



DOMESTIC HOT AND COLD WATER SUPPLY AND CENTRAL HEATING SYSTEMS

Guidance Notes

Introduction

Plastic pipes are widely used in domestic hot and cold water supply and central heating systems. Their flexibility offers the benefits of easy handling and installation. They are available in both straight lengths and coils, which enables threading around obstructions and through joists, reducing the number of joints required and the potential for leaks. Where joints are required, the extensive range of fittings available for each pipe system enables reliable, watertight joints to be made quickly and easily.

This guide provides information on materials, service conditions, design and installation of plastic pipes primarily for domestic hot and cold water systems and central heating systems for residential properties (excluding patient accommodation).

Overview

SYSTEMS

Cold water supply – pipework carrying water for domestic purposes including drinking, washing and operation of sanitary appliances.

Hot water supply – pipework carrying heated water for domestic purposes including washing. Additional guidance for continuously operated hot water systems is given in Annex A.

Central heating systems – pipework carrying heated water for space heating, see note below.



Note: Guidance on use of plastic pipes for warm water underfloor heating systems is available from the BPF Pipes Group website

PIPES

For hot and cold water supply and heating systems, the most suitable pipes are solid wall polybutylene (PB, also known as Polybutene, Polybut-1-ene and Polybutene-1) or cross-linked polyethylene (PEX); barrier pipes (plastic inner and outer wall with an adhesively bonded intermediate layer of plastic that forms a barrier to the passage of oxygen); and multi-layer pipes (MLC, plastic inner and outer wall with a bonded intermediate layer of metal such as aluminium). In this guide, the term 'plastic pipes' is used to cover all of these pipes, unless otherwise explained.

Pipes are generally available in nominal diameters of 10mm to 110mm in straight lengths or coils.

Note 1: Other materials may be offered for specific applications such as ABS and PVC-U (cold water supply), C-PVC and PP-R (hot and cold water supply). Guidance should be sought from the manufacturer on application and installation.

Note 2: Guidance on specifications for plastic pipes for domestic hot and cold water supply and domestic heating systems is available from the BPF Pipes Group website. The guidance is regularly updated as changes to standards are published.

FITTINGS

To ensure the joining system is compatible with the pipe being installed, the relevant manufacturer's literature should be consulted. The most common joining system for domestic applications is a push-fit fitting. A support sleeve is inserted into the pipe end and the pipe pushed firmly into the fitting to an insertion mark or specified depth. Push fit joints incorporate a rubber seal and a gripping mechanism to provide a secure mechanical connection. They are generally 'demountable' either by unscrewing or by using a special tool.



Other systems include:

- Mechanical compression jointing - the fitting compresses the pipe when mechanically tightened by the installer. These fittings may be supplied with / without a seal depending on design. Special tools may be required and a support sleeve would usually be required.
- Press fit jointing – the fitting comprises a metal outer sleeve and plastic or metal body with integral inserts. Using a special power tool, the outer sleeve is pressed to grip the pipe to the fitting body.
- Socket fusion – the outside of the pipe and the inside of the fitting are heated to a sufficient temperature. The two parts are then quickly pushed together, held for a determined length of time and, in cooling, the two parts combine to create a joint.
- Butt fusion - the parts to be jointed are pressed against a heating element and a bead is formed. The parts are then brought together and held under pressure. Pressure is also maintained during the cooling time. After jointing a bead should have formed around the whole circumference.
- Electrofusion - In this method the pipe and special fittings are heated by means of electrical resistance and fused together. The power and heating time is supplied through an electrofusion control unit.
- Shrink-fit - once a support ring is added to the end of the tube, either a hand operated or an electric expansion tool is used to swage open the pipe to allow the fitting to be inserted. The elastic memory of the pipe shrinks back onto the fitting making the permanent watertight seal.

Manufacturers also offer their own innovative designs and range of accessories such as pipe-in-conduit, pre-insulated pipes, pipes clips spacers, cold forming bends, pipe cutters etc. The manufacturer's literature should be consulted for the full range of fittings and accessories available for each system.

Note: Guidance on specifications for fittings for plastic piping systems for domestic hot and cold water supply and domestic heating systems is available from the BPF Pipes Group website. The guidance is regularly updated as changes to standards are published.

