in the embedment zone (bedding, pipe side support and overlay) of pipes installed in in-ground trenches, to ensure this material is fit for purpose and of suitable and consistent quality.

The specific requirements of the material in the embedment zone are to ensure that pipes installed are adequately supported, will achieve their design life, and where required, improve the stiffness for effective lateral restraint of the pipe.

1.2 Glossary

The following glossary items are used in this document:

Term	Description
CLSM	Controlled Low Strength Materials
DIT	Department for Infrastructure and Transport
IPWEA	Institute of Public Works Engineering Australasia
SA Water	South Australian Water Corporation
TDRF	Technical Dispensation Request Form. This form is part of SA Water's Technical Dispensation Request Procedure which details the process by which those required to comply, or ensure compliance, with SA Water's technical requirements may seek dispensation from those requirements.
TG	SA Water Technical Guideline
TS	SA Water Technical Standard
WSA	Water Services Association (of Australia)
WSCM	Water Supply Construction Manual

1.3 References

1.3.1 Australian and International

The following table identifies Australian and International standards and other similar documents referenced in this document:

Number	Title
AS1141.3.1	Method for sampling and testing aggregates, Method 3.1: Sampling-Aggregates
AS1141.5	Method for sampling and testing aggregates, Method 5: Particle density and water absorption of fine aggregate
AS 1141.11.1	Methods for sampling and testing aggregates, Method 11.1: Particle size distribution – Sieving method
AS 1141.12	Methods for sampling and testing aggregates, Method 12: Materials finer than 75 µm in aggregates (by washing)
AS 1141.13	Methods for sampling and testing aggregates, Method 13: Material finer than 2 µm
AS 1141.25.3	Methods for sampling and testing aggregates, Method 25.3: Degradation factor – Fine aggregate
AS1141.31	Methods for sampling and testing aggregates, Method 31: Light particles
AS 1289.3.3.1	Methods for testing soils for engineering purposes, Method 3.3.1: Soil classification tests – Calculation of the plasticity index of a soil
AS 1289.4.3.1	Methods of testing soils for engineering purposes, Method 4.3.1: Soil chemical tests – Determination of the pH value of a soil – Electrometric method
AS 1289.4.4.1	Methods of testing soils for engineering purposes, Method 4.4.1: Soil chemical tests–Determination of the electrical resistivity of a soil–Method for fine granular materials
AS/NZS 2566	Buried flexible pipelines, Part 1: Structural design and Part 2: Installation
AS/NZS ISO 9001	Quality management systems–Requirements
WSA PS - 360	Product Specification, WSA PS – 360 Embedment/Concrete Sand
WSA PS - 361	Product Specification, WSA PS – 361 Embedment / 5 mm Minus Fine Crushed Rock
-	Landscape South Australia Act 2019

1.3.2 SA Water Documents

The following table identifies the SA Water standards and other similar documents referenced in this document:

Number	Title
TS 0630	Coarse Aggregates for Civil Works
TS 0710	Concrete
TG 0637	General Technical Information for Geotechnical Design – Pipelines

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 0631 defined on page 3 (via SA Water's Representative).
Accepted	Determined to be satisfactory by SA Water's Representative
Contract Documents	A set of documents supplied to Constructor as the basis for construction; these documents contain contract forms, contract conditions, specifications, drawings, addenda, and contract changes.
Constructor	The organisation responsible for constructing and installing infrastructure for SA Water whether it be a third party under contract to SA Water or an in-house entity.
Designer	The organisation responsible for designing infrastructure for SA Water whether it be a third party under contract to SA Water or a Constructor, or an in-house entity.
'Shall' and 'Should'	In this Standard the word 'shall' indicates a requirement that is to be adopted to comply with the Standard. The word 'should' indicate practices which are advised or recommended.

2 Scope

This Technical Standard specifies SA Water minimum requirements for embedment cohesionless fine material to be used in the embedment zone for in-ground pipework installation, including:

- quality of material
- material requirements
- applicable pipe materials
- product certification
- Supplier's Quality Management System
- sampling and testing requirements
- acceptance and rejection criteria

Figure 1 defines the bedding, haunch support, side support and overlay zones; all designated as the Embedment Zone.

