

DUOPEX WATER MANUAL

32-63mm



The DUOPEX WATER Pipe and Fitting System is designed for 32mm-63mm potable hot and cold water applications. This revolutionary alternative for the professional plumber, makes any job quicker and easier.



DUOPEX WATER is a composite/multilayer pipe manufactured in accordance with AS 4176 together with ATS 5200-478 and carries Water Mark licenses for hot and cold water applications.

The system is intended for use by licensed plumbing tradesmen, who are experienced in working to accepted plumbing practices.

Installation should be carried out in accordance with accepted plumbing practices and instructions provided in this manual where practical. However, the installer should also be aware of local authority codes and by-laws relevant to plumbing, which take precedence over these guidelines in any area where they vary.

The requirements of the National Plumbing Codes (AS/NZS 3500.1 and AS/NZS 3500.4) should also be adhered to.

The DUOPEX WATER pipe and fittings system is designed to make every job quicker and easier. It provides a revolutionary alternative for the professional plumber.

This manual is for the introduction of large bore potable water pipe and fittings system with sizes ranging from 32mm to 63mm. This system can be used in conjunction with the Auspex potable water system in sizes ranging from 16mm to 25mm. Use recommended AUSPEX to DUOPEX WATER conversion adaptors or approved threaded connections.

The system is designed to use the same power tools and jaws that are used on the DUOPEX GAS system 32mm to 63mm and the Auspex hot and cold potable water system, 16mm to 25mm.

To enable adaption from multi-layer pipe to Auspex (PE-X) pipe a series of conversion couplings are available, e.g. 32mm multi layer pipe to 25mm Auspex pipe.



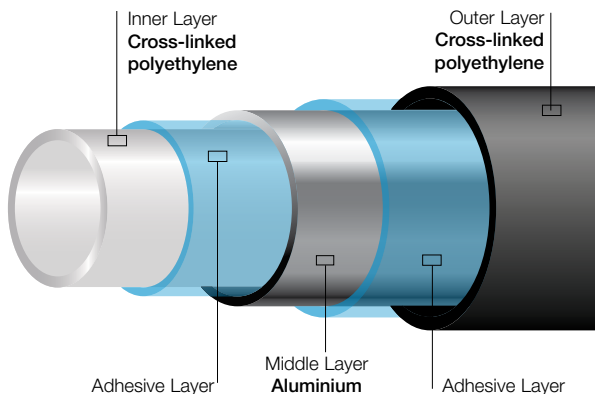
DUOPEX WATER PIPE

The DUOPEX WATER System is designed to be used in potable hot and cold water systems and can also be used for heating purposes.

The DUOPEX WATER Pipe is a multi-layer or composite system.

It consists of an inner layer of cross-linked polyethylene (PE-X), an adhesive layer, an aluminium layer, an adhesive layer, an outer layer of black cross-linked polyethylene (PE-X).

The color Black is in keeping with the Auspex hot and cold water pipe which is also black.



The pipe and fittings have been certified in accordance with AS4176 together with ATS 5200-478 and carries a water mark license.

The DUOPEX WATER pipe has many advantages, some are listed below:

- Form stability during installation, for example in a curve.
- Low thermal conductivity level.
- Light weight during transport and installation.
- Thermal expansion is lower than that of other tubes.
- Lower pressure loss thanks to the smooth inner layer.

Data Sheet

Dimension	32 x 3	40 x 3.5	50 x 4	63 x 4.5
Coefficient of Linear Thermal Expansion in mm/m x K	0.026	0.026	0.026	0.026
Thermal Conductivity in W/M x K	0.45	0.45	0.45	0.45
Water contents in 1/m	0.531	0.855	1.385	2.29
Radius of curvature without aids mm	-	-	-	-
Radius of curvature with bending spring mm	-	-	-	-
Radius of curvature with bending tool mm	3.6 x d	4.0 x d	4.0 x d	4.5 x d
Pipe roughness K mm	0.007	0.007	0.007	0.007
Coil Length 50	50	-	-	
Coil Dimensions mm inside x outside	940 x 1200 x 150	-	-	-
Weight per coil kg	21			
Metres per length	5	5	5	5

Forming Stability

After bending, the DUOPEX WATER pipe will remain stable, due to the metal layer. In many cases thanks to this characteristic, it is possible to prefabricate assemblies before delivery to the site.