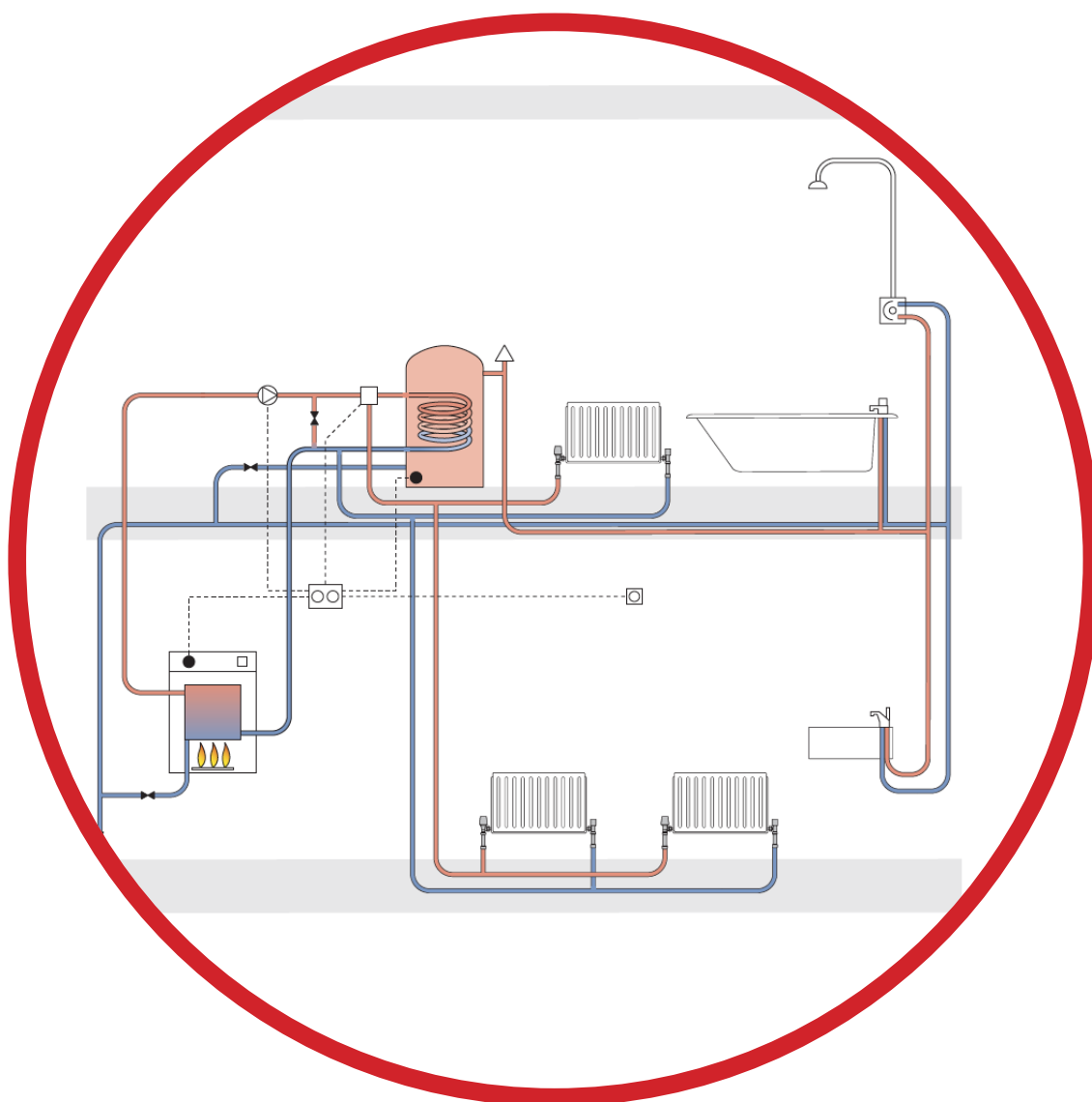
ADVANTAGES

The market's transition to plastic pipes for these applications has been driven by the practical advantages over traditional materials.

In-service: smooth internal bore reduces the accumulation of limescale and improves flow through the pipes reducing energy requirements; low thermal conductivity means that pipes carrying hot water are cooler and therefore safer to the touch; inherent corrosion resistance maintains a clean supply; and low noise transmission means that noise from the pumping systems are not broadcast through the building.

