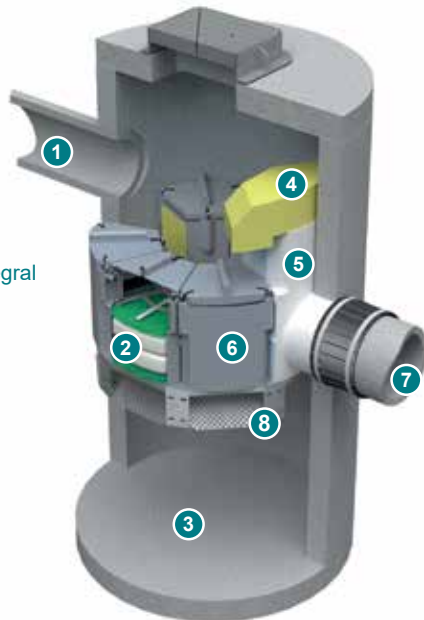


The Up-Flo™ Filter is an innovative surface water filtration technology that delivers a **high performance multi-stage treatment train** within a single device. The Up-Flo™ Filter combines sedimentation and screening with fluidised bed filtration technology to deliver high levels of performance.

1. Inlet pipe.
2. Media pack.
3. Sump.
4. Bypass siphon with floatables baffle.
5. Outlet module with integral drain down port.
6. Filter module.
7. Outlet pipe.
8. Angled screen.



## Components and filter media

The Up-Flo™ Filter packs a 4-5 stage treatment train into a single device that can be fitted into a standard manhole. Settleable solids are collected in the chamber sump, whilst floatable material gathers in the central chamber.

A screen prevents coarse material from reaching the filter media. The media itself can be tailored to target specific pollutant groups and, where required, promote reactive filtration. The fluidised bed technology prevents blinding, clogging and compaction of the media surface, whilst ensuring that no wormholes can form to short-circuit the treatment process.

Filter media options include:

**Filter Sand:**  
A good all-round media to target sediment and sediment-bound pollutants.



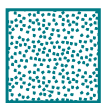
**CPZ™ Mix:**  
An engineered media to promote reactive filtration for enhanced treatment of metals, nutrients and organics.



Figure 1 - The Up-Flo™ Fluidised Bed Up Flow Filtration System

## Repeatable, reliable performance

The Up-Flo™ Filter combines multiple sequential treatment processes to deliver sedimentation, screening and filtration all in one compact unit to remove a wide variety of pollutants including:



### Very fine particles

Greater than 80% removal of fine sand and silt particles to a mass-median particle size of 22 µm.



### Heavy metals

Greater than 70% removal of metals commonly found in surface water runoff.



### Gross pollutants

Inclusion of the angled screen and protected bypass siphon effectively removes gross pollutants, including litter and leaf debris.



### Nutrients

Greater than 70% removal of phosphorus and other nutrients.



### Liquid and sediment bound hydrocarbons

Removal of various forms of hydrocarbons, including polycyclic aromatic hydrocarbons (PAHs).

## The Simple Index Approach (SIA)

The Simple Index Approach outlined in CIRIA C753 The SuDS Manual is a water quality design method for sites with a low to medium risk pollution hazard level. Sites with a high risk pollution hazard level should consider a more precautionary approach.

The approach assigns pollution hazard indices to the given land use for three pollutant groups, total suspended solids (TSS), metals and hydrocarbons. SuDS components are then selected until their combined pollution mitigation index score is greater than the pollution hazard index for each pollutant group.

Up-Flo™ Filter SuDS Mitigation Indices <sup>(a)</sup>			
Media grade	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Sand media	0.8	0.6	0.7
CPZ media	0.8	0.77	0.7

Notes:

(a) All mitigation indices supplied by Hydro International Ltd are independently verified and calculated using the methods laid out in the British Water How To Guide: Applying the CIRIA SuDS Manual Simple Index Approach to Proprietary / Manufactured Stormwater Treatment Devices and independently verified by the WRc, with the WRc Performance Declarations available on request.

(b) Mitigation Indices quoted for the Up-Flo™ Filter are valid when the unit is designed according to the Treatment Flow Rate (see Table 3).

