

Hot & Cold Plumbing Systems

Technical Brochure

FloFit+



building the future

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FloPlast

FloFit+ is a flexible and fully demountable push-fit plumbing system suitable for all domestic and small commercial hot & cold water installations, including central heating systems for both pressurised (unvented) and combi (vented) systems. FloFit+ enables the installer to undertake a faster, easier and more cost effective installation. Independent testing confirms time savings of up to 40% compared with traditional plumbing materials.

FloFit+ has a wide range of fittings in 10mm, 15mm, 22mm and 28mm sizes, which are both WRAS approved for use with plastic and/or copper pipe, and Kitemarked to BS 7291 Parts 1, 2 & 3.

System Benefits

- FloFit+ offers both a Polybutylene pipe which is flexible and aids installations, such as underfloor heating, cabling through awkward, confined and less accessible areas, as well as PEX pipe which is stiffer and ideal for shorter runs where a harder pipe is more suitable.
- Both Polybutylene and PEX pipes are supplied in white.
- Suitable for use with plastic and copper pipes.
- Low conductivity.
- Installation time reduced.
- The risk of fire generated using blowtorches is removed.
- Lead free and non-toxic.
- Excellent chemical resistance.
- Good long-term durability.
- Reduced costs through quicker installation and the use of multi-length pipes.
- Negligible scale build up.
- Reduced water hammer noise.
- Less noise from expansion and contraction caused by water flow.
- Good thermal resistance to freezing conditions.



System Features

- Lightweight and easy to handle.
- Grip ring seal connection.
- Fully demountable.
- All products supplied with white collet clips (preventing accidental pipe release).
- Coloured red and blue collet clips allow easy identification of hot and cold installations.
- Maintenance free white finish.
- Fittings are WRAS approved for use with plastic and copper pipe and Kitemarked approved to BS 7291 Parts 1, 2 & 3.
- Polybutylene pipe WRAS approved (WRAS Approval No. 1707604).
- PEX pipe WRAS approved (WRAS Approval No. 2009549).

Standards

The materials used in the FloFit+ systems are detailed and accepted on the WRAS approved materials register for use in all domestic installations throughout the UK's regional water authorities.

- FloFit+ fittings are Kitemarked to BS 7291 Parts 1, 2 & 3, including 'Class S' (KM6062628) and WRAS approved for use with Polybutylene, PEX and copper pipes (WRAS Approval No. 2101806).
- Both FloFit+ Polybutylene pipe and PEX pipe are Kitemarked to BS7291 Parts 1, 2 and 2 'Class S' (KM36801). Polybutylene and PEX pipes are WRAS approved (WRAS Approval No. 1707604 & 2009549).
- The FloFit+ range has been tested by "The Water Quality Centre" and complies with the recommendations of BS6920 Part 1 - Suitability of non-metallic products for use in contact with water for human consumption, regarding its effect on the water quality.
- The system is available in 10mm, 15mm, 22mm and 28mm diameters compatible with all plastic plumbing systems conforming to BS 7291 and copper pipe to BS EN 1057.

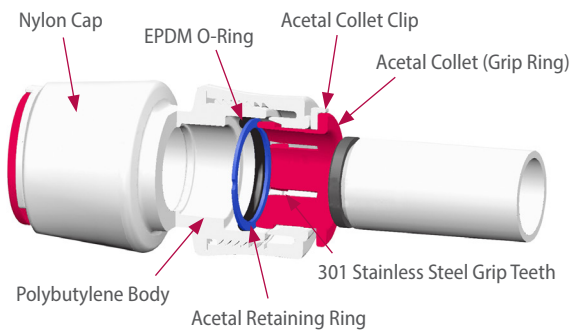


FloFit+ fittings should not be fitted or installed on stainless steel pipes, chrome plated copper tube or plain brass spigot ended fittings.

Fittings

The FloFit+ system provides a range of fittings in 10mm, 15mm, 22mm and 28mm sizes to meet the requirements of most domestic and commercial hot & cold water and central heating systems.

