

PTL SERIES - PLASTIC TWISTLOC® FITTINGS & VALVES

Twistloc®, the twist and lock system, is a fully demountable and reusable system that combines push-fit and compression fitting systems, re-designed for residential and commercial Copper Tube Size (CTS) copper, CPVC, PE-RT, PB and PEX pipe plumbing systems. Suitable for cold and hot potable water supply and central heating systems. Tube stiffeners are required for PEX pipe connections and come installed in each fitting (Boshart part series PTL-Sxx). This stiffener can be removed if installing on copper pipe for improved flow. (It does not have to be removed and will not improve flow if you are making a transition from copper to PEX piping.) Excellent for installation or repair where there is a fire risk due to open flame, as no heat is required. Twistloc® fittings are not suitable for burial.



FEATURES:

- Available for 1/4" through 1-1/8" O.D. copper tube size (CTS) piping material such as; Copper, PEX and CPVC
- Ideal for transitioning between different types of piping. Certified for use with Copper, CPVC, PE-RT, PB and PEX pipe, making it easy to combine different types of pipe for repairs or new installations
- White fittings with color coded rings for easy size recognition
- Resistant to temperature and pressure beyond the normal operation ranges
- Easy verification of coupling (lock/unlock) status at a distance. Secure connections indicator helps confirm leak free joints. Once the colored band can no longer be seen, the joint is properly connected
- Removable and reusable without damage to plumbing or fittings
- Lightweight, permanent anti-leak connection, no corrosion or scale deposits
- Low heat diffusion ensures safe surface temperature
- Approved for antifreezes which are based on Ethylene and Glycol mixtures only
- No heat source or open flame is required, no need to use locking clip
- More resistant to bursting under freezing temperatures
- Suitable for use outdoors, but should be painted (water or oil based with undercoat) or covered with insulation to protect against UV exposure



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SPECIFICATIONS:

- Manufactured to ISO 9001 BSI Standard - Quality Management
- BSI 7291 - Thermoplastics pipes and associated fittings for hot and cold water for domestic purposes and heating installations in buildings
- ASSE 1061 - Performance Requirements for Push-Fit Fittings
- IGC 188 - Removable and Non-Removable Push-Fit Fittings
- ASTM F877 - Standard Specification for Crosslinked Polyethylene (PEX) Hot and Cold Water Distribution Systems

CERTIFICATIONS:

- NSF/ANSI/CAN Standard 372 Certified (Drinking Water System Components - Lead Content)
- NSF/ANSI/CAN Standard 61 Certified (Drinking Water System Components - Health Effects)
- NSF/ANSI/CAN Standard 14 Certified (Plastics Piping System Components and Related Materials)

CAUTIONS:

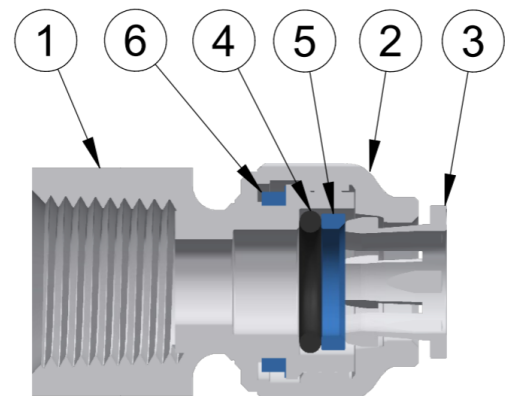
- Plastic Twistloc® fittings MUST NOT be used in gas, oil, or compressed air applications
- They should not come into contact with any chemical or foreign substance such as paint strippers, solder flux, acid based descalents or chemicals
- Fittings may melt, crack, or distort if exposed to open flames or excessive heat
- Do not use pipe or thread sealant, or Teflon paste to seal fittings
- Do not insert fingers into fittings as the stainless steel teeth may cause injury
- Do not apply any impact force to fittings
- If PEX pipe is used, then a tube support must be used
- Twistloc® fittings are not suitable for direct burial

Size / Colour Code			
Size code	Nominal CTS Size	Tube Outside Diameter (Inch)	
PTL-xx01	1/8"	0.250"	1/4"
PTL-xx02	1/4"	0.375"	3/8"
PTL-xx03	3/8"	0.500"	1/2"
PTL-xx05	1/2"	0.625"	5/8"
PTL-xx07	3/4"	0.875"	7/8"
PTL-xx10	1"	1.125"	1-1/8"

Fittings and Valve Performance			
Application	Usual Temp	Max Temp	Pressures
Cold Water	68°F (20°C)	68°F (20°C)	174 PSI (12 bar)
Hot Water	149°F (65°C)	203°F (95°C)	87 PSI (6 bar)
Central Heating	179.6°F (82°C)	237.2°F (114°C)	43 PSI (3 bar)

Pressure rating charts should be used as a guide only. For pressures or temperatures over the stated maximum independent testing by the end user is recommended. It is solely the user's responsibility to determine the suitability of the fitting for the intended service.

