SECTION 13150
SWIMMING POOL FILTRATION,
RECIRCULATION, CONTROL AND CHEMICAL EQUIPMENT

INTENT

A. Purpose of the bid is to purchase and have installed a complete filtration and recirculation system for the swimming pool. It is intended to limit the bidding to a style of product and company that has a proven history and record of performance.

B. Due to the specialized nature of certain components required for this project, these specifications, in some instances, refer to various components by trade or manufacturers name.

C. Whenever a proprietary (trade) name is used within this Specification Section, it is used for informational purposes to describe a standard of required function, dimension, appearance and quality. References to materials by trade name, make or model number shall not be construed as limiting competition. All bidders are required to bid on the named manufacturer in the BASE BID. The Contractor may at his option, elect to bid using the products and/or services of alternate manufacturers listed as **ALTERNATES ON THE BID FORM.**

ALTERNATES

A. Other treatment systems will be considered only if a complete set of drawings and specifications detailing such equipment as it pertains to this project are submitted for evaluation ten (10) days prior to the bid date. The submission should include a list of five (5) operating installations within a reasonable distance of the jobsite. List should include the names and telephone numbers of the operating personnel. The technical contents of the submittal shall include hydraulic calculations, equipment fabrication details, filter room layout in plan and elevation views, warranties, installation and operating instructions.
NOTE: This information must be submitted by a bidding contractor. Submittals will not be considered if provided directly by the alternate equipment manufacturer.

B. Alternates meeting the terms and conditions of the bidding documents will be acknowledged prior to bidding by addendum. No alternates will be considered after the bid.

C. For any and all alternates approved in accordance with the above conditions, state the amount to be DEDUCTED from the BASE BID if an alternate filtration system is being offered. No provision has been or will be made for ADDITIVE bids.

SUBSTITUTIONS

No substitutions will be considered unless the specified product becomes unavailable due to no fault of the Contractor.

QUALITY ASSURANCE

A. Due to the specialized nature of the specified work and products, all bidders shall be required to have a minimum of five (5) years of operating history. The equipment described herein shall be products of a manufacturer regularly engaged in the fabrication of filtration and recirculating systems for at least fifteen (15) years and shall be a professional engineering corporation.

B. The owner requires that filters bear the National Sanitation Foundation (NSF) seal for Standard #50. This NSF listing is required by the owner regardless of local health department regulations.

C. The specified filter system shall have had an NSF listing for at least two (2) years prior to the project bid date.

D. As assurance that each item of apparatus is properly sized to perform in conjunction with each other, the owner requires bidders to use the filter manufacturer as a single source of supply for the items of equipment as listed and described herewith.

E. For projects that incorporate stainless steel gutter systems, the filter system and stainless steel gutter system shall be manufactured and supplied by the same company.

F. The "EQUIPMENT SUPPLIER" shall be:

NEPTUNE-BENSON, INC.
WARWICK, RHODE ISLAND
1-800-832-8002

GUARANTEE

A. The “EQUIPMENT SUPPLIER” shall guarantee that the equipment to be furnished is of the correct capacity, that the various parts are designed to operate correctly and in conjunction with each other, that if the installation is made in accordance with the project drawings and operated in accordance with the suppliers instructions, the system will perform the prescribed functions correctly, the water entering the pool will be clear, bright, free from suspended matter visible to the unaided eye, and will be sanitary to the satisfaction of all authorities having jurisdiction.

SUBMITTALS

A. Provide detailed shop drawings of the items of equipment being provided, indicating the dimensions, material of the filter tanks, exterior face piping, internal manifolds and laterals and filter media.

B. Provide a complete set of operating instructions, embracing the operational functions and recurring maintenance processes involved in connection with the complete filtration system.

PART 2 - FILTER SYSTEM

A. FILTER SYSTEM REQUIREMENTS

1. The system shall be supplied complete by the manufacturer and shall include: internals, face piping and valves, gauge panel with tubing and petcocks, sight glass, air relief connection, bottom drain connection with internal strainer.

