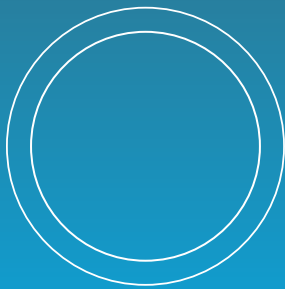


## CPM Perfect Manhole



# Welcome to CPM Group



CPM is a market-leading manufacturer of precast concrete products with extensive production facilities across the UK. This, combined with a network of specialist distributors, enables us to provide our customers with complete UK coverage.

Our business is built on a solid reputation for delivering quality products and providing a first class service. We supply a vast range of sustainable precast products to every sector of the construction industry, fully supported by our experienced technical and engineering teams.

The Company's comprehensive catalogue of products is enhanced by its innovative "off-site solutions" range. "Off-site" provides modern methods of construction for many applications including modular retaining walls, stormwater attenuation and control, water treatment and manhole innovation.

## **CPM - Innovation and diversification is the key to our success**

As a leading innovator in the precast concrete arena, CPM has partnerships with major technology companies. An ongoing and intensive research and development programme, headed by our experienced and dedicated Product Development Team who are at the heart of the precast operation ensures that our product range constantly evolves and provides imaginative solutions to our customers' requirements.

Our team of technicians and engineers are at the forefront of precast concrete technology and are backed by investment in plant, software and training.

Based centrally in the Midlands, CPM has a Technical Department with qualified engineers on hand to give advice on every aspect relating to our products and services and offers a complete design, engineering and technical support service.

AutoCAD drawings, designs, calculations and installation advice are just some of the benefits we provide to our clients and all design work is fully supported by professional indemnity insurance for peace of mind.

Please note that all weights and dimensions are correct at the time of publication and are subject to change. A copy of CPM's terms and conditions can be found at [www.cpm-group.com](http://www.cpm-group.com)

## + Product Index

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**02-03**

**Welcome to CPM Group / Product Index**

---

**04-05**

**Perfect Manhole System / Time Line / Attributes**

---

**06-07**

**Advantages / The Perfect Manhole System**

---

**08-11**

**The Perfect Manhole System and Drawings**

---

**12-13**

**The Perfect Manhole System / 1800 / Images**

---

**14-21**

**The Perfect Manhole System / Installation Guide**

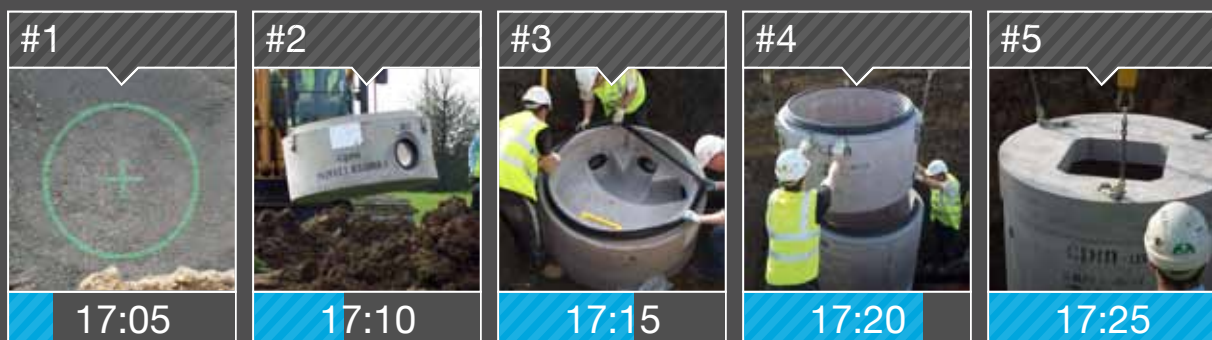
# The Perfect Manhole System

After an extensive research programme, CPM introduced the 1200mm Perfect Manhole system in October 2009 to meet the challenges of modern day construction. Today it is available in 1200mm, 1500mm and 1800mm diameters and comprises of a monolithic precast concrete base (available pre-benched in any configuration within just days of requisition), a sealed chamber ring (with a thicker wall than a traditional ring), a rubber joint (so no tokstrip or similar product is required) and a sealed cover slab (supplied with your required access).

