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**Agrément
 Certificate
 No 03/3979**

Designated by Government
 to issue
 European Technical
 Approvals

RIDGISEWER GRAVITY SEWER SYSTEM

Système d'égouts
 Kanalisationssystem


Product



- THIS CERTIFICATE RELATES TO THE RIDGISEWER GRAVITY SEWER SYSTEM, A RANGE OF POLYPROPYLENE COMPONENTS, REFERRED TO IN THE ACCOMPANYING DETAIL SHEETS, FOR USE UNDERGROUND.
- The system is for use in domestic drains and public and private sewers in accordance with WIS-4-35-01 : 2000.
- The system meets the relevant conditions and standards given in Water UK/WRc plc document — Sewers for Adoption, July 2001, 5th edition.

Regulations — Detail Sheet 1

1 The Building Regulations 2000 (as amended) (England and Wales)

 The Secretary of State has agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of drainage systems with the Building Regulations. In the opinion of the BBA, the Ridgisewer Gravity Sewer System, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement:	H1(1)	Foul water drainage
Comment:		The Ridgisewer Gravity Sewer System will convey the flow of foul or surface water and minimise the risk of blockages or leaks. See sections 6.1 and 6.2 of Detail Sheet 3.
Requirement:	H3	Rainwater drainage
Comment:		The Ridgisewer Gravity Sewer System will convey the flow of rainwater and minimise the risk of blockages or leaks. See sections 6.1 and 6.2 of Detail Sheet 3.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The system is acceptable.

continued

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continued

- Components of the system can be used individually or in combination as described in the Detail Sheets.

- This Certificate does not cover the use of the products for untreated trade effluents.

These Front Sheets must be read in conjunction with the accompanying Detail Sheets, which provide information for specific systems.

2 The Building Standards (Scotland) Regulations 1990 (as amended)



In the opinion of the BBA, the Ridgisewer Gravity Sewer System, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Building Regulations and related

Technical Standards as listed below.

Regulation:	10	Fitness of materials
Standard:	B2.1	Selection and use of materials, fittings, and components, and workmanship
Comment:		The system is acceptable.
Regulation:	24	Drainage
Standard:	M2.1	Drainage system — Wastewater and surface water drainage
Comment:		The system can meet the relevant requirements of this Standard. See sections 6.1 and 6.2 of Detail Sheet 3.

3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, the Ridgisewer Gravity Sewer System, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The system is acceptable.
Regulation:	N4	Underground foul drainage
Comment:		See sections 6.1 and 6.2 of Detail Sheet 3.
Regulation:	N5	Rain-water drainage
Comment:		See sections 6.1 and 6.2 of Detail Sheet 3.

4 Construction (Design and Management) Regulations 1994 (as amended)

Construction (Design and Management) Regulations (Northern Ireland) 1995 (as amended)

Information in this Certificate may assist the client, planning supervisor, designer and contractors to address their obligations under these Regulations.

See sections: 2 *Delivery and site handling*, 3 *General* and 12 *General* of Detail Sheet 3.

Bibliography

WIS 4-35-01, Issue 1 : 2000 *Specification for thermoplastic structured wall pipes, joints and couplers with a smooth bore for gravity sewers for the size range 150 to 900 inclusive*

Conditions of Certification

5 Conditions

5.1 This Certificate:

- (a) relates only to the product that is described, installed, used and maintained as set out in this Certificate;
- (b) is granted only to the company, firm or person identified on the front cover — no other company, firm or person may hold or claim any entitlement to this Certificate;
- (c) has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective;
- (d) is copyright of the BBA.

5.2 References in this Certificate to any Act of Parliament, Regulation made thereunder, Directive or Regulation of the European Union, Statutory Instrument, Code of Practice, British Standard, manufacturers' instructions or similar publication, shall be construed as references to such publication in the form in which it was current at the date of this Certificate.

5.3 This Certificate will remain valid for an unlimited period provided that the product and

the manufacture and/or fabricating process(es) thereof:

- (a) are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA;
- (b) continue to be checked by the BBA or its agents; and
- (c) are reviewed by the BBA as and when it considers appropriate.

