



# FORT HAYS STATE UNIVERSITY

*Forward thinking. World ready.*

## REQUEST FOR QUOTE #: 23020

Date Emailed: March 28, 2023

Site Visit and Questions to [purchasing@fhsu.edu](mailto:purchasing@fhsu.edu) by: Monday, April 3, 2023 at 12 p.m.

Closing Date: Thursday, April 6, 2023 at 4:30 p.m.

Fort Hays State University (FHSU)  
Purchasing Office bid solicitation site:  
<https://fhsu.edu/purchasing/bids/index.html>

It shall be the bidder's responsibility to monitor this website on a regular basis for any changes/addenda, <http://www.fhsu.edu/purchasing/bids>.

Purchasing Office Contact Information:  
Telephone: 785-628-4251  
Fax: 785-628-4046  
Email: [purchasing@fhsu.edu](mailto:purchasing@fhsu.edu)

### INSTRUCTIONS TO BIDDERS:

1. The FHSU Purchasing Office is the only point of contact for this RFQ. When communicating, always refer to the quotation number.
2. To be considered, one copy of this quotation, with your bid properly filled in, must be signed and returned to the FHSU Purchasing Office by the specified closing date. Late bids cannot be considered.
3. **Submit bid response through FHSU's bid solicitation site, Vendor Registry:**  
<https://fhsu.edu/purchasing/bids/index.html>.  
**Bidder must be registered.**
4. Bid must be in U.S. Dollars (\$US) excluding Federal Excise/State Sales Taxes.
5. All prices and conditions must be shown. Additions or conditions not shown on this bid will not be allowed.
6. Bid for comparable merchandise will be considered, unless the specifications indicate "no substitution".
7. Bidder must specify exceptions to any requirement or specification in the bid.
8. Bid must include complete specifications and/or descriptive literature to facilitate consideration.
9. Please browse our web-site for similar pending requests.
10. **THIS IS NOT AN ORDER.**

Item No.	Qty.	Unit	Description of Item(s)	Total Amount
<p><b>Fort Hays State University is seeking bids to replace Smith &amp; Loveless above ground lift stations at Custer Hall (16-07200) and Gross/Cunningham Hall (16-08353) per the attached specifications or equal to the following Manufacturers below:</b></p> <p><b>Smith &amp; Loveless Gorman-Rupp Pumps Wastecorp Pump Crane Engineering</b></p> <p><b>Replacements must be installed by August 1, 2023.</b></p>				
1	1	Ea.	<p><b>Replace above ground lift station at Custer Hall (16-07200).</b></p> <p>Complete specification attachment and return with the bid: page 1, \$ <span style="background-color: yellow;">    </span> per KWH; page 6, select option if requiring a Single-Phase 120-volt Power Transformer package; page 10, complete and sign if proposing an alternate.</p> <p>Materials</p> <p>Freight</p> <p>Labor/Installation</p> <p>Total</p>	<p>\$ _____</p> <p>\$ _____</p> <p>\$ _____</p> <p>\$ _____</p>

<b>2</b>	<b>2</b>	<p><b>Ea.</b></p> <p><b>Replace above ground lift station at Gross/Cunningham Hall (16-08353).</b></p> <p>Complete specification attachment and return with the bid: page 1, \$ <span style="background-color: yellow;">    </span> per KWH; page 10, complete and sign if proposing an alternate.</p> <p>Materials</p> <p>Freight</p> <p>Labor/Installation</p> <p>Total</p>	<p>\$ _____</p> <p>\$ _____</p> <p>\$ _____</p> <p>\$ _____</p>
		<p><b>If a site visit is necessary, contact Terry Pfeifer at <a href="mailto:tpfeifer@fhsu.edu">tpfeifer@fhsu.edu</a>. Site visit must be completed by Monday, April 3, 2023 at 12 p.m.</b></p> <p><b>All questions must be submitted to the Purchasing Office in writing to <a href="mailto:purchasing@fhsu.edu">purchasing@fhsu.edu</a> by Monday, April 3, 2023 at 12 p.m.</b></p> <p><b>NOTE: Vendors must register through Vendor Registry to access this bid document on FHSU Purchasing website, <a href="https://fhsu.edu/purchasing/bids/index.html">https://fhsu.edu/purchasing/bids/index.html</a>. Submit your bid response through Vendor Registry.</b></p>	
<b>TOTAL DELIVERED PRICE (FOB Destination Prepaid &amp; Allowed)</b>			\$ _____

**TO BE CONSIDERED, THE FOLLOWING INFORMATION MUST BE PROVIDED BY THE BIDDER:**

DATE \_\_\_\_\_

TERMS \_\_\_\_\_

DELIVERY WILL BE MADE \_\_\_\_\_ DAYS A.R.O.

F.O.B. DEST. Fort Hays State University, Hays, KS  
67601

F.E.I.N. OR S.S.N. \_\_\_\_\_

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ST \_\_\_\_\_ ZIP \_\_\_\_\_

**SIGNED BY** \_\_\_\_\_

PRINT OR TYPE NAME \_\_\_\_\_

TITLE \_\_\_\_\_

TELEPHONE # \_\_\_\_\_

FAX # \_\_\_\_\_

E-MAIL ADDRESS \_\_\_\_\_

CHECK IF APPLICABLE

Small Business \_\_\_\_\_ Woman-Owned \_\_\_\_\_ Minority-Owned \_\_\_\_\_

**State Credit Card:** Presently, FHSU uses a State of Kansas Procurement Card (Visa) in lieu of a state warrant to pay for some of its purchases. State of Kansas Law does not allow retailers to charge a credit fee for using their cards. (Refusal will not be a determining factor in award of this contract.) Will the credit card be allowed for purchases? Yes \_\_\_\_\_ No \_\_\_\_\_

## TERMS AND CONDITIONS

1. It is the intent of Fort Hays State University (FHSU) to permit competitive bidding. It is the bidder's responsibility to advise the FHSU Purchasing Office, in writing, no later than three (3) business days before the bid closing date, if any specification or requirement described herein limits bidding to a single source.
2. Unless otherwise specified, Fort Hays State University reserves the right to accept or reject all or any part of your quotation, and to waive technicalities.
3. Offered payment discounts will NOT be considered in determining the low bid. The discount period begins on the date of delivery, or acceptance, or receipt of a correct invoice by the receiving agency, whichever is later.
4. Except as otherwise indicated, the merchandise quoted is in new condition.
5. Fort Hays State University reserves the right to award purchases by item, by group, or by lot, whichever is deemed to be in the university's best interest.
6. In the event of a tie for the low bid, the award will be made to the Kansas bidder.
7. Unit price will prevail in the event of extension error(s).
8. If awarded a purchase order, the bidder agrees to furnish the item(s) or provide the service(s) enumerated hereon at the price(s) quoted and in accordance with the conditions indicated.
9. If a bid indicates that an item quoted is functionally equivalent and it is purchased and found not to be comparable, Fort Hays State University reserves the right to return that item at the bidder's expense, and the bidder will be billed for the difference in cost between this bid and the successful bid.
10. If any portion of this bid is provided by a vendor other than the bidder, the bidder remains the prime contractor responsible for fulfilling all requirements of this bid.
11. Contracts or purchase orders resulting from this quotation may not be assigned without prior written consent of the FHSU Director of Purchasing.
12. The seller agrees to protect Fort Hays State University from all damages arising out of alleged patent infringement.
13. Partial payments will not be made, unless otherwise specified.
14. Bid results are available by written request with a check payable to Fort Hays State University for five dollars (\$5.00) per request, tax included, with a stamped, self-addressed envelope. Unless otherwise requested, your canceled check will serve as your receipt.
15. Any conviction for a criminal or civil offense that indicates a lack of business integrity or business honesty which currently, seriously and directly affects responsibility as a state contractor must be disclosed. This is to include (1) conviction of a criminal offense as an incident to obtaining or attempting to obtain a public or private contract of subcontract or in the performance of such contract of subcontract; (2) conviction under state or federal statutes of embezzlement, theft, forgery, bribery, falsification or destruction of records, receiving stolen property; (3) conviction under state or federal antitrust statutes; and (4) any other offense to be serious and compelling as to affect responsibility as a state contractor. For the purpose of this section, an individual or entity shall be presumed to have control of a company or organization if the individual or entity directly or indirectly, or action in concert with one or more individuals or entities, owns or controls twenty-five percent (25%) or more of its equity, or otherwise controls its management or policies. Failure to disclose an offense may result in disqualification of the bid or termination of the contract.
16. If any part of this contract (including any required installation) is fulfilled by any other contractor, the successful bidder remains responsible for completing all aspects of the work described herein.
17. Vendors who are new to the university should complete a vendor registration form found at: <https://vrapp.vendorregistry.com/Vendor/Register/Index/fort-hays-state-university-ks-vendor-registration>. A copy of the vendor's W-9 should also be submitted with your bid: <http://www.irs.gov/pub/irs-pdf/fw9.pdf?portlet=3>.