2. System shall be fabricated and fully assembled at the manufacturer's plant for pressure testing and dimensional verification. System shall be knocked down for shipping purposes in subassemblies for minimum field assembly. Internal manifold and lateral piping shall be factory installed and shipped in place.

B. FILTER SYSTEM CAPACITY

1. The filter system capacity, size, performance and model number shall be as shown on the drawings.

FIBERGLASS FILTER TANK

A. The equipment described herein shall be products of a manufacturer regularly engaged in the fabrication of pressure vessels for at least 15 years.

B. The filter tank shall be suitable for 50 psi working pressure, hydrostatically tested to 1.1 times the working pressure and designed with a 4:1 safety factor.

C. Saddle style bases (2) shall be provided for tank support. Systems which incorporate stacked tanks shall include similar bases and mounting saddles for the upper vessel. Access to the tank shall be provided by a 14” x 18” manhole. Manhole cover shall be provided with clear viewing window and a two bolt, 4 point yoke. Manhole seal shall be complete with one-piece ¼” neoprene gasket and positioned so that internal pressure from the filter will augment the seal. Externally mounted bolt-on covers will not be accepted.

D. Drain out system shall consist of one (1) 3/4" fiberglass coupling mounted to the tank bottom. Each coupling to be fitted with a slotted PVC sand retainer. Air relief

connection shall be one (1) 3/4" coupling provided on top of the tank. Bulkhead fittings will not be accepted.

E. Each filter tank shall be equipped with the necessary flanges and connections for the internal and external piping. Connections shall be comprised of 1" minimum thickness fiberglass flanges with ANSI standard 150 lb. bolt pattern. Connections requiring bolt-thru hardware will not be accepted.

F. The resin used shall be a commercial grade, premium corrosion resistant vinylester that has been evaluated in a laminate by test in accordance with ASTM C-581 in service comparable to the intended service and recommended for this service by the manufacturer. Other generic types of resin such as isophthalics or general purpose polyester resins shall not be acceptable.

G. Ultraviolet absorbers shall be added to the exterior surface for improved exterior resistance.

H. Chopped strand mat shall be constructed from commercial grade E- type glass strands bonded together using a binder. The strands shall be treated with a sizing that is chemically compatible with the resin system used. Continuous roving shall be a commercial grade of E-type glass fiber with a sizing that is chemically compatible with the resin system used.

I. The inner surface exposed to the corrosive environment shall be followed with a layer composed of vinylester resin, reinforced only with non continuous glass fiber strands applied to a minimum thickness of 0.100 inches. The combined thickness of the inner surface and interior layer shall be 0.110 to 0.130 inches and in no case less than 0.100 inches.

J. The exterior laminate shall consist of filament winding and unilateral construction so as to create a modulus of elasticity to maintain no more than 0.1% strain in any direction.

K. Resin used in these layers shall be Hetron 922 incorporating a Cobalt/MEKP cure system as recommended by the manufacturer.

FILTER PIPING - INTERNAL

A. The upper and lower internal distribution system shall be a horizontal header/lateral arrangement. The headers shall be Schedule 80 PVC construction, capped on one end and flanged on the other end. Lateral connections shall be spaced no more than 6" on the centers and shall be 1½" FPT connections.

B. Underdrain laterals shall consist of 1½" Schedule 80 PVC pipe with machined double slotted openings on 1/8" centers. Machined openings shall be designed to retain all media particles as small as .30 mm particle size. Molded or drilled openings or

retainer screens will not be acceptable. Each lateral shall be fabricated complete with a socket cap on one end and male adapter on the other. Both fittings to be solvent welded to the slotted pipe. Laterals shall be fitted with a rubber 0-ring to allow for proper positioning of the machined openings.

