

## **SPECIFICATIONS ANOXIC BIOLOGICAL CLARIFIER – NITROGEN**

### **MODEL ABC-N™ 1.0**

#### **General Specifications**

The Anoxic Biological Clarifier for Nitrogen Abatement (ABC-N™) system described by these specifications is as manufactured by Bio-Microbics, Inc., of the State of Kansas, USA (hereinafter referred to as "Bio-Microbics") and distributed exclusively in Canada by Pinnacle Environmental Technologies Inc. of Langley, BC, Canada (hereinafter referred to as "Pinnacle").

The Contractor shall furnish and install the ABC-N™ Model 1.0 (hereinafter referred to as the "ABC-N™") as manufactured by Bio-Microbics and distributed by Pinnacle. The ABC-N™ shall be complete with all needed equipment as shown on the drawings and specified as provided by Pinnacle from time to time.

The principal items of the ABC-N™ equipment manufactured and supplied by Bio-Microbics shall consist of two (2) main components being (1) the ABC-N™ module and followed by (2) a Post-Polishing BioFilter Model MicroFAST® 0.5. The ABC-N™ 1.0 module and the Post-Polishing BioFilter shall be situated within a tank or tanks, as shown on shop drawings/plans provided 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 minimum volumetric capacity as stated herein and as shown on the shop drawings/plans as issued or approved by Pinnacle

The tank for the ABC-N™ 1.0 system shall have a volumetric working capacity of not less than 4,259 litres (938 imp. gals.) and the tank for the Post-Polishing BioFilter shall have shall have a volumetric working capacity of not less than 2,273 litres (500 imp. gals.)

Where the ABC-N™ or the Post-Polishing BioFilter and the tank(s) are supplied separately, the Contractor shall provide coordination between Pinnacle and tank supplier with regards to fabrication of the tank(s), installation of the ABC-N™, the Post-Polishing BioFilter and delivery to the job site.

#### **Operating Conditions**

The ABC-N™ and the Post-Polishing BioFilter shall be placed within a sewage wastewater treatment train after the main treatment works and before the final discharge dosing tank/chamber.

The ABC-N™ and the Post-Polishing BioFilter shall be capable of handling 11.37 m<sup>3</sup> (2,500 imp. gals.) per day Average Daily Flow (ADF) of treated wastewater with a typical biological loading of up to 30 mg/l of BOD<sub>5</sub>, 30 mg/l of Total Suspended Solids, 25 mg/l of Fats, Oils, and Greases, and to reduce Total Nitrogen down to 10 mg/l.

#### **Media**

The ABC-N™ and Post-Polishing BioFilter media shall be manufactured of rigid PVC or polypropylene and shall be supported by the polyethylene insert. The media shall be of such a design that if any bacterial growth is uniform over all media surfaces and the said design shall be for the clarification of a laminar flow of effluent sanitary wastewater. The media shall be fixed in position and contain no moving or wearing parts and shall not corrode. The media shall be designed and installed to ensure that the sloughed solids immediately descend through the media to the bottom of the tank.

### **Installation and Operating Instructions**

Installation of the ABC-N™ and the Post-Polishing BioFilter shall be done in accordance with the written instructions provided by Bio-Microbics or Pinnacle by either the Contractor onsite or in coordination with tank supplier, or shall be pre-assembled in the tank by Pinnacle. Operation manuals shall be furnished which will provide a description of the installation, operation, and system maintenance procedures.

### **Electrical – ABC-N™**

The ABC-N™ shall be designed to operate on standard current. The input power required for the submersible mixing pump is ½ HP, 115 Volts, Single Phase, 60 Hertz. The Contractor shall furnish all conduit and wiring between the power supply, the pump alarm panel and the submersible mixing pump.

The ABC-N™ shall be supplied with an electrical metering pump operating with 115 VAC, 1 Phase, 60 Hertz. The metering pump shall be installed indoors and shall have variable settings to allow for the increase and decrease the volume of carbon source to the ABC-N™™.

