

# Plumbing Fittings

Technical Manual

**RWC**

**CUT.  
PUSH.  
DONE.**



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## Terms and Conditions

No party should rely upon the contents of this publication as to the fitness of any particular product for any particular use or application. Goods are offered with the benefit of the manufacturers Warranty. Reliance Worldwide Corporation (AUST.) Pty Ltd. shall not be liable for any loss or damage either direct or consequential arising from any defect.

RWC reserves the right to modify designs and specifications and to withdraw and introduce products at any time without notice.

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## Installation

Installation is subject to the requirements of the applicable regulatory authority, the National Construction Code Volume Three – Plumbing Code of Australia, associated reference standards as applicable at the time and AS/NZS 3500. This product is compliant to the Lead Free requirements of the National Construction Code Volume Three. For further Scope of Use, please visit [www.rmc.com.au](http://www.rmc.com.au)

## Reliance Worldwide Corporation Warranty

Reliance Worldwide Corporation (Aust.) Pty. Ltd. (RWC) will either replace or repair any defective goods where the defect arose as a result of manufacture for up to twenty-five (25) years (see website for more details). You may contact RWC at the phone number, address or e-mail shown and will be required to return the goods for evaluation. Should the defect be found to be one of our manufacture we will send you a replacement product to your stated address at our expense. Our goods come with guarantees that cannot be excluded under Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and failure does not amount to a major failure.

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## System Description

SharkBite is an advanced design push-to-connect plumbing system for potable and non-potable recycled water distribution. SharkBite is available in an assortment of over 200 fittings and PEX pipe ranging from 16-25mm size. SharkBite has been engineered with ease of use and disconnection in mind and while being the most dependable way to join copper and PEX Pipe in any combination – with no soldering, clamps, unions or glue.

## System Benefits

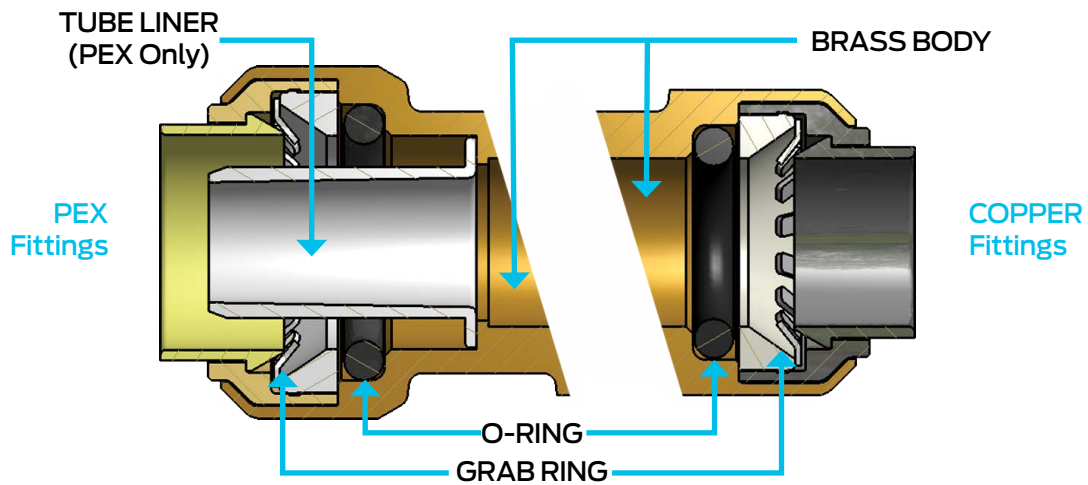
- Instant push-to-connect connection. Cut. Push. Done.
- No soldering, clamps, unions or glue required
- No expensive joining tools or ongoing tool maintenance
- Reduces installation time with no tightening of nuts, clamps and unions
- Integral tube liner for PEX installations means no loose components and ensures a secure, reliable connection
- The position of the O-Ring and grab ring allow for the immediate detection of leaks
- Can be installed wet or dry
- Rotatable during installation
- Approved for behind the wall and underground application
- Removable after installation
- Clean, professional installation
- Quality engineered and manufactured in Australia
- Compact, robust DZR brass body is strong, corrosion resistant and durable
- SharkBite PEX Pipe is pre-gauged with 'Safe-Seal Indicator Markings' to aid correct installation
- Fittings supplied ready for installation
- Transition fittings to Cu, SDR7.4 PEX, other SDR9 PEX & PB
- No product waste; simply disconnect and reuse

## Plumbing System Comparison

Feature	Push-To-Connect SharkBite	Crimp	Expansion
No tools required	✓	✗	✗
No calibration/maintenance required for proper function of the tool	✓	✗	✗
No grooves in the tubing caused by the expansion tool that can create potential leak paths	✓	✓	✗
No potential for leaks caused by nicks on the fitting exterior	✓	✗	✗
Fitting manufactured in Australia	✓	✗	✗
Easy install with minimal learning curve for new labourers	✓	✗	✗
Reusable during installation – no wasted products	✓	✗	✗
Fitting factory assembled, ready to install from the bag	✓	✓	✗

## The SharkBite Design

The SharkBite Fitting incorporates a number of unique and patented features.



## Materials

<b>Body</b>	LF DZR Brass
<b>Grab Ring</b>	316 Stainless Steel
<b>O-Ring</b>	EPDM
<b>Tube Liner</b>	Polysulfone (PEX fittings only)

SharkBite push-to-connect (PTC) fittings are made from lead free dezincification resistant brass (LF DZR) compliant with the low lead requirements specified in NSF/ANSI/CAN 372. Products are available in 200+ configurations including Couplings, Elbows, Tees, Reducers, Threaded Adaptors, Caps, Breeches, Ball Valves, Tempering Valves and Copper Slip Repair Couplings plus Conversion Couplings and Tees to Cu, SDR7.4 PEX, other SDR9 PEX and PB.

All SharkBite PEX fittings come with a pre-installed tube liner. It is an AS/NZS 3500 requirement when using Push-To-Connect fittings on PEX pipe. Tube liners are not required on copper fittings.

## Cross-Linked Polyethylene

SharkBite Crosslinked Polyethylene is extruded as a PEXb pipe and manufactured using the silane or 'moisture cure' method and is made in a two stage simple process.

1. Silane grafted polyethylene is combined with a catalyst and extruded into PEXb pipe.
2. The cross linking process is then performed by exposing the pipe to steam.

The moisture cure process of cross linking PEXb pipe enhances pipe performance properties including strength, temperature, chemical resistance, crack, creep and abrasion resistance, pipe flexibility, pressure rating, expansion and contraction.

Additionally SharkBite Crosslinked Polyethylene is made using a PEX100 raw material which provides the benefits of an SDR9 pipe wall, improved flow rates, and a pressure rating equivalent to a SDR7.4 pipe.