C. Upper laterals shall consist of 1½" Schedule 80 PVC pipe with 1/2" wide machine slotted openings on 1 1/4" centers. Upper laterals shall be designed and sized at the factory so as to provide uniform distribution and unrestricted flow during filter and backwash cycles. Laterals shall be fitted with a rubber 0-ring to allow for proper positioning of the machined openings.

D. All hardware in wetted areas shall be T304L stainless steel or non- metallic.

FACE PIPING

A. External face piping shall be Schedule 80 PVC pipe and fittings. All fittings, including 10" and 12" sizes shall be molded type. Fabricated or fiberglass wrapped fittings will not be acceptable. Flanges shall be located so as to allow for easy dismantling of face piping. All fittings shall be solvent cemented.

B. Piping shall be drilled and tapped where necessary to accommodate gauge tubing connectors.

C. All valves 3" – 12" shall be constructed with cast aluminum ASTM S12A housing and fully coated with Rilsan on all interior and exterior surfaces. Internal components include EPDM resilient lining, Rilsan coated ductile iron disc and T304 stainless steel shaft. Valves 14" and larger shall be constructed with cast iron housing epoxy coated and with nylon coated ductile iron disc. Unless otherwise specified, all nuts and bolts shall be stainless steel with stainless steel washers to be used when secured to PVC flanges.

D. Standard accessory items shall include sight glass rated for 50 psi with polycarbonate glass, remote mounted gauge panel with two 4½" diameter pressure gauges, ¼" petcocks, ¼" poly vent tubing with PVC compression adapters.

E. Face piping shall be fully factory assembled, knocked down and crated for shipment. The warranty of the face piping shall be provided by the filter manufacturer. Field gluing or assembly of the face piping by anyone other than the filter manufacturer will not be accepted.

F. Face piping arrangement shall be as indicated on the drawings.

AUTOMATIC AIR RELIEF VALVE

A. A 1" valve shall be provided to automatically and continuously release air in the filter. The valve shall be fabricated of plastic with Buna-N seals. A plumbing kit shall be provided with two (2) PVC ball valves to allow manual air relief and

isolation of the automatic valve. Valves fabricated of cast iron, bronze or stainless steel shall not be acceptable

FILTER SYSTEM PACKAGING

A. All filter piping and valves shall be factory assembled and knocked down into sub-assemblies for shipment.

B. The components shall be carefully packaged in a totally enclosed wooden crate to prevent damage during transport.

THREE (3)-WAY VALVE CONTROL ASSEMBLY

A. A mechanical linkage shall connect two (2) valves in order to create simultaneous movement. Connecting pieces shall vary with the size of face piping in order to operate with suitable mechanical advantage. All linkage parts shall be T304L stainless steel.

B. Linkage shall be designed so that filter and backwash cycles can be accomplished by repositioning two (2) pairs of valves. Each pair of valves shall be operated with electric actuation.

C. All linkage components shall be grit blasted to a 1-2 mil profile. All linkage components shall be finish coated with 3-4 mils DFT of Type 316 stainless steel paint.

ELECTRIC OPERATORS

A. Electric service shall be 110 VAC. Operator housing shall be corrosion resistant NEMA 4X (IP65). Electrical connectors shall be four-pole industrial style and meet DIN 43650 standards. Plug connection shall be gasketed and mechanically secured with a stainless steel screw. Harness assemblies from operator to control panel shall be factory fabricated. No field wiring shall be required.

B. Drive assembly shall include hardened steel and polyamide reduction gears with permanent lubrication. Operator shall be equipped with a manual override. Operator shall have a visual position indicator.

C. Electric drive motor minimum duty cycle rating to be 35%. Overloading protection shall be self-resetting. Limit switches shall be provided to allow adjustment of cycle. Two additional limit switch contacts shall be provided for indication or auxiliary.

PNEUMATIC OPERATORS

A. The actuators shall be double acting with valve mounted drilling to ISO 5211.

B. The actuators shall include (2) 1/4" FPT ports for open / close connections. Flow control valves with quick connect fittings shall be provided at each port to allow speed control adjustment for the open / close function of the actuators.

