

NOTICE

TO: All plan holders

DATE: August 4, 2017

FROM: Jason Brown, P.E.
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SUBJECT: Addendum No. 1 to the Contact Documents for 500 SOUTH DIVERSION, PHASE
2 PUMP STATION, Project No. 52490785

Transmitted herewith is ADDENDUM No. 1 to the contract documents for the above mentioned project.

Notes:

1. The Bid Date has been changed to **August 25, 2017**. See Part 2 – 2.2 below.
2. This addendum addresses questions received on SciQuest. See responses to questions attached below.



All bids submitted without the signed acknowledgment of this Addendum will be rejected.

DOCUMENT 00 91 13.1
ADDENDUM No. 1

PART 1 GENERAL

1.1 DOCUMENT INCLUDES

A. Changes to the Bid Documents.

1.2 CONSTRUCTION CONTRACT

A. 500 SOUTH DIVERSION, PHASE 2 PUMP STATION

B. Project No. 52490785

C. Date: August 4, 2017

PART 2 CHANGES

2.1 CHANGES TO PRIOR ADDENDA

A. NONE

2.2 CHANGES TO BIDDING REQUIREMENTS

A. Bid Date

1. The **bid date has been changed to August 25, 2017**. All times and locations required for submittal of bids remain unchanged from those listed in the contract documents.

2. Invitation to Bid 00 11 16 Paragraph 1.9

Replace: (in two places)

Friday August 11, 2017

With

Friday August 25, 2017

2.3 CHANGES TO AGREEMENT AND OTHER CONTRACT FORMS

A. NONE

2.4 CHANGES TO CONDITIONS OF THE CONTRACT

A. NONE

2.5 CHANGES TO SPECIFICATIONS

A. Specification Section 00 73 10 Paragraph 5.2.A.4.a

1. **Add:**

...2) Shoring Plans ", 3) Foundation ground improvements." CONTRACTOR shall obtain...

B. **Delete** Specification 11401 in its entirety.

C. **Add** the attached Specification Section 11410 in its entirety.

2.6 CHANGE TO DRAWINGS

A. NONE

PART 3 ACKNOWLEDGEMENT

3.1 Acknowledgement of receipt of this addendum is made in paragraph 1.4 A. ADDENDA of Section 00 41 00.

3.2 All bids submitted without the signed acknowledgment of this Addendum will be rejected.

END OF ADDENDUM

SciQuest Posted Questions and Responses

Updated: August 3, 2017

Project No. 52490785

500 South Diversion, Phase 2 Pump Station

Addendum No. 1

Question No.	Question	Response
1	I have received word from "Farrell Design Built Inc" one of the two approved GeoContractors listed in the Specification that they are not licensed in Utah and therefore cannot bid. Do you have any other approved GeoContractors?	Additional approved geocontractors will be provided in Addendum No. 2.
2	The chem pullbox at point 403 has two 3" CA lines coming in from the south, two leaving to the north and two leaving to the east. Please provide a piping arrangement for this box. are valves or flow control measures required in this box?	Refer to Typical Detail 15902A. Per drawing C-00-105, two carrier pipes (labeled as CA on the drawings) enter the box from the south and each contain two ¾" chemical tubing (labeled as FRC on the drawings) for a total of four ¾" FRC. Two carrier pipes leave to the north containing two ¾" FRC. Two carrier pipes leave to the east containing one ¾" FRC. The intent of the design is that the second CA pipe and FRC tubing entering the box are spares. Valves or flow control measures are not required in this box.
3	Detail 15902A Shows box sizes as 3'x3'x3'-6" but the civil sheets scale as 2'x2' which shall be installed?	The detail sizing governs.
4	Please provide invert elevations of the 42" Orange St line at inlet and outlet of Injection MH.	Will be provided in Addendum No. 2.
5	Please provide a line size for the new sewer line to serve the existing building.	Will be provided in Addendum No. 2.

