Hynds Concrete Retention Tank with Mul-T-Level™ Outlet

Technical Guide SW 22

Hynds strong and reliable retention tanks are available in Bell Socket Joint / In Wall Joint or Flange Base Manholes.

Applications

- Stormwater retention & detention
- Sewer storage
- Pump Stations

Product Attributes

- Versatile Mul-T-Level™ outlet
- Highly durable
- Simple installation
- Various design layouts and large capacity options available
- Water tight
- Proven history

Approvals/Standards

AS/NZS 4058:2007 Precast concrete pipes (pressure and non-pressure)

Quality/Environment/Health & Safety

ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018

HYNDS STORMWATER

Hynds strong and reliable retention tanks are available in Bell socket (BSJ) & In Wall (IWJ) Joint or Flange Base Manholes.

Design Specifications and Applications

BSJ/ IWJ Retention Tank

- Generally used when the location permits the installation of a long narrow tank.
- Comprised of Pinnacle® Hyspec steel reinforced concrete rubber ring joint pipes.
- Usually includes a spigot-plugged pipe, standard class 4 intermediate pipes and a collar-plugged pipe.
- The spigot and collar plugs are factory cast to ensure water tightness and integrity.
- A manhole offtake is factory fitted to one or more pipes to provide easy access for maintenance.

FB Retention Tank

- Generally used in compact site conditions where relatively small volumes are required.
- Comprised of Hynds flange base manhole risers and a precast concrete lid.

Mul-T-Level™ outlet

- Enables the tank to be used for both detention and retention.
- Both the BSJ/ IWJ and FB retention tanks have a standard 150mm diameter PVC slip coupler and Mul-T-Level™ outlet cast-in or fitted during manufacturing.
- The required retention/detention volume is set by an orifice hole (of specified diameter) being drilled on the Mul-T-Level™ outlet at a pre-determined height by contractor.
- All super quick and easy to install using std & approved civil pipe laying techinquies.

FIG. 1

General Specifications

- Manufactured from Hynds premium concrete range of pipes and manhole chambers.
- When the tank is installed in an aggressive environment, such as tidal areas, sewerage or mild acid solutions, the use of a special grade concrete is recommended. Contact Hynds Technical Team for more information.
- Retention tanks are available in class 4 to suit specific site conditions, loading and applications.
- The diameter and length of the retention tank depend on:
  - Storage volume required
  - Site configuration and access equipment available
- Inspection and maintenance access is provided by a fitted inspection chamber or manhole starter to end pipes.
- PVC slip couplers are fitted to end plugs to provide inlet and outlet connections to the retention tank.
- Non-standard couplers or starter types can be cast-in on request.
- Orifice holes are drilled at levels to suit the design requirements by contractor.
- Standard lids are available for access risers in the BSJ/IWJ type tanks.
- The 900/1050 mm diameter access riser requires a 900/1050 mm diameter manhole lid, which can be fitted with the cast iron manhole frame and cover.
- The FB tanks require a lid, which can be fitted with a cast iron frame and cover to suit the riser diameter.
  - ***Note:*** Lid thickness is dependent on loads and application
  - Refer to Table 1 for BSJ/IWJ tank capacities and Tables 2 for FB tank capacities.

TABLE 1 BSJ / IWJ Type retention tank

Nom Pipe Diameter and Joint Type	Pipe Effective Length (m)	Nom Vol per Pipe Length (m^3)	Nom Vol per Pipe Length (Litres)	Suggested Offtake Dia (mm)	Lifting plugged pipe anchor req.	Handling intermediate pipe anchor req.
1200BSJ	2606	2.83	2827	900	B1	B2
1350BSJ	2606	3.58	3578	1050	B1	B2
1500BSJ	2617	4.42	4418	900	B1	B2
1800BSJ	2617	6.36	6361	1050	C1	C2
2100IWJ	2623	8.66	8659	1050	C1	C2
2550IWJ	2624	12.77	12767	1050	C1	C2

Key:

- *B1 2.5 Tonne 2 no. in plug 1 no. in pipe*
- *B2 2.5 Tonne 2 no. in pipe*
- *C1 2.5 Tonne 2 no. in pipe*
- *C2 5 Tonne 1 no. in pipe*

Note:

- *All dimensions refer to Class 4 Pinnacle® pipe.*
- *Inlet/outlet to be placed minimum 100mm from invert of pipe. Please refer to X in FIG 2.*
- *Overflow 125mm below top.*

