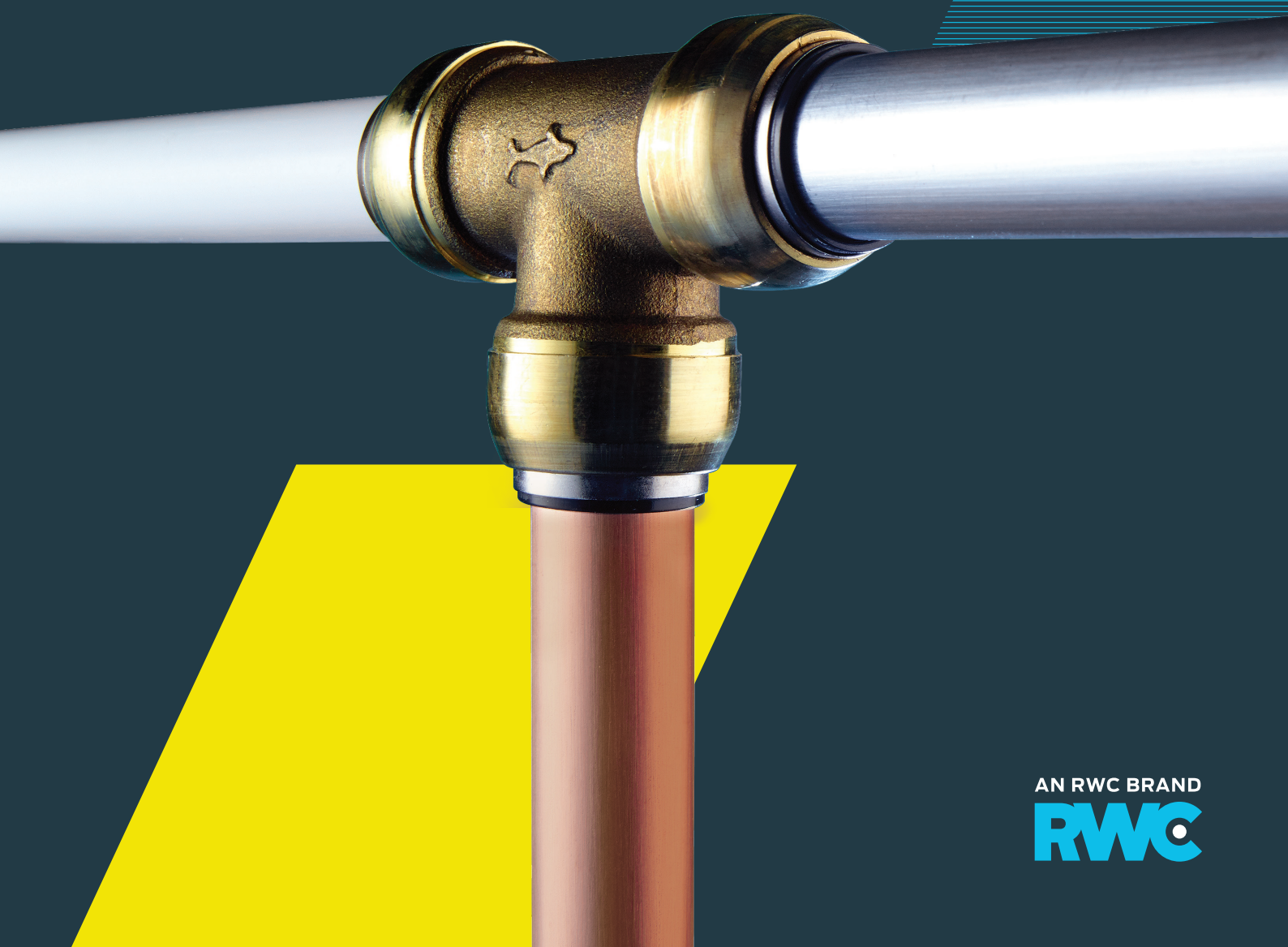


Brass push-fit for plumbing & heating

Technical Information



AN RWC BRAND

RWC

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How to make a connection

3 simple steps



STEP 1: CUT & DEBURR

Cut the pipe square and deburr



STEP 2: MARK

Mark insertion depth using the depth marker on the demount clip or using a tape measure. If using chromed copper, the pipe must first be marked and scored using the pipe scribing tool



STEP 3: PUSH & TWIST

Push pipe into fitting up to the depth mark with a small twist - DONE

Easy removal



DISCONNECTING CLIPS

Demount (10 to 28mm), by using the disconnecting clip (snap clip onto pipe, push against the release collar & pull pipe at the same time)



DISCONNECTING TONGS

Demount (10 to 28mm), by using disconnecting tongs (push tongs over pipe, squeeze tongs together and pull pipe at same time, using the thumb as a lever)



SHARKSHIFTERS

Demount (35 to 54mm), using the SharkShifter (Slide SharkShifter over pipe, locate on fitting lugs, rotate and remove tube)

Specification information

SharkBite is ideal for both domestic and commercial applications including:

- Potable water applications
- Vented and unvented hot water systems
- Hot and cold water services
- Heating and chilled water applications
- Pressurised, vented and sealed central heating systems



Approvals

The SharkBite range has been designed to exceed all approval requirements and has been certified by the following approval bodies:



BS 7291
PEX Pipe only.

Multiple pipes one solution

The SharkBite fitting and valves range has been designed to provide a single solution for all commonly available pipes for domestic and commercial applications. It has been rigorously tested and approved with the following pipes:



COPPER

SharkBite fittings and valves will connect compatibly sized Copper pipes that are manufactured in accordance with BS EN 1057 in sizes from 10mm to 54mm. If 10mm annealed Copper pipe is being used, it must be re-calibrated in accordance with table 4 R250 tolerances in the above standard and a Copper liner installed into the pipe prior to assembly.



CHROMED COPPER

SharkBite fittings and valves will connect compatibly sized Chrome Plated Copper pipes that are manufactured in accordance with BS EN 1057 and chrome plated to BS EN 1456:2009. The pipe must be scored using the SharkBite scribing tool (SB3415) prior to fittings being installed.



SHARKBITE PEX PIPE



SharkBite cross linked Polyethylene (PEX) is manufactured to BS 7291 part 3 and can be joined with SharkBite fittings and pipe liners for every connection. Available in 3 sizes, 15mm, 22mm and 28mm, in 3m straight lengths or 25m/50m coils. Alternatively, SharkBite fittings, valves and accessories can be used with other brands of PEX pipe and liners, provided they comply with BS 7291 part 3.



CARBON STEEL PIPE

SharkBite fittings will join Carbon Steel pipe manufactured to EN 10305-2, in sizes, 15mm up to 54mm.



POLYBUTYLENE

SharkBite fittings will join Polybutylene (PB) pipe manufactured to BS 7291: Part 2 when utilising the specific manufacturers' liner for every size and connection.

SharkBite design

The SharkBite logo represents genuine, high quality plumbing fittings that redefine the meaning of high performance and efficiency in the plumbing industry.