## TAX CLEARANCE

Fort Hays State University strongly supports the State of Kansas Tax Clearance Process. Vendors submitting bids or proposals which exceed \$25,000 over the term of the contract shall include a copy of a Tax Clearance Certification Form with their submittal. Failure to provide this information may be cause for rejection of vendor's bid or proposal.

A "Tax Clearance" is a comprehensive tax account review to determine and ensure that the account is compliant with all primary Kansas Tax Laws administered by the Kansas Department of Revenue (KDOR) Director of Taxation. Information pertaining to a Tax Clearance is subject to change(s), which may arise as a result of a State Tax Audit, Federal Revenue Agent Report, or other lawful adjustment(s).

**To obtain a Tax Clearance Certificate, you must:**

- Go to <https://www.kdor.ks.gov/apps/taxclearance/Default.aspx> to request a Tax Clearance Certificate
- Return to the website the following working day to see if KDOR will issue the certificate
- If issued an official certificate, print it and attach it to your bid response
- If denied a certificate, engage KDOR in a discussion about why a certificate wasn't issued

**Bidders (and their subcontractors) are expected to submit a current Tax Clearance Certificate with every event response.**

*Please Note: Individual and business applications are available. For applications entered prior to 5:00 PM Monday through Friday, results typically will be available the following business day. Tax clearance requests may be denied if the request includes incomplete or incorrect information.*

*Please Note: You will need to sign back into the KDOR website to view and print the official tax clearance certificate.*

**A copy of the Certification of Tax Clearance form received from the Kansas Department of Revenue should be sent along with the bid response(s) to:**

Fort Hays State University  
Purchasing Office  
601 Park Street, Sheridan Hall 318  
Hays, KS 67601

Failure to provide this information may be cause for rejection of vendor's bid or proposal.

Information about Tax Registration can be found at the following website:

<http://www.ksrevenue.org/forms-btreg.html>.

The FHSU Purchasing Office reserves the right to confirm tax status of all potential contractors and subcontractors prior to the release of a purchase order or contract award.

In the event that a current tax certificate is unavailable, the FHSU Purchasing Office reserves the right to notify a bidder (one that has submitted a timely event response) that they have to provide a current Tax Clearance Certificate within ten (10) calendar days, or FHSU may proceed with an award to the next lowest responsive bidder, whichever is determined by the Purchasing Director to be in the best interest of FHSU and the State.

**CERTIFICATION REGARDING  
IMMIGRATION REFORM & CONTROL**

All Contractors are expected to comply with the Immigration and Reform Control Act of 1986 (IRCA), as may be amended from time to time. This Act, with certain limitations, requires the verification of the employment status of all individuals who were hired on or after November 6, 1986, by the Contractor as well as any subcontractor or sub-subcontractor. The usual method of verification is through the Employment Verification (I-9) Form. With the submission of this bid, the Contractor hereby certifies without exception that Contractor has complied with all federal and state laws relating to immigration and reform. Any misrepresentation in this regard or any employment of persons not authorized to work in the United States constitutes a material breach and, at the State's option, may subject the contract to termination and any applicable damages.

Contractor certifies that, should it be awarded a contract by the State, Contractor will comply with all applicable federal and state laws, standards, orders and regulations affecting a person's participation and eligibility in any program or activity undertaken by the Contractor pursuant to this contract. Contractor further certifies that it will remain in compliance throughout the term of the contract.

At the State's request, Contractor is expected to produce to the State any documentation or other such evidence to verify Contractor's compliance with any provision, duty, certification, or the like under the contract.

Contractor agrees to include this Certification in contracts between itself and any subcontractors in connection with the services performed under this contract.

\_\_\_\_\_  
Signature, Title of Contractor

\_\_\_\_\_  
Date

State of Kansas  
Fort Hays State University  
DA-146a (Rev. 12/19)

### CONTRACTUAL PROVISIONS ATTACHMENT

Important: This form contains mandatory contract provisions and must be attached to or incorporated in all copies of any contractual agreement. If it is attached to the vendor/contractor's standard contract form, then that form must be altered to contain the following provision:

"The Provisions found in Contractual Provisions Attachment (Form DA-146a, Rev. 12/19), which is attached hereto, are hereby incorporated in this contract and made a part thereof."

The parties agree that the following provisions are hereby incorporated into the contract to which it is attached and made a part thereof.

- 1. Controlling Provisions:** It is expressly agreed that the terms of each and every provision in this attachment shall prevail and control over the terms of any other conflicting provision in any other document relating to and a part of the contract in which this attachment is incorporated. Any terms that conflict or could be interpreted to conflict with this attachment are nullified.
- 2. Disclaimer Of Liability:** No provision of this contract will be given effect that attempts to require Fort Hays State University or any of its affiliates ("University") to defend, hold harmless, or indemnify any contractor or third party for any acts or omissions. The terms, conditions, and limitations of liability of the State of Kansas, the University, and their employees are defined under the Kansas Tort Claims Act (K.S.A. 75-6101 et seq.).
- 3. Termination Due To Lack Of Funding Appropriation:** If, in the judgment of the Director of Accounts and Reports, Department of Administration, sufficient funds are not appropriated to continue the function performed in this agreement and for the payment of the charges hereunder, the University may terminate this agreement at the end of its current fiscal year. The University agrees to give written notice of termination to contractor at least 30 days prior to the end of its current fiscal year, and shall give such notice for a greater period prior to the end of such fiscal year as may be provided in this contract, except that such notice shall not be required prior to 90 days before the end of such fiscal year. Contractor shall have the right, at the end of such fiscal year, to take possession of any equipment provided under the contract for which it has not been paid. The University will pay contractor all regular contractual payments incurred through the end of such fiscal year, plus contractual charges incidental to the return of any such equipment. Upon termination of the agreement under this provision, title to any such equipment shall revert to contractor at the end of the University's current fiscal year. The termination of the contract pursuant to this paragraph shall not cause any penalty to be charged to the agency or the contractor.
- 4. Kansas Law and Venue:** All matters arising out of or related to this agreement shall be subject to, governed by, and construed according to the laws of the State of Kansas, and jurisdiction and venue of any suit arising out of or related to this agreement shall reside only in courts located in the State of Kansas.
- 5. Required Non-Discrimination Provision:** Contractor agrees to comply with all applicable state and federal anti-discrimination laws. Contractor specifically agrees: (a) to comply with the Kansas Act Against Discrimination (K.S.A. 44-1001 et seq.) and the Kansas Age Discrimination in Employment Act (K.S.A. 44-1111 et seq.) and the applicable provisions of the Americans With Disabilities Act (42 U.S.C. 12101 et seq.) (ADA) and to not discriminate against any person because of race, religion, color, sex, disability, national origin or ancestry, or age in the admission or access to, or treatment or employment in, its programs or activities; (b) to include in all solicitations or advertisements for employees, the phrase "equal opportunity employer"; (c) to comply with the reporting requirements set out at K.S.A. 44-1031 and K.S.A. 44-1116; (d) to include those provisions in every subcontract or purchase order so that they are binding upon such subcontractor or vendor; (e) that a failure to comply with the reporting requirements of (c) above or if the contractor is found guilty of any violation of such acts by the Kansas Human Rights Commission or if it is determined that the contractor has violated applicable provisions of ADA, such violation(s) shall constitute a breach of contract and the contract may be cancelled, terminated or suspended, in whole or in part, by the University. The provisions of this paragraph (except the provisions relating to the ADA) are not applicable to a contractor who employs fewer than four employees during the term of such contract or whose contracts with the University cumulatively total \$5,000 or less during the fiscal year.

