



Water Quality Guide

| November 2023 Version |

CIVILMART

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STORMWATER SOLUTIONS

Civilmart Stormwater
Products



CDS® Separator

The CDS® Separator is designed to capture and retain gross pollutants, litter, grit, sediments and associated oils, utilising patented CDS® indirect screening technology.

Civilmart offers a complete design service for CDS® products that takes into account the catchment's characteristics, pollution load, hydraulic site constraints and opportunities, system capacities, velocity, backwater, as well as the location of services and access for cleaning.

Hydraulic reports are available on request and are automatically carried out for larger units.

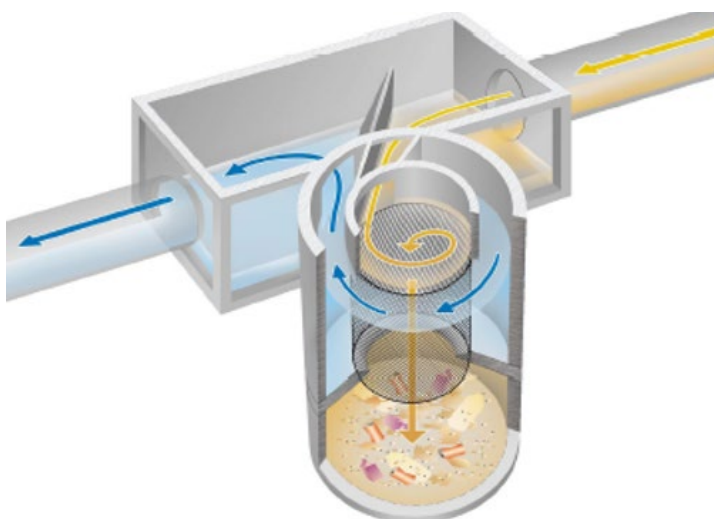
CDS® Continuous Deflective Separation

The CDS® Separator utilises the energy of the inflow to create a vortex flow regime within the CDS® screening chamber.

The CDS® Separator simply creates a whirlpool that draws all the deflected and settling pollutants to the centre of the screening chamber where they fall out into the storage sump below.

The pollutant storage sump located below the screening chamber allows pollutants to be removed from the flow path and away from the screens, thus maintaining a reliable treatment efficiency.

The unique CDS® technology is the most reliable way to effectively and efficiently treat gross pollutants in stormwater drainage systems.



Characteristics

- Non-blocking functionality
- 95% capture of gross pollutants >1 mm
- 95% sediment capture >200µm
- Captures organics and oils
- Captures adsorbed toxins and nutrients
- Can treat any pipe or multiple pipes
- Various sump sizes available
- Customised bypass requirements
- Underground - small footprint
- Easy installation
- No moving parts
- Lowest life cycle costs
- More water treated than comparable treatment designs
- Pollutants stored in the sump, not the screens

Benefits

- Subdivisions and roads
- Residential, commercial and industrial developments
- Car parks and shopping centres
- Pre-treatment for wetlands
- Pre-treatment for reuse applications
- Pipes, channels, culverts and creeks

Other CDS® models are available for non-stormwater applications involving high flow solids/ liquids separation, such as industrial processes and sewer overflows.

CDS® Unit Models

The size and type of CDS® Separator required depends on catchment area, flows, pollution loads, performance requirements, maintenance method, hydraulic limitations and site constraints.

Visit the Civilmart website for a sizing request form. Details submitted with this form provide all the information needed to calculate the size of device most applicable for the site.

CDS® Separator Model No.4	Overall Dia1 (mm)	Treatment3 Flow (L/s)	Weir Height2 (mm)	Minimum DTI5 (mm)
Nipper 0506	1300	20-22	300	1035
CDS 0708	1750	50-55	400	1105
CDS 0708Maxi	2600	50-55	400	1185
CDS 1009	1950	100-110	500	1610
CDS 1012	1950	140-150	600	1610
CDS 1015	1950	180-200	700	1610
CDS 1512	2600	220-250	650	1610
CDS 1518	2600	350-400	800	1610
CDS 2018	3400	500-600	900	1610
CDS 2028	3400	800-900	1100	1610
CDS 3018	5000	800-900	900	1610
CDS 3024	5000	1250-1400	1000	1610
CDS 3030	5000	1750-1900	1200	1800

1: Excludes Diversion Chamber except for models 0506, 0708 & 0708M

2: Measured from outlet invert with no tailwater

3: CDS treatment flows are indicative only

4: Model sizing is undertaken independently from the bypass hydraulics of the diversion chamber

5: In most cases minimum DTI is determined by diversion chamber depth

CDS® SEPARATOR PERFORMANCE

Gross Pollutant Removal	98% (>3mm)
Sediments Capture	>80% (>75µm)
TSS Removal	>70% (d50 = 106µm)
Total Phosphorous (TP) Removal	>30% (at 70% TSS removal)
Hydrocarbon Capture	80-90% 'at typical stormwater concentrations for free oil

Maintaining CDS® Separator

The CDS® Separator has the lowest life-cycle costs due to its non-blocking functionality, large off-line storage and multiple cleaning options. There are 3 methods of emptying CDS® Separators:

- Removable basket
- Material grab
- Suction method

With no requirement to unblock screens, confined space entry is minimised. Large off-line sump volumes (up to 10m³ available) also minimise cleaning frequency.



CDS® Continuous Deflective Separation

It has long been acknowledged that best management practice for stormwater pollutant traps involves locating the devices off-line.

- GPTs located on-line suffer badly from turbulence and eddies, often resulting in the re-suspension and loss of previously captured pollutants.
- PTs which store pollution in the screening area suffer decreasing screen area and therefore decreasing flow rates, as they fill up.
- GPTs which function by direct filtration have a treatable flow rate decay that is proportional to the percentage of screen blockage.
- GPTs that utilise a vortex only, without a screen, cannot guarantee neutrally buoyant pollution removal.

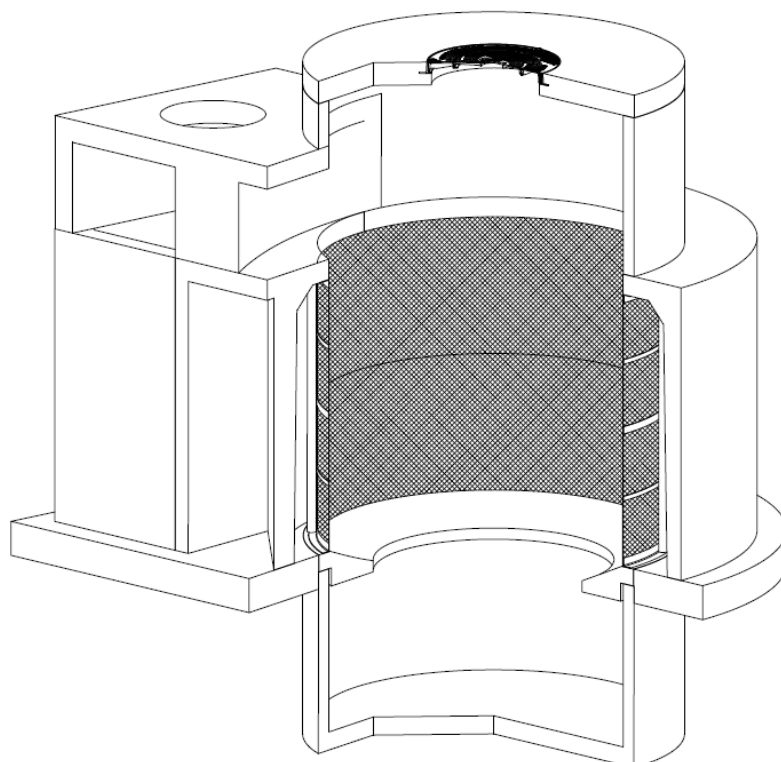
Only CDS® Separators combine the advantages of being off-line, having non-blocking functionality, vortex forces and storing pollution outside the screening area. For these reasons, no other device is “equivalent” to a CDS® Separator.

Diversion Chamber

Precast diversion chambers can be manufactured to suit most typical installations, or chambers can be tailored to meet the hydraulic limitations of the site.

The diversion chamber has the capacity to cater for the highest possible flow in the stormwater system. The chamber is configured on the assumption that the CDS® Separator has not been maintained and there is no flow passing through the unit.

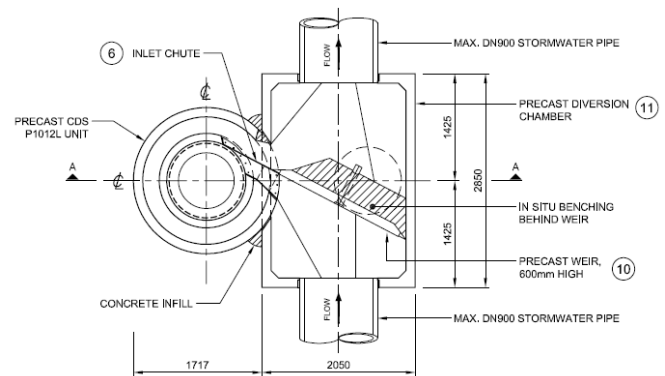
A weir is located within the diversion chamber to create a driving head and direct the majority of flows into the CDS® GPT.



Chamber Options

The CDS® Separator and diversion chamber design depends on the system capacity and site constraints. Civilmart will design the most suitable CDS® Separator configuration to meet project requirements.

