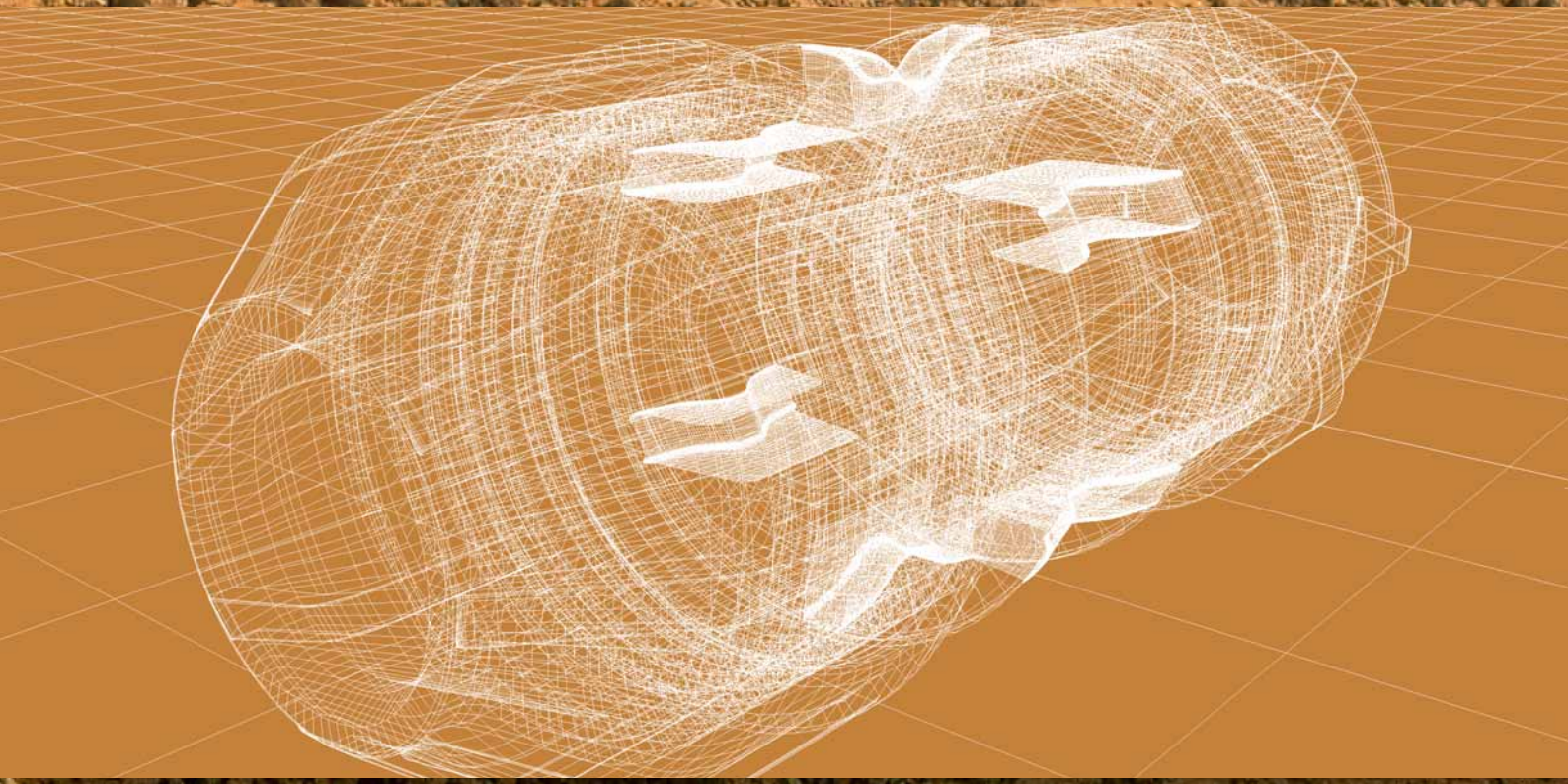
UNIVERSAL TRANSITION COUPLING

Technical Manual



Philmac®

The connection you can trust.

Quality System™

Quality Endorsed Company

ISO 9001-2000
License No. 2658
SAI Global

Environmental System™

Certified Environmental Management

ISO 14001 Lic CEM20307
SAI Global

NATA

NATA Accredited Laboratory Number: 14673

SYSTEM CERTIFICATION ISO 9001:2000 SGS

UKAS QUALITY MANAGEMENT 005

Committed to sustainable development, Philmac is well renowned for quality products and services. Philmac manufactures pipe fittings and valves under a Quality Assurance System assessed and approved to ISO 9001-2000 and has obtained the prestigious environmental management certification ISO 14000. Philmac has a NATA accredited laboratory and tests fittings and valves to international and national standards. Third party accreditation is carried out by SAI Global.

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Disclaimer

Please note that the information, opinions, recommendations and advice given in this manual are supplied only to provide an improved understanding of the technical aspects of fitting systems.

So far as the law allows, Philmac Pty Ltd will not accept liability in respect of any loss or damage of any kind claimed to arise as a result of reliance upon any information claimed in this manual.

Please refer to our Terms and Conditions of sale.

INTRODUCTION

Philmac, the global leader in the design and manufacture of plastic compression fittings, has developed a unique range of mechanical compression fittings that provide the ultimate in pipe connection flexibility.

The UTC® range is especially designed for connecting pipes that are made from a variety of different materials, such as polyethylene, galvanized iron, PVC, copper, ABS, lead and stainless steel.

In addition to winning an Australian Design Award in 1999 for innovation in product development, the UTC® has been embraced by water utilities right around the world, including Australia, the UK, Europe and North America.