**Contractor shall abide by the requirements of 41 CFR §§ 60-1.4(a), 60-300.5(a) and 60-741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities, and prohibit discrimination against all individuals based on their race, color, religion, sex, or national origin. Moreover, these regulations require that covered prime contractors and subcontractors take**

**affirmative action to employ and advance individuals in employment without regard to race, color, religion, sex, national origin, protected veteran status or disability.**

6. **Acceptance Of Contract:** This contract shall not be considered accepted, approved or otherwise effective until the statutorily required approvals and certifications have been given.
7. **Arbitration, Damages, Warranties:** Notwithstanding any language to the contrary, no interpretation of this contract shall find that the University has agreed to binding arbitration, or the payment of damages or penalties. Further, the University does not agree to pay attorney fees, costs, or late payment charges beyond those available under the Kansas Prompt Payment Act (K.S.A. 75-6403), and no provision will be given effect that attempts to exclude, modify, disclaim or otherwise attempt to limit any damages or rights of action available to the University at law, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.
8. **Authority To Contract:** By signing this contract, the representative of the contractor thereby represents that such person is duly authorized by the contractor to execute this contract on behalf of the contractor and that the contractor agrees to be bound by the provisions thereof.
9. **Responsibility For Taxes:** The University shall not be responsible for, nor indemnify a contractor for, any federal, state or local taxes which may be imposed or levied upon the subject matter of this contract.
10. **Insurance:** The University shall not be required to purchase any insurance against loss or damage to property or any other subject matter relating to this contract, nor shall this contract require the University to establish a "self-insurance" fund to protect against any such loss or damage.
11. **Information/Confidentiality:** As a state agency, the University's contracts are generally public records. Accordingly, no provision of this contract shall restrict the University's ability to produce this contract in response to a lawful request or from otherwise complying with the Kansas Open Records Act (K.S.A. 45-215 et seq.). Moreover, no provision of this contract shall be construed as limiting the Legislative Division of Post Audit from having access to information pursuant to K.S.A. 46-1101 et seq.
12. **The Eleventh Amendment:** The Eleventh Amendment is an inherent and incumbent protection of the State of Kansas and need not be reserved, but the University here reiterates that nothing in or related to this contract shall be deemed a waiver of the Eleventh Amendment.
13. **Campaign Contributions / Lobbying:** Funds provided through a grant award or contract shall not be given or received in exchange for the making of a campaign contribution. No part of the funds provided through this contract shall be used to influence or attempt to influence an officer or employee of any State of Kansas agency or a member of the Legislature regarding any pending legislation or the awarding, extension, continuation, renewal, amendment or modification of any government contract, grant, loan, or cooperative agreement.
14. **Privacy of Student Records:** Contractor understands that the University is subject to FERPA (Family Educational Rights and Privacy Act, 20 U.S.C. § 1232g) and agrees to handle any student education records it receives pursuant to this Agreement in a manner that enables the University to be compliant with FERPA and its regulations. Contractor agrees to protect the privacy of student data and educational records in a commercially reasonable manner and shall not transmit, share, or disclose any data about a student without the student's written consent, except to other University officials who seek the information within the context of his/her professionally assigned responsibilities and used within the context of official University business. Contractor shall promptly report to the University any disclosure of University's student educational records.
15. **Boycotts of Israel Prohibited:** Kansas 2018 HB 2482 generally prohibits the University from entering into a contract with a company to acquire or dispose of services, supplies, information technology or construction, unless such company submits a written certification that such company is not currently engaged in a boycott of Israel. For the purposes of this Section, "company" means an organization, association, corporation, partnership, venture or other entity, its subsidiary or affiliate, that exists for profitmaking purposes or to otherwise secure economic advantage. Accordingly, by executing this contract, Contractor hereby certifies that it is not currently engaged in a boycott of Israel.
16. **Harassment Policy:** Fort Hays State University prohibits sexual harassment, discrimination, and retaliation. The University's applicable policies on sexual harassment, discrimination, and retaliation are available at <https://fhsu.edu/policies/documents/harassment-policy/index.pdf> and include the procedures for submitting a complaint of sexual harassment, discrimination, or retaliation, including an anonymous complaint. Contractor and its employees, officials, agents, or subcontractors shall at all times comply with the University's policies on sexual harassment, discrimination, and retaliation.

# ENGINEERING DATA



Smith & Loveless Inc.®

14040 Santa Fe Trail Drive  
Lenexa, KS 66215  
smithandloveless.com

EVERLAST™  
1000 SERIES  
Wet Well Mounted Pump Station  
Specification  
Page 1

## SPECIFICATION - EVERLAST™ 1000 SERIES WET WELL MOUNTED PUMP STATION WITH DUPLEX NON-CLOG PUMP TO REPLACE 16-07200 FORT HAYS STATE UNIVERSITY (CUSTER HALL)

### GENERAL

The contractor shall furnish and install one factory-built, automatic pumping station as manufactured by Smith & Loveless, Inc., Lenexa, Kansas. The station shall be complete with all needed equipment, factory-installed on a welded steel base with a hinged fiberglass cover.

The principal items of equipment shall include two vertical, close-coupled, motor driven, vacuum primed, non-clog pumps; valves; internal piping; central control panel with circuit breakers; motor starters and automatic pumping level controls; heater; ventilating blower; priming pumps with WaveStart™ pump prime detection system and appurtenances; and all internal wiring.

### OPERATING CONDITIONS

Each pump shall be capable of delivering 200 GPM of raw water or wastewater against a total dynamic head of 20 feet. The minimum acceptable pump efficiency at this condition shall be 60%. Due to the energy conservation requirements, the minimum efficiency will be enforced. The maximum allowable speed shall be 875 RPM. The minimum rated horsepower of each pump motor shall be 3. The actual static suction lift, measured from the station baseplate to the "off" level in the wet well, shall be 15' at 2100' elevation above Mean Sea Level. The pumps shall be capable of meeting or exceeding this value, at the specified altitude.

The minimum specified pump efficiency is 60%. Should a Contractor wish to propose an alternate pump which does not meet or exceed the specified efficiency, the Contractor will be required to provide, 15 days prior to the bid opening, a pre-bid submittal packet with the proposed pump details, pump curve and efficiency. The submittal will be accompanied by a 25 year cost of operation difference calculation. The energy cost difference, due to reduced efficiency, over a 25 year period, calculated at \$ [redacted] per KWH, shall be applied as an adder when evaluating the alternate manufacturer's bid number.

All openings and passages shall be large enough to permit the passage of a sphere 3" (75 mm) in diameter and the pump shall have a flanged suction and discharge connection no smaller than 4" (100 mm). The pump motors shall not be overloaded beyond their nameplate rating at the design conditions nor at any head in the operating range.

### CONSTRUCTION

The station shall be constructed in one complete, factory-built assembly. It shall be sized to rest on the top of the wet well as detailed in the construction drawings.

### DURO-LAST® CORROSION-RESISTANT STAINLESS STEEL BASEPLATE

The baseplate of the pump station structure shall be fabricated of [3/8" (9.5 mm), 1/2" (13 mm)] corrosion-resistant lean duplex series 2100 stainless steel alloy, 316L stainless steel or equal. The stainless steel shall have a Pitting Resistance Equivalent Number (PRE<sub>N</sub>) of 24.0 or greater and general corrosion resistance shall be less than or equal to 0.1 mm per year in 15% H<sub>2</sub>SO<sub>4</sub> at 120 degrees F. Due to the corrosion resistance requirements, Grade 304-304L is not acceptable.

All stainless steel surfaces shall be dry abrasive blast cleaned to remove rust, mill scale, weld slag, etc. Cleanliness shall be to SSPC-SP16. The nominal surface profile shall be 0.75 mils. All blasted surfaces, including welds and cut edges, shall be coated completely with an environmentally friendly passivation solution and then thoroughly rinsed to provide a uniform finish, and to add a transparent oxide film to protect the surface from future contamination.

The pump station shall be enclosed by a hinged fiberglass cover made of molded reinforced orthophthalic polyester resins with a minimum of 30% glass fibers with a minimum average length of 1-1/4" (32mm). The outside of the enclosure shall be coated with a polyester protective in-mold coating for superior resistance to weathering, ultraviolet radiation, yellowing and chalking. The completed fiberglass enclosure shall be resistant to mold, mildew, fungus and corrosive liquids and gasses normally found in pump station environments. The dimensions of the enclosure shown on the drawings shall be considered a minimum, for internal component clearances and accessibility, and nothing smaller will be acceptable. The cover shall have a suitable drip-lip around the edge and shall be provided with a hasp and staple connection to the floor plate to allow the pump chamber to be locked with a padlock.



# ENGINEERING DATA



Smith & Loveless Inc.®

14040 Santa Fe Trail Drive  
Lenexa, KS 66215  
smithandloveless.com

**EVERLAST™**  
1000 SERIES  
Wet Well Mounted Pump Station  
Specification  
Page 2

The cover shall be attached with a multi segment stainless steel hinge, constructed of 7 gauge (4.6 mm) (minimum) type 304 stainless steel with a 3/8" (9.5 mm) diameter stainless steel pin and supporting at least 75% of the width of one end. Stainless steel bolts with tamperproof heads and a full width 3/8" (9.5 mm) thick anodized aluminum backing plate shall anchor the hinge to the fiberglass cover.

