

SCHEDULE OF TECHNICAL DATA FOR LINER FOR SEWER REHABILITATION

Provide the data required in this schedule together with illustration and other details to fully describe the product and installation process. Sydney Water will use the information provided to assess the suitability and conformance of the product to relevant Sydney Water technical specification.

1. GENERAL INFORMATION

- a. Name of the lining system:
- b. Type of lining (pre-cast, spirally wound, etc.)
- c. List material components that are combined to manufacture the lining:
 - Name of the manufacturer of each component
 - Manufacture and test data for each component
 - Material Safety Data Sheets for each component.
- d. Limitations of the lining system with regards to the following:
 - Size and shape including radii of curvature, corner radii, etc.
 - Depth of flow and bypass requirements.
 - Maximum length of lining for various sizes shown in Section 3 below.
 - Access requirements to manholes; minimum working space required inside manhole and conduit (in man-entry)
 - Changes in grade; stepped joints
 - Bends, variation in alignment
 - Excessive infiltration
- e. Method to seal liner ends and cut outs
- f. List the defects that are inherent to the lining system (eg. extent on liner-host pipe gap, local wrinkles, others). For each defect state the limit for the acceptance of work. The defect shall be described assuming that the samples of the lining will be extracted from the ground and examined close at hand.
- g. Maximum gap between the liner and the pipe for various size ranges (all values in mm); method of grouting behind liner.

2. MATERIAL AND DESIGN PROPERTIES

Provide test data to confirm material characteristics and state the standard that were followed in testing.

- a. Minimum values for the following material properties of the lining (lining composite):
- Short term tensile strength (MPa)
 - Short term flexural strength (MPa)
 - Short term flexural modulus (MPa)
 - Long term flexural strength (MPa)
 - Long term flexural modulus (MPa)
 - Maximum allowable long-term strain (%)
 - Poison's ratio
 - Hardness
 - Coefficient of thermal expansion
 - Shrinkage (%)
 1. Radial
 2. Longitudinal
 - Hydraulic Properties (Manning's n value)
 1. As new
 2. In Service
- b. Documented test data to support the short term and long-term flexural moduli and strength.
- c. Corrosion resistance to sewage with particular reference to inorganic and organic acids.
- d. Water tightness of the lining: material; for profiles water tightness across profile locks.
- e. Material characteristics of the sealing material including
- Chemical resistance to sewage
 - Dimensional stability (shrinkage, creep, thermal characteristics)
 - Bond strength to lining material, VC pipe and concrete surfaces
 - Effect of moisture on bond/strength
 - Effect of aging
- f. In case of profile liners, provide list of profiles with corresponding geometry properties of the profile e.g. dimensions, neutral axis, and moment of inertia. The corresponding stiffness values for each of the diameter shall also be provided.

3. INSTALLATION PROCESS

An installation specification and/or work method statement that describe the following factors shall be provided:

- a. Setting up
- b. Installation - transport to site, feeding into manhole and conduit
- c. Methods of grouting annular space between lining and pipe
- d. Method of sealing cut-outs and ends with sketch fully detailing the proposed seal
- e. Method of enhancing the soil modulus
- f. In-situ testing requirements, quality control
- g. Method of providing smooth transition from existing invert to lining and back to existing invert.

4. PREVIOUS CONTRACTS

List at least three most recently completed contracts for using the proposed lining system with relevant pipe details, and installation date and contact details.