



CORRUGATED PIPE SYSTEMS
AUSTRALIA

CORRUGATED PIPE INSTALLATION GUIDE

In compliance with AS/NZS 5065:2005
buried flexible pipelines requirements



AS/NZS 5065:2005
WM75236

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STORMWATER MANAGEMENT

Embracing PE Corrugated Drainage Pipes.

Stormwater Systems

These systems have long relied on the conventional use of rigid and seemingly cost-effective concrete pipes for drainage. However, a revolutionary shift is underway with the global recognition and acceptance of Polyethylene Corrugated drainage pipes as a superior engineered and most cost effective alternative for non-pressure drainage applications eliminating the effects of H₂S attack inherent to concrete pipes along with substantial reduction in embodied energy.

For decades, the construction of stormwater systems predominantly involved the deployment of concrete pipes. While they have been deemed a widely available and reliable solution, their rigid nature poses limitations in adapting to various landscapes and environmental conditions of corrugated HDPE solutions are proven to be vastly more eco-friendly.

PE Corrugated Drainage Pipes

HDPE Corrugated drainage pipes, embraced worldwide, signify a significant departure from traditional concrete pipes. Their distinct features of flexibility, durability, and adaptability have revolutionized the drainage system landscape.

Pipe Dimensions

CPSA corrugated structured wall polyethylene pipes are available in diameters ranging from DN225 to DN1050.

DN (mm)	Nominal Pipe OD (mm)	Minimum Mean Inside Diameter of Pipe (mm)	Stockcode	Effective Length (m)	Approximate Pipe Mass (kg/m)	Stiffness (N/m/m)
225	254	216	PC02256	6.28	3.0	8,000
300	345	292	PC03006	6.18	5.0	8,000
375	424	361	PC03756	6.18	8.0	8,000
450	506	432	PC04506	6.12	12.0	8,000
525	603	515	PC05256	6.03	16.5	8,000
600	689	584	PC06006	5.90	21.0	8,000
750	849	723	PC07506	5.91	44.0	8,000
900	1016	864	PC09006	5.97	33.0	8,000
1050	1186	1008	PC10506	5.91	58.0	8,000

CPSA corrugated structured wall polyethylene pipes are supplied in standard 6m nominal lengths. Pipes can be simply cut to length on site and re-joined for shorter length adjustments or connections.

Stiffness

The ring stiffness of a flexible pipe measures its strength against various pressures such as soil load, external water pressure, internal vacuum, vehicle weight, and loads during construction. This stiffness is tested in labs and is shown in units of N/m/m, based on standards AS/NZS 2566.1 and AS/NZS 1462.22. Polyflow corrugated structured wall polyethylene pipes exceed 8,000N/m/m (Classified SN8 in AS/NZS5065).

Chemical Resistance

Joints CPSA corrugated structured wall pipes and fittings are manufactured from polyethylene, ensuring outstanding durability against corrosive conditions in drainage environments. Polyethylene demonstrates high resilience to challenging underground environments.

Simplified Connection System

The design incorporates an effective rubber ring joint system that facilitates easy assembly and secure jointing. Designed to meet strict Australian Standards requirements for effective sealing and resistance to root intrusion, the seal simplifies installation.

Eco-friendly Materials and Manufacturing

CPSA polyethylene corrugated pipes are 100% recyclable and a low embodied energy, contributing significantly to its environmental benefits. Choosing materials with lower embodied energy helps reduce the overall carbon footprint of construction projects, aligning with sustainability goals and regulations.

Adaptability to Ground Conditions

The in-ground performance of polyethylene is exceptional, exhibiting a high tolerance to deformation and the ability to accommodate ground movements. This resilience ensures that the infrastructure remains functional and reliable over time.

Light Weight Design

Polyethylene corrugated pipes are lightweight, making them easy to handle, transport, and install. This makes installation faster and more cost-effective.

