Equipment and Performance Specifications

7161

Product: PuriSep™ Differential Gravity Inclined Plate Separator

Particle Separation System

The contractor shall furnish and install each PuriSep™ Model factory built (Solids/Liquid) (Oil/Water) (Flotation) (Combination) (Double Walled) Separator as designed and manufactured by ***WaterSmart Environmental, Inc.*** The separator shall be complete with all required parts, assemblies, and components factory installed in a welded steel vessel.

The principle items of the separation system shall include:

1. Inlet distribution network.
2. Corrugated plate flocculator.
3. Corrugated plate separator.
4. Corrugated plate DAF separator.
5. Skimmer mechanism w/scum collection trough.
6. Adjustable floating oil skimmer.
7. Sludge removal system.
8. Effluent collection network.
9. Dissolved air flotation recycle system.
10. Removable (steel)(aluminum)(fiberglass) cover. Integral separated (oil) (float) storage compartment.
11. Access ladder and operating platform.
12. Chemical feed system.
13. Instruments, controls and control panel.

Operating Conditions

Each particle separation system shall be capable of treating GPM of raw water. Each unit shall have an effective projected surface area of sq. ft. to provide an effective surface overflow rate (SOR) of GPD/sq.ft. In order to maintain laminar flow through the unit, the Reynolds Number may not exceed 500. Turbulent flow, characterized by Reynolds Numbers in excess of 500, inhibits separation by inducing particle reentrainment and therefore cannot be permitted. Reynolds Number calculations must be submitted prior to equipment approvals.

Construction

The particle separator shall be constructed of corrosion resistant materials. The vessel shall be 1/4" minimum thickness ASTM A-36 carbon steel plate. The corrugated plates used shall be fiberglass reinforced plastic using isopthalic acid polyester resins. All exterior flanges shall be constructed of steel. Additional construction features are shown on the construction plan drawings.

Welding

All steel in the structure shall be joined by electric arc welding with fillets of adequate section for the joint used. All welded joints on the shall be continuous on at least one side.

Protection Against Corrosion

After welding all inside and outside surfaces, the structure shall be blasted with steel or sand grit to remove rust, millscale, weld slag, etc. All interior surfaces shall be blasted to SSPC-SP10 and exterior surfaces shall be blasted to SSPC-SP6. Immediately following clean-up, a single heavy inert coating shall be factory applied to all inside and outside steel surfaces prior to shipment. This coating shall be PuriPox™ epoxy resin especially formulated by the WaterSmart Environmental, Inc. for maximum abrasion and corrosion resistance. The dry coating shall contain a minimum of 85% epoxy resin with the balance consisting of pigments and thixotropic agents.

A touch-up kit shall be provided for repair of any mars or scratches occurring during shipment and vessel placement. This kit shall contain detailed instructions for use and shall be the same material as the original coating.

Placement Below Grade

A total of 15 lb. zinc anode packs shall be supplied to provide cathodic protection. The sacrificial anode(s) shall be installed in accordance with the installation instructions accompanying the separator.

Separator Module

The separator module shall be formed by parallel corrugated plates placed at a maximum of 3/4" apart and at an angle of inclination of 55° from the horizontal. The flow will enter the side of the separator module in a cross flow hydraulic path. Heavy particles will settle to the lower corrugations or troughs of the individual separator plates where they will agglomerate and slide to the bottom of the compartment. If present, light particles will rise to the top corrugations of the individual separator plates where they will coalesce and slide to the surface of the compartment. The liquid flow will pass through the separator module and the clarified liquid is then collected through submerged orifices before discharging over an effluent weir. Plate material of construction shall be fiberglass. *No other materials or plate spacings will be considered or permitted*.

CorruFloc™ Flocculator

The flocculator module is formed by parallel corrugated plates arranged so that, as the flow passes through and between the adjacent plates, turbulence is created on a continuing pulsating basis to enhance particle floc formation. The plates shall be adjustable to permit the degree of turbulence, or velocity gradient, to be controlled. Adjusting the phase between adjacent plates may control the velocity gradient. The adjustment shall provide for gradient velocities over a 20 to 1 range to enable the plant operator to control flocculation according to prevailing conditions of flow and concentration of raw water contaminants.

Chemical Feed

Chemical feed shall consist of the following:

1. feed and feeder.
2. feed and feeder.
3. feed and feeder.

A static mixer installed as shown on the plans shall accomplish flash mixing. Chemical feed storage and capacities are as shown on the plans.

Dissolved Air Flotation

The Dissolved Air Flotation system consists of:

1. pressure pumps.
2. Air inlet eductor/mixer.
3. Dissolved air dissolution system.
4. Flow control valve.

