APPENDIX C

PWC Product Manual

PowerWater

Water Supply and Sewerage Approved Products Manual - February 2006

Pressure Sewerage Products – Ductile Iron Pipeline System

Section SPPS 01

PowerWater

DUCTILE IRON PIPELINE SYSTEM CONTENTS

SPPS 01-S1 SPIGOT-SOCKET PIPES TO AS/NZS 2280

STANDARD	AS/NZS 2280:2004 Ductile iron pressure pipes and fittings	
DESIGN	Ductile iron pipes to the Australian Standard have dimensions based on imperial sizing. As a result, the metric nominal sizing relates only roughly to the internal diameter of the pipe after cement lining. Pipe is classified by PN number based on the allowable operating pressure. Standard pressure classifications are PN20 and PN35. Other pressure classifications are allowed by AS2880:2004 and include PN16, PN25, PN30, PN40 and PN45. Allowable operating pressure of the pipe is generally not a factor in design due to the lower rating of pipe flanges and valves.	
MATERIALS	Pipe:	Spheroidal graphite cast iron (commonly known as ductile iron) – manufactured from scrap ductile iron, steel, ferrosilicon, coke, limestone and magnesium
	Internal lining:	GP or SL or SR cement to AS 3972 and inert aggregate Calcium aluminate cement to EN14647 Nominal lining thickness - 5mm for DN100 to DN600 and 6mm for DN750 Minimum lining thickness - 3.5mm for DN100 to DN600 and 4.5mm for DN750
	External coating:	Bitumen to AS/NZS 3750.4 (sleeving also required) Synthetic resin base coating to AS 4089 Thermal bonded polymer to AS/NZS 4158 Other external coatings may be considered for approval
	Socket lining:	Thermal bonded polymer to AS/NZS 4158 Other socket linings may be considered for approval
	Joint seal:	Approved elastomer to AS 1646.1 and AS 1646.2 or AS 1646.3
JOINTING	Skid fit elastomeric sealing joint allowing minimum joint deflections of 3.5° for DN 100-250, 2.5° for DN 300-600 and 1° for DN 750. Sockets with grooves to capture elastomeric seals. Sockets and seals of proprietary profile designs (e.g. Tyton, Griptite). Spigot end to be chamfered over 10 to 20 mm at approx. 20° to pipe barrel. Witness marks at spigot end showing insertion depth for maximum angular deflection and no angular deflection. Lubricant as supplied by pipe manufacturer.	
EFFECTIVE LENGTH	Minimum:	5.0 m
ALLOWABLE OPERATING PRESSURE	PN20:	2.0 MPa
	PN35:	3.5 MPa
MARKINGS	Manufacturer's name or mark Nominal size Classification The standard designation AS/NZS 2280 Product certification mark, e.g. StandardsMark Traceability code Place of manufacture (may be incorporated in traceability code)	
MARKING METHOD	Semi-permanent painted marking along the pipe barrel. Lettering height not specified in AS/NZS 2280.	
USE LIMITS	Normal Portland cement mortar (GP or SL) is not resistant to sulphuric acid that can form if H_2S develops in any headspace in the sewer. Sections of cement mortar lined pressure mains subject to partially full flow could experience sulphuric acid attack if pressure main is not designed to avoid H_2S generation (i.e. slime stripping velocity not achieved). H_2S is typically released at high points on the pipeline when pressure in the line drops below 5m head.	

SPPS 01-S1 SPIGOT-SOCKET PIPES TO AS/NZS 2280

GP or SL cement mortar should not be used if sulphate levels in the pressure sewer are likely to exceed 600 mg/litre. SR cement mortar is suitable for sulphate levels up to 6,000 mg/litre. If sulphate levels are likely to exceed 6,000 mg/litre or pH is likely to drop below 5.5, use calcium aluminate cement (CAC) mortar linings.

Only use DI pipe in tidal zones, anaerobic ground conditions and aggressive ground water when it has an external polymeric coating

Suitable for above ground use, i.e. where bridging support is provided, e.g. water course, culvert, drain and exposed bridge crossings

Externally coated bitumen pipes not suitable for use in extreme marine environments - seek specialist advice.

Use restraining elastomeric seals where buried service congestion prevents the use of thrust blocks or is subject to extreme ground movement.

Only use under or near DC traction systems (e.g. electric trains) with appropriate stray current insulation.

Suitable for use as conduit pipe for high loading applications, e.g. major road crossings, shallow cover, railway crossings.

SPPS 01-S3 FLANGED PIPES TO AS/NZS 2280

STANDARD	AS/NZS 2280: 2004	Ductile iron pressure pipes and fittings
	AS/NZS 4087:2004	Metallic Flanges for waterworks purposes
DESIGN	Ductile iron pipes to the Australian Standard have dimensions based on imperial sizing. As a result, the metric nominal sizing relates only roughly to the internal diameter of the pipe after cement lining. Flange Class pipe has a greater wall thickness than PN20 and PN35 pipe. Allowable operating pressures for flanged pipes are governed by the pressure rating of the flanges.	
MATERIALS	Pipe and flanges:	Spheroidal graphite cast iron (commonly known as ductile iron) – manufactured from scrap ductile iron, steel, ferrosilicon, coke, limestone and magnesium.
	Internal lining:	GP or SL or SR cement to AS 3972 and inert aggregate Thermal bonded polymer to AS/NZS 4158 Other linings may be considered
	External coating:	Bitumen to AS/NZS 3750.4 (sleeving also required) Synthetic resin based coating to AS 4089 Thermal bonded polymer to AS/NZS 4158 Other coatings may be considered
	Flange thread seal:	Epoxy resin
	Flange gasket:	Elastomer to AS 1646
JOINTING	Standard flanges:	Screw-on flanges to AS 4087 figure B5 for PN16 and AS 4087 figure B6 for PN35
	Flange gasket:	1.5mm and 3mm flat elastomeric full face gasket to AS 4087 for PN16 and PN35 - Appendix C, Table C1
	Socket and spigot:	Refer spigot-socket pipes specification
EFFECTIVE LENGTH	Maximum:	5.35m
	Minimum:	No value given in reference standard or specifications
ALLOWABLE OPERATING PRESSURE	PN16:	1.6 MPa
	PN35:	3.5 MPa
MARKINGS	Manufacturer's name or mark Nominal size Classification The standard designation AS/NZS 2280 Product certification mark, e.g. StandardsMark Traceability code Place of manufacture (may be incorporated in traceability code)	
MARKING METHOD	Semi-permanent marking along the pipe barrel. Lettering height not specified in AS/NZS 2280.	
USE LIMITS	Use only where restrained joints are required and spigot-socket restrained joints are inappropriate. Normal Portland cement mortar (GP or SL) is not resistant to H2S gas attack and sulphuric acid resulting from H2S. Sections of cement mortar lined pressure mains subject to partially full flow could experience H2S attack if pressure main is designed to avoid H2S generation (i.e. slime stripping velocity not achieved).	
NOTE:	The barrel of Flange Class pipe is tested to a pressure equal to or higher than the final pressure classification prior to fitting of flanges. Due to difficulties in restraining flanged pipe lengths during works hydrostatic tests, the completed flanged pipe may not be tested to its final pressure classification. AS 2280 requires DN100 to DN600 to be tested to 1.6 MPa or higher after flanges have been fitted, however DN750 is tested to 1.0 MPa complete with flanges. Calcium aluminate cement lining not available with flanged pipe	

SPPS 01-S4 FITTINGS TO AS/NZS 2280

STANDARD	AS/NZS 2280: 2004	Ductile iron pressure pipes and fittings
	AS/NZS 4087:2004	Metallic Flanges for waterworks purposes
DESIGN	Ductile iron fittings to the Australian Standard have dimensions based on imperial sizing. As a result, the metric nominal sizing relates only roughly to the internal diameter after cement lining.	
MATERIALS	Fitting:	Spheroidal graphite cast iron to AS 1831(commonly known as ductile iron) – manufactured from scrap ductile iron, steel, ferrosilicon, coke, limestone and magnesium
	Internal lining:	Thermal bonded polymer to AS/NZS 4158
	External coating:	Thermal bonded polymer to AS/NZS 4158
	Joint seal:	Elastomer to AS 1646
JOINTING	Socket:	Sockets with grooves to capture elastomeric seals. Sockets and seals of proprietary profile designs (e.g. Tyton, Griptite). Allowable minimum joint deflections of 3.5' for DN 100-250, 2.5° for DN 300-600 and 1° for DN 750. Jointing lugs on 90° and 45° bends for sizes DN 200 and greater.
	Spigot:	End to be chamfered over 10 to 20 mm at approximately 20° to pipe barrel. Jointing lugs on 90° and 45° bends for sizes DN 200 and greater.
	Flange:	Integral flanges to AS 4087 figure B5 for PN16 and figure B6 for PN35. 1.5mm and 3mm flat elastomeric full face gasket to AS 4087 for PN16 and PN35 - Appendix C, Table C1
ALLOWABLE OPERATING PRESSURE	PN16:	1.6 MPa
	PN35:	3.5 MPa
MARKINGS	Manufacturer's name or mark cast on Nominal size Ductile or DI moulded in raised form Where applicable, the angle of the bend cast on The standard designation AS/NZS 2280 Product certification mark, e.g. StandardsMark Traceability code Place of manufacture (may be incorporated in traceability code)	
MARKING METHOD	Clearly and indelibly marked on the fitting. Lettering heights and raised height not specified in AS/NZS 2280.	

SPPS 01-S5 JOINT SEALS FOR AS/NZS 2280 PIPES/FITTINGS

STANDARD

AS 1646: 2000 Elastomeric seals for waterworks purposes
AS 4087: 2004 Metallic flanges for waterworks purposes

SEALING DESIGN

Joint seals are to be of elastomeric compounds comprising suitable polymers. The elastomers have performance properties, which deteriorate with time and as such the design of the seal's profile and the compounding of the elastomer needs to ensure long term sealing of the joint. The elastomer properties affecting long term sealing performance are hardness, rate of compression stress relaxation, water absorption, resistance to ageing, resistance to chemicals and resistance to microbiological deterioration.

LATERAL RESTRAINT DESIGN

An option for lateral restraint of the spigot-socket joint available for use with Tyco Water pipes is the TYTON-LOK spigot-socket joint seal. This seal has stainless steel segments moulded into it at uniform intervals around the seal ring, which lock onto the spigot wall to resist joint pull-out.

