Standard Specification

Sydney WATER

SS 207
Junction Sealing for Circular Non Man-Entry Sewer Pipe

Version 1

1 General

1.1 Intent

The intent of this specification is to define the requirements for rehabilitating and sealing circular sewer junctions using fittings installed by non-man entry techniques. Sealing shall be such as to prevent leakage and/or root intrusion. The service life shall be at least 50 years.

1.2 Scope

This specification defines the requirements for manufacture, installation, workmanship and documentation of junction seals installed at sewer junctions from inside. The specification applies to following type of junctions:

- Main sewer and private sewer both unlined
- Main sewer lined but private sewer unlined
- Main sewer and private sewer both lined

The fitting may be in the shape of a T-seal or a Top Hat.

1.3 References

Document No	Title
AS 3572	Plastics – Glass Filament Reinforced Plastics (GRP) Methods of Test
BS 2782	Methods of Testing Plastics Method 335A: Determination of flexural properties of rigid plastics Method 1003: Determination of tensile properties.
WIS 4-34-04	Specification for Renovation of Gravity Sewers by Lining with Cured-in-Place Pipes
ASTM D638	Standard Test Method for Tensile Properties of Plastics
ASTM D790	Test Methods for Flexural Properties of Reinforced Plastics and Electrical Insulating Material
ASTM D2583	Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
SS 201	Linings for Circular Non Man-Entry Pipes

2 Product

2.1 Material

Materials and systems approved for the purpose of junction sealing by the Principal shall only be used. Materials used shall be suitable for long term durability in a sewer environment (Refer Clause 2.1 of SS 201)

Materials used for junction sealing fittings shall be such that under cured condition have good adhesions to host surfaces and seal completely.

Materials shall be compatible with any lining material against which the seal will be in contact.

It shall be sufficiently robust not to be damaged by pipe cleaning equipment that may be required to remove any future blockage following the installation of the fitting.

The lining shall have the following minimum physical properties:

- Short term flexural strength: 25 MPa
- Short term tensile strength: 20 MPa
- Short term flexural modulus: 2,200 MPa
- Bond strength to host surface: 1.0 MPa
- Capable of withstanding cleaning jet pressure under installed condition of 14 MPa at 5 Litres per second flow rate

2.2 Dimensions

Finished dimensions of junction fittings shall be as follows:

- Exactly fit internal dimensions of host surfaces.
- In case of a T-shaped fitting the length of the fitting arm in the main line shall be at least four (4) times the diameter of the lateral. The lateral arm shall extend at least 1.5 times the lateral diameter on either side of the junction/cut-out for the full circumference of the main line.
- Minimum extension into laterals shall be 400 mm and at least 150 mm passed the first joint in the lateral unless restricted by the host pipe dimension.
- Permissible thickness of the liner shall be as assessed by the Principal.

3 Execution

3.1 Flow Management

The Contractor shall arrange for flow isolation and/or flow by passing to avoid any over-flow from main and private sewers.

If flow isolation is required then the Contractors shall advise the Customer accordingly and make alternative arrangement for the Customer.

3.2 Infiltration

The Contractor shall be responsible for the control of infiltration using chemical grout or other approved means so that the quality of repair is not affected by infiltration

3.3 Surface Preparation

The Contractor shall prepare pipe junctions for installation of junction-sealing fittings. Junctions shall be cleaned and all roots removed. All surfaces that will be in contact with fittings shall be thoroughly cleaned so that good adhesion can be achieved. High-pressure air, steam or water cleaning, with or without cleaning agents shall be used to clean the host surfaces.

Care shall be taken during cleaning to avoid any damage to existing surfaces. Adequacy of cleaning shall be ensured by CCTV inspections.

Where necessary the Contractor shall trim the existing edges of the junction rim (cut out rim) to ensure that the lateral seal can be installed to fit the junction smoothly.

3.4 Delivery and Installation of Junction Fittings

Immediately prior to installation of a junction fitting the Contractor shall clean and CCTV the junction.

The Contractor shall not proceed with an installation in situations where there is a considerable risk that such an attempted will be unsuccessful. The Contractor shall take due note of prevailing ambient conditions (e.g. temperature, humidity, etc.) and plan installation times accordingly.

Where it is required to install a liner in the main sewer and/or in the private sewer then the work shall be sequenced such that junction seal is installed last.

Delivery and installation of the junction seal shall be carried out in accordance with a work method purpose written for the system. The specification shall cover different cases where the main line and lateral are lined or unlined. The Contractor upon request shall provide a copy of this work method to the Principal.

After curing, exposed surfaces of fittings shall be smooth. Fittings shall be free of any defect that affects the hydraulic or structural performance or the general quality.

Defects that are considered unacceptable include but are not limited to the following:

- Foreign inclusion
- Inadequate pipe preparation
- Leakage through repairs
- Bubbles or voids or blisters
- Inadequate material curing
- Poor finishing at corners and ends
- Inadequate bond
- Shrinkage
- Gap between the host surface and the fitting

3.5 Testing

The Contractor quality control system shall include methods to record details of the installation, impregnation and curing times for each installation.

The tests listed in this clause shall be undertaken to confirm physical properties of installed junction seal fittings. Each test listed below shall be undertaken at a minimum rate of 1 for every 20 installation.

- Hardness in accordance with ASTM D2583

- Short term tensile strength in accordance with ASTM D638 or BS 2782:Method 1003 (3 samples for each line being tested)
- Short term flexural strength and flexural modulus in accordance with ASTM D790 or BS 2782 Method 335A (3 samples for each line being tested) OR short term ring stiffness in accordance with AS 3572.10.

Samples for testing may be prepared using the procedure given in Appendix B of WIS 4-34-04.

The Contractor shall carry out hydrostatic test of the junction seal fitting under installed condition using lateral packer to confirm the watertightness of the installation. The hydrostatic testing shall be carried out in accordance with the requirements given elsewhere in the specification.

3.6 Reporting

Copies of quality log-sheets documenting each task and a CCTV recording for each of the junction sealed shall be submitted to the Principal. In case of any defect repaired, it shall be recorded on the CCTV recording and submitted with a written report describing fully the nature of defect and rectifications achieved.

Document control

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Change History

Version	Date	Description of change	Approved by
1	25/06/2012	Revision and renaming of EPS 207 issued in March 2009	PG