



## **FLEXSTORM™** Inlet Filter Specifications and Work Instructions

Product: FLEXSTORM Inlet Filters

Manufacturer: Inlet & Pipe Protection, Inc www.inletfilters.com

A division of Advanced Drainage Systems (ADS) www.ads-pipe.com

## 1.0 Description of Work:

1.1 The work covered shall consist of supplying, installing, and maintaining/cleaning of the FLEXSTORM Inlet Filter assembly. The purpose of the FLEXSTORM Inlet Filter system is to collect silt and sediment from surface storm water runoff at drainage locations shown on the plans or as directed by the Engineer. FLEXSTORM PURE, permanent filters, are capable of removing small particles, hydrocarbons, and other contaminants from drainage "hot spots".

### 2.0 Material:

2.1 The FLEXSTORM Inlet Filter system is comprised of a corrosion resistant steel frame and a replaceable geotextile sediment bag attached to the frame with a stainless steel locking band. The sediment bag hangs suspended from the rigid frame at a distance below the grate that shall allow full water flow into the drainage structure if the bag is completely filled with sediment.









2.2 The FLEXSTORM Inlet Filter frame includes lifting handles in addition to the standard overflow feature. A FLEXSTORM Removal Tool engages the lifting bars or handles to allow manual removal of the assembly without machine assistance. The frame suspension system on most rectangular designs is adjustable in ½" increments up to 5" per side should the casting or drainage structure have imperfections.











2.3 **FLEXSTORM CATCH-IT** Inlet Filters for temporary inlet protection: The FLEXSTORM CATCH IT framing is galvanized or zinc plated for corrosion resistance. The "**FX**" Woven Polypropylene filter bag is the design standard, although the "IL" Nonwoven geotextile is also available if preferred by the engineer. These products are typically used for temporary inlet protection lasting 3 months (short term road work) to 5 years (residential developments).







2.4 **FLEXSTORM PURE** Inlet Filters for permanent inlet protection: The FLEXSTORM PURE framing is comprised of 304 stainless steel with a 25 year life rating. Multiple filter bags are available however the Post Construction "**PC+**" is the design standard consisting of the "FX" Woven Polypropylene sediment bag lined with Adsorb-it filter fabric, which is made from recycled polyester fibers. The "**PC+**" includes a replaceable MyCelx skimmer pouch strapped to the bottom of the bag for advanced hydrocarbon removal.









## 3.0 Filter Bag Specifications and Capabilities:

3.1 Material Properties (taken from manufacturers average roll value):

FLEXSTORM FILTER BAGS	(22" depth) STD Bag P/N	(12" depth) Short Bag P/N	Clean Water Flow Rate (GPM/SqFt)	Min A.O.S. (US Sieve)
FX: Standard Woven Bag	FX	FX-S	200	40
FX+: Woven w/ MyCelx	FXP	FXP-S	200	40
FXO: Woven w/ Oil Boom	FXO	FXO-S	200	40
PC: Post Construction Bag	PC	PC-S	137	140
PC+: PC Bag w/ MyCelx	PCP	PCP-S	137	140
LL: Litter and Leaf Bag	LL	LL-S	High	3.5
IL: IDOT Non-Woven Bag	IL	IL-S	145	70





3.2 Standard Bag Sizes and Capabilities: Bag Sizes are determined by clear opening dimensions of the drainage structure. Once frame design size is confirmed, Small - XL bag ratings can be confirmed to meet design criteria. Ratings below are for standard 22" deep bags.

Standard Bag Size <sup>§</sup>	Solids Storage Capacity	Filtered Flow Rate at 50% Max (CFS)			Oil Retention (Oz)	
	(CuFt)	FX	PC	L	PC*	PCP**
Small	1.6	1.2	0.8	0.9	66	155
Medium	2.1	1.8	1.2	1.3	96	185
Large	3.8	2.2	1.5	1.6	120	209
XL	4.2	3.6	2.4	2.6	192	370

**4.0** Tested Filtration Efficiency and Removal Rates: Filtration Efficiency, TSS, and TPH testing performed under large scale, real world conditions at accredited third party erosion and sediment control testing laboratory. (See Full Test Reports at <a href="www.inletfilters.com">www.ads-pipe.com</a>)



Inside View of Hopper Agitator



Hopper With Outlet Pipe Leading To Area Inlet



Area Inlet Simulated Showing Influent Discharge From Pipe

4.1 FLEXSTORM "FX" Filtration Efficiency Test Results: All testing performed in general accordance with the ASTM D 7351, Standard Test Method For Determination of Sediment Retention Device Effectiveness in Sheet Flow Application, with flow diverted into an area inlet. Test Soil used as sediment had the following characteristics with a nominal 7% sediment to water concentration mix. This is representative of a heavy sediment load running off of a construction site.

