SECTION 13 17 23
THERAPEUTIC POOLS

SPEC WRITER NOTE: Delete between //----// if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.

PART 1 - GENERAL

1.1 DESCRIPTION
Therapeutic pool equipment, including filtering, heating, circulating, and sterilizing components as designated in this section.

1.2 RELATED WORK
A. Section 01 00 00, GENERAL REQUIREMENTS: Requirements for pre-test of equipment.
B. Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Seismic requirements for non-structural equipment.
C. Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING: General mechanical requirements and items, which are common to more than one section of Division 22.
D. Section 22 11 23, DOMESTIC WATER PUMPS and Section 22 14 29, SUMP PUMPS: Requirements for circulating pumps, sump pumps.
E. Section 23 07 11, HVAC, PLUMBING, AND BOILER PLANT INSULATION: Requirements for pipe insulation.
F. Section 22 05 19, METERS AND GAGES FOR PLUMBING PIPING and Section 22 05 23, GENERAL-DUTY VALVES FOR PLUMBING PIPING: For copper tubing valves and gages.
G. Section 22 33 00, ELECTRIC DOMESTIC WATER HEATERS: For semi instantaneous water heaters.

1.3 QUALITY ASSURANCE
Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING, which includes welding qualifications.

1.4 SUBMITTALS
A. Submit in accordance with specification Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
B. Manufacturer's Literature and Data:
   1. Pool Inlets
   2. Pool Drain
   3. Filter System
   4. Sight Glasses
   5. Float Tank
   6. Float Control and Valve
7. Rate of Flow Indicator
8. Hypochlorinator
9. Ozone Generator
10. Hair and Lint Interceptor
11. Vacuum Cleaning Tool
12. Vacuum Cleaning Fittings

1.5 APPLICABLE PUBLICATIONS
A. The publications listed below form a part of this specification to the extent referenced. The publications are listed in the text by the basic designation only.

B. American Society of Mechanical Engineers (ASME):
   B1.20.1-83(R2006) ...... Pipe Threads, General Purpose
   B16.5-09 .............. Pipe Flanges and Flanged Fittings
   B16.9-07 .............. Factory-Made Wrought Steel Butt welding Fittings
   B16.11-09 .............. Forged Fittings, Socket-Welding and Threaded
   B16.23-06 .............. Cast Copper Alloy Solder Joint Drainage Fittings
   B16.24-01(R2006) ...... Cast Copper Alloy Pipe Flanges and Flanged Fittings

C. American Society for Testing and Materials (ASTM):
   A47/A47M-99(R2009) ...... Ferritic Malleable Iron Castings
   B32-08 .................. Solder Metal
   B61-08 .................. Steam or Valve Bronze Castings
   B62-09 .................. Composition Bronze or Ounce Metal Castings
   F439-09 .................. Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80
   F441/F441M-09 .......... Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80

D. American Welding Society (AWS):
   A5.1/A5.1M-04 ........... Filler Metals for Brazing

E. Manufacturers Standardization Society (MSS) of the Valve and Fitting Industry, Inc.:
   SP-80-08 .............. Bronze Gate, Globe, Angle and Check Valves

PART 2 - PRODUCTS

2.1 POOL INLETS
   Nozzle-type with adjustable plastic jet head and regulating shutter in strainer plate to control flow. Shall have cast brass body, with anchor flange and all exposed parts nickel bronze.

2.2 POOL DRAINS
   A. Gutter Drains: Cast brass body with chromium plated polished brass strainer or PVC approximately 64 by 95 mm (2-1/2 by 3-3/4 inches).
B. Outlet Drains: Cast Iron body or PVC with adjustable anti-vortex cover of chromium plated brass or stainless steel or PVC not less than 300 mm (12 inches) in diameter.  

SPEC WRITER NOTE: No cartridge filters should be utilized only when State Department of Health Codes require, otherwise, should sand filters be utilized.

2.3 FILTER AND JET SYSTEM

A. Vertical pressure type or vacuum type utilizing diatomaceous earth as filtering medium, equipped with pre-coat tank, continuous body feed tank, and all necessary valves, gages, piping and accessories. Filters plant, when handling water from the pool at the rate of ____m/L (____gpm) shall deliver filtrate, free from color, turbidity, or matter in suspension.