MATERIAL LIST		
Part No.	Name	Material
1	Body	Polysulfone
2	Cap	Nylon
3	Collet	Nylon
4	O-Ring	EPDM (Ethylene Propylene Diene Monomer)
5	Insert Ring	Acetal
6	Size Indicator Ring	Acetal



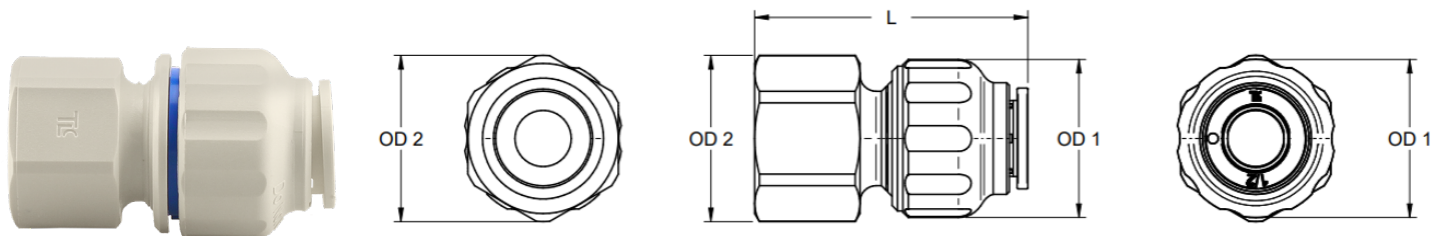
User Responsibility Statement: It is the user's sole responsibility to determine the product's suitability for its intended use. For full details, visit Boshart Industries [Reference Documents](#) or our User Safety Responsibility Statement and other important documents.

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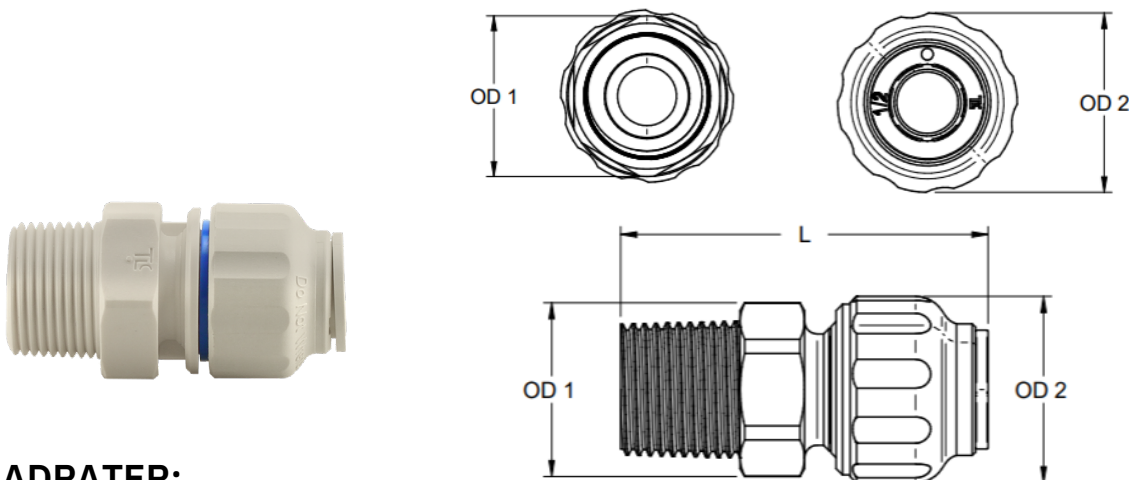


FITTINGS:



FEMALE ADAPTER:

DIMENSIONS									
Part No.	Size (CTS x FPT)	Length (L)		Outside Diameter 1 (OD1)		Outside Diameter 2 (OD2)		Weight	
		in	mm	in	mm	in	mm	lbs	grams
PTL-FA0305	3/8" CTS x 1/2" FPT	2.11	53.70	1.10	28.00	1.35	34.20	0.06	27.22
PTL-FA05	1/2" CTS x 1/2" FPT	2.20	56.00	1.35	34.20	1.35	34.20	0.07	31.75
PTL-FA0507	1/2" CTS x 3/4" FPT	2.26	57.50	1.35	34.20	1.65	42.00	0.08	36.29
PTL-FA07	3/4" CTS x 3/4" FPT	2.39	60.70	1.65	42.00	1.65	42.00	0.06	27.22
PTL-FA10	1" CTS x 1" FPT	2.99	75.90	1.99	50.50	1.99	50.50	0.19	86.18



MALE ADAPTER:

DIMENSIONS									
Part No.	Size (CTS x MPT)	Length (L)		Outside Diameter 1 (OD1)		Outside Diameter 2 (OD2)		Weight	
		in	mm	in	mm	in	mm	lbs	grams
PTL-MA0305	3/8" CTS x 1/2" MPT	2.36	60.00	1.15	29.10	1.35	34.20	0.05	22.68
PTL-MA05	1/2" CTS x 1/2" MPT	2.57	65.40	1.35	34.20	1.35	34.20	0.03	13.61
PTL-MA0507	1/2" CTS x 3/4" MPT	2.54	64.50	1.35	34.20	1.65	42.00	0.08	36.29
PTL-MA07	3/4" CTS x 3/4" MPT	2.74	69.50	1.65	42.00	1.65	42.00	0.11	49.90
PTL-MA10	1" CTS x 1" MPT	3.19	81.00	1.99	50.50	1.99	50.50	0.17	77.11