Question No.	Question	Response
6	Sheets C-00-101 and 104 show a new sewer line to an existing building. It is unclear where the connection point shall be between the old and new work, it is also unclear how deep this connection will be. Please clarify where the new pipe shall connect to the old and provide an invert depth at the connection point. It also seems that the connection point might be outside of the area shown as having new asphalt. Please indicate if asphalt will be required over this utility trench if the connection point is beyond the area showing new asphalt.	Will be provided in Addendum No. 2.
7	Sheet Note 5 on sheet C-00-104 says to install chemical feed lines with slope from vault to vault. Please provide invert elevations at high and low points or clarify if the pipe may be crowned between vaults with slope towards every vault from the center of each run.	The intent of the design is to slope carrier pipes between vaults so that any leakage within the pipes is routed to the vaults. Contractor is given discretion on inverts and pipe installation to accomplish this intent. Pipe may be crowned between vaults with slope towards every vault from the center of each run.
8	Detail C on Sheet C-00-301 calls for 12" of compacted base under the flume but the Spec (13253 3.1 K) and the manufacturers recommendations call for a concrete pad that the manhole is anchored to. Please clarify and provide the size, thickness, reinforcing, etc of this concrete pad.	Will be provided in Addendum No. 2.
9	Detail 2128 shows sand backfill and fabric around the chemical duct bank. Sheet Key Note 2 on sheet C-00-104 calls for concrete encasement. Please clarify how the duct bank shall be installed.	The intent is to concrete encase the carrier pipes. Detail 2128 will be revised accordingly in Addendum No. 2.
10	Please indicate the minimum depth of cover required for chemical lines at the pull boxes.	The intent is to maintain 2 1/2 ft of cover above carrier pipes. This will be addressed in Addendum No. 2.
11	The Pull Box Detail 15902A does not indicate minimum pull box dimensions nor does it show minimum depth of cover over the chemical pipes. Please provide box sizes and minimum depth of cover.	See detail 15902A for box size. Maintain 2 1/2 ft of cover above carrier pipes.

Question No.	Question	Response
12	West Inlet MH appears to be a 10' diameter manhole, please provide a drawing for this manhole including rim elevation and lid requirements. Please confirm that elevations at points 108 & 109 are inverts.	Will be provided in Addendum No. 2.
13	This is a request to extend the bid date. Due to the complexity and bid schedule of this project, our suppliers and subcontractors would like more time to bid this project.	Bid date is extended in Addendum No. 1.
14	Sheet C-00-301 shows the Gas Trap MH as 3' SQ (inside dimension) but sheet C-00-105 shows a round MH with an apparent inside dimension of 60". Please clarify what will be required.	The detail shown on Sheet C-00-301 governs.
15	On Drawings E-01-102 and E-01-103 it shows a total of five type "C" fixtures. The Lighting fixture schedule shows nothing for a type "C" fixture. Is this a typo, and should reflect type "G" or can we get the information for a type "C" fixture. Thank you.	Will be addressed in Addendum No. 2.
16	Is a profile view available for the three 22" FM lines? Elevations are provided for one end of the lines but not for the other. Are the lines flat? please provide more information.	The centerline elevation at the point of connection is 4219.03 for all three force mains. This will be clarified in Addendum No. 2.
17	the profile view shows three 20" SS lines near MH-2. Are these intended to be labeled as the 22" FM lines or other existing pipelines.	The three 20 inch SS lines shown on the profile drawing are the three force mains to be installed as part of this project. This will be clarified in Addendum No. 2.
18	Will SprayWall manufactured by SprayRoq be accepted for section 09875 coatings?	Will be addressed in Addendum No. 2.

