

**GENERAL****1.1 GENERAL REQUIREMENTS**

- .1 The General Conditions and General Specifications form an integral part of this specification and must be read in conjunction herewith. Read also and be fully cognizant of all Mechanical Sections.

**1.2 SCOPE OF WORK**

- .1 This section shall provide all labour, material, equipment and services necessary for and reasonable incidental to the supply and installation of the hydronic system as shown on the drawings and hereinafter specified. Generally this shall include the following:
  - .1 The demolition of existing pump, pad and various section of piping.
  - .2 The relocation of the chlorination system.
  - .3 The supply and installation of a pool pumps and piping distribution.
  - .4 The supply and installation of flow meter.
  - .5 The supply and installation of an Ultraviolet Treatment System.
  - .6 The supply and installation of isolation system for all powered equipment for this section as specified in Section 15070.

**1.3 GENERAL REQUIREMENTS AND PROCEDURE**

- .1 Refer to Section 15010 and 15050 for general requirements and installation procedure.

**1.4 SOUND CONTROL AND ISOLATION**

- .1 This section shall supply to Section 15050 approved drawings of all equipment to be isolated.
- .2 All bases shall be shimmed level so that all piping connections can be made to a rigid system, at the operating level, before isolator adjustment is made.
- .3 Pump bases shall be grouted to the concrete clean-up pads.
- .4 The Contractor shall supply all necessary structural steel wherever equipment is not sufficiently rigid for isolator point loading.

**MATERIALS****2.1 CIRCULATING PUMPS - GENERAL**

- .1 Supply and install circulating pumps where shown on the drawings, of the size and type and capacity as indicated in the Pump Schedule.
- .2 The complete pumping unit shall be suitable for the service shown in the Pump Schedule and the pump manufacturer shall conduct running tests to verify the conditions of head capacity specified.
- .3 Renewable bronze wearing rings shall be provided on both the impeller and the wheel to prevent wear.
- .4 The pump manufacturer shall include checking and aligning all pumps prior to start up.
- .5 All piping adjacent to each pump shall be adequately supported from the structure so that no weight is carried on the pump casings. In addition, long sweep elbows shall be used on each pump section and discharge.
- .6 See clause "Sound Control" for vibration isolators.
- .7 The standby pump shall be cross-connected with the other pumps as detailed.

**2.2 BASE-MOUNTED END-SUCTION PUMPS**

- .1 Furnish and install pumps with performance characteristics as shown on plans. The pumps shall be long coupled, base mounted, single stage, end suction, vertical split case design, in cast iron bronze fitted construction specifically

- designed for quiet operation. Suitable standard operations at 225° F and 175 PSIG working pressure or optional operations at up to 250° F and 250 PSIG working pressures. Working pressures shall not be de-rated at temperatures up to 250F. The pump internals shall be capable of being serviced without disturbing piping connections, electrical motor connections or pump to motor alignment.
- .2 The pumps shall be composed of three separable components a motor, bearing assembly, and pump end (wet end). The motor shaft shall be connected to the pump shaft via a replaceable flexible coupler.
- .3 All wetted components are to be epoxy coated for use with Pool water.
- .4 A bearing assembly shall support the shaft via two heavy-duty regreaseable ball bearings. Bearing assembly shall be replaceable without disturbing the system piping and shall have foot support at the coupling end. Pump bearings shall be regreaseable without removal of the bearings from the bearing assembly. Thermal expansion of the shaft toward the impeller shall be prevented via an inboard thrust bearing.
- .5 The bearing assembly shall have a solid SAE1144 steel shaft. A non-ferrous shaft sleeve shall be employed to completely cover the wetted area under the seal.
- .6 Pump shall be equipped with an internally flushed mechanical seal assembly installed in an enlarged tapered seal chamber. Application of an internally flushed mechanical seal shall be adequate for seal flushing without requiring external flushing lines. Seal assembly shall have a brass housing, Buna bellows and seat gasket, stainless steel spring, and be of a carbon ceramic design with the carbon face rotating against a stationary ceramic face.
- .7 Bearing assembly shaft shall connect to a bronze impeller. Impeller shall be both hydraulically and dynamically balanced to ANSI/HI grade G6.3 and keyed to the shaft and secured by a stainless steel locking capscrew or nut.
- .8 Pump should be designed to allow for true back pull-out allowing access to the pump's working components, without disturbing motor or piping, for ease of maintenance.
- .9 A centre drop-out type EPDM coupling, capable of absorbing torsional vibration, shall be employed between the pump and motor.
- .10 An ANSI and OSHA rated coupler guard shall shield the coupler during operation. Coupler guard shall be dual rated ANSI and OSHA compliant coupling guard and contain viewing windows for inspection of the coupling. No more than .25 inches of either rotating assembly shall be visible beyond the coupling guard.
- .11 Pump volute shall be of a cast bronze design with integrally cast pedestal volute support, rated for 175 PSIG with integral cast iron flanges drilled for 125# ANSI companion flanges. Volute shall include gauge ports at nozzles, and vent and drain ports.
- .12 Motors shall meet scheduled horsepower, speed, voltage, and enclosure design. Pump and motors shall be factory aligned, and shall be realigned after installation by the manufacturer's representative. Motors shall be non-overloading at any point on the pump curve and shall meet NEMA specifications and conform to the standards outlined in EPACK 92.
- .13 Base plate shall be of structural steel or fabricated steel channel configuration fully enclosed at sides and ends, with securely welded cross members and fully open grouting area (for field grouting). The minimum base plate stiffness shall conform to ANSI/HI for Horizontal Baseplate Design standards.
- .14 Pump shall be of a maintainable design and for ease of maintenance should use machine fit parts and not press fit components.
- .15 The pump(s) vibration limits shall conform to Hydraulic Institute ANSI/HI for recommended acceptable unfiltered field vibration limits for pumps with rolling contact bearings.

