BUTELINE™
PLUMBING SYSTEM

Technical Submittal

Site Name:

Address:

Developer:

Contractor:

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Contents

The Buteline Plumbing System & Buteline PB-1 Pipe

Buteline has developed a total solution engineered to deliver on the need for a safe, integrated and easy to use potable water plumbing and heating system, with an emphasis on speed, ease and security.

The resultant Polybutene-1 (PB-1) WRAS approved system is designed specifically for professional plumbers, based on hydraulic engineering principles and is the preferred choice for water recirculation where freezing conditions are possible as PB-1 pipe is able to withstand many freeze/thaw cycles.

Thermally efficient Buteline PB-1 barrier pipe retains heat for longer, meaning less energy use over time. No deburring of pipe is required and Buteline pipes are hygienic with no scale build-up or corrosion.

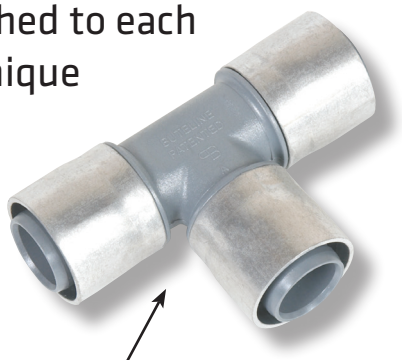
One pipe does it all – Hot & Cold plumbing, chilled water, central heating and underfloor heating.

Pre-insulated pipe for indoor use is also available (see page 13).

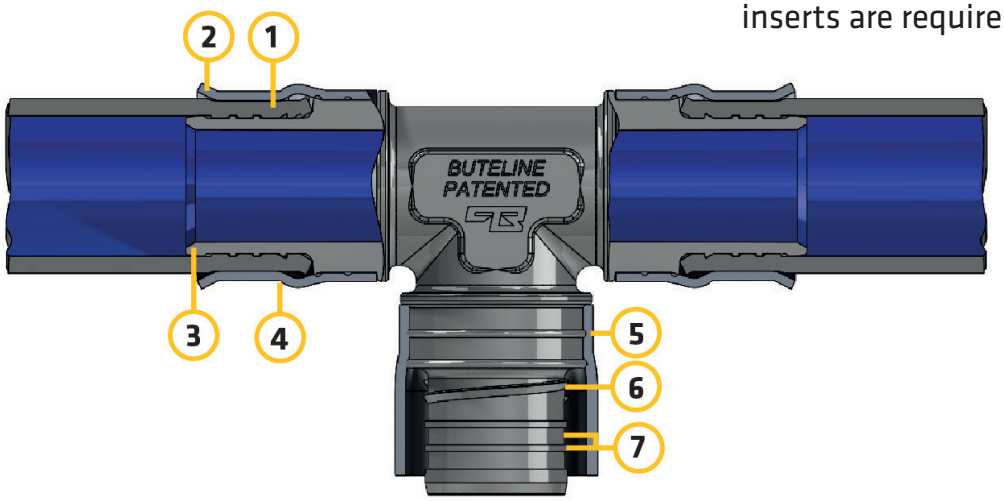
Buteline Fittings

The extensive range of quality, slimline, one-piece fittings which are completely compatible with Buteline Polybutene-1 pipe, are integrally strong and durable.

The annealed protective metal sleeves are precisely attached to each fitting during production and are designed to provide a unique metal reinforced joint. The total concept is much quicker and more economical than other available systems. Buteline polymer fittings are moulded from a modern, high perfomance thermoplastic (recyclable materials).



No o-rings, grab rings or pipe inserts are required



1 WIDE FORGED CLAMP
Minimum working stress applied (approx. 0.5 ton per sq. in.) allowing pipe material to "flow" into insert tail grooves.

2 2mm WIDE FLARE
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.

