Enviropod

Technical Design Manual

EnviroPod Contents

Design and Operation

The EnviroPod® is a proven catchpit insert designed to be easily retrofitted into new and existing stormwater catchpits, requiring no construction or land take. It removes a significant portion of sediment, trash, debris and other pollutants from water entering the stormwater system, and can be installed in either curb inlet, standard pre-cast catchpits or manhole catchpits. Using low-cost passive screening and
optional oil-adsorbent media, the EnviroPod® can be customised to meet site-specific requirements with interchangeable polyester mesh screens ranging from 100 to1600 micron pore size. 200micron filter mesh screening bags are supplied as standard (unless specified otherwise). This filter mesh has a moderate/high removal rate and a moderate maintenance requirement.

The EnviroPod is also effective as a pretreatment device for use in a treatment train with hydrodynamic separators, filtration, ponds, swales and wetlands. In many cases, it's often the most practical solution for retrofits.

Independently trialled and tested by city councils throughout Australia and New Zealand and with installation of over 7,000 units including North America, the EnviroPod® Filter is the premiere pit insert.

Design and Operation

The EnviroPod® consists of a screening bag supported by a fillterbox and structural cage. Modular plastic deflector panels attach to the filterbox and guide the flow of water to the screening bag. The screening bag captures pollutants and allows the water to pass through to the outlet pipe. Optional absorbent material inside the screening bag captures oil and grease. Openings in the filterbox allow water to bypass the screening bag during high flow conditions to prevent surface flooding.

Configurations

The EnviroPod® is designed to simply insert into the gully pit below the grate and is mounted on aluminum rails anchored to the (gully) pit walls. The one configuration fits sump type grates, road gullies, kerb entry units etc. Plastic deflector panels seal against the pit walls and direct flow into the filterbox and through the mesh screens. There are mainly two standard sizes to fit most pre-cast (FRC & plastic included) regular and curb entry gullypits with varying plan dimensions between 500 x 500 up to 900 x 900. Custom designs are able to be fabricated for non-standard pits.

Maintenance

Maintenance of the EnviroPod is easy and straight forward. Simply lift the screening bag from the frame and dump out the captured pollutants. Alternatively, the bag can be vacuumed for even faster maintenance. If necessary, replace the oil absorbent media bags.

Capabilities

- Captures sediment, trash, debris and other pollutants before they enter the storm drain system
- Fits curb inlet and flat-grate gully pits
- Easy access — maintenance-friendly design
- Fits a range of gully pit sizes — ideal for retrofits
- Adjustable panels allows fine-tuning during installation for a perfect fit

Configurations

Table 1.

	EPod - A	EPod - C
Gully Pit Width, Min – Max (mm)	500 - 900	450 - 650
Gully Pit Length, Min – Max (mm)	730 - 900	450 – 750
Mesh Size[1] (µm)	200, 1600	200, 1600
Debris Capacity (L)	135	60
Treated Flow Rate (L/s)	10-100	10-100
Bypass Flow Rate[2] (L/s)	200+	130+

Figure 1. Standard Enviropod Filter

Figure 2. Gully Pit Enviropod Filter configuration.

Parameter Performance: Gross Pollutants & Coarse Sediment

Testing at the University of South Australia Urban Water Resources Centre found that the Enviropod unit retained all litter up to an approach flow of 100L/sec. On this basis and the design of the Enviropod Filter bag material which has a sieve aperture of 200 micron we can say with confidence that the Enviropod pretreatment will retain 100% of Gross Pollutants and coarse sediment – defined by the Victoria Stormwater Committee as particles ranging from 500 to 5000 micron.

For full copies of the testing data please contact Stormwater360.

Parameter Performance: Suspended Solids

The Enviropod Filter is a gully pit insert designed to be easily retrofitted into new and existing stormwater gully pits, requiring no construction and no land take. Located at the source of stormwater contaminates the Enviropod Filter has interchangeable filters ranging from 100 micron to 4000 micron pore size. For Suspended Solids reduction application we recommend using a monofilament 200micron pore size filter bag (Enviropod 200).

The Enviropod filter relies on removing contaminants from stormwater by the mechanism of direct screening, guaranteeing debris and particles larger the pore size will be removed. Testing done in Auckland using an Enviropod 200micron filter shows a removal of up 97% Suspended Solids for particles 100 to 500micron in size (Butler, Ockleston, Foster, no date, pg 6).

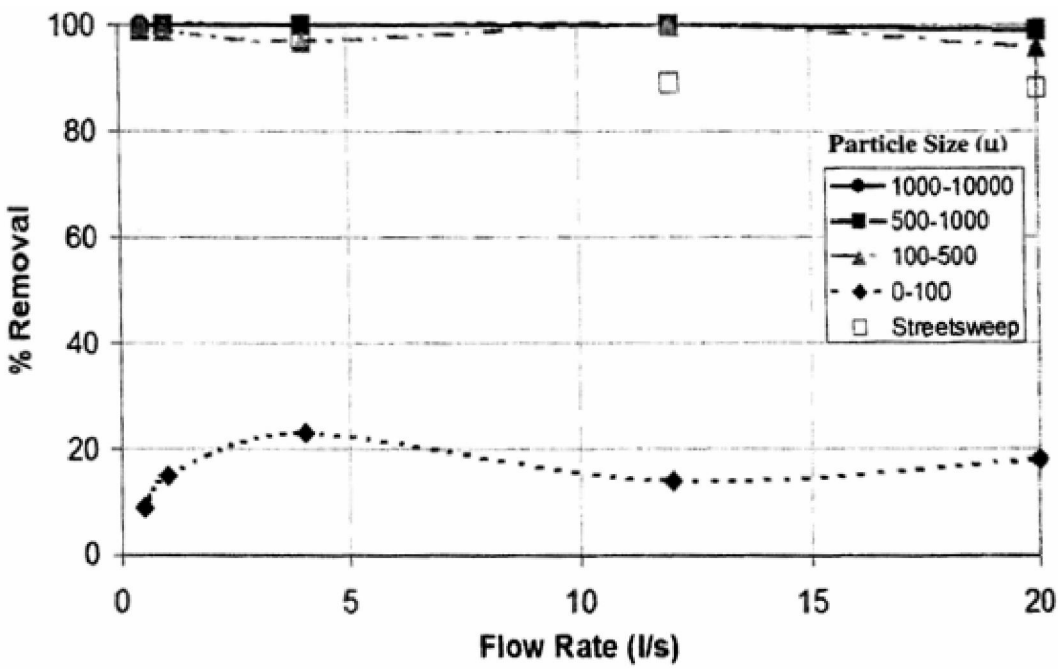

Figure 3. Percentage Removal for various particle sizes.

For full copies of the testing data please contact Stormwater360.

Parameter Performance: Oil and Grease

The EnviroPod uses a perlite based adsorbent material (optional) specially treated to enhance its natural ability to capture and retain oil and grease. The adsorbent material is contained in pouches that are designed to ensure maximum contact with stormwater as it enters the gully pit. Laboratory testing demonstrated that the oil adsorbent material can capture and retain three times its weight in oil.

Each EnviroPod is configured with oil adsorbent pouches around one side of the frame, at the top of the screening bag. During low flows, the water entering the catch basin contacts the oil adsorbent pouches before passing through the screening bag. During high flows, when the EnviroPod begins to bypass, the pouches skim floating oil and grease from the surface of the water retained in the screening bag.

The pouches are clipped to the screening bag for easy removal during maintenance. As the pouches capture oil, the adsorbent material darkens. When the pouches are nearly black they have almost reached their oil adsorbent capacity and should be replaced.

