

RIBSTRUCT

Product Specification.



*"THE LIGHTWEIGHT DRAINAGE
SYSTEM WITH THE STRENGTH OF A
HEAVYWEIGHT"*

Table of Contents

<i>1</i>	<i>History of RibStruct Polypropylene Pipe</i>	<i>Page 4</i>
<i>2</i>	<i>Product Advantages</i>	<i>Page 6</i>
<i>3</i>	<i>Manufacture</i>	<i>Page 9</i>
<i>4</i>	<i>Specification</i>	<i>Page 10</i>
<i>5</i>	<i>Physical Properties</i>	<i>Page 13</i>
<i>6</i>	<i>Chemical Properties</i>	<i>Page 14</i>
<i>7</i>	<i>Design Criteria</i>	<i>Page 15</i>
<i>8</i>	<i>Installation Code of Practice</i>	<i>Page 23</i>
<i>9</i>	<i>Maintenance</i>	<i>Page 27</i>
<i>10</i>	<i>Life Expectancy</i>	<i>Page 28</i>
<i>11</i>	<i>Quality Assurance</i>	<i>Page 29</i>
<i>12</i>	<i>Packaging & Handling</i>	<i>Page 30</i>
<i>13</i>	<i>Commercial</i>	<i>Page 31</i>

1

History of RibStruct Polypropylene Pipe.

Polypropylene was commercialised in 1957 and since then has attained an unprecedented production and application development throughout the world thanks especially to its superior mechanical characteristics and resistance to bending and deflection.

Towards the end of the seventies, extrusion processes for pipes made of this material were designed. Polypropylene is a thermoplastic polymer that may be employed in several ways due to its lower density when compared to polyethylene, to its higher melting point, to its excellent resistance to stress and chemical agents and to its lower impact on the environment.

In recent years, in different degrees according to the various countries, polypropylene has replaced materials traditionally used in drainage applications, i.e. Reinforced Concrete Pipes and Vitrified Clay.

RibStruct - A new dimension

By introducing a 'fourth dimension' into the manufacture of plastic pipes - considering an extruded pipe as having three dimensions (length, diameter and wall thickness) - a completely new field is opened up. It is not limited to cylindrical piping but permits the manufacture of square ducting, oval shaped pipes and many other products.

The extra dimension allows great liberty in design and lends itself to bigger products, in this instance larger diameter pipes in particular. The most immediate benefit is the possibility of designing a plastic pipe which can withstand external loads likely to be encountered in stormwater applications, but using only about 40 per cent of the material required for an extruded pipe of the same stiffness.

The essence of the RibStruct design is that it allows the manufacturer to reduce the quantity of expensive raw materials used in the creation of a product. This automatically minimises the energy required to produce the product, and to place it in its final operational area. Today these energy saving aspects have vital economic implications.

Manufactured from polypropylene, RibStruct is a plastic pipe with radial ribs, in lengths as long as transport convenience permits - and possessing all these remarkable properties unique to plastic. It realises the ideal of a pipe made from a homogenous, chemically inert material, in a structural form that is able to resist earth loads and is extremely cost effective.

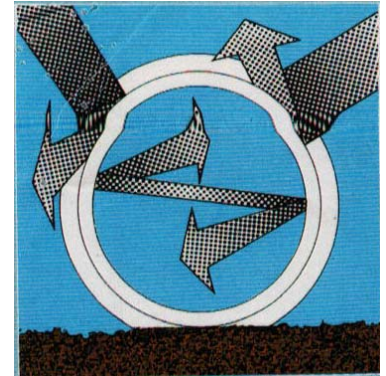


Typical RibStruct Installation

2

Advantages of the RibStruct System

RibStruct provides a valuable and cost-effective solution to drainage problems in diameters up to 630 mm, particularly where corrosion is a significant factor. While the advantages of RibStruct are extensive, they can be best categorised into areas where they are of specific interest to authorities, designers and contractors.



Benefits to the Local Authority:

- High level resistance to abrasion, erosion & corrosion.
- Smooth bore permits smaller sizes, higher velocities and flatter grades.
- Reduced number of joints, 6 metre lengths, results in greater pipeline integrity.
- Minimal sediment deposition and therefore requires less maintenance.
- Resilient nature, therefore not subjected to abrupt failure.
- Capacity is maintained throughout the pipe's working life.
- Lightweight design results in significant installation/repair cost saving.
- RibStruct is dimensionally accurate both internally and externally, providing tighter tolerance joints reducing the number of places for unwanted foreign material to lodge.
- RibStruct drainage system is manufactured entirely of polymer materials.
- The overall performance of RibStruct offers considerable economic advantage over the design life of a project.
- Manufactured to draft EN 13476-1:1999, Thermoplastic Piping Systems for Non Pressure Underground Drainage and Sewerage – Structured-wall piping system of uPVC, Polypropylene and PE – Part 1: Specifications for Pipes, Fittings and the System.
- Application to Standards Australia – Quality Assurance Services; Interim Standardsmark to EN13476-1 pending.
- Application for Appraisal to Water Service Association of Australia pending.