COMPOUND MATERIALS

Polymer for spigot-sockets rings:	Ethylene propylene diene monomer (EPDM), 40% minimum volume of compound for IRHD of ≥55<85 Styrene Butadiene Rubber (SBR), 50% minimum volume of compound for IRHD of ≥55<85
Polymer for flange gaskets:	Ethylene propylene diene monomer (EPDM), 30% minimum volume of compound for IRHD of ≥35<55 or 40% minimum volume of compound for IRHD ≥55≤65 Styrene Butadiene Rubber (SBR), 50% minimum volume of compound for IRHD of ≥35<55 or ≥55≤65
Antidegradant:	For EPDM: Not required For SBR: Based on the combined antioxidant-antiozonant N-(1,3-dimethyl-butyl)-N'-phenyl-p-phenylene diamine with a concentration (m/m) of not less than 1.5 parts per hundred of polymer.
Protective wax:	For EPDM: Not required For SBR: Wax with a melting point ≥ 57°C and concentration (m/m) not greater than 3.0 parts per hundred of polymer.
Filler:	Carbon black
Copper & manganese:	For EPDM: Not applicable For SBR: Not greater than 0.0008% copper and 0.0005% manganese

MARKINGS

Rings:
- Manufacturer's identification mark
- Cavity number, if applicable
- Nominal size or nominal internal and cord diameters as appropriate
- Year of manufacture, e.g. 01 to represent year 2001
- Standard designation where the elastomeric ring is certified to AS 1646

MARKING METHODS

Embossing with lettering 3 ± 1 mm high and 0.3 ± 0.1 mm proud of the surface; or
Vulcanised transfer or permanent ink with lettering 3.5 ± 1.5 mm.

ELASTOMER TYPE IDENTIFICATION

Marking colour:	EPDM: Green SBR: Blue
Marking method:	Continuous durable stripe of width 3.5 ± 1.5 mm; or Durable flash or dot of 6 mm minimum dimension

STORAGE

- Do not store seals in a room with any equipment capable of generating ozone (e.g. mercury vapour lamps, electric motors, high voltage equipment).
- Store in a relaxed condition free from tension, compression or other deformation.
- Seal temperature not to exceed 35°C and preferably not above 25°C or less than 5°C.

USE LIMITS

Do not use elastomeric seals removed from packaging for more than 3 months
Do not use elastomeric seals older than 18 months from date of manufacture unless supplier can demonstrate that seals have been stored in a cool, controlled environment
Do not use SBR elastomeric seals more than 3 years from date of manufacture
Do not use EPDM elastomeric seals more than 6 years from date of manufacture
Do not use SBR seals that have been stored unprotected from sunlight for more than 7 days
Do not use elastomeric seals that have been in contact with chemicals, e.g. solvents (petrol).

SPPS 01-S7 JOINTING LUBRICANT

STANDARD	None
DESIGN	Jointing lubricant is to achieve the following: • Provide sufficient lubrication to prevent damage to joint seals or surfaces on jointing. • Enable correctly configured jointing when using jointing methods recommended by the pipe or fitting manufacturer. • Not affect the elastomer or pipe or fitting materials. • Remain an effective lubricant under wet conditions. • Not be hazardous to handle and able to be applied by hand. • Be completely soluble in water. • Able to be removed under standard flushing arrangements for commissioning.
MATERIALS	Lubricant: Water based emulsion
CONTAINER MARKINGS	Manufacturer's name or trademark Proprietary name of joint seal with which the lubricant can be used. The words 'Jointing Lubricant' or 'Joint Lubricant'. Date of manufacture. Date of expiry for use. Instructions for use of lubricant
USE LIMITS	Do not use where past expiry date.

SPIGOT-SOCKET PIPES

Nominal size DN	Tyco Water TytonExtreme PN20	Tyco Water TytonExtreme PN35
100		✔
150		✔
200		✔
225	✔	✔
250	✔	✔
300	✔	✔
375	✔	✔
450	✔	✔
500	✔	✔
600	✔	✔
750	✔	✔

NOTES

1. TytonExtreme pipe is lined with calcium aluminate cement

FLANGE-FLANGE PIPES

Nominal size DN	Tyco Water
100	✔
150	✔
200	✔
225	✔
250	✔
300	✔
375	✔
450	✔
500	✔
600	✔
750	✔

NOTES

1. Flanged pipes coated internally and externally with thermal bonded coating - available in lengths up to 2.7m
2. Not available with calcium aluminate cement lining

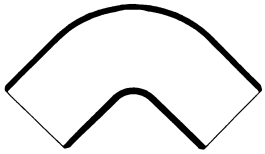
SOCKET-SOCKET BENDS

Nominal size DN x degrees	Mallet	Tyco Water	Tyco Water Austlite[1]	Derwent	Dobbie Dico
100 x 11.25	✔	✔	✔	✔	✔
100 x 22.5	✔	✔	✔	✔	✔
100 x 45	✔	✔	✔	✔	✔
100 x 90	✔	✔	✔	✔	✔
150 x 11.25	✔	✔	✔	✔	✔
150 x 22.5	✔	✔	✔	✔	✔
150 x 45	✔	✔	✔	✔	✔
150 x 90	✔	✔	✔	✔	✔
200 x 11.25	✔	✔		✔	✔
200 x 22.5	✔	✔		✔	✔
200 x 45	✔	✔		✔	✔
200 x 90	✔	✔		✔	✔
225 x 11.25	✔	✔		✔	
225 x 22.5	✔	✔		✔	
225 x 45	✔	✔		✔	
225 x 90	✔	✔		✔	
250 x 11.25	✔	✔		✔	✔
250 x 22.5	✔	✔		✔	✔
250 x 45	✔	✔		✔	✔
250 x 90	✔	✔		✔	✔
300 x 11.25	✔	✔		✔	
300 x 22.5	✔	✔		✔	
300 x 45	✔	✔		✔	
300 x 90	✔	✔		✔	
375 x 11.25	✔	✔		✔	
375 x 22.5	✔	✔		✔	
375 x 45	✔	✔		✔	
375 x 90	✔	✔		✔	
450 x 11.25	✔	✔		✔	
450 x 22.5	✔	✔		✔	
450 x 45	✔	✔		✔	
450 x 90	✔	✔		✔	
500 x 11.25	✔	✔		✔	
500 x 22.5	✔	✔		✔	
500 x 45	✔	✔		✔	
500 x 90	✔	✔		✔	
600 x 11.25	✔	✔		✔	
600 x 22.5	✔	✔		✔	
600 x 45	✔	✔		✔	
600 x 90	✔	✔		✔	
750 x 11.25	✔	✔			
750 x 22.5	✔	✔			
750 x 45	✔	✔			
750 x 90	✔	✔			

NOTES

1. Auslite fittings available in PN16 rating only

SPIGOT-SPIGOT BENDS



Nominal Size DN x Degrees	Mallet[1]	Tyco Water	Derwent
100 x 11.25	✔	✔	✔
100 x 22.5	✔	✔	✔
100 x 45	✔	✔	✔
100 x 90	✔	✔	✔
150 x 11.25	✔	✔	✔
150 x 22.5	✔	✔	✔
150 x 45	✔	✔	✔
150 x 90	✔	✔	✔
200 x 11.25	✔		✔
200 x 22.5	✔		✔
200 x 45	✔		✔
200 x 90	✔		✔
225 x 11.25	✔		✔
225 x 22.5	✔		✔
225 x 45	✔		✔
225 x 90	✔		✔
250 x 11.25	✔		✔
250 x 22.5	✔		✔
250 x 45	✔		✔
250 x 90	✔		✔
300 x 11.25	✔		✔
300 x 22.5	✔		✔
300 x 45	✔		✔
300 x 90	✔		✔
375 x 11.25	✔		✔
375 x 22.5	✔		✔
375 x 45	✔		✔
375 x 90	✔		✔
450 x 11.25	✔		✔
450 x 22.5	✔		✔
450 x 45	✔		✔
450 x 90	✔		✔
500 x 11.25	✔		✔
500 x 22.5	✔		✔
500 x 45	✔		✔
500 x 90	✔		✔
600 x 11.25	✔		✔
600 x 22.5	✔		✔
600 x 45	✔		✔
600 x 90	✔		✔
750 x 11.25	✔		
750 x 22.5	✔		
750 x 45	✔		
750 x 90	✔		

NOTES

1. Mallet fittings available in PN16 rating only

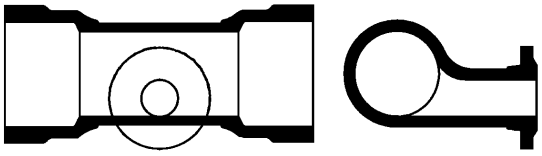
FLANGE-FLANGE BENDS

Nominal size DN x degrees	Mallet[1]	Tyco Water	Derwent	Tyco Water Austlite[1]	Dobbie Dico[1]
100 x 11.25	✔	✔	✔		
100 x 22.5	✔	✔	✔		
100 x 45	✔	✔	✔		
100 x 90	✔	✔	✔	✔	✔
150 x 11.25	✔	✔	✔		
150 x 22.5	✔	✔	✔		
150 x 45	✔	✔	✔		
150 x 90	✔	✔	✔		✔
200 x 11.25	✔	✔	✔		
200 x 22.5	✔	✔	✔		
200 x 45	✔	✔	✔		
200 x 90	✔	✔	✔		✔
225 x 11.25	✔	✔	✔		
225 x 22.5	✔	✔	✔		
225 x 45	✔	✔	✔		
225 x 90	✔	✔	✔		
250 x 11.25	✔	✔	✔		
250 x 22.5	✔	✔	✔		
250 x 45	✔	✔	✔		
250 x 90	✔	✔	✔		✔
300 x 11.25	✔	✔	✔		
300 x 22.5	✔	✔	✔		
300 x 45	✔	✔	✔		
300 x 90	✔	✔	✔		
375 x 11.25	✔	✔	✔		
375 x 22.5	✔	✔	✔		
375 x 45	✔	✔	✔		
375 x 90	✔	✔	✔		
450 x 11.25	✔	✔	✔		
450 x 22.5	✔	✔	✔		
450 x 45	✔	✔	✔		
450 x 90	✔	✔	✔		
500 x 11.25	✔	✔	✔		
500 x 22.5	✔	✔	✔		
500 x 45	✔	✔	✔		
500 x 90	✔	✔	✔		
600 x 11.25	✔	✔	✔		
600 x 22.5	✔	✔	✔		
600 x 45	✔	✔	✔		
600 x 90	✔	✔	✔		
750 x 11.25	✔	✔			
750 x 22.5	✔	✔			
750 x 45	✔	✔			
750 x 90	✔	✔			