BENEFITS

Complete Flexibility

Universal Design: Through its wide tolerance, the Philmac UTC® is designed to accommodate a range of different diameters on most pipe material (including copper, PE, PVC, lead, steel, galvanized iron, ABS and stainless steel).

Fast and Easy Installation

Slide & Tighten™ technology: The Philmac UTC® incorporates all the benefits of Philmac's Slide & Tighten™ technology.

Simply witness mark the pipe against the flange on the fitting, and then insert the pipe to the correct depth. The nut can then be tightened using a wrench. The UTC® is fully installed when the nut can no longer be tightened with reasonable force.

No special tools are required and the Philmac UTC® is supplied ready to use.

Easy Disassembly: The design of the UTC® means that once the nut is backed off, the pipe can easily be removed from the fitting

Complete Security

Dynamic Sealing Method: The mechanical advantage of the nut thread compresses the seal into position, eliminating resistance when inserting the pipe into the fitting, so there is no risk of seal distortion or displacement.

** Pipes at the top end of the fitting tolerance man incur minimum resistance.*

No Loose Components: The Philmac UTC® is fully integrated with no loose components. There is no need for individual assembly of a split ring, sealing ring or nut. All that is required is the insertion of the pipe and tightening of the nut.

Approvals: The Philmac UTC® holds a number of potable water approvals – WSAA and WaterMark (Australia); WRAS (UK) for above and below ground use; ACS (France); DTC (Denmark), CSA (Canada) and NSF (USA). The fittings are also manufactured to the highest standards in accordance with the company's ISO 9001:2000 Quality Endorsed status.

High Performance Materials

Made from advanced thermoplastic materials: The Philmac UTC® is manufactured from lightweight high performance thermoplastic materials with outstanding impact, UV, chemical and corrosion resistance. The UTC® end contains hard stainless steel grippers which provide superior end load resistance.

Rated to 1250KPa (181 PSI, 12.5 Bar): The Philmac UTC® is pressure rated to 1250KPa (12.5 bar) to meet the needs of high pressure systems.

50 year + design life: Built to withstand the toughest conditions to ensure longevity and durability, Philmac UTC® has a 50 year+ design life.

Complete Coverage

The Philmac UTC® range is comprehensive: Straight and reducing joiners, elbows, tees and male adaptors, in both transition (PE to UTC®) and double ended versions (UTC® to UTC®) ranging from 15mm to 61mm

STANDARDS

Philmac UTC® is designed to comply with the requirements of the following standards:

ATS 5200.458 Australian Technical Specification for Plumbing and Drainage Products, Part 458, Universal Transition Fitting.

AS/NZS 4020 Products for use in contact with water intended for human consumption with regards to their effect on the quality of water.

ISO 7.1 Pipe threads where pressure joints are made on the threads. Part 1 Dimensions, tolerances and designations.

AS/NZS 4129 Fittings for use with polyethylene (PE) pipes for pressure applications

NSF-61 (Canada & USA) Fitting materials approved for use in potable water applications

ACS (France) Fitting materials approved for use in potable water applications

BS6920 Fitting materials approved for use in potable water applications

ISO 14236 Plastic and pipe fittings for use with polyethylene pressure pipes in water supply systems

WIS-4-32-11 Specification for end load resistant mechanical fittings for PE pipes of nominal size less than or equal to 63mm

INSTALLATION INSTRUCTIONS – **UTC**®

(Joins PE, copper, stainless steel, ABS, galvanized iron, lead, steel or PVC pipes)

1. Cut pipe to length
Cut pipe square and to length using the flange on the central body as a guide. Ensure end of connecting pipe is undamaged and clean.

2. Ready to use position.
The fitting is pre-assembled and ready to use, however always ensure the nut is backed off and 3 threads are showing. Pipes at the top end of the fitting tolerance may require 5 threads showing.

3. Pipe insertion
To ensure adequate insertion depth, witness mark the pipe to the flange on the fitting. Then insert pipe to the correct depth.

4. Nut tightening
Tighten nut firmly with a wrench. Nut will not butt against the body flange when the pipe size is at the top end of the fitting tolerance.

5. Fully Installed
The fitting is fully installed when the nut cannot be tightened any further with reasonable force.

6. Disassembly
Unscrew the nut with a wrench. Pipe will be released and can be pulled out of the fitting.

- Use a pipe measuring gauge if there are doubts on pipe outside diameter (OD) size.
- Installation instructions are also applicable for the PE end.

SYSTEM DESIGN CONSIDERATIONS

Philmac UTC® is a range of mechanical fittings that offers three distinct advantages over thermofusion fittings;

- **The ability to transition from PE to any recommended pipe material**
- **The ability to connect multiple types of pipes together**
- **Quick and easy installation and disassembly**

This section highlights engineering considerations when designing a pipe system with Philmac UTC®.

Projected life of Compression Fittings

Whilst the Philmac UTC® conforms to institutionalised specifications written to have a minimum life of 50 years, its compression fittings are intentionally developed to exceed the expectations of these specifications.

Head losses

The following table offers a guide in estimating head losses in PE pipe systems based on the conveyance of water.
Use the following formula to estimate this head loss;

$L = F \times D$

where F = fitting constant
D = pipe inner diameter (m)
L = head loss based on equivalent pipe length (m)

Fitting	Fitting Constant (F)
90° elbow	30
90° tee - straight through	12
90° tee - side branch	60

Abrasion Resistance

Philmac UTC® is suitable for the transportation of abrasive slurries and will withstand normal conditions found in urban, mining, industrial, rural water and waste water systems.

Weathering

The materials used contain pigments to provide excellent protection against degradation from ultra-violet radiation. However, long term continuous use above ground does require fittings to be protected from direct sunlight.

