



State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Division of Science, Research and Technology

Bureau of Sustainable Communities & Innovative

Technologies

PO Box 409

Trenton, NJ 08625-0409

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JON S. CORZINE
Governor

LISA P. JACKSON
Acting Commissioner

January 19, 2006

Derek Berg
Research and Development
Vortechinics, Inc.
200 Enterprise Drive
Scarborough, ME 04074

RE: Conditional Interim Certification of VortFilter™ System.

Dear Mr. Berg:

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 VortFilter™ System developed by Vortechinics, Inc. This conditional interim certification is being issued as a result of the September 2005 submission of the final verification report by New Jersey Corporation for Advanced Technology (NJCAT), and **must be used in conjunction with the enclosed Conditional Interim Certification Findings document.**

According to NJCAT's verification report, and as indicated in the attached Conditional Interim Certification Findings, the VortFilter™ cartridge in combination with the VortFilter™ sump sized at a treatment rate of no more than 15 gpm with a perlite media and an event mean concentration influent in the range of 100 - 300 mg/L has been shown to have a regressed TSS removal efficiency (measured as SSC) of greater than 80% for two manufactured silica products with average particle sizes of 22 and 32 microns, respectively, in laboratory studies using simulated stormwater.

Based on the demonstrated laboratory performance with a material having an average particle size of 22 µm (Sil-Co-Sil 106), the NJDEP feels confident that the VortFilter™ System has the capability of achieving in field applications a TSS removal efficiency of 80%. Therefore, NJDEP certifies that the VortFilter™ cartridge, in combination with the VortFilter™ sump sized at a treatment rate of no more than 15 gpm, is capable of achieving a TSS removal efficiency of 80% at the respective maximum designed flow rates as given in Table 1 of the enclosed Conditional Interim Certification Findings document, and shall be permitted accordingly. In addition, the following conditions shall apply to the Conditional Interim Certification:

1. Since the VortFilter™ System was verified through laboratory performance data using a surrogate material, this device must be used with a pre-treatment device as part of a treatment train. The NJDEP has decided to adopt this conservative approach as a safety factor. However, upon the availability of acceptable **verified** field data, the NJDEP would consider revising this Interim Condition Certification to make the VortFilter™ System a stand-alone device. Presently, the selected pre-treatment device to be used with the respective VortFilter™ System can only be approved by the Land Use Regulation Program and/or the Division of Watershed Management.
2. The maximum TSS removal rate for any treatment train, comprising a pre-treatment device and the VortFilter™ System, shall be 80%.
3. The VortFilter™ System shall be designed in accordance with New Jersey's water quality design storm, as required in the Stormwater Management Rules (N.J.A.C. 7:8).
4. A Quality Assurance Project Plan supporting 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, shall be submitted to the NJDEP and NJCAT 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 July 31, 2007.
6. The appropriate devices satisfying site selection and sizing criteria must be consistent with the specifications as described in **Table 1 of the Conditional Interim Certification Findings document**.

Please note that this approval letter shall expire on January 31, 2008, unless extended by the NJDEP. For final certification of the VortFilter™ System, verified data must be generated from a full-scale field demonstration utilizing the TARP Tier II Protocol and New Jersey Tier II Stormwater Test Requirements. If you have any questions about this Conditional Interim Certification, please contact Ravi Patraju of my staff at (609) 292-0125.

Sincerely,



Martin Rosen
Chief - Bureau of Sustainable Communities
and Innovative Technologies

Enclosure

- c: Assistant Commissioner, Land Use Management
Sam Wolfe, Assistant Commissioner, Environmental Regulation
Larry Baier, Director, Division of Watershed Management
Mark Mauriello, Director, Division of Land Use Regulation
Narinder Ahuja, Director, Division of Water Quality
Eileen Murphy, Director, Division of Science, Research, and Technology
Rhea Brekke, Executive Director, New Jersey Corporation for Advanced Technology

Conditional Interim Certification Findings

NJDEP Technology Certification Program:

Bureau of Sustainable Communities & Innovative Technologies
Division of Science, Research & Technology
401 E State Street
P.O. Box 409
Trenton, NJ 08625
(609) 292-9692

Stormwater Manufactured Treatment Device:

VortFilter™ System by Vortechinics, Inc.

Applicant Information:

Vortechinics, Inc.
200 Enterprise Drive
Scarborough, ME 04074
(207) 885-9830

Technology Description:

Figure 1, as described in the New Jersey Corporation of Advanced Technology's verification report, displays a schematic of the VortFilter™ System, which is comprised of a sedimentation basin and filter basin deck with VortFilter™ cartridges. As stormwater enters the sedimentation basin, heavy particles settle to the bottom while floating pollutants rise to the water surface. As flow increases, the stormwater is then forced through the media cartridges where fine particulate material is removed by the filtration media. The treated water is discharged through the cartridge outlet, onto the filter basin deck, and ultimately exits through the VortFilter™ outlet pipe. Stormwater flows that exceed the VortFilter™ System's peak treatment flow rate will discharge through the standpipe that extends vertically from the filter basin deck. The standpipe is sized to allow the entire peak treatment flow rate to pass through the VortFilter™ System without restriction as long as the filter cartridges do not become occluded.

The filtration process begins when stormwater runoff is hydrostatically forced upward through the filter media cartridge. The VortFilter™ cartridge is filled with customized media that prevents the passage of sediment and other fine particulates and the pollutants associated with them. The precast concrete comprising the VortFilter™ housing and the filter basin deck are fabricated near the jobsite. The cartridges, designed to treat stormwater at the designed flow rate before bypass, are clamped into the filter basin deck after the site is stabilized.