Installation: lightweight, long lengths supplied in coils reduces the number of joints saving time and reducing the risk of leaks; flexibility means pipes can easily navigate obstructions; wide range of fittings which permit connection to existing metal pipework and avoids the use of solder or naked flames.

Physical: inherent properties combined with well-chosen joints allow thermal expansion during heating / cooling to be accommodated and reduces the risk of bursts during frosts; impact resistance means pipes are not easily damaged during installation or service; low scrap value reduces risk of theft from site.



UK SERVICE CONDITIONS

The service conditions in UK water supply and heating applications during routine operation and system malfunction are shown in the table below.

| | Nominal System Flow Temperature (Tf) | Maximum System Service Temperature (Ts) | System Malfunction Temperature (Tm) | System Maximum Working Pressure |
|---|--|---|---|---------------------------------------|
| 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 systems | 65 | 83 | 100 | 3.5 |
| Unvented hot water systems including instantaneous heaters and/or incorporating storage (excluding continuously operated systems) | 65 | 95 | 100 | 6 |
| 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 |

Plastic pipes and fittings assessed against all of these service conditions (designated as Class S to Table 1, BS 7291-1: 2010) can be safely used in UK applications, in particular the higher temperatures and pressures associated with unvented hot water storage systems and sealed central heating systems.

Note: Continuously operated recirculating domestic hot water systems and waste discharge from unvented hot water systems are excluded from these applications. Plastic pipes are not suitable for boiler vent pipes. Guidance on use of plastic pipes for discharge from unvented heating systems is available from the BPF Pipes Group website.

Design

Conventional design methods for hot and cold water supply and heating systems still apply when using plastic pipes. However, the properties of plastic pipe provide a wider range of design options. In all cases, health and safety obligations and national regulations need to be observed. Prior to designing and installing plastic pipe systems, it is important to read the relevant manufacturer's health and safety and installation guidelines.

DESIGN CODES

Approved Document G to the Building Regulations.

BS EN 14336 Heating systems in buildings. Installation and commissioning of water based heating systems.

BS EN 12828 Heating systems in buildings. Design for water-based heating systems.

BS EN 12831 Heating systems in buildings. Method for calculation of the design heat load.

BS EN 806 Specifications for installations inside buildings conveying water for human consumption.

Part 1: General, Part 2: Design, Part 3: Simplified Method, Part 4: Installation, Part 5: Operations and Maintenance.

BS 8558 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.

PAS 33 Specification for the design, installation and commissioning of gas fired central heating systems in domestic premises.

CIBSE Guide B1 Heating, Chartered Institute of Building Services Engineers.

The Plumbing Engineering Services Design Guide, CIPHE.

Safe water in healthcare premises (HTM 04-01).

Domestic Building Services Panel, HVDH Domestic Heating Design Guide (available from CIBSE).

Always refer to the latest editions of these documents.

MODULAR DESIGN

Many manufacturers supply manifolds for use in heating systems. These provide an opportunity for modular system design. One manifold is used in the flow pipework, and a second, matching unit, is provided in the return line. Individual manifolds can be joined together to provide multiple flow/return circuits. Manifolds are also available for distribution of hot and cold water directly to each outlet.

PIPE SIZING

In small, simple installations such as those in single dwellings, pipes can be sized using experience and convention. Although the nominal internal diameters of plastics pipe systems are often slightly less than that of the equivalent traditional material, this reduction has no significant effect on flow capacity. The internal diameter will remain consistent through the pipe lifetime and long radius bends reduce frictional losses.

In all other cases the probable flow rates and pipe sizes required should be calculated using a recognized method such as that in BS 8558.

The Plumbing Engineering Services Design Guide published by The Chartered Institute of Plumbing and Heating Engineers (CIPHE) provides guidance on pipe sizing.

HEAT DESIGN

Domestic central heating systems should be designed in line with conventional practice. Guidance and worked examples can be found in the Domestic Building Services Panel (DBSP) HVDH Domestic Heating Design Guide (2021) which references the earlier CIBSE Guide Part A Environmental Design.

EXPANSION CONTROL – HEATING SYSTEMS

In typical domestic applications, special provision for thermal movement is not normally required, as it is absorbed by the natural properties of the material and jointing. However, reference should always be made to individual manufacturer's instructions.

