

SECTION 44 44 13.01
CHEMICAL METERING PUMPS

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. Hydraulic Institute Standards.
 - 2. Institute of Electrical and Electronics Engineers (IEEE): 112, Standard Test Procedure for Polyphase Induction Motors and Generators.
 - 3. National Electrical Manufacturer's Association (NEMA): MG 1, Motors and Generators.
- B. Refer to Section 43 32 56, Membrane Equipment System (Membrane Bioreactor), for MES membrane cleaning system requirements.
- C. Refer to Section 01 33 23, Submittal Procedures, for submittal requirements and procedures.
- D. Refer to Section 01 88 15, Anchorage and Bracing, for anchorage and bracing requirements.
- E. Refer to Section 26 05 02, Basic Electrical Requirements, for motor and miscellaneous electrical requirements.

1.02 DEFINITIONS

- A. Terminology pertaining to pumping unit performance and construction shall conform to the ratings and nomenclature of the Hydraulic Institute Standards.

1.03 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings:
 - a. Make, model, weight, and horsepower of each equipment assembly.
 - b. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
 - c. Performance data on pumps, including curves showing flow rate verses pump stroke setting (in percent) at specified maximum speed in strokes per minute and at minimum pump speed.
 - d. Pump data sheet confirming pump capacity in gallons per hour and pressure in psig, required backpressure valve setting, pumped chemical characteristics, pipe connection sizes, stroke rate,

- materials, testing requirements, intermediate fluid type, and appurtenances to be provided with pumps.
- e. Detailed dimensional drawings for pump and driver, including mounting requirements and piping connection sizes and locations.
 - f. Power and control wiring diagrams, including terminals and numbers.
 - g. Complete motor nameplate data, as defined by NEMA, motor manufacturer, and including any motor modifications.
 - h. Manufacturer's materials compatibility information, confirming compatibility of wetted parts with specified pumped chemicals.
 - i. Factory finish system.
 - j. Seismic anchorage and bracing drawings and cut sheets, as required by Section 01 88 15, Anchorage and Bracing.

B. Informational Submittals:

- 1. Seismic anchorage and bracing calculations as required by Section 01 88 15, Anchorage and Bracing.
- 2. Manufacturer's Certificate of Compliance, in accordance with Section 01 61 03, Equipment - Basic Requirements, that factory finish system is identical to requirements specified herein.
- 3. Factory Functional and Performance Test Reports.
- 4. Special shipping, storage and protection, and handling instructions.
- 5. Manufacturer's printed installation instructions.
- 6. Suggested spare parts list to maintain the equipment in service for a period of 1 year and 5 years. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
- 7. List special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.
- 8. Operation and Maintenance Data: As specified in Section 01 78 23, Operation and Maintenance Data.
- 9. Manufacturer's Certificate of Proper Installation, in accordance with Section 01 61 03, Equipment - Basic Requirements.

1.04 EXTRA MATERIALS

A. Furnish for each set of pumps:

- 1. One complete pump, drive motor, and gear box.
- 2. One printed circuit board of each type.
- 3. One complete set of any special tools required to dismantle pump.

PART 2 PRODUCTS

2.01 GENERAL SUPPLY AND SCOPE

- A. Provide chemical feed systems for the following. Specific requirements for each chemical feed system are attached to this section as supplements:
 - 1. Magnesium hydroxide system for biological treatment process, to be furnished by Contractor.
 - 2. External carbon supply system for biological treatment process, to be furnished by Contractor.
 - 3. Citric acid supply system, to be provided by Membrane Equipment Supplier for membrane cleaning.
 - 4. Sodium hypochlorite supply system, to be provided by Membrane Equipment Supplier for membrane cleaning.
 - 5. Sodium hypochlorite supply system for reclaimed water chlorination, to be furnished by Contractor.