Dual high-pressure gas struts shall be provided to counteract the dead weight of the cover assembly and limit the maximum lifting force required for opening to less than 20 pounds (9 kg). The cover shall be self-latching upon opening, with a manually operated release for closing. Duplex heavy gauge safety chains shall be provided to prevent over-extension. All hardware and components of the cover assembly that are exposed to the weather shall be constructed of corrosion-resistant materials.

Heavy extruded aluminum, adjustable ventilating louvers shall be provided on each end of the fiberglass cover, which are capable of being closed during cold weather operation.

An aluminum manway cover fabricated of 1/4" (6.3 mm) treadplate, located exterior to the fiberglass pump chamber shall be provided, complete with padlocking provisions. The manway shall be an integral part of the station floor plate and provide access to the wet well. The minimum open area of the manway access into the wet well shall be at least 4.2 square feet (0.39 m<sup>2</sup>).

The manway cover shall have a three color 7" x 10" (178 mm x 254 mm) (minimum) corrosion-resistant sign permanently affixed to it, reading "DANGER – Before Entering, Test For Explosive Gases. Test For Oxygen Deficiency. Supply Fresh Air To Work Area".

Enclosures utilized to house the valve train and/or controls, which are defined under OSHA Article 29CFR, Parts 1910 as a Confined Space shall not be acceptable.

To allow on-site maintenance of the pumps, a stanchion with lifting arm shall be provided to lift each pump. The lifting arm shall have a hook over the center of the motor to support a hoist (provided by others) for removal of the motors, impellers and pumps from the station.

The pump casings and discharge piping shall be mounted in relation to the floor plate as detailed in the construction drawings. The suction and discharge connections, where they pass through the floor shall be sealed by gaskets, rather than being welded, to allow adjustment and replacement.

## WELDING

All steel structural members shall be joined by electric arc welding with welds of adequate section for the joint involved. Structural welding shall be performed in accordance with AWS standards and procedures.

## PROTECTION AGAINST CORROSION

All structural steel and cast iron surfaces shall be factory blasted with steel grit, in an environmentally controlled booth, to remove rust, mill scale, weld slag, etc. All weld spatter and surface roughness shall be removed by grinding. Surface preparation and cleanliness shall comply with SSPC-SP6 specifications. The surface profile shall be 2.0 mils (0.05 mm). Sandblasting is specifically prohibited. After blast cleaning, all surface contaminants, such as grease or oil, shall be removed before coating. Immediately following cleaning, a single 6 mil (0.15 mm) minimum dry film thickness coating of VERSAPOX®, a self-priming Cycloaliphatic Amine Epoxy shall be factory applied to the cleaned components. After curing, a 2.5 mil (0.06 mm) minimum DFT top coating of semi-gloss XTRATHANE™, a moisture-cured Aliphatic Polyurethane protective finish, for abrasion resistance and weather protection, shall be applied to the exterior areas, including the pumps and piping and the top and sides of the base, if carbon steel. These coatings shall be as formulated by Smith & Loveless specifically for this type of application and service.

Stainless steel, aluminum and other corrosion-resistant surfaces shall not be coated. Carbon steel surfaces not otherwise protected shall be coated with a suitable non-hardening rust preventative compound. Auxiliary components shall be furnished with the original manufacturer's coating.

Finish coating shall be accomplished prior to shipment of the equipment from the factory and shall comply fully with the intent of these specifications. A touch-up kit shall be provided by the pump station manufacturer for repair of any marks or scratches occurring during shipping and installation. This kit shall contain detailed instructions for use.

# ENGINEERING DATA



Smith & Loveless Inc.®

14040 Santa Fe Trail Drive  
Lenexa, KS 66215  
smithandloveless.com

EVERLAST™  
1000 SERIES  
Wet Well Mounted Pump Station  
Specification  
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## MAIN PUMPS

The pumps shall be 4" vertical, centrifugal non-clog type of heavy cast-iron construction, especially designed for the use of mechanical seals and vacuum priming. In order to minimize seal wear caused by linear movement of the shaft, the shaft bearing nearest the pump impeller shall be locked in place so that endplay is limited to the clearance within the bearing. To minimize seal wear resulting from shaft deflection caused by the radial thrust of the pump, the shaft from the top of the impeller to the lower bearing supporting the impeller shall have a minimum diameter of 1-7/8" (48 mm) for motor frame sizes 213 through 286; 2-1/8" (54 mm) for motor frame sizes 324 and 326; and 3" (76 mm) for frame 364 and larger. The dimension from the lowest bearing to the top of the impeller shall not exceed 6" (152 mm). The motor shaft shall be directly connected to the impeller without the use of drive belts or couplings, which require alignment and maintenance, and which increase power consumption due to their inherent energy losses.

Pumps with less than a standard 4" (100 mm) suction or 4" (100 mm) discharge connection, or with less than a 3" (76 mm) spherical solids handling capacity will be rejected for this application.

The oversized shaft incorporating oversized bearings and heavier bearing frame construction provides for extended mechanical seal, bearing and overall pump/motor life. Since the larger shaft with the specified minimum overhang is the key to heavier, more rigid construction throughout, no deviation from the specified shaft diameter or tolerances will be allowed.

The bearing nearest the impeller shall be designed for the combined thrust and radial load. The upper bearing shall be free to move in a linear direction with the thermal expansion of the shaft and shall carry only radial loads.

The shaft shall be solid stainless steel through the mechanical seal to eliminate corrosion and abrasive rust particles. Removable shaft sleeves will not be acceptable if the shaft under the sleeve does not meet the specified minimum diameter.

The pump shall have an integral adapter providing a large water reservoir above the impeller to provide for positive exclusion of air from the impeller. The seal shall be inside this area to assure lubrication. Pumps which do not use hollow priming adapters for positive lubrication of the seal will not be acceptable. Self-priming pumps are specifically unacceptable due to the need for suction check valves, air vent piping and the possibility of overheating and damaging the pump or producing steam or high temperatures in the pump, which may be a hazard to the operator, when the pump is run dry.

The pump controls must be set so that the main pumps cannot be turned on unless they are filled with liquid, and the pump is completely primed.

The pump shall be constructed so as to permit priming from the lower pressure area behind the impeller. Priming from high-pressure connections, which tends to cause solids to enter and clog the priming system, will not be acceptable. The priming bowl shall be transparent, enabling the operator to monitor the priming level.

The pump shall be arranged so that the rotating element can easily be removed from the casing without disconnecting the electrical wiring or disassembling the motor, impeller, backhead or seal, so that any foreign object may be removed from the pump or suction line. Enclosed impellers must be used to avoid the necessity of wear plates and the associated costs of replacement and maintenance of wear plate clearances with semi-open impellers.

The pump shaft shall be sealed against leakage by a single mechanical seal constructed so as to be automatically drained and primed each time the pump is drained and primed. Water, which lubricates the mechanical seal, shall be automatically drained from around the seal if the pump loses prime in order to allow both the pump and the seal to be drained, thereby preventing freezing and breakage of the seal during power outages in sub-freezing temperatures.

The seal shall be of carbon and ceramic materials with the mating surfaces lapped to a flatness tolerance of one light band. The rotating ceramic shall be held in mating position with the stationary carbon by a stainless steel spring. The entire seal assembly shall be held in place by a bronze seal housing to prevent excessive heat buildup. Use of cast-iron or other ferrous material for the seal housing which will rust and damage the seal, shortening its life, will not be acceptable.

The pump volute shall be furnished with mounting lugs and bolted to the station floor plate, forming a gas-tight seal.

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## X-PELLER® SUPER CLOG-RESISTANT MONO-PORT IMPELLER

The pump impeller shall be of the enclosed mono-port type made of close-grained cast-iron and shall be in dynamic balance when pumping wastewater. Two port impellers are specifically disallowed. The dynamic balance shall be obtained without the use of balance weights or liquid filled chambers. The impeller shall be designed to allow for the trimming of the impeller to meet design condition changes without altering the balance. The eye of the impeller as well as the port shall be large enough to permit the passage of a sphere 3" (76 mm) in diameter in accordance with nationally recognized codes. To further prevent clogging, the impeller port shall have a minimum area of 10.6 in<sup>2</sup> (6840 mm<sup>2</sup>). The impeller shall be keyed with a stainless steel key and secured to the motor shaft by a stainless steel capscrew equipped with a Nylock or other suitable self-locking device. The impeller shall not be screwed or pinned to the motor pump shaft and shall be readily removable without the use of special tools. To prevent the buildup of stringy materials, grit and other foreign particles around the pump shaft, all impellers less than full diameter shall be trimmed inside the impeller shrouds.