Each fitting comprises of a Polybutylene body, Nylon cap an Acetal collet (grip ring) containing 301 grade stainless steel grip teeth, an Ethylene Propylene Die Monomer (EPDM) O-ring, Acetal retaining ring and an Acetal collet clip.



Each socket comprises of an EPDM O-ring, an Acetal retaining ring and a collet (grip ring) containing the stainless-steel grip teeth. When the pipe is inserted into the socket it passes through the collet and the O-ring, to form a seal. The pipe is fully inserted when it reaches the stop within the body of the fitting. The pipe should be fully locked into the collet clip at this point, however, to ensure a tight fit pull the pipe firmly backwards from the fitting.

All joints made with Polybutylene or PEX pipes on the FloFit+ system, including compression fittings, must include a FloFit+ pipe insert. Whilst some alternative manufacturers' inserts are compatible with FloFit+ pipe systems, FloPlast advise against mixing other manufacturers pipe inserts as they are not all compatible with FloFit+ fittings.

FloFit+ fittings have been tested and exceed the maximum pull out pressures specified within BS7291.

All bodies that include BSP screwed adaptors are manufactured in DZR quality brass.



Pipes

FloFit+ Polybutylene and PEX pipes are BSI Class S Kitemarked to BS7291: Part 2 & 3 respectively (KM36801) and offer a high performance pressure and temperature rating resistant to most chemicals.

Polybutylene Pipes

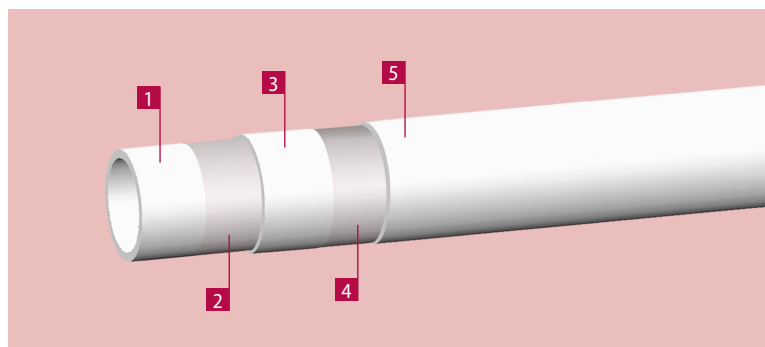
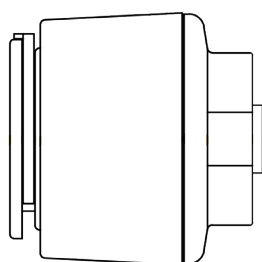
FloFit+ Polybutylene (PB) pipe is a 5-layer barrier (EVOH) pipe manufactured from polybutylene. Polybutylene is a high molecular weight polymer, manufactured by polymerizing butane-1 and is primarily used in hot water piping applications worldwide. FloFit+ PB pipe has many advantages over metal and other plastic piping systems; corrosion, scale, and electrolysis resistance; freezing tolerance, high temperature pressure carrying capabilities and ease of installation due to its flexibility. Polybutylene pipe thermally expands and allowances of 1% in length need to be taken into consideration when pipe is installed at 20°C for use up to 82°C during an installation. FloFit+ PB barrier pipe is WRAS approved, BS 7291 Class S approved and guaranteed for 50 years.

Field Of Application

FloFit+ PB barrier pipe has been approved for hot and cold water distribution systems, underfloor heating systems, central heating systems and plumbing systems.

Pipe Dimensions

Pipe Size (mm)	Outside Diameter (mm)		Wall Thickness (mm)	
	Minimum	Maximum	Minimum	Maximum
10	9.9	10.1	1.5	1.8
15	14.9	15.1	1.5	1.8
22	21.9	22.1	2.0	2.3
28	27.9	28.1	2.6	2.9



PB Pipe Layering – Technical Information

- 1 PB inner pipe layer (Polybutylene).
- 2 An adhesive layer bonding the inner pipe layer to the oxygen barrier.
- 3 Ethylene vinyl alcohol copolymer (EVOH) oxygen barrier layer.
- 4 An adhesive layer bonding the outer pipe layer to the oxygen barrier.
- 5 PB outer pipe layer (PB).