Where long runs of pipe are to be installed, it is important to assess the amount of thermal movement on the pipe run. Provisions should be made to control thermal movement by the use of anchor points. To retain the proper alignment of the system, guide brackets should be used which allow the pipe to slide within them during thermal movement.

Anchor points should be formed at couplings or tees and would normally be formed by locating two guide brackets directly against the opposing socket face of the fitting. This might vary if the anchor point is near an elbow or movement is only in one direction. The maximum distance between anchor points should not exceed 6m.

Provision for pipe expansion should be incorporated between each anchor point. There are two ways of allowing for pipe expansion: Flexible arm or Expansion loop. A flexible arm needs to be long enough to allow the pipe to flex naturally without causing any damage. An expansion loop allows for pipe expansion in the middle of a pipe section, alternatively pipes can be laid on a continuous support such as a cable tray to accommodate expansion by 'snaking' of the pipe. Where snaking is used, it is necessary to prevent upward movement of the pipe to prevent it coming into contact with pipe at a different temperature or electrical wiring.

Where a cold water pipe is installed in high ambient temperature conditions, provision for thermal movement due to contraction should also be considered.

DESIGN LIMITATIONS

In general, plastic pipe systems should not be used for pipelines carrying steam, gas, fuel oil, petroleum or water containing high levels of chlorine such as swimming pool installations. They should not be installed in locations where they are likely to be exposed to excessive levels of ultra violet light, such as in direct sunlight or where artificial sources of UV are in use. If such exposure is unavoidable, the pipes should be encased in a protective ducting or similar.

Plastic pipes should not be used for the primary circuit of solar heating systems where the temperature cannot be thermostatically controlled.

When in doubt, or for additional guidance, the advice of the manufacturer should be sought.

DESIGN PARAMETERS

The design parameters of a hot water system must be reviewed when any changes are made. For example, extension of the system, change of use, refurbishment or replacement of the water heater.



Installation

CONNECTION TO OTHER SYSTEMS

COPPER PIPE

Connection of plastic pipes to metric copper pipe to BS EN 1057 can be made using most push-fit connectors. Connection to other copper pipe sizes may require a change of ring seal or use of an adapter. Other connection types could be in the form of a soldered adapter, a compression adapter, a threaded adapter or an adapter to allow a copper press or copper compression connection.

CHROME-PLATED COPPER AND STAINLESS STEEL PIPE

Push-fit fittings are not suitable for use with chrome-plated copper pipe or stainless steel pipe due to the differences in surface hardness of the materials. Compression fittings or suitable adaptors should be used.

INCOMING SERVICE PIPES

The manufacturer's recommendations as to the correct method of jointing to incoming service pipes should be followed.

APPLIANCES, TAPS, ANCILLARIES, STORAGE VESSELS, RADIATORS ETC.

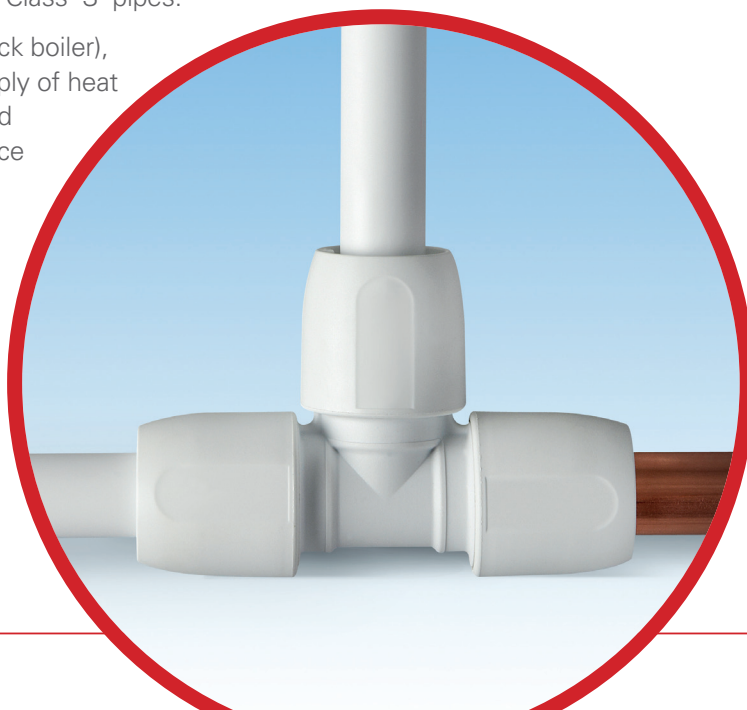
The manufacturer's advice should be sought. Most systems will include a suitable adaptor or connector fitting for any required connection.