Soil Characteristics	Test Method	Value	Filtration Efficiency of "FX" FLEXSTORM Bag
% Gravel		2	
% Sand	ASTM D 422	60	
% Silt	A31101 D 422	24	
% Clay		14	82%
Liquid Limit, %	ASTM D 4318	34	02 /0
Plasticity Index, %	A31WD 4310	9	
Soil Classification	USDA	Sandy Loam	
Soil Classification	USCS	Silty Sand (SM)	





4.2 **FLEXSTORM "PC" and "PC+" Test Results:** TSS measured on effluent samples in accordance with SM 2540D and TPH in accordance with EPA 1664A.

Product Tested	110 micron Sediment Load	Ave Flow Rate GPM	% TSS Removal	Soil Retention Efficiency
FLEXSTORM PC	1750 mg/L using	23	99.28%	98.96%
Sediment Bag	OK-110 Silica Sand and Clean Water	48	99.32%	99.25%
		70	98.89%	98.80%

Product Tested	Street Sweep	Particle Size of	% TSS	Soil Retention
	Sediment Load	Sediment Load	Removal	Efficiency
FLEXSTORM PC Sediment Bag	2.5% = 100 lbs Sed / 4000 lbs water	.001 mm - 10.0 mm (median 200 micron)	99.68%	95.61%

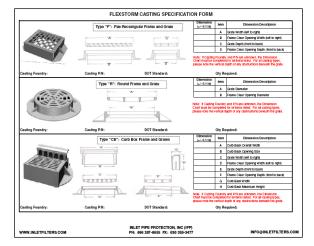
Product Tested	Hydrocarbon Load	Ave Flow Rate GPM	% TPH Removal	Oil Retention Efficiency
FLEXSTORM PC+	243 mg/L using 750	19	99.04%	97.22%
FLEXSTORM PC	mL (1.45 lb) used motor oil + lube oil	20	97.67%	91.61%
FLEXSTORM PC+	and clean water	92	96.88%	99.11%

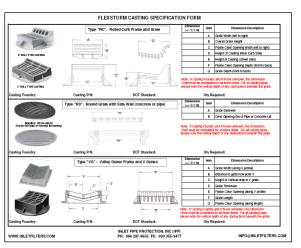
## 5.0 Identification of Drainage Structures:

5.1 The Installer (Contactor) shall inspect the plans and/or worksite to determine the quantity of each drainage structure casting type. The foundry casting number or the exact grate size and clear opening size will provide the information necessary to identify the required FLEXSTORM Inlet Filter part number. Inlet Filters are supplied to the field pre-configured to fit the specified drainage structure. (See Product Selection Guides and Casting ID Forms at <a href="https://www.inletfilters.com">www.ads-pipe.com</a>)









## 6.0 Installation Into Standard Grated Drainage Structures:

6.1 Remove the grate from the casting or concrete drainage structure. Clean the ledge (lip) of the casting frame or drainage structure to ensure it is free of stone and dirt. Drop in the FLEXSTORM Inlet Filter through the clear opening and be sure the suspension hangers rest firmly on the inside ledge (lip) of the casting. Replace the grate and confirm it is elevated no more than 1/8", which is the thickness of the steel hangers. For Curb Box Inlet Filters: Insert FLEXSTORM CATCH IT Inlet Filter as described above, pull the rear curb guard flap up and over the open curb box until tight, align magnets to ensure firm attachment to the top portion of the curb box casting. If the curb back opening is not magnetic, slide a typical rock sack or 2 x 4 through the 2-ply rear curb box flap to create a dam which will direct runoff into the sediment bag.









**7.0 Maintenance Guidelines:** The frequency of maintenance will vary depending on the application (course construction, post construction, or industrial use), the area of installation (relative to grade and runoff exposure), and the time of year relative to the geographic location (infrequent rain, year round rain, rain and snow conditions). The FLEXSTORM Operation & Maintenance Plan (as shown in 7.5) or other maintenance log should be kept on file.