Electrolytic Corrosion

The plastic body provides an effective means of isolation against electrolytic action when connecting two metal pipes. The stainless steel (grade 304) gripper teeth provide long term resistance to corrosion.

Thermal Insulation.

Polypropylene has natural thermal insulation of 2000 times over copper and 200 times over steel.

Light Transmission

The all black Philmac UTC® does not transmit light, thus protecting the water quality in potable water pipelines from growth of micro organisms.

Effect on Water.

Philmac UTC® does not impart to the water any odour, taste, colour, or any constituents in concentrations that could be injurious to health.

Fluids other than Water

Philmac UTC® may convey a wide variety of fluids. The following table is provided as a guide only for the compatibility of various chemicals to Philmac UTC®. Contact Philmac Technical Services for specific application.

CHEMICAL RESISTANCE

Chemical	Satisfactory	Not Satisfactory
Air	▲	
Ammonium Hydroxide	▲	
Alcohol	▲	
Acetone		▲
Auto Transmission Fluid	▲	
Antifreeze	▲	
Benzene		▲
Butane	▲	
Calcium Salts	▲	
Caustic Soda (40% aqueous)	▲	
Cresol		▲
Citric Acid (10% aqueous)	▲	
Copper Salts	▲	
Ethylene Alcohol	▲	
Ethyl Glycol	▲	
Diesel	▲	
Formic Acid		▲
Gasoline		▲
Hydrochloric Acid		▲
Kerosene		▲
Mineral Oils	▲	
Methane	▲	
Methylene Chloride		▲
Nitric Acid		▲
Petroleum Oils	▲	
Sewerage	▲	
Sodium Cyanide	▲	
Sulphuric Acid		▲
Toluene		▲
Turpentine		▲
Transformer Oil	▲	
Zinc Salt Solution	▲	
Note: Fluid Temperature = 20°c		

PRODUCT SPECIFICATION – FITTINGS FOR PE TO TRANSITION PIPE CONNECTION

Manufacturer Accreditation
Only fittings manufactured with a Quality System approved to ISO9001 or equivalent shall be accepted for use.

Product Performance Accreditation
Fittings for transitioning between a range of pipes including (PE) copper, galvanised iron, stainless steel, ABS, Lead and PVC shall be rated to 1250KPa or 12.5 bar

Threaded ends of fittings shall be tapered and conform to ISO 7.1 (specification for pipe threads for tubes and fittings where pressure tight joints are made on threads).

Product Body Material Accreditation
Fittings for Polyethylene (PE) pipes shall have a body made from materials tested in accordance with ISO 9080 (Plastic piping and ducting systems – determination of the long term hydrostatic strength of thermoplastic materials in pipe form by extrapolation).

Performance verification shall be according to test parameters outlined in Clause 8.3.2.2 of ISO14236 – Verification of long term behaviour.

Fittings shall be suitable for the conveyance of drinking water and shall conform to BS6920 (suitability of non metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of water).

Product Configuration / Material Overview
Fittings shall be of the compression fitting type.

Fitting bodies shall be of polypropylene material, nuts shall be of polypropylene or acetal material. Each fitting shall be supplied pre-assembled. Split rings shall be of acetal material with stainless steel grippers and the seal rings to be made of nitrile rubber.

Fitting colour shall be black so as to minimise potential light transmission and/or UV degradation.

Method of Connection
The seal of a joint will be achieved by nut tightening so as to obtain watertightness by a seal ring around the external diameter of the pipe.

Any pipe preparation will be limited to cutting and cleaning of pipe (for foreign material or burrs). Fittings shall not require the pipe to be lubricated or chamfered during installation.

