Q&E system for heating, hot water and cold water services

DECEMBER 2012

The Complete Plumbing system

Q&E evolution

Uponor Q&E
The Complete Plumbing system

A complete and extensive product line of pipes, fittings, tools and accessories to suit any kind of plumbing installation.

- **Simple**
- **Secure**
- **Complete**
- **Adaptable**
- **High Flow**
- **Hardwearing**

Uponor Q&E

The thermal memory system that never forgets to stay secure

www.uponor.co.uk

Contents:

Introduction

Uponor PEX Plumbing

The Uponor PEX Plumbing System is a completely flexible plastic plumbing and heating system adapted specifically for the UK market by Uponor. The Uponor PEX Plumbing system is manufactured to EN ISO 15875 and has WRAS Approval 1209073.

Uponor PEX pipe is approved for use with the secure Uponor Q&E fittings – a concept unique to Uponor. Already successfully sold throughout Europe and the USA for over 40 years, Uponor Q&E fittings are available in a range of Engineered Plastic (EP) for pipe dimensions 16, 20 and 25mm. Uponor PEX pipe may also be used with Uponor's range of compression fittings.

Uponor PEX Pipe

The Uponor PEX pipe offers benefits to both specifiers and to the professional plumber.

Key advantages are:

- One pipe for heating and potable water applications
- Pipe available in UK dimensions: 16mm, 20mm, 25mm
- Smooth bore to prevent scaling
- Choice of either the unique Uponor Q&E fittings or traditional compression fittings.
- Choice of straight and coil lengths to minimize wastage
- Available in pipe-in-conduit to meet Water Regulations

Uponor Q&E Jointing System

The Uponor Q&E fitting is a tried and tested concept with over 75 million fittings already sold world-wide. The jointing concept relies on the unique elastic features of Uponor PEX pipe to give a joint that is stronger than the pipe itself. A large range of plastic fittings and manifolds are available.

Key advantages are:

- Quicker than soldering and suitable for immediate handling
- Safe and no fire risks – no heat guns or naked flames are used
- Clean – no messy fluxes are required.
- Simple – no rubber seals or moving parts reducing the chance of leakage
- Internal jointing – external pipe damage on site does not influence joint integrity
- Pipe continues to contract onto the fitting after the joint has been made – increasing the joint integrity over time

DIMENSIONS Available in dimensions **16mm, 20mm and 25mm**

Uponor PEX Pipe

PEX Pipe Product Range

Item Detail			
Nominal outer diameter	16	20	25
Nominal wall thickness	1.8	1.9	2.3
Lengths available (m)			
3 m	●	●	●
50 m	●	●	●
100 m	●		
200 m	●		
500 m	●		
Pipe-in-Conduit (m)			
50 m (in Red or Blue)	●	●	●

What is PEX?

PEX is an acronym for crosslinked polyethylene. The PE refers to the raw material used to make PEX (polyethylene), and the X refers to crosslinking the polyethylene across its molecular chains. The molecular chains are linked into a three-dimensional network that makes PEX remarkably durable within a wide range of temperatures and pressures.

Marking and Identification

Uponor PEX pipes are always marked with the product name, outer diameter, wall thickness, date of manufacture, and continuous metre marks. They are also marked with the current standard, together with a type approval label and depending on the type of pipe, with the relevant production monitoring authority.

Application

Uponor PEX pipe is a white opaque barrier pipe with a special outer protective PEX layer designed for:

1. Indirect and direct cold water mains services
2. Vented and unvented hot water systems
3. Vented and sealed central heating systems
4. Chilled water systems.

Why Barrier Pipe?

Barrier pipe is designed for use in central heating systems and incorporates an oxygen diffusion barrier to protect the system from oxygen permeation.

Uponor PEX pipe is a barrier pipe that meets the oxygen diffusion requirements of DIN 4726.

Operating temperatures and pressures

Application	Working Temperature	Max. Operating Temp.	Max. Working Pressure
Heating Systems	80°C	95°C [1]	6 bar
Hot Water Services	70°C	95°C [2]	6 bar
Cold Water Services	20°C	20°C	12 bar

[1] Short-term malfunction temperature for a cumulative 100hrs per year
[2] Short-term malfunction temperature for a cumulative 100hrs over the working life of the system

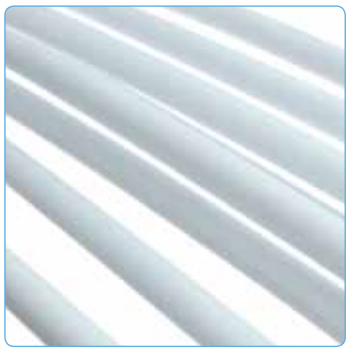
Fitting Systems Guide

Introduction

Uponor PEX pipe is manufactured to parts 1 and 2 of BS EN ISO 15875:2003 'Plastic piping systems for hot and cold water installations, cross-linked polyethylene (PEX).

The two main methods for joining the pipe are: (1) the unique Uponor Q&E jointing concept (2) brass compression adaptors consisting of a nut and insert.

Both jointing methods allow adaption from Uponor PEX onto other plumbing systems and components.



Uponor Q&E Fittings

The unique Q&E jointing concept relies on the elastic memory of the PEX pipe.

A Q&E ring is fitted over the pipe end; both the pipe and ring are expanded a number of times using an Uponor expander tool, then pushed onto the spigot of the Q&E fitting.

The pipe and ring shrink back to their original state in a matter of seconds, creating a water-tight seal between the pipe and fitting. (See P7 for details).

Q&E fittings are made of durable PPSU (Polyphenylsulfone Radel R 5100), and available as couplings, reducers, elbows, tees, tap connectors and threaded adaptors (M/F).

All Q&E fittings and rings are clearly labelled with the pipe size.

When making Q&E joints the following must be strictly observed:

- Uponor Q&E fittings must only be used with Uponor PEX pipe. No other pipe material can be used.
- A Q&E ring must be used for all joints
- Always use the correct sized Q&E rings and fittings

Compression adaptors

For adaption onto other systems via 15mm compression bodies conforming to BS EN 1254, Uponor compression adaptors can be used.

Manifold adaptors (½" and Eurocone ¾") allow Uponor PEX pipe to connect to male thread outlets on a variety of Uponor manifolds. (See P8 for details).

Making a Q&E Joint

Uponor Q&E joints can be made using either the Hand Expander tool or the Milwaukee M12 Cordless Expander.

Pre-jointing checks:

- Read and understand the operating instructions for the tool you are using.
- Ensure the expander head and Q&E rings and fittings are the correct size for the PEX pipe to be joined.
- Check battery has sufficient charge (if using M12 Expander tool).

1. Cut the pipe at right angles, using appropriate plastic pipe cutters (e.g. 1001369). The pipe end should be dry and free from grease and dirt before making a joint.
2. Place the correct size Q&E ring onto the end of the pipe, ensuring that the lugs are flush with the end of the pipe.
3. Gently insert the expander head into the end of the pipe and depress the trigger on the expander tool; the expander head will begin to splay and expand the end of the pipe.
   N.B. Excessive forcing of the head into the pipe end may result in the auto-rotation function not working.
4. Repeat the expansion procedure until the Q&E ring (and pipe end) is snug against the shoulder of the expander head. Carry out ONE MORE expansion and once the expander head has finished its cycle, remove the tool from the pipe end and set to one side.
5. Immediately push the pipe onto the nipple of the suitably sized fitting; there should be some resistance but the pipe should come up to the shoulder of the fitting. **N.B. If the pipe goes very easily onto the fitting or if the fitting is loose inside the pipe, over-expansion may have occurred and the joint may take much longer to contract**.
6. Hold the pipe in place for a few seconds (no longer than 10 seconds should be sufficient). The Uponor PEX Plumbing system Q&E joint is now complete and will be ready for pressure testing after the appropriate time has elapsed (see 'Time to Pressure Test' table on P15).

Good practice dictates that the inside con e of the expander head is cleaned at the end of each day's usage.

Details on using the Milwaukee M12 and hand expander tools can be found on P25/P26.

What is autorotation?

Autorotation causes the expansion head to automatically index (rotate) per expansion, ensuring the pipe becomes evenly expanded.

Milwaukee expander tools have built-in autorotation. If using the hand expander, an autorotation adaptor must be used.

Making a Compression Joint

- Uponor PEX plumbing pipe may be used with compression fittings for connection to both ½" and ¾" manifold outlet threads. Our specially manufactured compression range of fittings come with the addition of a specially designed olive and insert, as well as having the benefit of an additional o-ring around the seat of the insert.
- Cut the pipe at right angles, using appropriate plastic pipe cutters (e.g. 1001369). The pipe end should be dry and free from grease and dirt before making a joint.
- Slide the nut and olive over the pipe and push the insert fully into the pipe end (1). Ensure this is pressed in as far as possible, right up to the flange of the insert, in order to get a secure joint (2).
- Push the pipe end (with insert) into the body of the fitting/ manifold outlet. The end of the insert should fit snugly into the body of the fitting or manifold outlet.
- Tighten the nut onto the threads of the fitting/manifold, (3) making sure that you do not over tighten. For most applications, hand tighten then continue with a spanner for a maximum of 1½ turns. (4)
- The compression joint is now complete and ready for pressure testing.

Note:
If using third party compression fitting bodies always check the compatibility of the threads.

