



## Technical Submittal

Site Name:

Address:

Developer:

Contractor:

0800 043 8883  
[www.buteline.com](http://www.buteline.com)



## The Buteline Plumbing System

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Buteline has developed a total solution to the need for a safe, integrated and easy to use potable water plumbing and heating system.

The resultant PB-1 system is designed specifically for professional plumbers and has proven to be high quality and economical.



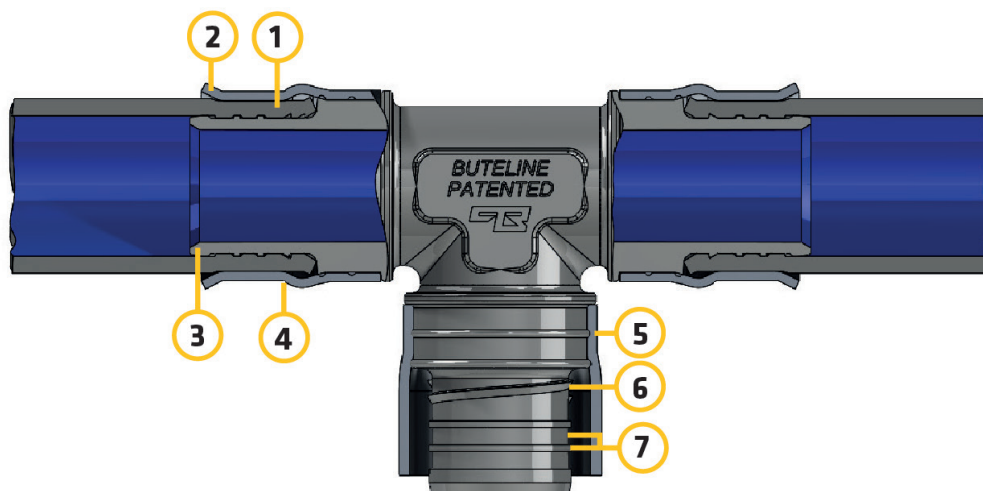
## Buteline Fittings

Buteline have developed an extensive range of quality fittings which have complete compatibility with Buteline Polybutene-1 pipe.

The annealed protective metal sleeve is precisely attached to each fitting during production and is designed to provide a unique metal reinforced joint. Users of Buteline fittings will therefore find the total concept much quicker and more economical than other available systems.



No o-rings or pipe inserts are required



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|---|---|
| <p><b>1 WIDE FORGED CLAMP</b><br/>Minimum working stress applied (approx. 0.5 ton per sq. in.) allowing pipe material to “flow” into insert tail grooves.</p> <p><b>2 2mm WIDE FLARE</b><br/>No stress from clamping transmitted to insert tail or pipe at end of fitting. End of metal sleeve cannot impinge into pipe, even in bending.</p> <p><b>3 TAPERED ENTRY, SMOOTH BORE</b><br/>Minimise resistance to water flow.</p> | <p><b>4 METAL REINFORCING SLEEVE</b><br/>Guarantees no stress break in this critical area.</p> <p><b>5 FULL LENGTH ALUMINIUM SUPPORT</b><br/>Provides additional rigidity and resistance to pull-off. Seals against dirt and moisture.</p> <p><b>6 SUREFIT HELIX</b><br/>Patented design feature prevents pipe from falling off sleeve, ensures precise positioning.</p> <p><b>7 SEALING RIBS</b><br/>Narrow lands with wide grooves, ensure clamp stress is transferred into the pipe joint efficiently.</p> |
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## Applications of Use

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Due to the excellent flow characteristics and the similar sizing to copper piping, no special considerations need to be given to the use of the Buteline System when designing central heating systems. The Buteline PB-1 System complies with the requirements of BS7291:2002, and has been approved by WRAS as compliant to all the requirements for class S of the UK's regulators performance specification.

Please note that generally all the same installation requirements apply to the Buteline Plumbing System when used for central heating systems as to general hot and cold water plumbing systems.

