

WEHOLITE SURFACE WATER DRAINAGE SYSTEM

WEHOLITE SURFACE WATER DRAINAGE PIPES

This HAPAS Certificate Product Sheet⁽¹⁾ is issued by the British Board of Agrément (BBA), supported by Highways England (HE) (acting on behalf of the Overseeing Organisations of the Department for Transport; Transport Scotland; the Welsh Assembly Government and the Department for Infrastructure, Northern Ireland), the Association of Directors of Environment, Economy, Planning and Transport (ADEPT), the Local Government Technical Advisers Group and industry bodies. HAPAS Certificates are normally each subject to a review every three years.
(1) Hereinafter referred to as 'Certificate'.

This Certificate relates to Weholite Surface Water Drainage Pipes comprising 450 to 900 mm internal diameter, structured wall, polyethylene pipes (perforated and unperforated), for use as filter and carrier pipes in highway drainage systems. The pipes are jointed on site by fusion welding.

CERTIFICATION INCLUDES:

- factors relating to compliance with HAPAS requirements
- factors relating to compliance with Regulations 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 pipes have adequate strength to resist loads associated with installation and service (see section 6).

Performance of joints — the pipes will remain watertight under normal service conditions (see section 7).

Maintenance — the pipes may be cleaned using standard pipe cleaning techniques (see section 11).

Durability — the pipes will have a service life in excess of 100 years (see section 12).



The BBA has awarded this Certificate to the company named above for the products described herein. These products have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément



Paul Valentine

Technical Excellence Director



Claire Curtis-Thomas

Chief Executive

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Originally certificated on 28 November 2014

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.*

Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.

Requirements

In the opinion of the BBA, Weholite Surface Water Drainage Pipes, when used in accordance with the provisions of this Certificate, will meet or contribute to meeting the requirements of the *Manual of Contract Documents for Highways Works* (MCHW)⁽¹⁾, Volumes 1 and 2.

The general requirements for structured wall pipes and fittings are contained in the MCHW, Volume 1, Clause 518. Further information and guidance is given in the MCHW, Volume 3, Drawing Numbers F1 and F2. Additional site requirements may be included on particular contracts.

(1) The MCHW is operated by the Overseeing Organisations: Highways England (HE), Transport Scotland, the Welsh Assembly Government and the Department for Infrastructure (Northern Ireland).

Regulations

Construction (Design and Management) Regulations 2015

Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See sections: 1 *Description* (1.2), 3 *Delivery and site handling* (3.4 and 3.5) and 15 *Procedure* (15.7) of this Certificate.

Technical Specification

1 Description

1.1 Weholite Surface Water Drainage Pipes are manufactured from black, high density polyethylene (HDPE) to the material specification given Table 1.

Table 1 Material properties/specification⁽¹⁾

Property	Test method reference	Specification
Tensile properties	BS EN ISO 527	≥ 22 MPa (50 mm·min ⁻¹)
Oxygen induction time	BS EN 728	>20 min (200°C)
Melt flow rate	BS EN ISO 1133-1	≤ 1.6 g/10 min ⁻¹ (5 kg at 190°C)
Density	BS EN ISO 1183-3	≥ 956 kg·m ⁻³

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

1.2 The pipes are of structured-wall construction, with smooth inner and outer surfaces and are made from a spirally wound extruded box profile to the dimensions shown in Figure 1 and Table 2. The pipes are available in nominal internal diameters of 450, 600, 750 and 900 mm.

