

Section VII. Technical Specifications

(Bidding Terms of Reference)

SUPPLY, DELIVERY, INSTALLATION AND COMMISSIONING OF ULTRAVIOLET HYDRO- OPTIC DISINFECTION SYSTEM AND AUTOMATIC SELF-CLEANING IN-LINE SCREEN FILTER INTENDED FOR SIX (6) IDENTIFIED PUMPING STATIONS AT CALAMBA WATER DISTRICT

TECHNICAL SPECIFICATIONS

GENERAL SPECIFICATION OF UV-HOD SYSTEM

Max. Operating Pressure : 10 bar

Water Operating Temperature : Up to 60°C

Electric Requirements : 3 Phase x 400/480VAC for the Ballast Module (Lamp) and 1-Phase x 110/220VAC for the Controller

Construction Materials:

Housing : Stainless Steel 316

Internals : High grade fused silica quartz

Real Time Tracking & Monitoring

Real Time Control:

> Two (2) sensors per lamp to continuously measure 3 parameters that affect UV dosage in real time (UV Transmittance, Lamp Power/Status and Flow rate)

> Control system which automatically adjust lamp power

> The unit should provide the minimum dose required.

> Full exception reporting, alarm and alerts, security suite.

> Real Time monitoring.

> Real-time status display of critical parameters

> Data-logging, remote monitoring and control capable

DISINFECTION PERFORMANCE CRITERIA

The system should guarantee the following microbial load complying with the required minimum microbial parameters in the Philippine National Standard for Drinking Water.

PARAMETERS	VALUES
1.Total Coliform	<1.1 MPN/100ml
2.Fecal Coliform	<1.1 MPN/100ml

3.Heterotrophic Plate Count	< 500CFU / ml	
4. E. Coli	<1 CFU / ml	

ULTRA VIOLET DISINFECTION CHAMBER (Chamber & UV Lamps)

1. Internal Quartz disinfection chamber to be used as the main disinfection chamber. All the influent water must flow through the quartz disinfection chamber from one side of the reactor to the next. Water and light shall be mixed in this disinfection chamber. Quartz chamber shall be capable of reflecting light within the disinfection zone. Any reflective coating used inside the disinfection chamber shall not be in direct contact with the water flow path. A 316 stainless steel casing is only used as a protective casing around the main quartz chamber.
2. Medium Pressure Lamps, enclosed within a quartz sleeve that is no less than 5 mm thick that is situated perpendicular to the flow path. If multiple lamps are each subsequent lamp shall be placed perpendicular to the previous lamp. Each lamp shall treat 100 percent of the water flow traveling through each UV System.
3. In cases of multiple lamps, the Lamps shall have the capability to be removed from the either side of the chamber without having to stop the UV system and drain the water from the disinfection.
4. Only medium pressure High Intensity UV tubes shall be provided for disinfection
5. Each lamp shall operate between 40% - 100% power.
6. Germicidal UV output from lamps shall not be affected by temperature.
7. Each UV system shall have a UV intensity sensor per lamp within the UV system. UV intensity sensor that views and monitors the lamp power directly through the air with no other medium in between. Each UV intensity sensor will be connected to the systems controller reporting real time intensity of each lamp for assuring the delivery of the contacted dose.
8. Each UV system shall include at least one UVT Sensor per system that is integrated within the system chamber. The UVT sensor will be connected to the system controller inline and provide the UVT for the validated dose pacing algorithm.

TECHNICAL SPECIFICATIONS

POWER / CONTROL MODULE / MONITORING

1. Each power supply (ballast) shall independently operate one lamp that is capable of 40-100 percent adjustability.
2. All power supply, UV intensity, UVT analyzer and flow meters will be controlled by a single controller with a touch screen which will capable of display and control of the following parameters:

a. Flowrate
b. UV Dose (in mJ/cm2)
c. Lamp life and efficiency for each individual lamp.
d. Power output of the Power Supply (ballast)
e. Specific screens for calibrating UVT and UV intensity sensors.
3. Each controller shall contain alarm capabilities, both display and remote. Alarms will report on low dose, lamp efficiency, temperature, UVT and flow conditions.
4. Each control Module shall have built-in automated programmed capability to operate in Dose mode.
5. Each controller will be capable of controlling external outputs, including dry outputs up to four flow valves.
6. Each controller will be capable of connecting to remote PC operation software provided by the manufacturer
7. Each controller shall be able to self-adjust within the operation envelope and defined in the validation protocol according to USEPA UVDGM protocols.
8. The software shall have built in EPA reporting capabilities for standard operation and off spec events.
9. Controller shall have built in capabilities to tie into existing SCADA via MODBUS Communication protocols via RS485.
DOSAGE
1. The UV system shall provide the minimum Validated dose needed for 3 log inactivation of Cryptosporidium (or UVDGM table 1.4 of specific micro-organism log removal required for inactivation) according to LT2ESWATR under peak flow conditions. The basis for evaluating the UV dose and system design criteria for the UV system shall be in accordance to the manufacturer's third party validation base on USEPA UVDGM validation protocol, Nov. 2006.
2. The validation process of the UV system must be done in the USA using the dose pacing validation, as specified in the USEPA UVDGM validation protocol, Nov. 2006.
3. The UV Dose will be adjusted using an end of lamp life factor of a minimum of 0.8.
4. The UV dose shall be capable of adjustment by a medium pressure lamp and ballast integrated system that is capable of adjusting the lamp intensity from 40-100 percent.
5. Should N+1 be required for system redundancy, manufacturer shall use the USEPA UVDGM validation received for the particular UV system as the design criteria for ensuring N+1 compliance.
NECESSARY INFORMATION TO PROVIDE IN PROPOSAL
<i>The manufacturer will provide the following information as part of its proposal:</i>
> Calculations of UV Dose used for system sizing and guarantees, System sizing to be solely based on EPA UVDGM validation protocol Nov. 2006 and validated RED values.
> The UV system shall provide the minimum Validated dose needed for 3 log inactivation of Cryptosporidium (or UVDGM table 1.4 of specific micro-organism inactivation of Cryptosporidium (or UVDGM table 1.4 of specific micro-organism log removal required for inactivation) according to LT2ESWTR under peak flow conditions with one reactor lamp output at end lamp life and under fouled conditions.

> Sleeve manufacturer certification approving that the absorption of the protecting quartz sleeve at 253.7 nanometers shall not exceed 2% per 1 mm. thickness.

MANUFACTURER EXPERIENCE

Minimum of Five (5) years' experience in the manufacture of closed piped ultraviolet Disinfection systems of similar design to that proposed for this project.

MANUFACTURER'S Exclusivity Certificate

Exclusivity Distributorship Agreement

AUTOMATIC SELF-CLEANING IN-LINE SCREEN FILTER

In/Out Diameter: 6"; 150mm
Maximum Flow Discharge: 41.6lps (150 m3/hr)
Maximum Working Pressure: 10 bar
Filtration Degree: 130 microns
Filter Element: Stainless Steel Screen AISI 316L mesh supported by a PVC cylinder
Housing: Carbon Steel ST37.2
Surface Preparation: Sand Blasting up to Sa 2.5 grade
Connection: Flange Type, ANSI 150
Controller: FT 1 Controller, Analog Type, DC6

ELECTROMAGNETIC FLOWMETER

V. Technical data

Sensors range	DN10 – DN3000
Measurement Flow range	0.03m/s -12m/s (Advice rangebetween 0.3m/s-10m/s)
Measurement Accuracy (relative with sensor diameter)	1、 0.5 m/s-10 m/s: +0.5% (User select+0.3%、 +0.2%) (Relate with sensor diameter) 2、 0.3 m/s-0.5 m/s: +0.5%
Repeatability	0.25%/0.1% (According Accuracy demand)
Environment Temperature	-20°C-55°C
Power supply	AC:85-265V,45-62Hz;DC: 18-36V
Power rating	AC: 10 VA; DC: 10W
Grade of Protection	IP65 IP67
Output	1 power output : 4-20mA load is less than 750Ω 2 frequency output 0 5KHz (active or passive), maximum amplitude of 24V, load current 50 3 Pulse Output: can be set equivalent pulse, pulse frequency of 0.006Hz-5KHz (active or passive), Load current o.2
Communication	RS485 Modbus or HART
Display	English show display instantaneous flow rate, positive cumulative volume, the reverse cumulative amount of net accumulated Volume, flow rate percentage, velocity and various self-diagnostic
Control methods	Three key
Low cut off %	0.0%~9.9% adjusts (for Display or output)
Damping time	0.1s~99.9s adjusts (for Display or output)
Auto Trim	Current output self-calibration; Empty/full Trim; Zero Trim
Self-test function	Current frequency output self-test
self-diagnostic function	Excitation loop detection; Zero ,Empty and flow signal detection

TERMS AND WARRANTY

1. One (1) Year warranty on spare parts and workmanship
2. After sales service shall include the O & M Training and free periodic maintenance schedule for One (1) year.
3. The spare parts availability shall be available locally within the period of the Contract to continue the proper function of the equipment.
4. The contractor shall provide all the labor, materials and equipment to be used.
5. The contractor shall finish the work contract within thirty (30) calendar days.