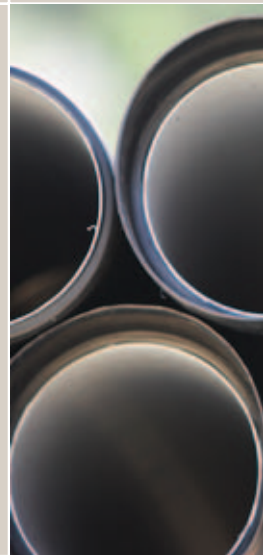


StormPRO® & SewerPRO® Installation Guide



LIGHTWEIGHT

EASY TO HANDLE

COST EFFECTIVE TO INSTALL

ABRASION RESISTANT

LONG LIFE PRODUCT

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Limitation of Liability

No liability will be accepted by Vinidex nor is any guarantee, warranty or undertaking given or implied in respect of any act or omission by Vinidex in respect of any injury, loss or damage suffered by a customer for, or user of, StormPRO® and SewerPRO® Products, which may in any degree be attributed to the use of such products or their installation and testing, or to the adoption or use of data, design, materials or advice given by Vinidex as to the use of these products or their installation or testing, and notwithstanding any want of care on the part of Vinidex in compiling or giving any such advice or information.

StormPRO® and SewerPRO® pipes provide an environmentally sensitive, cost-effective piping system for sewerage and drainage applications in sizes from DN150 to DN900.

1 Introduction

Vinidex StormPRO® and SewerPRO® pipes are twin-wall, corrugated polypropylene pipes for non-pressure applications, and can be installed in non-trafficable and trafficable areas, including under road pavements.

Using modern co-extrusion techniques, StormPRO® and SewerPRO® are manufactured with a smooth bore for optimum hydraulic performance and a corrugated outside wall for high stiffness to weight ratio.

By combining the strength and toughness of advanced polypropylene materials with the structured wall design,

StormPRO® pipe is available in standard rubber ring jointed spigot/socket configuration (Sp/So) in 6m nominal lengths. SewerPRO® pipe is available in standard rubber ring jointed spigot/socket configuration (Sp/So) in 3m nominal lengths.

This guide is intended to provide general information for the safe installation of Vinidex StormPRO® and SewerPRO® pipes. For more detailed information refer to AS/NZS 2566.2 “Buried flexible pipelines: Part 2, Installation”.

When designed and installed correctly, Vinidex StormPRO® and SewerPRO® systems will provide continuous service in excess of 50 years.

Table A: StormPRO® & SewerPRO® Pipe Dimensions

Nominal Diameter (mm)	Mean Pipe Outside Diameter (mm)	Mean Pipe internal Diameter (mm)	StormPRO® Approx Pipe Mass (kg/length)	SewerPRO® Approx Pipe Mass (kg/length)	Number of Pipes per Crate
150	169	148	9	5	30
225	259	226	19	10	12
300	343	300	31	16	6
375	428	374	48	25	2 or 3
450	514	448	72	38	2
525	600	523	94	49	6
600	682	596	121	62	3
750	835	731	190	98	2
900	999	873	260	134	2



2 Flexible Pipes

Vinidex StormPRO® and SewerPRO® are flexible pipes. This means that as vertical loads are applied, the pipe will deflect and take advantage of horizontal soil pressure to provide additional support. After initial compaction and settlement, applied vertical loads have very little effect on deflection.

Rigid pipes, such as steel reinforced concrete pipes do not deflect, and are designed to carry all applied vertical loads caused by soil and traffic. The surrounding soil provides little or no horizontal support to a rigid pipe. Notwithstanding this, proper placement and compaction of bedding material around rigid pipes is critical in minimising the load on the pipe.

Flexible pipes have the ability to deform without structural damage and provide designers and installers with a wide range of advantages.

The structural action and design methodology of flexible pipes is well understood. Their use in all buried applications and particularly under road pavements is well established throughout the world and in Australia.

As flexible pipes transfer load through deflection, loading outside design parameters leads mostly to deformation without structural damage. Overloading results in cracking of rigid pipes. Flexible pipes provide a substantial insurance for operational conditions outside design parameters.



3 Handling and Storage

Being manufactured from tough polypropylene, StormPRO® and SewerPRO® pipes are robust and are suitable for use in all site conditions. The pipes are relatively light weight and can generally be manhandled. Care should always be taken when pipes are loaded, unloaded, stacked or distributed on sites.