5.4 In granting this Certificate, the BBA makes no representation as to:

- (a) the presence or absence of any patent or similar rights subsisting in the product or any other product;
- (b) the right of the Certificate holder to market, supply, install or maintain the product; and
- (c) the nature of individual installations of the product, including methods and workmanship.

5.5 Any recommendations relating to the use or installation of this product which are contained or referred to in this Certificate are the minimum standards required to be met when the product is used. They do not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Certificate or in the future; nor is conformity with such recommendations to be taken as satisfying the requirements of the 1974 Act or of any present or future statutory, common law or other duty of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the installation and use of this product.



In the opinion of the British Board of Agrément, the Ridgisewer Gravity Sewer System is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 03/3979 is accordingly awarded to Polypipe Civils Ltd.

On behalf of the British Board of Agrément

Date of issue: 10th January 2003

A handwritten signature in black ink, appearing to read 'P. C. Newson'.

Chief Executive

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British Board of Agrément
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For additional information about the Certificate, tel: 01923 665300.
For information about Agrément Certificate validity and scope, tel: Hotline 01923 665400, or check the BBA website.



Polypipe Civils Ltd

Certificate No 03/3979

DETAIL SHEET 2

RIDGISEWER GRAVITY SEWER SYSTEM

BSI Kitemarked Components



- THIS DETAIL SHEET LISTS THE COMPONENTS IN THE RIDGISEWER 400 mm, 450 mm, 500 mm, 600 mm, 750 mm AND 900 mm GRAVITY SYSTEM THAT ARE CURRENTLY COVERED BY THE BSI KITEMARK CERTIFICATION SCHEME.

This Detail Sheet must be read in conjunction with the Front Sheets, which give the Conditions of Certification and the product's position regarding the Building Regulations.

BSI Kitemark Licence
No KM 55701 issued to:

Polypipe Civils Ltd
Union Works
Bishop Meadow Road
Loughborough
Leicestershire LE11 5RE

WIS 4-35-01 Specification for thermoplastic structured wall pipes, joints and couplers with a smooth bore for gravity sewers for the size range 150 to 900 inclusive.

Kitemark certified pipe and fittings to WIS 4-35-01	Product code					
	400 mm	450 mm	500 mm	600 mm	750 mm	900 mm
6 m plain ended pipe (Class 4)	RSW400X6PE4	RSW450X6PE4	RSW500X6PE4	RSW600X6PE4	—	—
6 m plain ended pipe (Class 8)	RSW400X6PE8	RSW450X6PE8	RSW500X6PE8	RSW600X6PE8	—	—
3 m plain ended pipe (Class 4)	RSW400X3PE4	RSW450X3PE4	RSW500X3PE4	RSW600X3PE4	—	—
3 m plain ended pipe (Class 8)	RSW400X3PE8	RSW450X3PE8	RSW500X3PE8	RSW600X3PE8	—	—
6 m socketed pipe (Class 4)	RSW400X6IS4	RSW450X6IS4	RSW500X6IS4	RSW600X6IS4	—	—
6 m socketed pipe (Class 8)	RSW400X6IS8	RSW450X6IS8	RSW500X6IS8	RSW600X6IS8	—	—
3 m socketed pipe (Class 4)	RSW400X3IS4	RSW450X3IS4	RSW500X3IS4	RSW600X3IS4	RSW750X3IS4	RSW900X3IS4
3 m socketed pipe (Class 8)	RSW400X3IS8	RSW450X3IS8	RSW500X3IS8	RSW600X3IS8	—	—
Pipe couplers	RSWC400	RSWC450	RSWC500	RSWC600	—	—
Slip couplers	RSWSC400	RSWSC450	RSWSC500	RSWSC600	—	—
Rocker pipes	—	—	—	—	RSWRP750	RSWRP900
Stub pipe	—	—	—	—	RSWST750	RSWST900



On behalf of the British Board of Agrément

Date of issue: 10th January 2003

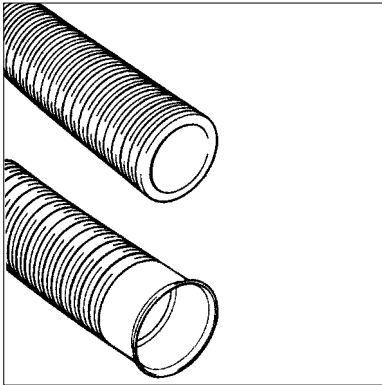
Chief Executive



Polypipe Civils Ltd

**RIDGISEWER 400 mm, 450 mm, 500 mm,
600 mm, 750 mm AND 900 mm FITTINGS**

Product



- THIS DETAIL SHEET RELATES TO RIDGISEWER 400 mm, 450 mm, 500 mm, 600 mm, 750 mm AND 900 mm FITTINGS.
- The Ridgisewer fittings are for use in domestic drains and public and private sewers at depths of up to 10 metres.