NOTES

1. Auslite, Dobbie Dico and Mallet fittings available in PN16 rating only

SOCKET-SOCKET FLANGE SCOUR TEES

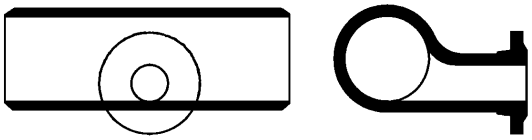


Nominal Size DN x DN x dn	Mallet[1]	Tyco Water	Derwent
150 x 150 x 80	✔	✔	✔
200 x 200 x 80	✔	✔	✔
225 x 225 x 100	✔	✔	✔
250 x 250 x 100	✔	✔	✔
300 x 300 x 100	✔	✔	✔
375 x 375 x 150	✔	✔	✔
450 x 450 x 150	✔	✔	✔
500 x 500 x 150	✔	✔	✔
600 x 600 x 150	✔	✔	✔
750 x 750 x 200	✔	✔	

NOTES

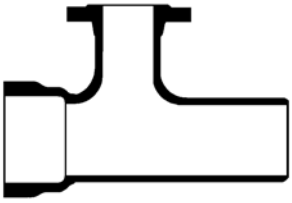
1. Mallet fittings available in PN16 rating only

SPIGOT-SPIGOT FLANGE SCOUR TEES



Nominal Size DN x DN x dn
150 x 150 x 80
200 x 200 x 80
225 x 225 x 100
250 x 250 x 100
300 x 300 x 100
375 x 375 x 150
450 x 450 x 150
500 x 500 x 150
525 x 525 x 150
600 x 600 x 150
675 x 675 x 150
750 x 750 x 200

SOCKET-SPIGOT-FLANGE GAS RELEASE VALVE TEES

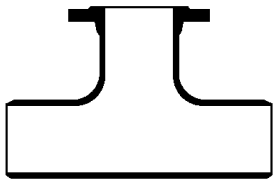


Nominal Size DN x dn x *dn*	Mallet[1]	Tyco Water	Derwent
100 x 100 x 80	✔	✔	✔
100 x 100 x 100	✔	✔	✔
150 x 150 x 80	✔	✔	✔
150 x 150 x 100	✔	✔	✔
200 x 200 x 80	✔	✔	✔
200 x 200 x 100	✔	✔	✔
225 x 225 x 80	✔	✔	✔
225 x 225 x 100	✔	✔	✔
250 x 250 x 80	✔	✔	✔
250 x 250 x 100	✔	✔	✔
300 x 300 x 80	✔	✔	✔
300 x 300 x 100	✔	✔	✔
375 x 375 x 80	✔	✔	✔
375 x 375 x 100	✔	✔	✔
450 x 450 x 80	✔	✔	✔
450 x 450 x 100	✔	✔	✔
500 x 500 x 80	✔	✔	✔
500 x 500 x 100	✔	✔	✔
600 x 600 x 80	✔	✔	✔
600 x 600 x 100	✔	✔	✔
750 x 750 x 80			
750 x 750 x 100	✔	✔	

NOTES

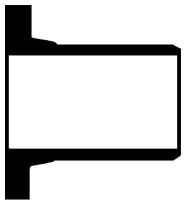
1. Mallet fittings available in PN16 rating only

SPIGOT-SPIGOT-FLANGE
GAS RELEASE VALVE TEES



Nominal Size DN x DN x dn	Tyco Water	Derwent
100 x 100 x 80	✔	✔
100 x 100 x 100	✔	✔
150 x 150 x 80	✔	✔
150 x 150 x 100	✔	✔
200 x 200 x 80	✔	✔
200 x 200 x 100	✔	✔
225 x 225 x 80	✔	✔
225 x 225 x 100	✔	✔
250 x 250 x 80	✔	✔
250 x 250 x 100	✔	✔
300 x 300 x 80	✔	✔
300 x 300 x 100	✔	✔
375 x 375 x 80	✔	✔
375 x 375 x 100	✔	✔
450 x 450 x 80	✔	✔
450 x 450 x 100	✔	✔
500 x 500 x 80	✔	✔
500 x 500 x 100	✔	✔
600 x 600 x 80	✔	✔
600 x 600 x 100	✔	✔
750 x 750 x 80		
750 x 750 x 100	✔	

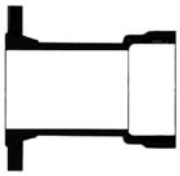
FLANGE-SPIGOT CONNECTORS



Nominal Size DN	Mallet[1]	Tyco Water	Derwent	Tyco Water Auslite[1]
100	✔	✔	✔	✔
150	✔	✔	✔	✔
200	✔	✔	✔	
225	✔	✔	✔	
250	✔	✔	✔	
300	✔	✔	✔	
375	✔	✔	✔	
450	✔	✔	✔	
500	✔	✔	✔	
600	✔	✔	✔	
750	✔	✔		

NOTES 1. Auslite and Mallet fittings available in PN16 rating only

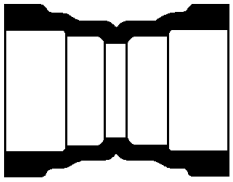
FLANGE-SOCKET CONNECTORS



Nominal Size DN	Mallet[1]	Tyco Water	Derwent	Tyco Water Auslite[1]	Dobbie Dico[1]
100	✔	✔	✔	✔	✔
150	✔	✔	✔	✔	✔
200	✔	✔	✔		✔
225	✔	✔	✔		
250	✔	✔	✔		✔
300	✔	✔	✔		
375	✔	✔	✔		
450	✔	✔	✔		
500	✔	✔	✔		
600	✔	✔	✔		
750	✔	✔			

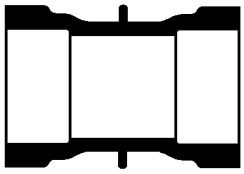
NOTES 1. Auslite, Dobbie Dico and Mallet fittings available in PN16 rating only

SOCKET-SOCKET CONNECTORS



Nominal Size DN	Mallet	Tyco Water	Derwent
100	✔	✔	✔
150	✔	✔	✔
200	✔	✔	✔
225	✔	✔	✔
250	✔	✔	✔
300	✔	✔	✔
375	✔	✔	✔
450	✔	✔	✔
500	✔	✔	✔
600	✔	✔	✔
750	✔	✔	

SOCKET-SOCKET SLIP COLLARS

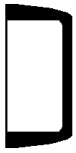


Nominal Size DN	Tyco Water (Sliptyt)
100	✔
150	✔

NOTES

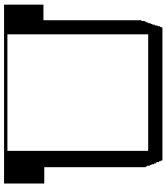
Sliptyt offered only with thermal bonded polymeric encapsulation utilising polyamide (nylon) being Rilsan T Blue 7411 MAC

CAPS



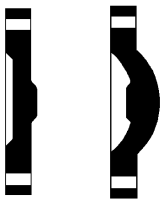
Nominal Size DN	Mallet	Tyco Water	Derwent	Dobbie Dico
100	✔	✔	✔	✔
150	✔	✔	✔	✔
200	✔	✔	✔	✔
225	✔	✔	✔	
250	✔	✔	✔	✔
300	✔	✔	✔	
375	✔	✔	✔	
450	✔	✔	✔	
500	✔	✔	✔	
600	✔	✔	✔	
750	✔	✔		

PLUGS



Nominal Size DN	Mallet	Derwent
100	✔	✔
150	✔	✔
200	✔	✔
225	✔	✔
250	✔	✔
300	✔	✔
375	✔	✔
450	✔	✔
500	✔	✔
600	✔	✔
750	✔	

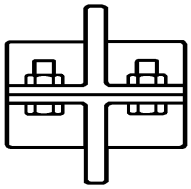
STANDARD PRESSURE BLANK FLANGES



Nominal Size DN	Tyco Water
100	I
150	I
200	I
225	I
250	I
300	I
375	I
450	I
500	I
600	I
750	

I = Interim approval

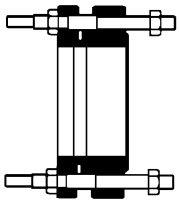
PUDDLE FLANGES



Nominal Size DN	Tyco Water
80	I
100	I
150	I
200	I
225	I
250	I
300	I
375	I
450	I
500	I
600	I
750	I

I = Interim approval

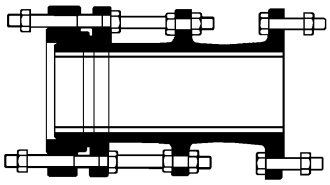
NON-THRUST DISMANTLING JOINTS
CLASS 16



Nominal Size DN	Tyco Water
100	I
150	I
200	I
225	I
250	I
300	I
375	I
450	I
500	I
600	I
750	I

I = Interim approval

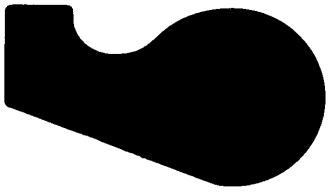
THRUST DISMANTLING JOINTS
CLASS 16



Nominal Size DN	Tyco Water
100	I
150	I
200	I
225	I
250	I
300	I
375	I
450	I
500	I
600	I
750	I

I = Interim approval

SPIGOT-SOCKET ELASTOMERIC SEALS

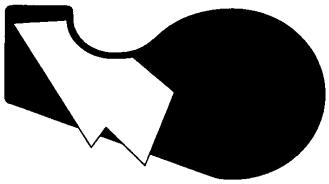


Nominal Size DN	Mallet (Ludowici)	Tyco Water (Gulf)	Derwent (Gulf)	Dobbie Dico (Gulf)
80	✔	✔	✔	✔
100	✔	✔	✔	✔
150	✔	✔	✔	✔
200	✔	✔	✔	✔
225	✔	✔	✔	
250	✔	✔	✔	✔
300	✔	✔	✔	
375	✔	✔	✔	
450	✔	✔	✔	
500	✔	✔	✔	
600	✔	✔	✔	
750	✔	✔		