Figure 1 Details of pipe

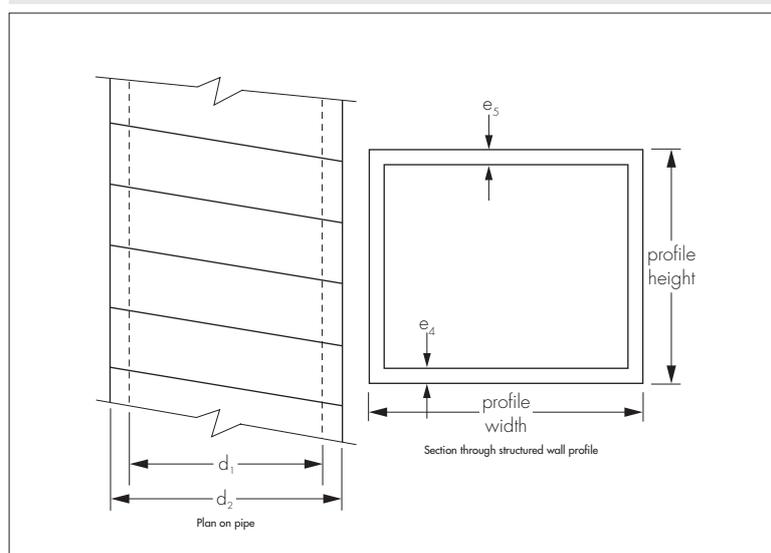


Table 2 Pipe details⁽¹⁾

Internal pipe diameter d_1 (mm)	External pipe diameter d_2 (mm)	Profile height (mm)	Profile width (mm)	Minimum inner wall thickness e_4 (mm)	Minimum outer wall thickness e_5 (mm)	Nominal length (m)	Minimum pipe weight per metre (kg·m ⁻¹)
450	506	28	35	2.3	1.9	6	13
600	675	38	47	3.2	2.6	6	22
750	838	44	55	4.1	3.3	6	34
900	1013	57	70	4.8	3.3	6	46

(1) Nominal values unless otherwise stated.

1.3 The pipes can be supplied either perforated or unperforated. Perforated pipes incorporate 10 mm diameter holes distributed in three rows 60° apart and may be placed at the crest or crown of the pipeline. The spacing of the holes and resultant permeable area per metre length of pipe are shown in Table 3.

Table 3 Details of holes

Internal pipe diameter (mm)	Number of holes per metre run of pipe	Nominal hole diameter (mm)	Permeable area per metre run of pipe (mm ² ·m ⁻¹)
450	16	10	1256
600	15	10	1178
750	18	10	1413
900	21	10	1649

1.4 The pipes are designed to be joined by fusion welding on site (see section 1.5.1).

2 Manufacture

2.1 Weholite Surface Water Drainage Pipes are manufactured from black HDPE. They are formed by spirally winding a preformed extruded box profile around a heated steel mandrel with adjacent sections welded together. The welded pipe is then reheated and trimmed to form a flat external surface. Where filter pipes are specified, 10 mm diameter drainage holes are drilled through the pipe walls at the required positions (see section 1.3).

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management system of Asset International Limited has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by BSI (Certificate FM12306).

3 Delivery and site handling

3.1 Weholite Surface Water Drainage Pipes are delivered to site in packs of between 9 and 30 pipe lengths depending on pipe diameter. A label bearing the BBA logo incorporating the number of this Certificate is attached to each pipe length or to each pack of pipes.

3.2 Handling, storage and transportation should be in accordance with the MCHW and the Certificate holder's instructions.

3.3 The pipes can be left outside as they contain a minimum of 2% carbon black. Where long-term storage is envisaged, the pipes can be protected.

3.4 The pipes should be suitably supported at a minimum of two places when being lifted. Protected slings should preferably be used, but if metal hooks or chains are used then padding should be placed around the pipes.

3.5 The pipes should be stored on a flat surface, free from sharp projections, stones or other protuberances. They should not be stacked to a height of more than 4 m high.

3.6 Care should be taken to avoid dropping the pipes on their ends, particularly during cold weather conditions.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Weholite Surface Water Drainage Pipes.

Design Considerations

4 Use

Weholite Surface Water Drainage Pipes comply with the requirements of the MCHW, Volume 1, Clause 518.5 for the pipes and Clause 518.7 for the system. When installed in accordance with the recommendations given in this Certificate, they are suitable for use in highways for the collection and disposal of surface and sub-surface water.

5 Practicability of installation

The pipes should only be installed by contractors who have been trained and approved by the Certificate holder in accordance with the Certificate holder's installation manual.

6 Strength

6.1 The pipes have a ring stiffness in excess of $6 \text{ kN}\cdot\text{m}^{-2}$ and a creep ratio of less than 4, and have adequate resistance to static loads.

6.2 The pipes have adequate resistance to the impact loads to which they may be subjected during installation and in service.

6.3 The pipes can be used as an alternative to the plastic pipes for surface water drains listed in the MCHW, Volume 1, Table 5/1, and for safe bedding depth purposes may be assumed to have a standard dimension ratio (SDR) equivalent of not greater than 41.

7 Performance of joints

Correctly made, the welded joints remain watertight.

8 Water infiltration

The perforated area for the infiltration pipes exceeds the HE minimum requirement given in the MCHW, Volume 1, Clause 518.3 of 1000 mm² per metre length (see section 1.3 of this Certificate).

