

# Access chambers and maintenance shafts

Issue 1



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# Access chambers (worker-entry)

Humes provides a range of precast concrete sewer access chambers suitable for depths up to 9 meters, in accordance with AS 4198-1994 Precast Concrete Access Chambers for Sewerage Applications.

Access chambers or manholes are vertical shafts that connect sewage transfer pipes to the surface to allow worker-entry. Humes manufacture complete access chamber structures to satisfy various local water codes, practices and physical site conditions.

To address the issue of groundwater ingress a wedge ring jointing system which provides a flexible watertight joint is available.

Humes offer a range of precast access chambers, with nominal sizes ranging from DN1050 to DN3600. In addition, a range of components are available to complete the access chamber structure for almost any application.



Left:  
Access chamber  
structure ready for  
backfilling

Below:  
1,100 mm precast  
base with factory  
benching

## Applications

Humes' access chambers are ideal for the following applications:

- New residential and commercial developments.
- Joining into existing sewer lines.
- Sewer infill projects within established urban areas where speed is of the essence to reduce disruption to residents.
- Vacuum collection and isolation chambers.
- Air valve and scour pits, as well as overflow and discharge chambers.
- Inspection and maintenance.



## Benefits

- Being precast, the need to pour concrete on site is eliminated. This not only reduces the total number of activities on site, but eliminates the in-situ base, which can be a major cause of water infiltration within sewer reticulation systems, if poor construction practices are used.
- One crew can lay the pipe and the access chambers. This improves labour and machinery efficiencies on site, while improving installation time and project costs.
- Backfilling the chambers can be coincidental with the pipeline backfilling. This eliminates delayed backfilling at access chambers, significantly reducing the time that trenches are left open, which improves safety and reduces risk.
- Given a stable soil foundation, bases require minimal bed preparation and are simple to place, which reduces dependence on specialist skills on site.
- HumeSeal® couplings make connecting pipes to the base quick, flexible, watertight and reliable (refer to page 5).
- Components can be supplied with Humes' jointing system that is specific to the local market (refer to page 6).
- Cored holes and precast benching can be placed at any angle making the system capable of accommodating all inlet configurations.
- Orders are usually supplied within three working days of receiving drawings. This just-in-time manufacturing process allows late changes in design.
- The installer is provided with a chamber-by-chamber component breakdown of the project.

# Design information

## Components (refer to Figure 1 on page 4)

### Precast base

The precast base is the foundation for Humes' watertight impermeable access chambers. Bases come in various configurations and are available with factory benched channels to suit specific site pipe geometry. Plain bases are available where site benching is preferred.

The Supabowl® conical base which has an internal surface in the shape of an inverted cone is another option (refer to page 5 for further information).

### Shaft

The chamber sections are manufactured in a standard range of heights. Shaft sections are generally selected in maximum individual heights to minimise handling and jointing on site. The most common diameter used for reticulation sewer works is 1,100 mm however, chamber diameters vary with local geographic requirements.

### Taper top (option one)

Where access chambers are greater than 1,200 mm in depth the taper top provides a vertical wall that corresponds to the chamber wall. The taper top may be supplied with step irons which continue to the chamber step irons to form access to the structure.

Ladders may be used in lieu of step irons where approved by local authorities. The taper top is configured with a wedge joint where applicable, for other joint options see page 6.

### Squat top (option two)

With an effective height of 300 mm, this is a concentric tapered cone and provides entry to access chambers which are shallow and do not require ladders or step irons. They are generally used in applications less than 1,200 mm in depth where approved by the water authority. The squat top is configured with a wedge joint where applicable, for other joint options see page 6.

### Converter slab (option three)

This slab converts the diameter of the chamber (e.g. 1,100 mm) down to the dimensions which will coincide with the surface cover and surround (e.g. 600 mm) or make up rings. It may be used in place of the squat top or taper top when additional headroom is required. The converter slab is configured with a wedge joint where applicable, for other joint options see page 6.