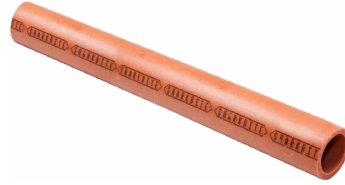
## SharkBite PEX Pipe

SharkBite PEX pipe is an SDR9 PEXb pipe available in sizes 16, 20 and 25mm in coils and straights with over 30 variations from 5m lengths to 100m coils, in a variety of different colour codes according to AS 2492 and the relevant applications.



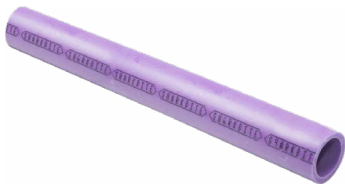
### Mustard Pipe

Mustard Pipe is typically used for Potable Water but can also be used for hot water installations.



### Red Pipe

Red Pipe is for hot water application only.



### Purple Pipe

Purple Pipe is coloured and branded specifically for Recycled Water applications in accordance with the authorities' requirements for the distribution of water not suitable for human consumption. This water is generally used for watering gardens and supply to cisterns.



### Green Pipe

Green Pipe is available for rainwater applications.

## Precautions

### Chemicals

Always check with RWC before using SharkBite PEX pipe for applications other than for potable water. Additionally, check with RWC if pipework is to be installed in a known contaminated area, in contaminated soils or where chemical spills may have occurred.

### Electrical

It is of the utmost importance that if a metallic pipe is being replaced or installed in part or in its entirety by a plastic pipe or other non-metallic fittings or couplings, the requirements of AS/NZS 3500 must be followed. Additionally, copper tube connected to a SharkBite fitting does not guarantee electrical continuity. No work should be carried out until the earth requirements have been checked by an electrical contractor and modified if necessary.

## PEX Dimensions

NOMINAL OUTSIDE DIAMETER	16.0	20.0	25.0
Average wall thickness	2.15	2.45	3.00
Average internal diameter	11.7	15.2	19.1



### AUSTRALIAN MADE AND OWNED



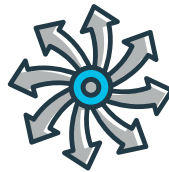
SharkBite® fittings and pipe are manufactured in Australia in Reliance Worldwide Corporation (Aust.) Pty. Ltd. state of the art facilities. Stringent quality control and advanced manufacturing procedures guarantee product satisfaction.

### 25 YEAR WARRANTY



The SharkBite® range of fittings and PEX pipe can be relied upon to perform year after year. SharkBite® is backed by the Reliance Worldwide Corporation (Aust.) Pty. Ltd. 25 year warranty.<sup>1</sup>

### VERSATILE AND REUSABLE



Can be easily disconnected using the SharkBite® Disassembly Clipss. Fittings can be rotated once installed allowing for a more versatile, easier use, especially in confined spaces. This feature is particularly useful where repairs and or maintenance are required.

### QUICK AND EASY



SharkBite® is quick and easy to install, making it the most time effective plumbing system available, allowing the installer to move onto the next job faster than ever before.

Utilising state of the art push-to-connect system design, SharkBite® fittings and pipes are easily assembled by hand.

### STANDARDS APPROVED



SharkBite® fittings and PEX pipe comply with and are approved to Australian Standards AS/NZS 2537 and AS 2492 – 1994 respectively.

## Approved Applications

The SharkBite system has WaterMark certification to AS/NZS 2537 & AS 2492 product standard for use in potable water. SharkBite plumbing systems are approved for hot and cold potable water installations above and below ground.

Please consult with local codes for final approval. Failure to comply with the above types of pipe applications could result in connection failures.

### REFERENCES

- A. AS/NZS 4020 – Testing of products for use in contact with drinking water.
- B. AS 2492 – Cross-linked polyethylene (PEX) pipes for pressure applications.
- C. AS/NZS 2537 – Mechanical jointing fittings for use with cross-linked polyethylene (PEX) pipe for hot and cold water applications.
- D. AS 3688 – Water supply – metallic fittings and connectors.
- E. AS 1432 – Copper tubes for plumbing, gas fittings and drainage applications.
- F. AS 2345 – Dezincification resistance of copper alloys.
- G. AS/NZS 3500 – National plumbing and drainage.
- H. NSF/ANSI/CAN 372 – Drinking Water System Components – Lead Content

## Potable Water Approved AS/NZS 4020

AS/NZS 4020 prescribes tests for analysing the suitability of products for use in contact with drinking water, with regard to their effect on the quality of the water. It is a requirement of Watermark Certification.

## Environment

We recognise that environmental impacts are increasingly important to our stakeholders and to society more broadly. RWC actively manages its consumption of energy, water and raw materials for manufacturing and packaging to mitigate our impact on the environment.

RWC supports local and global efforts to combat climate change and strives for a sustainable low carbon future. Our efforts are aligned with the UNFCCC Paris agreement which is focused on reducing emissions to limit global warming to a 1.5°C increase from pre-industrial level.

## Water Quality and Chlorine

Potable water is sourced using a variety of methods. The Australian Drinking Water Guidelines provides a framework to govern potable water. To achieve this, chlorine and other agents are sometimes used as constituents of the water or for commission purposes.

The SharkBite plumbing system is compliant and certified to AS/NZS 2537 and AS 2492 and as such all components of the system have been certified to AS/NZS 4020. RWC can confirm, based on the AS/NZS 4020 certification that the SharkBite system does not cause any multiplication of micro-organisms, microbial contamination, or legionella growth.

RWC recommend that an independently accredited provider is engaged to undertake any chemical flush of the system and that this work is carried out in line with the relevant Standards. Chemical flushing is to be done in line with the Australian Drinking Water Guidelines that prohibits flushing potable plumbing systems with a solution greater than 5ppm of chlorine and within the normal operating temperatures and pressures as specified in the SharkBite Technical Literature. If chemical flushing with a high concentration solution of chlorine is conducted incorrectly it will have a detrimental effect on any piping system. Dosing must be done in such a way as not to exceed the 5ppm chlorine level in any part of the plumbing system.

## Acoustic Tests

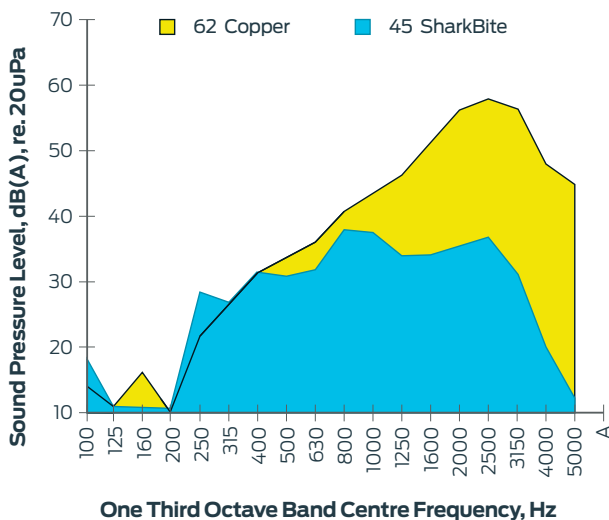
### Results Summary

- The noise emitted by the pipes through the wall was mainly evident in the mid to high frequencies of the A-weighted spectrum.
- Noise emitted at frequencies below 250Hz was affected by the level of background noise in the room.
- The change in radiated noise level was greater with the change in water flow compared with the change in water pressure.
- In all cases the overall noise level emitted by the SharkBite pipe was less than for the copper pipe. For the same flow conditions the differences in overall noise level between the pipes was between 14 and 17dB(A).

