

## **Polypipe Polyplumb Irish PB Barrier Pipe & Fittings**

### **Tubes et Raccords Rohre und Anschlusse**

The **Irish Agrément Board** is designated by Government to issue European Technical Approvals. Irish Agrément Board Certificates establish proof that the certified products are '**proper materials**' suitable for their intended use under Irish site conditions, and in accordance with the **Building Regulations 1997 to 2017**.

The **Irish Agrément Board** operates in association with the **National Standards Authority of Ireland (NSAI)** as the National Member of UEAtc.



#### **PRODUCT DESCRIPTION AND USE**

This Certificate relates to **Polyplumb** polybutylene barrier pipe and push-fit fittings. The **Polyplumb** plumbing pipe and fittings are manufactured from polybutylene plastic developed for hot/cold water services, central (radiator) and underfloor heating systems. The barrier pipes have an oxygen barrier layer at mid-wall thickness. **Polyplumb** polybutylene pipe and push-fit fittings meet the requirements of Class S service conditions specified in

Table 1 of BS 7291-1; 2017 for a service life of 50 years and BS 7291 - 2.

#### **MANUFACTURE:**

The product is manufactured by:

Polypipe Building Products Ltd.  
Broomhouse Lane  
Edlington  
Doncaster  
South Yorkshire  
DN12 IES  
United Kingdom.

#### **MARKETED BY:**

The product is marketed by:

Polypipe (Ireland) Ltd.,  
Dromore Road,  
Lurgan,  
Craigavon,  
Co. Armagh  
BT66 7HL.  
Northern Ireland.

## 1.1 ASSESSMENT

In the opinion of the Irish Agrément Board (IAB), the **Polyplumb** polybutylene Plumbing, Central & Underfloor Heating Pipe and push-fit fittings when used in accordance with the provision of this Certificate, are satisfactory for the purpose defined above and can meet the requirements of the Building Regulations 1997 to 2017 as indicated in Section 1.2 of this Certificate.

## 1.2 BUILDING REGULATIONS 1997 to 2017

### REQUIREMENT:

#### **Part D – Materials and Workmanship**

**D3 – Polyplumb** polybutylene Hot & Cold Plumbing Central and Underfloor Heating Pipe and push-fit fittings as certified in this IAB Certificate, are proper materials fit for their intended use (see Part 4 of this Certificate).

**D1 – Polyplumb** Hot & Cold Plumbing, Central and Underfloor Heating Pipe and push-fit fittings, used in accordance with this IAB Certificate, can meet the requirements for materials and workmanship.

#### **Part G – Hygiene**

##### **G1 – Bathrooms and Kitchens in Dwellings**

Hot and cold water systems using Polyplumb polybutylene pipe and push-fit fittings, used in accordance with this IAB Certificate can meet the current requirements for hot and cold water services.

##### **G2 – Sanitary Conveniences and Washing facilities**

Hot and cold water systems using Polyplumb polybutylene pipe and push-fit fittings and used in accordance with this IAB Certificate can meet the current requirements for the provision of hot and cold water services.

#### **Part L – Conservation of Fuel and Energy**

##### **L1 – Conservation of Fuel and Energy**

Heating and hot water systems using Polyplumb Polybutylene Plumbing, Central & Underfloor Heating Pipe and push-fit fittings can meet the current requirements for heating controls and the insulation of pipes and ducts (see Section 4.2 of this Certificate).

## 2.1 PRODUCT DESCRIPTION

The **Polyplumb** polybutylene barrier plumbing pipe was developed for hot/cold water services, central and underfloor heating systems. The pipe meets the requirements for class S service conditions specified in Table 1 of BS 7291–1: 2017 for a service life of 50 years and BS 7291 - 2. The Barrier Pipes have an oxygen barrier layer at mid-wall thickness. The pipe comprises a base polybutylene (PB) pipe, with a wall thickness of between 1.70 and 2.70 mm depending on pipe size details of available pipe specifications are shown in Table 1. The body of the fittings is also manufactured from polybutylene plastics material.

The push-fit fittings consist of a body, EPDM ‘O’ rings, spacer washers, stainless steel grab rings and black mineral filled polyamide retaining caps. Polysulphone support sleeve inserts are supplied for each pipe size and must be inserted into the pipe before jointing. Table 2 shows the range of available push-fit fittings.

All pipe runs must be secured with the appropriate Polyplumb pipe brackets/clips.