EVOH - Oxygen Barrier Layer

FloFit+ PB barrier pipe incorporates an EVOH oxygen diffusion barrier layer sandwiched within the wall of the pipe which protects the layer from physical and UV damage. The EVOH layer which complies with DIN 4726 and ISO 17455 renders the pipe virtually impervious to gases.

FloFit+ PB Guarantee

FloFit+ PB barrier pipe is guaranteed for a period of 50 years.

Provided FloFit+ PB installation guidelines are adhered to, the pipe is guaranteed against any manufacturing defects for a period of 50 years.



Register your guarantee at www.floplast.co.uk

Pipes

PEX Pipes

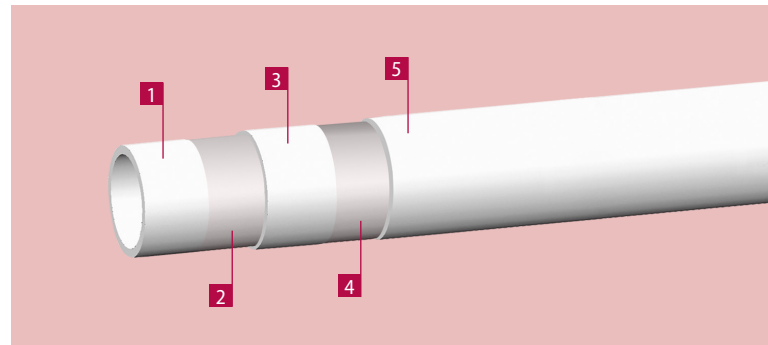
FloFit+ PEX barrier pipe is a 5-layer barrier (EVOH) pipe manufactured from cross-linked high-density polyethylene developed for hot and cold-water services. PEX pipe is designed to suit BS 7291 Pushfit fitting as well as standard brass compression fittings. FloFit+ PEX barrier pipe is a tough, flexible pipe, compatible with corrosion inhibitors and has a smooth bore and a flexibility that prevents the build-up of lime scale from adhering to the inner surface of the pipe in hard water areas. The flexible nature of FloFit+ PEX also allows for considerable ease of installation with significant time and cost savings. FloFit+ PEX is not designed for permanent direct exposure to sunlight, under these conditions painting or lagging is required.

Field Of Application

FloFit+ PEX barrier pipe has been approved for hot and cold water distribution systems, underfloor heating systems, central heating systems and plumbing systems.

Pipe Dimensions

Pipe Size (mm)	Outside Diameter (mm)		Wall Thickness (mm)	
	Minimum	Maximum	Minimum	Maximum
10	9.9	10.1	1.5	1.8
15	14.9	15.1	1.5	1.8
22	21.9	22.1	2.0	2.3
28	27.9	28.1	2.6	2.9



PEX Pipe Layering – Technical Information

- 1 PEX inner pipe layer.
- 2 An adhesive layer bonding the inner pipe layer to the oxygen barrier.
- 3 Ethylene vinyl alcohol copolymer (EVOH) oxygen barrier layer.
- 4 An adhesive layer bonding the outer pipe layer to the oxygen barrier.
- 5 PEX outer pipe layer.

EVOH - Oxygen Barrier Layer

FloFit+ PEX barrier pipe incorporates an EVOH oxygen diffusion barrier layer sandwiched within the wall of the pipe which protects the layer from physical and UV damage. The EVOH layer which complies with DIN 4726 and ISO 17455 renders the pipe virtually impervious to gases.

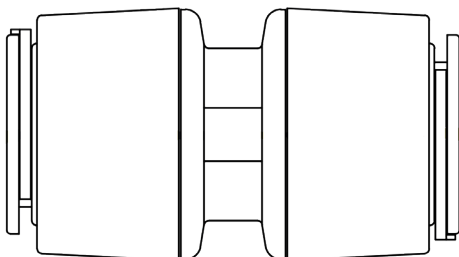
FloFit+ PEX Guarantee

FloFit+ PEX barrier pipe is guaranteed for a period of 50 years.