CONNECTION TO BOILERS AND HEATERS

Direct connections from either a vented or unvented hot water storage system to BS 7291 Class 'S' pipes can be made where the system incorporates a non-self-resetting energy cut out to disconnect the supply of heat, a means of venting in the case of system overhear (vent pipe or temperature and pressure relief valve) and have connections outside the boiler casing a minimum of 350mm from the heat source. If any of the above criteria cannot be met, a minimum one metre run of copper pipe should be installed between the boiler and the start of the plastic pipe system. In all cases (including instantaneous water heaters, caravan heaters etc.), care should be taken to ensure that the appliances have the appropriate thermostatic controls and cut outs in accordance with Part G of the Building Regulations to ensure that operating conditions do not exceed the temperature and pressure limits laid down for Class 'S' pipes.

For any type of solid fuel boiler (including a back boiler), where it is not possible to disconnect the supply of heat to the storage vessel, any gravity circuit should always be installed with copper pipe. Reference is made to Part G of the Building Regulations.

For solar water heating systems, plastic pipes should not be used for the primary circuit as the temperatures cannot be thermostatically controlled. Plastic pipes may be used for the secondary circuit.



ROUTING AND LAYING

BENDING

A bend is made by installing a fixing at one end and gently curving the pipe by hand (using an appropriate tool where necessary) to the required shape, and then installing a second fixing at the other end. Alternatively, bends can be supported with an appropriate bend former. MLC pipe will retain its shape after bending due to the metal layer, the manufacturer's literature should be consulted. Care should be taken not to bend the pipe beyond its recommended bending radius as this can cause kinking. Pipes that have been damaged during bending should not be used. Details of the bending radius can be obtained from the manufacturer's literature. It is generally 12 times the pipe diameter for unsupported pipe and 8 times the pipe diameter for supported pipe.

FIXING

Plastic pipe systems manufactured in PB or PEX in diameters less than 32mm are not self-supporting and should be adequately supported in accordance with the support centres detailed in BS 5955: Part 8: 2001.

Where piping is adequately supported or is run within concealed spaces (e.g. through suspended timber floors), the number of clips can be reduced or omitted provided that:

- The pipe will not be subjected to vigorous movement.
- The pipe does not form a distribution pipe or circuit where effective air venting might be impaired by poor pipe alignment.
- Hot pipes will not touch cold pipes.
- There is no risk pipe will come into contact with sharp, abrasive or other potentially damaging surfaces.
- There is no risk pipe will come into contact with hot surfaces or transmitted heat that may melt the pipe e.g. inset lighting.
- There is no risk the pipe will come in contact with materials that may suffer damage or discoloration from transmitted heat.

The inherent flexibility of plastic pipe systems means that there is generally no need to make any special provision for thermal expansion. Each manufacturer supplies the appropriate fixings for their pipe and these should be installed in line with each individual manufacturer's guidelines.

A screw-in type fixing may be used with a spacer, which provides a greater spacing between the pipe and the fixing background. This allows for different pipe fixing centres, which can be used to enable pipe cross-overs or the installation of thermal insulation.

For MLC pipes, barrier pipes and large diameter pipes, the manufacturer's literature should be consulted.



PIPE ROUTING

The flexibility of these systems allows pipes to be threaded through the fabric of the building: – through stud partitions, dry walling, steel structural members and drilled holes in joists.

THREADING THROUGH JOISTS

Flexible pipe can be threaded through holes drilled in the joists allowing pipework to be installed from below, after the flooring has been laid. This has important health and safety advantages as well as enabling more accurate setting out for 'second fix' connections to appliances and easier insulation.

- **Traditional Timber Joists**

Holes need to be located in the correct zones of the joist span, which is different from the notching zone. The permitted zone for holes is between 0.25 and 0.4 of the joist span (see diagram below)

Within the drilling zone, the holes must be located on the central axis of the joist, with the centre lines spaced no closer than three times the largest diameter apart. The maximum size of hole must not exceed one quarter of the joist height.