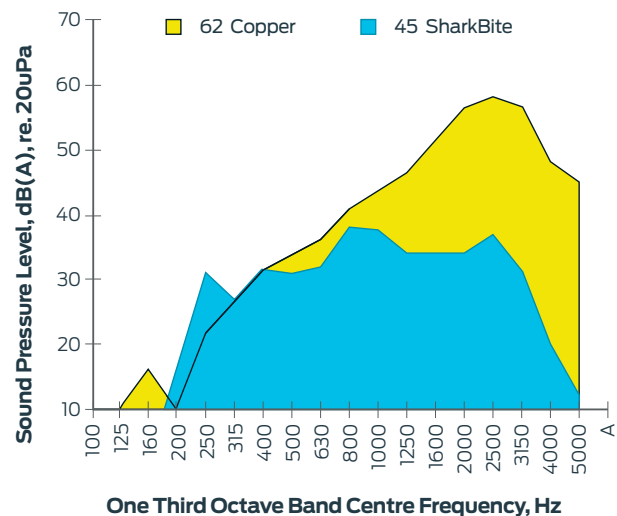
### Conclusion

Measurements of noise emitted from nominal 15mm bore pipes attached to the other side of a concrete block wall with water flowing through them and a noise source in the pipe showed that the SharkBite cross-linked polyethylene pipe was between 14 and 17dB(A) quieter than the standard copper pipe.

WATERFLOW (l/min)	WATER PRESSURE (kPa)	MEASURED NOISE LEVEL dB(A)		DIFFERENCE dB(A)
		SHARKBITE	COPPER	COPPER - SHARKBITE
15	300	38	55	17
15	600	40	54	14
20	600	45	62	17
20	700	45	62	17



Measured noise level of water flow through nominal 15mm bore SharkBite and copper pipe, 20L/min, 600kPa with DIN 52218 noise source.



Measured noise level of water flow through nominal 15mm bore SharkBite and copper pipe, 20L/min, 700kPa with DIN 52218 noise source.

## UV Resistance

SharkBite pipe should not be installed in direct or reflected sunlight as the material may degrade with extended UV exposure. Where external installation is required, install the SharkBite pre-conduited product or provide other similar UV protection.

## SharkBite Burial

SharkBite fittings are suitable for burial in most applications; however care is required when using fittings in applications that require burial to ensure the correct installation practices are used and due care is given to any environmental factors that may have a detrimental effect on the life expectancy of the fittings and pipe.

The installation of SharkBite fittings that require burial or chasing into concrete or brickwork, must comply with all local plumbing code requirements. SharkBite fittings are not suitable for use in areas where the soil is or may become contaminated\* including the soil used for back filling. It is recommended that all SharkBite fittings have an impervious barrier between the fitting and the surrounding soil (*RWC Silicone Burial Wrap*).

The soil used for back filling must be free of rocks, debris or any sharp objects that may cause damage to the fitting or pipe through impact or abrasion.

*\* Examples of contamination include, but are not limited to: petrochemicals (reclaimed service station sites), high levels of nitrogen compounds (this could be caused by animal waste or fertilizer that may be found in some agricultural applications), low pH levels (below pH 6), high pH levels (above pH 8), run off from land fill, formaldehyde compounds, and solvents. It should be noted that such contaminants have been known to migrate through plastic piping systems and contaminate the Potable water supplied through these pipes.*

## RWC Silicone Burial Wrap

When using RWC Silicone Burial Wrap, make a SharkBite connection ensuring pipe is inserted correctly in the fitting (see Installation Instructions in this manual for details). While leaving the protective film in place, measure the amount of tape needed to completely wrap the fitting. To ensure a proper seal, overlap tape by 25mm past the end of the fitting on every end and 5mm – 10mm between/ across the fitting.

Completely cover the fitting by wrapping (overlapping each edge of the tape) the fitting, pulling the tape tight and removing the protective film. The tape will bond to itself within minutes and form an impervious barrier within a few hours.

## Uncontrolled Heat Sources

In the case of uncontrolled heat sources (eg. Slow combustion stoves, water heating coils, wet back boilers, solar, or similar) SharkBite PEX pipe should not be used. The primary flow and returns on these types of heaters should not be installed in SharkBite PEX pipe. Secondary flow and returns must be controlled so that the temperature / pressure requirements are not exceeded.

In the interest of safe temperature and to protect the user, tempering valves should be installed in accordance with AS/NZS3500.

When using solar systems, installers should consult with manufacturers to ensure that water leaving the storage facilities does not exceed the performance capabilities of the pipe. Primary flow and returns should not be installed in SharkBite PEX pipe and secondary flow and returns must be controlled.

## Water Quality and Chlorine

Potable water is sourced using a variety of methods. The Australian Drinking Water Guidelines provides a framework to govern potable water. To achieve this, chlorine and other agents are sometimes used as constituents of the water. Chlorine levels within the levels of the Australian Drinking Water Guidelines are in most cases suitable in standard discontinuous flow applications. For continuous flow applications such as circulating hot water lines a maximum chlorine level of 1.2ppm must be maintained.

Water pH levels must be greater than 7.5. Should the installer have concerns relating to water chemistry including chlorine levels for a particular site or application they should contact RWC for further information.

## Disinfection of Plumbing System

The SharkBite plumbing system is compliant and certified to AS/NZS 2537 and AS 2492 and as such all components of the system have been certified to AS/NZS 4020. RWC can confirm, based on the AS/NZS 4020 certification that the SharkBite system does not cause any multiplication of micro-organisms, microbial contamination. RWC recommend that an independently accredited provider is engaged to undertake any thermal disinfection or chemical flush of the system and that this work is carried out in line with the relevant Standards. Chemical flushes must be limited to a maximum of 5 occurrences over the system lifetime and records must be maintained showing when disinfection took place, what process was followed and who undertook the disinfection works.

Chemical flushing is to be done in line with the Australian Drinking Water Guidelines. The guidelines prohibit flushing potable plumbing systems with a solution greater than 5ppm of chlorine and within the normal operating temperatures and pressures (as specified in the SharkBite Technical Literature). If chemical flushing with a high concentration solution of chlorine is conducted incorrectly it will have a detrimental effect on any piping system. Dosing must be done in such a way as not to exceed the 5ppm chlorine level in any part of the plumbing system. Thermal disinfection processes must be conducted within the normal operating conditions of the SharkBite plumbing system.