C. Materials of Construction

1. Body: aluminum alloy, extruded acc. to ASTM 6063, anodized acc. To UNI 4522
2. Ends: Die-cast in aluminum alloy acc. To ASTM B179, epoxy-polyester coated
3. Pistons: Die-cast in aluminum alloy acc. To ASTM B179
4. Pinion: Nickel-plated steel
5. Slideways: Acetal resin (LAT LUB 731320T)
6. Fasteners: AISI 304 Stainless steel
7. Springs: Epoxy coated steel, pre-compressed
8. Seals: NBR Nitrile rubber
9. Lubricant: MoS2

D. The actuators shall be factory lubricated to allow for 1,000,000 maneuvers.

E. The actuators shall have adjustable travel stops for both directions.

F. Working temperature limits: 4ºF to 186ºF.

H. A tool kit for adjustment of pneumatic actuators shall be provided by the filter manufacturer.

MODEL MFP 4 AUTOMATIC CONTROLLER

A. The controller shall govern the operation of the filter system by means of a programmable logic controller. All power to the controller and valves shall be 120 VAC or 240 VAC – single phase, 50/60HZ.

B. The controller shall be housed in a Nema 4X polycarbonate enclosure with padlockable stainless steel snap latch hinges.

C. The controller shall include a 2-row x 16 character LCD display with a 16 button keypad and programmable function keys. The controller shall have programs for filtered water (3WAY) and standard backwash functions for up to 4 tank/4 cell systems. The unit shall display system operation and status functions.

D. The controller shall include (5) miniature plug-in double pole/double throw (DPDT) relays fully integrated to manage the system functions.

E. The controller shall include two (2) normally open/normally closed dry contacts to turn off/on devices during backwash cycle.

F. The controller shall include a timed heater cool down relay (fireman's switch).

G. A pressure switch shall be installed to sense and signal for backwash actuation based on a field adjustable pressure.

H. ½" strain relief connections shall be provided in the bottom of the enclosure for all of the necessary input connections.

I. The Model MFP 4 Controller shall provide the following operational features:

3. Manual backwash initiation

4. Automatic backwash initiation (pressure and/or time options)

5. Timer for time clock backwashing

6. Manual backwash abort initiation

7. Fixed backwash duration and delay features

8. Real time clock with battery backup of data entry to maintain time during power failure.

9. Capable of controlling up to (4) filters and (1) one priority valve

J. All controller programming shall be accomplished using on-screen instructions.

K. Controller shall be UL labeled.

MEDIA

A. Sand shall be a carefully selected grade of hard, uniformly graded silica material. Media shall be naturally rounded particles of silica or milled angularly shaped particles of silica quartz. Sand shall have a particle size between .45mm and .55 mm.(#20). No more than 1.5% shall be allowed to pass through a #40 sieve (.0164"). Uniformity coefficient shall not exceed 1.53. Specific gravity to be not less than 2.5. Filter shall contain a minimum bed depth as shown on the drawings. Systems which do not provide a minimum bed depth, as shown on the drawings, will not be acceptable. Sand shall be delivered and stored in 100 pound bags (approximately one cubic foot) for ease of handling and elimination of possible contamination. Media shall be free from minerals which may precipitate onto pool surfaces.

B. Each filter tank shall be provided with the media quantities as shown on the drawings.

WARRANTIES

A. 1. Filter tanks shall carry a 15 year fully rated warranty as regularly offered by the tank manufacturer.

2. Internal and external face piping shall carry a fully rated 3 year warranty.

3. Valve bodies shall carry a 5 year fully rated warranty.

4. Valve operators and system accessories including sight glass, pressure gauges and air relief valve shall carry one year warranty as provided by the product manufacturer.

B. Unless otherwise specified, workmanship is to be guaranteed first class and carry a one (1) year warranty.