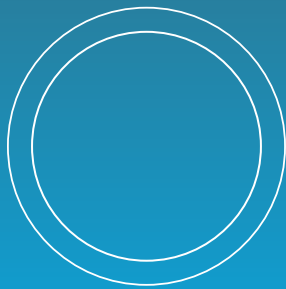


## CPM Perfect Manhole



**Concrete for Life**

# 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.

The CPM 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 concrete products to every sector of the construction industry.

The construction industry's demand for fast, efficient, sustainable modular systems has led CPM to introduce a diverse range of precast off-site solutions which are designed, engineered and manufactured off-site, under factory conditions. These off-site solutions offer a real alternative to traditional on-site construction and include 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 an ongoing and intensive research and development programme, headed by our experienced and dedicated product development team, who are at the heart of our precast operation. This ensures that our product range constantly evolves and provides imaginative solutions to our customers' requirements.

## CPM – Concrete for Life

The CPM Perfect Manhole team is centrally based in the Midlands and is committed to offering excellent customer service throughout the lifecycle of a project – from beginning to end and work closely with CPM's Technical team who are made up of qualified engineers and are on hand to give advice on every aspect relating to our products and services and offer a complete design, engineering and technical support service.

BIM (Building Information Modeling), AutoCAD drawings, designs, calculations and installation advice are just some of the benefits we provide and all our 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 is available at [www.cpm-group.com](http://www.cpm-group.com)

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**The Perfect Manhole System / Installation Guide**

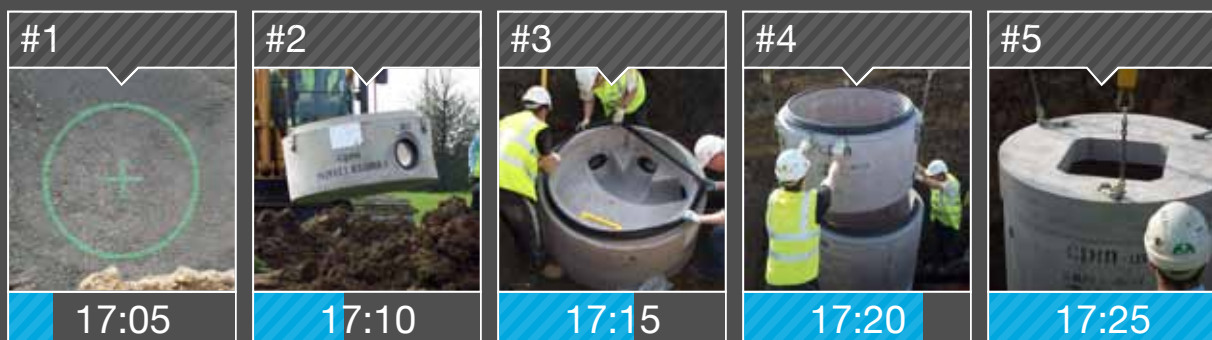
# The Perfect Manhole System

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



## **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 withstand 5m head of 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.

\*Watertightness is defined in BS EN 1917 as resisting a 5m head for 15 minutes. This is to simulate a temporary surcharge condition not a permanent head of water.

\*Shafts in high water tables are subject to buoyancy effects. For further information please contact the CPM Group Technical team.

# Ticking all the boxes

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## 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.**