Minimum Bending Radii

Bending can be made manually, however if tighter bends are required, bending tools may be used.

Pipe Dimension (mm)	Bending radii with bending tools
32 x 3.0	$3.6 \times d_a$
40 x 3.5	$4.0 \times d_a$
50 x 4.0	$4.0 \times d_a$
63 x 4.5	$4.5 \times d_a$

The bending process on DUOPEX WATER pipe shall not result in either indentations or deformations on the inside of the pipe bend. Damage to the PE-X layer of the DUOPEX WATER pipe is not permitted.

Thermal Changes in Length

Heating and cooling cause pipe length changes.

The coefficient of expansion of DUOPEX WATER composite pipes is $0.026 \text{ mm/m} \times \text{K}$

Thermal changes in length

Pipe length changes are caused by heating and cooling.

The coefficient of expansion of Duopex composite pipes is $0.026 \text{ mm/m} \times \text{K}$.

Example

Temperature

differential ΔT	50k
Pipe length L	5 m
Coefficient of expansion a	0.026 mm/m.K
Linear expansion ΔL	6.5 mm
ΔL	$= a \times L \times \Delta T$
	$= 0.0026 \text{ mm/m} \cdot \text{K} \times 5 \text{ m} \times 50 \text{ K}$
	$= 6.5 \text{ mm}$

Thermal conductivity = $0.45 \text{ W/M} \times \text{K}$

Spacing of Supporting Devices

Pipe Dimension (mm)	Max Pipe clip clearance (cm)
32 x 3.0	200
40 x 3.5	200
50 x 4.0	250
63 x 4.5	250

Synthetic clips must be used.

Fire and Excessive Heat

Keep DUOPEX WATER Pipe a minimum of 500mm from sources of high heat such as heating appliances and flues from heating appliances.

Keep DUOPEX WATER Pipe 1500mm from slow combustion type stoves and flues used to heat hot water or cooking. (Wet back type).

Leave 300mm minimum space between DUOPEX WATER and recessed electric light fittings.

DUOPEX WATER Pipe should not be positioned within 150mm of gas or central heating vents or flues.

Uncontrolled Heat Sources

In the case of uncontrolled heat sources, i.e slow combustion stoves, water heating coils, wet back boilers, solar, or the like, DUOPEX WATER Pipe should not be used. The primary flow and return on these types of heaters should not be installed in DUOPEX WATER Pipe

Secondary flow and returns must be controlled so that the temperature/pressure requirements are not exceeded.

In the interest of safe temperatures and to protect the user, tempering valves should be installed in accordance with AS/NZS 3500 4.2.

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 DUOPEX WATER Pipe and secondary flow and returns must be controlled.

TEMPERATURE / PRESSURE REQUIREMENTS

ISO 21003 allows PEX/AL/PEX pipes to be used at 1000kPa at a temperature of 95°C. For applications in excess of 1000kPa, please consult with your Duopex representative.

Because Duopex has both synthetic layers made of PE-X, Duopex is not subject to the temperature limitations imposed by AS 4176 on multi layer pipes that have one or more layers of PE rather than PE-X.

Direct Sunlight Exposure

Consult with the manufacturer regarding direct sunlight applications.

DO NOT USE PIPES THAT HAVE:

Kinks, cuts, deep scratches, squashed ends, imperfections or have been in contact with contaminating substances. Any of the above should be cut out and replaced, as these conditions may affect the integrity of the system

Chemical Resistance

The chemical properties of polyethylene are significantly improved by the cross-linking process.

DUOPEX WATER Pipes are resistant to the following media:

- Concrete, plaster, mortar, and cement.
- Disinfectants and cleaning agents according to DVGW worksheet W 291 and DIN 2000.
- All natural potable water constituents.
- Corrosion – protection agents according to DIN 1988 part 4.

