

HYNDS
ENVIRONMENTAL

ENVIRONMENTAL
PROTECTION
SYSTEMS

**HYNDS
DOWNSTREAM
DEFENDER®**

*Advanced
vortex
technology
for high
performance
stormwater
separation*

protecting our environment



DOWNSTREAM DEFENDER

The Hynds Downstream Defender is an advanced Hydro-dynamic Vortex Separator that is specifically designed to provide high removal efficiencies of settleable solids and floatables over a wide range of flow rates.

Its flow-modifying internal components have been developed from extensive full scale testing, CFD modelling and over thirty years of hydro-dynamic separation experience in wastewater and stormwater applications.

These internal components distinguish the Hynds Downstream Defender from simple swirl-type devices and conventional oil/grit separators by minimising turbulence and head-losses, enhancing separation, and preventing re-suspension of previously stored pollutants.

The high removal efficiencies and inherent low head-losses of the Hynds Downstream Defender allow for a small footprint, making it a compact and economical solution for non-point source pollution.

Advantages

- Removes sediment, floatables, oils and grease
- Small footprint
- No pollutant re-entrainment
- No loss of treatment capacity between clean-outs
- Low head-loss
- Efficient over a wide range of flows
- Easy to install
- Low maintenance
- Easy to specify



Applications

The Hynds Downstream Defender's small footprint makes it an ideal choice wherever stormwater treatment is required.

Installation locations include:

- Small footprint
- Streets and roadways
- Parking areas
- New developments
- Construction sites
- Vehicle maintenance yards
- Industrial and commercial facilities
- Airports, truck stops, shopping malls, restaurants, supermarkets, etc.

The Hynds Downstream Defender can also be used as a pre-treatment device for detention systems, mitigating wetlands, swales, filters or other polishing systems.

No Pollutant Re-entrainment

Most stormwater treatment devices collect sediment within the treatment vessel. This reduces treatment capacity, compromises removal efficiency and increases the risk of re-entrainment between clean-outs

The Hynds Downstream Defender is unique as the internal components create isolated zones for pollutant capture and storage. Separate oil and sediment storage areas are thereby established outside the main treatment flow path. Isolating the storage zones maintains treatment capacity and removal efficiency and prevents pollutant re-entrainment between clean-outs.