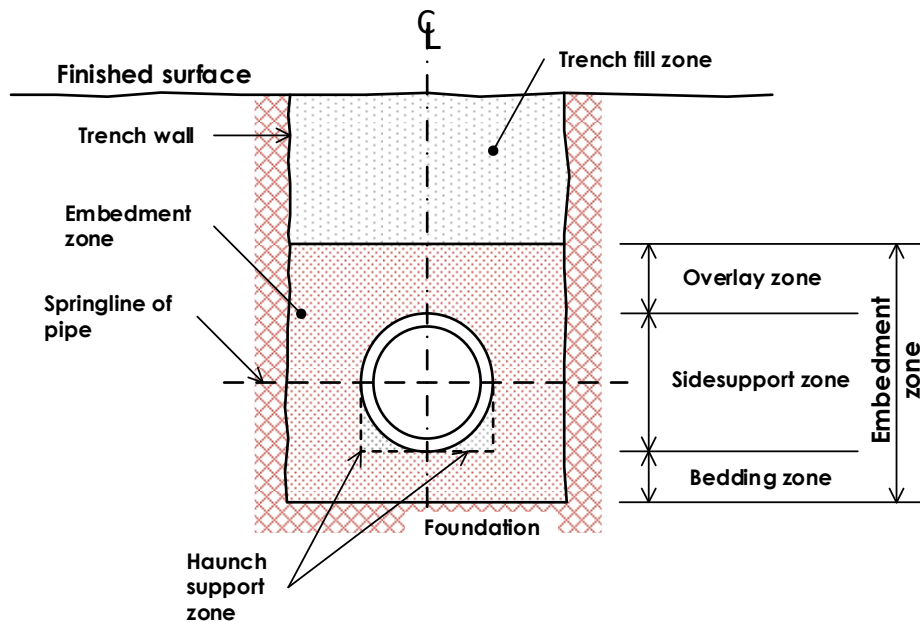


Figure 1: Terminology of buried flexible pipelines, modified after AS 2566.1

3 Limitations

This standard does not cover other aspects of pipe embedment (i.e., beyond what is discussed in Section 2), including:

- requirements for CLSM (controlled low strength material) if used in lieu of granular material in the embedment zone. CLSM is not typically used on SA Water projects, as per the guidance in TG 0637 - General Technical Information for Geotechnical Design – Pipelines, the application of CLSM in any project will require a thorough assessment – the Constructor will need to apply for dispensation with required technical submissions to SA Water for approval.
- requirements for concrete encasement. For concrete encasement, reference shall be made to SA Water TS 0710 - Concrete.
- requirements for trench fill above the embedment zone. For trench fill requirements, reference shall be made to SA Water WSCM or the respective authority's (e.g., DIT, local council, etc) specifications and requirements.
- requirements for coarse aggregate. For coarse aggregate requirements, reference shall be made to SA Water TS 0630 - Coarse Aggregates for Civil Works.
- construction requirements (e.g., compaction) for embedment material. For guidance on compaction requirements, reference shall be made to TG 0637 - General Technical Information for Geotechnical Design – Pipelines.

4 Quality of Material

The characteristics required of pipe embedment material are that:

- it shall compact easily enough that the minimum compaction requirements can be achieved all around the pipe without damaging or displacing the pipe – despite the restricted access normally encountered in a pipe trench,
- it shall not mechanically damage the pipes or fittings or their protective coatings during placement or compaction,
- it shall not be corrosive to the pipes or fittings, and
- it shall meet the requirements presented in Section 5 of this Standard.

To the satisfaction of SA Water's Representative, the pipe embedment material shall be free from:

- dust, cohesive lumps, and other deleterious material,
- organic material that will affect embedment material performance,
- material that would be physically harmful (e.g., rock, or other sharp particles) or chemically harmful to any pipeline component, including any protective coatings,
- weeds and declared plants (including seeds) that are regulated under the Landscape South Australia Act 2019 and associated Regulations.

This technical standard specifies the requirements for the following three pipe embedment materials:

- TS0631a Sand embedment material (previously known as TS 4 sand)
- TS0631b Sand embedment material (alternative)
- TS0631c Fine crushed rock embedment material (alternative)

All three of these pipe embedment materials shall comply with the above quality of material requirements. Refer to Section 5 for detailed descriptions of these embedment materials and further requirements.

