



# MC<sup>c</sup> Easi-Cast

## FP M<sup>c</sup>Cann

# Caisson Units

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## FP M<sup>c</sup>Cann Caisson Units

FP McCann manufactures a range of reinforcing units suitable for sinking by the caisson method. Caisson shaft units can be supplied with diameters of 2100mm up to 4000mm. Caissons are manufactured in accordance with the requirements of BS EN 1916:2002, and have Kitemark certification where relevant to the scope of BS5911-3:2002 (2100mm – 3000mm diameters). However 3600mm and 4000mm diameters remain operative within the scope of the ISO9001:2000 accredited Quality Management System.

Open caisson-sinking techniques permit a shaft structure to be progressively sunk, either under its own weight or with the aid of caisson jacks, in a controlled manner from the surface to a predetermined depth. Caisson shafts are constructed using a metal cutter ring and base section with rings being added on top as excavation proceeds. The technique is suited to shaft construction through weak soils, high-plasticity clays, silts, sands and gravels; particularly below the water table.

### FP McCann Caisson Range

Caissons Shafts DN	Available Depths (mm)			Barrel DN	Wall Thickness	Lifting Hole
	mm	1000	750			
2100	√	√	√	2350	125	3 No. RD24 Wavy Tail Inserts
2400	√	√	√	2680	140	3 No. RD24 Wavy Tail Inserts
2700	√	√	√	3000	150	3 No. RD30 Wavy Tail Inserts
3000	√	√	√	3360	180	3 No. RD30 Wavy Tail Inserts
3600	√	√	√	3970	185	3 No. RD30 Wavy Tail Inserts
4000*	√	√	X	4400	200	6 No. RD36 Wavy Tail Inserts

\*DN4000 supplied as a two piece unit.

### Caisson Rings – Table of Weights (DN 2100-4000)

Caissons Shafts DN	Cutting Shoe Weight (Kg)		Approx. Weight p/meter Caisson (with cutting shoe) (Kg)**		Approx. Weight p/meter Caisson (without cutting shoe)**
	10mm	20mm	10mm	20mm	
2100	320	581	2590	2851	2270
2400	378	635	3278	3535	2900
2700	441	794	3931	4284	3490
3000	529	953	5209	5633	4680
3600	641	1148	6061	6568	5420
4000*	725	1298	7585	8158	6860

\* DN4000 supplied as a two piece unit.

\*\* Nominal weights increase by 5% for sizing lifting equipment and reduce by 5% for floatation design.

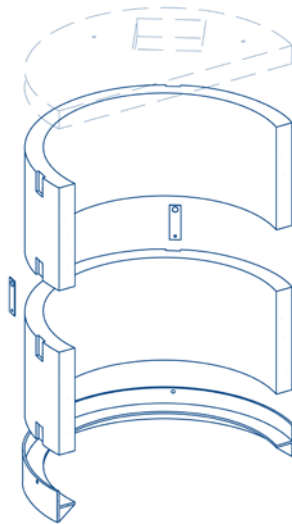
Base units may be fitted with a light duty (10mm) or a medium duty (20mm) cutting shoe.

# Building Manual - One Piece

**Building Manual for FP McCann One Piece Caisson Units**  
(To be read in conjunction with the Caisson Unit Safety Data Sheet)

Caisson ring types provided by FP McCann:

1. One piece standard units, sizes, 2.100m, 2.400m, 2.700m, 3.000m, 3.600m internal diameter units. Units depths available 1.000m, 0.750m and 0.500m.
  2. Special Base fitted with a light or medium duty steel cutting shoe \*.
- \* heavy duty cutting shoe made to order



