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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
**00/3699**
**Product Sheet 1**

# POLYPIPE PLUMBING SYSTEMS

# POLYPLUMB STANDARD PIPE AND POLYMAX, POLYPLUMB AND POLYFIT BARRIER PIPE SYSTEMS

This Agrément Certificate Product Sheet(1) relates to PolyPlumb Standard Pipe and PolyMax, PolyPlumb and PolyFit Barrier Pipe Systems, in various diameters, for use in hot and cold water services (including potable water) and central heating in conjunction with PolyMax, PolyPlumb and PolyFit push-fit and PolySure press-fit fittings, and in service conditions defined as Class S in BS 7291-1 : 2010.

(1) Hereinafter referred to as 'Certificate'.

## CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information 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

**Safe working temperatures and pressures** — a range of temperatures and pressures have been assessed (see section 7).

**Chemical resistance** — the materials used in the products will be unaffected by soft, hard or aggressive potable water (see section 8).

**Durability** — the pipe and fittings have an equivalent service life to traditional metal pipes and fittings (see section 13).

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

Date of Second issue: 9 July 2018

Originally certificated on 29 March 2000

Paul Valentine
Technical Excellence Director

Claire Curtis-Thomas
Chief Executive

*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.*

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# Regulations

In the opinion of the BBA, PolyPlumb Standard Pipe and PolyMax, PolyPlumb and PolyFit Barrier Pipe Systems, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):

**The Building Regulations 2010 (England and Wales) (as amended)**

| | | |
|---|---|---|
| Requirement: | G1 | Cold water supply |
| Comment: | | Plumbing systems incorporating the products can satisfy this Requirement. See sections 8 and 9 of this Certificate. |
| Regulation: | 7 | Materials and workmanship |
| Comment: | | The products are acceptable. See section 13.1 and the *Installation* part of this Certificate. |

**The Building (Scotland) Regulations 2004 (as amended)**

| | | |
|---|---|---|
| Regulation: | 8(1)(2) | Durability, workmanship and fitness of materials |
| Comment: | | The products can contribute to a construction satisfying this Regulation. See section 13.1 and *Installation* part of this Certificate. |
| Regulation: | 9 | Building standards applicable to construction |
| Standard: | 6.3 | Heating system |
| Comment: | | The system incorporating the products can satisfy this Standard, with reference to clause 6.3.0[1][2] and 6.3.1[1][2]. See section 6.1 of this Certificate. |
| Standard: | 7.1(a)(b) | Statement of sustainability |
| Comment: | | The products can contribute to meeting the relevant requirements of Regulation 9, Standards 1 to 6 and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard. |

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).

**The Building Regulations (Northern Ireland) 2012 (as amended)**

| | | |
|---|---|---|
| Regulation: | 23(a)(i)(iii)(b)(i) | Fitness of materials and workmanship |
| Comment: | | The products are acceptable. See section 13.1 and the *Installation* part of this Certificate. |
| Regulation: | 86(2) | Sanitary appliances |
| Comment: | | The system incorporating the products can satisfy this Regulation. See section 6.1 of this Certificate. |

**Construction (Design and Management) Regulations 2015**

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

In the opinion of the BBA, there is no information in this Certificate which relates to the obligations of the client, designer (including Principal Designer) and contractor (including Principal Contractor) under these Regulations.

**Byelaws**

In the opinion of the BBA, PolyPlumb Standard Pipe and PolyMax, PolyPlumb and PolyFit Barrier Pipe Systems can satisfy or contribute to satisfying the requirements of the Water Supply (Water Fittings) Regulations 1999, England and Wales; the Water Supply (Water Fittings) (Scotland) Byelaws and the Water Supply (Water Fittings) Regulations (Northern Ireland) 2009, if used and installed in accordance with this Certificate.

# Technical Specification

## 1 Description

1.1 Polypipe Standard Pipe comprises polybutylene (PB) pipe, for use in hot or cold water services. It is grey in colour and is available in seven sizes (see Table 1).

1.2 Polypipe Barrier Pipe comprises five layers: PB/adhesive/ethylene vinyl alcohol (EVOH)[1]/adhesive/PB in accordance with BS 7291-1 : 2010 and BS 7291-2 : 2010 and is available in two types: PolyPlumb (grey) and PolyFit (white). Both types are available in seven sizes (see Table 1).

(1) The central EVOH layer is between 0.09 and 0.20 mm thick and acts as an oxygen diffusion barrier; it is bound either side with hot-melt adhesive.

