



State of New Jersey

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BOB MARTIN
Acting Commissioner

February 24, 2010

Hans de Bruijn
P.O. Box 10
Terre Hill, PA 17581

Re: Conditional Interim Certification for the TerreKleen Stormwater Device by Terre Hill Stormwater Systems

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

Dear Mr. de Bruijn:

The Stormwater Management Rules under N.J.A.C. 7:8-5.5(b) and 5.7(c) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by New Jersey Corporation for Advanced Technology and have been certified by the New Jersey Department of Environmental Protection (NJDEP).

The certification process has been revised. The revised process places MTDs into five categories. The TerreKleen Stormwater Device by Terre Hill Stormwater Systems has been qualified for Category III, MTDs within Testing Portion of the NJCAT Verification Process as of May 15, 2009.

The TerreKleen Stormwater Device, shown in figure 1, is a hydrodynamic treatment system comprised of laminar plates to remove sediments from runoff.

The NJDEP received the submitted data demonstrating the above approved TSS Removal Rate, a maintenance plan required under Category III, and a signed statement indicating that the 2009 NJDEP Testing Protocols as amended and supplemented (Hydrodynamic, Filter, or Field requirements in accordance with NJ Amendments of TARP) are unincorporated into the maintenance plan. This certification is based solely on the documentation submitted and the verification of such documentation by NJCAT.

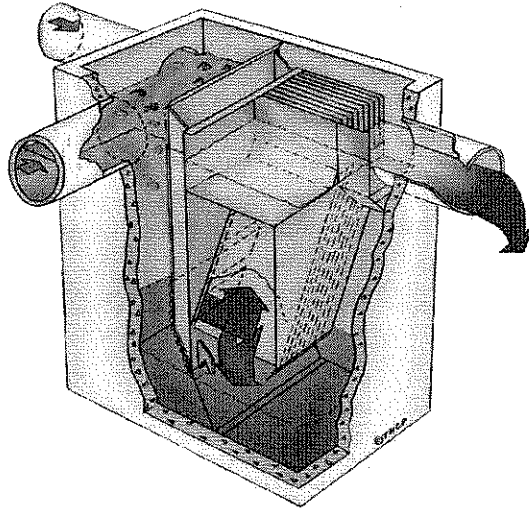


Figure 1 Schematic of the Terre Kleen™ TK09

The NJDEP certifies the use of the TerreKleen Stormwater Device by Terre Hill Stormwater Systems at a TSS removal rate of 50%, subject to the following conditions:

1. The TerreKleen Stormwater Device is designed according to the NJ Water Quality Design Storm in N.J.A.C. 7:8-5.5.
2. 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.

Table 1 Terre Kleen™ Treatment Flow Rates

Terre Kleen™ Model	Number of sedimentation cells in the Grit-Chamber	Horizontally Projected Sedimentation Area (ft ²)	Design Flow Rate (cfs)
TK01	1	8	0.32
TK02	2	13	0.52
TK05	5	32	1.28
TK09	9	57	2.29
TK18	18	115	4.61
TK27	27	172	6.90
TK36	36	230	9.22
TK45	45	288	11.55
TK54	54	346	13.88
TK63	63	403	16.19

3. The TerreKleen Stormwater Device is certified as an off-line system only. Any flow above the New Jersey water quality design storm must be bypassed around the system.
4. A hydrodynamic separator, such as TerreKleen Stormwater Device, cannot be used in series with another settling device to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.
5. The maintenance plan for sites using this device shall incorporate, at a minimum, the maintenance requirements for the TerreKleen Stormwater Device shown in the attachment entitled "Maintenance Procedures" and the attached letter entitled "Sediment Removal Interval Terre Kleen model TK18".

In addition to the attached, 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.

Additional information regarding the implementation of the Stormwater Management rules N.J.A.C. 7:8 are available at www.njstormwater.org.