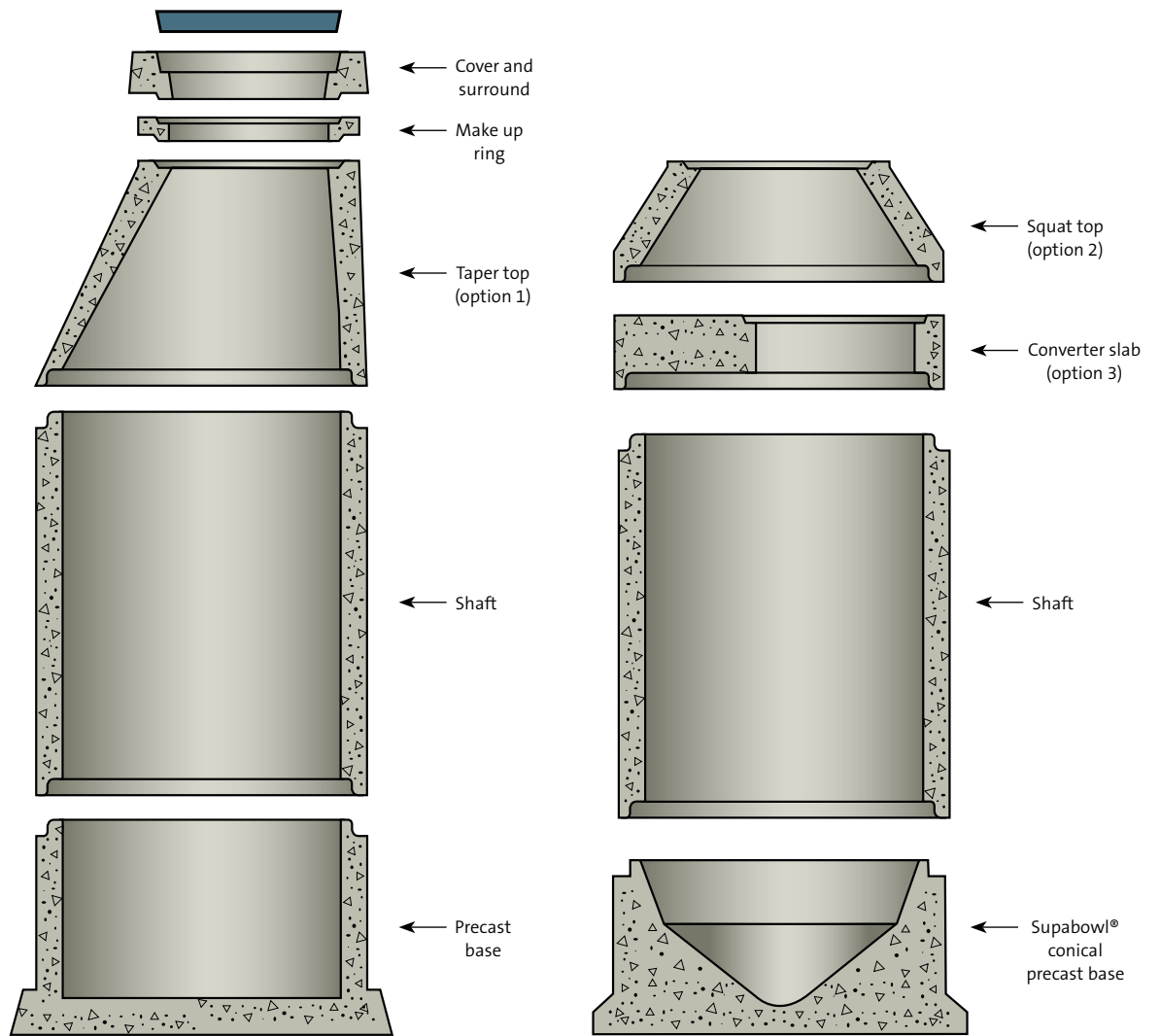
### Make up rings

The make up rings facilitate the construction of the top of the structure (refer to Figure 1 on page 4) relative to the finished surface level and are available in 100, 150 and 200 mm thicknesses. They may be joined with an elastomeric seal or epoxy.

### Cover and surround

The tops of the cover and surround are flush with, or just above, the finished surface level and are manufactured from cast iron, concrete infill cast iron, ductile iron or concrete, dependent on water authority policy. In general, they have a gas-tight seal and feature specific load ratings.

Figure 1 – Access chamber components



## The Supabowl® conical precast base

The Supabowl® conical precast base has an internal surface in the shape of an inverted cone. The point of the cone is semi-spherical and acts as a node where incoming flows are concentrated prior to draining through a preformed outlet. Inlets are cored in the factory to suit site line and levels.

Extensive laboratory testing has shown that this type of base has the same hydraulic efficiency as traditional channel benched bases while displaying superior self-cleansing under surcharge conditions. The unique design concept eliminates the need for a separate benching process and greatly improves supply lead times.



