

**EQUIPMENT SPECIFICATIONS
FOR
ASTRASAND® FILTRATION
CONTINUOUS BACKWASH**

PART 1.00 – GENERAL

1.01 Description

- A. The Manufacturer shall furnish a continuous backwash, upflow deep bed filtration system to function on the process as specified in the enclosed process specification.
- B. Filters shall be designed specifically for filtering _____ containing _____ mg/l in the influent and producing _____ mg/l in the effluent. The average daily flow to the filtration system is _____MGD (_____GPM) with a peak of _____MGD (_____GPM).
- C. The filter shall consist of a cylindrical tank with a conical hopper, feed inlet manifold, feed distribution system, weir and flume, internal sand washer, sand distribution cone, wash water outlet, filtrate overflow weir, airlift pipe and a compressed air control system.
- D. The filter or filters shall operate in a manner such that the total cross sectional area of each filter or filters shall be in a continuous filtration an a continuous backwash mode. There shall be no interruption of the filtration process by shutting down a part or a whole filter for backwashing.
- E. In addition to the above mentioned equipment, the following principal items of equipment shall be included.
 - 1. Access Ladder with Safety Cage (Optional)
 - 2. Walkways and Handrails (Optional)
 - 3. Tank Covers
 - 4. Electrical and Pneumatic Controls
 - 5. Compressed Air System
- F. The above equipment shall be as manufactured by Siemens Water Technologies, Thomasville, Georgia as sole source, based on prequalification procedure implemented during the planning stage.

1.02 Pre Bid Submittal Requirements

- A. All Manufacturers not named in these specifications shall submit a minimum of three (3) copies of data to the Engineer not later than 14 days prior to the bid date. Any Manufacturer meeting the requirements will be

so listed by addendum prior to the bid date. Submission of inadequate information will be cause for rejection.

- B. Each set of data shall include but not necessarily be limited to:
 - 1. Drawings showing dimensions and details of all the units and minimum recommended spacing
 - 2. Control details and electrical wiring diagrams
 - 3. Compressor performance data
 - 4. Installation list of similar installations
 - 5. All other information necessary to enable the Engineer to determine whether the proposed equipment meets the specified requirements.

1.03 Shop Drawings

- A. The Contractor shall submit a minimum of six (6) copies of all shop drawings to the Engineer for approval. Of these, two (2) copies will be returned to the Contractor with appropriate action taken. Receipt of less than the minimum required number of copies will be cause for withholding the shop drawings from being checked until receipt of the necessary additional copies.
- B. Each set of shop drawings shall include but not necessarily be limited to:
 - 1. Drawings showing dimensions of all the units and minimum recommended spacing
 - 2. Control details and electrical wiring diagrams
 - 3. Performance data compressor
 - 4. All other information necessary to enable the Engineer to determine whether the proposed equipment meets the specified requirements.

PART 2 - PRODUCTS

2.01 Scope of Supply

- A. The following is provided for the use of the Contractor and the filter supplier. These are no way inclusive and are only to be used as a guide.
- B. The following material shall be supplied by the filter supplier
 - 1. Quantity _____ (___) filters
 - 2. Filter Media of factory recommended size and uniformity
 - 3. Internal HDPE wash water pipe with flexible connectors
 - 4. Compressed Air System
 - 5. All necessary anchor bolts and fasteners necessary for complete assembly and installation of the filter modules.

2.02 Design Requirements

- A. All components supplied shall conform to the size requirements as set forth in the plans, to the requirements included in other sections of this specification, and to the following broad design parameters.

1. Tank diameter and height	_____ “ x _____ “
2. Wall thickness	_____ gauge
3. Filtration Area (Per Filter)	_____ Ft ² Minimum
4. Total Filtration Area	_____ Ft ²
5. Design Flow	_____ MGD
6. Loading Rate @ Design Flow	_____ GPM/Ft ²
7. Wash Water Connection	_____ Inch Diameter
8. Wash Water Rate	_____ GPM Continuous
9. Air Requirements, Maximum	_____ SCFM @ _____ PSIG

- B. Materials of Construction

1. Tank	CS, SS, FRP or concrete
2. Feed Inlet Risers	304 SS
3. Feed Distribution Ring	304 SS
4. Washer	HDPE
5. Air Lift	HDPE
6. Sand Washer Housing	HDPE
7. Sand Washer Inserts	Polyethylene
8. Sand Distribution Cone	304 SS

- C. Filter Media

1. Filtration Bed Depth	_____ Inches
2. Media Content	_____ ft ³
3. Shipping Weight	_____ lbs per Module

2.03 Filter Design

- A. Each filter module shall be a continuous backwash, upflow, deep bed, single media filter. Mixes and multiple media shall not be allowed.
- B. Each filter shall operate counter-currently. The feed shall be upflow with sand moving downward.
- C. The filters shall not contain any moving parts
- D. The filters shall not contain any screens, wedgewires, grids, etc to retain the media in place.
- E. The filter air supply system shall consist of a separate panel including an air filter, control valve, air flow meter, pressure regulator and gauge.
- F. Each filter cell shall produce a continuous filtrate stream and each filter module a continuous wash stream neither of which shall be shut down for any backwash cycle.

- G. No backwash valves, pumps or instrumentation shall be required for backwash cycles.
- H. The sand bed shall be continually backwashed internally.
- I. Filtered water shall be used for continuous sand cleaning within the filter module(s). Feed water shall not be used for cleaning.
- J. The headloss through the filters shall not exceed _____ inches.

