



MWI/COUCH PUMP COMPANY

"NW" SERIES AXIAL AND MIXED FLOW PUMPS

1.0 Scope:

This specification covers vertical and angle, single-stage, single end suction, axial flow and mixed flow impeller pumps designed specifically for municipal, commercial and industrial water handling applications.

2.0 Operating Conditions:

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| 2.1 | Quantity of Pump(s) | 1 EA |
| 2.2 | Design Capacity | 8,000 GPM |
| 2.3 | Normal Operating Speed | 1350 RPM |
| 2.4 | Maximum Static Lift | 6 FT |
| 2.5 | The equipment to be furnished under this contract shall be made by a manufacturer regularly engaged in such work, and who has furnished like equipment and specialties. | |

3.0 Pump Construction:

- 3.1. Pump Bowl: Pump bowl assembly shall be manufactured from AISI 316 stainless steel. The suction bell shall be manufactured from AISI 316 stainless steel and bolted to the discharge bowl with heavy flanges accurately machine faced and drilled. Both the intake bell and the pump bowl shall have straightening vanes. Intake bell diameter shall be 1 1/2 times the impeller diameter and shall be constructed to minimize vortex tendencies by maintaining equal pressure and velocities across the bell entrance.
- 3.2. Impeller: The impeller hub shall be manufactured from AISI 316 series stainless steel. The hub shall be bored with a taper and keyed for positive locking to the pump shaft and easy removal. The impeller blades shall be manufactured from AISI 316 series stainless steel. The impeller blades shall be formed with rounded leading edges and tapered trailing edges and has smooth contours for hydraulic efficiency. Blades shall be chamfered both sides at the root for full-penetration welding to the hub. The periphery of the blades shall be machined for a close running fit with the impeller casing. After manufacturing, the complete impeller shall be statically balanced.
- 3.3. The entire weight of the rotating element of the pump and the hydraulic thrust imposed by the impeller shall be carried by the thrust bearing located in the pump thrust bearing housing.

- 3.4. Pump Column Assembly: Pump discharge column and discharge elbow shall be manufactured from AISI 316 stainless steel. The elbow shall be long radius type with the centerline radius not less than 1 times the nominal pipe diameter. Discharge flanges shall safely withstand all operating heads without distortion or leakage.
- 3.5. Pump Shaft: The pump shaft shall be of sufficient diameter to transmit full load torque and to prevent vibration according to the applicable ASME code for transmission shafting. The shaft shall be manufactured from pump shaft quality (PSQ) cold rolled ASTM A316 stainless steel. The shaft couplings as required will be heavy wall steel of threaded type.
- 3.6. Line shaft Enclosure: A shaft enclosing tube shall be provided between the discharge bowl and the pump thrust bearing housing. The enclosing tube shall be AISI 316 stainless steel. Lip Seals shall be installed at the top and lower end of the enclosing tube to prevent foreign material from entering the enclosing tube. The enclosing tube shall be filled with bearing grease for the pump shaft bronze bearings. Grease fitting shall be located near the top of the enclosing tube for easy access.
- 3.7. Bearings: Grease lubricated bronze bearings shall be provided in the shaft enclosing tube. Bearings shall be in alignment and supported in steel sleeve plugs welded in the tube. At bearing locations, the tube shall be amply supported by spiders fastened to the pump discharge column.
- 3.8. Welding: Pump and pipe welding shall be continuous and full penetration inside and out. All flanges shall be welded inside and out. All slag shall be removed and undercutting shall not exceed 15% of the material thickness.
- 3.9. Data Plates: All data plates shall be of stainless steel and suitably attached to the pump. Data plates shall contain the manufacturer's name, pump size and type, serial number, speed, impeller diameter, capacity and head rating, and other pertinent data.
- 3.10. Inspection: The pump manufacturer shall arrange for the inspection by the Engineer of the pump and pump parts during manufacturing stages to assure compliance with these specifications.

4.0 Drive Equipment:

- 4.1. Diesel Engine: Engine: Engines shall be heavy duty industrial type, water cooled diesel engine. Engine shall be at minimum EPA Tier III emissions rated, with a continuous (A) rating of 50 HP @ 1,350 rpm.
- 4.2. The engines shall be new naturally aspirated, or turbocharged if necessary to meet emission standards, compression-ignited diesel engines using No. 2 diesel fuel.