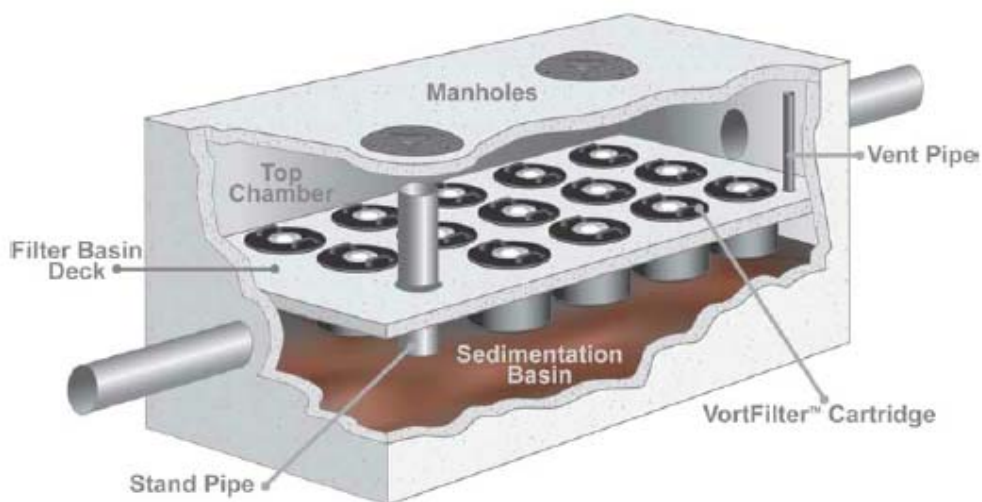


Figure 1. VortFilter™ Components

New Jersey Corporation for Advanced Technology (NJCAT) Verified Claim:

The VortFilter™ cartridge in combination with the VortFilter™ sump sized at a treatment rate of no more than 15 gpm with a perlite media and an event mean concentration influent in the range of 100 - 300 mg/L, has been shown to have a regressed TSS removal efficiency (measured as SSC) of greater than 80% for two manufactured silica products with average particle sizes of 22 and 32 microns, respectively, in laboratory studies using simulated stormwater.

Technology Limitations/Concerns:

- Lack of maintenance may cause the VortFilter™ filtration media to become occluded with sediments, thus reducing the TSS removal efficiency of the system. Therefore, inspections of accumulated pollutants must be performed as recommended by the manufacturer.
- Heavy solids loading may cause the cartridges to be occluded earlier thus requiring an increase in maintenance frequency.
- The VortFilter™ System design will cause ponding of water, which can become a breeding site for mosquitoes. Also, if the cartridges become occluded due to inadequate maintenance, additional standing water will result.

NJDEP Conditional Interim Certification:

Based on the demonstrated laboratory performance with a material having an average particle size of 22 μm (Sil-Co-Sil 106), the NJDEP feels confident that the VortFilter™ System has the capability of achieving in field applications a TSS removal efficiency of 80%. Therefore, NJDEP certifies that the VortFilter™ cartridge, in combination with the VortFilter™ sump sized at a treatment rate of no more than 15 gpm, is capable of achieving a TSS removal efficiency of 80%. In addition, the various models of the VortFilter™ System that are capable of achieving a TSS removal efficiency of 80% from stormwater runoff at the respective maximum designed flow

rates are given in **Table 1**, and shall be permitted accordingly. The following **conditions** shall apply to the Conditional Interim Certification:

1. Since the VortFilter™ System was verified through laboratory performance data using a surrogate material, this device must be used with a pre-treatment device as part of a treatment train. The NJDEP has decided to adopt this conservative approach as a safety factor. However, upon the availability of acceptable **verified** field data, the NJDEP would consider revising this Interim Condition Certification to make the VortFilter™ System a stand-alone device. Presently, the selected pre-treatment device to be used with the respective VortFilter™ System can only be approved by the Land Use Regulation Program and/or the Division of Watershed Management.
2. The maximum TSS removal rate for any treatment train, comprising a pre-treatment device and the VortFilter™ System, shall be 80%.
3. The VortFilter™ System shall be designed in accordance with New Jersey’s water quality design storm, as required in the Stormwater Management Rules (N.J.A.C. 7:8).
4. A Quality Assurance Project Plan supporting 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, shall be submitted to the NJDEP and NJCAT 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 July 31, 2007.
6. The appropriate devices satisfying site selection and sizing criteria must be consistent with the specifications as described in **Table 1**.

Table 1. VortFilter™ System Models with Peak Treatment Rates

VortFilter™ Model	Approximate Size	Structure Type	Maximum Number of Cartridges	Peak Treatment Rate^a (cfs)
VF4r	4’ diameter	Manhole	1	0.03
VF5r	5’ diameter	Manhole	3	0.10
VF6r	6 diameter	Manhole	4	0.14
VF7r	7’ diameter	Manhole	6	0.20
VF8r	8’ diameter	Manhole	8	0.27
VF612	6’ x 12’	Vault	11	0.37
VF713	7’ x 13’	Vault	17	0.57
VF816	8’ x 16’	Vault	20	0.67
VF 915	9’ x 15	Vault	23	0.77
VF1016	10’ x 16’	Vault	27	0.90
VF1218	12’ x 18’	Vault	34	1.14

^a Based on each cartridge designed for 15 gpm.