B. Filter Elements: Shall consist of a battery of elements having a total free unobstructed filter area of not less than ____ square meters (____ square feet). Filtering medium shall be deposited on elements constructed of stainless steel or stone. Elements shall be easily removable for cleaning when necessary. Head and tail-pieces shall be bronze.

C. Pressure Type Filter: Filter elements shall be contained in filter shells fabricated of high grade tank steel with corrosion-resisting interior finish, riveted or welded, designed for a working pressure of 410 kPa (60 psig). Shells shall be tested before shipment under a hydrostatic pressure of 690 kPa (100 psig) and shall show no sign of leakage. Top heads shall be easily removable to give access to elements. Shells shall be securely supported by legs and shall have all necessary openings for pipes properly reinforced.

D. Vacuum Type Filter: Tank shall be open type made completely of glass fiber reinforced plastic and externally braced with galvanized steel. Elements shall have suitable porosity and permeability so that after pre-coating initial pressure loss will be less than 3400 Pa (1 inch mercury). Filter elements shall be glass fiber reinforced plastic with mono-filament plastic sleeves, or corrosion-resisting metal, mounted vertically, and connected to a closed underdrain manifold leading to pump suction. Elements shall be easily and individually removable and not require tie rods for assembly. Provide filter battery with a vacuum limit switch to stop circulating pump at a predetermined point before reaching maximum possible suction lift.

E. Vacuum Type Filter Level Control Valve: Modulating type float valve installed in filter inlet line with float operator installed in filter
tank to insure no overflowing of filter tank. Valve shall be a butterfly type with diaphragm operator and be controlled by a pilot float valve in filter tank. Level control shall be fail-safe type.

F. Pre-coat Tank: Steel, having a capacity of not less than 4.5 kg (10 pounds) of filtering medium. Assemble into inlet piping.

G. Continuous Feed Tank (Slurry Tank): Continuous motor agitated feed tank of sufficient size for filter battery.

H. Jets shall be adjustable / directional and multi-functional jets formed of thermoplastic co-extrusion of PVC so as not to cause corrosive action with pool shell. Jets shall be pumped and plumbed through manufacturer’s standard dual pump system. Jets for the therapy pool shall include (2) front resistance/therapy jets, (1) 5’ attachable therapy hose for deep tissue massage. These jets are controlled with a variable frequency drive and cannot be driven with pneumatic controls appropriately. Laminar flow or paddle wheel systems are not to be accepted as adequate replacements for the adjustable multi-directional jet system.

2.4 SIGHT GLASSES
Shall be manufacturer's standard. Vane shall extend into pipe to deflect a continuous stream of water into and through the glass. Sight glass shall have blow-off cock.

2.5 FLOAT TANK OR POOL VESSEL
A. Constructed of steel or thermoplastic with reinforced fiberglass backing. Steel is welded construction, open top, galvanized after fabrication.

B. Openings: Sizes shown and properly reinforced with flanges welded to tank and threaded for screwed pipe connections, or may have extra heavy couplings welded to tank both inside and outside.

C. Support: Iron or steel stand or chair or other type suitable for tank furnished.

D. Tank size: Tank size shall be 7'-6" x 14' x 5' deep containing a volume of 2,250 total gallon capacity.

2.6 FLOW METER
Meter shall be capable of operating at 52 degrees C (125 degrees F) and 410 kPa (60 psig). Scale shall be calibrated in L/min (gpm) and shall be suitable for the flow delivery.

2.7 HYPOCHLORINATOR OR BROMINATOR
A. Automatically controlled of sufficient capacity to produce residual chlorine or bromine content in pool water, at any point in pool, of between 0.40 and 0.60 mg/L (ppm). Hypochlorinator shall be installed complete with suction hose, strainer assembly at end of suction hose,
sight feed indicator, two hypochlorite solution tanks of sufficient size, and all other necessary accessories.

B. Furnish one orthotolidin comparator having a standard color disc with a range from 0.05 to 1.00 mg/L (ppm), arranged in nine steps and equipped with a dust-proof eyepiece, fitted with a glass prism which will bring image of treated sample and color standard side by side to facilitate quick and accurate reading.

