

Marshalls Civils & Drainage Downstream Defender Select® Installation Instructions

General

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).

Handling & Storage Instructions

1. The Downstream Defender Select® internal components are manufactured utilising highly durable thermoplastics (co-polymer polypropylene). Improper handling can result in damage to the components and the precast concrete chamber. Failure to comply with the handling, storage and installation instructions voids warranties.
2. Upon delivery of the Downstream Defender Select® components, inspect immediately for delivery damage. If any discrepancies or product problems are found notify the supplier prior to unloading to initiate corrective action. Unloading of a damaged unit without notifying the supplier voids all warranties and releases liability of costs of repair or replacement from Hydro International or Marshalls Civils & Drainage.
3. At all times during unloading and installation, avoid any unnecessary and extreme impacts to the units. Do not allow components to be dropped, rolled or pushed. All components shall be lifted and transported using the designated lifting holes where supplied giving firm and complete support to the unit. At no time shall anyone step, stand or otherwise place unnecessary load on the components.
4. The Downstream Defender Select® shall be as far as practical, installed as so as possible. Pending installation any loose components including lifting loops shall be stored in area protected from dirt and impact.

Lifting Guidelines

1. Marshalls Civils & Drainage/Hydro International recommend 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).
2. The client/contractor will assume ALL responsibility for site lifting operations involving Marshalls Civils & Drainage/Hydro International products.

Foundations & Excavations

1. The chamber excavation shall be properly prepared in advance so that the unit may be installed as practical upon delivery. The chamber excavation shall meet all minimum Health and Safety standards for construction.
2. The area of excavation should be carefully checked for services to at least 800mm greater than the external diameter of the chamber and any services should be excluded from the area.
3. Where the ground bearing pressure exceeds 150kN/m² a sub-base of a 50mm layer of Class 6L over 150mm of well graded Class 6N granular material under the unit, with a surface layer of fine material to assist in levelling, in accordance with BD31/01, is required. If the ground bearing pressure is less than 150kN/m² then a detailed design will need to be carried out as a concrete foundation slab may be required.
4. The sub-base of compacted stone or concrete (depending on site conditions) must be level and at the correct elevation prior to placing the Downstream Defender® concrete chamber in to the excavation.

General Installation Instructions

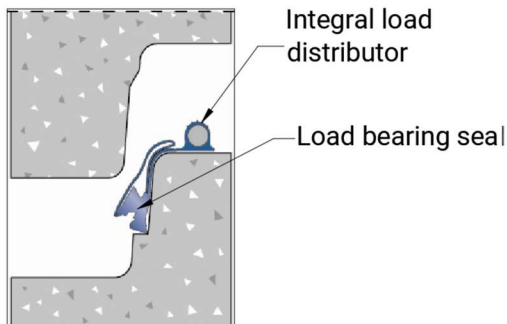
1. There are four lifting arrangements for the Downstream Defender Select®.
 - The Cover slab requires an appropriately rated three legged chain with hooks (to be supplied by the customer).
 - The base slab required for 2.1m, 2.4m & 3.0m units require an appropriately rated three legged chain with hooks (to be supplied by the customer). Note: 1.0m, 1.2m, 1.5m & 1.8m units do not have separate base slab.
 - The 2.1m, 2.4m & 3.0m main units require a four legged chain (to be supplied by the customer) which should have a minimum chain length (2.1m unit = 2.75m, 2.4m unit = 2.75m & 3.0m unit = 3.5m) & four M36 (M42 for 3.0m unit) Lifting Loops (supplied by Marshalls Civils & Drainage).
 - The 1.0m, 1.2m, 1.5m & 1.8m main units require a three legged strap and deha clutch set (to be supplied by the Marshalls Civils & Drainage)

2. The Downstream Defender Select® can be built off either:

- Minimum 200mm pipe granular bedding material being 5-20 graded, 14, 20,40mm single size suitably compacted to provide a level base. Alternatively a Class 6N or 6L material can be used.
- 200mm 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.