- Precast diversion chambers
- Semi-precast diversion chambers
- Customised designs for multiple pipes, drops and bends
- In-situ channel designs
- Fixed or collapsible weirs
- Any flow capacity
- No flooding



CDS® 0506 Separator

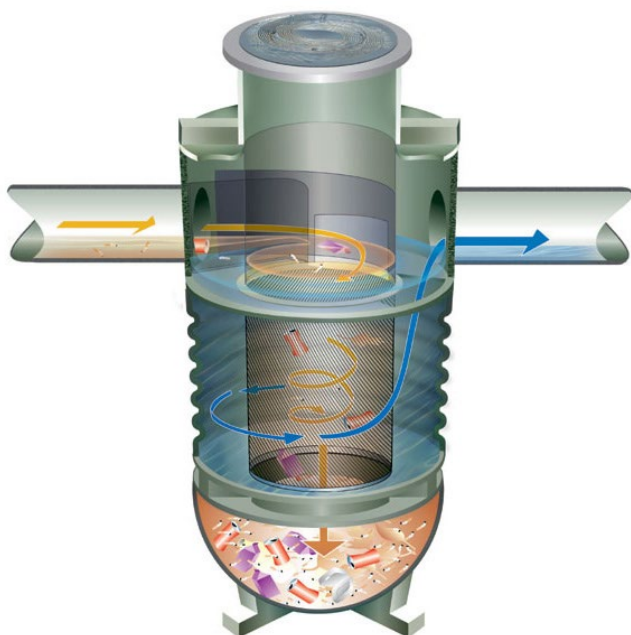
The PL0506 in-line CDS® Unit, known as the Nipper, is the smallest in the CDS® range of gross pollutant traps. It provides the fully proven performance of CDS® Separators in a pint-sized polymer unit.

The Nipper is ideally suited for installation at the collection source in small catchment areas of less than a hectare and is designed to remove gross pollutants, organic waste, silt, sediment and oils.

Manufactured from strong, lightweight polymer material, the CDS® 0506 is delivered to site in one piece, making it easy to install and cost-effective.

CDS® 0506 PERFORMANCE

Pipe Flows	Treatment 25 L/sMax 150 L/S
Gross Pollutant Removal	98% (>3mm)
Sediments Capture	>80% (>75µm)
TSS Removal	>70% (d50 = 106µm)
Total Phosphorous (TP) Removal	>30% (at 70% TSS removal)
Hydrocarbon Capture	80-90% 'at typical stormwater concentrations for free oil
Free Oil Storage Capacity	150 litres



Product Application Design (Pad) Services

Civilmart offers a full design and drafting service in support of its water quality products, including the CDS® separator.

These service are available to all customers. To see how Civilmart can assist you with your water sensitive urban design (WSUD) solutions please visit the Civilmart website or call your local sales representative on 131 004.

Specifications

- **Storage**
0.72 cubic metres
- **Weight**
140 kilograms
- **Footprint**
1050mm diameter
- **Material**
High density polyethylene
- **Treatment**
Self-cleaning screens, vortex and gravity
- **Screens**
2.4mm stainless steel
- **Inlet Size**
Up to 375mm diameter

Applications

- Small subdivisions
- Bus and train stations
- Pre-screening bio-retention systems
- Pre-screening construction wetlands
- Packaging warehouses
- Roadside drains
- Car parks



CleansAll® Gross Pollutant Trap

Simple. Effective.

Civilmart CleansAll® Gross Pollutant Traps are the ideal defence against the wide range of pollutant generators that have developed over recent decades.

The increase in dwellings, in commercial and industrial activity - and ever-spreading impervious zones such as car parks and road reserves - have led to a huge increase in litter, sediment and oil loads being collected by stormwater.

The Civilmart CleansAll® Gross Pollutant Trap provides simple, effective removal of gross pollutants as well as suspended solids and oils. Designed to treat large flows in-line or end-of-line, the Civilmart CleansAll® GPT protects the environment by removing gross pollutants before they reach the ocean, waterways or wetlands.

The Pollution Watchdog

Once installed, the Civilmart CleansAll® Gross Pollutant Trap becomes an indispensable management tool for formulating pollution control strategies.

- GPTs are an excellent source of data for monitoring upstream activities and managing pollution of catchments. Analysis of pollutants provides a range of useful indicators, such as:
 - Sediment load: Indicates road works, removal of pipe bedding, pipe ingress, construction activity.
 - Fuel or oil load: Potentially poor industrial pollution management or dumping of contaminants.
 - Organic load: An indicator of street sweeping or maintenance effectiveness
 - Litter load: Useful in identifying high litter generating activities or zones within the catchment.
 - Unusual pollutants: If the pollutant trap is collecting something other than what is expected, further investigation may be required. For example, a high load of decomposing vegetable matter may indicate dumping of foodstuffs at a particular location.

Pollutant Control

- Excellent capture of gross pollutants
- Excellent capture of oils
- High sediment removal
- Low head loss
- Retention of pollutants during peak flows
- Effective overflow system for larger flows
- Cost effective maintenance
- Does not rely on special hydraulic conditions
- Durable precast construction
- No moving parts

Low Cost, Low Maintenance

On a whole-of-life cost comparison, the Civilmart CleansAll® GPT provides one of the most cost-effective methods of controlling stormwater pollution. Ease of maintenance has made the Civilmart CleansAll® GPT a fundamental part of stormwater quality management programs throughout Australia.

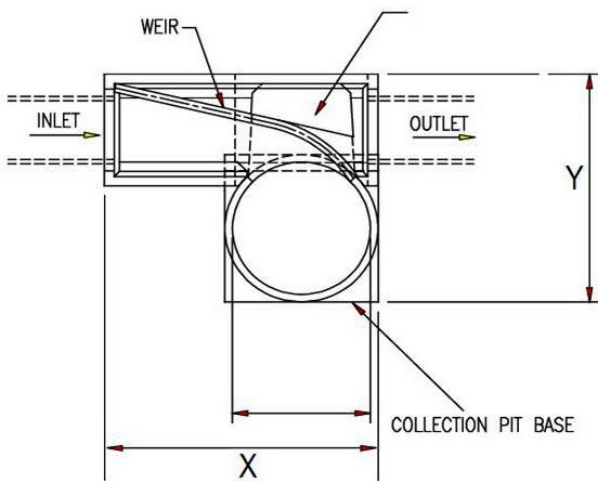


CLEANSALL® Gross Pollutant Trap - Product Data

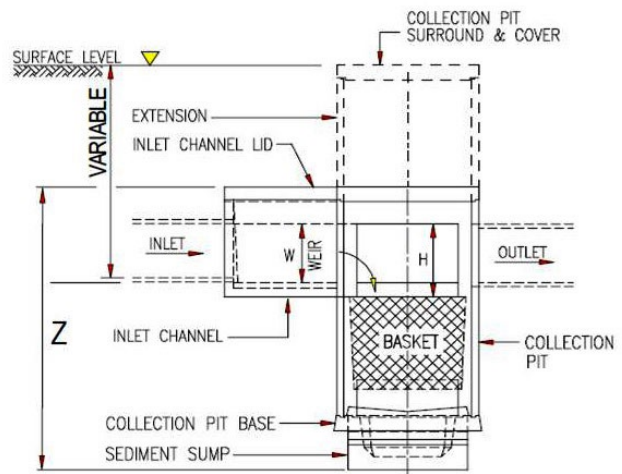
Model Type	Treatment Flow 1 (L/s)	Inlet/Outlet Pipe Range (mm)	Minimum DTI (mm)	X Length (mm)	Y Width (mm)	Z Min Depth (mm)	Approximate Storage (m3)		
							Baskets	Sediment Sump	Oil
CleansAll 375	90	300 - 600	990	2000	1690	2570	0.2	0.1	0.3
CleansAll 600	320	450 - 750	1070	2730	2365	3170	1.1	0.2	1.1
CleansAll 750	750	750 - 1200	1510	4000	3310	3610	1.8	0.7	3.2
CleansAll 900	930	750 - 1200	1510	4000	3310	4370	3.3	0.7	3.2

- 1: Treatment flow indicated is for the standard units. Units can be customised to provide required treatment flows to suit project requirements.
 - 2: This is subject to flow capacity requirements. Pipe sizes shown are for standard units. Units can be customised to take other pipe sizes as per project requirements.
 - 3: This depth is the minimum to have the unit flush with the surrounding ground level.
 - 4: Minimum storage volumes are approximate and may vary depending on the use of single or quarter baskets.
- Units are also available for open channel and box culvert applications.
The units have a maximum head loss co-efficient (k) of 1.3 based on a ratio of weir height to outlet pipe diameter.
The units can capture nearly 100% of all material greater than 0.6 mm at the treatment flow.

CLEANSALL® GPT PLAN



CLEANSALL® GPT ELEVATION



Product Application Design (PAD) Services

Civilmart offers a full design and drafting service in support of its water quality products, including the CleansAll® Gross Pollutant Trap.

These service are available to all customers. To see how Civilmart can assist you with your water sensitive urban design (WSUD) solutions please visit the Civilmart website or call your local sales representative on 131 004.



Installation

The Civilmart CleansAll® GPT is designed for ease of assembly. The unit is made up of basic 'building block' components that are craned into an excavated pit and bolted together.

The basic elements of the trap are made from high strength steel-reinforced concrete. There are no moving parts. The sturdy collection baskets are manufactured from stainless steel. A long, reliable service life is assured by the solid construction, high quality components and the simplicity of the design.