Provided FloFit+ PEX installation guidelines are adhered to, the pipe is guaranteed against any manufacturing defects for a period of 50 years.



Register your guarantee at www.floplast.co.uk



Flexible Hoses

The FloFit+ flexible hose range provides a safe and taint free conveyance of potable water supplies in both domestic and commercial applications. Fully WRAS approved, the versatile FloFit+ flexible hose range features a high-quality EPDM rubber liner with a 12mm bore and robust stainless steel overbraid – with black tracer for easy identification.

The range is designed to achieve robust and flexible solutions with the following attributes:

- Water Regulation Advisory Scheme (WRAS) approved for both hot and cold water.
- Robust construction with excellent abrasion and crush resistance.
- Excellent flexibility and kink resistance.
- Wide selection of standard plumbing connection.

Operating Parameter

To connect the hose to other applications, some products include one end that contains a robust nickel-plated brass fitting accepting temperatures up to 65°. The adjacent end contains a plastic push-fit fitting, accepting temperatures up to 95°.

The hoses have a temperature range of 5°C to 65°, with a maximum working pressure of:

- 6 bar at 65°C
- 12 bar at 20°C

The hoses do have a security pressure of 18 bar at 20°C.

Working: Pressure & temperature are stated as the maximum continuous value.

Security: Pressure is stated as the peak pressure to be attained for short durations or transient pressure spikes. Installations where water hammer exceeds the limits stated will invalidate warranty.

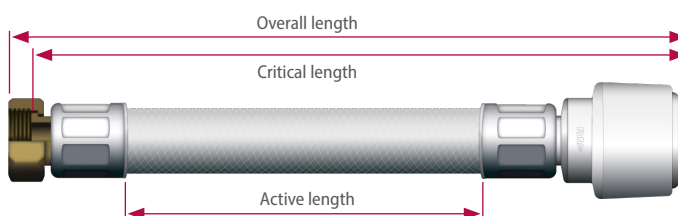
Application

The FloFit+ range is used extensively in the UK for Domestic and Commercial potable water applications in:

- Bathroom appliances: pumps, shower systems.
- Free standing appliances: glass washers and dish washers.
- Kitchen and bathroom brassware: drinking faucets, kitchen and bathroom taps.

Code	Pipe Diameter	BSP Nut	Length	Bore
FH10	15mm	½"	300mm	12mm
FH12	15mm	¾"	300mm	12mm
FH15	15mm	15mm Push-Fit both ends	300mm	12mm
FH20	22mm	¾"	300mm	12mm
FH22	22mm	22mm Push-Fit both ends	300mm	12mm

Hose assemblies are quoted by their overall length as measured from end face to end face for each fitting. The standard manufacturing tolerance on overall length is: 300mm +/- 5.0mmL



Critical length is the distance between hose mating faces. This must be 10% greater than the actual distance between the two corresponding fixed mating parts to avoid tensile stress whilst in service.

Active length is the length by which pressure and movement is absorbed by the flexible hose.

Straight Chrome Isolating Valve

The FloFit+ 15mm ISO valve provides a safe and taint free isolating valve for potable and hot water supplies in both domestic and commercial applications. Fully WRAS approved, the FloFit+ isolating valve a high-quality EPDM 15mm 'O' ring, 15mm packing washer, 15mm FloFit+ collet and 15mm ISO valve body.

Operating Parameter

The ISO Valves have a temperature range of 5°C to 65°, with a maximum working pressure of:

- 6 bar at 65°C
- 12 bar at 20°C

Code	Diameter
FV15	15mm



Application

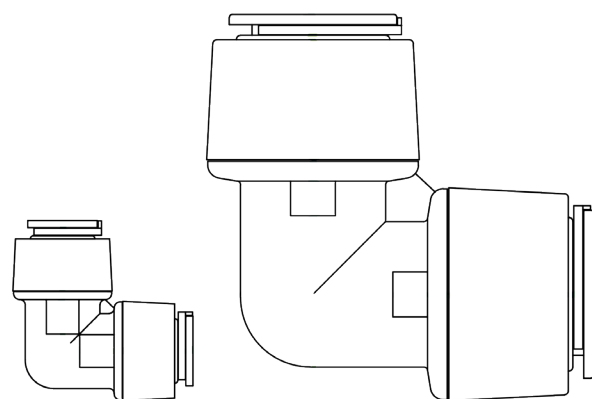
FloFit+

The FloFit+ system is suitable for all domestic and light commercial hot & cold-water installations, including most central heating systems:

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

FloFit+ must not be used for:

- Gas applications
- Oil fuel applications
- High pressure air supplies



Service Conditions

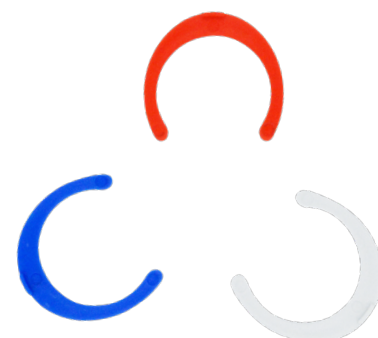
The FloFit+ range of products are certified and manufactured to the Class S service requirements of BS 7291, the approved service conditions, and applications of which are as follows:

Application	Nominal system flow temperature °C	Maximum system service temperature °C	System malfunction temperature °C	System maximum working pressure bar
Indirect cold-water systems	20	20		3.5
Direct mains-fed cold-water systems	20	20		12.5
Subsurface heating systems	60	83	100	3.5
Vented hot water supply systems	65	83	100	3.5
Unvented hot water supply systems including instantaneous heaters and/or incorporating storage	65	95	100	6.0
Vented central heating systems and indirect hot water primary circuits	82	95	100	3.5
Sealed central heating systems and indirect hot water primary circuits	82	105	114	3.0

Continuously operated re-circulating systems are excluded from these applications.

The FloFit+ system can withstand high temperatures, up to 114°C for short periods; however, it should not be used in conjunction with uncontrolled heat sources.

FloFit+ fittings installed with copper or plastic barrier pipes at 20°C, will withstand pressures well in excess of normal service conditions.



- 1** When making a joint with FloFit+, ensure that the pipe has been cut square and is free from burrs, scratches and sharp edges.
FloPlast recommend that all pipes are cut with pipe cutters and not hacksaws.
Do not use damaged or scratched pipes as this could cause a leak.
- 2** Before assembling the joint, ensure that the appropriate pipe insert has been inserted into the pipe. (Figure 1)
All joints with either FloFit+ fitting or compression fittings must include the correct pipe insert.
- 3** Mark the pipe to the required insert depth (see table) including the correct insert.
Push the pipe into the fitting to the stop point, the insert depth line (previously marked) should not be visible. (Figure 2 & 3).
Check the assembly to ensure that the pipe is fully locked by pulling the pipe away from the fitting.
Copper Pipe Only – Before installing the pipe, remove the collet clip and then ensure that the collet is pushed into the body of the fitting. Install the pipe ensuring that it is fully inserted into the fitting. Pull the collet out and secure the joint sufficiently to enable the collet clip to be re-fitted. This ensures that the joint is locked.
Not to be used in conjunction with Plated Copper Pipe.
- 4** To dismantle FloFit+ fittings, remove the collet clip, loosen the cap, pull the pipe back slightly and push the collet face towards the body of the fitting, then pull the pipe out of the socket. (Figure 4)
No tools are required to dismantle FloFit+ fittings.