- B. Each chemical feed system consists of a chemical supply intake tubing; and a skid-mounted chemical metering pump(s) system. Include with each skid-mounted chemical feed system:
 - 1. Chemical metering pumps.
 - 2. Fabricated polypropylene skid with back panel.
 - 3. Equipment identification plate.
 - 4. Lifting lugs for equipment weighing over 100 pounds.
 - 5. Anchor bolts.
 - 6. Gauge connections.
 - 7. Pressure gauges.
 - 8. Pressure diaphragm seals.
 - 9. Pressure switch.
 - 10. PVC ball valves.
 - 11. PVC ball check valves.
 - 12. Calibration column.
 - 13. Pressure relief valves.
 - 14. Spill containment.

- C. Coordinate pump requirements with drive manufacturer and be responsible for pump and drive requirements.

- D. Specific requirements for each chemical feed system are attached to this section as supplements.

2.02 CHEMICAL METERING PUMP

A. Physical Characteristics:

1. Type of Metering Pump: Peristaltic.
2. Specific requirements for each are attached to this section as supplements.
3. There shall be no valves, diaphragms, springs, or dynamic seals in the fluid path.
4. Refer to supplements Pump Data Sheets at the end of this section.

B. Functional Characteristics:

1. Pump shall be capable of running dry without damage.
2. Pump shall be capable of operating in either direction without output variation.

C. Performance Characteristics:

1. Pump shall be capable of 24-hour continuous duty, self-priming and operating in either direction of flow at the rated maximum pressure of up to 125 psi.
2. Suction lift shall be 30 feet of water.

2.03 PUMP HEAD

A. Physical Characteristics:

1. Squeeze rollers with encapsulated ball bearings shall be directly coupled to a one-piece thermoplastic rotor. Four nylon rollers shall be provided; two squeeze rollers for tubing compression shall be located 180 degrees apart and two guide rollers that do not compress the tubing shall be located 180 degrees apart. The roller diameters and occlusion gap shall be factory set to provide the optimum tubing compression; field adjustment shall not be required. Spring-loaded or hinged rollers shall not be used.
2. Squeeze and guide roller arms shall be removeable for ease of replacement.
3. Rotor assembly shall be installed on a chrome plated motor shaft and removable without tools.
4. For tubing installation and removal, rotor assembly shall be rotated by the motor drive at 6 rpm maximum when the pump head cover is removed. Hand cranking of the rotor assembly shall not be required.
5. Pump head and tubing compression surface shall be corrosion resistant thermoplastic.
6. The pump head cover shall be clear, polycarbonate thermoplastic with an integral ball bearing fitted to support the overhung load on the motor

shaft. Cover shall include an imbedded magnetic safety interlock which will limit the motor rotation speed to 6 rpm when removed.

7. Cover shall be positively secured to the pump head using a minimum of four thumb screws. Tools shall not be required to remove the pump head cover.

- B. Functional Characteristics: Tube failure detection sensors shall be constructed of two corrosion resistant alloy pins that are located at the bottom of the pump head. The corrosion resistant alloy pins shall act as electrical contacts. When both pins are immersed in a conductive fluid, a circuit shall be completed between the pins and indicate a tube failure has occurred. Tube failure detection system shall not trigger with water contact from rain or condensation. Float type switches shall not be used. Process fluid waste ports or leak drains shall not be provided.

- C. Performance Characteristics: None.

2.04 PUMP TUBE ASSEMBLY

- A. Physical Characteristics:

1. To ensure pump performance and accuracy, only tubing provided by the manufacturer is acceptable.
2. Pump tube shall be assembled to connection fittings of PVDF material.
3. Connection fittings shall be permanently clamped to the tubing with stainless steel clamps or over molded directly to the tubing. To prevent tubing misalignment and ensure accuracy, fittings shall insert into keyed slots located in the pump head and secured in place by the pump head cover.

- B. Functional Characteristics: None.

- C. Performance Characteristics: None.

2.05 DRIVE SYSTEM

- A. Physical Characteristics: Drive system shall be factory installed and totally enclosed in a NEMA 4X, (IP66) wash-down enclosure. Capable of operating on any input power from 110V ac to 240V ac, 50/60 Hz single-phase supply without user configuration or selection switches.

1. Motor:
 - a. Reversible, brushless DC gear motor rated for continuous duty.
 - b. Motor shall include overload protection.
 - c. The maximum gear motor shall be 125 rpm.

