HAPAS

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HAPAS Certificate

07/H130

Product Sheet 1 Issue 5

CHERRY TWINWALL HIGHWAY DRAINAGE SYSTEM

CHERRY TWINWALL PIPES AND COUPLERS

This Product Sheet(1) is issued by the British Board of Agrément (BBA). The Highways Authorities Product Approval Scheme (HAPAS) is supported by National Highways (NH) (acting on behalf of the Overseeing Organisations of the Department for Transport; Transport Scotland; the Welsh 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.

(1) Hereinafter referred to as 'Certificate'.

This Certificate relates to Cherry Twinwall Pipes and Couplers, ranging from 150 to 600 mm diameter, for use in non-pressure underground highway drainage systems, as carrier and filter drains, for the collection and disposal of surface and sub-surface water, in accordance with the *Manual of Contract Documents for Highway Works* (MCHW), Volumes 1 and 2.

The BBA has awarded this Certificate to the company named above for the products described herein. These products have been assessed as complying with the requirements of the BBA HAPAS Certification Scheme according to the assessments set out in this Certificate.

On behalf of the British Board of Agrément

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Originally certificated on 30 April 2008

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1 Production Description

1.1 The Certificate holder specifies the products under assessment, Cherry Twinwall Pipes and Couplers, for use in conjunction with Cherry Twinwall Fittings (the subject of Product Sheet 2 of this Certificate), in non-pressure underground highway drainage systems, as carrier and filter drains, for the collection and disposal of surface and sub-surface water, in accordance with the *Manual of Contract Documents for Highway Works* (MCHW), Volumes 1 and 2.

1.2 Cherry Twinwall Pipes and Couplers comprise 150 to 600 mm diameter (nominal size DN 150, 225, 300, 375, 450, 600) filter and carrier black high-density polyethylene (HDPE) pipes, black polypropylene (PP) (150 to 450 mm) and PE (600 mm) couplers and ethylene propylene diene monomer (EPDM) seals.

1.3 The pipes and couplers are manufactured to material specifications as detailed in Table 1.

Table 1 Material characteristics

Product	Pipes
Dimensions (mm)	150 to 600
Material	PE
Test method	Specification
Tensile properties BS EN ISO 527-2 : 2012	Sample 1B at 50 $mm \cdot min^{-1}$ ≥ 18 MPa
Thermal stability (OIT) BS EN 728 : 1997	≥ 4 min
Melt mass-flow rate BS EN ISO 1133-1 : 2011	≥ 0.75 g $(10\ min)^{-1}$ 2.16 kg at 190 °C
Reference density BS EN ISO 1183-1 : 2012	≥ 935 $kg \cdot m^{-3}$

1.4 The pipes have structured-wall construction and a corrugated outer wall and smooth inner wall.

1.5 The pipes are manufactured either perforated or unperforated. Perforated pipes are available with the slots in the dwell between corrugations equally spaced around the circumference and offset symmetrically for alternate dwells along the pipe length. Alternatively, the slots are located on one half of the pipe only, and thus the permeable area is approximately halved.

1.6 The pipes are manufactured with either two plain ends, or with one plain end and a welded integral socket. The integral socket is to the same profile as that of the half coupler for integral sockets of 600 mm diameter. The couplers are used for jointing the plain-ended pipes.

1.7 Sealing of the joints requires rubber sealing rings supplied by Certificate holder. The seals are manufactured from EPDM to BS EN 681-1 : 1996, Type WC.

1.8 Cherry Twinwall Pipes and Couplers comply with the requirements of the MCHW, Volume 1, Clause 518.5 for the pipes, Clause 518.6 for the couplers, and Clause 518.7 for the system. When installed in accordance with the recommendations given in this Certificate, the products are suitable for use in highway drainage systems for the collection and disposal of surface and sub-surface water.

2 Requirements

Requirements for the products are outlined in the BBA HAPAS Certification Scheme Document and have been established from the following specification documents:

- the MCHW(1), Volume 1, Series 500
- the MCHW, Volume 2, Series NG 500.

(1) The MCHW is operated by National Highways (NH) (acting on behalf of the Overseeing Organisations of the Department for Transport; Transport Scotland; the Welsh Government and the Department for Infrastructure, Northern Ireland).