Question No.	Question	Response
19	I have received the following questions from one of the GeoContractors that was listed in the spec's. "I boxed in the area on the attached drawing that I think marks the portion of the structure intended for support on aggregate piers. Please confirm. Drawings S-01-202 and S-01-204 show piers installed from ground surface to depth of excavation. Is it the intent to fully extend piers through all fill? Are piers intended only for footings of the marked area or for the full footprint? Entire area loaded at 3,000 psf or just footings?"	The intent is for the Geocontractor to provide foundation ground improvement design for the area shown with aggregate piers. Geocontractor is given discretion on the design as described in spec section 02450. Geotechnical report is provided for use by Geocontractor.
20	Sheet C-00-301, Section C for the Flume Manhole has a note regarding "Fill with CLSM..." with a Key Note "7" referenced. Key Note 7 states to provide a pipe support per detail 15000, this detail doesn't seem to apply. Please clarify.	Keynote 7 does not apply to this detail. This will be addressed in Addendum No. 2.
21	Sheets C-00-104,-5 show the 2" water line scheduled as Copper material. Would HDPE (Vanguard Bruiser or equal) be an acceptable alternate?	Provide copper pipe material per Salt Lake City standard and the piping schedule.
22	Sheets C-00-104,5 show a 2" NG line between a main line and the building. The Natural Gas Utility Company requires that a Questar certified contractor perform the work between the gas main and the meter, the meter location is not shown. Typically the Owner schedules and pays for this work as the provider requires a service contract with entity responsible to pay the utility bill. Please clarify how the contractor should address this portion of the work.	The intent of the design is for the Contractor to complete this work in compliance with the utility company and Salt Lake City Standards. The Contractor is responsible for utility approval as stated in the specifications and notes on the drawings. See point 502 on sheet C-00-105 for intended location of gas meter.
23	Detail 15902A seems to indicate that a carrier pipe will be installed between chemical pull boxes but Civil drawings do not show a carrier pipe, or carrier pipe size. Please clarify if a carrier pipe will be required and provide sizing for the pipe. Detail 2128 does not show pipe size or spacing relative to size.	Sheet G-00-008 provides explanation for pipe callouts used throughout all drawings. Carrier pipe size and number is shown on civil yard piping drawings C-00-104 and C-00-105.

Question No.	Question	Response
24	Sheet SD-01-007 has a detail near center bottom which has an ID number which is partially blocked/ not shown please identify the detail.	The detail number is 3610. This will be addressed in Addendum No. 2.
25	Can we substitute EPS for XPS as the roof insulation? EPS is going to be significantly less expensive.	This will be addressed in Addendum No. 2.
26	The influent line coming into the North side of the Grinder Vault is labeled as 36" on sheet C-00-105 but 48" on the other sheets. Please clarify.	The influent line is 48 inch. Sheet C-00-105 will be corrected in Addendum No. 2.
27	The 48" SS influent line on Shee C-00-104 is labeled as material type (35) but on sheet C-00-106 it is labeled as material type (28) which is not on the pipe material schedule. Please clarify.	Pipe material is type (35). Sheet C-00-106 will be corrected in Addendum No. 2.
28	I am unable to find the size and detail for the West Inlet Manhole shown on sheets C-00-104 and C-00-105.	This will be addressed in Addendum No. 2.
29	Due to the size and complexity of this project, more time is needed to prepare accurate and competitive bids. Can the bid date be extended?	Bid date is extended in Addendum No. 1.
30	Section 015502.2.12.b requires the addition of ferric chloride and hydrogen peroxide up-stream of the pumping location to control odor. Please identify acceptable locations for the dosing of these chemicals. Please identify whether traffic control will be required at these locations and what methods of dosing are acceptable. Please indicate the maximum allowable dosing for each of the chemicals. (mg/l) (based on commercially available and Owner accepted concentrations.) Please specify any additional public safety requirements to meet the dosing requirements of this section.	Contractor is required to maintain the operation of the bypass pumping system including the chemical feed systems and feed points. As indicated in the specifications, the Contractor is required to provide all public safety measures. The Contractor is also responsible to determine the feed points and dose to provide adequate odor control.