Long Lasting Performance

The durability of polyethylene is a key asset, providing it the ability to resist heavy handling and installation stresses without compromising its integrity or performance. This ensures that the product remains effective over long periods, even in demanding conditions.

Australian Made

Australian made products guarantee that the products meet strict Australian standards for quality. Reflecting a commitment to supporting local industries and reducing environmental impacts.

Life Expectancy

CPSA corrugated pipes are manufactured to the requirements of AS/NZS5065. Correctly designed and installed pipe systems can be expected to perform well in excess of 100 years.

UV Stability

The PE black compounds used for the manufacture of CPSA corrugated pipe on all external surfaces contains well dispersed carbon black giving outstanding UV resistance and long term stability.

APPLICATIONS

Corrugated structured wall polyethylene pipes and fittings offer effective drainage solutions and are suitable for non-pressure and low-head applications. Typical applications include:

- Gravity stormwater and drainage pipelines.
- Rural and agricultural.
- Sewer chamber riser.
- Ventilation ducting.
- Culverts Retention systems.
- Low head water transfer.
- Pipeline rehabilitation and relining.
- Leachate collection.

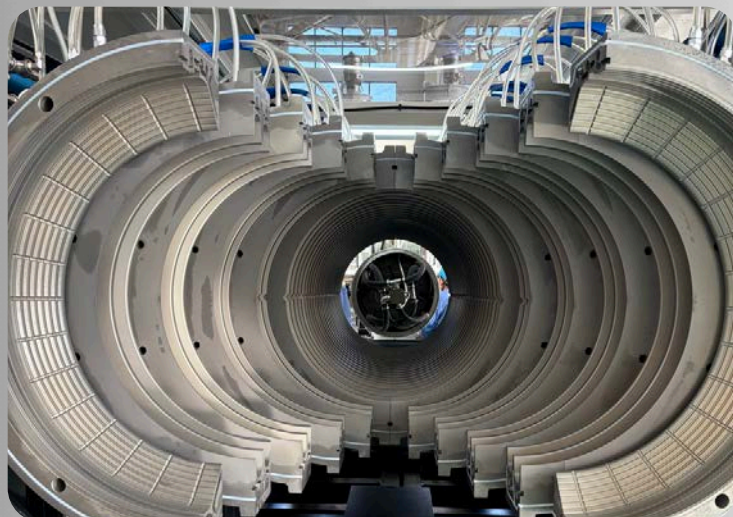
MATERIAL PROPERTIES

Property	Units	Value
Density	kg/m ³	960
Circumferential Flexural Modulus (2mm/min)	MPa	>10 000
Pipe Ring Bending Stiffness	N/m/m	≥ 8000
Tensile Yield Stress(50mm/min)	MPa	20
Poisson's Ratio		0.40

HANDLING & STORAGE

When unloading, handling and storing pipes, the following needs to be considered:

- Follow all safe handling requirements.
- Storage should be on flat stable ground.
- Pipes should be stored off the ground and layed on supporting timbers approximately 2m centres.
- Pipe sockets should not be stored directly on the ground.
- Do not drag pipes along the ground.
- Visually check for any damage that may have been caused by handling and storage before installation of pipes. Do not install damaged pipe/s.