The shrouds shall remain full diameter so that close minimum clearance from shrouds to volute is maintained. Both the end of the shaft and the bore of the impeller shall be tapered to permit easy removal of the impeller from the shaft.

## MOTORS

The pump motors shall be vertical, solid shaft, NEMA P-base, squirrel-cage induction type, suitable for 3 phase, 60 cycle, 208 volt electric current.

They shall have Class F insulation. Insulation temperature shall, however, be limited to Class B. The motors shall have normal starting torque and low-starting current, as specified by NEMA Design B characteristics. They shall have forced air circulation by an integral fan. Openings for ventilation shall be uniformly spaced around the motor frame. Leads shall be terminated in a cast connection box and shall be clearly identified.

The motors shall have 1.15 service factor. The service factor shall be reserved for the owner's protection. The motors shall not be overloaded beyond their nameplate rating, at the design conditions, nor at any head in the operating range as specified under Operating Conditions.

The motor-pump shaft shall be centered, in relation to the motor base, within .005" (0.127 mm). The shaft runout shall not exceed .003" (0.076 mm).

The motor shaft shall equal or exceed the diameter specified under Main Pumps at all points from immediately below the top bearing to the top of the impeller hub.

A bearing cap shall be provided to hold the bottom motor bearing in a fixed position. Bearing housings shall be provided with fittings for lubrication as well as purging old lubricant.

The motor shall be fitted with heavy lifting eyes or lugs, each capable of supporting the entire weight of the pump and motor.

## CONTROLS

The control equipment shall be mounted in a NEMA Type 1 steel enclosure with 2 hinged access doors.

A grounding-type convenience outlet shall be provided on the side of the cabinet for operation of 120-volt AC devices.

Thermal magnetic air circuit breakers shall be provided for branch disconnect service and short circuit protection of all motor control and auxiliary circuits.

Magnetic across-the-line starters with under-voltage release and overload coils for each phase shall be provided for each pump motor to give positive protection. Each single-phase auxiliary motor shall be equipped with an over-current protection device in addition to the branch circuit breaker, or shall be impedance protected.

All wiring shall be labeled with thermal transfer self-laminating labels and a coded wiring diagram shall be provided.



## FLOAT SWITCH LEVEL CONTROLS

To control the operation of the pumps with variations of liquid level in the wet well, a minimum of three (3) displacement switches shall be provided. A 30' (9 m) cord shall be provided with each switch. The cord shall have a corrosion-resistant vinyl jacket and be multi-stranded in order to prevent fatigue.

The displacement switch cords shall enter the wet well through cord grip seals mounted to a removable, gasketed floor plate. The floor plate shall allow the displacement switches to be adjusted or removed and replaced without having to enter or reach into the wet well.

An automatic alternator with manual switch shall be provided to change the sequence of operation of the pumps every eight hours. Alternating the pumps at less than eight-hour intervals will not be acceptable.

Provisions shall also be made for the pumps to operate in parallel should the level in the wet well continue to rise above the starting level for the low level pump.

## HIGH WET WELL LEVEL ALARM

An adjustable displacement switch shall be provided to sense a high water level condition. The switch shall hang into the wet well and shall activate a contact to indicate the high water condition.

## REMOTE ALARM CONTACTS

In addition to the common, powered local alarm connection, individual unpowered contacts shall be provided and wired to a terminal strip for field connection to a remote alarm monitoring system (not included).

## RUNNING TIME METER

A running time meter shall be supplied for each pump to show the number of hours of operation. The meter shall be enclosed in a dust and moisture-proof molded plastic case. The flush-mounted dial shall register in hours and tenths of hours up to 99,999.9 hours before repeating. The meter shall be suitable for operation from a 115-volt, 60 (50)-cycle supply.

## PUMP FAILURE TO PRIME OR FAILURE TO PUMP ALARM (CHECK VALVE SWITCH TYPE)

To sense failure to deliver normal flow for any reason, including failure to prime, each pump shall be provided with a sealed, non-contact, non-mercury type solid state, UL labeled sensor switch mounted with an adjustable universal mounting bracket to the external arm of each discharge check valve. The mounting bracket shall allow the adjustment of the sensor switch with a single locking pivot adjustment. A red LED indicating light shall be provided on each switch unit to facilitate accurate setting of the switch for proper operation. The sensor switch shall monitor the movement of the check valve arm and thereby detect failure of the pump to deliver normal operating flow when called on to run. An auxiliary time delay relay shall be provided to prevent an alarm signal during the pump priming and startup period.

## VACUUM-PRIMING SYSTEM

A vacuum priming system shall be furnished to prime the main pumps. The system shall be as shown on the vacuum priming schematic and shall include two vacuum pumps, providing 100 percent standby. Vacuum pumps shall have corrosion-resistant internal components. The vacuum priming system shall be complete with large port vacuum control solenoid valves, **WaveStart™** prime level sensor, float-operated check valves to protect the vacuum pumps, and all necessary shut-off valves as shown on the piping schematic. The float-operated check valves shall have a transparent body for visual inspection. All hoses and tubing used in the priming system shall be at least 3/8" (9.5 mm) nominal diameter.

The solenoid valves used in the vacuum priming system shall be of the high flow, direct acting brass body type, with threaded ports, NBR seals and 300 Series stainless steel plunger, rod, plate and springs.

The minimum orifice diameter shall be 5/16" (8 mm). The solenoid valves shall be UL Listed, with Class F coil rating and of suitable voltage and thermal capacity for the application.

Liquid level in the pump priming chamber shall be monitored by a **WaveStart™** liquid level sensing probe incorporating frequency spectrum technology to evaluate the media with which it is in contact at several measurement points. At each

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measurement point the sensor shall take readings. Using a multi-variable sensing technology, collected over a spectrum sweep, the sensor shall create an outline of the medium, its residue and absence of medium. From these reference points the sensor shall be able to accurately determine the presence or absence of liquid, unaffected by foam, residue or deposits. The liquid level sensor algorithm shall provide prime status in less than 100 milliseconds.

Systems utilizing an electrode, mechanical means such as a float or protrusions into the pump, which may become fouled due to bridging or wrapping, or that require any type of electrical or moving parts inside the priming chamber, which may accumulate debris, short out, bind or fail will not be acceptable. Single or double medium sensing probes will be unacceptable.

The **WaveStart™** probe shall be provided with light emitting diodes. This diagnostic tool shall indicate connectivity, prime status or a fault condition. The probe shall be complete sealed and have a 316L stainless steel housing for corrosion resistance. It shall be provided with a wiring connector of molded thermoplastic for impact and chemical resistance. The probe shall have a threaded electrical connector to facilitate easy removal.

The priming system shall automatically provide positive lubrication of the mechanical seal each time a main pump is primed. To prevent excessive stoppage due to grease accumulation, no passageway in the priming system through which the pumped liquid must pass shall be smaller than the equivalent of a 2-1/2" (64 mm) opening.

The vacuum priming system shall have two field selectable modes of operation. In the "On-Demand" mode, the priming system will operate only after a pump is called on to run, and if it is not primed. Once primed, the pump will be allowed to run. In the "Constant Prime" mode, both pumps are kept primed continuously, and ready to start immediately when called for.

## ENVIRONMENTAL EQUIPMENT

A ventilating blower capable of delivering 245 CFM at 0.1" (116 l/s at 2.5 mm) static water pressure shall be provided in order to remove the heat generated by continuous motor operation. The ventilating blower shall be turned on and off automatically by a preset thermostat. A heavy extruded aluminum louvered grille with adjustable openings shall cover the discharge of the blower. A similar grille shall be provided in the other end of the station enclosure for air intake. A 500-watt electric heater controlled by a preset thermostat shall be furnished. The heater shall be rigidly mounted in the station to prevent removal.

### (OPTIONAL ITEM – CHECK IF REQUIRED)

#### **SINGLE-PHASE 120-VOLT POWER TRANSFORMER PACKAGE. SELECT IF SEPARATE 120-VOLT SUPPLY IS NOT AVAILABLE.**

A 5 KVA insulating-type transformer shall be provided to supply power for lights, controls and auxiliary devices. The transformer shall have 240/480 volt primary, 120/240 volt secondary, Class F insulation, with temperature rise not to exceed 115°C above 40°C ambient. The core and coil assembly shall be given a double dip and bake. The coil shall be protected by a metal housing to prevent damage. The transformer shall be protected by a separate circuit breaker on the supply side.

