

**PT/284/0609 – AS (June 2009) Polypipe Civils
Ridgiform XL Pipe System 750mm to 2100mm
for drains, sewers and attenuation tanks –
Assessment Schedule**



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1. Scope

1.1 Polypipe Civils Ltd manufacture the Ridgiform XL Pipe System which is a range of large diameter structured wall pipes that include an integral electrofusion joint. The system can be used in low pressure applications including drains, sewers and attenuation tanks. The pipes have profiled walls and are manufactured from PE 80 grade polyethylene.

1.2 Polypipe Civils Ltd manufacture this product under licence from Krah AG of Germany. It is an established product for which there is extensive installation experience in continental Europe.

1.3 This schedule covers the range of pipe products specified according to the four criteria listed below.

1. Internal diameters (mm): 750, 900, 1050, 1200, 1500, 1800 and 2100.
2. Wall profile types:
 - VW solid wall;
 - PR spiral tube – smooth intrados, profiled extrados;
 - SQ regular layers of tubes – smooth intrados, smooth extrados;
 - OP staggered layers of tubes – smooth intrados, profiled extrados.
3. The core tubes used to produce the PR, SQ and OP profiles have the following range of internal hole diameters (mm): 21, 34, 42, 54 and 65.
4. Pipe stiffness range 2 kN/m² to 8 kN/m².

1.4 One method of pipe jointing is covered by this schedule – Krah AG integrated electrofusion jointing.

1.5 Also included in this schedule is the Krah AG EasyPipe software package that is used by Polypipe Civils Ltd for designing the pipes in accordance with the German standard ATV A 127E⁽¹⁾.

1.6 The pipes are manufactured in accordance with BS EN 13476 Parts 1⁽²⁾, 2⁽³⁾ and 3⁽⁴⁾ structured wall plastic pipes standard.

1.7 Fittings and special sections are also within the scope of the assessment but only when the pipes used to make the fittings are WRc Approved™ products.

1.8 The fittings and special sections within the scope of this assessment include:

- bends;
- reductions;
- branches, and;
- special sections comprising pieces of pipe and/or the above fittings.

2. Assessment schedule

2.1 This assessment includes the following items:

1. Audit of production facilities, including quality control testing and test results.
2. Review of type test data for pipes and joints and witnessing of additional testing where necessary.
3. Check of the EasyPipe structural design procedures

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and their applicability for use in the UK.

4. Review of installation procedures including on-site witnessing of the externally profiled pipe and jointing.
5. Check on overall product performance.

3. Audit of Production Procedures

3.1 The materials specifications and detailed drawings for the pipe products and fittings shall be checked.

3.2 Quality management system certification for the materials suppliers shall be audited. This includes any suppliers of profiled sections used in the pipe manufacture.

3.3 Production facilities are inspected and the quality control is audited as it applies to:

- incoming materials;
- machine operation;
- control of production.

3.4 The manufacture of a pipe and a fitting shall be witnessed.

4. Assessment of Pipe and Joint Properties

4.1 BS EN 13476 Parts 1, 2 and 3 are taken as the basis for the assessment with additional requirements in the National Annex (note: this refers to clauses in WIS 4-35-01⁽⁶⁾) in order to form the complete UK requirements.

4.2 British standard BS EN 13476 - Part 1 is applicable to all pipes.

4.3 British standard BS EN 13476 - Part 2 is applicable to the PR and OP wall profiles which have smooth internal and external surfaces.

4.4 British standard BS EN 13476 - Part 3 is applicable to the VW and SQ wall profiles which have smooth internal and profiled external surfaces.

Appearance and colour

4.5 The appearance of the pipes shall meet the requirements of Section 6.1 of BS EN 13476 - Part 1.

4.6 The colour shall meet the requirements of WIS 4-35-01.

Geometrical Characteristics

4.7 The pipe dimensions shall conform to the requirements of Section 7 of BS EN 13476 - Part 2 or 3.

Type Tests – Pipes & Joints

4.8 Performance testing requirements are summarised in Table 4 of BS EN 13476 - Part 1. Detailed requirements are provided in BS EN 13476 - Parts 2 and 3 in the following sections covering:

- Section 4 - material properties;
- Section 8 - physical characteristics;
- Section 9 - mechanical characteristics;
- Section 10 - performance requirements.

