Water Supply and Sewerage Approved Products Manual 2022

Sewerage Gravity Pipeline Systems – Ductile Iron (DI) Pipeline System

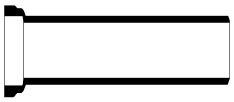
Section SGPS 03

PowerWater

Contents

1 Pipes

1.1 Ductile iron pipe (DI), spigot-socket or flanged pipes

Compliance	Sizes DN(mm)	Length (m)	Products	Manufacturers
AS/NZS 2280 AS/NZS 4158 AS 3680 WSA PS – 202S WSA PS – 320	150 225 300 375 450 500 600 750	6	  	Viadux Tytonxtreme VonRoll Ecopur Saint Gobain PAM (Reece/Viadux) Integral

Notes:

- Pipes must be:
  - Installed in a loose PE sleeve
  - Located away from electricity transmission lines and railways/trams due to stray current
  - Insulated from copper services
- Thermal bonded polymeric coating shall be to AS/NZS 4158. Where coatings damage is evident the contractor shall undertake additional corrosion protective measure to safeguard against corrosion.
- If soil conditions are aggressive, all fittings shall be wrapped in polyethylene sleeving to ensure protection.
- Approved thrust-resisting joints to be used when concrete restraints are unstable or in grounds subject to extreme movement.
- Other products may be considered but approval is required from Power and Water representative.

2 Fittings

2.1 Fittings notes

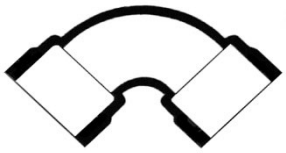
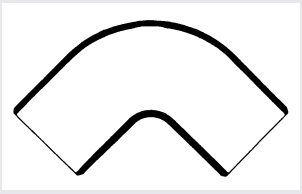
Shall comply to: AS/NZS 2280, AS/NZS 4158, AS 3680, AS 3681, WSA PS – 202S, and WSA PS – 320.

Sizes DN (mm): 150, 225, 300, 375, 450, 500, 600 and 750

Notes:

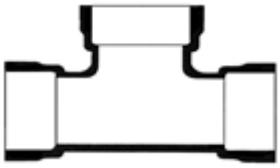
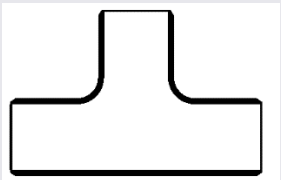
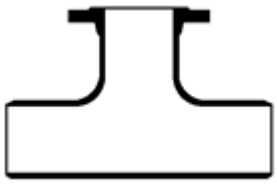
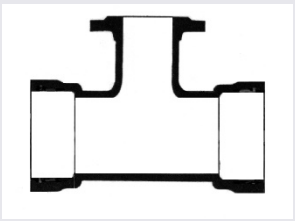
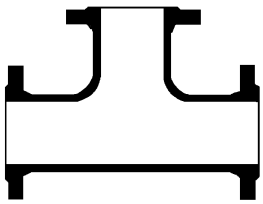
- Thermal bonded polymeric coating shall be to AS/NZS 4158. Where coatings damage is evident the contractor shall undertake additional corrosion protective measure to safeguard against corrosion.
- If soil conditions are aggressive, all fittings shall be wrapped in polyethylene sleeving to ensure protection.
- Approved thrust-resisting joints to be used when concrete restraints are unstable or in grounds subject to extreme movement.
- Other products may be considered but approval is required from Power and Water representative. Refer to manufacturer regarding availability.

2.2 Bends

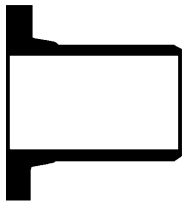
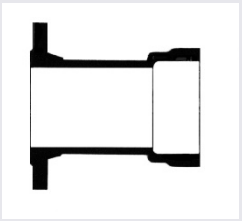
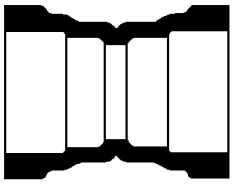
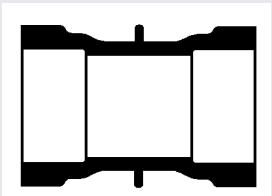
Bends	Products	Manufacturers
Socket-socket		Mallet Foundry Viadux SUREFLOW (Reece) Derwent Industries Northern Iron and Brass Foundry (NIBF)
Spigot-spigot		
Flange-flange		

Note: Includes socket-spigot, spigot-flange and socket-flange arrangements

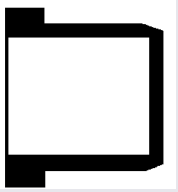
2.3 Tees

Tees	Products	Manufacturers
Socket-socket-socket		Mallet Foundry Viadux SUREFLOW (Reece) Derwent Industries Northern Iron and Brass Foundry (NIBF)
Spigot-spigot-spigot		
Spigot-spigot-flange		
Socket-socket-flange		
Flange-flange-flange		

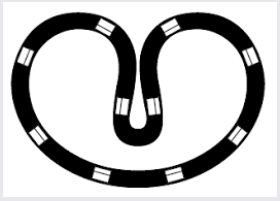
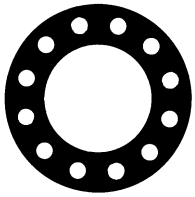
2.4 Connectors

Connectors	Products	Manufacturers
Flange-spigot		Mallet Foundry Viadux SUREFLOW (Reece) Derwent Industries Northern Iron and Brass Foundry (NIBF)
Flange-socket		
Socket-socket		
Socket-socket slip		