NOTES

1. Seal manufacturers are shown in brackets.

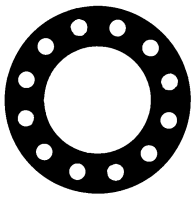
SPIGOT-SOCKET RESTRAINING ELASTOMERIC SEALS



Nominal Size DN	Tyco Water[1, 2] (Tyton-Lok)
80	
100	✔
150	✔
200	I
225	I
250	I
300	I
375	I

I = Interim approval

FLANGE ELASTOMERIC SEALS



Nominal Size DN	Mallet (Ludowici)	Tyco Water (SDQ)
80	✔	✔
100	✔	✔
150	✔	✔
200	✔	✔
225	✔	✔
250	✔	✔
300	✔	✔
375	✔	✔
450	✔	✔
500	✔	✔
600	✔	✔
750	✔	✔

NOTES

1. Seal manufacturers are shown in brackets.

JOINTING LUBRICANT

Size	Tyco Water (Thomas Grozier)
500g	✔
1kg	✔
2kg	✔
4kg	✔

NOTES

1. Lubricant manufacturers are shown in brackets.

EXTERNAL CORROSION PROTECTION
POLYETHYLENE SLEEVING & PETROLATUM SYSTEM

REFER TO SECTION SPO 04 CORROSION PROTECTION

Water Supply and Sewerage Approved Products Manual - February 2006

Pressure Sewerage Products – PVC Metric Pipeline System

Section SPPS 02

PowerWater

PVC METRIC PIPELINE SYSTEM CONTENTS

SPPS 02-1 SPIGOT-SOCKET PVC-U PIPES

STANDARD	AS/NZS 1477:1999 PVC pipes and fittings for pressure applications
DESIGN	Unplasticised PVC pressure pipes (PVC-U or uPVC) have a plain (solid) wall structure and are manufactured in two standard sizings. For pressure sewers, Power and Water follows WSAA Codes and uses Series 1 pipe, which conforms to the metric sizing in international piping standards. Pipe wall thickness is varied to achieve the desired pipe pressure rating. Pressure ratings are determined at 20°C. Pressure derating is required for higher operating temperatures. Pressure de-rating is required to cater for fatigue issues where fluctuating pressures occur (ie. pumped systems) – refer WSAA Technical Notes TN4 and TN5.
MATERIALS	Pipe: Polyvinyl chloride (83.3 % minimum) Calcium-zinc to prevent PVC degradation from high processing temperatures Lubricants to lower the viscosity of molten PVC during pipe processing Fillers, e.g. calcium carbonate, to aid pipe processing Rutile titanium dioxide to prevent ultraviolet degradation and to provide white colouring pigment for Series 1 pipe (1.5 parts minimum per 100 parts PVC). Joint seal: Approved elastomer to AS 1646.1 and AS 1646.2 or AS 1646.3
JOINTING	Rubber ring joints are to be used unless otherwise permitted. Sockets are to have grooves to capture elastomeric seals. Seal profiles are to manufacturers' proprietary designs. Spigots are to have witness marks to identify socket insertion depth.
EFFECTIVE LENGTH	6 m (+0.05, -0 m)
PRESSURE CLASSES	PN 9, PN 12, PN 15 and PN 18 corresponding to 0.9, 1.2, 1.5 and 1.8 MPa working pressure
MARKINGS	Manufacturer's name and registered trademark The pipe series number '1' for metric pipe series The letters 'PVC-U' Nominal size in the form '100', as appropriate Classification in the form 'PN 12', as appropriate For pipes designed with deflection joints, the maximum allowable angular deflection in degrees Date of manufacture, using the ISO system in the form YYMMDD Identification of place of manufacture. The manufacturer's code is acceptable The Australian Standard number, i.e. AS/NZS 1477 Product certification mark, e.g. StandardsMark Warning - 'SEWERAGE - DO NOT DRINK'
MARKING METHOD	Legible and durable marking along the pipe barrel, minimum lettering height of 3 mm for DN 100 and 5 mm for greater than DN 100. Unmarked pipe length not to exceed 1 m.
USE LIMITS	Do not use PVC-U for new works in sizes greater than DN 225 Do not use solvent cement jointing except for unusual requirements. Do not use in ground subject to extreme movement where joint pull-out could occur Do not use above ground or in ground contaminated with chemicals deleterious to PVC Do not use pipe stored unshaded for 6 months or more from date of manufacture Do not use pipe older than 12 months from the date of manufacture Do not use pipe scratched to a depth greater than 0.5 mm (or 10% of wall thickness for sizes smaller than DN80)

SPPS 02-2 SPIGOT-SOCKET PVC-M PIPES

STANDARD	AS/NZS 4765 (Int):2000 Modified PVC (PVC-M) pipes for pressure applications
DESIGN	Modified PVC (PVC-M) differs from traditional unplasticised PVC (PVC-U or uPVC) by way of an elastomer additive of quantity sufficient to improve toughness without excessive yield strength reduction. Improved toughness and performance predicability allows the pressure rating design factor for PVC-M pipe to be less than that for PVC-U pipe. PVC-M pipe of the same pressure rating as PVC-U pipe thus has a thinner wall (and lower stiffness). PVC-M pipes have a plain (solid) wall structure. For pressure sewers, Power and Water follows WSAA Codes and uses Series 1 pipe, which conforms to the metric sizing in international piping standards. Pipe wall thickness is varied to achieve the desired pipe pressure rating. Pressure ratings are determined at 20°C. Pressure de-rating is required for higher operating temperatures. Pressure de-rating is required to cater for fatigue issues where fluctuating pressures occur (ie. pumped systems) – refer WSAA Technical Notes TN4 and TN5.
MATERIALS	Pipe: Polyvinyl chloride (83.3% minimum) Elastomer to improve ductility (fracture toughness) Rutile titanium dioxide to prevent ultraviolet degradation (minimum of 1.5 parts per 100 parts PVC mass) Calcium-zinc to prevent PVC degradation from high processing temperatures Lubricants to lower the viscosity of molten PVC during pipe processing Fillers, e.g. calcium carbonate, to aid pipe processing Joint seal: Approved elastomer to AS 1646.1 and AS 1646.2 or AS 1646.3
JOINTING	Only rubber ring joints permitted. Sockets to have grooves to capture seals. Spigots to have witness marks to identify socket insertion depth.
EFFECTIVE LENGTH	6 m (+0.05, -0 m)
PRESSURE CLASSES	PN 9, PN 12, PN 15 and PN 18 corresponding to 0.9, 1.2, 1.5 and 1.8 MPa working pressure
MARKINGS	*Product code (e.g. PPRW 12225)* Manufacturer's name and registered trademark *Trade name (e.g. White Rhino)* - OPTIONAL The pipe series number '1' for metric pipe series The letters 'PVC-M' Nominal size in the form '100', as appropriate Classification in the form 'PN 12', as appropriate For pipes designed with deflection joints, the maximum allowable angular deflection in degrees Date of manufacture, using the ISO system in the form YYMMDD *Time of manufacture* - OPTIONAL Identification of place of manufacture. The manufacturer's code is acceptable The Australian Standard number, i.e. AS/NZS 4765(Int) Warning - 'SEWERAGE - DO NOT DRINK'
MARKING METHOD	Legible and durable marking along the pipe barrel, minimum lettering height of 5 mm. Unmarked pipe length not to exceed 1 m.
USE LIMITS	Solvent cement joint PVC-M pipes not permitted Do not use in ground subject to extreme movement where joint pull-out could occur Do not use above ground or in ground contaminated with chemicals deleterious to PVC Do not use pipe stored unshaded for 6 months or more from date of manufacture Do not use pipe older than 12 months from the date of manufacture Do not use pipe scratched to a depth greater than 0.25 mm Do not use PVC-M pipes for new works in sizes greater than DN225 unless specific project approval has been granted by the Water Engineering section of Power and Water

SPPS 02-3 DUCTILE IRON FITTINGS

STANDARD	AS/NZS 2280:2004	Ductile iron pressure pipes and fittings
	AS/NZS 4087:2004	Metallic Flanges for waterworks purposes
DESIGN	Ductile iron fittings to the Australian Standard have dimensions based on imperial sizing. As a result, the metric nominal sizing relates only roughly to the internal diameter after cement lining.	
MATERIALS	Fitting:	Spheroidal graphite cast iron to AS 1831(commonly known as ductile iron) – manufactured from scrap ductile iron, steel, ferrosilicon, coke, limestone and magnesium
	Internal lining:	Thermal bonded polymer to AS/NZS 4158
	External coating:	Thermal bonded polymer to AS/NZS 4158 Other coatings may be considered
	Joint seal:	Elastomer type to AS 1646
JOINTING	Socket:	Sockets with grooves to capture elastomeric seals. Sockets and seals of proprietary designs (e.g. Tyton/Plastyt, Nortite) to connect with metric series PVC pipe. Allowable minimum joint deflections of 3.5° for DN 100-250 and 2.5° for DN 300-375. Jointing lugs on 90° and 45° bends for sizes DN 200 and greater.
	Spigot:	End to be chamfered over 10 to 20 mm at approximately 20° to pipe barrel. Jointing lugs on 90° and 45° bends for sizes DN 200 and greater.
	Flange:	Integral flanges to AS 4087 figure B5 for PN16 and figure B6 for PN35. 1.5mm and 3mm flat elastomeric full face gasket to AS 4087 for PN16 and PN35 - Appendix C, Table C1
ALLOWABLE OPERATING PRESSURE	PN16:	1.6 MPa
	PN35:	3.5 MPa

MARKINGS

Manufacturer's name or mark cast on
Nominal size
Ductile or DI moulded in raised form
Where applicable, the angle of the bend cast on
The standard designation AS/NZS 2280
Product certification mark, e.g. StandardsMark
Traceability code
Place of manufacture (may be incorporated in traceability code)

MARKING METHOD Clearly & indelibly marked on fitting. Lettering size & raised height not specified in AS/NZS 2280.

SPPS 02-4 JOINT SEALS

STANDARD

AS 1646: 2000 Elastomeric seals for waterworks purposes
AS 4087: 2004 Metallic flanges for waterworks purposes

SEALING DESIGN

Joint seals are to be of elastomeric compounds comprising suitable polymers. The elastomers have performance properties which deteriorate with time and as such the design of the seal's profile and the compounding of the elastomer needs to ensure long term sealing of the joint. The elastomer properties affecting long term sealing performance are hardness, rate of compression stress relaxation, water absorption, resistance to ageing, resistance to chemicals and resistance to microbiological deterioration.

