

**Assessment Schedule for the Ridgistorm XL Pipe System for drains, sewers and attenuation tanks as manufactured by Polypipe Civils**



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## 1. SCOPE

### 1.1 Product Description

This schedule covers the Ridgistorm XL Pipe System as manufactured by Polypipe Civils Ltd. It is applicable to pipelines or where storage, diversion, treatment or processes of stormwater is required.

The Ridgistorm XL Pipe System is a large diameter structured wall pipe manufactured from polyethylene. There are two jointing options either an integral electrofusion joint or push-fit elastomeric sealing rings.

The Ridgistorm XL Pipe System is available in a range of diameters between 750mm and 3000mm in four profiled variations:

- 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

Pipes can be manufactured with pipe stiffness between 2 kN/m<sup>2</sup> and 8kN/m<sup>2</sup>.

Fittings (i.e. bends, reductions, manifolds, branches and special sections) are also within the scope of the assessment but only when the pipes used to make the fittings are Ridgistorm XL pipes.

The following are excluded from the scope of this assessment schedule:

- Pressurised storage applications
- Using jointing mechanisms not specified in this assessment schedule

### 1.2 Applicable Standards

The following relevant standards were identified that meet the requirements of the UK sewerage undertakers:

- 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) in order to form the complete UK requirements.
- BS EN 13476 - Part 1 is applicable to all pipes<sup>(1)</sup>.
- BS EN 13476 - Part 2 is applicable to the VW and SQ wall profiles which have smooth internal and external surfaces<sup>(2)</sup>.
- BS EN 13476 - Part 3 is applicable to the PR and OP wall profiles which have smooth internal and profiled external surfaces<sup>(3)</sup>.

All structures and configurations shall be in accordance with the applicable standards for the function of the structure.

### 1.3 Product Design Requirement

There are two elements to the design:

1. Structural design to resist internal and external loading that could be applied to the structure.
2. When used for flow attenuation the configuration of the structure shall meet the functional requirement.

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<sup>(4)</sup>.

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

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.

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 sufficient wall rigidity
2. If required, verification of multi-axial stress conditions.

Note: The ATV A 127E calculation procedures apply to pipes having a minimum ring stiffness of 3.75 kN/m<sup>2</sup>.

#### 1.4 Approval History

The Ridgiform XL Pipe System was first approved in June 2009; reference PT/284/06/09.

In 2012 the assessment schedule was revised to include factory fitted push-fit elastomeric sealing rings for diameters up to 1800mm, reference PT/284/0609 revised January 2012.

## 2. TESTING & REQUIREMENTS

### 2.1 Assessment of Pipe and Joint properties

**Appearance and colour:** Shall meet the requirements of BS EN 13476 Part 1 Section 6 and WIS 4-35-01<sup>(5)</sup> respectively.

**Geometric characteristics:** The pipes dimensions shall conform to the requirements of BS EN 13476 Part 2 or 3 Section 7.

**Marking:** Marking of the pipe shall conform to the requirements of BS EN 13476-Part 1 Section 10.

**Type testing:** 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

Grouping for testing purposes is based on:

- Three size groups - ID range 750mm to 1499mm, 1500mm to 2099mm and 2100mm to 3000mm
- Four pipe profile groups – VW, PR, SQ and OP
- Two ring stiffness groups – SN 2 (2 to less than 4 N/mm<sup>2</sup>) and SN 4 (4 to less than 8 N/mm<sup>2</sup>)

The type tests listed in of BS EN 13476 - Part 1 Table 4 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

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

**Joint Testing**

**Integral electrofusion joint** (750mm-3000mm): Mechanical performance shall be tested the type testing requirements of BS EN 13476 - Part 1 Table 4.

**Elastomeric seals** (750mm–1800mm) shall meet the requirements of BS EN 681-1 (1996)<sup>(6)</sup>.

**2.2 Manufacture**

WRc shall audit Polypipe's production of the Ridgiform XL Pipe System and fabrication of special sections with regard to:

- Specification of component materials
- Detailed drawings for the pipe and fitting products
- Verification component materials received are to specification
- Handling and storage of all component materials
- Production of pipe lengths
- Fabrication of sections and quality of workmanship

WRc shall audit production of the pipe lengths and related Quality Control procedures to ensure they follow good practice so that the product meets all requirements.

**2.3 Product Documentation**

WRc shall review installation documentation<sup>(7)</sup> supplied for the Ridgiform XL Pipe System by Polypipe to check for completeness and accuracy.

**2.4 Installation**

WRc shall witness two site installations undertaken in accordance with the Ridgiform-XL Pipe System installation instructions.

WRc shall witness the assembly and subsequent leak-tightness testing of each jointing option for the Ridgiform-XL Pipe System.

The Ridgiform XL Pipe System has been audited and has successfully met all of the requirements stated within this assessment schedule.

Signed:

A handwritten signature in black ink that reads 'K.A. Adams'.

**3. REFERENCES**

1. 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.

**PT/348/0614 – AS (June 2014)**

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2. BS EN 13476 - Part 2: Specifications for pipes and fittings with smooth internal and external surface and the system, Type A.
3. BS EN 13476 - Part 3: Specifications for pipes, fittings and the system, Type B.
4. German standard ATV-DVWK-A 127E Static Calculation of Drains and Sewers. August 2000. ATV-DVWK.
5. WIS 4-35-01: Water Industry Specification for thermoplastics structured wall pipes – supplementary test requirements, October 2008, Issue 2.
6. BS EN 681-1: Elastomeric seals. Material requirements for pipe joint seals used in water and drainage applications. Vulcanized rubber, 1996.
7. Ridgistorm-XL technical guide, dated May 2009, Section 4 Installation.