Inspection and Maintenance

EnviroPod installations vary due the vast number of gully pit configurations. These guidelines should apply to most cases as written. For the remaining cases, follow the general actions of these guidelines, varying them as necessary.

The maintenance crew is responsible for disposing of debris in accordance with all applicable regulations and is responsible for following all applicable regulations, including confined space entry requirements.

Contact the maintenance department at Stormwater360 for more information or to order EnviroPod bags and oil absorbent pouches.

Vacuum Truck Maintenance

1. Establish a safe working area per typical catch basin service activity.
2. Remove grate.
3. Vacuum accumulated debris from the upper portion of the catch basin.
4. Remove and inspect the oil absorbent pouches clipped to the inside of the EnviroPod bag. Replace with new pouches in step 8 if the pouches are dark with oil.
5. Vacuum contents from bag. Once most of the material is removed, remove the bag from the EnviroPod with two manhole cover hooks through the loops at the top of the bag.
6. Clean sediment and oils from sides of bag by shaking and/or brushing, taking care not to damage the bag.
7. Inspect the bag, replace if damaged.
8. Re-install oil absorbent pouches. Place bag in EnviroPod.
9. Replace grate.

Hand Maintenance

1. Establish a safe working area per typical catch basin service activity.
2. Remove manhole cover.
3. Remove any material that is in the trough through the curb inlet or manhole.
4. Remove the bag from the EnviroPod with two manhole cover hooks through the loops at the top of the bag. Excess debris should be scooped out first if the bag is near full.
5. Remove and inspect the oil absorbent pouches clipped to the inside of the bag. Replace with new pouches in step 9 if the pouches are dark with oil.
6. Pour contents of bag into disposal container.
7. Clean sediment and oils from sides of bag by shaking and/or brushing, taking care not to damage the bag.
8. Inspect bag, replace if damaged.
9. Re-install oil absorbent pouches in bag.
10. Place bag in EnviroPod. CRITICAL – There is a steel ring inside the bag. Make sure the loose ends are joined together in the connector tube.
11. Replace manhole cover.

Stormwater360
AUSTRALIA

Operations and Maintenance

Enviropod

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APPENDICES

1 INTRODUCTION

The following report details the recommended methods for cleaning and maintaining the Enviropod Stormwater Gully Pit Insert. The aspects associated with cleaning included in this manual are methods for grate removal, filter bag cleaning, unit inspection, filter bag rejuvenation and the re-installation of the filter bags. This plan should be used in conjunction with the appropriate traffic management plans and site safety plans produced for each project. Other Stormwater360 (IES) documents which IES staff should use in conjunction with this report include the IES Employee Health and Safety Manual. It is recommended that contractors develop their own health and safety plans for activities to ensure that the workers are placed in a safe work environment.

Enviropod filter in service.

Each stormwater treatment device must be inspected and maintained regularly to ensure it is working properly throughout the estimated design life. The Enviropod filters require servicing every 1 - 6 months depending on site characteristics; however the maintenance requirements are less labour intensive than alternate traditional treatments. During each inspection and clean, details of the mass, volume and type of material observed should be record to provide ongoing data for future management plan revisions and the optimisation of the maintenance frequency. It is essential that maintenance (including inspections, recording and reporting) be carried out in a systematic manner and is carried out by qualified and experienced personnel. It is also advisable that the treatment device owner has a nominated person responsible for overseeing the management process.

Maintenance is an essential component of stormwater management enabling ongoing at source control of stormwater pollution. Maintenance will also prevent failures such as structural failure (e.g. prevents blocked outlets) or aesthetic failure (e.g. debris accumulation). All stormwater treatment devices require maintenance to ensure the ongoing performance of the system.

Stormwater360 (IES) is a specialised stormwater consultancy with trained and experienced staff. The company has a comprehensive database with detailed information on every Enviropod filter

sold and serviced by IES (formerly Enviropod), collecting site-specific data that can be easily accessed and analysed as required.

This document consists primarily of the processes and tasks associated with the hand maintenance and inductor maintenance procedures. It does not include detail of the traffic management requirements or occupational health and safety requirements. Contractors or IES staff should utilise their own Employee Health and Safety Manual, which details the policies and procedures for safe work.

2 Enviropod Health and Safety

The following section details some of the considerations which may be required for a contactor to comply with relevant health and safety regulations regarding the manual handing activities, hazards associated with the waste material and issues associated with working on roads.

Cleaning of Enviropod filters is a specialist activity. Material collected can be harmful if not handled correctly. Sediments may contain heavy metals and carcinogenic substances as well as harmful objects such as broken glass and syringes. As all of the Enviropod units are located on roads particular care must be taken due to the potential build-up of hydrocarbon based products and other vehicle based contaminants which may be carcinogenic or toxic. It is essential that Occupational Safety and Health guidelines are followed at all times, and that the following steps are carried out to ensure safe and successful maintenance operations.

In additional to the hazards associated with the cleaning handling of material in the filter bags, there also hazards associated with traffic at the work site, the removal of the grate, pedestrians and other non-worker personnel, and general work place hazards associated with working outdoors.

This section is not intended to address all the safety issues associated with Enviropod maintenance, providing only information and suggestions on safety aspects associated with the maintenance procedures. A separate safety plan should be prepared for each project address the specific requirements of the project.

The procedures indicated in the Operations section of this manual are recommend as the safest and most efficient manner in conducting the maintenance of Enviropod Units (Section 3), however contractors and cleaning staff may vary the procedure in response to the site conditions, varying work practices or general preferences in the cleaning techniques. Please note that procedures outlined in this manual are not exhaustive, and that any changes should still comply with general safe work practices.

2.1 Personnel Health and Safety

All contractors and staff shall comply with all current Health and Safety Legislation and take all practicable steps to:

- Comply with all applicable laws, regulations and standards.
- Ensure that all employees, contractors and visitors are informed of and understand their obligations in respect of current Health and Safety Legislation.
- Ensure that employees understand and accept their responsibility to practice and promote a safe and healthy work environment.

All relevant precautions must be taken to prevent contact with sediment and litter when maintaining filters. The following personal protective equipment (PPE) safety equipment should be worn:

- Puncture resistant gloves.
- Steel capped safety boots.
- Fluorescent safety vest.
- Overalls or similar skin protection.
- Safety apron. (if necessary)*
- Eye protection. (if necessary)*

*Higher personal safety conditions may be required when maintaining units that may contain more hazardous material, for example pits where syringes have be observed or pits located in areas associated with such activities.

2.2 Traffic Control

All stormwater collection pits are typically situated either in/on roads and car parks or adjacent to roads in the footpath or swales. Traffic control requirements at each of these locations is typically the same, with most of the state and local road authorities requiring the same controls implemented whether the work is to be conducted on the road or on the road reserve.

As traffic requirements vary based on the road usage and the specific road configuration, traffic control plans should be prepared for each site. Given that maintenance is typically a quick process, the contractor should liaise with the relevant road authority to determine the specific road safety requirements for each location to ensure that on site workers can conduct the cleaning operations safely and efficiently, while complying with all laws and regulations.

NSW RTA working on roads safety manual indicates the signage requirements, placement of barricades or witches hats and the positioning of traffic control personnel. In addition to standard safety requirements IES recommends that the maintenance vehicle be used to increase safety, through shielding the work area from oncoming traffic.

Plate 1 indicates the vehicle placed to shield the work area with cones placed around the vehicle. Plate 2 indicates at head on view, note the vehicle is positioned to allow access to the drive, whilst still blocking the pit from on-coming traffic. The vehicle has a flashing light on the roof and the hazard lights switched on.