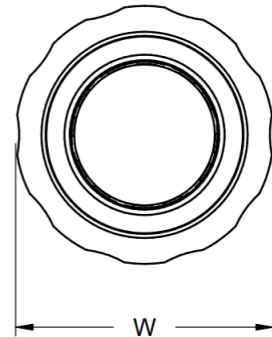
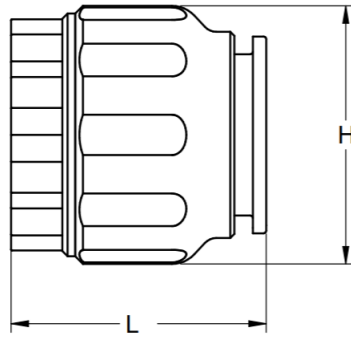
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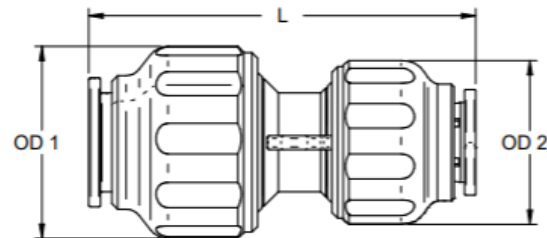
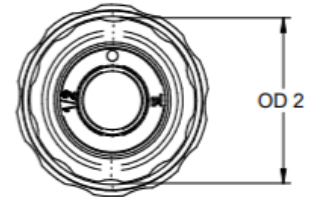
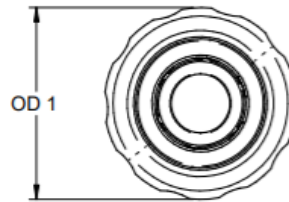
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CAP:

DIMENSIONS									
Part No.	Size (CTS)	Length (L)		Width (W)		Height (H)		Weight	
		in	mm	in	mm	in	mm	lbs	grams
PTL-CA05	1/2" CTS	1.51	38.30	1.35	34.20	1.35	34.20	0.05	22.68
PTL-CA07	3/4" CTS	1.72	43.70	1.65	42.00	1.65	42.00	0.09	40.82
PTL-CA10	1" CTS	1.99	50.50	1.99	50.50	1.99	50.50	0.13	58.70



COUPLING:

DIMENSIONS									
Part No.	Size (CTS x CTS)	Length (L)		Collar Outside Diameter 1 (OD1)		Collar Outside Diameter 2 (OD2)		Weight	
		in	mm	in	mm	in	mm	lbs	grams
PTL-C03	3/8" CTS x 3/8" CTS	2.55	64.80	1.15	29.10	1.15	29.10	0.06	27.22
PTL-C05	1/2" CTS x 1/2" CTS	2.91	74.00	1.35	34.20	1.35	34.20	0.09	31.30
PTL-C0503	1/2" CTS X 3/8" CTS	2.74	69.50	1.35	34.20	1.15	29.10	0.08	36.29
PTL-C07	3/4" CTS x 3/4" CTS	3.32	84.40	1.65	42.00	1.65	42.00	0.15	68.04
PTL-C0705	3/4" CTS X 1/2" CTS	3.12	79.20	1.65	42.00	1.35	34.20	0.13	58.97
PTL-C10	1" CTS x 1" CTS	3.80	96.60	1.99	50.50	1.99	50.50	0.25	113.40
PTL-C1007	1" CTS X 3/4" CTS	3.56	90.50	1.99	50.50	1.65	42.00	0.20	91.3

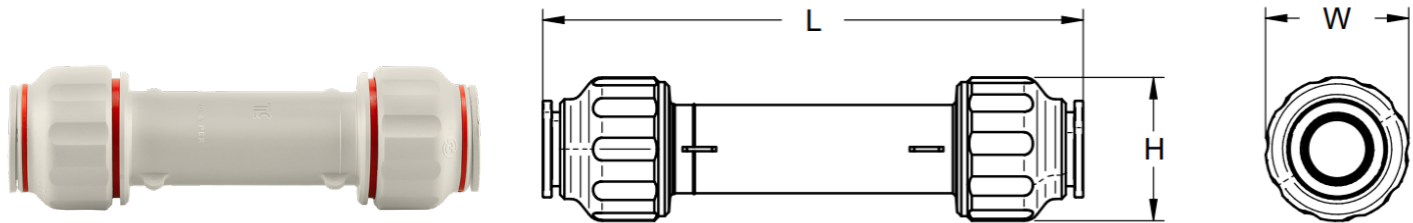
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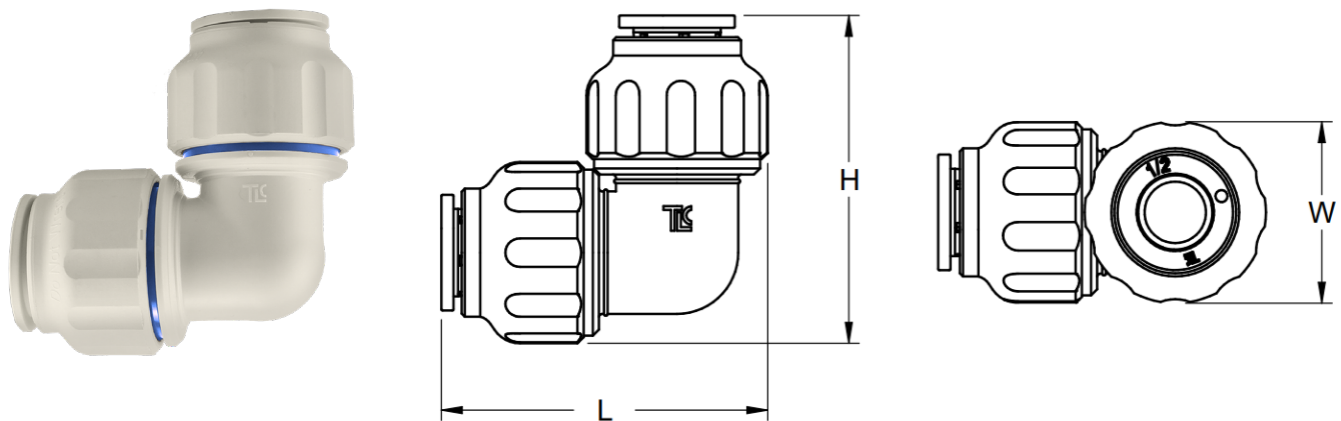
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REPAIR COUPLING:

DIMENSIONS									
Part No.	Size (CTS x CTS)	Length (L)		Width (W)		Height (H)		Weight	
		in	mm	in	mm	in	mm	lbs	grams
PTL-SC05	1/2" CTS x 1/2" CTS	5.10	129.50	1.35	34.20	1.35	34.20	0.11	49.90
PTL-SC07	3/4" CTS x 3/4" CTS	5.39	136.90	1.54	39.00	1.54	39.00	0.18	81.64



90° Elbow:

DIMENSIONS									
Part No.	Size (CTS x CTS)	Length (L)		Width (W)		Height (H)		Weight	
		in	mm	in	mm	in	mm	lbs	grams
PTL-E03	3/8" CTS x 3/8" CTS	2.11	53.50	1.15	29.10	2.11	53.50	0.07	31.75
PTL-E05	1/2" CTS x 1/2" CTS	2.48	62.90	1.35	34.20	2.48	62.90	0.10	45.36
PTL-E07	3/4" CTS x 3/4" CTS	2.94	74.70	1.65	42.00	2.94	74.70	0.06	27.22
PTL-E0705	3/4" CTS x 1/2" CTS	2.77	70.30	1.65	42.00	2.79	70.80	0.15	68.04
PTL-E10	1" CTS x 1" CTS	3.46	87.90	1.99	50.50	3.46	87.90	0.27	122.47

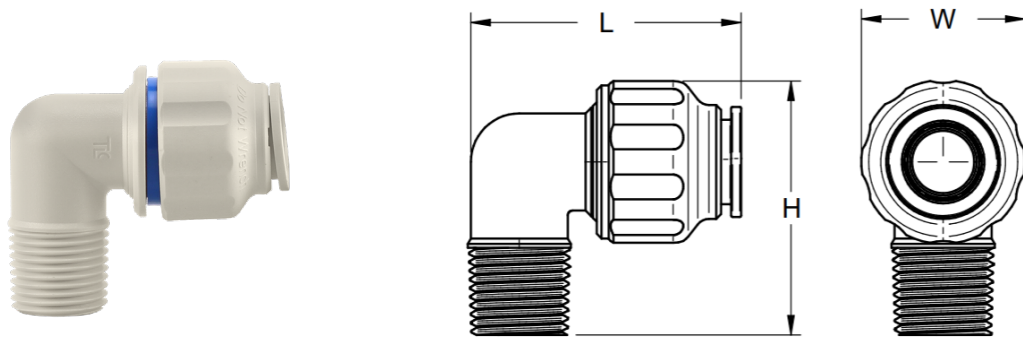
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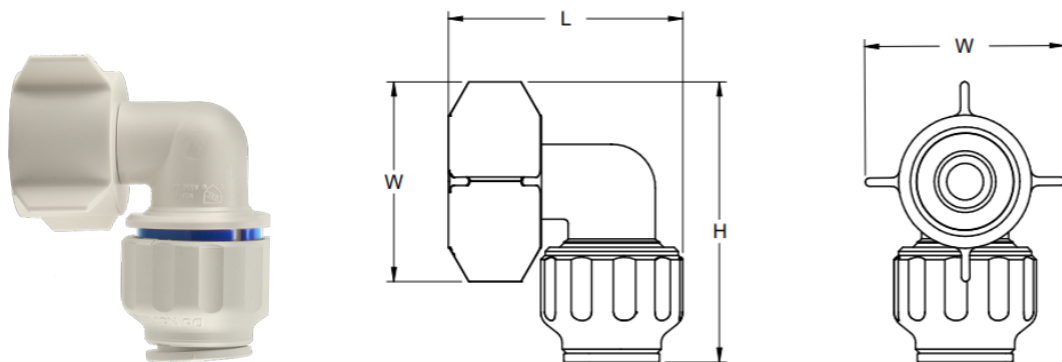
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90° Elbow:

DIMENSIONS									
Part No	Size (CTS x MPT)	Length (L)		Width (W)		Height (H)		Weight	
		in	mm	in	mm	in	mm	lbs	grams
PTL-ME05	1/2" CTS x 1/2" MPT	2.26	57.30	1.35	34.20	2.10	53.30	0.07	31.75



90° ELBOW:

DIMENSIONS									
Part No	Size (CTS x GHT Swivel)	Length (L)		Width (W)		Height (H)		Weight	
		in	mm	in	mm	in	mm	lbs	grams
PTL-FSEGH	1/2" CTS x 3/4" GHT Swivel	2.22	56.30	1.87	47.50	2.74	69.50	0.10	45.36