2. Enclosure:
 - a. Bottom housing shall be pressure cast aluminum with acidic liquid iron phosphate three-stage clean and coat pretreatment and exterior grade corrosion resistant polyester polyurethane powder coat.
 - b. Top housing shall be structural foam molded engineered thermoplastic.
 - c. Rated NEMA 4X (IP66).
 - d. Provided with Type 316 stainless steel floor/shelf level mounting brackets and hardware.
3. Control:
 - a. The pump output shall be capable of being controlled via EtherNet/IP, Modbus TCP/IP, or Profibus DP.
 - b. Provide a front panel touchscreen control for stop/start, configuration menu access and navigation, operating mode selection, display options selection, tube info data, and reverse direction.
 - c. Provide a multi-color LCD touchscreen display for menu driven configuration settings, pump output value, service alerts, tube failure detection (TFD) system and flow verification system (FVS) alarms status, remote input signal values, tubing life timer value. Display color shall be green when indicating run operation, blue when in idle, yellow when in stand-by, and red to indicate an alarm condition exists.
 - d. Provide for remote STOP/START pump via nonpowered contact closure loop.
 - e. Provide for remote priming via nonpowered contact closure loop.
 - f. Provide for secondary START/STOP input via nonpowered contact closure.
 - g. Provide for alternate control methods including: Dispensing Mode, Cycle Adjust Mode, and Time-of-Day Mode.
 - h. Provide a user selectable 4 mA to 20 mA and 0 Hz to 1,000 Hz output signal which are scalable and proportional to pump output volume.
 - i. Provide four contact closure alarm outputs. Three rated at 1A to 115V ac, 0.8A to 30V dc and one rated at 6A to 250V ac, 5A to 30V dc. Each alarm output shall be assignable to monitor any of the following pump functions:
 - 1) TFD system, FVS system, motor run/stop, motor failed to respond to commands, motor is running in reverse, general alarm (TFD, FVS, and/or motor over current), input signal failure, output signal failure, remote/local control status, revolution counter (tube life) set-point, or monitor which of the nine different pump operating modes is currently active.

B. Functional Characteristics: None.

C. Performance Characteristics:

1. Motor: None.
2. Enclosure: None.
3. Control:
 - a. All control circuitries shall be integral to the pump and capable of adjusting the pump motor speed from 0.01 percent to 100 percent in 0.01 percent increments less than 10 percent motor speed, in 0.01 percent and in 0.1 percent increments greater than 10 percent motor speed (10,000:1 turndown ratio).
 - b. The pump output shall be capable of being manually controlled via front panel touchscreen. The pump motor speed shall be adjustable from 0.01 percent to 100 percent in 0.01 percent increments less than 10 percent motor speed and in 0.1 percent increments greater than 10 percent motor speed.
 - c. The pump output shall be capable of being remotely controlled via 4 mA to 20 mA analog input. The input resolution shall be 0.01 percent of input value and capable of adjusting the pump motor speed from 0 percent to 100 percent motor speed in 0.1 percent increments. Four values shall be user configurable to define the low and high points on the output slope: a low input value, the required pump percentage of motor speed at the low input value, a high input value, the required pump percentage of motor speed at the high input value.
 - d. The pump output shall be capable of being remotely controlled via TTL/CMOS digital high-speed pulse type input and an AC sine wave type pulse input in the range of 0 Hz to 1,000 Hz. The frequency resolution shall be 1 Hz and capable of adjusting the pump motor speed from 0 percent to 100 percent motor speed in 0.1 percent increments. Four values shall be user configurable to define the low and high points on the output slope: a low input value, the required pump percentage of motor speed at the low input value, a high input value, the required pump percentage of motor speed at the high input value.
 - e. The pump output shall be capable of being remotely controlled via pulse triggered batching. The pump shall accept a TTL/CMOS digital pulse type input and a contact closure type pulse input in the range of 1 pulse to 9,000 pulses per batch. The batch time shall be adjustable from 1 second to 500,000 seconds. The pump motor speed during the batch shall be adjustable from 0 percent to 100 percent motor speed in 0.1 percent increments.
 - f. Provide a six-digit password protected configuration menu.