For installations in a solid floor (see section 2.4) the base pipe is protected with a minimum screed thickness of 35mm or should be placed in PP conduit pipe.

Nominal diameter	1/2"	3/4"	1"
Outside dia. mm:	14.60 – 14.80	20.90 – 21.10	27.30 – 27.50
Wall thickness mm:	1.65 – 1.85	2.05-2.30	2.60 – 2.90
Weight kg/100m:	6.5	12.2	19.9
Standard lengths (m):	3/6	3/6	3/6
Standard coils (m):	25/50/100/ 150/200	25/50/100 150/200	25/50/100 150/200
Colour:	Grey		

*(Other diameter and lengths available to order)*

**Table 1: Product Range**

### ANCILLARY ITEMS:

Standard pipe clips  
Standard trunking systems.

**Table 2 Range of push-fit fittings**

Fitting type	Normal size (inches)	Product code
Coupler	½", ¾, 1	PB012, PB034, PB01
Elbow	½, ¾, 1	PB112, PB134, PB11
Tee	½, ¾, 1	PB212, PB234, PB21
Tank connector	½, ¾	PB3812, PB3834
Tap connector	½ x ½, ¾ x ¾	PB712, PB 734
Bent tap connector	½ x ½	PB1712
MBSP adaptor	½ x ½, ¾ x ¾, 1 x 1	B4312, PB4334, PB431
FBSP adaptor	½ x ½, ¾ x ¾, 1 x 1	B4412, PB4434, PB441
FBSP wall plate elbow	½ x ½	PB1312
Spigot blanking cap	½ x ½, ¾ x ¾, 1 x 1	PB912, PB934, PB91
Socket blanking cap	½ x ½, ¾ x ¾, 1 x 1	PB1912, PB1934, PB191
Pipe stiffener	½ x ½, ¾ x ¾, 1 x 1	PB6412, PB6434, PB641
Spares pack	½ x ½, ¾ x ¾, 1 x 1	PB9512, PB9534, PB951
Socket x spigot reducer	¾, 1	PB1834, PB181
Socket x socket reducer	¾	PB5834
End reduced tee	¾ x ½ x ¾	PB1434
Branch reduced tee	¾ x ¾ x ½	PB1134
Branch and one end reduced tee	¾ x ½ x ½	PB1534
Shut-off valve	½	PB3912
Appliance valve	½	PB6112
Stop-cock	½, ¾	PB2612, PB2634
Quarter turn ball valve	½, ¾, 1	PB6712, PB6734, PB671

**Table 2 Range of push-fit fittings**

## 2.2 MANUFACTURE

The polybutylene pipes are produced as a five layer pipe by an extrusion process and the body of the push-fit fittings are manufactured by injection moulding. The fittings are assembled automatically with the specified number of components.

### 2.2.1 QUALITY CONTROL

Continuous quality control is carried out during manufacture, including checks on dimensional accuracy, degree of heat reversion, pressure resistance, thermostability thermal ageing and leak-tightness.

The management systems of Polypipe Building Products Ltd. have been assessed and registered as meeting the requirements of BS EN ISO 9001: 2000 – 'Quality Management Systems - Requirements' by the British Standards Institute (Certificate Registration No. FM 00318 dated 1/12/2003).

### 2.3 DELIVERY, STORAGE AND MARKING

To maintain **Polyplumb** pipe in the best possible condition for use it may be stored either horizontally or vertically but should be stored out of direct sunlight. Pipe lengths or coils, should be stored and supported so as to avoid sagging. The pipe should be similarly supported in transit and protected from abrasion and crushing. The push-fit fittings are packed in labelled polyethylene

bags. The number of fittings per bag is dependent on the type and size of fitting being supplied.

The pipe is supplied in 3 and 6m straight lengths and coils of 25 -150m depending on pipe diameter. The pipe bears a continuous mark showing the manufacturer's trade mark, nominal pipe size, operating temperature and pressure, manufacturing code, year and week of production. Each coil also shows the manufacturer's name and product description, the IAB identification mark and Certificate number and contains instructions on storage and installation.

## 2.4 INSTALLATION PROCEDURE

Installation must be carried out in accordance with the manufacturer's instructions and BS 5955: Part 8: 2001 *Specification for the installation of thermoplastics pipes and associated fittings for use in domestic hot and cold water services and heating systems* and BS 6700:2006 *Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages*. General installation details are shown in Fig. 1, 2 and 3. Care should be taken during the project planning phase of a project, to ensure that buried or inaccessible jointing/fittings are avoided.