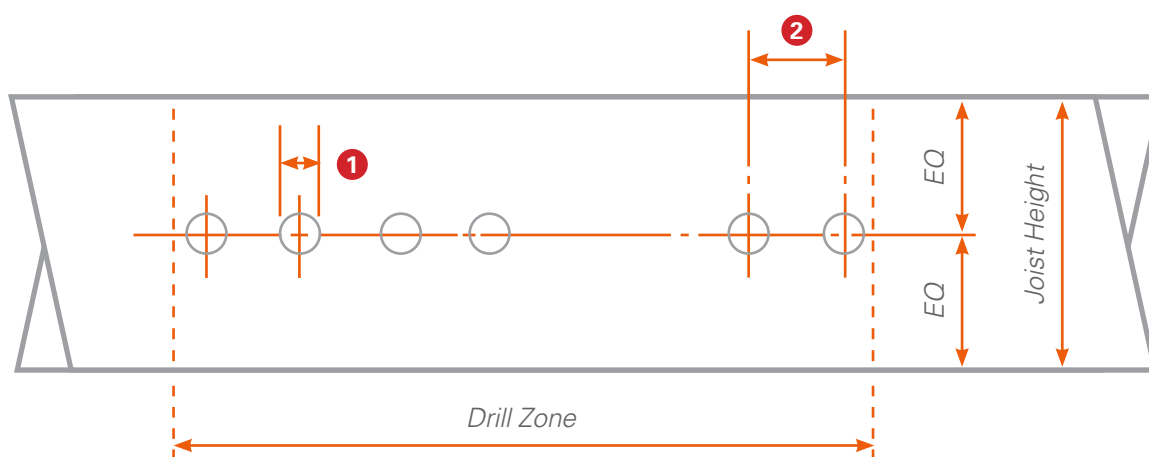
Once the drill positions have been determined and marked on the first joist, a batten can be used as a quick measuring template to transfer the position of the hole to other joists.

Holes can be drilled by using a drill with an angle chuck (suitable eye protection should be worn). When the holes have been drilled, the flexible pipe can be threaded into position.

When pipework is installed in notches in the joists, structural timbers should be notched only with the permission of the architect or a structural engineer.

- **Threading through engineered joists**

Plastic pipe systems are ideal in buildings incorporating engineered 'I' section composite timber joists. The piping can be installed through holes in the web section without damaging flange members.



- ① Maximum dia. of hole = Joist height \times 0.25 ② Minimum distance between hole centres = Largest hole dia. \times 3

- **Threading through steel structural members**

In fabricated steel framing systems, plastic pipes can be threaded through the open webs of the frame work. Some mechanical protection should be provided to prevent chaffing of the pipe walls where these rest on the steel members.

LAYING PIPES IN CONCRETE FLOORS

Plastics are not affected by cement, limes, mortars, concrete and general corrosion. The Water Supply (Water Fittings) Regulations 1999 require pipework to be accessible to facilitate its repair and replacement. Therefore, pipe-in-conduit systems supplied by many manufacturers are ideal for installation directly into screeded concrete floors.

These comprise a flexible plastic pipe for use in a water supply or heating system inside a slightly larger conduit pipe. This allows the pipe to be withdrawn and replaced in case of damage whilst avoiding the need for a pipe ducting system that requires continuous timber access boarding.

The pipe-in-conduit system should be installed so that the pipe in the conduit may be removed, by disconnecting the exposed ends and withdrawing it through the conduit. For further installation recommendations refer to the manufacturer. The system should be pressure tested before the screed is laid. The thickness of the screed will depend upon the loading requirements of the floor and the screed should be laid in accordance with the relevant requirements of BS 8204-1:2003 (Screeds, Bases and In-situ Floorings. Concrete bases and cement sand levelling screeds to receive floorings. Code of Practice.)

WALL AND FLOOR PENETRATIONS

Pipes which pass through blockwork, brickwork, solid floors, concrete, steelwork and similar abrasive constructional elements should be protected from mechanical damage by the use of a plastic sleeve. This sleeve should project at least 3mm beyond the wall at either end. The use of a protective sleeve is particularly important if there is any likelihood of movement by expansion or of structural movement.

Whenever the pipe passes through a firewall or floor where firestopping is required, an intumescent fire collar (fire seal) should be fitted. Proprietary foil-clad intumescent products are available from various manufacturers.



