

Pinnacle[®] Sealed Box Culvert Tank System

Technical Guide D8.6

Hynds Pinnacle Sealed Box Culvert system uses the innovative Tylox[®] SuperSeal[™] pre-lubricated gasket by Hamilton Kent to simplify the construction process, providing a fast, reliable and cost-effective sealed culvert solution.



08.22 | DRAINAGE | D8.6 BOX CULVERT TANK SYSTEM

Applications

Shallow retention/detention tanks particularly under car parks, parks, roads, etc

Vertical stormwater chambers

Sewer storage tanks (lined or unlined)

Liquid storage chambers

Product Attributes

Large range of sizes

Modular sections for easier delivery, handling, and installation

Sealed joints rated to 5m head

Quality

ISO 9001:2008 Quality Management Standard

Approvals/Standards

Purpose designed for various load configurations up to HN-HO-72

NZS 3101, Concrete Structures Standard

NZS3109, Concrete Construction

We are the supply partner of choice for New Zealand's civil construction industry, specialising in water and infrastructure based solutions.

Introduction

Hynds Sealed Box Culvert Tank System uses an innovative pre-lubricated gasket that offers a fast, reliable, and cost-effective sealed Joint between the precast units. Options to have cast-on end walls or bases manufactured to client's requirements provide reliable, sealed modular Retention Tank or Pump Chamber solutions. Hynds Sealed Box Culvert Tank System is also available with an HDPE Liner cast onto the internal culvert walls during the manufacturing process. The addition of the HDPE Liner provides the Box Culvert with:

- Resistance to H₂S gases & chemical attack
- Durability against other aggressive
- Superior abrasion resistance to standard concrete(Refer to Hynds Hyliner Data sheet D1.12 for additional information)



FIG. 1 Sealed Box Culvert with HDPE Liner

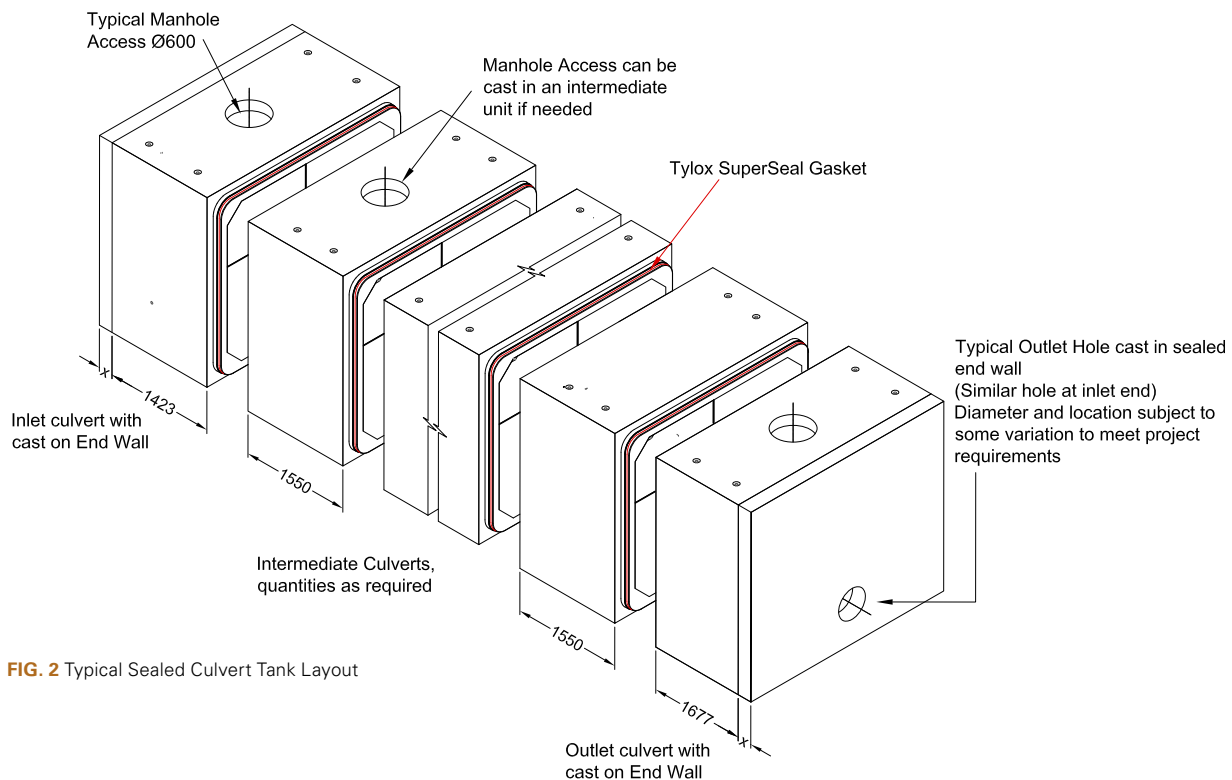


FIG. 2 Typical Sealed Culvert Tank Layout

Product Attributes

- Ability to tie units together longitudinally using Hynds Dog-bone connectors, Reid Bar tie rods or strand tendons
- Cast-in Internal HDPE liner
- Joint in HDPE liner sealed by welding joint strips across joint after installation around Internal joints
- Customizable cast on front and back panels to accommodate inlet & outlet pipes.