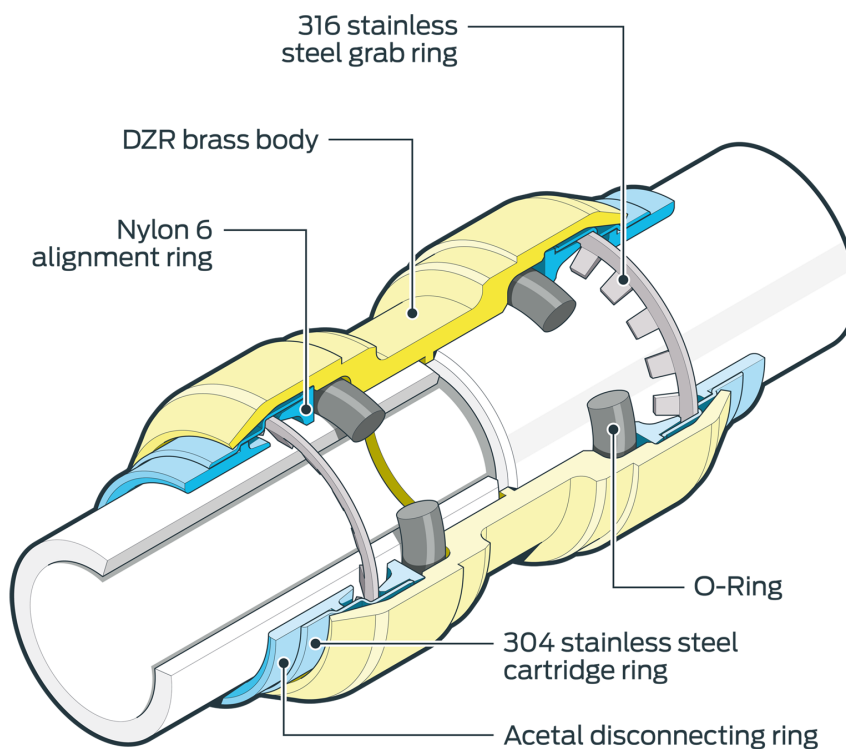
SharkBite fittings provide a fast, secure and heat-free pipework connection solution that will reduce installation times and the requirement to return to an installation in the future. Their slim-line design provides an aesthetically pleasing appearance when surface mounted. It also makes the fittings ideal for installation in tight spaces and easier to insulate, if required.

The fitting bodies are manufactured from robust ultra low lead DZR brass. The toothed grab ring is manufactured from 316 Stainless Steel which provides the firm bite that ensures the strongest of joints is made. The cartridge ring is manufactured from 304 stainless steel to provide guaranteed electrical continuity. The O-Ring provides a long lasting and watertight seal.

SharkBite Chrome Plated Fittings are electroplated prior to the O-Ring being inserted which ensure the body is free from any harmful residual chemicals.

15mm - 28mm are rated to 10 bar at 120°C, WRAS approved and certified by many other international approval bodies.

All fittings bodies are also date marked to ensure fully traceability.



SharkBite specification

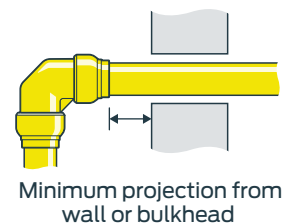
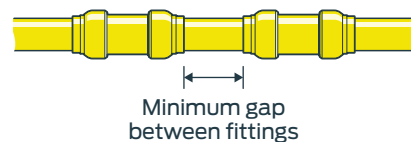
A WRAS approved range of 10-54mm DZR Brass Push-fit plumbing fittings, valves, flexible's and pipe, with a stainless steel cartridge ring, compatible with Copper, Chromed Copper, PEX, Carbon Steel and Polybutylene pipe. De-mountable and instantly re-useable, providing electrical continuity for metallic installations and compact to assist in system lagging. Date marking on the actual fitting to ensure full traceability.

System design

Minimum distances

To facilitate the disconnection of SharkBite fittings, it is essential that sufficient space is allowed between the fitting and wall or bulkhead to allow demounting.

Fitting size	Minimum gap	Minimum projection
10mm	15mm	40mm
15mm	15mm	45mm
22mm	15mm	50mm
28mm	15mm	55mm
35mm	40mm	100mm
42mm	40mm	100mm
54mm	40mm	110mm



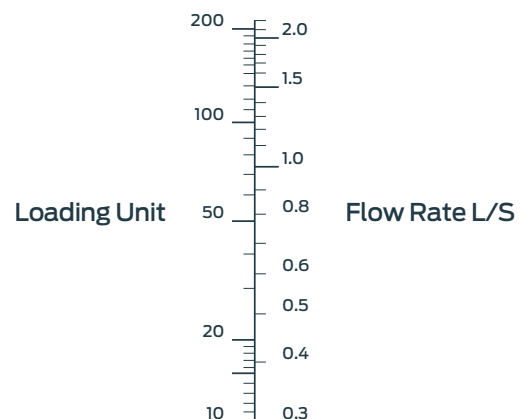
Loading units

When designing an installation, system demand, pipe sizes and flow rates need to be considered and calculated.

Demand is calculated by considering the flow rate of the appliance, the frequency and length of time used. Examples of loading units are shown in the table below. The total loading units can then be converted into demand in litres per second.

Appliance	Loading Units
Toilet Cistern	2
Wash Basin ½" – DN15	1.5-3
Bath Taps ¾" – DN20	10
Bath Tap 1" – DN25	20
Shower	3
Sink Tap ½" – DN15	3
Sink Tap ¾" – DN20	5
Washing Machine ½" – DN15	3

Conversion Loading Units to Flow Rate



Pressure loss and flow rates

Pressure or head loss at 10°C due to selected pipe diameter and the resistance of the fittings can be calculated in metres per 100 metres from the table below:

Lamont's smooth pipe formula S3
 $v = 0.5545 d^{0.6935} i^{0.5645}$

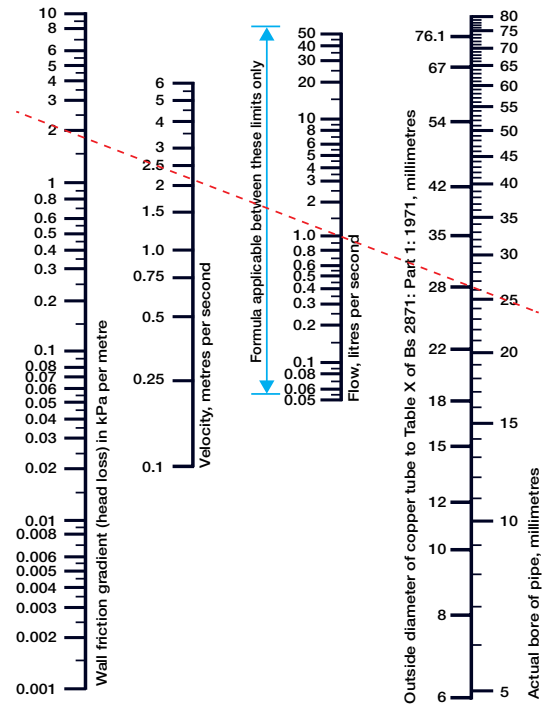
where: v is the velocity (m/s);
 d is the diameter (mm);
 i is the hydraulic gradient

and $R = 10 \left[\frac{v}{0.5545 d^{0.6935}} \right]^{1.7715}$

where: R is the wall friction gradient (kPa)

Example

- Assuming a loading rate of 75 gives a flow rate of 1 litre/second
- Draw a straight line through the selected pipe OD and the flow rate
- Therefore a 28mm OD pipe would provide a water velocity of 2.1m/s and a head loss of 1.8Kpa per metre