As all plastics materials expand & contract with temperature change, due allowance in pipe runs shall be made on installation to accommodate expansion & contraction of the pipe.

### Procedure:

#### Cutting:

To ensure successful jointing, **Polyplumb** pipe ends should be cut smoothly and squarely. This can be achieved with purpose-made pipe secateurs (correctly sharpened), or rotary pipe cutters. This will allow easy insertion of the **Polyplumb** pipe support sleeve insert.

#### Jointing:

A **Polyplumb** Irish size support sleeve/insert is placed into the pipe (see fig. 1). Push the pipe firmly up to the shoulder in the fitting (see fig. 2), a secure joint has been made when the end of the retaining cap has reached the next 'K' mark on the pipe. The fitting should never be knocked on to the pipe, nor the retaining cap slackened prior to insertion of the pipe as these actions will not ease jointing. Check that the joint is fully secure by pulling on it, thus ensuring that the grab ring is fully engaged.

For correct joints the insertion depth of the pipe into the different size fittings are as shown in Table 3.

Nominal pipe dia.	Insertion depth (mm)
1/2" polyplumb pipe	27
3/4" Polyplumb pipe	30
1" Polyplumb pipe	35

**Table 3: Insertion depth for pipe/fitting**

### Bending:

For sharp bends (<80mm in radius), standard elbow fittings should be used. Where 8x radius bends are required in 1/2" and 3/4" Polyplumb pipe it is often quicker and neater to use a standard 1/2" (15mm) and 3/4" (22mm) bend formers. Gentle bends (radii  $\geq 175$ mm) may be made by the use of the pipe clips on either side of the bend, positioned to maintain the bend radius. Table 4 gives guidelines on minimum bend radii for the **Polyplumb** pipe.

The use of pipe bending springs and skilled manipulation is not required. The pipe should not be heated with a blow lamp, hot-air gun or similar.

1/2" Polyplumb	80 mm using angle brackets 175 mm using pipe clips
3/4" Polyplumb	225 mm using pipe clips
1" Polyplumb	300 mm using pipe clips

**Table 4: Minimum Bend Radii**

**Figure 1**



**Figure 2**



**Clipping**

Clips should be positioned adjacent to fittings wherever possible, making due allowance for expansion and contraction of the pipework. Where Polyplumb pipe is to be surface mounted and visible the clipping distances in Table 5 are recommended:

**Figure 3**



	Average service temperature		
	20°C	60°C	80°C
<b>1/2" Polyplumb</b>			
- horizontal	500 mm	400 mm	300 mm
- vertical	800 mm	600 mm	500 mm
<b>3/4" Polyplumb</b>			
- horizontal	800 mm	600 mm	500 mm
- vertical	1200 mm	1000 mm	800 mm
<b>1 " Polyplumb</b>			
- horizontal	800 mm	600 mm	500 mm
- vertical	1200 mm	1000 mm	800 mm

**Table 5 : Clipping Distances**

Where Polyplumb pipe is to be boxed-in or installed under floors or in loft spaces etc., clipping distances can be increased or the clips omitted altogether if the pipe is adequately supported by other means.

**Protection:**

**Polyplumb** pipe is a tough material that needs no greater protection from accidental damage when installed than conventional copper. As with copper pipe **Polyplumb** pipe should be sleeved when passing through walls and protected from nails, etc., when placed under floorboards or buried under plaster.

**Polyplumb** pipe is stabilised to withstand limited exposure to ultraviolet radiation or sunlight, but is not designed for permanent direct exposure. Under such conditions painting with non-cellulose based paints or lagging is required.

**Installation in a screed:**

The system should be pressure tested before the concrete screed or sand/cement is laid over the pipe or conduit. Should pressure testing take place in sub-zero temperatures all necessary precautions should be taken to avoid frost damage to the pipes or heating system. Screeds should be laid in accordance with the relevant requirements of BS 8204: Part 1: 2003 *Screeds, bases and in-situ floorings. Concrete bases and cement sand levelling screeds to receive floorings – Code of practice.*

**Installation in a suspended timber floor:**

Pipe runs are secured to joists using **Polyplumb** pipe clips. The recommended spacing of supports are shown in Table 5. The pipes are secured on the sides of joists. Structural timbers should be notched only with the permission of the architect or structural engineer and in accordance with CL. 13.7.9. of BS 6700: 2006. *Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.* The system should be pressure tested before nailing down the floor deck.