Design/ Standards

- Designed for below ground installations
- Purpose designed for various load configurations LD20, HD60 and HN-HO-72
- NZS3101: Concrete Structures Standard
- NZS3109: Concrete Construction
- Option to design to NZS: 3106-2009 (but Consult with Hynds)

Design Consideration

It is important to discuss design requirements with Hynds Technical Sales Team early in the design phase of a project.

- Direction of traffic traveling over structure
- Depth of fill on top of Culverts
- Presence of any ground water
- Align any manhole inlet and outlet pipe positions with Hynds Standard hole locations

If there is a specific requirement for a partially buried or above ground installations this needs to be reviewed on a case-by-case basis.

The Customer would need to allow engagement of a suitably qualified Consulting Engineer to carry out site foundation design and stability checks that can be supplied to Hynds for incorporation into a review or design.

Culvert Dimensions

Hynds Sealed Box Culvert Systems are designed and made to order. Standard sizes are available as shown in Table 1

TABLE 1 Standard box sizes (other sizes made to order)

Height (mm)	Width (mm)				
	2000	2500	3000	3500	4000
1000	✓	✓	✓	✓	✓
1500	✓	✓	✓	✓	✓
2000	✓	✓	✓	✓	✓
2500		✓	✓	✓	✓
3000			✓	✓	✓

Larger sizes available by request

Alternate sizes are available on request – Standard unit length is 1550 mm. Lengths up to 2.4m available in 2.5m and 3.5m spans

Handling

- Box culvert units are normally supplied with swiftlift anchors cast into the top of each unit. Appropriately rated chains / lifting beam must be used when handling the units.
- Lifting anchor positioning and lifting equipment specifications can be supplied upon request.

Joining

- Hynds Pinnacle® Sealed Box Culvert system are manufactured with a collar and spigot which together with the Tylox SuperSeal gasket and dog bone connector locates and locks adjacent units together the Culvert system offers a robust joint.
- HDPE Lined Culverts are generally supplied with ducting cast in the Culvert corners to accommodate Reid Bar Tie Rods, or Strand when post tensioning maybe required. Lined Culverts can be supplied with the Dog Bone system but requires a HDPE cover Strip to be welded over top after installation.

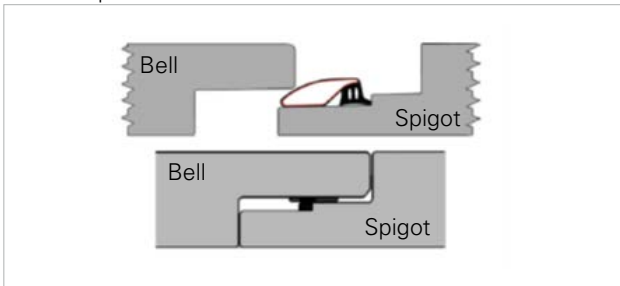


FIG. 3 General detail for Tylox SuperSeal gasket

TABLE 2 Gasket Codes

Gasket code	BXC culvert/ chamber size(LxW)				
RGSBXC3000	2m x 1m	-	-	-	-
RGSBXC3500	2m x 1.5m	2.5m x 1m	-	-	-
RGSBXC4000	2m x 2m	2.5m x 1.5m	3m x 1m	-	-
RGSBXC4500	-	2.5m x 2m	3m x 1.5m	3.5m x 1m	-
RGSBXC5000	-	2.5m x 2.5m	3m x 2m	3.5m x 1.5m	4m x 1m
RGSBXC5500	-	-	3m x 2.5m	3.5m x 2m	4m x 1.5m
RGSBXC6000	-	-	3m x 3m	3.5m x 2.5m	4m x 2m
RGSBXC6500	-	-	-	3.5m x 3m	4m x 2.5m

Refer to Hynds Data Sheet D8.5 Pinnacle® Sealed Box Culvert System for full Tylox SuperSeal Gasket and Culvert installation details.

Gasket Installation

- The Tylox SuperSeal pre-lubricated gasket is to be installed on the Spigot end of each Culvert unit. The gasket negates the need for any further sealing agents for most installs, contact your local Hynds Sales Team to discuss your requirements.
- The box culvert spigot centres on the bell due to the forces generated as the tube rolls into the annular space during the homing process (See Fig.1)

General Procedures for Gasket Installation are as below:

- Ensure spigot is free of dirt, debris, cracks, chips, or other defects.

- Stretch gasket around spigot, with nose against step. Ensure gasket splice is placed in middle of bottom span of the joint.
- Equalize the gasket tension around the perimeter of the spigot by pulling the gasket towards all four corners, away from the sides and spans. Roll gasket up onto step of spigot.
- Apply Adhesive (*Ados F2 or similar approved*) in a 25mm wide strip of glue next to the step on entire flat portion of bottom span (see Fig.2), and centre part of sides and top for a minimum length of 1/8th of the height or span. e.g. 4000mm span, apply 500mm strip of adhesive.
 - No gluing corners.
 - Roll gasket back into place while ensuring gasket rolling tube does not touch glue.