COMPOUND MATERIALS

Polymer for spigot-socket rings:	Ethylene propylene diene monomer (EPDM), 40% minimum volume of compound for IRHD of ≥55<85 Styrene Butadiene Rubber (SBR), 50% minimum volume of compound for IRHD of ≥55<85
Polymer for flange gaskets:	Ethylene propylene diene monomer (EPDM), 30% minimum volume of compound for IRHD of ≥35<55 or 40% minimum volume of compound for IRHD ≥55≤65 Styrene Butadiene Rubber (SBR), 50% minimum volume of compound for IRHD of ≥35<55 or ≥55≤65
Antidegradant:	For EPDM: Not required For SBR: Based on the combined antioxidant –antiozonant N-(1,3 dimethy-butyl)-N'-phenyl-p-phenylene diamine with a concentration (m/m) of not less than 1.5 parts per hundred of polymer.
Protective wax:	For EPDM: Not required For SBR: Wax with a melting point of not less than 57°C and concentration (m/m) not greater than 3.0 parts per hundred of polymer.
Filler:	Carbon black
Copper & manganese:	For EPDM: Not applicable For SBR: Not greater than 0.0008% copper and 0.0005% manganese

MARKINGS

Rings:
Manufacturer's identification mark
Cavity number, if applicable
Nominal size or nominal internal and cord diameters as appropriate
Year of manufacture, e.g. 01 to represent year 2001
Standard designation where the elastomeric ring is certified to AS 1646.

MARKING METHODS

Embossing with lettering 3 ± 1 mm high and 0.3 ± 0.1 mm proud of the surface; or
Vulcanised transfer or permanent ink with lettering 3.5 ± 1.5 mm.

ELASTOMER TYPE IDENTIFICATION

Marking colour:	EPDM: Green SBR: Blue
Marking method:	Continuous durable stripe of width 3.5 ± 1.5 mm; or Durable flash or dot of 6 mm minimum dimension

STORAGE

- Do not store seals in a room with any equipment capable of generating ozone (e.g. mercury vapour lamps, electric motors, high voltage equipment).
- Store in a relaxed condition free from tension, compression or other deformation.
- Seal temperature not to exceed 35°C and preferably not above 25°C or less than 5°C.

USE LIMITS

Do not use elastomeric seals removed from packaging for more than 3 months
Do not use elastomeric seals older than 18 months from date of manufacture unless supplier can demonstrate that seals have been stored in a cool, controlled environment
Do not use SBR elastomeric seals more than 3 years for date of manufacture
Do not use EPDM elastomeric seals more than 6 years for date of manufacture
Do not use SBR seals that have been stored unprotected from sunlight for more than 7 days
Do not use elastomeric seals that have been in contact with chemicals, e.g. solvents (petrol).

SPPS 02-5 JOINTING LUBRICANT

STANDARD	None
SPECIFICATION	MP52: None
DESIGN	Jointing lubricant is required to achieve the following: • Provide sufficient lubrication to prevent damage to joint seals or surfaces on jointing. • Enable correctly configured jointing when using jointing methods recommended by the pipe or fitting manufacturer. • Not affect the elastomer or pipe or fitting materials. • Remain an effective lubricant under wet conditions. • Not be hazardous to handle and be able to be applied by hand. • Be completely soluble in water. • Be able to be removed under standard flushing arrangements for commissioning.
MATERIALS	Lubricant: Water based emulsion
CONTAINER MARKINGS	Manufacturer's name or trademark Proprietary name of joint seal with which the lubricant can be used. The words 'Jointing Lubricant' or 'Joint Lubricant'. Date of manufacture. Date of expiry for use. The specification to which it complies The WaterMark or other mark to certify compliance with the specification. Instructions for use of lubricant.
USE LIMITS	Do not use where past expiry date.

SPPS 02-6 SOLVENT CEMENTING

STANDARD	AS: 3879: 1995	Solvent cements and priming fluids for use with unplasticized PVC (uPVC) pipes and fittings
SPECIFICATION	WSAA: None	
DESIGN	Solvent cement:	The solvent in the cement softens and swells a layer of the PVC on the spigot and socket mating surfaces and these layers combine with the PVC already in the solvent cement to create a bond on drying of the solvent.
	Priming fluid:	The priming fluid cleans the joint mating surfaces of dirt, oil and other contamination prior to application of the solvent cement and removes the surface sheen on the PVC to aid action of the solvent cement.
MATERIALS	Solvent cement:	Consists of one or more solvents and a sufficient quantity of base PVC material dissolved in the solvent/s to give the cement the body and consistency required for proper application. Small amounts of inert fillers are sometimes added to control shrinkage during drying. The principal solvent used is tetrahydrofuran (THF).
	Priming fluid:	
CONTAINER MARKINGS	Manufacturer's name Marking 'Type P' to indicate solvent cement for pressure applications. Net mass or volume Date of manufacture Recommended storage life Instructions for storage and use The statement 'Priming fluids shall be used to prepare the jointing surface prior to solvent cement application.' A statement of any toxic vapour or flammability hazards associated with the solvent cement or priming fluid. The statement 'No additives of any kind shall be mixed with this solvent cement/priming fluid'. (as applicable) The number of the Australian Standard, i.e. AS/NZS 3879	
COLOUR	Solvent cement:	Green for pressure applications.
	Priming fluid:	Pink or red
USE LIMITS	Clear solvent cement is not permitted Solvent cement jointing is permitted only for unusual requirements. Do not use solvent cement where 12 months past the date on the container.	

SPPS 02-7 SPIGOT-SOCKET PVC-O PIPES

STANDARD AS/NZS 4441 (Int):2003 Oriented PVC (PVC-O) pipes for pressure applications

UNDER DEVELOPMENT

SPIGOT-SOCKET RRJ PIPES

CLASS PN 9

Nominal size DN	Iplex (PVC-U)	Iplex (PVC-M)	Iplex (PVC-M) Reiber Joint	Tyco (PVC-U) Plas-flo	Tyco (PVC-M) Tuf-flo	Vinidex (PVC-M)
80	✔			✔		
100		✔			✔	✔
150			✔		✔	✔
200			✔		✔	✔
225			✔		✔	✔
250			✔		✔ 1	✔ 1
300			✔ 1		✔ 1	✔ 1
375			✔ 1		✔ 1	✔ 1

CLASS PN 12

Nominal size DN	Iplex (PVC-U)	Iplex (PVC-M)	Iplex (PVC-M) Rieber Joint	Tyco (PVC-U) Plas-flo	Tyco (PVC-M) Tuf-flo	Vinidex (PVC-M)
80	✔			✔		
100		✔			✔	✔
150			✔		✔	✔
200			✔		✔	✔
225			✔		✔	✔
250			✔ 1		✔ 1	✔ 1
300			✔ 1		✔ 1	✔ 1
375			✔ 1		✔ 1,2	✔ 1

CLASS PN 15

Nominal size DN	Iplex (PVC-U)	Iplex (PVC-M)	Iplex (PVC-M) Rieber Joint
80	✔		
100		✔	
150			✔
200			
225			
250			
300			
375			

CLASS PN 18

Nominal size DN	Iplex (PVC-U)	Iplex (PVC-M)	Iplex (PVC-M) Rieber Joint
80	✔		
100		✔	
150			✔
200			✔ 2
225			✔ 2
250			✔ 1,2
300			✔ 1,2
375			✔ 1,2

NOTES

1. Project approval necessary (refer to Water Engineering section of Power and Water)
2. Not readily available

SPIGOT-SOCKET SCJ PIPES
(Only permitted for unusual requirements)

CLASS PN 9

Nominal size DN	Iplex (PVC-U)	Tyco (PVC-U)
80	✔	✔
100	✔	✔
150	✔	✔

CLASS PN 12

Nominal size DN	Iplex (PVC-U)	Tyco (PVC-U)
80	✔	✔
100	✔	✔
150	✔	✔

CLASS PN 15

Nominal size DN
80
100
150

CLASS PN 18

Nominal size DN	Iplex (PVC-U)
80	✔
100	✔
150	✔

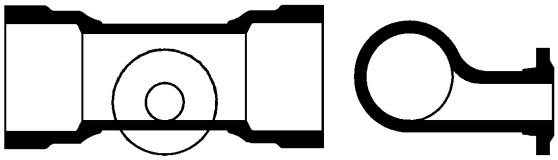
SOCKET-SOCKET BENDS

Nominal Size DN x Degrees	Mallet	Tyco Water	Tyco Water Austlite[1]	Derwent	Dobbie Dico
100 x 11.25	✔	✔	✔	✔	✔
100 x 22.5	✔	✔	✔	✔	✔
100 x 45	✔	✔	✔	✔	✔
100 x 90	✔	✔	✔	✔	✔
150 x 11.25	✔	✔	✔	✔	✔
150 x 22.5	✔	✔	✔	✔	✔
150 x 45	✔	✔	✔	✔	✔
150 x 90	✔	✔	✔	✔	✔
200 x 11.25	✔	✔		✔	✔
200 x 22.5	✔	✔		✔	✔
200 x 45	✔	✔		✔	✔
200 x 90	✔	✔		✔	✔
225 x 11.25	✔	✔		✔	
225 x 22.5	✔	✔		✔	
225 x 45	✔	✔		✔	
225 x 90	✔	✔		✔	
250 x 11.25	✔	✔		✔	✔
250 x 22.5	✔	✔		✔	✔
250 x 45	✔	✔		✔	✔
250 x 90	✔	✔		✔	✔
300 x 11.25	✔	✔		✔	
300 x 22.5	✔	✔		✔	
300 x 45	✔	✔		✔	
300 x 90	✔	✔		✔	
375 x 11.25	✔	✔		✔	
375 x 22.5	✔	✔		✔	
375 x 45	✔	✔		✔	
375 x 90	✔	✔		✔	

NOTES

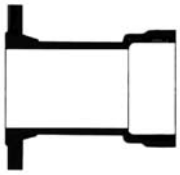
1. Auslite fittings available in PN16 rating only