Advantages for the Designer:

The designer has the dual responsibility of ensuring that the project will continue to function as designed, while taking account of the total capital and whole of life costs incurred during the systems design life.

- The hydraulically smooth bore of RibStruct stays that way throughout the pipe's working life. It eliminates the uncertainty of reducing capacity (as with conventional materials) when the effects of corrosion and abrasion are felt.
- RibStruct joints are generally six metres apart, which means that hydraulic resistance depends primarily on the wall smoothness, and not flow disturbance from frequent joints.
- It is a semi-flexible pipe and thus sheds loads to the side fill. The soil-pipe interaction permits an economic design balance between pipe strength and quality of backfill.
- Ribstruct's reduced flexibility, compared with plain wall plastic pipes, provides additional safety when the designer anticipates problems in achieving specified backfill compaction, and prefers the use of a plastic pipe where soil conditions are poor.
- Because it is resilient, it will not sustain latent damage due to rough handling and laying.
- RibStruct can be made in any length that can be transported, thereby providing a solution to the potential problem of unnecessary or an excessive number of joints.
- The ribs anchor against thermal and other horizontal movements, thus minimising the operational requirements of the joint, and ensuring water-tightness.
- RibStruct pipe has been extensively tested by independent authorities and procedures for the structural design of flexible conduits.
- Manufactured to draft EN 13476-1:1999, Thermoplastic Piping Systems for Non Pressure Underground Drainage and Sewerage – Structured-wall piping system of uPVC, Polypropylene and PE – Part 1: Specifications for Pipes, Fittings and the System.
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Advantages for Contractors

Issues facing the contractor are mainly concerned with handling and laying.

- RibStruct has exceptionally low mass which means:
 - Easy handling
 - Low transport costs
 - No crane necessary for handling or laying.
 - Results in significantly lower cost per metre laid than traditional materials.
- RibStruct pipe is manufactured into six metre lengths, unless otherwise specified, thereby reducing the amount of handling. The maximum length is limited to about 12m by transport restrictions.
- Reduced number of joints, 6 metre lengths, results in greater pipeline integrity.
- Simple rubber ring joint system on six metre lengths is easy to lay which results higher productivity. (up to 35% more efficient than traditional products)
- Polypropylenes resilient design properties allows for standard on site handling without incurring mechanical damage or creating latent weakness for future potential problems.
- Lightweight product design allows for cutting of RibStruct pipe with a standard fine tooth hand saw, therefore closure pieces and angular ends can then be made easily with minimal wastage.
- RibStruct is a semi-flexible pipeline system that ensures firm contact with the bed of the trench. The need for support is transferred from under the pipe, where compaction is difficult, to the side areas of the pipes.
- Manufactured to draft EN 13476-1:1999, Thermoplastic Piping Systems for Non Pressure Underground Drainage and Sewerage – Structured-wall piping system of uPVC, Polypropylene and PE – Part 1: Specifications for Pipes, Fittings and the System.
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3

Manufacture

In 1972 Duropenta patented the idea of injection moulding a section of ribbed pipe and of welding successive sections together as they are formed in the mould.

In 1980, after eight years of making and testing prototypes, the process became a productive reality.

The heart of the equipment is a 650-ton press in which both platens move. Bolted to the platens are the two halves of a mould, split along its centre line. In the closed position the mould creates a cavity around a fixed inner mandrel and molten plastic is injected into this cavity.

After cooling, the moulded plastic part is pushed off the inner mandrel, just so far that 50mm of its length remains inside the mould to be united with the next section. The injection cycle is repeated and the newly forming section welds itself firmly to the retained part through the heat and pressure of the molten mass and thus a continuous length of pipe leaves the machine to be cut into convenient lengths.



RibStruct Grow Moulding Process – 630mm

4

Specification

1. Pipes

RibStruct pipes are manufactured in a standard range of sizes, with the external diameters chosen to conform to standard. Dimensions are given in Table1.

Table 1: Dimensions of Standard RibStruct Pipes

Ext. Wall Diameter	Internal Diameter	Wall Thickness	Rib Thickness	Rib Height	Rib Spacing	Outside Rib Diameter	Mass Per Meter
mm	mm	mm	Mm	mm	mm	mm	kg
225*	233	4.0	4.0	22	93	285	3.3
310	300	5.0	5.0	30	125	370	5.7
385	373	6	5	35	142	455	7.9
500	486	7	7	42	160	584	12.6
630	613	8.5	8.6	52	185	734	18.0

*** Available soon.**

While standardisation has been one of Everhard’s objectives, the flexibility of the Gromold process lends itself to the production of many other shapes and sizes. Examples include elliptical, box or pear shaped sections.

The production of a special section or size would depend entirely on the economic viability of manufacturing the necessary mould.

Designers are invited to contact Everhard’s Product Manager section to discuss and evaluate special projects on (07) 3265 3999.

2 Joints

Since plastic materials have a relatively high thermal co-efficient, conventional plastic pipes require careful attention to jointing and laying details to cater for the resultant expansion and contraction.

