



State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Office of the Commissioner

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JON S. CORZINE
Governor

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Commissioner

January 4, 2008

Skip Short
Eastern Manager
KriStar Enterprises, Inc.
P.O. Box 6419
Santa Rosa, CA 95406

Dear Mr. Short:

In accordance with the Energy and Environmental Technology Verification (EETV) Act at N.J.S.A. 13:1D-134, the New Jersey Department of Environmental Protection (NJDEP) is pleased to issue a **Conditional Interim Certification** for the FloGard[®] Dual-Vortex Hydrodynamic Separator developed by KriStar Enterprises, Inc. This Conditional Interim Certification is being issued pursuant to this program's receipt and review of the New Jersey Corporation for Advanced Technology (NJCAT) verification report, for the FloGard[®] Dual-Vortex Hydrodynamic Separator, dated August 2007.

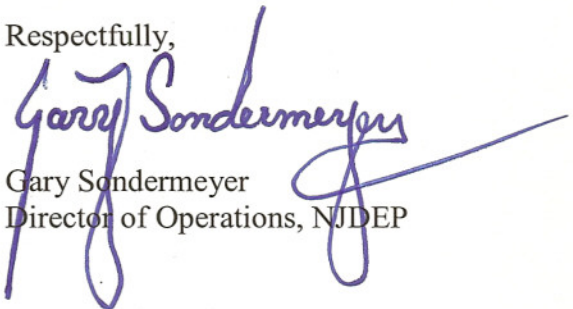
Based on the NJCAT verified laboratory performance, the NJDEP feels that the FloGard[®] Dual-Vortex Hydrodynamic Separator Model DVS-48 has the capability of achieving in field applications a TSS removal efficiency of 50%. Therefore, the NJDEP certifies the **FloGard[®] Dual-Vortex Hydrodynamic Separator, Model DVS-48 at 50% TSS removal rate while operating at a treatment flow rate not to exceed 280 gpm (0.63 cfs)**. In addition, the various models of the FloGard[®] Dual-Vortex Hydrodynamic Separator, as presented in **Table 1** of the attached Conditional Interim Certification Findings, are also approved for use to achieve the same TSS removal efficiency of 50% from stormwater runoff, while operating at or below the respective designed treatment flow rates. Additional conditions regarding this Conditional Interim Certification are as follows:

1. Presently, the FloGard[®] Dual-Vortex Hydrodynamic Separator can only be used as an offline system. Therefore, the amount of stormwater runoff diverted to the device must not exceed the respective designed flow rate.
2. The FloGard[®] Dual-Vortex Hydrodynamic Separator is flow-based and shall be sized to accommodate the peak of the water quality design storm as defined in the stormwater management rules at N.J.A.C. 7:8-5.5(a). If the peak flow is attenuated by another device, the FloGard[®] Dual-Vortex Hydrodynamic Separator must be sized to

- accommodate the outflow from the attenuating device at a rate not to exceed the respective designed treatment flow rate.
3. Training must be provided to the users of the FloGard[®] Dual-Vortex Hydrodynamic Separator to perform scheduled maintenance, which must be based at a minimum on inspection, for clogging, and excessive debris and sediment accumulation, to be performed at least four times annually as well as after every storm that exceeds 1 inch of rainfall.
 4. A field test of the FloGard[®] Dual-Vortex Hydrodynamic Separator in accordance with the requirements of the Technology Acceptance and Reciprocity Partnership (TARP) Tier II Protocol for Stormwater Best Management Practice Demonstration (July, 2003), and New Jersey Tier II Stormwater Test Requirements must be performed and the performance data be submitted to NJCAT for final verification. However, before a field test can be initiated, a Quality Assurance Project Plan (QAPP) must be submitted to NJCAT and NJDEP within six (6) months from the date of the Conditional Interim Certification letter.
 5. Field evaluation data that are consistent with the TARP Tier II Protocol and New Jersey Tier II Stormwater Test Requirements, which are available from NJCAT or www.state.nj.us/dep/dsr/bscit/Documents.htm, shall be submitted to the NJDEP and NJCAT by June 30, 2009.
 6. The Conditional Interim Certification of the FloGard[®] Dual-Vortex Hydrodynamic Separator shall expire on December 31, 2009.