The Civilmart CleansAll® GPT is designed to simplify the installation process as much as possible. All concrete components are precast and generally no in-situ concreting is required. However, this also means that at the time of ordering a CleansAll® GPT design information such as pipe diameters, depth to pipe invert and finished ground level must be known so the unit can be manufactured to suit the site conditions.

Civilmart has simplified the process of ordering a CleansAll® Gross Pollutant Trap, while ensuring the information requested is sufficient for successful design, manufacture and installation.

When placing an order, the following administrative information is required:

1. Name of project
2. Location of project
3. Precise delivery address
4. Site access conditions
5. Contact details on site
6. Contact details off site
7. Expected delivery date

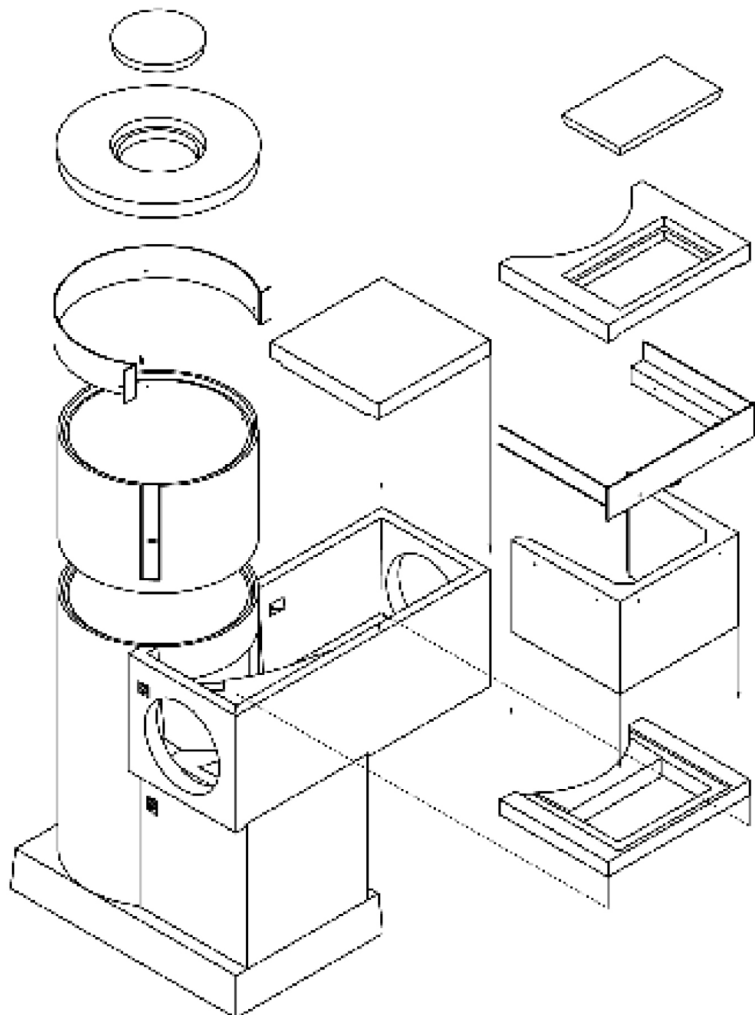
Note that the recommendations provided in this section should be taken as a guide only; installation methods may need to be modified to suit actual conditions..

Design Assistance

The Civilmart CleansAll® Gross Pollutant Trap can be customised to treat flow through box culverts, open channels and any high flow situation. Civilmart can provide assistance in adapting the design for these applications

Civilmart Reliability

Fully supported by Civilmart technical expertise and on-site assistance. Civilmart is a Quality Endorsed company with accreditation to ISO 9001.



Maintenance

Maintenance is the most significant cost in the life cycle of a GPT. The key benefits of the CleansAll® GPT are its low cost and simple maintenance requirements. When considered on a whole of life cost basis, the CleansAll® GPT is generally the most cost effective choice. The unique basket removal system offers a number of advantages:

- Baskets can be removed using a small crane truck, which is commonly available even in rural areas. On larger CleansAll® GPT models, quarter-baskets are generally used to ensure the weight of each individual basket is low enough for a crane truck.
- Expensive vacuum trucks, which can be difficult to source in rural areas, are required infrequently and can be eliminated if preferred.
- The CleansAll® GPT basket removal system removes the captured litter only and not the water that makes up the majority of the storage volume of a GPT. The use of vacuum trucks requires the removal of water and hence higher disposal costs because the removed volume is larger.
- No confined space access is required for regular maintenance of a CleansAll® GPT.
- Human access to the unit is not required for maintenance, reducing staff costs and assuring safe work practices.

These benefits make the CleansAll® GPT the most cost-effective GPT when considered on a whole of life basis.

Measuring Available Storage Capacity

Basket Capacity (% Full) Indicated By Available Storage Depth Below Inlet Pipe

Model	Basket Empty	Basket 25% Full	Basket 50% Full	Basket %75 Full	Basket 100% Full	Storage when Baskets Full (m3)
CA375	700	550	400	250	100	0.2
CA600	1000	770	550	330	100	1.1
CA750	900	720	550	370	200	1.8
CA900	1550	1200	875	540	200	3.3

Notes:

- All depths are in mm
- To establish depth to surface level add the depth to invert
- Depths are approximate only and may vary by plus or minus 50mm
- It is recommended that baskets be emptied when 75% full





ecoSep[®] Oil-Water Separator

ecoSep[®]

The Civilmart ecoSep[®] oil-water separator is a below grade device that permanently separates oil from water.

The system provides cost effective, high efficiency elimination of sediments and oil from point source run off (such as floor drains) and non point source stormwater run off from industrial areas (such as refuelling depots and maintenance facilities).

The performance of Civilmart ecoSep[®] oil-water separator has been proven by independent testing authorities to exceed the strict European standards for the separation of free non-emulsified oil from water (5ppm separation ratios).

Standard units are available in flow rates of 3, 10 and 20l/s with custom designed units to 100l/s. The system is normally supplied as a two tank design. The first precast concrete chamber removes grit and other solids.

The second chamber separates oil from the water through a combination of gravity and the coalescing separator. This chamber also contains the Civilmart ecoStop[®] spill control system to contain catastrophic spills.

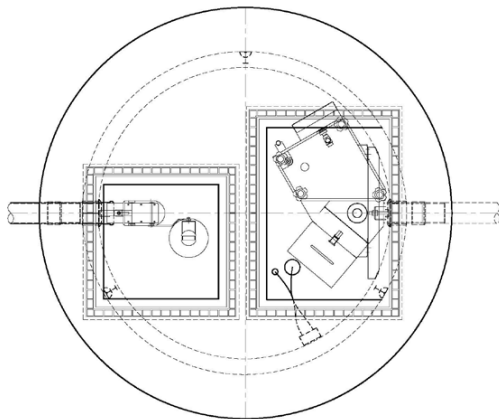
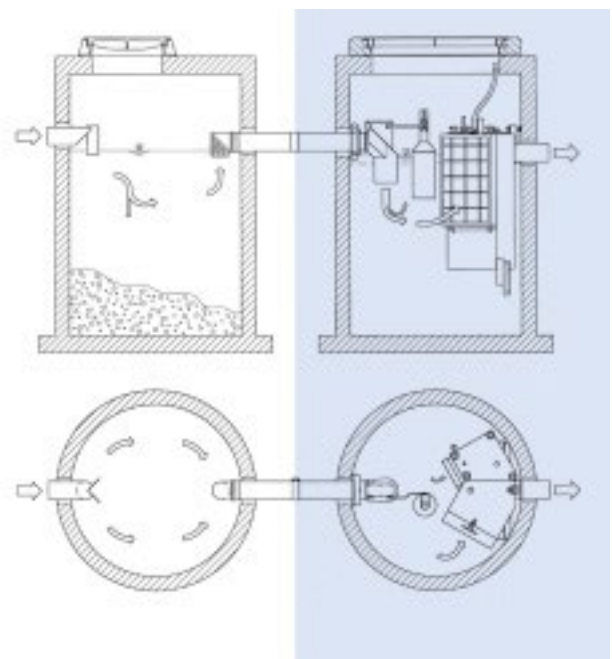


Figure: Large access covers for ecoSep[®] oil-water separator

FEATURES

- Permanently separates oil from water
- Complies with European Standard EN858 for control of free oil
- Automatic hydrocarbon spill control
- Separates light liquids (specific gravity below 0.95)
- Separates free oils to less than 5ppm in discharge
- High operational reliability
- All stainless steel internal components
- High quality precast concrete chambers
- Low maintenance and waste disposal costs



GRIT REMOVAL

OIL SEPARATION

Annual maintenance costs can be substantially reduced compared with conventional separator systems.

Large access covers are provided with the system, facilitating routine cleaning and maintenance. The openings and covers are designed to optimise safe access for key internal components, such as the inlet float and coalescing media cartridge.

All internal stainless steel components are factory installed in high quality precast concrete chambers.