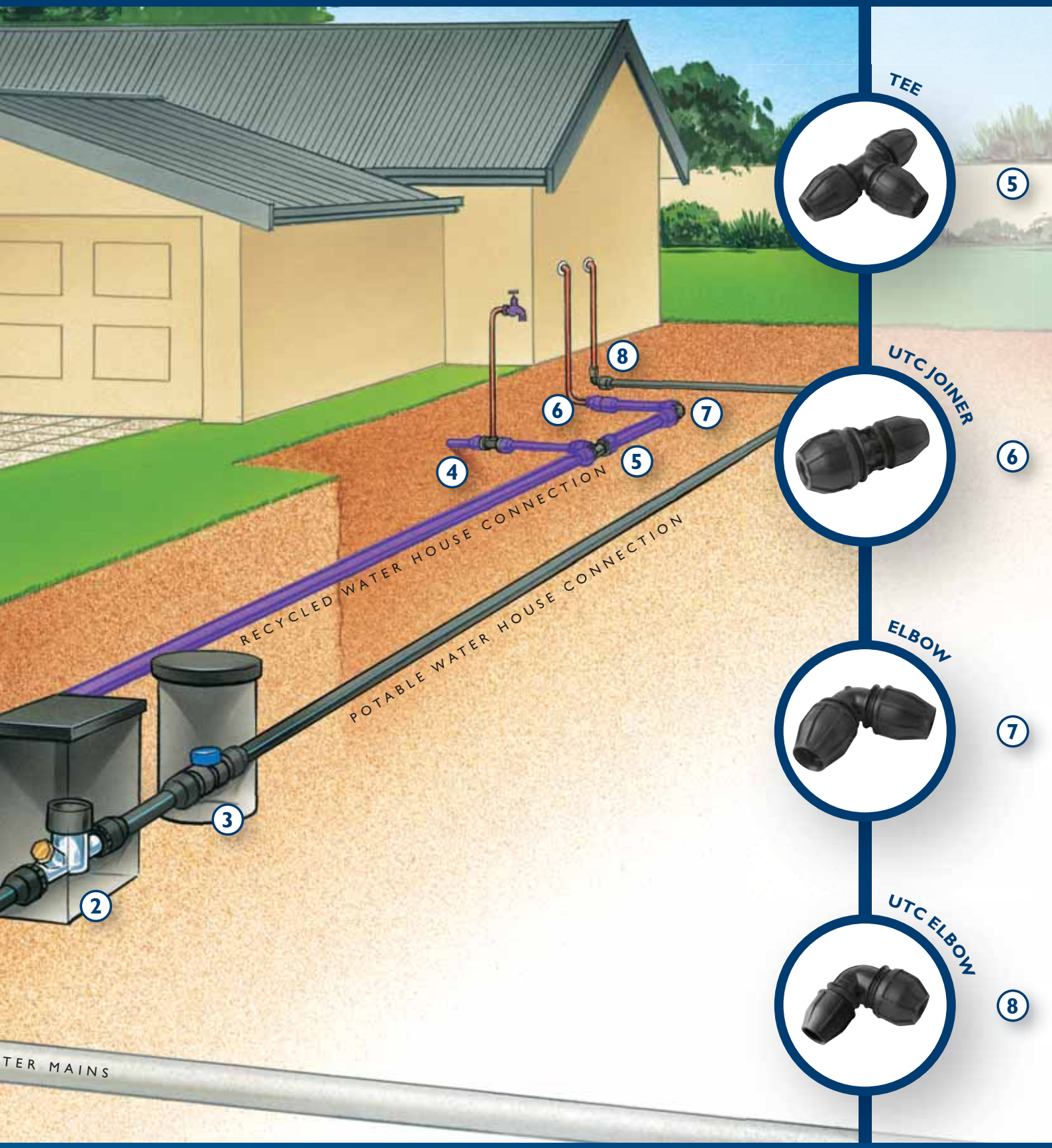
There shall be no loose components during assembly or disassembly (meaning that the fitting shall not be required to be dismantled during assembly or disassembly).

PARTS AND MATERIAL

		PIPE OUTSIDE DIAMETER RANGE						
No.	**Description**	**15-21**	**21-27**	**27-34**	**34-39**	**39-43**	**47-49**	**59-61**
1	Body	Black polypropylene	Black polypropylene	Black polypropylene	Black polypropylene	Black polypropylene	Black polypropylene	Black polypropylene
2	Nut	Black polypropylene	Black polypropylene	Black polypropylene	Black acetal	Black polypropylene	Black acetal	Black acetal
3	Split ring	Black acetal	Black acetal	Black acetal	Black acetal	Black acetal	Black acetal	Black acetal
4	Gripper	Stainless steel 304	Stainless steel 304	Stainless steel 304	Stainless steel 301	Stainless steel 304	Stainless steel 301	Stainless steel 301
5	Spacer (Universal end)	Black polypropylene	Black polypropylene	Black polypropylene	Black polypropylene	Black polypropylene	Black acetal	Black acetal
6	Spacer (Metric end)	Black nylon	Black nylon	Black nylon	Black nylon	Black nylon	Black nylon	Black nylon
7	Sealing ring	Black nitrile rubber*	Black nitrile rubber*	Black nitrile rubber*	Black nitrile rubber*	Black nitrile rubber*	Black nitrile rubber*	Black nitrile rubber*

