

## **OZONE ODOR REMEDIATION SYSTEM**

### **PART 1 - GENERAL**

#### **1.01 DESCRIPTION**

- A. Contractor shall furnish and install ( ) ozone odor remediation systems, complete with weatherproof enclosures, air compressors, air filtration system, ozone generators, inline booster fans, ozone gas detection systems, heaters, mounting brackets, flexible hosing, and all other appurtenances and accessories necessary to provide fully functional systems.
- B. Contractor shall furnish only ( ) spare ozone odor remediation system, complete with weatherproof enclosure, air compressor, air filtration system, ozone generator, inline booster fan, ozone gas detection system, heater, mounting bracket, flexible hosing, and all other appurtenances and accessories to .

#### **1.02 SUBMITTALS**

- A. Product Data: Catalog data for the ozone odor remediation system and accessories.
- B. Certifications: Submit manufacturer's certificates for ozone odor remediation system.
- C. Shop Drawings: Equipment descriptions, specifications, dimensional and assembly drawings, parts lists, and job specific drawings, including wiring diagrams.
- D. Operation and Maintenance Manuals: The manuals shall include equipment descriptions, operating instructions, drawings, troubleshooting techniques, a recommended maintenance schedule, recommended lubricants, and complete overhaul information for all components of the system.
- E. Manufacturer's Warranty: The system shall be warranted to be free from defects in materials and workmanship for a period of one year from date of installation. The manufacturer may, at its option, repair or replace without charge during this period.
- F. Equipment Warranty and Certification Form

In addition to submitting shop drawings for the ozone odor remediation systems, the Contractor shall obtain and submit to the Engineer and Owner certification from the ozone odor remediation system manufacturer that the system meets the requirements of the intended application and contract specifications. This certification shall be provided by way of the Equipment Warranty and Certification .

### 1.03 PERFORMANCE REQUIREMENTS

- A. Each ozone odor remediation system shall be capable of generating 16 g/hr of ozone, and discharging it into the wetwell at a rate of 400 CFM at 1.0" w.g.
- B. The ozone odor remediation system shall be capable of varying both the ozone production and air flow rate, independently of each other.

### 1.04 SPARE PARTS

- A. Furnish four (4) air inlet filters, four (4) air compressor inlet filters, 10 feet of ¼" tubing, two (2) SUPRA W4 heavy duty stainless steel T-bolt hose clamps and 10 feet of 3/8" tubing.

## PART 2 - PRODUCTS

### 2.01 GENERAL

- A. Ozone odor remediation system shall include Gasblaster Model 200 LSX ozone production system and Enchlor Gas Detector Model 1700-O3, as manufactured by Enchlor, Inc. or approved equal.

### 2.02 WEATHERPROOF ENCLOSURE

- A. The enclosure shall be for exterior applications measuring 36 inches wide by 18 inches high by 20 inches deep. The enclosure shall house the air compressor, air filtration system, ozone generator module, alarm indicator unit and heater, providing weatherproof protection. The enclosure shall be of 316 stainless steel construction with a stainless steel keyed locking mechanism.
- B. The enclosure shall have a removable intake filter hood, a pre-wired socket for connections of the sensor cables to the internal alarm indicator unit, and 10 feet of external power cord.

### 2.03 AIR COMPRESSOR

- A. The air compressor shall be oil-less rocking piston pump rated for continuous operation at 4.90 CFM open flow at 30 PSI of pressure. Air compressor shall be constructed of aluminum parts treated for corrosion protection, and shall be Gast Manufacturing Model 75R645, or approved equal.

### 2.04 AIR FILTRATION SYSTEM

- A. The air filtration system shall consist of a two stage coalescing and micron filtration chambers to provide dry and filtered compressed air to the generators. The system shall include an Enchlor series 26 coalescing filter and an Enchlor series 26 micron filter. The coalescing filter shall remove 99.97% of the oil and water from the air and the micron filter shall remove all particulates larger than 5 microns..