2.8 OZONE GENERATOR
Automatically controlled non-arc, conforming to OSHA Standards and shall be suitable for wall mounting. Components shall be Underwriters Laboratories labeled. Replacement ozone cartridge cells shall have a minimum life of 6,000 hours.

2.9 HAIR AND LINT INTERCEPTOR
Install in suction line of circulating pump, a duplex strainer with heavy cast iron body or PVC body, flanged inlet and outlet with IPS standard interceptors, removable brass or stainless steel or PVC perforated basket strainers, gasketed water-tight covers secured with bolted yoke arrangement, install valves to allow off-stream basket to be removed for cleaning with continuous flow through the other strainer. Strainer size shall be based on a flow rate of 125 percent of circulating pump L/min (gpm), with maximum pressure drop of 45 kPa (15 feet). Floating weir systems made of PVC material and telescoping skimmer body are also acceptable alternatives.

2.10 VACUUM CLEANING TOOL
"Tow Type" vacuum cleaning tool complete with 375 mm (15 inch sweep), renewable bristle brush, with handle and swivel tee connection and solid rubber or rubber-tired wheels, extension handles and 15 m (50 feet) of vacuum hose with couplings at each end and any other accessories necessary for cleaning pool. Provide six copper floats, with clamps, for hose. Handheld vacuum model with manual suction stimulation is acceptable alternative.

2.11 VACUUM CLEANING FITTING
If "tow type" vacuum, Shall have cast iron body, with polished brass, chromium plated, adjustable vacuum connection with approved type cover.

2.12 POOL HEATERS
Refer to specification Section 22 33 00, ELECTRIC DOMESTIC WATER HEATERS, for semi instantaneous water heaters.

2.13 COMPUTER DOCUMENTATION SYSTEM AND REMOTE CONTROL OPERATIONS
A. Control system, which was custom designed, utilizes a fully integrated control system. This system is based around an industry standard PLC
(Programmable Logic Controller) which monitors pool conditions through various sensors. The PLC also communicates with the Operator/Trainer via the infrared remote control, the maintenance pendant, and Windows-based software running on a personal computer. The software monitors the pool functions, treadmill speed, and jet power via RS-232 communications with the PLC, and then uses this information to display current session information, and store the information in a patient database for future reference, and progress reports.

B. Control system shall include water-resistant remote control unit, which can control jet action, treadmill floor action. Additional controls shall include manual controls for the previously listed items, thermostatic control of water temperature, filtration system controls, and all other pertinent controls for a complete working system.

C. Pool electronic patient monitoring systems shall include Pentium PC complete with monitor, tower, mouse, surge protector, and keyboard, two fixed underwater cameras, camera switching device, 25 viewing monitor, VCR, and appropriate software and licensing agreements.

2.14 PIPING AND DRAINS

A. Piping shall be PVC schedule 40 piping from each drain with shutoff valve as required and down turn to existing adjacent sump pit drain. Water supply piping shall not be ferrous metals to prevent corrosion and water chemistry issues.

B. Pool drain: Install and connect pool drain from the pool to the designated location in the sump pit. Refer to Section 22 14 29, SUMP PUMPS.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install therapeutic pool equipment as per manufacturer's instruction and under the supervision of manufacturer's qualified representative and as shown on drawings.

B. Caulk watertight pool inlets.

C. Install flow meter on filtered water supply pipe to pool.

D. Install sight glass as required per manufacturer's instructions.

E. Installation and activation of chlorinator shall be under direct supervision of a qualified representative of manufacturer of apparatus.

3.2 INSTRUCTION AND PERSONNEL TRAINING

One 8 hour day of pool and water chemistry training shall be provided to the facility maintenance personnel to educate the user on how to maintain the pool and properly care for the pool water. Addition
training shall be provided for the physical therapists, doctors and athletic trainers on water therapy and conditioning techniques.

3.3 TEST

Conduct performance test, in the presence of the Resident Engineer and a manufacturer's field representative, to show that all therapeutic pool equipment and control devices operate properly and in accordance with design and specification requirements.

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