

# **Water Supply and Sewerage Approved Products Manual - February 2006**

## **Pressure Sewerage Products – Glass Reinforced Plastic Pipeline System**

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## SPPS 05-S1 CENTRIFUGALLY CAST GRP PIPES

<b>STANDARD</b>	AS 3571:1989 Glass filament reinforced thermosetting plastics (GRP) pipes-Polyester based-Water supply sewerage and drainage applications
<b>DESIGN</b>	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).
<b>MATERIALS</b>	<p><b>CC GRP Pipe:</b> 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)</p> <p><b>FW GRP</b> Polyester resin</p> <p><b>Coupling for</b> Continuous glass rovings with either chopped strand mat or chopped</p> <p><b>CC GRP Pipe:</b> 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.</p>
<b>JOINTING</b>	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.
<b>EFFECTIVE LENGTH</b>	6 m for CC GRP pipe (+0.12, -0 m). Optional pipe lengths available on request, 1m minimum.
<b>PRESSURE CLASSES</b>	PN 12.5, PN 16 and PN 20 corresponding to 1.25, 1.6 and 2.0 MPa working pressure
<b>PIPE MARKINGS</b>	<p>Manufacturer's name &amp; registered trademark</p> <p>Application in the form 'PRESSURE PIPE'</p> <p>Nominal size in the form 'DN 500'</p> <p>Nominal stiffness class in the form 'SN 10000'</p> <p>Nominal pressure class in the form 'PN 12.5'</p> <p>Place of manufacture</p> <p>Machine number (Iplex marking)</p> <p>Date of manufacture, using the ISO system in the form 010220 (20<sup>th</sup> February 2001)</p> <p>Unique pipe number (Iplex marking)</p> <p>Australian Standard number, i.e. AS 3571</p> <p>Product certification mark e.g. StandardsMark</p>
<b>COUPLING MARKINGS</b>	<p>Nominal size in the form 'DN 500'</p> <p>Nominal pressure class in the form 'PN 12.5'</p> <p>Date of manufacture using the ISO system</p> <p>Sequential coupling number</p> <p>Shift of manufacture</p> <p>Weight of coupling in kg</p> <p>Product certification mark e.g. StandardsMark</p> <p>License number e.g. StandardsMark</p>
<b>MARKING METHOD</b>	Permanent and indelible marking in lettering of 10 mm minimum height along the pipe barrel.
<b>USE LIMITS</b>	<p>Do not use pipes/couplings with chips, cracks, crazing, layer delamination or exposed fibres. Seal cut pipe ends with resin.</p> <p>Do not use pipe and couplings, stored unprotected from sunlight for more than 9 months.</p> <p>Do not use pipe older than 24 months from the date of manufacture.</p> <p>Pipe and couplings used above ground to have Power and Water approved UV protection.</p>

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 rating factors for surge events of more than  $10^5$  over the service life.

## SPPS 05-S2

## DUCTILE IRON FITTINGS

<b>STANDARD</b>	AS/NZS 2280:2004 Ductile iron pressure pipes and fittings AS/NZS 4087:2004 Metallic Flanges for waterworks purposes
<b>DESIGN</b>	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.
<b>MATERIALS</b>	<p><b>Fitting:</b> Spheroidal graphite cast iron to AS 1831 (commonly known as ductile iron) – manufactured from scrap ductile iron, steel, ferrosilicon, coke, limestone and magnesium</p> <p><b>Internal lining:</b> Thermal bonded polymer to AS/NZS 4158</p> <p><b>External coating:</b> Thermal bonded polymer to AS/NZS 4158 Other coatings may be considered</p> <p><b>Joint seal:</b> Elastomer type to AS 1646</p>
<b>JOINTING</b>	<p><b>Socket:</b> 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.</p> <p><b>Spigot:</b> 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.</p> <p><b>Flange:</b> 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</p>
<b>ALLOWABLE OPERATING PRESSURE</b>	<p><b>PN16:</b> 1.6 MPa</p> <p><b>PN35:</b> 3.5 MPa</p>
<b>MARKINGS</b>	<p>Manufacturer's name or mark cast on</p> <p>Nominal size</p> <p>Ductile or DI moulded in raised form</p> <p>Where applicable, the angle of the bend cast on</p> <p>The standard designation AS/NZS 2280</p> <p>Product certification mark, e.g. StandardsMark</p> <p>Traceability code</p> <p>Place of manufacture (may be incorporated in traceability code)</p>
<b>MARKING METHOD</b>	Clearly & indelibly marked on the fitting. Lettering heights & raised height not specified in AS/NZS 2280.