5 Material Requirements

This section specifies the material requirements for the following embedment materials:

- TS0631a Sand embedment material (previously known as TS 4 sand)
- TS0631b Sand embedment material (alternative)
- TS0631c Fine crushed rock embedment material (alternative)

5.1 TS 0631a Sand Embedment Material (Former TS 4 Sand)

TS 0631a sand embedment material shall be natural sand obtained from pits or sand dunes.

TS 0631a sand embedment material shall comply with the requirements presented in Table 1 and Figure 2.

Table 1: TS 0631a Sand Embedment Material Requirements

Test	Description	Criteria	Standard
Particle Size Distribution	Sieve Size (mm)	Percent Passing (%)	AS 1141.11.1 (Including Clause 6.6 – Washing using dispersing agent)
	9.5	100	
	6.7	95-100	
	4.75	90-100	
	2.36	75-100	
	1.18	40-100	
	0.6	20-100	
	0.3	10-95	
	0.15	0-55	
	0.075	0-10	
Resistivity	(ohm.m)	≥ 50	AS 1289.4.4.1
pH	-	≥ 5.0	AS 1289.4.3.1
Plasticity Index	(%)	Non-Plastic	AS 1289.3.3.1

Note: The criteria in Table 1 do not always guarantee sand that will compact easily enough for use as pipe embedment sand. For example, sand that contains carbonate fines (lime) or that are unusually well-graded may be difficult to compact if their moisture content is even slightly above optimum and/or such sands may not drain well once wetted.

Note: The pH of soil/aggregates is commonly tested using other standards/methods in South Australia (e.g., LTM-GEN-7090 pH in soil by ISE), however studies undertaken by SA Water have indicated pH test results for the same material can vary significantly when using different test methods. Hence, only AS 1289.4.3.1 shall be used to test the pH of TS 0631a sand embedment material.

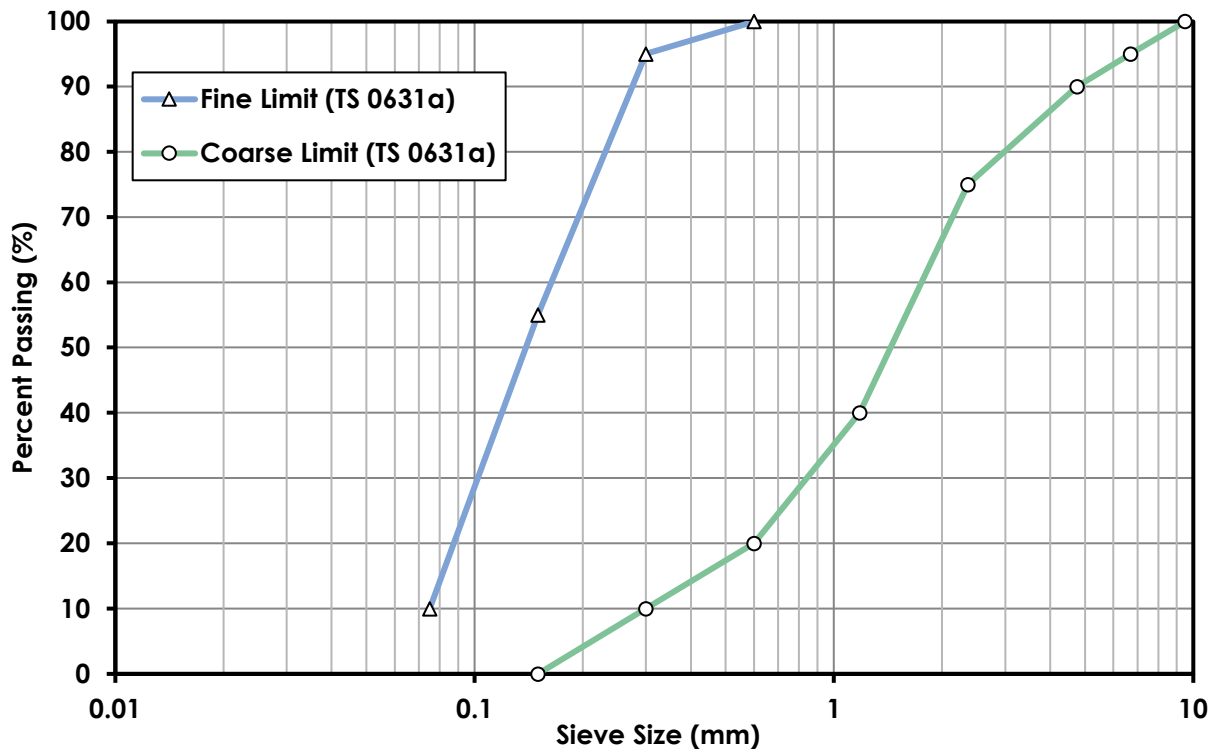


Figure 2: TS 0631a Sand Embedment Material – Particle Size Distribution Requirements

5.2 Alternative Embedment Materials

5.2.1 TS0631b Sand Embedment Material (Alternative)

TS0631b sand embedment material shall be natural sand obtained from pits or sand dunes.

