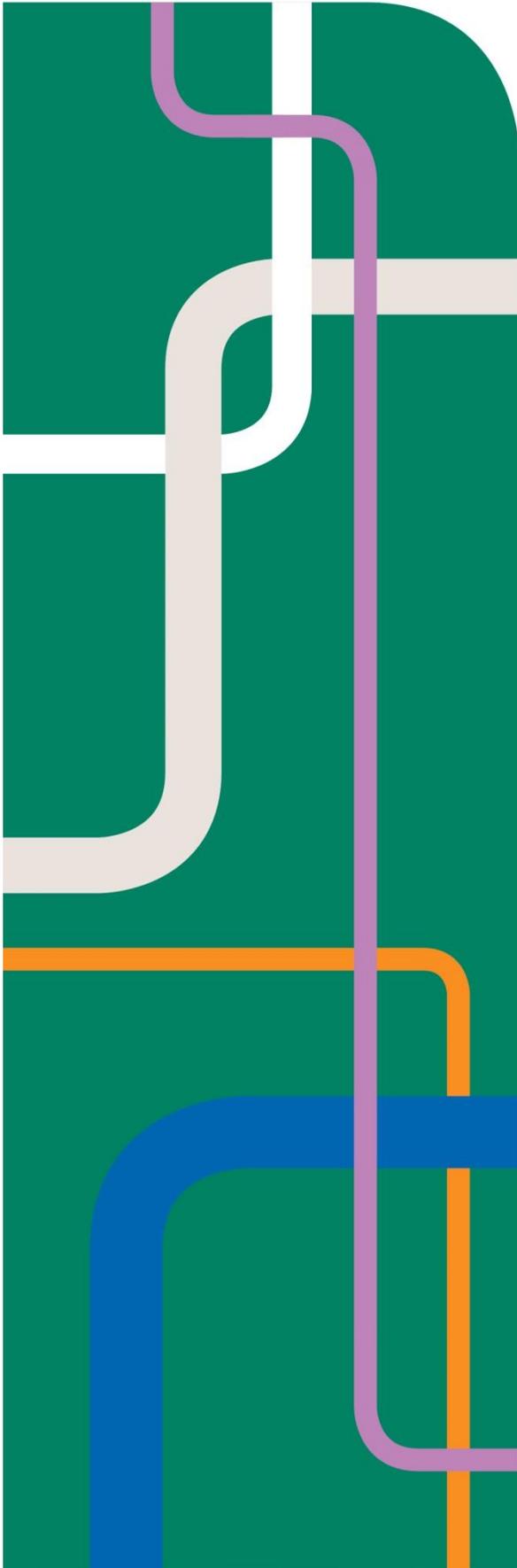




Government
of South Australia



Engineering Services

**Technical Standard
TS 4**

**Packing Sand for Pipe Laying and
Trench Fill**

**Revision: 1.0
Date: 04 November 2015**

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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

Appendix A "pH Testing of Soil - Colorimetric Method" added (previously reference document).

This standard is a re-issue of this standard and is technically equivalent to TS 4, dated 10 August 2010.

Document Controls

Revision History

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1.0	03 November 2015	B Harris	

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1 Introduction

This standard is one of a suite of Technical Standards and Guidelines that have been developed by SA Water over many years to facilitate the provision and maintenance of infrastructure owned and operated by SA Water.

1.1 Purpose

The purpose of this standard is to specify minimum requirements for packing sand used for bedding and backfilling in pipe trenches, which is fit for purpose and will ensure pipes installed are adequately supported and will achieve their design life.

1.2 Glossary

The following glossary items are used in this document:

Term	Description
SA Water	South Australian Water Corporation
TG	SA Water Technical Guideline
TS	SA Water Technical Standard

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
AS 1141	Methods for sampling and testing aggregates
AS 1289	Methods of testing soils for engineering purposes

1.3.2 SA Water Documents

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

Number	Title

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 4 defined on page 3 (via SA Water's Representative)

2 Scope

The scope of this technical standard is to define the requirements for the packing sand used as bedding and backfilling material around pipes installed in in-ground trenches for SA Water infrastructure.

3 Quality of Material

The characteristics required of pipe embedment sand are that:

1. It will compact easily enough that the required density can be achieved all around the pipe without damaging or displacing the pipe – despite the restricted access normally encountered in a pipe trench,
2. That it will not mechanically damage the pipes or fittings or their protective coatings during placement or compaction,
3. That it will not be corrosive to the pipes or fittings.