Plate 1 Vehicle positioned near pit, preventing traffic from passing close to the pit.

Plate 1 Head-on view, indicating the placement of the vehicle near the pit.

2.3 Confined Spaces

Confined spaces poses a serious safety hazard for all personnel, however during the normal maintenance procedures there should be no reason to enter a confined space. All maintenance procedures are able to be conducted from the surface. Confined space entry procedures are not included as part of this manual, for IES employees confined space entry procedures are included as part of the IES Safety Manual. It is recommend that all contractors evaluate their own needs for confined space entry and compliance with Occupation Health and Safety regulations.

When repairs or maintenance activities cannot be conducted from the surface, the contractor/cleaner should evaluate the need to enter the confined space, considering all alternative options. Where there is a need to proceed in a confined space, only staff with current confined space training shall operate in a confined space. Appropriate measures and controls shall be put in place to meet confined space entry requirements. Safety equipment must be worn where deemed necessary and where gas or oxygen hazard occurs, staff trained in its use will only use BA gear. **Non-trained staff must not go into confined spaces**.

3 Operations

This section details the specific activities required to clean the Enviropod units. Please note it has been written for use by someone who has never encountered a stormwater pit or an Enviropod unit, providing a step by step process for each of the cleaning stages.

3.1 Maintenance & Monitoring of Enviropod filters

The maintenance frequency is dependent on several variables, such as catchment area, surrounding land use, vegetation type, traffic loading and rainfall patterns. IES recommends that during the first year of operation the units should be monitored monthly, with maintenance as required.

The ensure that the unit performs optimally, the material collected by the filter bag should be emptied when the level of material is no more than approximately **half to two thirds** of the total bag depth or when there is evidence of material overflow. Although the bag has greater storage area, it is recommended that it is not left to fill completely prior to empting, for the following reasons; the bags are capable of retaining a heavy mass of material (in excess of 50kg); material near the top of the bag can be resuspended during high to extreme rainfall events; and blockage of the overflow sections can occur, when material is allowed to build up above the filter bag.

Maintenance frequency should be adjusted to accommodate variable rainfall patterns. Regions east of the Great Dividing Range typically are dominated by greater rainfall during summer and Autumn Months, as such more maintenance is typically required during these periods. It is recommended that biannual inspections be carried out in November and April, while quarterly inspections should be conducted in February, April, July and November.

It is also recommended that additional monitoring should be conducted following moderate to extreme rainfall events, in particular, when preceding months have had little to no rainfall. This monitoring is considered necessary to accommodate for higher volumes of runoff generated during major rainfall events, an anticipated greater accumulation of surface contamination during low rainfall periods and to ensure that the units have not been damaged due to high pipe velocities.

Attached in Appendix A & B is an example of an Enviropod Service Receipt and Generic Monitoring Form which is to be completed by the Cleaning Contractor when servicing any Filters. Relevant information is recorded and forwarded to the client following each maintenance clean.

Table 1: FREQUENCY OF MAINTENANCE ACTIVITY

	INSPECTION/MINOR MAINTENANCE (TIMES/YEAR)	**MAJOR MAINTENANCE (TIMES/YEAR)**
Enviropod	12 (and after major storms)	2-6 (except in case of a spill)

3.2 Stormwater Pit Cover Removal

There are several different types of stormwater pit covers used throughout Australia. These grates/lids are constructed of three main materials, cast iron, galvanised steel and concrete. Stormwater pits covers will either be hinged (lockable) or simply placed on a recessed frame, with cover which are not hinged are typically heavy, to prevent the grate being easily knocked open by passing traffic. Each different pit cover requires different techniques to safely remove the cover to gain access to the Enviropod Unit.

Plate 2 Hinged galvanised steel pit grate

Plate 3 Heavy duty hinged galvanised steel pit grate

Plate 4 Hinged cast iron grate

Plate 5 Non-hinged heavy duty galvanised steel pit grate

Plate 6 Non-hinged cast iron grate

3.2.1 Hinged Pit Grates

Hinged pit grates are typically either light duty galvanised steel, heavy duty galvanised steel or two-piece cast iron. Generally hinged pit grates can be opened by one person, however heavy duty galvanised lids and cast iron lids may require two people. If you are unclear about the type of grate, always use two people.

To open a hinged pit grate follow the following steps:

1. Insert the lifting hooks beneath the grate. (Position indicated in Plate 7)
2. Check hinge point is not damaged and debris is not caught in the hinge area.
3. Note many cast iron hinges are not hinged securely (to enable the removal of the grate). This may result in the pit grate not being able to sit in an open position. Additionally the hinge pins may also be damaged or corroded, which may allow for the pit grate to fall into pit. Such pit grates can be removed using the method indicated below for non-hinged grates.
4. Fully open pit grate, ensuring that the grate will stay in the open position without any external forces applied. Grates which do not remain open without being held should be removed or secured during cleaning or maintenance activities. Plate 8 and Plate 9 indicate the grate being opened and grate resting freely in the open position, respectively.

Plate 7 Lifting the grate

Plate 8 Opening Grate

Plate 9 Fully open grate

Plate 10 Lowing grate

To close an open hinged grate

1. Place lifting hooks through grate. (same position to remove grate)
2. Gently lower grate into position. (Plate 10)
3. Note some grates have offset hinges points that prevent the grate from falling over, such pits require the hinged side of the grate to be lifted while the grate is lowered into position. (insert picture)

3.2.2 Non-Hinged Pit Grates

Non hinged pits are typically constructed of cast iron, concrete or heavy duty galvanised steel. As such the pit grates are generally heavy and difficult to remove, generally requiring two people to safely remove the lids.

To remove a non-hinged pit grate:

1. Place lifting hooks beneath grate, where possible in the four corners of the grate (Plate 11). Concrete lids may have Gatic lifting points, a key arrangement or holes in the lid, as such special equipment, such as Gatic lifters may be required.
2. Position each person either side of the grate. (Plate 12)
3. Lift the grate, ensuring that good heavy lifting posture is used at all times.
4. Place the grate on an angle on the gutter, to allow for the lifting hooks to be removed. (Plate 13)
5. For extremely heavy one piece grates and concrete Gatic covers, insert the lifters in place and slide the lids back. Note some lids may still require two people. (Picture required)

Plate 11 Insert hook near edge of grate

Plate 12 Position each lifter either side of the grate

Plate 13 Lift grate and move grate to one side

Plate 14 Lift grate above the support frame

Plate 15 Reinstated non hinged grate

To reinstate a non-hinged pit grate

1. Place lifting hooks though the grate. Note do not place hooks at the very edge of the grate, as this will make it difficult to place grate on the support.
2. Lift the grate into position and lower onto the supporting frame (Plate 14), ensuring that the grate sits level with the finished surface. If the grate does not sit securely remove the pit cover and check for debris in the pit cover frame, then try to lower grate again.
3. Check final position of the cover, ensuring that the cover sits flush with the surface and does not create a trip or traffic hazard. (Plate 15)

Note all grates should be reinstated to the original condition.

Care should be taken with old or damaged pit covers and grates. Grates or covers observed to be in poor condition should be first inspected to determine whether further damage will occur if an attempt to remove the grate is made. Pits grates which appear to be severely damaged or appear as though they would break while being removed should not be removed. Contact the client (and pit owner if not the client) and IES (IES Sydney office number is 02 9907 1401) to discuss an appropriate action. Pit grates and covers damaged by the contractor will be repaired at the cost of the contractor, or as part of an arrangement with the pit owner.