- B. The air filtration system shall provide the feed gas to the ozone generator with the following properties:

<b>Properties</b>	<b>Values</b>
Air Delivery Rate	0-30 scfh
Air Delivery Pressure	5-7 psig
Oxygen Purity	18-21%
Dew Point	-0°F
Hydrocarbons	< 15 ppm
Particulate	< 5 microns
Ambient Temperature Range	40-130°F

## 2.05 OZONE GENERATOR

- A. The ozone generator shall be housed within the weatherproof enclosure, and shall include all controls and reactor cells necessary to generate ozone at a variable rate. The ozone generator shall be Enchlor Inc. Model OEM 21, or approved equal.
- B. The ozone generator shall be supplied with a variable output controller, power feed back reference meter, over temp control, feed gas switch, on/off circuit breaker, LED visual ozone indicator, stainless steel hardware, and meet the following properties:

<b>Properties</b>	<b>Values</b>
Ozone Production	0-16 g/hr
Air Feed Gas Flow	0-30 scfh
Ozone Concentration	8-10%
Variable Control	0-100%
Compressed Air Inlet Fitting	1/4" FNPT
Ozone Outlet Fitting	3/8" tube
Ambient Temperature Range	40-130°F

- C. Unit must be designed to meet UL and NFPA Codes.

## 2.06 INLINE BOOSTER FAN

- A. Exhaust inline fan shall be of the centrifugal, direct driven type, mounted to the exterior of the weatherproof enclosure, and shall be Fantech Model FR250, or approved equal.
- B. The fan shall have a variable output range, capable of delivering 400 CFM at 1.0" w.g., adjustable in the field.
- C. Fan housing shall be constructed of UV resistant ABS-PC blend thermoplastic, shall be supplied with an integral external electrical terminal box with pre-wired terminal strip, and shall have an 8-inch discharge duct connection.
- D. Motorized impeller shall be an external rotor type, Class B insulation, totally enclosed PSC Type for maximum efficiency. Motor shall be a permanently sealed self lubricating ball bearing type, equipped with automatic reset thermal overload protection, and shall be suitable for continuous duty.
- E. Fan wheel shall be of the backward inclined centrifugal type with a well designed inlet venturi for maximum performance. Motorized impeller shall be both statically and dynamically balanced as one integral unit to provide for vibration-free performance.

## 2.07 OZONE GAS DETECTION SYSTEM (optional)

- A. Gas Sensors:
  - 1. The detection system shall include two remotely mounted gas sensors and interconnecting cables to connect to the alarm indicator unit. The connecting cable shall be pre-wired plug and socket type for quick connect/disconnect to both sensors and alarm indicator unit.
  - 2. Gas sensors shall be capable of operating in temperatures ranging from -4 degrees F to 120 degrees F and humidity levels from 15-90%. Gas Sensor shall be Series 1700-OZ-HZ as manufactured by Enchlor, Inc. or approved equal.
  - 3. Each gas sensor shall housed in a Class 1, Division 1 & 2, Group C,D enclosure for installation within the wetwell. Each sensor shall be a high resolution transducer that quickly reacts to the changing level of ambient gas, proportional to the level of the specific gas to the Alarm Indicator Unit. Each sensor shall be capable of responding to levels of ozone gas from 0 to 100 PPM.
  - 4. The detector shall be designed to provide operational limit control of ozone production to the odor control system provided. The alarm set points shall be calibrated to provide supply power to the system at or below the set high limit alarm. The system shall provide an alarm condition if the ozone level falls below the set low limit alarm. System controls for direct wiring connection to the odor control system shall be provided.

B. Alarm Indicator Unit

1. The alarm indicator unit shall be housed in the weatherproof enclosure. The unit shall be equipped with a two-line by 16-character backlit LCD display. The first line of the operational display shall register gas concentration or, when in alarm, the words "Critical" or "Danger" shall be displayed and the display shall flash. The second line shall show the measured gas concentration as a percent of full scale bar graph. The unit shall provide an isolated 4-20 mADC output signal proportional to the full-scale calibrated range. The alarm indicator unit shall be capable of single or dual channel operation.
2. Three programmable relays shall be provided to permit actuation of alarms for Danger and Critical alarm conditions and to alert the operator to a sensor fault condition. All alarms shall be displayed on the alphanumeric display and annunciated via a 103 dB integral audible alarm horn. All alarm contacts shall be gold plated and be rated 1.2 A at 120 VAC. The alarm set point values shall be entered via an instrument keypad and stored in non-volatile EEPROM memory. All programming, including alarm set-point values shall be retained regardless of main power condition. Each gas sensor shall be furnished with a cable of sufficient length for interconnection to the alarm indicator unit. The gas detector shall operate on 120 Vac 60 Hz, single-phase power.
3. In addition to the LCD display interface, each alarm indicator unit shall provide:
  - a. Failure alarm to pump control panel.
  - b. Critical sensor #1 alarm to pump control panel set at 3 ppm.
  - c. Critical sensor #2 alarm to pump control panel set at 3 ppm.
  - d. Danger alarm to pump control panel set at 10 ppm.
  - e. One 4-20 mA analog output, 500 Ohms max. load output to pump control panel with operating range of 0-10 ppm.

