

Technical Specifications

DESCRIPTIONS/SPECIFICATIONS		<u>STATEMENT OF COMPLIANCE</u> (State "Comply or not Comply" for each item description and specifications and attach your company shop/drawing and or brochures / and or Literatures)										
PR No. 16-03-08-046- 1 Lot Supply, Delivery, Installation And Commissioning Of Gas Chlorinating System Complete With Residual Analyzers, Auto Valves, Leak Detector, Switch Over System, Weighing Scale And Booster Pump Including Accessories.												
A.) GAS CHLORINATOR SYSTEM WITH SWITCH OVER	<p><u>1. Vacuum Regulators – Two (2) units:</u></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Rated</td> <td>: 250 PPD</td> </tr> <tr> <td>Type</td> <td>: Cylinder Mounted</td> </tr> <tr> <td>Yoke</td> <td>: Corrosion resistant and gasketed yoke assembly complying with the standards of The Chlorine Institute, Inc.</td> </tr> <tr> <td>Body</td> <td>: Constructed of solid machined PVC material for maximum cracking resistance</td> </tr> <tr> <td>Protection</td> <td>: Each regulator shall have a spring-opposed diaphragm that controls vacuum and closes tight upon loss of vacuum. It shall incorporate a pressure relief (vent) valve with separate ports for chlorine feed and chlorine vent. Automatic switchover vacuum regulators, which compromise safety by having a single exit port for vent and feed and rely on a detent mechanism and external pressure relief (vent) valve, shall not be acceptable. Connections shall be provided for tubing vented gas away from the pressure relief (vent) port of each vacuum regulator to atmosphere outside the building. The outside end of the vent tubing shall be equipped with an insect screen. Each regulator shall be equipped with an inlet filter to remove particulate matter from the gas before it enters the inlet safety valve. The gas chlorinator system shall include a remote flow rate meter with tube to be mounted with the Auto valve for automatic dosing to indicate feed rate at each injection points. Each regulator shall include a colored mechanism indicator to indicate when the cylinder in use is still with chlorine content (green colored indicator) or empty (red colored indicator) and needs to be</td> </tr> </table>	Rated	: 250 PPD	Type	: Cylinder Mounted	Yoke	: Corrosion resistant and gasketed yoke assembly complying with the standards of The Chlorine Institute, Inc.	Body	: Constructed of solid machined PVC material for maximum cracking resistance	Protection	: Each regulator shall have a spring-opposed diaphragm that controls vacuum and closes tight upon loss of vacuum. It shall incorporate a pressure relief (vent) valve with separate ports for chlorine feed and chlorine vent. Automatic switchover vacuum regulators, which compromise safety by having a single exit port for vent and feed and rely on a detent mechanism and external pressure relief (vent) valve, shall not be acceptable. Connections shall be provided for tubing vented gas away from the pressure relief (vent) port of each vacuum regulator to atmosphere outside the building. The outside end of the vent tubing shall be equipped with an insect screen. Each regulator shall be equipped with an inlet filter to remove particulate matter from the gas before it enters the inlet safety valve. The gas chlorinator system shall include a remote flow rate meter with tube to be mounted with the Auto valve for automatic dosing to indicate feed rate at each injection points. Each regulator shall include a colored mechanism indicator to indicate when the cylinder in use is still with chlorine content (green colored indicator) or empty (red colored indicator) and needs to be	
Rated	: 250 PPD											
Type	: Cylinder Mounted											
Yoke	: Corrosion resistant and gasketed yoke assembly complying with the standards of The Chlorine Institute, Inc.											
Body	: Constructed of solid machined PVC material for maximum cracking resistance											
Protection	: Each regulator shall have a spring-opposed diaphragm that controls vacuum and closes tight upon loss of vacuum. It shall incorporate a pressure relief (vent) valve with separate ports for chlorine feed and chlorine vent. Automatic switchover vacuum regulators, which compromise safety by having a single exit port for vent and feed and rely on a detent mechanism and external pressure relief (vent) valve, shall not be acceptable. Connections shall be provided for tubing vented gas away from the pressure relief (vent) port of each vacuum regulator to atmosphere outside the building. The outside end of the vent tubing shall be equipped with an insect screen. Each regulator shall be equipped with an inlet filter to remove particulate matter from the gas before it enters the inlet safety valve. The gas chlorinator system shall include a remote flow rate meter with tube to be mounted with the Auto valve for automatic dosing to indicate feed rate at each injection points. Each regulator shall include a colored mechanism indicator to indicate when the cylinder in use is still with chlorine content (green colored indicator) or empty (red colored indicator) and needs to be											