Operation is achieved by mixing air with recycled treated water to saturation at elevated pressure. Upon release to atmospheric pressure, the super-saturated portion of the air releases from solution forming microscopic bubbles. These small bubbles attach to particles in the flow stream and thereby lift them to the surface of the vessel where the resulting scum or float is mechanically skimmed off and discharged.

Particle Separation

The PuriSep™ separator shall contain flow distribution and collection networks which provide for pressure drops and resulting flow distribution. Enhanced flow distribution is necessary for maximum separator module utilization. The terminal points of all process piping shall be flanged. The vessel shall have wall mounted brackets which shall hold the separator module in place. The separator module shall be removable for maintenance and inspection.

Below the separator module shall be storage space for the separated and settled sludge. This sludge holding compartment shall be equipped with a sludge collection and removal network. Above the separator module shall be storage space for the collected (scum) (oil) (float). [Additional (scum) (oil) (float) storage is provided in an integral storage compartment as shown on the plans.]

Factory Tests

All components of the PuriSep™ separator shall be given an operational/hydrostatic test at the manufacturer's facility to check for leaks in all piping and welds. Holiday testing (is) (is not) required.

Field Service and Start Up

The service of a factory trained representative shall be provided for _____ day(s) by the equipment manufacturer to assist in the initial start up of the PuriSep™ separator and to instruct the owner's personnel in the operation and maintenance of the equipment.

Quality Assurance

1. Installation: Provide a qualified manufacturer's representative to supervise work related to equipment installation, check out, customer training and startup.
2. Training: Provide technical representative to train Owner's Maintenance personnel in operation and maintenance of specified equipment.

Suppliers Qualifications

1. Supplier shall have been regularly engaged in the design and supply of the type of equipment specified herein, for a period of not less than five years. Assembled components such as motors, pumps, electrical devices, etc., shall be the standard products of qualified manufacturers. All similar items shall be the products of one manufacturer. The equipment offered shall be the latest standard product, modified as necessary to meet the requirements of the specification, of a type that has been commercially available and in satisfactory use for at least five years.

2. The equipment specified herein is based on the water purification equipment as supplied by WSE or engineer approved equal.

3. All contractors bidding non-approved equipment shall submit to the engineer 14 days prior to bidding the following information for approved equal status:

   A Detailed description of the sequence of the operation of the proposed system.

   B Equipment general layout drawings of the proposed system.

   C List (minimum of 5 sites) of water purification equipment installations similar in usage where the proposed equipment by the supplier has been in service, including the duration of service.

4. Provide name of contact person at each installation location which is familiar with the operation and maintenance of the water purification equipment.

5. Based on the information supplied and discussions with contact persons named, the engineer will determine the acceptability of the proposed supplier and the equipment.

Deviations From These Specifications

1. No deviations from these specifications will be allowed unless approved by the Engineer in writing prior to bid closing as specified herein. All equipment and equipment functions must be built and designed to these specifications.
2. Regardless of the Engineer's approval for any deviations and/or changes, the Contractor is solely responsible for the performance of the supplied equipment as per these specifications.
3. The Engineer may permit variations from the requirements of these specifications provided that in his/her opinion such proposed equipment fully meets and/or exceeds these specifications and the specified performance and is in every way adequate for the intended use. All such variations proposed

by the Contractor shall be called to the attention of the Engineer in writing 14 days prior to the bid opening and shall be made only if approved in writing.

4. Certain design limitations, tests, etc. are herein specified as a partial check on the adequacy of design, fabrication, and materials. These requirements do not cover all features necessary to insure satisfactory and approved operation of the equipment. Conformity of these requirements shall in no way supersede the general requirements as to satisfactory and efficient operation of the equipment.

System Performance

1. The supplier is responsible to design, engineer, manufacture, supply, and start-up the water purification equipment to satisfactorily treat and clean the wastewater. Satisfactory performance will be gauged by representatives of the owner.
2. The supplier is solely responsible for the equipment performance. Should the equipment not perform as per specifications requirements, the supplier shall modify, and/or alter the equipment supplied at his own expense until the performance is satisfactory. All such changes shall be approved by the engineer.

Warranty

1. Warranty work specified herein is for one (1) year from substantial completion against defects in materials and in labor and workmanship
2. Defects shall include, but not be limited to:
    A. Operation: Noisy, rough or substandard operation.
    B. Parts: Loose, damaged and missing parts.
    C. Finish: Abnormal deterioration

The supplier guarantees that he is familiar with the cleaning requirements and that the system shall be built to accommodate such.