* lubricated with silicon oil

MUNICIPAL AND PLUMBING SOLUTIONS



TEE

5

UTC JOINER

6

ELBOW

7

UTC ELBOW

8

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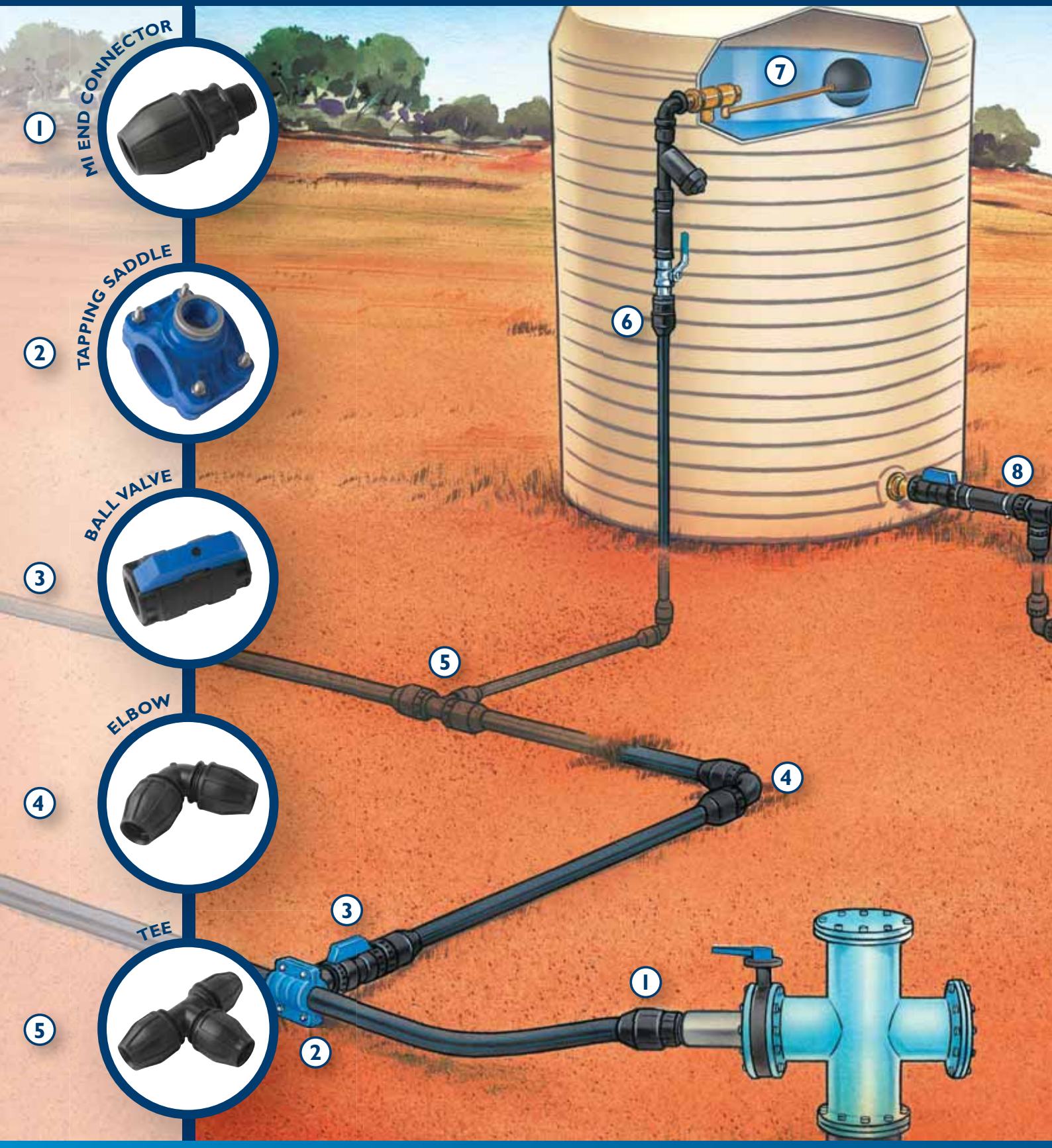
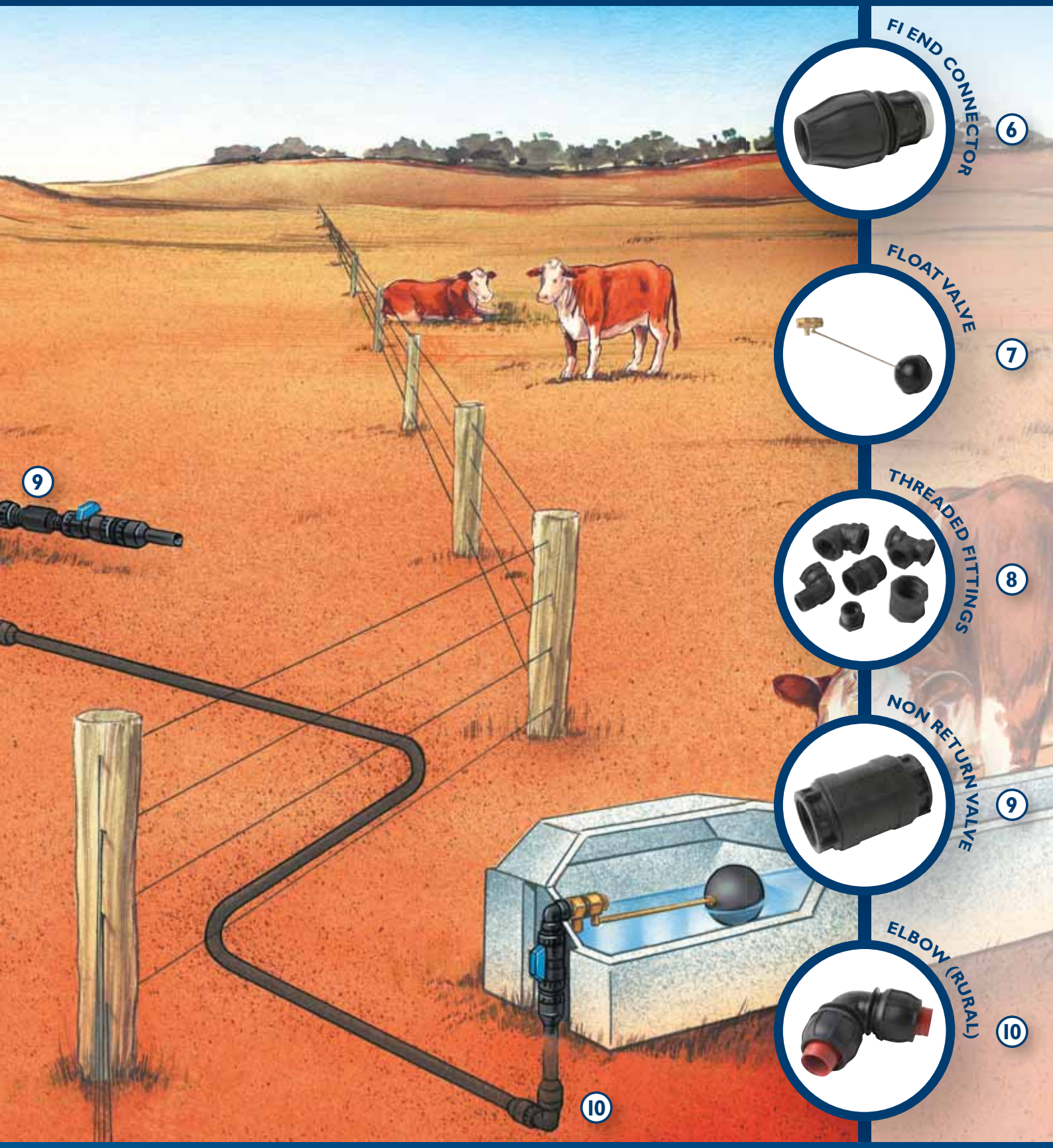
The connection you can trust.


