

## SECTION 15051

### HYDRAULIC COMMINUTOR

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. This section of the specification describes the equipment to be furnished and installed. The equipment shall be installed as shown on the plans, as recommended by the supplier, and in compliance with all OSHA, local, state and federal codes and regulations.
- B. The following equipment shall be furnished and installed at the Atlantic Highlands Pump Station:
  - 1. Five horsepower electric hydraulic pump motor and hydraulic fluid pump (two of each)
  - 2. Three horsepower hydraulic torque motor (two total)
  - 3. Furnish and install two new Muffin Monster 30005-24 comminutors.

Two sets (each set has two hoses) of new hydraulic hoses approximately 12' long each between the hydraulic torque motor and hydraulic valving located in the wet well.

- 4. Two sets (each set has two hoses) of new hydraulic hoses approximately 6' long each between the hydraulic fluid pump and piping in the pump station building.
- C. New comminutors shall fit into the space provided for the existing Muffin Monster 30005-24 comminutors.
- D. Proposed comminutors shall be compatible with existing controls and provide the same functionality as existing.
- E. Equipment installed in the wet well shall be rated for use in Hazardous (classified) Class 1 Division 1 areas.

##### 1.02 REFERENCES

A. Equipment shall, as applicable, meet the requirements of the following industry standards:

1. American Society for Testing and Materials (ASTM)  
A36: Carbon Steel Plate
2. American Society for Testing and Materials (ASTM)  
A536-84: Ferritic Ductile Iron Castings
3. American Society for Testing and Materials (ASTM)  
A48-83: Grey Iron Casting
4. American Society for Testing and Materials (ASTM)  
A743 Stainless Steel Casting
5. American Iron and Steel Institute (AISI) 303  
Stainless Steel
6. American Iron and Steel Institute (AISI) 304  
Stainless Steel
7. American Iron and Steel Institute (AISI) 316  
Stainless Steel
8. American Iron and Steel Institute (AISI) 4130  
Heat Treated Alloy Steel
9. American Iron and Steel Institute (AISI) 4140  
Heat Treated Alloy Steel
10. American Iron and Steel Institute (AISI) 8620  
Heat Treated Alloy Steel
11. American Iron and Steel Institute (AISI) 17-4  
Stainless Steel
12. Society of Automotive Engineers (SAE) 660 Bearing  
Bronze

B. Equipment shall, as applicable, meet the requirements of the following Regulatory Agencies:

1. National Electrical Manufacturer's Association  
(NEMA) Standards
2. National Electric Code (NEC)

3. Underwriters Laboratory (UL and cUL)
4. International Electrotechnical Commission (IEC)

### 1.03 DOCUMENTS

#### A. Submittals

1. Contractor shall submit six (6) sets of submittals. Submittals shall include equipment descriptions, functional descriptions, dimensional and assembly drawings, catalog data, and job specific drawings.

#### B. Operation and Maintenance Manuals.

1. The supplier shall provide three (3) Operation & Maintenance manuals. An electronic version shall be supplied to create additional copies. The manuals shall include equipment descriptions, operating instructions, drawings, troubleshooting techniques, a recommended schedule, and the recommended lubricants.

### 1.04 QUALITY ASSURANCE

#### A. Identification

1. Equipment shall be identified with a corrosion resistant nameplate affixed in a conspicuous location.
2. Nameplate information shall include manufacturer's name and address, equipment model number, and serial number.

#### B. Manufacturer

1. Supplier shall have a minimum 30 years experience as a manufacturer of municipal waste water equipment and a minimum 5,000 prior installations of similar equipment.
2. Supplier shall provide a list of reference sites for similar equipment for verification by the Engineer.

3. Supplier shall conduct factory testing and verification of equipment prior to shipment.

C. Installation & Start-up

1. Contractor shall provide services of a factory trained and certified representative to check installation and review start-up of equipment.
2. Contractor shall pay for and coordinate a factory trained and certified supplier representative to inspect and approve site installation.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Packaging

1. Containers or skids shall be constructed for normal shipping, handling, and storage.
2. Containers shall provide adequate protection for the equipment in a dry indoor environment between +40° F (+4.5° C) and +100° F (+37.8° C).