## Unit Handling

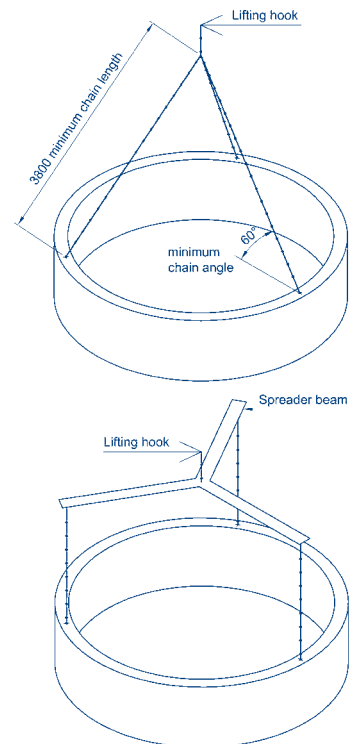
### 1. Lifting

All units are lifted using 3 number threaded lifting loops\*\* which locate into threaded lifting sockets, cast into the segments, all of which must be used. The chain angle should not be less than 60 degrees to the horizontal. Refer to diagram below for explanation of minimum chain angle. Alternatively a spreader beam may be used. The Safety Data Sheet provides the relevant information with regard to unit weights and chain lengths.

\*\* All lifting loop devices are proof loaded before dispatch and labelled with a unique code number. If reused the lifting loop manufacturer's details must be referred to for instruction on inspection and testing.

### 2. Storage / Stacking

Units are stacked vertically. The first unit should be placed on two timber bearers on even and firm ground. Subsequent units, placed on top, should be separated with two timber bearers. Further measures will need to be taken to ensure the stacks are stable. The maximum height the units should be stacked is 2m unless otherwise instructed by the Site Engineer.



## Building Manual - One Piece

### Shaft design

The units are designed by FP McCann for handling and installation only. The overall shaft design should be undertaken by the Scheme Engineer. For advice contact FP McCann Technical Department.

### Joint seal

All rings have a tongue and groove circle joint which has been designed to incorporate a bitumen rubber compressible. The seal should be fitted on site just prior to installation.

### Building Sequence

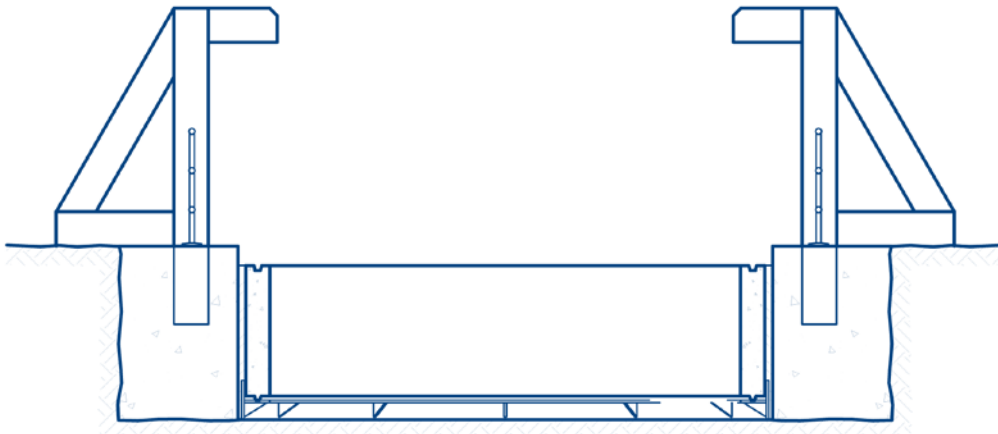
The sequence of installation described in this document is indicative only and the exact method of installation is the responsibility of the Contractor. Health and Safety measures that apply specifically to the caisson units and their fittings are indicated, other measures that apply to the shaft construction e.g. temporary guard rails to the top of the shaft, are the responsibility of the Contractor.



### Building Sequence

The shaft may be sunk using a FP McCann standard concrete ring fitted with a steel cutting edge. The installation should proceed as follows:

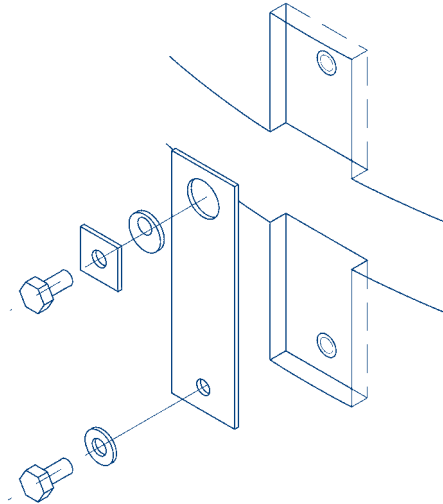
- Excavate a circular hole, typically to accommodate one or two rings and a concrete collar.
- Build the first ring (incorporating cutting edge) to correct line and level
- Wrap sheets of polystyrene or other suitable material around the external face of the unit(s) to provide an annulus between the collar and the rings, which can be filled with bentonite slurry if required.
- Pour the concrete collar. Note: The collar should be of sufficient size and strength to be capable of supporting the hydraulic rams (if required).
- Install the hydraulic rams (if required).