Pressure loss at 15.5°C - copper pipe

Pressure drop Pa/m	15mm			22mm			28mm		
	Average Velocity m/s	l/s	kg/hr	Average Velocity m/s	l/s	kg/hr	Average Velocity m/s	l/s	kg/hr
100	0.248	0.0330	118.52	0.341	0.1071	385.33	0.408	0.2000	719.56
120	0.274	0.0363	130.58	0.381	0.1196	430.25	0.451	0.2216	797.14
140	0.300	0.0399	143.35	0.414	0.1301	467.82	0.495	0.2428	873.23
160	0.325	0.0431	155.16	0.449	0.1410	507.09	0.533	0.2618	941.65
180	0.349	0.0463	166.50	0.479	0.1506	541.56	0.571	0.2803	1,008.39
200	0.372	0.0493	177.37	0.510	0.1602	576.31	0.609	0.2990	1,075.31
220	0.391	0.0519	186.67	0.540	0.1696	609.92	0.641	0.3149	1,132.52
240	0.412	0.0547	196.58	0.568	0.1783	641.28	0.674	0.3308	1,189.91
260	0.433	0.0574	206.61	0.593	0.1863	670.10	0.707	0.3468	1,247.49
280	0.450	0.0598	214.96	0.619	0.1944	699.19	0.738	0.3623	1,303.20
300	0.470	0.0624	224.51	0.645	0.2025	728.29	0.767	0.3767	1,354.99
350	0.513	0.0681	244.80	0.702	0.2205	793.27	0.841	0.4128	1,484.90
400	0.556	0.0738	265.57	0.759	0.2384	857.68	0.905	0.4442	1,597.83
450	0.594	0.0788	283.35	0.813	0.2553	918.13	0.968	0.4751	1,709.06
500	0.632	0.0839	301.85	0.863	0.2711	975.20	1.028	0.5045	1,814.69
600	0.704	0.0934	335.87	0.957	0.3006	1,081.14	1.140	0.5597	2,013.04
700	0.768	0.1019	366.43	1.046	0.3286	1,181.99	1.244	0.6106	2,196.43
800	0.829	0.1100	395.67	1.128	0.3544	1,274.65	1.342	0.6586	2,368.80

Pressure loss at 65°C - copper pipe

Pressure drop Pa/m	15mm			22mm			28mm		
	Average Velocity			Average Velocity			Average Velocity		
	m/s	l/s	kg/hr	m/s	l/s	kg/hr	m/s	l/s	kg/hr
120	0.319	0.0423	149.25	0.433	0.1361	480.51	0.505	0.2479	875.22
140	0.348	0.0462	162.95	0.474	0.1489	525.71	0.552	0.2708	955.95
160	0.375	0.0498	175.72	0.511	0.1606	567.02	0.595	0.2921	1,031.18
180	0.401	0.0533	188.02	0.547	0.1718	606.39	0.636	0.3124	1,102.74
200	0.427	0.0566	199.85	0.580	0.1822	643.27	0.677	0.3321	1,172.47
220	0.451	0.0599	211.33	0.612	0.1923	679.04	0.714	0.3503	1,236.68
240	0.474	0.0629	222.23	0.643	0.2018	712.59	0.750	0.3680	1,299.07
260	0.495	0.0657	232.07	0.673	0.2114	746.41	0.785	0.3851	1,359.62
280	0.518	0.0687	242.61	0.701	0.2203	777.75	0.818	0.4018	1,418.33
300	0.538	0.0714	251.98	0.730	0.2292	809.08	0.851	0.4179	1,475.21
350	0.585	0.0777	274.24	0.792	0.2488	878.40	0.930	0.4565	1,611.64
400	0.634	0.0841	296.97	0.859	0.2699	952.70	1.002	0.4917	1,735.76
450	0.679	0.0901	317.94	0.918	0.2882	1,017.59	1.070	0.5255	1,855.03
500	0.720	0.0955	337.27	0.973	0.3057	1,079.14	1.136	0.5577	1,968.79
600	0.799	0.1060	374.17	1.079	0.3391	1,196.98	1.259	0.6180	2,181.63
700	0.873	0.1158	408.84	1.176	0.3695	1,304.28	1.373	0.6741	2,379.79
800	0.941	0.1249	441.06	1.268	0.3984	1,406.32	1.480	0.7266	2,565.11

Pressure loss at 110°C - copper pipe

Pressure drop Pa/m	15mm			22mm			28mm		
	Average Velocity			Average Velocity			Average Velocity		
	m/s	l/s	kg/hr	m/s	l/s	kg/hr	m/s	l/s	kg/hr
120	0.355	0.0472	160.71	0.480	0.1509	514.21	0.554	0.2718	926.42
140	0.387	0.0514	175.07	0.523	0.1643	559.98	0.604	0.2963	1,009.67
160	0.420	0.0557	189.77	0.563	0.1768	602.54	0.651	0.3196	1,089.38
180	0.448	0.0595	202.78	0.603	0.1895	645.91	0.696	0.3415	1,163.78
200	0.473	0.0628	214.09	0.639	0.2007	684.18	0.738	0.3623	1,234.64
220	0.500	0.0664	226.19	0.674	0.2117	721.39	0.779	0.3825	1,303.72
240	0.526	0.0698	237.84	0.709	0.2228	759.40	0.818	0.4018	1,369.26
260	0.552	0.0733	249.82	0.742	0.2331	794.47	0.856	0.4199	1,431.26
280	0.574	0.0762	259.78	0.773	0.2428	827.39	0.892	0.4376	1,491.48
300	0.597	0.0792	270.07	0.804	0.2524	860.32	0.928	0.4553	1,551.71
350	0.647	0.0858	292.57	0.868	0.2728	929.64	1.010	0.4958	1,689.72
400	0.703	0.0933	318.02	0.943	0.2961	1,009.14	1.090	0.5348	1,822.73
450	0.750	0.0995	339.17	1.009	0.3169	1,080.08	1.164	0.5712	1,946.72
500	0.796	0.1057	360.20	1.069	0.3359	1,144.86	1.235	0.6060	2,065.40
600	0.883	0.1171	399.22	1.183	0.3715	1,266.12	1.367	0.6710	2,286.82
700	0.961	0.1276	434.73	1.292	0.4060	1,383.63	1.491	0.7318	2,494.07
800	1.037	0.1377	469.23	1.392	0.4372	1,489.89	1.606	0.7884	2,687.15

Working pressures and temperatures

Fittings

Size	Pipe	Pressure/Temperature			
10mm	PEX or PB	12 bar / -20°C	12 bar / 20°C	6 bar / 65°C	6 bar / 95°C
	Copper	16 bar / -24°C	16 bar / 30°C	10 bar / 65°C	6 bar / 95°C
15mm	PEX or PB	12 bar / -20°C	12 bar / 20°C	6 bar / 65°C	6 bar / 95°C
	Copper/Chromed Copper	20 bar / -24°C	20 bar / 30°C	16 bar / 65°C	10 bar / 120°C
22mm	PEX or PB	12 bar / -20°C	12 bar / 20°C	6 bar / 65°C	6 bar / 95°C
	Copper/Carbon Steel	20 bar / -24°C	20 bar / 30°C	16 bar / 65°C	10 bar / 120°C
28mm	PEX or PB	12 bar / -20°C	12 bar / 20°C	6 bar / 65°C	6 bar / 95°C
	Copper/Carbon Steel	20 bar / -24°C	20 bar / 30°C	16 bar / 65°C	10 bar / 120°C
35mm	Copper/PEX/Carbon Steel	16 bar / -24°C	16 bar / 30°C	10 bar / 65°C	6 bar / 95°C
42mm	Copper/PEX/Carbon Steel	16 bar / -24°C	16 bar / 30°C	10 bar / 65°C	6 bar / 95°C
54mm	Copper/PEX/Carbon Steel	16 bar / -24°C	16 bar / 30°C	10 bar / 65°C	6 bar / 95°C

Flexible connectors

Size	Pressure/Temperature			
15mm	16 bar / -20°C	16 bar / 30°C	10 bar / 65°C	10 bar / 90°C
22mm	16 bar / -10°C	16 bar / 30°C	10 bar / 65°C	10 bar / 90°C

Service valves

Size	Pressure/Temperature			
15-22mm	16 bar / -15°C	16 bar / 30°C	10 bar / 65°C	10 bar / 85°C

