

HAPAS

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HAPAS Certificate

09/H145

Product Sheet 2 Issue 7

NAYLOR HIGHWAY DRAINAGE SYSTEM

METRODRAIN FABRICATED FITTINGS

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 Metrodrain Fabricated Fittings, ranging from 150 to 600 mm in diameter, for use in non-pressure underground highway drainage systems, 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, and the *Design Manual for Roads and Bridges* (DMRB), CG 501 *Design of highway drainage systems*.



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

Date of Seventh issue: 29 August 2024
Originally certified on 2 April 2009

Hardy Giesler
Chief Executive Officer

A handwritten signature in black ink, appearing to read 'Giesler'.

This BBA HAPAS Certificate is issued under the BBA's accreditation to ISO/IEC 17065 (UKAS accredited Certification Body Number 0113).

Clauses marked † are additional information outside the scope of accreditation.

Readers MUST check the validity and latest issue number of this BBA HAPAS Certificate by referring to the BBA website or contacting the BBA directly.

The Certificate should be read in full as it may be misleading to read clauses in isolation.

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

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1 Production Description

1.1 The Certificate holder specifies the products under assessment, Metrodrain Fabricated Fittings, for use in conjunction with pipes (the subject of Product Sheets 1, 3 and 5 of this Certificate), in non-pressure underground highway drainage systems, for the collection and disposal of surface and sub-surface water, in accordance with the MCHW, Volumes 1 and 2, and DMRB, CG 501.

1.2 Metrodrain Fabricated Fittings comprise 150 to 600 mm diameter (nominal size internal diameter DN/ID 150, 225, 300, 375, 450, 600 as detailed in Table 1) polyethylene (PE) and polypropylene (PP) fittings. The fittings have a structured-wall construction and a black corrugated outer and green smooth inner wall.

1.3 Each bend requires two rubber seals, and each junction requires three rubber seals available from the Certificate holder. The seals are manufactured from ethylene propylene diene monomer (EPDM) to BS EN 681-1 : 1996, Type WC.

Table 1 Product range

DN/ID	Code	DN/ID	Code	DN/ID	Code	DN/ID	Code
Bend 11.25°							
150	71351	300	71504	450	71506		
225	71563	375	71505	600	71507		
Bend 22.5°							
150	71352	300	71514	450	71516		
225	71573	375	71515	600	71517		
Bend 45°							
150	71353	300	71524	450	71526		
225	71583	375	71525	600	71527		
Bend 90°							
150	71354	300	71534	450	71536		
225	71593	375	71535	600	71537		
90° Junctions (socketed)							
150x150	71585	375x150	71634	450x300	71648	600x375	71670
225x150	71587	375x225	71636	450x375	71650	600x450	71672
225x225	71588	375x300	71638	450x450	71652	600x600	71674
300x150	71624	375x375	71640	600x150	71664		
300x225	71626	450x150	71644	600x225	71666		
300x300	71628	450x225	71646	600x300	71668		
45° Junctions (socketed)							
150x150	71581	375x150	71633	450x300	71647	600x375	71669
225x150	71586	375x225	71635	450x375	71649	600x450	71671
225x225	71584	375x300	71637	450x450	71651	600x600	71673
300x150	71623	375x375	71639	600x150	71663		
300x225	71625	450x150	71643	600x225	71665		
300x300	71627	450x225	71645	600x300	71667		
Sealing rings							
150	71342	300	71344	450	71346	750	71099
225	71343	375	71345	600	71347	900	71102

1.4 The pipes and couplers used to fabricate the fittings are manufactured to material specifications as detailed in Tables 2.

Table 2 Material characteristics

Characteristic	Pipes	Couplers
Material	PE	Injection moulded PP
Test method	Specification	
Tensile properties to BS EN ISO 527-2 : 2012	≥ 18 MPa (Sample 1B at 50 mm·min ⁻¹)	
Melt mass-flow rate to BS EN ISO 1133-1 : 2011	≤ 1.0 g (10 min) ⁻¹ 2.16 kg at 190°C ⁽¹⁾	≤ 13 g·(10 min) ⁻¹ 2.16 kg at 190°C
Reference density to BS EN ISO 1183-1 : 2012	≥ 935 kg·m ⁻³ ⁽²⁾	> 890 kg·m ⁻³

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 and specifically Clause 518
- the MCHW, Volume 2, Series NG 500 and specifically Clause NG 518
- the DMRB⁽²⁾, CG 501.

(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).

(2) The DMRB is operated by the Overseeing Organisations: National Highways (NH), 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 3 Characteristics for mechanical properties

Product assessed	Assessment method	Requirement	Outcome
Fittings DN < 300	Impact resistance at 0° to BS EN 12061 : 1999	No damage	Pass
Fittings DN ≥ 300		May fail but must be identified as 'handle with care'	No damage

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

3.1.2 Performance of joints

Table 4 Characteristics for performance of joints

Product assessed	Assessment method	Requirement	Outcome
Fittings	Dimensions	As per drawings	Pass
	Watertightness to BS EN ISO 13254 : 2017	No leakage	Pass
	Tightness of joints to BS EN 1277 : 2003	No leakage	Pass

The assessment showed that the products comply with HAPAS requirements for these characteristics.