Table 1 - SuDS mitigation indices for Up-Flo™ Filter

## Sizing

The modular design of the Up-Flo™ Filter ensures that project specific treatment goals are easily met. Intended for intercepting pollutants at or close to source, the modular components are standardised for installation into a standard 1.2 m diameter manhole. For larger catchment areas, custom built vaults can be created to accommodate additional filter modules.

For design purposes, the selected number of modules required should be such that the total Treatment Flow Rate is greater or equal to the site's Water Quality Flow Rate.

The hydraulic capacity of the system should be considered with respect to the peak discharge flow rate from the site or pipe full flow rate.

Model	Chamber Size (m)	Number of Filter Modules <sup>(a)</sup>	Treatment Flow Rate <sup>(b)</sup> (l/s)	Hydraulic Capacity <sup>(c)</sup> (l/s)	Operating Head <sup>(d)</sup> (mm)	Oil Storage Capacity (l)	Sediment Storage Capacity (m <sup>3</sup> )
Manhole	1.2 m diameter	1-6	1.3 - 7.8	170	750	190	0.7
Vault	Site specific	7-19	7.8 - 24.7	170 - 340	750-900	Site specific	Site specific

**Notes:**

(a) If more than 20 modules are required, multiple vaults can be linked together to increase capacity.

(b) Treatment flow rates based on >80% removal of Sil-Co-Sil 106 fine sand and silt ( $D_{50} = 22 \mu\text{m}$ ).

(c) Maximum flow rate that can pass through the chamber without surcharge to the upstream network.

(d) Driving head for filter media.

Table 2 - Up-Flo™ Filter design information.



Figure 2 - Chamber configuration



Figure 3 - Vault configuration

## Easy installation for trouble-free construction

The Up-Flo™ Filter is typically delivered to site as a pre-cast concrete manhole, complete with innovative manhole sealing system and internal components already installed. Installation is therefore similar to any other manhole installation on site.

The relative position of the filter modules and the inlet / outlet pipes can be adjusted to suit site conditions.

The outlet adapter allows a variety of different outlet pipe sizes to be easily connected (see Table 3).

Full installation guidelines are available.

## Dimensions and weights

The dimensions in Table 3 are given as a guide for standard manhole configurations. Vault configurations are site specific.

Detailed general arrangement drawings are available for download from [hydro-int.com/up-flo](http://hydro-int.com/up-flo)

Unit	External Diameter of Unit (mm) (A)	Inlet Pipe Diameter (mm) (B)	Outlet Pipe Diameter (mm) (C)	Depth (m)			Minimum Pipe Level Offset (G)	Lift Weight (t)
				Depth to Outlet Invert (m BGL) (D)	Sump Depth (m) (E)	Component Depth <sup>a)</sup> (m) (F)		
<b>1.2 m Sealed Manhole System with HD Cover Slab</b>	1460	225-375	225-375	1.150	1.100	2.560	0.75	n/a
HD Cover Slab <sup>b)</sup>						0.230		0.60
Base Section						1.145		1.85
Top Section						1.330		1.60