Buteline can be used on the following:

- Mains fed and indirect cold water systems
- Vented and unvented hot water systems
- Vented and sealed central heating installations
- Chilled water
- Underfloor heating

When installing direct to a central heating boiler Buteline recommends a minimum of 1m of copper pipe from the boiler unit to allow for conducted residual heat, unless otherwise stated in the manufacturers installation instructions.

Buteline PB-1 pipe has a maximum recommended everyday operating temperature of 82°C and it is not recommended for applications where the CONTINUOUS operating temperature may exceed this limit.

The Buteline plumbing system will operate at temperatures exceeding this limit (been tested and approved by WRAS to 95°C) and whilst this is not harmful to the system in the short term, it will prove detrimental to the long term performance of the Buteline PB-1 plumbing system and will greatly shorten the life expectancy of the entire system significantly below its intended design life.

As a responsible and transparent manufacturer, Buteline will not guarantee its PB-1 pipe and fitting system where the everyday operating conditions exceed 82°C and cause damage to the molecular structure of the polymers as a result of constant overheating.

## Bending Radius

Buteline Polybutene-1 pipe should be installed ensuring any bending radius is at least 10 times the outside diameter of the pipe.

Sharp bends should be made with appropriate fittings.

Pipe Size	Minimum Bending Radius
10mm (O.D. 10mm) (Type 10 Class 16)	100mm
16mm (O.D. 16mm) (Type 18 Class 16)	160mm
22mm (O.D. 22mm) (Type 22 Class 16)	220mm
28mm (O.D. 28mm) (Type 28 Class 16)	280mm

## Pipe Clipping

There are 2 types of Buteline pipe clips available:



Nailed pipe clip



Interlockable hinged pipe clip

- (a) Remember that Buteline PB-1 pipe is flexible but must not be “anchored tightly” between two points.
- (b) Pipes unsupported by clips are unsightly and can be damaged.

Maximum spacing of clips (metres)*		
PB-1 Pipe	Horizontal or graded pipes	Vertical pipes
Type 10mm & Type 16mm	0.60	1.2
Type 22mm	0.70	1.4
Type 28mm	0.75	1.5

\*The above stated distances are generally 33% less than other plastic plumbing manufacturers.

## Fire Protection

In tests performed at Springborn Laboratories in Enfield, Connecticut, Polybutylene-1 met the requirements of the Underwriters Laboratories test, regarding its fire resistance, and was classified as material UL94HB. Where Buteline PB-1 penetrates fire resistant barriers, it must be installed to ensure the fire resistant integrity of the building is maintained (refer to local building codes).

### Flow Rates at Specific Velocities for PB-1 Pipe

Velocity	10PB Flow Rate	16PB Flow Rate	22PB Flow Rate	28PB Flow Rate
1.6m/s	0.37 L/min	11.8 L/min	23.4 L/min	37.9 L/min
2.4m/s	0.55 L/min	17.7 L/min	34.9 L/min	56.8 L/min
3.0m/s	0.68 L/min	22.1 L/min	43.8 L/min	71.0 L/min

### Buteline Internal Bore Sizes

Pipe		Fittings	
Pipe Size	I.D. of Pipe (mm)	Fitting Size	I.D. of Fittings (mm)
10mm	6.9	10mm	4.55
16mm	12.1	16mm	9.60
22mm	17.1	22mm	14.40
28mm	22.2	28mm	18.05

## Working Temperature and Pressure

As stipulated in ISO 10508, the lifetime of Polybutene-1 (PB-1) pipe is 50 years and longer according to permissible working pressure / temperature.

Buteline Class 16 PB-1 Pipe

Temperature °C	Pressure		
	kPa	P.S.I.	Bar
20	1600	232	16.0
40	1370	198	13.7
60	1050	152	10.5
70	880	128	8.8
82	740	108	7.4

NOTE: These pressure/temperature combinations are maximum and should not be exceeded.

