

SPECIFICATIONS - DETAILED PROVISIONS
Section 11938 - Progressing Cavity Pump

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ATTACHMENT

[MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION](#)

SECTION 11938
PROGRESSING CAVITY PUMP

PART 1 - GENERAL

1.01 GENERAL

This section is for heavy duty, positive displacement, progressing cavity pumps for the pumping of sludge or slurry in a wastewater treatment facility.

1.02 RELATED SPECIFICATION SECTIONS

- A. General Conditions, Section "F" - Labor and Construction
- B. Special Conditions
- C. Section 11005 - General Mechanical and Equipment Provisions
- D. Section 16150 - Induction Motors

1.03 MANUFACTURERS

Progressing cavity pumps shall be manufactured by Moyno, Monoflo, Netzsch, Seepex, or Tarby. No alternatives will be accepted.

PART 2 - PRODUCT

2.01 PUMP MOUNTING

The pump(s) shall be cradle mounted to allow the normally vertical suction port to be rotated to any angle perpendicular to the centerline to facilitate piping connections.

2.02 PUMP CASING AND SUCTION HOUSING

The bearing and suction housings of the pump shall be thick-walled cast iron. All cast parts shall be free of sand holes, blow holes, and other defects. The suction housing shall incorporate two rectangular inspection ports, 180° apart, to permit access to the suction housing interior without disconnecting piping.

2.03 SUCTION AND DISCHARGE

The suction and discharge connections shall be 125 lb. flat face flanges with bolt hole dimensions and spacing to ANSI Standards.

2.04 ROTOR

The rotor shall be single helix stainless steel with a nominal chrome plate thickness of .010 inches for maximum abrasion resistance. The stainless steel rotor shall be a machined and polished

2.05 STATOR

The stator shall of double helix configuration and shall be vulcanized in a metal tube and have a shore hardness of 70. The stator shall be fastened to the suction housing and discharge flange with removable clamp rings to facilitate stator removal. The stator seals shall be designed to prevent the material being pumped from contacting the stator bonding and tube.

2.06 BEARINGS

The bearings shall be sized to provide a minimum service life of 50,000 hours when operating at the rated capacity and head. The bearing housing shall be sealed with a double bearing seal on both sides of the cartridge housing, and the housing shall be so designed that it can be removed without dismantling the pump or suction piping.

2.07 GEAR JOINTS AND SHAFT ASSEMBLY

The gear joints shall be of the grease lubricated crowned gear type, totally enclosed and protected by a wire reinforced elastomeric seal. Mechanical components of the gear joints shall be designed to operate for a minimum of 10,000 hours at the manufacturer's published maximum speeds and pressures.

A rigid, splined connecting rod shall connect the gear joints of the drive shaft and eccentrically moving rotor. The connecting rod shall pass through the shaft seal area inside the hollow drive shaft quill so that no eccentric loads are imparted on the shaft seal area. The quill portion of the shaft shall be hard chrome plated.

The drive shaft shall be of one piece construction through the bearings and shaft seal area. This design shall permit disassembly of the universal joints without effecting the alignment of the shaft in the shaft sealing area.

The bearings shall be of the grease lubricated, tapered roller bearing type with diverging pressure angles for maximum shaft stability. Bearings shall be designed for a minimum B-10 life of 30,000 hours under maximum operating conditions and shall not require periodic relubrication. The bearings shall be protected from contaminants by means of a bearing cover plate bolted to the bearing housing.

Alternatively, the following universal joint and shaft design, as manufactured by Seepex, is acceptable. The universal joints shall utilize an oversized hardened bolt and companion bushing assembly hardened to 70 and 74 HRc respectively. The joint shall be designed to permit replacement of the bolts and bushings and not the drive shaft or coupling rod. The “U” joints shall be packed with a high quality synthetic grease and shall be protected by an elastomeric sleeve which is secured by two stainless steel bands for a positive seal preventing ingress of liquid into the joint area. Each joint shall be designed to transmit the maximum torque at the maximum speed and at the maximum pressure rating of the pump.

The pump shaft shall be manufactured of solid bar stock and shall be solid shaft design of chrome. The shaft shall also incorporate a plug-in arrangement allowing quick replacement of the rotating assembly through the gland area without disturbing the suction piping or pump driver. Disassembly shall be front-pull-out design, allowing rotor, both “U” joints, and shaft to be removed as one unit.

2.08 STUFFING BOX

The stuffing box shall be removable, should modification be desired and shall be equipped with a mechanical seal, with fittings provided for lubrication.

2.09 PUMP PERFORMANCE CHARACTERISTICS

The pump(s) shall be capable of pumping 200 gpm against 134 ft. of total discharge head at a maximum of 300 rpm. The minimum driver horsepower shall be 15 HP.