Failure to satisfy any of the above conditions may result in the rescission of this Conditional Interim Certification letter. If you have any questions about this Conditional Interim Certification, please contact Ravi Patraju at (609) 292-0125.

Respectfully,



Gary Sondermeyer
Director of Operations, NJDEP

Enclosure

Larry Baier, Director, Division of Watershed Management
Tom Micai, Director, Land Use Regulation Program
Eileen Murphy, Director, Division of Science, Research, and Technology
Narinder Ahuja, Director, Division of Water Quality
Rhea Brekke, Executive Director, New Jersey Corporation for Advanced Technology
Ravi Patraju, Research Scientist, Division of Science, Research, and Technology

Conditional Interim Certification Findings

Manufactured Treatment Device

FloGard[®] Dual-Vortex Hydrodynamic Separator

Applicant Information

Skip Short
Eastern Manager
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P.O. Box 6419
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770-889-4338

Technology Description

As presented in the verification report from New Jersey Corporation for Advanced Technology (NJCAT), the schematic diagram of the FloGard[®] Dual-Vortex Hydrodynamic Separator shown in Figure 1 describes a hydrodynamic treatment system for stormwater runoff in which dual vortex separators are used to remove sediments from runoff. The separators are designed to function in stages, with the first separator treating low flows and the second separator becoming active as flows increase. At peak flow, an in-line bypass allows any excess flow to pass through the treatment system, thereby preventing backup of stormwater, while at the same time leaving accumulated materials undisturbed.

The vortex separators themselves consist of cylindrical tubes, extending downwardly from the pass-through member through a central platform, to a debris holding reservoir below the platform. A first weir at its base directs the initial, low flow to the first passageway, thus carrying first flow stormwater to the first of the two vortex separators. A second weir, taller than the first, directs overflow from the first weir to a second transport passageway to the second, vertically oriented vortex separator. When flows from storm runoff increase beyond the capacity of the two separators, water will flow over the second weir, thereby continuing through the assembly, without decreasing the treatment flow rate or re-entraining captured pollutants, and exit into the storm drain system for discharge or treatment. The capacity of the pass-through member must be equal to or larger than that of the drainage pipe supplying the system, to prevent the possibility of backup.

NJCAT Verified Claim

The FloGard[®] Dual-Vortex Hydrodynamic Separator, Model DVS-48, at a flow rate of 280 gpm (0.63 cfs), has been shown to have a 60% total suspended solids (TSS) removal efficiency, measured as suspended solids concentration (SSC) (as per the NJDEP methodology for calculation of treatment efficiency) using NJDEP specified material with an average d_{50} particle size of 70 microns, an average influent concentration of 202 mg/L and 100% initial sediment loading in laboratory studies using simulated stormwater.