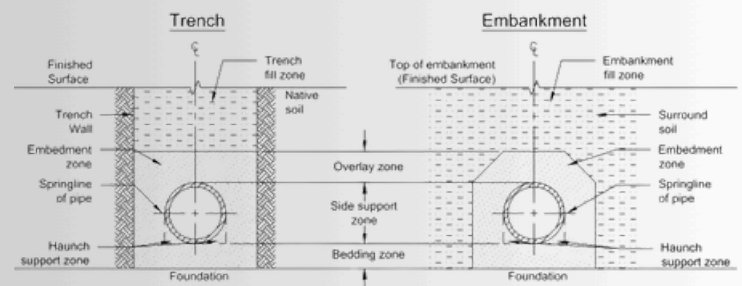


PIPELINE INSTALLATION & PREPARATION GUIDE

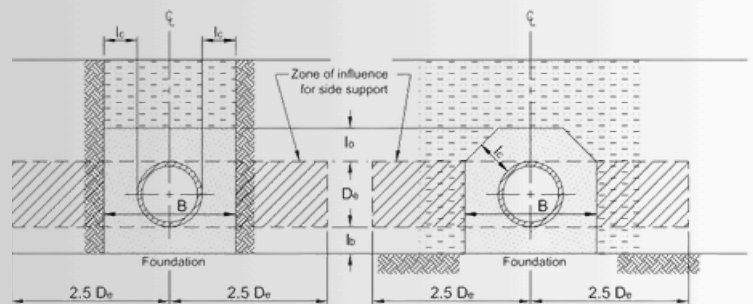
This guide should also be read in conjunction with AS/NZS2566.2 Buried Flexible Pipelines and relevant client specification, which will always take precedence over the recommendations in this guide.

Prior to commencement a risk assessment of activities to be carried out and the necessary controls should be carried out for the installation processes. Also, soil and groundwater conditions should be determined.

Location of existing services should be identified and any trench support systems should be considered to prevent disturbance and protection of adjacent structures and services.



AS/NZS2566.2 Installation Definitions



AS/NZS2566.2 Installation Definitions

TRENCH EXCAVATION & SITE PREPARATION

The installer should complete site assessment and preparation plans prior to commencement of any excavation or works. Any underground services should be located and marked before commencement.

Assessment should be made of required trench stability and the need for shoring. The use of an effective and efficient excavation methodology is recommended.

GENERAL TRENCH REQUIREMENTS

Trench width and depth requirements will vary depending on site conditions. An assessment will need to be carried out by the installer, taking into consideration, but not limited to the below.

Excavate to base RL. Alignment and grade as per design; excavation requirements in accordance with WSA03 Water Supply Code, Section 13.

Inspect trench foundation. No protruding rocks and base material is suitable. If unsuitable material encountered in base of excavation, review with Superintendent. If excavation exceeds the correct depth, reinstate to correct depth and bearing value using compacted bedding material or grade N20 concrete.

Following points should be considered during trench excavation:

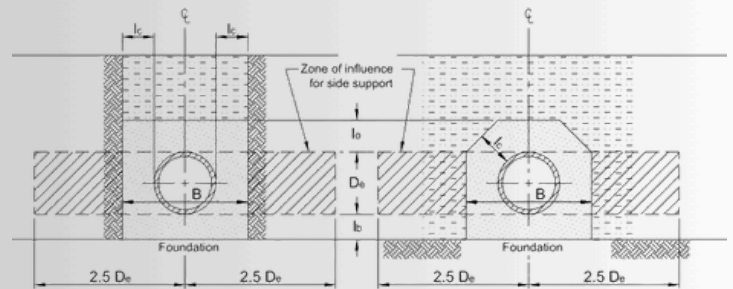
- Take necessary safety precautions to ensure a safe working environment.
- Prevent water penetration into the trench.
- During excavation, make sure that trench walls keep vertical position.
- Remove all obstacles and sharp edges such as rocks, gravels, concrete, etc. from the trench.
- Remove all organic items such as plants, tree roots, etc. from trench ground.
- Ensure that trench ground is strong and stable.
- If the trench ground is not stable enough, increase trench depth for stabilization works.
- Discharge water (if there is any) from the trench before bedding preparation.
- When the underground water level is high, it might cause pipes to float. To prevent flotation, increase the trench depth to increase the height of backfilling.
- Ensure that trench width is sufficient enough for bedding and backfilling compaction works.
- Ensure that excavated materials are piled at a distance from the trench to avoid the possibility of rolling back into the trench.

TRENCH DIMENSIONS

Minimum Width

Trench width should be wide enough to install pipe, fittings and connection parts, and to allow a convenient working space for field teams for pipe jointing, pipe alignment and satisfactory compaction.

