

HUMES

Stormwater



Sewer



Fig 1 – Manhole general arrangement

Concrete VT Manhole 1050

September 2024

PRODUCT BENEFITS

Strong and Durable	HN-HO-72 Design loading
	100-year design life
Modern Technology	Reduced Manhole lid weight
	High resistance to infiltration & leaking

APPROVAL/STANDARDS

NZS 4058: 1997 "Precast Concrete Pipes"

NZS 3109: 1997 "Concrete Construction"

NZS 3114: 1987 "Surface Finishes"

NZS 3101: Part 1: 2006 "Concrete Structures Standard"

QUALITY

ISO 9001: 2015 "Quality Management Standards"

Quality Designed to
100 Years Service Life

0800 502 112 | WWW.HUMES.CO.NZ



Humes Concrete VT manholes are designed to meet **HN-HO-72** loading requirements for an extensive range of applications.

Applications:

- Stormwater (SW) Manholes
- Wastewater (WW) Manholes
- Pipeline Junction
- Pipeline Re-direction
- Catchment Inlet Access Structure

Extensively used throughout New Zealand, strong, durable, capable of withstanding infiltration and attack from corrosive environments.

Design Specifications & Considerations

When selecting components for a manhole system, it's important to consider several factors: applications (SW, WW, Marine, etc.), diameter, height, riser and lid strength, connections, installation requirements, and accessory options. The Local Council Authority guidance should be followed to determine regional requirements for manhole construction. If regional guidance is not available, refer to the Concrete Pipe Association of Australasia (CPAA) *Guidance Note (NZ) – Loads on Circular Precast Concrete Manholes and Access Chambers* for guidance.

Manhole Bedding Preparation

The bedding shall be a uniform, pre-prepared layer of suitable granular material placed on natural, firm ground. For the base, the safe bearing capacity (SBC) should be a minimum of 100 kPa for manhole depths less than 5m, and 150 kPa for manhole depths in excess of 5m. Ensure the bedding base is levelled and compacted beneath the manhole walls and extends at least 150 mm on each side of the wall centreline. This provides uniform support and prevents the formation of a central high spot.

Humes Concrete Manhole Riser

Humes standard Manhole Risers meet Watercare Wastewater Manhole requirements and has allowed 25mm sacrificial layer on the internal walls. Other Supplementary Cementitious Materials (SCMs) or liner options are available as custom product options for specific project requirements.

Fig 2 – Concrete Manhole Riser



Table 1 – Concrete Manhole Riser

INTERNAL DIAMETER (mm)	EFFECTIVE INTERNAL HEIGHT (mm)	OVERALL HEIGHT (mm)	EXTERNAL DIAMETER (mm)	WALL THICKNESS (mm)	MASS (kg)	LIFTING PIN (Tonne)	HUMES ITEM CODE	REGION
1050	300	320	1190	70	182	1.3 (x2)	80113312	North
	600	620	1190	70	366	1.3 (x2)	80113313	North
	900	920	1190	70	551	1.3 (x2)	80113314	North
	1200	1220	1190	70	735	1.3 (x2)	80113315	North
	1500	1520	1190	70	919	1.3 (x2)	80113316	North
	1800	1820	1190	70	1104	1.3 (x2)	80113317	North
	2100	2120	1190	70	1288	1.3 (x2)	80113318	North
	2400	2420	1190	70	1473	1.3 (x2)	80113319	North

Humes Concrete Manhole Riser on Base

Humes manholes have a flange base with a 150mm wide external foot to provide anti-floatation resistance. Humes flanged bases are manufactured in a 2-stage process. Benching is completed on site by installers



Fig 3 – Concrete Manhole Riser on Base

Table 2 – Concrete Manhole Riser on Base

INTERNAL DIAMETER (mm)	EFFECTIVE INTERNAL HEIGHT (mm)	OVERALL HEIGHT (mm)	EXTERNAL BASE DIAMETER (mm)	FLANGED BASE WIDTH (mm)	BASE THICKNESS (mm)	WALL THICKNESS (mm)	MASS (kg)	LIFTING PIN (Tonne)	HUMES ITEM CODE	REGION
1050	495	705	1490	150	190	70	1136	1.3 (x2)	80129681	North
	795	1005	1490	150	190	70	1320	1.3 (x2)	80129682	North
	1095	1305	1490	150	190	70	1505	1.3 (x2)	80129683	North
	1395	1605	1490	150	190	70	1689	1.3 (x2)	80129684	North
	1695	1905	1490	150	190	70	1874	1.3 (x2)	80129685	North
	1995	2205	1490	150	190	70	2058	1.3 (x2)	80129686	North
	2295	2505	1490	150	190	70	2242	1.3 (x2)	80129687	North

Humes Concrete Manhole Lids

Humes Manhole lids are designed and manufactured in accordance with New Zealand Transport Agency (NZTA) Bridge Manual, NZS 3101, NZS 3109 and CPAA Guidelines. Humes manhole lids are only 150mm thick for HN-HO-72 loading. 175mm thick lids are available for Watercare application. Humes manhole lids are standard with a 610mm opening and offset for ease of access to safety steps. 540mm openings and centrally located options are available as made to order items.

