

SPECIFICATIONS StormTreat System

I. Specifications

Track Record: The StormTreat System has been designed by a company whom is regularly engaged in the engineering, design, and production of treatment systems for stormwater. The StormTreat System has been installed and in use across the united states since 1994.

Coverage: The StormTreat System is to be used in offline volume based designs. The StormTreat has the ability to treat the entire water quality volume when used with pre-storage and properly sized. The StormTreat System should be installed offline of the main drainage infrastructure to allow higher flows to bypass around the StormTreat System

Non-Corrosive Materials: The StormTreat System's inner and outer chambers are constructed of recycled polyethylene. Internal partitions are also constructed of polyethylene. The chambers are fastened together using a series of ¼" diameter 1-1/2" length stainless steel bolts, nuts and washers. The chambers are fastened together the seals are made water tight with the use of TRV Silicone that meets ASTM C920-98. The silicone is applied around the perimeter and between of the joining channels of the two chambers. Inner perforated piping is SD40 4" diameter PVC.

Durability: The structure of the StormTreat System is recycled polyethylene. The StormTreat is preferably formed through a rotocast process, and has substantially uniformed wall thickness. The tanks are made by injecting plastic in a mold. The mold is then rotated to distribute the casting material over the surface of the mold with a combination of gravity and mold movement. The StormTreat structure is of sufficient strength to support water, sediment, and debris loads when the filter is full, with no slippage, breaking, or tearing under specified installation requirements. The StormTreat System is made to last several years under normal circumstances.

Oil Absorbent Mechanism: The StormTreat Systems utilizes both physical and biological mechanisms to capture and filter oil and grease. The initial inflow chamber is designed with an outflow orifice at a 90 degree downward angle to trap floating oil and grease within the first chamber. Each of the subsequent 4 chambers contains a floating skimmer. This float skims water 4" below the surface, thus creating a physical trap for oil and grease. Within the outer biological chamber of the StormTreat System biological processes capture and break down oil and grease. Much of the breakdown and transformation of oil and grease is performed by bacteria.

Overflow Protection: The StormTreat System is always to be installed offline of the main drainage infrastructure. Therefore bypass occurs externally of the StormTreat System; usually located upstream in a diversion structure.

Filter Bypass: Water will not bypass the StormTreat System up to designated volume and flow.

Pollutant Removal Efficiency: The StormTreat System is capable of removing the majority of pollutants found in stormwater runoff. The following removal efficiency data has been proven over a period of 12 years through a series of third party independent field studies. The StormTreat System is nationally recognized as the leading biological stormwater filtration system. To obtain a copy of the field studies please contact a StormTreat representative.

POLLUTANT	StormTreat Removal Efficiency
Trash & Litter	100% - pre-treatment recommended for gross solids.
Oil & Grease	90% to 100%
Sediments/TSS	93% to 98%
Bacteria	68% to 90%
Total Nitrogen	44% to 73%
Total Phosphorus	73% to 91%
Total Metals	65% to 98%

Non-Scouring: The StormTreat System is designed to treat water at low flows over an extended period of time. Water velocities through the StormTreat at peak flows are insufficient to cause scouring.

II. Installation

Installation: The StormTreat is to be installed according to the drawings and as specified herein. Install at elevations and locations shown on drawings or as otherwise directed by engineer. The StormTreat is to be installed with the top of the system not below finish grade. Place the StormTreat System on a granular subbase of minimum thickness of 4 inches after compaction or of greater thickness and compaction if specified elsewhere. The granular subbase shall be checked at four points of the perimeter after it is set. If the slope from any perimeter point to any other perimeter exceeds 0.5%, the base section shall be removed and the granular subbase material re-leveled. The area around the system is to be backfilled with gravel, sand, or native backfill if deemed appropriate.