Sincerely,



Nancy Wittenberg
Assistant Commissioner

Attachments

c: Tom Micai, NJDEP
Mary Beth Brenner, NJDEP
Rhea Weinberg Brekke, NJCAT
Barry Chalofsky, NJDEP



Maintenance Procedures

Maintenance Record

When a Terre Kleen™ unit is newly installed, frequent inspection is highly recommended. The design of the Terre Kleen™ unit permits easy inspection. It is recommended that, during the first two years after installation, inspections be performed at least quarterly for the purpose of noting the rate of sediment and floatable accumulation.

Attached is a form that may be used for recording information resulting from the inspections. Maintaining accurate records provides a history of the pollutant accumulation for this unit and can be used as a comparison to other Terre Kleen™ units that are in use in your region.

To determine sediment accumulation, a stadia rod or similar measuring device may be used. Cleaning is recommended when the sediment is found to be at the level shown in the Terre Kleen™ flow diagram. To avoid underestimating the volume of sediment in the chamber, care must be exercised in lowering the measuring device to the top of the sediment pile. The clean-out procedure may occur anytime after a rain event. It is not necessary to wait for particles to settle due to the high sedimentation efficiency of the device.

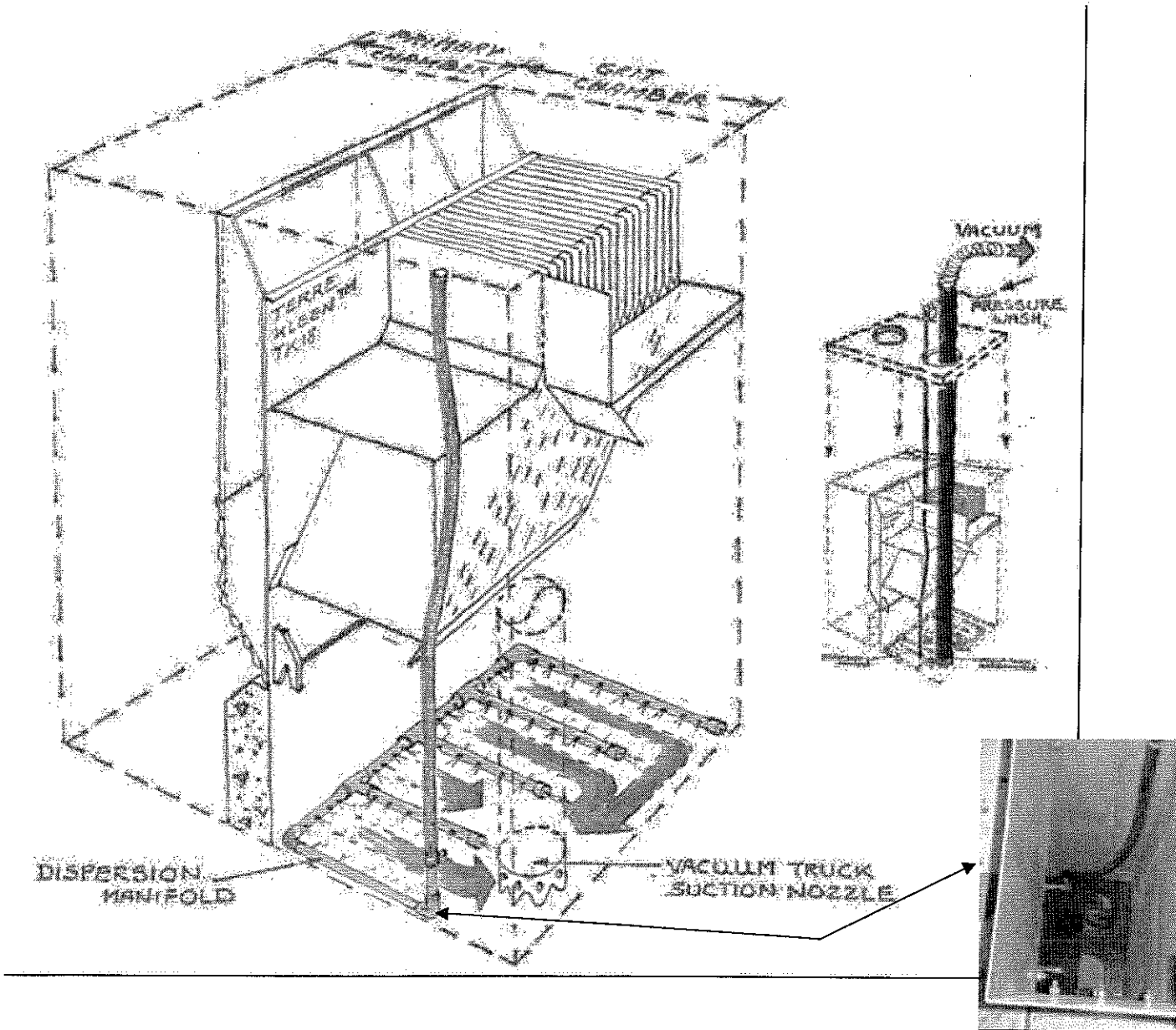
Maintenance Cleaning

The Terre Kleen™ is designed with clear access to the primary and grit chambers. A vacuum truck, or similar trailer mounted equipment, can be used to clean both chambers by lowering the suction hose through the openings. The oil and litter in the primary chamber should be removed first. Depending on the equipment used, it may be necessary to remove floating trash and debris with a net or rake. To further prevent discharge of hydrocarbons, "oil absorption booms" were added to the primary chamber during installation. They will float among the litter and begin to sink as they absorb oil. The boom size 2¼" Ø x 12" will absorb about a quart of oil and solidify it within the boom. These booms should be replaced when they become saturated with oil and no longer appear above the water surface. Depending on the site conditions, the number of booms can be adjusted up or down. Additional booms can be purchased from Terre Hill Concrete Products. (*The sorbent booms are placed in the primary chamber for the absorption of gasoline; diesel fuel, lube oil, jet fuel, transformer oils, chlorinated solvents, aromatic solvents, hydraulic oils, and light crude. The sorbent boom is Rubberizer® boom manufactured by Haz-Mat Response Technologies Inc. A standard TerreKleen™ TK09 has 4 booms, TK18 has 8 booms, TK27 has 12 booms, TK36 has 16 booms, TK45 has 20 booms, and TK54 has 25 booms.*)