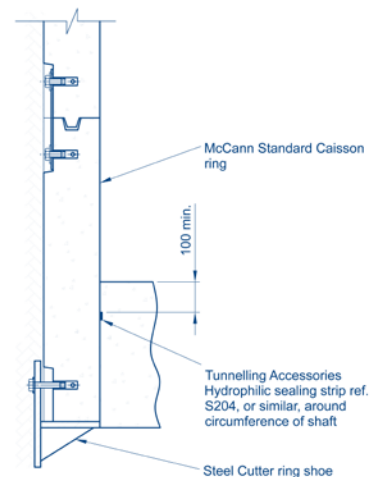
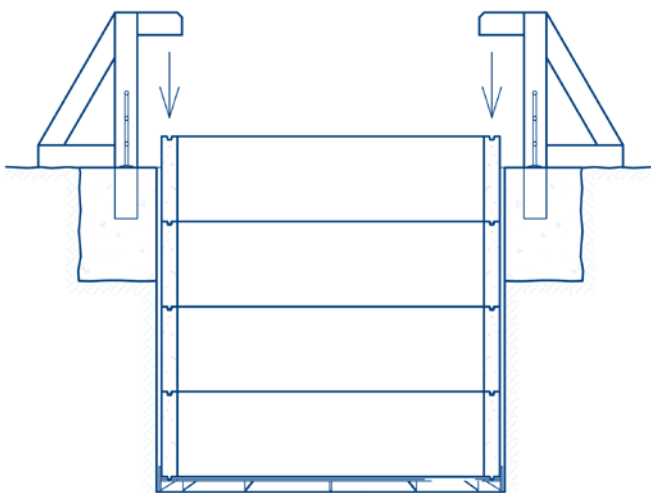
## Building Manual - One Piece

**When building the next and subsequent rings, follow the sequence as described below:**

- Fit the compressible seal and along the circle joint groove of the built ring.
- Lower the unit onto the ring built previously aligning the fixing sockets cast into the external face of each unit.
- Fix each plate with 2 no M20 bolts using the adjusting washer to correct for alignment and level. Note: 3 number plates per unit.

