



## State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Bureau of Nonpoint Pollution Control

Division of Water Quality

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[http://www.state.nj.us/dep/dwq/bnpc\\_home.htm](http://www.state.nj.us/dep/dwq/bnpc_home.htm)

JON S. CORZINE  
Governor

MARK N. MAURIELLO  
Acting Commissioner

November 6, 2009

Craig Beatty, President  
KriStar Enterprises, Inc.  
P.O. Box 6419  
Santa Rosa, CA 95406

Re: Addendum to the Conditional Interim Certification for the FloGard® Dual Vortex Hydrodynamic Separator by KriStar Enterprises Inc. dated October 2, 2009

**Expiration Date: May 15, 2011**  
**TSS Removal Rate: 50%**

Dear Mr. Beatty:

This letter is a response to the KriStar Enterprises, Inc. (KriStar) request for an addendum to the Conditional Interim Certification (CIC) dated October 2, 2009. KriStar has requested the addition of three models to the CIC and a revision to the Operations and Maintenance Manual attached to the October CIC.

Within the CIC dated October 2, 2009 the various models for use were contained in Table 1 entitled: "FloGard® Dual-Vortex Hydrodynamic Separator Models". The NJDEP certifies the use of the additional models of the FloGard Dual-Vortex Hydrodynamic Separator by KriStar Enterprises, Inc. at a TSS removal rate of 50%, subject to the following conditions:

1. The various models and associated water quality flow capacities shall be sized for the peak flow of the New Jersey water quality design storm per N.J.A.C. 7:8-5, as shown in Table 1.
2. The FloGard® Dual-Vortex Hydrodynamic Separator is certified as an off-line system only. Any flow above the New Jersey water quality design storm must be bypassed around the system.
3. A hydrodynamic separator, such as the FloGard® Dual-Vortex, cannot be used in series with another hydrodynamic separator to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.

4. The maintenance plan for sites using this device shall incorporate, at a minimum, the revised maintenance requirements for the FloGard® Dual-Vortex Hydrodynamic Separator shown in the attachment.

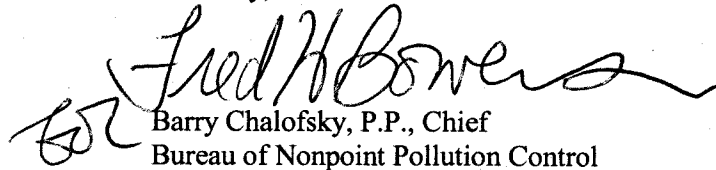
**Table 1. FloGard® Dual-Vortex Hydrodynamic Separator Models**

Model	Diameter (ft)	Treatment Flow Rate
DVS-36	3	180 gpm (0.4 cfs)
DVS-48	4	449 gpm (1.0 cfs)
DVS-60	5	898 gpm (2.0 cfs)
DVS-72	6	1,526 gpm (3.4 cfs)
DVS-84	7	2,424 gpm (5.4 cfs)
DVS-96	8	3,591 gpm (8.0 cfs)
DVS-120	10	7,002 gpm (15.6 cfs)
DVS-144	12	12,118 gpm (27 cfs)

In addition to the attached Version 1.01 - October 6, 2009 of the “FloGard® Dual Vortex Hydrodynamic Separator Operations and Maintenance Manual (for use with NJDEP projects)”, the detailed maintenance plan must include all of the items identified in Chapter 8: Maintenance of the New Jersey Stormwater Best Management Manual. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional operation and maintenance information associated with this manufactured treatment device is available from the vendor to assist in the development of a complete maintenance plan.

The Department anticipates proposing further adjustments to this process through the readoption of the Stormwater Management Rules. Additional information regarding the implementation of the Stormwater Management Rules N.J.A.C. 7:8 are available at [www.njstormwater.org](http://www.njstormwater.org). If you have any questions regarding the above information, please contact Ms. Sandra Blick of my office at (609) 633-7021.

Sincerely,

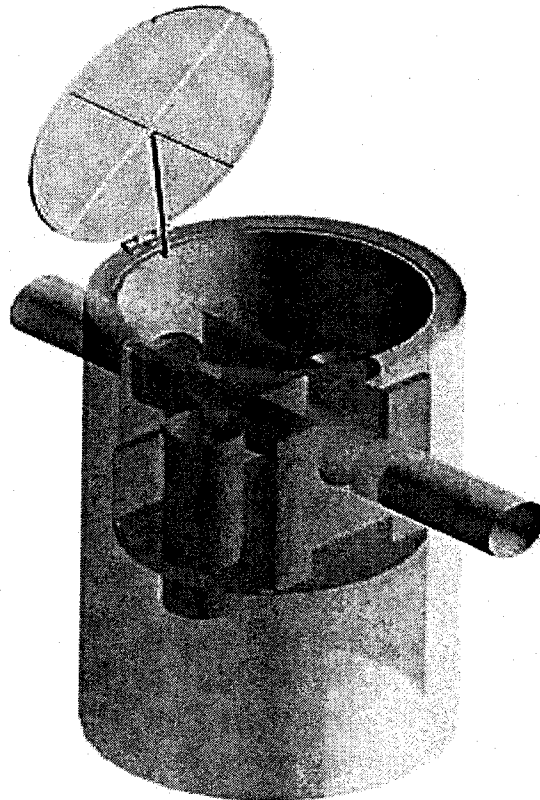
  
 Barry Chalofsky, P.P., Chief  
 Bureau of Nonpoint Pollution Control

- c: Tom Micai, NJDEP  
 Mary Beth Brenner, NJDEP  
 Rhea Weinberg Brekke, NJCAT  
 Elizabeth Dragon, NJDEP



# FloGard<sup>®</sup> Dual Vortex Hydrodynamic Separator

Operations and Maintenance Manual  
(for use with NJDEP projects)



## **FloGard® Dual-Vortex Hydrodynamic Separator**

### **Description / Basic Function**

The Dual-Vortex Hydrodynamic Separator is a stormwater filtration device used to reduce pollutant loading in runoff from urban developments. Impervious surfaces and other urban and suburban landscapes generate a variety of contaminants that can enter stormwater, polluting downstream receiving waters. The DVS captures and retains sediment, oils, metals and other target constituents close to the source and reduces the total discharge load.

