

Safe Use/Installation Instructions

Manhole Frames (Single and Double Acting)

This describes the correct and safe method of assembly, how to put the manhole frames together to form your Square or rectangle, and also how to use the double acting hydraulics, and how to secure the hanging chains. It also offers a guide on a correct method of installation, and how to leave an excavation safe.

The method of equipment installation described is only a suggestion, the ultimate safety and responsibility of installation is with the company/responsible person installing it.

| Manhole Frame Leg Type | Length Range | kn/m Open | Weight |
|---|---------------------|------------------|---------------|
| Double Acting A legs | 2 to 3mtr | 65.0 | 960kg |
| Assumed excavation size 2.5 x 2.5mtr square x 3mtr deep | | | |

In most situations where sheets and frames are being used to form a manhole or cofferdam, there will almost certainly have been ground exploration carried out. It is very important when carrying out a temporary works design that the designer has all the relevant information to calculate it as accurately as possible.

All this information needs to be given in writing, a minimum three or four days before the equipment is required.

This design will calculate the exact pressures in the excavation, and the solution to carry out the works safely and efficiently, and in most cases will be checked by the temporary works designer employed by the main contractors.

From this a quote will be supplied by us for the exact quantity and cost of the equipment required.

Part 1

Putting the manhole frame legs together, and getting them ready for installation.

- (1) The manhole frame legs will come delivered in single pieces (legs).
Set out the manhole frame legs that have been supplied in the shape of the excavation you are going to excavate. Please ensure you lift the legs correctly, on the hanging points, and use a suitable chain sling that has the correct safe working load for the four legs, and has a current report of thorough examination and conforms to LOLER, (the chain is normally supplied by the trench support company). Connect the manhole frame legs together with the four large pins at every corner, ensuring you put all the r clips back in the bottom of the large corner pins.
- (2) You are now ready to attach the hydraulics and pump, and pump out the manhole frame legs (if required) roughly to the size of your excavation, making sure you have the correct internal size you require.
Ensure you have shoring fluid in the pump (Bucket or Powered) only three quarters full – no more, as you must allow for expansion inside the pump. Attach the two single hoses supplied to either side of the pump. Then attach the ends of the single hoses to the four way hoses, supplied, one to the male connector at the block end, and the other to the female connector on the block end of the other four way hose.
You will now have eight female connectors to connect to the manhole frame legs. Connect one set of hoses to the male connector on the top of the manhole frame block, and the other set of four hoses to the bottom male connectors on the manhole frame legs. You must ensure all the connectors are fitted properly, as the hydraulic circuit will not work if one connector is not connected properly (this is generally the cause of most hydraulic frame legs that will not pump out).

- (3) Once you are happy everything is connected properly, make sure the lock off valves are in the open position – anti clockwise (13mm spanner or socket required – we will supply if requested) turn the lever on the pump to the right, and start pumping out the manhole frame to the required size.

When you reach the required size, push the lever on the pump back to the middle, and turn the lock off valve clockwise to keep the pressure on the frame legs, do this with both frames. Place one of the manhole frames on the top of the surface you are going to excavate. You can now mark the ground on the external edge of the manhole frames, which is where the trench sheets will be placed.

When you are happy with your excavation size, you can lift away the frame to the side, ready to be placed into the excavation. When placing the frames in the excavation pump them in slightly to allow them to pass down the excavation with ease.

