

WATER INDUSTRY SPECIFICATION

SPECIFIER AND CONTRACTOR BENEFITS

Some of the major benefits of specifying pipe to this Water Industry Standard are:

- Durable pipes made from durable materials
- In built robustness for installation and maintenance operations
- Long laying lengths and fewer joints for rapid installation
- Hydraulically efficient pipes whose performance does not deteriorate with age
- Flexible construction accommodates differential settlement
- Resistance to attack from a wide range of chemicals
- Light weight reduces health and safety risk during installation
- Other materials do not readily bond to plastics reducing maintenance and potential damage during blockage removal



British Plastics Federation Pipes Group
 6 Bath Place, Rivington Street, London EC2A 3JE
 Tel: 020 7457 5024 Fax: 020 7457 5018
 E-mail: frankj@pipesgroup.co.uk
 Web site: www.pipesgroup.co.uk

ASSET INTERNATIONAL LTD
 Stephenson Street
 Newport
 South Wales
 NP19 4XH
 Tel: 01633 271906
 Fax: 01633 290519
 E-mail: sales@assetint.co.uk
 Web site: www.assetint.co.uk

MARLEY PLUMBING & DRAINAGE
 Lenham
 Maidstone
 Kent
 ME17 2DE
 Tel: 01622 858888
 Fax: 01622 858725
 E-mail: marketing@marleyext.com
 Web site: www.marley.co.uk

POLYPIPE CIVILS DIVISION
 Bishop Meadow Road
 Loughborough
 Leicestershire
 LE11 5RE
 Tel: 01509 615100
 Fax: 01509 610215
 E-mail: SteveK@polypipecivils.co.uk
 Web site: www.polypipecivils.co.uk

UPONOR LTD
 PO Box 1
 Berristow Lane
 Blackwell
 Near Alfreton
 Derbyshire DE55 5JD
 Tel: 01773 811112
 Fax: 01773 812343
 E-mail: mark.hunter@uponor.com
 Web site: www.uponor.co.uk

WAVIN BUILDING PRODUCTS LTD
 Parsonage Way
 Chippenham
 Wiltshire
 SN15 5PN
 Tel: 01249 654121
 Fax: 01249 443286
 E-mail: george.gray@wavin.co.uk
 Web site: www.wavin.co.uk

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BPF PIPES GROUP GUIDANCE NOTE



WATER INDUSTRY SPECIFICATION 4 - 35 - 01 GUIDANCE NOTE

Specification For Thermoplastics Structured Wall Pipes, Joints And Couplers With A Smooth Bore For Gravity Sewers For The Size Range 150-900 Inclusive

INTRODUCTION TO WIS 4 - 35 - 01

What is it?

WIS 4-35-01 is a new UK specification for PVC-u, polypropylene and polyethylene structured wall pipes for gravity sewer applications. Water Industry engineers and consultants can now be confident that by specifying sewer pipes to WIS 4-35-01 the materials used will meet the stringent performance levels for adoptable sewers laid down by the UK Water Companies and Scottish Regional Water Authorities.

The specification, which was developed by Water UK in conjunction with participating members of the BPF Pipes Group, BSI, BBA and WRc, follows extensive research and investigation and sets out a comprehensive range of performance based tests including long term structural performance, joint integrity under extreme loading conditions and, for the first time in a UK specification, resistance to potential damage from sewer cleaning and maintenance practices.

What will it be used for?

It will replace the current product or geometry specific water industry specifications and will eliminate any remaining confusion or misunderstanding when determining the suitability of structured wall plastic pipes for adoptable sewer applications.

How will it be used?

The British Standards Institution will be extending their Kitemark Certification Scheme to cover products manufactured to WIS 4-35-01. BSI Certification will verify compliance with all aspects of performance tests and quality control requirements set out in the document.

How will it affect existing products?

BSI Certification for existing water Industry approved structured wall sewer pipes will be transferred to the new specification. Products from other leading UK plastic pipe manufacturers will be introduced following completion of the certification process.

When will it happen ?

The new Water Industry Specification WIS 4-35-01 was published in August 2000. Existing and new products will be BSI certified to the specification over the next few months.

During this transition period existing product specific approvals will remain in force.



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SEWER MAINTENANCE

WIS 4-35-01 breaks new ground in introducing performance tests for water jetting and resistance to internal impact from rodding.

