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HAPAS Certificate
13/H205
Product Sheet 1

POLYPIPE DUCTING SYSTEMS

RIDGIDUCT TWIN-WALLED HIGH DENSITY POLYETHYLENE DUCTING

This HAPAS Certificate Product Sheet⁽¹⁾ is issued by the British Board of Agrément (BBA), supported by the Highways Agency (HA) (acting on behalf of the Overseeing Organisations of the Department for Transport; Transport Scotland; the Welsh Assembly Government and the Department for Regional Development, 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 replaces Certificate 90/R049 and relates to Ridgiduct Twin-walled High Density Polyethylene Ducting, for use in highways as underground ducting for electricity, gas and water supply services, and for street lighting cables and fibre-optic cabling for telecommunications.

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 products have adequate strength to resist the loads likely to be encountered during service (see section 6).

Resistance to elevated temperatures — the products have adequate resistance to long-term deformation at an elevated temperature of 45°C (see section 7).

Resistance to chemicals — the products have an adequate resistance to attack from chemicals likely to occur in soils and groundwater (see section 8).

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

Brian Chamberlain
Head of Approvals — Engineering

Claire Curtis-Thomas
Chief Executive

Date of First issue: 14 November 2013

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.

Requirements

In the opinion of the BBA, Ridgiduct Twin-walled High Density Polyethylene Ducting, when used in accordance with the provisions of this Certificate, will meet or contribute to meeting the following requirements of the Manual of Contract Documents for Highways Works (MCHW)⁽¹⁾, Specification for Highways Works (SHW), Volume 1 and Volume 3.

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

Regulations

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: 3 *Delivery and site handling* (3.1) of this Certificate.

Technical Specification

1 Description

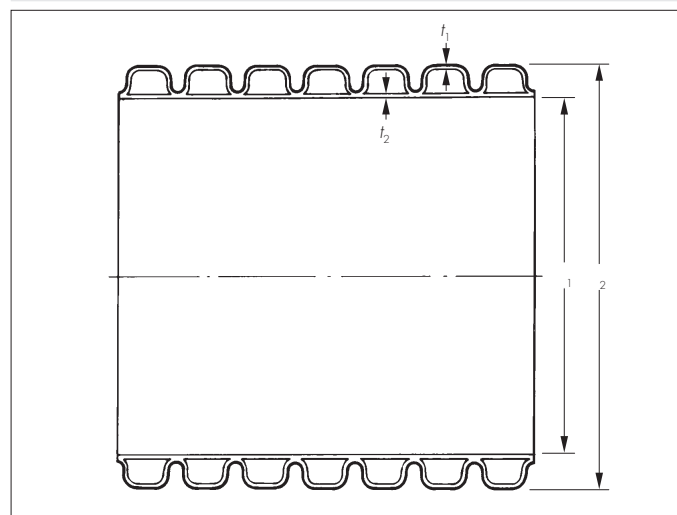
1.1 Ridgiduct Twin-Walled High Density Polyethylene Ducting comprises twin-walled high density polyethylene (HDPE) ducts and polypropylene (PP) couplers.

1.2 The outer wall of the ducts is corrugated and the inner wall is smooth finished. Details and dimensions are given in Table 1 and Figure 1.

Table 1 Duct dimensions

Manufacturer's Code No	Internal diameter (d_1) (mm)	External diameter (d_2) (mm)	t_1 (mm)	t_2 (mm)	Length (m)
RB 94	94	110	0.70	0.60	1, 2, 3 and 6
RB 100	100	118	1.00	0.80	1, 2, 3 and 6
RB 125	125	148	1.00	0.90	1, 2, 3 and 6
RB 150	150	177	0.90	0.95	1, 2, 3 and 6

Figure 1 Ridgiduct



1.3 The ducts are available in a colour range of black, purple, orange, green, blue and yellow. The ducts are marked appropriately in accordance with the customer's requirements.