1
MI END CONNECTOR
2
TAPPING SADDLE
3
BALL VALVE
4
ELBOW
5
TEE
1
2
3
4
5
6
7
8



FI END CONNECTOR 6

FLOAT VALVE 7

THREADED FITTINGS 8

NON RETURN VALVE 9

ELBOW (RURAL) 10

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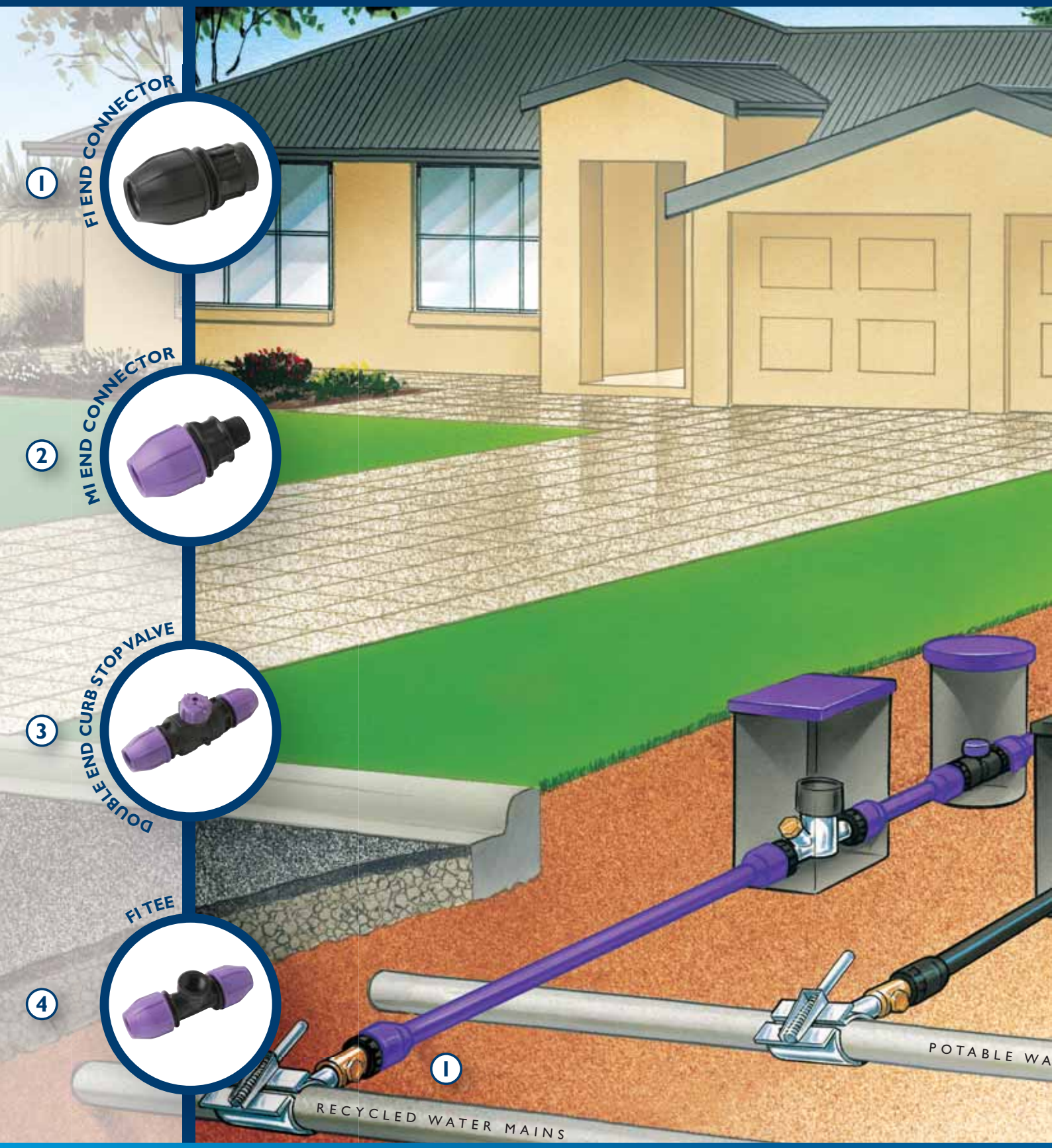

1
FI END CONNECTOR
2
MI END CONNECTOR
3
DOUBLE END CURB STOP VALVE
FI TEE
4
1
RECYCLED WATER MAINS
POTABLE WA

MATERIALS & COMPONENTS

PE END

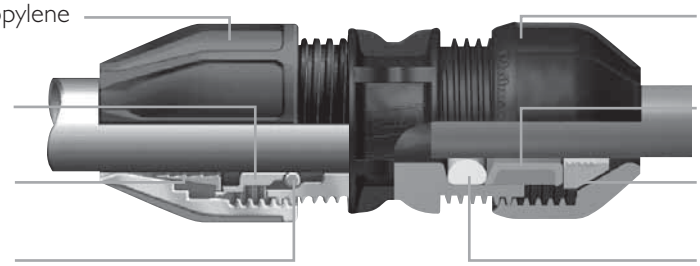
BODY & NUT - Polypropylene

SPACER – Nylon

SPLIT RING – Acetal

SEAL – Nitrile Rubber

LUBRICANT – Silicone Oil



UTC® END

BODY & NUT - Polypropylene (34-39, 47-49 & 59-61 – Acetal Nut)