NEW TEST FOR HIGH PRESSURE WATER JETTING

High pressure water jetting has been an issue in the industry since the mid 1990s and WIS 4-35-01 is the first pipe specification in Europe to include a jetting test and set performance levels for compliance



It must be remembered that much of the nation's drainage and sewerage infrastructure is not in a condition to withstand high pressure water jetting. WRc research estimated that over 20% of the UK's sewer network could be vulnerable if jetted at pressures above 130 Bar and set this pressure as the upper limit for jetting when, as is frequently the case, the condition of the sewer is unknown.

Certification to WIS 4-35-01 provides confidence to the industry that structured wall thermoplastic pipes can be safely and effectively maintained by water jetting carried out in accordance with the widely accepted WRc code of practice.

NEW TEST FOR RESISTANCE TO INTERNAL IMPACT

Conventional cleaning and surveying equipment of course continues to be widely used for routine clearing of sewer systems.

WIS 4-35-01 is the first pipe specification to include an impact test to assess the toughness of the internal wall and sets minimum levels to ensure that certified pipes can be safely maintained without damage.

ROBUSTNESS DURING INSTALLATION

WIS 4-35-01 also contains an external impact test as a measure of quality control which provides confidence in the ability of the pipe to withstand site handling during installation.

STIFFNESS AND INSTALLATION

STIFFNESS CLASSES

One of the major changes in WIS 4-35-01 compared to previous specifications for structured wall sewer pipes are the new stiffness classes aligned with European Standards.

WIS 4-35-01 also takes into account the different stiffness characteristics of PVC-u, polypropylene and polyethylene thus ensuring that designers can be confident that they are using appropriate data when carrying out structural calculations for a specific pipe and bedding combination.

STIFFNESS DEFINITIONS

Short term ring stiffness - The stiffness of the pipe at the time of manufacture. (as determined by BS EN ISO 9969)

Creep Ratio - A figure representing the ratio between short and long term ring stiffness (derived using the test method in BS EN ISO 9967)

Long term ring stiffness - A calculated value for the pipe stiffness after two years (which can be derived from the short term ring stiffness and creep ratio)

WIS 4-35-01 includes two pipe stiffness classes

Stiffness Class (as marked on pipe)	Long Term Stiffness (minimum)	Creep Ratio (maximum)	Short Term Stiffness (minimum)
8	4 kN/m ²	2.5 (PVC) 4.0 (PE/PP)	8 kN/m ² or* creep x 4
4	2 kN/m ²	2.5 (PVC) 4.0 (PE/PP)	4 kN/m ² or* creep x 2

*whichever value is the greater

APPLICATIONS

It is safe to use pipes of both stiffness classes in a wide range of bed and surround conditions. The appropriate short term and long term stiffness values are used in the various equations in BS EN 1295 to determine the pipe's suitability for use in a given bed and surround specification when subjected to specified loading conditions. The appropriate stiffness values should replace the term EI/D³ in the relevant formulae.

The pipe / soil interaction which takes place with flexible pipelines is considered to be stable and not prone to further discernible settlement after a period of two years from installation. In fact, the maximum deflection experienced by the pipe system is frequently due to loading during construction operations and does not subsequently increase.

BED & SURROUND REQUIREMENTS

As with all buried flexible pipes, pipe systems to WIS 4-35-01 should be designed in accordance with BS EN 1295. In particular reference should be made to Tables NA.6 and NA.8 for the appropriate design properties of the proposed embedment conditions.

Further reference can be made to BS EN 1610 for guidance on pipeline construction.



The test method is based on WRc research with which virtually the entire UK pipe industry collaborated. The WRc project resulted in publication of a Code of Practice for safe and effective sewer jetting in June 1997.

A great deal of confusion exists as to the best methods and procedures for use with different types of systems, materials, and applications. Very high pressures are often quoted, tending to reflect the maximum capability of a particular type of jetting rig instead of the pressure that may safely be used or is appropriate for the specific maintenance activity.

The minimum resistance to jetting mandated in WIS 4-35-01 is 180 Bar, well in excess of the pressures required to clean any blockage or sediment from plastic pipe systems, and is in accordance with WRc recommendations.

In tests, total blockages of grease, and even deposits of cured concrete are easily and efficiently removed from plastic pipes at pressures of 75 Bar. It is a simple fact that materials generally present in sewers will not successfully adhere to the walls of plastic pipes.