1.4 A black PP coupler is used to join the ducts. Details of size are given in Table 2 and Figures 2 and 3.

Table 2 Coupler dimensions

Coupler type	Internal diameter (d_1) (mm)	Internal diameter (d_2) (mm)	External diameter (d_3) (mm)	L (mm)	t (mm)
94	111.60	111.25	114.50	100.00	2.0
100	117.5	119.4	125	97.25	2.5
125	147.5	148.25	155	101.60	2.5
150	177.0	178.5	185	123.00	2.5

Figure 2 94 mm coupler

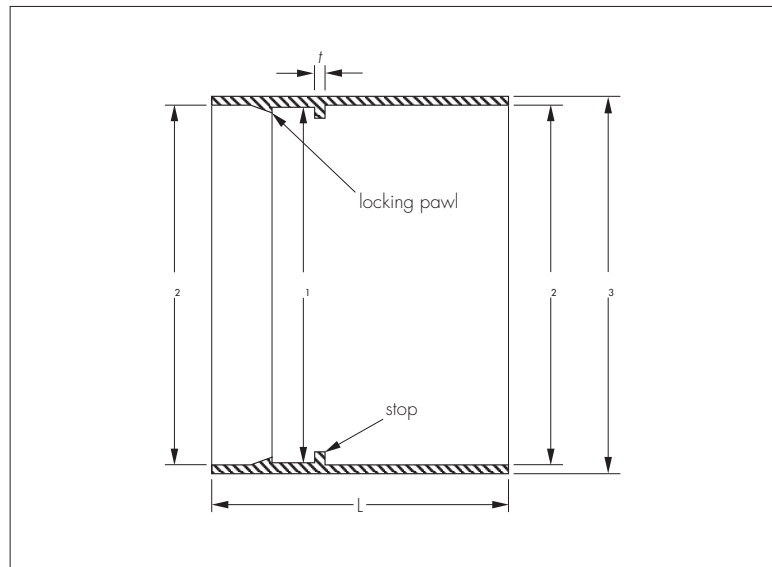
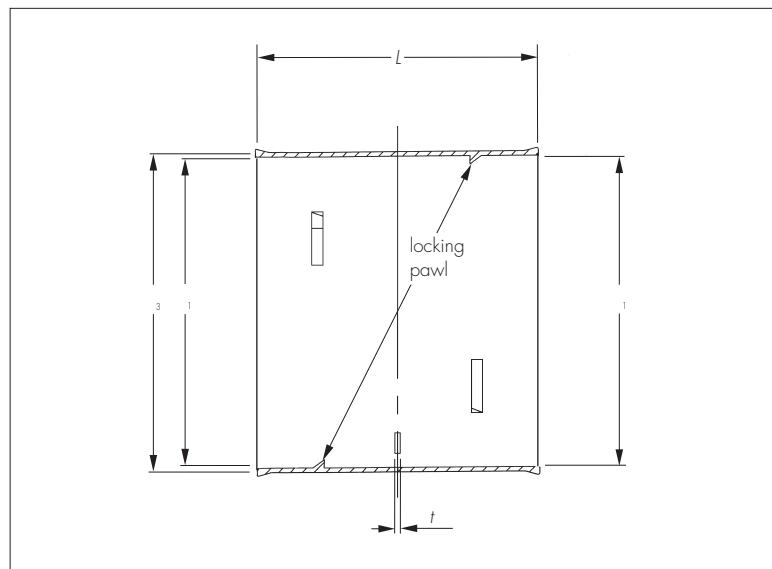


Figure 3 100 mm, 125 mm and 150 mm couplers



1.5 Joining of the ducts with the couplers produces a system with protection against penetration by solid foreign objects of 2.5 mm diameter or greater, ie an IP rating of 3 (first characteristic numeral) to BS EN 60529 : 1992.

1.6 When used with an optional sealed coupling, available from the Certificate holder, and elastomeric seal, Ridgiduct RB 94, RB 100 and RB 150 are suitable for motorway communications applications as a sealed system to BS EN 61386-24 : 2010, IP67.

2 Manufacture

2.1 The ducts are manufactured from HDPE by a twin-extrusion process. Two pipes are extruded simultaneously, one inside the other, and heat-welded together in one continuous process.