3.2.3 Pits unable to be opened

Pits may be unable to be opened for several reasons, including through corrosion, new road surfaces covering the pit lid, and foreign material jammed in the lid. The following steps may assist in opening the pits:

- Chip away new road coverings or concrete/bitumen spills using a pinch bar or similar device. **Care must be taken not to damage road surfaces**.
- Corroded or jammed pits may be loosened from the grate frame by using a lubricant such as RP7 and tapping the grate frame and grate. **Note if the grate or grate frame appears severely corroded, the grate should not be opened and IES and the client should be contacted to discuss options.**
- Pits which cannot be opened may require a hydraulic lifting arm to fully remove the lid.

3.3 Cleaning Methods

One of the following methods of maintenance should be used for the servicing of these Enviropod Filters:

- Cleaning using Inductor Truck.
- Hand Maintenance.

One of the advantages of the Enviropod units is that it doesn't require specialised equipment for maintenance. In certain situations it may be more feasible to maintain the units using the inductor truck method, while for other projects hand maintenance may be the preferred option. The cleaning method for the Enviropod units should be evaluated specifically for each project.

3.3.1 Cleaning using Inductor Truck

The following steps indicate a safe and efficient method to clean the Enviropod using an Inductor:

1. Open gully pit. (See Section 3.2)
2. Place the inductor hose over the material collected in the filter bag and switch on the inductor.
3. Using the inductor hose suck all of the sediment, organic leaf material, litter etc., collected in the filter bag
4. Allow the filter bag to be sucked up into the inductor hose for a few seconds to allow for the filter mesh pores to be cleaned. Care is to be taken by the operator not to damage the filter, i.e. ensure that there are no sharp edges on the inductor hose.
5. If material has built up around the overflows, use the inductor hose to clear the accumulated material.
6. Remove filter bag from the pit.
7. Sediment retained in the gully pit grate is to be removed.

8. Back opening channels are to be cleared of any debris to ensure flow is not hindered. Debris can be collected using the inductor truck.
9. All gully pit waste is to be removed from the pit.
10. Check the Enviropod unit. (See Section 3.4)
11. Check filter bag. (See Section 3.5)
12. Reinstate filter bag and gully pit lids.

Plate 16 Cleaning an Enviropod using the inductor method

Gully pit sediments under no circumstances are to be backwashed into the gully pit.

3.3.2 Hand Maintenance

Two people are generally preferred to maintain the units by hand. However for shallow units and units which contain mainly leaf material (low overall accumulated weight), may be cleaned by one person. Note additional personnel may be required for traffic management purposes or for general safety.

The following steps indicate a safe and efficient method to clean the Enviropod manually by hand:

1. Open gully pit. (See Section 3.2)
2. Place the lifting hooks in the lifting loops of the filter bag. (See Plate 17)
3. For extremely heavy and overfilled bags either use a hydraulic lifting arm to lift the bag, or remove excess material using a shovel or similar piece of equipment. IES prefers the use of a post hole shovel, due to the reduced strain on the back when digging and the ability of the shovel to grab material vertically. (Insert Picture)
4. Lift the bag vertically off the supporting frame, ensuring that no undue pressure is placed on the filter bag. (See Plate 18)
5. Lift the bag clear of the stormwater pit. (See Plate 19)
6. Position the bag over the truck or other collection vehicle, taking hold of the loops at the base of the bag. (See Plate 20 and Plate 21)
7. Lift and empty the filter bag by holding the bottom lifting loops only. (See Plate 22)
8. Completely empty the filter bag. (See Plate 23)
9. Brush the filter bag with a stiff brush to remove bound sediment from the filter pores. (See Plate 24)

10. Check the filter bag. (See Section 3.5)
11. Check the Enviropod unit. (See Section 3.4)
12. Reinstate filter bag, ensuring bag is installed the correct way. (See Plate 25 and Plate 26)
13. Reinstate gully pit lids. (See Plate 27 and Plate 28)

Plate 17 Place the lifting hooks through the bag loops

Plate 18 Lift the bag from the cage and support frame

Plate 19 Lift the bag from the stormwater pit

Plate 20 Lift the bag onto the collection vehicle

Plate 21 Grab the bottom lifting loops

Plate 22 Lifting the bottom bag loops empty the filter bag

Plate 23 Completely empty the contents of the filter bag

Plate 24 Brush the pores filter bag with a stiff brush

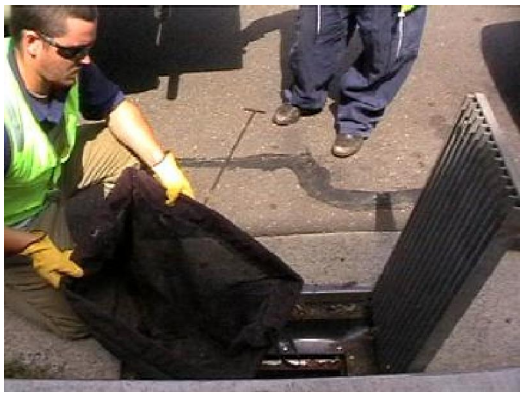

Plate 25 Reinstall filter bag

Plate 26 Ensure that the unit is positioned correctly, with the lifting loops on the inside

Plate 27 Correctly installed filter bag

Plate 28 Installed filter bag and sealed pit

3.4 Unit Inspection

After the Enviropod filter bag is removed, emptied and cleaned, the following should be checked to ensure that the unit has not been damaged:

- All connections and joints should be checked and broken rivets replaced (See Plate 29);
- The plastic pit seals should be inspected for unit movement or damage (See Plate 30); and

- The cage should be inspected for damage or movement (See Plate 31).

The overflow diversion channels, and the area between the Enviropod cage and pit wall should also be inspected for the accumulation of debris. Any observed debris should be removed and disposed of off-site. Accumulated material within the outlet pipe may need to be flushed.

Note: If the units are not cleaned regularly the mobilisation of material collected in the Enviropod unit may occur, as such cleaning of the units in accordance with this management plan is required. As this plan is based on observations and data collected during the monitoring period, ongoing adjustment of the cleaning frequency is generally required to improve the overall efficiency in the removal of collected material and prevent material overflow.

Plate 29 Check seals are pushed against the pit walls

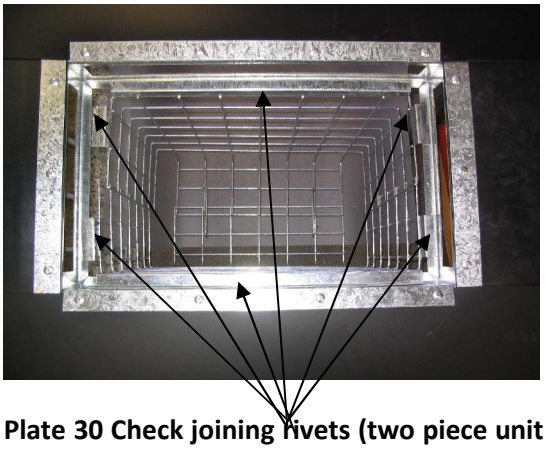

Plate 30 Check joining rivets (two piece unit shown above)

3.5 Filter Bag Inspection and Rejuvenation

Following the emptying and cleaning of the filter bags, the filter bag should be inspected to evaluate the bag condition. Given the nature of stormwater the filter bag from some Enviropod units can become considerably clogged with fine sediment. Filters can also be damaged by various objects in stormwater as well as fauna. Sharp objects such as sticks combined with high velocity water and a large mass in the filter bag can cause small tears in the filter material. Animals such as rats have also been known to chew through fine mesh filter bags located in gully pits near takeaway food outlets.