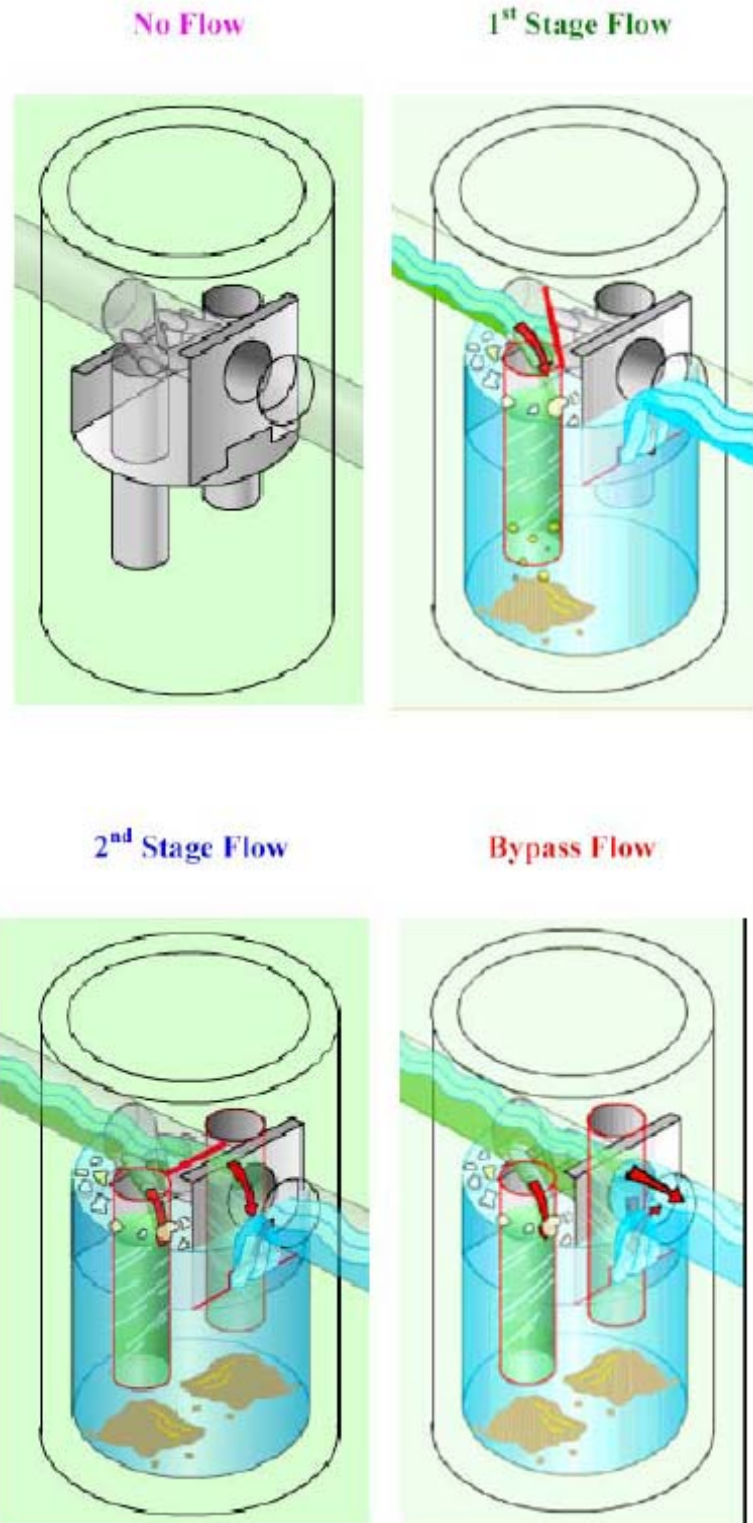


Figure 1. FloGard[®] Dual-Vortex Hydrodynamic Separator

NJDEP Conditional Interim Certification

Based on the NJCAT verified laboratory performance, the NJDEP feels that the FloGard® Dual-Vortex Hydrodynamic Separator Model DVS-48 has the capability of achieving in field applications a TSS removal efficiency of 50%. Therefore, the **NJDEP certifies the FloGard® Dual-Vortex Hydrodynamic Separator, Model DVS-48 at 50% TSS removal rate while operating at a treatment flow rate not to exceed 280 gpm (0.63 cfs)**. In addition, the various models of the FloGard® Dual-Vortex Hydrodynamic Separator, as presented in **Table 1**, are also approved for use to achieve the same TSS removal efficiency of 50% from stormwater runoff, while operating at or below the respective designed treatment flow rates.