When pipes are lifted mechanically, web or rope slings should be used. Pipes should not be allowed to overhang by more than 1 metre. Transport should not have sharp projections which could cause damage to pipes. Pipes should not be dragged along the ground as this can damage the pipe, causing difficulty with jointing and testing.

StormPRO® and SewerPRO® pipes should be stacked on flat firm ground, which has been cleared of debris. Pipes should be laid flat on transverse bearers at least 75mm wide at maximum 1.5m centres.

Pipe sockets should be supported so that the ends are free from loading, with sockets in each layer opposite to the previous layer. Different sizes are best stacked separately. If this is not practical, then stack with the largest pipes at the base. Framed crates must be stored timber on timber and may go up three crates but should not exceed 3m in height.

If pipes are to be nested for long periods, stacks should not exceed 2m in height.

Rubber rings should be stored away from direct sunlight or weathering. Rubber rings should never be placed on the ends of pipes which are being stored.



4 Trench Dimensions

Preparation

The trench should not be excavated too far in advance of pipe laying and should be backfilled as soon as possible.

Minimum Trench Width

The trench width should be as narrow as is practicable, but wide enough to allow adequate compaction of the haunch zone.

Pipes in Parallel

Where pipes are laid in parallel, the minimum spacings between pipelines are given in Table B below.

Table B: Minimum spacings between parallel pipelines

Nominal Diameter (mm)	150	225	300	375	450	525	600	750	900
Minimum Spacing (mm)	150	150	200	200	300	300	300	300	350

The trench should be excavated deep enough to allow for the specified grade, the required depth of underlay and the minimum cover.

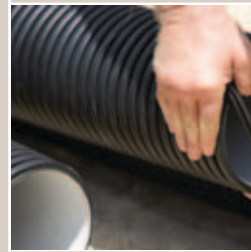


5 Allowable Deflection

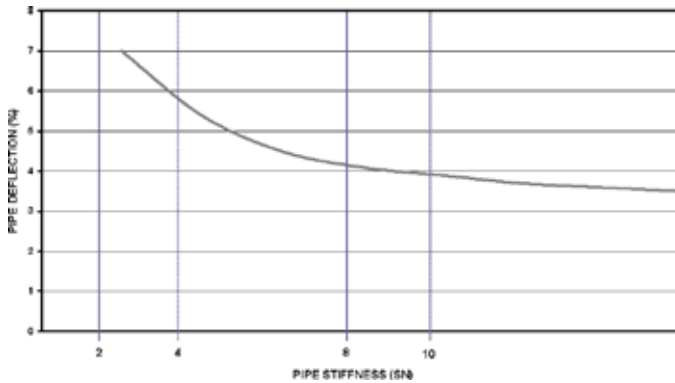
Minimum cover Table C reflects industry standards in relation to minimum depth. StormPRO® and SewerPRO® are not limited to these industry norms and designers should refer to Vinidex engineers if reduced cover is required.

Table C: Minimum depth of cover over pipe

Loading Condition	Minimum Cover (m)
Not subject to vehicular loading	0.30
Land zoned for agricultural use	0.60
Subject to vehicular loading-	
(a) no carriageway	0.45
(b) sealed carriageways	0.60
(c) unsealed carriageways	0.75
Pipelines in embankments or subject to construction equipment loads	0.75



The prime influence on deflection is quality of installation, with depth of cover, pipe stiffness, and pipe material being of relatively minor importance. An intensive study of the deflection history of pipes installed under different conditions, in service for up to 25 years, has resulted in a simple pipe design graph for buried thermoplastics pipes.



TEPPFA 1999; Design Of Buried Thermoplastics Pipes

This graph predicts the maximum long term pipe deflection at up to 6m depth of cover (including traffic loading) for pipe of a given stiffness, with moderately compacted granular bedding material placed as follows:

- Bedding material placed and compacted around the pipe to 87% to 94% dry density ratio, in layers of maximum 500mm thickness, to a minimum depth over the pipe of 150mm;

For greater than 6m depth of cover, improved compaction standards are required, and the bedding requirements are as follows:

- Bedding material placed and compacted around the pipe to a minimum 94% dry density ratio, in layers of maximum 300mm thickness, to a minimum depth over the pipe of 150mm;

Where other design parameters may be critical, such as high water table, refer AS/NZS 2566.1. Vinidex recommends a design deflection limit of 10% as suggested in ISO 21138.1. For other conditions, such as increased trench widths and compaction standards, contact Vinidex for advice.