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***The Buteline plumbing system will operate at temperatures exceeding this limit (been tested and approved by WRAS to 95°C) and whilst this is not harmful to the system in the short term, it will prove detrimental to the long term performance of the Buteline PB-1 plumbing system and will greatly shorten the life expectancy of the entire system significantly below its intended design life.***

***As a responsible and transparent manufacturer, Buteline will not guarantee its PB-1 pipe and fitting system where the everyday operating conditions exceed 82°C and cause damage to the molecular structure of the polymers as a result of constant overheating.***

## Working Temperature and Pressure

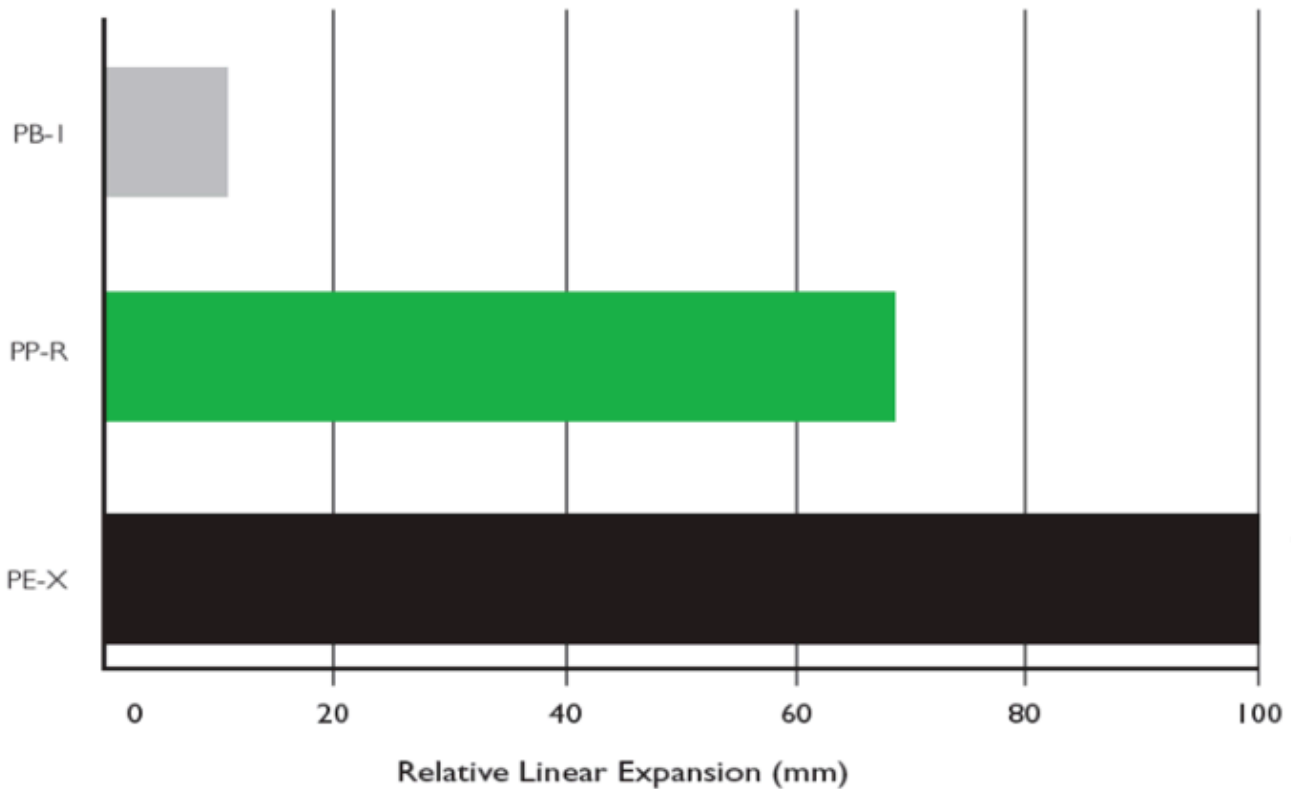
Buteline recommends a safety valve be incorporated in all high pressure hot water systems.