	replaced. The design of the regulators shall not rely on any O-Ring(s) to prevent pressurized Chlorine leaks, into the room, from the region upstream of the inlet safety valve.	
	<u>2. Automatic Switchover Module – 1 set</u>	
	The switch over module, a separate mechanical device, shall be provided to automatically switch from empty cylinder to the stand cylinder. The switchover module shall be suitable for wall mounting.	
	<u>3. Gas Flow Meter – 1 set</u>	
	Type : Remote gas flow meter mounted with the Auto Valve mounting pad complete with bypass piping	
	Control : Shall be equipped with a control valve for manual feed rate adjustment.	
	Capacity : Flow meter tubes shall indicate flow rates up to 250 pounds per day and down to a minimum of 1/20 of the maximum value.	
	<u>4. Ejectors – 2 sets</u>	
	Type : Water operated venturi nozzle type	
	Operating System : The ejector and its built in check valve shall be suitable for back pressures up to a minimum of 140 psi	
	Protection : Shall incorporate a spring loaded, normally closed check valve to prevent the backflow of water into the chlorine gas equipment. The Ejector/check valve assembly shall automatically close upon the loss of vacuum in the Ejector.	
B.) RESIDUAL ANALYZERS (AMPEROMETRIC) – Two (2) sets	<u>Technical Features:</u>	
	A.) Amperometric Measurement, Wall Mounted, The residual analyzer shall employ a galvanic cell to continually monitor the targeted species	
	B.) Available with pH & continuous temperature monitoring compensation without buffer chemicals for Free Chlorine (Automatic pH compensation software standard)	
	C.) The residual analyzer shall be capable of monitoring total chlorine, chlorine dioxide, iodide, and bromine chloride with the use of reagent chemicals	
	D.) Power Requirement: 240 VAC, 60 Hz, single phase	
	E.) Output Signal; (2) isolated 4-20mA (residual, pH, temperature or control)	

	F.) Input Signal; 4-20 mA (flow input)	
	G.) Speed Response: 4 seconds, Full-scale residual change 90 to 120 seconds	
	H.) Range: 0 to 0.1 to 0 to 20mg/l (PPM), Field Adjustable	
	I.) Accuracy: 0.003 mg/l or +/-1% of range, whichever is larger	
	J.) Sensitivity: 0.001 mg/l (1ppb)	
	K.) The measurement cell shall be self-cleaning through the action of a continuously driven motor cleaning mechanism.	
	L.) The residual analyzer shall always include a thermistor and allow the input of the process water pH for software pH compensation.	
	M.) An optional reagent feed system or pH sensor shall be available.	
	N.) With data logger for automatically recording the analyzer output data (residual, temperature and pH when applicable) at a selectable frequency.	
	O.) A motor shall continuously drive a quantity of small PTFE (Teflon) cleaning balls around the space between the electrodes to prevent the accumulation of deposits.	
	P.) A thermistor shall be installed in the measurement cell to provide a temperature reading of the sample water.	
	Q.) The residual analyzer sample water inlet shall include a coarse mesh screen to prevent larger particles from entering the measurement cell.	
	R.) A sample feed rate control valve, constructed from machined type-1 PVC and having a PVDF (Kynar) v-notch style valve stem is optionally available for precise sample flow control.	
	S.) A sample water inlet weir shall help to maintain the appropriate sample water flow rate of 500 ml/minute (8 GPH).	
	<u>pH Compensation (pH Probe)</u>	
	1.) The residual analyzer shall be capable of incorporating an optional pH probe to measure the pH of the sample water entering the measurement cell.	
	2.) The pH reading can be used by the monitor/controller to allow software compensation for the effects of pH and Temperature changes on free chlorine residual measurements.	
	<u>Standard Monitor/Controller Electronics</u>	
	1.) Shall include two-line, 20 characters per line digital display and four push button interface and shall be housed in a NEMA4X rated enclosure.	
	2.) Shall include a complete PID control software program, which can be enabled and disabled in the field and offer proportional, set-point, or compound loop control providing up to two analog output signal(s) for chemical feed control.	
	3.) Shall accept input signals from the galvanic measurement cell electrodes, thermistor, pH probe and a proportional process variable (water flow meter).	
	4.) Shall be capable of zero and span calibrations for the cell input signal through software.	