Question No.	Question	Response
31	Please clarify section 0-1550.1.2F which requires 100% redundant pumping capacity. Is it the Owners intent to have a second complete system including pumps and piping? Is it the Owners intent that the redundant system be installed ready to pump or merely be onsite ready to swap if there is a need? It is most likely that each bypass will be best handled by a series of several pumps rather than just one pump, will the Owner accept a stand-by pump or pumps to replace a downed unit? Space becomes an issue as more pumps are added. (this translates to more like a 50% to 75% redundancy.)	Per section 01550 2.2 A 7 standby pump shall be "online" as indicated by the following "Provide a minimum of one full capacity standby pump for each size maintained on-site. Standby pump shall be maintained online, isolated from duty pump by a valve."
32	The chem pull-boxes at points 401 & 403 have two 3" CA lines coming in but four 3" lines going out. Please provide a piping arrangement for these locations, are valves or flow control measures required at these locations? The Box at point 401 shows a 3/4" NPW line coming in but none going out. please provide a termination detail for the NPW line in box 401. Please provide a termination/diffuser detail for chem lines at the injection manhole, at the grinder vault and at point 405	The 3 inch CA lines are carrier pipes only. The ¾ inch FRC lines are routed within the 3 inch carrier pipes. The intent is to have one duty and one standby carrier pipe routed between all chemical pull boxes. See drawing G-00-005 for intended dose locations and routing of ¾ inch FRC. Additional ¾ inch FRC required in civil sheets C-00-104 and C-00-105 are intended to be installed as spares. ¾ inch NPW is routed adjacent to carrier pipes to yard hydrant shown on drawing M-01-105.
33	Sheet C-00-106 call for the 48" Line to be material 28, please specify the material, or clarify if the material should be material 35 as indicated on C-00-105	Pipe material is to be type (35). This will be addressed in Addendum No. 2.

SECTION 11410

PERISTALTIC METERING PUMPS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. This specification covers the supply, assembly and testing of completely functional, peristaltic metering pumps complete and operational with pumps, motors, control equipment and appurtenances as shown and indicated in the Contract Documents. The peristaltic metering pump supplier shall be responsible for supplying all pump appurtenances as specified herein.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate installation of items that must be installed with or before peristaltic metering pumps and appurtenances are placed in service.

C. Equipment Tag Numbers: The following equipment identification numbers have been assigned to the equipment that shall be provided under this Section:

1. PMP-0911
2. PMP-0921
3. PMP-0931

1.2 REFERENCES

A. Standards referenced in this Section are:

1. American Bearing Manufacturers Association (ABMA)
2. American Gear Manufacturers Association (AGMA)
3. American National Standards Institute (ANSI)
4. API 675, Positive Displacement Pumps Controlled Volume
5. American Society for Testing and Materials (ASTM)
6. Institute of Electrical and Electronics Engineers (IEEE)
7. National Electrical Code (NEC)
8. National Electrical Manufacturer's Association (NEMA)
9. National Sanitation Foundation (NSF)

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer:

- a. Shall have minimum of five (5) years experience producing substantially similar equipment to that required and shall be able to provide documentation of at least five (5) installations in satisfactory operation for at least five (5) years.
- b. Multiple units at a plant shall be considered as one (1) installation towards meeting experience requirements.

B. Component Supply and Compatibility:

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1. Obtain all materials and equipment included in this Section regardless of component manufacturer, from a single peristaltic metering pump Supplier.
 2. Peristaltic metering pumps and appurtenances equipment manufacturer shall review and approve or prepare all Shop Drawings and other submittals for components furnished under this Section.
 3. Materials and equipment shall be fully compatible with 40% ferric chloride and shall be integrated into overall assembly by peristaltic metering pumps and appurtenances equipment Supplier.
 4. All fittings and other appurtenances shall be made of CPVC, compatible with 40% ferric chloride.
- C. Warranties:
1. The peristaltic pump manufacturer shall provide a minimum five-year warranty on all peristaltic pump mechanical drives and a minimum two-year warranty on the liquid end and pump accessories.