3 TAPERED ENTRY, SMOOTH BORE
Minimise resistance to water flow.

4 METAL REINFORCING SLEEVE
Guarantees no stress break in this critical area.

5 FULL LENGTH ALUMINIUM SUPPORT
Provides additional rigidity and resistance to pull-off. Seals against dirt and moisture.

6 SUREFIT HELIX
Patented design feature prevents pipe from falling off sleeve, ensures precise positioning.

7 SEALING RIBS
Narrow lands with wide grooves, ensure clamp stress is transferred into the pipe joint efficiently.

Buteline Clamp Tools

Buteline have engineered their clamp tool to ensure a simple, controlled, accurate joint every time. They have a “head” design which permits easy access and alignment. The Buteline clamp tool is available in four sizes to suit 10mm, 16mm, 22mm and 28mm Buteline Polybutene-1 pipe and fittings.

Buteline have developed an alternative tool to the standard clamp tool, the ProClamp tools (pictured below) for 16mm and 22mm.

(Buteline Mini Tools & ProClamp Tools come with a 12 month guarantee from date of purchase.)

Standard Clamp Tools

Mini Tool

Electric Clamp Tool & Bute Jaws

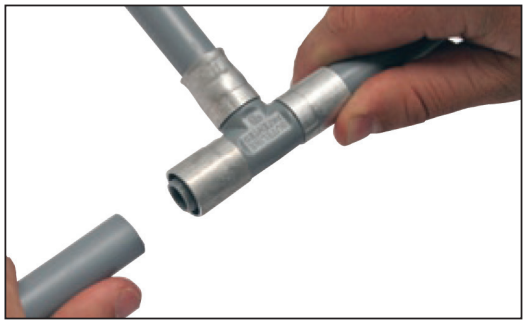
ProClamp Tools

Installation Demonstration

1. **Cut** the pipe square and straight with the Buteline pipe cutter.

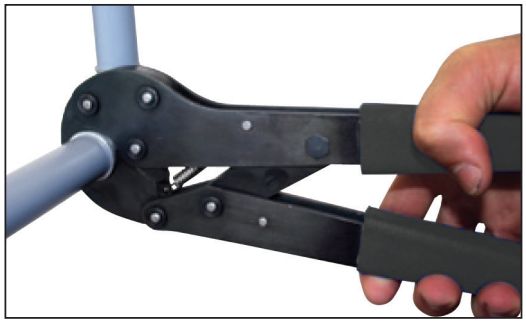
Cut

2. **Insert** the pipe into the fitting. Ensure you push the pipe all the way (15mm) into the shoulder of the fitting.



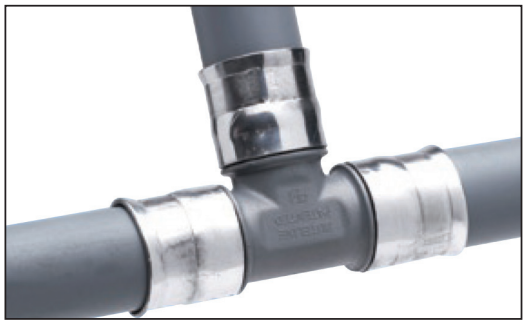
Insert

3. **Clamp-Hold-Release**
   Clamp approximately 2mm in from the end of the fitting, close the tool handles completely to the stops provided, and hold firmly for around 2 seconds then release.



Clamp

4. **Complete**
   The process of installing the system is clean and quick, leaving a watertight mechanical joint.



Complete. As you can see the process is simple, fast and very secure!

Note: Where joints come into contact with cement, lime or soil, completely wrap the aluminium ring using self amalgamating tape, PVC insulation tape or similar.

Applications of Use

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. To ensure the systems life expendancy, all boiler thermostats should be set to a maximum of 70°C.