TS0631b sand embedment material shall comply with the requirements presented in Table 2 and Figure 3.

Table 2: TS 0631b Sand Embedment Material (Alternative) Requirements

Test	Description	Criteria	Standard
Particle Size Distribution	Sieve Size (mm)	Percent Passing (%)	AS 1141.11.1 (Including Clause 6.6 – Washing using dispersing agent)
	9.5	100	
	4.75	90-100	
	2.36	60-100	
	1.18	30-100	
	0.6	15-100	
	0.3	5-50	
	0.15	0-15	
	0.075	0-5	
Particle Density	(kg/m ³)	≥ 2100	AS 1141.5
Water Absorption	(%)	≤ 3	AS 1141.5
Material finer than 0.075 mm	(%)	≤ 5	AS 1141.12
Material finer than 0.002 mm	(%)	≤ 1	AS 1141.13
Friable/Weak/Light Particles	(%)	≤ 1	AS 1141.31
Resistivity	(ohm.m)	≥ 15	AS1289.4.4.1
pH	-	5-9	AS1289.4.3.1

Note: The criteria in Table 2 is mostly consistent with the requirements of WSA PS – 360.

Note: The pH of soil/aggregates is commonly tested using other standards/methods in South Australia (e.g., LTM-GEN-7090 pH in soil by ISE), however studies undertaken by SA Water have indicated pH test results for the same material can vary significantly when using different test methods. Hence, only AS 1289.4.3.1 shall be used to test the pH of TS 0631b sand embedment material (alternative).