2.2 The couplers are manufactured from PP using a conventional injection moulding technique.

2.3 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.

2.4 The management system of Polypipe Civils Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by BSI (Certificate Q06225).

3 Delivery and site handling

3.1 The products are delivered to site strapped to pallets.

3.2 When used for electric cables, the ducts are marked with the legend 'electric cable duct'. The ducts are appropriately marked, in accordance with the customer's requirements.

3.3 The HDPE ducts and PP couplers have good resistance to UV degradation but, to avoid damage or deterioration in storage, it is recommended that the ducts be protected from direct sunlight. However, if this is unavoidable, the following mechanism of deterioration should be considered:

- up to three months' daily exposure to direct sunlight will cause negligible UV degradation but extreme surface temperatures of up to 80°C are possible on exposed surfaces and may cause some localised distortion
- three to 12 months' daily exposure to direct sunlight may have a significant effect on the impact resistance and physical properties of the duct
- over 12 months' daily exposure to direct sunlight will damage the duct and should be avoided.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on to Ridgiduct Twin-walled High Density Polyethylene Ducting.

Design Considerations

4 General

Ridgiduct Twin-Walled High Density Polyethylene Ducting, when installed in accordance with the recommendations given in this Certificate, is suitable for use in highways as underground ducting for electricity, gas and water supply services, and for street lighting cables and fibre optic cabling for cable television and telecommunications.

5 Practicability of installation

5.1 The products are designed to be installed by a competent general builder, or a contractor, experienced with these types of product.

5.2 The ducts have a smooth internal surface and a static coefficient of less than 0.22. The ducts and their joints do not present any internal projection or impedance to the installation or withdrawal of cables through the duct run.

6 Strength

6.1 The products have adequate strength to resist the loads likely to be encountered during service when used and installed in accordance with the recommendations given in this Certificate.

6.2 The ducts can be used as an alternative to the plastics pipes listed in the MCHW, Volume 1, Series 500, Table 5/2 *Pipes for Ducts*.

6.3 The ducts will have adequate resistance to the impact loads normally encountered during handling and installation. The ducts meet the resistance to impact requirements defined as 'normal duty' and the resistance to compression requirements defined in 'type 450' of BS EN 61386-24 : 2010.

6.4 The ducts have an adequate resistance to long-term deformation. When tested in accordance with BS 4962 : 1989, the ducts have an ultimate pipe stiffness (STES) value in excess of 1400 N·m⁻².

7 Resistance to elevated temperatures

7.1 The maximum temperature to which the ducts and couplers will be subject in service as an electrical cable duct is dependent on the ground thermal conductivity, depth of burial, ground temperature and the heat load imposed by the electrical cable.

7.2 In general, cables with a surface temperature of up to 60°C will not affect the integrity of the ducts. For example, in a typical installation with a 300 mm² copper cable carrying a current of 600 amps imposing a heat load of 25 W·m⁻¹, the cable would have a surface temperature of 60°C; this would result in a mean internal duct temperature of 45°C.

7.3 The ducts have adequate resistance to long-term deformation at an elevated temperature of 45°C.

8 Resistance to chemicals

The HDPE used to manufacture ducting and the PP used to manufacture couplers have an adequate resistance to attack from chemicals likely to occur in soils and groundwater. Details of chemical resistance of HDPE and PP are given in CP 312-1 : 1973.

9 Maintenance

As the products are buried and have suitable durability (see section 10), maintenance is not required.

10 Durability

When used in the context of this Certificate, the products will have adequate durability.