For standard installations, as a guide only, minimum trench width is given as follows; also refer AS/NZS2566.2,



AS/NZS2566.2 Side support and embedment zone symbols

If there are unstable, loose or soft soil conditions, based on the pipe stiffness and trench depth, trench width can be increased. The values of l_c may not always be sufficient to cover all installation purposes such as jointing, access and space for welding around pipe joints, flange products etc.

Minimum Cover

Minimum cover is to ensure:

- Surcharge loadings such as traffic and construction equipment are not concentrated and adequately distributed.
- Give sufficient clearance to overlay heavy mechanical compaction.
- Ensure pipe and side support is appropriate and consideration of any foreseen lowering of finished surface levels.



TRENCH DIMENSIONS CONT.

Table: Minimum Cover

Loading Conditions	Minimum Cover (mm)
Not subject to vehicle loading	300
Land zoned for agricultural use	600
Subject to vehicle loading	
■ no carriageway;	450
■ sealed carriageways; and	600
■ unsealed carriageways	750
Pipelines in embankments or subject to construction equipment loads	750

Note: Above table aligns with AS/NZS2566.2 refer AS/NZS2566.2 for any additional specific requirements.

Minimum pipeline cover shall be specified to:

- ensure surcharge loadings, e.g., traffic and construction equipment, are not concentrated but instead are distributed over an adequate area;
- give sufficient clearance to overlying layers that require heavy mechanical compaction, e.g., road sub-bases; and
- ensure the pipe or side support is appropriate, having regard to the proposed land use and any foreseeable lowering of finished surface levels. Subject to variation by the relevant asset owner. Under cultivated agricultural land cover should not be less than 0.6 m. Railway crossings shall comply with AS 4799.

Table: Minimum Embedment Zone Dimensions as per AS2566.2

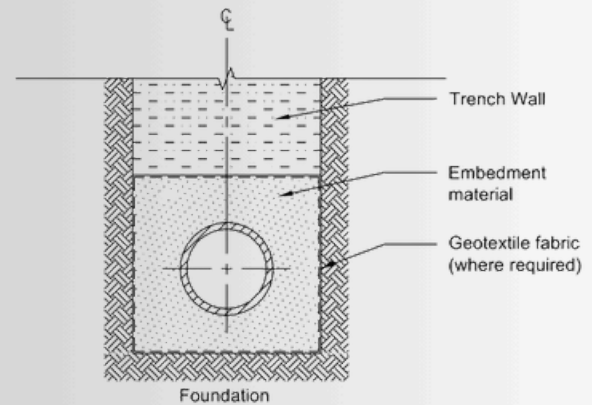
Nominal Diameter (DN)	Minimum Dimensions (mm)			
	lb (mm)	lc (mm)	lo (mm)	B = De + 2lc (mm)
De				
225	75	150	150	525
300	75	150	150	600
375	100	200	150	775
450	100	200	150	850
525	150	300	150	1125
600	150	300	150	1200
750	150	300	150	1350
900	150	300	150	1500
1050	150	350	200	1750

Note: Refer customer specifications for additional information.

EMBEDMENT ZONE

Migration of Fines

Geotextile filter fabric may be required, where there is a possibility of migration of fines between the native soil and the embedment zone. Refer below detail and AS/NZS2566.2 for additional information also refer AS/ NZS2566.2 and refer customer specifications for additional information.



Bedding/Embedment Material

Bedding shall be cohesion less material with sand grading limits of AS2566.2 Table G3 or as per approved construction drawings and refer customer specifications for additional information.

All pipework shall be laid on a continuous bed of pipe bedding material having a minimum thickness and side support as per Minimum Embedment Zone Dimensions table.

The bedding layer shall be spread so that it provides uniform support for the pipe over the whole of its length and not only the sockets.

Maximum material particle sizes and other detail is covered by AS/NZS2566.2. Refer customer specifications for additional information.