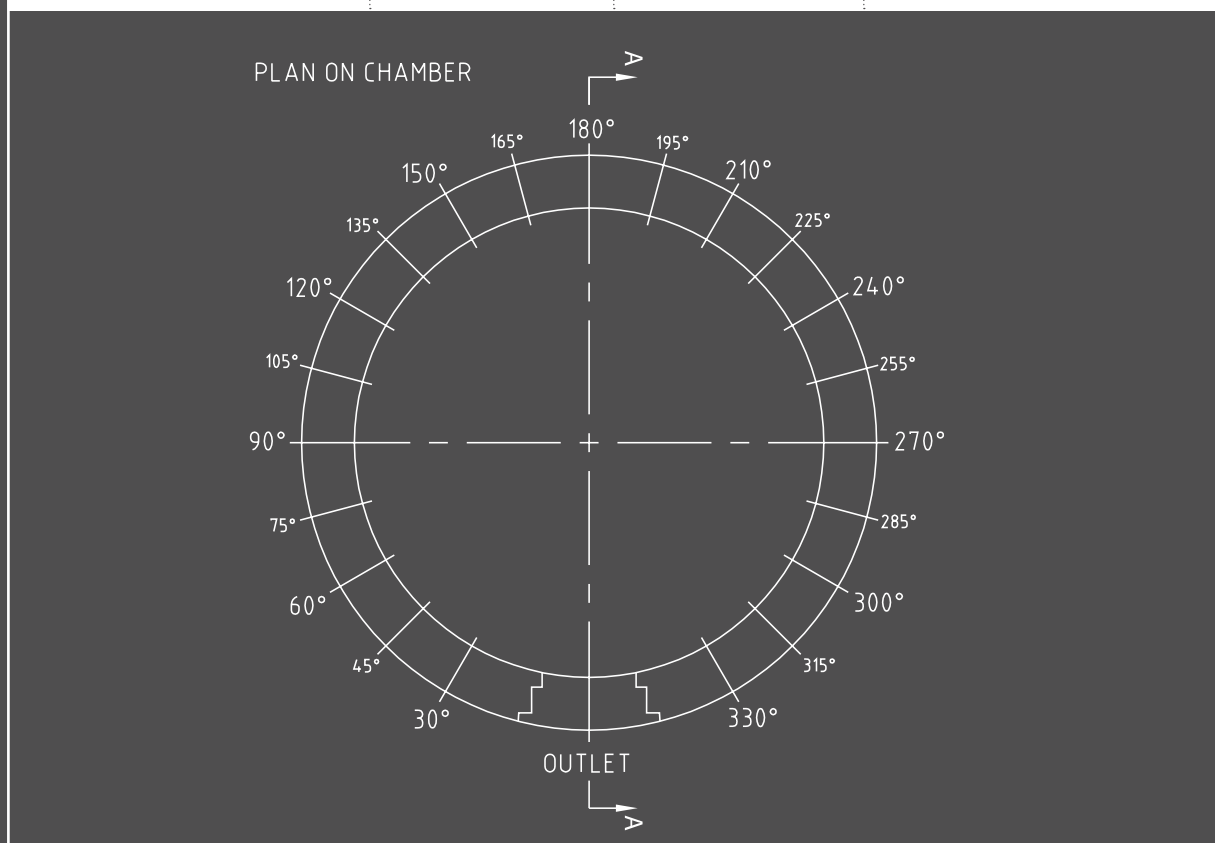
**Hydro-Brake® / Penstocks and valves can be pre-fitted.**

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

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

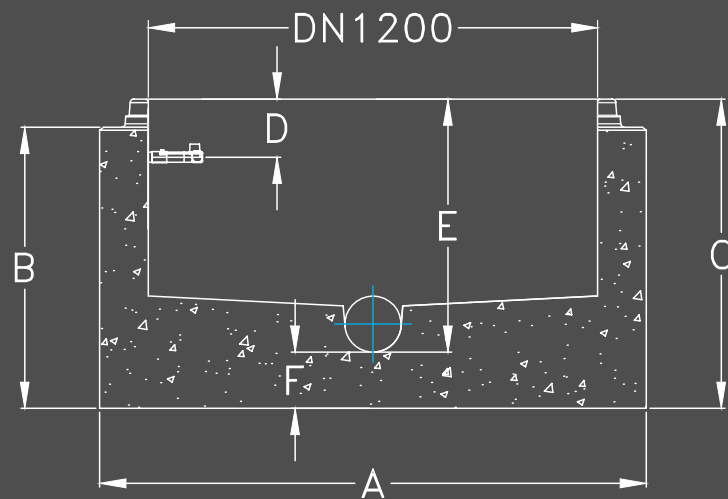


Please use this diagram to scan/photocopy and forward your requirements to [perfect@cpm-group.com](mailto:perfect@cpm-group.com)