- .16 Pump shall conform to ANSI/HI standard for Preferred Operating Region (POR) unless otherwise approved by the engineer. The pump NPSH shall conform to the ANSI/HI standards for Centrifugal and Vertical Pumps for NPSH Margin.
- .17 Pump manufacturer shall be ISO-9001 certified.
- .18 Pump impeller shall be factory-supplied to match the performance specifications in the schedule.
- .19 Impeller trimming is to be by factory certified personnel and shall be completed such that the work does not void any warranty.
- .20 The contractor and/or pump supplier shall be responsible for covering any costs associated with the impeller trim in order to meet the balance requirements.
- .21 See clause "Sound Control" for vibration isolators.
- .22 Each pump shall be factory tested and name-plated before shipment.
- .23 **Standard of Acceptance:**
  - .1 Bell & Gossett Model 1510
  - .2 Armstrong 4030

### 2.3 FLOW MEASUREMENT METER

- .1 Supply and install Primary Flow elements, one for each primary station, where shown on the Drawings.
- .2 Construction and metering
  - .1 Meter shall be capable of operation in pool environment.
  - .2 Meter shall be a vortex flow meter.
  - .3 Nominal pipe diameter of piping serving meter to be nominal size of meter.
  - .4 The elements shall be capable of operating at a maximum temperature of 250°F (120°C).
- .3 The elements shall be located and installed in accordance with the manufacturer's recommendations and shall be installed in the horizontal position.
- .4 Digital flow measurement display to be provided with measuring element. Display is to be wired by Division 15.
- .5 **Standard of Acceptance:**
  - .1 Kohne Optiswirl

### 2.4 ULTRA VIOLET (UV) TREATMENT SYSTEM

- .1 Supply and install UV treatment system of size and capacity as noted in the contract documents.
- .2 The UV treatment system shall be of a 2 medium pressure lamp design, flow through configuration, designed for pool applications. System shall come complete with treatment chamber and control system.
- .3 Treatment chamber shall be constructed of 316L stainless steel and rated for 150 psi at operating temperature. Chamber shall come complete with temperature probes, UV monitor probes, and automatic quartz wipers.
- .4 Control system shall:
  - .1 Provide control and protection of the UV system.
  - .2 Controller shall be complete with contacts for pump control.
  - .3 Come complete in a NEMA 12 rated cabinet
- .5 Electrical connections by Division 16.
- .6 **Standard of Acceptance:**
  - .1 ETS - ECOFLO II

**EXECUTION PROCEDURES****3.1 PUMP CONNECTIONS**

- .1 All piping adjacent to each pump shall be adequately supported from the structure so that no weight is carried on the pump casings. In addition long sweep elbows shall be used on each pump suction and discharge.
- .2 Provide a minimum of 5x suction diameter of pipe on pump suction of pipe size shown on drawings.
- .3 Provide the necessary access space around components to allow for servicing, repair, replacement as well as for the TAB technician to take proper readings. .
- .4 Deliver equipment and store in area as designated by the Contract Administrator. Set equipment on temporary bases to avoid contact with the ground. Protect equipment from damage.
- .5 Locate equipment as shown on the drawings to provide best possible connection arrangement and accessibility for servicing. Provide clearances on all sides of equipment as required by Authorities having jurisdiction or Manufacturer, whichever is greater.

**3.2 WATER BALANCING**

- .1 Provide flow measurement ports as shown on drawings, on piping schematics, and in locations as directed by the water balancing specialist.
- .2 Provide any pump impeller modifications as recommended by Division 15850.