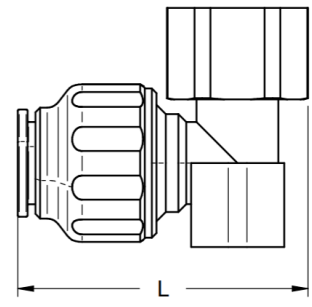
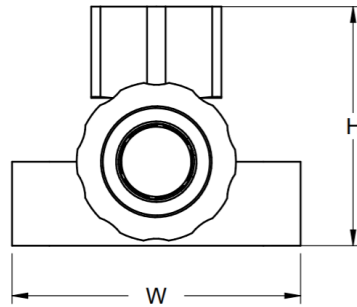
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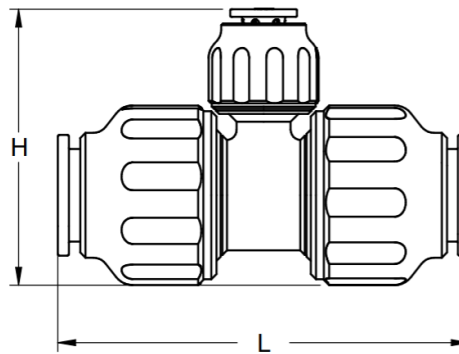
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DROPEAR 90° ELBOW:

DIMENSIONS									
Part No	Size (CTS x FPT)	Length (L)		Width (W)		Height (H)		Weight	
		in	mm	in	mm	in	mm	lbs	grams
PTL-DE05	1/2" CTS x 1/2" FPT	2.48	63.00	2.44	62.00	2.01	51.00	0.12	52.20



TEE:

DIMENSIONS									
Part No.	Size (CTS x CTS x CTS)	Length (L)		Width (W)		Height (H)		Weight	
		in	mm	in	mm	in	mm	lbs	grams
PTL-T03	3/8" CTS x 3/8" CTS x 3/8" CTS	3.06	77.70	1.16	29.50	2.11	53.50	0.10	45.36
PTL-T05	1/2" CTS x 1/2" CTS x 1/2" CTS	3.61	91.60	1.35	34.20	2.48	62.90	0.14	63.50
PTL-T050501	1/2" CTS x 1/2" CTS x 1/8" CTS	3.09	78.60	1.35	34.20	2.07	52.50	0.11	49.90
PTL-T07	3/4" CTS x 3/4" CTS x 3/4" CTS	4.23	107.40	1.65	42.00	2.94	74.70	0.22	99.79
PTL-T070505	3/4" CTS x 1/2" CTS x 1/2" CTS	3.78	96.00	1.65	42.00	2.77	70.30	0.19	86.18
PTL-070705	3/4" CTS x 3/4" CTS x 1/2" CTS	3.95	100.40	1.99	50.50	2.77	70.30	0.22	99.79
PTL-T10	1" CTS x 1" CTS x 1" CTS	4.95	125.60	1.99	50.50	3.46	87.90	0.39	196.90
PTL-101007	1" CTS x 1" CTS x 3/4" CTS	4.061	117.00	1.99	50.50	3.30	83.80	0.35	158.76

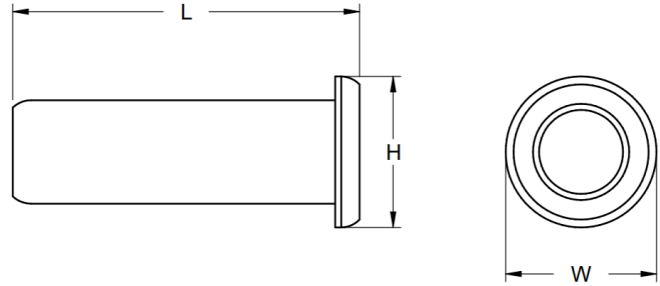
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TUBE SUPPORT:

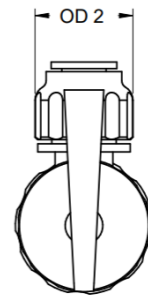
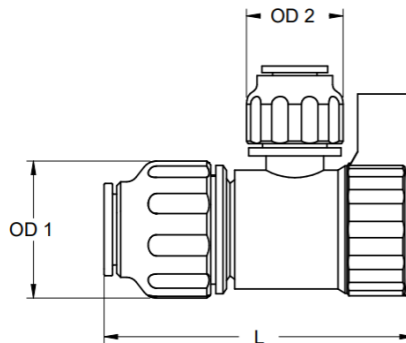
DIMENSIONS									
Part No.	Size (CTS)	Length (L)		Width (W)		Height (H)		Weight	
		in	mm	in	mm	in	mm	lbs	grams
PTL-S01	1/8" CTS	0.80	20.20	0.24	6.15	0.24	6.15	0.01	0.05
PTL-S02	1/4" CTS	0.92	23.30	0.37	9.30	0.37	9.30	0.01	0.33
PTL-S03	3/8" CTS	1.12	28.50	0.49	12.40	0.49	12.40	0.01	0.61
PTL-S05	1/2" CTS	1.30	33.00	0.62	15.75	0.62	15.75	0.01	1.16
PTL-S07	3/4" CTS	1.48	37.60	0.87	22.00	0.87	22.00	0.01	1.93
PTL-S10	1" CTS	1.67	42.30	1.10	28.00	1.10	28.00	0.01	2.34

VALVES:

RATINGS:

- Max Temperature Rating: 149°F (65°C)

Working Temperatures and Pressures	
Usual Temp	Pressures
1°C	10 bar
20°C	10 bar
65°C	7 bar



ANGLE SUPPLY VALVE:

DIMENSIONS									
Part No.	Size (CTS x CTS)	Length (L)		Outside Diameter 1 (OD1)		Outside Diameter 2 (OD2)		Weight	
		in	mm	in	mm	in	mm	lbs	grams
PTLSVA-0502	1/2" CTS x 1/4" CTS	3.05	77.50	2.25	57.20	1.35	34.20	0.14	63.50