The sand shall be obtained from pits or sand dunes.

To the satisfaction of SA Water's Representative, the sand shall be free from:

1. Cohesive and organic lumps,
2. Rocks or other sharp particles likely to damage pipes or protective coatings,
3. Dangerous and noxious weeds or their seeds as proclaimed in South Australia by regulations under the Animal and Plant Control Act with amendments.

The sand shall comply with the criteria detailed in Table 1 of this Technical Standard.

Table 1 – Essential Criteria

Test	Description	Criteria	Procedure
Practical Size Distribution	Sieve Size (mm)	Percent Passing	AS 1141.11 (Including Clause 5.6 – Washing using dispersing agent)
	9.5	100	
	6.7	95 – 100	
	4.75	90 – 100	
	2.36	75 – 100	
	1.18	40 – 100	
	0.600	20 – 100	
	0.300	10 – 95	
	0.150	0 – 55	
	0.0075	0 – 10	
Resistivity	(ohm metre)	≥ 50	AS 1289.4.4.1
pH	–	≥ 5.0	AS 1289.4.3.1 or Appendix A
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, sands that contain 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.

4 Samples

When requested by the SA Water Representative, a 25 kg sample of packing sand shall be submitted and sent for testing to a laboratory nominated by the SA Water Representative.

Each sample shall be clearly marked with the following information:

1. Technical Standard TS 4,
2. Type of Material,
3. Contract Number,
4. Name of Contractor,
5. Origin of Supply.

The initial sample of material submitted will be retained for reference throughout duration of works.

5 Testing

When requested by SA Water's Representative, test results shall be supplied to prove compliance with the criteria detailed in Table 1.

Testing shall be carried out by a NATA registered laboratory or a laboratory approved by SA Water's Representative. All relevant test certificates shall be submitted to SA Water's Representative immediately they become available.

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 Supplier.

6 Rejection

Any material that is not of the required quality of grading, or is in any other way not in accordance with this Technical Standard or has a moisture content greater than 8 % will be rejected.

No payment will be made for rejected materials.

Appendix A pH Testing of Soil - Colorimetric Method

The procedure detailed in this appendix may be used to test the pH value of a soil sample for the purposes of this standard.

Step	Description
Apparatus	<ol style="list-style-type: none"> Quantity of glass tubes, each approximately 200 mm long and 13 mm internal diameter, with two graduations of 115 mm and 140 mm relative to the same end. The tubes shall be fitted with a rubber bung at each end. A wooden rack to hold glass tubes. A spatula with a blade width slightly less than the internal diameter of the tubes, 130 mm long and 0.3 mm thick is suitable. 100 ml measuring cylinder. 500 ml volumetric flask. Plastic wash bottle containing deionised water. Ruler graduated in millimetres. Glass rod about 200 mm long and 5 mm in diameter. Sieve 2.36 mm Mortar and rubber pestle
Reagents	<ol style="list-style-type: none"> Indicator Solution. Proprietary soil indicator solutions may be used. BDH Universal Indicator pH 4 – 11 is suitable. The indicator is diluted in a ratio of 1 -12 with deionised water. Barium Sulphate. Preferably use "soil testing grade", otherwise use precipitated barium sulphate.
Procedure	<ol style="list-style-type: none"> Obtain a sample which has been prepared in accordance with the procedure prescribed in AS 1289.1.1 for the preparation of disturbed samples for testing. Sieve this material on a 2.36 mm sieve. From the material passing the sieve obtain, by riffing or quartering, a sample of about 35 g. In one of the glass tubes which is stoppered, place the sample at the end farthest from the graduations. For clay soils use 15 mm depth of soil in the tube, for silty soils 25 mm and for sandy soils 40 mm. Add barium sulphate to the tube so that the combined depth of the soil and the barium sulphate in the tube is approximately 50 mm. Fill the tube to the first graduation mark with deionised water and then to the second mark with indicator solution. Place a rubber bung in the open end of the tube and shake the tube vigorously until all the soil and barium sulphate are in suspension. Place the tube in the rack to allow the solids to settle. Estimate the pH value of the soil by comparing the colour of the clear supernatant liquid with the colour chart on the indicator container (Note 1).
Results	<ol style="list-style-type: none"> Report the pH value of the soil suspension to the nearest 0.5 pH unit. Report that the colorimetric method was used.

Note 1: Certain organic soils may absorb the indicator so that the supernatant liquid will be only faintly coloured. In such cases add extra indicator to the suspension and re-examine the colour after reshaking the tube and allowing the contents to settle.