The Ideal Oil-Water Separation Solution For:

- Fuelling facilities, transformers and oil storage areas
- Treatment of non-detergent washing water from vehicle washing and repair workshops
- Treatment of industrial process waste water
- Treatment of waste water from oil removal plants
- Purification upstream from emulsion breakers and micro filtration units

Product	Model	Code	Inlet DN (mm)	Outlet DN (mm)	Outlet Min. DTI (mm)	Chamber DN(mm)	Nom Oil Storage L	Operating Volume L
ecoStop®	100	ECS10C	100	100	700	1200	260	1600
	150	ECS15C	150	150	700	1500	400	2900
	200	ECS20C	225	225	760	1800	580	3950

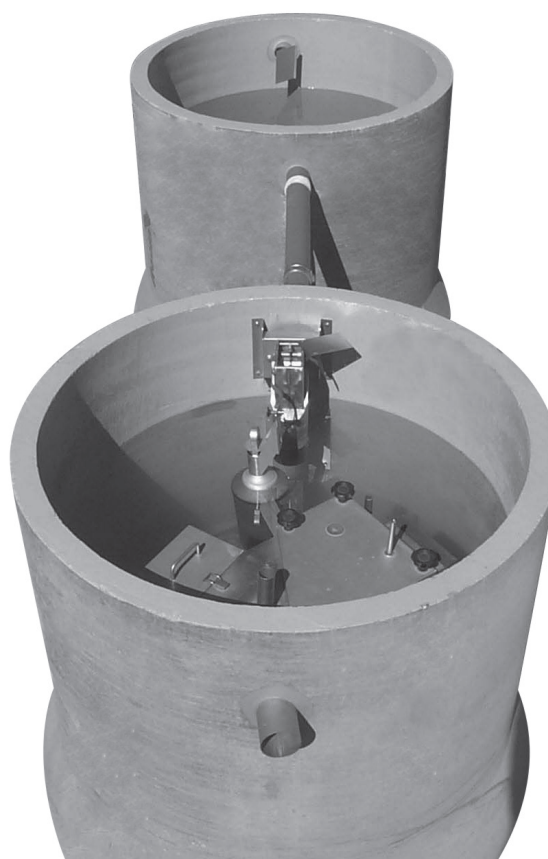
Product	Model	Code	Max Flow (L/sec)	Inlet DN (mm)	Outlet DN (mm)	Outlet Min. DTI (mm)	Grit Chamber DN (mm)	Main Chamber DN (mm)	Nom Oil Storage (Litres)	Operating Volume (Litres)
ecoSep®	NS03	ECE03C	3	100	100	590	1050	1500	260	1700
	NS10	ECE10C	10	150	150	660	1200	1800	400	3000
	NS20	ECE20C	20	225	225	820	1500	2400	600	4200

Three-Stage Water Purification

Civilmart ecoSep® oil-water separator makes optimum use of three purification methods:

1. Sedimentation
2. Gravity oil-water separation
3. Final effluent polishing in a residual oil coalescing medium

The accumulated oil can be continuously removed with the addition of an automatic oil draw-off device, saving disposal costs and avoiding emulsification.



Step 1: Grit Removal

The first, upstream grit chamber removes solids from the influent. A perforated 90-degree outlet tube prevents floating solids from entering the separation chamber.

Step 2: Gravity Separation of Oil

The first, upstream grit chamber removes solids from the influent. A perforated 90-degree outlet tube prevents floating solids from entering the separation chamber.

Step 3: Gravity Separation of Oil

Fine oil droplets that are too small to be separated by gravity then pass through the coalescing medium in the Civilmart ecoSep® oil-water separator.

The coalescing medium is a net-like polyurethane foam that accumulates the droplets into larger drops that can rise to the surface. The separated water leaving the system has a residual free petroleum content of less than 5mg/l (5ppm).



How It Works

The ecoSep® outlet structure also contains an oil storage chamber which allows accumulated hydrocarbons to be stored. As hydrocarbons accumulate on the water surface they can be manually drawn away by opening a valve and allowing the oil to drain into an independent storage chamber.

The oil passes through a piece of coalescing media on the inlet to the valve, further refining it.

ECOSTOP®

Civilmart ecoStop® spill control system is a secure and reliable hydrocarbon spill management system suitable for any site with a potential for spills. As the system detects and responds to spills automatically, it minimises the chances of failures caused by human error.

The system is installed in a precast concrete chamber, downstream from a segregated hydrocarbon containment drainage area. The float actuated shut-off valve stops flow through the system when maximum hydrocarbon storage capacity or a certain liquid level is reached, preventing the discharge of free hydrocarbon to municipal sewers or direct discharge outfalls.

Civilmart ecoStop® spill control system maintains the spill on site where it can be contained either below grade (in an underground storage tank or large diameter pipe) or above grade in a bunded area.

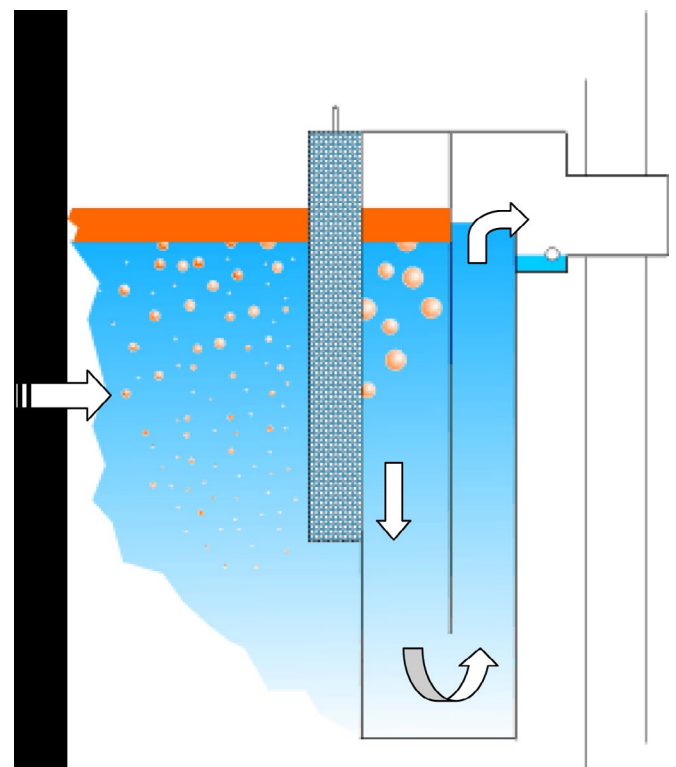


Figure: ecoSep® Coalescing Separation

OPTIONAL EXTRAS

Automatic Draw-Off Device (Add)

The ADD is an add-on device that constantly removes accumulated light liquid from the water surface to be stored in a separate oil vessel.

In the first chamber oil is once again separated from water and builds up a layer on the surface of the water.

Due to the height difference only light liquid can be discharged to the oil vessel. When the maximum level in the oil vessel is reached, a float closes the inlet valve of the ADD.

The second float controls the water level in the separator and closes the inlet and outlet valve of the ADD when the water level in the separator rises.

These valves ensure that the oil collected in the tank cannot be mixed with water once again.

ECOWARN®

The ecoWarn® is an alarm device used to monitor the depth of accumulated oil within the separator and warns operators when spills have occurred.

The device uses two probes to monitor the oil/water level within the chamber as well as the oil depth.

The high level probe will activate in both oil and water and is designed to warn maintenance staff when the ecoStop® valve has been actuated or when the system is malfunctioning.

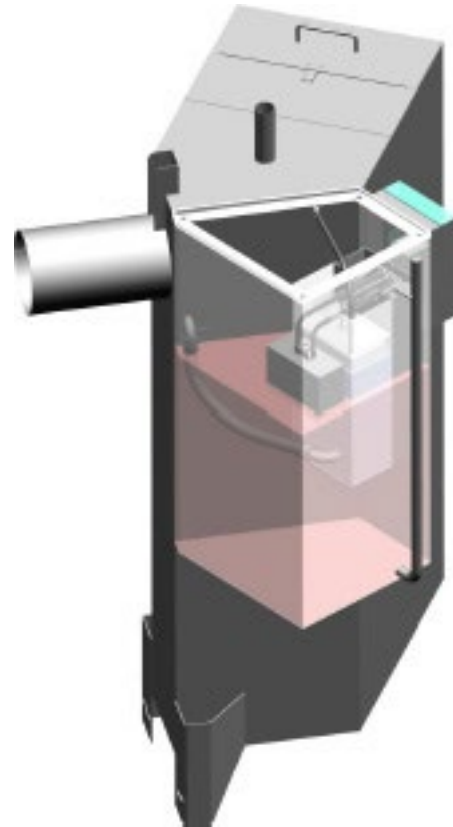
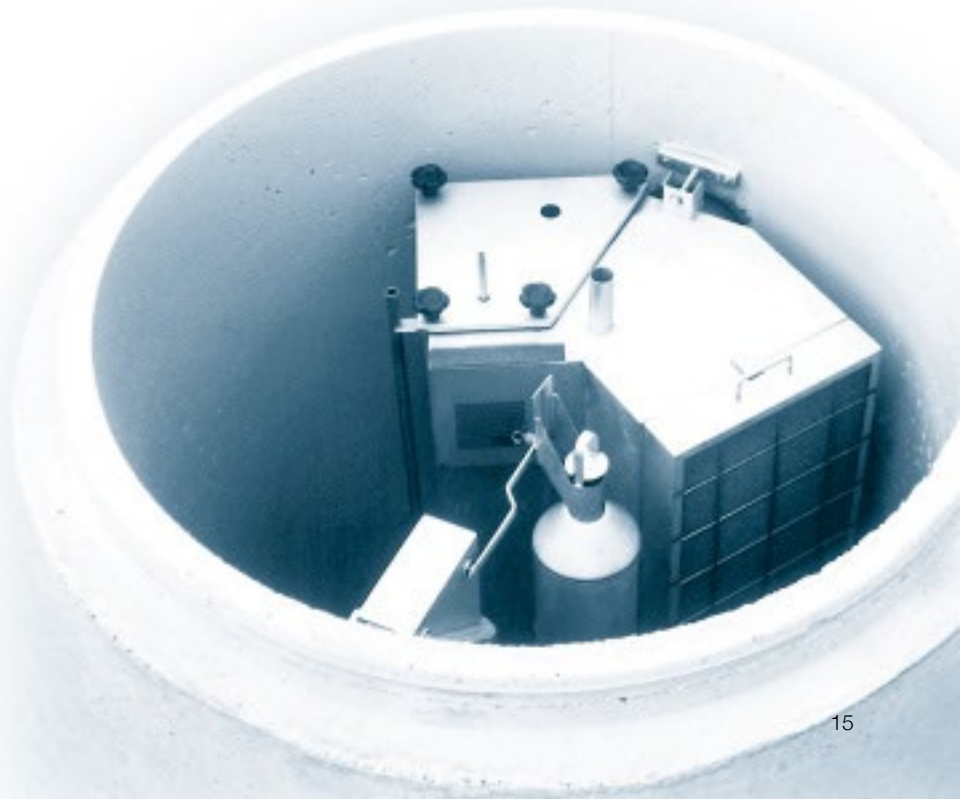