2.04 Tank Covers

The filter(s) shall be covered with aluminum safety plate, 0.250 inch thick and shall be designed to withstand a uniform load of 75 lbs. per square foot plus the dead load of the structure. The cover is provided only in order to prevent any objects from falling into the filter.

2.05 ASTRAMETER[®] (Optional)

- A. The sand circulation rate shall be measured automatically at 4 points across the filter bed surface.
- B. An alarm will be set off when preset circulation rate values are exceeded or when deviation between individual measuring points exceeds a preset maximum.

2.06 ASTRACONTROL[®] System (Optional)

- A. The filter performance shall be controlled by automatically adjust the sand recirculation speed based on the specific influent readings. Influent parameters read shall be the headloss over the filter, temperature and flow. Based on the preset values, the airflow to the airlift shall be adjusted according to the actual reading. The readings by sensors shall be interpreted by a preprogrammed PLC algorithm to calculate and adjust the required sand velocity or sand re-circulation speed.
- B. The control system shall be operated as a stand-alone process control unit but may also be incorporated in a central control system.

PART 3.0 – ACCESS BRIDGE and LADDER (OPTIONAL)

- A. The bridge shall be made of structural steel shapes 1/4" minimum thickness and shall be supported on the plant walls. The bridge shall extend across the tanks as shown on the drawings.
- B. Access to the tank bridge shall be provided by a vertical ladder with safety cage as located on the drawings.
- C. The bridge shall have a 36 inch wide deck made of 0.250 inch aluminum

safety plate and shall be designed to withstand a uniform live load of 75 lbs. per square foot plus the dead load of the structure. The deflection shall not exceed 1/360 of the unsupported span when the design loads are applied. The bridge shall be provided with aluminum handrails on both sides consisting of an upper, intermediate rail, and vertical posts fabricated from 1-1/2 inch diameter schedule 40, anodized aluminum pipe.

PART 4.0 - SURFACE PREPARATION AND CORROSION PROTECTION (SHOP)

- A. All carbon steel surfaces only shall receive a near white blast (SSPC-SP10) to remove rust, mill scale and weld slag. All weld splatter and surface roughness shall be removed by chipping and grinding smooth. Blasting shall be accomplished indoors using steel shot to produce a mil profile for optimum adhesion of the primer. Sand blasting shall not be accepted.
- B. All prepared surfaces shall be thoroughly dry and free from preparation dust and foreign matter prior to the application of any coating. Craftsmen applying protective coatings shall be thoroughly familiar with the application guidelines and preparation requirements of the product to be applied. All materials shall be evenly applied and shall be free from obvious defects.
- C. Protective coatings shall not be applied to improperly prepared surfaces or during conditions considered to be not conducive to sound painting practices or in fog, rain, snow, mist or when the surface temperature is less than 40° F. or the humidity exceeds 85%.
- D. Immediately after surface preparation, a rust inhibitive epoxy primer coat shall be applied. No discoloration of the cleaned areas shall occur prior to the application of the prime coat. All steel surfaces shall receive a 3.0 mil dry film thickness of this protective coating followed by 3.0 – 5.0 mil dry film thickness of an epoxy top coat.

PART 5.0 - INSTALLATION AND OPERATING INSTRUCTIONS

- A. The Equipment Manufacturer shall provide detailed operating and installation instructions. Each set of books shall be prepared especially for the type of equipment delivered, and all operating instructions shall refer only to that particular equipment. The Manufacturer shall provide a minimum of two bound sets of literature and two sets of installation drawings.
- B. The Equipment Manufacturer shall provide the services of a factory trained representative for a minimum period of one day to perform initial start-up, to instruct the owner's operating personnel in the operation and

maintenance of the equipment and to adjust the equipment for satisfactory operation. The Manufacturer's representative performing this service shall be a direct employee of the Equipment Manufacturer, normally engaged in this type of service work.

PART 6.0 - WARRANTY

- A. The Manufacturer of the equipment shall warrant for one year from date of start-up or 18 months from date of shipment, whichever occurs first, that the equipment will be free from defects in design, material, and workmanship.
- B. Warranties and guarantees by the suppliers of various components in lieu of a single source responsibility by the Equipment Manufacturer shall not be accepted. The Equipment Manufacturer shall be solely responsible for the warranty of the equipment and all related components.
- C. In the event a component fails to perform as specified or is proven defective in service during the warranty period, excluding items of supply normally expended during operation, the Manufacturer shall provide a replacement part without cost to the owner.
- D. This warranty shall be valid only if the product is properly serviced and operated under normal conditions and in accordance with the Manufacturer's instructions.

PART 7.0 - EQUIPMENT MANUFACTURER

- A. In order to establish a standard of quality and to insure a uniform basis of bidding, the equipment furnished shall be as manufactured by Siemens Water Technologies, Thomasville, Georgia, or an approved equal as detailed in pre-bid submittal requirements.
- B. The Contractor shall prepare his bid on the basis of the specific equipment and materials, specified for purposes of determining the low bid. After the execution of the contract, substitution of equipment of makes other than that specified will be considered if the substitution is, in the opinion of the Engineer, equal in quality to that named. If such substitution is approved by the Engineer, all savings effected by the Contractor in the purchase of the substituted equipment shall be passed on to the owner by reducing the contract price. In submitting for substitution, the Contractor shall provide certified copies of priced equipment proposals from both the named Manufacturer and the Manufacturer of the proposed substitute equipment to properly establish the reduction of the contract price.