3 Summary of Product Assessment

The products were assessed on the basis of the following characteristics in accordance with HAPAS requirements.

3.1 Mechanical resistance and stability

3.1.1 Mechanical properties

Table 2 Characteristics for mechanical properties

Product assessed	Assessment method	Requirement	Result
Pipes	Impact resistance at 0 and 23°C BS EN 1411 : 1996	No failure	Pass
Pipes ≤ 350 mm	Longitudinal bending to MCHW Vol. 1, sub-Clause 518.11	Deflection < 5%	Pass

The assessment showed that the products comply with HAPAS requirements for this characteristic.

3.1.2 Performance of joints

Table 3 Characteristics for performance of joints

Product assessed	Assessment method	Requirement	Result
Pipes	Dimensions BS ISO 11922-1 : 1997	As per drawings	Pass
Pipes, couplers, and seals	Tightness of joints BS EN 1277: 2003	No leakage	Pass

The assessment showed that the products comply with HAPAS requirements for this characteristic.

3.1.3 Strength and stability

Table 4 Characteristics for strength and stability

Product assessed	Assessment method	Requirement	Result
SN6 pipes	Ring stiffness BS EN ISO 9969 : 2016	≥ 6 $kN \cdot m^{-2}$	Pass
Pipes (perforated and half perforated)		Strength reduction < 5% compared to unperforated relevant pipes	Pass
Pipes DN 600	Ring flexibility at 30% deflection EN ISO 13968 : 2008	No cracks, craters, wall delamination, rupture, buckling	Pass

The assessment showed that the products comply with HAPAS requirements for this characteristic.

3.2 Hygiene, health and the environment

3.2.1 Water infiltration

Table 5 Characteristics for water infiltration

Product assessed	Assessment method	Requirement	Result
Perforated pipes	Infiltration cross section area to the MCHW, Vol 1, sub-Clause 518.3	Permeable area minimum 1000 $mm^2 \cdot m^{-1}$ Perforation size: circular: 3 - 10 mm rectangular 0.6 - 4 mm	Pass

The assessment showed that the products comply with HAPAS requirements for this characteristic.

3.3 Sustainable use of natural resources

The product is manufactured from polyethylene and polypropylene, which can be recycled.

3.4 Durability

Table 6 Characteristics for durability

Product assessed	Assessment method	Requirement	Outcome
Pipes	Creep ratio BS EN ISO 9967 : 2016	≤ 4	Pass
	Resistance to heating ISO 12091 : 1995	No delamination, cracks or bubbles	Pass
Pipes and couplers material	Resistance chemicals to the MCHW Vol 1, Clause 518.2. For guidance: PD ISO/TR 10358 : 2021	Product conforming to the MCHW, Vol 1, Clause 518	Pass
Seals material	Resistance chemicals to the MCHW, Vol 1, Clause 518.2. For guidance: PD ISO/TR 7620 : 2005		Pass

The assessment showed that the products comply with HAPAS requirements for this characteristic.

3.4.1 The assessment showed that the products comply with HAPAS requirements for chemical resistance, subject to the water discharged being rainwater, surface water and ground water, excluding chemically contaminated wastewaters, such as industrial discharges. In situations where the piping system is to be exposed to the excluded influents, specific chemical and temperature resistance must be taken into account by a suitably experienced and competent individual. Material used in the manufacture of the product, is expected to have an adequate resistance to the types and levels of chemicals likely to occur in soils and groundwater in civil engineering applications.

3.4.2 Under normal service conditions, the products will have a life of at least 50 years, provided they are designed, installed and maintained in accordance with this Certificate and the Certificate holder's instructions.

3.5 Cleaning and maintenance

Table 7 Characteristics for maintenance and cleaning

Product assessed	Assessment method	Requirement	Result
Pipes	Resistance to water jetting (high-volume, low-pressure jetting) to WIS 4-35-01 : 2008	Failure pressure ≥ 137 bar	Pass
Pipes ≤ 350 mm	Rodding resistance to the MCHW, Vol 1, sub-Clause 518.12	No damage	Pass

The assessment showed that the products comply with HAPAS requirements for this characteristic.