This Detail Sheet must be read in conjunction with the Front Sheets, which give the Conditions of Certification and the product's position regarding the Building Regulations.

Technical Specification

1 Description

1.1 Ridgisewer fittings are all fabricated from Ridgisewer pipe, socketed pipe and couplers. The pipes and couplers are cut to the appropriate length and angle and welded together by extrusion welding to form the desired fitting. The range of fittings covered by this Detail Sheet is shown in Figure 1. Rubber sealing rings are injection moulded from EPDM rubber and conform to type WC as referred to in BS EN 681-1 : 1996.

1.2 Continuous quality control is exercised during manufacture to maintain product quality and includes checks for dimensional accuracy and watertightness on the fittings.

1.3 Each fitting is labelled with the product name and code, the internal diameter and angle of bend/branch and the BBA identification mark incorporating the number of this Certificate.

2 Delivery and site handling

2.1 Handling, storage and transportation should be in accordance with BS 5955-6 : 1980.

2.2 When long-term storage is envisaged, the fittings and adaptors must be protected from direct sunlight.

Design Data

3 General

Ridgisewer fittings are for use as sewerage systems designed in accordance with BS EN 752-1 to 4 for the conveyance, by combined or separate systems, of surface water and domestic sewage as is permitted to be discharged into public sewers by the Water Industry Act 1991, Chapter 50, and surface water and sewage as is permitted and defined by the sewerage (Scotland) Act 1968 and the Water and Sewerage Services (Northern Ireland) Order 1973.

4 Strength

4.1 The fittings have adequate strength for use in situations when pipe to WIS 4-35-01 : 2000 (Issue 1) is suitable.

4.2 The nominal short-term stiffness is not less than 8 kNm⁻².

5 Performance of joints

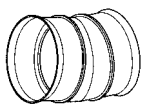
5.1 The performance of joints will not be adversely affected by thermal expansion or contraction when correctly made.

5.2 Joints on the pipeline remain watertight under conditions of pipeline movement in excess of those expected to occur in normal good drainage practice.

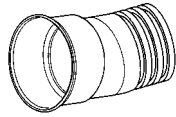
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Figure 1 Ridgisewer fittings (all measurements in mm)

Short radius bends 11.25°



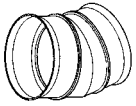
400 to 600



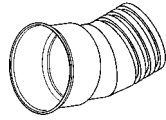
750 and 900

Nominal size
400
450
500
600
750
900

Short radius bends 22.5°



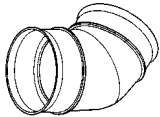
400 to 600



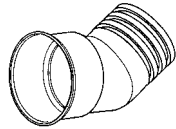
750 and 900

Nominal size
400
450
500
600
750
900

Short radius bends 45°



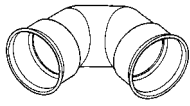
400 to 600



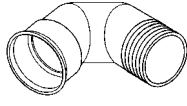
750 and 900

Nominal size
400
450
500
600
750
900

Short radius bends 90°



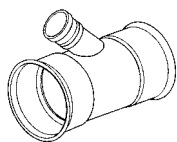
400 and 600



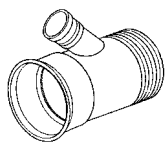
750 and 900

Nominal size
400
450
500
600
750
900

Unequal junctions 45°



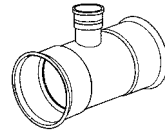
400 to 600



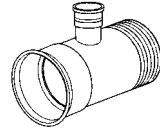
750 and 900

Nominal size
400 x 110
400 x 160
450 x 110
450 x 160
500 x 110
500 x 160
600 x 110
600 x 160
750 x 110
750 x 160
900 x 110
900 x 160
400 x 150
450 x 150
500 x 150
600 x 150
750 x 150
900 x 150