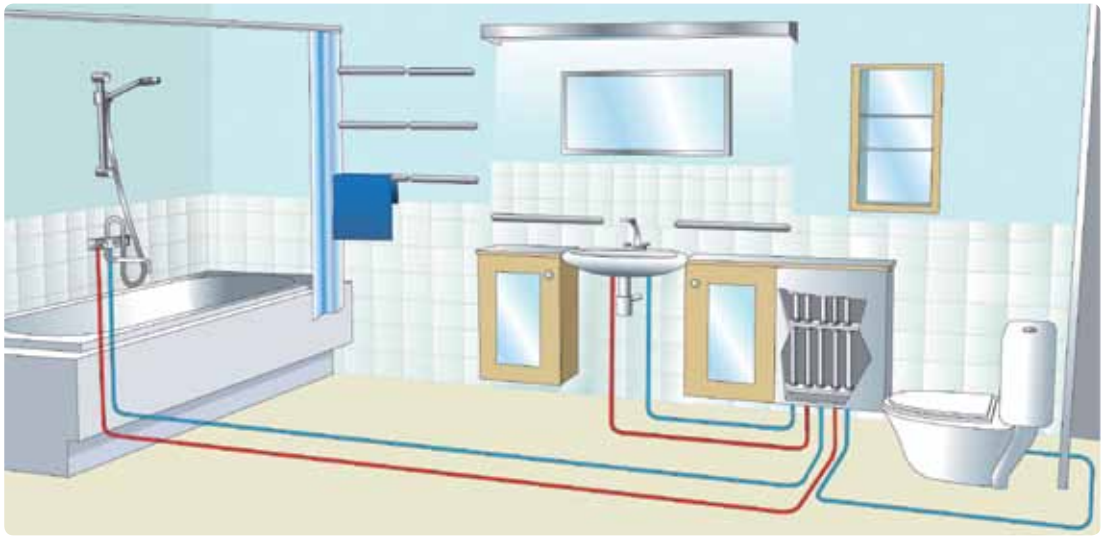
Contact us on 01923 927000 enquiries.uk@uponor.com

Connections to Other Systems

The comprehensive range of fittings for Uponor PEX pipe allows adaption to many other plumbing systems and components. Please refer to the table below

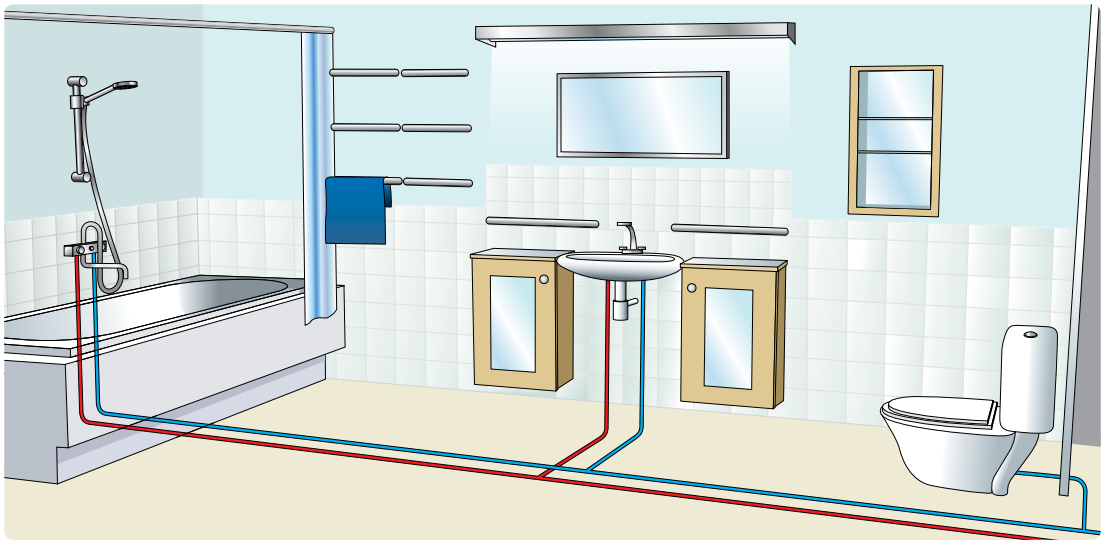
System to connect to	Method	Uponor item	Notes
Copper	Solder		Solder first and allow to cool before making the Q&E joint
	Compression		Use with compression fitting bodies conforming to EN 1254
Valves	Thread		Seal with PTFE tape or Loctite 55
	Compression		Compatibility of threads must be checked
Plastic	Thread		Seal with PTFE tape or Loctite 55
Old Uponor PEX Pipe 15, 22 & 28mm	Compression		Use with compression fitting bodies conforming to EN 1254

Installation Methods



Manifold System

The basic principle of the Uponor manifold system is to provide joint free pipe runs from a centrally positioned manifold to each radiator valve or tap or water outlet. The system can be designed with one single pipe dimension from the manifold to the draw-off point, which simplifies design and installation work. With joints only at the manifold and the radiator/taps, the risk of leakage from joints is considerably reduced and there are no connections within the walls or floors . Since also there are no other draw-off points on the same pipe, pressure and temperature variations are minimal when taps are turned on and off. Small pipe diameters and fewer fittings save on installation time and labour costs.



Branch System

The Uponor PEX Plumbing System can be installed in the same fashion as a traditional "Tee" system using the various range of Q&E fittings. The advantage with this installation method is that it uses less piping than the manifold system. However, the traditional method has some inherent disadvantages that should be taken into consideration. There are more joints than with the manifold system and these are often inaccessible within the floors or walls. There are temperature and pressure variations due to the fact that one pipe has more than one draw-off point. The design work is more complicated, as most engineers wish to reduce the pipe diameter, from the beginning of the system to the end, which is why more careful calculations are needed to determine the various pipe sizes.

All in all, branch plumbing would be the best choice for installers who are more used to traditional installation methods using traditional materials such as copper pipe and fittings.

Water Regulations 1999

Some key items in the Water Regulations 1999 Schedule 2 Section 3: Paragraph 7 can be summarised as:

> *Water pipes and fittings must be installed so that they can be readily removed and replaced.*
>
> *Pipes may be installed in conduits so that any leaks become apparent and so that the pipe can be withdrawn and replaced.*
>
> *Properly formed openings should be provided for the inspection and dismantling of pipe joints.*

Installations in solid floors using Uponor PEX Pipe-in-Conduit systems and Uponor Radiator Connection Guides will conform to the Water Regulations.

Solid Floors

Uponor PEX Pipe-in-Conduit should be used in solid floors to comply with the Water Regulations 1999. With Uponor PEX Pipe-in-Conduit no ducting is necessary and pipes can subsequently be withdrawn and replaced if required.

Always allow some extra piping at the beginning and at the end of the runs to simplify connection to manifolds and fittings. Lay the pipe in smooth serpentine bends to allow for expansion and contraction. Lay pipes with no sharp bends or kinks to ensure pipes can be easily withdrawn and replaced if necessary. The conduits should be fixed in position at a maximum spacing of 750 mm.

Use pipe bend supports for perpendicular upturns from the floor to the manifold, radiator or to a temporary stand. Temporary stands are often used to hold a loose pipe end or manifold in place if the pipe work is installed before the wall is built.

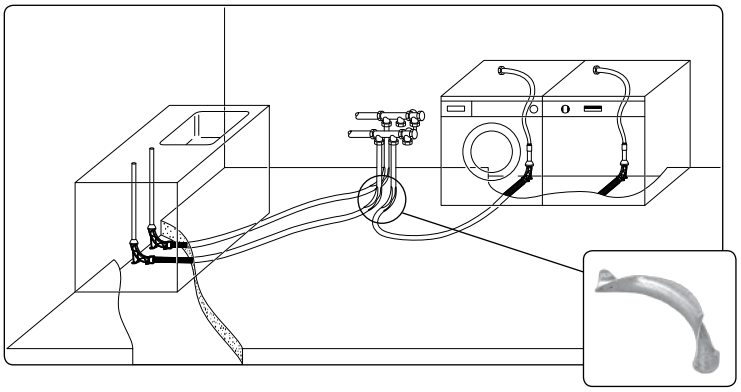
Use Radiator Connection Guides to take the pipe to the finished floor level and connect to the radiator or tap using a connection pipe after screeding.

Alternatively, use single bend guides to take the pipe directly to the radiator or tap above the finished floor level. Once the manifold and radiators and taps have been fixed into position, simply connect the pipe at both ends.

Notes

- Uponor pipes are not affected by concrete or screeds. However, when installing Uponor PEX Pipe-in-Conduit ensure that no concrete or screed forces its way into or between the pipe or the conduit.
- Before screeding or otherwise concealing the conduit, check that it has not been deformed or blocked. An obstruction may affect later removal and replacement of the pipe.

Screeded Floors (tap water system)



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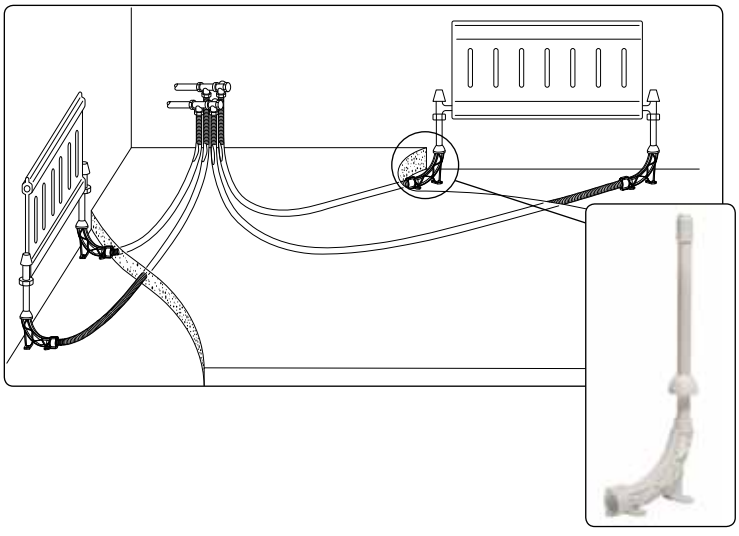
Screeded Floors (radiator system)



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Installation Methods

Joist Floors

Pipes should be laid in runs which are simple to locate in order to help prevent any puncturing with nails or screws. Decide where to locate the manifold and the position of the radiators or taps. Then decide the route from the manifold to each radiator or tap and notch or drill the joists in accordance with Building Regulations Part A and BS EN 806. Pull the pipes through the drilled holes or lay them in the prepared notches. Once the manifold and the radiators or taps have been fixed into position, simply connect the pipes at both ends. In timber joist floors, use a pipe bend support, bend the pipe through 90° out of the floor directly onto the radiator valve or tap. Alternatively, use an elbow under the floorboards and make the final connection to the radiator valve or to the tap using a copper connection pipe.