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

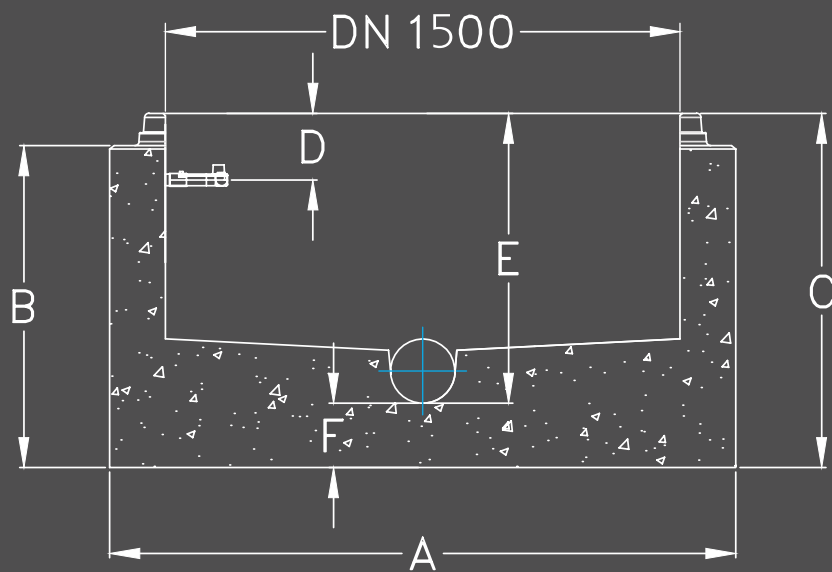


**1200mm Standard Base Unit**

Dimensions	A	B	C	D	E	F	G	Weight/kg
100 Diameter Outlet	1460	600	675	155	400	275	130	1820
100 Diameter Outlet	1460	675	750	155	475	275	130	1918
100 Diameter Outlet	1460	750	825	155	550	275	130	2016
150 Diameter Outlet	1460	600	675	155	450	225	130	1806
150 Diameter Outlet	1460	675	750	155	525	225	130	1984
150 Diameter Outlet	1460	750	825	155	600	225	130	2002
225 Diameter Outlet	1460	600	675	155	525	150	130	1753
225 Diameter Outlet	1460	675	750	155	675	150	130	1853
225 Diameter Outlet	1460	750	825	155	985	150	130	1951
300 Diameter Outlet	1460	675	750	155	600	150	130	1998
300 Diameter Outlet	1460	750	825	155	675	150	130	2096

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	1820	750	835	155	580	255	160	2900
100 Diameter Outlet	1820	825	910	155	655	255	160	3100
150 Diameter Outlet	1820	750	835	155	630	205	160	2900
150 Diameter Outlet	1820	825	910	155	705	205	160	3100
225 Diameter Outlet	1820	750	835	155	630	205	160	2900
225 Diameter Outlet	1820	825	910	155	705	205	160	3100
300 Diameter Outlet	1820	825	910	155	705	205	160	3100
100 Diameter Outlet	1820	900	985	155	730	255	160	3224
150 Diameter Outlet	1820	900	985	155	780	205	160	3195
255 Diameter Outlet	1820	900	985	155	780	205	160	3363
255 Diameter Outlet	1820	900	985	155	855	205	160	3514
300 Diameter Outlet	1820	900	985	155	780	205	160	3566
300 Diameter Outlet	1820	975	1060	155	855	205	160	3716
300 Diameter Outlet	1820	900	985	155	930	205	160	3867
375 Diameter Outlet	1780	975	1060	155	855	205	160	3772
375 Diameter Outlet	1820	1050	1135	155	930	205	160	3992
375 Diameter Outlet	1820	1125	1210	155	1005	205	160	4072
450 Diameter Outlet	1820	975	1060	155	855	205	160	3835
450 Diameter Outlet	1820	1050	1135	155	930	205	160	3985
450 Diameter Outlet	1820	1125	1210	155	1005	205	160	4135
450 Diameter Outlet	1820	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