Unequal junctions 90°



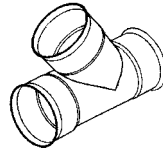
400 to 600



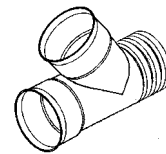
750 and 900

Nominal size	
400 x 110	750 x 160
400 x 160	900 x 110
450 x 110	900 x 160
450 x 160	400 x 150
500 x 110	450 x 150
500 x 160	500 x 150
600 x 110	600 x 150
600 x 160	750 x 150
750 x 110	900 x 150

Equal junctions 45°



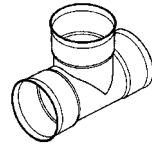
400 to 600



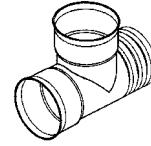
750 and 900

Nominal size
400
450
500
600
750
900

Equal junctions 90°



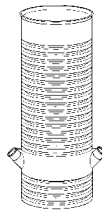
400 to 600



750 and 900

Nominal size
400
450
500
600
750
900

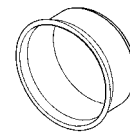
Special long fittings, single or double 45° branch



Nominal size	Length	Branch size	
		unequal	equal
400	3000	110, 150, 160	400 ⁽¹⁾
450	3000	110, 150, 160	450 ⁽¹⁾
500	3000	110, 150, 160	500 ⁽¹⁾
600	3000	110, 150, 160	600 ⁽¹⁾
750	3000	110, 150, 160	750 ⁽¹⁾
900	3000	110, 150, 160	900 ⁽¹⁾

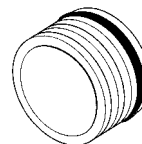
(1) Equal double branch not covered by this Certificate.

End caps



Nominal size
400
450
500
600
750
900

Socket plugs



Nominal size
400
450
500
600
750
900

Sealing rings



Nominal size
400
450
500
600
750
900

6 Flow characteristics



6.1 The products will have the normal flow characteristics associated with polypropylene underground sewerage systems.

6.2 Full bore velocities are available from the *Table for the Hydraulic Design of Pipes, Sewers and Channels, Volume 2, 7th Edition* by H R Wallingford and D I H Barr. The values are based on the Colebrook-White equation.

7 Resistance to chemicals

7.1 The products are suitable for use where pipe to WIS 4-35-01 : 2000 (Issue 1) and fittings to BS EN 1401-1 : 1998 are normally used. They have adequate resistance to the type and quantities of chemicals likely to be found in domestic sewage.

7.2 Details of the chemical resistance of PP is given in CP 312-1 : 1973 and for EPDM rubber in ISO 7620 : 1986.

8 Resistance to elevated temperatures

The products are for use where pipe to WIS 4-35-01 : 2000 (Issue 1) and fittings to BS EN 1401-1 : 1998 are normally used and have adequate resistance to the temperatures likely to be found in domestic sewage.

9 Practicability of installation

The products are installed easily under normal site conditions.

10 Rodding

10.1 Drains incorporating the product can be rodded easily using conventional flexible drain rods. Toothed root cutters, as used with some mechanical cleaning systems, could damage the fittings and should not be used.

10.2 The system has adequate resistance to water cleansing using pressure jetting equipment. It is recommended that low pressure, high volume systems are utilised in accordance with WIS 4-35-01 : 2000 (Issue 1).

11 Durability

In the opinion of the BBA, when used in the context of this Detail Sheet, no significant deterioration of the product will take place and installations will have a life in excess of 50 years.