2.06 ACCESSORIES

A. Physical Characteristics:

1. Equipment Identification Plate: 16-gauge stainless steel with 1/4-inch die-stamped equipment tag number securely mounted in a readily visible location.
2. Lifting Lugs: Equipment weighing over 100 pounds.
3. Anchor Bolts: Type 316 stainless steel and as specified in Section 05 50 00, Metal Fabrications. Coat in accordance with Section 09 90 00, Painting and Coating.
4. Gauge Connections: Tapped and plugged suction and discharge gauge connections on piping headers adjacent to pumps.
5. Screens or Guards: Mesh size of less than 0.5 inch, exposed rotating shafts, rotors, couplings, pulley, wheel, bolts, chains, or similar components. Where guards/screens are over grease fittings, couplings, or other items requiring maintenance, provide a means for ready access.
6. Calibrated Cylinder: Graduated in 10-ml increments, constructed of Schedule 80 clear polypropylene and PVC with ball type shutoff valve. Provide calibration column as shown on the Drawings.
7. Suction and Discharge Valves: Fit suction and discharge valve cartridges with ball checks that open to full pipe diameter.
8. Back Pressure Valve: Install back pressure regulating valve on the pump discharge and factory adjust to crack open at the indicated pressure. Provide spring opposed diaphragms with loading pressures adjustable by means of a screw in the top works.

B. Functional Characteristics: Calibrated cylinder is sized for each chemical dosing skid to allow convenient observation of the change of fluid level for at least 1/2 minute at full stroke and maximum speed settings.

C. Performance Characteristics: None.

2.07 FACTORY FINISHING

A. Physical Characteristics: Provide manufacturer's standard finish.

B. Functional Characteristics: None.

C. Performance Characteristics: None.

2.08 SOURCE QUALITY CONTROL

A. Factory Inspections: Inspect control panels for required construction, electrical connection, and intended function.

- B. Factory Tests and Adjustments: Test all equipment and control panels actually furnished.
- C. Factory Test Report: Include test data sheets.
- D. Functional Test: Perform manufacturer's standard, test on equipment.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's printed instructions.
- B. Anchor Bolts: Accurately place using equipment templates and as specified in Section 05 50 00, Metal Fabrications.

3.02 FIELD QUALITY CONTROL

- A. Conduct tests on each pump.
- B. Functional Test:
 - 1. Alignment: Test complete assemblies for correct rotation, proper alignment and connection, and quiet operation.
- C. Performance Test:
 - 1. Perform under actual or approved simulated operating conditions.
 - 2. Test for a continuous 3-hour period without malfunction.

3.03 MANUFACTURER'S SERVICES

- A. Manufacturer's Representative:
 - 1. Present at Site or classroom designated by Government, for minimum person-days listed below, travel time excluded:
 - a. 1 person-day for installation assistance and inspection.
 - b. 1 person-day for facility startup.
- B. See Section 01 43 33, Manufacturers' Field Services.

3.04 SUPPLEMENTS

- A. The supplements listed below, following "End of Section," are a part of this specification:
 - 1. Magnesium Hydroxide Pumps 1 and 2 Data Sheet.
 - 2. Supplemental Carbon Pumps 1, 2, 3, and 4 Data Sheet.

3. Citric Acid Pumps 1 and 2 Data Sheet.
4. Sodium Hypochlorite Pumps 1 and 2 Data Sheet.
5. Sodium Hypochlorite Pumps 3 and 4 Data Sheet.

END OF SECTION

MAGNESIUM HYDROXIDE PUMPS 1 AND 2 DATA SHEET

Tag Numbers: PMP-3225, PMP-3265

Pump Name: Magnesium Hydroxide Pumps 1 and 2

Manufacturer and Model Number: (1) _____
(2) _____

SERVICE CONDITIONS

Liquid Pumped (Material and Percent): Citric Acid, 50% w/w

Pumping Temperature (Fahrenheit): Normal: 60 Max 85 Min 50

Liquid pH: 11-13

Abrasive (Y/N) N Possible Scale Buildup (Y/N): N

Suction Pressure (psig): Minimum _____

Altitude (ft msl): 6,800 Area Classification: Unclassified Location (indoor/outdoor):
Indoor