9 Flow characteristics

9.1 The pipes will have normal flow characteristics associated with thermoplastic pipes.

9.2 Full-bore velocities are available from the *Tables for the hydraulic design of pipes, sewers and channels*, Volume 2, 8th Edition by H R Wallingford and D I H Barr. The values are based on the Colebrook-White equation. An appropriate value of roughness coefficient should be selected when designing the drainage system. For new pipes, a value of 0.006 mm is applicable, but for design purposes, a value of 0.6 mm is generally used.

10 Resistance of chemicals

The pipes will be unaffected by the types and quantities of chemicals likely to be found in surface water.

11 Maintenance

11.1 Access to the system for cleaning should be provided by conventional methods, eg manholes, inspection chambers and rodding access points.

11.2 In common with other standard plastic drainage systems, toothed root cutters and rods with metal ferrules, as used with some mechanical clearing systems, could damage the pipes and should not be used.

11.3 The pipes can be cleaned using low pressure, high volume jetting equipment in accordance with the MCHW, Volume 1, Clause 520.

12 Durability

In the opinion of the BBA, when used in the context of this Certificate, the material from which the pipes are manufactured will not significantly deteriorate and the anticipated life of the products will be in excess of 100 years.

13 Reuse and recyclability

The pipes are manufactured from polyethylene and can be recycled.

14 General

14.1 Weholite Surface Water Drainage Pipes must be installed in accordance with HE requirements and the MCHW, Volume 1, Clauses 503, 505, 518.7 and 518.8.

14.2 The pipes are installed using traditional drain-laying methods. The pipes can be handled and installed readily in the lengths supplied.

14.3 The pipes must be protected from damage from site construction traffic.

15 Procedure

15.1 The pipes must be prepared and fusion welded by trained operatives in accordance with the Certificate holder's documented procedures.

15.2 The pipes can be cut using conventional hand tools and should be cut square.

15.3 The pipe edge to be welded should be chamfered using an abrasive disc and the oxide layer removed.

15.4 The pipes should be raised on timbers, butted together leaving a gap of between 10 and 20 mm and tack welded.

Note: Hand-held extruders should be allowed to warm up for between 20 and 30 minutes prior to use, dependent on ambient temperature.

15.5 The tack welds should be allowed to set and the oxide layer removed with an abrasive disc.

15.6 Root weld should be laid around the joint with an angled weld tip. The oxide layer should be removed with an abrasive disc when the weld has set. The joint should be capped using a 'half-moon' shaped head attachment.

Note: In sub-zero temperatures and rain, joints should be tented off.

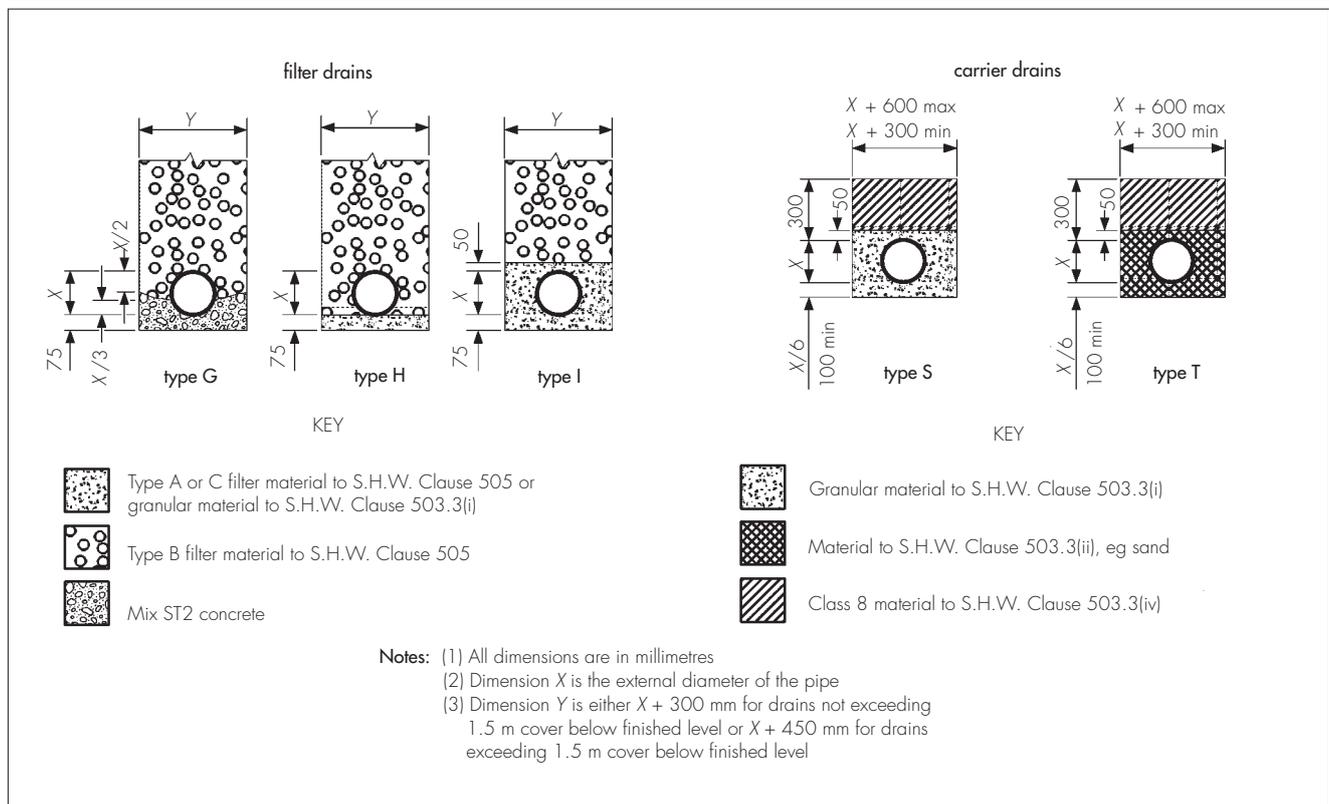
15.7 Joints can be welded either in the trench, depending on the depth of dig and relevant Health and Safety Regulations, or above the trench and lifted into place after welding.