## Installation Considerations

- Keep SharkBite PEX pipe at a minimum of 500mm from sources of high heat such as heating appliances (e.g. flues)
- Keep SharkBite PEX pipe 1500mm from slow combustion type stoves (wet back type).
- Leave 300mm minimum space between SharkBite PEX pipe and recessed electric light fittings.
- SharkBite PEX pipe should not be positioned within 150mm of gas or central heating vents or flues.
- Where fire collars or the like are required, installers should contact the manufacturer of those products to ensure they have certification for use with PEX pipes.

## Minimum Cold Bending Radii

DIAMETER	RADII
16mm	160mm
20mm	200mm
25mm	250mm

*Ten times the outside diameter of the pipe used*

Bending of the SharkBite PEX pipe for change of direction is preferable to elbows, however fittings will be required where sharp bends are necessary. Tighter bends can be achieved by using a bend support.

Note: Do not use pipes that have kinks, cuts, deep scratches, squashed ends, imperfections or have been in contact with grease or tar substances. Any of the above should be cut out and replaced, as these conditions may affect the integrity of the SharkBite system.



## Clipping

AS/NZS 3500 recommend the following spacings:

Diameter	Horizontal	Vertical
16mm	600mm	1200mm
20mm	700mm	1400mm
25mm	750mm	1500mm

The above is a guide only. Good plumbing practice requires that clipping be installed so that stress is not imposed on the joint. When bending close to a joint, clips should be placed near the fitting in a manner not to stress the joint.

## Timber & Steel Frames

Drill holes through studs, plates etc. large enough so that the SharkBite pipe can move freely to allow for expansion and contraction and pressure surges.

Holes drilled or formed in metal studs or plates must be accurately sized to enable suitable grommets. Insulation or a short sleeve of oversize pipe should also be firmly secured in the framework to be inserted around the pipe. This helps to ensure that there is no direct contact between the pipe and framework and allows for movement of the pipe through the grommet, lagging or sleeve. To avoid noises where pipes pass through studs, plates etc. That have large holes, consideration should be given to the use of a non-aggressive compound, grommet or sleeve in the annular space in the stud or plat.

AS/NZS 3500 allows neutral cure silicone to be used around PE-X pipes to fill the annual space drilled through a stud or plate.

SharkBite fittings must be located away from stud penetrations or other abutments to ensure the fittings demount function is not engaged due to the effects of thermal expansion/contraction.

## Pipes In Chases, Ducts or Conduits

- SharkBite PEX pipes in chases must be continuously wrapped with an impermeable flexible material
- Ducts shall be fitted with removable covers
- Conduits embedded in walls or floors should conform to the requirements of the NCC or New Zealand Building Codes as applicable

Although water service pipes are not permitted to be embedded or cast directly into a concrete structure it is permissible for a water service pipe to be within a conduit and then embedded within a wall or floor of masonry or concrete construction.

Refer to AS/NZS 3500 – 5.4.3

## Under Concrete Slabs

Water pipes located beneath slabs on ground shall be laid on a compacted bed of sand or fine-grained soil with a minimum distance of 75mm between the top of the underside of the slab. Pipe work that penetrates the slab shall be at right angles to the slab surface and lagged the full length of the slab penetration with an impermeable flexible material not less than 6mm in thickness. Alternatively, an impermeable plastic sleeves or conduit providing equivalent protection.

Any joints located beneath a concrete slab should be kept to a minimum and fitting protection applied.

Refer to *SharkBite Burial* (page 8)

## Thermal Properties

PEX pipe will not melt. This is due to the irreversible cross-linking process which has changed the chemical structure of the base polyethylene.

PROPERTY	VALUE
Ignition Temperature °C	380
Specific Heat (J/kg/K)	2300
Density (g/cm <sup>3</sup> )	0.94
Thermal Expansion Coefficient (x10 <sup>-6</sup> /K)	14.22

## Thermal Expansion

The table below represents expansion and contraction of PEX pipe in millimetres, resulting from a given change in temperature. The graph and table are calculated using the following equation:

$\text{Change in pipe length} = 0.1422 \times \text{Pipe length} \times \text{Change in temperature}$

		CHANGE IN TEMPERATURE (°C)															
		10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
LENGTH OF PIPE IN METRES	1	1.4	1.7	2.0	2.3	2.6	2.8	3.1	3.4	3.7	4.0	4.3	4.6	4.8	5.1	5.4	5.7
	2	2.8	3.4	4.0	4.6	5.1	5.7	6.3	6.8	7.4	8.0	8.5	9.1	9.7	10.2	10.8	11.4
	4	5.7	6.8	8.0	9.1	10.2	11.4	12.5	13.7	14.8	15.9	17.1	18.2	19.3	20.5	21.6	22.8
	6	8.5	10.2	11.9	13.7	15.4	17.1	18.8	20.5	22.2	23.9	25.6	27.3	29.0	30.7	32.4	34.1
	8	11.4	13.7	15.9	18.2	20.5	22.8	25.0	27.3	29.6	31.9	34.1	36.4	38.7	41.0	43.2	45.5
	10	14.2	17.1	19.9	22.8	25.6	28.4	31.3	34.1	37.0	39.8	42.7	45.5	48.3	51.2	54.0	56.9
	12	17.1	20.5	23.9	27.3	30.7	34.1	37.5	41.0	44.4	47.8	51.2	54.6	58.0	61.4	64.8	68.3
	14	19.9	23.9	27.9	31.9	35.8	39.8	43.8	47.8	51.8	55.7	59.7	63.7	67.7	71.7	75.7	79.6
	16	22.8	27.3	31.9	36.4	41.0	45.5	50.1	54.6	59.2	63.7	68.3	72.8	77.4	81.9	86.5	91.0
	18	25.6	30.7	35.8	41.0	46.1	51.2	56.3	61.4	66.5	71.7	76.8	81.9	87.0	92.1	97.3	102.4
	20	28.4	34.1	39.8	45.5	51.2	56.9	62.6	68.3	73.9	79.6	85.3	91.0	96.7	102.4	108.1	113.8
	22	31.3	37.5	43.8	50.1	56.3	62.6	68.8	75.1	81.3	87.6	93.9	100.1	106.4	112.6	118.9	125.1
	24	34.1	41.0	47.8	54.6	61.4	68.3	75.1	81.9	88.7	95.6	102.4	109.2	116.0	122.9	129.7	136.5
	26	37.0	44.4	51.8	59.2	66.5	73.9	81.3	88.7	96.1	103.5	110.9	118.3	125.7	133.1	140.5	147.9
	28	39.8	47.8	55.7	63.7	71.7	79.6	87.6	95.6	103.5	111.5	119.4	127.4	135.4	143.3	151.3	159.3
	30	42.7	51.2	59.7	68.3	76.8	85.3	93.9	102.4	110.9	119.4	128.0	136.5	145.0	153.6	162.1	170.6
	32	45.5	54.6	63.7	72.8	81.9	91.0	100.1	109.2	118.3	127.4	136.5	145.6	154.7	163.8	172.9	182.0
	34	48.3	58.0	67.7	77.4	87.0	96.7	106.4	116.0	125.7	135.4	145.0	154.7	164.4	174.1	183.7	193.4
	36	51.2	61.4	71.7	81.9	92.1	102.4	112.6	122.9	133.1	143.3	153.6	163.8	174.1	184.3	194.5	204.8
	38	54.0	64.8	75.7	86.5	97.3	108.1	118.9	129.7	140.5	151.3	162.1	172.9	183.7	194.5	205.3	216.1
	40	56.9	68.3	79.6	91.0	102.4	113.8	125.1	136.5	147.9	159.3	170.6	182.0	193.4	204.8	216.1	227.5

## Thermal Insulation

R-Values of Common Plumbing Piping and Insulation. In certain areas, AS/NZS 3500 requires a minimum insulation of R=0.3. No current piping material will meet this requirement without suitable thermal insulation.