For other sizes please Telephone: 01538 380500 / Email [perfect@cpm-group.com](mailto:perfect@cpm-group.com)

This unique system of products combine to form the CPM Perfect Manhole system; designed and manufactured to last a minimum of 120 years that provides a sealed manhole system that gives up to 40% savings on green house emissions compared to traditional manhole construction and eliminates the need of ready mixed concrete to form the traditional base, chamber benching and further concrete to surround the manhole. A complete manhole can be installed in as little as 25 minutes, and making safe site practice a real winner when using the Perfect Manhole as it reduces the need to work in confined spaces and eliminates the need for wet trades resulting in rapid construction compared to traditional methods as well as a reduction in time for the excavation space to be open.

## The Perfect Installation / Time Line



# Attributes of the Perfect Manhole System

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✓ Build Greener	Up to 40% lower greenhouse gas emissions
✓ Build Leaner	Saves material and labour / No waste
✓ Build Faster	Speedy installation
✓ Build Safer	No confined space working, excavation closed quicker
✓ Build Quality	CPM's Perfect Manhole is produced in a quality controlled factory environment

## Quality of the Perfect Manhole System

- ✓ Perfect Manhole complies with BSEN1917:2002 and BS5911-3.
- ✓ CPM's Perfect Manhole is accepted for use by all major UK companies and is included in Sewers for Adoption 7th edition.

## The long term benefits














- ✓ CPM's Perfect Manhole is made from high quality durable concrete with a minimum of 120 year design life.
- ✓ Easy access for inspection - reduces maintenance and running costs.
- ✓ Watertight Manhole – prevents water infiltration into the manhole system and ex-filtration of raw sewage or dirty water from the manhole into the surrounding area.

## The Perfect Manhole take off tool / Configurator

Available from CPM's website [www.cpm-group.com](http://www.cpm-group.com) is the Perfect Manhole take off tool and configurator. Just input your 1200mm or 1500mm manhole details and email to [perfect@cpm-group.com](mailto:perfect@cpm-group.com) and CPM will send you back a complete schedule and costs for your project.

# Advantages / Perfect Manhole System

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-  **Safer construction**  
No requirement to form a concrete surround. Reduction of open excavation.
-  **GHG savings**  
Up to 40% savings on GHG emissions compared with traditional construction.
-  **Fast installation**  
The modular solution eliminates the need for wet trades resulting in rapid construction compared to conventional methods.
-  **No need to surround in concrete unless specifically required**  
130mm wall thickness.
-  **Available at short notice**  
Our modern methods of production enables just in time delivery of all components including bases at short notice.
-  **Watertight**  
The combination of a thicker wall and rubber joints ensures a watertight structure.
-  **No water ingress into sewerage network reduces treatment costs**  
The combination of a 130mm wall and sealed rubber joint is guaranteed to withstand 5m head of water pressure.
-  **Combined seal includes load distributor**  
Load distribution ensures even distribution of vertical loads.
-  **Allows joint inspection**  
Correct installation can be visually confirmed.
-  **Fully tested under factory conditions**  
The whole system from base to cover slab is subject to testing.
-  **Kitemarked solution manufactured under factory conditions**  
Complies with the requirements of BSEN 1917 and BS5911-3
-  **Concrete for life – built to last.**  
High quality durable concrete with a minimum 120 year design life.
-  **Flexible connections**  
The Perfect Manhole can be connected to plastic, clay, cast iron or concrete - giving you a larger choice.

# Ticking all the boxes



## ✓ Efficient construction

Available in varying depths for efficient construction.

## ✓ Base options

Available pre-benched or plain bottom with or without inlet / outlets.

## ✓ Pre-fit options

Hydro-Brake®, penstocks, non-return valves, and filters can be pre-fitted in the factory.

## ✓ Customer choice

The perfect manhole is available with or without double steps. Sealed chamber rings can be used without the perfect base.