Top:  
The Supabowl®  
conical precast base

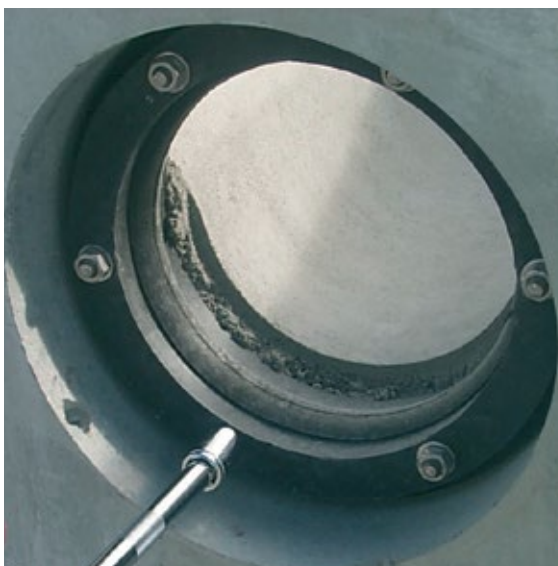
Bottom:  
HumeSeal®  
watertight coupling

## HumeSeal® watertight coupling

The HumeSeal® coupling is a mechanical coupling designed for fast, efficient and watertight joining of UPVC pipe, DN100 - DN225, into precast concrete or in-situ structures.

It has been extensively tested and performs well above specification requirements for pressure, angular deflection and lateral loads. The HumeSeal® coupling will accommodate a 90 kPa pressure differential and remain watertight with up to 17 degrees of angular deflection.

It is constructed to AS 1646 from natural rubber, glass filled nylon, and 316 stainless steel bolts and nuts, for compression of the coupling.



## Joint types

Various joint configurations are available to meet local requirements and conditions.

### Wedge joint

The wedge joint is the leading watertight joint recommended for zero infiltration in all ground conditions (refer to Figure 2). It is an elastomeric seal, created by a skid ring captivated on the spigot end of the chamber.

Generally, sections will join under their own weight. The wedge joint can withstand groundwater pressure of 90 kPa with a joint deflection of up to 6 mm.

### Epoxy joint

Humes has specialist formulations of epoxy resins which are applied to both spigot and socket before joining. Self-weight is sufficient to apply the requisite jointing pressure. The key issue to ensure a watertight seal is to apply the epoxy for a full 360 degrees on spigot and socket (refer to Figure 3).

Epoxy joint access chambers are structurally monolithic with 360 degrees of epoxy application but offer limited structural flexibility.

### Mastic joint

This joint sealant is used in nominated areas and must be applied in accordance with the instructions, including the application of a primer (refer to Figure 4).

Mastic joints are rated as water resistant and cannot withstand differential soil movements. They are suitable in homogeneous sandy soils of uniform moisture. Humes does not recommend the use of mastic joints in clay soil, particularly in saturated conditions.

Figure 2 – Wedge joint

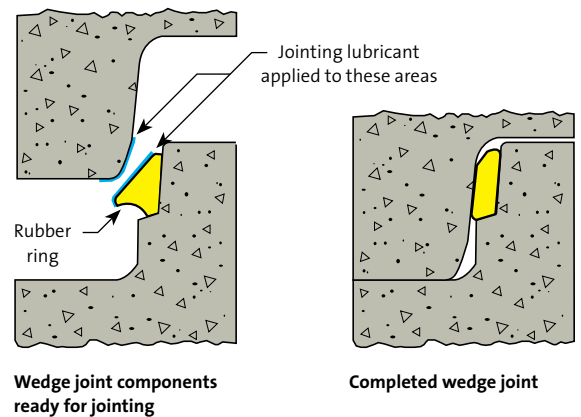


Figure 3 – Epoxy joint

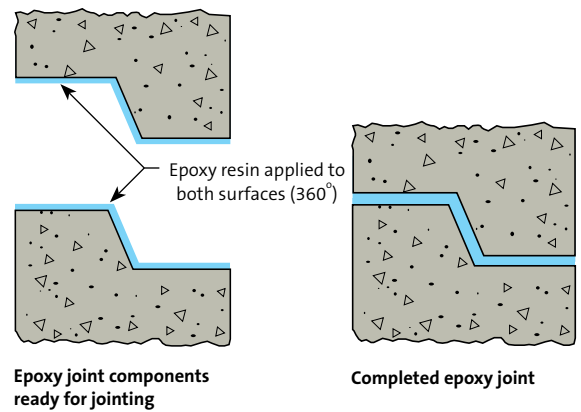
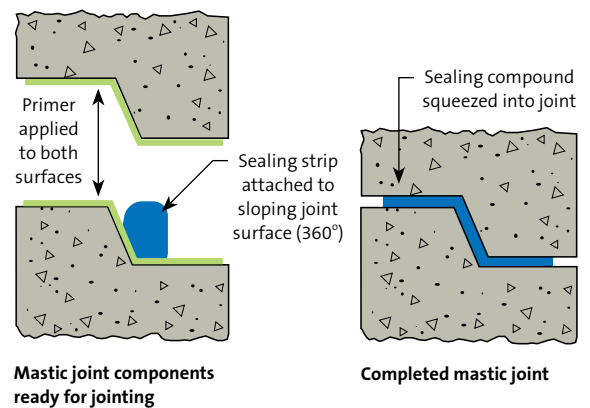