*"R-value = Thickness / Conductivity. See AS/NZS 3500 Section 8.6"*

	CONDUCTIVITY (K)W/M/K	OD mm	ID mm	WALL THICKNESS mm	R-VALUE K.M <sup>2</sup> /W
Air	0.02			6	0.300
Copper DN15	401	12.7	10.88	.91	0.0000023
Lagged Copper (Approx.)	Cu + Air + Plastic			~2	0.034
SharkBite PEX 16mm	0.35	16	11.6	2.2	0.006
SharkBite PEX 20mm	0.35	20	15.1	2.45	0.007
SharkBite PEX 25mm	0.35	25	18.6	3.2	0.009
E-Therm™	0.034			8	0.235
Requirement Of AS/NZS 3500 5.19 DN15	0.03			9	0.300
Requirement Of AS/NZS 3500 2003 Amendment 1 2005 (Table 8.1 & 8.2)	0.0433			13	0.300

## Operating Parameters – Pressure and Temperature

### SharkBite PEX SDR9 Pipe is manufactured to AS 2492

Designed to operate with a working pressure of 2000kPa at 20°C and can be operated at 70°C with a maximum working pressure of 1000kpa (see special conditions relating to Recirculating Systems on page 8).

Temperature above 70°C for any period will affect the life of the pipe.

Designated SharkBite connection can only be used on SharkBite PEX SDR9 Pipe.

The table below represents the working pressures of cross-linked polyethylene PN20 pipe at various pipe material temperatures (PMT) as per AS 2492.

TEMPERATURE	20°C	60°C	70°C
kPa	2000	1190	1000

## Fitting Pressure Loss

To calculate the pressure loss through a particular fitting, the type and diameter of the fitting and the flow rate must be established. The pressure loss may then be read from the vertical axis. To calculate the pressure loss through a number of fittings in a circuit, the number and type of fittings, along with the direction of flow must be known. The pressure loss through each fitting can then be added together to calculate a total pressure loss.

### Elbows – Head Loss In kPa Per Fitting

FITTING SIZE	FLOW RATES PER SECOND								
16mm	1.0	3.5	11.9	21.2	33.1	47.6	64.8	84.7	107.1
20mm	0.3	1.0	4.3	7.6	11.9	17.2	23.4	30.5	38.6
25mm	0.1	0.4	1.8	3.2	5.1	7.3	9.9	13.0	16.4

### Straight Connectors – Head Loss In kPa Per Fitting

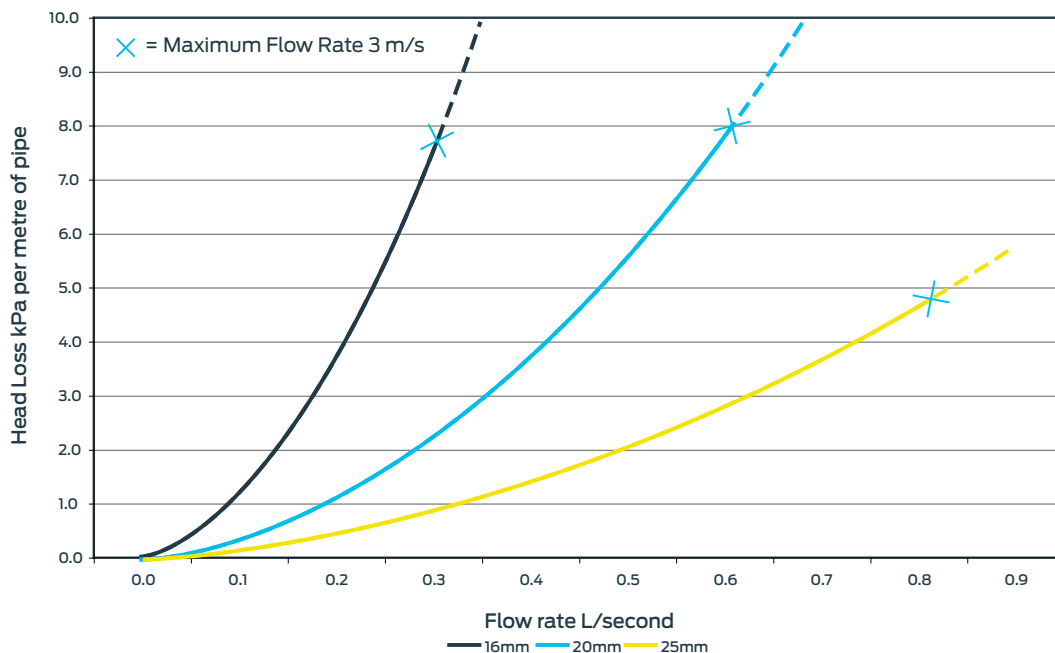
Due to the design of the SharkBite copper fitting, there is no significant pressure loss through a straight connection. Pressure loss is to be calculated as a straight length of tube.

FITTING SIZE	FLOW RATES PER SECOND								
16mm	0.4	1.6	3.6	6.3	9.9	14.3	19.4	25.4	32.1
20mm	0.1	0.6	1.3	2.3	3.6	5.1	7.0	9.2	11.6
25mm	0.1	0.2	0.5	1.0	1.5	2.2	3.0	3.9	4.9

## Pressure or Head Loss Through PEX Pipe

This graph shows pressure loss through SharkBite PEX Pipe at various flow rates in 16mm and 20mm.

In order to calculate the pressure loss through the pipe, the given flow rate for a particular portion of tube must be established (this may be done using the table provided in AS/NZS 3500), along with the required pipe length and diameter. The pressure loss can then be read off the vertical axis.



Information provided here is theoretical and based on new clean pipe. No allowance has been made for age or any abnormal conditions of the interior surface of the pipe.