Quarter turn ball valves

Size	Pressure/Temperature			
15-54mm	16 bar / -15°C	16 bar / 30°C	10 bar / 65°C	10 bar / 85°C

Stop cocks

Size	Pressure/Temperature
15-22mm	10 bar

Check valves

Size	Pressure/Temperature
15mm	10 bar

Washing machine valves

Size	Pressure/Temperature
15mm	10 bar / 90°C

Ausimix™ TMVs

Size	Pressure/Temperature
15-22mm	5 bar / 85°C

Easiset® 320 PRVs (cold)

Size	Pressure/Temperature
15-22mm	16 bar / 45°C

Easiset® 320 PRVs (hot)

Size	Pressure/Temperature
15-22mm	16 bar / 85°C

314 PRVs

Size	Pressure/Temperature
15-22mm	16 bar / 70°C

Tenant® valve

Size	Pressure/Temperature
15-22mm	16 bar / 80°C

Combination PRV/TBV

Size	Pressure/Temperature
15-22mm	0.2-16 bar / 80°C

Thermal balancing valve

Size	Pressure/Temperature
15-22mm	10 bar / 65°C

Heatguard Style TMV

Size	Pressure/Temperature
15mm	10 bar / 85°C

All volumetric flow rates

Thermal expansion tables

Copper pipe

The design of the system must consider thermal expansion. Copper pipes will expand with temperature and long runs may buckle or bend unless compensation is incorporated into the system. This can be prevented by installing Copper bellows or a telescopic expansion device, which will absorb the expansion and contraction. The amount of expansion in a Copper system can be calculated using the formula below:

$$L = \frac{1}{2} \left(\frac{3E}{P} \right)^{1/2} (d_0 e)^{1/2}$$

Where L – Length of expansion loop or offset
 E – Modulus of electricity of Copper, in psi
 P – Design fibre stress of material in flexure, in psi
 do – Outside diameter of pipe, in inches
 e – Amount of expansion to be absorbed, in inches

For annealed copper pipe

E = 17,000,000psi

P = 6,000psi

$$\therefore L = 7.68 (d_0 e)^{1/2}$$

Copper pipe expansion

Temperature	3 Mtrs	4 Mtrs	5 Mtrs	6 Mtrs	7 Mtrs	8 Mtrs	9 Mtrs	10 Mtrs	12 Mtrs	25 Mtrs
10°	0.5mm	0.7mm	0.9mm	1.0mm	1.2mm	1.4mm	1.5mm	1.7mm	2.0mm	4.3mm
20°	1.0mm	1.4mm	1.7mm	2.0mm	2.4mm	2.7mm	3.0mm	3.4mm	4.0mm	8.5mm
30°	1.5mm	2.0mm	2.6mm	3.1mm	3.6mm	4.1mm	4.6mm	5.1mm	6.1mm	13.0mm
40°	2.0mm	2.7mm	3.4mm	4.1mm	4.8mm	5.4mm	6.1mm	6.8mm	8.2mm	17.0mm
50°	2.6mm	3.4mm	4.3mm	5.1mm	6.0mm	6.8mm	7.7mm	8.5mm	10.2mm	21.0mm
60°	3.1mm	4.1mm	5.1mm	6.1mm	7.1mm	8.2mm	9.2mm	10.2mm	12.2mm	26.0mm
70°	3.6mm	4.8mm	6.0mm	7.1mm	8.3mm	9.5mm	10.7mm	11.9mm	14.3mm	30.0mm
80°	4.1mm	5.4mm	6.8mm	8.2mm	9.5mm	10.9mm	12.2mm	13.6mm	16.3mm	34.0mm
90°	4.6mm	6.1mm	7.7mm	9.2mm	10.7mm	12.2mm	13.8mm	15.3mm	18.4mm	38.0mm
100°	5.1mm	6.8mm	8.5mm	10.2mm	11.9mm	13.6mm	15.3mm	17.0mm	20.4mm	43.0mm

PEX pipe expansion

Temperature	3 Mtrs	4 Mtrs	5 Mtrs	6 Mtrs	7 Mtrs	8 Mtrs	9 Mtrs	10 Mtrs	12 Mtrs	25 Mtrs
10°	2.4mm	3.2mm	4.0mm	4.8mm	5.6mm	6.4mm	7.2mm	8.0mm	9.6mm	20.0mm
20°	4.8mm	6.4mm	8.0mm	9.6mm	11.2mm	12.8mm	14.4mm	16.0mm	19.2mm	40.0mm
30°	7.2mm	9.6mm	12.0mm	14.4mm	16.8mm	19.2mm	21.6mm	24.0mm	28.8mm	60.0mm
40°	9.6mm	12.8mm	16.0mm	19.2mm	22.4mm	25.6mm	28.8mm	32.0mm	38.4mm	80.0mm
50°	12.0mm	16.0mm	20.0mm	24.0mm	28.0mm	32.0mm	36.0mm	40.0mm	48.0mm	100.0mm
60°	14.4mm	19.2mm	24.0mm	28.8mm	33.6mm	38.4mm	43.2mm	48.0mm	57.6mm	120.0mm
70°	16.8mm	22.4mm	28.0mm	33.6mm	39.2mm	44.8mm	50.4mm	56.0mm	67.2mm	140.0mm
80°	19.2mm	25.6mm	32.0mm	38.4mm	44.8mm	51.2mm	57.6mm	64.0mm	76.8mm	160.0mm
90°	21.6mm	28.8mm	36.0mm	43.2mm	50.4mm	57.6mm	64.8mm	72.0mm	86.4mm	180.0mm
100°	24.0mm	32.0mm	40.0mm	48.0mm	56.0mm	64.0mm	72.0mm	80.0mm	96.0mm	200.0mm

Expansion and contraction

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

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

Where SharkBite PEX Barrier Pipe is to be surface mounted and used in visible situations for either hot-water supply or central-heating pipework, long straight runs should be avoided since some distortion may occur. Where this is not practicable, pipework should be boxed. Care should be taken at all times to ensure that pipework is laid out to allow for expansion and contraction. Where appropriate, expansion loops may be employed.

Carbon Steel pipe expansion

Temperature	3 Mtrs	4 Mtrs	5 Mtrs	6 Mtrs	7 Mtrs	8 Mtrs	9 Mtrs	10 Mtrs	12 Mtrs	25 Mtrs
10°	0.4mm	0.5mm	0.6mm	0.7mm	0.8mm	1.0mm	1.1mm	1.2mm	1.4mm	3.0mm
20°	0.7mm	1.0mm	1.2mm	1.4mm	1.7mm	1.9mm	2.2mm	2.4mm	2.9mm	6.0mm
30°	1.1mm	1.4mm	1.8mm	2.2mm	2.5mm	2.9mm	3.2mm	3.6mm	4.3mm	9.0mm
40°	1.4mm	1.9mm	2.4mm	2.9mm	3.4mm	3.8mm	4.3mm	4.8mm	5.8mm	12.0mm
50°	1.8mm	2.4mm	3.0mm	3.6mm	4.2mm	4.8mm	5.4mm	6.0mm	7.2mm	15.0mm
60°	2.2mm	2.9mm	3.6mm	4.3mm	5.0mm	5.8mm	6.5mm	7.2mm	8.6mm	18.0mm
70°	2.5mm	3.4mm	4.2mm	5.0mm	5.9mm	6.7mm	7.6mm	8.4mm	10.1mm	21.0mm
80°	2.9mm	3.8mm	4.8mm	5.8mm	6.7mm	7.7mm	8.6mm	9.6mm	11.5mm	24.0mm
90°	3.2mm	4.3mm	5.4mm	6.5mm	7.6mm	8.6mm	9.7mm	10.8mm	13.0mm	27.0mm
100°	3.6mm	4.8mm	6.0mm	7.2mm	8.4mm	9.6mm	10.8mm	12.0mm	14.4mm	30.0mm