In the case of the RibStruct underground drainage system, the ribs are an effective means of transferring thermal stresses to the surrounding material, thereby confining the effect of temperature changes to stress variations, rather than strain movements. Coupled with the advantage of dimensional accuracy inherent to the Gromold process, this reduces considerably the operational requirements of the joint.

RibStruct can be laid using your choice of two types of jointing system.

The majority of installations utilise the rigid rubber ring joint coupling system. This system is the most commonly applied, along with being tried and tested, jointing method in the pipeline industry. With the vee-seal coupling system the elastomeric natural rubber seals are fitted to a moulded seal cavity, located on the pipe at the centre of each pair of ribs.

This system ensures the polypropylene coupling provides an adequate sealing length in the event of the pipe moving or being moved during the installation process. Additional advantages of the rubber ring joint coupling system include:

- Faster effective laying of pipeline system
- Rigid coupling provides for better alignment of pipeline
- Coupling manufactured from same material as RibStruct pipeline, Polypropylene.
- Ensures maximum effective sealing length every time
- Hydrostatically tested up to 280 kPa while subject to 3-degree deflection.

A drawing of the coupling design and application can be found in section sixteen of this document for your information.

The second jointing alternative is a simple rubber band joint secured with stainless steel straps. It is suitable where operational requirements are not as critical and provides an ideal repair pipe joint. This joint will comfortably withstand internal pressures of 20 kPa. The flexible jointing is made of natural rubber. This type of joint is suitable for most stormwater applications.

3 Fittings

It is recommended that, where a RibStruct pipe forms a straight-through section, the pipe should be laid continuously through the manhole site. The ease with which the plastic can be cut facilitates a later removal of the crown section over the exact length needed to form the open channel within the manhole space. Similarly, openings for side entry can be cut as required. Where this method is used, the manhole benching serves to locate and fix the channel sections.

The polypropylene, from which RibStruct is manufactured, can be welded in the factory and hence a wide range of specials such as bends, intersections and reducers can be simply fabricated from the basic pipe.



RibStruct Product

5

Physical Properties

The values given are typical for the grade of polypropylene used in the manufacture of the RibStruct drainage system.

Table 2: Physical properties of polypropylene.

No. Property	Test Method	Test Specimen	Unit	Value
1. Density	DIN 53479	Sheet	Kg/m ³	900
2. Yield stress (tensile strength)	DIN 53455	Test specimen	MPa	27
3. Elongation at break	Straining rate 125mm/min	Test specimen	%	13
4. Flexural strength	DIN 53452	Small size standard/test bar	MPa	12.5
5. Torsional rigidity	DIN 53447	60mm x 6.35mm x 2mm	MPa	380
6. Bend creep modulus 1 min value	Bend creep test	120mm x 20mm x 6mm	MPa	1150
7. Ball indentation hardness (30 sec value)	DIN 53456 text loading 358 N	Sheet, 4mm thick	MPa	57
8. Notched impact strength	DIN 53453	Small size standard/test bar	J/m ²	1.8 x 10 ⁴
9. Abrasion wear by abrader wheel Thermal properties	DIN 53754 E	Sheet	mm ³ /10 0 rev.	14
10. Crystalline melting range	Polarisation microscope	Microtome section, 20	°C	160..162
11. Coefficient of linear expansion between 30 and 100°C	DIN 52328; ASTM D696	50mm x 4mm x 4mm	°C	1.8 x 10 ⁴
12. Thermal conductivity at 20°C	DIN 52612 two sheet method	Sheet, 8mm thick	°C	0.22
13. FDA Approval for contact with foodstuffs	FDA 177.1520		°	Approved

6

Chemical Properties

Polypropylene and its copolymers are resistant to aqueous solutions of inorganic acids, alkalis and salts even at relatively high concentration and raised temperature. By contrast they are attacked by oxidizing agents such as concentrated nitric acid or fuming sulphuric acid (oleum).

Polypropylene is stable to many organic solvents – particularly alcohols and also to esters and ketones. Certain solvents such as halogenated hydrocarbons, aliphatic hydrocarbons (e.g. petroleum fractions), and aromatic hydrocarbons (e.g. benzene) and other solvents cause swelling or may dissolve Polypropylene particularly at raised temperatures, giving rise to changes in the properties of the material.

At temperatures below 60°C Polypropylene is resistant to very many solvents. At higher temperatures it is not resistant to aromatic or halogenated hydrocarbons. Fats, oils and waxes cause only slight swelling of the material.

7

Design Criteria – RibStruct Drainage System

1. Flow Capacity

The Gromold process produces a plastic pipe with an exceptionally smooth bore. Since the pipe material is nonpolar, as well as corrosion and abrasion resistant, there will be virtually no roughening or “furring” of the wall during the whole life of the pipe.