SPACER – Polypropylene

SPLIT RING – Acetal with stainless steel grippers

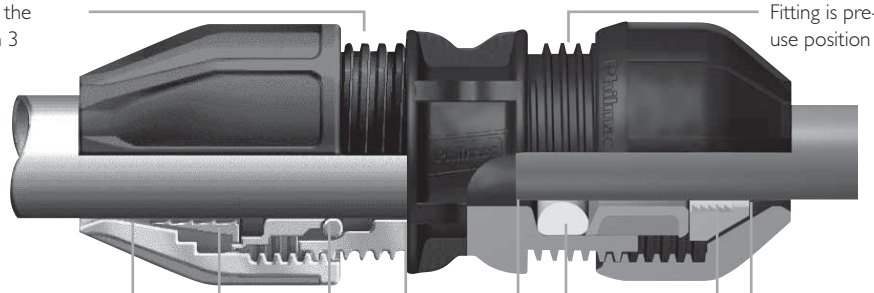
SEAL – Nitrile Rubber

LUBRICANT – Silicone Oil

PRINCIPALS OF OPERATION – COMPRESSION FITTINGS

FULLY OPEN – PE END

Fitting is pre-assembled in the ready to use position with 3 threads showing



Clearance between the pipe and fitting allows for easy insertion of the pipe

Split ring – is in a relaxed position

Seal – is in a relaxed position

Pipe is inserted up to the flange on the fitting

FULLY OPEN – UTC® END

Fitting is pre-assembled in the ready to use position with 3 threads showing

Clearance between the pipe and fitting allows for easy insertion of the pipe

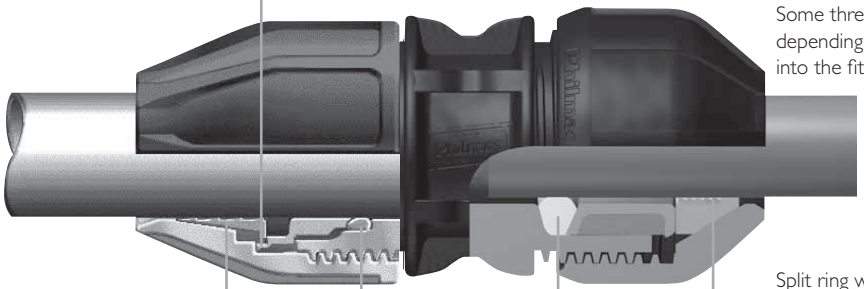
Split ring – is in a relaxed position

Seal – is in a relaxed position

Pipe is inserted up to the flange on the fitting

FULLY CLOSED – PE END

Positive internal stop when the spacer butts up against the nut and fitting.



Split ring bites into the pipe providing end load resistance

Seal ring compression is achieved by exploiting the mechanical advantage of the thread.

FULLY CLOSED – UTC® END

The nut is tightened with a wrench firmly to ensure proper installation. Some threads may be exposed, depending on the size of pipe inserted into the fitting.

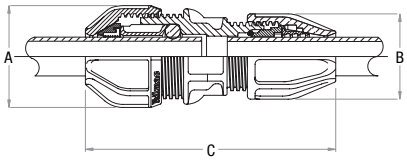
Split ring with the stainless grippers bites into the pipe providing end load resistance

Seal ring compression is achieved by exploiting the mechanical advantage of the thread.

RANGE DIMENSIONS & WEIGHTS

RANGE DIMENSIONS & WEIGHTS

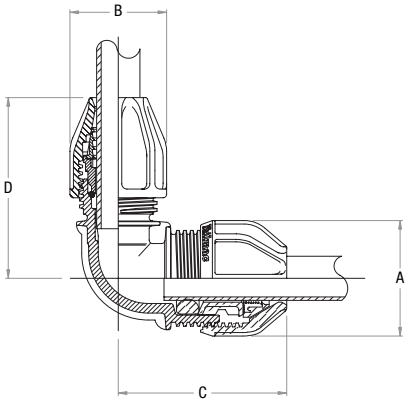
COUPLER (Trans x Poly)



		Dimensions mm.			kg.
Size (OD)	Ref No	**A**	**B**	**C**	**Wt**
15-21mm Trans x 20mm PE*	97103200	54	47	121	0.12
15-21mm Trans x 25mm PE*	97103300	54	56	133	0.14
21-27mm Trans x 20mm PE	97104200	66	47	136	0.16
21-27mm Trans x 25mm PE*	97104300	66	56	144	0.2
27-34mm Trans x 20mm PE	97105200	80	47	164	0.26
27-34mm Trans x 25mm PE	97105300	80	56	172	0.31
27-34mm Trans x 32mm PE*	97105400	80	69	172	0.31
34-39mm Trans x 32mm PE	97107400	80	69	117	0.32
34-39mm Trans x 40mm PE	97107500	80	82	213	0.4
39-43mm Trans x 32mm PE	97106400	95	69	200	0.35
47-49mm Trans x 50mm PE	97108600	96	96	235	0.71
47-49mm Trans x 63mm PE	97108700	96	113	250	0.82
59-61mm Trans x 63mm PE	97109700	113	113	270	1.02

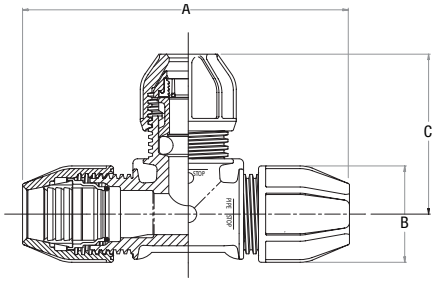
* fitting can also be used as a slip coupling

ELBOW (Trans x Poly 90°)