	5.) Shall be capable of software compensation for temperature fluctuations and also for temperature and pH effects on free chlorine measurements.	
	6.) Shall provide power to operate the continuously driven motor.	
	7.) Shall be capable of software compensation for temperature fluctuations and also for temperature and pH effects on free chlorine measurements.	
	8.) Shall include two (2) optically isolated 4-20mA output channels, each field-selectable for indication of measurement cell reading, pH, temperature or control signal output.	
	9.) Shall include one additional 4-20mA input channel for process water flow.	
C.) AUTO VALVES – Two (2) sets	Wall Panel Auto valves rated 250ppd with by-pass piping and valve arrangements which will allow for manual feed control when calibration is needed for the auto valve complete with related accessories – 2 sets	
	Technical Features:	
	A.) <u>Control Options:</u> Manual Control, Proportional (Flow) Control), Set Point (Residual) Control, set Point (ORP Control), Compound Loop (PID) Control, Step Feed Rate Control, Dual set Point Control. All shall be field selectable and can be changed anytime.	
	B.) 2 x 20 Character Liquid Crystal display	
	C.) Modbus communications (RS 485)	
	D.) 3 – Analog inputs (Flow, Residual and Remote dosage)	
	E.) Adjustable dosage set points, lag time, signal filters, display ranges, alarms	
	F.) Linear operation	
	G.) Two 4-20mA outputs	
	H.) Password protected settings	
	I.) External Control: Duty/Standby and Auto/Manual	
	Operation:	
	1.) The automatic control valve shall be provided to control 250 PPD of gas feed.	
	2.) The automatic control valve shall be comprised of a PID controller and variable area orifice rate valve. These devices shall be incorporated into one compact unit.	
	3.) The microprocessor based automatic control valve shall adjust the gas feed rate based on up to three analog input signals or by means of one to four 12-24VDC inputs.	
	4.) The automatic control valve shall allow for the following standard, field selectable control modes: a. Manual b. Proportional control (Flow) c. Set-Point control (Residual/ORP) d. Compound Loop control (PID) e. Step-Feed control f. Dual Input Feed Forward control Specification WPOV-110 g. Dual Set-Point control	
	5.) Motion of the valve shall be achieved by means of a linear stepper motor.	
	6.) Motion control shall be achieved without the use of a feedback potentiometer.	

	7.) To ensure accurate feed rates throughout the range of operation, the software shall incorporate a 10-point valve linearization calibration.	
	8.) The automatic control valve shall be capable of remote communication using the Modbus RS-485 standard.	
	9.) The automatic control valve shall have a turn down of 20:1 and an accuracy of +/-2% of full scale or better.	
	Construction	
	1.) The automatic valve shall be housed in a NEMA4X rated enclosure.	
	2.) Materials of construction shall be of the finest available for the appropriate chemical.	
	3.) For accurate feed rate control, the length of the variable area orifice portion of the rate valve stem shall be no less than 1.5 inches.	
	4.) The automatic valve shall be installed onto a ½" thick polypropylene panel suitable for wall mounting.	
	User Interface	
	1.) The automatic control valve shall include a 2-line, 20-character, alphanumeric, LCD display.	
	2.) User controls shall be through a front panel 4-button keypad.	
	3.) Menus and variables shall be displayed in plain English words using easy to read, alphanumeric characters for clear understanding.	
	4.) Control mode and all control parameters shall be password protected and adjustable through the keypad while displayed on the screen. The control mode and all control parameters shall also be adjustable remotely through Modbus communication.	
	Inputs and Outputs	
	1.) The automatic control valve shall include three analog input channels.	
	2.) Each analog input signal shall be independently user selectable as either 4-20mA or 0-10V.	
	3.) The first input channel shall be used only for proportional (flow) input signals.	
	4.) The second input channel shall be used only for set point (residual or ORP) input signals.	
	5.) The third input channel shall be used for one of the following: <ul style="list-style-type: none"> a. Remote adjustment of dosage b. Remote adjustment of set-point c. Remote valve positioning d. Additional input for Dual Set-Point control 	
	6.) Four 12-24VDC inputs shall be provided. These inputs can be used for: <ul style="list-style-type: none"> a. Step-Feed control b. External control of AUTO or MANUAL modes 	
	CHLORINE LEAK DETECTOR – One (1) set	
	Technical Features:	
	1.) Enclosure : NEMA 4X Enclosure 8" x 6" x 4"	
	2.) Temperature Range : 0°-55°C / 32°-131°F	
	3.) Relays : Common AC Power Loss 5A SPDT Common Sensor Failure 5A SPDT	

	Each Channel Low Alarm (Danger) 5A SPDT High Alarm (Alarm) 5A DPDT Audible Alarm 90dB	
	4.) Power Requirement 120 V/240 V, 50-60 Hz	
	5.) Power Consumption 20 W max.	
	6.) Battery Back-Up (optional) 12 hours, 2.9 A•Hr, 12 VDC gel cell	
	7.) External Acknowledge Input Contact	
	8.) Signal Output (optional) RS232, 4-20 mA	
	9.) Remote Acknowledge Input Contact	
	Operations:	
	1.) The Chlorine Gas Detector shall be a device including a monitor and up to four electrochemical gas sensors.	
	2.) The Chlorine Gas Detector shall include a microprocessor-based monitor operating the electrochemical sensors.	
	3.) The microprocessor-based monitor shall be enclosed in a NEMA 4X (IP66) rated housing. The monitor shall include a two (2) line sixteen (16) character, alphanumeric, backlit, liquid crystal, display, two (2) alarm LED's for each sensor, a 90 dB audible alarm, and four front panel push buttons.	
	4.) Alteration of the Gas Detector settings shall be password protected.	
	5.) A minimum of Twenty-five (25) feet of shielded signal cable shall be provided to connect each sensor to the monitor.	
	6.) A minimum of six (6) foot long power cord shall be provided to connect the monitor to the AC Power.	
	7.) The Gas Detector shall operate from 120 Volt or 240 Volt (50-60 Hz) AC Power.	
D.) WEIGHING SCALES AND ACCESSORIES – Two (2) sets	<u>Weighing Scale with Digital indicator</u>	
	Two (2) Chlorine scales shall be provided with digital indicator to monitor chlorine content and usage through electronic load cell type. The scale platform shall be constructed of non-corrosive materials and shall be intended for use with hazardous and corrosive chemicals. The scale shall be capable of monitoring upright type of 150 lb. (68 kg) cylinder. The scales shall be equipped with signal cable going to the digital indicator and shall be provided with signal cable of adequate length and shall also be provided with cylinder chain to avoid accidental fall of the cylinder for safety purposes.	
E.) BOOSTER PUMPS AND ACCESSORIES	<u>Two (2) units, One (1) standby, One (1) on duty complete with accessories</u>	
	There shall be two (2) sets of horizontal booster pumps, (1) on duty and (1) on standby, adequately rated and designed to realize the needed vacuum pressure at the ejectors in consideration of the ejectors flow requirements and back pressure at the point of application. The booster pump system shall be provided with complete suction and discharge piping tapped to respective injection points and shall be adequately sized and provided with suitable isolation valves to allow dismantling and repairs if necessary.	

	<u>Other Conditions:</u>	
	1.) Prospective bidder/supplier must conduct site inspection and submit design scheme for the gas chlorination system.	
	2.) The bidder/supplier shall submit a current certification as exclusive/authorized distributor for the automated gas chlorinator equipment and shall have the continuous support from the principal relative to after sales and spare parts.	
	3.) The automated gas chlorinator equipment shall be LWUA accredited and certified.	
	4.) All required tools and equipment needed in the installation shall be provided by the supplier including pipes, control valves, hose, etc.	
	5.) The winning bidder/supplier must conduct daily monitoring for about three days and must provide monitoring report.	
	6.) The winning bidder/supplier will provide at least three (3) days of training on proper usage, maintenance and troubleshooting if necessary. The cost of which shall be shouldered by the winning bidder/supplier.	