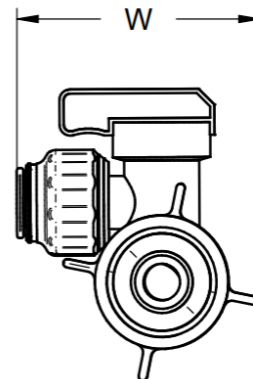
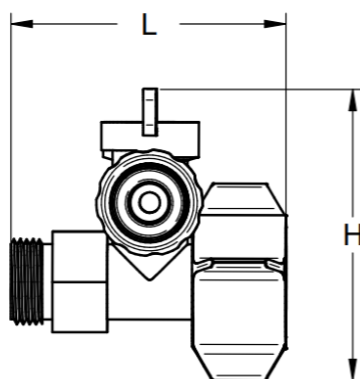
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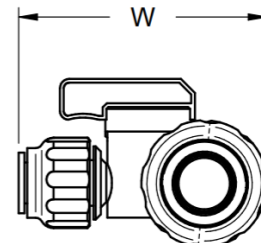
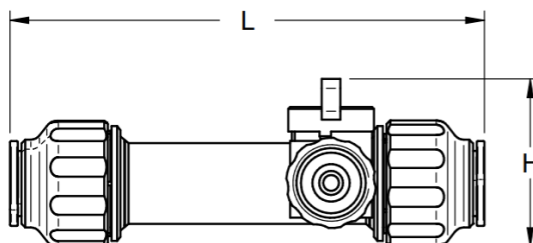
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VALVE ADAPTER:

DIMENSIONS									
Part No.	Size (GHT Swivel x MPT x CTS)	Length (L)		Width (W)		Height (H)		Weight	
		in	mm	in	mm	in	mm	lbs	grams
PTLVA-0301	3/8" GHT Swivel x 3/8" MPT x 1/8" CTS	2.12	53.80	1.81	46.00	2.28	58.00	0.07	31.75
PTLVA-0302	3/8" GHT Swivel x 3/8" MPT x 1/4" CTS	2.12	53.80	1.89	48.00	2.28	58.00	0.08	36.29
PTLVA-0501	1/2" GHT Swivel x 1/2" MPT x 1/8" CTS	2.64	67.00	2.09	53.00	2.56	65.00	0.09	40.82
PTLVA-0502	1/2" GHT Swivel x 1/2" MPT x 1/4" CTS	2.64	67.00	2.17	55.00	2.56	65.00	0.10	45.36



TEE VALVE:

DIMENSIONS									
Part No.	Size (CTS x CTS)	Length (L)		Width (W)		Height (H)		Weight	
		in	mm	in	mm	in	mm	lbs	grams
PTLSCTV-0501	1/2" CTS x 1/8" CTS	5.12	130.00	2.44	62.00	1.73	44.00	0.15	68.04
PTLSCTV-0502	1/2" CTS x 1/4" CTS	5.12	130.00	2.56	65.00	1.73	44.00	0.16	72.57

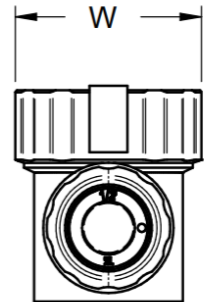
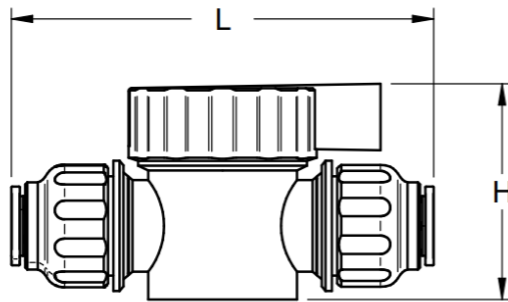
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STRAIGHT SUPPLY VALVE:

DIMENSIONS									
Part No.	Size (CTS x CTS)	Length (L)		Width (W)		Height (H)		Weight	
		in	mm	in	mm	in	mm	lbs	grams
PTLSVS-03	3/8" CTS x 3/8" CTS	3.46	87.80	1.30	32.90	1.81	46.00	0.16	72.57
PTLSVS-05	1/2" CTS x 1/2" CTS	4.22	107.20	1.57	40.00	2.03	51.50	0.20	90.72
PTLSVS-0501	1/2" CTS 1/8" CTS	4.02	102.20	1.57	40.00	2.03	51.50	0.17	77.11
PTLSVS-07	3/4" CTS x 3/4" CTS	4.83	122.80	1.96	49.70	2.39	60.80	0.34	154.22

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PTL SERIES - PLASTIC TWISTLOC® INSTALLATION INSTRUCTIONS

CAUTION:

Do not apply any impact force to Twistloc® fittings.

Twistloc® fittings are made of plastic materials and should not be treated the same as metals.

Twistloc® fittings may melt, crack or distort if exposed to open flames or excessive heat.

Do not use pipe sealant, thread sealants or Teflon® paste to seal threaded fittings. All the connections to Twistloc® fittings are either a mechanical compression type, or seal with a rubber gasket and do not require any other forms of sealant. Do not insert fingers into Twistloc® fittings as the stainless steel teeth may cause injury.

If PEX pipe is used, then a tube support liner must be used also. The tube support liner acts as an internal support for the end of the pipe.

Twistloc® fittings should not be used for gas, fuel oil or compressed air applications.

DO NOT allow contact with any chemical or foreign substance; paint strippers, solder flux, acid based descalents or chemicals.

Twistloc® fittings are not suitable for buried installation.