## ✓ Cover choice.

Each perfect manhole is available with a cover slab opening of 600 x 600mm, 675 x 675mm, 750 x 600mm or 1200 x 675mm

## Extra Services

### ✓ Full take-off service available.

### ✓ Lifting apparatus available for fast, effective and safe handling.

### ✓ Full installation guide available.

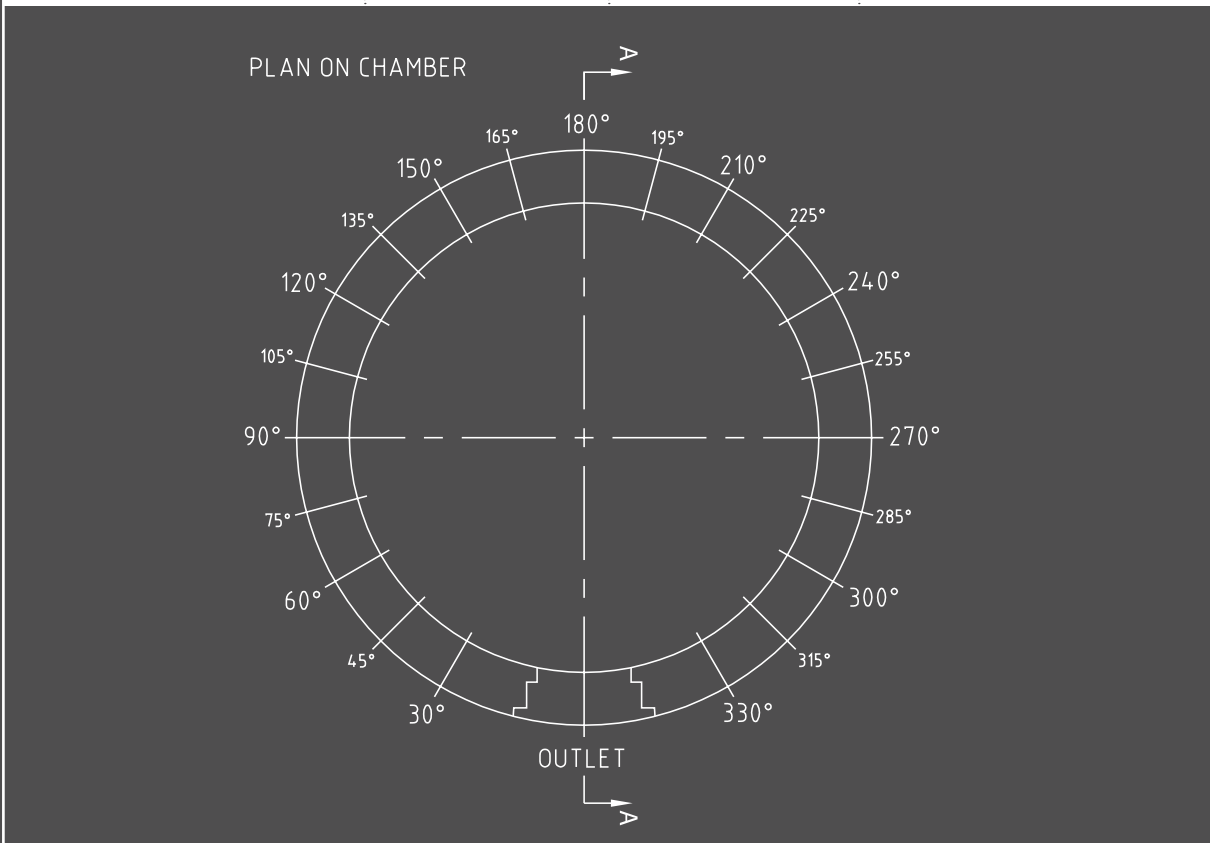
### ✓ Hydro-Brake® / Penstocks and valves can be pre-fitted.

Available in 1200mm, 1500mm and 1800mm diameter

For other sizes please call 01538 380500 or Email [perfect@cpm-group.com](mailto:perfect@cpm-group.com)

# Perfect Manhole / Diagrams

<b>Customer</b>		<b>Product Reference</b>	
<b>Site</b>		<b>Originator</b>	
<b>Customers MH Ref</b>			
<b>Required fall across main channel (E1 To A0)</b>			
<b>Double steps position if Required (DEG)</b>			
<b>Outlet / Inlet Postions (DEG)</b>	<b>Pipe Size</b>	<b>Gradient</b>	<b>Pipe Type</b>
Outlet - A0			
Inlet - E1			
Inlet - E2			
Inlet - E3			
Inlet - E4			