Bending Radius

Buteline Polybutene-1 pipe is flexible but 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 unslightly 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	3.7 L/min	11.8 L/min	23.4 L/min	37.9 L/min
2.4m/s	5.5 L/min	17.7 L/min	34.9 L/min	56.8 L/min
3.0m/s	6.8 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	4.5
16mm	12.1	16mm	9.0
22mm	17.1	22mm	12.8
28mm	22.2	28mm	18.0

Pipe Pressure Head Loss for Polybutene-1 Pipe

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

Minimum Flow Required	10mm	16mm	22mm	28mm
L/min	Bar	Bar	Bar	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

Working Temperature & 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	Pressure		
°C	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.

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.

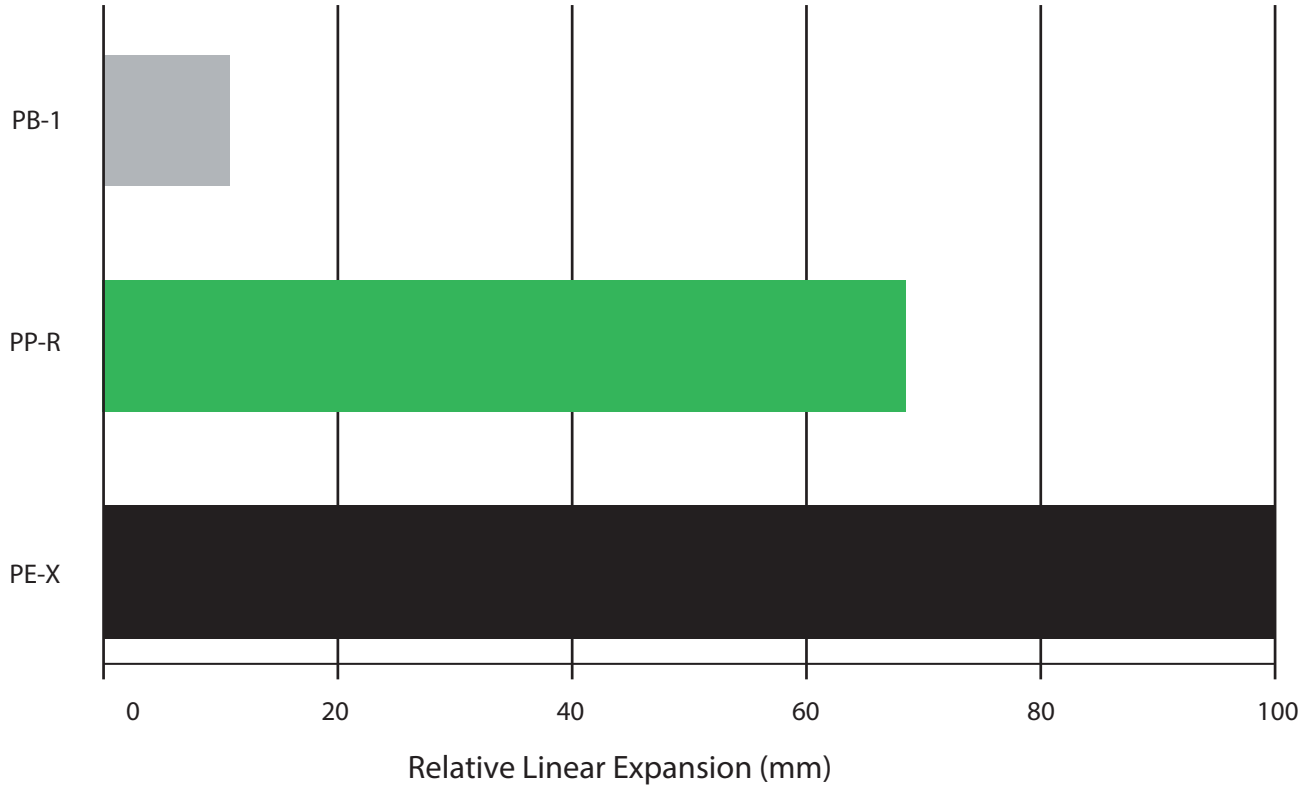
Working Temperature & Pressure

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

**Installers should follow the unvented hot water cylinder manufacturer's recommendations.*

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 x 10^{-4} $l^{o}K^{2}$.

