

TIPTON ENVIRONMENTAL INTERNATIONAL, INC.
ULTRAVIOLET DISINFECTION SYSTEMS
Horizontal Series Type

I. GENERAL

- 1.1 The contractor shall furnish and install one Ultraviolet Disinfection System, complete and ready for operation in accordance with the specifications stated herein. The system shall be a Horizontal series type, Model Number TEII-UV-1S2 as manufactured by Tipton Environmental International, Inc. The system shall be designed to treat a total of 5,000 gallons per day with peak of 3 GPM of effluent having the characteristics as described in section 2.1 below. The ultraviolet disinfection system shall be capable of meeting the fecal coliform limits set at 200 MPN / 100 ml monthly average, when operated in accordance with the manufactures operation and maintenance instructions. The system shall be designed for installation in a gravity flow effluent channel.

2. SYSTEM DESIGN PARAMETERS

2.1 Influent Characteristics - The flow entering the System shall be of the Quality of water to meet the following characteristics:

2.1 Inlet Water Quality-

- | | |
|------------------------------|--------|
| A) Maximum suspended solids- | 30 PPM |
| B) Maximum BOD 5 - | 30 PPM |

2.2 Effluent Water Quality.

- | | |
|--|--------------------|
| A) Fecal coliform per 100 ml sample | 200 MPN per 100 ml |
| Geometric means for samples collected daily in any 30 day consecutive period | |
| B) Maximum fecal coliform count - | 235 MPN/100 ml |

3. EQUIPMENT SECTION

3.1 Materials of Construction

- 3.11 Trough Housing Assembly - The trough housing assembly is constructed to allow the total system flow rate to pass through with the minimum head loss and in combination with acting as a housing the fit in position the lighting modules. The system shall have the capacity of holding 1 light module. All wetted and non-wetted surfaces of the Trough Housing Assembly shall be type 304 stainless steel. The inlet connection of the trough housing assembly shall be a flanged inlet and outlet box for connection as shown in the plans .

- 3.12 Lamp Module Assembly – There shall be supplied 1 lamp module assemblies with each assembly housing 2 lamps. The lamp module assembly is the frame which holds the lamp and the quartz sleeve. There shall be supplied three lamp module assemblies. Each module shall be easy removed from the channel. This will allow easy removal and maintenance of the lamp module. The lamp module frame shall be made of 304 stainless steel. The interconnecting cable from the lamp module to the wireway is CSA (5/C-(9/C) indoor/outdoor type and shall be abrasion, flame, ozone, and fungus resistant. The lamp module assembly shall be tolerant to a temperature range of -50 degrees C to + 90 degrees C. The connector is molded to ensure “waterproofing” connection. There shall be a interface fit of the elastomeric surfaces of the nipples on the connector pins and around the high pressure side of the sockets. O-rings are molded in the bulkhead and in line connectors to act as additional sealing surfaces. Contacts are gold plated to Mil-G45204 for superior corrosion resistance. Teflon Type E hook-up wire is used for bulkhead connections.
- 3.13 Quartz Gland Fitting- The quartz gland fittings shall be precision machined fitting made of teflon. It shall have an o-ring groove which provides a water tight seal against the quartz sleeve. This assembly can handle very high pressure.
- 3.14 UV Lamps - The ultraviolet disinfection unit shall utilize low pressure mercury germicidal lamps of instant start, hot cathode type using triple coiled filaments as cathodes. The filament construction uses nickel inner lead in a clamped filament design. Each lamp shall produce ultraviolet light with at least 90% of the emission within the wavelengths of 2537 Angstroms. The lamp shall be rated to produce zero level ozone. The rated lifetime of the lamps shall be in excess of 8,500 hours.
- 3.15 Quartz Sleeves - The quartz sleeves are type 214 clear fused quartz and shall contain 99.9 percent Silicone Dioxide. The sleeve shall be rated for UV transmission of 95 percent and shall not be subject to solarization over the length of its life.
- 3.16 Remote Sensor - The remote sensor probe shall be submersible and sensitive to 253.7 NM wavelength. The sensor shall be mounted with a watertight quartz sleeve and shall be mounted by means of a type 304 stainless steel clamp and shall be mounted to one of the quartz sleeves and directed at a lamp. Other locations are available.
- 3.17 Outlet Baffle - A stainless steel outlet baffle shall be installed in the lamp housing assembly to control the water level in the trough so the UV lamps are submerged in the effluent irrespective of the design flow rate.

3.2 Electrical Control Center

- 3.21 An all weatherproof electrical control enclosure shall be provided to house the power ballast's, controls and current monitoring systems. Individual lamp and power status shall be monitored by simply observing the light emitting diodes (LED's) mounted on the control panel for easy viewing. A continuous duty fan shall be mounted with in the enclosure complete with replaceable filters, for providing constant cooling of the ballasts. The on/off switch shall allow for convenient power control during servicing. Standard power/ control leads of 6 feet allow flexibility in choosing a suitable location for the control center.

- 3.22 A UV intensity monitor shall be furnished as a detection system for measuring the 254 nanometer component of UV spectrum. The remote sensor mounted within the trough housing assembly shall measure the UV intensity in the effluent and send the signal to the monitor controller mounted on the control panel.
- 3.23 The control center shall be a complete factory built and tested electrical control console. The control voltage shall be 118 volt, single phase 60 Hz.
- 3.24 The enclosure shall be fabricated of stainless steel and be of Nema 4 construction. A pedestal shall be supplied to allow bottom entrance of all electrical connections where requested.
- 3.25 All controls shall be mounted to a removable sub-panel within the enclosure and shall be wired and spaced in accordance with the latest National Electric Code. The control console shall be supplied with a property sized GFIC safety switch and act as a main disconnect for the system.
- 3.26 All wiring and conduit required between the electrical control panel and the electrical power service shall be furnished and installed by the purchaser. For ease of installation, non-metallic receptacles/plugs shall be supplied for connection between the ultraviolet unit and the electrical controls. The control panel shall be detached for shipping purposes.

4.0 Field Service

- 4.1 The contractor shall provide the services of a representative of the manufacture who shall instruct the owner's representative in the proper operation and maintenance of the ultraviolet disinfection unit, including instructions in conducting all required operational tests. The manufacturer's representative shall furnish at this time service manuals on the equipment. The manufacturer's representative shall for a period of one (1) year after delivery is made, make periodic inspections of the system, advising the owner's representative of any operational difficulties.

5.0 Guarantee

The manufacturer of the ultraviolet disinfection system shall guarantee for a period of one (1) year from the date of shipment that the system and all of it's components equipment shall be free from defective materials and workmanship. The manufacturer shall furnish replacement parts for any components considered in the opinion of the manufacturer to be defective, whether of his or other manufacturer during the guarantee period.