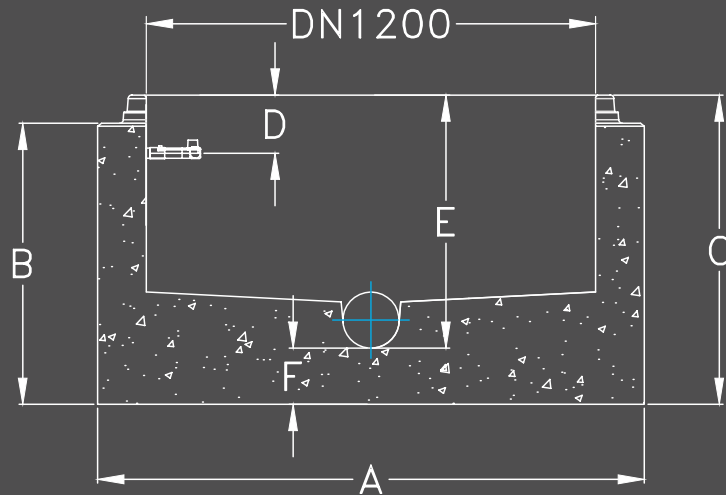


Please use this diagram to scan/photocopy and forward your requirements to [perfect@cpm-group.com](mailto:perfect@cpm-group.com)

Please note that there is a 1 in 9 gradient for the 1200mm perfect manhole and a 1 in 18 gradient for pipes 450mm upwards for the 1500mm perfect manhole and the angles between adjacent connection cannot be less than 24 degrees.



# Perfect Manhole Dimensions / 1200mm

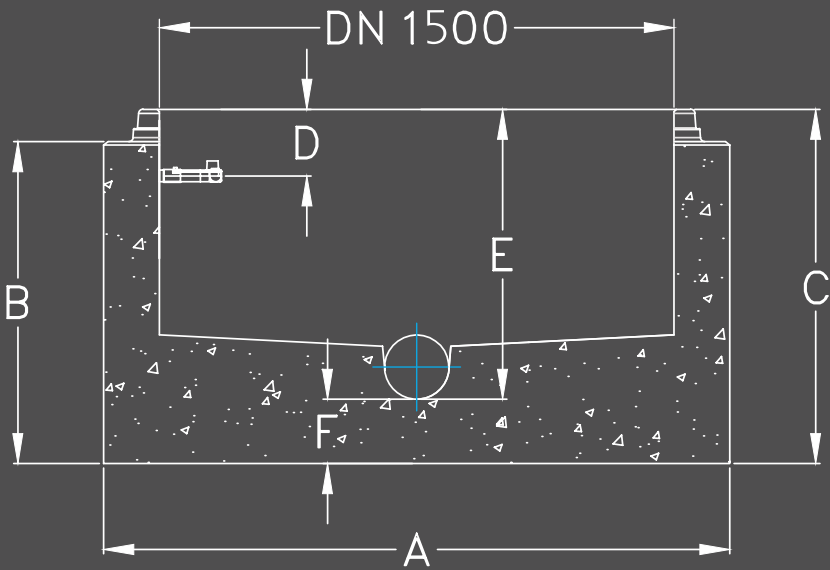


## 1200mm Standard Base Unit

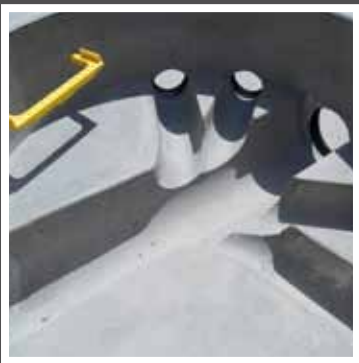
Dimensions	A	B	C	D	E	F	G	Weight/kg
100 Diameter Outlet	1460	600	675	155	400	275	130	1607
100 Diameter Outlet	1460	675	750	155	475	275	130	1705
100 Diameter Outlet	1460	750	825	155	550	275	130	2006
150 Diameter Outlet	1460	600	675	155	450	225	130	1568
150 Diameter Outlet	1460	675	750	155	525	225	130	1665
150 Diameter Outlet	1460	750	825	155	600	225	130	1967
225 Diameter Outlet	1460	600	675	155	525	150	130	1854
225 Diameter Outlet	1460	675	750	155	675	150	130	1952
225 Diameter Outlet	1460	750	825	155	985	150	130	2049
300 Diameter Outlet	1460	600	675	155	525	150	130	1761
300 Diameter Outlet	1460	675	750	155	600	150	130	1859
300 Diameter Outlet	1460	750	825	155	675	150	130	1956

1200mm chambers have a nominal fall of 20mm +/- 10mm north to south across the major incoming to outgoing inlets.  
G=Wall Thickness. Please note that all weights and measures are approximate.