After the oil and litter is removed, the grit chamber can be cleaned out. Finally, switch back to the primary chamber to remove remaining debris. Water can be sprayed into the chambers as necessary to loosen debris.

Sludge dispersion manifold

Each Terre Kleen™ water quality device contains a “Sludge Dispersion Manifold”. The manifold pipes are mounted to the floor underneath the inclined plate settler and connect to a hose that leads to the clean out opening at grade level. This hose is pressurized by the vacuum truck’s spray nozzle. While the suction nozzle removes the captured pollutants, the pressurized manifold sprays water through the small horizontal holes in the manifold pipes. This water lifts and disperses the sludge blanket causing it to drain to the suction nozzle.



Disposal

Disposal of removed material will depend on the nature of the drainage area. For example, sediment collected from a system of stormwater inlets may possibly be disposed at a landfill after the liquid fraction is decanted at a sewage treatment facility. Material removed from the Terre Kleen™ must be handled according to local, state, and federal regulations. Some materials, such as sediment and detritus from lawn areas may be reused on site, which is often recommended by the local authorities. After the clean-out procedure is complete, replace the manhole covers securely to the frames for safety purposes.

Cold Weather Concerns

There is limited data concerning cold weather effects on a properly maintained Terre Kleen™ device. The depth of the structure in the soil insulates it from freezing which is similar to exposure conditions of septic tanks. When inlets are integrated into the Terre Kleen™, exposure to freezing may become an issue and may result in more runoff bypassing the treatment system due to a build-up of snow and ice. Saltwater stratification in the water may also reduce detention time. Colder temperatures reduce the settling velocity of particles, which can result in fewer particles being "trapped". The amount of grit and sand in the runoff from paved areas may be significantly increased in the winter, which may warrant more frequent maintenance. Access to the device for maintenance may be more difficult.