All Twistloc® fittings and related products should be selected, installed, used and maintained in accordance with these Technical Specifications.

Ensure that there are no scratches, gouges or any form of damage on the circumference of the pipe within 1 in. (25.4mm) of the cut end. Damage in this area may cause leaking. Check the fitting for any signs of damage or foreign objects.

Do not use a damaged or scored pipe.

Do not leave burrs on the pipe.

Ensure that the pipe is pushed into the fitting fully and is engaged properly in accordance with the instructions.

* If the pipe is not fully inserted, the connection cannot be properly sealed even if the fitting is coupled.

* If these installation guidelines conflict or are inconsistent with local building or plumbing codes, any codes applicable to parallel plumbing systems shall prevail.

Maximum Torque Figures		
Material	Thread Size	Max Torque (Nm)
Plastic	1/2"	3.5
	3/4"	4
	1"	5

The listed values are based on an average of the maximum applied torque and should be used as a guide only. Actual results may vary.

TWISTLOC® VALVE INSTALLATION:

STEP 1: Shut off existing stop valve and disconnect riser from the valve.

STEP 2: Connect stop valve to the water valve.

STEP 3: Connect riser to the valve.

STEP 4: Push fitting onto the end of the pipe, until it reaches the pipe stop. Twist screw cap until the colored ring is no longer visible.

STEP 5: Pull pipe away from fitting to ensure a tight fit.

STEP 6: Test system to ensure it is watertight.



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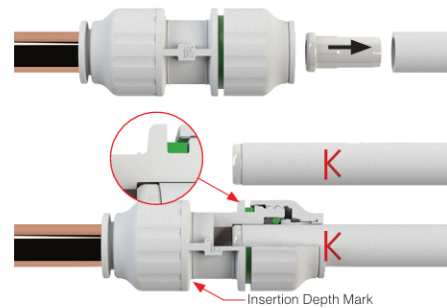
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TWISTLOC® FITTING INSTALLATION:

STEP 1: Cut the pipe squarely using a plastic pipe cutting tool. Ensure the outside of the pipe is free of burrs and score marks. Push tube support into the pipe (not required when using copper pipe).

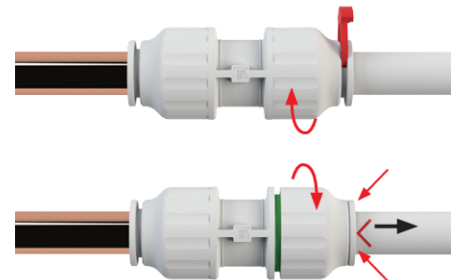
STEP 2: Measure and mark the insertion depth on the pipe. Push fitting onto the end of the pipe until it reaches the pipe stop and insertion depth marking.



Millimeters	Pipe Size (OD)	10mm	15mm	16mm	20mm	22mm	28mm
	Insertion Depth	22mm	30mm	32mm	36mm	36mm	41mm
Inches	Pipe Size (OD)	1/4"	3/8"	1/2"	5/8"	7/8"	1-1/8"
	Insertion Depth	20mm	22mm	27mm	32mm	27mm	41mm

STEP 3: Twist the screw cap until the coloured ring is no longer visible. Only use hand force to twist the screw cap.
****Using a wrench or other tools can easily damage the fitting and would not be covered by warranty****

STEP 4: To DISCONNECT: Make sure that the system is depressurized. Unlock fitting by twisting until coloured ring is visible. Press collet squarely against the face of the fitting. With the collet depressed, pull on the pipe to remove it from the fitting.



REPAIR COUPLING INSTALLATION:

- 

Ensure that the damaged pipe is clean.
- 

Cut out the damaged section of pipe. Ensure the pipe is cut square and that the pipe surface is clean and free of debris before installation.
- 

Connect the slip end to the pipe first, then slide the fitting into position and align it with the opposite pipe. Tighten the screw cap by hand until the colored ring is no longer visible. Do not use a wrench or other tools, as they may damage the fitting and void the warranty.
- 

Connect the fitting to the opposite pipe and ensure it is properly aligned. Tighten the screw cap by hand until the colored ring is no longer visible. Gently pull on the pipe to confirm the connection is secure. Test the system to ensure it is watertight.

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Connect to other Brands of pipe

Twistloc® insists on rigorous testing to ensure that all of the pipes and fittings are manufactured within certain tolerances. As we are unable to guarantee those tolerances used by other manufacturers, we are unable to recommend our fittings be used with any other plastic pipe or fittings be used with ours.

End Stop

If necessary, Twistloc® not only provides a permanent leak-prevention sealing, but also enables immediate removal and system extension for re-work. In particular, this is a Push-in design for easy use. The Stop End is also useful in system pressure testing prior to connection works. Fully push in the pipe and pull to check it is secure. The release, depress the collet and pull out the pipe

Pipe Bending

To maintain the pipe radius. (Pipe bends not supplied by Boshart)

For sharp bends, standard elbow fittings can be used. For slight bends it is possible to use the flexibility of the pipe to produce a bend which can be clipped into shape, or tighter still with the cold forming bends, subject to the following limits.

Pipe Size (OD)	3/8" & 1/2"	5/8"
	10 & 12mm	15 & 16mm
Min Radius with Clips	100mm	175mm
Min Radius with Cold Forming Bend	90mm	

Pipe inserts

Pipe inserts must be used with all plastic pipe installations and must be fully inserted. The Twistloc insert is suitable for both PEX and PB (polybutylene) pipes.