3.5.1 Clogged Filters

Clogged filter bags can be clean using several different methods. If the bag cleaning techniques described in the general maintenance sections above are not able to clean the filter bags the following options should be considered:

- Using a stiff brush and a bucket of soapy water scrub the filter bag surface.
- Remove filter bags from the pit and wash the bags using a high pressure water spray. Care has to be taken to not transfer the contamination elsewhere. Waste water from the process should be collected of and disposed of correctly.
- Remove the filter bags from the pits and the support rings and wash the bags in an industrial washing machine.

The final option presented above typically results in the bags appearing like new, with no visible stain or pore clogging within the filter mesh.

Plate 31 Slightly clogged filter bag, indicated by the brown stain on in the centre of the bag

Plate 32 A clean used filter bag

3.5.2 Damaged Filters

Damaged filters can often be repaired, provided the damage is small. Small tears in the fabric may occur do to several reasons, however the overall strength & structure of the nylon fabric typically prevents small tears becoming much large. Although the bag is unlikely to tear further care must be used when clean torn bags as not to spill the collected material into the pit.

Small tears may repaired by either sewing the tear back together, with additional fabric to increase the strength of the stitching, or by sewing a patch of the filter material onto the filter bag. The filter bags may need to be replaced if large tears are present, as the filter bag is no longer able to function as intended.

IES is able to repair bags or replace bags which have been damaged during maintenance. Please contact IES Sydney office on 02 9907 1401 for details or a quote.

3.6 Disposal of Material

All gully pit wastes from the site are to be taken off site and disposed of at a transfer station or similar approved disposal site. Stormwater Sediments can contain Lead, Copper, Zinc, Mercury, hydrocarbons and PCBs, which are harmful to both humans and the receiving environment. Appropriate sampling and laboratory analysis may be required to classify the material as suitable for reuse, or disposal under appropriate local guidelines.

4 Emergency Procedures

4.1 Spill Procedures

In the event of a spill discharging into any gully pit all sediment is to be extracted and the filter bags are to be removed and replaced with rejuvenated filter bags. Normal operation procedures apply to additional cleaning as a result of spills.

4.2 Blockages

In the unlikely event of surface flooding around a gully pit fitted with an Enviropod the following steps should be carried out:

Check Enviropod over flow bypass. The Enviropod filter has been designed with an overflow mechanism built into the filter box. If surface flooding still exists check the overflow slots underneath the rubber seal. If debris is lodged in the overflow slots these can be easily cleared by hand or steel rod.

If overflow is clear and surface flooding still exists remove Enviropod and check outlet pipe for blockages.

Removal of the Enviropod may be difficult if the filter is clogged and the Enviropod is holding water. If the filter is clogged, brush the side walls of the filter with a yard broom or similar. This will dislodge particles trapped at the interface allowing contained water to flow through the filter.

If the outlet pipe is blocked, it is likely that a gully sucker truck will be required to unblock it. Debris should be removed from the Enviropod with the gully sucker truck before removal of the Enviropod filter.

If a gully sucker truck is not available and the Enviropod needs to be removed by hand, follow the steps below:

- Remove excess debris by hand or brush the side of the filter.
- Lift and place filter ring through the filter box and into cage.
- Remove Filter box.
- Lift cage containing filter bag and ring out of the pit.
- Unblock outlet pipe.

Appendix A
Service Receipt Example

Enviropod Service Receipt

Site:
Contractor:
Location:
Year:

Job Number:
Receipt Number:
Week Serviced:

Service Frequency:
Enviropods on Site:

Enviropods Cleaned:
Bags Checked:
Frames and Seals Checked:
Overflows Checked
Tonnage:

If Damaged, Action:
If Damaged, Action:
If Blocked, Cleaned:

Comments

This service has been performed in accordance with Enviropod Management Plan (EMP) for above site. Please file this receipt with EMP and keep on site for compliance inspections.

Signature:

Position:

Appendix B
Maintenance Form Example

Enviropod Maintenance Form

Client: **Bag:** **NOTE:** **See maps for detailed location.**

Project: **Date:**

ENVIROPOD Sites

Pit No.	Map No.	Location	Bag Size	Date	% Organics	% Litter	% Sediment	Fullness - F, 1/2, 1/4 or 0	Notes	Grate
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
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21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Stormwater360
AUSTRALIA

Enviropod

Installation Manual

Enviropod® Installation Manual

Purpose
The purpose of this manual is to indicate the safest and most efficient method in installing the Enviropod units.

Personal Protective Equipment
The following personal protective equipment is required by staff for installation activities:

- High visibility vest or shirt
- Safety Footwear (Steel cap toe)
- Gloves (leather palmed riggers gloves or similar)
- Safety eyewear whilst drilling, hammering, cutting T section struts and installing tops and cages.
- Hearing protection for drilling, cutting using electric or battery saws and hammering.

Note: Personnel on construction and private sites must also adhere to the specific safety requirements of each work site.

Tools Required For Installation

1. Tape measure
2. 8mm masonry drill
3. 5 mm steel drill
4. Pop Riveter for 4.8mm rivets
5. Hammer
6. Stanley knife
7. straight edge
8. 10mm socket and ratchet
9. hacksaw

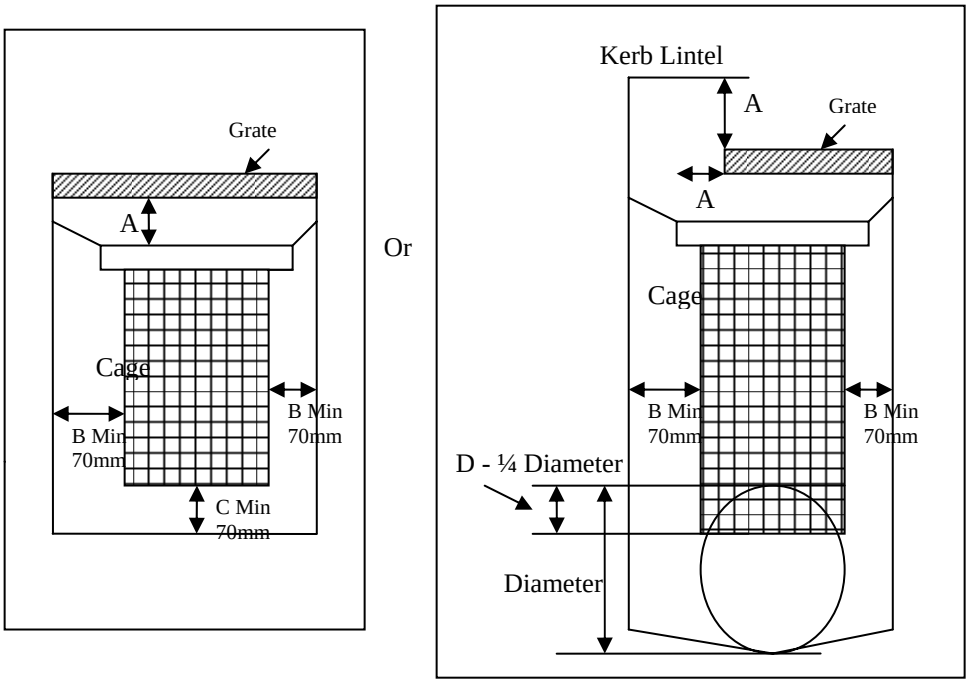
Pre-Installation Works (to be completed by others)

1. Gully pits shall be clean prior to installation by either a “Gully sucker” or manual methods.
2. All solidified material and debris within the gully pit shall be broken-out and removed.
3. Cleaning shall be carried out up to 1 week immediately prior to installation.
4. Any standing water shall be removed from the gully pit.
5. Any pipe penetrations within the gully pit must cut off flush with pit walls and rendered prior to installation.