## Maximum Flow Rates

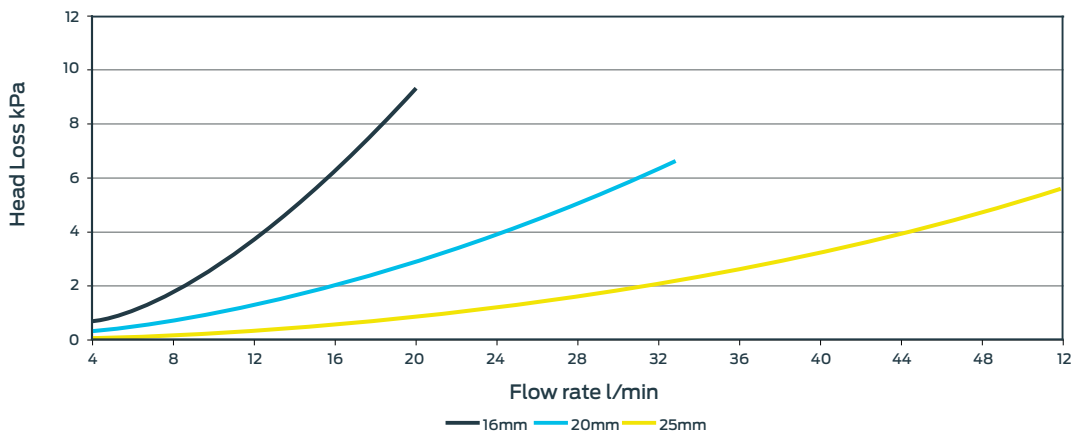
	SHARKBITE PEX PIPE SDR9			COPPER TUBE		
	16mm	20mm	25mm	DN15	DN20	DN25
MIN ID (MM)	11.5	15.0#	18.7	10.7	17.0	23
MAX FLOW (L/MIN)*	18.7	31.8	49.4	16.2	40.9	74.8
MAX FLOW (L/SEC)*	0.31	0.53	0.82	0.27	0.68	1.25

\* Based on AS/NZS 3500 maximum allowable velocity in pipe of 3m/s.

Based on its minimum ID of 15mm, 20mm SharkBite may be used where AS/NZS 3500 requires a nominal pipe size of DN20 (eg. Section 3.5.1). This is a feature of SharkBite pipe only, and not generally applicable to PEX pipe.

## Pipe Flow Characteristics

PIPE SIZE	FLOW RATE (l/min) VS HEAD LOSS (kPa)													
	4l/min	8l/min	12l/min	16l/min	20l/min	24l/min	28l/min	32l/min	36l/min	40l/min	44l/min	48l/min	52l/min	
16mm	0.59	1.75	3.71	6.33	9.57	-	-	-	-	-	-	-	-	
20mm	0.14	0.52	1.09	1.86	2.82	3.95	5.25	6.72	-	-	-	-	-	
25mm	0.05	0.17	0.36	0.61	0.92	1.29	1.71	2.19	2.73	3.32	3.96	4.65	5.49	



16mm PEX	
Velocity	Flow Rate
1.0m/s	6.6l/min
2.0m/s	16.4l/min
3.0m/s	20.0l/min

20mm PEX	
Velocity	Flow Rate
1.0m/s	11.0l/min
2.0m/s	22.1l/min
3.0m/s	33.1l/min

25mm PEX	
Velocity	Flow Rate
1.0m/s	17.5l/min
2.0m/s	35.0l/min
3.0m/s	52.0l/min



## SharkBite Push-To-Connect Plumbing System

The SharkBite fitting works via a two-stage process that ensures a quick, easy connection. In one easy push, the SharkBite fittings advanced design seals and locks the pipe securely.

**Stage ONE** As the pipe is inserted into the fitting, it passes through the release collar and then through the 316-stainless steel grab ring. The grab ring opens out and grabs the pipe, preventing it from being withdrawn.

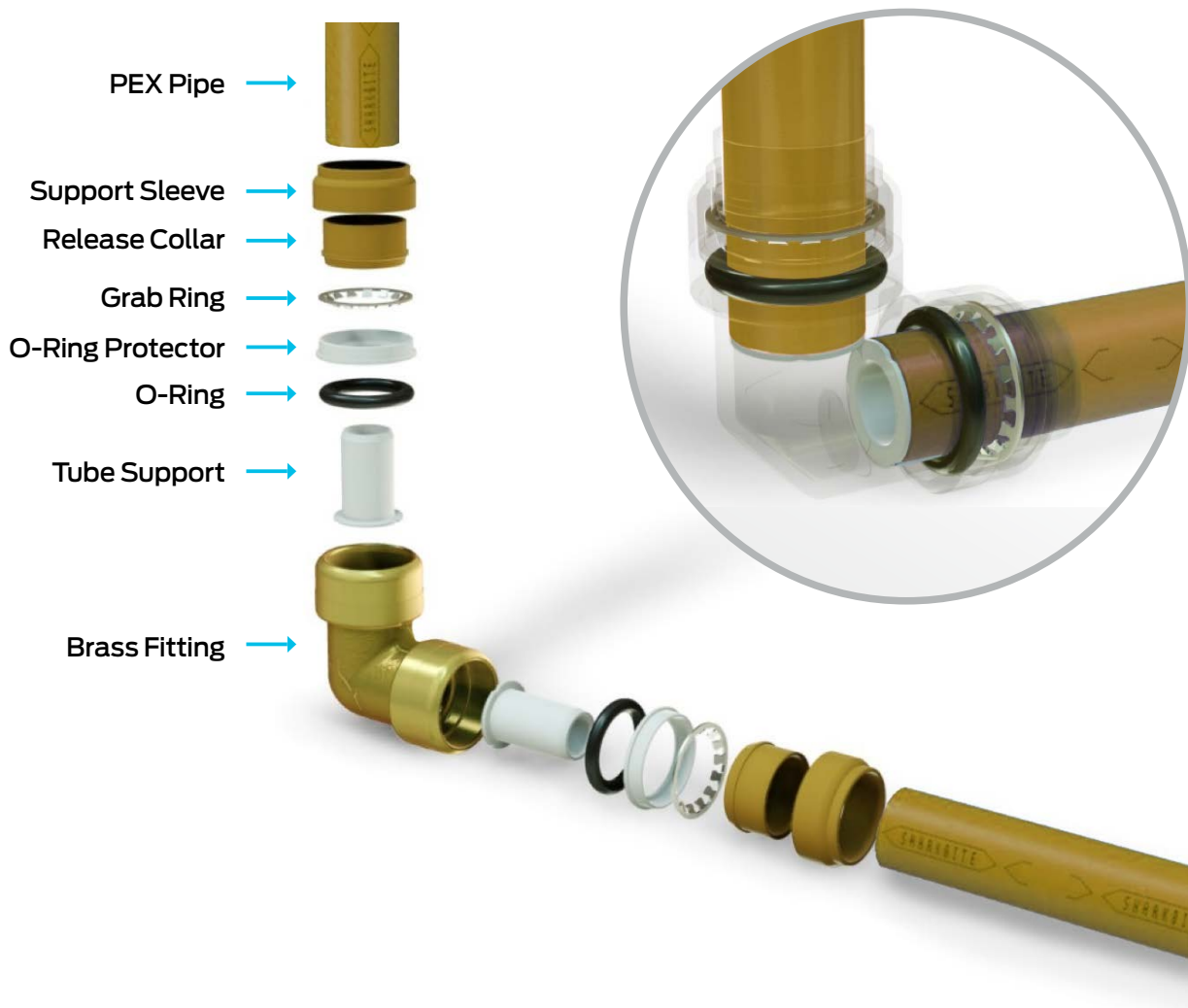
**Stage TWO** The pipe then passes through the O-Ring protector. This aligns the pipe before it passes through the specially formulated EDPM O-Ring which compresses between the pipe OD and the wall of the fitting, creating a seal. When the pipe reaches the tube support stop, a secure joint has been made.