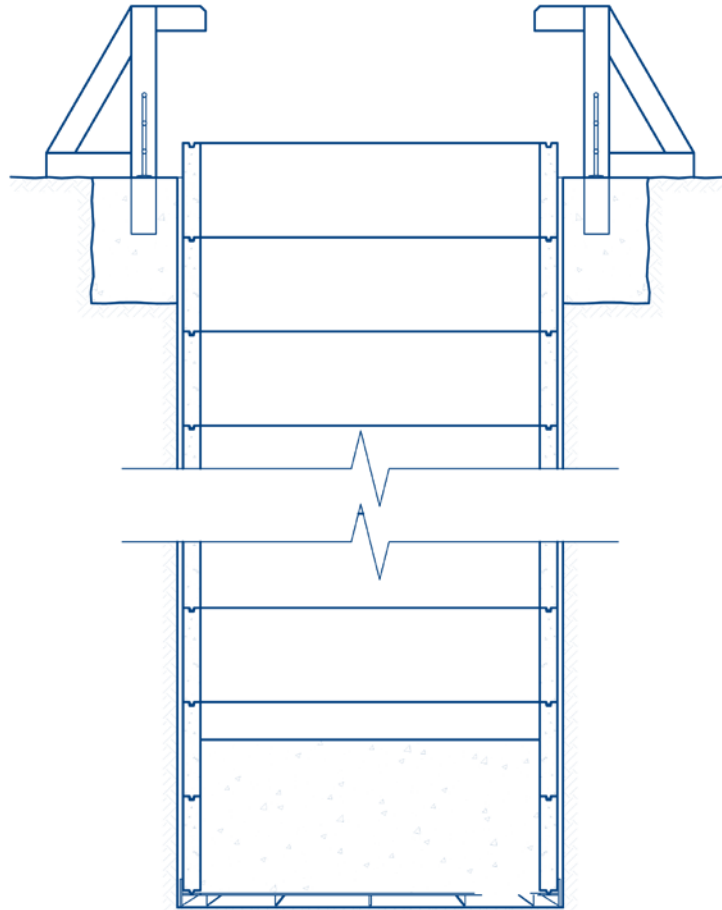


- Push the rings into the ground using the hydraulic rams or suitable kentledge spread evenly about the ring. Use bentonite slurry within the annulus around the shaft to assist sinking if required.
- Excavate the ground within the built rings. Care should be taken not over excavate to ensure that the shaft does not sink in an uncontrolled way.
- Push the rings to a depth to enable the next ring to be erected. Build the next ring as described above and repeat the process until the desired depth is achieved.
- Drill the units as required to provide holes for grouting. Grout the shaft.
- A base slab may then be cast within the bottom of the shaft. The installation of seals will be required to avoid tracking of water between the base slab and the rings. For advice contact FP McCann Technical Department.



Section through Base

## Building Manual - One Piece



### Ancillary Items

- Available from FP McCann or recommend specialist supplier

### Shaft slabs

- Pre cast cover and landing slabs.

### Shaft specialist building equipment

- Bitumen rubber circle joint seal
- Lifting loops

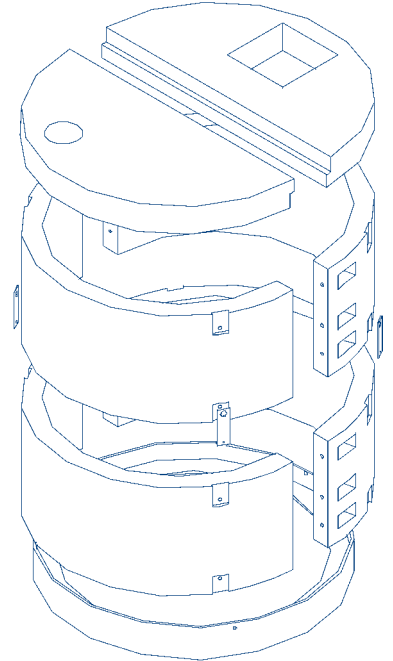
# Building Manual - Two Piece

**Building Manual for FP McCann Two Piece Caisson Units**  
(To be read in conjunction with the Caisson Unit Safety Data Sheet)

Caisson ring types provided by FP McCann:

1. Two piece standard unit size 4.000m internal diameter units. Unit depths available 1.000m and 0.750m.
2. Special bases fitted with a light or medium duty steel cutting shoe \*.