Temp. Pressure Relief Valve	Expansion Valve	Limiting Valve
7.0 Bar	5.5 Bar	3.5 Bar
8.5 Bar	7.0 Bar	3.5 Bar

*NOTE: Hot water storage cylinders with specification ratings of 1000 - 1400kPa need to be valved as directly above.*

## Expansion / Contraction Rate

Pipe movement on a hot water line with a temperature increase from 20°C to 55°C over 10 metres of pipe:



*NOTE: Thermal linear coefficient of expansion of Polybutene-1 (PB-1) pipe may be taken for reference purposes as  $1.3 \times 10^{-4} \text{ } ^\circ\text{K}^{-2}$ .*



## Expansion / Contraction Rate

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The thermal expansion co-efficient of Polybutene-1 (PB-1) is 0.000013 mm/mm<sup>°C</sup>, which is low for plastic materials.

Polypropylene (PP-R) has a thermal expansion co-efficient of 0.000086 mm/mm<sup>°C</sup> and PE-X has a thermal expansion co-efficient of 0.000130 mm/mm<sup>°C</sup>. which is 10 times larger than that of PB-1.

This has been summarized in the following table:

Coefficient Of Linear Expansion Of Polymer	
Polybutene-1 (PB-1)	0.000013 mm / mm / °C
Polypropylene (PP-R)	0.000086 mm / mm / °C
HDPE and PE-X	0.000130 mm / mm / °C

## Thermal Conductivity

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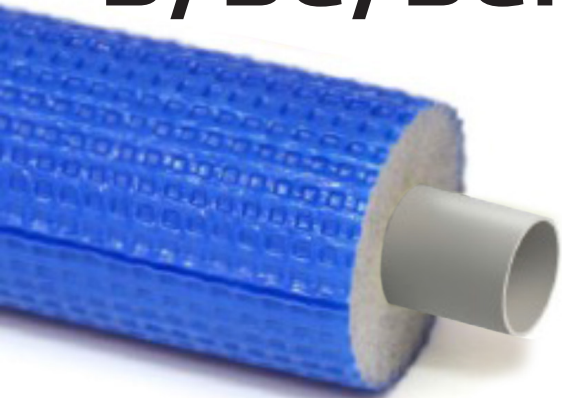
The thermal conductivity of copper is 400 W/m/°C, compared to that of Polybutene-1, which is 0.217 W/m/°C. Buteline Polybutene-1 is more than 1,800 times thermally efficient than copper, so therefore 1,800 times less heat loss through Buteline Polybutene-1 pipe, compared to copper.

Furthermore Polybutene-1 pipe has a thicker wall thickness in comparison to copper which further decreases the temperature loss the pipe wall.

# Pre-Insulated Pipes For Indoor Use



## B/BC/BCK



Pre-insulated pipes inflex B (basic) are designed for transporting liquids in heating and sanitary installations inside buildings. The applied layer of soft EPE foam provides excellent thermal and acoustic insulation over a wide temperature range. The closed-cell structure of the material acts against water absorption and vapor permeability. High flexibility of the pipes makes it easy for carrying out installation. Pipes are available in coils: 25 and 50 meters. **Insulation according to standard EN14313.**



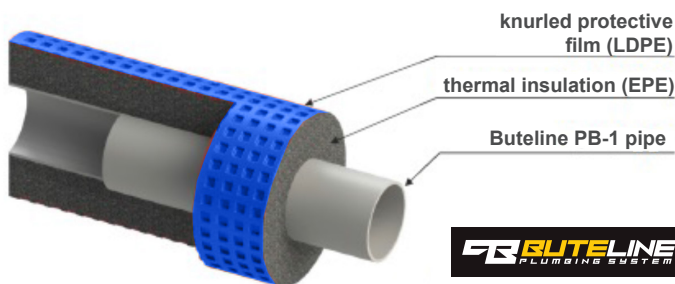
### Basic Coated Knurled

Pipes recommended for use in wooden constructions, traditional (brick) buildings and areas difficult to access.

The knurled outer protective film has a deep ribbing which allows a stable and lasting connection with mortar. The high quality of the knurled film gives the insulation greater resistance to breaking, tearing, puncture and abrasion. It provides a perfect seal against the ingress of moisture from the concreed screed.