If required, the pipe and fitting can be easily disconnected using SharkBite Disassembly Clips. Simply apply pressure to the release collar. This releases the grab ring teeth, allowing the pipe to be withdrawn from the fitting.

Refer to this manual for detailed connection and disconnection instructions.

SharkBite PEX fittings are designed for use only on SharkBite PEX pipe.

SharkBite copper fittings are designed for use only with copper pipe that conforms with and is approved to AS 1432.



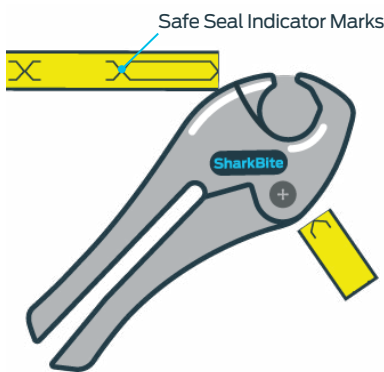
## Connection of PEX Fittings

- Used to connect only SharkBite PEX pipe
- PEX fittings have mustard coloured ends
- Fittings are rotatable after connection
- Fittings can be installed on wet pipe even with water flowing
- Fittings can be disconnected and reconnected as required



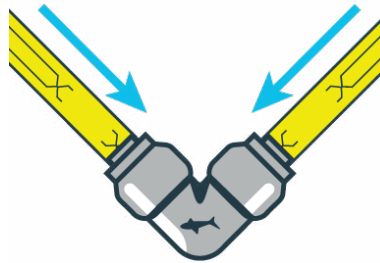
## Installation

1. All pipe should be free of damage or debris. Cut PEX pipe with quality PEX cutters. Cutters with blunt or damaged blades may damage the pipe, causing failure.
2. SharkBite PEX pipe is supplied with pre-gauged "Safe Seal Indicator Marks" (SSIM) for faster installation. Cut between the SSIM.
3. Simply push to the next SSIM.



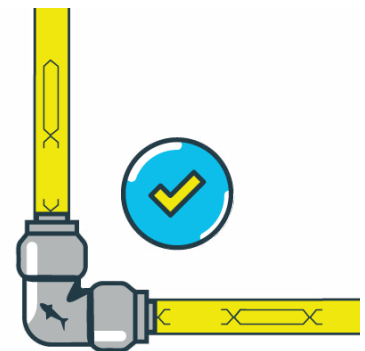
### Cut

Using SharkBite PEX Pipe Cutters, cut the pipe squarely between two of the SharkBite safe seal indicator marks as shown in the picture. Ensure pipe is round, clean and free of debris.



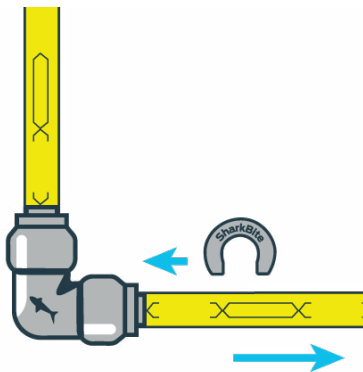
### Push

Insert the pipe through the release collar to rest against the grab ring. Push the pipe firmly with a twisting action and push to the SharkBite safe seal indicator mark.



### Done

Ensure the SharkBite Safe Seal Indicator Mark aligns with the release collar as shown.



## Disassembly

Using the Disassembly Clip, fittings can be easily changed, removed and the fittings reused.

**Note:** Safety precautions need to be observed when cutting into pipework or disconnecting water meters, fittings and devices on pipework. There have been fatalities and injuries that have been attributed to water services carrying an electrical current.

Any existing metallic service pipework is to be replaced in part or in its entirety by plastics pipe or other non-metallic fittings or couplings, the work should not commence until the earthing requirements have been checked by an electrical contractor and modified, if necessary.

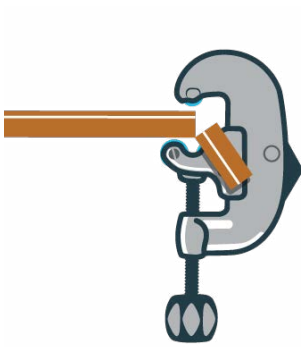
## Connection of Copper Fittings

- Used to connect copper systems
- Copper fittings have black coloured ends
- A range of fittings and adapters are available



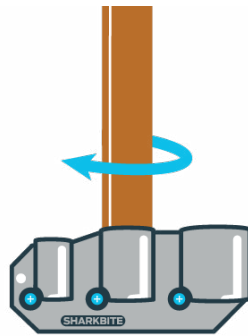
## Installation

1. All pipe should be free of damage or debris. Cut copper pipe with a tube cutter. Do not use a hacksaw, as this will cause damage to the pipe ends.
2. Deburr the end of the pipe using the SharkBite F702 Deburring tool. Be sure to remove any sharp edges that may damage the O-Ring, as this will cause failure.
3. Mark the pipe with a marker, using the SharkBite F702 Gauge to determine the correct insertion depth.
4. Push the pipe into the fitting to the mark made in step 3. The mark should rest against the collar of the fitting, indicating correct insertion depth.



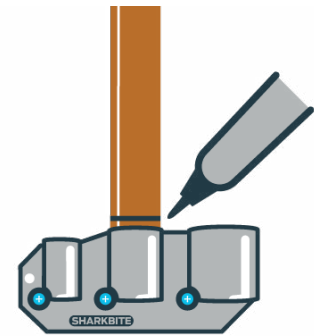
### Cut

Using a pipe cutter, cut the copper tube to length, making sure the pipe is cut squarely. Ensure pipe is round, clean and free of debris.



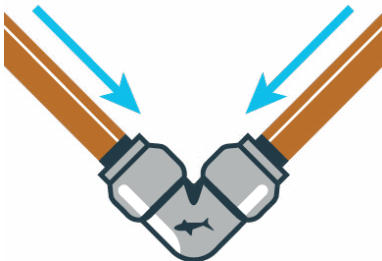
### Deburr

Remove burrs from the pipe using the SharkBite Deburrer and Depth Gauge.