Polybutylene pipe expansion

Temperature	3 Mtrs	4 Mtrs	5 Mtrs	6 Mtrs	7 Mtrs	8 Mtrs	9 Mtrs	10 Mtrs	12 Mtrs	25 Mtrs
10°	3.9mm	5.2mm	6.5mm	7.8mm	9.1mm	10.4mm	12.6mm	13.0mm	15.6mm	32.5mm
20°	7.8mm	10.4mm	13.0mm	15.6mm	18.2mm	20.8mm	25.2mm	26.0mm	31.2mm	65.0mm
30°	9.0mm	15.6mm	19.5mm	23.4mm	27.3mm	31.2mm	35.1mm	39.0mm	46.8mm	97.5mm
40°	15.6mm	20.8mm	26.0mm	31.2mm	36.4mm	41.6mm	46.8mm	52.0mm	62.4mm	130.0mm
50°	19.5mm	26.0mm	32.5mm	39.0mm	45.5mm	52.0mm	58.5mm	65.0mm	78.0mm	162.5mm
60°	23.4mm	31.2mm	39.0mm	46.8mm	54.6mm	62.4mm	70.2mm	78.0mm	93.6mm	195.0mm
70°	27.3mm	36.4mm	45.5mm	54.6mm	63.7mm	72.8mm	81.9mm	91.0mm	109.2mm	227.5mm
80°	31.2mm	41.6mm	52.0mm	62.4mm	72.8mm	83.2mm	93.6mm	104.0mm	124.8mm	260.0mm
90°	35.1mm	46.8mm	58.5mm	70.2mm	81.9mm	93.6mm	105.3mm	117.0mm	140.4mm	292.5mm
100°	39.0mm	52.0mm	65.0mm	78.0mm	91.0mm	104.0mm	117.0mm	130.0mm	156.0mm	325.0mm

SharkBite PEX Barrier Pipe

SharkBite PEX Barrier Pipe is a flexible white coloured cross-linked polyethylene plumbing pipe and has been developed, tested and approved for hot and cold water services, central and underfloor heating systems.

Designed to suit BS 7291 Pushfit Fittings and Manifolds with an EVOH Barrier Layer that complies with DIN 4726.

SharkBite PEX Barrier Pipe is rigid enough to minimise sag with pipe runs looking neat, tidy and professional but is also flexible enough to be cabled through awkwardly placed holes under flooring and threaded behind partition walls and through ducts.

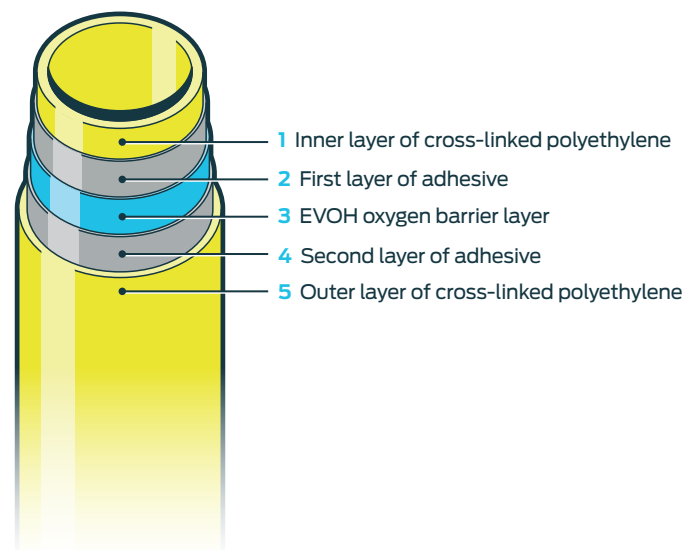
BSI Kitemark approved for use under the service conditions listed in BS 7291: Parts 1 and 3 Class S:- 12 Bar at 20°C - 4 Bar at 82°C - 6 Bar at 95°C and short term overload temperatures up to 114°C.

Approved for use by:

- IAB (Irish Agreement Board)
- WRAS (Water Regulations Advisory Scheme)

SharkBite PEX Barrier Pipe incorporates an EVOH oxygen diffusion barrier layer sandwiched within the wall of the pipe, which protects the layer from physical and UV damage. The EVOH layer renders the pipe virtually impervious to gases.

SharkBite PEX Barrier Pipe Layer Illustration



SharkBite PEX Barrier Pipe application guidelines

Product selection and installation

SharkBite PEX Barrier Pipe is suitable for use in hot and cold water distribution systems, underfloor heating systems and central heating systems that are operated continuously at temperatures up to 95°C at 6 bar pressure. Short-term overload temperatures up to 114°C are permissible. For cold water systems SharkBite PEX Barrier Pipe is suitable for use up to 12 bar pressure. For hot water systems SharkBite PEX Barrier Pipe is suitable for use up to 6 bar pressure.

SharkBite PEX Barrier Pipe (Metric size) can be joined using SharkBite fittings and valves designed for use with 15mm, 22mm and 28mm pipe.

SharkBite PEX Barrier Pipe is a semi-rigid pipe that can be used as a direct replacement for copper in many applications. Although semi-rigid, it can be bent readily without tools.

SharkBite PEX Barrier Pipe toughness and flexibility at low temperatures allows the pipe to be used with little risk of bursting where frost damage might otherwise occur when insulated as recommended in BS 5970:2012.

Specification - material

SharkBite PEX Barrier Pipe is a cross-linked high-density polyethylene.

'Cross-linking' is a widely employed method of forging permanent links between polymer chains to form an interwoven three dimensional lattice within the pipe wall. This greatly reduces the ability of the polymer to 'creep' with time and allows the burst resistance of SharkBite PEX Barrier Pipe to be maintained almost indefinitely at high temperatures. The cross-linking process is irreversible and is not lessened by continuous exposure to hot water.

Dimensions	15mm	22mm	28mm
Outside diameter (mm)	15 ± 0.1	22 ± 0.1	28 ± 0.1
Wall thickness (mm)	1.5 - 1.8	2.00 - 2.30	2.60 - 2.90
Weight / 100 (meters)	6.9 kg	12.9 kg	20.4 kg
Standard lengths	3m & 6m	3m & 6m	-
Standard coils (meters)	25/50	25/50	25/50

Mechanical properties of SharkBite PEX Barrier Pipe

Dimensions	15mm
Tensile Strength (at break)	20 Mpa at 50 mm/min
Elongation at break (minimum)	150%
Impact strength (notched izod)	900 J/m notch
Co-efficient of linear expansion (20°C)	1.5 x 10 ⁻⁴ m/°C
Co-efficient of linear expansion (82°C)	2.8 x 10 ⁻⁴ m/°C

Approvals and testing

SharkBite PEX Barrier Pipe has been tested according to the German Standard DIN 16892 and the British Standard BS 7291, which are the most stringent European standards for cross-linked polyethylene pipe used for central heating, underfloor heating and hot/cold water systems.

- SharkBite PEX Barrier Pipe pipe fully meets the requirements of DIN 16892.
- SharkBite PEX Barrier Pipe is WRAS (Water Regulations Advisory Scheme) approved.
- SharkBite PEX Barrier Pipe (metric size) is BSI Kitemark approved to BS7291 Class S.
- SharkBite PEX Barrier Pipe is approved by the Irish Agreement Board.

Quality control testing

SharkBite PEX Barrier Pipe is manufactured in an ISO 9001 approved facility. SharkBite PEX Barrier Pipe is sampled frequently during normal production and subjected to rigorous tests to establish that it meets specifications for mechanical strength at elevated temperatures and pressures, and resistance to long-term degradation.