**Commissioning the system:**

When commissioning the system it must be flushed 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 pipes are covered. The system shall be tested hydraulically in accordance with the recommendations referenced in the Polyplumb Installation guide. For example, for first fix, water at a temperature not exceeding 20°C a test pressure of 18 bar should be applied to the pipes and pipe fittings for at least 15 minutes and for not greater than 60 minutes. There shall be no visible leakage of water from the system. As with all plumbing systems care should be taken in the layout of pipe runs to avoid damage from nailing.

To minimise the risks of damage associated with nailing through floor decks the pipe runs should

be kept clear of room perimeters and where possible doorways.

**Boiler connections:**

Polyplumb barrier pipe should not be connected directly to a boiler or similar heat source. It is important to ensure that such a connection is made with a minimum of one metre length of copper pipe. Polyplumb pipe can be joined to this.

**Gas pipe:**

Polyplumb barrier pipe should never be used for gas piping.

**Electrical connections:**

Since it is extruded from plastics material, Polyplumb is an insulator and is NOT suitable for earthing electrical appliances. Alternative arrangements must be made to earth metal items such as sinks, baths etc. as required by the 'National Rules for Electrical Installations ET 101/(current version). This is particularly important when extending existing buildings.

### 3. GENERAL

The heating demands for particular rooms are designed in accordance with the CIBSE Guide 1980: Part A.

To calculate the pressure drop in the pipes connected to each radiator or underfloor heating coil, the total length of pipe is defined as the sum of the lengths of flow and return pipes from the boiler.

Flow rates for the **Polyplumb** pipe are calculated *in accordance with BS 6700: 1997 'Design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages'*.

#### 3.1 Structural design:

Floor constructions should be designed to comply with the relevant technical specifications.

#### 3.2 Safe working temperatures and pressures:

The pipe meets the requirements for Class S service conditions specified in Table 1 of BS 7291-1: 2006. The pipe is also suitable for cold water services for a period of 50 years at temperatures of 20°C and an operating pressure of 12.5 bar.

#### 3.3 Chemical resistance:

Polybutylene pipe should not come into contact with materials such as cellulose based paints, paint thinners or strippers, soldering flux, acid based descalents or aggressive cleaning products. However, the material used in the **Polyplumb** pipe will not be adversely affected by accidental contact with linseed oil based sealing compounds or soldering flux, although these materials should not be used in making joints to the pipe.

#### 3.4 Effect on water quality:

**Polyplumb** barrier pipe is approved and listed by WRc-NSF (UK Water Fittings Byelaws Scheme) as an item which has passed full tests on the effect on water quality in accordance with BS 6920: Part 1: 1996 *Specification for the suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water.*

#### 3.5 Flow characteristics:

The bore of the **Polyplumb** pipe is less than copper or steel pipe of the equivalent outside diameter. The consequent reduction in flow rate for a given pressure head should be considered when designing a system. The design flow rates and head losses for both the PolyPlumb pipe and fittings should be calculated in accordance with BS 6700 : 1997.

#### 3.6 Note on System Design:

In systems where low water content gas boilers with cast iron heat exchangers are used it is recommended that a balancing valve for the hot water circuit be a brass lockshield gate valve (Conforming to BS 5154: 1991 *Specification for copper alloy globe, globe stop and check, check and gate valves*). This lockshield valve is important so as to prevent the valve being inadvertently turned off while the boiler is on and so avoid the pipework being exposed to excessive temperatures by providing an open circuit for water to circulate between the boiler flow and return.



#### 4.1 BEHAVIOUR IN FIRE

Where the **Polyplumb** barrier pipe passes through an element or structure or cavity barrier the opening should be firestopped in a way that will permit thermal movement.

#### 4.2 THERMAL INSULATION:

Heating controls and pipe insulation must meet the minimum requirements of Part L Conservation of Fuel and Energy of the Building Regulations 1997 - 2017. Guidance is given in Section 2-3 of the Technical Guidance Document to Part L.

#### 4.3 DURABILITY:

The **Polyplumb** barrier pipe has been widely used in other European countries for excess of ten years. Experience with the system has been favourable.

For central and under floor heating applications, in accordance with good practice, it is recommended that a corrosion inhibitor is used and its concentration checked and maintained in accordance with the manufacturers instructions.