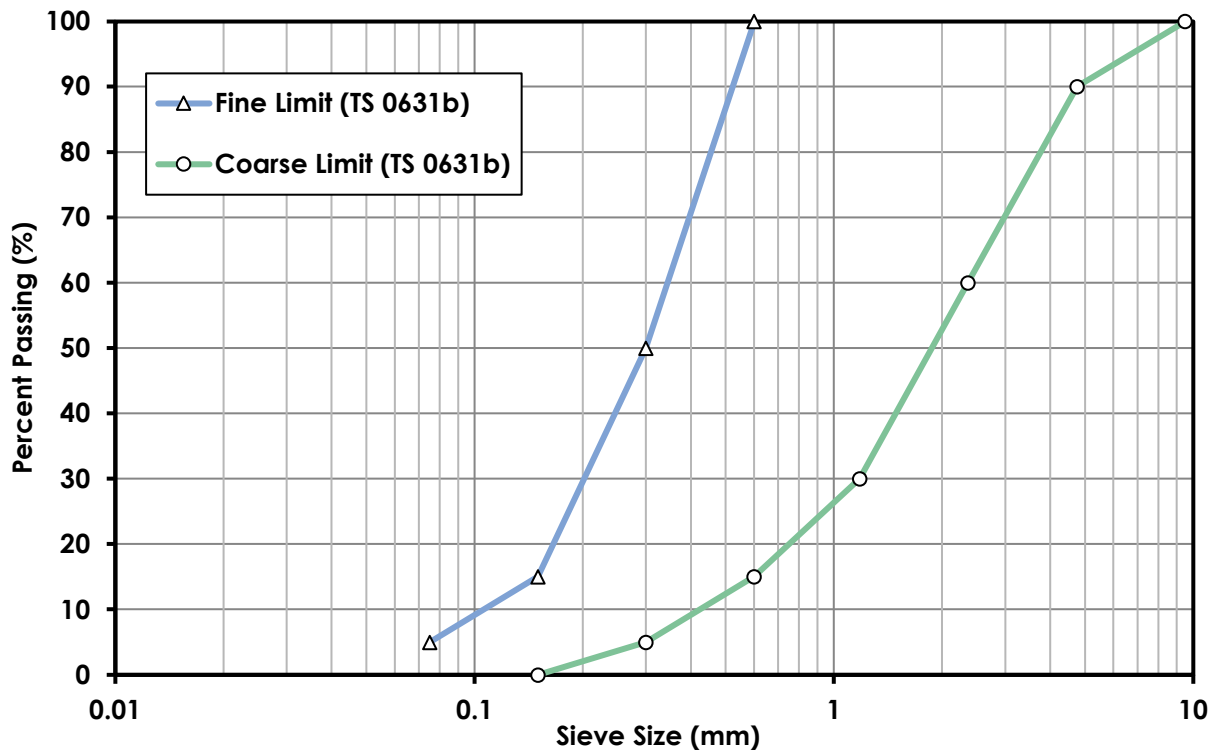


Figure 3: TS 0631b Sand Embedment Material (Alternative) – Particle Size Distribution Requirements

5.2.2 TS 0631c Fine Crushed Rock Embedment Material (Alternative)

TS 0631c fine crushed rock embedment material shall be material produced from the crushing and screening of durable non-sedimentary (with the exception of low porosity indurated carbonate rocks, e.g., limestone) quarried rock.

TS 0631c fine crushed rock embedment material shall comply with the requirements presented in Table 3 and Figure 4.

Table 3: TS 0631c Fine Crushed Rock Embedment Material (Alternative) Requirements

Test	Description	Criteria	Standard
Particle Size Distribution	Sieve Size (mm)	Percent Passing (%)	AS 1141.11.1 (Including Clause 6.6 – Washing using dispersing agent)
	6.7	100	
	4.75	90-100	
	2.36	60-100	
	1.18	30-80	
	0.6	15-60	
	0.3	5-40	
	0.15	0-20	
	0.075	0-10	
Particle Density	(kg/m ³)	≥ 1900	AS 1141.5
Plasticity Index	(%)	≤ 10	AS 1289.3.3.1
Degradation Factor - Fines	-	≥ 50	AS 1141.25.3
Resistivity	(ohm.m)	≥ 15	AS1289.4.4.1
pH	-	5-9	AS1289.4.3.1

Note: The criteria in Table 3 is mostly consistent with the requirements of WSA PS – 361.

Note: The pH of soil/aggregates is commonly tested using other standards/methods in South Australia (e.g., LTM-GEN-7090 pH in soil by ISE), however studies undertaken by SA Water have indicated pH test results for the same material can vary significantly when using different test methods. Hence, only AS 1289.4.3.1 shall be used to test the pH of TS 0631c fine crushed rock embedment material (alternative).