# Perfect Manhole Dimensions / 1500mm



# Typical Perfect Manhole Images



## 1500mm Standard Base Unit

Dimensions	A	B	C	D	E	F	Wall	Weight/kg
100 Diameter Outlet	1780	900	985	155	730	255	160	3224
150 Diameter Outlet	1780	900	985	155	780	205	160	3195
255 Diameter Outlet	1780	900	985	155	780	205	160	3363
255 Diameter Outlet	1780	900	985	155	855	205	160	3514
300 Diameter Outlet	1780	900	985	155	780	205	160	3566
300 Diameter Outlet	1780	975	1060	155	855	205	160	3716
300 Diameter Outlet	1780	900	985	155	930	205	160	3867
375 Diameter Outlet	1780	975	1060	155	855	205	160	3772
375 Diameter Outlet	1780	1050	1135	155	930	205	160	3992
375 Diameter Outlet	1780	1125	1210	155	1005	205	160	4072
450 Diameter Outlet	1780	975	1060	155	855	205	160	3835
450 Diameter Outlet	1780	1050	1135	155	930	205	160	3985
450 Diameter Outlet	1780	1125	1210	155	1005	205	160	4135
450 Diameter Outlet	1780	1200	1285	155	1080	205	160	4522
525 Diameter Outlet	1960	1050	1135	155	930	205	230	5039
525 Diameter Outlet	1960	1125	1210	155	1005	205	230	5264
525 Diameter Outlet	1960	1200	1285	155	1080	205	230	5489
600 Diameter Outlet	1960	1125	1210	155	1005	205	230	4950
600 Diameter Outlet	1960	1200	1285	155	1080	205	230	5362
600 Diameter Outlet	1960	1275	1360	155	1155	205	230	5587
675 Diameter Outlet	1960	1125	1210	155	1005	205	230	5035
675 Diameter Outlet	1960	1200	1285	155	1080	205	230	5260
675 Diameter Outlet	1960	1275	1360	155	1155	205	230	5485
675 Diameter Outlet	1960	1350	1435	155	1230	205	230	5710

1500mm chambers have a nominal fall of 25mm +10mm/-13mm north to south across the major incoming to outgoing inlets. G=Wall Thickness. Please note that all weights and measures are approximate.

# Perfect Manhole System / 1800mm

---

After the successful introduction of the 1200mm and 1500mm perfect manhole system, CPM has developed an 1800mm sealed manhole that can be used for precast concrete pipes up to 900mm diameter.

The system includes a cast-in base and incorporates the concrete butt pipes into the chamber base and pipe channel; this only leaves the benching to be completed on site. By leaving the benching out of the base element, the weight of the unit is reduced to between 5.0 and 5.5 tonnes depending upon the configuration.

Deeper manholes are accommodated by using a reducing slab to a 1200mm sealed manhole.

The 1800mm Perfect Manhole system can be supplied with either double steps or with an integrated ladder system which is available from CPM.

As the 1800mm sealed manhole system is a bespoke precast product, standard measurements cannot be given as each is individual.

For further information please call 01538 380500 or email [perfect@cpm-group.com](mailto:perfect@cpm-group.com)

## Typical Perfect Manhole Images

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# Perfect Manhole / Rings

Perfect Manhole Ring / Typical Weights	
1200 Dimensions / mm	Weight / kg
1200 x 1000	1250
1200 x 750	940
1200 x 500	640
1200 x 250	330
1500 Dimensions / mm	Weight / kg
1500 x 1000	1730
1500 x 750	1330
1500 x 500	860

# Perfect Manhole / Cover Slabs

Perfect Manhole Cover Slab / Typical Weights / kg				
Dimensions	600 X 600	675 X 675	750 X 600	1200 X 675
1200	675	600	600	470
1500	1170	1120	1120	960

Please note that all weights and measures are approximate.

# CPM Perfect Installation Guide

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## Introduction

This guide offers advice on how to install the CPM Perfect Manhole system incorporating a load bearing elastomeric seal known as a 'sealed manhole' system.

The system provides a manhole whereby all joints and connections have elastomeric seals enabling a watertight manhole to be constructed quickly and easily with the minimum of site work.