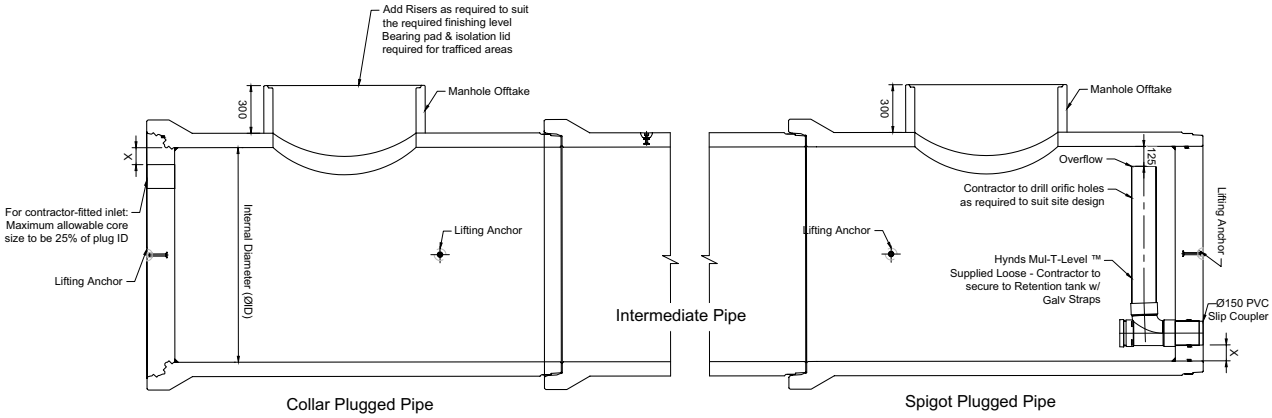

FIG. 2 Recommended detail on roadway installation

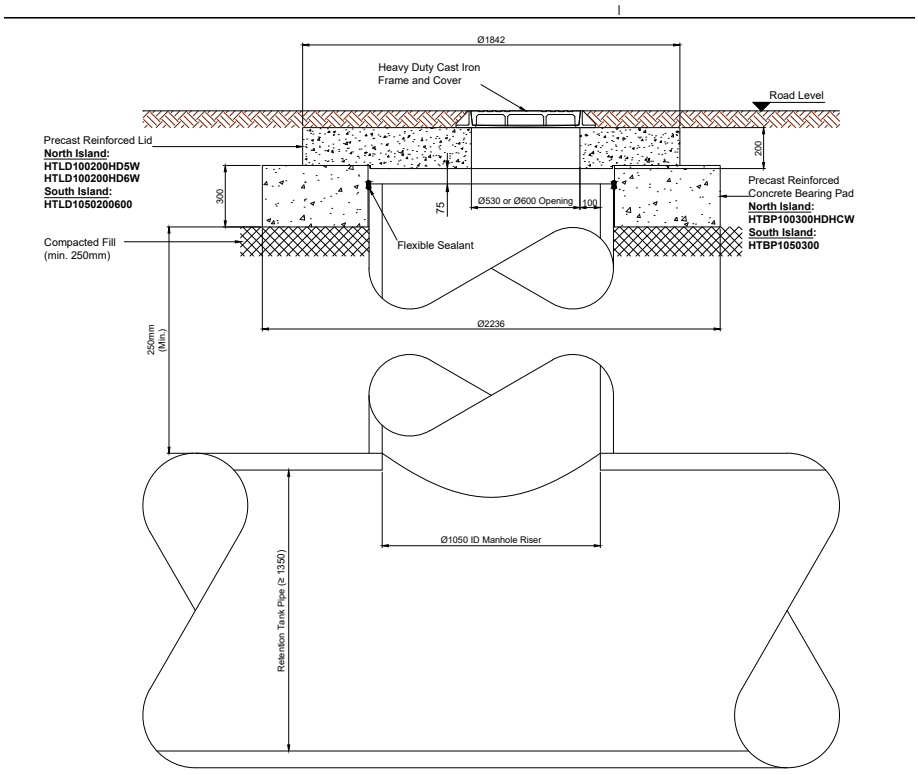

FIG. 3 Recommended detail on roadway installation

Flange base type

The Hynds flange base concrete retention tank is a standard manhole flange base with a multi-level outlet. It is designed as an alternative option to the BSJ/IWJ pipe. This flange base retention has lower storage volume efficiency compared to the BSJ/IWJ tank, but it has a smaller footprint, minimises the risk of structural failure, requires no extra components such as bearing pads or isolation lids, and offers ease of maintenance.

