SECTION 13 11 35 - POOL ULTRAVIOLET DISINFECTION EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pool ultraviolet disinfection equipment

1.2 RELATED DOCUMENTS

A. Drawings and Contracting Requirements, including General and Supplementary Conditions and Division 01 - General Requirements, apply to this Section.

1.3 REFERENCES

A. The following latest edition reference specifications, guides and standards shall become part of this Specification as if herein written. If provisions conflict, the more stringent provisions shall apply.
   1. NSF – National Sanitary Foundation
   2. MET – Met Laboratories, Inc.
   3. CSA – Canadian Standards Association
   4. UL – Underwriters Laboratory
   5. NEMA – National Electrical Manufacturers' Association
   6. ANSI – American National Standards Institute

1.4 SUBMITTALS

A. Drawings and Instructions
   1. Provide detailed Shop Drawings of the items of equipment being provided, indicating the dimensions, material and characteristics.
   2. Provide a typed sheet of Operating Instructions, embracing the operation functions and recurring maintenance processes

1.5 SUBSTITUTIONS

A. Refer to General Requirements and Division 01.

1.6 DELEVERY, STORAGE, AND HANDLING

A. Refer to General Requirements and Division 01.

1.7 WARRANTY

A. A factory trained representative of the manufacturer shall perform all warranty work. Manufacturer to warranty Ultraviolet chamber and Spectra Control panel for a period of 12 months. Medium pressure Ultraviolet bulbs shall be warranted for a period of 4,000 hours. Intermittently operated bulbs (≥ 1 on/off cycles per day) will be replaced free of charge should failure occur prior to 3,000 hours and replacement will be prorated between 3,000 and 4,000 hours.

PART 2 PRODUCTS

2.1 GENERAL

A. The UV unit must be interlocked by the installer and capable of shutting down the activity pump in the event the UV dosage falls below satisfactory levels as determined by The State of Florida Pool Code.

B. Provide 208 Volt to 480 Volt step up transformer model # BAUT4T15E

C. Ultraviolet Disinfection Equipment: Shall operate within the UVC electromagnetic spectrum emitting wavelengths in the range of 200nm to 400nm. This required wavelength will provide constant disinfection/inactivation of bacteria, algae, molds, viruses and destruction of Monochloramines, Trichloramines, and Dichloramines. Ultraviolet Lamp/Chamber and spectra Control Panel by Engineered Treatment Systems/atg-Willand (Telephone 920-885-4628, Fax 920-885-4386) or Architect/Engineer approved equal.

D. The UV System shall have an MET or equivalent (ETL, CSA, or UL) listing, and be NSF-50 certified.
   1. Equipment General Description
      a. The Ultraviolet System shall be provided in a complete package to include: 316L Stainless Steel Chamber, Spectra Control System located in a NEMA 12 rated panel, Medium Pressure Bulb(s) designed to emit wavelengths within the UVC electromagnetic spectrum, strainer basket automatic wiper system, and Project Commissioning by a Certified Ultraviolet Technician.

2.2 UNIT TYPES

A. ECOFLO: Ultraviolet manufacturer to offer unit capability of a Horizontal OR vertical installation application using state of art design and direct flow through characteristics. Direct flow will be required in order to reduce total head loss through the system. Unit shall be a Multiple Lamp medium pressure system with a bulb range of two1.5 kW – five 3.0 kW power range. Multiple lamp system is required in order to maintain quality disinfection in the event of a single bulb failure. ANSI flange range of 6” – 14” and flow pattern of 560 – 4500 gpm. Chamber shall be the equivalent of Engineered Treatment Systems/atg-Willand ECOFLO Model (ECF-225-8) and Spectra Control Cabinet ECF-(A) or equal. Electrical requirements to include 480 volt 3-phase (32) amp internal breaker. Electrical contractor to take into account plus/minus 3% for external breaker. All required electrical work to be performed by licensed electrician.

B. The Ultraviolet System shall be sized to emit a minimum dose of 60 mj/cm^2, with flow rates of up to (1000) gpm, within a (8”) schedule (80/40) PVC pipe.

2.3 ULTRAVIOLET CHAMBER

A. Pressure rated for 100 psi (tested to 150 psi), and pressure drop across the unit will be minimal. The unit shall be constructed of 316L stainless steel to prevent corrosion within the harsh pool environment. The Ultraviolet chamber shall come complete with the following equipment:

B. Ultraviolet intensity monitor with built-in alarm system to notify operator when output level drops below required level of 60 mj/cm2 (or operator set dosing levels).

C. Ultraviolet temperature control system shall be provided to maintain system integrity in the event of flow interruptions to the chamber.

D. Ultraviolet chamber shall come complete with annealed quartz sleeve with “O” ring seals for water tightness.

E. Chambers shall be complete with ANSI flanges and all ports or vents shall be threaded NPT. The Ultraviolet chamber must be capable of installation in the system so that it remains full under all conditions.