4 Summary of Process Assessment

Manufacturing process and quality control	Complies with HAPAS requirements
Delivery and site handling	Complies with HAPAS requirements
Installation	Complies with HAPAS requirements

4.1 Manufacture

4.1.1 The BBA has undertaken the following tasks for the assessment of product manufacture and has established that the manufacture complies with BBA HAPAS Certification Scheme requirements:

- the BBA has recorded and evaluated the manufacturer's documentation on the methods adopted for quality control procedures and product testing against HAPAS requirements
- the BBA has assessed the quality control operated over batches of incoming materials and formulations against HAPAS Requirements
- the BBA has evaluated the process for management of non-conforming work
- the BBA has audited the production process and verified that it is in accordance with the documented process
- the BBA has checked that equipment has been properly tested and calibrated.

4.1.2 The BBA has undertaken to review 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.

† 4.1.3 The management systems of the manufacturer have been assessed and registered as meeting the requirements of ISO/ISE 9001 : 2015 and ISO/ISE 14001 : 2015 by BSI (Certificates FM 25305 and EMS 541255 respectively).

4.2 Delivery and site handling

† 4.2.1 The Certificate holder stated that the products are delivered to site as follows:

- each pack of pipes bears a label including the nominal pipe diameter, Certificate holder's name, product code, perforation type, batch and pack number and intended use (eg highway surface water drainage)
- pipes are packed in wooden support frames and secured by straps
- number of pipe lengths, depending on pipe diameter, per pack:
  150 mm – 36 units; 225 mm – 14 units; 300 mm – 8 units; 375 mm – 5 units; 450 mm – 4 units and 600 mm – 2 units.
- couplers in diameters 100 to 375 mm are packed in plastic bags and palletised. The 450 mm diameter and above couplers are stacked loose on pallets.

4.2.2 To achieve the performance described in this Certificate, delivery and site handing must be performed in accordance with the Certificate holder's instructions and this Certificate, including:

- compliance with the requirements of the MCHW, Vol 1, Series 500, Clause 518 and BS EN 1610 : 2015
- care must be taken not to drop products on their ends, particularly during cold weather conditions
- pipes must be stored on a flat surface
- loose length pipes must not be stacked more than 4 m high
- the products must be protected from direct sunlight if long-term storage is envisaged.

4.3 Design

4.3.1 Structural design

4.3.1.1 In general, structural design of the products, by employing analytical or numerical methods, is not needed provided the parameters of the project are within the value range as given in PD CEN/TS 15223 : 2017, Table 1.

4.3.1.2 Specific combinations (when prescribing loads that each component must be able to withstand or any special safety factors to be used etc) must be supported by calculations carried out by a suitably experienced and competent individual in accordance with BS 9295 : 2020, BS EN 1295-1 : 2019 and PD CEN/TR 1295-2 : 2005.

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4.3.1.3 Calculated prediction of the actual pipe's behaviour depends on the framework conditions used for it. Applied values must be monitored through exhaustive soil survey assessments and by supervising the installation.

4.3.2 Hydraulic design of the system

4.3.2.1 The internal surface of the product is hydraulically smooth, and the design of joints and fittings ensures good hydraulic performances. An appropriate value of roughness coefficient must be selected when designing the drainage system. For new pipes, a value of 0.006 mm is applicable, but for designs, a value of 0.6 mm is generally used.

4.3.2.2 The products have normal flow characteristics associated with thermoplastics pipes.

4.4 Installation

4.4.1 The Certificate holder's instructions for installation of the products were confirmed as meeting the BBA HAPAS Certification Scheme requirements.

4.4.2 To achieve the performance described in this Certificate, the product must be protected against damage from site construction traffic.

4.4.3 To achieve the performance described in this Certificate, the products must be installed in accordance with:

- Certificate holder's instructions
- National Highways requirements and the MCHW Volume 1, Clauses 502 to 505, 518.8, and 518.9, and Volume 3, Drawing Nos F1 (Type T and S) and F2 (Type G, H and I)
- CD 533 (DMRB 4.2.5)
- BS EN 752 : 2017 and BS EN 1610 : 2015

and tested in accordance with the MCHW, Volume 1, Clause 509.