DUOPEX WATER pipes must be protected against

- Direct contact with bitumen or bitumen strips.
- Pipes must be protected against greases, solvents and oils.
- Contaminated areas as defined in AS3500.

If the DUOPEX WATER pipe and fittings installation system is used in areas where, for example, aggressive gases, permanently acting moistures or building materials containing chlorine are to be encountered, the **FITTINGS** have to be protected using suitable jacketing. This also applies to contact with screed, concrete, mortar or plaster.

Always consult the manufacturer for details.

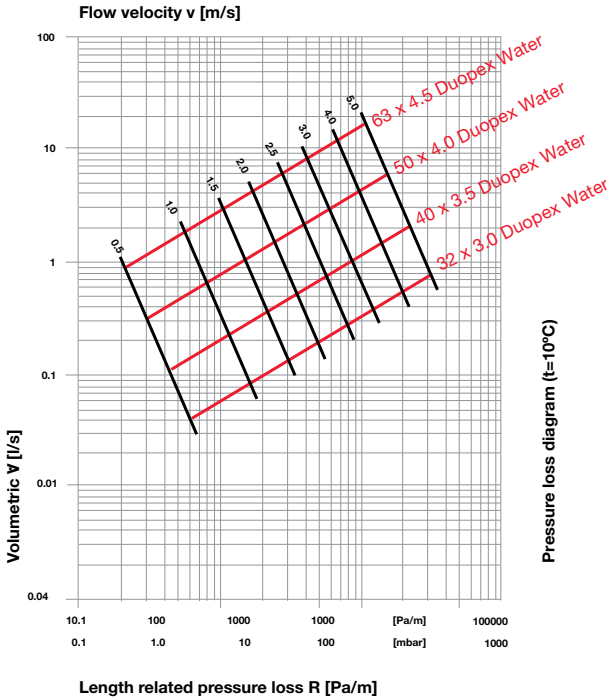
The pipes and fittings have been certified in accordance with ATS 5200.478, which was written to address the dimensional limitations within AS4176. The testing requirements of this technical specification match those in AS4176.

Calculation of potable water - principals

Pressure loss table for DUOPEX WATER pipe at a fluid temperature of 10°C

Pipe Size Flow Velocity V (m/s)	32 x 3.0		40 x 3.5		50 x 4.0		63 x 4.5	
	Volumetric flow V (l/s)	Pressure Loss R (kPa/m)	Volumetric flow V (l/s)	Pressure Loss R (kPa/m)	Volumetric flow V (l/s)	Pressure Loss R (kPa/m)	Volumetric flow V (l/s)	Pressure Loss R (kPa/m)
0.5	0.27	0.15	0.43	0.11	0.69	0.08	1.15	0.06
0.6	0.32	0.21	0.51	0.15	0.83	0.11	1.37	0.08
0.7	0.37	0.27	0.60	0.20	0.97	0.15	1.60	0.11
0.8	0.42	0.34	0.68	0.25	1.11	0.19	1.83	0.14
0.9	0.48	0.42	0.77	0.31	1.25	0.23	2.06	0.17
1.0	0.53	0.50	0.88	0.37	1.39	0.28	2.29	0.20
1.2	0.64	0.70	1.03	0.52	1.66	0.38	2.75	0.28
1.4	0.74	0.91	1.20	0.68	1.94	0.51	3.21	0.38
1.6	0.85	1.17	1.37	0.86	2.22	0.65	3.66	0.49
1.8	0.96	1.45	1.54	1.07	2.49	0.81	4.12	0.59
2.0	1.06	1.75	1.71	1.30	2.77	0.99	4.58	0.72
2.5	1.33	2.61	2.14	1.97	3.46	1.48	5.73	1.07
3.0	1.59	3.65	2.57	2.75	4.16	2.05	6.87	1.49
3.5	1.86	4.90	2.99	3.64	4.85	2.73	8.02	1.99
4.0	2.12	6.21	3.42	4.61	5.54	3.50	9.16	2.55
4.5	2.39	7.71	3.85	5.77	6.23	4.31	10.31	3.15
5.0	2.65	9.33	4.28	6.97	6.93	5.27	11.45	3.82