## SPPS 05-S3 JOINT SEALS

<b>STANDARD</b>	AS 1646: 2000 Elastomeric seals for waterworks purposes AS 4087: 2004 Metallic flanges for waterworks purposes
<b>SEALING DESIGN</b>	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.
<b>COMPOUND MATERIALS</b>	<p><b>Polymer for spigot-socket rings:</b> Ethylene propylene diene monomer (EPDM), 40% minimum volume of compound for IRHD of <math>\geq 55 &lt; 85</math> Styrene Butadiene Rubber (SBR), 60% minimum volume of compound for IRHD of <math>\geq 55 &lt; 85</math></p> <p><b>Polymer for flange gaskets:</b> Ethylene propylene diene monomer (EPDM), 30% minimum volume of compound for IRHD of <math>\geq 35 &lt; 55</math> or 40% minimum volume of compound for IRHD <math>\geq 55 \leq 65</math> Styrene Butadiene Rubber (SBR), 50% minimum volume of compound for IRHD of <math>\geq 35 &lt; 55</math> or <math>\geq 55 \leq 65</math></p> <p><b>Antidegradant:</b> 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.</p> <p><b>Protective wax:</b> 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.</p> <p><b>Filler:</b> Carbon black</p> <p><b>Copper &amp; manganese:</b> For EPDM: Not applicable For SBR: Not greater than 0.0008% copper and 0.0005% manganese</p>
<b>MARKINGS</b>	<b>Rings:</b> 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.
<b>MARKING METHODS</b>	Embossing with lettering $3 \pm 1$ mm high and $0.3 \pm 0.1$ mm proud of the surface; or Vulcanised transfer or permanent ink with lettering $3.5 \pm 1.5$ mm.
<b>ELASTOMER TYPE IDENTIFICATION</b>	<b>Marking colour:</b> EPDM: Green SBR: Blue
	<b>Marking method:</b> Continuous durable stripe of width $3.5 \pm 1.5$ mm; or Durable flash or dot of 6 mm minimum dimension
<b>STORAGE</b>	<ul style="list-style-type: none"> <li>• Do not store seals in a room with any equipment capable of generating ozone (e.g. mercury vapour lamps, electric motors, high voltage equipment).</li> <li>• Store in a relaxed condition free from tension, compression or other deformation.</li> <li>• Seal temperature not to exceed 35°C and preferably not above 25°C or less than 5°C.</li> </ul>
<b>USE LIMITS</b>	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

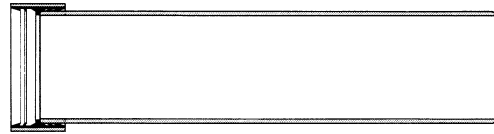
STANDARD	None
DESIGN	<p>Jointing lubricant is required to achieve the following:</p> <ul style="list-style-type: none"><li>• Provide sufficient lubrication to prevent damage to joint seals or surfaces on jointing.</li><li>• Enable correctly configured jointing when using jointing methods recommended by the pipe or fitting manufacturer.</li><li>• Not affect the elastomer or pipe or fitting materials.</li><li>• Remain an effective lubricant under wet conditions.</li><li>• Not be hazardous to handle and be able to be applied by hand.</li><li>• Be completely soluble in water.</li><li>• Be able to be removed under standard flushing arrangements for commissioning.</li></ul>
MATERIALS	Lubricant: Water based emulsion
CONTAINER MARKINGS	<p>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.</p>
USE LIMITS	Do not use where past expiry date.

