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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
02/3940
Product Sheet 3

WAVIN TWINWALL DRAINAGE SYSTEM

WAVIN TWINWALL JUNCTIONS, BENDS AND REDUCERS

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to Wavin TwinWall Junctions, Bends and Reducers, for use in surface water drainage for the collection and disposal of surface and sub-surface water.

AGRÉMENT CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Strength — the fittings have adequate strength to resist loads associated with installation and subsequent use (see section 5).

Performance of the joints — the joints constructed from fittings and pipes with rubber seals remain watertight when subjected to deflection and distortion (see section 6).

Flow characteristics — loss coefficients of fittings have been evaluated (see section 7).

Durability — the material from which the fittings are manufactured will not significantly deteriorate and the anticipated life of the products will be in excess of 50 years (see section 9).

The BBA has awarded this Agrément Certificate to the company named above for the system described herein. This system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 19 October 2009
Originally certificated on 10 July 2002

Brian Chamberlain
Head of Approvals — Engineering

Greg Cooper
Chief Executive

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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Regulations

In the opinion of the BBA, Wavin TwinWall Junctions, Bends and Reducers, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:

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

Requirement:	H3(3)	Rainwater drainage
Comment:		The system will convey the flow of rainwater and minimise the risk of blockages or leakage. See section 7 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The system is acceptable. See section 9 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The system complies with this Regulation. See sections 8, 9 and the *Installation* part of this Certificate.
Regulation:	9	Building standards — construction
Standard:	3.6(a)	Surface water drainage
Comment:		The system will meet the relevant requirements of this Standard, with reference to clauses 3.6.1[(1)(2)], 3.6.2[(1)(2)] and 3.6.3[(1)(2)]. See section 7 of this Certificate. (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).

The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The system is acceptable. See section 9 and the *Installation* part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The system is acceptable. See section 8 of this Certificate.
Regulation:	N5	Rainwater drainage
Comment:		The system will meet the relevant requirements of this Regulation. See section 7 of this Certificate.

Construction (Design and Management) Regulations 2007
Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See section: 1 *Description* (1.2), 2 *Delivery and site handling* (2.1), 3 *General* of the *Design Considerations* part and 10 *General* of the *Installation* part.

Non-regulatory Information

NHBC Standards 2008

NHBC accepts the use of Wavin TwinWall Junctions, Bends and Reducers, when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 5.3 *Drainage below ground*.

Zurich Building Guarantee Technical Manual 2007

In the opinion of the BBA, Wavin TwinWall Junctions, Bends and Reducers, when installed and used in accordance with this Certificate, satisfy the requirements of the *Zurich Building Guarantee Technical Manual*, Section 3 *Substructure*, Sub-section *Drainage*.

General

This Certificate relates to Wavin TwinWall Junctions, Bends and Reducers which are for use in surface water drainage for the collection and disposal of surface and sub-surface water.

Technical Specification

1 Description

1.1 Wavin TwinWall Junctions, Bends and Reducers are manufactured from material with the specifications given in Table 1.

Table 1 Material properties/specification — Polypropylene[1][2]

Property	Test method reference	Specification
Tensile properties	BS ENISO 527-1 : 1996	Sample 1B at 50 mm min^{-1} ⩾ 21 MPa
Oxygen induction time	BS EN 728 : 1997	⩾ 8 min
Melt flow rate	BS EN ISO 1133 : 2005	⩽ 8.5 g $(10\ min)^{-1}$
Density	ISO 1183-3 : 1999	⩾ 850 kgm^{-3}
Heat reversion	ISO 12091 : 1995	N/A
Effects of heating (injection moulded fittings only)	BS EN ISO 580 : 2005	N/A

(1) This table is in the format of Appendix 5/7 of MCHW, Volume 2. It is used to satisfy Clause 518.2 of MCHW, Volume 1.