WATER PRESSURE LOSS DIAGRAM



Flow velocity		Correction factor depending on temperature								
		10 [°C]	20 [°C]	30 [°C]	40 [°C]	50 [°C]	60 [°C]	70 [°C]	80 [°C]	90 [°C]
[v (m/s)]	0.5	1.0	0.93	0.88	0.83	0.79	0.76	0.73	0.71	0.68
	1.0	1.0	0.94	0.89	0.84	0.81	0.78	0.76	0.73	0.71
	2.0	1.0	0.94	0.90	0.86	0.84	0.81	0.79	0.77	0.75
	3.0	1.0	0.95	0.91	0.88	0.86	0.83	0.81	0.80	0.78
	4.0	1.0	0.95	0.92	0.89	0.87	0.85	0.83	0.82	0.80
	5.0	1.0	0.96	0.93	0.90	0.88	0.86	0.84	0.83	0.82
	6.0	1.0	0.96	0.93	0.91	0.89	0.87	0.86	0.84	0.83

DUOPEX WATER FITTINGS

DUOPEX WATER fittings are manufactured from dezincification resistance (DR) brass with a stainless steel crimp ring and joined to the pipe using a specific precision crimping tool.

The DUOPEX WATER pipe and fittings system can be used below ground in accordance with AS3500 part 1 & part 4.

The fittings have been certified in accordance with ATS 5200.478. The testing requirement of this technical specification match those in AS4176. The fittings carry watermark license.

If the DUOPEX WATER pipe and fittings installation system is used in areas where, for example, aggressive gases, permanently acting moistures or building materials containing chlorine are to be encountered, the FITTINGS have to be protected using suitable jacketing. This also applies to contact with screed, concrete, mortar or plaster.



Female BSP Tee

For the complete range of fittings see pages 18 to 24.

DUOPEX WATER FITTINGS

To increase joint performance, all DUOPEX WATER crimp fittings are characterized by a blue plastic holding ring which has 3 important functions:

1. A blue locating ring that matches the DUOPEX WATER jaws for a perfect crimp position.
2. It allows the installer to visually check when the pipe is correctly fitted on the fitting.
3. The fitting has a blue plastic locating ring to identify the fitting is for hot and cold water installations only.

These pipe fittings are available for DUOPEX WATER in sizes ranging from 32 to 63mm.

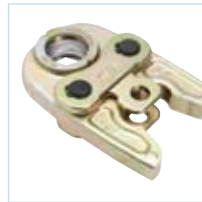
The DUOPEX GAS Fittings and DUOPEX WATER Fittings have different O Ring compositions that are specific to their purpose. The yellow holding ring indicates O Rings for GAS and the blue holding rings indicates O Rings for WATER. Use the correct fitting for each application. This must be strictly adhered to.



MAXI TOOL



Auspex Water Jaws
16mm, 20mm & 25mm



DUOPEX Jaws
32mm only



DUOPEX Jaws
40mm, 50mm & 63mm

MINI TOOL



Auspex Water Jaws
16mm, 20mm & 25mm



Duopex Jaws
32mm only

JOINTING TOOLS

MAXI TOOL

Battery powered – hydraulic 12V.

Lightweight, compact design and construction.

Ergonomic handle design (one hand operation).

Short pressure time (depending on pipe diameter, approx. 5 to 7 sec.).

Automatic piston retraction after reaching operating pressure, motor cut-off.

Maintenance and malfunction warnings microprocessor – controlled.

360 degree moveable jaw holder.

Jaw range available from 16 to 63mm.

Metal carrying case complete with battery-hydraulic tool, one battery and charger.

At medium pipe diameters, approx 150 crimp strokes per battery charge.

32mm to 63mm DUOPEX GAS jaw may be used to join 32mm to 63mm DUOPEX WATER System.