Confined Space Entry

Regular maintenance and clean out does not require confined space entry into the Terre Kleen™ unit. If confined entry is required, it will need to be performed by qualified personnel who are properly trained for confined space activity using proper equipment as per the latest OSHA regulations.

The Terre Kleen™ will trap floatable litter and oils that are not emulsified in the stormwater runoff. **Keep sparks and open flames away when working around a Terre Kleen™ unit that may contain flammable material.**

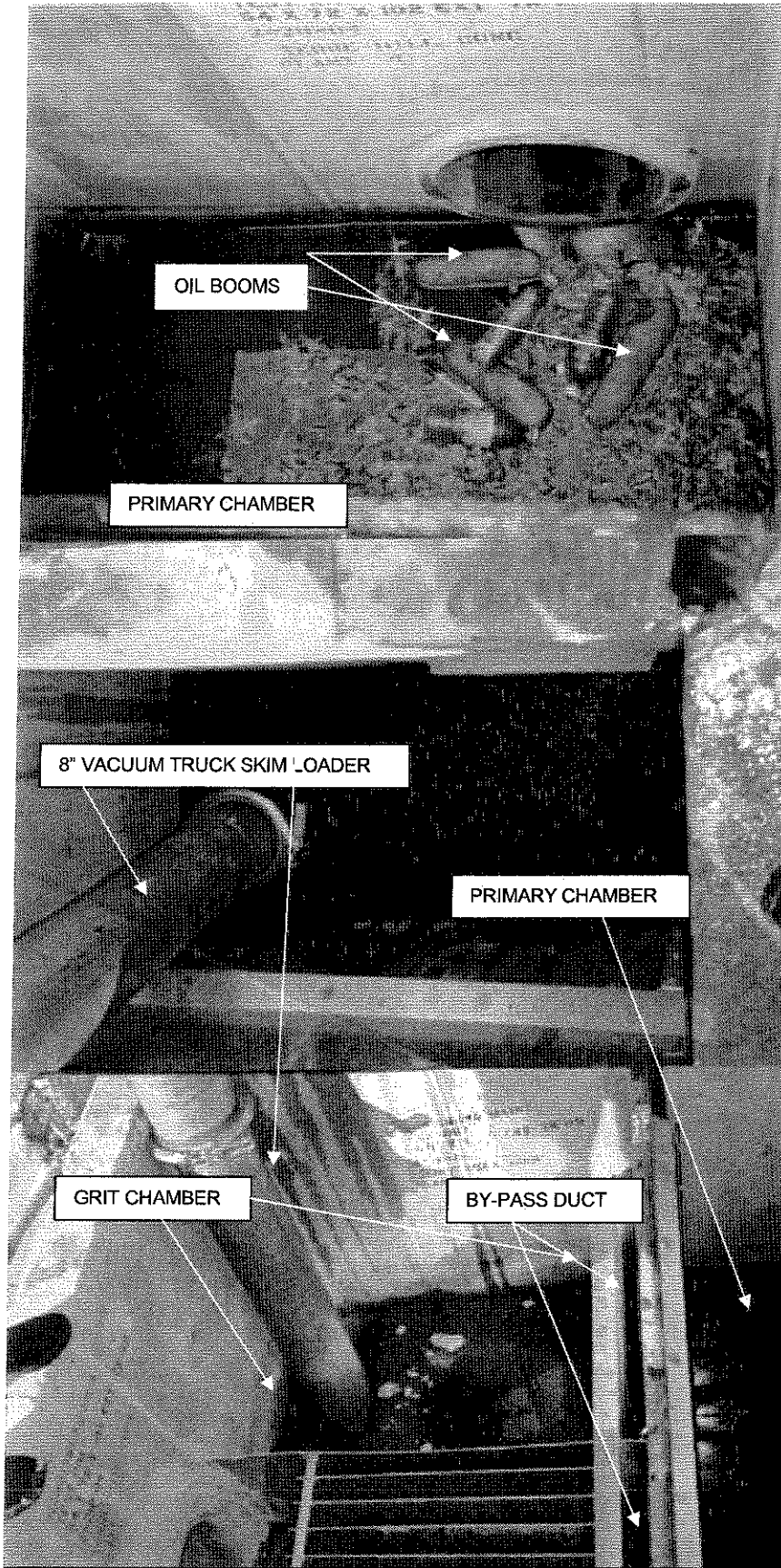
Information is subject to change without notice.
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Attachments:

Appendix A - Clean-out sequence

Appendix B - Terre Kleen™ Maintenance Chart

Appendix A – Clean out sequence



The Primary Chamber is where the stormwater enters. The water may enter through pipes or an inlet grate in the lid.

Gross pollutants, oils, and coarse sediment is collected in this chamber. Oil booms may be used to absorb hydrocarbons.

First: Remove trash and oil until the sheen is largely reduced to a rainbow colored reflection of the light on the oil.

Second: Move the skim-loader to the Grit Chamber and draw the water down to the sediment and sludge layer. Water will drain from both chambers and drag sludge to the vacuum nozzle.

Third: Move back to the Primary Chamber and remove the remaining sediment.

Fourth: Activate the dispersion manifold and spray water on the soiled areas and complete removal of loosened debris.

Fifth: Drop new oil booms into the Primary Chamber and reinstall the lids of the manholes and/or grates.



Wednesday, February 24, 2010

THSS File: 704928-TK18-Alden-NJDEP Certification.

Subject: Sediment Removal Interval¹ Terre Kleen model TK18

$$\begin{aligned} \text{Annual Sediment Volume Captured} &= (9.70 \text{ CF/Acre})(0.347)(\text{MTFR})(\text{TSS Removal Efficiency}) \\ &= (3.366)(\text{MTFR})(\text{TSS Removal Efficiency}) \end{aligned}$$

$$\begin{aligned} \text{Required Sediment Removal Interval (Years)} &= \\ &= \frac{(50\% \text{ of MTD's Maximum Sediment Storage Volume})}{(3.366)(\text{MTFR})(\text{TSS Removal Efficiency})} \end{aligned}$$

$$\begin{aligned} \text{Required Sediment Removal Interval (Months)} &= \\ &= \frac{(50\% \text{ of MTD's Maximum Sediment Storage Volume})(12)}{(3.366)(\text{MTFR})(\text{TSS Removal Efficiency})} \end{aligned}$$

Given:

MTFR of a Terre Kleen TK18 = 4.61 cfs²
 (Certified) TSS Removal Efficiency = 50%
 Maximum Sediment Storage Volume = 36 cf³

Conclusion:

Certified Sediment Storage in CF	NJDEP Certified MTFR in CFS	Certified Removal Efficiency	Annual Sediment Volume Captured in CF	Required Sediment Removal Interval in (Years)	Required Removal Interval (Months)
Sediment depth 16.5 Inch					
36	4.61	50%	7.76	2.30	28

¹ Calculation according to Appendix A: NJDEP Protocol for Hydrodynamic Devices December 15, 2009

² Table 4 of NJCAT Technology verification report.

³ Table 1 of NJCAT Technology verification report.



Following is the relative storage data for all Terre Kleen models.

	Certified Sediment Storage in CF	NJDEP Certified MFR in CFS	Certified Removal Efficiency	Annual Sediment Volume Captured in CF	Required Sediment Removal Interval in (Years)	Required Removal Interval (Months)
	depth					
Model	16.5 Inch					
TK 1	11	0.32	50%	0.54	10.19	122
TK 2	18	0.52	50%	0.88	10.19	122
TK 5	44	1.28	50%	2.16	10.19	122
TK 9	25	2.29	50%	3.85	3.21	39
TK 18	36	4.61	50%	7.76	2.30	28
TK 27	47	6.90	50%	11.61	2.01	24
TK 36	58	9.22	50%	15.52	1.86	22
TK 45	69	11.55	50%	19.44	1.77	21
TK 54	80	13.88	50%	23.36	1.71	20
TK 63	91	16.19	50%	27.25	1.67	20