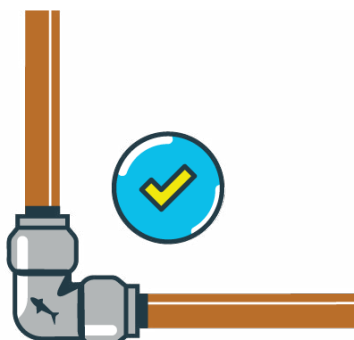
### Mark

Mark the pipe with a marker using the Depth Gauge.



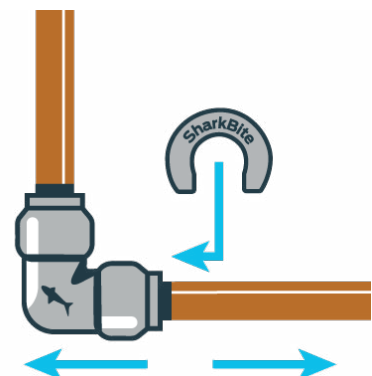
### Push

Insert the pipe by pushing firmly until a positive click is heard.



### Done

Ensure the mark made with Depth Gauge aligns with the release collar.



### Disassembly

Using the Disassembly Clip, fittings can be easily changed, removed and the fittings reused.

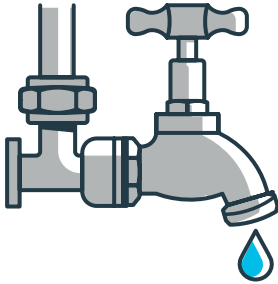
*Installation per AS/NZS 3500*

## Disconnecting Fittings

SharkBite fittings are designed to accommodate simple changes during installation.

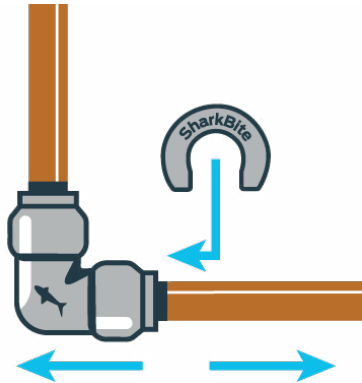
When reusing fittings, ensure the fitting and pipe connection have not been compromised before reinstalling. Visit the Installation Trouble Shooting section for more details.

Additionally, copper tube connected to a SharkBite fitting does not guarantee electrical continuity.



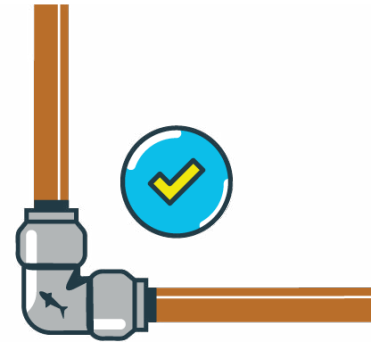
### Relieve Pressure

Ensure all system pressure has been relieved and drained where possible, although draining is not mandatory. SharkBite can be installed wet or dry.



### Disconnect

Place the Disconnection Clip over the pipe with the flat face towards the fitting release collar. Apply pressure to the clip against the collar, and with your free hand, remove the pipe.



### Re-use

Refer to the SharkBite Installation procedure when remaking a joint.

**Note:** Always recut pipe as damage may have been done during disconnection.

## Use approved SharkBite Disconnection tools

### DISCONNECTION CLIPS

\*Suitable for use on 16mm & 20mm pipes only



## Installation Requirements

Installation is subject to the requirements of the applicable regulatory authority, the National Construction Code Volume Three – Plumbing Code of Australia, associated reference standards as applicable at the time and AS/NZS 3500. This product is compliant to the Lead Free requirements of the National Construction Code Volume Three. For further Scope of Use, please visit [www.rmc.com.au](http://www.rmc.com.au)

The SharkBite Push-to-Connect Plumbing System is simple and effective when executed in accordance with the jointing procedures in this manual. However, if sufficient care is not taken, this can result in an ineffective joint.

SharkBite fittings are not suitable for use on stainless steel pipe.

## Installation Best Practice

- ALL SharkBite O-Rings are pre-lubricated during manufacture, do not apply additional lubrication.
- Cut the pipe square – use SharkBite cutting tools with sharp, undamaged cutting blades to ensure a clean, square cut. Do not use a hacksaw when cutting copper pipe and use the SharkBite Deburring & Gauge Tool to ensure the ends are free from burrs.
- Keep it clean – ensure your SharkBite PEX and fittings are free from building-site contamination such as dirt, sand, sawdust, concrete dust etc.
- To ensure fittings stay clean and the O-Ring is protected from damage, fittings must be kept in their original packaging until immediately prior to installation .
- Push the pipe all the way in – use the Safe Seal Indicator Marks on PEX or the SharkBite Deburring & Gauge Tool as a depth indicator on copper to ensure the pipe has achieved full insertion .
- If the pipe is difficult to insert or will not engage into the fitting do not force the pipe. Remove and check for obstructions inside the fitting and check for damage to the end of the pipe.
- If SharkBite pipe is to be refitted to a SharkBite fitting, it is important to trim the pipe before remaking the joint.
- SharkBite fittings are not to be installed back to back. A minimum distance of 1 Safe Seal Indicator Mark for PEX and 25mm for copper, is required.
- If you are soldering/sweating copper pipe solder/sweat all connections first then make the SharkBite connections – Do NOT solder next to SharkBite connection.
- SharkBite copper fittings may be used on annealed copper tube, however, achieving a watertight connection may be difficult. Using an alternate connection method may be more suitable.
- Always pressure test with water on completion and before covering the pipe.
- Always look for the shark – beware of imitators, you can tell genuine SharkBite fittings from the embossed shark icon on the body of the fitting.



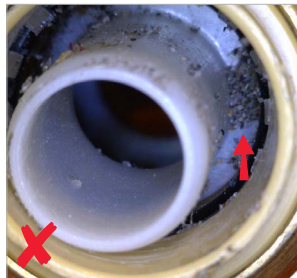


### Ineffective Joints Most Often Occur When:

- There is debris or foreign matter inside the fitting
- The PEX or copper pipe has not been cut square
- The PEX or copper pipe has rough edges, cuts, abrasions or other damage
- The PEX pipe has been cut with blunt or damaged tools
- The copper pipe has been cut with a hack-saw
- Correct pipe insertion depth has not been achieved



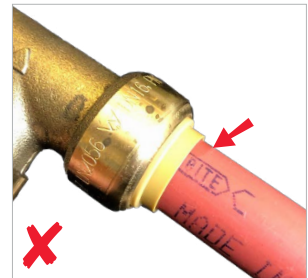
Cutting tool  
damaged



Dirt/debris inside  
fitting



Pipe has not been  
cut square



Short engagement  
– pipe not inserted  
correctly

### If an ineffective joint is detected

- Disconnect the defective joint and recut the pipe to ensure it is square and free from damage
- Check the fitting is clean and there has been no damage to the grab ring or O-Ring
- Re-install the fitting as per instructions in this manual
- If the joint fails a pressure test, discard fitting and repeat these steps with a new fitting



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