Installation

The aim of all Enviropod installations is to install the largest unit into each pit, without influencing the hydraulic performance of the pit or drainage system. To provide clarification on certain aspects of the installation the following tolerances are included in the following table:

Code (Drawing)	Location	Tolerance	Description
A	Between top section and underside of grate	**Equal** distance **between** the **unit and the underside of the grate** to that **between the kerb lintel and the gutter invert**.	The distance is to ensure that any object entering the pit, through the kerb inlet, will not cause any blockages
B	Between the cage walls and the pit	A minimum of **70mm**. A maximum of **300mm** (without unit modification)	This distance is to ensure that unit will not cause material to accumulate between the pit walls and the cage and that standard plastic sizes can be used.
C	Between the cage base and the pit	A minimum of **70mm**.	This distance is to ensure that unit will not cause material to accumulate between the pit base and the cage.
D	Into through flow pipe	Maximum of the top **¼ of the pipe** can be obstructed by the cage.	To ensure that the through pipe is not obstructed.



Enviropod Installation Procedure – 1 Piece Cage

Strut Installation

1. Measure the internal dimensions of the pit while marking the centre of the pit length, at 150mm down from entry of pit (the height where the struts are to be secured). Remembering to allow for dimension “A”.

2. Using a unit template mark the position of the holes for the L-brackets, based on the centre mark.

3. Using an 8mm masonry drill bit drill holes for the insertion of the Dyna Bolts

4. Cut the T sections to length, and pop rivet an L-bracket to one end of the T sections


5. Insert the T section, with L-bracket under the lintel and secure L-bracket to the pit wall with an 8mm Galvanised Dyna Bolt

6. Secure second L-bracket to the opposite pit wall using a Dyna Bolt

7. Pop rivet the free side of the T section to the second L-bracket

8. Repeat the steps 5-7 for the second T section

Top Section Installation

1. Measure the internal dimensions of the pit at the height at which the plastic is to sit

2. Trim the plastic to fit the internal pit dimensions, adding an extra 20mm to each side to ensure a tight fit

3. With the plastic bent slightly upwards, lower the Top Section into the pit, guiding the unit so that it locates on the T Sections struts.

4. Slide the Top Section along the T Sections until it sits in the centre of the pit.

5. Check unit to ensure a good fit within the pit. If the unit does not make a good fit, and that any gaps are less than 15mm. If the gaps are larger than 15mm the plastic will need to be replaced by a larger section.

6. On each strut drill a 5mm hole through the Top Section and the T Struts, and secure the Top Section to the struts using a 73AS6-8 pop rivet. **NOTE: if the EnviroPod incorporates a cage, step 6 can be completed during <u>stage 2</u> of 'Cage Installation'.**

7. Check plastic to ensure that it is bent upwards on all sides, adjusting plastic if required, fill small gaps with silicon sealant if required

Cage Installation (If Required)

1. Lower the cage through the Top Section until the lip of the cage sits on the internal lip of the Top Section

2. Drill a 5mm hole through the Top Section and Cage Lip, and secure with a pop rivet

3. Repeat for opposite side

Bag Installation

1. Thread the filter bag onto the stainless steel support ring

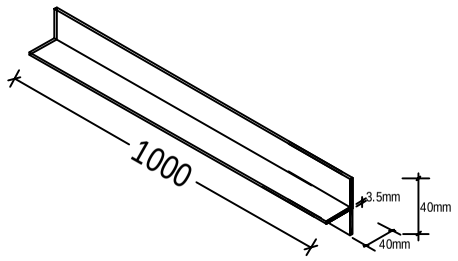
2. Lower the bag into the pit ensuring that the lifting loops at the base of the bag or on the outside

3. Pull the internal filter mesh downwards to ensure a secure fit with the top section.

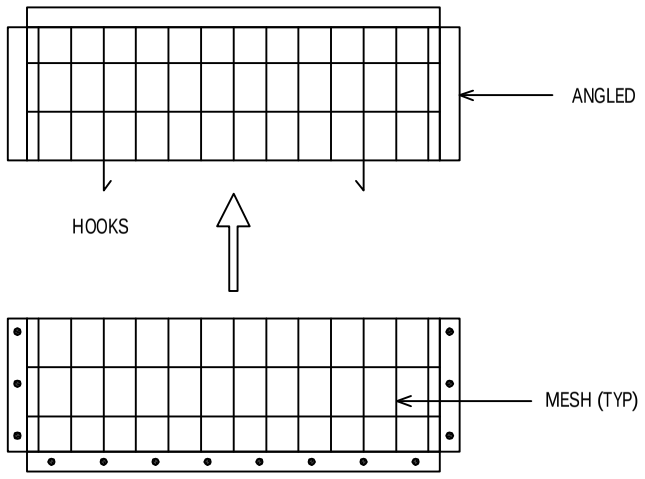
A-TYPE UNIT CONFIGURATIONS

UNIT TYPE	STRUT TYPE	TOP TYPE	CAGE TYPE 2-PART (HEIGHT mm)	RING TYPE	BAG TYPE (HEIGHT mm)
A1	A	A	A1(600)	A	A1(600)
A3	A	A	A3(350)	A	A3(300)
A5	A	A	N/A	A	A5(170)

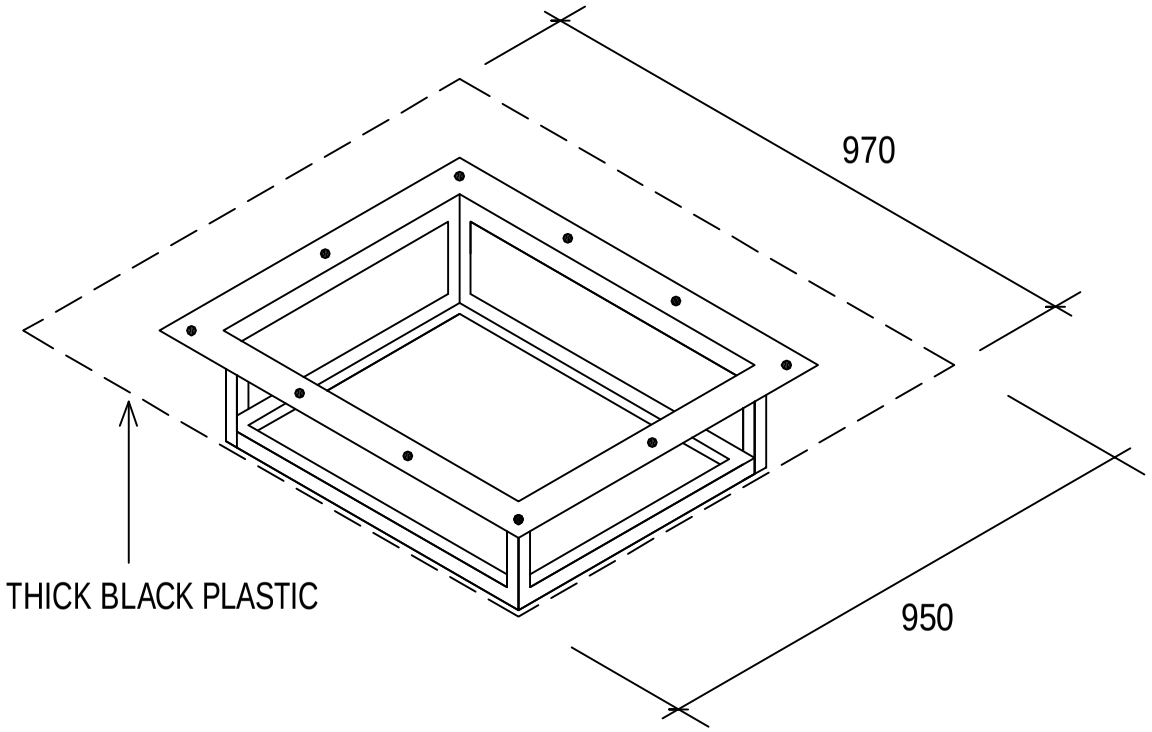
NOTE: UNIT TYPES A5 ARE INSTALLED WITHOUT ANY CAGES. USE ONLY STRUT, TOP, BAG & RING.



