

## **PART 1 - GENERAL**

### **1.1 SUMMARY:**

- A. The submersible mixing aerator components shall be constructed of HDPE, Pressure Class 235 psi (DR 18) PVC, 304 and 316 stainless steel. The mixing aerator can be implemented or installed into but not limited to wastewater plants, wastewater lagoons, lift / pump stations, wet wells and in other highly corrosive environments for extended periods of time with limited maintenance required.
- B. The mixing aerator shall be designed to have the capability of being deconstructed and in-turn re-constructed per supplied detail drawing.pdf of components for the purposes of warranty, thorough cleaning and maintenance.
- C. The mixing aerator with regenerative blower package must be designed for prolonged performance in hydrogen sulfide exposed environments, heavy duty continuous operation, twenty-four (24) hours per day seven (7) days per week.
- D. The mixing aerator must be able to move fluid and solids continuously without interruption and with a maximum solid size equal to or less than three (3) inches in diameter.
- E. The submersible mixing aerator will have no moving parts but shall allow for repositioning of static components.
- F. The mixing aerator shall enhance aerobic digestion by passing organic material repeatedly against triangular static shear edges and circulate the entire water column reducing organic particle size for aerobic bacterial consumption.

### **1.2 SUBMITTALS:**

- A. Product Data: Catalog Cuts with dimensions, specifications, and installation instructions. Also, include electronic file copy of manufacturer's installation, operations, and maintenance manual for informational purposes.

### **1.3 QUALITY ASSURANCE:**

- A. Accepted Manufacturers:
  - 1. The Mixing Aeration Technology shall be the "TWISTER®" as manufactured by TITUS® Industrial Group Inc., 1450 NW Gardner Road, Prineville, Oregon 97754 (phone 877-582-9899 [titusig.com](http://titusig.com)).
  - 2. Motorized regenerative blowers shall be specified and supplied by TITUS® Industrial Group Inc.
  - 3. Blower enclosure is designed and shall be designed and supplied by TITUS® Industrial Group Inc. All controls, switch boxes, optional enhancements, and air filtration compartment with washable removable media within a standardized repetitive design.
  - 4. Blower hose shall be supplied by TITUS® Industrial Group Inc. will be EPDM material. Furthermore, blower hose shall be supplied with 316 stainless steel camlock quick disconnect fittings to match that of the enclosure and TWISTER® Mixing Aerator air manifold.
- B. Governing Performance Standards for Motorized Blower:

1. Motorized blower enclosure supplied by TITUS® Industrial Group Inc., must be connected to a matching voltage, amperage and single or three phase electrical source by the owner's licensed, certified electrician.
2. All three phase motors are 60 HZ. Single phase motors are 60 HZ and project specific. Noise level will vary depending upon model.
3. All blowers shall be equipped with: Stainless steel bearing protector, Viton® O-ring, Viton shaft seal, Viton® sealed bearings and all parts in wetted areas anodized for corrosion resistance.
4. Blower pressure must not exceed 4.5 PSI while maintaining minimum airflow equal to or greater than 40 ft<sup>3</sup>/min, while under pressure.
5. Periodic inspections of the blower should be made. Refer to included regenerative blower manufactures operations and maintenance manual.

#### 1.4 SEQUENCING AND SCHEDULING:

- A. Coordinate equipment installation with other components as required.
- B. Sequence, coordinate, and integrate installations of materials and equipment for efficient flow of the Work.
- C. Coordinate connection of piping systems with other exterior underground utilities and services. Comply with requirements of authorities having jurisdiction, franchised service companies, and controlling agencies.

### **PART 2 – TECHNOLOGY & COMPONENT PROCESSES**

#### 2.1 TWISTER® Submersible Aeration Mixing Technology Processes:

- A. Mechanical: A Passive system with “No” moving parts. The Mixing Aerator shall be capable of continuous repeating break down of organic solids into smaller particulates by driving them repeatedly against static shear surfaces at the approximate acceleration of bubbles freely rotating upward through the mixing aerator. These increasingly smaller organic particulate in an oxygen saturated environment promote healthy aerobic bacteria in consuming and metabolize organic material at an increased rate.
- B. Dissolved Oxygen Saturation: The mixing aerator injects a continuous flow of air through a special manifold which drives the mixing and accounts for efficient gas (dissolved oxygen) transfer to water, thus creating a constant and stable environment for aerobic bacterial propagation.
- C. Ballast: The mixing aerator shall have 304 stainless steel weighted ballast plate sufficient to maintain the mixing aerator's placement on the proposed vessel floor, allow for predetermined elevation setting or adjustable vertical positioning. The ballast plate shall be fitted with a welded 316 stainless steel pressure end cap that is centered and to be drilled and tapped for 316ss bolts for fastening the devices barrel.
- D. Barrel: The mixing aerator shall be equipped with an eight inch (8”) or twelve inch (12”) diameter Pressure Class 235 psi (DR 18) PVC barrel section equipped with a minimum of three (3) organic circulating “draw ports” located above the ballast plate at the bottom of the vertical barrel column. Furthermore, the barrels configuration shall not restrict the physical Coriolis impact on or impede the ability for increased bubble acceleration that the 360° spin or twist around the mixing aerator's air manifold that allow for the maximum draw of organic particles upward through the intake ports while maintaining maximum velocity within the barrel circumference.

- E. Air Manifold: The mixing aerator technology air manifold shall be constructed from 316ss schedule 40 tubing with holes designed to be located above the crown of the barrel column “draw” or intake ports, deliver air at a volume through a multiple series of engineered bubble orifices that enhance percentage saturation of gases to water and continually transfer oxygen to upstream influent flowing into mixing aerated equipped vessel.
- F. Triangular Shear Edges: The 8” diameter barrel shall have three (3), and the 12” diameter barrel shall have four (4) - ½” equilateral triangular, HDPE organic shear edges, placed horizontally and stacked, with the small triangle at the bottom and the incrementally larger triangles stacked on one another. The geometry of the triangular stack of shear edges engage the organic material as it spirals upward around the air manifold as the material passes a greater shear potential exists with a minimum of nine (9) shear edges.
- G. Horizontal Deflection Plate: The 8” diameter barrel, triangular shear edges shall have a 9 ½” diameter x ½” horizontal deflection plate. The 12” diameter barrel, triangular shear edges shall have a 12” diameter x ½” horizontal deflection plate. The purpose of the horizontal deflection plate is to direct any energy existing post shear to be directed to the horizontal cross section at the elevation of the largest shear triangle.
- H. Cutter Blades: The circumference of the top edge of the barrel shall include (2) SDR 35 cutter blades

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION:**

- A. Perform as per manufacturer’s recommendations.

### **PART 4 – OPTIONAL ADD-ONS**

#### **4.1 TRI-ATOMIC OXYGEN:**

- A. Ozone Generation: Perform as per manufacturer’s installation, operations and maintenance manual INSTRUCTIONS.

END OF SECTION