1.4 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00
- B. Shop Drawings:
1. Detailed peristaltic pump diagram, including mounting requirements and piping connection sizes and locations
 2. Control and power wiring diagrams, including terminals and numbers
 3. Enclosure dimensions and fabrication details
 4. Connection point locations and sizes
 5. Control panel dimensions, connection details, and wiring diagrams
 6. Location of all specified appurtenances
- C. Product Data:
1. Complete catalog information, descriptive literature, and specifications, including but not limited to the following:
 - a. Make, model, weight, and power requirements for each equipment assembly
 - b. Materials of construction
 - 1) Confirmation that all wetted parts are compatible with specified service chemical
 - c. Performance data on pumps, including curves showing flow rate versus pump speed setting in percent, associated with all applicable tube sizes.
 - d. Pump data sheet confirming:
 - 1) Pump capacity in gallons per hour and pressure in psig
 - 2) Pumped chemical characteristics
 - 3) Pipe connection sizes
 - 4) Tube diameter to be provided
 - 5) Tube diameter range that can be accommodated with the pump
 - 6) Minimum and maximum capacity of the pump with provided tube diameter
 - 7) Minimum and maximum capacity of the pump with minimum and maximum tube diameter that can be accommodated with the pump, respectively.
 - 8) Field testing recommendations
 - e. Control system details
 - f. Appurtenance details
 - g. Confirmation of pumping accuracy over flowrate range specified herein
 - h. Factory finish system
 2. Testing Plans:

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- a. Source quality control testing plan
- b. Field quality control testing plan
- 3. Manufacturer's printed installation instructions
- 4. Manufacturer's Reports:
 - a. Submit a written report of results of each visit to Site by Supplier's service technician, including purpose and time of visit, tasks performed, and results obtained.
 - b. System Supplier's Certificate of Proper Installation
- 5. Recommended spare parts list, including a list of special tools required
- 6. Complete O&M manual for each pump model and control system in accordance with Section 01 33 10.

D. Quality Assurance Submittals

- 1. Factory operational and performance testing results shall be submitted for ENGINEER's review prior to shipment.
- 2. System Suppliers certificate of compliance with these specifications

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, Handling, and Unloading:

- 1. Deliver materials and equipment to Site to ensure uninterrupted progress of the Work.
- 2. Inspect all boxes, crates, and packages upon delivery to the Site and notify ENGINEER in writing of loss or damage to products. Promptly remedy loss and damage to new condition in accordance with manufacturer's instructions.

B. Storage and Protection:

- 1. Keep materials and equipment off ground using pallets, platforms, or other supports. Protect steel, packaged materials, and electronics from corrosion and deterioration.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Pumps shall be positive displacement peristaltic type complete with rotating rollers that compress an elastomeric tube, integral variable speed drive, and flexible extruded tube as specified.
- B. Pumps shall be dry self-priming, capable of being run dry without damaging effects to pump or tube, and shall have a suction lift capability of minimum 10 ft vertical water column.
- C. Pumps shall not use check valves or diaphragms and shall not require dynamic seals in contact with pumped fluid. Process fluid shall be contained within pump tubing and shall not directly contact any rotary or metallic components.
- D. Flow shall be in the direction of the rotor rotation, which shall be reversible. Flow shall be proportional to rotor speed.

2.2 MANUFACTURERS

- A. Products and Manufacturers:

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1. Watson-Marlow 530DuN
2. Verder Vantage 5000
3. Or Equal

2.3 SERVICE CONDITIONS AND PERFORMANCE

- A. Provide equipment compatible with specified service conditions and performance criteria:
- B. Service Chemical: 40% Ferric Chloride
 1. Specific Gravity: 1.4
 2. Temperature: 50 to 90 deg F

Chemical Room	
Design Parameter	Value
Equipment ID	PMP-0911, PMP-0921, PMP-0931
Minimum Feed Rate, gph	1
Maximum Feed Rate, gph	24
Discharge Pressure, psig	30
Motor: Enclosure/Volts/Phase/Hertz	TEFC/120V/1PH/60Hz
Minimum Turndown Required	2650:1

2.4 PUMP DESIGN

- A. Drive and pump heads shall be 24-hr continuous duty rated.
- B. Pumps shall be manufacturer's standard product.
- C. Pumps shall meet all applicable CE and C ETL US standards per UL610101A.