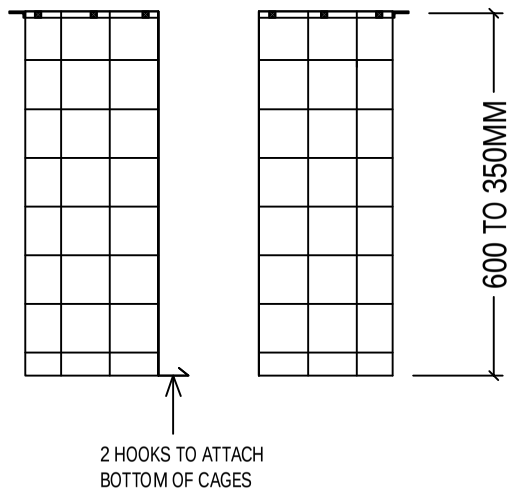
A-TYPE ALUMINIUM STRUT



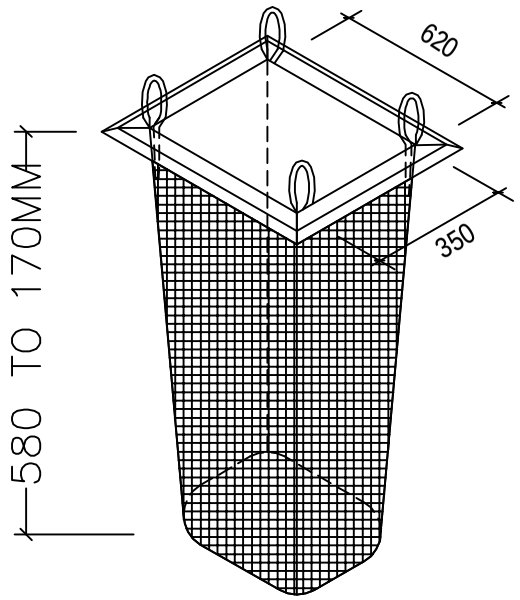
A1(600MM) TO A3 (300MM) CAGES - PLAN



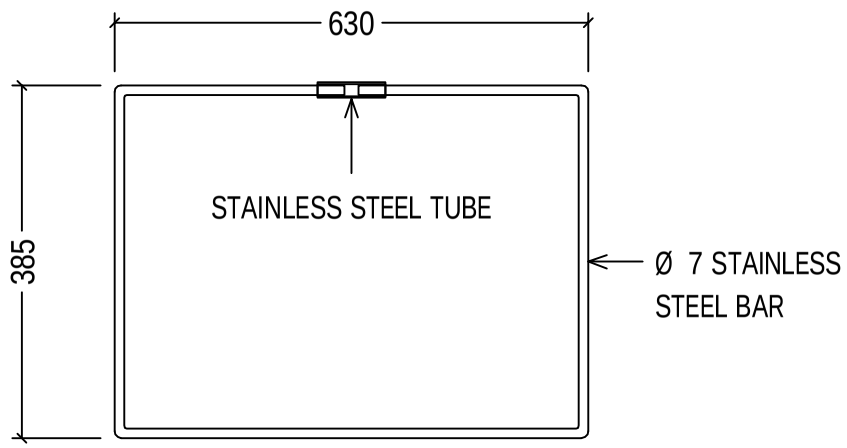
A-TYPE TOP



A1(600MM) TO A3 (350MM) CAGES - SECTION



A1(600MM) TO A5 (100MM nom.) BAGS



A-TYPE RING

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STANDARD ENVIROPOD FILTER
A-TYPE CONFIGURATION & COMPONENTS
GENERAL ARRANGEMENT

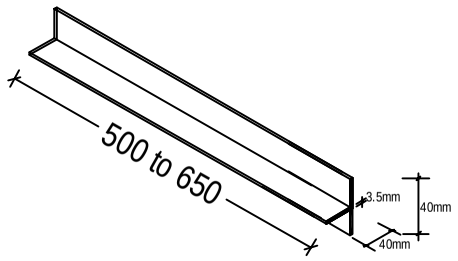
DRAWING 1 B

DATE: 18.03.08 | SCALE: N.T.S. | FILE NAME: EPOD_TYPE_A_KEY_1B | DRN: R.P. | CHK: M.W.

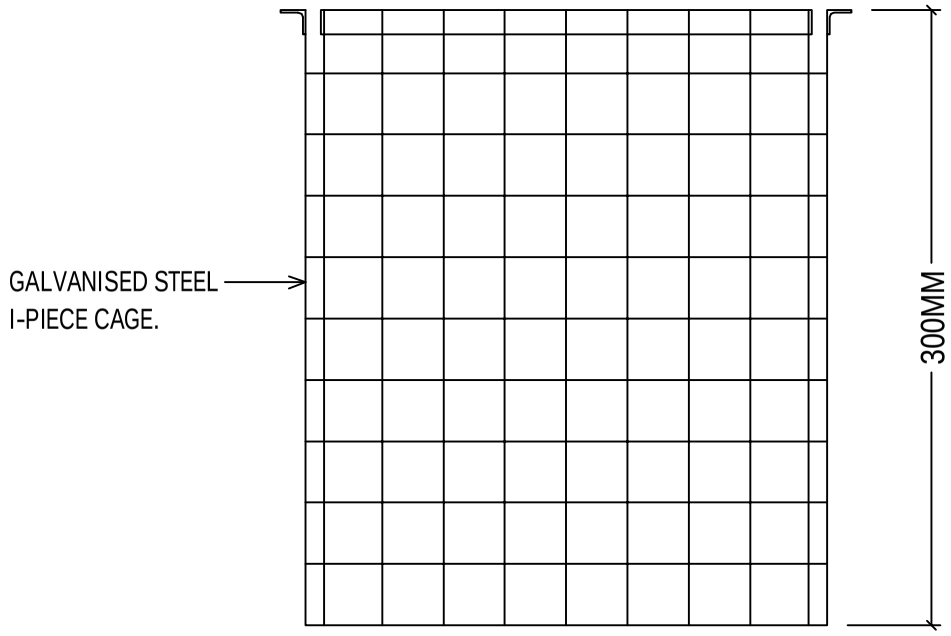
C-TYPE UNIT CONFIGURATIONS

UNIT TYPE	STRUT TYPE	TOP TYPE	CAGE TYPE 1-PIECE (HEIGHT mm)	RING TYPE	BAG TYPE (HEIGHT mm)
C3	C	C	C3(300)	C	C3(300)
C5	C	C	N/A	C	C5(170)