Installation

12 General

Installation must be in accordance with the *Ridgisewer Technical Brochure* and, when appropriate, BS 5955-6 : 1980, BS EN 752-1 to 4 : 1998 and the Water UK/WRc plc

13 Jointing procedure

13.1 The pipe is cut midway between the corrugations as shown in Figure 2a.

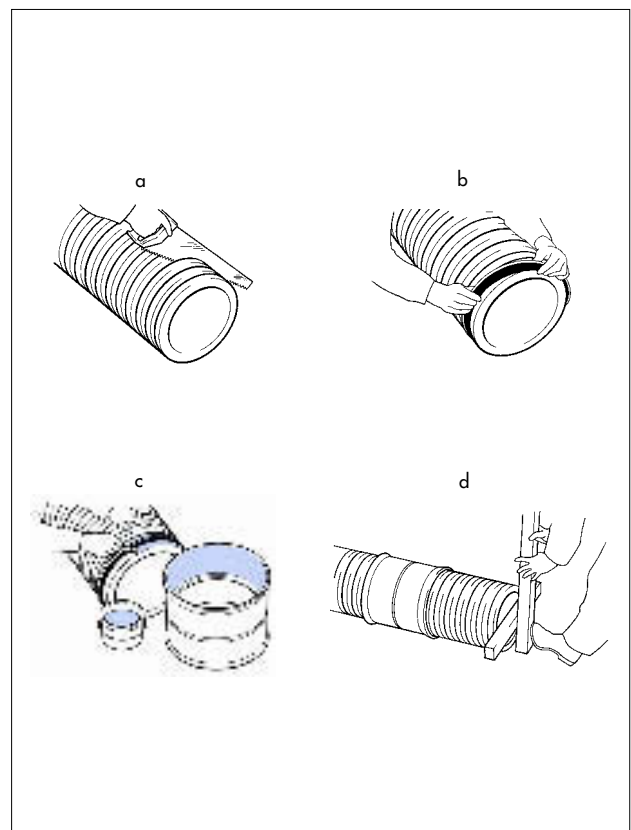
13.2 Swarf is removed from the pipe end — a chamfer is not required.

13.3 The pipe spigots and sockets are cleaned and the sealing ring is checked to ensure that it is correctly seated (not twisted) between the first and second corrugations of the pipe end as shown in Figure 2b.

13.4 The Certificate holder's lubricant is applied generously to the whole of the inside area of the socket and to the sealing ring, ensuring that it does not subsequently become contaminated with dirt, as shown in Figure 2c.

13.5 The pipe is offered to the socket, the pipe aligned and pushed fully home as shown in Figure 2d.

Figure 2 Joint details



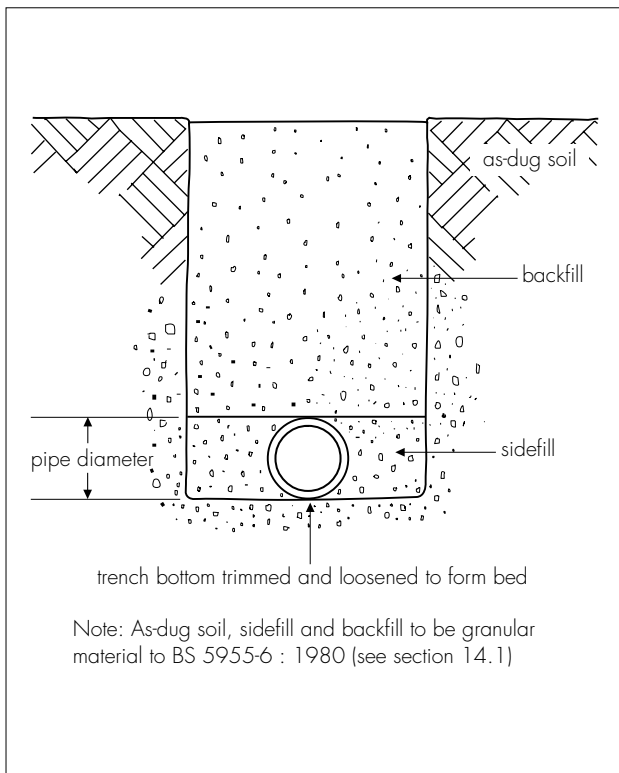
13.6 Jointing to other materials must be carried out in accordance with *Ridgisewer Design and Installation Guide*.

13.7 The fittings must have adequate protection against damage from site traffic.

14 Procedure for laying pipes

On trench bottom in granular material (see Figure 3).

Figure 3 Pipes laid on trench bottom



14.1 Where the as-dug material is suitable⁽¹⁾ for use as bedding, the bottom of the trench may be trimmed to form the pipe bed.

(1) Suitable material is defined as granular material in accordance with the recommendations of BS 5955-6 : 1980, Table 2.

