

Attachment 1

Manufactured Treatment Device (MTD) Registration

1. Manufactured Treatment Device Name:

StormVault BioFiltration (SVBF) with Sierra Blend Media

2. Company Name: *Jensen Enterprises*

Mailing Address: *9895 Double R Blvd*

City: *Reno*

State: *NV* Zip: *89521*

3. Contact Name (to whom questions should be addressed): *Walter Stein*

Mailing Address: *521 Dunn Cir*

City: *Sparks*

State: *NV* Zip: *89431*

Phone number: *(775) 352-6336*

E-mail address: *wstein@jensenprecast.com*

Web address: <https://www.jensenprecast.com/water-resources/>

4. Technology

Specific size/capacity of MTD assessed (include units):

The StormVault BioFiltration with Sierra Blend media can be configured in multiple options:

- *SVBF Planter Box*
- *SVBF Tree Box*
- *SVBF Tree Well*
- *SVBF Underground Vault.*

The SVBF can be deployed in standard size concrete vaults ranging from 3'x5' to 10'x20' interior dimensions. This equates to a treatment capacity ranging from 0.07-cfs (30-gpm) to 0.89-cfs (400-gpm). The SVBF system with Sierra Blend media can also be deployed in long linear precast trench configurations having widths of 3 to 7-ft, which are ideal for parking lots and parking strips.

Range of drainage areas served by MTD (acres):

SVBF units are designed to treat various drainage areas on a project by project basis. The SVBF has a maximum allowable inflow drainage area ranging from 0.28-acres to 3.70-acres based on 600-lbs of mass contributed per acre per year as certified by New Jersey Department of Environmental Protection (NJDEP).

Include sizing chart or describe sizing criteria:

A SVBF sizing table can be found in the attached New Jersey Corporation for Advanced Technology (NJCAT) performance verification report. The SVBF is sized on the NJDEP certified 2.0 gpm/ft² (191 in/hr/ft²) at a Total Suspended Solids (TSS) removal rate of 80%.

Intended application: on-line or offline:

The SVBF can be deployed in either an on-line or offline configuration as certified by NJDEP.

Media used (if applicable):

The SVBF unit consists of the following, layered from bottom to top: 4, 6 or 8-inch diameter perforated underdrain piping surrounded by stone, 6-inches of bridging stone, 18-inches of Sierra Blend bio-soils media, 3-inches of mulch, and 6-inches of ponding depth with at least 6-inches of freeboard. An apron of 4 to 6-inch diameter stone is placed beneath the inflow point as rip rap for erosion control.

5. Warranty Information (describe, or provide web address):

Jensen Precast provides a 12-month (1-year) warranty against all manufacturers' defects from the date of final project acceptance. Jensen Precast or its agent/representative upon its determination will repair, correct or replace any noted manufacturer originated defects advised to Jensen Precast in writing during the warranty period.

6. Treatment Type

- Hydrodynamic Structure
- Filtering Structure
- Manufactured Bioretention System
Provide Infiltration Rate (in/hr): 191-in/hr/ft² or 2.0-gpm/ft²
- Other (describe):

7. Water Quality Treatment Mechanisms (check all that apply)

- Sedimentation/settling
- Infiltration
- Filtration (specify filter media), Sierra Blend Bio Soils Media
- Adsorption/cation exchange
- Chelating/precipitation
- Chemical treatment
- Biological uptake
- Other (describe):

8. Performance Testing and Certification (check all that apply):

Performance Claim (include removal efficiencies for treated pollutants, flow criteria, drainage area):

Through laboratory verification testing, the SVBF achieves 80% removal efficiency of total suspended solids (TSS) with a d_{50} of 48-microns (μm) at a hydraulic loading rate of 2.0-gpm/ft². These results are NJCAT verified and NJDEP approved.

Specific size/Capacity of MTD assessed:

A SVBF 4x4 unit was tested with a capacity of 0.07-cfs (32-gpm).

Has the MTD been "approved" by an established granting agency, e.g. New Jersey Department of Environmental Protection (NJDEP) , Washington State Department of Ecology, etc.

No

Yes; For each approval, indicate (1) the granting agency, (2) use level if awarded (3) the protocol version under which performance testing occurred (if applicable), and (4) the date of award, and attach award letter.

- 1. New Jersey Department of Environmental Protection (NJDEP)*
- 2. Manufactured Treatment Device Lab Certification*
- 3. New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device (NJDEP 2013)*
- 4. May 5, 2020*

- 1. Washington State Department of Ecology (WASDOE)*
- 2. Pilot Use Level Designation (PULD) for Basic (TSS)*
- 3. Technical Guidance Manual for Evaluating Emerging Stormwater Treatment Technologies, Technology Assessment Protocol – Ecology (TAPE), (August 2011)*
- 4. October 2020*

Was an established testing protocol followed?

No

Yes, (1) Provide name of testing protocol followed, (2) list any protocol deviations:

Provide the information below and provide a performance report (attach report):

For lab tests:

- i. Summarize the specific settings for each test run (flow rates, run times, loading rates) and performance for each run:

A full scale SVBF was lab tested according to New Jersey Department of Environmental Protection Laboratory Protocol to Assess Total Suspended Solids Removal by a Filtration Manufactured Treatment Device (NJDEP 2013). Specific testing information can be found in the attached New Jersey Corporation for Advanced Technology (NJCAT) performance verification report.