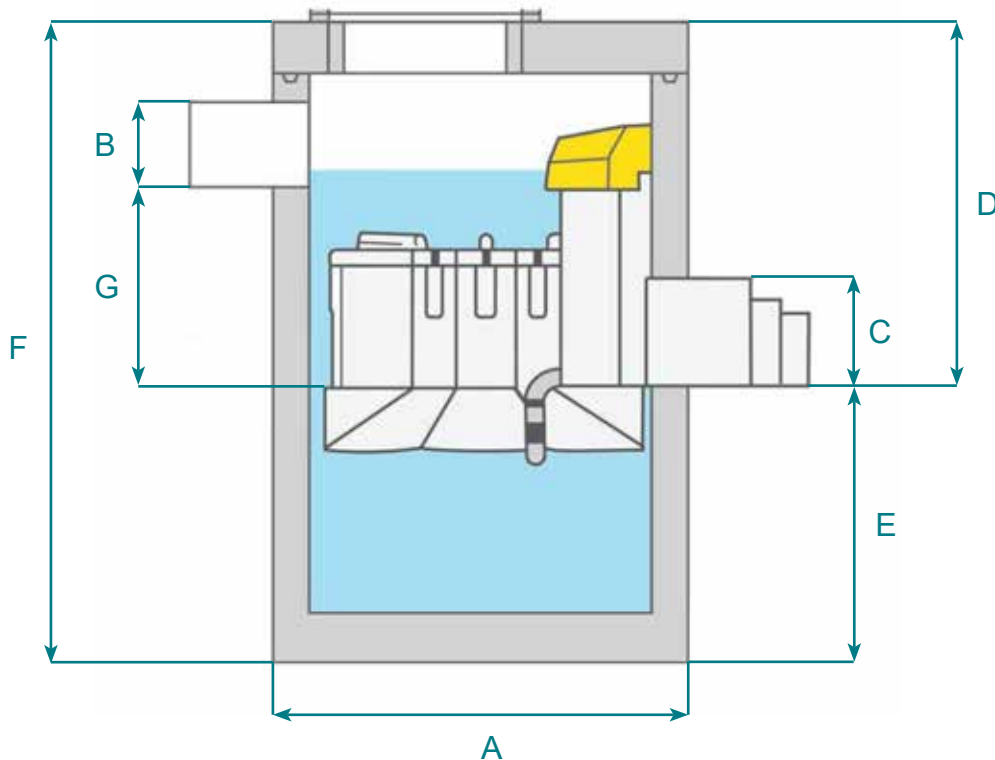
**Notes:**

a) Base and Top Section component depths are shown as the total height during transportation / before assembly on site. The total depth is the depth of the assembled unit.

b) Cover slabs are heavy duty, suited for highways loading and are supplied with one or two access openings for maintenance.

c) Stub pipes are provided.

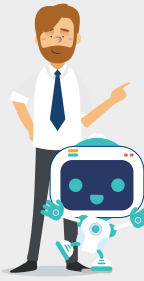
Table 3 - Up-Flo™ Filter dimensions and weights.



## Simple and cost-effective maintenance

The gentle and effective action of the Up-Flo™ Filter ensures the filtration media have a much longer life than comparable media filters, so maintenance is infrequent, cost-effective and simple, with just three easy steps:

- 1) Floatable debris and litter is skimmed from the water surface.
- 2) Sediment collected in the sump is removed with a standard vacuum tanker.
- 3) Filter media packs are exchanged with no specialist lifting or handling equipment required.



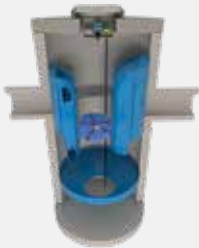
**Make Maintenance Smart**

Add Hydro-Logic® Smart Maintenance and your Up-Flo™ Filter will let you know when it needs maintenance

Get monitoring maintenance alerts from your Up-Flo™ Filter  
Save time and money by only visiting your Up-Flo™ Filter when it actually needs emptying.

## Our full range of stormwater treatment solutions

We have a range of stormwater treatment devices to treat stormwater flows of varying quality. All our solutions can work alongside, enable or enhance natural SuDS, helping to meet or improve on biodiversity and amenity targets.



Downstream Defender® Select



Up-Flo™ Filter



Hydro Biofilter™

Product		Description	Targeted pollutants						
			Sediments		Litter, debris	Liquid hydrocarbons	Sediment bound hydrocarbons, nutrients and heavy metals	Dissolved metals	Nutrients
Downstream Defender® Select	Vortex	Vortex separator	Coarse & fine	Retained up to 2 x treatment flow rate	✗	✗	✓	✗	✗
	Vortex Plus	Vortex plus separator	Coarse & fine	Retained up to 2 x treatment flow rate	✓	✓ Option for increased retention on request	✓	✗	✗
	Advanced Vortex	Advanced hydrodynamic vortex separator	Coarse & fine	Retained up to 4 x treatment flow rate	✓	✓ Option for increased retention on request	✓	✗	✗
Up-Flo™ Filter	Sand	Fluidised bed up flow filtration system with Sand media	Very fine sediment		✓	✓	✓	✗	✓
	CPZ	Fluidised bed up flow filtration system with CPZ media	Very fine sediment		✓	✓	✓	✓	✓
Hydro Biofilter™		Biofiltration system	Very fine and dissolved sediments		✓	✓	✓	✓	✓

To find out more about our range of stormwater treatment solutions visit [hydro-int.com](https://hydro-int.com).

[Downstream Defender® Select](#)

[Up-Flo™ Filter](#)

[Hydro-Biofilter™](#)

Patent: [hydro-int.com/patents](https://hydro-int.com/patents)

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