As with all plumbing and heating systems the control fittings, i.e. thermostatic radiator valves may require replacement within the life time of the **Polyplumb** pipe and push-fit fittings.

The **Polyplumb** barrier pipe will have a life at least equivalent to that expected from a traditional installation with metal pipes and fittings.

#### 4.4 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

- dimensional accuracy
- thermal cycling on pipes and fittings
- opacity
- long-term hydrostatic pressure resistance of pipe
- resistance to pull-out of assembled joints
- short-term hydrostatic pressure resistance of pipes at 20°C
- short term hydrostatic pressure resistance of pipes at 95°C

#### 4.5 OTHER INVESTIGATIONS:

- (i) **Polyplumb** barrier pipe has been tested and meets the requirements of Class S service conditions as specified in BS 7291: Part 1: 2006 – *Thermoplastics pipes and associated fittings for hot and cold water for domestic purposes and heating installations in buildings – general requirements*, which covers specifications for both vented and sealed central heating systems and BS 7291-2 – *Specification for polybutylene (PB) pipes and associated fittings*.
- (ii) Existing data on product properties in relation to toxicity with respect to suitability for use with potable water supplies, mechanical strength/ stability and durability were assessed.
- (iii) The manufacturing process was examined including the methods adopted for product quality control, and details were obtained of the quality and composition of the materials used.
- (iv) Site visits were conducted in Ireland to assess the practicability of installation and the history of performance in use of the product.

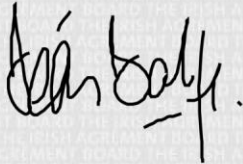
- 5.1** National Standards Authority of Ireland ("NSAI") following consultation with the Irish Agrément Board ("IAB") has assessed the performance and method of installation of the product/process and the quality of the materials used in its manufacture and certifies the product/process to be fit for the use for which it is certified provided that it is manufactured, installed, used and maintained in accordance with the descriptions and specifications set out in this Certificate and in accordance with the manufacturer's instructions and usual trade practice. This Certificate shall remain valid for five years from date of issue so long as:
- (a) the specification of the product is unchanged.
  - (b) the Building Regulations 1997 to 2017 and any other regulation or standard applicable to the product/process, its use or installation remains unchanged.
  - (c) the product continues to be assessed for the quality of its manufacture and marking by NSAI.
  - (d) no new information becomes available which in the opinion of the NSAI, would preclude the granting of the Certificate.
  - (e) the product or process continues to be manufactured, installed, used and maintained in accordance with the description, specifications and safety recommendations set out in this certificate.
  - (f) the registration and/or surveillance fees due to IAB are paid.
- 5.2** The IAB mark and certification number may only be used on or in relation to product/processes in respect of which a valid Certificate exists. If the Certificate becomes invalid the Certificate holder must not use the IAB mark and certification number and must remove them from the products already marked.
- 5.3** In granting Certification, the NSAI makes no representation as to;
- (a) the absence or presence of patent rights subsisting in the product/process; or
  - (b) the legal right of the Certificate holder to market, install or maintain the product/process; or
  - (c) whether individual products have been manufactured or installed by the Certificate holder in accordance with the descriptions and specifications set out in this Certificate.
- 5.4** This Certificate does not comprise installation instructions and does not replace the manufacturer's directions or any professional or trade advice relating to use and installation which may be appropriate.
- 5.5** Any recommendations contained in this Certificate relating to the safe use of the certified product/process are preconditions to the validity of the Certificate. However the NSAI does not certify that the manufacture or installation of the certified product or process in accordance with the descriptions and specifications set out in this Certificate will satisfy the requirements of the Safety, Health and Welfare at Work Act, 2005, or of any other current or future common law duty of care owed by the manufacturer or by the Certificate holder.
- 5.6** The NSAI is not responsible to any person or body for loss or damage including personal injury arising as a direct or indirect result of the use of this product or process.
- 5.7** Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, Manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is in force at the date of this Certification.

## The Irish Agrément Board

This Certificate No. **07/0281** is accordingly granted by the NSAI to **Polypipe Building Products Ltd.**, on behalf of The Irish Agrément Board.

Date of Issue: **July 2007**

Signed:



**Seán Balfe**

**Director of the Irish Agrément Board**

Readers may check that the status of this Certificate has not changed by contacting the Irish Agrément Board, NSAI, Glasnevin, Dublin 9, Ireland. Telephone: (01) 807 3800. Fax: (01) 807 3842. [www.n sai.ie](http://www.n sai.ie)

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