Table: Max Particle Size

Nominal Diameter (DN)	Maximum Particle Size (mm)
100	10
150	14
>150	20

Trench Support

Trench support may be required for deeper. For guidance on trench support systems, refer to AS2566.2

Dewatering

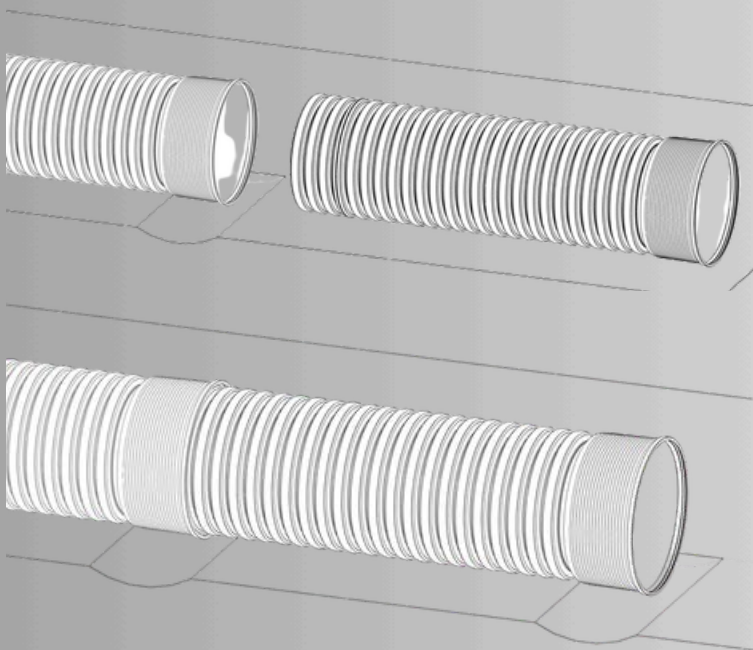
Excavation should be kept free of water to maintain stability of surroundings and to provide a safe and stable construction environment. Consideration of groundwater conditions is required to prevent washout. Removal of water should be carried out with relevant environmental practices. Pipes may need to be capped during times of construction to ensure water does not enter constructed pipeline sections and create potential contamination.

Trench Bedding

Trench bedding should be flattened, levelled. Under unstable soil conditions, trench depth and bedding thickness can be increased. After trench excavation, bedding should be prepared to provide durable and stable support for pipe. Bedding depth should be increased if there are unstable, loose or soft soil conditions. Bedding should always be flat and levelled with the trench bottom.

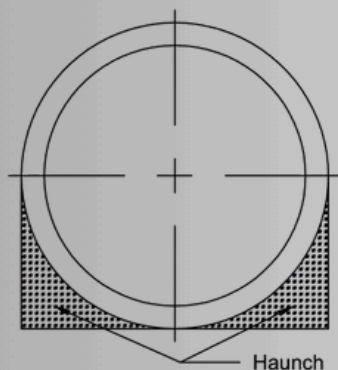
Pockets need to be provided for pipe and fitting sockets, flanged products, valves etc. to ensure the embedment zone requirements are met and the pipeline is fully supported.

Refer Minimum Embedment Zone Dimensions Table for minimum bedding depths, also refer customer specifications for additional information.



Haunching

After pipe placement and jointing, the embedment material should be worked to ensure all voids are completely filled. This also includes Pockets created for pipe and fitting sockets, flanged products, valves etc.



Pre-Installation Stage

After completion of trench excavation and bedding, installation can start in line with the project.

- After completion of trench excavation and bedding, installation can start in line with the project.
- Pipes and fittings should be stored along the pipeline next to the trench according to the daily installation program for a faster and easier installation.
- Stored goods should not block the working path of the construction machines such as crane, excavator, bulldozer, etc.
- Lifting straps should be tied around the pipe from the appropriate lifting points.
- While lifting fittings, special lifting and alignment requirements should be taken into consideration. Lifting can be performed with a crane or with the excavator arm and pipe should be lowered onto the bedding slowly.
- During lifting and lowering inside the trench, field teams instruct directions to the excavator operator to make sure that pipe will be placed at the right location.
- Pipe should be lowered closer to the previously installed pipe and should be carefully aligned.
- Care should be taken to ensure pipes are not damaged.