The calculation of flow in plastic pipes:

$$V = 142 r^{0.64} s^{0.55}$$

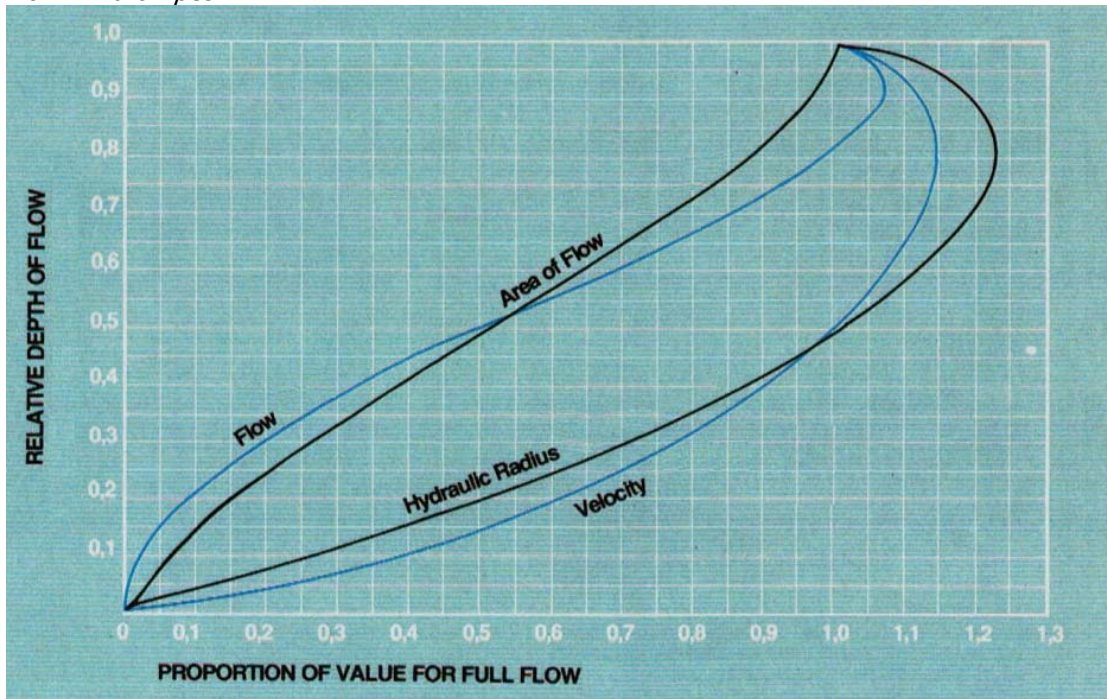
Where r = hydraulic radius in metres
 s = slope in metres per metre

The following design friction coefficients apply in the various formulae used by designers:

1. Mannings, n = 0.009
2. Hazen-williams, C = 140
3. Colebrook-White, k = 3×10^6 metres

Designers should note that the Manning or Strickler equation assumes rough turbulent flow conditions and therefore may not be strictly applicable to the RibStruct system.

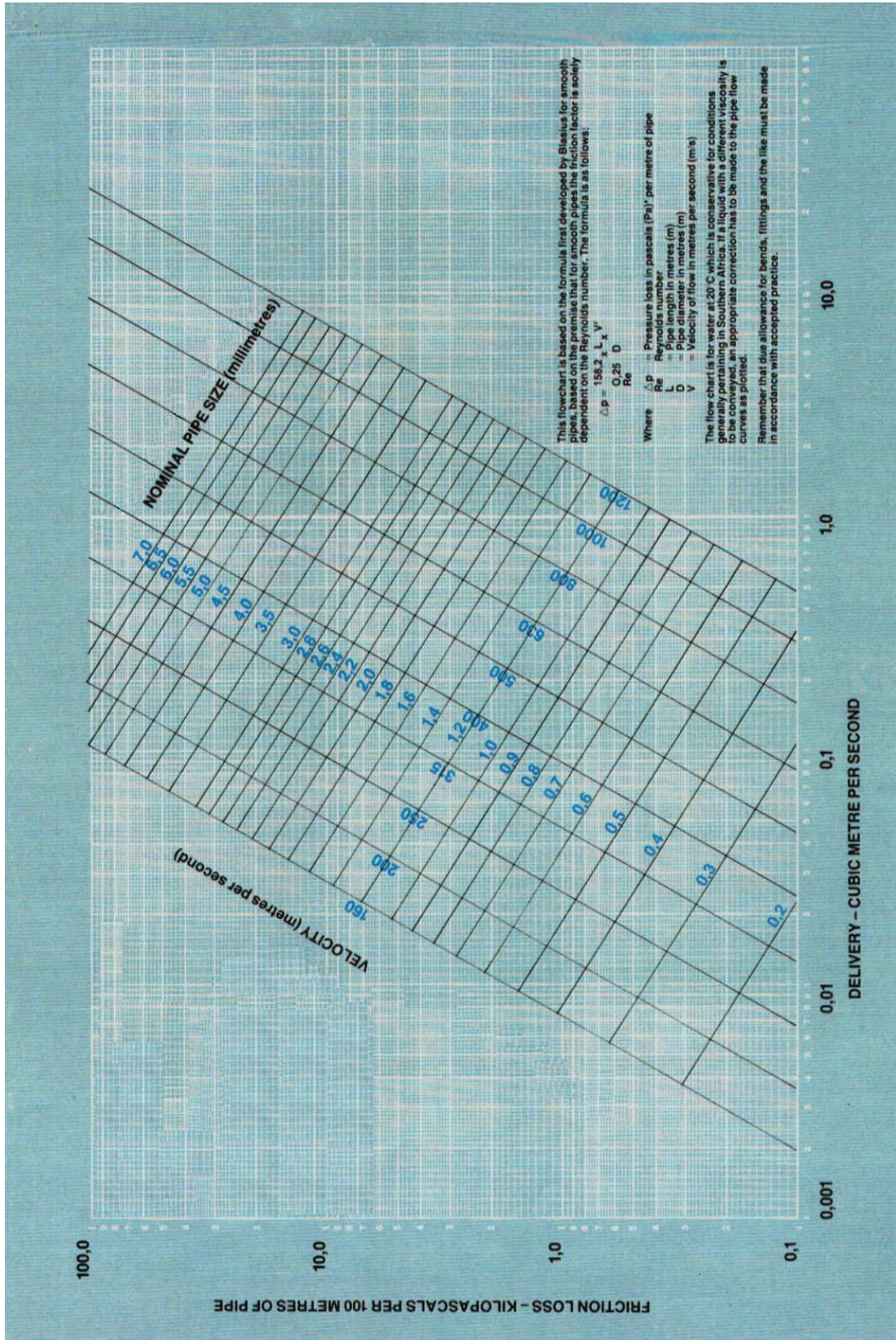
Flow in Part Pipes.