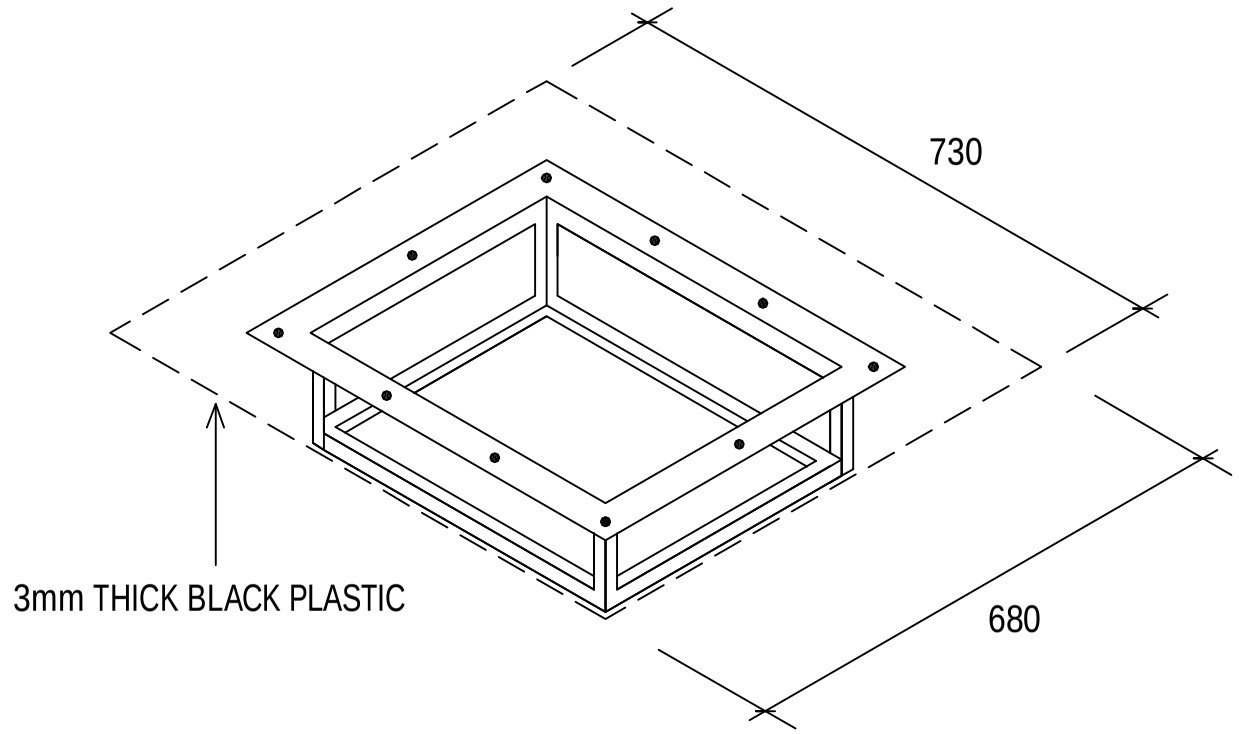
NOTE: UNIT TYPES C5 ARE INSTALLED WITHOUT ANY CAGES. USE ONLY STRUT, TOP, BAG & RING.



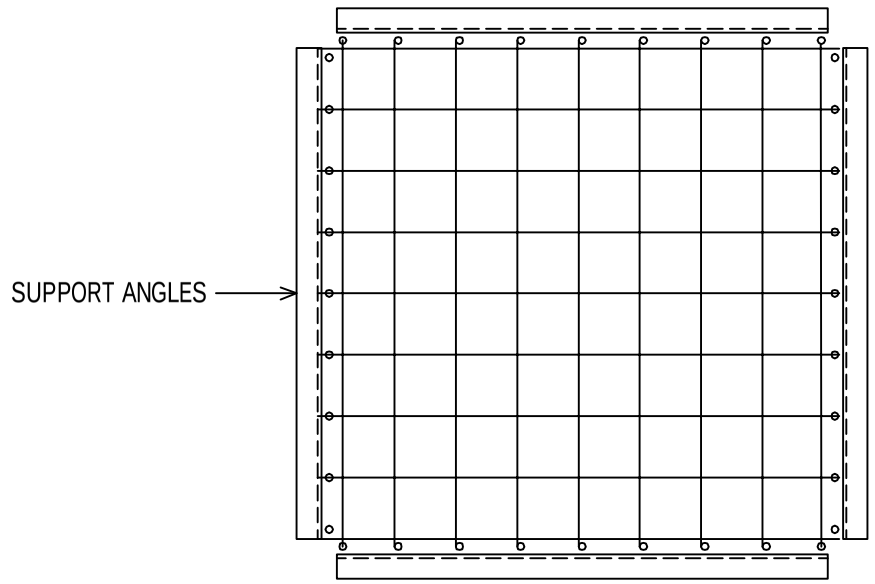
C-TYPE ALUMINIUM STRUT



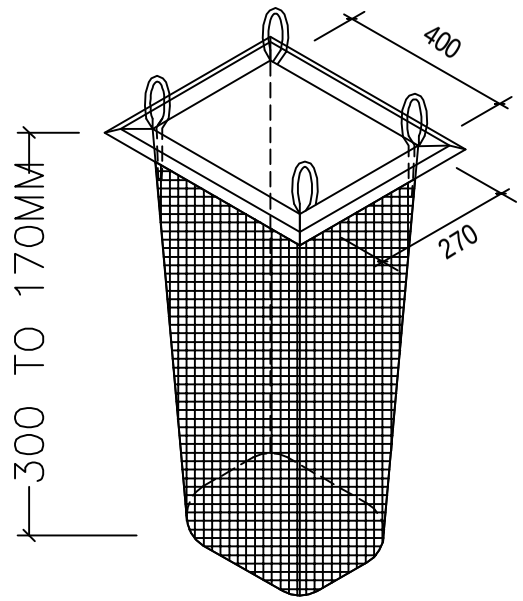
C1(600MM) TO C3 (300MM) CAGES - PLAN



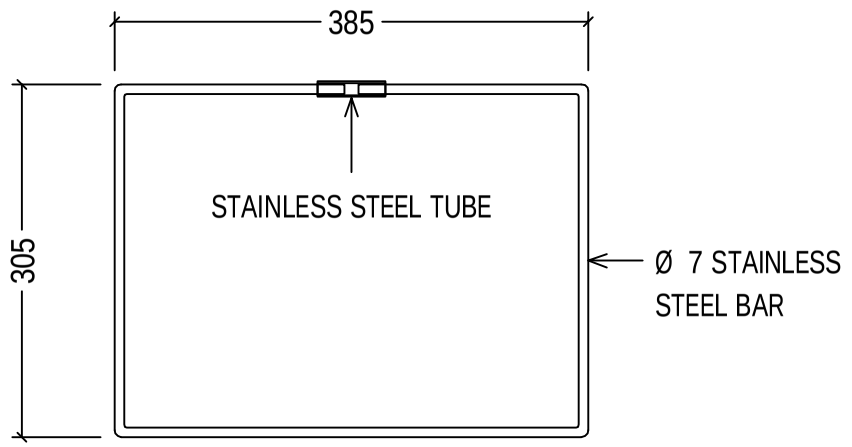
C-TYPE TOP



C3 (300MM) CAGES - SECTION



C3(300MM) TO C5 (170MM nom.) BAGS



C-TYPE RING

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STANDARD ENVIROPOD FILTER
C-TYPE COMPONENTS & CONFIGURATION
GENERAL ARRANGEMENT

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DATE: 18.03.08 | SCALE: N.T.S. | FILE NAME: EPOD_TYPE_C_KEY_1B | DRN: R.P. | CHK: M.W.