INSTALLING PIPES IN WALLS

Plastic pipe systems up to 10mm can be accommodated behind 'dot and dab' plasterboard walls to give a pipe free appearance within the room.

When installing pipes in dry lined walls care should be taken to avoid running the pipework along any obvious fixing zone i.e. at skirting level or where curtain rails may be fixed. Lateral pipes should be run horizontally in line with plasterboard penetrations and radiator drops should be run vertically, side by side, at one end of the radiator position.

Plastic pipe systems can be easily threaded through studwork and within wall systems during construction. This method is often used for running feeds to radiators or where concealed plumbing is required.

Note: Guidance on sealing gaps around pipes in buildings is available from the BPF Pipes Group website.

PROTECTION

ELECTRICAL BONDING

There is no risk of electric shock from plastic pipes, as they do not conduct electricity.
See BPF Pipes Group website

Where the pipe forms a break in the continuity of existing metal pipe, which may have been used for earthing or bonding, the electrical continuity should be reinstated. The bonding lead should be fixed permanently to both ends of the existing metal pipework.

INSULATION

The inherent resilience and flexibility of plastic pipes offer considerably increased resistance to damage from freezing. The pipe walls are able to deform under pressure from the internal expansion and will resume their original shape without damage after thawing.

However, plastic pipes do not provide any resistance to resistance to freezing of the conveyed water. Freezing may prevent the system from functioning and can cause damage to metallic parts of the system. Therefore it is always advisable to provide insulation in accordance with Part L of the Building Regulations in situations where there is any likelihood of freezing. More information can be found in Approved Document L1A and the Domestic Building Services Compliance Guide. Trace heating may be used as part of frost protection measures. Please always refer to the pipe manufacturer.

INSULATION OF PIPES FOR TEMPERATURE MAINTENANCE

Reasonable provision should be made to limit heat losses from the pipes. More information can be found in Approved Document L1A and the Domestic Building Services Compliance Guide.

PAINTING

Most plastic pipe systems can be painted if preferred. It is advisable to consult the pipe manufacturer's literature for acceptable paints, but these will generally be in the form of an emulsion paint, with a suitable undercoat. Before painting, ensure the surface of the pipe is clean, dry and free from grease and silicone compounds. If repainting is required, chemical paint strippers and hot air guns should not be used.

CHEMICAL RESISTANCE

Plastics pipes have good chemical resistance. However, in the event of spillage of chemicals, the pipework should be washed with clean water. Building materials such as standard concrete, mortar, plaster, do not affect the pipes. Timber treatments for woodworm or rot are normally water-based: ideally spraying is carried out prior to pipe installation but if not, pipes and fittings should be covered during treatment. Care should be taken that solvent-based cleaning products, tapes, paints, adhesives or sealing compounds do not come in contact with pipes.

COMMISSIONING

PRESSURE TESTING

When the installation is complete, pressure testing of the pipework and fittings in accordance with the guidelines laid down by the Water Supply (Water Fittings) Regulations 1999 and as recommended in BS EN 806-2 should be carried out by a plumber trained to do so. This should always be carried out before the next building process covers the pipes e.g. screeding of floors or laying of floorboards. These Regulations stipulate a minimum pressure condition for testing that may be below individual manufacturer's recommendations.

Care should be taken to ensure that the pressure used does not exceed the figures recommended by the manufacturers for other components of the system such as pumps, cylinders etc.

DISINFECTING

Once a hot or cold water supply system has been successfully tested, it should be disinfected in accordance with the WRAS Commissioning Plumbing Systems advisory leaflet. Note: specific requirements apply in healthcare and other properties and should be consulted.

FLUSHING

Once a central heating system installation has been successfully tested, it should be flushed and filled in accordance with BS 7593 (Code of practice for the treatment of water in domestic hot water central heating systems).

CORROSION INHIBITORS

Corrosion Inhibitors should be used in all heating circuits in the normal way to prevent corrosion of steel radiators and other vulnerable components. Most proprietary anti-corrosion compounds and central heating anti-freeze admixtures used at the normal recommended levels do not affect the majority of plastic pipe systems.