14.2 Small depressions should be made to accommodate the pipe sockets or couplings. After the pipe has been laid these should be carefully filled to ensure that no voids remain under, or around, the socket.

14.3 When the formation is prepared, the pipes should be laid upon it true to line and level within the specified tolerances. Each pipe should be checked and any necessary adjustments to level made by raising or lowering the formation, ensuring that the pipes finally rest evenly on the adjusted formation throughout the length of the barrels. Adjustment should never be made by local packing.

14.4 Where the formation is low and does not provide continuous support, it should be brought up to the correct level by placing and compacting suitable material.

14.5 When the as-dug material is not suitable as a bedding, a layer of suitable granular material (see section 14.1) must be spread evenly on the trimmed trench bottom before the pipes are installed. The trench should be excavated to allow for a minimum thickness of 100 mm granular bedding under the barrels, in accordance with BS 5955-6 : 1980 (see Figure 4).

Figure 4 Pipes laid on 100 mm minimum granular bedding

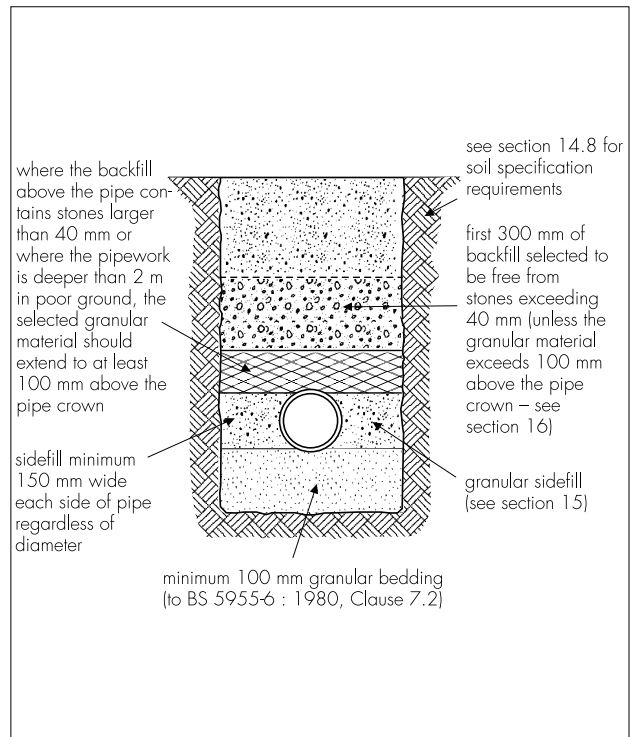
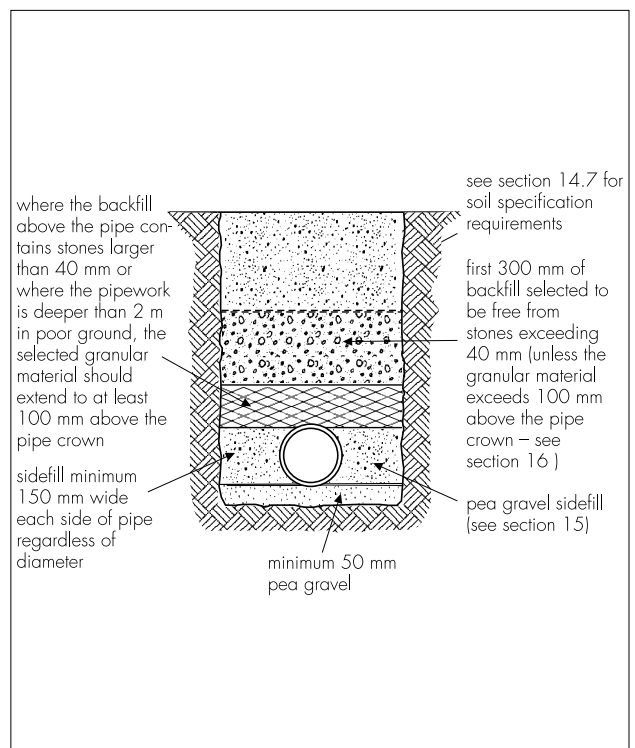


Figure 5 Pipes laid on 50 mm minimum pea gravel bedding



14.6 The trench formation should be prepared, the bedding placed and the pipes laid in accordance with BS 5955-6 : 1980 and BS 8301 : 1985.