Table 1. FloGard® Dual-Vortex Hydrodynamic Separator Models

Model	Diameter (ft)	Treatment Flow rate
DVS-36	3	160 gpm (0.35 cfs)
DVS-48	4	280 gpm (0.63 cfs)
DVS-60	5	440 gpm (0.98 cfs)
DVS-72	6	630 gpm (1.4 cfs)
DVS-96	8	1120 gpm (2.5 cfs)

The following conditions shall also apply to the Conditional Interim Certification:

1. Presently, the FloGard® Dual-Vortex Hydrodynamic Separator can only be used as an offline system. Therefore, the amount of stormwater runoff diverted to the device must not exceed the respective designed flow rate.
2. The FloGard® Dual-Vortex Hydrodynamic Separator is flow-based and shall be sized to accommodate the peak of the water quality design storm as defined in the stormwater management rules at N.J.A.C. 7:8-5.5(a). If the peak flow is attenuated by another device, the FloGard® Dual-Vortex Hydrodynamic Separator must be sized to accommodate the outflow from the attenuating device at a rate not to exceed the respective designed treatment flow rate.
3. Training must be provided to the users of the FloGard® Dual-Vortex Hydrodynamic Separator to perform scheduled maintenance following recommended inspection for clogging, and accumulation of excessive debris and sediment. The frequency of inspection recommended by NJDEP is, at a minimum, at least four times annually as well as after every storm that exceeds 1 inch of rainfall. Maintenance recommendations are given below.
4. A field test of the FloGard® Dual-Vortex Hydrodynamic Separator in accordance with the requirements of the Technology Acceptance and Reciprocity Partnership (TARP) Tier II Protocol for Stormwater Best Management Practice Demonstration (July, 2003), and New Jersey Tier II Stormwater Test Requirements must be completed, and the performance data submitted to NJCAT for final verification. However, before a field test can be initiated, a Quality Assurance Project Plan (QAPP) must be submitted to NJCAT for approval within six (6) months from the date of the Conditional Interim Certification letter.
5. Field evaluation data that are consistent with the TARP Tier II Protocol and New Jersey Tier II Stormwater Test Requirements, which are available from NJCAT or www.state.nj.us/dep/dsr/bscit/Documents.htm, shall be submitted to the NJDEP and NJCAT by June 30, 2009.

6. The Conditional Interim Certification of the FloGard® Dual-Vortex Hydrodynamic Separator shall expire on December 31, 2009.

Maintenance Recommendations

- As described in the documentation supplied by KriStar Enterprises, Inc., maintenance must be performed when sediments accumulate in the various devices to the respective depths as described in Table 2.

Table 2. Sediment Depths for Scheduling Maintenance

Model	Unit ID (ft)	Floatable Storage Capacity (gal)	Maximum Floatable Depth (in)	Sediment Storage Capacity (cu ft)	Maximum Sediment Depth (in)
DVS-36	3	10	5.3	8	13.5
DVS-48	4	23	7.0	19	18.0
DVS-60	5	44	8.8	37	22.5
DVS-72	6	77	10.5	64	27.0
DVS-96	8	182	14.0	151	36.0

- Disposal of debris, trash, sediment, and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state, and federal waste regulations.

Technology Limitations/Concerns

- Heavy loads of sediment will increase the needed maintenance frequency. Also, lack of maintenance may cause the system to operate at a reduced efficiency.
- The FloGard® Dual-Vortex Hydrodynamic Separator will not increase the net pollutant load to the downstream environment. However, pollutants may be transformed within the unit. For example, organic matter may decompose and release nitrogen in the form of nitrogen gas or nitrate. Steps should be taken to reduce the amount of organic matter to the device, especially in areas that may be sensitive to nitrogen.
- Although the FloGard® Dual-Vortex Hydrodynamic Separator is a self-contained unit, the design does incorporate standing water in the chambers, which can be a breeding site for mosquitoes. The technology has not been tested to identify mosquito related effects.