Part 2

- (1) There are many methods of carrying out this kind of excavation, and in normal circumstances there will be a method statement produced by the groundwork contractor detailing the method being used. This is a guide to one of the methods. Excavate approximately 1.5 mtr below ground level to the overall plan size as marked out earlier.
- (2) Attach four of the hanging chains supplied to four corners of the manhole frame. Place the already assembled manhole frame in the excavation. It is correct practice to ensure the hoses are kept attached to the manhole frame legs at this stage to enable the frame to be pumped out when it goes deeper into the excavation.
- (3) The next stage is to place the trench sheets. We advise using a quick release shackle to place the trench sheets, and a driving cap for driving the sheets short distances, and a vibrating hammer for longer distances (only trench sheets 6mm or above). There are two methods of doing this; either place the four corners first, or place trench sheets in one of the four corners of the excavation, and continue around, placing the shorter trench sheets supplied to the digging side (the machine needs to be able to have good digging reach), as it is digging deeper and pushing the sheets.
- (4) When you have reached the correct depth for the bottom frame, and the trench sheets are toed in to the correct depth, as per the (Temporary Works Design) insert the top frame at the required level, remembering to attach the hanging chains, and pump out both the manhole frames against the sides of the excavation, remembering to close the lock off valves on the frames, and ensure all the hanging chains are secured properly. The hanging chains are a safety system for the manhole frames, and **must not** be used for lifting or pulling.
- (5) It is the responsibility of the person in charge of the excavation to inspect it at regular intervals to ensure it is safe to work in. When the excavation is not being worked in, it must be fenced off at all times, and “Danger Deep Excavation” signs placed around the excavation.
- (6) It is common health and safety practice to have at least a half metre upstand above ground level around the excavation, in this case four metre sheets would be used.
We offer a complete fall prevention, safety barrier system, that clamps to any thickness of trench sheet, which is available from all our depots. It consists of a clamp, upright post that sits inside the clamp, and boards to place horizontally on the posts.

- (7) When the base at the bottom of the excavation has been poured and the concrete cured, you are ready to extract the top manhole frame. Pump in the bottom manhole frame by 50mm or so, to ease lifting, and lift it directly below the top frame and pump it out again, so it is tight to the sides of the excavation, re-position the hanging chains and secure properly. Release the pressure on the top manhole frame, and lift it out.

When you are returning the manhole frames please ensure they are all pumped in, as you will be charged if they are not, please also ensure when the trench sheets and manhole frame legs are returned they do not have excess soil and concrete on them, as there will be a charge for cleaning them also.

Warning – Shock loads can be more than twice the static load, and can cause very serious damage or failure to the lifting or pulling equipment you are using – this could also cause death or serious injury to the people around the excavation. Always check the equipment you are using is safe and has a current report of thorough examination – if it doesn't – DO NOT USE IT !!!!!

- (8) When you are extracting the trench sheets we recommend using a trench sheet extractor, please ensure it has the correct safe working load for pulling. This will also stop any damage and ripping to the top of the trench sheets. The manhole frames and trench sheets should be progressively withdrawn as you are backfilling the excavation.

Current Safety Legislation

We recommend that users of any excavation support equipment are familiar with the following references and publications:

- (i) HSE – Safety in Excavations – CIS8REV1
- (ii) HSE – Health and Safety in Excavations - Be Safe and Shore – HSG 185
- (iii) BS8002 (1994) – Earth Retaining Structures
- (iv) CIRIA SP95 – The Design and Construction of Sheet Piled Cofferdams
- (v) CIRIA Report 97 – Trenching Practice

Current Safety Legislation requires that the product users formulate a safe system of work to undertake the excavation, which may include a temporary works design. This information is intended to provide general guidance on the equipment needed, and the ground pressures that will be encountered when undertaking the excavation. It is in effect a solution – from this the equipment needed will be calculated. If ever there is a doubt about whether you need a temporary works design, think it can't happen to you, or think you know better, then remember this:

Four very experienced groundworkers were laying foul drains across a greenfield site. The trench was 4.5mtr deep and 2.2mtr wide, with vertical sides. The contractors were advised to provide shoring but they insisted that the ground, comprising of mudstone, was self-supporting and showed no sign of movement. The following day the trench side collapsed catastrophically, killing three of the workers and seriously injuring the fourth.

Moral to the story – No matter how much trenching experience you have, never take the ground and soil conditions for granted, they will surprise you – don't become a statistic!

For any further information you require, on technical support, lifting equipment, or advice on temporary works designs and equipment, contact:

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