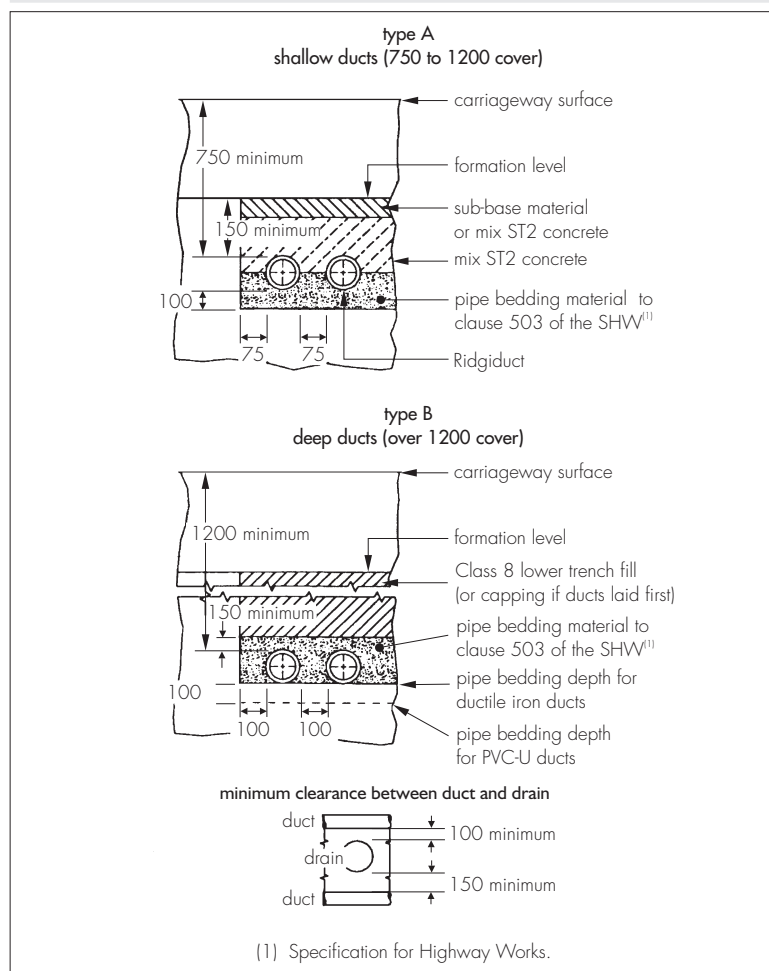
Installation

11 General

11.1 Ridgiduct Twin-Walled High Density Polyethylene Ducting must be installed in accordance with the general requirements and any additional site requirements (see section 1).

11.2 The general requirements are to be in accordance with the MCHW, Volume 3, as shown in Figure 4.

Figure 4 Highway construction detail



11.3 Ducting laid in depths of cover other than those specified in Figure 4 must be laid in accordance with the procedures described in the contract with the Highways Agency (HA).

11.4 The products must be adequately protected against damage from site construction traffic and from agricultural or similar operations.

11.5 When used as ducts for fibre optic cabling the recommendations in the MCHW, Volume 1, Series 1500, Clause 1531, should be followed.

12 Procedure

12.1 Joints are made by a simple push-fit of one duct length into the coupler attached to the adjacent length, ensuring that the connection is fully made.

12.2 Inspection points can be made in the conventional manner depending upon the type of services to be installed.

Technical Investigations

13 Tests

As part of the assessment leading to the issue of Certificate 90/R049, tests were carried out to determine:

- dimensional accuracy
- resistance to compression
- impact strength at -5°C
- Vicat softening temperature
- static friction coefficient
- visual examination
- adhesion of printing
- resistance to long-term deformation.
- ease of jointing
- resistance to penetration of simulated sharp aggregate
- resistance to sharp objects
- watertightness of joints
- degree of protection against foreign objects
- creep ratio
- degrees of protection by enclosure

14 Investigations

14.1 An examination was made of data relating to:

- chemical resistance
- heat dissipation
- effect of temperature
- practicability of installation
- material properties
- durability.

14.2 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 4962 : 1989 *Plastic pipes and fittings for use as subsoil field drains*

BS EN 60529 : 1992 *Specification for degrees of protection provided by enclosures (IP code)*

BS EN 61386-24 : 2010 *Conduit systems for cable management — Particular requirements — Conduit systems buried underground*

BS EN ISO 9001 : 2008 *Quality management systems — Requirements*

CP 312-1 : 1973F *Code of practice for plastics pipework (thermoplastics material) — General principles and choice of material*

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*

15 Conditions

15.1 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.

15.2 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.

15.3 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.

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

15.5 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.

15.6 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.