## MAIN PIPING

The pump suction connections shall be drilled and tapped for a 125-pound American Standard flange for easy attachment of the suction risers. The discharge line from each pump shall be fitted with a clapper-type check valve and eccentric plug valve. Size, location and quantity of check valves and plug valves shall be as shown on the construction drawing.

The check valve shall be of the spring-loaded type with external lever arm and an easily replaced resilient seat for added assurance against vacuum leaks. Check valves shall have stainless steel shaft with replaceable bronze shaft bushings. Ball-type check valves are specifically unacceptable for this application. An operating wrench shall be provided for the plug valves. All station piping and fittings shall be capable of passing a 3" (76 mm) spherical solid.

## RAPID-JACK™ CHECK VALVE

The cast iron check valve body shall be designed so that the upper portion may be easily removed, without disturbing the end flange seals to adjacent piping, to service the shaft, arm and clapper or to remove any material which may be causing clogging. Provide one spare body gasket for each valve.

Protrusions through the station floor shall be sealed where necessary to effect sealing between the equipment chamber and the wet well. The suction and discharge connections, where they pass through the floor, shall be sealed by gaskets in order

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to prevent corrosive, noxious fumes from entering the station. Welded joints that do not allow adjustment or replacement will not be considered for this application. The pump station manufacturer shall extend the suction and discharge connections below the floor at the factory so that field connections can be made without disturbing the gas-tight seals.

The manufacturer of the pump station shall provide a compression-type sleeve coupling for installation on the common discharge pipe. A minimum of two anchoring points shall be provided on the bottom of the station baseplate for attachment of coupling joint restraints, which shall be provided by the installing contractor.

## SUCTION PIPE SUPPORT KIT

To restrain and support the two 4" diameter suction pipes in the 4'-0" inside diameter wet well, a 6" 304L stainless steel horizontal support channel with 304L stainless steel adjustable end brackets and 316 stainless steel "U" bolts and mounting hardware, shall be provided for field installation by the Installing Contractor. It shall be anchored to the wet well wall by the Contractor, using the provided 316 stainless steel 5/8" wedge anchors, and adjusted to hold the suction pipes securely in a vertical position and minimize strain on the piping. The support shall be located 4' to 10' above the bottom of the vertical piping, as shown on the drawings.

## COLD CLIMATE PACKAGE

For cold weather operation, the station shall be provided with a 1300/1500 watt, dual range auxiliary heater with automatic circulating fan, thermostat control and an On/Off switch. The auxiliary heater shall be plugged into the station's duplex receptacle. In addition, the fiberglass cover shall have a minimum of 1" thick urethane insulation, protected by fiberglass, with an "R" value of 7 or more. Also, the priming system shall be interlocked with the station temperature sensor so that, should the station ambient temperature fall below a pre-set minimum, solenoid valves shall open the priming system to atmospheric pressure, when the pumps are not running, allowing the liquid in the pumps and piping to drain back into the wet well, preventing freezing.

## PROTECTED LIQUID FILLED COMPOUND PRESSURE GAUGES

A four-inch (4") (100 mm) Bourdon tube-type compound vacuum/pressure gauge with 3-1/2" (89 mm) dial, fitted with a brass stop valve and a manual air relief valve shall be provided for each pump. The gauges shall be mounted apart from the pumps, on a bracket attached to the control panel support structure, and connected to the pump discharge taps by flexible tubing to minimize vibration. The range of each gauge shall be selected to place the normal operating discharge pressure reading in the middle one-third of the scale and the gauge shall also be capable of measuring up to 30" HG (1.0 bar) of vacuum. The dial shall be white with black markings and the gauge itself shall have an accuracy of 1% of scale. The gauge shall be American made, with a Zytel Nylon case with 1/2" (13 mm) blow-out plug, stainless steel bezel, acrylic lens and phosphorus bronze tube with brass socket. Temperature compensation shall be provided by an internal compensating diaphragm. Gauges shall be protected from the service fluid by a Buna-N elastomer "boot" diaphragm within the stem, and the Bourdon tube and the space between the Bourdon tube and the internal isolating diaphragm shall be filled with low temperature instrument oil, completely isolating the gauge components from the fluid being measured.

## CHECKLIST

The pump and pump station specifications and the following checklist must be met in total. There are many reasons for incorporating a good pump specification. For example, the stainless steel shaft with tapered impeller attachment is provided to minimize corrosion, extend seal life, and provide ease of impeller removal and seal replacement without use of a wheel puller. All items specified are for long life, durability and maintainability of the pumping equipment. Deviations from the pump specification will not be allowed.

The checklist is also provided to insure that the proper pumping system is provided to the owner.

## FACTORY TESTS

All components of the pump station shall be given an operational test at the pump station manufacturer's facility to check for excessive vibration or leaks in the piping or seals, and to correct operation of the automatic control and vacuum priming systems and all auxiliary equipment. Installed pumps shall take suction from a deep wet well, simulating actual service conditions. The control panel shall undergo both a dry logic test and a full operational test with all systems operating.

Factory test instrumentation must include flow measuring with indicator; compound suction gauge; Bourdon tube-type discharge pressure gauge; electrical meters to measure amperes, volts, kilowatts and power factor; speed indicator; and a Vibrometer

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capable of measuring both amplitude and frequency.

## SPARE PARTS

A complete replacement pump shaft seal assembly shall be furnished with each pump station. The spare seal shall be packed in a suitable container and shall include complete installation instructions. A spare volute gasket and seal gasket shall be provided.

An instructional video presentation on the pump mechanical seal system in DVD format shall be included. The DVD shall contain a presentation on the following subjects: purpose and location of the mechanical seal, signs of a defective mechanical seal, how to remove the mechanical seal, troubleshooting seal failure causes, seal components, required tools, how to reinstall the seal and how to place the pump back into service. The video shall include footage of an actual seal replacement.

## INSTALLATION AND OPERATING INSTRUCTIONS

Installation of the pump chamber shall be done in accordance with the written instructions provided by the manufacturer.

Operation and maintenance manuals shall be furnished which will include parts lists of components and complete service procedures and troubleshooting guide.

## STARTUP

The Manufacturer shall provide the services of a factory-trained representative for a maximum period of one day on-site to perform initial startup of the pump station and to instruct the owners operating personnel in the operation and maintenance of the equipment.

## WARRANTY

The manufacturer of the station shall warrant for one (1) year from date of start-up, not to exceed eighteen (18) months from date of shipment, that the structure and all equipment he provides will be free from defects in material and workmanship. Warranties and guarantees of the suppliers of various components in lieu of a single-source responsibility by the Manufacturer will not be accepted. The Manufacturer shall assume prime responsibility for the warranty of the station and all components provided by them. Equipment supplied by others and incorporated into the station is not covered by this warranty.

In the event a component fails to perform as specified or is proven defective in service during the warranty period, the Manufacturer shall repair or replace, at his discretion, such defective part.

He shall further provide, without cost, such labor as may be required to replace, repair or modify the steel structure. After start-up service has been performed, the labor to replace accessory items, such as the blower, priming pumps, alternator, etc., shall be the responsibility of others.

It is not intended that the Manufacturer assume responsibility for contingent liabilities or consequential damages of any nature resulting from defects in design, material, workmanship or delays in delivery, replacement or otherwise.

The motor adapter, volute, impeller, fiberglass enclosure and steel base shall be covered by a 10-year pro-rated warranty. The fiberglass enclosure shall be warranted against failure of the fiberglass components. The steel base shall be warranted against structural failure and perforation due to corrosion. If applicable, the microprocessor controller, panel display unit and submersible level transducer shall be covered by a 5-year pro-rated warranty.

The pro-rated warranties shall be computed on a monthly basis starting at shipment and shall cover replacement parts only.

The repair or replacement of those items normally consumed in service, such as pump seals, grease, light bulbs, etc., shall be considered as part of routine maintenance and upkeep.

This warranty is valid only when installation, operation and maintenance has been done in accordance with the manufacturer's recommendations. A start-up report filed by an authorized representative of the manufacturer must be received by the manufacturer after the unit is placed in service.

The manufacturer shall provide a warranty certificate covering specific details.

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## MANUFACTURER'S INSURANCE

ALL EQUIPMENT MANUFACTURERS, either direct or subcontractors to the general or mechanical contractors, SHALL HAVE in effect at TIME OF BID, CONTRACT AWARD, CONTRACT PERFORMANCE, and WARRANTY TERM, PRODUCT AND COMPREHENSIVE LIABILITY INSURANCE, INCLUDING SUDDEN AND ACCIDENTAL POLLUTION COVERAGE in the amount of FIVE MILLION DOLLARS, \$5,000,000, through an insurance company with a minimum rating of A+ (SUPERIOR) XV according to the BEST'S INSURANCE REPORTS. All policies must be written on an OCCURRENCE BASIS. Policies written on a CLAIMS MADE BASIS are not acceptable. A typical CERTIFICATE OF INSURANCE attesting to the specified coverage issued by the responsible carrier naming the ENGINEER OF RECORD and the OWNER as ADDITIONAL INSURED must be presented to the named additional insured prior to contract award. A FAILURE TO COMPLY with this requirement BY THE BIDDER will require DISQUALIFICATION of the BID and CONTRACT AWARD.