14.7 For 150 mm pipes and fittings and where the as-dug material can be hand trimmed by shovel and is not puddled when walked upon, a 50 mm depth of bedding material may be used. In this

case the material must be a nominal 10 mm, single-sized aggregate with no sharp edges, ie pea gravel (see Figure 5).

14.8 When the 150 mm pipes are to be laid on rock, compacted sand or gravel requiring mechanical means of trimming, or in very soft or wet ground, the bedding should be as detailed in section 14.5.

15 Sidefill

In all cases the sidefill must be of the same specification as the bedding material and extend to the level of the crown of the pipe and be placed and compacted in accordance with BS 5955-6 : 1980.

16 Backfill

Backfill above the level of the crown of the pipe must be in accordance with BS 5955-6 : 1980 (see Figures 3, 4 and 5).

Technical Investigations

The following is a summary of the technical investigations carried out on Ridgisewer Gravity Sewer System.

17 Tests

Tests were carried out on the system to determine:

- leaktightness whilst under angular deflection and diametric distortion to WIS No 4-35-01 : 2000 (Issue 1), and BS EN 1277 : 1996
- ring stiffness to ISO 13967 : 1998
- strength and flexibility of fabricated fittings to BS EN 12256 : 1998
- ease of jointing
- dimensional accuracy.

18 Investigations

18.1 An investigation into existing data was assessed in relation to:

- impact resistance to WIS No 4-35-01 : 2000 (Issue 1) and BS EN 14111 : 1996
- resistance to internal puncture to WIS No 4-35-01 : 2000 (Issue 1)
- resistance to internal pressure to WIS No 4-35-01 : 2000 (Issue 1)

18.2 An examination was made of data relating to:

- resistance to damage before installation
- resistance to damage from sharp aggregate
- practicability of installation
- chemical resistance
- design method
- flow capacities.

18.3 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

Bibliography

BS 5955-6 : 1980 *Plastics pipework (thermoplastics materials) — Code of practice for the installation of unplasticized PVC pipework for gravity drains and sewers*

BS 8301 : 1985 *Code of practice for building drainage*

BS EN 681-1 : 1996 *Elastomeric seals — Material requirements for pipe joint seals used in water and drainage applications — Vulcanized rubber*

BS EN 752-1 : 1996 *Drain and sewer systems outside buildings — Generalities and definitions*

BS EN 752-2 : 1997 *Drain and sewer systems outside buildings — Performance requirements*

BS EN 752-3 : 1997 *Drain and sewer systems outside buildings — Planning*

BS EN 752-4 : 1998 *Drain and sewer systems outside buildings — Hydraulic design and environmental considerations*

BS EN 1277 : 1996 *Plastics piping systems — Thermoplastics piping systems for buried non-pressure applications — Test methods for leaktightness of elastomeric sealing ring type joints*

BS EN 1401-1 : 1998 *Plastics piping systems for non-pressure underground drainage and sewerage. Unplasticized poly(vinylchloride) (PVC-U) — Specifications for pipes, fittings and the system*

BS EN 1411 : 1996 *Plastics piping and ducting systems — Thermoplastics pipes — Determination of resistance to external blows by the staircase method*

BS EN 1446 : 1996 *Plastics piping and ducting systems. Thermoplastics pipes — Determination of ring flexibility*

BS EN 12256 : 1998 *Plastics piping systems — Thermoplastics fittings — Test method for mechanical strength or flexibility of fabricated fittings*

CP 312-1 : 1973 *Code of practice for plastics pipework (thermoplastics material) — General principles and choice of material*

ISO 7620 : 1986 *Rubber materials — Chemical resistance*

ISO 13967 : 1998 *Thermoplastics fittings — Determination of ring stiffness*

WIS 4-35-01 : 2000 (Issue 1) *Specification for thermoplastic structured wall pipes, joints and couplers with a smooth bore for gravity sewers for the size range 150 to 900 inclusive*



On behalf of the British Board of Agrément

Date of issue: 10th January 2003

A handwritten signature in black ink, appearing to read 'P. C. Newson'.

Chief Executive

Electronic Copy

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