Fig 4 – Concrete Manhole Lid



Table 3 – Concrete Manhole Lid Load Class

LOAD TYPE	DESCRIPTION	LOAD RATING (KN)
LD20	Lightly Trafficked Areas – Light vehicles only	20kN Wheel Load
HD60	Residential and Secondary Roads – Bridge manual rating not required	60kN Wheel Load
HN-HO-72	Bridge Manual Loading – Major road and state highways	60–120kN Wheel Load

Table 4 – Concrete Manhole Lids

NORMAL LID DIAMETER (mm)	OUTSIDE DIAMETER (mm)	OPENING SIZE (mm)	LID THICKNESS (mm)	LID LOAD CLASS	MASS (kg)	EXPOSURE	LIFTING PIN (Tonne)	HUMES ITEM CODE	REGION
1050	1270	610	150	HN-HO-72	358	Normal	1.3 (x2)	80113342	North
	1270	610	175	HN-HO-72	418	Watercare	1.3 (x2)	80113344	North

MANHOLE JOINT – UNIVERSAL

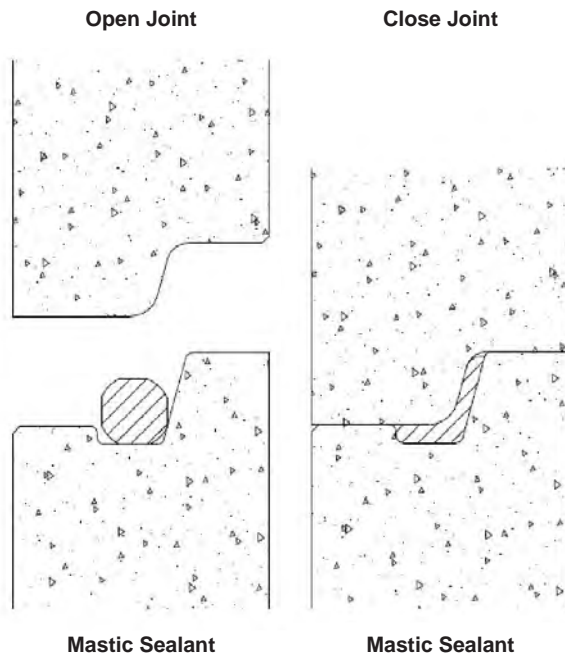
Riser to lid joint connection: Preformed grey sealant strips based on high molecular weight cross linked butyl rubber. This product has a moderate amount of surface tack and deforms readily under moderate loading.

To ensure a watertight seal, do not stretch the strip to fit the joint diameter.

Riser to riser joint connections: Self-adhering black butyl mastic extruded into a ready to use tape form for non-structural permanent, weather-tight sealing of concrete surfaces. Adheres immediately, does not shrink and is unaffected by prolonged climate exposure.

For instructions on use, please refer to the seal manufacturer's instructions.

Fig 5 – Universal Joint



MANHOLE STEPS

Standard step rungs are mild steel hot dipped galvanised units, 20mm diameter, 230mm width and 150mm depth; of plain or stepped (safety) type. Step rungs are supplied complete with nuts and steel and rubber washers.

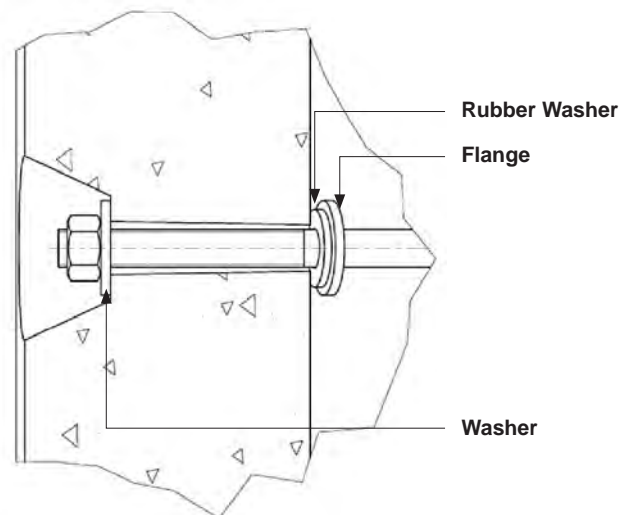
Provision is made in riser sections for step rungs to be fitted at 300mm intervals. Stainless steel and plastic-coated step rungs are available, as are various types of ladders.

Post installation, all step rungs to have the external recessed pocket and any exposed step thread covered with Humebond epoxy mortar, ensuring a maximum watertight seal.