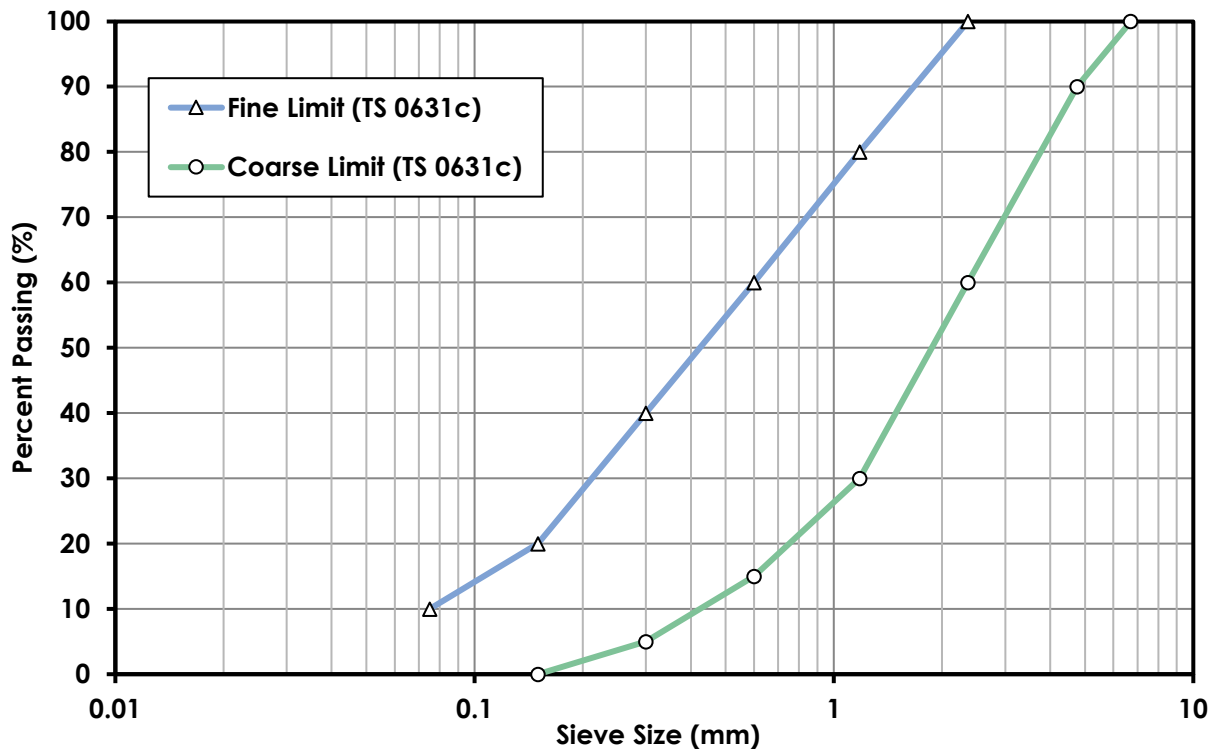


Figure 4: TS 0631c Fine Crushed Rock Embedment Material (Alternative) – Particle Size Distribution Requirements

5.3 Use of Recycled Products as Fine Embedment Materials

In preparation of this Standard, SA Water noted that some recycled fine materials are currently available in the market and being used in various civil works such as concrete, roads and pavements, and stormwater works. However, in order to assess the applicability of recycled materials in pipe embedment, SA Water will require further information about properties, workmanship and long-term performance of recycled products if used as embedment materials in pipe installation. In particular, SA Water will need to see how:

- These materials would be manufactured to ensure physical characteristics required of this standard are satisfied,
- Such materials are handled and compacted to ensure suitable embedment and support of pipework is provided, and,
- These products perform in service under typical SA Water operating conditions.

SA Water has also considered the use of WSA recycled materials in initial assessments. However, it was noted that the use of recycled materials according to IPWEA requirements has been limited to stormwater pipes, sewer pipes and sub-surface drainage line, and is not for use in water mains installation. SA Water often uses screenings (single sized aggregates) for embedment of sewer pipes (their qualifications are covered in TS 0630), therefore use of WSA recycled materials will not normally be possible in SA Water sewer mains.

Therefore, at the time of preparation of this standard, further development is deemed required to understand performance characteristics of recycled fine materials.

Due to this reason any possible use of recycled material as an alternative to embedment fine materials will be subject to future research and investigations in next revisions of the current Standard.

6 Applicable Use of TS 0631 Embedment Materials

6.1 General

TS 0631a pipe embedment sand is the primary material to be used around pipes in the embedment zone (bedding, haunch support, side support and overlay zones) installed in in-ground trenches for SA Water infrastructure.

The preference is to use TS0631a in all SA Water pipe-laying projects, however where material meeting the requirements of TS 0631a pipe embedment sand is not viable, the following two alternative materials may be considered for SA Water Capital Works Projects only.

- TS0631b Sand embedment material (alternative)
- TS0631c Fine crushed rock embedment material (alternative)

Prior to use of TS 0631b or TS 0631c material on a SA Water project, the Constructor shall submit the following to SA Water's Representative for approval (**Hold Point**):

- Documentation that clearly provides justification to use TS 0631b or TS 0631c embedment material (i.e., why TS 0631a is not viable).
- Detailed construction methodology, including:
 - consideration of a trial section to prove methodology achieves performance requirements (e.g., compaction around pipe).
 - Quality Assurance procedure to ensure quality of material consistently meets the requirements in Section 4 of this standard.
 - Quality Assurance procedure to ensure material consistently achieves construction performance requirements (e.g., compaction required) for the project.

Note that requirements for compaction (including frequency of testing) presented in other SA Water Technical Standards, SA Water Technical Guidelines and SA Water Standard Drawings establish the minimum requirements for TS 0631a sand embedment material and may not be sufficiently rigorous to obtain SA Water approval for TS 0631b sand embedment material (alternative) or TS 0631c fine crushed rock embedment material (alternative).