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Perfect Manhole Ring / Typical Weights	
1200 Dimensions / mm	Weight / kg
1200 x 1000	1180
1200 x 750	890
1200 x 500	590
1200 x 250	300
1500 Dimensions / mm	Weight / kg
1500 x 1000	1730
1500 x 750	1330
1500 x 500	860

# Perfect Manhole / Cover Slabs

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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

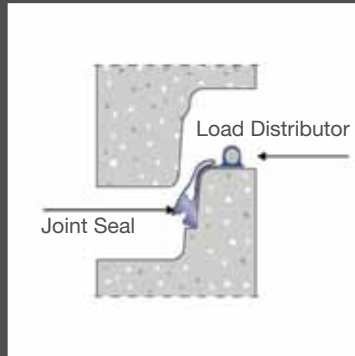
A perfect manhole system will typically comprise of a combination of the following standard elements.

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
- Joint on chamber unit designed to utilise a load bearing elastomeric seal
- 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

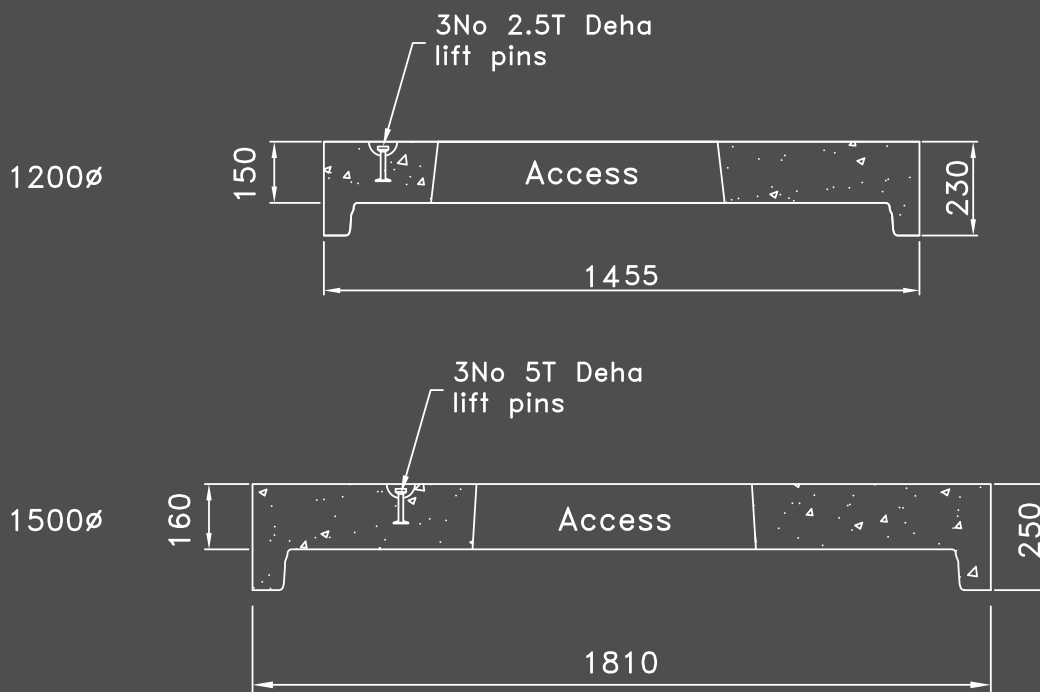
- Shaft unit with spigot and socket joint with the seal fitted
- Units can be supplied with or without double steps
- The Integrated ladder system is also available with the sealed manhole system.