Installation Notes:

StormTreat Systems provides installation assistance with shipping. Delivery staff are also trained and experienced in installation procedures. For first-time clients this is recommended. Generally, the installation steps are as follows:

1. Excavate an area approximately 10 feet by 10 feet and to a depth of approximately 5 feet (and more specifically to a level of one foot below the design elevation for the bottom of the units) for each StormTreat System unit. Excavate additional areas for inflow and discharge pipes (specific to the design plans).
2. Pour a stone (approximate 3/4-inch diameter) base and level to the base design elevation of the floor of the STS units.
3. Lower StormTreat System units into place using sling hanging from a backhoe or, in sensitive areas, place by hand with crew.
4. Connect inlet and outlet/discharge piping and outlet control valve (PVC ball valve is recommended). If outlet cannot be accessed from the surface an access well should be placed for the control valve.
5. Carefully fill wetland container with "rice stone" (1/8 to 1/4 - inch diameter) alternating (at one-foot depth intervals) with backfilling excavation (outside unit) with 3/4-inch diameter stone. Note: it is important the rice stone be naturally sorted (sometimes referred to as "bank run") or is carefully washed to eliminate "fines". Crushed stone commonly has high fractions of "fines" which may cause clogging of the wetland portion of the treatment system.
6. Plant wetland plants (provided from nursery as "plugs", approximate size of 6 inches in height). Wetland plant species may vary by region and local sunlight/shade and salt/fresh conditions as advised by nursery. However, we recommend bulrush and wool grass (*Scirpus*) as generally adaptive to most conditions. Consult with local nursery for recommendations for other species. For Southern California installations it is recommended the stonewool plant propagation cubes be placed under each plant. For details reference the "StormTreat Contractors Packet".

Acclimate wetland plants (during the growing season) by leaving outlet valve closed for the first two weeks and filling the tanks (either by natural rainfall or from local water supply source), then opening the outlet valve to a low-discharge rate (approximately 0.25 gallons/minute) for an additional four weeks. After this acclimation period the outlet valves should be set at the design rate (0.5 gallons/minute for most applications).

III. Maintenance

Maintenance: The following procedures are necessary for proper maintenance of StormTreat System (STS):

Annual Inspection:

1. Inspect and clean catch basins preceding the STS tanks.
2. Visually inspect influent pipe and clean out debris, if necessary.
3. Open sediment chamber cover.
4. Visually inspect skimmers to ensure that the flexible hoses are undamaged and tightly connected to the skimmer and bulkhead. Replace damaged hoses.
5. Close sediment chamber cover.
6. Collect debris from wetland area and trim dead growth from wetland plants. Replace dead plants as needed.
7. Rake and clean up area around systems.
8. If there is flow from the effluent pipe, open valve cover, measure flow rate and adjust. Reset exit valve if necessary. Close and lock valve cover.

Three -Year Maintenance:

1. Inspect and clean catch basins preceding the STS tanks.
2. Visually inspect influent pipe and clean out debris, if necessary.
3. Open sediment chamber cover.
4. Spray down all sediments in the tank and pump the tank clean. Make sure that the exit pipes to the wetland, as well as all flexible hoses and skimmers are clean.
5. Visually inspect skimmers to ensure that the flexible hoses are undamaged and tightly connected to the skimmer and the bulkheads. Replace damaged hoses.
6. Close sediment chamber cover.
7. Collect debris from wetland area and trim dead growth from wetland plants. Replace dead plants as needed.
8. Rake and clean area around systems. If there is flow from the effluent pipe, open valve cover, measure flow rate and adjust. Reset exit valve if necessary. Close and lock valve cover.

Maintenance Notes:

1. Bio Clean Environmental Services, Inc. recommends the StormTreat System be inspected a minimum of once every year. The cleaning and debris removal maintenance a minimum of once every three years, if appropriate pre-treatment of sediments and gross solids is provided as recommended by the manufacture. The procedure is easily done with the use of any standard vacuum truck.
2. Following maintenance and/or inspection, the maintenance operator shall prepare a maintenance/inspection record. The record shall include any maintenance activities performed, amount and description of debris collected, and condition of filter.
3. The owner shall retain the maintenance/inspection record for a minimum of five years from the date of maintenance. These records shall be made available to the governing municipality for inspection upon request at any time.
4. Any person performing maintenance activities must have completed a minimum of OSHA 24-hour hazardous waste worker (hazwoper) training.
5. Remove access lid. Where possible the maintenance should be performed from the ground surface. Note: entry into an inner chamber may require certification in confined space training.
6. Remove all debris and organics from the StormTreat System with the vacuum hose.
7. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.