SOCKET-SOCKET-FLANGE SCOUR TEES



Nominal Size DN x DN x dn	Mallet	Tyco Water	Derwent
150 x 150 x 80	✔	✔	✔
200 x 200 x 80	✔	✔	✔
225 x 225 x 100	✔	✔	✔
250 x 250 x 100	✔	✔	✔
300 x 300 x 100	✔	✔	✔
375 x 375 x 150	✔	✔	✔

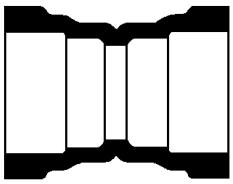
FLANGE-SOCKET CONNECTORS



Nominal Size DN	Mallet[1]	Tyco Water	Derwent	Tyco Water Auslite[1]	Dobbie Dico[1]
100	✔	✔	✔	✔	✔
150	✔	✔	✔	✔	✔
200	✔	✔	✔		✔
225	✔	✔	✔		
250	✔	✔	✔		✔
300	✔	✔	✔		
375	✔	✔	✔		

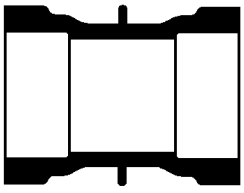
NOTES 1. Auslite, Dobbie Dico and Mallet fittings available in PN16 rating only

SOCKET-SOCKET CONNECTORS



Nominal Size DN	Mallet	Tyco Water	Derwent
100	✔	✔	✔
150	✔	✔	✔
200	✔	✔	✔
225	✔	✔	✔
250	✔	✔	✔
300	✔	✔	✔
375	✔	✔	✔

SOCKET-SOCKET SLIP COLLARS



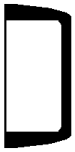
Nominal Size DN	Tyco Water (Sliptyt)
100	✔
150	✔

NOTES

1. Sliptyt offered only with thermal bonded polymeric encapsulation utilising polyamide (nylon) being Rilsan T Blue 7411 MAC

POLYVINYL CHLORIDE PIPELINE SYSTEM END SEALS

CAPS

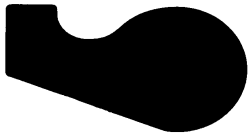


Nominal Size DN	Mallet	Tyco Water	Derwent	Dobbie Dico
100	✔	✔	✔	✔
150	✔	✔	✔	✔
200	✔	✔	✔	✔
225	✔	✔	✔	
250	✔	✔	✔	✔
300	✔	✔	✔	
375	✔	✔	✔	

PVC SPIGOT TO PVC SOCKET ELASTOMERIC SEALS

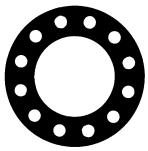
Nominal Size DN	Iplex (Gulf & Hultec)	Vinidex (Gulf & Hultec)	Derwent (Gulf)	Dobbie Dico (Gulf)
100	✔	✔	✔	✔
150	✔	✔	✔	✔
200	✔	✔	✔	✔
225	✔	✔	✔	
250	✔	✔	✔	✔
300	✔	✔	✔	
375	✔	✔	✔	

PVC SPIGOT TO DI SOCKET ELASTOMERIC SEALS



Nominal Size DN	Mallet (Ludowici)	Tyco Water (Gulf)	Derwent (Gulf)
80	✔	✔	✔
100	✔	✔	✔
150	✔	✔	✔
200	✔	✔	✔
225	✔	✔	✔
250	✔	✔	✔
300	✔	✔	✔
375	✔	✔	✔

FLANGE ELASTOMERIC SEALS



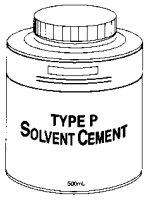
Nominal Size DN	Mallet	Tyco Water (SDQ))
80	✔	✔
100	✔	✔
150	✔	✔
200	✔	✔
225	✔	✔
250	✔	✔
300	✔	✔
375	✔	✔

JOINTING LUBRICANT

Lubricants Size	Iplex (Thomas Grozier)	Vinidex (IDL Chemicals)
500ml	✔	
1L	✔	✔
2L		✔
5L	✔	✔

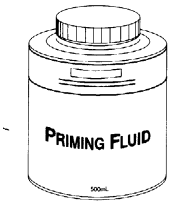
SOLVENT CEMENTING

SOLVENT CEMENT (type P – colour green)



Sizes	Iplex (Bostik)
125ml	✔
250ml	✔
500ml	✔
1L	✔
4L	

PRIMING FLUID (colour pink or red)



Sizes	Iplex (Bostik)
250ml	✔
500ml	✔
1L	✔
4L	

EXTERNAL CORROSION PROTECTION FOR DI FITTINGS
POLYETHYLENE SLEEVING & PETROLATUM SYSTEM

REFER TO SECTION SPO 04 CORROSION PROTECTION

Water Supply and Sewerage Approved Products Manual - February 2006

Pressure Sewerage Products – Steel Pipeline System

Section SPPS 06

PowerWater

STEEL PIPELINE SYSTEM CONTENTS

SPPS 06-S1 STEEL PIPES

STANDARD

AS 1579:2001 Arc welded steel pipes and fittings for water and waste water

DESIGN

Arc-welded steel pipes with butt-welded seams, either welded longitudinally, circumferentially or spirally. The standard defines nominal pipe sizes and the true outside diameters for those pipes. Pipe sizes are not restricted to these nominal sizes, and upon request from the purchaser, can be made to any outside diameter equal to or greater than 114 mm. Pipes are protected from corrosion by suitable coating and lining.

MATERIALS

Pipe:	Structural or analysis grade steel to AS 1594 or 3678
Weld:	Complete penetration butt welds to AS 1554.1 category SP. Double sided welds are specified
Internal lining:	Cement mortar to AS 1281 using GP or SR cement and inert aggregate Calcium aluminate cement mortar to EN14647 Polyethylene coating to AS 4321 Other linings may be applied as specified by the purchaser
External coating:	Polyethylene coating to AS 4321 Other linings may be applied as specified by the purchaser
Socket lining:	Polyethylene coating to AS 4321 Other linings may be applied as specified by the purchaser
Joint seal:	Approved elastomer to AS 1646.1 and 1646.2 or AS 1646.3

JOINTING

Joint types:	Butt weld spigots (plain butt joint, butt joint with collar) Fillet weld spigot-socket (spherical slip-in joint, ball and socket joint) Flanged Elastomeric sealed spigot-socket Combination elastomeric sealed spigot-socket with fillet lock weld

EFFECTIVE LENGTH

6, 9 or 12 metre lengths normally available. Longer lengths available on special request.

ALLOWABLE OPERATING PRESSURE

Dependent on pipe diameter, wall thickness and material grade

PIPE SIZES USED BY POWER AND WATER

CURRENTLY USED FOR NEW CONSTRUCTION		NO LONGER USED FOR NEW CONSTRUCTION	
Nominal Size	Outside Diameter	Nominal Size	Outside Diameter
DN	mm	DN	mm
100	114	100	121
150	168	150	178
225	257	525	559
300	337	825	889
375	419	1100	1206
450	508		
600	660		
750	813		
1000	1067		

MARKINGS

Unique serial number
Place of manufacture
Outside diameter
Wall thickness
Australian standard number i.e. AS1579
Manufacturers name or registered trademark
For hydrostatically tested pipes only, the rated pressure, in megapascals (MPa)
For non-hydrostatically tested pipes, the words “Not hydrostatically tested”
For pipes complying with AS/NZS 4020 ‘AS/NZS 4020’

MARKING METHOD

Legibly and permanently marked on the external surface no closer than 300 mm from an end

USE LIMITS

Normal Portland cement mortar (GP) is not resistant to sulphuric acid that can form if H_2S develops in any headspace in the sewer. Sections of cement mortar lined pressure mains subject to partially full flow could experience sulphuric acid attack if pressure main is not designed to avoid H_2S generation (i.e. slime stripping velocity not achieved). H_2S is typically released at high points on the pipeline when pressure in the line drops below 5m head.
GP cement mortar should not be used if sulphate levels in the pressure sewer are likely to exceed 600 mg/litre. SR cement mortar is suitable for sulphate levels up to 6,000 mg/litre. If sulphate levels are likely to exceed 6,000 mg/litre or pH is likely to drop below 5.5, use calcium aluminate cement (CAC) mortar linings.
Welding of joints to be performed by qualified welders
Welded joints to have reinstatement of protection systems on site
Special design required for welded installations parallel to high voltage (>66kV) transmission lines
Polyethylene coating should not be used where there is extended exposure to direct sunlight.
Use approved paint schemes for aboveground piping

SPPS 06-S2 STEEL FITTINGS

STANDARD	AS 1579:2001 Arc welded steel pipes and fittings for water and waste water	
DESIGN	Arc-welded steel fittings with butt-welded seams, either welded longitudinal, circumferential or spiral. The standard also sets out the nominal fitting sizes and the true outside diameters for those fittings. Fitting sizes are not restricted to these nominal sizes, and upon request from the purchaser, can be made to any outside diameter equal to or greater than 114 mm. Fittings are protected from corrosion by suitable coating and lining. The standard allows for the use in both water and waste water.	
MATERIALS	Fitting:	Structural or Analysis grade steel to AS 1594 or 3678
	Weld:	Complete penetration butt welds to AS 1554.1 category SP. Single sided wields are permitted if full penetration achieved.
	Internal lining:	Cement mortar to AS 1281 using GP or SR cement and inert aggregate Calcium aluminate cement mortar to EN14647 Polyethylene coating to AS 4321 Other linings may be applied as specified by the purchaser
	External coating:	Polyethylene coating to AS 4321 Other linings may be applied as specified by the purchaser
	Socket lining:	Polyethylene coating to AS 4321 Other linings may be applied as specified by the purchaser
	Joint seal:	Approved elastomer to AS 1646.1 and 1646.2 or AS 1646.3
JOINTING	Types permitted:	Butt weld spigots (plain butt joint, butt joint with collar) Fillet weld spigot-socket (spherical slip-in joint, ball and socket joint) Flanged Elastomeric sealed spigot-socket Combination elastomeric sealed spigot-socket with fillet lock weld
MARKINGS	Unique serial number Place of manufacture Outside diameter Wall thickness Australian standard number i.e. AS1579 Manufacturer's name or registered trademark For fittings compiling with AS/NZS 4020 'AS/NZS 4020'	
MARKING METHOD	Legibly and permanently marked on the external surface no closer than 300 mm to from an end	
USE LIMITS	Welding of joints to be performed by qualified welders Welded joints to have reinstatement of protection systems on site Special design required for welded installations parallel to high voltage (>66kV) transmission lines Polyethylene coating should not be used where there is extended exposure to direct sunlight. Use approved paint schemes for aboveground piping	

