

ATTCHMENT B- SPECIFICATIONS

Background - The City of Cedar Rapids is seeking bids from qualified Vendors for the purchase and delivery of lab scale chemical metering pumps for the purpose of pumping zinc orthophosphate and phosphoric acid for pipe rig testing in Cedar Rapids, Iowa. Deliveries shall be made to both the J Avenue Water Treatment Plant, 761 J Avenue NE and the Northwest Water Treatment Plant, 7807 Ellis Road NW.

Specifications

Required Product Quality

- a. The (12) chemical metering pumps supplied shall be the highest quality and be suitable for the pumping of 47-51% Zinc Orthophosphate (or equivalent dose Phosphoric Acid Solution) for use in the treatment of potable water. The chemical metering pumps shall be positive displacement pumps (peristaltic) capable of achieving consistent flow rates at from 0.0074 to 0.0118 mL/min at 40 psi, per feed point. Each pump will feed (2) feed points, requiring the pump to have at least dual channel (two tubes) capability. Chemical feed pumps shall be mounted on to a testing skid with 3 pumps in a skid and all required tubing, valving, and controls therein. All pump and pump tubing shall be appropriate to the chemical being pumped.
- c. Pumps shall include;
 1. Moving parts totally enclosed and self-lubricating.
 2. Capable of operating dry without damage to any component.
 3. Repeatable accuracy $\pm 1\%$
 4. Nameplate with chemical, capacity (mL/min) and pressure (PSI) ratings.
 5. Factory-installed NEMA 5-15 three-prong electrical plugs compatible with 120VAC power supply.
- d. Acceptable pump manufacturers:
 1. Watson-Marlow, Model 120U with 400DM2 pump head. Fisher Scientific catalog number 14-284-206.
 2. Masterflex C/L Analog Variable-Speed Pump with Dual-Channel Pump Head for Microbore Tubing Pump, 1 to 6 RPM; 90 to 260 VAC, Cole-Parmer Catalog Number 77120-32, pg 593.

Documentation Requirements - To facilitate proper evaluation, all bids must include the following:

- a. Supplier's total price of (12) chemical metering pumps. The unit price must include all costs for the supply and delivery of the products and accessories specified and all other applicable fees. Owner to install, startup, and test products. Product Manufacturer or Supplier shall provide technical support services remotely (telephone, video conference, etc.) to the Owner at no additional charge. In-person services including trips made by field technicians or Supplier shall be made available to the Owner at an additional cost.
- b. Chemical resistance data for materials used.
- c. Complete performance information:
 1. Capacity, operating range.
 2. Pressure Rating.
 3. Self-priming capacity
 4. Power required, motor voltage/phase, motor maximum RPM.
- d. Supplier data sheet for tubing
 1. Include proof of chemical resistance rating for pumped chemical.
 2. Include proof of NSF/ANSI-61 certification for tubing.
 3. List of materials exposed to the environment, all moving/wear parts, and all wetted parts.

General Product Requirements:

- a. Variable speed drive.
- b. Output speed adjustment manually.
- c. Pumps shall be capable of operating based on a on/off flow signal or in manual mode.
- d. Pumps shall be capable of operation with pump head rotation in either direction.
- e. Pumps shall be capable to run dry for an indefinite time without damage.
- f. The process fluid shall only be in contact with the inside of the pump tubing or hose.
- g. One compression roller or shoe shall be fully engaged at all times with the tubing providing complete compression to prevent backflow and siphoning.
- h. The tubes provided shall comprise of material compatible with the chemical being pumped and the thickness shall be selected for the longest use life.
- i. No special tools shall be required for regular maintenance.
- j. Permanent nameplate identifying pump by chemical metered and point of application.
- k. Product shall be UL listed.

Pump Performance and Design Requirements:

- a. Pump type: peristaltic.
- b. Chemical: Orthophosphate solution, phosphoric acid solution, sodium hydroxide (caustic) solution.
- c. Normal operating capacity per channel or tube (mL/min): 0.0074 to 0.15.
- d. Discharge pressure: 0 to 10 psi.
- e. Self-priming.
- f. Minimum Suction Lift: 5 ft water column.
- g. Pump speed: 130 rpm maximum.
- h. Integral variable speed drive.
- i. Drive motor: ½ hp (maximum).
- j. Turndown: 100:1 or greater is desirable; if less contact Engineer.
- k. Tubing: Tygon, 0.187 diameter or equal.
- l. Leak detector system and accessories.

Materials:

- a. All metering and transfer pump equipment and accessories in contact with the pumped fluid shall be chemically and physically compatible.
 1. Drive Case: Glass filled PPE/PS.
 2. Pumphead Enclosure: Glass filled PPE/413 aluminum (powder coated).
 3. Hydraulic Connectors (barbs): PVDF.
 4. Rotor: Glass filled nylon or PBT.
 5. Rotor Bearings: Steel.
 6. Drive Shaft: 316 SS.

Pump Fabrication:

- a. Pump
 1. Moving parts totally enclosed and self-lubricating.
 2. Capable of operating dry without damage to any component.
 3. Repeatable accuracy: 1 PCT of maximum output or better.
 4. Nameplate with chemical, capacity (mL/min), pressure (psi) ratings, motor horsepower, manufacturer, model number, and serial number.

b. Motor

1. Integrally mounted.
2. Reversible, brushed DC gear motor rated for continuous duty.
3. Motor shall include overload protection.
4. Enclosed in a NEMA 4X housing.
5. 115 VAC, 1 phase, 60 HZ.
6. Power Cord: 3-conductor with SJTW jacket.

c. Control Panel:

1. An integral control panel shall provide the following features:
 - a) Local controls:
 - (1) Start, stop, speed increment, speed decrement, rapid prime.
 - b) Calibration with choice of flow units (gph and ml/min).
 - c) Auto restart option to resume pump status in the event of power outage interruption.
 - d) Speed display (RPM).
 - e) Manual and automatic control selection.

d. Rotors:

- a. One rotor (roller) shall at all times be fully engaged with the tubing providing complete compression to prevent back flow or siphoning.
- b. The pumping action shall be created by the occlusion (compression) of the pump hose and its subsequent restitution (return to original shape) causing a vacuum effect to draw the fluid into the suction side of the hose.
- c. The tubing shall be in contact with the inside diameter of the track (housing) through a minimum angle of 150 degrees and be held in place on the suction and discharge.
- d. Peristaltic occlusion level shall be factory set to ensure flow accuracy of +/- 1% and repeatability performance of +/- 0.5% and shall not require any field adjustment.
- e. A rotor cover preventing fingers from entering the deep internal rotor region.

d. Tubing:

- a. The process fluid shall only be in contact with the inside of the pump tubing. The pump tubing shall be extruded from a material compatible with the pumped chemical and shall be suitable for long life when pumping alum, orthophosphate, polymer, sodium fluoride, and sodium hypochlorite.
- b. Tubing shall be provided by the pump supplier.

e. Spare Parts:

1. Provide the following spare parts for each metering pump:
 - a. One (1) roll of each size and type of tubing used (50-foot length in a roll minimum).
 - b. Four (4) spare pumpheads.
 - c. One (1) Spare power cord.

4.3 Delivery Locations and Requirements

J Avenue Water Treatment Plant
761 J Avenue NE
Cedar Rapids, IA 52402

Northwest Water Treatment Plant
7807 Ellis Road
Cedar Rapids, IA 52405