Marshalls

Civils & Drainage

Manhole Installation Guide

DN900 – DN3000 Units

1.0 Introduction

Marshalls Civils & Drainage concrete manholes are designed, manufactured and kitemarked to BS EN 1917 and BS5911-3. The intended use is to permit access and to allow aeration of drain or sewer systems conveying sewage or surface water under gravity.

When correctly installed the manhole units are designed to withstand main road traffic loading. For further details of the specification and performance criteria please contact Marshalls Civils & Drainage Technical Department.

Please note this is a general guide and reference to drawings and specification should be made for any particular requirements.

Marshalls Civils & Drainage is committed that its products are designed and manufactured to ensure the safety of users. Installation of products involves breaking ground and is thus considered as construction work under the Construction (Design and Management) Regulations 2015.

Marshalls Civils & Drainage puts a great deal of effort into ensuring that its designs are safe and will provide structural details to the Principal Designer nominated by the Construction Site Client, if requested (please contact Marshalls Civils & Drainage Technical Office).

2.0 Preparatory Considerations

- Marshalls Civils & Drainage 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).

- For the excavation work required prior to manhole construction a mechanical excavator is normally required. The type is dependent on the manhole diameter and weight (see table).

- For manhole rings up to and including DN1200, a backhoe type excavator with a 1T lift capacity is generally adequate. For larger rings and slabs a 360^{o} slew machine will be required.

- The bucket of the excavator being used should be fitted with an approved lifting point to which the chains or webbing sling can be attached. DO NOT USE MAKESHIFT LIFTING ARRANGEMENTS.

3.0 Off Loading

Chamber sections should be delivered vertically on the lorry. Proprietary lifting bolts are required (available from your supplier) which fit through the 3 No. 50mm

diameter holes in the chamber units. Chains should be fitted through from the inside of the chamber unit.

Cover slabs have 3 lifting points around the outer rim of the slab requiring chains with hooks.

IT IS ESSENTIAL FOR THE LIFTING CHAINS OR SLINGS TO HAVE A SAFE WORKING LOAD AND SUITABLE ANGLE OF LIFT APPROPRIATE FOR THE UNIT BEING LIFTED.

DN	Chamber Unit Weight (Kg's) /m Depth	Cover Slab Weight (Kg's) 675^2 access
900	530	130
1050	710	235
1200	912	355
1350	1080	475
1500	1330	790
1800	1760	1210
2100	2140	1745
2400	2740	2375
2700	3400	3335
3000	4140	4585

4.0 Construction

Manhole Bases are generally cast in-situ and placing of the first chamber unit will be dependent on the particular detail required by the design.

However, it will generally be one of the following 2 types.

a) In-situ base built to incorporate the main pipes (Sewers for Adoption typical details).

The in-situ base should be taken to a minimum of 50mm above the highest pipe. The ring should be lowered onto the concrete, levelled and additional concrete placed to build the ring in a minimum of 75mm.

b) In-situ base slab.

The first ring can be placed directly onto a cast base slab. The ring should be placed on 2 layers of bitumen sealant (see table) or on a 10mm thick 3:1 sand/cement mortar bed. Inlets, outlets and benching will then have to be formed.

The manhole can then be constructed to the required height. The joints should be made with either sealant as shown in the following table or a 3:1 sand/cement mortar. Reference to the specification should be made to confirm particular requirements for the joints.

Joint Sealant

Sealant size (tongue and groove joints)	12mm x 60mm		12mm x 80mm				12mm x 120mm			
Unit nom. Size (mm)	900	1050	1200	1350	1500	1800	2100	2400	2700	3000
Sealant length (per joint)	3.5m	4.0m	4.5m	5.0m	5.5m	6.5m	7.5m	8.5m	9.5m	10.5m
Primer	5 litres / 100m		5 litres / 75m				5 litres / 50m			

The cover slab is seated on 1 layer of sealant for manholes up to DN1200 and 2 layers for larger diameters.

Some specifications may require a 150mm concrete surround to the manhole. Proprietary shutters are available for this should it be required.

The manhole can then be completed to ground level by using either class B engineering bricks or precast concrete adjusting units with the access cover and frame finally seated at ground level.

5.0 Units with pre-formed cases

Products such as bespoke manhole units and catchpits with preformed bases can be laid on a minimum 150mm pipe bedding material unless otherwise specified in the contract.

The outlet pipe is laid to its correct level as far as the butt pipe which is connected into the chamber wall.

The unit with the butt pipe is jointed onto the pipeline.

Once installed, the unit should be checked for level. The unit is backfilled with pipe bedding to 150mm over the pipes after which suitable backfill can be used unless the contract requires otherwise.

If required benching can be completed at this stage or after the chamber has been built and backfilled.

The units are then completed as a standard manhole.