RibStruct eliminates the problem that a designer has in estimating the future deterioration in capacity while, at the same time, demands on the system are increasing.

The following chart provides the designer assistance in estimating the full flow capacity of RibStruct pipes. Sizes given are nominal diameter and allowance has been made for the wall thickness of standard pipes. The chart has been drawn up with flows calculated by the Blasius formula. Where the pipe flows only part full, the full flow conditions should first be estimated as above. The proportional depth, velocity and capacity can then be estimated using Figure 2.

Full Pipe Flow Characteristics for RibStruct Drainage System.



2. Structural Design

The structural design of RibStruct semi-flexible pipes, subjected to earth and superimposed loads, is based on developments of the original work by Spangler although differs considerably from that normally used for rigid conduits. The method it described here follows the proposal by Stephenson.

The fundamental difference between the methods is the description of how the loads act. For a rigid conduit in a trench, a part of the earth load is assumed to be carried by the friction on the trench wall. The soil pressure at the crown of the pipe is less than would have resulted from the direct mass of the soil cover alone.

Since it is rigid, the pipe is then assumed to carry a force equal to the crown pressure acting over the full trench width. Its ability to withstand this force is related to its strength in the three-edge test being a bedding factor which, depends upon the nature of the bed onto which the pipe is laid.

For a flexible or semi-flexible pipe, the soil pressure acting at the pipe crown level is, as before, modified by the friction on the trench walls. The elasticity of the pipe and the surrounding soil mass are now comparable and, as the pipe deflects, so load is "shed" to the side-fill in the trench. The pipe thus carries only the load of the soil directly above it, and not that of the full trench. The pipe's vertical diameter is decreased and the horizontal diameter increased.

The side movement develops reaction from the soil in the side-fills and an arching action develops. Unlike rigid conduit, the pipe will not fail structurally by cracking, therefore, the design performance limits must be defined in another way.

These are normally defined as material strain of 4%, a relative deflection in the diameter of 7.5%, and a wall that will not buckle. Regarding the latter aspect, the ribs effectively increase the moment of inertia of the wall that the first two criteria will always be exceeded before the buckling load, as defined for example by the CIRIA equation, is reached.

$$W_b = \sqrt{32 E_s EI/d^3}$$

Similarly, the standard RibStruct pipes are so proportioned that the pipe will not fail through buckling of the ribs.

The structural design of flexible buried pipelines is covered by AS/NZS 2566.1:1998.

The following is a procedure for solving the simplest - although most frequent - case of a pipe in a trench. Designs of the loading and pipe are separated so that designers can use more elaborate load evaluations with the pipe resistance criteria presented here.