\* heavy duty cutting shoe made to order



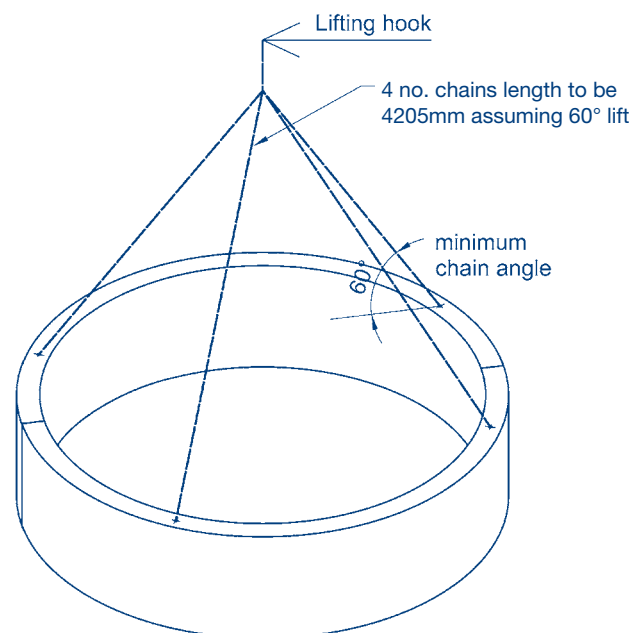
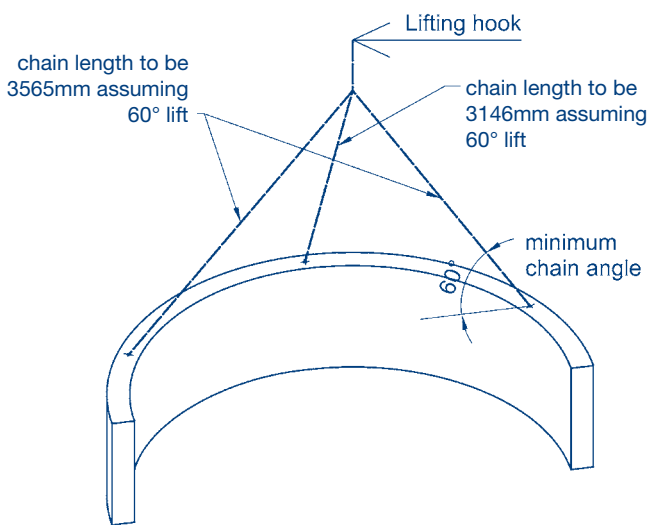
## Unit Handling

### 1. Lifting

Single units (half ring) are lifted using 3 number threaded lifting loops\*\* which locate into threaded lifting sockets, cast into the units, all of which must be used. The chain angle should not be less than 60 degrees to the horizontal. In order to lift without tilt the chain lengths will differ. Refer to diagram below for explanation of minimum chain angle and lengths. Alternatively a spreader beam may be used.

Complete units (full ring) are lifted using 4 number threaded lifting loops\*\* which locate into threaded lifting sockets cast into the units. Refer to diagram below for explanation of the location of the lifting sockets to be used. The chain angle should not be less than 60 degrees to the horizontal. Alternatively a spreader beam may be used Note: Using 3 chains will put unforeseen stresses on the concrete and may cause the concrete around the join to crack). The Safety Data Sheet provides the relevant information with regard to unit weights and chain lengths.

\*\* All lifting loop devices are proof loaded before dispatch and labelled with a unique code number. If reused the lifting loop manufacturer's details must be referred to for instruction on inspection and testing.



## Building Manual - Two Piece

### 2. Storage / Stacking

Units are stacked vertically. The first unit should be placed on two timber bearers on even and firm ground. Subsequent units, placed on top, should be separated with two timber bearers. Further measures will need to be taken to ensure the stacks are stable. The maximum height the units should be stacked is 2m unless otherwise instructed by the Site Engineer.

### Shaft design

The units are designed by FP McCann for handling and installation only. The overall shaft design should be undertaken by the Scheme Engineer. For advice contact FP McCann Technical Department.

### Joint seal

All rings have a tongue and groove circle joint which has been designed to incorporate a bitumen rubber compressible seal. The seal should be fitted on site just prior to installation.

### Building Sequence

The sequence of installation described in this document is indicative only and the exact method of installation is the responsibility of the Contractor. Health and Safety measures that apply specifically to the caisson units and their fittings are indicated, other measures that apply to the shaft construction e.g. temporary guard rails to the top of the shaft, are the responsibility of the Contractor.



**It is recommended that two piece caissons are jointed before lifting into place.**

Place the two units on a level surface, ideally on 2 no skids to reduce resistance when jointing and also to maintain a clean joint.

Place both halves side by side ensuring both are at the correct orientation i.e. with bolt holes in line with threaded sockets.

Insert the M24x200 threaded pin with the 60mm threaded side placed into the cast in sockets.

Place the butyl rubber sealant along the vertical joint on both halves of ring.