- 7.1 Frequency of Inspections: Construction site inspection should occur following each ½" or more rain event. Post Construction inspections should occur three times per year (every four months) in areas with year round rainfall and three times per year (every three months) in areas with rainy seasons before and after snowfall season. Industrial application site inspections (loading ramps, wash racks, maintenance facilities) should occur on a regularly scheduled basis no less than three times per year.
- 7.2 General Maintenance for standard sediment bags: Upon inspection, the FLEXSTORM Inlet Filter should be emptied if the sediment bag is more than half filled with sediment and debris, or as directed by the Engineer. Remove the grate, engage the lifting bars or handles with the FLEXSTORM Removal Tool, and lift the FLEXSTORM Inlet Filter from the drainage structure. Machine assistance is not required. Dispose of the sediment or debris as directed by the Engineer. As an alternative, an industrial vacuum may be used to collect the accumulated sediment if available. Remove any caked on silt from the sediment bag and reverse flush the bag for optimal filtration. Replace the bag if the geotextile is torn or punctured to ½" diameter or greater on the lower half of the bag. If properly maintained, the Woven sediment bag will last a minimum of 4 years in the field.
- 7.3 Inspection and Handling of the FLEXSTORM PC / PC+ post construction sediment bag: The PC+ sediment bags will collect oil until saturated. Both the Adsorb-it filter liner and the MyCelx skimmer pouch will retain oil. The volume of oils retained will depend on sediment bag size. Unlike other passive oil sorbent products, Adsorb-it filter fabric has the ability to remove hydrocarbons at high flow rates while retaining 10- 20 times its weight in oil (weight of fabric is 12.8 oz / sq yd). The average 2' x 2' PC Bag contains approx .8 sq yds, or 10 oz of fabric. At 50% saturation, the average Adsorb-it lined PC filter will retain approximately 75 oz (4.2 lbs) of oil. Once the bag has become saturated with oils, it can be centrifuged or passed through a wringer to recover the oils, and the fabric reused with 85% to 90% efficacy. If it is determined, per Maintenance Contracts or Engineering Instructions, that the saturated PC sediment bags will be completely replaced, it is the responsibility of the service technician to place the filter medium and associated debris in an approved container and dispose of in accordance with EPA regulations. Spent Adsorb-it can be recycled for its fuel value through waste to energy incineration with a higher BTU per pound value than coal. The MyCelx skimmer pouch is made of all natural biodegradable materials and should be disposed of in the same fashion as the Adsorb-it filter membrane (likened to an oily rag). It too, is an excellent fuel source and can be burned for energy. The skimmers start yellow in color and will gradually turn brown as they become saturated, indicating time for replacement. Each MyCelx skimmer pouch will absorb approximately 89 oz (5 lbs) of oil before requiring replacement. To remove the pouch simply unclip it from the swivel strap sewn to the bottom of the bag.
- 7.4 Sediment Bag Replacement: When replacing a Sediment Bag, remove the bag by loosening or cutting off the clamping band. Take the new sediment bag, which is equipped with a stainless steel worm drive clamping band, and use a screw driver to tighten the bag around the frame channel. Ensure the bag is secure and that there is no slack around the perimeter of the band. For Oil absorbent boom bags, simply replace the oil boom or pouch when saturated by sliding it through the mesh support sleeve.





7.5 Operation & Maintenance Plan. (Download at www.inletfilters.com or www.ads-pipe.com)

## FLEXSTORM OPERATION & MAINTENANCE PLAN

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### Installation Instructions:

- Remove the grate from the casting or concrete drainage structure.
- Clean the ledge (lip) of the casting frame or drainage structure to ensure it is free of stone and dirt.
- Drop in the FLEXSTORM Inlet Filter through the clear opening and be sure the suspension hangers rest firmly on the inside ledge (lip) of the casting.
- Replace the grate and confirm it is elevated no more than 1/8", which is the thickness of the steel hangers.

#### Frequency of Inspections:

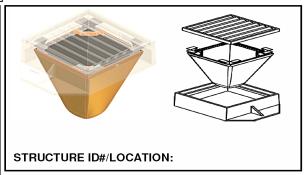
- 1. Construction site inspection should occur following each  $\frac{1}{2}$  or more rain event.
- Post Construction inspections should occur three times per year (every four months) in areas with mild year round rainfall and four times per year (every three months Feb-Nov) in areas with summer rains before and after the winter snowfall season.
- Industrial application site inspections (loading ramps, wash racks, maintenance facilities) should occur on a regularly scheduled basis no less than three times per year.

### Maintenance Guidelines:

- Empty the sediment bag if more than half filled with sediment and debris, or as directed by the Engineer.
- Remove the grate, engage the lifting bars or handles with the FLEXSTORM Removal Tool, and lift from the drainage
- Dispose of the sediment or debris as directed by the Engineer or Maintenance Contract in accordance with EPA guidelines.
- 4. As an alternative, an industrial vacuum may be used to collect the accumulated sediment.
- Remove any caked on silt from the sediment bag and reverse flush the bag with medium spray for optimal filtration.
- 6. Replace the bag if torn or punctured to  $V_2$ " diameter or greater on the lower half of the bag.
- 7. Post Construction PC Bags maint: At 50% saturation, the average 2' x 2' Adsorb-it lined PC filter will retain approx 75 oz (4.2 lbs) of oil and should be serviced or replaced. It can be centrifuged or passed through a wringer to recover the oils, and the fabric reused with 85% to 90% efficacy. It may also be recycled for its fuel value through waste to energy incineration.
- MyCelx Skimmer Pouches: The skimmers start yellow in color and will gradually turn brown as they become saturated, indicating time for replacement. Each MyCelx skimmer pouch will absorb approximately 89 oz (5 lbs) of oil before requiring replacement
- Dispose of all oil contaminated products in accordance with EPA guidelines.

### Sediment Bag Replacement:

- 1. Remove the bag by loosening or cutting off the clamping band.
- Take the new sediment bag, which is equipped with a stainless steel worm drive clamping band, and use a screw driver to tighten the bag around the frame channel.
- Ensure the bag is secure and that there is no slack around the perimeter of the band.



DATE	TASK PERFORMED	INSPECTOR