TYCO ARC WELDED STEEL PIPE

Coating/Lining Options				Jointing Options				
UC	SK/SL [1]	P [2]	CL [3]	BSJ	BV	SB	SSJ	RRJ
✔	✔	✔	✔	✔	✔	✔	✔	✔ [4]

NOTES

1. Fusion bonded polyethylene cannot be used as a lining option where welded joints are to be used
2. Paint product is to be specified by purchaser and approved by Power and Water
3. Lining option only
4. Not available in sizes less than DN300
5. Tyco considers flanged pipes as fittings

KEY

Lining/Coating Options

- UC Uncoated
- SK/SL Sintakote / Sintaline - Fusion bonded polyethylene (FBPE)
- P Paint
- CL Cement mortar lining

Jointing Options

- BSJ Ball and socket joint
- BV Plain end with bevel
- SB Plain end with weld band
- SSJ Spherical slip in joint
- RRJ Rubber ring joint

STEEL FITTINGS TO SUIT TYCO ARC WELDED PIPE

Tyco Water
✔

Note: Project specific approval can be sought from Power and Water to fabricate fittings, subject to:

- Fabrication off-site in a suitable workshop
- Agreed procedures for repair / reinstatement of cement mortar lining
- Agreed procedures for repair / reinstatement of external coatings
- Welding of joints is performed by qualified welders
- Agreed procedures for non-destructive testing of welds
- Structural certification by an independent engineer

EXTERNAL CORROSION PROTECTION
POLYETHYLENE SLEEVING & PETROLATUM SYSTEM

REFER TO SECTION SPO 04 CORROSION PROTECTION

Water Supply and Sewerage Approved Products Manual - February 2006

Pressure Sewerage Products – Glass Reinforced Plastic Pipeline System

Section SPPS 05

PowerWater

GRP PIPELINE SYSTEM CONTENTS

SPPS 05-S1 CENTRIFUGALLY CAST GRP PIPES

STANDARD	AS 3571:1989 Glass filament reinforced thermosetting plastics (GRP) pipes-Polyester based-Water supply sewerage and drainage applications	
DESIGN	Centrifugally cast (CC) GRP pipe to AS 3571 is manufactured with external diameters equivalent to that for DI pipe to AS/NZS 2280, i.e. Cast Iron Outside Diameter (CIOD) Series or Series 2. Centrifugally cast GRP pipe can thus be joined to ductile iron sockets. GRP pressure pipes are defined by both pressure class and stiffness class. For centrifugally cast GRP pressure pipe, the GRP composite through the wall is varied to increase the pressure rating while the wall thickness is increased to increase the ring-bending stiffness (wall thickness increase is not used to increase the pressure rating).	
MATERIALS	CC GRP Pipe:	Polyester resin (inner corrosion barrier resin differs to structural layer resin) Chopped glass filaments (E-glass) with coupling agent to bond to resin Quartz sand (for central and outer layers only)
	FW GRP	Polyester resin
	Coupling for CC GRP Pipe:	Continuous glass rovings with either chopped strand mat or chopped rovings (E-glass) with coupling agent to bond to resin. Coat the chopped roving couplings with pigmented resin or acrylic paint for above ground use.
JOINTING	Plain ended CC GRP pipes are joined with a sleeve coupling, factory fitted to one pipe end. Couplings comprise a filament wound (FW) GRP outer shell and inner elastomeric membrane The membrane seals each pipe with both an initial compression seal and secondary lip seal and also has a central pipe insertion stop. Flexible joints are to allow min. deflection of 3° for ≤DN 500 and 2° for DN 525 to DN 1000. Spigots to have witness marks for insertion depth.	
EFFECTIVE LENGTH	6 m for CC GRP pipe (+0.12, -0 m). Optional pipe lengths available on request, 1m minimum.	
PRESSURE CLASSES	PN 12.5, PN 16 and PN 20 corresponding to 1.25, 1.6 and 2.0 MPa working pressure	
PIPE MARKINGS	Manufacturer's name & registered trademark Application in the form 'PRESSURE PIPE' Nominal size in the form 'DN 500' Nominal stiffness class in the form 'SN 10000' Nominal pressure class in the form 'PN 12.5' Place of manufacture Machine number (Iplex marking) Date of manufacture, using the ISO system in the form 010220 (20th February 2001) Unique pipe number (Iplex marking) Australian Standard number, i.e. AS 3571 Product certification mark e.g. StandardsMark	
COUPLING MARKINGS	Nominal size in the form 'DN 500' Nominal pressure class in the form 'PN 12.5' Date of manufacture using the ISO system Sequential coupling number Shift of manufacture Weight of coupling in kg Product certification mark e.g. StandardsMark License number e.g. StandardsMark	
MARKING METHOD	Permanent and indelible marking in lettering of 10 mm minimum height along the pipe barrel.	
USE LIMITS	Do not use pipes/couplings with chips, cracks, crazing, layer delamination or exposed fibres. Seal cut pipe ends with resin. Do not use pipe and couplings, stored unprotected from sunlight for more than 9 months. Do not use pipe older than 24 months from the date of manufacture. Pipe and couplings used above ground to have Power and Water approved UV protection.	

Do not use in ground conditions having low stiffness, e.g. tidal zones
Do not use where ground is unacceptably contaminated with organic compounds.
Use under railways only with an encasing pipe.
Combined max. steady state and surge pressure not to exceed the working pressure rating.
Apply manufacturer's rerating factors for surge events of more than 10^5 over the service life.

SPPS 05-S2 DUCTILE IRON FITTINGS

STANDARD	AS/NZS 2280:2004Ductile iron pressure pipes and fittings AS/NZS 4087:2004Metallic Flanges for waterworks purposes	
DESIGN	Ductile iron fittings to the Australian Standard have dimensions based on imperial sizing. As a result, the metric nominal sizing relates only roughly to the internal diameter after cement lining.	
MATERIALS	Fitting:	Spheroidal graphite cast iron to AS 1831(commonly known as ductile iron) – manufactured from scrap ductile iron, steel, ferrosilicon, coke, limestone and magnesium
	Internal lining:	Thermal bonded polymer to AS/NZS 4158
	External coating:	Thermal bonded polymer to AS/NZS 4158 Other coatings may be considered
	Joint seal:	Elastomer type to AS 1646
JOINTING	Socket:	Sockets with grooves to capture elastomeric seals. Sockets and seals of proprietary profile designs, (e.g. Tyton, Griptite). Allowable minimum joint deflections of 2.5° for DN 300-600 and 1° for DN 750. Jointing lugs on 90° and 45° bends for sizes DN 200 and greater.
	Spigot:	End to be chamfered over 10 to 20 mm at approximately 20° to pipe barrel. Jointing lugs on 90° and 45° bends for sizes DN 200 and greater.
	Flange:	Integral flanges to AS 4087 figure B5 for PN16 and figure B6 for PN35. 1.5mm and 3mm flat elastomeric full face gasket to AS 4087 for PN16 and PN35 - Appendix C, Table C1
ALLOWABLE OPERATING PRESSURE	PN16:	1.6 MPa
	PN35:	3.5 MPa
MARKINGS	Manufacturer's name or mark cast on Nominal size Ductile or DI moulded in raised form Where applicable, the angle of the bend cast on The standard designation AS/NZS 2280 Product certification mark, e.g. StandardsMark Traceability code Place of manufacture (may be incorporated in traceability code)	
MARKING METHOD	Clearly & indelibly marked on the fitting. Lettering heights & raised height not specified in AS/NZS 2280.	

SPPS 05-S3 JOINT SEALS

STANDARD	AS 1646: 2000 Elastomeric seals for waterworks purposes AS 4087: 2004 Metallic flanges for waterworks purposes	
SEALING DESIGN	Joint seals are to be of elastomeric compounds comprising suitable polymers. The elastomers have performance properties, which deteriorate with time and as such the design of the seal's profile and the compounding of the elastomer needs to ensure long term sealing of the joint. The elastomer properties affecting long term sealing performance are hardness, rate of compression stress relaxation, water absorption, resistance to ageing, resistance to chemicals and resistance to microbiological deterioration.	
COMPOUND MATERIALS	Polymer for spigot-socket rings:	Ethylene propylene diene monomer (EPDM), 40% minimum volume of compound for IRHD of ≥55<85 Styrene Butadiene Rubber (SBR), 60% minimum volume of compound for IRHD of ≥55<85
	Polymer for flange gaskets:	Ethylene propylene diene monomer (EPDM), 30% minimum volume of compound for IRHD of ≥35<55 or 40% minimum volume of compound for IRHD ≥55≤65 Styrene Butadiene Rubber (SBR), 50% minimum volume of compound for IRHD of ≥35<55 or ≥55≤65
	Antidegradant:	For EPDM: Not required For SBR: Based on the combined antioxidant-antiozonant N-(1,3-dimethyl-butyl)-N'-phenyl-p-phenylene diamine with a concentration (m/m) of not less than 1.5 parts per hundred of polymer.
	Protective wax:	For EPDM: Not required For SBR: Wax with a melting point of not less than 57°C and concentration (m/m) not greater than 3.0 parts per hundred of polymer.
	Filler:	Carbon black
	Copper & manganese:	For EPDM: Not applicable For SBR: Not greater than 0.0008% copper and 0.0005% manganese
MARKINGS	Rings:	Manufacturer's identification mark Cavity number, if applicable Nominal size or nominal internal and cord diameters as appropriate Year of manufacture, e.g. 00 to represent year 2000 Standard designation where the elastomeric ring is certified to AS 1646.
MARKING METHODS	Embossing with lettering 3 ± 1 mm high and 0.3 ± 0.1 mm proud of the surface; or Vulcanised transfer or permanent ink with lettering 3.5 ± 1.5 mm.	
ELASTOMER TYPE IDENTIFICATION	Marking colour:	EPDM: Green SBR: Blue
	Marking method:	Continuous durable stripe of width 3.5 ± 1.5 mm; or Durable flash or dot of 6 mm minimum dimension

STORAGE

- Do not store seals in a room with any equipment capable of generating ozone (e.g. mercury vapour lamps, electric motors, high voltage equipment).
- Store in a relaxed condition free from tension, compression or other deformation.
- Seal temperature not to exceed 35°C and preferably not above 25°C or less than 5°C.