Once bolts and sealant are in position, the 2 halves of the unit must be pulled together using a ratchet system e.g. a chain block fixed to the cast in M24x80 sockets on opposite ends of the units. **(Do not use the bolting system to pull the units together as this may crack the concrete and damage the joint)**



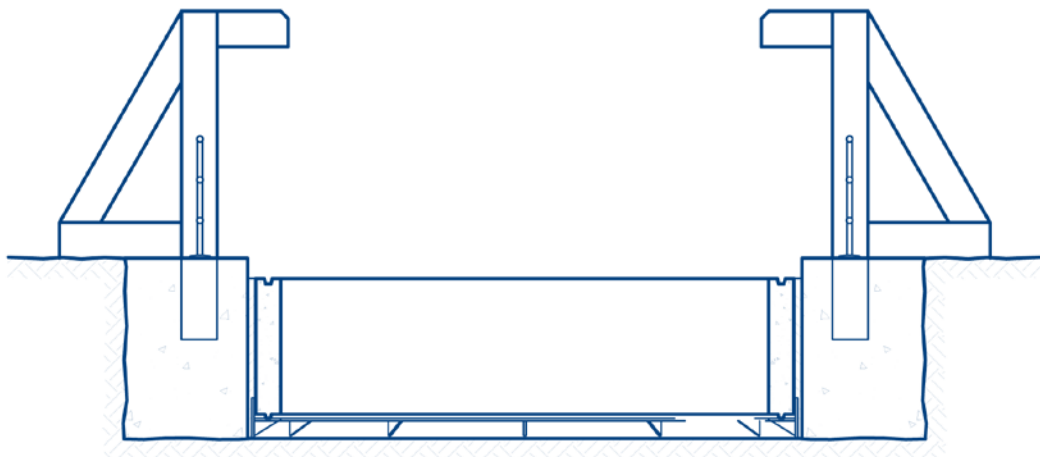
## Building Manual - Two Piece



### Building Sequence

The shaft may be sunk using a FP McCann standard concrete ring fitted with a steel cutting edge. The installation should proceed as follows:

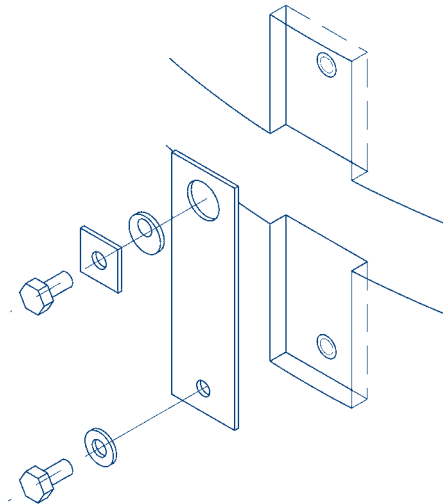
- Excavate a circular hole, typically to accommodate one or two rings and a concrete collar.
- Build the first ring (incorporating cutting edge) to correct line and level
- Wrap sheets of polystyrene or other suitable material around the external face of the unit(s) to provide an annulus between the collar and the rings, which can be filled with bentonite slurry if required.
- Pour the concrete collar. Note: The collar should be of sufficient size and strength to be capable of supporting the hydraulic rams (if required).
- Install the hydraulic rams (if required).



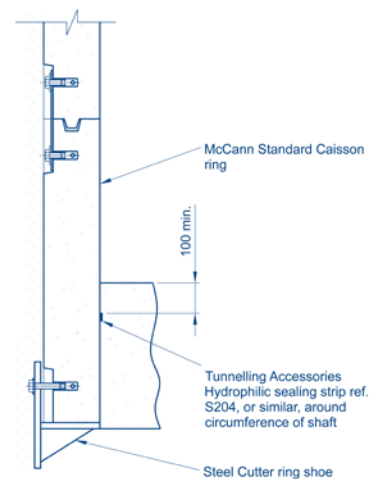
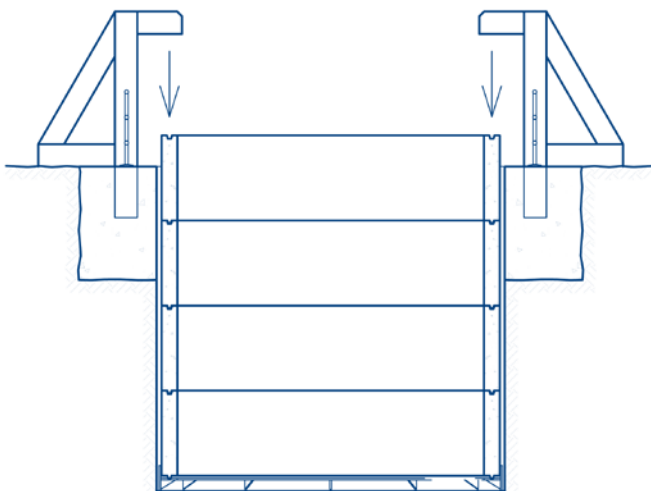
## Building Manual - Two Piece