2.5 Caps and plugs

Types	Products	Manufacturers
Caps		Mallet Foundry Viadux (Reece) Derwent Industries Northern Iron and Brass Foundry (NIBF)
Plugs		
Blank flanges		

2.6 Seals and lubricant

Types	Products	Manufacturers
Elastomeric seals		Iplex (Gulf & Hultec) Viadux (Gulf)
Restraining elastomeric seals		Viadux (Tyton-lok)
Flange elastomeric seals		Daemco Wenac James Walker Ludowici
Jointing Lubricant		Iplex MacDermid Plc Thomas Grozier & Son

3 Specifications

3.1 SGPS 03 - 1 Spigot-socket pipes

Standards:

- AS/NZS 2280:2020 - Ductile iron 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 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 to AS1831 (commonly known as ductile iron) – manufactured from scrap ductile iron, steel, ferrosilicon, coke, limestone and magnesium.
- **Internal lining**:
    - Calcium aluminate cement to BS EN 14647
    - Nominal lining thickness - 5mm for DN150 to DN600 and 6mm for DN750
    - Minimum lining thickness - 3.5mm for DN150 to DN600 and 4.5mm for DN750.
- **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 for approval.
- **Socket lining**:
    - Bitumen to AS/NZS 3750.4
    - Synthetic resin based coating to AS 4089
    - Thermal bonded polymer to AS/NZS 4158
    - Other socket linings may be considered for approval.
- **Joint seal**: Approved elastomer to AS 1646.

Jointing:

- Skid fit elastomeric sealing joint allowing maximum joint deflections of 3.5° for DN 150-250, 2.5° for DN 300-600 and 1° for DN 750.
- Witness marks at spigot end showing insertion depth with no angular deflection.
- Lubricant as supplied by pipe manufacturer.

Effective length:

- Minimum 5.0 m

Allowable operating pressure:

- PN20 – 2.0 MP
- PN35 – 3.5 MP.

Markings:
Marking cast onto products in accordance with AS/NZS 2280 including:

- Manufacturer's name or mark
- Nominal size
- Classification
- The number of the standard (i.e. AS/NZS 2280)
- Product certification mark, e.g. StandardsMark
- Traceability code
- Place of manufacture (may be incorporated in traceability code).

Use limits:

- Only use DI pipe in tidal zones, anaerobic ground conditions and aggressive ground water when it has an external polymeric coating.
- Calcium aluminate cement mortar provides improved resistance to corrosion caused by formation of sulphuric acid from H_2S collecting in any headspace in the sewer.
- 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.

3.2 SGPS 03 - 2 Flanged pipes

Standard:

- AS/NZS 2280: 2020 - Ductile iron pipes and fittings
- AS/NZS 4087:2011 - 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 to AS1831 (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
    - Other linings may be considered for approval.
- **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 for approval.
- **Flange thread seal:**
    - Epoxy resin
- **Flange gasket**:
    - Elastomer to AS 1646.

Jointing:

- **Standard flanges:**
    - Screw-on flanges to AS/NZS 4087 figure B5 for PN16
- **Flange gasket**:
    - 3 mm flat elastomeric full face gasket to AS/NZS 4087 - Appendix C, Table C1
- **Socket and spigot**: Refer spigot-socket pipes specification.

Effective length:

- **Maximum**: Typically manufactured at approx. 6 m.

Allowable operating pressure:

- **PN16**: 1.6 MPa
- **PN35**: 3.5 MPa.

Markings:
Marking cast onto products in accordance with AS/NZS 2280 including:

- Manufacturer’s name or mark

- Nominal size
- Classification
- The number of the standard (i.e. AS/NZS 2280)
- Product certification mark, e.g. StandardsMark
- Traceability code
- Place of manufacture (may be incorporated in traceability code).

Use limits:

- Use only where restrained DI joints are required and spigot-socket restrained DI joints are inappropriate.
- Flange Class pipe is to be pressure tested in accordance with AS/NZS 2280.

3.3 SGPS 03 - 3 Fittings

Standard:

- AS/NZS 2280: 2020 - Ductile iron pipes and fittings
- AS/NZS 4087:2011 - Metallic flanges for waterworks purposes.

Design:

- Ductile iron fittings to the Australian Standard have dimensions based on imperial sizing.
-

Materials:

- **Fitting**: Spheroidal graphite cast iron to AS1831 (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**:
    - Skid fit elastomeric sealing joint allowing maximum joint deflections of 3.5o for DN 150-250, 2.5o for DN 300-600 and 1o for DN 750.
    - Witness marks at spigot end showing insertion depth with no angular deflection.
    - Lubricant as supplied by pipe manufacturer.
- **Flange**: Screw-on flanges to AS/NZS 4087. 3 mm flat elastomeric full face gasket to AS/NZS 4087 - Appendix C, Table C1.

Allowable operating pressure:

- **PN16**: 1.6 MPa
- **PN35:** 3.5 MPa.

Markings:

- Marking cast onto products in accordance with AS/NZS 2280 including:
- Manufacturer’s name or mark
- Nominal size
- Classification
- The number of the standard (i.e. AS/NZS 2280)
- Product certification mark, e.g. StandardsMark
- Traceability code
- Place of manufacture (may be incorporated in traceability code).

3.4 SGPS 03 - 4 Joint seals for pipes/fittings

Standard:

- AS/NZS 2280: 2020 - Ductile iron pipes and fittings
- AS/NZS 4087:2011 - Metallic flanges for waterworks purposes.

Sealing design:

- Joint seals are to be of elastomeric compounds complying with AS 1646.
- 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.

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.

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 35o C and preferably not above 25o C or less than 5o 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).

Contact

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