The Contractor shall furnish the small diameter piping from the drum of carbon source to the metering pump and from the metering pump to the ABC-N™ tank.

At the OPTION of the project's designer, an electrical relay from the effluent final dosing pump to the metering pump control panel may be used to automate the volume of carbon source needed to the ABC-N™.

### **Alarms – ABC-N™**

The alarm system shall consist of a visual and audible alarm to indicate either a failure of the submersible mixing pump. The alarm shall be located on site as shown on the plans and in accordance with local, state, provincial or other applicable code or standard. A manual silence switch is included. The ABC-N™™ alarm control box shall be ANSI/NSF International certified and CUL and/or CSA rated and shall be supplied in an indoor/outdoor NEMA 4R plastic enclosure.

### **ABC-N™ Carbon Source**

Pinnacle shall supply the first drum of a vegetable based carbon source. The Contractor shall furnish the housing or shed to house the drum of the carbon source and the metering pump.

The volume of liquid carbon source to be added to the ABC-N™ shall be determined by either Project's Designer or by the Site Maintenance Provider subject to the actual daily sewage flow rate and the actual mg/l of TKN entering the sewage treatment train or Total Nitrogen entering the ABC-N™™.

### **Post-Polishing BioFilter Remote Mounted Air Pump/Blower**

The Post-Polishing BioFilter shall have an air pump/blower that shall be mounted remote, up to 100 feet (30.5m) maximum, from the Post-Polishing BioFilter and is to be installed by the Contractor. An in-ground air pump plastic vault shall be supplied by Pinnacle and shall consist of the air blower, wooden blower supports, 2 of 2" rubber grommets for the air supply line, 1 of 4" rubber grommet for fresh air intake and air intake filter assembly. Supplied by Pinnacle shall be Alarm Controller for the Air Blower, and a 6"x 6" x 4" PVC Tee for tank cleaning and air exhaust. The airline from the air pump/blower to the Post-Polishing BioFilter shall be provided and installed by the Contractor.

### **Post-Polishing BioFilter Electrical**

The Post-Polishing BioFilter shall be designed to operate on standard current. The input power required for the air pump/blower is 115/230 Volts, Single Phase, 60/50 Hertz, 2.8 Amps. The Contractor shall furnish all conduit and wiring between the electrical control panel, the power supply, and the air pump/blower.

### **Post-Polishing BioFilter Alarms**

The alarm system shall consist of a visual and audible alarm to indicate either a failure of the air pump/blower or that the liquid level in the treatment system is above the normal working operating level. The alarm shall be located on site as shown on the plans and in accordance with local, state, provincial or other applicable code or standard. A manual silence switch is included. The treatment system's alarm control box shall be ANSI/NSF International certified and CUL and/or CSA rated and shall be supplied in an indoor/outdoor NEMA 4R plastic enclosure.

### **Piping**

The ABC-N™ shall be provided with a STANDARD four (4) inch diameter effluent pipe opening and gasket. The maximum free and unrestricted flow of a 4" effluent pipe is 341 litres/minute (90 usgpm) or with a 2.0 design safety factor is 170 litres/minute (45 usgpm).

Any and all piping, fittings or valves outside the ABC-N™ such as, but not limited to, the wastewater drain line to and from the ABC-N™ and to and from the Post-Polishing BioFilter shall be furnished by the Contractor.

The Contractor shall furnish any sampling ports or stations.

### **Workmanship and Experience**

All workmanship and materials shall be of the highest quality. The wastewater treatment plant shall be the product of an experienced manufacturer actively engaged in the manufacturing and research and development of sewage treatment facilities.

### **Tank Construction**

The tank or chamber may be constructed from fibreglass reinforced plastic or from concrete in accordance to the following specifications.

### **Typical Fibreglass Tank Construction**

The main treatment tank shall be constructed of 9.55 mm (3/8 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.

### **Typical Concrete Tank Construction**

The treatment plant main tank shall be constructed of a minimum 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 32 MPA. The top, bottom, interior wall (s) and side walls 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 B66 standard for septic and sewage holding tanks in regards to the tanks structural integrity.