## MANUFACTURED EQUIPMENT

The specifications and drawings detail Smith & Loveless equipment and represent the minimum standard of quality for both equipment and materials of construction. The contractor shall prepare his bid on the basis of the particular equipment and materials specified for the purpose of determining the low bid.

The owner has standardized on the named equipment in order to optimize their operation, facilitate maintenance and safety programs, provide for interchangeability of costly equipment items, reduce stocking levels required for necessary spare parts and provide increased flexibility in the utilization of their pumping equipment. Equipment substitutions, since incompatible with the district's standardization program, will not be considered.



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## PUMP STATION CERTIFICATION AFFIDAVIT (X-PELLER® Mono-Port Impeller)

A submittal to the owner by manufacturers proposing alternate, unnamed pump stations will be required with their bid. Included in the submittal shall be detailed drawings and specifications on the proposed pump station. The bid submittal shall include the following completed checklist signed by an officer of the company.

	YES	NO
Close-coupled pump design – no motor to pump shaft coupling or drive belts		
Pump shaft diameter of 1-7/8” minimum through seal		
Full diameter impeller shrouds, top and bottom		
Stainless steel pump shaft with tapered shaft to impeller fit		
Maximum pump shaft overhang of 6” (152 mm) - lower bearing to impeller		
Bronze seal housing		
Minimum pump efficiency at design point of 200 GPM of 60 %		
Impeller eye and port pass a 3” (76 mm) sphere		
Impeller of mono-port design with a minimum area of 10.6 square inches (6840 mm <sup>2</sup> )		
Trimming of impeller vane does not alter dynamic balance		
Impeller dynamically balanced without use of weights or liquid filled chambers		
Class F motor insulation with Class B max motor temperature rise and 1.15 service factor		
Motor shaft run-out 0.003” (0.076 mm) max at end of shaft		
Motor shaft centered to motor base with 0.005” (0.127 mm)		
Locked lower bearing and floating upper bearing		
One-piece motor adapter/backhead		
Motor HP of 3 at 875 RPM		
Complete pump station factory tested on a wet well		
Priming from low pressure area behind the impeller		
Frequency spectrum technology pump prime detection system		
Transparent priming bowl for operator monitoring		
Hollow priming adapter for positive seal lubrication		
Completely separate priming system for each pump		
Minimum 2-1/2” (64 mm) equivalent opening in priming passageways		
Maximum 20 lb. (9 kg) force required to open station cover		
All other items for the station, as specified with minimum sizes, capacities and materials indicated		
Product liability insurance, \$5 million per specification		
Structure blasted with steel grit in environmentally controlled booth prior to coating with epoxy resin		

The consulting engineer shall be the sole judge of whether the proposed equipment is acceptable. The manufacturer shall have the responsibility of submitting sufficient information in one submission. Incomplete or inaccurate submittal data shall be cause for rejection of the proposed equipment.

By signing this affidavit, the officer of the company has stated 100% compliance with the plans and specifications and further states he will supply or pay for all deficiencies found in the job submittals or after the unit is installed. The consulting engineer shall be the sole judge regarding compliance with the plans and specifications and shall be sole judge on the amount of moneys required if any deficiencies are found, related to, but not limited to, a 20-year station design life.

\_\_\_\_\_  
Signature of Company Officer

\_\_\_\_\_  
Title

Corporate Seal  
(Notarized)

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## SPECIFICATION - EVERLAST™ 1000 SERIES WET WELL MOUNTED PUMP STATION WITH DUPLEX NON-CLOG PUMP TO REPLACE 16-08353 FORT HAYS STATE UNIVERSITY (GROSS/CUNNINGHAM HALL)

### GENERAL

The contractor shall furnish and install one factory-built, automatic pumping station as manufactured by Smith & Loveless, Inc., Lenexa, Kansas. The station shall be complete with all needed equipment, factory-installed on a welded steel base with a hinged fiberglass cover.

The principal items of equipment shall include two vertical, close-coupled, motor driven, vacuum primed, non-clog pumps; valves; internal piping; central control panel with circuit breakers; motor starters and automatic pumping level controls; heater; ventilating blower; priming pumps with WaveStart™ pump prime detection system and appurtenances; and all internal wiring.

### OPERATING CONDITIONS

Each pump shall be capable of delivering 350 GPM of raw water or wastewater against a total dynamic head of 40 feet. The minimum acceptable pump efficiency at this condition shall be 48%. Due to the energy conservation requirements, the minimum efficiency will be enforced. The maximum allowable speed shall be 1760 RPM. The minimum rated horsepower of each pump motor shall be 10. The actual static suction lift, measured from the station baseplate to the "off" level in the wet well, shall be 20' at 2100' elevation above Mean Sea Level. The pumps shall be capable of meeting or exceeding this value, at the specified altitude.

The minimum specified pump efficiency is 60%. Should a Contractor wish to propose an alternate pump which does not meet or exceed the specified efficiency, the Contractor will be required to provide, 15 days prior to the bid opening, a pre-bid submittal packet with the proposed pump details, pump curve and efficiency. The submittal will be accompanied by a 25 year cost of operation difference calculation. The energy cost difference, due to reduced efficiency, over a 25 year period, calculated at \$ [redacted] per KWH, shall be applied as an adder when evaluating the alternate manufacturer's bid number.

All openings and passages shall be large enough to permit the passage of a sphere 3" (75 mm) in diameter and the pump shall have a flanged suction and discharge connection no smaller than 4" (100 mm). The pump motors shall not be overloaded beyond their nameplate rating at the design conditions nor at any head in the operating range.

### CONSTRUCTION

The station shall be constructed in one complete, factory-built assembly. It shall be sized to rest on the top of the wet well as detailed in the construction drawings.

### DURO-LAST® CORROSION-RESISTANT STAINLESS STEEL BASEPLATE

The baseplate of the pump station structure shall be fabricated of [3/8" (9.5 mm), 1/2" (13 mm)] corrosion-resistant lean duplex series 2100 stainless steel alloy, 316L stainless steel or equal. The stainless steel shall have a Pitting Resistance Equivalent Number (PRE<sub>N</sub>) of 24.0 or greater and general corrosion resistance shall be less than or equal to 0.1 mm per year in 15% H<sub>2</sub>SO<sub>4</sub> at 120 degrees F. Due to the corrosion resistance requirements, Grade 304-304L is not acceptable.

All stainless steel surfaces shall be dry abrasive blast cleaned to remove rust, mill scale, weld slag, etc. Cleanliness shall be to SSPC-SP16. The nominal surface profile shall be 0.75 mils. All blasted surfaces, including welds and cut edges, shall be coated completely with an environmentally friendly passivation solution and then thoroughly rinsed to provide a uniform finish, and to add a transparent oxide film to protect the surface from future contamination.

The pump station shall be enclosed by a hinged fiberglass cover made of molded reinforced orthophthalic polyester resins with a minimum of 30% glass fibers with a minimum average length of 1-1/4" (32mm). The outside of the enclosure shall be coated with a polyester protective in-mold coating for superior resistance to weathering, ultraviolet radiation, yellowing and chalking. The completed fiberglass enclosure shall be resistant to mold, mildew, fungus and corrosive liquids and gasses normally found in pump station environments. The dimensions of the enclosure shown on the drawings shall be considered a minimum, for internal component clearances and accessibility, and nothing smaller will be acceptable. The cover shall have a suitable drip-lip around the edge and shall be provided with a hasp and staple connection to the floor plate to allow the pump chamber to be locked with a padlock.

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The cover shall be attached with a multi segment stainless steel hinge, constructed of 7 gauge (4.6 mm) (minimum) type 304 stainless steel with a 3/8" (9.5 mm) diameter stainless steel pin and supporting at least 75% of the width of one end. Stainless steel bolts with tamperproof heads and a full width 3/8" (9.5 mm) thick anodized aluminum backing plate shall anchor the hinge to the fiberglass cover.

Dual high-pressure gas struts shall be provided to counteract the dead weight of the cover assembly and limit the maximum lifting force required for opening to less than 20 pounds (9 kg). The cover shall be self-latching upon opening, with a manually operated release for closing. Duplex heavy gauge safety chains shall be provided to prevent over-extension. All hardware and components of the cover assembly that are exposed to the weather shall be constructed of corrosion-resistant materials.