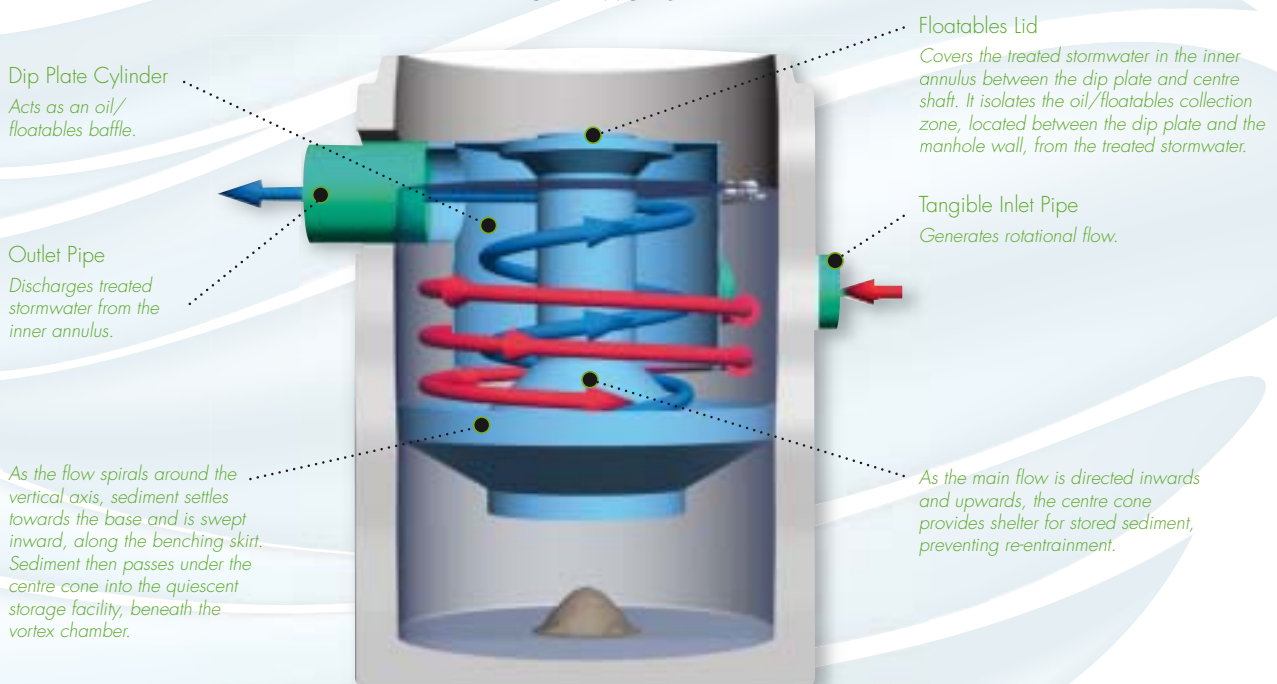
How it Works

The Hynds Downstream Defender consists of a concrete cylindrical vessel with a sloping base and internal components. Raw liquid is introduced tangentially into the side of the cylinder and spirals down the perimeter allowing heavier particles to settle out by gravity and the drag forces on the wall and base of the vessel.

The base of the Hynds Downstream Defender is formed at a 30 degree angle. As the flow rotates about the vertical axis, solids are directed towards the base of the vessel where they are stored in a collection facility. The internal components direct the main flow away from the perimeter and back up the middle of the vessel as a narrower spiralling column rotating at a slower velocity than the downward flow.

By the time the flow reaches the top of the vessel, it is virtually free of solids and is discharged through the outlet pipe.

How it Works



Low Head-loss

The Hynds Downstream Defender has large clear openings and no internal restrictions. Without internal orifice plates or weirs, hydraulic losses are minimised. The results are:

- Low headlosses (see table below)
- Reduced risk of blockage
- No upstream flooding

Performance

The device operates over a wide range of flows. At design flow the Hynds Downstream Defender is designed to remove 90% of all particles larger than 150 microns (0.15mm) with a specific gravity of 2.65. At lower flows this performance will increase.

The system also captures a large proportion of floatables, oils and grease and features a bypass system for flows greater than the capacity flow.

Sizing and Design

The sizing of a Hynds Downstream Defender is generally based on treating a 1 in 3 month storm or the "first flush".

The capacity through the system is shown below. At flows greater than capacity, the stormwater will bypass the Hynds Downstream Defender via an upstream manhole.

Installation

Installing a Hynds Downstream Defender is as simple as installing a standard manhole. It typically requires significantly less excavation than other flow through systems.

The Hynds Downstream Defender is delivered to site in a kit-set form, ready to be installed into the excavated hole and connected to the stormwater system.

Maintenance

Units are typically installed in locations that are easily accessible for a maintenance vehicle. A simple vector procedure is used to periodically remove the pollutants.

Two ports at ground level provide access for inspection and clean-out of stored floatables and sediment. In most situations, bi-annual clean-outs are recommended.

Hynds Environmental offers maintenance contracts on all Downstream Defenders.

Detailed maintenance instructions and maintenance logs are also available.

Unit Size (mm)	Design Flow (l/s)	Capacity Flow (l/s)	Inlet Pipe Diameter (mm)	Outlet Pipe Diameter (mm)	Head-loss at Design Flow (mm)	Head-loss at Capacity (mm)	Minimum Sediment Storage (m ³)
1200	20	85	225	300	75	575	0.55
1800	85	200	300	450	175	825	1.60
2550	200	425	450	600	225	575	4.05
3000	370	700	600	750	250	550	6.65

Hynds Environmental Systems Limited

North Island

PO Box 17388, Greenlane,
Auckland 1546, New Zealand
Telephone +64 9 571 0090
Facsimile +64 9 571 0091
Email sales@hyndsend.co.nz

South Island

PO Box 16552, Hornby,
Christchurch 8441, New Zealand
Telephone +64 3 344 1370
Facsimile +64 3 344 1375
Email mikes@hyndsend.co.nz

www.hynds.co.nz

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Hynds Pipe Systems Ltd manufactures the Downstream Defender under license from Hydro International. New Zealand Patent Number 197894.

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