Figure: ADD with ecoSep® Oil Storage Chamber



enviss[®] Sentinel

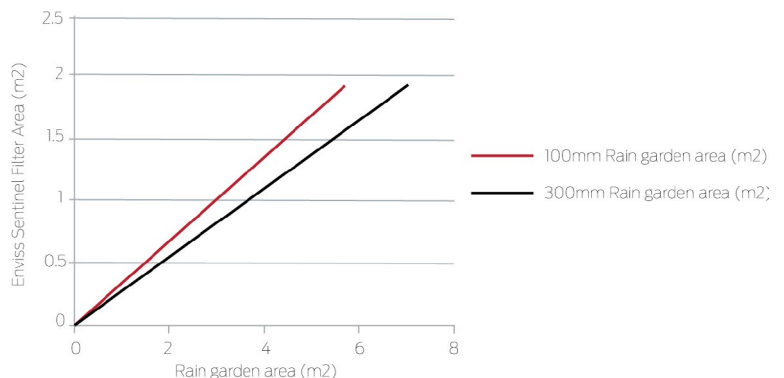
Design

Criteria	Specification
Application	Stormwater source control
Filter Type	Three stages of stormwater filtration: <ul style="list-style-type: none"> • Prevents Gross Pollutants entering pit • Removal of coarse and fine sediment • Removal of dissolved and complex pollutants
(1) Permeable paving	
(2) Sediment trap	
(3) Envis media	
Lid Type:	Steel grate lid with permeable paving infill
Load Rating:	Class B or Class D
Hydraulic Conductivity:	2000 mm/ Hr
Maintenance Period	Replace sediment module and filter media every 2 years
Maintenance Type:	Remove lid and remove and replace all sediment and media.
Lifting requirements:	2 x 1.3t swift and lift anchors

Performance

Pollutant [Group]	% Removal Rate * [MUSIC Nodes]
Gross pollutant removal	100%
Total suspended solids	96%
Hydrocarbons (dissolved organics)	99%
Heavy metals	
• lead	81%
• zinc, manganese	94%
• copper	88%
• nickel	> 67%
Total nitrogen	79%
Total phosphorus	67%

Figure shows relative equivalencies of the envissSentinel[®] Media Filter, the Storm Calculator's raingarden estimate.¹



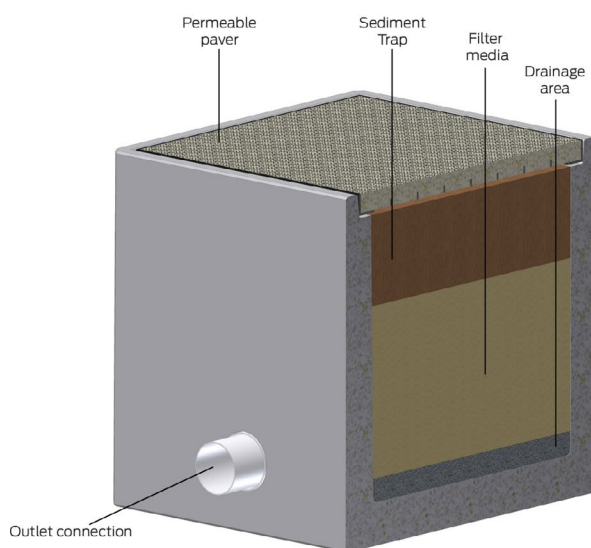
¹ Storm Calculator estimate is an application available on Melbourne Water's website.

*Mean pollutant removal performance figures based on laboratory testing at Monash University and verified in field testing at a purpose built stormwater harvesting system in Melbourne 2009 utilising auto-sampling of the stormwater inflows and outflows. The water samples were tested and the results compared against the laboratory results. To further ensure the testing of the filter media has been completed to a high standard, the methods and results of the testing have been scrutinised by peer review and presented at national and international conferences.

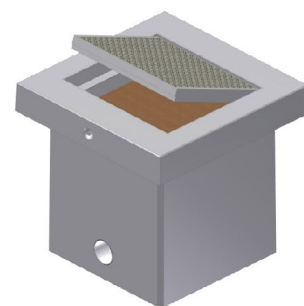


Technical

Criteria	Dimensions/Weight	
Load Rating:	Class B (80 kN)	Class D (210 kN)
Nominal Dimensions:	600mm x 600mm x 650mm RKO Pit	600mm x 600mm x 650mm RKO pit plus 150MM surround
Clear Opening:	596mm x 596mm	
External Dimensions:	763mm x 763mm 740 (deep)	763mm x 763mm 890 (deep)
Effective filter area:	0.36 m2	
enviss® filter media depth:	360mm	
Sediment trap depth:	170mm	
Outlet pipe size:	DN100 PVC socket connection	
Nominal Depth to Invert:	650mm	800mm
Nominal Mass:	900kg	1100kg



enviss® Sentinel Stormwater Filtration Pit Assembly Class B lid (surround not required)



enviss® Sentinel Class D Lid and surround



Up-Flo™ Filter

Fluidised Media Bed Up-Flow Filtration System

The Civilmart Up-Flo™ Filter is the most efficient high-rate stormwater filtration technology available for the removal of sediments, nutrients, metals and hydrocarbons from stormwater runoff.

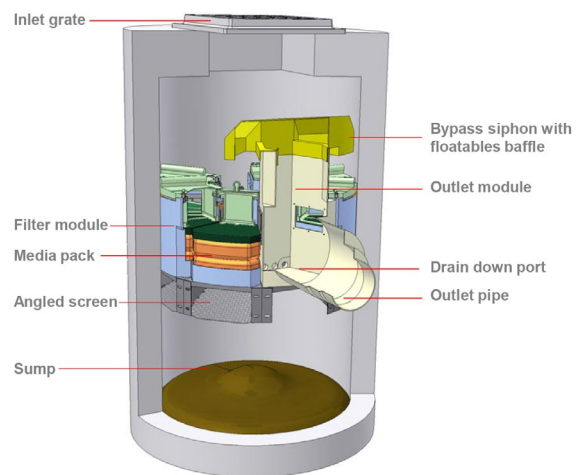
As the industry's only fluidized bed upflow filtration technology, the Up-Flo™ Filter provides a higher level of treatment, a higher rate of filtration, longer life of filter media and a longer maintenance cycle than other filter systems.

Applications

- New developments
- Industrial and commercial facilities
- Source control
- Sediment and hydrocarbon control
- Nutrient control
- Heavy metal control
- Wetlands protection
- Retrofit

Advantages

- Available in multiple configurations
- Removes >70% total suspended solids (TSS) with a mean particle size of 20 microns
- Low head requirements
- Higher flow capacity, smaller footprint
- Includes a 4mm pre-screening
- Uses a patented CPZ™ media
- Patented drain-down prevents media degradation
- Long media life and maintenance cycle
- Easy installation & Low Maintenance



How It Works

During a storm event, stormwater enters the chamber via an inlet pipe or inlet grate and fills the chamber, as flow is directed up through the angled screen and filter modules. Flow is evenly distributed across the media for maximum treatment.

Gross debris and sediment settle out in the sump. Oil and floatables rise to the surface of the water. Treated water flows out of the filter module to the outlet module and into the outlet pipe.

Excess flows are discharged to the outlet using a siphon bypass, which also acts as a floatables baffle, preventing the escape of oil and floatable trash.

To guard against pollutant leaching and filter media degradation between storm events, water drains out of the chamber through the filtered drain-down port as the storm subsides.

CPZ™ Mix

- Over 70% removal of metals, nutrients & TSS
- TSS removal down to 1 micron particle
- 1.6 l/s per module

Product Selection Table

UFF Model Type	Chamber Size	Number of Modules	Maximum Treatment Flow (L/s)	Peak Syphonic Bypass Flow (L/s)	Min Standard Headloss (mm)	Sump Storage Capacity (Litres)
Standard	DN1200	1 - 6	9.6	170	500	700
Small Vault	DN1800	7 - 8	12.8	225	500	1580
Medium Vault	DN2400	9 - 14	22.4	400	500	2800
Large Vault	DN2700	15 - 19	30.4	535	500	3550
Special	As required	>19	>30.4	>535	500	As designed

Filter Modules

Each filter module has a typical treatment flow rate of 1.6 L/ sec.