The surface velocity of the sludge feed pump rotor shall not exceed 6.6 feet per second where $V = \pi \times n \times (d+42e)$.

where n = revolutions per minute
 d = rotor diameter
 e = rotor eccentricity

2.10 PUMP NAMEPLATE

The pump shall be supplied with an easy-to-read, corrosion resistant, nameplate. It shall contain complete pump information including: manufacturer’s name, serial number, model number, number of stages, speed, T.D.H. and capacity in GPM, and year manufactured. The nameplate shall be installed in an easily readable position on the pump gear housing (not on replaceable parts such as the stator).

PART 3 - EXECUTION

3.01 DELIVERY

The Contractor shall order the pump at the earliest possible time to allow time for the preparation, submittal, approval of shop drawings, and subsequent manufacture and installation of the pump in a timely manner.

3.02 PREPARATION

Sets of instructions for field procedures for erection, adjustments, inspection, and testing shall be provided prior to installation of the pumps, as required by the General or Special Conditions.

3.03 EQUIPMENT TESTING

The purpose of equipment testing is to demonstrate that the pump units meet the specified requirements.

- A. Tests shall be performed on the actual assembled unit over the entire operating range on the certified performance curve. Prototype model tests will not be acceptable.
- B. All pumps 10 to 50 horsepower shall be factory-tested in accordance with the above specifications. Pumps larger than 50 horsepower may be subject to a "factory witness test" attended by a District representative. The District shall be notified at least 2 weeks in advance such that a representative can witness the pump testing. Certified test results shall be submitted to the Engineer for approval prior to shipment.
- C. Pump curves shall reflect data secured during actual test runs and shall be signed by a responsible representative of the pump manufacture. Test reports and procedures shall conform to applicable requirements of the Hydraulic Institute Standards.

3.04 INSTALLATION

The Contractor shall install all pumping equipment in strict accordance with the manufacturer's instructions. Care shall be used in handling to avoid bumping, twisting, dropping, or otherwise damaging the equipment.

All pump manufacturers shall furnish the services of factory-trained personnel as required to examine the installation, supervise start-up of equipment installed, and repair the equipment at no additional expense to the District.

3.05 FIELD ACCEPTANCE TEST

The contractor under this specification shall have full responsibility for the proper installation and performance of said pumping equipment, including furnishing the services of a pumping equipment Field Service Engineer to inspect equipment installation, and to adjust, if necessary, any portion of the pumping equipment required herein. The manufacturer's Field Service Engineer shall assist the District in the proper conduct of pumping unit field acceptance tests. The pump units shall perform in the field as shown on the certified pump curves furnished by the Contractor. Tests shall also demonstrate operation without cavitation, vibration, overheating of moving parts, and excessive noise. The Contractor and pump manufacturer shall make necessary corrections to achieve smooth pump operation. In the event the tests reveal noncompliance of the workmanship or equipment, the Contractor shall either make alterations as necessary or replace the pumps in order to meet the requirements of the specifications at no additional cost to the District.

3.06 CERTIFICATION OF INSTALLATION

The Contractor shall submit the attached “Manufacturer’s Certificate of Proper Installation” to the District confirming that all pumping equipment was inspected, operation checked, and installation approved in writing by the respective pumping equipment representative.

3.07 WARRANTY

All pumping equipment shall carry an extended warranty for a two year period from the date of **acceptance**. All warranties shall be turned into the District prior to project completion.

3.08 MAINTENANCE BOND FOR PUMPING EQUIPMENT

The contractor or his supplier shall provide a maintenance bond (see EMWD standard form C-14 or C-14.1) from a bonding company acceptable to the District equal to 100% of the pumping equipment value (including motors, pumps and pump assemblies) for a two (2) year term starting when the District has accepted the contracted work. Equipment and/or components failing within this period due to deficiency in design, workmanship or material shall be removed, replaced, and reinstalled at no cost to the District, and said replacement shall be guaranteed for two years continuous service. The maintenance bond shall be submitted to the District prior to the performance test of the pump(s).

END OF SECTION 11938

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MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

OWNER: _____ EQPT SERIAL NO: _____
EQPT TAG NO: _____ EQPT/SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- Installed in accordance with Manufacturer's recommendations.
- Inspected, checked, and adjusted.
- Serviced with proper initial lubricants.
- Electrical and mechanical connections meet quality and safety standards.
- All applicable safety equipment has been properly installed.
- System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Comments: _____

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate his equipment and (iii) authorized to make recommendations required to assure that the equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____

Manufacturer: _____

By Manufacturer's Authorized Representative: _____
(Authorized Signature)

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