Summary

In summary, the main advice points from manufacturers are:

- Use connectors (and pipe inserts) compatible with the pipe
- Consult pipe sizing guides to guarantee sufficient flow
- Do not exceed the specified temperatures and pressures for the application
- Design the system to allow for movement and expansion caused by thermal cycling
- Do not put mechanical strain on a piping system
- Carefully follow manufacturer's guidance when connecting to a boiler
- Protect from direct sunlight
- Do not bury pipe and fittings directly in concrete (except for underfloor heating pipe)

INSTALLATION

- Protect pipework during installation from damage such as scratching, chemical attack by unsuitable substances (e.g. solder flux) or heat (e.g. blow torches)
- Do not use components that are obviously damaged
- Protect the pipework during service from freezing, direct mechanical abuse or attack by rodents
- Comply with electrical continuity requirements
- Do not bend pipework excessively, twist joints or apply side load
- Correctly support the pipe (consult manufacturer instructions on clipping)

TESTING AND COMMISSIONING

- Ensure unvented hot water cylinders are functioning correctly
- Always pressure test systems before commissioning
- Always disinfect hot and cold water domestic systems before commissioning

Annex A

CONTINUOUSLY CIRCULATED HOT WATER SYSTEMS

OVERVIEW

These systems (known as recirculating, secondary hot circulation, return or ring main systems) carry pumped hot potable water to outlets where the temperature is between 60°C to 70°C and is replenished by an incoming water supply to replace the water drawn to outlets. These systems are very different from intermittent systems for hot water distribution which are only hot when water is being drawn. **Only products approved by the manufacturer for continuously operating systems should be used.** The manufacturer and their technical information must always be consulted for specific limitations. A clear understanding of the quality of the water to be used in a recirculating system is essential. The long-term performance of a continuously operating system will be affected by the temperature and pressure duty cycle and the aggressiveness of the water e.g. from free chlorine and pH. Disinfection routines may also have an effect and therefore must also be agreed by the manufacturer.

The following aspects must be considered for recirculating hot water systems **in addition** to all other advice in this guide.

UK SERVICE CONDITIONS

Temperature: Systems shall have a design recirculating temperature of between 60°C and 70°C. The maximum temperature during fault conditions (for very short periods of time) should not exceed 95°C.

The difference in temperature between the flow and return connections on the water heater shall not exceed 5°C and insufficient temperature at the outlets must not be solved by raising the temperature in the recirculating hot water system above 70°C. Refer to **PIPE SIZING (Page 6)**, **FLOW RATES (ANNEX A)** and **INSULATION OF PIPES FOR TEMPERATURE MAINTENANCE (Page 12)**.

Pressure: System pressures shall not exceed those specified by the manufacturer. Refer to BS EN 806-2, table 2 for specific information on classification of service conditions.

DESIGN

The following documents are particularly relevant for the design of recirculating hot water systems: BS EN 806 Specifications for installations inside buildings conveying water for human consumption. Part 1: General, Part 2: Design, Part 3: Simplified Method, Part 4: Installation, Part 5: Operations and Maintenance.

BS 8558 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. Safe water in healthcare premises (HTM 04-01).

FLOW RATES

Pipes within a recirculating hot water system cannot be sized only using methods which specify delivery of water in terms of volume. Additionally, the pipes must be sized to ensure the velocity of the water is limited to a maximum of 2.0m/s.

Manufacturers' technical information shall be used during the design of a recirculating hot water system.

DISINFECTING

Particular attention is drawn to the requirements on disinfecting as they are especially important during the design, commissioning and use of a recirculating hot water system.

REFERENCES

Approved Document L1A: Conservation of fuel and power in new dwellings.

BS 7291 Thermoplastics pipe and fitting systems for hot and cold water for domestic purposes and heating installations in buildings. Part 1: General requirements. Part 2: Specification for polybutylene (PB) pipe and associated fittings. Part 3: Specification for crosslinked polyethylene (PE-X) pipes and associated fittings.

BS EN 1057 Copper and copper alloys. Seamless, round copper tubes for water and gas in sanitary and heating applications.

Domestic Building Services Compliance Guide, DCLG, 2013 (incorporating 2018 amendments).

Water Supply (Water Fittings) Regulations 1999 No. 1148.

WRAS Commissioning Plumbing Systems Advisory Leaflet. No. 9-05-01, WRAS, December 2008.

See also list of design codes on page 6.

A list of members who manufacture and supply plastic pipes for hot and cold water supply and central heating systems is provided on the BPF Pipes Group website,

<https://bpfpipesgroup.com/applications/building-services/>