SharkBite PEX Barrier Pipe installation guidelines

Cutting

To ensure successful jointing, pipe ends should be cut smoothly and squarely with purpose-made pipe cutters.

Jointing

All cut ends of PEX require internal support inserts to be fitted before insertion into a fitting. This insert is designed by RWC within very fine tolerances to give a perfect fit and to have very high strength.

Ducting and insulation

PEX is a tough material that needs no greater protection from accidental damage when installed than copper. As with copper, PEX pipe should be sleeved when passing through walls and protected from nails etc., when placed under floorboards or buried under plaster. If the pipe is to be cabled through the building it is recommended to tape over the pipe ends to prevent debris getting in the pipe & blocking filters. Note that some local authorities advise that all pipework in screeded floors should be run in ducting to facilitate easy extraction in case of accidental damage e.g. puncturing with a nail.

Under intermediate floors lagging is not required on SharkBite PEX Barrier Pipe, but insulation should be used where SharkBite PEX Barrier Pipe is run in unheated spaces, for frost protection and energy conservation. It should be noted that heat losses from SharkBite PEX Barrier Pipe are less than those of rigid pipes, and SharkBite PEX Barrier Pipe is resistant to bursting, down to - 20°C. Although concrete has no adverse effect on SharkBite PEX Barrier Pipe, and it may be buried directly in concrete (subject to bye-laws), in order to avoid heat losses it is advisable to thermally insulate the pipe in ground floors.

Surface temperatures

Due to its low thermal conductivity, SharkBite PEX Barrier Pipe has a much lower surface temperature than copper pipe. As a guide, the following formula can be used to estimate surface temperatures:

Surface temperature T°C = 0.75 x (Ti – Ta) + Ta.

Where Ti = flow temperature in the pipe (°C).

Ta = ambient temperature (°C).

Specific requirements

Low water content boilers with cast iron heat exchangers

A minimum of 1 metre of copper tube is required between the boiler connections and SharkBite PEX Barrier Pipe. Furthermore a permanent by-pass must be fitted directly after the pump between the main flow and return pipes to allow the pump to dissipate residual heat from the boiler under all circumstances.

Lightweight system boilers with copper heat exchangers

SharkBite PEX Barrier Pipe may be connected directly to the boiler connections provided that (a) the boiler incorporates a high limit stat, (b) the connections are outside the casing, and (c) these connections are more than 350mm from the heat exchanger. Note that all three requirements must be met.

All heat emitting appliances

A minimum of 1 metre of copper tube is required between the appliance connections and SharkBite PEX Barrier Pipe.

All appliances should incorporate a high limit stat to protect pipework in the event of boiler malfunction.

Solid fuel boilers

The gravity circuit on a solid fuel heating system should always be installed using copper pipe. SharkBite PEX Barrier Pipe may be used on the secondary (pumped) side of a solid fuel heating system, provided that the nearest connection to the boiler is at least one metre away from the boiler and outside the fireplace.

Pressure testing

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

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

Gas pipe

SharkBite fittings and PEX Barrier pipe should NEVER be used to carry gas.

Electrical connections

Since it is extruded from a plastic material, SharkBite PEX Barrier Pipe is an insulator and is not suitable for earthing electrical appliances.

Circulating hot water systems

A continuously operated re-circulating system is a water replenished circulating system which is maintained at a constant high temperature to provide a constant source of hot water. Continuously operated re-circulating systems are used to distribute constant hot water to draw off points that may be distant from the source or hot water storage vessel. Continuously operated recirculating systems are very different from conventional hot water supply and central heating systems found in domestic properties, for which our products have been tested to, under BS7291 Class S approval standard, and for this reason SharkBite PEX Barrier Pipe must not be used on any continuously operated re-circulating systems as they are not approved under the current version of this standards.

Handling and storage

To maintain SharkBite PEX Barrier Pipe in the best possible condition for use it may be stored either horizontally or vertically but should be out of direct sunlight. SharkBite PEX Barrier Pipe is stabilised to withstand limited exposure to ultra violet radiation or sunlight, but is not designed for permanent direct exposure. Under such conditions, painting or lagging is required. The pipe should be supported throughout its length to avoid sagging. The pipe should be similarly supported in transit and protected from abrasion and crushing.

Corrosion inhibitors / prevention

To prevent sludging & corrosion in the heating system, the following appropriate measures should be taken. Inhibitors: RWC UK fully approves the use of corrosion inhibitors with SharkBite PEX Barrier Pipe. SharkBite PEX Barrier Pipe dramatically reduces the ingress of oxygen into the heating system thus reducing the possibility of corrosion of ferrous parts in the heating system.

Hard/soft water areas

In hard water areas, the smooth bore and flexibility of SharkBite PEX Barrier Pipe prevents lime scale from adhering to the inner surface of the pipe, therefore SharkBite PEX Barrier Pipe is the ideal pipe to use where water is of a temporary hard nature. Unlike rigid metal pipes, SharkBite PEX Barrier Pipe is not dissolved or corroded by soft acidic waters.

SharkBite PEX Barrier Pipe frequently asked questions

Q: Is SharkBite PEX barrier pipe approved for drinking water?

A: Yes. SharkBite PEX Barrier Pipe is specifically tested and approved to carry drinking water by WRAS.

Q: Can SharkBite PEX barrier pipe be buried in concrete?

A: Yes. Concrete does not have an adverse effect on SharkBite PEX Barrier Pipe and the pipe may be buried directly in concrete (subject to bye-laws). However, in order to avoid heat loss, it is advisable to thermally insulate the pipe.

Q: Does SharkBite PEX barrier pipe require lagging under floors?

A: Lagging is not required under intermediate floors, but should be used where SharkBite PEX Barrier Pipe is run in underground floors or in unheated spaces, for frost protection and energy conservation. Heat loss is less from SharkBite PEX Barrier Pipe than from rigid pipes, and SharkBite PEX Barrier Pipe is resistant to bursting down to -20°C.

Q: Can inhibitors be used on SharkBite PEX barrier pipe?

A: Yes. Inhibitors are recommended for all heating systems.

Q: What effect does hard water have on SharkBite PEX Barrier Pipe?

A: None. Unlike rigid metal pipes, SharkBite PEX Barrier Pipe is not dissolved or corroded by soft acidic water

Q: Can SharkBite PEX barrier pipe be used on solid fuel central heating systems?

A: SharkBite PEX Barrier Pipe can be used on the secondary side of a solid fuel heating system. SharkBite PEX Barrier Pipe should not be used for primary pipework on gravity systems.

Q: Can SharkBite PEX Barrier Pipe be used on sealed central heating systems?

A: Yes, provided the maximum system service temperature is less than 95°C.

Q: Can SharkBite PEX barrier pipe be painted?

A: Yes SharkBite PEX Barrier Pipe can be painted

Q: Can SharkBite PEX barrier pipe be used for gas pipe or for carrying oil?

A: No. SharkBite PEX Barrier Pipe is only guaranteed for use with water.

Q: Is there any guidance or recommendations with regard to CLO² (Chlorine Dioxide) levels?

A: Yes, SharkBite PEX Barrier Pipe and fittings are not suitable for use in systems which have high concentrations of chlorine, e.g. swimming pools. Short term chlorination for disinfection will not have an adverse effect on the system. Sustained exposure to chlorine levels above 0.5ppm should be avoided; however these concentrations do not normally arise in potable water supplies.

Q: Is there any guidance or recommendations with regard to the use of trace heating tapes?