USE LIMITS

Do not use elastomeric seals removed from packaging for more than 3 months
Do not use elastomeric seals older than 18 months from date of manufacture unless supplier can demonstrate that seals have been stored in a cool, controlled environment.
Do not use SBR elastomeric seals more than 3 years from date of manufacture
Do not use EPDM elastomeric seals more than 6 years from date of manufacture
Do not use SBR seals that have been stored unprotected from sunlight for more than 7 days
Do not use elastomeric seals that have been in contact with chemicals, e.g. solvents (petrol).

SPPS 05-S4 JOINTING LUBRICANT

STANDARD None

DESIGN Jointing lubricant is required to achieve the following:

- Provide sufficient lubrication to prevent damage to joint seals or surfaces on jointing.
- Enable correctly configured jointing when using jointing methods recommended by the pipe or fitting manufacturer.
- Not affect the elastomer or pipe or fitting materials.
- Remain an effective lubricant under wet conditions.
- Not be hazardous to handle and be able to be applied by hand.
- Be completely soluble in water.
- Be able to be removed under standard flushing arrangements for commissioning.

MATERIALS Lubricant: Water based emulsion

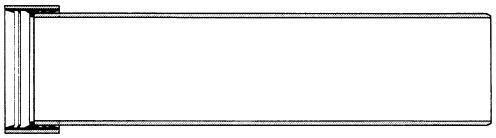
CONTAINER MARKINGS Manufacturer's name or trademark
Proprietary name of joint seal with which the lubricant can be used.
The words 'Jointing Lubricant' or 'Joint Lubricant'.
Date of manufacture.
Date of expiry for use.
The specification to which it complies.
The WaterMark or other mark to certify compliance with the specification.
Instructions for use of lubricant.

USE LIMITS Do not use where past expiry date.

WPS 05-S5 FILAMENT WOUND GRP PIPES

STANDARD	ISO 10639 Plastic Piping Systems for Pressure and Non-Pressure Water Supply – Glass-Reinforced Thermosetting Plastics (GRP) Systems Based on Unsaturated Polyester (UP) Resin
DESIGN	GRP pipe manufactured with external diameters equivalent to that for DI pipe to AS/NZS 2280, i.e. Cast Iron Outside Diameter (CIOD) Series or Series 2 GRP pressure pipes are defined by both pressure class and stiffness class.
MATERIALS	GRP Pipe: Polyester resin Chopped and continuous glass filaments (ECR-glass) Quartz sand (filler)
JOINTING	Plain ended GRP pipes are joined with a sleeve coupling, factory fitted to one pipe end. Deflection permitted at joints varies with pipe pressure class and pipe diameter. PN10 & PN16 – 3° maximum for DN300, DN375 and DN450. 2° maximum for DN525, DN600, DN675 and DN750. PN20 – 2° maximum for DN300, DN375 and DN450. 1.5° maximum for DN525, DN600, DN675 and DN750. External diameter of the pipe may vary along its length. Pipes with external diameter within tolerances for full length to be marked as 'alignment pipes' and may be used on-site as cut pipe. Sealing of cut ends of pipe not required.
EFFECTIVE LENGTH	6 m. Optional pipe lengths available on request, 1m minimum.
PRESSURE CLASSES	PN 10, PN 16 and PN 20 corresponding to 1.0, 1.6 and 2.0 MPa working pressure
PIPE MARKINGS	Manufacturer's name and/or logo Nominal size in the form 'DN 450' Nominal stiffness in the form 'SN 10000' Nominal pressure class in the form 'PN 16' Date of manufacture, using the ISO system in the form YYMMDD (eg. 000220 is 20th February 2000) Batch description Date of manufacture, using the ISO system in the form 000220 (20th February 2000) Unique pipe number
MARKING METHOD	Permanent and indelible marking in lettering of 10 mm minimum height along the pipe barrel.
USE LIMITS	Do not use pipes/couplings with chips, cracks, crazing, layer delamination or exposed fibres. Only tap GRP pipes in accordance with manufacturer's instructions Do not use pipe and couplings, stored unprotected from sunlight for more than 9 months. Do not use pipe older than 24 months from the date of manufacture. Pipe and couplings used above ground to have Power and Water approved UV protection. Do not use in ground conditions having low stiffness, e.g. tidal zones Do not use where ground is unacceptably contaminated with organic compounds. Use under railways only with an encasing pipe. Combined max. steady state and surge pressure not to exceed the working pressure rating. For pumped systems, fatigue allowances must be made (refer to manufacturer)

FILAMENT WOUND GRP PIPES
COMPLETE WITH COUPLING
(STIFFNESS CLASS SN 10000)



CLASS PN 10

Nominal size DN	Iplex (Flowtite)
300	✔
375	✔
450	✔
525	✔
600	✔
675	✔
750	✔

CLASS PN 16

Nominal size DN	Iplex (Flowtite)
300	✔
375	✔
450	✔
525	✔
600	✔
675	✔
750	✔

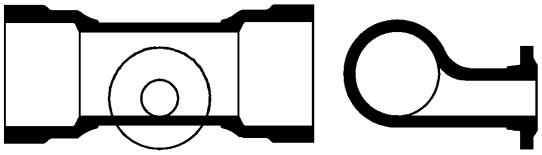
CLASS PN 20

Nominal size DN	Iplex (Flowtite)
300	✔
375	✔
450	✔
525	✔
600	✔
675	✔
750	✔

SOCKET-SOCKET BENDS

Nominal size DN x degrees	Mallet	Tyco Water	Derwent
300 x 11.25	✔	✔	✔
300 x 22.5	✔	✔	✔
300 x 45	✔	✔	✔
300 x 90	✔	✔	✔
375 x 11.25	✔	✔	✔
375 x 22.5	✔	✔	✔
375 x 45	✔	✔	✔
375 x 90	✔	✔	✔
450 x 11.25	✔	✔	✔
450 x 22.5	✔	✔	✔
450 x 45	✔	✔	✔
450 x 90	✔	✔	✔
525 x 11.25			
525 x 22.5			
525 x 45			
525 x 90			
600 x 11.25	✔	✔	✔
600 x 22.5	✔	✔	✔
600 x 45	✔	✔	✔
600 x 90	✔	✔	✔
675 x 11.25			
675 x 22.5			
675 x 45			
675 x 90			
750 x 11.25	✔	✔	
750 x 22.5	✔	✔	
750 x 45	✔	✔	
750 x 90	✔	✔	

SOCKET-SOCKET-FLANGE SCOUR TEES

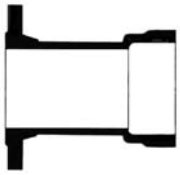


Nominal Size DN x DN x dn	Mallet[1]	Tyco Water	Derwent
300 x 300 x 100	✔	✔	✔
375 x 375 x 150	✔	✔	✔
450 x 450 x 150	✔	✔	✔
525 x 525 x 150			
600 x 600 x 150	✔	✔	✔
675 x 675 x 150			
750 x 750 x 200	✔	✔	

NOTES

1. Mallet fittings available in PN16 rating only

FLANGE-SOCKET CONNECTORS

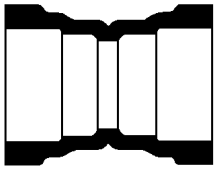


Nominal Size DN	Mallet[1]	Tyco Water	Derwent
300	✔	✔	✔
375	✔	✔	✔
450	✔	✔	✔
525			
600	✔	✔	✔
675			
750	✔	✔	

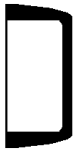
NOTES

1. Mallet fittings available in PN16 rating only

SOCKET-SOCKET CONNECTORS

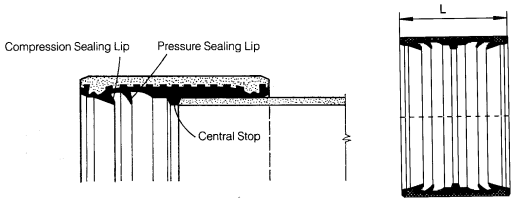


Nominal Size DN	Mallet	Tyco Water	Derwent
300	✔	✔	✔
375	✔	✔	✔
450	✔	✔	✔
525			
600	✔	✔	✔
675			
750	✔	✔	



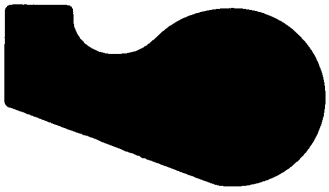
Nominal Size DN	Mallet	Tyco Water	Derwent
300	✔	✔	✔
375	✔	✔	✔
450	✔	✔	✔
525			
600	✔	✔	✔
675			
750	✔	✔	

CC GRP PIPE
SYMMETRICAL COUPLINGS



Nominal Size DN	Iplex (Flowtite)
300	✔ (L= 270)
375	✔ (L= 270)
450	✔ (L= 270)
525	✔ (L= 270)
600	✔ (L= 330)
675	✔ (L= 330)
750	✔ (L= 330)

GRP SPIGOT- DI SOCKET ELASTOMERIC SEALS

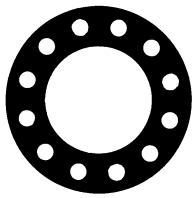


Nominal Size DN	Mallet (Ludowici)	Tyco Water (SDQ)	Derwent (Gulf)
300	✔	✔	✔
375	✔	✔	✔
450	✔	✔	✔
525			
600	✔	✔	✔
675			
750	✔	✔	

NOTES

1. Seal manufacturers are shown in brackets.

DI FLANGE ELASTOMERIC SEALS



Nominal Size DN	Mallet (Ludowici)	Tyco Water (SDQ)
300	✔	✔
375	✔	✔
450	✔	✔
500	✔	✔
600	✔	✔
750	✔	✔

NOTES

1. Seal manufacturers are shown in brackets.

JOINTING LUBRICANT

Size	Iplex (Thomas Grozier)
500mL	✔
1L	✔
4L	✔

EXTERNAL CORROSION PROTECTION FOR DI FITTINGS POLYETHYLENE SLEEVING & PETROLATUM SYSTEM

REFER TO SECTION SPO 04 CORROSION PROTECTION