2.5 DETAILS OF CONSTRUCTION

- A. Pumphead
 1. Pumphead door shall have clear windows for viewing of rotational direction. Window shall be sufficiently sized to allow installation and adjustment of tubing.
 2. Tools shall not be required for removal of pumphead or pumphead door.
 3. When closed, pumphead shall seal for leak containment in the event of tubing failure.
 4. Flip-top pumphead designs are not acceptable.
- B. Rotor:
 1. Provide rotor assembly that ensures gradual tube occlusion and compensates for tube tolerance.
 - a. Tube occlusion shall be factory set to accommodate 2.4mm wall thickness tubing and shall not require adjustment for accommodating tubing of 0.5mm to 8.0mm.
 2. Rotor shall be in contact with the tubing via two (2) rollers at an angle of 180 degrees.
 3. Rotor Assembly:
 - a. The rotor bearings will be constructed of stainless steel.
 - b. The rotor shaft will be constructed of 316 stainless steel.

4. One roller at all times shall be fully engaged with the tubing providing complete compression to prevent backflow and siphoning.
- C. Rollers:
1. Rollers shall be nylon, each with two (2) permanently grease lubricated ball bearings and two (2) nitrile rubber lip seals (front and rear) to isolate the bearings from the pumped liquid in the event of a tube failure.
- D. Tubing
1. Pump tubing shall be constructed of a thermoplastic elastomer provided by the manufacturer.
 2. Tubing shall be replaceable without the use of tools and with no disassembly of pumphead.
 3. Pump shall readily accept tubing of various inside diameters and a minimum 2.4mm wall thickness without pump adjustment or replacement.
 4. Provide PVDF hose barb connections for each tube connection.
 5. Supply 15-meter roll of specified tubing sizes to meet specified flowrates.
- E. Drive
1. Rating: continuous 24-hr operation, 40° C ambient.
 2. Supply: 110-120V, 50/60Hz and 220-240V, 50/60Hz, single phase, field switchable. Supply main cord at least nine-foot length with standard 115V three-prong plug.
 3. Max drive power consumption: 135VA
 4. Drive Motor: brushless DC motor with integral gearbox and tachometer feedback.
- F. Enclosure
1. Pressure cast aluminum with Alocrom pre-treatment and exterior grade corrosion resistant polyester powder coat.
 2. By nature of the environmental conditions, unpainted enclosures, including 316 stainless steel is not acceptable.
- G. Tubing Leak Detector:
1. Tubing leak detector shall be of the optical type, located at the lowest point of the pump body.
 2. Upon actuation, leak detector shall STOP the pump, light a locally visible LED, and sound a remote alarm.
 3. Tube leak detectors shall not trigger with water contact.

2.6 APPURTENANCES

- A. Calibration Columns:
1. Construction: Transparent, clear tube. Calibration columns must have an inlet port (bottom) and outlet port (top) that can be connected to piping via threaded or solvent welded joints.
 2. Calibration columns shall be calibrated in gallons.
 3. Size calibration columns to provide at least 30 seconds of storage at maximum rated pump flow.
 4. Calibration column shall be suitable for installation as indicated on Drawings.
- B. Pressure Relief Valves:
1. Valves shall be field-adjustable without removing from piping, and shall initially be set 10 psi higher than design discharge pressure of the associated pumps.

2. Pressure relief valve material shall be compatible with pumped fluid and piping system material. Valve size shall be as shown on the Drawings or Valve Schedule.
- C. Equipment Identification:
1. Provide 16-gauge stainless steel plate with ¼-inch die-stamped equipment identification numbers mounted in a visible location.