Pipe Symbol	Insulation thickness (mm)	Outside diameter (mm)	heat emission W/m	Buteline PB-1 Pipe
B/BC/BCK 16x13	13	42	7,61	<b>Applications:</b> Mains fed and indirect cold water systems, vented and unvented hot water systems, vented and sealed central heating installations, chilled water and underfloor heating.  <b>Insulation</b>  Material: <b>Extended polyethylene closed cell foam (EPE)</b> Produced without (H)CFCs Density: <b>30 kg/m<sup>3</sup>, +/- 10%</b> Thermal Conductivity (λ): <b>0,039 W/mK 40°C</b> <b>0,041 W/mK 50°C</b> Water vapour resistance: <b>3.170μ</b> Water absorption: <b>B -1%</b> Minimum working temperature: <b>-50°C</b> Maximum working temperature: <b>+95°C</b> Chemical resistance: <b>Excellent</b> Flammability (reaction to fire): <b>Class F / E / D</b>
B/BC/BCK 22x13	13	48	9,42	
B/BC/BCK 28x13	13	54	11,19	

### Pipe Section



### Coating

Material: **Polyethylene mod. (LDPE mod.)**  
 Water vapour resistance: **Minimum**  
 Chemical resistance: **Excellent**

## Pipe Pressure Head Loss for Polybutene-1 Pipe

Pressure / Head Loss per 30 Metres (100 Feet) of Pipe

Minimum Flow Required L/min	10mm Bar	16mm Bar	22mm Bar	28mm Bar
0.5	0.036	0.002	-	-
1	0.131	0.007	0.001	-
2	0.472	0.026	0.005	0.002
3	1.000	0.055	0.011	0.004
4	1.704	0.094	0.019	0.006
5	2.573	0.141	0.029	0.009
10	-	0.510	0.104	0.034
12	-	0.715	0.146	0.047
14	-	0.950	0.194	0.063
16	-	1.217	0.248	0.080
18	-	1.513	0.309	0.100
20	-	1.839	0.375	0.121
25	-	2.778	0.567	0.183
30	-	3.893	0.795	0.256
35	-	5.177	1.057	0.341
40	-	6.628	1.353	0.437
45	-	8.242	1.628	0.543



*This certifies that*

**BUTELINE UK LTD**

*has had the undermentioned product examined, tested and found, when correctly installed, to comply with the requirements of the United Kingdom Water Supply (Water Fittings) Regulations and Scottish Water Byelaws.*

**`BUTELINE` RANGE OF PRESS FIT FITTINGS FOR USE WITH 'BUTELINE' POLYBUTYLENE BARRIER PIPE (FOR MODELS AND SIZES COVERED PLEASE CONSULT THE ACCOMPANYING WRAS APPROVAL LETTER AND/OR ONLINE WRAS DIRECTORY)**

*The certificate by itself is not evidence of a valid WRAS Approval. Confirmation of the current status of an approval must be obtained from the WRAS Directory ([www.wras.co.uk/directory](http://www.wras.co.uk/directory))*

*The product so mentioned will be valid until the end of:*

**February 2022**

**1702071**

*Certificate No.*

A handwritten signature in black ink, appearing to read 'J Funnell', written over a horizontal line.

*Secretary*

A handwritten signature in black ink, consisting of several vertical strokes followed by a horizontal line, written over a horizontal line.

*Chairman, Product Assessment Group*

## Industry Affiliations

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Buteline is highly regarded by the plumbing industries in the United Kingdom and is ISO 9001:2008 certified.

The Buteline system is manufactured to comply with BS 7291: 2002

The Buteline Plumbing System meets all the requirements of the British Standard – BS7291:2002 and is a WRAS approved product.



## Buteline UK Limited

9 Swanbridge Industrial Park, Black Croft Road,  
Witham, Essex, CM8 3YN, United Kingdom

Phone: 01376 520792    Freephone: 0800 043 8883

Fax: 01376 520793    Email: [info@buteline.co.uk](mailto:info@buteline.co.uk)

[www.buteline.com](http://www.buteline.com)