A: Trace heating tape has no adverse reaction on SharkBite PEX Barrier Pipe as long as it does not exceed the maximum temperatures as per our guidelines. Trace heating generally works on very low temperatures, and will be well below the maximum temperatures recommended.

Q: Do you recommend pressure testing SharkBite PEX Barrier Pipe with air or water?

A: We do not recommend pressure testing of joints with compressed air, only water for pressure system testing. Water will detect any leaks and is far safer.

N.B. In winter, due care must be taken to avoid damage to pipes in the event of water freezing.

Pipe bending information

Bending copper pipe

Copper pipe up to 28mm should be bent using a portable bending machine. Bending copper pipe correctly will avoid the pipe wrinkling or flattening which can affect flow conditions.

To eliminate the risk of the pipe wall collapsing, most bending machines bend the pipe between the formers and guides to support the outside diameter (OD) of the pipe. The point at which the bending pressure is applied must remain consistent at the correct distance in front of the former's point of support. It's important to ensure bending equipment is well maintained and kept lubricated.

Bending SharkBite PEX Pipe

For sharp bends standard elbow fittings should be used. Where slower 90° bends are required in 15mm or 1/2" PEX it is often quicker, neater and cheaper to use a standard 15mm x 90° angle bracket/cold forming bend.

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

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

Minimum bend radii are as follows:

15mm PEX - 100mm using pipe clips

22mm PEX - 175mm using pipe clips

28mm PEX - 300mm using pipe clips

Bending polybutylene pipe

For sharp bends (<80mm in radius), SharkBite elbow fittings should be used. Where bends of >80mm radius are required in 15mm PB, it is quicker and neater to use a SharkBite PEX pipe bend former (SBPXBFI5).

A bending radius of 8 X the pipe diameter is the minimum allowed and may be made by the use of pipe clips on either side of the bend, positioned to maintain the bend radius.

The use of pipe bending spring and skilled manipulation is not required. The pipe should not be heated with a blow lamp, hot air-gun or similar.

Bending Carbon Steel Pipe

Carbon Steel pipe manufactured to EN 10305–2 is an easy to handle, cost effective, lightweight pipe.

The thermally bonding galvanisation process provides the pipe with a minimum thickness of 7µm depth of coating.

Carbon Steel pipe can be bent in sizes up to and including 22mm using a standard portable bending machine with the correct sized formers. When bending Carbon Steel pipe ensure that there is a sufficient length of 'straight' pipe after the bend to accept a SharkBite fitting if required. The minimum radii that the pipe can be bent and also the minimum projection to permit assembly with a SharkBite fitting are shown in the table below:

SharkBite PEX Pipe bending Radii		Carbon Steel Pipe bending Radii and Projection			Polybutylene Pipe bending Radii	
Size	Minimum Bending Radii	Size	Minimum Bending Radii	Minimum Pipe Projection	Size	Minimum Bending Radii
15mm	90mm using angle brackets or 100mm using pipe clips	15mm	30mm	36mm	15mm	120mm using pipe clips
22mm	175mm using pipe clips	18mm	36mm	39mm	22mm	176mm using pipe clips
28mm	300mm using pipe clips	22mm	44mm	41mm	28mm	227mm using pipe clips
		28mm	N/A	42mm		
		35mm	N/A	85mm		
		42mm	N/A	90mm		
		54mm	N/A	96mm		

System installation

Pipe guidance

SharkBite includes a special component which provides pipe guidance and reduces the risk of misalignment or damaging the O-Ring during installation, thus offering 'superior O-Ring protection'.

The table below shows the pipe insertion depths for SharkBite fittings, if marking the pipe with a tape measure.

Insertion depths

Fitting size	Insertion depth
10mm	24mm
15mm	22mm
22mm	28mm
28mm	32mm
35mm	51mm
42mm	57mm
54mm	64mm

Fitting materials

Component	Material
Body	DZR Brass
15, 22 & 28mm Cartridge Ring	304 Stainless Steel
35, 42 & 54mm Cartridge Ring	Polyphenylsulfone (PPSU)
Grab Ring	316 Stainless Steel
Disconnecting Ring	Acetal Copolymer
Alignment Ring	Nylon 6
O-Ring	Rubber

Electrical continuity

SharkBite fittings are TRaC certified to provide electrical continuity when used with Copper or Carbon Steel pipe with the exception of 10mm fittings.

Manufacturing standards

Male BSP threaded connectors are available with either taper or parallel (ISO 7) threads up to 1" and taper only 1¼ to 2" Female BSP parallel threaded connectors are manufactured to ISO 228.

Jointing and disconnecting

SharkBite fittings have been engineered to provide an extremely fast, secure and reliable method of joining the most commonly available metal and plastic pipes. The assembly method is similar irrespective of fitting size and pipe material and if followed correctly will provide a secure joint every time.

Jointing

Cut

Ensure that the pipe is not damaged or scored and remove any adhesive labels or residue. Cut the pipe squarely using a rotary pipe cutter. For Carbon Steel above 28mm, we recommend the use of a pipe cutting machine. Deburr - there should be no burrs or sharp edges on the pipe end, as this could damage the O-Ring during pipe insertion. If installing PEX or PB, cut the pipe squarely with pipe cutters and insert the manufacturers pipe liner.

Mark

If using chromed copper, the pipe must first be scored using the pipe scribing tool. Using the appropriate size disconnecting clip/depth marker, pipe scribing tool or tape measure, mark the insertion depth onto the pipe.

Push

Keep the fitting in the bag until it is required for installation, ensure that the fitting and pipe are free from dirt and debris. Locate the end of the pipe squarely in the mouth of the fitting and push the pipe into the fitting with a slight twisting action until the pipe touches the pipe stop. SharkBite fittings utilise a pre-lubricated O-Ring so no additional lubricants are required. If the pipe is difficult to insert, ensure the pipe is not damaged and has been prepared as described above.

Done

Check the depth mark on the pipe aligns with the disconnecting ring on the SharkBite fitting. Pull the pipe to ensure that the joint is secure.

Disconnecting

10mm – 28mm disconnection

For sizes 10mm – 28mm, the SharkBite range provides two methods of disconnecting the pipe from the fitting – either the patented disconnecting/depth marking clip or metal disconnecting tongs.

If disconnecting using the clip, 'snap' the clip over the pipe, with the SharkBite logo positioned facing away from the fitting. Slide the clip up to the disconnecting ring and press firmly on the two finger pads whilst at the same time pulling the pipe to remove.

If using the disconnecting tongs, position the tongs over the end of the fitting and the pipe with the SharkBite logo positioned facing away from the fitting. Squeeze the tongs together to depress the disconnecting ring, whilst at the same time pulling the pipe to remove (using your thumb to assist against the tongs if necessary).

35mm – 54mm disconnection

For sizes 35mm – 54mm, the Sharkshifter tool is easy to use. Simply clip the Sharkshifter on to the lugs of the fitting and twist the Sharkshifter clock-wise to 'lock open' the grab ring. Then using both hands pull the pipe to remove.

The purpose of the twist/lock mechanism is to ensure accidental disconnection is prevented and that the installer can use both hands to remove the pipe. This patented innovation can also be used to ease installation in confined spaces by eliminating the force required to push the pipe through the grab ring.

If the pipe is to be re-used, it must be inspected for damage prior to re-assembly, if re-using PEX the end of the pipe, where the grab ring has previously gripped must be removed.

Slip feature function

The 'Slip feature' function is designed to permit easy repairs and extensions to be made on wet or dry systems in seconds. Slip couplings and our unique slip tees that are manufactured with one end of the fitting with the 'slip feature' as standard.

The 35mm – 54mm slip fittings are supplied with an instruction band on the slip end of the fitting detailing the pipe size, removal section and maximum pipe insert length as well as fitting movement direction.