F. The ultraviolet unit must be complete with appropriate brackets or feet for ease of installation.

2.4 ULTRAVIOLET LAMP

A. Ultraviolet lamp shall be medium pressure high intensity. Lamp shall be designed to emit continuous Ultraviolet wavelengths in the range of 200nm to 400nm. This will provide optimal disinfection benefits and destruction of the Monochloramine, Dichloramine, and Trichloramine compounds. Lamp must remain unaffected by temperature variance of 0 degrees to 200 degrees Fahrenheit.

B. The lamp unit must provide a dose not less than 60 mj/cm2 at the end of the lamp life and this must be based on the full recirculating flowrate, not on a sidestream treatment.

2.5 STEP UP TRANSFORMER

A. Provide 208 Volt to 480 Volt step up transformer model # BAUT4T15E, coordinate installation with electrical contractor.

2.6 AUDIBLE ALARM PANEL

A. An automatic alarm and buzzer, 110 Volt, 10 Amp. Shall be interlocked to the associated activity pumps to shut down in the event the UV dosage falls below required limits. coordinate installation with electrical contractor.

2.7 AUTOMATIC WIPER SYSTEM

A. An automatic cleaning system shall be provided for cleaning of quartz sleeve and Ultraviolet monitor probe. The system shall travel the entire length of the quartz sleeve twice per desired cleaning cycle. Precision molded wiper rings shall be provided to ensure thorough quartz tube cleaning and quartz tube protection. Wiper cycle shall be user selectable and adjustable within a range of 15 minutes to 24 hours depending on anticipated application and deposit build-up. At a minimum the Automatic Wiper system shall have the following characteristics:
   1. System shall utilize direct Belt Drive with square machined pulleys and shafts to prevent slippage and pin shearing. Systems utilizing shear pins or complicated gear boxes will be unacceptable.
   2. Wiper power supply shall be 24 volt DC for improved safety.
   3. System shall incorporate Direct Shaft Encoding for positional location. Systems relying on external proxy switches or internally located magnets will be unacceptable.
   4. Wiper interval shall be operator selectable with optional override switch.
   5. Wiper faults are to be indicated on the control system display.
   6. Wiper System to utilize “Intelligent Operation” for automatic start-up commissioning.
      a. Records wiper position at chamber ends. Position must be fixed and not dependent on a timed interval or component striking end of chamber.
      b. Establish a travel run without setting limit adjustments to ensure system integrity and longevity.

2.8 ULTRAVIOLET CONTROL SYSTEM

A. Control cabinet shall be Engineered Treatment System/atg-Willand SPECTRA microprocessor control unit. (Phone: 920-885-4386) Systems shall be epoxy coated NEMA 12 rated cabinet. Three levels of operation shall be provided to meet the needs of the operator and pool environment: Simple Control (start, stop and reset), Full Parameter Display, and Customized Operator Configuration. Modes of operation shall be password protected to secure system critical setup functions. Control system shall have clearly identifiable start, stop, and reset control buttons (suitable for gloved operation) with Running and Fault LCD indicators.
   1. Two-line LCD screen shall display a minimum of the following: Ultraviolet dose (derived from flow and intensity inputs), Ultraviolet intensity (as a % and mw/cm2), Lamp Current, Flow rate (accepts signal from optional flow meter – displayed as gallons per minute), Chamber temperature (displayed as deg. F), Operation hour meter, System spares listing, Lamp fault, low Ultraviolet & temperature alarm, Ground fault trip, Wiper fault. All alarm functions shall have simple text message display to assist in fault finding.
   2. Control system shall have a minimum of the following system interface control: Remote operation, Process interrupt features (from valves, flow meters), Low UV dose (configurable to shutdown or alarm only), Flow meter input, Auto-Restrike, Half to full power Ultraviolet setting with 24 hour/7 day settable timer.
   3. An automatic alarm and buzzer, 110 Volt, 10 Amp. Shall be interlocked to the associated activity pumps to shut down in the event the UV dosage falls below required limits per Florida pool code requirements.
   4. Control system shall have built in data-logging capabilities to record the following information: Ultraviolet intensity required, Ultraviolet intensity measured, Lamp current, Chamber temperature, Flow rate (if flow meter is connected), Time and date stamp, All alarms generated.

PART 3 EXECUTION

3.1 SYSTEM STARTUP

A. Install in accordance with contract documents and manufacturer's instructions.

B. Commissioning
   1. Ultraviolet Chamber and Control Panel shall be commissioned by a qualified factory trained technician.
   2. Final electrical and control cabling will be connected from the Spectra control cabinet to the Ultraviolet disinfection chamber during the commissioning process.
   3. Daily operation and simple maintenance instructions shall be provided during the commissioning process.

END OF SECTION