15.8 Proper equipment should be used when lifting a welded string of pipes and the pipeline should be slung so as to avoid excessive strain on the welded joints.

15.9 Care should be taken during backfill to maintain the line and level of the pipelines. If necessary, the pipe should be restrained to prevent uplift.

15.10 For typical laying, trench and backfilling specification details, reference should be made to Figure 2 of this Certificate and the MCHW, Volume 3, Drawing Numbers F1 (Type T and S) and F2 (Type G, H and I).

Figure 2 Trench and bedding details



16 Tests

16.1 The following tests were carried out to determine the characteristics of the pipe and the pipe material:

- impact test to the MCHW, Volume 1, Clause 518 requirements at temperatures 0 and 23°C
- pipe stiffness to BS EN ISO 9969 : 2016
- creep ratio to BS EN ISO 9967 : 2016
- tensile properties to BS EN ISO 527-1 : 2012 and BS EN ISO 527-2 : 2012
- oxygen induction to BS EN 728 : 1997
- melt flow rate to BS EN ISO 1133-1 : 2011
- density to BS EN ISO 1183-3 : 1999
- ring flexibility to BS EN ISO 13968 : 2008
- internal puncture to the MCHW, Volume 1, Clause 518
- tensile strength of seam to the MCHW, Volume 1, Clause 518.

16.2 Tests were carried out to establish the dimensional accuracy of the pipes.

17 Investigations

17.1 An examination was made of data in relation to the effect of the production tolerances on the performance of the products.

17.2 An evaluation of existing data was made to assess material properties, chemical resistance and durability.

17.3 Calculations were carried out to determine the slot area.

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

Bibliography

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

BS EN ISO 527-1 : 2012 *Plastics — Determination of tensile properties — General principles*

BS EN ISO 527-2 : 2012 *Plastics — Determination of tensile properties — Test conditions for moulding and extrusion plastics*

BS EN ISO 9001 : 2008 *Quality management systems*

BS EN ISO 9967 : 2016 *Thermoplastic pipes — Determination of creep ratio*

BS EN ISO 9969 : 2016 *Thermoplastic pipes — Determination of ring stiffness*

BS EN ISO 1133 : 2000 *Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics*

BS EN ISO 1183-3 : 1999 *Plastics — Methods for determining the density and relative density of non-cellular plastics*

BS EN ISO 13968 : 2008 *Plastic piping and ducting systems — Thermoplastics pipes — Determination of ring flexibility*

Manual of Contract Documents for Highway Works, Volume 1 *Specification for Highway Works*

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

Manual of Contract Documents for Highway Works, Volume 3 *Highway Construction Details*

18 Conditions

18.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- 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.

18.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

18.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and 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.

18.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

18.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- 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
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

18.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal 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, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue 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.