- ii. If a synthetic sediment product was used, include information about the particle size distribution of the test material:

The sediment was mixed in accordance with the NJCAT testing protocol. A sediment blend with a particle size distribution d_{50} of 48-microns (μm) was mixed with commercially available sediment products. Full particle size distribution analysis is readily available within the attached NJCAT performance verification report.

- iii. If less than full-scale setup was tested, describe the ratio of that tested to the full-scale MTD:

A full scale, SVBF 4x4 unit was tested.

For field tests:

- i. Provide the address, average annual rainfall and characterized rainfall pattern, and the average annual number of storms for the field-test location:

The SVBF is presently being tested at a location in ZigZag, OR 97049. The average annual rainfall is 71.01-inches. The site has an average of 140 days of rainfall per year.

- ii. Provide the total contributing drainage area for the test site, percent of impervious area in the drainage area, and percentages of land uses within the drainage area (acres):

The SVBF field test site has a contributing drainage area of 0.19-acres of 100% impervious area. The entire drainage area is a paved bridge.

- iii. Describe pretreatment, bypass conditions, or other special circumstances at the test site:

The SVBF tested at the field site is a standard configuration SVBF unit with Sierra Blend media. Bypass was separately monitored upstream of the SVBF unit in accordance with the TAPE protocol. There were no other pretreatment or special circumstances.

- iv. Provide the number of storms monitored and describe the monitored storm events (amount of precipitation, duration, etc.):

The SVBF is still undergoing field testing to demonstrate achievement of a General Use Level Designation (GULD) per the WASDOE TAPE program. The unit has been continually monitored since June 2019. Data for all qualifying storm events will be provided at a later time once GULD has been approved. GULD approval is anticipated to be approved in September or October of 2021.

- v. Describe whether or not monitoring examined seasonal variation in MTD performance:

Seasonal variation of the SVBF has not been a problem. The SVBF performs in all seasons.

9. MTD History:

How long has this specific model/design been on the market?

The SVBF has been available on the market since summer 2020.

List no more than three locations where the assessed model size(s) has/have been installed in Virginia. If applicable, provide permitting authority. If known, provide latitude & longitude:

No SVBF units are currently installed in Virginia.

List no more than three locations where the assessed model size(s) has/have been installed outside of Virginia. If applicable, provide permitting authority. If known, provide latitude & longitude:

*WASDOE Field Test Site
ZigZag, OR 97049
45.346997, -121.942405*

10. Maintenance:

What is the generic inspection and maintenance plan/procedure? (attach necessary documents):

The operation and maintenance manual can be found at:
<https://www.jensenprecast.com/water-resources/wp-content/uploads/2020/05/SVBF-OM-Manual-Mar-2020.pdf>

Is there a maintenance track record/history that can be documented?

No, no track record.

Yes, track record exists; (provide maintenance track record, location, and sizing of three to five MTDs installed in Virginia [preferred] or elsewhere):

Routine SVBF maintenance records are the responsibility of the property owner.

Recognizing that maintenance is an integral function of the MTD, provide the following: amount of runoff treated, the water quality of the runoff, and what is the expected maintenance frequency for this MTD in Virginia, per year?

The SVBF maintenance frequency is typically governed by the specific site pollutant loads and should be evaluated in the first year of installation. Jensen recommends a routine inspection every six months, or approximately every 10-inches of rainfall process through the unit.

Total life expectancy of MTD when properly operated in Virginia and, if relevant, life expectancy of media:

The accepted design life of the concrete components of the SVBF is 50 years. The accepted design life of the stainless-steel connection hardware is at least 25 years. The Sierra Blend Media and mulch layers will need to be replaced when they become completely occluded with stormwater pollutants. This is dependent on the specific site pollutant loads and should be frequently monitored.

For media or amendments functioning based on cation exchange or adsorption, how long will the media last before breakthrough (indicator capacity is nearly reached) occurs?

The SVBF has not undergone any breakthrough testing.

For media or amendments functioning based on cation exchange or adsorption, how has the longevity of the media or amendments been quantified prior to breakthrough (attach necessary performance data or documents)?

The SVBF has not undergone any breakthrough testing.

Is the maintenance procedure and/or are materials/components proprietary?

Yes, proprietary – *General maintenance procedures of the SVBF are not proprietary, however, the replacement of Sierra Blend media is proprietary and is acquired from Jensen Precast.*

No, not proprietary

Maintenance complexity (check all that apply):

Confined space training required for maintenance

Liquid pumping and transportation

Specify method:

Solids removal and disposal

Specify method: *Vactor truck or scooped and loaded into dump trucks*

Other noteworthy maintenance parameter (describe):


11. Comments

Include any additional explanations or comments:

12. Certification

Signed by the company president or responsible officer of the organization:

“I certify that all information submitted is to the best of my knowledge and belief true, accurate, and complete.”

Signature:  _____

Name: Eric Jensen _____

Title: President _____

Date: 11/11/2020 _____

NOTE: All information submitted to the department will be made publicly accessible to all interested parties. This MTD registration form will be posted on the Virginia Stormwater BMP Clearinghouse website.