Figure 1

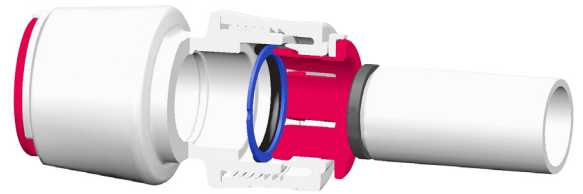


Figure 2

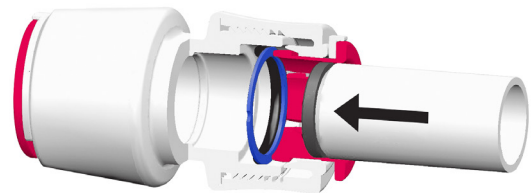


Figure 3

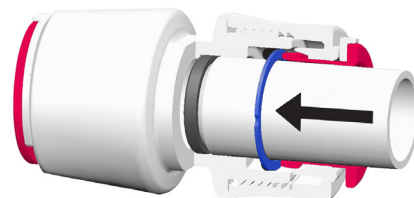
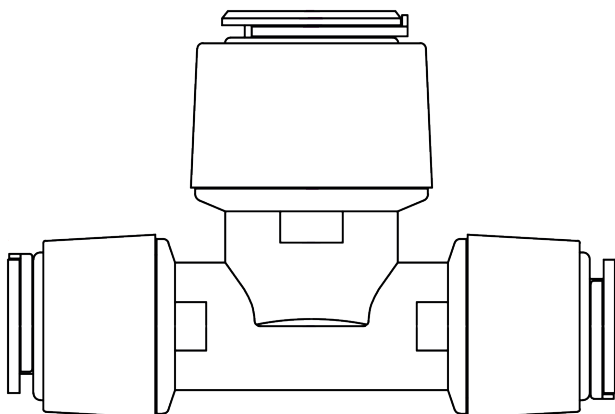
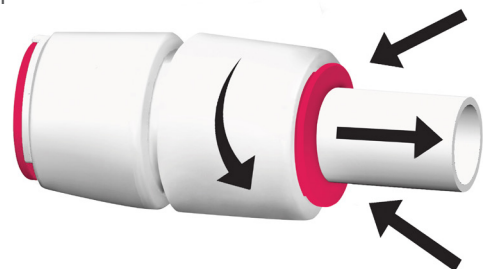


Figure 4



Insertion Depth

Pipe Size (mm)	Insertion Depth (mm)
10	23
15	30
22	37
28	45

Connection to Boiler

A minimum of 1 metre of copper tube is required between the appliance connections and both FloPlast+ Polybutylene and PEX pipe. All appliances should incorporate a high limit stat to protect pipework in the event of boiler malfunction.

Connection to Copper Pipe

FloPlast recommend that a minimum distance of 450mm of copper pipe should be installed between that last solder joint and the first FloFit joint to ensure residual flux solder does not come in contact with the fitting. If the copper pipe is of the old Imperial sizing (i.e. slightly smaller than 15mm) then the initial connection to plastic should be made with a compression fitting.

When used with brass compression fittings, the nut and olive should be passed over the end of the pipe before placing the insert in the end.

Electrical Continuity

When using FloFit+ in conjunction with any existing or new metal (copper) systems, which are or could be used for earthing, electrical continuity must be maintained.

Pressure Testing

Pressure test the system for at least 1 hour using the conditions for pressure testing listed in BS 5955.

- 1 For sections of the system, which can be subjected to full mains pressure, apply a minimum test pressure of the available mains water pressure.
- 2 For sections of the system downstream of a pressure control valve, apply a test pressure equal to the pressure control valve setting.
- 3 For heating systems, apply a test pressure equal to the pressure relief valve setting.

System Flushing

To ensure that any potential contaminates, or chemical residue is flushed from any system prior to the use of FloFit+, the system should be flushed prior to commencing any installation.



All installations should comply with the requirements of BS6700 and BS 5422, as also required for copper pipe systems.

Piping Layout

FloFit+ is an easy and flexible system to install both in refurbishments and new builds. Routing of the pipe work can be via the following:

- Timber framed buildings
- Ceiling voids
- Conduit
- Cellars
- Lofts

Where surface mounted pipe is installed, FloFit+ white and clean appearance provides an attractive alternative to copper.

Due to the flexibility of FloFit+, it allows cabling through timber framed buildings and floor joists with the use of drilled holes, therefore notching is not required. The correct location of drilled holes should be in accordance with NHBC regulations.