4.9 Grouping for testing purposes is based on:

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- Two size groups - ID range 750mm to 1499mm and 1500mm to 2100mm;
- Four pipe profile groups – VW, PR, SQ and OP;
- Two ring stiffness groups – SN 2 (2 to less than 4 N/mm²) and SN 4 (4 to less than 8 N/mm²).

Note: Any ring stiffness in each stiffness group can be tested. The ring stiffness of the pipe being tested shall be specified in advance and the testing confirms whether this stiffness has been met.

4.10 The type tests listed in Table 4 of BS EN 13476 - Part 1 shall be carried out on samples, as detailed below:

- resistance to internal pressure;
- melt mass-flow rate (MFR);
- thermal stability (components for fused joints);
- longitudinal reversion;
- ring stiffness;
- impact strength;
- ring flexibility;
- creep ratio;
- tensile test of fused joints.

Marking

4.11 Marking of the pipes shall conform to the requirements of Section 10 of BS EN 13476 - Part 1.

Jetting Resistance

4.12 The pipe products with the thinnest internal wall thickness for each of the four pipe profiles shall be tested to demonstrate that they meet the jetting resistance requirements

specified in WIS 4-35-01⁽⁵⁾ Appendix B Resistance to Water Jetting.

4.13 Pipes having an inner solid wall thickness of 5mm or greater do not require testing for jetting resistance.

Puncture Resistance

4.14 A pipe sample with a thin internal wall thickness shall be tested to demonstrate it meets the requirements specified in WIS 4-35-01⁽⁵⁾ Appendix A Resistance to Internal Puncture.

5. Assessment of Fitting Properties

5.1 The requirements for type tests listed in Table 16 of BS EN 13476 - Part 3 (and in Table 17 of BS EN 13476 - Part 2) shall be met.

5.2 A bend, branch and reduction fitting shall be tested. They shall be 1500mm or larger diameter.

5.3 A 90 degree bend fitting shall be tested.

5.4 A 45 degree branch fitting having a minimum diameter of 750mm shall be tested.

5.5 A minimum reduction fitting of 200mm shall be tested.

6. Design

6.1 The EasyPipe software design package shall be audited to verify it produces pipe designs in accordance with ATV A 127E.

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Note: The ATV A 127E calculation procedures apply to pipes having a minimum ring stiffness of 3.75 kN/m².

6.2 Section 9.4 of ATV A 127E permits a maximum vertical pipe deflection that is 6% of the pipe's diameter. The designer may apply a lower percentage in trafficked areas.

6.3 Section 9.6 of ATV A 127E, Supplementary Notes for Profiled Pipes, requires the verification in Sections 9.2, 9.4 and 9.5 to be modified and the following additional verification to be carried out:

1. Verification of a sufficient wall rigidity;
2. If required, verification of multi-axial stress conditions.

7. Installation

7.1 The Polypipe Civils Ridgistorm XL installation instructions⁽⁶⁾ shall be reviewed and the installation of one profiled pipe shall be witnessed and checked against the instructions on site.

7.2 The pipe being inspected shall be man-entry size (1500mm diameter or larger).

7.3 The Kraih AG pipe electrofusion jointing (welding) instructions shall be reviewed and the procedures shall be witnessed and checked against the instructions on-site. Items to be checked include:

- pipe preparation;
- operation of machines;
- quality of welds.

7.4 A completed installation, with pipe surround material in place, shall be inspected to check it meets general fitness-for-purpose requirements.

8. Reference documents

1. German standard ATV-DVWK-A 127E Static Calculation of Drains and Sewers. August 2000. ATV-DVWK.
2. BS EN 13476 Plastics piping systems for non-pressure underground drainage and sewerage - Structured-wall piping systems of Unplasticised poly (vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 1: General requirements and performance characteristics. Includes a National Annex with additional guidance for UK users.
3. BS EN 13476 - Part 2: Specifications for pipes and fittings with smooth internal and external surface and the system, Type A.
4. BS EN 13476 - Part 3: Specifications for pipes, fittings and the system, Type B.
5. WIS 4-35-01: Water Industry Specification for thermoplastics structured wall pipes – supplementary test requirements, October 2008, Issue 2.
6. Ridgistorm–XL technical guide, dated May 2009, Section 4 Installation.