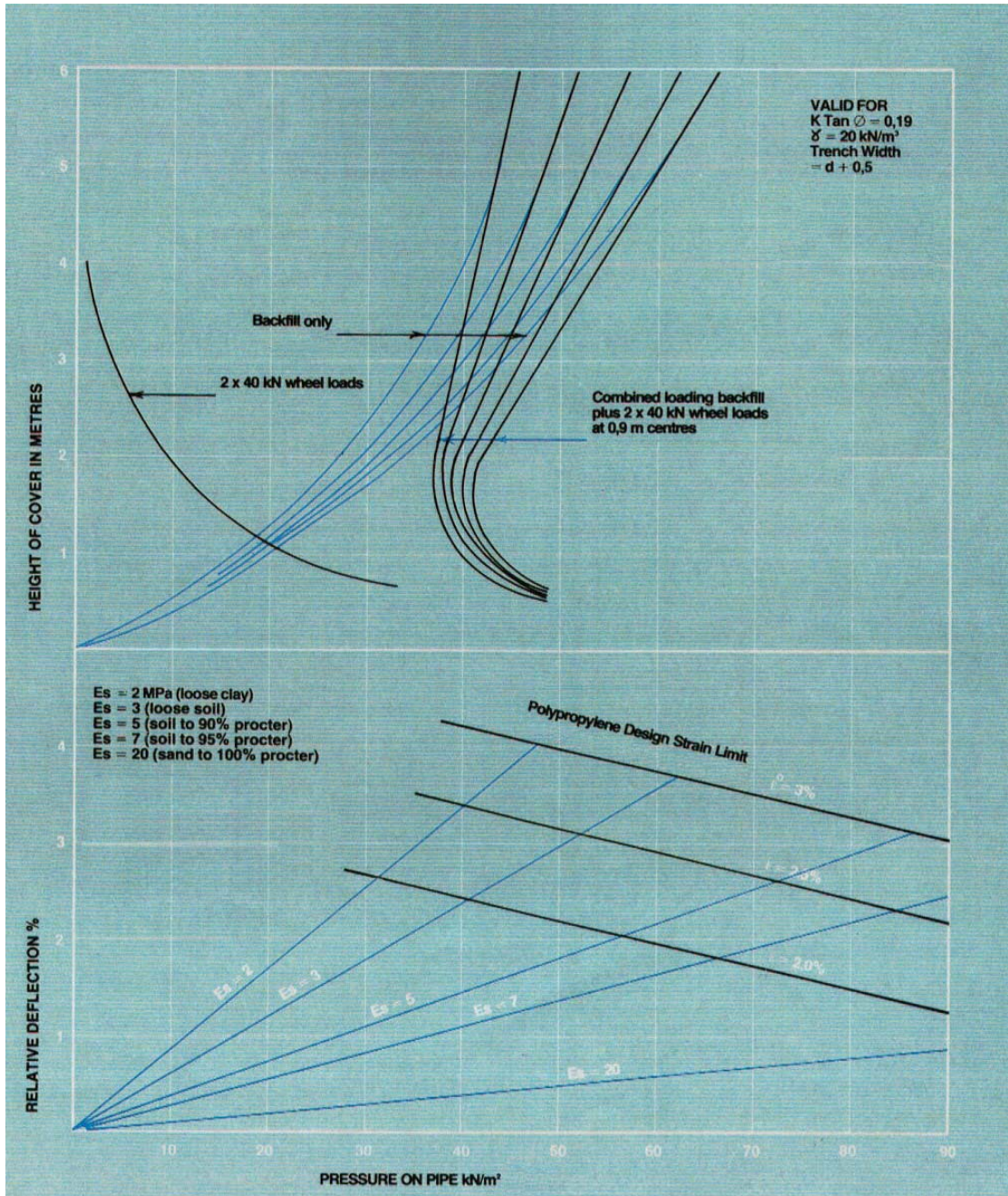
A. Load Determination

1. Using the upper portion of Figure 3. determine the vertical soil pressure on the pipe. Note that this assumes the following:

γ	=	unit weight of backfill in kN/m ³	20
$K \tan \emptyset$	=	characteristic soil parameter	0.19
B	=	trench width	d + 0.5m
d	=	pipe outside (wall) diameter	

2. If the parameters are different to the above interpolation can be used as an approximation, or the references should be consulted.

Figure 3 – Load Determination



3. Calculate the pressure at crown level due to superimposed loads. The Boussinesque formula for point load is:

$$W_p = \frac{3PH^3}{2\pi T} (H^2 + X^2)^{-2.5}$$

Where P = point load in kN

H = depth of pipe crown below point load in metres

X = lateral distance from calculation point to applied load in metres

W_p = vertical pressure in kPa

Many authorities however specify a pressure distribution underneath design point loads. Where H exceeds 3.5 metres the pressure due to design wheel loads becomes negligible. Figure 3 gives the maximum pressure under two wheel loads of 40 kN each that are 0.9m apart.

- 4a. Add the pressure due to the superimposed load to the soil pressure to obtain the total pressure.
- 4b. Alternatively, the methods given in Section 4 of AS/NZS 2566.1:1998 may be employed to determine the design pressure.

Allowable Pressure on Pipe

- 5 Decide upon the maximum allowable relative deflection of the pipe. For steel pipes a normal limit of 2% has been suggested but this is determined by operational requirements imposed by linings and joints. For plastic pipe a limit of 7.5% is commonly used.
- 6 Decide upon the maximum allowable strain in the pipe material. An upper limit of 4% has been recommended for injection mouldings from polypropylene. However recent investigations of plastic pipe subjected to the constant strain condition that is inherent to a buried pipe system have found that the material in the plastic pipe can be strained considerably beyond the limiting strain normally associated with the constant stress condition. In one test specimens of PVC (which has a lower strain limit than polypropylene) were subjected to various levels of uniaxial constant strain up to 50%.

Failures occurred above 33% during initial loading but with one exception after twenty-four hours, no further failures occurred during the next three years. The creep process caused a diminution in the stress required to maintain the set strain level. This suggests that the nominal 4% strain limit may be conservative for use in soil pipe systems.