3.1.3 Strength and stability

Table 5 Characteristics for strength and stability

Product assessed	Assessment method	Requirement	Outcome
Fittings	Strength and flexibility to BS EN ISO 13264 : 2017	No leakage	Pass

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

3.2 Sustainable use of natural resources

The products are manufactured from polyethylene and polypropylene, which can be recycled.

3.3 Durability

Table 6 Characteristics for durability

Product assessed	Assessment method	Requirement	Outcome
Fittings	Ring stiffness to BS EN ISO 13967 : 1998	$\geq 6 \text{ kN}\cdot\text{m}^{-2}$	Value achieved
PE and PP material	Resistance to chemicals to the MCHW, Vol 1, Sub-clause 518.2. For guidance see PD ISO/TR 10358 : 2021	Product conforming to the MCHW, Vol 1, Clause 518	Pass
Seals material	Resistance to chemicals to the MCHW, Vol 1, Sub-clause 518.2. For guidance see PD ISO/TR 7620 : 2005		Pass
PE and PP material	Thermal stability (OIT) to BS EN 728 : 1997	Declared value $\geq 4 \text{ min}$	Pass

The assessment showed that the products comply with HAPAS requirements for these characteristics.

3.3.1 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. The materials used in the manufacture of the products are expected to have an adequate resistance to the types and levels of chemicals likely to occur in soils and groundwater in civil engineering applications.

3.3.2 Under normal service conditions, the products will have a life of at least 60 years, provided they are designed, installed and maintained in accordance with this Certificate and the Certificate holder's instructions.

3.4 Cleaning and maintenance

Table 7 Characteristics for maintenance and cleaning

Product assessed	Assessment method	Requirement	Outcome
Fittings	Resistance to water jetting (high-volume, low-pressure jetting) to WIS 4-35-01 : 2008	Failure pressure $\geq 137 \text{ bar}$	Pass
Fittings DN ≤ 350	Rodding resistance to the MCHW, Vol 1, Sub-clause 518.12	Average failure energy > 3 joules. No damage	Pass

The assessment showed that the products comply with HAPAS requirements for these characteristics.

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 of 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 9001 : 2015 by BSI (Certificate FM01420).

4.2 Delivery and site handling

†4.2.1 The Certificate holder stated that the products are delivered to site in packaging (bag or pallet) bearing a label including product batch, machine operator, date of manufacture and who packed the product. The fittings have an embossed logo or a sticker including the number of this Certificate and a month/year date wheel to identify approximate manufacture time.

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

- compliance with the requirements of the MCHW 1, Volume 1, Series 500, Clause 518
- care must be taken not to drop products on their ends, particularly during cold weather conditions
- the products must be protected from direct sunlight when long-term storage is envisaged. 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.

4.3 Design

4.3.1 Structural design

4.3.1.1 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.

4.3.1.2 Calculated prediction of the actual products' 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 products 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 fittings.

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 products must be protected against damage from site construction traffic.

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

- the Certificate holder's instructions
- DMRB, CD 533
- MCHW Volume 1, Series 500; Volume 2, Series NG 500 and Volume 3, Drawings F1 (Type T and S) and F2 (Type G, H and I)
- BS EN 752 : 2017 and BS EN 1610 : 2015.

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

- for a watertight joint, the pipe end and socket/coupler/fittings 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 this type of product.

4.5 Maintenance

4.5.1 To achieve the performance described in this Certificate:

- access 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 product and must not be used
- the product has adequate resistance to cleaning by water jetting and rodding. However, it is recommended that low-pressure, high-volume jetting method is used in accordance with the MCHW, Volume 1, Clause 521 and general advice as stated in sub-Clauses 520.1 to 520.4.

5 Fulfilment of Requirements

5.1 The conclusion of this BBA assessment is that Metrodrain Fabricated Fittings, 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 in accordance with the Certificate holder's instructions and this 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 12061 : 1999 *Plastics piping systems — Thermoplastics fittings — Test method for impact resistance*

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

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 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 13254 : 2017 *Thermoplastics piping systems for non-pressure applications — Test method for watertightness*

BS EN ISO 13264 : 2017 *Thermoplastics piping systems for non-pressure underground drainage and sewerage — Thermoplastics fittings — Test method for mechanical strength or flexibility of fabricated fittings*

ISO 9001 : 2015 *Quality management systems — Requirements*

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 — Combined chemical-resistance classification table*

Water Industry Specification (WIS) 4-35-01 : 2008 *Specification for Thermoplastics Structured Wall Pipes — Supplementary Test Requirements*

Design Manual for Roads and Bridges, CD 533 *Determination of pipe and bedding combinations for drainage works, Version 1.1.0. (12/21)*

Design Manual for Roads and Bridges, CG 501 *Design of highway drainage systems, Version 2.1.0 (08/22)*

Manual of Contract Documents for Highway Works, Volume 1 *Specification for Highway Works, Series 0500, Drainage and Service Ducts (02/20)*

Manual of Contract Documents for Highway Works, Volume 2 *Notes for Guidance on the Specification for Highway Works, Series NG 0500, Drainage and Service Ducts (02/20)*

Manual of Contract Documents for Highway Works, Volume 3 *Highway Construction Details, F Series, Drainage (05/06)*

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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