PERFORMANCE REQUIREMENTS

Capacity (US gpm): Maximum: 1 Minimum: 0.1

Maximum Discharge Pressure (psig): 125

Internal Bypass Valve Setting (psig): _____

Relief Valve Setting (psig/as recommended): As recommended

Back Pressure Valve Setting (psig/as recommended): As recommended

Max. Gear Motor Rate (rpm): Mfr. (1) 125 Mfr. (2) _____

DESIGN AND MATERIALS

Pump Type: Peristaltic (Y/N) Y Peristaltic

Tubular (double) Diaphragm (Y/N) _____ Other _____

Tube Material: PVDF

Check Valve Material: _____ Configuration(Single/Double): _____

Diaphragm Material: _____ Primary: _____ Tubular: _____

Calibration Cylinder: Quantity: _____ Material: _____ Units: _____ Capacity: _____

Diaphragm Actuation Type: Mechanical _____ Hydraulic _____

Stroke Position Adjustment: Manual _____ Automatic _____

Pump Speed Control: Constant _____ Variable _____

DRIVE MOTOR (See Section 26 20 00, Low-Voltage AC Induction Motors)

Horsepower: 0.5 Voltage: 120 Phase: 1 Synchronous Speed (rpm) _____

Service Factor: _____

Motor nameplate horsepower shall not be exceeded at any head-capacity point on pump curve.

Enclosure: DIP _____ EXP _____ ODP _____ TEFC _____ CISD-TEFC _____
TENV _____ WPI _____ WPII _____ SUBM _____

Adjustable Speed Drive, See Section 26 29 23, Low-Voltage Adjustable Frequency Drive System.

TESTING

Pump Tests: Factory Functional (Y/N) Y Factory Performance (Y/N) Y

Field Functional (Y/N) Y Field Performance (Y/N) Y

Motor Test: Short Commercial (Y/N) Y Other _____

REMARKS: To be sized and provided by Membrane Equipment Supplier. _____

SUPPLEMENTAL CARBON PUMPS 1, 2, 3, AND 4 DATA SHEET

Tag Numbers: PMP-3221, PMP-3222, PMP-3223, PMP-3224

Pump Name: Supplemental Carbon Pumps 1, 2, 3, and 4

Manufacturer and Model Number: (1) _____

(2) _____

SERVICE CONDITIONS

Liquid Pumped (Material and Percent): MicroC, or equivalent

Pumping Temperature (Fahrenheit): Normal: 60 Max 85 Min 50

Liquid pH: 6-8

Abrasive (Y/N) N Possible Scale Buildup (Y/N): N

Suction Pressure (psig): Minimum _____

Altitude (ft msl): 6,800 Area Classification: Unclassified Location (indoor/outdoor):
Indoor

PERFORMANCE REQUIREMENTS

Capacity (US gpm): Maximum: 10 Minimum: 0.1

Maximum Discharge Pressure (psig): 50

Internal Bypass Valve Setting (psig): _____

Relief Valve Setting (psig/as recommended): As recommended

Back Pressure Valve Setting (psig/as recommended): As recommended

Max. Gear Motor Rate (rpm): Mfr. (1) 125 Mfr. (2) _____

PHYSICAL CHARACTERISTICS

Pump Type: Peristaltic (Y/N) Y Peristaltic

Tube Material: PVDF

Check Valve Material: _____ Configuration(Single/Double): _____

Diaphragm Material: _____ Primary: _____ Tubular: _____

Calibration Cylinder: Quantity: _____ Material: _____ Units: _____ Capacity: _____

Diaphragm Actuation Type: Mechanical _____ Hydraulic _____

Stroke Position Adjustment: Manual _____ Automatic _____

Pump Speed Control: Constant _____ Variable _____

DRIVE MOTOR (See Section 26 20 00, Low-Voltage AC Induction Motors)

Horsepower: 0.5 Voltage: 120 Phase: 1 Synchronous Speed (rpm) _____

Service Factor: _____

Motor nameplate horsepower shall not be exceeded at any head-capacity point on pump curve.