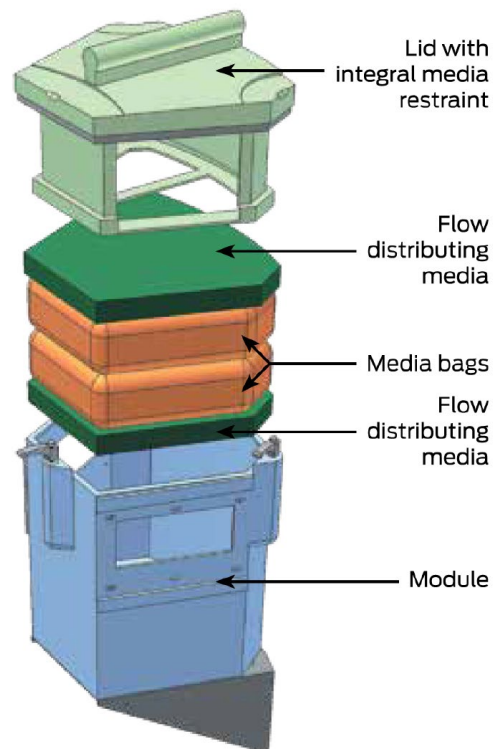
Sizing And Design

The Civilmart Up-Flo™ Filter is sized to treat a specified runoff area or a design flow rate for a water quality design storm.

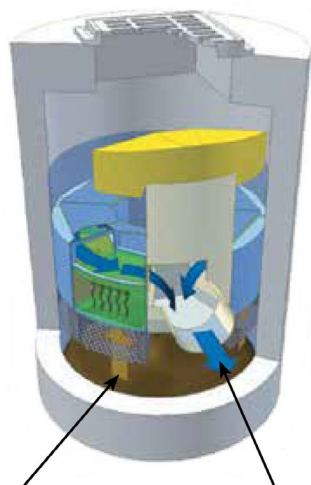
The number of modules is determined by the treatment objectives and the size of the runoff area. This is based on each individual filter module treatment flowrate.

The flexibility of the system allows effective design for sites with low hydraulic drops. Civilmart Water Quality's expert PAD engineering team can assist in designing a system that is right for each situation.

To allow easier access to the individual modules the design includes removeable lids that can be temporarily stacked adjacent to the inlet.



Design developed at the University of Alabama. Data is collected through extensive field testing by the University of Alabama. No chemical exhaustion of media after 12 months of field testing.



Flow is directed upwards through angled screen and filter modules

Treated stormwater flows through a conveyance channel to an outlet module, where it leaves the chamber

Installation

Installing a Civilmart Up-Flo™ Filter is as simple as installing a standard precast pit and connecting to the stormwater system.

Maintenance

Maintenance is simple, with easy access to the sump and replaceable media packs. A vacuum truck is used to remove sediment and other pollutants from the sump and the media packs are replaced manually. Unlike other filtration systems, no specialised heavy lifting equipment is needed.



First Defense® High Capacity



High Quality. High Efficiency.

The First Defense® High Capacity by Hydro International is an advancement on the First Defense® enhanced vortex separator, available in Australia exclusively through Civilmart.

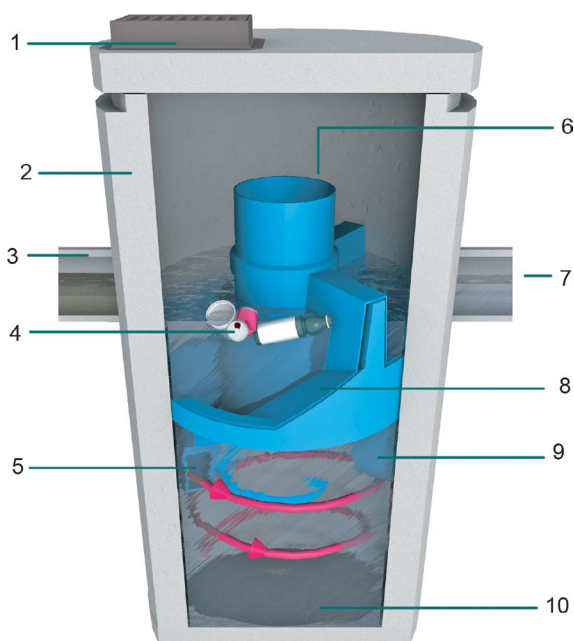


Fig.1 The First Defense® High Capacity separator has internal components designed to efficiently capture stormwater pollutants and prevent washout at peak flows.

1. Inlet Grate (optional)
2. Precast chamber
3. Inlet Pipe (optional)
4. Floatables Draw Off Slot (not pictured)
5. Inlet Chute
6. Internal Bypass
7. Outlet pipe
8. Oil and Floatables Storage
9. Outlet chute
10. Sediment Storage Sump

New Features

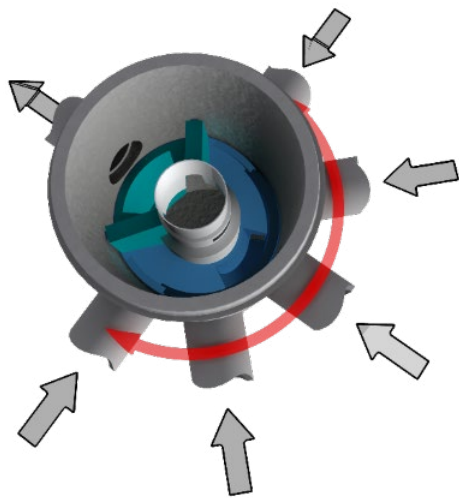
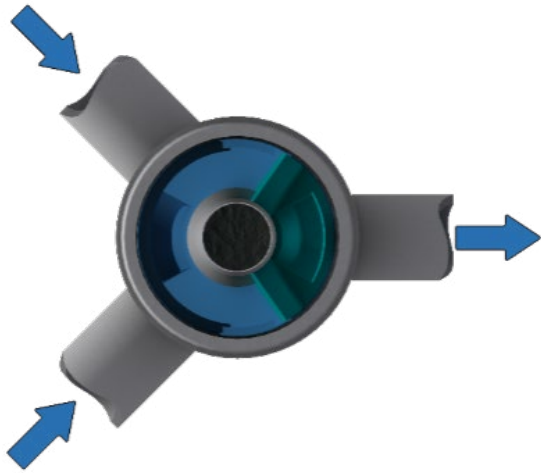
- More model sizes - from 900mm dia. to 2400mm dia. systems
- Improved treatment flow rates
- Accommodates larger pipe diameters and higher peak flow rates
- Accommodates more design scenarios requiring multiple inlets
- Requires a shallower installation depth

Applications

- Stormwater treatment at the point of entry into the drainage line
- Sites constrained by space, topography or drainage profiles with limited slope and depth of cover
- Retrofit installations where stormwater treatment is placed on or tied into an existing storm water line
- Pretreatment for filters, infiltration and storage

Advantages

- Inlet options include surface grate or multiple inlet pipes
- Delivered to site pre-assembled and ready for installation
- Proven to prevent pollutant washout
- Long flow path through the device ensures a long residence time within the treatment chamber, enhancing pollutant settling
- Integral high capacity bypass conveys large peak flows without the need for “offline” arrangements using separate junction manholes



Tested To Reduce Average Annual Loads:

- **80%** - Total Suspended Solids (TSS)
- **99%** - Gross Pollutant Solids (GP) >3mm
- **40%** - Total Phosphorous (TP)
- **PLUS** - Free Oil & Hydrocarbons

How It Works

The First Defense® High Capacity separator has internal components designed to remove and retain gross debris, total suspended solids (TSS) and hydrocarbons (Fig.1).

Contaminated stormwater runoff enters the inlet chute from a surface grate and/or inlet pipe. The inlet chute introduces flow into the chamber tangentially to create a low energy vortex flow regime (magenta arrow) that directs sediment into the sump while oils, floating rubbish and debris rise to the surface.

Treated stormwater exits through a submerged outlet chute located opposite to the direction of the rotating flow (blue arrow). Enhanced vortex separation is provided by forcing the rotating flow within the vessel to follow the longest path possible rather than directly from inlet to outlet.

Higher flows bypass the treatment chamber to prevent turbulence and washout of captured pollutants. An internal bypass conveys infrequent peak flows directly to the outlet eliminating the need for, and expense of, external bypass control structures. A floatables draw off slot functions to convey floatables into the treatment chamber prior to bypass.