Expansion / Contraction Rate

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

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

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

The thermal conductivity of copper is 400 W/mK, compared to that of Polybutene-1, which is 0.217 W/mK. 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 through 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 metres. **Insulation according to standard EN14313.**

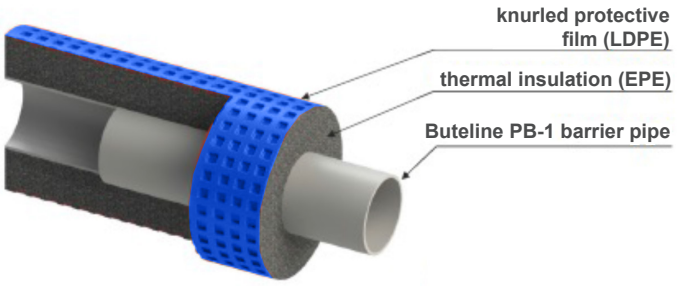
Basic Coated Knurled

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 concrete screed.

Pipe Symbol	Insulation Thickness (mm)	Outside Diameter (mm)	Heat Emission W/m
B/BC/BCK 16x13	13	42	4.85
B/BC/BCK 22x13	13	48	5.93
B/BC/BCK 28x13	13	54	6.94

Pipe Section



Buteline PB-1 Pipe

Applications: Mains fed and indirect cold water systems, vented and unvented hot water systems, vented and sealed central heating installations, chilled water and underfloor heating.

Insulation

Material: **Extended polyethylene closed cell foam (EPE)**
Produced without (H)CFCs
Density: **30 kg/m3, +/- 10%**
Thermal Conductivity (λ):
0,039 W/mK 40°C
0,041 W/mK 50°C
Water vapour resistance: **3.170μ**
Water absorpsion: **B -1%**
Minimum working temperature: **-50°C**
Maximum working temperature: **+95°C**
Chemical resistance: **Excellent**
Flammability (reaction to fire): **Class F / E / D**

Coating

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

WRAS Certificate

WRAS APPROVED PRODUCT

This certifies that

BUTELINE UK LTD

has had the undermentioned product(s) examined, tested and certified as being of an appropriate quality and standard as required in the Water Supply (Water Fittings) Regulations and Scottish Water Byelaws, subject to scheme requirements being met when installed.

Model Numbers

'BUTELINE POLYBUTYLENE PLUMBING SYSTEM' RANGE OF DZR BRASS OR PLASTIC FITTING FOR USE WITH POLYBUTYLENE PIPE

(FOR MODELS AND SIZES COVERED, PLEASE CONSULT THE WRAS APPROVALS DIRECTORY OR THE ACCOMPANYING APPROVAL LETTER)

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 Approvals Directory (www.wras.co.uk/directory)

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

July 2028

Certificate No.

2307012

Ian Hughes,
WRAS Approvals Manager

Industry Affiliations

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

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

Each Buteline plumbing joint is robust and proudly backed by a 25 year guarantee. It's the Buteline promise of enduring performance and a testament to the quality of the system.

Security, reliability and peace of mind.

CPD CIBSE APPROVED UNTIL 2027

WRAS APPROVED PRODUCT

iphe INDUSTRIAL ASSOCIATE

Buteline 25 Year Guarantee

Buteline UK Ltd warrants all of our pipes and fittings for 25 years from the date of manufacture against manufacturing defects, providing any installation of the Buteline Plumbing System is carried out by a suitably qualified plumber and installed in accordance to the guidelines set out in the current version of Buteline UK's Plumbing & Heating Installation manual.

Any claim made during the guarantee period subject to the above, where products are proven to be defective in materials and or manufacture then Buteline UK Ltd will supply replacement parts free of charge. This is the exclusive remedy under this guarantee.

This guarantee does not affect the statutory rights of a consumer.

Notes

Notes

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