Manholes are consequently installed in a similar manner to pipes requiring a different technique to traditional manhole construction.

The wall thickness being over 125mm means that the installed manhole does not require a concrete surround unless specified by the client.

The system is Kitemarked to BS EN 1917 and BS 5911-3 and the 1200mm diameter Perfect Manhole is CE Marked.

For further information on this please visit: [www.cpm-group.com/quality](http://www.cpm-group.com/quality)

## Components

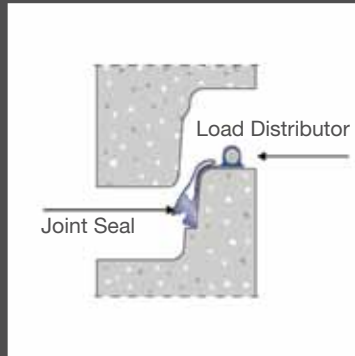
A perfect manhole system will typically comprise of a combination of the following standard elements.

Base units - Base units shall comprise of the following:

- Chamber unit depth dependant on manhole diameter and channel diameter
- The base depth varies to obtain the correct overall height.
- Integral base to give a watertight unit
- Channel and benching formed by CPM or on site subject to customers requirements
- Double steps fitted if required
- Formed or cored holes for jointing to inlet/outlet pipes with seals

## Shaft Units

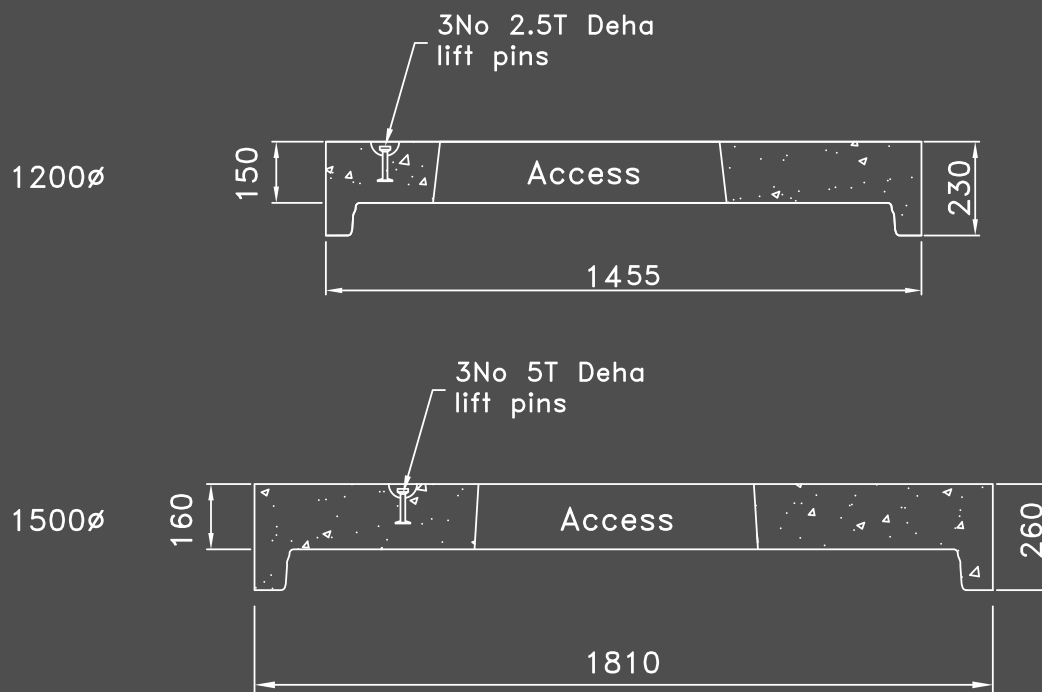
- Shaft unit with spigot and socket joint with the seal fitted
- Units can be supplied with or without double steps
- The Integrated ladder system is also available with the sealed manhole system.



Forsheda F-171 1180 x 24.4  
Manufactured to BS EN 681-1 type WC  
Actual size is dependant  
on manhole diameter.

Elastomeric Seal

## Cover Slab Drawings



In a 1500mm diameter, the cover slab maybe supplied with an integral 250mm shaft to obtain the correct overall height

**Off Loading and Lifting - See also CPM advisory note on customer offloading**

CPM is able to offer advice and recommendations for off loading products on site and assist in the preparation of a safe delivery plan in accordance with the HSE document 'Delivering safety: co-operating to prevent workplace vehicle accidents'.

