

**PT/304/0710 – AS (July 2010)**  
**Assessment of the SPR™ ST Lining System for Gravity Pipes**



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**1. Scope**

1.1 This schedule sets down the requirements for assessing the SPR™ ST lining system for use in 450mm to 2500mm nominal diameter gravity pipes.

1.2 SPR™ ST is a no-dig solution for the renovation of gravity pipes using a factory extruded PVC profile strip and steel reinforcing band which are fed from a spool down into an access chamber and into a patented hydraulically driven winding machine at the base of the manhole. The winding machine spirally winds the plastic/steel composite into a liner directly into the deteriorated pipe.

1.3 The PVC profile has interlocking edges which, when the profile is spirally wound, lock together to form a liner of high stiffness. The stiffness is achieved through integral 'T' ribs on the outer surface of the profile together with steel reinforcing bands. A number of profile and steel configurations are available so that pipe stiffness can be tailored to specific applications. The profiles are 126-15RS, 126-20RS and 91-25RS.

1.4 The PVC profile has two male locks on one edge of the strip and two female locks on the other edge. Within the mechanical locks there are three seals and three sealing materials. Inside the first female lock there is an 'O' ring, around the inside wall of each female lock is a thin layer of hot melt adhesive and on the landing adjacent to the male locks there is a layer of hot melt adhesive.

1.5 The liner is wound at a fixed diameter, leaving an annular space between the liner and host pipe wall which is filled with cementitious grout.

1.6 Lateral connections can be made into the SPR™ ST system.

1.7 The SPR™ ST system installs a reinforced thermoplastic lining which can be used as a partially or fully deteriorated structural lining.

1.8 The ends of the SPR™ ST lining are sealed against the host pipe by installing an end seal between the liner and existing pipe with a sealing material that is compatible with the liner pipe material.

1.9 The specification for the SPR™ ST system is provided in the SPR™ ST Technical Guide<sup>(1)</sup>. Key items manufactured by Sekisui Rib Loc Australia Pty Limited include:

- i. Winding machine.
- ii. PVC profile strip.
- iii. Steel reinforcing band.

1.10 This assessment covers the following:

- i. Materials quality audit.
- ii. Review of the quality systems for the manufacture, supply, materials handling and storage.
- iii. Testing of the product against performance requirements.
- iv. Structural design of the lining.
- v. Audit of installation instructions and witnessing of installation on site.

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Approval exclusions:

- i. The installation or reconnection of the laterals.
- ii. The liner end seals.

Product claims: evidence which are claimed include:

- High quality control, low risk: use of factory extruded profiles, no mixing of chemicals or curing required on site.
- Fully structural renovation technique: capable of withstanding external hydrostatic pressure and, if required, soil and live loads.
- Minimal environmental disruption: quiet hydraulically driven winding machine, trenchless (minimum excavation) technique.

## **2. Materials Quality Audit**

2.1 The PVC profile is manufactured from Corvic 67R1/2 PVC-U cell class 13354 in accordance with ASTM D1784<sup>(2)</sup> plus (proprietary) additives.

2.2 The profile includes a Santoprene TPV 201-64W175 resin 'O'-ring, a H B Fuller HL 5121 hot melt adhesive between the male locks and a H B Fuller HMS 44/4 hot melt adhesive within the female locks.

2.3 The steel reinforcing band is typically formed from Grade 304 or 316L stainless steel (other steel grades can be used, as determined by project requirements).

2.4 Quality management system certification for the materials supply and strip manufacture shall be audited.

## **3. Performance Testing**

3.1 Performance testing is listed below which is in accordance with relevant standards, including ASTM F1697<sup>(3)</sup> and ASTM F1741<sup>(4)</sup>.

### *General Characteristics*

3.2 Appearance – the internal surface of the lining shall be smooth, clean and free from scoring, cavities, wrinkling and other surface defects that would prevent the SPR™ ST liner from meeting the general fitness for purpose requirement.

### *Mechanical Characteristics Testing*

3.3 Short term ring stiffness testing shall be carried out in accordance with BS EN ISO 9969<sup>(5)</sup>.

3.4 The 50 year creep ratio shall be determined in accordance with BS EN ISO 9967<sup>(6)</sup>.

3.5 Joint tightness testing, both internal pressure and vacuum, shall be carried out in accordance with ASTM F1697<sup>(3)</sup>.

## **4. Lining structural design**

4.1 The lining is structurally designed in accordance with ASTM F1741<sup>(4)</sup>.

## **5. Review of Installation Procedures**

5.1 Audit the installation instructions in the SPR™ ST Technical Guide<sup>(1)</sup> and witness two on-site installations to check for compliance with instructions.

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5.2 At least one of the site installations shall be man-entry size to allow internal inspection.

**6. Reference Documents**

1. SPR™ ST Technical Guide 0011, Rib Loc, 2006.
2. ASTM D1784-07, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds, 2007.
3. ASTM F1697-07, Standard Specification for Poly(Vinyl Chloride) (PVC) Profile Strip for Machine Spiral-Wound Liner Pipe Rehabilitation of Existing Sewers and Conduit, 2007.
4. ASTM F1741-07, Standard Practice for Installation of Machine Spiral Wound Poly (Vinyl Chloride) (PVC) Liner Pipe for Rehabilitation of Existing Sewers and Conduits, 2007.
5. BS EN ISO 9969:2007, Thermoplastics pipes. Determination of ring stiffness.
6. BS EN ISO 9967, Thermoplastics pipes. Determination of creep ratio, 2007.