2.08 HEATER (optional)

- A. Heater shall be a 120-volt solid billet aluminum construction with high temperature corrosion resistant alloy sheathing. Heater shall be able to generate 150 watts of heat output, and shall be Enchlor Model GBE-464-500, or approved equal.

2.09 PORTABLE OZONE SENSING AND MONITORING UNIT (optional)

- A. The portable ozone sensor unit shall be housed in a rugged case with built in tilt stand and wall hanging hook, and shall be equipped with a single line backlit LCD display and internal data logger with instant readouts. The sensor unit shall use a

replaceable pre-calibrated heated metal oxide sensor chip, capable of auto ranging from 0.030 – 1.999 and 2.0 - 20.0 ppm of ozone, and shall automatically compensate for temperature and relative humidity while being within 10% of the actual ozone levels. The sensor unit shall have data ports for USB and 4-20 mAdc output signals, and a selector switch to display average, maximum, or minimum ozone levels. The unit shall be powered by internal rechargeable batteries or a supplied 12-24 VDC, 500 mA external charger. The portable ozone sensor unit shall be ECO Sensors Inc. Model A-22, or approved equal.

## 2.10 ACCESSORIES

- A. Each unit shall be supplied with ten (10) feet of 8-inch flexible PVC tubing and two (2) SUPRA W4 heavy duty stainless steel T-bolt hose clamps. The hose clamps shall connect the PVC tubing to both the discharge of the booster fan and a permanent 8-inch PVC outlet fitting which shall convey the ozonated air to the wetwell.
- B. A suitable 316 stainless steel wall-mounting bracket shall be provided. Provide 316 stainless steel anchors appropriate for anchoring to a concrete or masonry wall, as applicable.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Ozone odor remediation system and piping shall be installed in accordance with the manufacturer's installation instructions, and in compliance with all OSHA, local, state and federal codes and regulations.
- B. Ozone gas sensors shall be mounted in the wetwell at locations shown on the plans, or at locations selected by the County. Exact locations shall obtain County approval prior to installation.
- C. Provide spare ozone odor remediation system and portable ozone sensing unit to the County Bureau of Utilities.
- D. The Contractor shall install the ozone odor remediation system and appurtenances in strict accordance with the manufacturer's recommendations and as approved by the County. The Contractor and Pump Control System Supplier under Division 17 shall be responsible for supervising the installation, cabling, startup, training activities, and for implementing all functions of the ozone odor remediation system required for the Pump Control System.

### 3.02 PERFORMANCE TESTING

- A. Inline booster fan shall be certified by HVI and licensed to bear the HVI Tested/Certified Performance Logo.
- B. Manufacturer's representative shall attest the unit has been properly installed and is

ready for testing and operation.

- C. After field adjustments are completed, the odor remediation system shall be tested.
- D. The unit shall perform to produce a result in compliance with these specifications; modifications may be made to the unit to produce the specified result providing the modification does not later alter the basic design or operating characteristics.
- E. Should the unit fail to meet the performance criteria after modification, the unit shall be removed and replaced with a unit that can meet the performance standard, at no additional cost to the County.

### 3.03 MANUFACTURER'S SERVICES

The manufacturer shall furnish the services of a qualified, factory-trained service representative who shall inspect the complete equipment installation to insure that it is installed in accordance with the manufacturer's recommendations, make all adjustments necessary to place the system in trouble-free operation and instruct the operating personnel in the proper maintenance and operation of the equipment furnished.

END OF SECTION