Weights will be given on the General Arrangement drawing.

CPM recommends that ALL lifting operations should comply with the Lifting Operations and Lifting Equipment Regulations (LOLER) 1998, and the Provision and Use of Work Equipment Regulations 1998 (PUWER).

The lift system is of a 'Deha' style incorporating a cast-in lift pin on to which a lifting clutch is attached for lifting. CPM can provide a set of three way lifting straps into which the lifting clutches are fixed. The lifting straps are supplied for sale and are fully certified.



The lift Clutch is attached to the anchor by lowering the clutch slot over the anchor and rotating The tab until it rests on the concrete surface, with the tab facing the direction of the lift.



## Assembly

Normal considerations should be taken into account when assessing the suitability of the formation. The manhole can be built off either:

- Minimum 150mm pipe granular bedding material being 5-20 graded, 14, 20, 40mm single size suitably compacted to provide a level base.
- 150mm GEN 1(C8/10) concrete. Base unit should be placed whilst concrete is wet so it can be set level otherwise a levelling screed of 15- 20mm sand cement will be required to prevent point loading on the base unit.

Note: In poor or wet ground conditions a concrete pad is advised.

Normally a granular bedding is recommended where the safe ground bearing pressure  $>200\text{kN/m}^2$ .

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## Seal Installation

The seal is ideally positioned on the base unit before it is in the excavation in the following manner

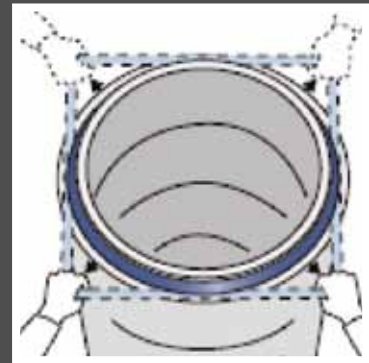


Stretch the seal onto the spigot of the manhole and position it against the shoulder. Make sure the load distributor (the circular part) is located on the upper surface of the spigot.



Load distributor

Check that the internally lubricated skin is correctly positioned and sitting against the rest shoulder.



Equalise the stretch in the seal by lifting at several points.

Note: External lubrication is not required

## Shaft Construction

Once the bedding has been prepared, the base unit can be positioned. It is advisable to lay the pipeline up to and including the rocker pipe on the downstream side. A short length of pipe should then be inserted into the outlet pipe seal on the base unit. This acts as the 'butt' pipe.

### Note:

The butt pipe is not strictly required as the joint within the manhole wall acts as a flexible joint.

The unit can then be jointed with the rocker pipe as it is finally positioned in the excavation. A final level check should be carried out. The base unit can then be backfilled with granular pipe bedding around the pipes and suitable material around the shaft.

The remainder of the shaft can then be constructed by centring the upper manhole section, and lowering into place. The design of the joint encourages 'self centring'. For ease of installing it is advisable to backfill the shaft as it is built. This provides ease of access to unhook the lift clutches and to guide the units into position.

A joint gap of between 10-20mm should be obtained after jointing, this gap may reduce as the shaft is constructed dependant on the depth to the minimum 10mm. The cover slab can be laid again using the lifting system. The slab may need slight vertical downward pressure to seal the unit as the self weight may not always be sufficient. The shaft is then completed using adjusting units and the cover and frame.



## Pipe Jointing to Perfect Manhole bases

Perfect Manhole bases are supplied with inlet/outlet seals specifically for the pipe being used. The bases will be delivered with the seals set in the base wall. The connection is dependant on the pipe type as per pages 20 and 21.

'Sewers for Adoption' requires a flexible joint as close as possible to the manhole face for movement. The base joint can be considered as this joint however it is still advisable to provide a short length butt pipe acting as the rocker pipe and of the same length as would normally be provided. This arrangement then provides two flexible joints for all connecting pipes as required by Sewers for Adoption.