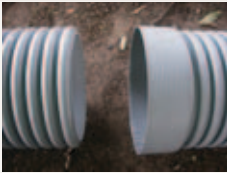


6 Jointing

The following procedure is recommended when jointing StormPRO® and SewerPRO® rubber ring jointed pipes:

Step 1

Clean the pipe socket and spigot end, making sure both are free of any dirt and grit.



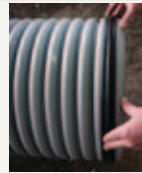
Step 2

Install the rubber ring by stretching it over the spigot so that it seats between the first and second corrugations from pipe spigot end.



Step 3

Ensure the rubber ring is evenly fitted by running fingers around the full circumference of the pipe.



Step 4

Apply a generous quantity of Vinidex jointing lubricant to the inside of the receiving socket. Avoid getting lubricant under the rubber ring.



Step 5

Insert the leading edge of the spigot into the receiving socket. It is essential that pipes are in a straight line before attempting to make the joint.



Step 6

Do not apply jointing force directly to the socket. Insert a short piece of pipe in the socket. The short piece can be an off-cut, 50mm longer than the socket, and can be re-used.



Step 7

Apply an even jointing force. Subject to pipe diameter and local conditions, use a crowbar to push on a timber block on the end of the short pipe.



Step 8

Push home the pipe until the spigot end comes into contact with the inner wall of the socket.



NOTE:

The pipe may be deflected at the joint after jointing has been completed. Any deflection should be limited to a maximum of 3°.

Installation must follow the diagrams below:

(referring to Steps 2 & 3)

150 & 225mm Pipe



300 - 900mm

Ring orientation as shown



7 Cutting of pipes

StormPRO® and SewerPRO® pipes may be cut anywhere along their length as required. The cut should be made in the valley between the corrugations at right angles to the axis of the pipe using a suitable saw. A chamfer is not required.



8 Selection of embedment material

Embedment material for StormPRO® and SewerPRO® pipes should preferably be granular, free-flowing material. This type of embedment material requires less compactive effort to provide support for the pipe and minimise soil settlement.

The most common embedment material is 5-7mm crushed rock. A typical grading is shown in tables below.

Table D: Typical 5-7mm crushed rock grading

Sieve Size (mm)	9.5	6.7	4.75	2.36	1.18
% Passing by Mass	100	85-100	30-85	0-30	0-5

Where sand is more readily available, a typical sand grading is shown in Table E below.

Table E: Typical sand grading

Sieve Size (mm)	4.75	2.36	1.18	0.6	0.3	0.15	0.075
% Passing by Mass	100	90-100	85-100	70-100	50-100	0-40	0-5

For further information, refer to AS/NZS 2566.2.

9 Placing and compacting embedment material

The bedding material should be placed and graded to invert level, and compacted as required (refer to page 7). In conditions where the trench bottom is wet, soft or irregular, it may be necessary to first stabilise, fill and level, and compact the base. Place and compact material in the pipe bedding zone to minimum depth of 75mm beneath the pipe.

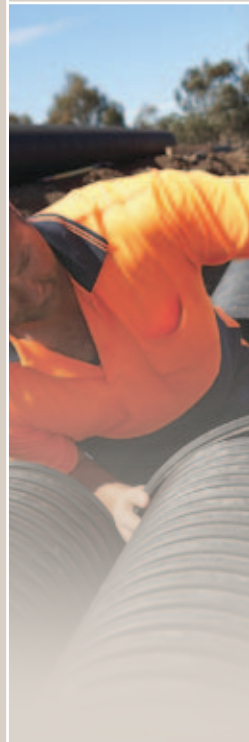
In order to ensure uniform support along the pipe barrel, a small indentation should be excavated in the pipe bedding zone to accommodate the pipe sockets.

The pipe side support material should be placed evenly on both sides of the pipeline and compacted such that relative compaction is consistent with design. Side support material should be worked under the sides of the pipe to minimise voids and provide maximum pipe haunching, taking care to minimise distortion of the pipe and maintain alignment and grade.

The pipe overlay material should be levelled and compacted in layers, to a minimum height of 150mm above the crown of the pipe, or as specified.