Enclosure: DIP _____ EXP _____ ODP _____ TEFC _____ CISD-TEFC _____
TENV _____ WPI _____ WPII _____ SUBM _____

Adjustable Speed Drive, See Section 26 29 23, Low-Voltage Adjustable Frequency Drive System.

TESTING

Pump Tests: Factory Functional (Y/N) Y Factory Performance (Y/N) Y

Field Functional (Y/N) Y Field Performance (Y/N) Y

Motor Test: Short Commercial (Y/N) Y Other _____

REMARKS:

CITRIC ACID PUMPS 1 AND 2 DATA SHEET

Tag Numbers: PMP-3219, PMP-3220

Pump Name: Citric Acid Pumps 1 and 2

Manufacturer and Model Number: (1) Per MES Supplier

(2) Per MES Supplier

SERVICE CONDITIONS

Liquid Pumped (Material and Percent): Citric Acid, 50% w/w

Pumping Temperature (Fahrenheit): Normal: 60 Max 85 Min 50

Liquid pH: 1-3

Abrasive (Y/N) N Possible Scale Buildup (Y/N): N

Suction Pressure (psig): Minimum

Altitude (ft msl): 6,800 Area Classification: Unclassified Location (indoor/outdoor):
Indoor

PERFORMANCE REQUIREMENTS

Capacity (US gpm): Maximum: 1 Minimum: 0.1

Maximum Discharge Pressure (psig): 50

Internal Bypass Valve Setting (psig):

Relief Valve Setting (psig/as recommended): As recommended

Back Pressure Valve Setting (psig/as recommended): As recommended

Max. Gear Motor Rate (rpm): Mfr. (1) 125 Mfr. (2)

PHYSICAL CHARACTERISTICS

Pump Type: Peristaltic (Y/N) Y Peristaltic

Tube Material: PVDF

Check Valve Material: Configuration(Single/Double):

Diaphragm Material: Primary: Tubular:

Calibration Cylinder: Quantity: Material: Units: Capacity:

Diaphragm Actuation Type: Mechanical Hydraulic

Stroke Position Adjustment: Manual Automatic

Pump Speed Control: Constant Variable

DRIVE MOTOR (See Section 26 20 00, Low-Voltage AC Induction Motors)

Horsepower: 0.5 Voltage: 120 Phase: 1 Synchronous Speed (rpm) _____

Service Factor: _____

Motor nameplate horsepower shall not be exceeded at any head-capacity point on pump curve.

Enclosure: DIP _____ EXP _____ ODP _____ TEFC _____ CISD-TEFC _____
TENV _____ WPI _____ WPII _____ SUBM _____

Adjustable Speed Drive, See Section 26 29 23, Low-Voltage Adjustable Frequency Drive System.

TESTING

Pump Tests: Factory Functional (Y/N) Y Factory Performance (Y/N) Y

Field Functional (Y/N) Y Field Performance (Y/N) Y

Motor Test: Short Commercial (Y/N) Y Other _____

REMARKS: To be sized and provided by Membrane Equipment Supplier.

SODIUM HYPOCHLORITE PUMPS 1 AND 2 DATA SHEET

Tag Numbers: PMP-3215, PMP-3216

Pump Name: Sodium Hypochlorite Pumps 1 and 2

Manufacturer and Model Number: (1) Per MES Supplier

(2) Per MES Supplier

SERVICE CONDITIONS

Liquid Pumped (Material and Percent): Sodium hypochlorite, 10-12% w/w

Pumping Temperature (Fahrenheit): Normal: 60 Max 85 Min 50

Liquid pH: 11-13

Abrasive (Y/N) N Possible Scale Buildup (Y/N): Y

Suction Pressure (psig): Minimum _____

Altitude (ft msl): 6,800 Area Classification: Unclassified Location (indoor/outdoor):
Indoor