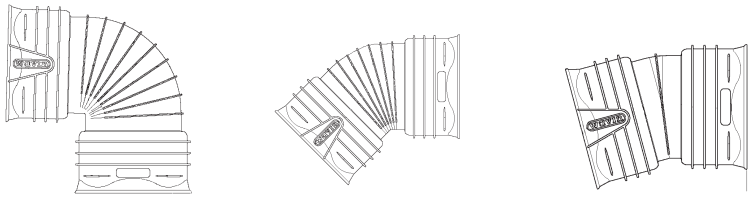
(2) This covers, 150 mm, 225 mm, 300 mm, 375 mm, 450 mm, 500 mm and 600 mm (injection moulded), and 375 mm, 450 mm, 500 mm and 600 mm fittings (fabricated).

1.2 Details and dimensions of the fittings are given in Table 2.

Table 2 Fittings (all dimensions in mm)

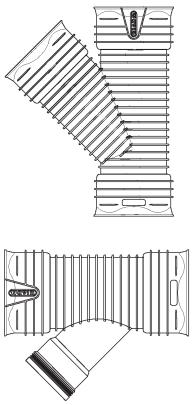
Bends 88.5° (150 mm—300 mm); 90° (375 mm—600 mm); 45°, 30° and 15° (D/S)

150
225
300
375
450
500
600



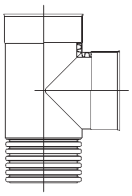
Junctions 45°

150 x 150 (D/S)
225 x 225 (D/S)
300 x 300 (D/S)
375 x 375 (D/S)
450 x 450 (D/S)
500 x 500 (D/S)
600 x 600 (D/S)
225 x 150 (D/S)
300 x 150 (D/S)
300 x 225 (D/S)
375 x 150 (D/S)
375 x 225 (S/S)
375 x 300 (S/S)
450 x 150 (D/S)
450 x 225 (S/S)
450 x 300 (S/S)
450 x 375 (S/S)
500 x 150 (D/S)
500 x 225 (S/S)
500 x 300 (S/S)
500 x 375 (S/S)
500 x 450 (S/S)
600 x 150 (D/S)
600 x 225 (S/S)
600 x 300 (S/S)
600 x 375 (S/S)
600 x 450 (S/S)
600 x 500 (S/S)



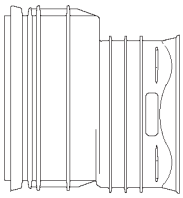
Junctions 90° (S/S)

375 x 375
450 x 450
500 x 500
600 x 600
375 x 150
150 x 150 (D/S)
375 x 225
450 x 150
450 x 225
500 x 150
600 x 150



Level invert reducers (S/S)

150 x 110
225 x 150
300 x 225
375 x 300
450 x 375
500 x 450
600 x 500



225 x 150 reducer

1.3 The ring seals described in Product Sheets 1 and 2 are available for each size of pipe for connection to the fittings.

1.4 Continuous quality control is exercised during manufacture. Checks include:

- dimensional accuracy
- airtightness
- visual examination.

1.5 Fittings carry a label bearing the BBA identification mark (incorporating the number of this Certificate), the angle of the bends and junctions, and, for fittings greater than 375 mm nominal diameter, the legend 'Handle with Care' where applicable.

2 Delivery and site handling

2.1 Handling, storage and transportation should be in accordance with MCHW and the manufacturer's instructions.

2.2 When long-term storage is envisaged, Wavin TwinWall Junctions, Bends and Reducers must be protected from direct sunlight. If protection cannot be provided, consideration must be given to the effects of daily exposure to direct sunlight:

- up to 3 months — negligible UV degradation but possible extreme surface temperatures of up to 80°C may cause some localised distortion
- 3 to 12 months — may have significant effect on the impact resistance and physical properties
- over 12 months — damage will occur unless protection provided.

2.3 Fittings above 375 mm nominal diameter must be handled with care.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Wavin TwinWall Junctions, Bends and Reducers.

Design Considerations

3 General

Wavin TwinWall Junctions, Bends and Reducers, when used with the pipes described in Product Sheets 1 and 2 comply with the requirements of the Department for Transport, Local Government and the Regions, Highways Agency (HA) Manual of Contract Documents for Highway Works (MCHW)[1], Volume 1, Clause 518.3 for pipe, Clause 518.6 for couplers and Clause 518.7 for the system. When installed in accordance with the recommendations given in the Certificate they are suitable for use in highways for the collection and disposal of surface and sub-surface water.

(1) The MCHW is operated by the Overseeing Organisations: The Highways Agency (HA), the Scottish Executive, the Welsh Assembly Government and The Department for Regional Development (Northern Ireland).

4 Practicability of installation

The fittings are installed easily using conventional drain-laying techniques (see section 11).

5 Strength

The fittings have adequate strength to resist loads associated with installation and with subsequent use in the situations described in this Certificate.

6 Performance of joints

The joints constructed from fittings and pipes with rubber seals comply with watertight joints in accordance with MCHW, Volume 1, sub-clause 504.3.

7 Flow characteristics

When used with the pipes described in Product Sheets 1 and 2, the fittings will increase the hydraulic resistance of the system. Loss coefficients (K values) may be taken as:

15° bends	0.2
30° and 45° bend	0.5
45° branch connections	1.0

8 Maintenance

Drains incorporating the fittings can be rodded easily using conventional drain rods. In common with other standard plastics drainage systems, toothed root cutters and rods with metal ferrules, as used with some mechanical cleaning systems, could damage the fittings and should not be used.

9 Durability

In the opinion of the BBA, when used in the context of this Certificate, the material from which the fittings are manufactured will not significantly deteriorate and the anticipated life of the products will be in excess of 50 years.

Installation

10 General

Drains utilising the Wavin TwinWall Junctions, Bends and Reducers must be installed in accordance with MCHW, Volume 1, Clauses 503, 505, 518.7 and 518.8.

11 Procedure

11.1 Details for typical laying, trench and backfilling specification are given in the *Installation* parts of Product Sheets 1 and 2.

11.2 To make a joint a ring seal is fitted externally to the first corrugation in the pipe. The inside of the coupler is lubricated and the pipe pushed fully home to the central register.

11.3 Pipes and fittings must protected from site construction traffic.

Technical Investigations

12 Tests

Tests were carried out to determine:

- dimensional accuracy to ISO 11922-1 : 1997 and ISO 11922-2 : 1997
- impact resistance (drop test) to BS EN 12061 : 1999
- ring stiffness to ISO 13967 : 1998
- rodding resistance to sub-clause 518.12
- watertightness of fabricated fittings to EN 1053 : 1995
- flexibility of fabricated fittings to BS EN 12256 : 1998.

13 Investigations

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 EN 12061 : 1999 *Plastics piping systems — Thermoplastics fittings — Test method for impact resistance*

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

BS EN 728 : 1997 *Plastics piping and ducting systems — Polyolefin pipes and fittings — Determination of oxidation induction time*

EN 1053 : 1995 *Plastics piping systems — Thermoplastics piping systems for non-pressure applications — Test method for watertightness*

BS EN ISO 527-1 : 1996 *Plastics — Determination of tensile properties — General principles*

BS EN ISO 580 : 2005 *Plastics piping and ducting systems — Injection-moulded thermoplastics fittings — Methods for visually assessing the effects of heating*

BS EN ISO 1133 : 2005 *Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics*

ISO 1183-3 : 1999 *Plastics — Methods for determining the density of non-cellular plastics — Gas pyknometer method*

ISO 12091 : 1995 *Structural wall thermoplastics pipes — Oven test*

ISO 11922-1 : 1997 *Thermoplastic pipes for the conveyance of fluids — Dimensions and tolerances — Metric series*

ISO 11922-2 : 1997 *Thermoplastic pipes for the conveyance of fluids — Dimensions and tolerances — Inch-based series*

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

Manual of Contract Documents for Highway Works, Volume 1 : *Specification for Highway Works* : May 2001 edition

Manual of Contract Documents for Highway Works, Volume 2 : *Notes for Guidance on the Specification for Highway Works* : 2001

14 Conditions

14.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English law.

14.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

14.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

14.4 In granting this Certificate, the BBA is not responsible for:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

14.5 Any information relating to the manufacture, supply, installation, use and maintenance of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used and maintained. It does 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; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any 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 manufacture, supply, installation, use and maintenance of this product/system.

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