*Table 1 Pipe details*

| Nominal pipe diameter (mm) | Wall thickness (mm) |
|---|---|
| 10 | 1.5 |
| 12 | 1.5 |
| 15 | 1.7 |
| 18 | 1.8 |
| 20 | 1.9 |
| 22 | 2.0 |
| 28 | 2.6 |

1.3 The pipes are covered by BSI Kitemark Licence No KM 38148 in respect of BS 7291-2 : 2010 and can be used with PolyPlumb and PolyFit push-fit and PolySure press-fit fittings covered by the same BSI Kitemark Licence.

### Accessories and support

1.4 Before jointing the pipe into PolyMax, PolyPlumb and PolyFit push-fit fittings, pipe stiffeners must be inserted into the pipe ends. Stainless steel stiffeners are bought-in to an agreed specification to BS EN 10088-2 : 2014, grade 1.4404 and polysulphone stiffeners are injection moulded by the Certificate holder.

1.5 PolySure press-fit fittings incorporate a sleeve fitted with two EPDM rubber seals and, therefore, stiffeners are not required.

1.6 A Polypipe chamfering tool is available from the Certificate holder for milling a chamfer into the inside of the pipe end to allow the PolySure press-fit fittings to be applied.

1.7 For securing pipe runs, there are two types of pipe clips: screw-fix clip and nail-in clip:

### screw-fix clip

- snap-fit for 10, 15, 22 and 28 mm diameter pipes
- Bulldog for 15, 22 and 28 mm diameter pipes

### nail-in clip

- for 10, 15, 22 and 28 mm diameter pipes.

1.8 A cold-forming bend fixture in engineering plastic is available for 15 and 22 mm diameter pipes. The fixtures are used to ensure that sharp bends remain smoothly curved.

## 2 Manufacture

2.1 Polypipe Standard Pipe and PolyPlumb and PolyFit Barrier Pipe are manufactured by extrusion.

2.2 Continuous quality control is carried out during manufacture, including checks on dimensional accuracy and short-term pressure tests at 20 and 95°C.

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

- agreed with the Certificate holder/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 is in accordance with the documented process
- evaluated the process for management of non-conformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis as part of a surveillance process to ensure that standards are maintained and that the product or system remains as Certificated.

## 3 Delivery and site handling

3.1 The pipe is supplied in straight lengths of 3 or 6 m and in coils in lengths from 6 to 500 m. The pipe is marked at approximately 1 m intervals with the manufacturer's trademark, the number of this Certificate, reference to a website or Polypipe literature for operating temperature and pressure, and date of production (including time, day, month and year). Standard pipe is marked in black and barrier pipe in red and including the legend BARRIER.

3.2 Straight lengths are packed in sealed polyethylene sleeves and coils in sealed polyethylene bags. The colour coding of the packaging identifies the product:

- PolyPlumb Standard Pipe beige
- PolyPlumb Barrier Pipe yellow
- PolyFit Barrier Pipe blue.

3.3 Fittings are supplied in sealed polyethylene bags.

3.4 The pipe should be transported on a flat-bed vehicle. Straight pipes should be loaded to avoid overhang or crushing.

3.5 Once unwrapped, pipes should be stored indoors or in a shaded area to prevent ultraviolet degradation. To prevent distortion, pipes should be stored in racks which give support to their whole length.

# Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on PolyPlumb Standard Pipe and PolyMax, PolyPlumb and PolyFit Barrier Pipe Systems.

## Design Considerations

### 4 Use

4.1 PolyPlumb Standard Pipe and PolyMax, PolyPlumb and PolyFit Barrier Pipe Systems are for use in hot and cold water services installations designed in accordance with BS 5955-8 : 2001 in new or existing buildings. The pipes are suitable for use for those applications and service conditions defined as Class S in BS 7291-1 : 2010.

4.2 The products can be installed easily in new or existing buildings.

4.3 Care must be taken during installation to ensure that damage does not occur to the pipe, eg by nail penetration.

### 5 Practicability of installation

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

### 6 Design procedure

Heating design

6.1 The heating demands for particular rooms are evaluated as detailed in the CIBSE Guide A : 2015 and BS EN 1264-2 : 2008.

6.2 Where pipes pass through areas not contributing to space heating, they should be insulated.

### 7 Safe working temperatures and pressures

The pipes, and some of PolyMax, PolyPlumb, PolyFit and PolySure fittings, have been tested and comply with the Class S service conditions in a normal domestic operation, given in BS 7291-1 : 2010, Table 1 (reproduced in Table 2 of this Certificate), and can be used in all applications listed in the Table(1).

(1) Limitations are indicated against the relevant fitting in the Certificate holder's *Trade Price List*.