MINI TOOL

- Battery Powered – hydraulic 9.6 volts/Ah.
- Ergonomic handling.
- Short crimping time (approx.3-4 sec.)
- Automatic piston return and motor cut off.
- 360° moveable jaw holder.
- Weight including crimping jaws only 2.5 kg approx.
- System dependent, up to 32mm can be used.
- At 20mm approx. 65 crimps per battery charge possible.
- Charging time of approx. 40 min.
- Delivery contents: crimping tool, carrying case, charger and two battery.
- Jaws are available in sizes 16-32mm for DUOPEX GAS.
- Jaws for Auspex hot and cold water PE-X system are available and are compatible with the Auspex mini tool 16mm to 25mm.
- The carrying case can be supplied complete with the mini tool and accessories.
- 32mm DUOPEX GAS Jaw can be used on the DUOPEX WATER system.

It is most important that the tool manual supplied with the tool is read in its entirety and the user becomes familiar with the maintenance, precautions and the proper use of this tool.



The following describes, in general terms, the jointing procedures using the Auspex Maxi Tool but should not be regarded as a substitute for reading and applying the detailed instructions contained in the tool manual.

MAKING A JOINT USING THE MAXI TOOL



- 1** Ensure that the battery is fully charged and attach it to the tool.



- 2** Select the jaw size to suit the fitting to be crimped. The jaws must be examined in terms of possible damage or dirt in the compression area.

- 3** To change the jaw, push the pin in and at the same time twist it in an anti-clockwise direction. The pin should then spring back.

- 4** Insert the jaws, and line up the holes in the tool with the hole in the jaw.

- 5** Push the pin through the hole in the jaw until it locks in position.



- 6** Cut the pipe to the required length with the recommended multi layer pipe cutters.

MAKING A JOINT USING THE MAXI TOOL



32 - 40mm Calibrating and Deburring Tool



50mm Calibrating and Deburring Tool



63mm Calibrating and Deburring Tool

- 7 Insert the calibrating/deburring tool into the pipe, and then alternately turn in a clockwise and in a counter-clockwise direction.



- 8 Insert the pipe into the fitting and under the stainless steel ring and push the pipe until it is visible in the slots of the plastic ring. This ensures you have pushed the pipe home.



- 9 By squeezing the back of the jaw the jaws will open. If you look at the machined profile on the inside of the jaws you will note a slot on each side of the profile.

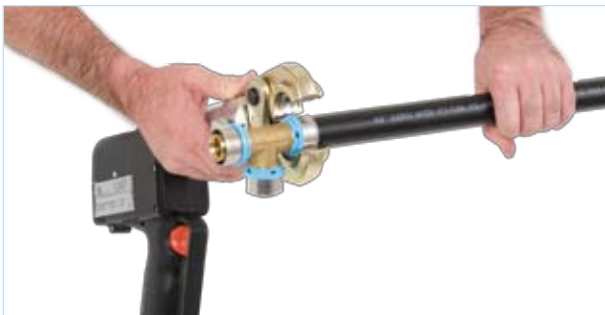
MAKING A JOINT USING THE MAXI TOOL



- 10** With the jaws open, place the fitting inside the jaws so that the raised section of the plastic ring fits into the slot in the jaws. Release the jaws so they fit exactly over the fitting ensuring that the raised section of the plastic ring fits into the slots in the jaw.



- 11** Press the switch mechanism until the joint is completed and the piston has retracted back into the body of the tool.



- 12** Press the back end of the jaws and remove the completed joint.

MAKING A JOINT USING THE MINI TOOL

The following describes, in general terms, the jointing procedures using the Auspex MINI TOOL but should not be regarded as a substitute for reading and applying the detailed instructions contained in the tool manual.

- 1** Ensure that the battery is fully charged and attach it to the tool.



- 2** Select the jaw size to suit the fitting to be crimped. The jaws must be examined in terms of possible damage, or dirt in the compression area.

- 3** To change the jaw push the pin in and at the same time twist it in an anti clockwise direction. The pin should then spring back.