When building the next and subsequent rings, follow the sequence as described below:

- Fit the compressible seal and along the circle joint groove of the built ring.
- Lower the unit onto the ring built previously aligning the fixing sockets cast into the external face of each unit.
- Fix each plate with 2 no M20 bolts using the adjusting washer to correct for alignment and level. Note: 4 number plates per ring.

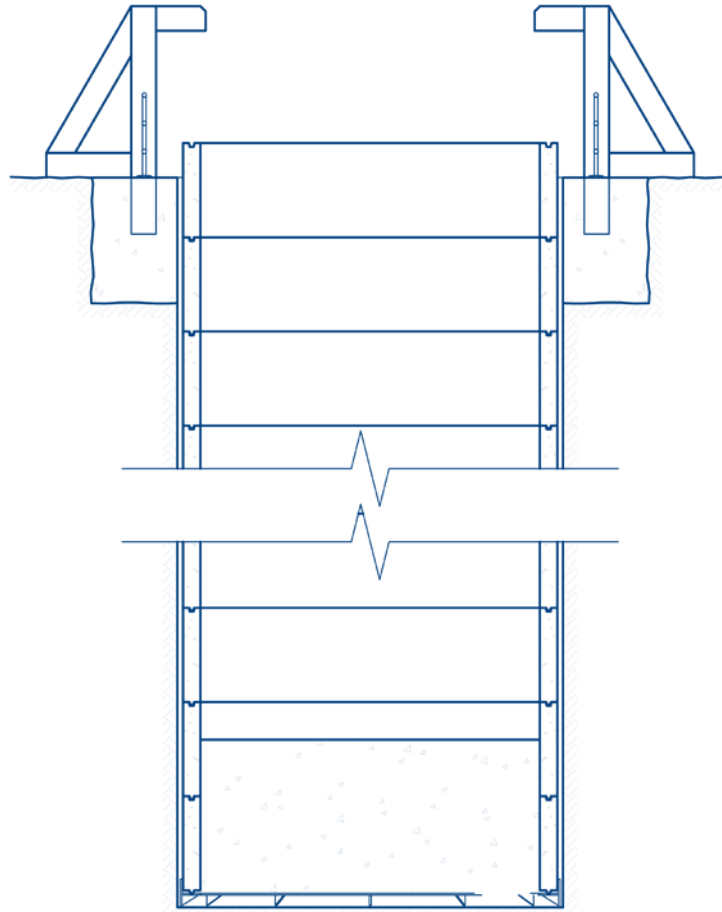


- Push the rings into the ground using the hydraulic rams or suitable kentledge spread evenly about the ring. Use bentonite slurry within the annulus around the shaft to assist sinking if required.
- Excavate the ground within the built rings. Care should be taken not over excavate to ensure that the shaft does not sink in an uncontrolled way.
- Push the rings to a depth to enable the next unit to be erected. Build the next ring as described above and the process repeated until the desired depth is achieved.
- Drill the units as required to provide holes for grouting. Grout the shaft.
- A base slab may then be cast within the bottom of the shaft. The installation of seals will be required to avoid tracking of water between the base slab and the rings. For advice contact FP McCann Technical Department.



Section through Base

## Building Manual - Two Piece



### Ancillary Items

- Available from FP McCann or recommend specialist supplier

### Shaft slabs

- Pre cast cover and landing slabs.

### Shaft specialist building equipment

- Bitumen rubber vertical and circle joint seal
- Lifting loops

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# MIC

**Easi-Cast**

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