Identify the area for repair or additional pipework

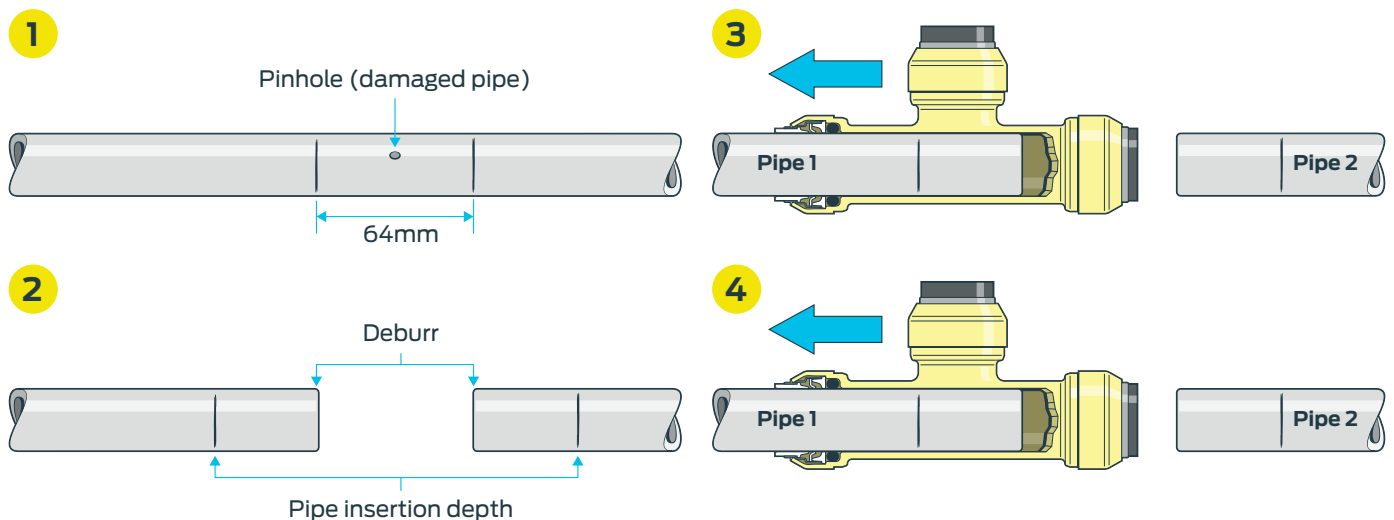
Identify the section to be removed for repair using a slip coupling or if you are adding additional pipework to an existing pipe, use a slip tee.

Mark the section to be removed, dependent upon the pipe size as shown below:

- 15mm pipe – repairable section 34mm
- 22mm pipe – repairable section 40mm
- 28mm pipe – repairable section 48mm
- 35mm pipe – repairable section 64mm
- 42mm pipe – repairable section 70mm
- 54mm pipe – repairable section 76mm

Note: It is important the correct size section is removed as detailed above. Any smaller section will not provide sufficient space to engage the second pipe and may partially block the flow of the branch on a tee. Larger removed sections would create short pipe engagement.

Diagram shows the repairable section to a 35mm pipe



Cut

Cut out the section using a proprietary pipe cutter and deburr the pipe. Ensure that the pipe is free from burrs, scratches and debris. Mark the pipe insertion depths (see insertion depths section) on both pipes.

Push

Align pipe 1 with the bore of the slip end of the fitting and insert fully until the stop end of the fitting is clear of pipe 2.

Note: At this point the bore of the branch is completely blocked.

Withdraw pipe 1 allowing pipe 2 to engage up to the insertion mark. Do not withdraw pipe 1 further than the depth insertion mark.

Note: The pipe is now clear of the branch.

Done

You have now completed a repair or added additional pipework into an existing system in minutes.

Note: For 35mm - 54mm fittings only, a Sharkshifter tool will be required to open and close the grab ring during installation (see diagrams below).

Covered pipe work

If the system pipework and fittings are to be installed in a concealed position, under plaster or screed or are to be cabled through block or brick work, adequate provision for movement of the pipe relative to the floor or wall must be made by the use of a sleeve bonded into the wall or other similar means.

Clipping

Pipe clips and trunking systems designed for use with copper tube may also be used with SharkBite PEX Barrier Pipe. Clips should be positioned adjacent to fittings wherever possible, making due allowance for expansion and contraction of the pipework. Where SharkBite PEX Barrier Pipe is to be surface mounted and visible, the following clipping distances are recommended:

Fittings size	Copper and Chromed Copper		PEX and PB		Carbon Steel	
	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
10mm	1.2m	1.8m	0.3m	0.5m	n/a	n/a
15mm	1.8m	2.0m	0.3m	0.5m	1.8m	2.0m
22mm	2.4m	3.0m	0.5m	0.8m	2.4m	3.0m
28mm	2.4m	3.0m	0.8m	1.0m	2.4m	3.0m
35mm	2.7m	3.0m	0.9m	1.2m	2.7m	3.0m
42mm	3.0m	3.6m	0.9m	1.2m	3.0m	3.6m
54mm	3.0m	3.6m	0.9m	1.2m	3.0m	3.6m

Insulation

All systems should be insulated as per the recommendations listed in BS 5970:2012

Phenolic foam lagging

When lagging SharkBite fittings with thermal insulation (unless the lagging is an internal polyethylene or sodium silicate barrier), wrap the fitting with a moisture barrier to protect the fitting. System pressure testing should be conducted prior to the lagging of the system.

Glycol compatibility

SharkBite products can be used with a 25% Glycol: 75% Water solution.

Chlorination

Chlorination of the system as per the recommendations of BS 6700 will not have any detrimental effect on SharkBite fittings.

System testing

Copper systems

To ensure that all the pipe and fittings have been installed correctly, we recommend to test the system following the guidelines as given in BS 6700. Fill the installation slowly to ensure that the air has been expelled from the system. Then pressurise the system to 1.5 times the normal working pressure, for a minimum of 15 minutes. Reduce the pressure by bleeding the system to one third of the previous test pressure for a period of 45 minutes. There should be no visible leakage of water and no pressure decay.

Pex systems

Pressure test the system for at least 1 hour using the conditions for pressure testing listed in Appendix C of BS 5955: Part 8: 1990:

A) For sections of the system, which can be subjected to full mains pressure, apply a minimum pressure of the available mains water pressure.

B) For sections of the system downstream of a pressure control valve, apply a pressure equal to the pressure control valve setting.

Carbon steel systems

Carbon Steel pipe corrodes if the system is filled and not used for extensive periods of time, after the hydraulic system testing has been conducted. Therefore it is recommended that the system should be dry tested with air or nitrogen to a maximum pressure of 0.5 bar. The air should be clean and free from oil.

If the system is to be tested hydraulically, the test water should contain anti-corrosion chemicals and the system should not be drained after testing (suitable provision against freezing should be installed if required). If the system cannot be left full and has to be drained, purge the system with dry air after draining.

Polybutylene systems

The system should be filled completely using water not more than 20°C at 1.5 times working pressure, to a maximum of 18 bar which should be applied for not less than 15 minutes and no longer than 1 hour. Any appliances or fittings that are not rated at 18 bar, should be disconnected prior to the test being conducted.



Technical support

At Reliance Worldwide Corporation (UK) Ltd we are extremely proud of our heritage and reputation for providing excellent products and customer service levels.

Our highly trained Customer Service Team and Technical Support Team is available and keen to help with product advice, technical enquiries and installation issues; and our Sales Managers are available throughout the UK to discuss product and installation specifications.

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In the interests of continuous product improvement RWC reserve the right to alter specifications as necessary. E&OE. Issue July 2019

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