For a uniform finish above surface, Uponor recommend using Radiator Connection Guides for Joisted Floors (1002238)

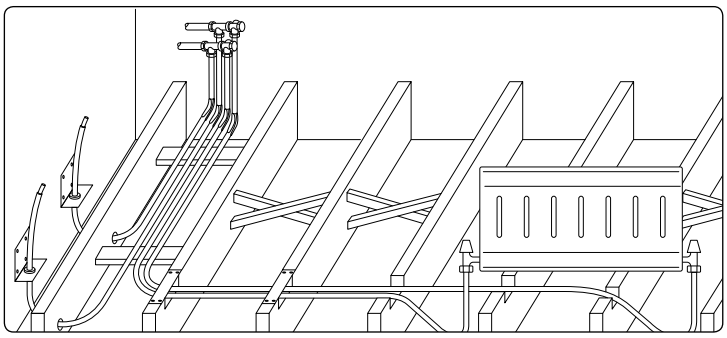
Expansion and Contraction

As is common with all plastic materials, Uponor PEX has a higher coefficient of expansion than metal. This must be considered when installing plastic pipework. All hot water pipes should be laid in soft serpentine bends or with expansion loops or bellows to accommodate the expansion.

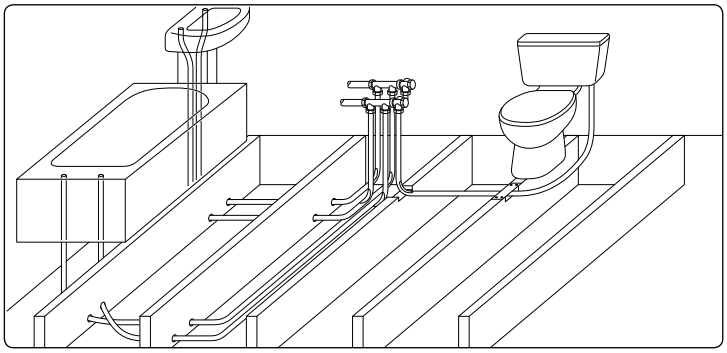
Allow for 1.5% expansion & contraction of the pipe when installed at 20°C for use at 80°C.

Contraction or shrinkage up to 1.5% of the pipe length occurs when the pipes have been in use and the temperature and pressure drops. The grip of a correctly installed fitting is greater than that of the shrinkage force, and if the pipe has been installed allowing for expansion, there should be no problem. After 10-15 temperature cycles the pipe will stabilise and no more shrinkage will occur.

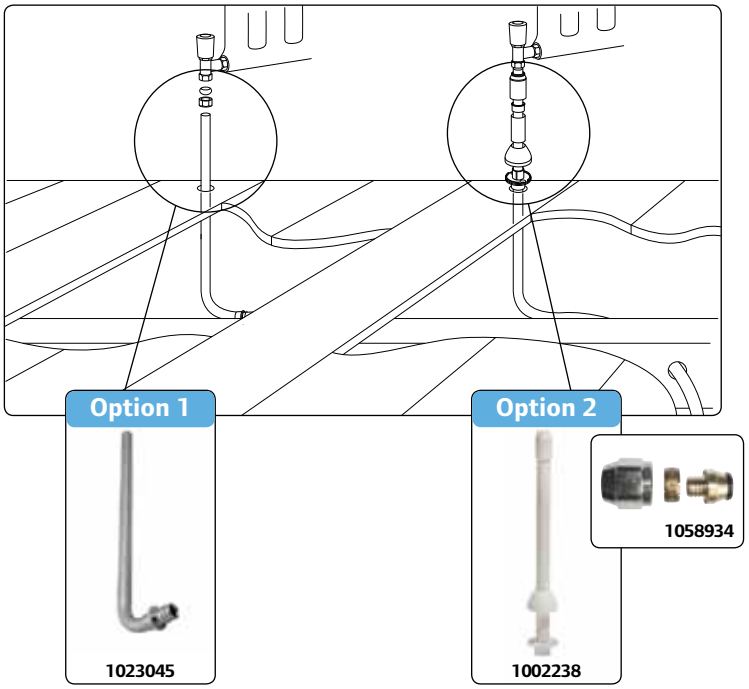
Joist Floors (radiator system)



Joist Floors (tap water system)



Connections in Joist Floors



Notes

All installations must comply with latest Building Regulations, Water Regulations and with the requirements of BS EN 806 and BS5955.

General Instructions

Storage and general care

Uponor pipes should be stored in a clean dry environment and must not be stored or installed in areas where prolonged exposure to UV radiation (sunlight) is likely. Pipes should be kept clean from dirt, grease, mortar etc. To prevent dirt entering the pipe system, end caps should be used on free pipe ends until final connections are made. For conduit systems, no concrete or screed should be allowed between the pipe and the conduit.

Handling

Uponor pipes will withstand all normal handling but as with all plastic pipes, care should be taken to avoid any damage. Avoid dragging pipes across rough surfaces, e.g. concrete, and do not tug pipes which have become trapped. Avoid any action which may cause the pipe to be punctured, kinked or cut. Avoid walking on pipes.

Uncoiling the pipe

An Uponor pipe decoiler is available 1058662). This should be located in the working area to avoid dragging pipe across floor surfaces and around corners.

Cutting Uponor pipes

Pipes must only be cut using plastic pipe cutters to ensure a clean square cut with no internal or external burrs. Hacksaws must not be used to cut plastic pipes.

Bending

Uponor PEX pipes may normally be bent without the need for any special tool. To make a bend in Uponor PEX pipe, fix the pipe at one end and gently curve the pipe by hand and fix the pipe at the other end. Use pipe bend supports to hold the pipe in position. The minimum bend radius is given in Table 5 and care should be taken not to bend the pipe beyond this radius since this may cause the pipe to kink. Pipes that have been damaged during bending should not be used.

Uponor supplies a variety of metal and plastic pipe bend supports for pipe diameters 16-25 mm. No heat or special tools are required and the pipe support should be left in place during the life of the system.

Minimum bend radius (mm)

Dimension	Bend Radius Without fixture
16	80
20	100
25	125

Recommended spacing of support centres for horizontal pipe runs

Diameter (mm)	Hot pipe runs (m)	Cold pipe runs (m)
16	0.4	0.75
20	0.5	0.8
25	0.6	0.85

Note: For vertical pipe runs use dimension in table above multiplied by 1.3

Pipe Fixing

Uponor PEX pipes are not self supporting and should be fixed using pipe clips to provide adequate support whilst allowing for thermal expansion. A certain degree of sagging is to be expected in horizontal pipe runs – this will not affect the performance of the product. Uponor supply a variety of plastic pipe clips to fix Uponor pipe products into position.

Supports should always be installed at either side of a bend. It is recommended that pipes be supported at not more than 150 mm from connections, junctions, valves and other controls. Additional support must always be provided for pumps and other heavy items.

Pipework

- Pipes which pass through walls, floors, concrete or brickwork must be protected by a suitable pipe sleeve, e.g. Uponor conduit.
- Pipes laid in floors or walls should be run in soft serpentine bends to allow for thermal movement of the pipe. This also applies to pipe-in-pipe products.
- Where pipes cross-over, do not allow hot and cold water pipes to come into contact with each other.
- The relative positions of cold water pipes to hot water pipes should be such that the cold water pipes are not warmed, particularly when pipes are running parallel.
- Do not allow pipe to make contact with any sharp or abrasive surfaces which could damage the pipe.
- Pipe at high level or in ceiling voids can be laid on a metal tray which will allow for thermal movement.

Pressure Testing

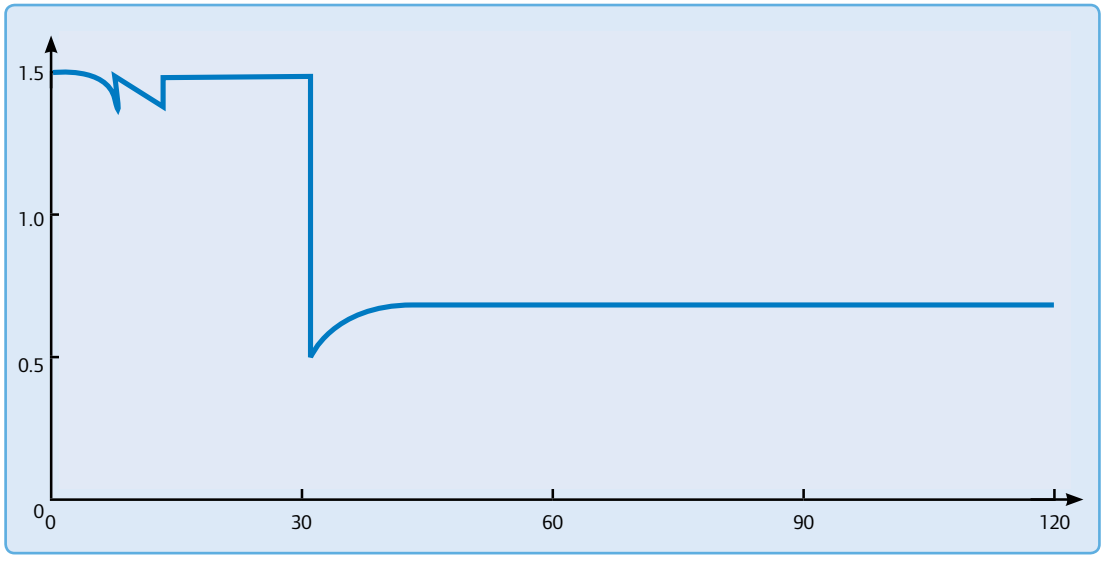
Hydraulic pressure testing shall be undertaken in accordance with BS EN 806-4:2010 or Water Regulations 1999 using cold potable water BEFORE the system is taken into operation. Hydraulic pressure testing is not a substitute for the correct installation of the PEX pipe and associated fittings. It is essential that the correct size fittings are used for the pipe and that thermal movements are taken into account when installing the pipe.