2.7 CONTROLS

- A. Pumps must meet the following minimum requirements for operator interface functionality. Pumps not meeting this minimum functionality will not be accepted. The controls shall be designed to allow complete remote control and monitoring of the pumps. Refer to contract drawings and Div 16 for additional control requirements.
1. Operator Controls and Indicators:
 - a. Backlit graphical LCD to display pump speed in rpm or percent and running status.
 - b. Sealed keypad for START, STOP, AUTO/MANUAL, speed adjustment, forward/reverse direction, and rapid priming.
 - c. "Auto Restart" feature to resume pump status in the event of power outage interruption.
 - d. Provide programmable "Maximum Speed" to allow operator to set the maximum speed of the pump.
 2. External Interfaces:
 - a. Analog Input: 4 to 20 mA speed input to control pump speed in AUTO mode, with input signal trimmable and speed scaleable over any part of the drive speed range.
 - b. Analog Output: Provide the following dry contact closure outputs, rated 4 to 20 mA, minimum:
 - 1) Speed output
 - c. Discrete Input: Pump RUN in AUTO mode, dry contact.
 - d. Discrete Outputs: Provide the following dry contact closure outputs, rated 2A at 120 VAC, minimum:
 - 1) Pump ON status.
 - 2) Pump AUTO mode status.
 - 3) Leak detected status
 3. Security:
 - a. Programmable keypad lock and PIN security for optional lockout of all keys except emergency stop.
 4. Power Requirements: 120 volts, 60-Hz, single-phase.
 5. Termination: Supply screw down terminals suitable for up to 18 AWG field wire and accessible through four glanded cable entry points on the pump.
- B. Provide all cables, connectors, and a terminal junction box for termination of remote signal circuits.

2.8 SOURCE QUALITY CONTROL

- A. Peristaltic Metering Pumps: Test each pump in the shop as follows:
1. Calibration test
 2. Inspect all components prior to and during shop testing
 3. Capacity/head tests, including pump's rated design point, at minimum flow, and at maximum flow.

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- B. Controls: Test controls in the shop as follows:
 - 1. Verify operation in all operating modes.
 - 2. Inspect control components for defects.
 - 3. Perform manufacturer's standard quality tests.

- C. Appurtenances:
 - 1. Inspect components for defects.
 - 2. Perform manufacturer's standard quality tests.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Installation shall be in complete accordance with manufacturer's instructions.

- B. Installation shall include furnishing and applying an initial supply of any pump spare parts, lubricants, rebuild kits, etc, recommended by manufacturer.

- C. General:
 - 1. Perform drilling and fitting required for installation. Set equipment accurately in location, alignment, and elevation, plumb, true, and free of rack.
 - 2. Making plate cutouts or openings at the Site is not allowed.
 - 3. Fit exposed connections accurately together to form tight hairline joints.
 - 4. Provide connections in accordance with the Contract Documents.

3.2 FIELD QUALITY CONTROL

- A. Following installation, CONTRACTOR and qualified field service representative of Supplier shall conduct operating tests of all equipment, functions, and controls at the Site in presence of ENGINEER.

- B. Field Operating Test:
 - 1. Field test equipment and its controls in local mode, followed by demonstrating proper orientation and controls in automatic mode. Demonstrate that each part individually and all parts together function properly in manner intended. Total duration of testing shall be 72 hours, continuous and uninterrupted, in automatic mode. All testing equipment and labor shall be by CONTRACTOR.
 - 2. Should test result in malfunction, make necessary repairs, revisions, and adjustments and restart test from the beginning. Repeat tests and repairs, revisions, and adjustments until, in opinion of ENGINEER, installation is complete and equipment is functioning properly and accurately, and is ready for permanent operation.

3.3 MANUFACTURER'S FIELD SERVICES

- A. A factory trained representative shall be provided for installation supervision, start-up and test services, and operation and maintenance personnel training services.

- B. The serviceman shall make two (2) visits to the Site, with a minimum of two hours at the Site for each visit.
 - 1. The first visit shall be for assistance in the installation of equipment.
 - 2. The second visit shall be for checking the completed installation, start-up of the system, and instruction of operations personnel.

+ + END OF SECTION + +

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