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Equipment furnished and installed shall be in accordance with these specification and plans and shall be supplied by one of the following manufacturers:

1. JWC Environmental, 290 Paularino Ave, Costa Mesa, CA 92626; Tel: 800-331-2277 [www.jwce.com](http://www.jwce.com). The local representative is G.P. Jager & Associates, Inc. Tel: 201-986-1994
2. Or approved equal.

- B. Manufacturers requesting to be selected as an approved equal shall submit certified documentation including installation lists with phone numbers, equipment drawings, flow performance curves, electrical schematics and cut sheets, O&M draft showing compliance with these specifications as part of the

shop drawing and a statement certifying that their equipment is compatible with the existing system.

## 2.02 GRINDER

### A. General

1. Grinder shall reduce or shred influent solids for protection of downstream equipment. Grinder shall be two shafted design consisting of individual cutters and spacers of equal diameter on both shafts. Grinder shall have high flow or slotted side rails. Grinder shall have torque motor and hydraulic power pack.

### B. Components

#### 1. Cutters and Spacers

- a. Cutting stack shall be a nominal height of 24inches.
- b. Cutter shall be an individual disk constructed of AISI 8620 alloy steel surface ground to thickness of .438-inches  $+.000/- .001$  (11.1 mm  $+.000/- .003$ ).
- c. Cutters shall be heat treated to produce a hardness of 60-65 Rockwell C.
- d. Cutters shall have 7 cam shaped teeth. Tooth height shall not be greater than  $\frac{1}{2}$ -inch (13 mm) above the root diameter of the cutter. OD shall be 4.71-inches (120 mm).
- e. Spacers shall be an individual disk constructed of AISI 8620 alloy steel surface ground to a thickness of .319-inches  $+.001/- .000$  (11.3 mm  $+.003/- .000$ ).
- f. Spacers shall have a hardness of 34-38 Rockwell C.
- g. Spacers shall have a smooth outside diameter with no tooth profiles.

#### 2. Shafts

- a. Shafts shall be constructed from AISI 4140 alloy steel with a minimum tensile strength of 149,000 PSI (1,027 kPA).
- b. Shafts shall be measure a nominal 2-inches (51 mm) across flats of hex.
- c. Shafts shall be hardened to 38-42 Rockwell C.

### 3. Intermediate Shaft Supports

- a. Intermediate shaft supports shall be constructed of ASTM A743 stainless steel, AISI 17-4 stainless steel and SAE 660 bearing bronze.
- b. Shaft supports shall be lubricated with high temperature marine grade grease at the factory.
- c. Intermediate shaft supports shall provide additional support to the shafts during severe grinding demands.
- d. Intermediate shaft supports shall be provided only for cutter stacks of 40 inches (1016 mm) and greater.

### 4. Seal Cartridges

- a. Seal cartridges shall be rated to a maximum of 90 PSI (620 kPA).
- b. Seal cartridges shall not require flushing.
- c. Dynamic and rotating seal faces shall be constructed of tungsten carbide with 6% nickel binder.
- d. O-rings shall be constructed of Buna-N (Nitrile).
- e. Radial and axial loads shall be borne by sealed, oversized, deep-groove ball bearings.

5. Housings and Covers

- a. Top cover and end housings shall be ASTM A536-84 ductile iron.
- b. Bottom cover shall be ASTM A36 steel.
- c. End housing shall have integral bushing deflectors to guide solids away from seal cartridges.
- d. End housings shall have directional flow arrows cast into external side wall.

6. Side Rails

- a. Side rails shall be ASTM A536-84 ductile iron.
- b. Side rails shall have evenly-spaced horizontal slots to increase flow and decrease water head loss through the grinder. Slots shall only be located on the upstream or influent side of the rail and the effluent side of the rail shall be void of slots to allow for unobstructed flow.
- c. Inside profile of the cutters shall be concave and follow the radial arc of the cutters.
- d. Clearance between the outside diameter of cutters and concave arc of the side rail shall not exceed 5/16-inch (7.9 mm).