## WPS 05-S5 FILAMENT WOUND GRP PIPES

<b>STANDARD</b>	ISO 10639 Plastic Piping Systems for Pressure and Non-Pressure Water Supply – Glass-Reinforced Thermosetting Plastics (GRP) Systems Based on Unsaturated Polyester (UP) Resin
<b>DESIGN</b>	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.
<b>MATERIALS</b>	<p><b>GRP Pipe:</b> Polyester resin Chopped and continuous glass filaments (ECR-glass) Quartz sand (filler)</p>
<b>JOINTING</b>	<p>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 &amp; 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.</p> <p>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.</p>
<b>EFFECTIVE LENGTH</b>	6 m. Optional pipe lengths available on request, 1m minimum.
<b>PRESSURE CLASSES</b>	PN 10, PN 16 and PN 20 corresponding to 1.0, 1.6 and 2.0 MPa working pressure
<b>PIPE MARKINGS</b>	<p>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 20<sup>th</sup> February 2000) Batch description Date of manufacture, using the ISO system in the form 000220 (20<sup>th</sup> February 2000) Unique pipe number</p>
<b>MARKING METHOD</b>	Permanent and indelible marking in lettering of 10 mm minimum height along the pipe barrel.
<b>USE LIMITS</b>	<p>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)</p>



**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	✓

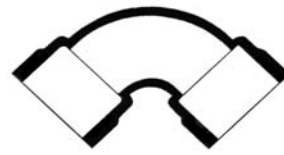
**CLASS PN 16**

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

**CLASS PN 20**

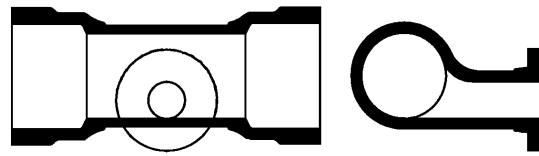
Nominal size DN	Iplex (Flowtite)
300	✓
375	✓
450	✓
525	✓
600	✓
675	✓
750	✓

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

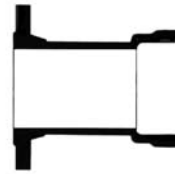


Nominal Size DN x DN x dn	Mallet <sup>1</sup>	Tyco Water	Derwent
300 x 300 x 100	✓	✓	✓
375 x 375 x 150	✓	✓	✓
450 x 450 x 150	✓	✓	✓
525 x 525 x 150			
600 x 600 x 150	✓	✓	✓
675 x 675 x 150			
750 x 750 x 200	✓	✓	

NOTES

1. Mallet fittings available in PN16 rating only

FLANGE-SOCKET CONNECTORS

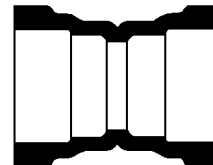


Nominal Size DN	Mallet <sup>1</sup>	Tyco Water	Derwent
300	✓	✓	✓
375	✓	✓	✓
450	✓	✓	✓
525			
600	✓	✓	✓
675			
750	✓	✓	

NOTES

1. Mallet fittings available in PN16 rating only

SOCKET-SOCKET CONNECTORS

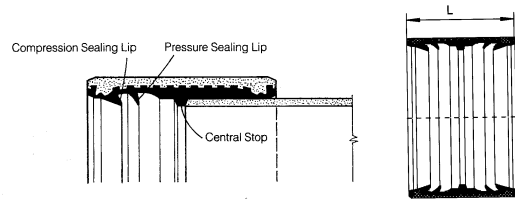


Nominal Size DN	Mallet	Tyco Water	Derwent
300	✓	✓	✓
375	✓	✓	✓
450	✓	✓	✓
525			
600	✓	✓	✓
675			
750	✓	✓	



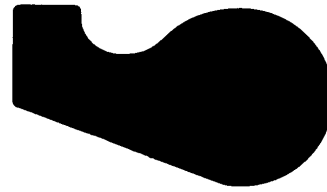
Nominal Size DN	Mallet	Tyco Water	Derwent
300	✓	✓	✓
375	✓	✓	✓
450	✓	✓	✓
525			
600	✓	✓	✓
675			
750	✓	✓	

CC GRP PIPE  
SYMMETRICAL COUPLINGS



Nominal Size DN	Iplex (Flowiite)
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**

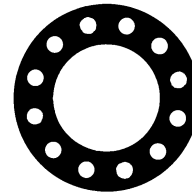


Nominal Size DN	Mallet (Ludowici)	Tyco Water (SDQ)	Derwent (Gulf)
300	✓	✓	✓
375	✓	✓	✓
450	✓	✓	✓
525			
600	✓	✓	✓
675			
750	✓	✓	

**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