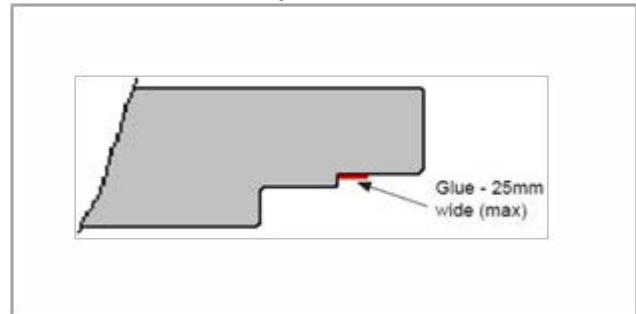


FIG. 4

- To prevent sagging on bottom span, use a long board and clamp the gasket body to spigot until glue has set. (See Fig.5)



FIG. 5

Laying

Recommended practise is as follow:

- Install Tylox SuperSeal Rubber Ring Gasket to Spigot end of Culvert well before placing culvert units
- Place first box culvert into required position.
- Using the crane, position the second culvert as close as possible to the previously installed culvert, and whilst being supported by the crane pull the culverts together with levered chain blocks attached to the internal or external swiftlifts as shown in Installation step 3 (refer to page 5)

Note: Consult with Hynds as to actual swift lift positions as can vary subject to culvert details and

design requirements

4. Pull the units together evenly ensuring that all four sides come together at the same time. As the units are coming together always check gasket is rolling correctly and has not locally “pinched or bulged”. If this has occurred, remove the units and start the process again. The units are designed to have a nominal 5mm residual joint Gap. Do not pull the units together flush, this will damage the units.
5. Install dog-bone connectors or other Tie Rod system.
 - See Installation steps on the following page for visual steps.
 - Where required Hynds Box Culverts can be manufactured with a duct in each corner. The units can then be post-tensioned on site. Recommended practise is to insert the tie rods as the first unit is placed and push through subsequent units as they are installed.
6. Backfilling.
 - Backfilling should commence as soon as possible after the box culverts have been laid.
 - Fill the trench to the level of the top of the culvert working evenly on each side.
 - Use selected backfill material well compacted in layers not exceeding 200 mm thickness.
 - Do not use heavy vibratory equipment.

Dog Bone Connector Jointing System:

Hynds Box Culverts are manufactured with our exclusive Dog Bone Connector System, the ideal solution for tying together culvert sections. This system combined with the pre installed rubber gasket joint allows a fast and accurate installation.

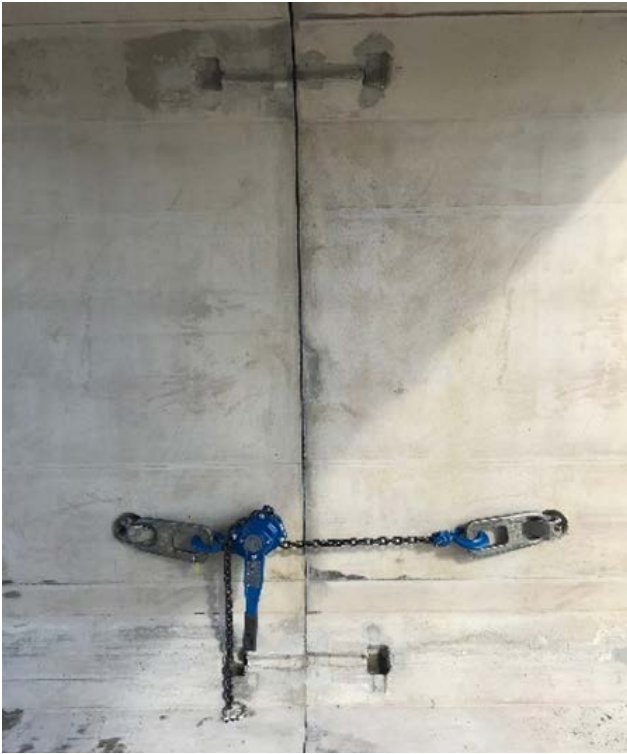
Visual Installation Steps:



1. Place first culvert into required position with the downstream end first.



2. Place the next culvert as close as possible to desired position. Maintain weight on the crane. *(Alternative rigging maybe required in some cases).*



3. Connect Lifting Clutches to the swiftlifts in the culvert and the lever chain block, then pull Culvert into correct position



4. Dog Bone Tie rods placed in recess ready for grouting



FIG. 6 Alternative tie rod connections are available as shown above.

Branches Nationwide *Support Office & Technical Services 0800 93 7473*

Disclaimer: While every effort has been made to ensure that the information in this document is correct and accurate, users of Hynds product or information within this document must make their own assessment of suitability for their particular application. Product dimensions are nominal only, and should be verified if critical to a particular installation. No warranty is either expressed, implied, or statutory made by Hynds unless expressly stated in any sale and purchase agreement entered into between Hynds and the user.

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