Fig 6 – Step



Fig 7 – Step connection



Manhole Installation

A manhole structure may be constructed as follows:

1. Consider site-specific health and safety requirements (check that the base riser module does not contain water or any other items that may increase the weight of the unit).
2. Install steps into riser components if required.
3. Prepare the lateral connection holes.
4. Use a spreader beam and appropriate lifting equipment to lower the flange base unit into position.
5. Apply the appropriate joint seal continuously around the joint circumference.
6. Use a spreader beam and appropriate lifting equipment to place the next riser section. If multiple riser sections are required, the appropriate joint seal must be applied to the top of each lower riser.
7. Make and seal all lateral connections as needed.
8. Bench invert as required.
9. Place and seal the manhole lid.
10. Place and mortar seal the cover set adjustment rings to the required level.
11. Position the access frame and cover.

Lifting and Handling Requirements

All Humes manhole lids, risers and flanged bases incorporate Swiftlift lifting anchors for safe lifting and must be used with the correct lifting clutch.

Refer to “*Safe work with precast concrete - handling, transportation and erection of precast concrete elements*” published by Worksafe New Zealand (October 2018) for detail.

Use a spreader beam between two chains to protect the top edge of the manhole riser from damage. Ensure that the angle between the chains does **not** exceed 60 degrees.

Humes Pipe Systems has designed and manufactured Humes Concrete Manholes 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 manholes;

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.
 - 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

Shock loads caused by transporting suspended risers or flanged bases over rough or uneven terrain may exceed the designed dynamic load capacity of lifting systems. To prevent anchor failure, handling lifting and transportation with care is crucial to avoid additional stress.

Lifting and Handling Requirements cont.

**THE LONGER THE SLINGS,
THE LOWER THE LOAD ON ANCHORS.**

For example, at an included angle of 170° the load on each sling is six times the weight of the actual load being lifted.

Fig 8 – Sling Angles

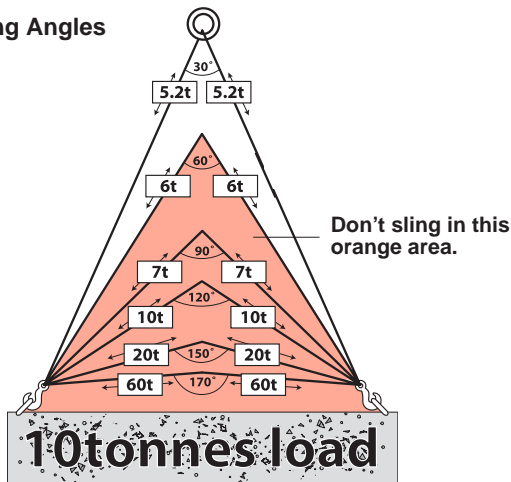
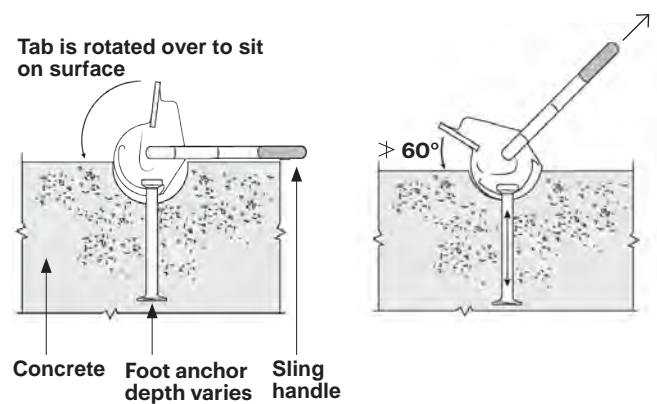


Fig 11 – Swiftlift clutch operation



NB – Never make sling length shorter than the distance between two anchors.

Fig 9 – Riser on base

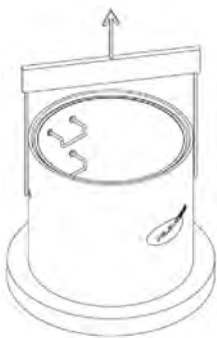
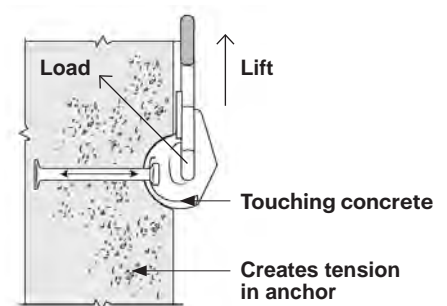


Fig 10 – Manhole Lid



Refer to Humes Streetware guide for certified access covers and grates.

**For further technical details or advice freephone
0800 502 112 or visit www.humes.co.nz**

Buyers and users of the products described in this brochure must make their own assessment of the suitability and appropriateness of the products for their particular use and the conditions in which they will be used. All queries regarding product suitability, purpose or installation should be directed to the nearest Humes Sales Centre for service and assistance. Fletcher Concrete and Infrastructure Limited.