

# HAPAS

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**HAPAS Certificate**  
**09/H145**  
Product Sheet 4 Issue 2

### NAYLOR METRODRAIN TWINWALL HIGHWAY DRAINAGE SYSTEM

### METRODRAIN MOULDED FITTINGS

This Product Sheet<sup>(1)</sup> is issued by the British Board of Agrément (BBA). The Highways Authorities Product Approval Scheme (HAPAS) is supported by National Highways (N.H.) (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 Moulded Fittings, ranging from 150 to 225 mm 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.



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 Second issue: 23 May 2023

Originally certificated on 6 April 2021

Hardy Giesler  
Chief Executive Officer

*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 product under assessment, Metrodrain Moulded Fittings, for use in conjunction with Metrodrain Pipes and Couplers (the subject of Product Sheet 1 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 *Manual of Contract Documents for Highway Works (MCHW)*, Volumes 1 and 2.

1.2 Metrodrain Moulded Fittings comprise a range of 150 to 225 mm diameter (nominal size DN 150, 225) fittings, to material specifications given in Table 1 and range in Table 2:

- 150 mm bends, manufactured from black polypropylene (PP)
- 150 mm junctions and 225 mm bends and junctions, manufactured from black polyethylene (PE).

*Table 1 Material characteristics*

Product	Fittings	
	Injection Moulded	Rotor Moulded
Manufacturing process		
Dimensions (mm)	150	150 - 225
Material	PP	PE
Test method	Specification	
Tensile properties BS EN ISO 527-2 : 2012 (1B at 50 mm·min <sup>-1</sup> )	≥ 18 MPa	≥ 14 MPa
Melt mass-flow rate	≤ 13 g (10 min) <sup>-1</sup>	≤ 8 g (10 min) <sup>-1</sup>
BS EN ISO 1133-1 : 2011	2.16 kg at 190°C	2.16 kg at 190°C
Reference density BS EN ISO 1183-1 : 2012	> 890 kg·m <sup>-3</sup>	> 900 kg·m <sup>-3</sup>
Effects of heating BS EN ISO 580 (pass)	150°C ± 2°C	110°C ± 2°C

*Table 2 Fitting range*

Bends	Size	150 mm	225 mm (D/S)
	Angle	Product code	Product code
	11.25°	71351	71563
	22.5°	71352	71573
	45°	71353	71583
	90°	71354	71593
Junctions	Angle	45°	90°
	Size	Product code	Product code
	150 x 150	71581	71585
	225 x 150	71586	71587
	225 x 225	71584	71588

1.3 Sealing of the joints requires rubber sealing rings supplied by the Certificate holder. The seals are manufactured from ethylene propylene diene monomer (EPDM) to BS EN 681-1 : 1996, Type WC.

1.4 Metrodrain Moulded Fittings comply with the requirements of the MCHW, Volume 1, Clause 518.6 for the fittings, 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<sup>(1)</sup>, Volume 1, Series 500
- the MCHW, Volume 2, Series NG 500.

(1) The MCHW is operated by National Highways (N.H.) (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 3 Characteristics for mechanical properties*

Product assessed	Assessment method	Requirement	Result
Fittings	Impact resistance BS EN ISO 13263 : 2017	DN < 300, no damage DN ≥ 300, may fail and must be identified as 'handle with care'	Pass

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	Result
Fittings	Dimensions BS ISO 11922-1 : 2018	As per drawings	Pass
System (Pipe, fitting, seal)	Tightness of joints BS EN ISO 13259 : 2018	No leakage	Pass

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

#### 3.1.3 Strength and stability

*Table 5 Characteristics for strength and stability*

Product assessed	Assessment method	Requirement	Result
Fittings	Ring stiffness BS EN ISO 13967 : 2009	≥ 6 kN·m <sup>2</sup>	Pass

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

### 3.2 Sustainable use of natural resources

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

### 3.2 Durability

*Table 6 Characteristics for durability*

Product assessed	Assessment method	Requirement	Outcome
Fittings	Ring stiffness BS EN ISO 13967 : 2009	$\geq 6 \text{ kN}\cdot\text{m}^{-2}$	Value achieved
	Resistance to heating BS EN ISO 580 : 2005	Depth of cracks, delamination or blisters less than 20 % of the wall thickness around the injection point(s). No part of the weld line to open to a depth of more than 20 % of the wall thickness	Pass
Fittings material	Resistance to chemicals MCHW Vol. 1, Clause 518.2, For guidance: PD ISO/TR 10358 : 2021	Product conforming to the MCHW, Vol 1, Clause 518	Pass
	Thermal stability (OIT) BS EN 728 : 1997	Declared value	$\geq 4 \text{ min}$

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

3.2.1 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 products 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.

3.2.2 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.

### 3.3 Cleaning and maintenance

*Table 7 Characteristics for maintenance and cleaning*

Product assessed	Assessment method	Requirement	Result
Fittings DN $\leq$ 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 this characteristic.

## 4 Summary of Process Assessment

<b>Manufacturing process and quality control</b>	Complies with HAPAS requirements
<b>Delivery and site handling</b>	Complies with HAPAS requirements
<b>Installation</b>	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 manufacturers have been assessed and registered as meeting the requirements of ISO 9001 : 2015 by BSI (Certificate FM 01420) and by QAS International (Certificate CA14944).

### 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, 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
- 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 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 the UK National Annex to BS EN 1295-1 : 2019.

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 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 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:

- 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 and relevant fittings where applicable, should be restrained to prevent uplift
- all pipework elements 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 product and must not be used
- the product has 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 Metrodrain Moulded 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 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.

## 8 Bibliography

- 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 1610 : 2015 *Construction and testing of drains and sewers*
- 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 580 : 2005 *Plastics piping and ducting systems — Injection-moulded thermoplastics fittings — Methods for visually assessing the effects of heating*
- 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 13259 : 2018 *Thermoplastics piping systems for underground non-pressure applications — Test method for leaktightness of elastomeric sealing ring type joints*
- BS EN ISO 13263 : 2017 *Thermoplastics piping systems for non-pressure underground drainage and sewerage - thermoplastics fittings — test method for impact strength*
- BS EN ISO 13967 : 2009 *Thermoplastics fittings — Determination of ring stiffness*
- BS ISO 11922-1 : 2018 *Thermoplastics pipes for the conveyance of fluids. Dimensions and tolerances — Metric series*
- ISO/IEC 9001 : 2015 *Quality management systems — Requirements*
- PD CEN/TS 15223 : 2017 *Plastics piping systems — Validated design parameters of buried thermoplastics piping systems*
- PD ISO/TR 10358 : 2021 *Plastics pipes and fittings — Combined chemical-resistance classification table*
- 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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