6.2 Correspondence of Embedment Type with Pipe Type

The use of TS 0631a sand embedment material (primary product to be used on SA Water infrastructure projects), TS 0631b pipe embedment sand (alternative) and TS 0631c fine crushed rock embedment material (alternative) shall be limited to the pipe materials presented in Table 4 below only.

Table 4: Embedment Type vs. Applicable Pipe Materials

Pipe embedment material	Applicable pipe materials
TS 0631a sand embedment material (primary product)	All pipe types
TS 0631b sand embedment material (alternative)	Concrete, Plastics
TS 0631c fine crushed rock embedment material (alternative)	Concrete

Note: The use of TS 0631b sand embedment material and TS 0631c fine crushed rock embedment material shall only be considered for SA Water Capital Works Projects and where TS 0631a sand embedment material is not viable.

Note: Applicable pipe materials have considered the resistivity requirements presented in Section 5.2 and potential for fine crushed rock material to comprise sharp material that could damage the external surface of the pipe or protective coatings and sleeveings.

7 Product Certification

In order for a supplier to be nominated on SA Water approved suppliers list, the supplier of any type of sand embedment material or fine crushed rock embedment material listed herein shall provide a certificate of compliance verifying that the sand embedment material or fine crushed rock embedment material complies with all the requirements of this Standard with test results reported on NATA accredited test documents **(Hold Point)**.

The certificate for tests shall not be more than six (6) months old, when the supplier applies for the Product Certification.

The supplier shall forward the Product Certification with the delivery of each order of material stating that the material is in accordance with this Standard.

It should be noted that the requirements of this section and the Product Certification are for the supplier to be listed on SA Water approved supplier list and it will not replace the need for continuous sampling and testing of the supplied material to SA Water as per requirements of Section 9 of this Standard.

8 Supplier's Quality Management System

The supplier must establish and maintain a Quality Management System (QMS) complying with AS/NZS ISO 9001 or equivalent QMS in place as a means of ensuring that the product conforms to this Standard.

The supplier shall provide evidence verifying the compliance with this Clause **(Hold Point)**.

9 Samples and Testing

During the supply of sand embedment material or fine crushed rock embedment material to any SA Water projects, which shall satisfy the requirements of Section 5, the Constructor shall provide the result of material testings in accordance with Table 5 to Table 7 to SA Water's Representative.

All sand embedment material or fine crushed rock embedment material shall be tested at a frequency which is sufficient to ensure that it consistently complies with the requirements specified in this standard. The minimum frequency of testing is shown in Table 5 to Table 7. A minimum of three tests must be carried out per test type, material type and source.

Any change in production parameters or change in quarry face shall initiate the commencement of a new test cycle.

SA Water's Representative reserves the right to carry out independent audit testing. The costs of such audit testing shall be borne by SA Water, except for all audit tests that indicate failure to meet the specified criteria, in which case the costs shall be borne by the Constructor or their supplier.

All tests shall be performed by a NATA accredited laboratory approved by SA Water's Representative (**Witness Point**). All test certificates shall clearly show the following information:

1. Technical Standard TS 0631
2. Type of Material (i.e., TS 0631a sand embedment material, TS 0631b sand embedment material (alternative) or TS 0631c fine crushed rock embedment material)
3. Material Origin (e.g., dune sand, quarried metamorphic limestone, etc.)
4. Contract Number
5. Name of Constructor and/or Supplier
6. Origin of Supply and Supplier Name (if not provided above)
7. Date of sample testing

All relevant test certificates shall be submitted to SA Water's Representative immediately when they become available (**Hold Point**).

The initial sample of material submitted for testing shall be retained for reference throughout the duration of works.

Table 5: TS 0631a Sand Embedment Material Minimum Frequency of Testing

Test	Standard	Minimum Frequency of Testing
Particle Size Distribution	AS 1141.11.1 (Including Clause 6.6 – Washing using dispersing agent)	<ol style="list-style-type: none"> 1. At the start of the project or as part of regular supplier compliance if the Product Certification is current; and 2. 1 per 500 tonnes of embedment material production or part thereof.
Resistivity	AS 1289.4.4.1	<ol style="list-style-type: none"> 1. At the start of the project or as part of regular supplier compliance if the Product Certification is current; and 2. 1 per 1000 tonnes of embedment material production or part thereof.
pH	AS 1289.4.3.1	
Plasticity Index	AS 1289.3.3.1	