### General

- All pipes to be jointed into the perfect manhole should be cut square with all sharp edges removed and where necessary chamfered.
- All pipes and F-910 seals fitted to the perfect base, should be lubricated with CPM Pipe Jointing Lubricant.
- All pipes should be centred and pushed squarely in to the F-910 seal until an even joint gap is achieved.
- It may be necessary to utilise mechanical means such as an excavator bucket. In which case a timber should be placed against the pipe to prevent damage to the pipe.
- If for any reason the F-910 seal has to be removed, when it is replaced, locate the seal back in to the hole without lubricant.
- Care should always be taken to prevent soil and stones from entering the joint. A joint gap of between 5-15mm should be obtained between the end of the pipe and the concrete channel.
- An even joint gap should be achieved.
- The permitted deflection on the pipe / base joint is 2 degrees.
- The provision of a short length 'butt' pipe is advised particularly with flexible pipelines.

### Concrete Pipelines

- A CPM socket butt at the upstream and a spigot butt at the downstream end are required. Note: The joints are designed primarily for CPM concrete pipe diameters and to ensure a correct joint, CPM pipes must be used. Other manufacturer's pipes can still be used for the rest of the pipeline as the joints are compatible.
- Using CPM pipe lubricant, thoroughly lube the seal and butt end of the pipe.
- The pipe can now be jointed into the base. A 5-20mm joint gap should be achieved between the end of the pipe and the benching face.

### Clay/Solid Wall PVC Pipelines

- Cut and chamfer the pipe prior to jointing.
- Clean and lubricate the pipe end to be jointed.
- Care should be taken to ensure the pipe is not damaged during mechanical jointing.
- The pipe can then be jointed directly into the F-910 seal.

### Twinwall up to and including 300mm diameter Pipelines

- Cut and remove all sharp edges prior to jointing. Ensure the pipe is clean.
- Locate the twinwall seal into the pipe groove as per the manufacturer's instructions. Note: This may vary between manufacturers.
- Lubricate the F-910 seal, the twinwall seal and the first rib of the twinwall pipe prior to jointing.
- Care should be taken to ensure the pipe is not damaged during mechanical jointing.

### Ultra-Rib / Ultra Fortis Pipelines

- Ultra-rib and Ultra Fortis are jointed using an adaptor coupler. The pipe end is prepared in accordance with manufacturers recommendations
- Place the ring seal between the 2nd and 3rd ribs from the spigot end.
- Make sure the ring is correctly seated and is not twisted.
- Apply lubricant to the ring seal and adaptor.
- Push the spigot into the adaptor until it is fully engaged.
- Apply lubricant to the seal set in the Perfect Manhole base unit and push home the pipe and adaptor. Alternatively the adaptor can be pushed into the base first.

## Twinwall 375 to 600mm diameter Pipelines

- This range of pipe joins into a 1500mm Perfect Manhole and utilises a twinwall double socket coupling.
- The coupling has to be split into two separate socket ends each with a butt end.
- A sealing ring is placed on the end of the pipe in accordance with manufacturers instructions.
- The pipe is firstly jointed into the split double socket coupling.
- The split double socket coupling and base seal are greased.
- The pipe together with the split coupling can be jointed into the base seal.

## Backdrop Manholes

Provide B12 dowels at 150 centres vertically either side of the vertical pipe, set into the shaft wall with epoxy resin. The dowels are to be set into the wall a maximum of 75mm to ensure sufficient cover to the dowel on the internal face. The vertical pipe can then have a concrete surround as detailed in B.15 of Sewers for Adoption 7th Edition and a monolithic structure will be achieved.

### Note:

The Installer is to ensure that the connecting pipe is within the manufacturers specifications. The Perfect Manhole base seals have been specifically designed to ensure a watertight seal and operate within the tolerance of the pipe. Should the outside diameter of the pipe be out of the specified tolerances, CPM Group cannot accept responsibility for the performance of the joint.

## Jointing in extreme cold weather

When jointing lateral connections into the Perfect Manhole bases in extreme cold conditions, the F-910 seals should be brought back to temperature by placing the seals either in the excavator cabin or in on-site canteen etc.

### Then follow below

- Ensure that the hole for the seal is clean, dry and frost free.
- The F-910 connector seal should be installed into the hole without lubricant.
- Lubricate the connecting pipe and the sealing lips of the F-910 seal with CPM lubricant for concrete pipes and suitable lubricant for other materials.
- Centre the end of the pipe and push it into the seal until fully home.







## Complete UK Coverage

### HEAD OFFICE / ENGLAND / WALES SALES AND SOUTHERN WORKS

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