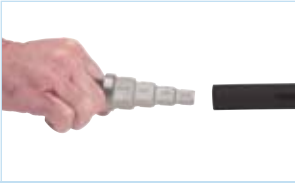
- 4** Insert the jaws and line up the holes in the tool with the hole in the jaw.

- 5** Push the pin through the hole in the jaw until it locks in position.



- 6** Cut the pipe to the required length with the recommended multi layer pipe cutters.

MAKING A JOINT USING THE MINI TOOL



- 7** Insert the calibrating/deburring tool into the pipe, and then alternately turn in a clockwise and in a counter clockwise direction. (See accessories for calibrating tools and cutting tool)

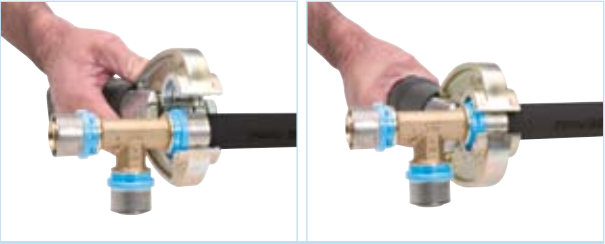


- 8** Insert the pipe into the fitting and under the stainless steel ring and push the pipe until it is visible in the slots of the plastic ring. This ensures you have pushed the pipe home.



- 9** By squeezing the back of the jaw the jaws will open. If you look at the machined profile on the inside of the jaws you will note a slot on each side of the profile.

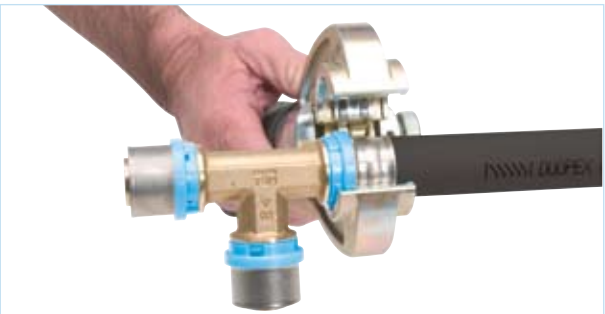
MAKING A JOINT USING THE MINI TOOL



- 10** With the jaws open place the fitting inside the jaws so that the raised section of the plastic ring fits into the slot in the jaws. Release the jaws so they fit exactly over the fitting ensuring that the raised section of the plastic ring fits into the slots in the jaw.



- 11** Press the switch mechanism until the joint is completed and the piston has retracted back into the body of the tool.

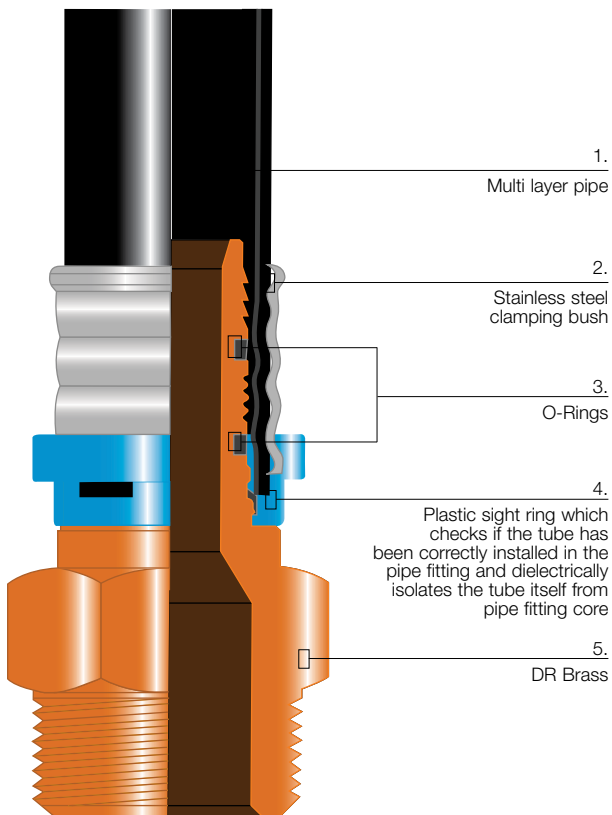


- 12** Press the back end of the jaws and remove the completed joint.