Table 6: TS 0631b Sand Embedment Material (Alternative) Minimum Frequency of Testing

Test	Standard	Minimum Frequency of Testing
Particle Size Distribution	AS 1141.11.1 (Including Clause 6.6 – Washing using dispersing agent)	<ol style="list-style-type: none"> At the start of the project or as part of regular supplier compliance if the Product Certification is current; and 1 per 500 tonnes of embedment material production or part thereof.
Particle Density	AS 1141.5	<ol style="list-style-type: none"> At the start of the project or as part of regular supplier compliance if the Product Certification is current; and 1 per 1000 tonnes of embedment material production or part thereof.
Water Absorption	AS 1141.5	
Material finer than 0.075 mm	AS 1141.12	
Material finer than 0.002 mm	AS 1141.13	
Friable/Weak/Light Particles	AS 1141.31	
Resistivity	AS1289.4.4.1	
pH	AS1289.4.3.1	

Table 7: TS 0631c Fine Crushed Rock Embedment Material Minimum Frequency of Testing

Test	Standard	Minimum Frequency of Testing
Particle Size Distribution	AS 1141.11.1 (Including Clause 6.6 – Washing using dispersing agent)	<ol style="list-style-type: none"> At the start of the project or as part of regular supplier compliance if the Product Certification is current; and 1 per 500 tonnes of embedment material production or part thereof.
Particle Density	AS 1141.5	<ol style="list-style-type: none"> At the start of the project or as part of regular supplier compliance if the Product Certification is current; and 1 per 1000 tonnes of embedment material production or part thereof.
Plasticity Index	AS 1289.3.3.1	
Degradation Factor - Fines	AS 1141.25.3	
Resistivity	AS1289.4.4.1	
pH	AS1289.4.3.1	

Sampling must be carried out as described in AS 1141.3.1 with all samples taken from at least 300 mm away from the face of the stockpile. Use the sampling technique detailed in Annexure A5 in AS1141.3.1.

Sampling may be carried out using AS 1141.3.1 Section 9.3 “Backblading method” but the samples must not be mixed to form an average from the stockpile.

The Constructor or their supplier may propose to SA Water’s Representative a reduced minimum frequency of testing. In such cases, the Constructor shall submit a Technical Dispensation Request Form (TDRF), in accordance with the Standards Dispensation Procedure, and support their dispensation request by a statistical analysis verifying consistent process capability and product characteristics.

10 Acceptance of Material

All materials shall be subject to testing and will be accepted only if the requirements of this Standard are met.

11 Rejection

Materials that do not comply with the requirements of this Standard shall be liable to rejection by SA Water's Representative.

Where the embedment material is overly wet or dry such that, it cannot be readily placed and compacted to achieve project requirements, the material shall be liable to rejection by SA Water's Representative. The Constructor may propose to moisture condition the material prior to placement.

The moisture content of the materials shall be limited to 8%. In case of non-complying to this requirement the material will be subject to rejection, unless the Constructor request a Dispensation from this requirement and can prove by a trial compaction program that the material although having higher moisture content can be compacted to the required specifications, to the satisfaction of SA Water's Representative.

All rejected materials shall be removed from the site by the supplier or the responsible Constructor at their expense.

Appendix A : Schedules of Hold Points, Witness Points, and Identified Records

A1 Schedule of Hold Points and Witness Points

Clause	Type	Description
6.1	Hold	Submission of documentation justifying use of TS 0631b or TS 0631c to SA Water's Representative, to be reviewed and approved prior to use of material on a SA Water project.
7.0	Hold	Product Certification is required for all sand embedment material and fine crushed rock embedment material supplied to SA Water projects.
8.0	Hold	Evidence of the supplier's Quality Management System (QMS) complying with AS/NZS ISO 9001 or equivalent QMS that ensures the product conforms to this Standard.
9.0	Hold	During the supply process of the embedment material to any SA Water projects, the Constructor or their supplier shall provide test certificates showing the results of testing of the materials in accordance with Table 5 to Table 7 as applicable.
9.0	Witness	All tests shall be performed by a NATA accredited laboratory.

A2 Schedule of Identified Records

Clause	Description of Identified Record
7.0	Certificate of conformity
9.0	All test certificates during the supply of embedment material to SA Water projects. All tests shall be performed by a NATA accredited laboratory.