This method of installing provides several distinct advantages:

- Pipe work can be installed from below, after floors have been laid.
- No risk to the pipe work when fixing flooring.
- The spacing around the piping allows the thermal installation to be fitted in accordance with the Building Regulations or designated specifications.
- No notching is required.
- FloFit+ is ideally suited for cabling through proprietary timber CEI joists, such as TJI joists used in the Silent Floor systems.

Pipe Clips

Pipe clips and trunking systems designed for use with copper tube may also be used with Polybutylene pipe. Clips should be positioned adjacent to fittings wherever possible, making an allowance for expansion and contraction of the pipework.

Where FloPlast+ Polybutylene or PEX pipe is to be surface mounted and visible; the following clipping distances are recommended:

Pipe Size (mm)	Average Service Temperature (mm)					
	20°C		60°C		80°C	
	Vertical	Horizontal	Vertical	Horizontal	Vertical	Horizontal
10						
15	800	500	600	400	500	300
22						
28	1200	800	1000	600	800	500

Bending

For sharp bends standard elbow fittings should be used. Where slower 90° bends are required in 15mm FloFit+ systems it is often quicker, neater and cheaper to use a standard 15mm x 90° angle bracket/cold forming bend.

Gentle bends may be made using pipe clips on either side of the bend, positioned to maintain the bend radius.

The use of bending springs and skilled manipulation is not required. The pipe should not be heated with a blowlamp or hot air gun.

Pipe Size (mm)	Radi using pipe clips (mm)
10	45
15	100
22	175
28	300

Thermal Expansion

Compared with steel or copper, Polybutylene & PE-X has a high coefficient of expansion and precautions should be taken to compensate for this. The coefficient of expansion for PEX increases from about $1.5 \times 10^{-4} \text{m}/^\circ\text{C}$ at 20°C to approximately $2.8 \times 10^{-4} \text{m}/^\circ\text{C}$ at 82°C.

N.B. Allow for 1% expansion on the length when pipe is installed at 20°C for use up to 82°C.

Pipe Inserts

FloFit+ pipe inserts must be used on all installations with FloFit+, please ensure the inserts are fully inserted into the pipework.

Metal Joists

If FloFit+ pipe is installed through metal joists, it is recommended that the joists are fitted with rubber grommets to prevent damage to the pipe.

Potable Water

FloFit+ is designed and suitable for the conveyance of all types of potable water.

In hard water areas, the smooth bore and flexibility of FloFit+ Polybutylene and PEX systems prevents lime scale from adhering to the inner surface of the pipe, therefore the FloFit+ system is the ideal pipe to use where water is of a temporary hard nature.

Unlike rigid metal pipes, Polybutylene pipe is not dissolved or corroded by soft acidic waters.

Chlorine

The FloFit+ range of pipe and fittings are suitable for carrying normal levels of chlorine found in domestic water supply systems.

Short term chlorination for disinfection will not have an adverse effect on the system. Sustained exposure to chlorine levels above 0.5ppm should be avoided, however these concentrations do not normally arise in potable water supplies.

FloFit+ pipe and fittings are not suitable for use in systems which have high concentrations of chlorine, e.g. swimming pools.

Soldering Flux

No fluxes of any type should come in contact with FloFit+ pipes and/or fittings. If fluxes are to be used in an environment where our fittings are installed, then extreme care should be taken to ensure that no such contact takes place.

Corrosion Inhibitors / Prevention

To prevent sludging & corrosion in the heating system, the following appropriate measures should be taken.

FloPlast fully approves the use of corrosion inhibitors with its FloFit+ systems PB.

Both the FloFit+ Polybutylene and PEX Barrier pipes dramatically reduce the ingress of oxygen into the heating system thus reducing the possibility of corrosion of ferrous parts in the heating system.

For further advice on inhibitors, the following companies should be contacted:



www.fernox.com
0330 100 7750



www.sentinelprotects.com
01928 704330

Paint

FloFit+ can be painted with either water or oil-based paints. Avoid all contact with cellulose or solvent based paints, thinners, stripper's aggressive cleaning fluids or acid-based descalents.