7. With known soil pressure and selected deflection and strain limits, enter the lower part of Figure 3 and determine the minimum backfill conditions that should be specified. Note that the lower portion of Figure 3 applies to the standard RibStruct pipes, manufactured from polypropylene and dimensioned in Table 1. The figure has been prepared using a modified Spangler equation.

$$\Delta/d = 0.1w / 8 EI/d^3 + 0.05 Es$$

where

- Δ/d = relative deflection
- w = pressure on pipe in Mpa
- E = pipe material modulus in Mpa
- Es = soil modulus in Mpa
- I = wall moment of inertia in mm^4/mm
- D = pipe external wall diameter in mm

8. Where the design requires a pipe with a higher modulus, this can be increased by a factor of up to five times by the use of more exotic materials. Naturally this will increase the cost of the pipe but may be economically justified in special applications.

8

Installation Code of Practice.

INSTALLATION

The following Standard deals with the installation of plastic pipes:
AS/NZS 2566.1:1998 Buried flexible pipelines.

The following is a condensation of the most important aspects. When drawing up a contract specification, the designer would be well advised to consult the above standards or reference works, such as N.W.B. Clarke's "Buried Pipelines".

1 Excavation of Trenches

The engineer in charge of the project establishes a recommended alignment and grade of trench.

The width of the trench should be kept to a minimum, allowing just sufficient working area for jointing and initial compaction around the pipe.

Recommended embedment geometry is given in AS/NZS 2566.1:1998. It is important that the trench is not opened too far in advance of the pipe-laying operation. Pipes must be backfilled immediately after laying.

Where traffic loads occur it is recommended that the depth of cover from the top of the pipe to the ground surface be not less than 0.6 metre (Diagram 1). Minimum covers for various situations is given in AS/NZS 2566.1:1998.

2 Trench Preparation

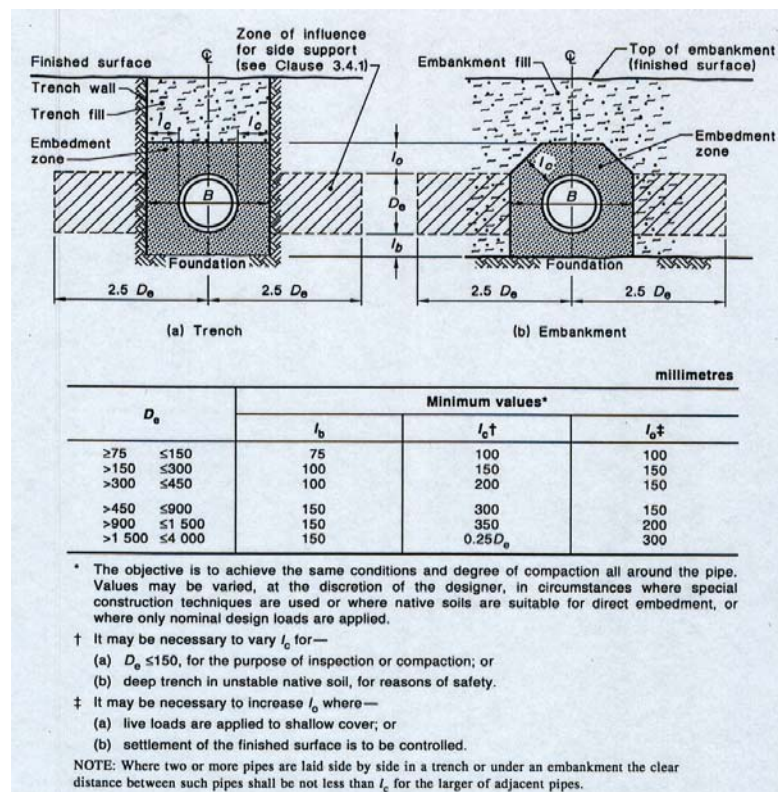
The trench bed must be free from all stone or hard projections which may cause damage to the pipe.

The bottom of the trench should be backfilled to a depth of between 75mm - 100mm, with suitable bedding material as specified in AS/NZS 2566.1:1998 (Diagram 1).

This bedding should be lightly compacted to produce a level, uniform bed onto which the pipe is directly laid. Excessive compaction at this stage will prevent the pipe ribs from penetrating the bedding.

All leveling and side sheeting must be removed before bedding. The size of the majority of particles in a bedding material should not exceed 20mm. Embedment materials and compactions must be in accordance with Section 3 of AS/NZS 2566.1:1999

Diagram 1: - Typical Trench Geometry



3 BEDDING THE PIPE

The pipeline must be laid directly onto the prepared bedding in the trench and any bricks or other hard objects that were used to level the bedding must be removed.

If the pipeline is supported above the final level by the ribs, the ribs may be worked into the bedding by rocking the pipe. Where this fails to achieve the desired result, bedding material must be removed. It is **EXTREMELY IMPORTANT** that the RibStruct pipe is supported along the barrel and not by the ribs.