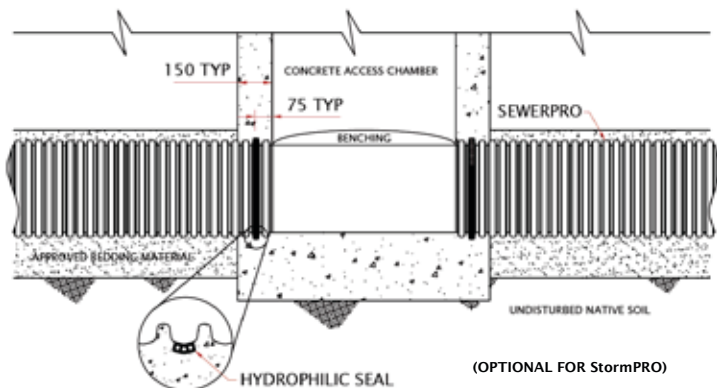
10 Backfilling

Backfill should be placed on the pipe overlay and compacted as specified but generally not in layers in excess of 300mm. Complete the backfilling operation to finished surface level.

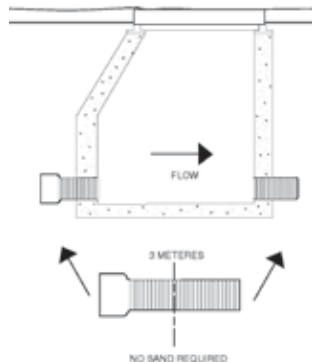


11 Connection to structures

StormPRO® and SewerPRO® pipes may generally be connected to rigid structures without the use of short rocker pipes. StormPRO® and SewerPRO® pipes have sufficient flexibility and strain tolerance to accommodate differential settlement at the interface. The figure below shows a typical entry or exit to a concrete structure.



Where short rocker pipes are specified, either in 300mm or 600mm lengths, these should be installed as shown below. The most cost-effective method is to cut pipe off-cuts to length on site, and join with plain couplings.



Note that sanded shorts are not required as the corrugated pipe provides an adequate keying action into the concrete.



12 Above-ground installation

For above-ground applications StormPRO® must be adequately supported in order to prevent sagging and excessive distortion.

Clamp, saddle, angle, spring or other standard types of supports and hangers may be used where necessary. Pipe hangers should not be over-tightened.

StormPRO® should be supported at regular intervals as detailed below, always with one support located directly behind the socket. These support spacings are based on StormPRO® carrying water at 20°C. Note that where temperatures in excess of 20°C are likely, the support spacing should be reduced.

Nominal Diameter (mm)	150	225	300	375	450	525	600	750	900
Minimum Horizontal Support Spacing (m)	1.25	1.60	1.90	2.15	2.50	2.75	3.00	3.00	3.00

The supports should provide a bearing surface of 120° under the base of the pipes and should be at least two corrugations wide. The pipes should be protected from damage at the supports with the provision of a membrane of PE, PVC or rubber.





13 Stormwater connections

The Vinidex PROgrommet® range of stormwater service connections provide 100mm and 150mm diameter connections to StormPRO® pipe up to 900mm nominal diameter.

The following procedure is recommended when installing PROgrommets®.

1. Drill hole in StormPRO® pipe using the PROsaw®. Hole centre must be located in the valley between corrugations.
2. Inspect marking on PROgrommet® to ensure the correct size for selected StormPRO® pipe
3. Present PROgrommet® to hole with PROgrommet® flange to the inside and locating wings to the outside of the StormPRO® pipe
4. Squash the PROgrommet® by hand whereby the two locating wings align in the centre
5. With the flattened PROgrommet®, form a “C” shape and offer it to the prepared hole
6. Position locating wings in the valley of the StormPRO® pipe profile
7. Apply Vinidex Lubricant to the inside diameter of the PROgrommet®

8. Cut lead-in chamfer on pipe which is to be offered to PROgrommet®

9. Mark a line on pipe showing the required insertion depth

10. Apply Vinidex Lubricant to outside diameter of pipe

11. Insert prepared pipe to pre-marked insertion depth

14 Field testing

Leakage testing is carried out to identify installation faults and sources of infiltration and exfiltration in pipelines which are required to be water tight such as sewerage systems. Leakage testing is generally not required for stormwater systems.

AS/NZS 2566.2 specifies detailed procedures for leakage testing using hydrostatic testing, air or vacuum testing or infiltration testing of non pressure pipelines.

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