Installation Instructions for 1.0m, 1.2m, 1.5m & 1.8m units

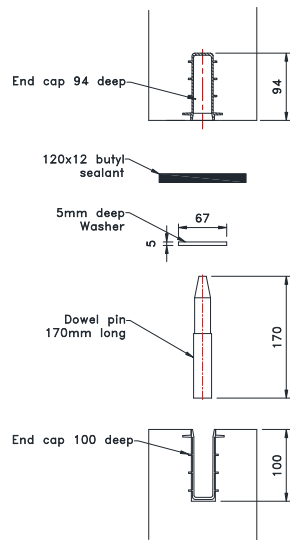
- Base unit to positioned and checked for level on the prepared bedding base (as above).
- Stretch the load bearing seal onto the spigot of the base unit and position it against the rest shoulder. Make sure the load distributor is located on the upper surface of the spigot. Note: External lubrication is not required.



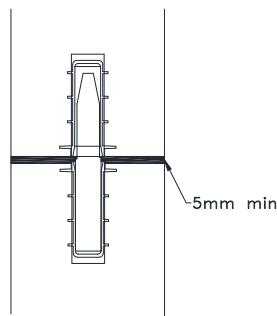
- The top section can then be installed by aligning the outlet marker to the correct orientation and lowering onto the load bearing seal. The design of the joint encourages 'self centring'.
- If any further sections require to construct to the required height then repeat the jointing procedure for every section installed. Once chamber rings in position then install required pipework.
- After reaching the required shaft height, the cover slab should be installed. The slab may require slight vertical downward pressure to seal the unit, as the self weight may not always be sufficient.
- Some specifications may require a concrete surround to the manhole. If the chamber is in an area of high ground water then a concrete surround will be required.
- The Downstream Defender Select® 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.

Installation Instructions for 2.1m, 2.4m & 3.0m units

- Base slab to positioned and checked for level on the prepared bedding base (as above).
- The 120 x 12mm jointing sealant provided should be laid around the base slabs rebated circumference so that it is directly below the first shaft section to be installed. Four of the circular 5mm thick spacer washers provided should be placed at equal spacing around the sealants circumference to ensure an even minimum joint gap when the two units are together and under compression load. Ensure that the ends of the jointing material are overlapped by 50mm to provide a good seal.
- To install the first section onto the base slab, four M36 (M42 for 3.0m) lifting fittings should be fully screwed into the threaded inserts cast-in to the shaft sections top surface. Appropriate chains with hooks can then be used to carry out the lift and install. Use the inlet/outlet markers to align the section with the pipeline orientation.
- Following the first section placement, the four plastic protection caps fitted in the section top jointing surface should be removed to allow the stainless steel jointing dowel pins to be inserted. The four EPDM spacing washers provided should then be placed over the dowel pins to lie flat against the concrete surface.



- The sealing material can then be laid around the sections joint circumference, taking care to carefully pierce the locating dowels through the material so that it lies flat against the spacing washers. The purpose of the washers is to maintain a minimum 5mm joint gap for the sealing material between the two jointed surfaces when under compression.



- The top section can then be installed, align the outlet with the outlet marker on the first section and carefully lowering the unit over the locating dowel pins. **Please Note: The plastic component on the inlet is in raised position until it reached site, & will need to be lowered down once installed on the sump chamber.**
- If any further sections require to construct to the required height then repeat the jointing procedure for every section installed. Once chamber rings in position then install required pipework
- After reaching the required shaft height, the cover slab should be installed on two layers of sealing material between the top manhole section and cover slab making sure to offset the ends of the two layers of material to ensure a good seal.
- Some specifications may require a concrete surround to the manhole. If the chamber is in an area of high ground water then a concrete surround will be required.
- The Downstream Defender Select® 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.

Once installed, the unit should be checked for level, after which suitable backfill can be used unless the contract requires otherwise.

Contact Telephone Numbers: Marshalls Civils & Drainage: 01179 814500. Hydro International: 01275 878371