Double Seal Inserts

The Twistloc® pipe insert has been developed for use with barrier pipes and Twistloc® fittings to provide additional defenses when installing the Twistloc® push-fit system. The insert has its own O-ring which provides a secondary seal to the inside of the fitting with a stem sliding within the pipe's inner diameter.

Concealed pipework

When installing the Twistloc® system in concrete and masonry, the pipe should be run inside conduit pipe with access boxes for the fittings. This ensures that all pipe can be removed for replacement and maintenance, therefore complying with the requirements of the water regulations.

Concrete and masonry

If Twistloc® fittings are installed in conduit pipes with access boxes for fittings, they can be laid in concrete and masonry. This is to extend the pipe and provide access to both pipes and fittings. As specified in Schedule 2.7 to the Water Regulations and BS8000: Part 15, the fittings and pipes shall be detachable for possible replacement. Insulation is also recommended to protect against heat loss and frost effects.

Copper pipe connection

400 mm is the minimum distance for soldering to the copper pipe inserted into the Twistloc® fitting. Make sure that the residual flux and solder do not touch the fittings.

Connecting to a storage vessel

We offer a range of tank connectors in 15mm and 22mm options for connection to cold water storage tanks. During installation, do not use any joint compound on the connector. It should be tightened by hand as further mechanical tightening will damage the fitting.



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Connecting to boilers and heaters

A minimum length of 1 meter of copper pipe must be installed before connecting to a Twistloc pipework system. To avoid serious overheating, trapped air must be purged from the heating system before the boiler is operated. Always refer to the boiler manufacturer's installation instructions.

Continuously operated recirculating systems (secondary hot water circulation / ring main installations)

Plastic plumbing systems are not suitable for use on any continuously operated recirculating systems (secondary hot water circulation / ring main systems). These installations differ greatly from traditional domestic installations and therefore Twistloc® pipe and fittings may not be used.

Freezing for maintenance/system modification

We wouldn't recommend freezing techniques to carry out maintenance on our pipework or fittings. Ensure when installing the system that there are suitable isolation valves used for maintenance purposes.

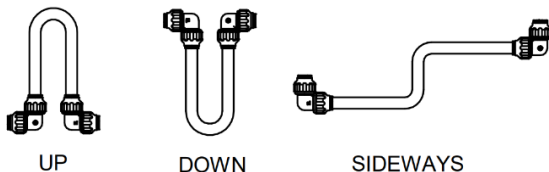
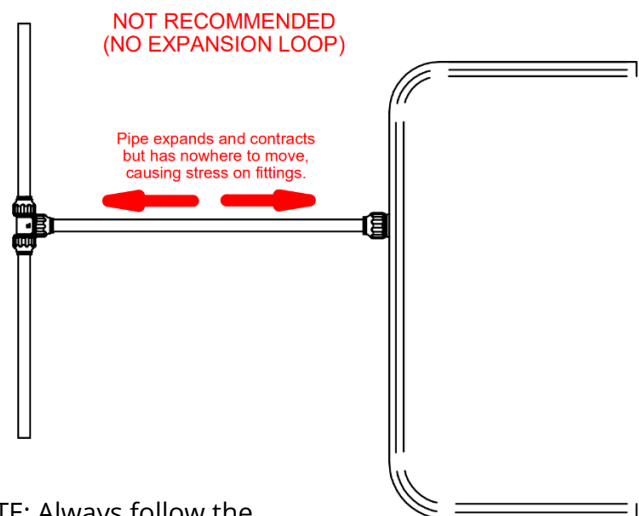
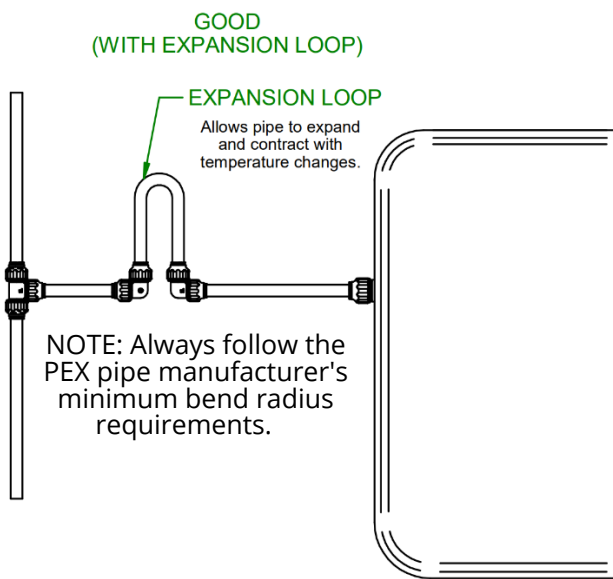
Freezing conditions

Our plastic pipe can be used in freezing conditions. However, to minimize potential failure, the below steps should be followed:

- Make sure that metal to plastic pipe connections are made in an area where freezing will not occur.
- Ensure fittings are placed 150mm away from areas where freezing may occur to ensure there is enough free pipe to absorb the expansion caused by freezing.
- Insulate plastic pipe and fittings where freezing conditions may occur.

Expansion Loops

Expansion loops are intentional bends or loops installed in the piping to accommodate the natural expansion and contraction of plastic pipe caused by temperature changes. They help reduce stress on the piping system and fittings, preventing excessive strain, leaks, or damage. When installing Twistloc® fittings, expansion loops should be incorporated where required to ensure long-term system performance and reliability.



NOTE: Always follow the pipe fitting manufacturer's installation instructions and local plumbing codes.

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