Where the RibStruct pipe has to be brought up to grade, additional bedding material must be rammed under the pipe. This can be achieved by tamping the side-fill and is the recommended method of achieving grade. In **NO CIRCUMSTANCES** must wedges or other hard objects be used.

Because of Ribstruct's low mass, the pipeline can be moved easily in the trench to achieve correct alignment. While this offers considerable advantage, the importance of early backfill to prevent unwanted displacements is emphasised.

4 BACKFILLING

Embedment to be carried out in accordance with Section 3 of AS/NZS 2566.1:1998 to the depth specified by Diagram 1.

The simultaneous filling and even compaction of material on either side of the pipe should prevent displacement of the pipe.

The balance of the backfill may be placed in layers of 300mm and compacted by machine. The engineer should specify densities to meet pavement or other design requirements.

Because RibStruct relies on the arching action of the soil pipe system to resist external loads, the importance of optimum compactions of the side-fill must be stressed.

The basic theory of the system is that, on the application of load, the pipe's horizontal diameter will increase. This creates a reactionary force in the soil, the magnitude of which depends on the soil modulus. Where soil is placed loosely, this modulus may be only 1 to 3 MPa whereas were it to be well compacted, it could increase to 10MPa, indicating a near doubling of the ability of the soil-pipe system to withstand load.

Unless otherwise requested, RibStruct will be supplied in lengths of six metres so that the joints may be conveniently left open during the initial backfilling, to permit inspection during water-tightness tests.

9

Maintenance

The RibStruct Drainage system does not require ongoing maintenance once installed in accordance with the standard specifications as contained in this document.

One of the advantages associated with the RibStruct Polypropylene system is the material properties of polypropylene and its ability to withstand abrasion. This unique property ensures the internal diameter and wall thickness of the pipeline is maintained throughout the design life of the system.

As with any polymer product, RibStruct should not be stored for long periods of time in situations where it is exposed to constant levels of ultra violet radiation. It is strongly recommended, as with uPVC and PE, that the product be installed underground within a period of not more than twelve months from date of manufacture.

10

Life Expectancy.

The RibStruct Polypropylene drainage system is manufactured under strict quality controlled procedures. The precise raw material recipe utilized in the production process is commercially confidential, although the percentage of carbon black and UV stabilisation applied is available upon request.

Everhard Industries current investigations indicated that the RibStruct polypropylene product, stored in the appropriate manner and installed in accordance with the manufacturers recommendations has a nominal life expectancy of in excess of **50 (Fifty) years.**

11

Quality Assurance.

Everhard Industries Pty Ltd operate a Quality Management System.
The company holds product certification to the following Australian Standards:

AS/NZS1546.1:1998	Licence 1652 Geebung Site
AS/NZS1546.1:1998	Licence 1950 Geebung Site

The Macro Plastics Division of Everhard Industries Pty Ltd is accredited to AS/NZS ISO9001: 1994 for the "Provision of Aerated Wastewater Treatment Plants, Grease Traps and Septic Tanks. Design, Manufacture Sales, Installation and Servicing. Certificate of Registration, number 676, was issued by SCI-QUAL on April 7th 2000

Current application to Standards Australia – Quality Assurance Services for interim StandardsMark to prEN13476 Part 1: Thermoplastic Piping Systems for Non Pressure underground Drainage and Sewerage – Structured Wall piping systems; Specifications for Pipes Fittings and the System pending.

Everhard Industries Pty Ltd also have lodged application to Water Services Association of Australia for the appraisal of the RibStruct Drainage System.

12

Packaging and Handling.

The RibStruct drainage pipe system is manufactured in standard 6 metre lengths. This enables for transport on most standard length flat tray delivery vehicles.

The RibStruct system is designed to allow the effective nesting of size on size. This results in the ability to package 225mm pipe inside 300mm, 300mm inside 375mm etc, alleviating the inefficient shipment of empty space inside a standard pipe along with optimising freight costs to isolated locations.

The product is dispatched from the manufacturing operation in 6 metre lengths complete with coupling fitted to one end. Accompanying the crate of pipe will be a package containing the correct number of vee-seals required to lay the number of pipes supplied. Included in each carton of vee-seals is a quantity of pipe lubricant associated with the number of pipes to be laid.

Each container of lubricant has detailed instructions on the correct seal/coupling fittings procedure for the RibStruct drainage system

With the ductile properties of the RibStruct drainage system, there are no specific handling requirements to be adhered too. As with any polymer pipeline product, best practice and due care is to be taken at all times to ensure that no damage is sustained to either persons or product during the loading, unloading or installation process.

13

Commercial

The commercial aspects of the RibStruct Drainage system are as follows:

- 1 Low capital cost per metre
- 2 Ability to nest product provides for reduced transport cost and subsequent lower per metre cost delivered to site.
- 3 Lightweight nature combined with the products ductility reduces the dependency on heavy lifting machinery to unload and lay
- 4 Saving of up to 55% in laying costs due to reduced number of pipes / joints in comparison to traditional reinforced drainage pipeline systems.

While every effort is made to ensure stability in pricing of product it must be noted that prices quoted are indicative only and are subject to change.