JOINTING GUIDELINE

CPSA corrugated structured pipe wall polyethylene pipes incorporate an advanced spigot and socket elastomeric joint, designed to meet the performance requirements of AS/NZS5065.

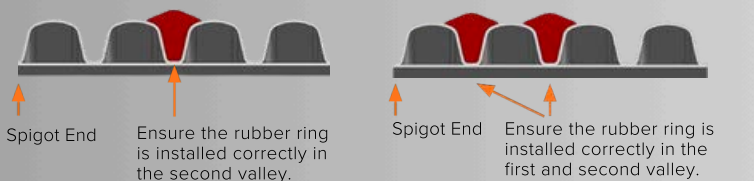
Pipes are designed with standard elastomer (EPDM or SBR) gasket/s for simple and effective jointing. Care to be taken when removing packaging, to ensure seals are not damaged.

Jointing

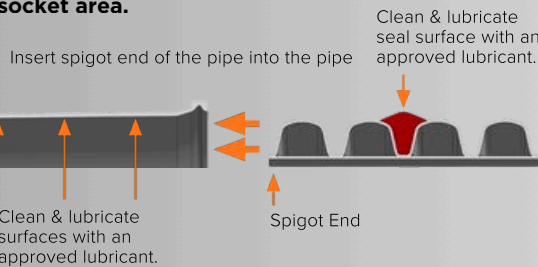
Insert seal into the correct valley/s as shown below and are clean prior to jointing.

Sizes: DN225 to DN600, DN900

Sizes: DN750, DN1050



Once seals are installed and jointing areas are clean, apply lubrication to the outside of the seal and inside socket area.



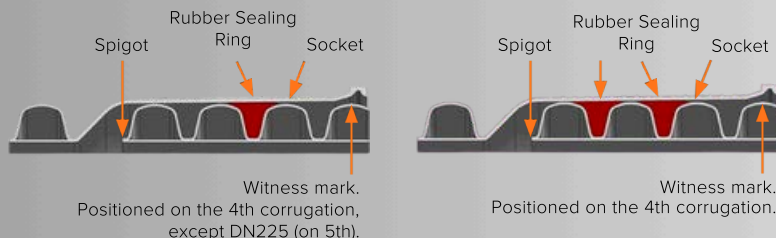
Ensure pipe spigot is aligned square to the socket during spigot insertion, whilst apply constant force.

The witness mark is moulded on the pipe corrugation.

The witness mark may sit slightly into the socket after installation.

Sizes: DN225 to DN600, DN900

Sizes: DN750, DN1050



PIPE CUTTING

If pipe needs to be cut, appropriate safety precautions, risk assessments and appropriate PPE will be required.

Key points in pipe cutting:

- Cut pipe in the corrugation valleys only.
- Pipes can be cut using a handsaw, reciprocating saw, or circular saw with a fine-toothed blade designed for plastic.
- Selecting the appropriate cutting tool ensures smooth and efficient cutting without damaging the pipe.

BACK FILLING

Detection Tape

All pipes and conduits may be installed with a marker tape above the service. Detectable marking tape in accordance with WSA PSA-318 shall be laid on top of the pipe embedment material before trench filling in accordance with the installation drawings also refer customer specifications for additional information.

Backfill and Compaction

Select fill material to be used for backfilling. No backfill material shall contain rocks larger than 150mm diameter. Layers not exceeding 225 mm in depth shall be placed in trenches and carefully compacted. Measure pipe ovality after compaction, pipe ends must be within $(dh - dv)/2$ (mm).

PIPELINE FIELD TESTING

Field testing requirements are detailed in AS2566.2 and/or client specifications.



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