



1. Scope

1.1 To assess performance and effectiveness of the ICP Breathe liner and ICP Process as developed by Shonan Plastics MFG. Co. Ltd. and distributed by Sanpo Bussan Ltd.

1.2 The ICP Process is a cured-in-place lining system developed for the renovation of gravity sewers or pressure sewers of 0.5 bar or less including laterals and manholes.

1.3 The system consists of a resin absorbent polyester quilt coated in unsaturated polyester resin to form a liner. The liner is inverted into either the main sewer, lateral or manhole and then pressurised. Curing is then carried out by spraying the inside of the liner with heated water. Once the lining has fully cured the internal pressure is removed and any final finishing operations carried out.

2. Assessment schedule

The assessment comprises the following checks:

2.1 Technical audit of production facilities, quality control and resin storage;

2.2 Technical audit of type testing including limited testing by WRc, and;

2.3 Audit of on-site procedures by witnessing two site installations for the main pipe, lateral and manhole.

3. Review of properties

3.1 From a comparison of standards and current UK Water Industry requirements, the following properties are deemed important. These are to be checked in the technical audit where possible.

3.2 Dimensions and tolerances to manufacturer's specification.

3.3 Resin properties:

- viscosity;
- thixotropy, and;
- pot life.

3.4 Properties of the ICP Process system:

- short-term flexural modulus (minimum: 1900 MPa);
- 50-year flexural modulus (minimum: See Table 1);
- 50-year creep factor (minimum: 0.1);
- flexural strain at first break (minimum: 0.75%);
- flexural stress at first break (minimum: 25 MPa), and;
- wall thickness (minimum: design thickness).

4. Review of procedures

4.1 In addition to the performance of the lining, the following items will be checked.



4.2 Quality control, as it applies to:

- incoming materials;
- resin storage;
- liner storage;
- transportation to site, and;
- post-installation inspection.

4.3 Design and installation procedures and available guidance to users.

4.4 Lining procedures (written), including:

- transportation to site;
- pipe preparation;
- operation of machines;
- method of curing;
- records required and recording interval;
- quality of lining, and;
- rectification of defects.

2. BS EN 13566-4:2002: Plastic piping systems for renovation of underground non-pressure drainage and sewerage networks: Lining with cured-in-place pipes.

Table 1 Declared long-term values

	Conditions in which resin is used	Declared Value
Resin Type PS-W3330PT	for branch pipe	580 MPa
Resin Type PS-W3335T	for diameters <700mm	540 MPa
Resin Type PS-W3331T for diameters ≥ 700 mm and manholes	for diameters ≥ 700 mm and manholes	650 MPa
Note: Declared values were calculated in accordance with the 90% lower confidence limit on completion of 10 000 hour tests.		

5. System integrity

5.1 Evaluation of the complete ICP Process with respect to fitness for purpose and system integrity.

6. Reference documents

1. Sewerage Rehabilitation Manual, published by WRc plc, 4th Edition, 2001.