First Defense® High Capacity Model Number	Diameter	Typical TSS Treatment Flow Rates for Removal of 106µm Particles ⁴	Peak Online Flow Rate	Maximum Pipe Diameter ¹	Oil Storage Capacity	Typical Sediment Storage Capacity ²	Minimum Distance from Outlet Invert to Top of Rim ³	Standard Distance from Outlet Invert to Sump Floor
	(Nominal)	(L/s)	(L/s)	(Nominal)	(L)	(m ³)	(m)	(m)
FD-HCM	DN900	26	350	DN375	473	0.22	0.6 - 1.0	0.98
FD-HC3	DN900	32	424	DN450	473	0.3	0.6 - 1.0	1.13
FD-HC4	DN1200	58	510	DN600	723	0.5	0.7 - 1.2	1.5
FD-HC6	DN1800	132	906	DN750	1,878	1.2	0.9 - 1.6	1.8
FD-HC8	DN2400	236	1,415	DN1200	4,239	2.1	0.9 - 1.8	2.2

1 Contact Civilmart when larger pipe sizes are required.

2 Contact Civilmart when additional sediment storage capacity is required.

3 Minimum distance for models depends on pipe diameter. Contact Civilmart for technical assistance.

4 PSD of d50 = 106µm for 80% TSS removal



Sizing And Design

This adaptable online treatment system works easily with large pipes, multiple inlet pipes, inlet grates and now, contains a high capacity bypass for the conveyance of large peak flows.

Designed with site flexibility in mind, the First Defense® High Capacity separator allows engineers to maximize available site space without compromising treatment level.

Product Application Design (PAD)

Civilmart offers a complimentary design service to assist with providing the most appropriate solution to your stormwater treatment projects.

Inspection And Maintenance

Inspection and maintenance are conducted from the surface, without need for man-entry into the First Defense® High Capacity separator.

Inspection is conducted by visually assessing the rate of rubbish accumulation in the device and measuring sediment and oil depth accumulations with measuring probes.

Maintenance is conducted with a standard sump vac, and typically takes less than an hour.





RECYCLE YOUR WASTEWATER

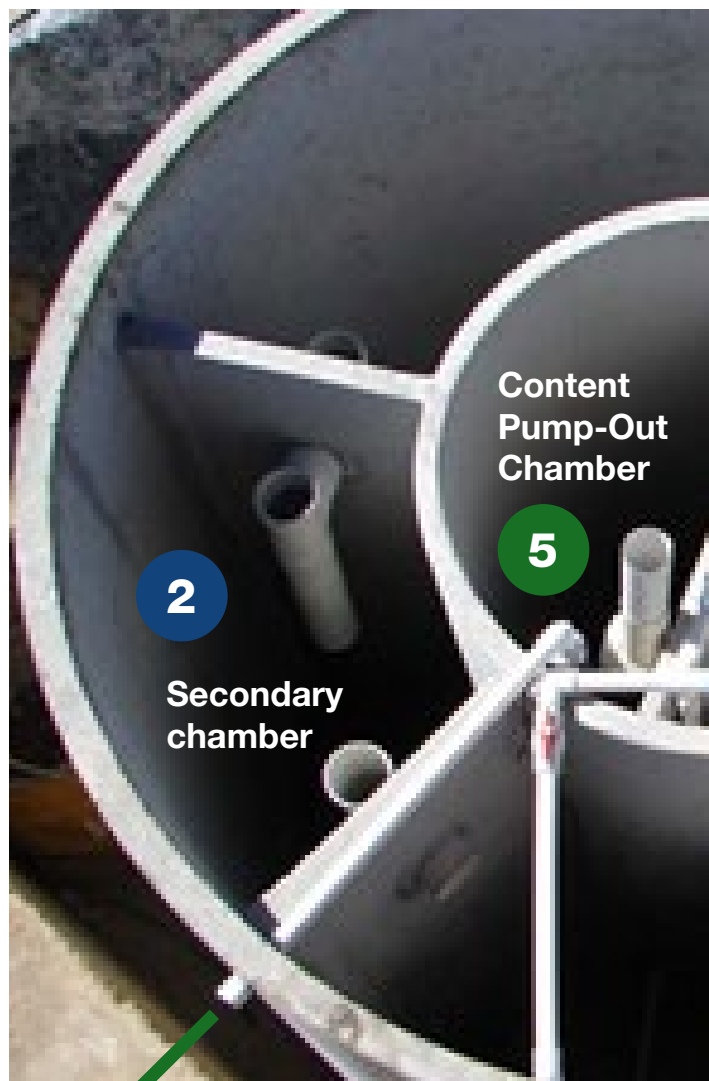
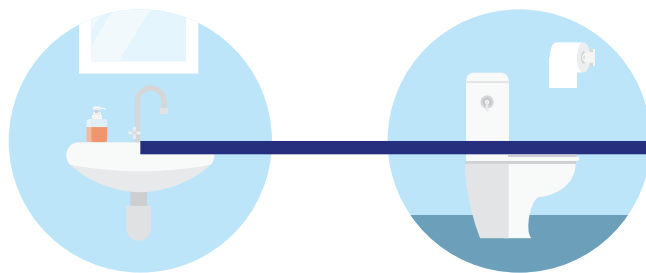
Civilmart Wastewater
Products

Very Simple, Very Effective.

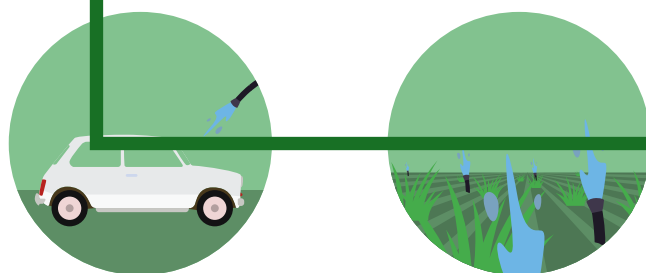
The simple, smart design of the TurboJet Single advanced secondary treatment system makes it the easiest and most effective product on the market to install, run and service.

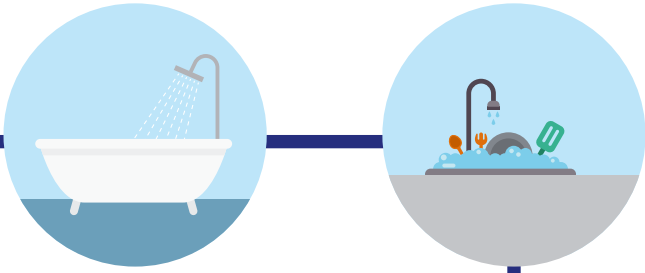
The five-chamber TurboJet Single concrete tank is one piece, cast in a single mould - it's tough and totally leak free. The system collects and processes household wastewater from all sources, safely recycling it and delivering clean, odour-free water for gardens and lawns.

- ✓ Trusted technology
- ✓ Australian-made and owned
- ✓ Quality assured under ISO 9001
- ✓ Complies with current specifications



Clean water out

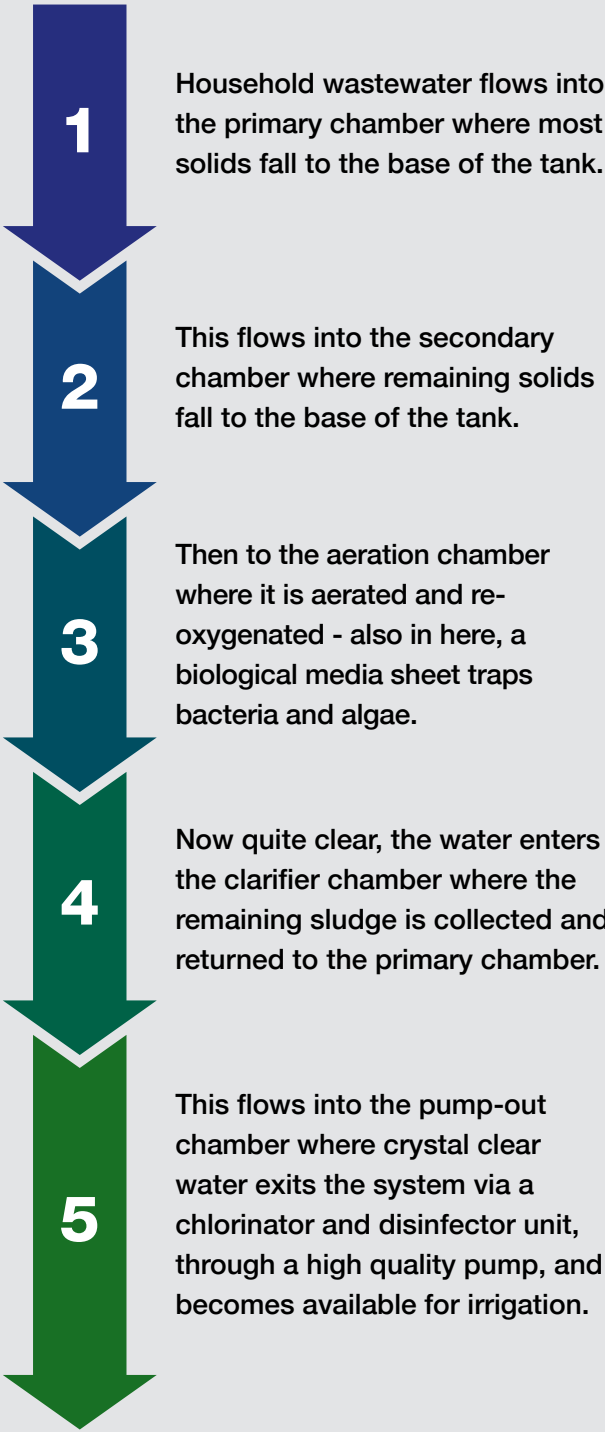




Wastewater in



Smart. Safe. Clean.