TABLE 2 **Flange base retention tank**

Nominal Diameter (mm)	**Nominal Height** (mm)	**Internal Height** (mm)	**External Height** (mm)	**Wall Thickness** (mm)	**Base Thickness** (mm)	**FB Capacity** (m3)	**Mass** (kg)	**Swiftlift Lifting Clutch Size** (tonne)
1050	1200	1200	1360.5	68	150	1.039	1361	1.3
	1500	1500	1660.5	68	150	1.299	1544	1.3
	1800	1800	1960.5	68	150	1.559	1725	1.3
	2100	2100	2260.5	68	150	1.818	1908	1.3
	2400	2400	2560.5	68	150	2.078	2091	1.3
1200	1200	1200	1360.5	70	150	1.357	1625	2.5
	1500	1500	1660.5	70	150	1.696	1839	2.5
	1800	1800	1960.5	70	150	2.036	2053	2.5
	2100	2100	2260.5	70	150	2.375	2267	2.5
	2400	2400	2560.5	70	150	2.714	2482	2.5
1350	1200	1050	1260.5	76	200	1.503	2338	2.5
	1500	1350	1560.5	76	200	1.932	2600	2.5
	1800	1650	1860.5	76	200	2.362	2860	2.5
	2100	1950	2160.5	76	200	2.791	3120	2.5
	2400	2250	2460.5	76	200	3.221	3380	2.5
1500	1200	1200	1375	76.5	175	1.850	2450	5
	1500	1500	1675	76.5	175	2.380	2752	5
	1800	1800	1975	76.5	175	2.910	3030	5
	2100	2100	2275	76.5	175	3.441	3307	5
	2400	2400	2575	76.5	175	3.971	3609	5
1800	1200	1200	1375	89	200	2.664	3374	5
	1500	1500	1675	89	200	3.428	3777	5
	1800	1800	1975	89	200	4.191	4180	5
	2100	2100	2275	89	200	4.955	4583	5
	2400	2400	2575	89	200	5.718	4986	5
2020	1200	1050	1260.5	102	200	3.365	4650	10
	1500	1350	1560.5	102	200	4.326	5176	10
	1800	1650	1860.5	102	200	5.288	5702	10
	2100	1950	2160.5	102	200	6.249	6228	10
	2400	2250	2460.5	102	200	7.211	6754	10
2550	1500	1350	1550	150	200	6.895	8908	10
	1900	1750	1950	150	200	8.937	10204	10
	2000	1850	2050	150	200	9.448	10528	10
	2400	2250	2450	150	200	11.491	11824	10