The test pressure applied to the system should be 10 bar or 1.5 x the maximum pressure rating of the lowest rated component in the system. The maximum test pressure applied to Uponor Q&E pipe should not exceed 18 bar at 20°C. Other equipment in the system, such as boilers, cylinders, radiators, valves, etc. should be checked with the manufacturer as to their maximum pressure rating BEFORE any pressure test of the complete system is performed. If in any doubt, isolate all other equipment before pressure testing and only test the Uponor PEX pipe with the Uponor Q&E joint or Uponor compression fittings.

Method

- Vent and fill the system with potable drinking water.
- Visually inspect the whole system for leaks.
- Pressurise the installation to a test pressure of not less than 1.5 times the maximum working pressure.
- Apply the test pressure by pumping for a period of 30 minutes. Inspect for leaks.
- Reduce the pressure in the pipework by bleeding water from the system to 0.5 times the maximum working pressure.
- Close the bleed valve. Visually check for leakage and monitor for 90 minutes. If there is no reduction in pressure the system is regarded as leak tight.
- Flush the system as required

Pressure testing graph



Special notes for pressure testing Q&E joints

Uponor Q&E joints depend on the elasticity of the Uponor PEX material to form a tight joint. At low temperatures, the elasticity of the material is reduced. This means that in cold conditions, it will take a longer period of time for the joint to become tight. The pipe will always shrink back to it's original dimensions and the joint will always eventually become leak tight.

Please observe the minimum waiting time **after making the last joint** before making the system pressure test. The joint can be pressure tested after 30 mins at ambient temperatures above 5°C. At lower temperatures allow more time before testing the joints, as shown in the table below.

The maximum test pressure for Uponor PEX pipe with Uponor Q&E joints **which must not be exceeded** is 18 bar.

Time to pressure testing with Q&E Joints

Ambient Temperature	Time to pressure test
5°C above	0.5 hour
0°C to +5°C	1.5 hours
-5°C to 0°C	3 hours
-10°C to -5°C	4 hours

Other Considerations

Electrical Continuity

Like all plastics, Uponor PEX pipe is non-conductive and does not need to be bonded to earth.

In new installations which do not use any sections of metal pipes, there is no requirement to bond the pipe work to earth. However, it is still necessary to bond all electrical components such as pumps, boilers and heaters and other exposed metallic components of the plumbing and heating system. Uponor PEX pipe itself is not suitable for electrical earthing. Pipe systems should be earthed in accordance with current IEE Regulations. In case of doubt, seek advice from a qualified electrician.

Gas

Uponor PEX pipes must not be used to carry gas inside a domestic building or to carry compressed air.

Corrosion Inhibitors

Corrosion inhibitors should be used in central heating systems in the normal way to prevent corrosion of steel radiators and other components. Uponor PEX pipes are not affected by proprietary anti-corrosion compounds such as Fernox or Sentinel at the normal recommended dosing levels.

Antifreeze

Ethylene glycol central heating anti-freeze mixtures have no adverse effect on Uponor PEX pipes.

Where systems are left with residual water in unheated and unprotected buildings in freezing conditions, there is a risk of frost damage to the pipe. In all cases where there is a risk of freezing, add a glycol-based antifreeze to the water to avoid ice damage to the pipe. The % mixture should be in accordance with the particular brand of anti-freeze being used and the expected temperature level.

After freezing conditions have lifted and before the system is started, the anti-freeze mixture should be fully flushed-out of the loops and disposed of properly in accordance with local regulations.

Solvents

Solvent based cellulose or adhesive products must not come into contact with Uponor PEX pipes.

Disinfecting

The system should be disinfected after installation and pressure testing in accordance with the procedure in BS EN 806-4:2010. Care should be taken to ensure that the chlorine level does not exceed the permitted maximum for Uponor PEX pipe work of 5 ppm. Potable water which contains chlorine at levels which is safe for human consumption will not adversely affect Uponor PEX pipe work, i.e. concentrations below 2 ppm for continuous use. Uponor pipes must not be used for conveying high levels of chlorine such as in swimming pools.

Household Chemicals

Uponor PEX pipes have good chemical resistance to most household chemicals. In the event of spillage, the pipe work should be washed with clean water.

Painting

Uponor PEX pipe is specially manufactured in white to obviate the need for onsite painting. It is not recommended to paint Uponor PEX pipe.

Vermin

Vermin are not attracted to Uponor PEX pipes. However, any products which are softer than rodents teeth are liable to be gnawed in vermin infested property, including electric cables and conduits. Vermin present a health risk. Buildings should be constructed and maintained to exclude vermin and if vermin infestation is suspected then a reputable rodent exterminator should be consulted.

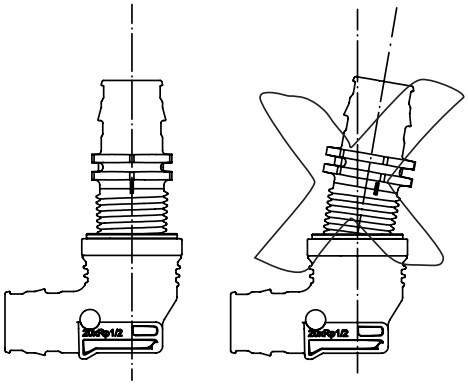
PPSU threaded fitting instructions

Material

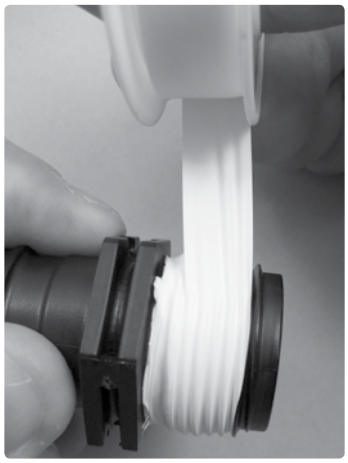
Polyphenylsulfone Radel R 5100

Use PTFE tape according to EN 751-3 FRp

Tape thickness:
0,076 - 0,1 mm for 1/2″ threads
0,1 - 0,2 mm for 3/4″ - 1 threads



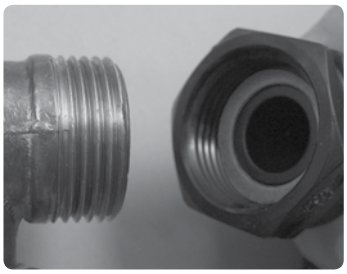
Threaded fittings



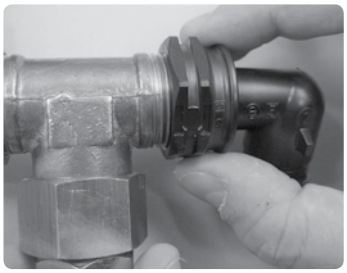
- Start to add PTFE tape from the bottom of the thread. Move up leaving first thread free.
- Add tape clockwise to allow good sealing performance between the threads.

- It will be easier for threads to get a good start when having first threads on male fitting free.

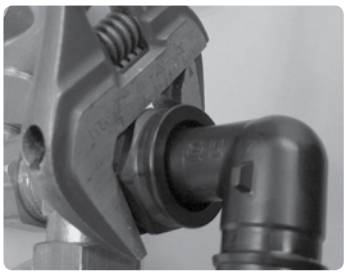
Swivel nut



- Ensure that gasket is in place.
- Do not use sealing tape on male counter threads.



- Fingertip tighten, and ...



... tighten with suitable wrench 90º.

The following products are recommended with Q&E PPSU products
PTFE tapes according to EN 751-3 FRp
Loctite 5061, Loctite 5331, Loctite 516, Loctite 55

The following products are strictly forbidden with Q&E PPSU products
Ever Seal Thread 483
Loctite 518, Loctite 542,
Scotch-Grip Rubber 1300, Scotch- Grip Rubber 2141
Scotch-Grip Rubber 847, Rector Seal 5
Rite-Lock, Selet Unyte

Pipe and Material Data

Uponor PEX Properties Mechanical Properties	Conditions	Value	Unit	Standard
Density	-	0.938	g/cm^3	-
Tensile strength	(at 20°C)	19-26	N/mm^2	EN ISO 527
	(at 100°C)	9-13	N/mm^2	-
Modulus of elasticity E	(at 20°C)	800-900	N/mm^2	EN ISO 527
	(at 80°C)	300-350	N/mm^2	-
Elongation on failure	(at 20°C)	350-550	%	EN ISO 527
	(at 100°C)	500-700	%	-
Impact strength	(at 20°C)	No failure	kJ/m^2	ISO 179
	(at -140°C)	No failure	kJ/m^2	-
Moisture absorption	(at 22°C)	0.01	mg/4d	-
Pipe roughness	-	$5x10^{-4}$	mm	-
Surface energy	-	$34x10^{-3}$	N/m	-
Minimum Bend radius	(at 20°C)	5xOD	mm	-
Thermal properties		**Value**	**Unit**	**Standard**
Temperature range	-	-100 to +110	°C	-
Coefficient of linear expansion	(at 20°C)	$1.4x10^{-4}$	m/m°C	-
Coefficient of linear expansion	(at 100°C)	$2.05x10^{-4}$	m/m°C	-
Softening temperature	-	+130	°C	-
Specific heat	-	2.3	kJ/kg°C	-
Coefficient of thermal conductivity	-	0.35	W/m°C	DIN 4725
Electrical properties		**Value**	**Unit**	**Standard**
Specific internal resistance	(at 20°C)	10^{15}	Ω m	-
Dielectric constant	(at 20°C)	2.3	-	-
Dielectric loss factor	(at 20°C/50 Hz)	$1x10^{-3}$	-	-
Rupture voltage	(at 20°C)	100	kV/mm	-
Pipe properties		**Value**	**Unit**	**Standard**
Oxygen diffusion resistance	-	Oxygen-tight(≤0.10)	$g/(m^3d)$	DIN 4726
Min laying temperature	-	-15	°C	-
Max operating temperature	-	+95*	°C	EN ISO 15875
Uponor PEX – outer layer properties **Mechanical properties**		**Value**	**Unit**	**Standard**
Density	-	0.952	g/cm^3	ASTM D792
Tensile strength 20°C	-	26	MPa	ASTM D638
Elongation at break	-	200	%	-
Modulus of elasticity 20°C	-	1000	MPa	ASTM D638
Specific heat	-	2.3	kJ/kg °C	-
Impact strength	-	140	J/m	BS 2782 306A

***Short term**

Contact us on 01923 927000 enquiries.uk@uponor.com

Force of expansion and contraction

These can appear when a pipe has been installed at an ambient temperature of about 20°C and is then suddenly exposed to a water temperature of 80°C. Forces can appear during both expansion and contraction. However if the temperature changes gradually or if the pipe can give sideways, the strength of the forces will diminish. Naturally sideways movement can be influenced by pipe length and by clamping, but note that the length of the pipe has no bearing on the size of the force. The maximum force of contraction remaining in the pipe at installation temperature due to the longitudinal shrinkage when a fixed pipe has been under maximum pressure and temperature for some time is given in the table on the right.

Dimension mm mm	Max force of contraction N
16x1.8	150
20x1.9	175
25x2.3	200

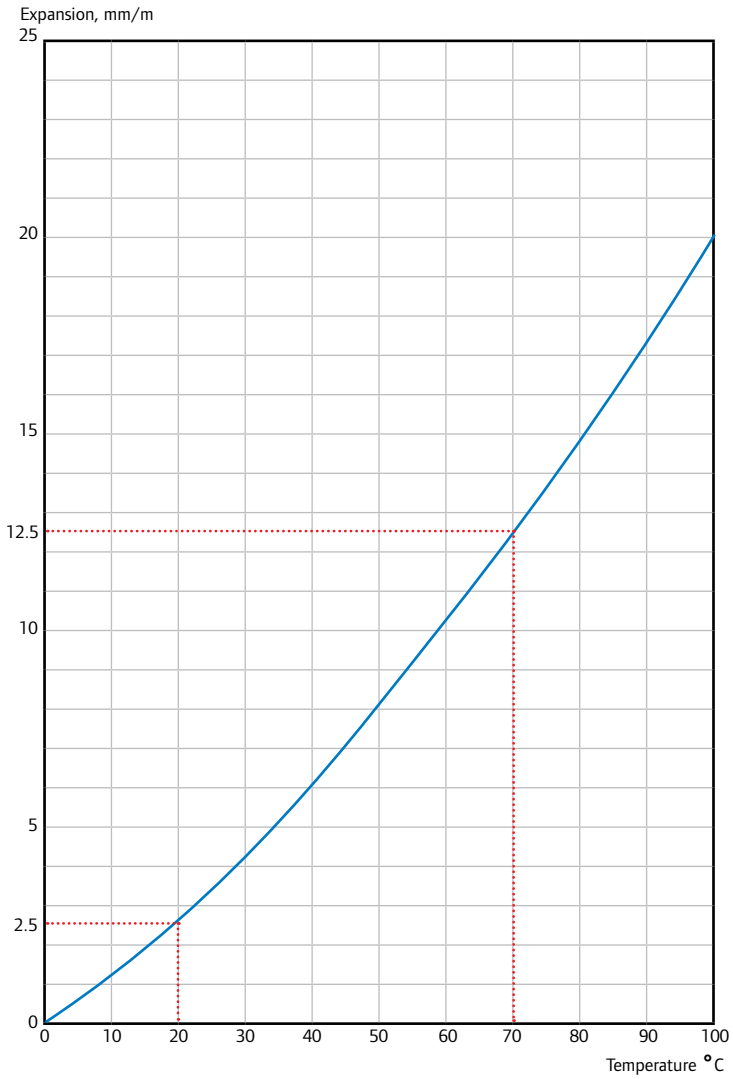
Pipe Weights and Volumes

Dimension mm	Weight kg/m	Volume l/m
16x1.8	0.088	0.11
20x1.9	0.117	0.197
25x2.3	0.182	0.306

Longitudinal Shrinkage and Expansion

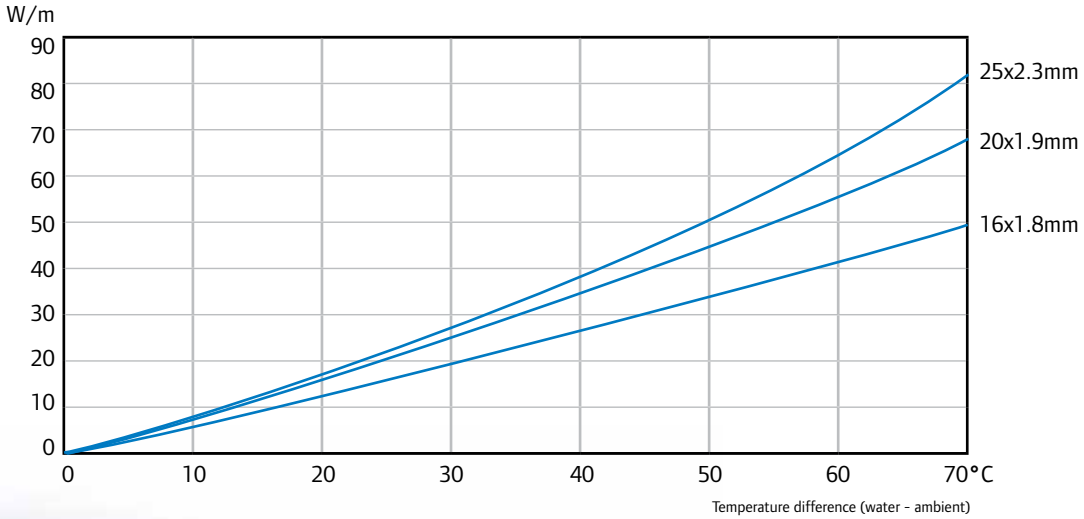
Example:
A riser conveying hot water is installed at ambient temperature 20°C. How much will the riser expand if the conveyed water has a temperature of 70°C?

According to the diagram at 20°C the thermal expansion is 2.5 mm/m. At 70°C the expansion is 12.5mm/m. The expansion of the pipe when conveying hot water will be 12.5 mm/m -2.5 mm/m = 10 mm/m.

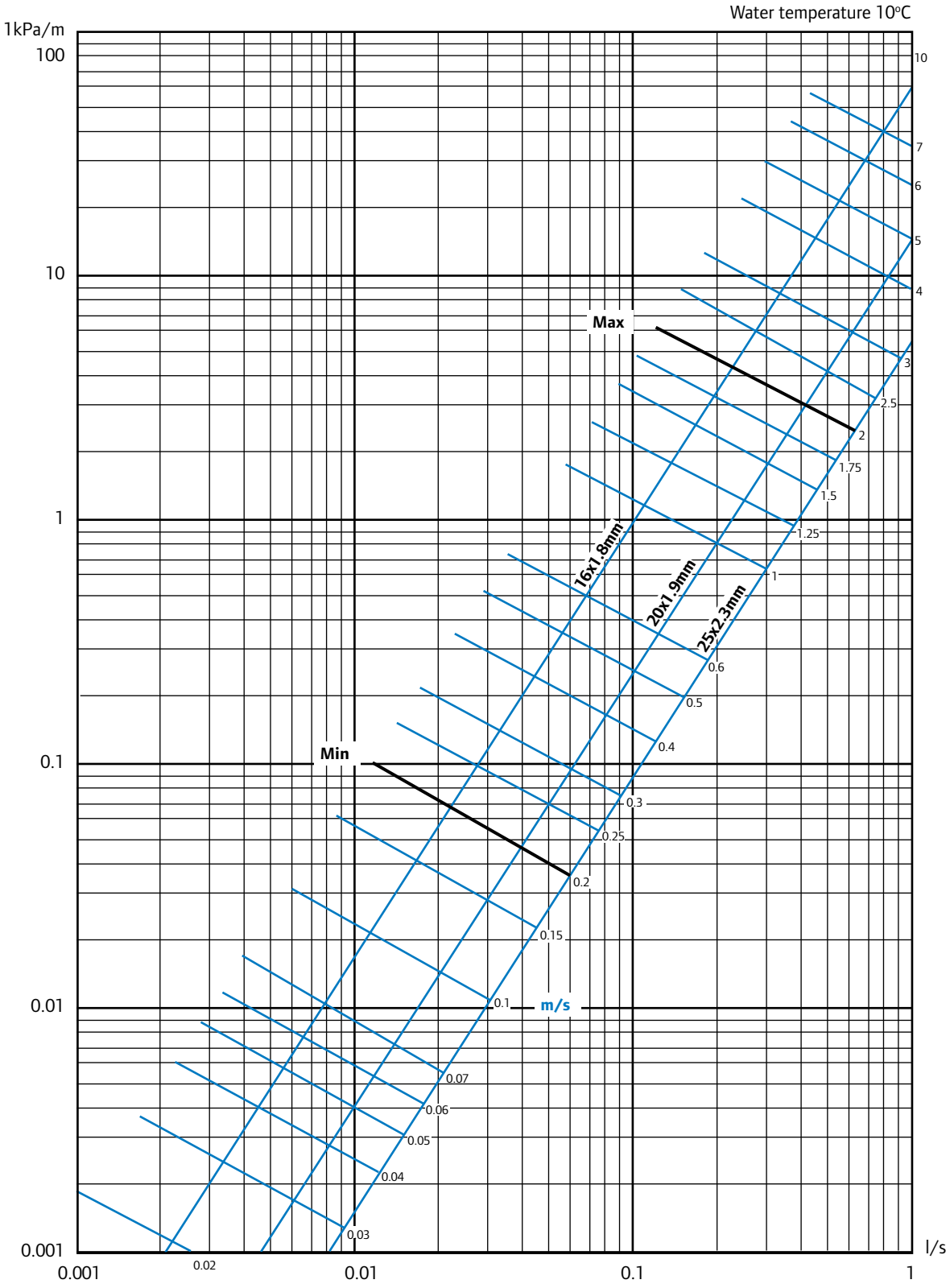


Pipe and Material Data

Heat emission loss Uponor PEX Pipe



Pressure Drop Diagram for Uponor PEX pipe



Correction factors for other temperatures

Temperature °C	90	80	70	60	50	40	30	20	10
Factor	0.76	0.78	0.80	0.82	0.84	0.87	0.91	0.96	1.00

Pipe-in-Conduit Systems

Uponor Pipe-in-Conduit System

Although a properly installed Uponor system is secure from leakage, there may be occasions when extra precautions against damage to the construction of a building from leakage is required. Uponor Pipe-in-Conduit allows the pipe to be withdrawn and replaced particularly in solid floors or walls where compliance with the requirements of The Water Regulations 1999 is required. Supplied to site with the pipe already threaded into the conduit, this system saves time and money on site. Any leakage is retained within the conduit and can be detected. In addition, in a concealed pipe run without any Tee-joints, an accidentally damaged section of pipe can be withdrawn and replaced whilst minimizing structural damage.

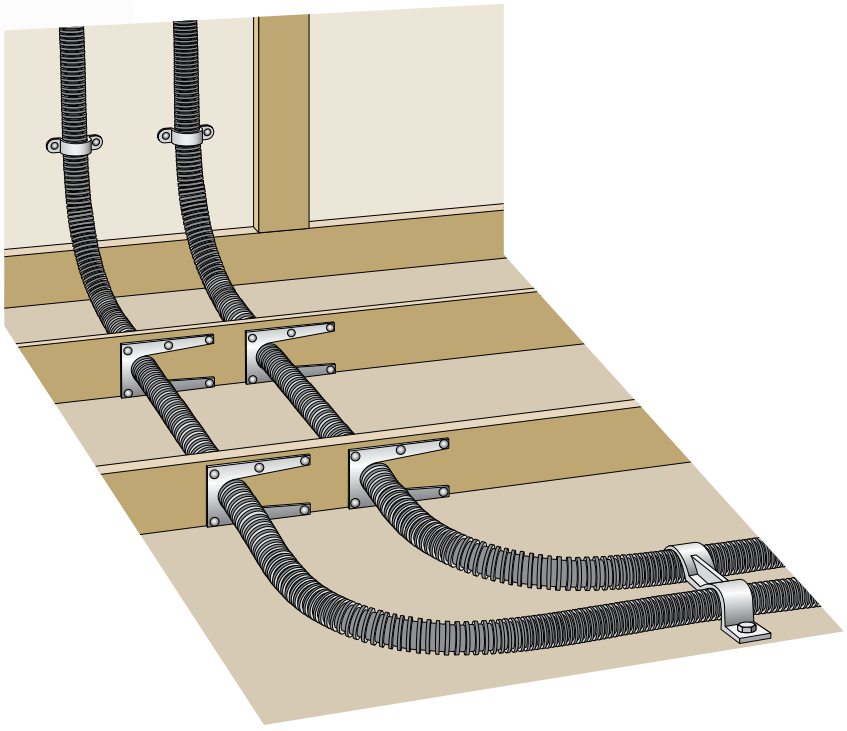
Uponor Pipe-in-Conduit comes in ready-to-install, pre-inserted lengths. However, the conduit may also be installed initially and the pipe inserted at a later stage.

Securing the conduit

Conduits should be properly secured to simplify any subsequent pipe replacement. Uponor Pipe-in - Conduit should be laid with the fewest possible bends and the largest possible bend radii. This will also make it easier to remove the pipe at a later stage if necessary. In concrete structures, conduits should be secured to the reinforcing steel with metal or plastic ties. In a floor screed, conduits should be secured to the surface of the concrete slab with suitably sized plastic clips. In timber constructions, conduits may be secured to timber studs and joists using suitable clips placed at recommended intervals. Fixings must not deform or damage the pipe or the conduit.

Where the pipe bends, the conduit should be supported using a pipe bend support or fixed at either side of the bend using suitable clips.

A conduit run through joist with pipe clips and securing plates.



Radiator Connection Guides

A professional finish to your heating installation

The Uponor Radiator Connection Guides give the plastic pipe installation a tough yet aesthetic finish to above floor connections. With a common appearance to the viewable part of the guides, the two different designs may be used on the same installation (e.g. ground floor screed and first floor joisted) with any colour of flexible plastic pipe.

Universally adaptable

Both of the Uponor Radiator Connection Guides may be used with any flexible plastic piping system of suitable outside diameter and can be installed quickly and easily using standard tool-box equipment. Each pack comes complete with polypropylene riser tube inserts to suit plastic pipe with outside diameter 12mm, 14mm, 15mm and 16mm. The metal riser tube can be cut to suit.

Take full advantage of the benefits of plastic piping systems

By using a plastic piping system such as Uponor's 16mm PEX or 12mm MLCP, the installer saves time by not having to joint the pipework below the floor surface. In fact, when used with manifold plumbing, the only two joints to be made are one at the radiator and one at the manifold. Plastic pipe in conjunction with conduit sleeving (pipe-in conduit system) offers the installer a quick and simple installation but also offers the end user the security of a fully extractable pipe, should there be a requirement for repair or replacement.

Additional benefits

By utilising the flexibility of the plastic pipe and the support of the Uponor Solid Floor Guide (1002237), 90° elbows may be avoided. This provides an increased efficiency in water flow due to reduced frictional resistance, which in turn benefits the end user by extending the life of the circulating pump. The reduction in water velocity can result in a generally quieter system.

Chromed Guides

When installers would prefer to have a chrome finish above the floor (e.g for towel rails) then they may wish to use the Uponor Chrome Upstand Pipe packs. These packs are available in pairs and contain chromed versions of the base cone, gaiter and pipe (either 250mm long or 750mm long) for use with either the radiator connection guides for joisted floors or for solid floors. Both are suitable for use with plastic pipe in dimensions 12mm, 14mm, 15mm or 16mm.

1002240 (250mm)
1002239 (750mm)

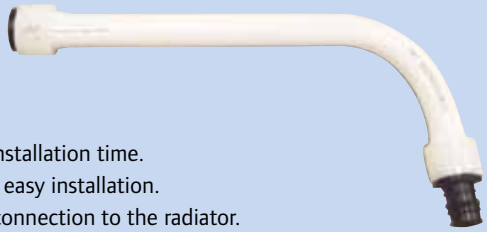
1002238 (250mm)

1002237 (250mm)

Radiator Connection Elbow

Uponor has developed the Q&E radiator connection elbow for easy first fix installation of radiator systems. The Q&E radiator connection elbow is made from Uponor eval PEX Q&E pipe and has a plug on one end to facilitate pressure testing.

1042320



Advantages:

- Safety.
- Saves installation time.
- Simple, easy installation.
- Direct connection to the radiator.

Installation Instructions

1. Connect to feed pipe and conduct system pressure test

2. After test, align with radiator valve and cut back to suit

3. Fit compression adaptor to pipe and connect to valve

4. Completed connection

Making Q&E Connections with Milwaukee Q&E Expansion Tools

Important! When making a Q&E connection, be sure to follow the guidelines for the tool you are using in your application.

1. Square cut the PEX pipe perpendicular to the length of the pipe. Remove all excess material or burrs that might affect the fitting connection.
2. Slide the Q&E Ring over the end of the pipe until it reaches the stop edge.
3. Milwaukee Q&E Expansion Tools come with built-in auto rotation. If using a Milwaukee expansion head, simply hold the pipe and tool in place while holding the trigger to expand the pipe. The head will automatically rotate to ensure the pipe is evenly expanded.
4. Continue expanding until the pipe and ring are snug against the shoulder on the expander head. See table below for the recommended number of expansions for each pipe size.

Pipe	Expansions
16x1.8mm	5
20x1.9mm	7
25x2.3mm	10

Making Q&E Connections with the Q&E Hand Expander Tool

1. Square cut the PEX pipe perpendicular to the length of the pipe. Remove all excess material or burrs that might affect the fitting connection.
2. Slide the Q&E Ring over the end of the pipe until it reaches the stop edge.
3. When using the Hand Expander Tool, brace the free handle of the tool against your hip, or place one hand on each handle. Fully separate the handles and slide the expander head into the pipe until it stops. Full expansions are necessary to make a proper connection. Simply hold the pipe and tool in place while separating and closing the handles to expand the pipe. The Auto Rotation Adapter will automatically rotate to ensure the pipe is evenly expanded. Continue expanding until the pipe and ring are snug against the shoulder on the expander head. See table on page 25 for the recommended number of expansions for each pipe size.
4. After the final expansion, immediately remove the tool and insert the fitting. Ensure the pipe and ring seat against the shoulder of the fitting.

Important! You should feel some resistance as the fitting goes into the pipe. If you do not feel any resistance, the pipe may be over expanded and will require additional time to shrink over the fitting.

Troubleshooting Q&E Connections

Trouble-free Q&E installations begin with a tool that is maintained in proper working condition. If the tool or segment fingers are damaged, it is very difficult to make a proper connection. Refer to the following guidelines to assist with challenges in the field.

Fittings Won't Seal

- Make sure the expander head is securely tightened onto the tool.
- Ensure the segment fingers are not bent. If the head does not completely close when the drive unit is fully retracted or the handles of the manual tool are open, replace the head.
- Examine the tool for excess grease on the segment fingers. Remove excess grease prior to making connections.
- Check the fitting for damage. Nicks and gouges will cause the fitting to leak.
- Make sure the internal driver cone is not damaged or bent.
- Make sure the last expansion is not held in the expanded position before the fitting is inserted. You should feel some resistance as the fitting goes into the pipe. If you do not feel any resistance, the pipe may be over expanded and will require additional time to shrink over the fitting.

Expansion is Difficult

- Make sure the internal cone is properly greased.

Expansion Head Slips Out of pipe When Making Expansions

- Ensure the pipe and Q&E Ring are dry.
- Make sure that grease is not getting into the pipe.
- Examine the segment fingers to ensure they are not damaged or bent.

More Than the Recommended Number of Expansions are Needed to Make a Connection

- Ensure the head is hand-tightened to the expander tool.
- Examine the segment fingers for damage.
- Be sure to completely cycle the tool on each expansion (i.e., close the manual tool handle or release the trigger).

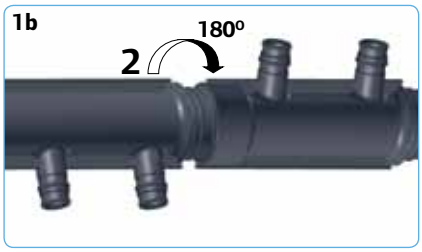
Cold-weather Expansions

- Temperatures affect the time required for the pipe and ring to shrink onto the fitting. The colder the temperature, the slower the contraction time.
- Warming the fittings and rings reduces contraction time. Put fittings and rings in your pockets prior to installation to keep them warm.
- Make Q&E connections at temperatures above -15°C.

PPSU modular manifold components

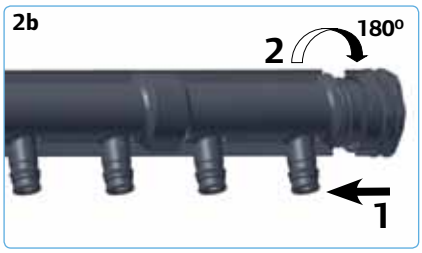
Manifold Installation Instructions

Align and push together

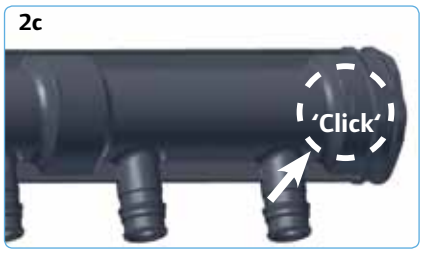


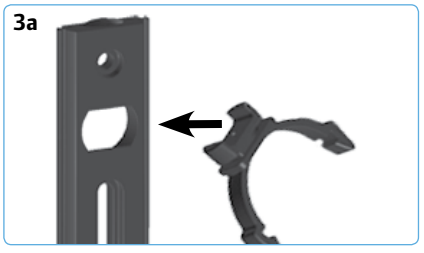
Twist 180°

Choose end cap and threaded adaptor

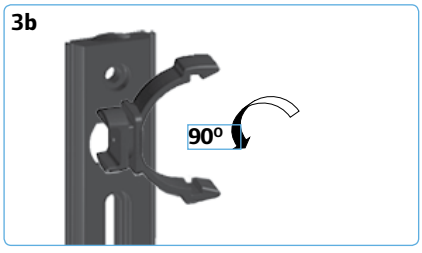


Push together and twist

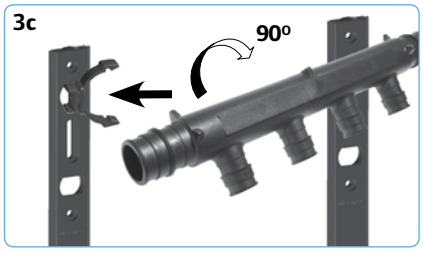




Inset clip into bracket



Twist 90°



Position manifold in clips and twist 90°

Contact us on 01923 927000

enquiries.uk@uponor.com

Examples of modular arrangements

Q&E System Product Range

Uponor Q&E PEX Pipe & Rings

Description	Order Code	Pack Qty

PEX Pipe white, supplied in 3m straight lengths

Diffusion-resistant PEX pipes, five-layer (PEX – adhesive agent – oxygen barrier – adhesive agent – PEX), for general plumbing and radiator connection applications. Manufactured to ISO 15875 for hot and cold water and heating applications with full WRAS approval.

16x1.8mm	**1058803**	75m
20x1.9mm	**1058804**	48m
25x2.3mm	**1058805**	30m

PEX Pipe white, supplied in coils

Diffusion-resistant PEX pipes, five-layer (PEX – adhesive agent – oxygen barrier – adhesive agent – PEX), for general plumbing and radiator connection applications. Manufactured to ISO 15875 for hot and cold water and heating applications with full WRAS approval.

16x1.8mm	**1059173**	50m
16x1.8mm	**1059182**	100m
16x1.8mm	**1059183**	200m
16x1.8mm	**1058802**	500m
20x1.9mm	**1059174**	50m
25x2.3mm	**1059175**	50m

PEX Pipe-in-Pipe

Uponor pipe-in-pipe system is designed to be integrated into the building structure and to be covered by screeds. Pipe can be withdrawn without damage to the building structure. Uponor pipe-in-pipe complies with the requirements of the Water Regulations 1999.

16mm - Red	**1059179**	50m
16mm - Blue	**1059176**	50m
20mm - Red	**1059180**	50m
20mm - Blue	**1059177**	50m
25mm - Red	**1059181**	50m
25mm - Blue	**1059178**	50m

PEX conduit

Made of high-density polyethylene. Supplied in coils. Details and prices of a wide range of other sizes of conduit are available on request. First number shown in description refers to O.D. of the protective tube. The second is the size of PEX pipe suitable. N.B. Does not include PEX Pipe.

25 Black (16mm)	**1012860**	50m
34 Black (20mm)	**1012864**	50m
42 Black (25mm)	**1012872**	25m

Uponor Q&E PEX rings

Must be used on all Uponor Q&E PEX plumbing system joints.

16mm Blue	**1042386**	20
16mm Red	**1042387**	20
20mm Blue	**1042834**	20
20mm Red	**1042835**	20
25mm Blue	**1042838**	20
25mm Red	**1042839**	20

All fittings are supplied without Uponor Q&E PEX Rings which must be ordered separately.

Uponor Q&E Plastic Fittings

Description	Order Code	Pack Qty

Coupling

Made from Engineered Plastic (PPSU). Uponor PEX plumbing system on both ends.

16mm	**1008669**	5
20mm	**1008932**	5
25mm	**1008671**	5

Elbow 90°

Made from Engineered Plastic (PPSU). Uponor PEX plumbing system on both ends.

16mm	**1008679**	5
20mm	**1008680**	5
25mm	**1008681**	5

Equal Tee

Made from Engineered Plastic (PPSU). Uponor PEX plumbing system on all ends.

16mm	**1008684**	5
20mm	**1008685**	5
25mm	**1008686**	5

Tee with reducer

Made from Engineered Plastic (PPSU). Uponor PEX plumbing system on all ends.

A B C		
16x20x16mm	**1008710**	5
20x16x16mm	**1008700**	5
20x16x20mm	**1008689**	5
20x20x16mm	**1008697**	5
20x25x20mm	**1008711**	5
25x16x16mm	**1008702**	5
25x16x20mm	**1008699**	5
25x16x25mm	**1008690**	5
25x20x16mm	**1008701**	5
25x20x20mm	**1008703**	5
25x20x25mm	**1008691**	5
25x25x20mm	**1001420**	5

Female centre tee

Made from Engineered Plastic (PPSU).

A B C		
16x½"x16mm	**1042338**	5
20x½"x20mm	**1042339**	5
25x½"x25mm	**1042340**	5
25x¾"x25mm	**1042341**	5

Male thread adaptor

Uponor PEX plumbing system on one end. With BSP male-threaded adaptor for screw connections.

16x½" MT	**1008661**	5
20x½" MT	**1008662**	5
20x¾" MT	**1008663**	5
25x¾" MT	**1008664**	5
25x1" MT	**1008665**	5

Uponor Q&E Plastic Fittings & Manifolds

Female thread adaptor

Uponor PEX plumbing system on one end. With BSP female-threaded adaptor for screw connections.

Description	Order Code	Pack Qty
16x½″ FT	**1042329**	5
20x½″ FT	**1042330**	5
20x¾″ FT	**1042331**	5
25x¾″ FT	**1042332**	5
25x1″ FT	**1042333**	5

Tap connector straight

Uponor PEX plumbing system on one end. With BSP female-threaded adaptor for screw connections. Washer included.

Description	Order Code	Pack Qty
16x½″ FT	**1038021**	1
20x½″ FT	**1038022**	1
20x¾″ FT	**1038023**	1
25x¾″ FT	**1038024**	1
25x1″ FT	**1038025**	1

Wall plate elbow

Uponor PEX plumbing system on one end. With BSP female-threaded adaptor for screw connections.

Description	Order Code	Pack Qty
16x½″	**1042342**	5
20x½″	**1042343**	5

Reducer

Uponor PEX plumbing system on both ends.

Description	Order Code	Pack Qty
20x16mm	**1008674**	5
25x16mm	**1008675**	5
25x20mm	**1008676**	5

Elbow 90º with female thread

Uponor PEX plumbing system on one end. With BSP female-threaded adaptor for screw connections.

Description	Order Code	Pack Qty
16x½″ FT	**1042334**	5
20x½″ FT	**1042335**	5
20x¾″ FT	**1042336**	5
25x¾″ FT	**1042337**	5

Tap connector elbow 90deg

Uponor PEX plumbing system on one end. With BSP female-threaded adaptor for screw connections. Washer included.