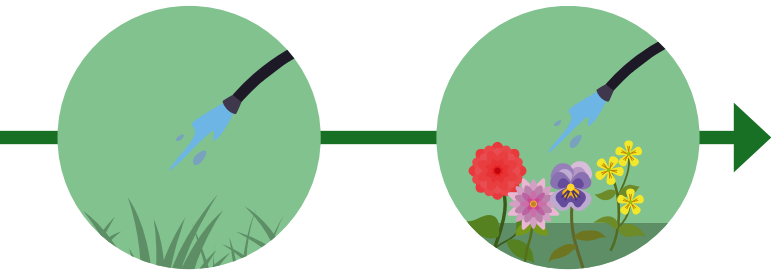
1 Household wastewater flows into the primary chamber where most solids fall to the base of the tank.

2 This flows into the secondary chamber where remaining solids fall to the base of the tank.

3 Then to the aeration chamber where it is aerated and re-oxygenated - also in here, a biological media sheet traps bacteria and algae.

4 Now quite clear, the water enters the clarifier chamber where the remaining sludge is collected and returned to the primary chamber.

5 This flows into the pump-out chamber where crystal clear water exits the system via a chlorinator and disinfectant unit, through a high quality pump, and becomes available for irrigation.



- Processes ALL household wastewater
- Simple controller requires no maintenance
- The most effective advanced secondary treatment tank in Australia
- Proven performance over 25 years



Septic Tanks



Size (L)	I.D (mm)	O.D (mm)
1700	1230	1360
3400*	1825	1955
5000*	2030	2160

Please note: All Inlet & Outlet holes are measured externally from the bottom of the tank.
 *Available with Baffle Wall



Septic Tanks

- 1700L commonly used for black water (toilet), 1-3 bedrooms
- 3400L commonly used for grey water (laundry/bathroom), 1-3 bedrooms (all purpose)
- 5000L commonly used for grey and black water, 3-5 bedrooms (all purpose)
- Custom size tanks available: 10,000L, 15,000L & 22,500L
- Holes / Blockouts can be added for pipe penetrations

Tank	Height (mm)	Wall Thickness (mm)	Tank Lid		INLET Centerline	OUTLET Centerline
			Non-Trafficable (Class A)	Trafficable (Class D)		
	1910	65	75	Roof Slab (1370OD) x 175TH with 600 Hole c/w Class D 600mm Round Cast Iron Manhole C&F Supplied Loose	1600	1530
	1860	65	95	Roof Slab (1970OD) x 175TH with 600 Hole c/w Class D 600mm Round Cast Iron Manhole C&F Supplied Loose	1500	1430
	2100	65	95	Roof Slab (2150OD) x 225TH with 600 Hole c/w Class D 600mm Round Cast Iron Manhole C&F Supplied Loose	1750	1695

Bottom of the tank to the centerline of the hole.



Holding Tanks



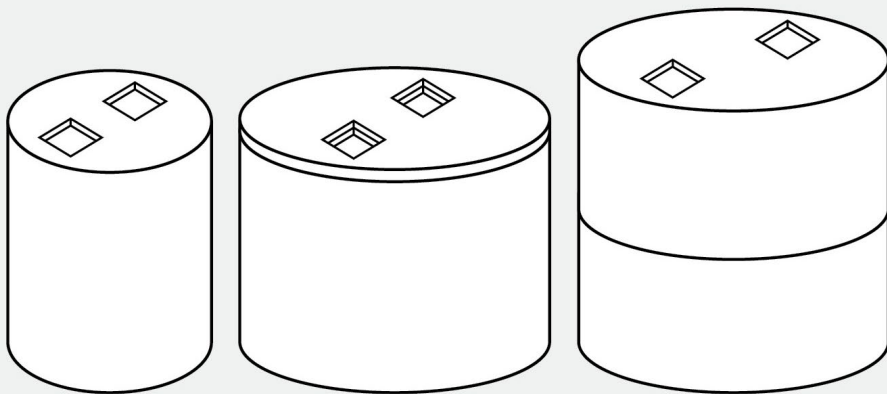
Size (L)	I.D (mm)	O.D (mm)	Tank
380	630	760	
600	850	980	
1200	1230	1360	
2200	1230	1360	
4700	1825	1955	
6500	2030	2160	
10,000	2330	2450	
15,000	2745	2865	
22,500	2280	3480	



Please note: All Inlet & Outlet holes are measured externally from the bottom of the tank.



Available in 1-piece, tank & lid or multi-part configurations



Join multiple tanks side-by-side for greater capacity

Water Tanks

- Available in one-piece, tank & lid or multi-part configurations for extra capacity
- Suitable for in-ground or above-ground use
- All tanks are engineer certified to T44 Class D
- Range of access hole designs available in tank lids including:
 - 600 round
 - 600 x 600 square
 - 900 x 600 rectangular
 - 900 x 900 square
 - 1200 x 1200 square
- Range of galvanised grates and cast iron covers & frames available to be cast in or supplied loose

Height (mm)	Wall Thickness (mm)	Tank Lid		INLET Centerline
		Non-Trafficable (Class A)	Trafficable (Class D)	
1175	65	65	Class D Cast Iron Sewer Lid in Concrete Surround 900 OD 150TH	150mm from top of tank
1200	65	65	Roof Slab (1130OD) x 150TH	150mm from top of tank
1200	65	65	Roof Slab (1370OD) x 175TH	150mm from top of tank
1910	65	75	Roof Slab (1370OD) x 175TH	150mm from top of tank
1860	65	95	Roof Slab (1970OD) x 175TH	150mm from top of tank
2100	65	95	Roof Slab (2150OD) x 225TH	150mm from top of tank
2400	65	100	Roof Slab (2450OD) x 250TH	150mm from top of tank
2815	60	100	Roof Slab (3000od) x 250TH	150mm from top of tank
2700	50	100	Roof Slab (3480od) x 250TH	150mm from top of tank

Bottom of the tank to the centerline of the hole.



Large Volume Water Storage Systems

Large Volume Water Storage Systems

Civilmart Toowoomba Tanks can supply large volume water storage systems by linking multiple tanks together to achieve maximum capacities.

Civilmart Toowoomba Tanks manufacture a wide range of tanks to meet your onsite requirements. Whether you are looking to Detain, Retain or Harvest water; the team at Civilmart Toowoomba Tanks will have an option for you.

- Squat Tanks available to meet onsite restrictions
- All tanks are certified to T44 (Class D)
- Wide range of access hole sizes available. See Page 7
- Can be poured with Anti-float bases
- Link multiple tanks side by side for greater capacity







Pump Tanks



Pump Tanks

- Tank Height 1200mm
- Lid Thickness 75mm
- Tank Wall Thickness 65mm

Size (L)	Tank				Tank Lid		INLET Centerline	OUTLET Centerline
	I.D (mm)	O.D (mm)	Height (mm)	Wall Thickness (mm)	Non-Trafficable (Class A)	Trafficable (Class D)		
380	630	760	1175	65	65	Class D Cast Iron Sewer Lid in Concrete Surround 900 OD, 150mm thickness	750	40mm Brass Fitting, Cast in 1050mm
600	980	1200	1200	65	65	Roof Slab (1130OD) x 150TH with 600 Hole c/w Class D 600mm Round Cast Iron Manhole C&F Supplied Loose	950	40mm Brass Fitting, Cast in 1050mm
1200	1230	1360	1200	65	65	Roof Slab (1370OD) x 175TH with 600 Hole c/w Class D 600mm Round Cast Iron Manhole C&F Supplied Loose	950	40mm Brass Fitting, Cast in 1050mm

Please note: All Inlet & Outlet holes are measured externally from the bottom of the tank to the centerline of the hole.



Pump Out System



Pump Out System

- 380L up to 1200L suitable for grey water storage, pumping to a disposal area
- 1700L suitable for black and grey water
- 3400L with baffle wall and pump well
- 5000L with baffle wall and pump well
- 7000L multichamber

Size (L)	Tank				Tank Lid	INLET Centerline	OUTLET Centerline
	I.D (mm)	O.D (mm)	Height (mm)	Wall Thickness (mm)	Non-Trafficable (Class A)		
380L c/w Davey 15V Pump	630	760	1175	65	65	760	40mm Brass Fitting Cast in 1050mm
600L c/w Davey 15V Pump	850	980	1200	65	65	950	40mm Brass Fitting Cast in 1050mm
1200L c/w Davey 15V Pump	1230	1360	1200	65	65	950	40mm Brass Fitting Cast in 1050mm
3400L c/w Pump Well, Baffle Wall, Davey 15V Pump, Non Return Valve and High Level Alarm	1825	1955	1860	65	95	1500	40mm Brass Fitting Cast in 1730mm
5000L c/w Pump Well, Baffle Wall, Davey 25V Pump, Non Return Valve and High Level Alarm	2030	2160	2100	65	95	1750	40mm Brass Fitting Cast in 2000mm
Supertreat 1T-AST (7000L)	2330	2450	2400	65	65	2310	1940

Please note: All Inlet & Outlet holes are measured externally from the bottom of the tank to the centerline of the hole



Custom Precast Specialists



Need a custom job?

Civilmart is uniquely positioned amongst precast concrete suppliers in that we are experts in designing and manufacturing custom precast products. If non-standard specifications are involved in a project, we will do what it takes to make it a reality. We have extensive custom-manufacturing capabilities and if necessary, we will build new moulds to create exactly what you need. Our agility and flexibility when creating products is unmatched, it's something we're extremely proud of.

Submit your plans or let us work with you to design a product that will perfectly fit your next project. Whether it's a small variation to a standard product or a completely new idea built from scratch, Civilmart will help you get it done.







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