*Table 2 Class S service conditions*

| Application(1) | Nominal system flow temperature $T_f$(2) (°C) | Maximum system service temperature $T_s$(3) (°C) | System malfunction temperature $T_m$(4) (°C) | System maximum working pressure(5) (bar(6)) |
|---|---|---|---|---|
| Indirect cold water systems | 20 | 20 | – | 3½ |
| Direct mains-fed cold water systems | 20 | 20 | – | 12½ |
| Sub-surface heating systems | 60 | 83 | 100 | 3½ |
| Vented hot water supply systems | 65 | 83 | 100 | 3½ |
| Unvented hot water supply systems including instantaneous heaters and/or incorporating storage | 65 | 95 | 100 | 6 |
| Vented central heating systems and indirect hot water primary circuits | 82 | 95 | 100 | 3½ |
| Sealed central heating systems and indirect hot water primary circuits | 82 | 105 | 114 | 3 |

(1) Continuously operated re-circulating systems are excluded from these applications.
(2) Where $T_f$ is the intended maximum flow temperature of a system for a particular application as recommended in codes of practice and other guidance documents.
(3) Where $T_s$ is the maximum service temperature that can occur intermittently during normal operation.
(4) Where $T_m$ is the maximum temperature likely to be applied to pipes and fittings in the event of control thermostat failure or malfunction.
(5) Where a maximum working pressure does not comprise an integer value, the mantissa is expressed in a fractional format. This is done to reduce the possibility of misinterpretation or obscurity that could cause a system to be subjected to an excessive pressure (see also clause 8.4 of BS 7291-1 : 2010).
(6) 1 bar = $10^5$ N·m$^{-2}$ = $10^5$ Pa.

### 8 Chemical resistance

8.1 PB pipe will be unaffected by soft, hard or aggressive potable water, subject to the exclusions detailed in section 7.

8.2 The materials used in the pipe and fittings could be adversely affected by contact with some types of soldering flux and associated sealing compounds(1) and, therefore, such materials should be avoided.

(1) These traditional materials are not used with the products.

## 9 Effect on water quality

The pipe and fittings have been tested in relation to the above and found to be satisfactory. The PB material is listed in the Water Regulations Advisory Service Directory.

## 10 Properties in relation to fire

Where the pipe passes through an element of structure or cavity barrier, the opening should be fire-stopped in a way that will permit thermal movement of the pipe.

## 11 Flow characteristics

The insertion of pipe stiffeners into the pipe does not significantly affect the system flow characteristics.

## 12 Maintenance

12.1 The pipe does not require special maintenance unless it is damaged.

12.2 In the event of a leak in the pipe, eg due to local damage, repairs can be carried out by a plumbing contractor using a new section of pipe and appropriate fittings. It should be noted that the stainless steel grab rings are single use only and whenever a PolyPlumb joint is dismantled, the grab ring should be cut off and a new one fitted as per Polypipe's published instructions, ensuring the new grab ring is correctly seated in the base of the socket before jointing.

## 13 Durability

13.1 The EVOH oxygen barrier in the PolyPlumb and PolyFit barrier pipes virtually eliminates the diffusion of oxygen into the heating system provided the system is completely sealed. For standard and barrier pipe, provided the system is correctly installed, the requirements for the addition of a corrosion inhibitor will be the same as that for a traditional installation with metal pipes and fittings.

13.2 The plumbing system will have a life at least equivalent to that expected from a traditional installation with metal pipes and fittings.

13.3 The terminal fittings, eg thermostatic radiator valves, are produced from materials known to be durable in plumbing applications. They may require replacement within the life of the pipe.

## 14 Re-use and recyclability

The pipes are manufactured from PB which can be recycled.

# Installation

## 15 General

15.1 Installation must be carried out in accordance with the manufacturer's instructions, the *Polypipe Plumbing and Heating Installation Guide*, BS 5955-8 : 2001 and BS 8558 : 2015.

15.2 The pipes must not be used within 350 mm of a concentrated heat source, such as a boiler, or in uncontrolled primary heating circuits where the safe operating pressure and maximum temperature rating may be regularly exceeded. The metal (copper) section of pipework should be used to form a transmission piece between the boiler and the first plastic pipe connection. The pipe must not be positioned in locations subjected to direct sunlight, close to a fire, light fitting or other source of direct heat which would raise the temperature of the pipe above safe limits.

15.3 Standard and barrier pipe is flexible and cannot be used to support fittings, eg circulating pumps or appliances.

## 16 Procedure

### Jointing method

16.1 The pipe is cut to length using Polypipe pipe cutters (available from the Certificate holder). The cut end is checked to ensure that it is free from burrs, score marks and sharp edges. With PolyMax, PolyPlumb and PolyFit push-fit fittings, a stainless steel or polysulphone pipe stiffener is inserted into the end of the pipe. With PolySure press-fit fittings, a chamfer is milled on the inside of the pipe end using the Polypipe chamfering tool.