DVS units are designed to effect greater than 80% removal of TSS reflective of typical urban runoff. Units are sized to treat stormwater at the design removal efficiency in an equal or smaller footprint than other typical hydrodynamic separators. DVS units offer an economical alternative structural BMP for use in developments where land area necessitates compact, effective treatment for removal of suspended pollutants from stormwater runoff.

The DVS internal components may be manufactured from durable stainless steel, concrete or marine-grade fiberglass materials. The internal components are configured to fit into industry standard precast concrete circular or rectangular manholes.

### **How It Works**

Particle settling or floatation is accelerated by centripetal forces induced by the tangential flow pattern augmented by a highly circuitous flow path. The unit uses two independent cylindrical separators: Low flow is diverted by the inlet to the first separator, while moderate flow begins to overflow the first control weir and enter the second separator. Settled particles collect in the bottom storage area of the unit which is isolated from the fluid outlet, minimizing resuspension. Floating debris and oils are temporarily held at the top of each separator and deposited in the upper storage area by peak storm events. Once the unit treatment capacity is exceeded, excess flow breaches a second control weir at the inlet and passes through the bypass pipe without decreasing the treatment flow or re-entraining captured pollutants.

### **Maintenance Overview for DVS Systems**

State and Local regulations require that stormwater management systems be maintained and serviced on a recurring basis. The purpose of maintaining a clean and obstruction-free system is to preserve the performance and function of the device to ensure the protection of downstream receiving waters. Trash and debris, floatables, gross pollutants and sediment are intended to build up in any stormwater treatment system. Without consistent maintenance, pollutant buildup can cause the system to function improperly by reducing removal efficiency, increasing the potential for pollutant loss through scour, or by impeding flow in or out of the system. Upstream areas may run the risk of flooding and deleterious environmental impact downstream could occur.

### **Recommended Frequency of Service**

It is recommended that FloGard® Dual-Vortex Hydrodynamic Separators be inspected on a regularly occurring basis. Inspections should occur not less than two (2) times per year to assess the sediment level in the sump and remove floatable debris and trash from the collection areas. If the sediment level

exceeds 50% of the depth of the sump, sediment removal should be scheduled immediately to maintain the operating efficiency of the system.

In accordance with the NJDEP Protocol for Manufactured Hydrodynamic Sedimentation Devices for Total Suspended Solids Based on Laboratory Analysis (August 2009, revised September 1, 2009), the required sediment removal intervals are shown in the table below:

**Required Sediment Removal Interval (Years) =**

$$\frac{(50\% \text{ of MTD's Maximum Sediment Storage Volume})}{(3.366)(\text{MTFR})(\text{TSS Removal Efficiency})}$$

Model	MTFR <sup>1</sup> (cfs)	% TSS Removal <sup>1</sup>	Maximum Sediment Storage Volume (cf)	Required Sediment Removal Interval (mo)
DVS-36	0.35	50%	8	71
DVS-48	0.63	50%	18	64
DVS-60	1.00	50%	35	62
DVS-72	1.40	50%	60	63
DVS-84	1.90	50%	95	63
DVS-96	2.50	50%	142	63
DVS-120	3.90	50%	278	64
DVS-144	5.70	50%	481	64

### Service Procedures

1. Open the access cover
  - a. If equipped with an EZ Lift cover, pull the cover back to an upright position and check to see it is locked in place.
  - b. If equipped with cast iron access covers, remove the covers and set to one side.
2. Then either:
  - a. Use an industrial vacuum with an extension to remove collected floating debris and hydrocarbons from surface, or;
  - b. Manually remove collected floating debris and hydrocarbons from the surface.
3. Measure depth of sediment buildup at bottom of tank through separator tube. Inspect tank and internal components for damage and obstructions.
4. As required, use an industrial vacuum with an extension to remove sediment from the bottom of the tank through the separator tubes.
5. The EZ-Lift manhole cover shall be pulled back into place, or the cast iron access covers replaced.

### **Inspection / Maintenance Requirements**

Listed below are some recommendations for equipment and training for personnel to inspect and maintain a FloGard® Dual-Vortex Hydrodynamic Separator system.

- Personnel – OSHA Confined Space Entry training and certification is a prerequisite for entrance into a system.
  
- Equipment –
  - Record Taking (pen, paper, voice recorder)
  - Proper Clothing (appropriate footwear, gloves, hardhat, safety glasses, etc.)
  - Flashlight
  - Tape Measure
  - Measuring Stick
  - Pry Bar
  - Traffic Control (Flagging, barricades, signage, cones, etc.)
  - First aid materials
  - Debris and Contaminant collectors
  - Debris and Contaminant containers
  - Vacuum Truck
  
- Parts - There are no replacement wear parts required. Should any of the internal components be damaged in some manner, contact Kristar for locally available materials.

### **Disposal of Pollutants**

The collected gross pollutants, hydrocarbons, sediment, and absorbent (where applicable) shall be disposed of in accordance with local, state and/or federal agency requirements.