Seal references are Forsheda F-171 or DS SDVSEAL, manufactured to BS EN 681-1 type WC. Actual size is dependent 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

## Offloading and Lifting

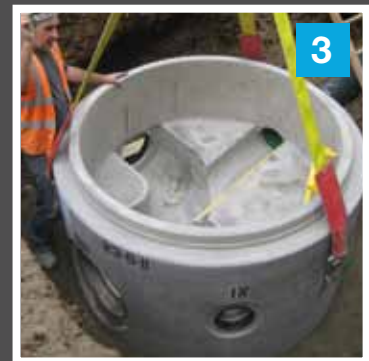
CPM is able to offer advice and recommendations for offloading products on site and assist in the preparation of a safe delivery plan in accordance with the HSE document 'Delivering safety: co-operating to prevent workplace vehicle accidents'.

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.

More information is available at [www.cpm-group.com](http://www.cpm-group.com)



- 1) The lift clutch is attached to the lift pin by lowering the clutch slot over the lift pin and rotating the tab until it rests on the concrete surface, with the tab facing the direction of the lift
- 2) Correctly attached lift clutch
- 3) Three way straps with protective sleeves



## 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  $>200\text{kN/m}^2$ .

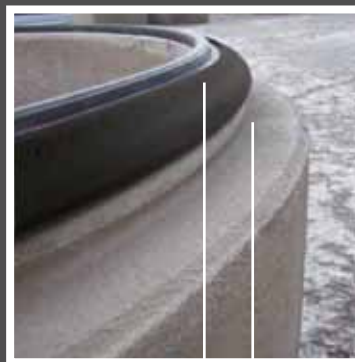
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## Seal Installation

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

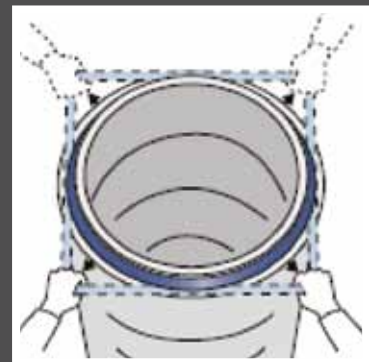


Stretch the seal onto the spigot of the manhole and position it against the shoulder. Make sure the load distributor (the circular part) is located on the upper surface of the spigot.



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 butt pipe should then be inserted in to the outlet pipe seal on the base unit.

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 5mm. 250mm deep rings may require slight downward pressure to joint. The cover slab can also be laid using the same lifting system.

The slab may need slight vertical downward pressure to seal the unit as the self-weight may not always be sufficient.



## 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 grease 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 600mm 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 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.

### 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.







**Concrete for Life**

## Complete UK Coverage

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

CPM Group Ltd, Mells Road, Mells,  
Nr Frome, Somerset, BA11 3PD  
Tel: 01179 814500 Fax: 01179 814511

### NORTHERN WORKS

CPM Group Ltd, Pollington, Goole,  
East Riding of Yorkshire, DN14 0DU  
Tel: 01405 860591 Fax: 01405 863606

### SCOTLAND SALES

CPM Group Ltd, 101 Main Street, Newmains,  
Wishaw, Lanarkshire, ML2 9BG  
Tel: 01698 386922 Fax: 01698 387167

### PERFECT MANHOLE SALES

CPM Group Ltd, 1st Floor Alexandra Mill,  
Queen Street, Leek,  
Staffordshire, ST13 6LP  
Tel: 01538 380500 Fax: 01538 380510

### TECHNICAL OFFICES

CPM Group Ltd, CPM House,  
Heath Mill Road, Wombourne,  
Staffordshire, WV5 8AP  
Tel: 01902 356220 Fax: 01902 356221



[sales@cpm-group.com](mailto:sales@cpm-group.com)  
[www.cpm-group.com](http://www.cpm-group.com)