		Dimensions mm.				kg.
Size (OD)	Ref No	**A**	**B**	**C**	**D**	**Wt**
15-21 Trans x 25mm PE	97153300	54	56	89	93	0.16
21-27 Trans x 25mm PE	97154300	66	56	94	96	0.2
21-27 Trans x 32mm PE	97154400	66	69	94	107	0.22
27-34 Trans x 25mm PE	97155300	80	56	99	100	0.23
27-34 Trans x 32mm PE	97165300	80	69	100	107	0.30

TEES

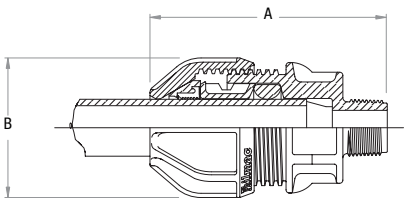


		Dimensions mm.			kg.
Size (OD)	Ref No	**A**	**B**	**C**	**Wt**
25 x 25 x 15-21 Trans	97733100	177	89	56	0.18
40 x 40 x 15-21 Trans	97735100	251	115	82	0.51

RANGE DIMENSIONS & WEIGHTS

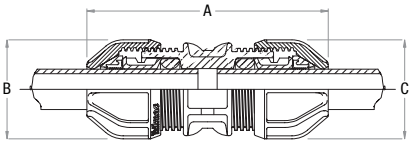
END CONNECTOR (Trans x MI BSP)

		Dimensions mm.		kg.
Size (OD)	Ref No	**A**	**B**	**Wt**
15-21mm Trans x ¾" BSP	97123200	97	54	0.08
21-27mm Trans x ¾" BSP	97124200	107	66	0.13
27-34mm Trans x ¾" BSP	97125200	119	80	0.20



COUPLING (Trans x Trans)

		Dimensions mm.			kg.
Size (OD)	Ref No	**A**	**B**	**C**	**Wt**
15-21mm Trans x 15-21mm*	97113310	133	54	54	0.15
21-27mm Trans x 21-27mm*	97114410	154	66	66	0.22
27-34mm Trans x 27-34mm*	97115510	168	80	80	0.35
34-39mm Trans x 34-39mm*	97117710	173	80	80	0.41
39-43mm Trans x 39-43mm*	97116610	192	95	95	0.51
47-49mm Trans x 47-49mm*	97118810	224	96	96	0.78
59-61mm Trans x 59-61mm*	97119910	270	113	113	1.07



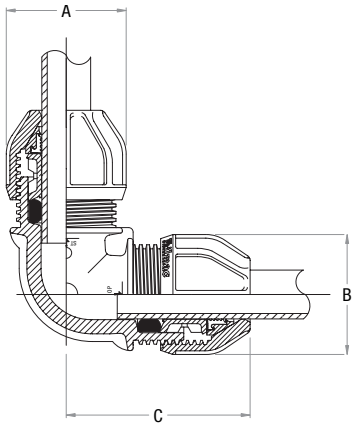
* fitting can also be used as a slip coupling

REDUCING COUPLING (Trans x Trans)

		Dimensions mm.			kg.
Size (OD)	Ref No	**A**	**B**	**C**	**Wt**
21-27mm Trans x 15-21mm Trans	97114310	143	66	54	0.18
27-34mm Trans x 15-21mm Trans	97115310	163	80	54	0.24
27-34mm Trans x 21-27mm Trans	97115410	168	80	66	0.28
39-43mm Trans x 27-34mm Trans	97116510	185	96	80	0.43

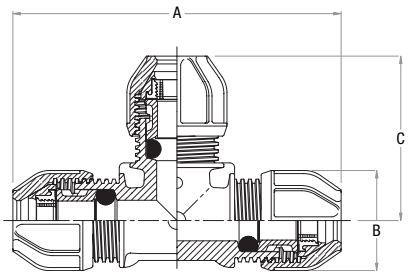
ELBOW (Trans x Trans 90°)

		Dimensions mm.			kg.
Size (OD)	Ref No	**A**	**B**	**C**	**Wt**
15-21mm Trans x 15-21mm Trans	97053300	54	54	89	0.16
21-27mm Trans x 21-27mm Trans	97054400	66	66	94	0.25



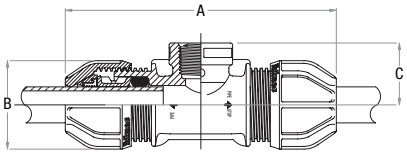
TRANSITION TEES

		Dimensions mm.			kg.
Size (OD)	Ref No	**A**	**B**	**C**	**Wt**
15-21mm Trans	97133310	171	54	86	0.22



TRANSITION TEES (Trans x FI BSP)

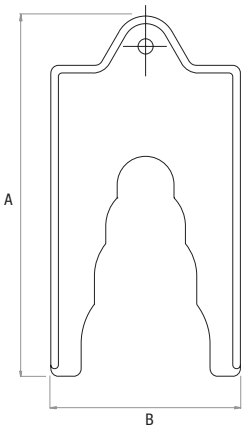
		Dimensions mm.			kg.
Size (OD)	Ref No	**A**	**B**	**C**	**Wt**
15-21mm Trans x ¾" FI BSP*	97143200	171	54	38	0.17
15-21mm Trans x 1" FI BSP*	97143300	171	54	38	0.18
21-27mm Trans x ¾" FI BSP*	97144200	198	66	40	0.26
21-27mm Trans x 1" FI BSP*	97144300	198	66	40	0.27



* fitting can also be used as a slip coupling

PIPE GAUGE (Assists with Pipe Sizing for UTC®)

		Dimensions mm.		kg.
Size (OD)	Ref No	**A**	**B**	**Wt**
15-34mm OD	97113500	95	50	0.02



NOTES

NOTES

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