Description	Order Code	Pack Qty
16x½″ FT	**1038037**	1
20x½″ FT	**1038038**	1
20x¾″ FT	**1038039**	1
25x¾″ FT	**1038040**	1

Manifold PEX (PPSU), BSP inlet

Supplied as a single manifold. Made from Engineered Plastic (PPSU). Use with Uponor Q&E PEX rings

Description	Order Code	Pack Qty
¾″x16x16x16mm	**1008714**	1
¾″x20x16x16mm	**1008716**	1
¾″x16x16x16x16mm	**1008715**	1
¾″x20x16x16x16mm	**1008717**	1

Manifold PEX (PPSU), Q&E inlet

Supplied as a single manifold. Made from Engineered Plastic (PPSU). Use with Uponor Q&E PEX rings

Description	Order Code	Pack Qty
25/20x16x16mm	**1008720**	1
25/20x16x16x16mm	**1008721**	1
25/16x16x16mm	**1008718**	1
25/16x16x16x16mm	**1008719**	1

Manifold H PEX (PPSU), Q&E inlet

Supplied as a single manifold. Made from Engineered Plastic (PPSU). Use with Uponor Q&E PEX rings

Description	Order Code	Pack Qty
20/20x16x16mm	**1008722**	1
20/20x16x16x16mm	**1008723**	1
25/20x16x16mm	**1008724**	1
25/20x16x16x16mm	**1008725**	1

Manifold PEX brackets

For use with Manifold PEX. Not suitable for use with modular manifolds.

Description	Order Code	Pack Qty
¾″	**1001338**	2

Modular manifold c/c 50

Made from Engineered Plastic (PPSU), c/w BSP outlets

Description	Order Code	Pack Qty
1xG½″	**1047997**	1
1xG¾″	**1047998**	1

Modular manifold Q&E c/c 50

Made from Engineered Plastic (PPSU) c/w with Uponor Q&E outlets

Description	Order Code	Pack Qty
2x16	**1047999**	1
3x16	**1048000**	1
4x16	**1048001**	1

Q&E System Product Range

Uponor Q&E PEX Manifolds & Fittings

Description	Order Code	Pack Qty

Modular straight connection

Made from Engineered Plastic (PPSU). For straight adaption from Modular manifold, BSP thread.

¾″	**1048002**	1

Modular elbow connection

Made from Engineered Plastic (PPSU). For 90 degree adaption from Modular manifold, BSP thread.

¾″	**1048003**	1

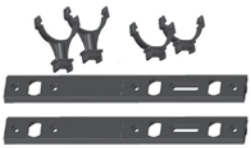
Modular end cap

1″	**1048004**	1

Modular end cap c/w air nipple

1″	**1048005**	1

Modular manifold wall bracket



Bag includes two wall brackets, two long - and two short clips.

1″	**1048007**	1

Blanking plug

For sealing off Uponor 1/2″ outlets during pressure testing

½″ MT	**1008281**	25

Copper adaptor

To adapt to Uponor Q&E PEX pipe from copper. Allow to cool before making Q&E joint.

16x15mm	**1023040**	5
20x22mm	**1047941**	5
25x22mm	**1023042**	5
25x28mm	**1047942**	5

Uponor Q&E PEX Radiator Terminations & Accessories

Description	Order Code	Pack Qty

Compression adaptors (PEX Pipe)

Brass compression fitting to be used in conjunction with standard 15mm compression fitting bodies. Compatibility of threads must be checked.

16x½″ FT	**1058934**	1
20x½″ FT	**1058935**	1

Manifold adaptors (PEX Pipe)

Made of plated brass. For use with Manifold L/P.

16x½″ FT	**1059510**	1
20x½″ FT	**1059511**	1

Eurocone compression adaptors (PEX Pipe)

Made of plated brass ¾″FT Eurocone thread for connection to ¾″MT outlets of NV/LS/TM Manifolds.

16x¾″FT	**1057368**	1
20x¾″FT	**1057370**	1

Radiator connection pipe c/w stop end

For easy first fix installation of radiators. After pressure testing, cut off stop end, then make connection

16x200mm	**1042320**	5

Radiator connection elbow

Uponor PEX plumbing system on one end. Plated brass elbow with 15mm plated brass spigot for connecting Uponor PEX plumbing system to radiators.

16x300mm	**1023045**	2

Single bend guide plastic

Used to curve and protect Uponor PEX 16mm pipe-in-pipe up out of the floor leaving only the Uponor PEX 16mm pipe exposed through the floor. Protects the pipe below floor level. Price refers to single bend guide.

	1009008	1

Snap ring

Clip-on snap ring made of Polypropylene, available in white only.

15/16mm	**1011370**	50

Contact us on 01923 927000

enquiries.uk@uponor.com

Uponor Q&E PEX Accessories

Pipe clips

Pipe clips made of white plastic.

Description	Order Code	Pack Qty
12mm	**1013141**	100
15/16mm	**1013142**	100
20mm	**1013144**	50
22/25mm	**1013145**	50
28/32mm	**1013146**	50
40mm	**1013147**	25

Single plugged hook

For the fast attachment of pipes with outer diameter of up to 32mm. Suitable for use on concrete floor.

60mm	**1013137**	50
80mm	**1013138**	50

Twin plugged hook

For the fast attachment of pipes with outer diameter of up to 32mm. Suitable for use on concrete floor.

60mm	**1013139**	50
80mm	**1013140**	50

Radiator connection guide (solid floor)

Robust bend support and white powder coated aluminium upstand to protect pipe between floor and radiator. Price refers to a pack of two guides.

12/16mm	**1002237**	1

Radiator connection guide (joisted floor)

Robust white powder coated aluminium upstand to protect pipe between floor and radiator. Price refers to a pack of two guides.

12/16mm	**1002238**	1

Chromed Upstand Pipe Pack (750mm)

Chrome upstand to protect pipe between floor and radiator. For use with both pipe-in-pipe and pipe without conduit. Pack of two upstands.

12/16mm	**1002239**	1

Chromed Upstand Pipe Pack (250mm)

Chrome upstand to protect pipe between floor and radiator. For use with both pipe-in-pipe and pipe without conduit. Pack of two upstands.

12/16mm	**1002240**	1

PEX Pipe bend supports

These should be used for all pipe and pipe-in-pipe bends. Use the correct bend support to match the outer diameter of the pipe or of the conduit.

Description	Order Code	Pack Qty
Metal		
15mm/16mm	**1009004**	1
20mm	**1009233**	1
25mm	**1009006**	1
28-34mm	**1001231**	1
Plastic		
15mm/16mm	**1002038**	1
20mm	**1002039**	1
25mm	**1002040**	1

Conduit pipe clip

For nailing conduit in position.

25mm	**1009014**	50
34mm	**1009015**	20

Uponor PEX insert spares

For use with Uponor PEX plumbing in old sizes 15x1.5, 22x2.0, 28x2.6mm. Allows modification and repairs in conjunction with standard compression fitting.

15mm	**1002034**	1
22mm	**1002035**	1
28mm	**1002036**	1

Milwaukee expander tool set

Includes 1x 230V, 50Hz fast battery charger, 2x 14.4V /1.5Ah Li-ion Batteries, 1x 100g tube of Molykote tool lubricant, 1x operation manual, 1x lightweight plastic case. Expander heads included.

M12 Expander tool	**1057166**	1

Uponor PEX hand tool set and heads

Complete tool set in a box. Includes all 3 expander heads and instructions.

3 Heads (16, 20, 25mm)	**1004000**	1

Autorotation head

Used in conjunction with item 1004000

	1038188	1

Codes of Practice

The following Standards apply in the design and installation of plastic pipes for heating and hot/cold water applications:

BS EN 12828:2003
Heating systems in buildings. Design for water-based heating systems.

BS EN 12831:2003
Heating systems in buildings. Method for calculation of the design heat load.

BS 6700:2006
Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages - Specification.

Note: BS 6700 is to be withdrawn and replaced by a new British Standard BS EN 806 parts 1-5, which is currently under development, as is BS 8558, which will be a supplement and guide to BS EN 806.

BS 5449:1990
(withdrawn & replaced by BS EN 12828, but included for reference)
Specification for forced circulation hot water central heating systems for domestic premises.

BS 5955-8:2001
Plastics pipework (thermoplastics materials).
Specification for the installation of thermoplastics pipes and associated fittings for use in domestic hot and cold services and heating systems in buildings.

BS 8000-15:1990
Workmanship on building sites. Code of practice for hot and cold water services (domestic scale).

PAS 33:1999
Specification for the design, installation and commissioning of gas fired central heating systems in domestic premises.

Water Industry Act 1991
Water Supply (Water Fittings) Regulations 1999.

The Building Regulations 2010
(including approved documents G and L).

M12
Uponor Quick&Easy
Cordless Expander.

Quick Cam mechanism: Single pull, continuous action installs Q&E up to 4X faster.

Compatibility: with Uponor standard heads.

Steel gears and integrated metal frame: Jobsite and impact durability.

Right-angle design: Easily install Uponor Q&E fittings in confined locations.

Built-in battery fuel gauge: Displays remaining run-time.

LED light: Easily see and install in dark areas.

Compatibility: M12 Compact LITHIUM-ION Batteries work with more than 20 other Milwaukee M12 tools.

CHARACTERISTICS

Speed	**< 10 seg.** Complete expansion.
Weight	**< 2,2 kg.** Including head and battery.
Size	**< 18 cm.**
Capacity	**16 - 25mm OD.** 6 bar pipes.
	16 - 25ø. 10 bar pipes.
Battery Charge	**30 min.**

Quicker connections

Compact design

ACCESSORIES

Battery	**Li-Ion 1.5 Ah.**
	No memory effect & more run time.
Charger	**220/240v / 50-60 Hz.**

BATTERY RUN TIME

Diameter	Estimate Joints 6 bar
16	139
20	84
25	42

Uponor Limited ("Uponor") guarantees [to the original purchaser/customer] that pipes and fittings sold by it are free of defects in materials or manufacture under normal conditions of use for a period of 25 years and in case of electrical and mechanical products for 1 year from the date of installation. This guarantee only applies to the products stored, installed, tested and operated in accordance with the fitting instructions issued by Uponor and valid at the time the products were installed.

Where a claim is made during the guarantee period and products are proven to be defective in materials and/or manufacture at the time of delivery, Uponor will supply replacement products free of charge. This is the exclusive remedy under this guarantee.

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Uponor reserves the right to alter specifications and operating parameters for all their Underfloor Heating and Plumbing & Heating Systems at any time as part of its policy of continuous product development.

Care has been taken to ensure that the information in this publication is correct at the time of going to press.

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