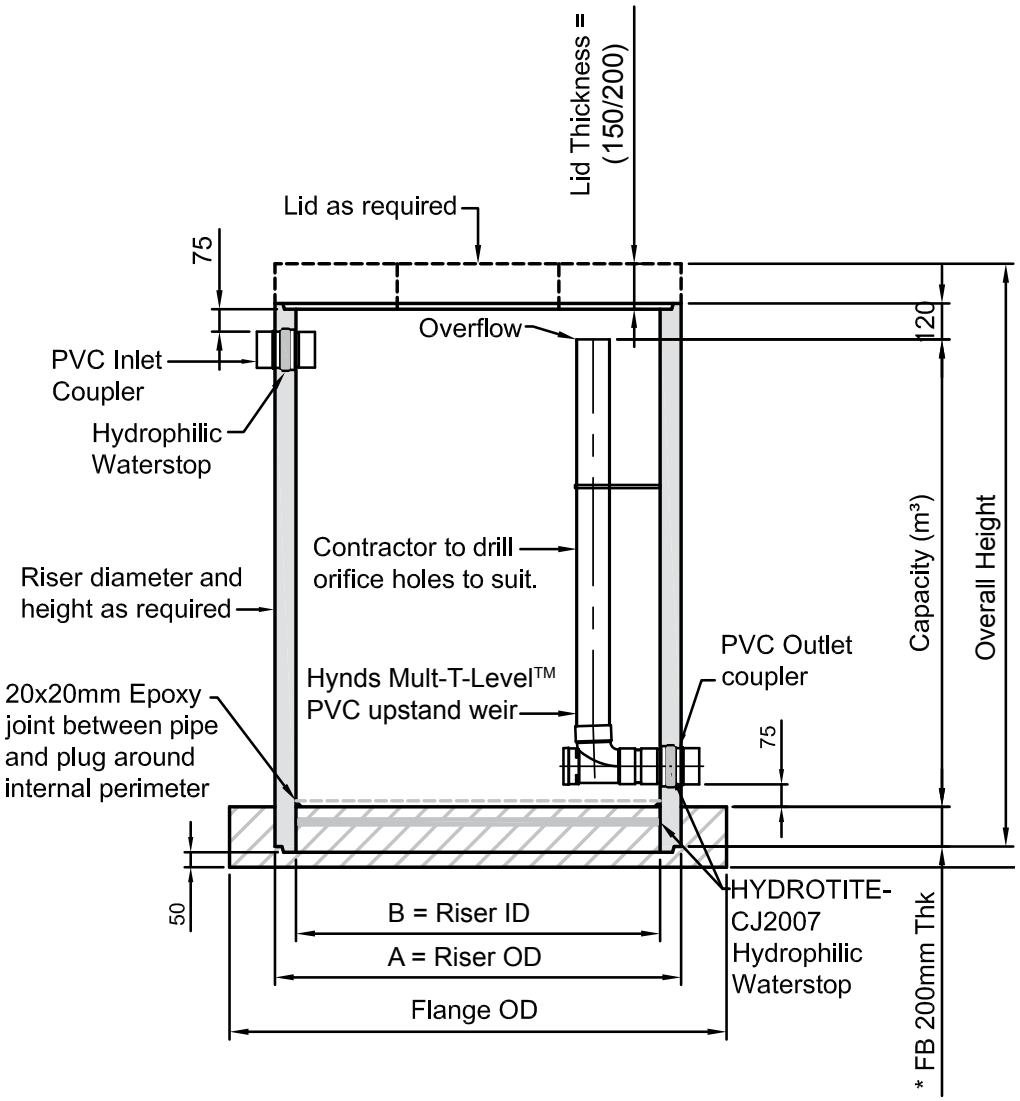

FIG. 4 General drawing of FB type retention tank

Installation

Mul-T-Level™ outlet

- Installation is simple and normally carried out by a drain layer using the same equipment and procedures as for the installation of concrete pipelines, or manholes.

BSJ / IWJ Retention Tank

- Similar installation to reinforced concrete rubber ring jointed pipes (including bedding requirements) and are dependent on site conditions and loading.
- Once the pipe sections have been installed and backfilled, the additional access risers are epoxied to the starter risers and brought up to the finished levels.
- The installation is then completed by fitting the required lids.
- The contractor must then drill the orifice holes at the required design levels.

Note: *Refer to Figure 1 for a general layout of a typical BSJ/IWJ type tank.*

BSJ/IWJ Retention Tank – Roadway Installation

- To minimise the effects of traffic, isolation of the manhole lid and bearing pad from the access riser is recommended.
- The depth of the modified flange base and riser must be kept to a minimum to enable maximum distribution of load above the tank.
- Refer to Figure 5 for 3 point lift of typical plugged end pipe.

FB Retention Tank

- Similar installation to concrete manholes.
- Foundations should be prepared with compacted hardfill to prevent excessive settlement.
- Once the FB tank is backfilled, the installation is completed by fitting the relevant concrete lid with the appropriate cast iron frame.
- The depth of the modified flange base and riser must be kept to a minimum to eable maximum distribution of load above the tank.

FIG. 6 Point lift of typical plugged and pipe

Lifting and Handling

All Hynds Retention Tank with Mul-T-Level™ Outlets incorporate Swiftlift lifting anchors for safe lifting and must be used with the correct lifting clutch.

Hynds Pipe Systems has designed and manufactured Hynds Retention Tank with Mul-T-Level™ Outlet with a minimum dynamic factor of 1.2. This dynamic factor requires that all the following conditions are observed when lifting, moving or placing the pipes:

1. Lifting with mobile plant *(such as an excavator or similar)* where equipment is specifically exempt from the requirements of the PECPR Regulations 1999, subject to the conditions outlined in the New Zealand Gazette, No. 104, September 2015 and
2. Lifting, travelling and placing over rough or uneven ground where anchor failure is not anticipated to cause harm or injury, by adopting procedures such as:
   a. Transporting the element as close as practical to ground level (300mm recommended)
   b. Establishing and maintaining exclusion zones
   c. Transporting only precast concrete elements that are unlikely to topple if they were to hit the ground
   d. Inspecting lifting anchors both after transportation and before final lifting into place
3. Hynds uses both Reids and Ancon lifting anchors which are both designed to *(Haeussler)* specifications and as such are compatible with Reid, Deha or Ancon anchors, clutches, and recess formers of the same load range.

Refer to "Safe work with precast concrete - Handling, transportation and erection of precast concrete elements" published by Worksafe New Zealand (October 2018)

Shock loads resulting from travelling with suspended retention tanks over rough terrain and uneven ground may exceed design, dynamic and safety factors of the lifting systems. It is essential that care is taken during lifting and transporting as additional stresses could result in anchor failure.

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