

# Water Supply and Sewerage Approved Products Manual 2024

Water Pipeline Systems – Polyvinyl Chloride (PVC)  
Water Pipeline Systems

Section WPS 02

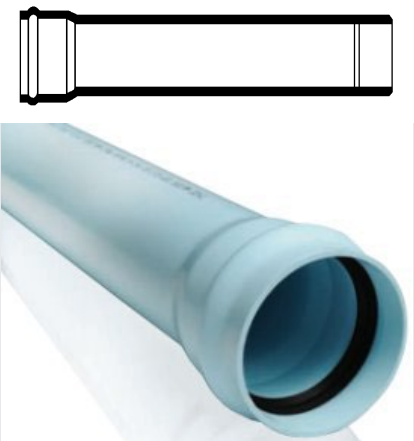
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Abbreviation	In full
AS	Australian Standard
AS/NZS	Australian / New Zealand Standard
WSA PS	Water Services Association Product Specification

# 1 Pipes

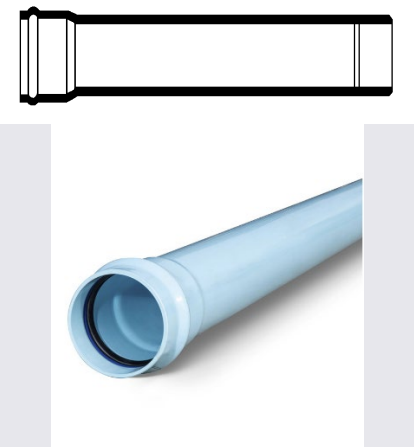
## 1.1 Modified polyvinyl chloride (PVC-M) – series 2 pipe

Compliance	Size DN (mm)	Length (m)	Products	Manufacturers
AS/NZS 4765 WSA PS - 209	100 150 225 300	6		David Moss DAMOS Pipemakers Environmain Iplex Rhino PVC-M Vinidex Hydro PVC-M

### Notes:

- Only DI fittings to be used
- Only rubber ring joints (RRJ) to be used
- Not to be used in grounds contaminated with chemicals deleterious to PVC (i.e. organic solvents)
- Pressure nominal 16 (PN16) as a minimum for series 2 pipes
- Not to be used where ground subject to extreme movement
- Do not use pipe scratched to a depth > 0.25 mm
- Larger sizes require approval from a Power and Water representative.

## 1.2 Oriented polyvinyl chloride (PVC-O) – series 2 pipe

Compliance	Size DN (mm)	Length (m)	Products	Manufacturers
AS/NZS 4441 WSA PS - 210	100 150 225 300	6		Iplex Apollo Pipemakers Alphamain Vinidex Supermain

**Notes:**

- PVC-O is rarely used in water reticulation systems due to PVC-O not demonstrating fittings comply with AS 4181 (repair and offtake clamps)
- Requires approval from a Power and Water representative before use
- Only DI fittings to be used
- Only rubber ring joints (RRJ) to be used
- Not to be used in grounds contaminated with chemicals deleterious to PVC (i.e. organic solvents)
- Pressure nominal 16 (PN16) as a minimum for series 2 pipes
- Not to be used where ground subject to extreme movement
- Do not use pipe scratched to a depth > 0.25 mm
- Larger sizes require approval from a Power and Water representative.

## 2 Specifications

### 2.1 Spigot-socket PVC-M pipes

**Shall comply with the following standard:**

- AS/NZS 4765:2017 - 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 predictability 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.
- Power and Water exclusively uses Series 2 pipe series. Pipe wall thickness is varied to achieve the desired pressure rating.
- Pressure rating 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.

**Materials:**

- Pipes:
  - Minimum 83.3% Polyvinyl chloride
  - Elastomer to improve ductility (fracture toughness)
  - Rutile titanium dioxide to prevent ultraviolet degradation (minimum 1.5 parts per 100 parts PVC)
  - Calcium-zinc to prevent PVC degradation from high processing temperatures
  - Lubricants to lower the viscosity of molten PVC during pipe processing
  - Filters (e.g. calcium carbonate) to aid pipe processing.
- Joint seal:
  - Approved elastomer to AS 1646.

**Jointing:**

- Only rubber ring joints are permitted. Sockets are to have grooves to capture seals. Spigots are to have witness marks to identify socket insertion depth.

**Effective length:**

- 6 m.

**Pressure class:**

- Minimum PN16 Series 2 pipe.

**Colour:**

- Series 2 pipe shall be blue.

**Markings:**

- Manufacturer's name or registered trademark, or both
- The pipe series number (i.e. Series 2 or S2)
- The letters 'PVC-M'
- Material Class in the form '450', as appropriate
- Nominal size in the form 'DN150' or '150', as appropriate
- Classification in the form 'PN 16', as appropriate
- 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 4765
- Product certification mark, e.g. StandardsMark.

**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
- Not suitable for use with repair clamps.

## 2.2 Spigot-socket PVC-O pipes

**Shall comply with the following standard:**

- AS/NZS 4441:2017 - Oriented PVC (PVC-O) pipes for pressure applications.

**Design:**

- Oriented PVC (PVC-O) differs from traditional unplasticised PVC (PVC-U or uPVC) by way of molecular orientation of the plastic to enhance the yield strength.
- PVC-O pipe has a thinner wall than PVC-U of the same pressure rating because it has higher yield strength, impact resistance and significantly better fatigue resistance.
- Power and Water exclusively uses Series 2 pipe series. Pipe wall thickness is varied to achieve the desired pressure rating.
- Pressure rating 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.

**Materials:**

- Pipes:
  - Minimum 83.3% Polyvinyl chloride
  - Rutile titanium dioxide to prevent ultraviolet degradation (minimum 1.5 parts per 100 parts PVC)
  - Calcium-zinc to prevent PVC degradation from high processing temperatures
  - Lubricants to lower the viscosity of molten PVC during pipe processing
  - Filters (e.g. calcium carbonate) to aid pipe processing.
- Joint seal:
  - Approved elastomer to AS 1646.

**Jointing:**

- Only rubber ring joints are permitted. Sockets are to have grooves to capture seals. Spigots are to have witness marks to identify socket insertion depth.

**Effective length:**

- 6 m.

**Pressure class:**

- Minimum PN16 Series 2 pipe.

**Colour:**

- Series 2 pipe shall be blue.

**Markings:**

- Manufacturer's name or registered trademark, or both
- The pipe series number (i.e. Series 2 or S2)
- The letters 'PVC-O'
- Nominal size in the form 'DN150' or '150', as appropriate
- Classification in the form 'PN 16', as appropriate
- 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 4765
- Product certification mark, e.g. StandardsMark.

**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-O 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
- Not suitable with repair clamps.



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