First Defense® High Capacity

A Simple Solution for your Trickiest Sites

Verified by NJCAT and NJDEP

Product Profile

The First Defense® High Capacity is an enhanced vortex separator that combines an effective stormwater treatment chamber with an integral peak flow bypass. It efficiently removes sediment total suspended solids (TSS), trash and hydrocarbons from stormwater runoff without washing out previously captured pollutants. The First Defense® High Capacity is available in several model configurations to accommodate a wide range of pipe sizes, peak flows and depth constraints (**Table 1**, next page).

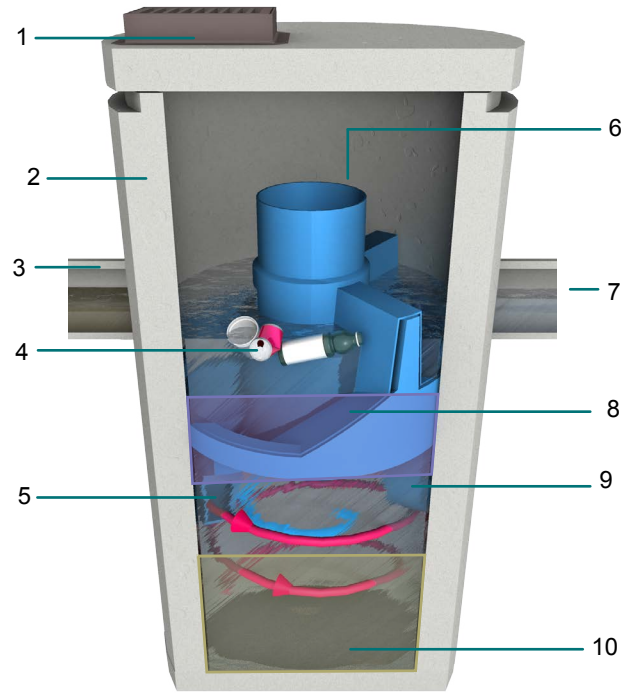
Applications

- 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 drain line
- Pretreatment for filters, infiltration and storage

Advantages

- Inlet options include surface grate or multiple inlet pipes
- Integral high capacity bypass conveys large peak flows without the need for “offline” arrangements using separate junction manholes
- Proven to prevent pollutant washout at up to 450% of its treatment flow
- Long flow path through the device ensures a long residence time within the treatment chamber, enhancing pollutant settling
- Delivered to site pre-assembled and ready for installation

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



Components

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

How it Works

The First Defense® High Capacity 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 trash 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.

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First Defense® High Capacity

Sizing & 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 allows engineers to maximize available site space without compromising treatment level.

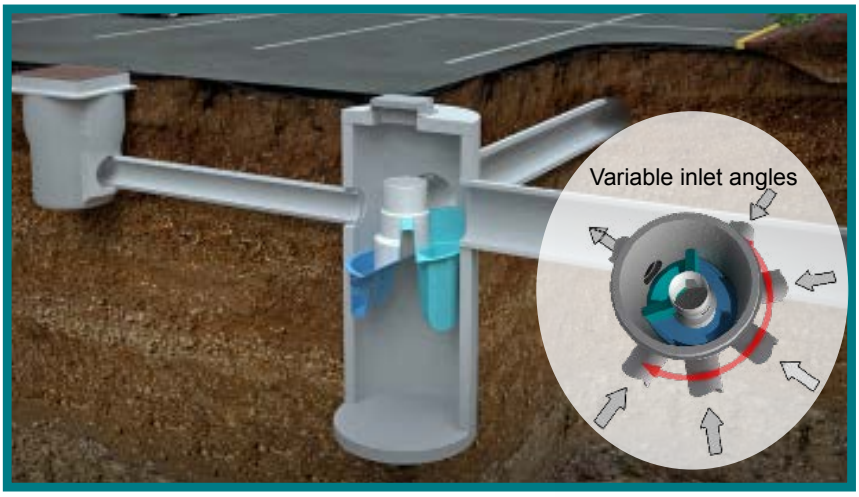

Fig 2. Works with multiple inlet pipes and grates

Free *Stormwater Separator Sizing Calculator* for Engineers

This simple online tool will recommend the best separatror, model size and online/offline arrangement based on site-specific data entered by the user.

Go to hydro-int.com/sizing to access the tool.

Inspection and Maintenance

Nobody maintains our systems better than we do. To ensure optimal, ongoing device performance, be sure to recommend Hydro International as a preferred service and maintenance provider to your clients.

Call **1 (800) 848-2706** to schedule an inspection and cleanout or learn more at **hydro-int.com/service**

Fig 3. Maintenance is done with a vactor truck

Table 1. First Defense® High Capacity Design Criteria.

First Defense® High Capacity Model Number	Diameter	Typical TSS Treatment Flow Rates			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
		NJDEP Certified	106µm	230µm						
	(ft / m)	(cfs / L/s)	(cfs / L/s)	(cfs / L/s)	(cfs / L/s)	(in / mm)	(gal / L)	(yd^3 / m^3)	(ft / m)	(ft / m)
FD-3HC	3 / 0.9	0.84 / 23.7	0.3 / 8.77	0.53 / 15.0	15 / 424	18 / 457	125 / 473	0.4 / 0.3	2.0 - 3.5 / 0.6 - 1.0	3.71 / 1.13
FD-4HC	4 / 1.2	1.50 / 42.4	0.7 / 20	1.2 / 34	18 / 510	24 / 600	191 / 723	0.7 / 0.5	2.3 - 3.9 / 0.7 - 1.2	4.97 / 1.5
FD-5HC	5 / 1.5	2.34 / 66.2	1.3 / 37.9	2.2 / 62.2	20 / 566	24 / 609	300 / 1135	1.1 / .84	2.5 - 4.5 / 0.7 - 1.3	5.19 / 1.5
FD-6HC	6 / 1.8	3.38 / 95.7	2.2 / 63	3.8 / 108	32 / 906	30 / 750	496 / 1,878	1.6 / 1.2	3.0 - 5.1 / 0.9 - 1.6	5.97 / 1.8
FD-8HC	8 / 2.4	6.00 / 169.9	5.1 / 144	8.6 / 243	50 / 1,415	48 / 1219	1120 / 4239	2.8 / 2.1	3.0 - 6.0 / 0.9 -1.8	7.40 / 2.2

[1]Contact Hydro International when larger pipe sizes are required.
[2]Contact Hydro International when custom sediment storage capacity is required.
[3]Minimum distance for models depends on pipe diameter.

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Stormwater Solutions
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