Figure 4 – Mastic joint





# Maintenance shafts (non worker-entry)

## The QuickTee® system

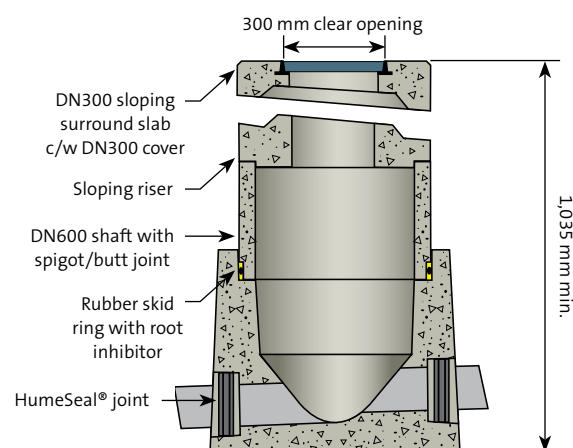
The QuickTee® maintenance shaft is a DN600 vertical shaft for non worker-entry to the sewerage system to introduce inspection (CCTV) and maintenance equipment. The shaft is a complete system offering:

- effective heights from 1 m to 5.5 m (refer to Figures 5 and 6)
- a robust design for fast installation using ordinary backfill material and techniques
- the ability to accommodate traffic loadings and construction in roadways
- inline storage in the event of system surcharge
- high quality, high strength precast concrete for maximum service life
- an innovative base design to ensure efficient hydraulic performance
- a small site footprint for installation in areas congested with other services
- precisely engineered HumeSeal® joints for watertight performance.

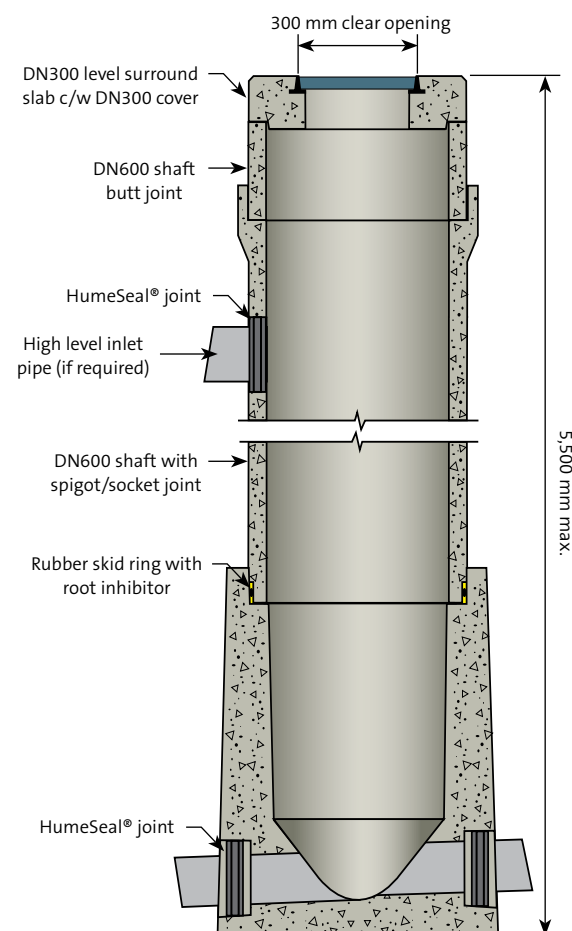


Left: QuickTee® maintenance shaft base unit

**Figure 5 – Shallow installation - 500 mm base**



**Figure 6 – Deep installation - 900 mm base**



# Precast solutions

Top:  
Rubber ring jointed  
pressure pipes

Middle:  
HDPE lined pipes

Bottom:  
Segmental shaft

## Stormwater solutions

Stormwater drainage  
Stormwater treatment  
Detention and infiltration  
Harvesting and reuse

## Sewage transfer and storage solutions

Sewage transfer  
Corrosion protection for sewage system components  
Storage, overflow and pump stations  
Inspection and maintenance

## Bridge and platform solutions

Traffic bridges  
Pedestrian crossings  
Wharf structures

## Tunnel and shaft solutions

Access, pipe jacking and ventilation shafts  
Mine portals and reclaim tunnels  
Traffic and utility tunnels  
Escape tunnels and shafts

## Walling solutions

Earth retaining walls  
Wall panels

## Potable water supply solutions

## Traffic management solutions

## Cable and power management solutions

## Rail solutions



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