PERFORMANCE REQUIREMENTS

Capacity (US gpm): Maximum: 1 Minimum: 0.1

Maximum Discharge Pressure (psig): 50

Internal Bypass Valve Setting (psig): _____

Relief Valve Setting (psig/as recommended): As recommended

Back Pressure Valve Setting (psig/as recommended): As recommended

Max. Gear Motor Rate (rpm): Mfr. (1) 125 Mfr. (2) _____

PHYSICAL CHARACTERISTICS

Pump Type: Peristaltic (Y/N) Y Peristaltic

Tube Material: PVDF

Check Valve Material: _____ Configuration(Single/Double): _____

Diaphragm Material: _____ Primary: _____ Tubular: _____

Calibration Cylinder: Quantity: _____ Material: _____ Units: _____ Capacity:

Diaphragm Actuation Type: Mechanical _____ Hydraulic _____

Stroke Position Adjustment: Manual _____ Automatic _____

Pump Speed Control: Constant _____ Variable _____

DRIVE MOTOR (See Section 26 20 00, Low-Voltage AC Induction Motors)

Horsepower: 0.5 Voltage: 120 Phase: 1 Synchronous Speed (rpm) _____

Service Factor: _____

Motor nameplate horsepower shall not be exceeded at any head-capacity point on pump curve.

Enclosure: DIP _____ EXP _____ ODP _____ TEFC _____ CISD-TEFC _____
TENV _____ WPI _____ WPII _____ SUBM _____

Adjustable Speed Drive, See Section 26 29 23, Low-Voltage Adjustable Frequency Drive System.

TESTING

Pump Tests: Factory Functional (Y/N) Factory Performance (Y/N)

Field Functional (Y/N) Field Performance (Y/N)

Motor Test: Short Commercial (Y/N) Other

REMARKS: To be sized and provided by Membrane Equipment Supplier.

SODIUM HYPOCHLORITE PUMPS 3 AND 4 DATA SHEET

Tag Numbers: PMP-3217, PMP-3218

Pump Name: Sodium Hypochlorite Pumps 3 and 4

Manufacturer and Model Number: (1) _____
(2) _____

SERVICE CONDITIONS

Liquid Pumped (Material and Percent): Sodium hypochlorite, 10-12% w/w

Pumping Temperature (Fahrenheit): Normal: 60 Max 85 Min 50

Liquid pH: 11-13

Abrasive (Y/N) N Possible Scale Buildup (Y/N): N

Suction Pressure (psig): Minimum _____

Altitude (ft msl): 6,800 Area Classification: Unclassified Location (indoor/outdoor):
Indoor

PERFORMANCE REQUIREMENTS

Capacity (US gpm): Maximum: 10 Minimum: 0.1

Maximum Discharge Pressure (psig): 50

Internal Bypass Valve Setting (psig): _____

Relief Valve Setting (psig/as recommended): As recommended

Back Pressure Valve Setting (psig/as recommended): As recommended

Max. Gear Motor Rate (rpm): Mfr. (1) 125 Mfr. (2) _____

PHYSICAL CHARACTERISTICS

Pump Type: Peristaltic (Y/N) Y Peristaltic

Tube Material: PVDF

Check Valve Material: _____ Configuration (Single/Double): _____

Diaphragm Material: _____ Primary: _____ Tubular: _____

Calibration Cylinder: Quantity: _____ Material: _____ Units: _____ Capacity:

Diaphragm Actuation Type: Mechanical _____ Hydraulic _____

Stroke Position Adjustment: Manual _____ Automatic _____

Pump Speed Control: Constant _____ Variable _____

DRIVE MOTOR (See Section 26 20 00, Low-Voltage AC Induction Motors)

Horsepower: 0.5 Voltage: 120 Phase: 1 Synchronous Speed (rpm) _____

Service Factor: _____

Motor nameplate horsepower shall not be exceeded at any head-capacity point on pump curve.

Enclosure: DIP _____ EXP _____ ODP _____ TEFC _____ CISD-TEFC _____
TENV _____ WPI _____ WPII _____ SUBM _____

Adjustable Speed Drive, See Section 26 29 23, Low-Voltage Adjustable Frequency Drive System.

TESTING

Pump Tests: Factory Functional (Y/N) Y Factory Performance (Y/N) Y

Field Functional (Y/N) Y Field Performance (Y/N) Y

Motor Test: Short Commercial (Y/N) Y Other _____

REMARKS:
