

1. SCOPE

This schedule specifies requirements for the Pro-Liner Fibre Glass Resin Liner system as manufactured by Anhui Pro Liner Pipeline Repair Technology Co., Ltd. which is applicable to the renovation of gravity sewers and drains.

It is cured by ultra-violet (UV) light and is applicable to circular host pipes having diameters between 150mm and 2,400mm and can also renovate oviform/egg, oval and box cross-sections up to 2,400mm equivalent.

The approval is not applicable to:

- leaktightness of end seals.
- reconnection of laterals.

2. PRODUCT DESCRIPTION

2.1 Introduction

The liner system comprises of an ECR glass fibre reinforcement woven sleeve which is factory impregnated with an ultra-violet (UV) light curing polyester or vinyl ester thermosetting resin. When installed and cured this forms a full length cured-in-place structural liner within the host pipe.

The Pro-Liner Fibre Glass Resin Liner system has a range of internal diameter from 150mm to 2,400mm for circular liners and for oviform/egg, oval and box cross-sections up to 2,400mm equivalent.

2.2 Relevant Standards

The following relevant standard was identified for cured-in-place pipe liners:

- BS EN ISO 11296-4:2018+A1:2021⁽¹⁾

2.3 Approval History

This is the first WRc Approved™ certification for the Pro-Liner Fibre Glass Resin Liner system.

3. REQUIREMENTS AND TESTING

3.1 Product Design

The Pro-Liner Fibre Glass Resin Liner system can be structurally designed in accordance with AS/NZS 2566-1⁽²⁾, DWA-A143-2⁽³⁾, ASTM F1216⁽⁴⁾, ASTM F2019-20⁽⁵⁾ or WRc Type 2 Sewerage Rehabilitation Manual website⁽⁶⁾ as specified by the asset owner and conducted by the contractor.

3.2 Type Testing

The Pro-Liner Fibre Glass Resin Liner system shall comply with the following test requirements which are based upon BS EN ISO 11296-4.

Appearance: The internal surface of the Pro-Liner Fibre Glass Resin Liner system shall be smooth, clean and free from scoring, cavities, wrinkling and other surface defects that would prevent the Pro-Liner Fibre Glass Resin Liner system from meeting the general fitness for purpose requirement.

Mechanical Characteristics Testing: Mechanical testing requirements of BS EN ISO 11296-4 are listed in Table 1.

Table 1 Pro-Liner Fibre Glass Resin Liner system mechanical characteristics

Characteristic	Declared value (mean)
Short-term flexural modulus	15,936 MPa
Flexural stress at first break	550 MPa
Ultimate longitudinal tensile strength	194 MPa
Long-term flexural strength (acid condition)	Full results due Summer 2024
Creep factor	0.80 (5 samples) TBC Summer 2024 (acid)
Calculated long-term flexural modulus	12,748 MPa
Poisson's ratio	0.233

Quality control tests

Samples are taken each day or from each batch of impregnated lining and cured. The cured sample is tested in accordance with BS EN ISO 11296-4 as detailed in Table 2.

Table 2 Quality control tests

Characteristic	Requirement
Short-term flexural modulus	Clause 8.5.2 Table 5
Short-term flexural strength	Clause 8.5.2 Table 5
Short-term Tensile strength	Clause 8.5.2 Table 5

3.3 Manufacture

To ensure the quality and performance of the Pro-Liner Fibre Glass Resin Liner system, the manufacturing process shall include appropriate systems for:

- Verification that component materials received are to specification.
- Handling and storage of all component materials and finished linings.
- Records of manufacture.
- Inspection and maintenance of manufacturing equipment.

The production of the Pro-Liner Fibre Glass Resin Liner system and related Quality Control procedures shall comply with requirements to ensure the stated performance of the product is reliably achieved.

3.4 Installation

When installed in accordance with the installation documentation⁽⁷⁾, the installation shall be practicable and suitable for conditions that could reasonably be expected on site.

PT/527/1223-AS (December 2023)

**Assessment Schedule for Pro-Liner Fibre
Glass Resin Liner system as
manufactured by Anhui Pro Liner
Pipeline Repair Technology Co., Ltd.**



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4. APPROVAL

The Pro-Liner Fibre Glass Resin Liner system has been audited and has successfully met all of the requirements stated within this assessment schedule.

Signed:

A handwritten signature in black ink, appearing to be 'G.L.' followed by a long horizontal line.

Valid until: 30 November 2028.

Place (GRP-CIPP) Using the UV-Light Curing Method.

6. Sewerage Rehabilitation Manual Website, WRc Ltd.
7. Pro-Liner UV-CIPP Operation Manual, version AHPLL-QESP-01, 4th April 2020.

5. REFERENCES

1. BS EN ISO 11296-4 Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks. Part 4 Lining with cured-in-place-pipes, 2018+A1:2021.
2. AS/NZS 2566-1:1998, Australian/New Zealand Standard, Buried flexible pipelines, Part 1: Structural design.
3. DWA-A 143.2 Rehabilitation of drainage systems outside buildings - Part 2: Static calculation for the rehabilitation of wastewater pipes and pipes with lining and assembly methods (July 2015).
4. ASTM F1216-2021 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube.
5. ASTM F2019-20 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled In Place Installation Of Glass Reinforced Plastic Cured-In-