PIPE AND FITTING SEAL

Pipe and fittings are joined and sealed thanks to the stainless steel outer bush mechanical deformation (2). This deformation is achieved by using the special DUOPEX jaws.

- 1 Multi layer pipe
- 2 Stainless steel clamping bush
- 3 O-Rings
- 4 Plastic sight ring
- 5 DR Brass



PIPES

PIPE STRAIGHT

32MM X 5M	DPW433205
40MM X 5M	DPW444005
50MM X 5M	DPW455005
63MM X 5M	DPW466305

PIPE COILS

32 X 50M	DPW433250
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FITTINGS

COUPLINGS

32	DPW013232
40	DPW014040
50	DPW015050
63	DPW016363
40 X 32	DPW024032
50 X 32	DPW025032
50 X 40	DPW025040
63 X 40	DPW026340
63 X 50	DPW026350



CONVERSION COUPLINGS

DPWCC4025	40 X 25
DPWCC4020	40 X 20
DPWCC3225	32 X 25
DPWCC3220	32 X 20



FITTINGS

TEES

32MM	DPW03323232
40MM	DPW03404040
50MM	DPW03505050
63MM	DPW03636363
40 X 40 X 32	DPW04404032
40 X 32 X 32	DPW04403232
40 X 32 X 40	DPW04403240
50 X 50 X 32	DPW04505032
50 X 50 X 40	DPW04505040
63 X 63 X 32	DPW04636332
63 X 63 X 40	DPW04636340
63 X 63 X 50	DPW04636350



THREADED BSP TEES (MALE)

32 X 32 X 1"	DPW04323225MI
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THREADED BSP TEES (FEMALE)

32 X 32 X 1"	DPW04323225FI
40 X 40 X 3/4"	DPW04404020FI
40 X 40 X 1"	DPW04404025FI
50 X 50 X 3/4"	DPW04505020FI
50 X 50 X 1"	DPW04505025FI
63 X 63 X 1"	DPW04636325FI



45° ELBOWS

32 X 32	DPW05453232
40 X 40	DPW05454040
50 X 50	DPW05455050
63 X 63	DPW05456363



ELBOWS

32MM	DPW053232
40MM	DPW054040
50MM	DPW055050
63MM	DPW056363



FITTINGS

THREADED BSP ELBOWS (FEMALE)

32 X 1"	DPW053225FI
40 X 1 1/4"	DPW054032FI
50 X 1 1/2"	DPW055040FI



THREADED BSP ELBOWS (MALE)

32 X 1"	DPW053225MI
40 X 1 1/4"	DPW054032MI
50 X 1 1/2"	DPW055040MI
63 X 2"	DPW056350MI



THREADED BSP ADAPTORS (MALE)

32 X 1"	DPW093225
32 X 1 1/4"	DPW093232
40 X 1 1/4"	DPW094032
50 X 1 1/2"	DPW095040
63 X 2"	DPW096350



THREADED BSP ADAPTORS (FEMALE)

32 X 1"	DPW103225
32 X 1 1/4"	DPW103232
40 X 1 1/4"	DPW104032
50 X 1 1/2"	DPW105040



END CAPS

32	DPW1432
40	DPW1440



TOOL KITS

MAXI KIT



DUOPEX WATER & Gas
Jaws 40, 50 & 63mm

Tools suitable for DUOPEX GAS 16 - 63mm and DUOPEX WATER 32 - 63mm.

Jaws compatible with this tool for Auspex 16mm, 20mm and 25mm jaws are available separately.

MINI KIT



Mini tool kit with 16 & 20mm Auspex Water Jaws
25mm Auspex Water Jaw also available



DUOPEX 32mm Jaw

32mm Gas jaws for MINI TOOL kit can be used for 32mm DUOPEX WATER fittings.

ACCESSORIES

CUTTING TOOL CALIBRATING TOOL



Tool specific for multi layered pipe



16-40mm

CALIBRATING/DEBURRING TOOLS



50mm



63mm



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