Engines will conform to standards of the American Society of Mechanical Engineers (ASME) and the Society of Automotive Engineers (SAE).

- 4.3. The engine speed shall be 1350 RPM, with continuous service load condition. Engine horsepower rating shall be based on continuous duty rating plus 10% in excess of maximum operating requirement. Engines shall be capable of operating 110% full-load rating at rated speed for 2 hours in 24 hours.
- 4.4. Engine governor shall maintain engine speed within 6% when load is introduced or removed. The engine cooling system shall be by means of water cooling system (radiator) sized per engine manufacturer.
- 4.5. The engines shall develop sufficient torque and horsepower to start and accelerate the pump rotating mass, gear reducer, and any other power absorbing accessories and to ramp up rated engine speed.
- 4.6. Provide muffler and exhaust piping as shown on the Drawings. Muffler shall be a residential grad silencer, sized so as not to exceed allowable engine backpressure. Provide blow down connection for removing condensation from muffler and exhaust piping.
- 4.7. Muffler shall be complete double wall, all welded construction and protected by a high temperature corrosion resistant coating
- 4.8. Radiator shall be adequately braced with shroud.

5.0 Controls and Alarms

- 5.1. Engine control panel shall be mounted on the unit frame complete with oil pressure gauge, low oil pressure alarm contacts, low oil pressure shutdown contacts, water temperature gauge, and high water temperature shutdown contacts.
- 5.2. Starter control panel shall be mounted on the unit complete with 12v electric start system consisting of engine alternator, engine starting motor. Supply charging ammeter and alarm contacts. Panel shall be equipped with cables to separate unit mounted starting battery. Battery shall be sized to provide cycle cranking of 10 seconds crank and 10 seconds rest for a minimum of 5 cycles at 32 degrees F.

6.0 Batteries

- 6.1. Batteries shall be supplied with engine and securely mounted with metal straps and can be pad locked with standard sized pad lock.

7.0 Power Take Off

- 7.1. Engine will have heavy duty, in-line, twin disk, power take off manufactured by Rockford or prior approved equal.

- 7.2. Power take off shall be completely equipped to mount and properly operate on engine as specified.
- 7.3. Drive Shaft: Drive shaft shall be double universal joint, heavy duty, needle bearing type as manufactured by Dana/Spicer or Owner approved equal. It shall be rated for a B10 life of not less than 16,000 hours (including applicable service factor for driver utilized) and shall be dynamically balanced for proper operation.
- 7.4. Drive shaft shall be protected by an expanded metal or sheet metal guard rigidly mounted to the pump station structure or pump house floor. Tubular guards mounted to the gear drive and engine PTO shall not be acceptable.

8.0 Trailer

Trailer shall be a single axel sufficiently sized for all static weight and all corresponding water weight when the unit is operating. Trailer shall be epoxy coated. Two jack shaft stands located at the front two corners of the trailer. The winch assembly shall be 12 volt and be sized for the weight of the pump plus a minimum of 20% safety factor. Winch to include 3/8" stainless steel winch cable. Diesel engine shall be mounted at 15 degrees so as to align the drive shaft with max offset during operation of 3-5 degrees. Drive shaft guard supplied. 75 gallon fuel tank shall be aluminum. 2" trailer hitch and ball shall be provided.

9.0 Maintenance Manuals:

- 9.1. Complete installation, operation and maintenance instructions shall be sent to the owner when the pump is shipped.

10.0 Vendor Qualifications and Pump Performance Curve:

- 10.1. MWI is certified as an ISO 9001:2008 Quality System Accredited Company to insure their products and services meet or exceed the requirements of the Customer.
- 10.2. A Certified Performance Curve shall be supplied with bid documents. Curve shall be signed by a Professional Engineer full time employed by MWI.

11.0 Warranty:

- 11.1. The pumping system and controls as described shall be warranted for one (1) year by the manufacturer against defects in material and workmanship under normal use and service from the date of shipment from the factory.