7. Hydraulic Torque Motor

- a. Torque motor shall be manufactured by Parker Hannifin Corporation.
- b. Torque motor shall have a 29.1 in<sup>3</sup>/rev displacement.
- c. Torque motor shall be rated for 4350 max. psi (300 bar).

C. Performance

1. Grinder shall provide a minimum peak shaft torque of 2,298 lb-in/hp (348 Nm/kW).
2. Grinder shall provide a minimum peak force at cutter tip of 991 lb<sub>f</sub>/hp (5,911 N/kW).

2.03 HYDRAULIC POWER PACK

A. General

1. Hydraulic power pack shall provide pressure and flow to the torque motor of the grinder. Power pack shall provide sensors and valves to control the pressure, temperature, and flow. Power pack shall include pressure switches, directional control valves, pressure relief valves, pressure gauges, filters, pump, and motor. Existing tanks shall be reused.

1. Pump

- a. Pump shall be a positive displacement type supplying 4.5 GPM (17 L).
- b. Pump shall be driven by a 5 HP (3.7 kW) TEFC electric motor manufactured by Baldor Electric Company.
- c. Inlet to pump shall have a suction strainer.
- d. Return line to pump shall have a replaceable high pressure filter assembly.
- e. The existing pump, motor and ancillary equipment are mounted to a steel plate. This steel plate is bolted to the top of the hydraulic fluid reservoir. The proposed pump, motor and ancillary equipment, required for a fully functional system, shall be plate mounted and mount to the existing reservoir without modification to the reservoir. The Contractor shall field verify that the proposed plate conforms to the mounting requirements. Plate shall be epoxy coated to match existing reservoir.

- f. A detail of the existing pump, motor and ancillary equipment is included in Appendix A. Contractor shall provide equivalent ancillary equipment to that shown on the detail to match the same functionality as existing.

## 2. Control Devices and Indicators

- a. Relief valve shall be set 3,000 psi (20,690 kPa).
- b. Pressure Switch shall be set at 2,850 psi (19,655 kPa).
- c. Temperature switch shall be set at 160<sup>0</sup>F (71<sup>0</sup>C).
- d. Directional control valve shall be two-port design with 110 volt coil.
- e. Pressure gauge shall be 2-1/2 inch (64 mm) 0-5000 psi (34,450 kPa) oil filled.
- f. Liquid level switch shall open at 6 gallons in reservoir to indicate low level.

## 2.04 HYDRAULIC HOSE AND FITTINGS

### 1. Hose

- a. Hose shall be ½ inch (13 mm) rated for a minimum of 3,500 psi (24, 138 kPa) working pressure with a 14,000 psi (96,552 kPa) burst pressure.
- b. Hose shall have an operating temperature of -65<sup>0</sup>F to +200<sup>0</sup>F (-54<sup>0</sup>C to +93<sup>0</sup>C).
- c. Hose shall be constructed of thermoplastic polyester tube, single braid Kevlar reinforcement, and a black perforated polyurethane cover.

### 2. Fittings

- a. Fittings shall be SAE 37<sup>0</sup> flare or SAE o-ring or NPT as required with minimum failure pressure of 21,000 psi (144,690 kPa).
- b. Fittings shall be constructed of steel.

## 2.05 FRAME AND SUPPORTS

### A. General

1. Comminutor shall be mounted into the existing frame which is compatible with the existing comminutor. Contractor shall be responsible for providing a new frame should an alternate comminutor be approved and is not compatible with existing at no additional cost to the Owner.

### B. Components

1. Frame and/ or supports shall be AISI 304 stainless steel.
2. Frame shall provide proper support and interface to guide influent flow into the grinder.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Equipment shall be installed in accordance with supplier's installation instructions, these specifications and in accordance with all OSHA, local, state, and federal codes and regulations.

### 3.02 TESTING

- A. Upon installation of new equipment, the Contractor shall test the grinders to demonstrate correct alignment, smooth operation in the presence of a manufacturer's representative and the Owner. Test period shall demonstrate a jam condition and automatic reversing for grinder. Any deficiencies noted during the test shall be corrected by the Contractor to the satisfaction of the Owner at no additional cost to the Owner.

END OF SECTION