16.2 Joints can be made using the fittings listed in BSI Kitemark Licence No KM 38148 in respect of BS 7291-2 : 2010 following the instructions given in the *Polypipe Plumbing and Heating Installation Guide*.

### Over a concrete floor in a screed (see Figure 1)

16.3 The plumbing system should be contained in a conduit pipe. The system should be pressure tested before the concrete screed or cement-sand is laid over the conduit pipe. Should pressure testing take place in sub-zero temperatures, or if the system is to be left after pressure testing in sub-zero temperatures, all necessary precautions should be taken to avoid frost damage to radiators and fittings and all water should be drained from the system after completion of the testing. The thickness of the screed will be dependent upon the loading requirements of the floor, but the cover to the pipe must never be less than 35 mm. The screed should be laid in accordance with the relevant requirements of BS 8204-1 : 2003.

*Figure 1 Installation in a solid floor*

### In a suspended wooden floor

16.4 Pipe runs are secured using pipe clips. The recommended spacing of support centres is shown in Table 3.

*Table 3 Spacing of support systems*

| Nominal diameter of pipe (mm) | Horizontal runs[1] (m) | Vertical runs (m) |
|---|---|---|
| 10 | 0.3 | 0.5 |
| 15 | 0.3 | 0.5 |
| 22 | 0.5 | 0.8 |
| 28 | 0.8 | 1.0 |

(1) In-line with joists.

16.5 The pipes are secured beneath the joists. Service entries through joists must be approved by an appropriately qualified structural engineer and be in accordance with BS 8558 : 2015 and relevant structural standards. The system should be pressure tested before nailing down the floor deck.

### Commissioning the plumbing system

16.6 When commissioning the system it must be flushed, filled with water, the pump started and residual air removed by opening the bleed valves in each circuit. The system must be checked for leaks after all the air has been removed and before the floor is covered with either concrete or wood.

16.7 A notice should be displayed in buildings when the system is installed, drawing attention to the risks of damage associated with nailing through the floor decks. To minimise this risk, the pipe runs should be kept clear of room perimeters and, where possible, doorways.

## Technical Investigations

### 17 Tests

Tests were carried out and the results assessed to determine:

- dimensional accuracy
- effect of thermal cycling on pipes and fittings[1]
- oxygen diffusion to DIN 4726 and DIN 4727
- long-term hydrostatic pressure resistance of pipe[1]
- resistance to pull-out of assembled joints[2]
- short-term hydrostatic pressure resistance of pipe at 20°C[2]
- short-term hydrostatic pressure resistance of pipe at 95°C[2]
- resistance to cyclic pressure shock of assembled pipes and fittings[1]
- effect of freezing.

(1) To BS 7291-1 : 2010.
(2) To BS 7291-2 : 2010.

## 18 Investigations

18.1 An examination was made of data relating to:

- thermal stability of the oxygen diffusion barrier
- behaviour in fire
- chemical resistance
- effect of materials on water quality
- practicability of installation
- durability.

18.2 The *Polypipe Plumbing and Heating Installation Guide* was examined and compared to conventional practice in the UK.

18.3 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. The factory production control was examined and found to be in accordance with the guidance on quality control testing given in BS 7291-2 : 2010. The pipe and fittings are covered by Kitemark Licence No KM 38148 in respect of BS 7291-2 : 2010.

# Bibliography


BS 5955-8 : 2001 *Plastics pipework (thermoplastics materials) — Specification for the installation of thermoplastics pipes and associated fittings for use in domestic hot and cold services and heating systems in buildings*

BS 7291-1 : 2010 *Thermoplastics pipe and fitting systems for hot and cold water for domestic purposes and heating installations in buildings — General requirements*
BS 7291-2 : 2010 *Thermoplastics pipe and fitting systems for hot and cold water for domestic purposes and heating installations in buildings — Specification for polybutylene (PB) pipe and associated fittings*

BS 8204-1 : 2003 + A1 : 2009 *Screeds, bases and in-situ floorings — Concrete bases and cement sand levelling screeds to receive floorings — Code of practice*

BS 8558 : 2015 *Guide to the design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages — Complementary guidance to BS EN 806*

BS EN 1264-2 : 2008 + A1 : 2012 *Water based surface embedded heating and cooling systems — Floor heating — Prove methods for the determination of the thermal output using calculation and test methods*

BS EN 10088-2 : 2014 *Stainless steels — Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*

CIBSE Guide A : 2015 *Environmental design*

DIN 4726 : 2008 *Warm water surface heating systems and radiator connecting systems — Plastics piping systems and multilayer piping systems*

DIN 4727 : 1988 *Pipelines of polybuten used in warm water floor heating systems; Special requirements and testing*

## 19 Conditions

19.1 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.

19.2 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.

19.3 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.

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

19.5 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.

19.6 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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