

SPECIFICATIONS FOR BioSTORM® MODEL NO. 1.0

STORM WATER CLARIFICATION SYSTEM

General Specifications

The storm water clarification system described by these specifications consisting of a Model No. BioSTORM® 1.0 and a StormTEE™ Model No. SMT838 as available from Bio-Microbics, Inc., of the State of Kansas, USA (hereinafter referred to as "Bio-Microbics"), and, as distributed in Canada and in accordance with tank installation requirements as required by Pinnacle Environmental Technologies Inc. of Langley, BC, Canada (hereinafter referred to as "Pinnacle").

The Contractor shall furnish and install the BioSTORM® Model 1.0 clarification system and the StormTEE™ Model SMT838 (hereinafter referred to as the "clarification system" or "storm water clarification system") as manufactured by Bio-Microbics and distributed by Pinnacle. The clarification system shall be complete with all needed equipment as shown on the drawings and specified herein.

The principal items of equipment manufactured and supplied by Bio-Microbics shall include (a) the BioSTORM® system insert, (b) leg extension package and (c) a StormTEE™ litter screen filter Model SMT838. The BioSTORM® 1.0 unit shall be situated within a tank, as shown on the shop drawings/plans as approved by Pinnacle. The tank(s) must conform to local, state or provincial, and all other applicable codes and standards. The tank(s) shall have a volumetric capacity as stated herein and as shown on the shop drawings/plans as approved by Pinnacle

The tank(s) for the BioSTORM® 1.0 system shall have a volumetric working capacity for the coarse sand, grit and sediment tank/chamber of not less than 1,268 litres (335 us gals.) and for the tank or chamber that holds the BioSTORM® 1.0 insert not less than 4,550 litres (1,202 us gals.).

Where the BioSTORM® clarification system and the tank are supplied separately from the tank, the Contractor shall provide coordination between the tank supplier and Pinnacle with regard to fabrication of the tank, installation of the BioSTORM® clarification system and delivery to the job site.

Operating Conditions

The clarification system shall be capable of a storm water flow peak loading of not more than 1.0 cubic feet per second (0.028 m³/s or 450 us gals/minute) and the Total Suspended Solids shall be reduced at the rate to meet or exceed industry standards that are usually set at 70 - 80% and a 95% reduction of floatable free oils.

StormTEE™ Litter Control Screen

The StormTEE™ shall be manufactured of rigid PVC or polyethylene and shall have molded-in solids exclusion ring, 3/8 inch clog resistant angled slots, gas lifted solids deflector, keyhole weir flow attenuation, extendable handles and 16 inch internal swab, 8 inch top diverter and 4 inch bottom diverter.

BioSTORM® Media

The BioSTORM® clarification system media shall be manufactured of rigid PVC or polyethylene and shall be supported by a polyethylene casing. The media shall be of such a design that the storm water shall flow through laminar clarification and permit any accumulation of fine sediment to be deposited to casing's floor openings. The media shall be fixed in a position and contain no moving or wearing parts and shall not corrode. The media shall be designed and installed to ensure that the sloughed sediments immediately descend through the media to the bottom of the tank.

Installation and Operating Instructions

Installation of the BioSTORM® shall be done by, in accordance with the written instructions provided by Bio-Microbics or Pinnacle, either the Contractor onsite or in coordination with tank supplier, or shall be pre-assembled in the tank by Pinnacle. Installation installations shall be furnished by Pinnacle that will provide a description of the installation, operation, and system maintenance procedures.

Piping

The BioSTORM® clarification system shall be provided with a six (6) inch diameter effluent pipe opening and gasket. Any and all weirs, piping, fittings or valves outside the clarification system such as, but not limited to, the external weir and pipe works line to and from the clarification system, vent and inspection ports shall be furnished by the Contractor. Internal pipe works shall be not less than PVC Schedule 40 and shall be supported or anchored in accordance with recommendations published from time to time by Pinnacle. Internal pipe works shall be serviceable from surface.

Workmanship and Experience

All workmanship and materials shall be of the highest quality. The storm water clarification system shall be the product of an experienced manufacturer actively engaged in the manufacturing and research and development of storm water clarification or treatment facilities.

Tank Construction

The coarse sand, grit and sediment tank/chamber or chamber and the BioSTORM® main tank/chamber may be constructed from fibreglass reinforced plastic (FRP) or from concrete in accordance to the following specifications.

Typical Concrete Tank Construction

The storm water clarification system main tank shall be constructed of a minimum of 76.2 mm (3 inch) thick, 3,500 PSI precast concrete. The top, bottom, and outer walls of all concrete tanks shall be a minimum of 76.2 mm (3 inch) thick and constructed of concrete with a minimum compressive strength of 3,500 PSI and/or a minimum of 28 MPA. The top, bottom, interior wall (s) and sidewalls shall be reinforced uniformly. The concrete tank shall be constructed in accordance with any local, state, provincial or any other applicable code or standard one of which will be CSA standard for septic and sewage holding tanks for structural integrity. The tank shall have a sloped floor under the BioSTORM® as shown on the shop general arrangement drawings and as approved by Pinnacle.

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Typical Fibreglass Tank Construction

The main treatment tank shall be constructed of 6.35 mm (1/4 inch) minimum thickness FRP. The tank shall be molded of FRP polyester resin manufactured by the lay-up and spray technique to assure that the interior surface is smooth and resin rich. Tank shall be constructed in accordance with the National Standard of Canada, Fibreglass-Reinforced Plastic Corrosion-Resistant Equipment, CAN/CGSB-41.22-93 or current issue. The tank shall have a sloped floor under the BioSTORM® as shown on the shop general arrangement drawings as approved by Pinnacle.

Materials & Workmanship Warranty

Bio-Microbics shall warrant every new BioSTORM® stormwater package consisting of: the insert, leg extensions and litter screen against defects in materials and workmanship for a period of 12 months after installation or 18 months from date of shipment, whichever occurs first.

There is no warranty for materials and workmanship used by the Contractor to install the BioSTORM® clarification system into a tank.

During the warranty period, if any part is defective when operating at design conditions, and if the equipment has been installed and is being operated and maintained in accordance with the written instructions, Bio-Microbics will repair or replace at its discretion such defective part free of charge. Cost of labour to determine failure, to remove and replace the defective part is NOT covered under this warranty.

Any replacement or repair of those items normally consumed in service shall be considered as part of routine maintenance and as such are NOT covered under this warranty.

Bio-Microbics and Pinnacle do not assume responsibility for contingent liabilities or consequential damages of any nature resulting from defects in design, material or workmanship, or delays in delivery, replacement, or otherwise.

This warranty is solely for the BioSTORM® clarification system available from Bio-Microbics. Tanks as supplied by Pinnacle or others shall have a separate warranty as issued by the tank manufacturer.