† 4.4.4 The Certificate holder's instructions advise the following:

- the pipes are cut using conventional hand tools and should be cut square between the corrugations
- for a watertight joint, the pipe end and socket/coupler/fitting should be cleaned, and a rubber seal fitted externally between the first and second corrugation in the pipe. The seal and inside of the socket/coupler should be lubricated and the pipe pushed fully home to the central register, either by hand or using a lever if necessary
- 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
- all pipework must be laid with the correct bedding and surrounding material.

4.4.5 To achieve the performance described in this Certificate, Installation of the products must be carried out by a competent general builder, or a contractor, experienced with these types of products.

4.5 Maintenance

4.5.1 To achieve the performance described in this Certificate:

- access to the system for cleaning must be provided by conventional means
- 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 products and must not be used
- the products have adequate resistance to cleaning by water jetting and rodding. However, it is recommended that a low-pressure, high-volume jetting method is used in accordance with the MCHW, Volume 1, Clause 521 and general advice as stated in sub-Causes 520.1 to 520.4.

5 Fulfilment of Requirements

5.1 The conclusion of this BBA assessment is that Cherry Twinwall Pipes and Couplers, when used in accordance with the provisions of this Certificate comply with the BBA HAPAS Certification Scheme requirements.

5.2 In order for the products to continue to meet Scheme requirements, they must be installed, used and maintained as per the manufacturer's instructions and as detailed in the Certificate.

6 Validity of Certificate

Continuing validity of this Certificate is dependent on the following factors:

- continuing compliance with product or process requirements, as described in the HAPAS Scheme document, and the specification documents referred to therein
- ongoing BBA surveillance of factory production control, to verify that the specifications and quality control being operated by the manufacturer are being maintained
- formal triennial Review of the Certificate, and Reissue for required technical or non-technical updates.
- compliance with ongoing Certificate obligations by the Certificate holder and manufacturers.

†7 Additional 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.

CE Marking

The Certificate holder has taken the responsibility of CE Marking the products in accordance with harmonised European Standard EN 681-1 : 1996.

8 Bibliography

BS 9295 : 2020 *Guide to the structural design of buried pipes*

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

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

BS EN 752 : 2017 *Drain and sewer systems outside buildings - sewer system management*

BS EN 1277 : 2003 Plastics piping systems - Thermoplastics piping systems for buried non-pressure applications - Test methods for leaktightness of elastomeric sealing ring type joints

BS EN 1295-1 : 2019 *Structural design of buried pipelines under various conditions of loading - General requirements*

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

BS EN 1610 : 2015 *Construction and testing of drains and sewers*

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

BS EN ISO 1133-1 : 2011 *Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics*

BS EN ISO 1183-1 : 2012 Plastics *— Methods for determining the density and relative density of non-cellular plastics — Immersion method, liquid pycnometer method and titration method*

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

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

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

BS ISO 11922-1 : 1997 *Thermoplastics pipes for the conveyance of fluids. Dimensions and tolerances - Metric series*

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

ISO/ICE 9001 : 2015 *Quality management systems — Requirements*

ISO/ICE 14001 : 2015 *Environmental management system — Requirements*

PD CEN/TS 15223 : 2017 *Plastics piping systems - Validated design parameters of buried thermoplastics piping systems*

PD CEN/TR 1295-2 : 2005 *Structural design of buried pipelines under loading — Part 2: Summary of nationally established methods of design*

PD ISO/TR 7620 : 2005 *Rubber materials — Chemical resistance*

PD ISO/TR 10358 : 2021 *Plastics pipes and fittings for industrial applications — Collection of data on combined chemical-resistance*

Water Industry Specification 4-35-01 : 2008 *Specification for Thermoplastics Structured Wall Pipes – Supplementary Test Requirements*

Design Manual for Roads and Bridges (DMRB), CD 533 Determination of pipe and bedding combinations for drainage works SG, Version 1.1.0. Issue December 2021

Manual of Contract Documents for Highway Works, Volume 1 *Specification for Highway Works, Series 0500, Drainage and Service Ducts, February 2020*
Manual of Contract Documents for Highway Works, Volume 2 *Notes for Guidance on the Specification for Highway Works, Series NG 0500, February 2020*
Manual of Contract Documents for Highway Works, Volume 3 *Highway Construction Details, Section 1 Carriageway and Other Details, F Series*

9 Conditions of Certification

9.1 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.

9.2 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.

9.3 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.

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

9.5 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 UKCA marking and CE marking.

9.6 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.

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