Heavy extruded aluminum, adjustable ventilating louvers shall be provided on each end of the fiberglass cover, which are capable of being closed during cold weather operation.

An aluminum manway cover fabricated of 1/4" (6.3 mm) treadplate, located exterior to the fiberglass pump chamber shall be provided, complete with padlocking provisions. The manway shall be an integral part of the station floor plate and provide access to the wet well. The minimum open area of the manway access into the wet well shall be at least 4.2 square feet (0.39 m<sup>2</sup>).

The manway cover shall have a three color 7" x 10" (178 mm x 254 mm) (minimum) corrosion-resistant sign permanently affixed to it, reading "DANGER – Before Entering, Test For Explosive Gases. Test For Oxygen Deficiency. Supply Fresh Air To Work Area".

Enclosures utilized to house the valve train and/or controls, which are defined under OSHA Article 29CFR, Parts 1910 as a Confined Space shall not be acceptable.

To allow on-site maintenance of the pumps, a stanchion with lifting arm shall be provided to lift each pump. The lifting arm shall have a hook over the center of the motor to support a hoist (provided by others) for removal of the motors, impellers and pumps from the station.

The pump casings and discharge piping shall be mounted in relation to the floor plate as detailed in the construction drawings. The suction and discharge connections, where they pass through the floor shall be sealed by gaskets, rather than being welded, to allow adjustment and replacement.

## WELDING

All steel structural members shall be joined by electric arc welding with welds of adequate section for the joint involved. Structural welding shall be performed in accordance with AWS standards and procedures.

## PROTECTION AGAINST CORROSION

All structural steel and cast iron surfaces shall be factory blasted with steel grit, in an environmentally controlled booth, to remove rust, mill scale, weld slag, etc. All weld spatter and surface roughness shall be removed by grinding. Surface preparation and cleanliness shall comply with SSPC-SP6 specifications. The surface profile shall be 2.0 mils (0.05 mm). Sandblasting is specifically prohibited. After blast cleaning, all surface contaminants, such as grease or oil, shall be removed before coating. Immediately following cleaning, a single 6 mil (0.15 mm) minimum dry film thickness coating of VERSAPOX®, a self-priming Cycloaliphatic Amine Epoxy shall be factory applied to the cleaned components. After curing, a 2.5 mil (0.06 mm) minimum DFT top coating of semi-gloss XTRATHANE™, a moisture-cured Aliphatic Polyurethane protective finish, for abrasion resistance and weather protection, shall be applied to the exterior areas, including the pumps and piping and the top and sides of the base, if carbon steel. These coatings shall be as formulated by Smith & Loveless specifically for this type of application and service.

Stainless steel, aluminum and other corrosion-resistant surfaces shall not be coated. Carbon steel surfaces not otherwise protected shall be coated with a suitable non-hardening rust preventative compound. Auxiliary components shall be furnished with the original manufacturer's coating.

Finish coating shall be accomplished prior to shipment of the equipment from the factory and shall comply fully with the intent of these specifications. A touch-up kit shall be provided by the pump station manufacturer for repair of any marks or scratches occurring during shipping and installation. This kit shall contain detailed instructions for use.

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## MAIN PUMPS

The pumps shall be 4" vertical, centrifugal non-clog type of heavy cast-iron construction, especially designed for the use of mechanical seals and vacuum priming. In order to minimize seal wear caused by linear movement of the shaft, the shaft bearing nearest the pump impeller shall be locked in place so that endplay is limited to the clearance within the bearing. To minimize seal wear resulting from shaft deflection caused by the radial thrust of the pump, the shaft from the top of the impeller to the lower bearing supporting the impeller shall have a minimum diameter of 1-7/8" (48 mm) for motor frame sizes 213 through 286; 2-1/8" (54 mm) for motor frame sizes 324 and 326; and 3" (76 mm) for frame 364 and larger. The dimension from the lowest bearing to the top of the impeller shall not exceed 6" (152 mm). The motor shaft shall be directly connected to the impeller without the use of drive belts or couplings, which require alignment and maintenance, and which increase power consumption due to their inherent energy losses.

Pumps with less than a standard 4" (100 mm) suction or 4" (100 mm) discharge connection, or with less than a 3" (76 mm) spherical solids handling capacity will be rejected for this application.

The oversized shaft incorporating oversized bearings and heavier bearing frame construction provides for extended mechanical seal, bearing and overall pump/motor life. Since the larger shaft with the specified minimum overhang is the key to heavier, more rigid construction throughout, no deviation from the specified shaft diameter or tolerances will be allowed.

The bearing nearest the impeller shall be designed for the combined thrust and radial load. The upper bearing shall be free to move in a linear direction with the thermal expansion of the shaft and shall carry only radial loads.

The shaft shall be solid stainless steel through the mechanical seal to eliminate corrosion and abrasive rust particles. Removable shaft sleeves will not be acceptable if the shaft under the sleeve does not meet the specified minimum diameter.

The pump shall have an integral adapter providing a large water reservoir above the impeller to provide for positive exclusion of air from the impeller. The seal shall be inside this area to assure lubrication. Pumps which do not use hollow priming adapters for positive lubrication of the seal will not be acceptable. Self-priming pumps are specifically unacceptable due to the need for suction check valves, air vent piping and the possibility of overheating and damaging the pump or producing steam or high temperatures in the pump, which may be a hazard to the operator, when the pump is run dry.

The pump controls must be set so that the main pumps cannot be turned on unless they are filled with liquid, and the pump is completely primed.

The pump shall be constructed so as to permit priming from the lower pressure area behind the impeller. Priming from high-pressure connections, which tends to cause solids to enter and clog the priming system, will not be acceptable. The priming bowl shall be transparent, enabling the operator to monitor the priming level.

The pump shall be arranged so that the rotating element can easily be removed from the casing without disconnecting the electrical wiring or disassembling the motor, impeller, backhead or seal, so that any foreign object may be removed from the pump or suction line. Enclosed impellers must be used to avoid the necessity of wear plates and the associated costs of replacement and maintenance of wear plate clearances with semi-open impellers.

The pump shaft shall be sealed against leakage by a single mechanical seal constructed so as to be automatically drained and primed each time the pump is drained and primed. Water, which lubricates the mechanical seal, shall be automatically drained from around the seal if the pump loses prime in order to allow both the pump and the seal to be drained, thereby preventing freezing and breakage of the seal during power outages in sub-freezing temperatures.

The seal shall be of carbon and ceramic materials with the mating surfaces lapped to a flatness tolerance of one light band. The rotating ceramic shall be held in mating position with the stationary carbon by a stainless steel spring. The entire seal assembly shall be held in place by a bronze seal housing to prevent excessive heat buildup. Use of cast-iron or other ferrous material for the seal housing which will rust and damage the seal, shortening its life, will not be acceptable.

The pump volute shall be furnished with mounting lugs and bolted to the station floor plate, forming a gas-tight seal.

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## X-PELLER® SUPER CLOG-RESISTANT MONO-PORT IMPELLER

The pump impeller shall be of the enclosed mono-port type made of close-grained cast-iron and shall be in dynamic balance when pumping wastewater. Two port impellers are specifically disallowed. The dynamic balance shall be obtained without the use of balance weights or liquid filled chambers. The impeller shall be designed to allow for the trimming of the impeller to meet design condition changes without altering the balance. The eye of the impeller as well as the port shall be large enough to permit the passage of a sphere 3" (76 mm) in diameter in accordance with nationally recognized codes. To further prevent clogging, the impeller port shall have a minimum area of 10.6 in<sup>2</sup> (6840 mm<sup>2</sup>). The impeller shall be keyed with a stainless steel key and secured to the motor shaft by a stainless steel capscrew equipped with a Nylock or other suitable self-locking device. The impeller shall not be screwed or pinned to the motor pump shaft and shall be readily removable without the use of special tools. To prevent the buildup of stringy materials, grit and other foreign particles around the pump shaft, all impellers less than full diameter shall be trimmed inside the impeller shrouds.

The shrouds shall remain full diameter so that close minimum clearance from shrouds to volute is maintained. Both the end of the shaft and the bore of the impeller shall be tapered to permit easy removal of the impeller from the shaft.

## MOTORS

The pump motors shall be vertical, solid shaft, NEMA P-base, squirrel-cage induction type, suitable for 3 phase, 60 cycle, 460 volt electric current.

They shall have Class F insulation. Insulation temperature shall, however, be limited to Class B. The motors shall have normal starting torque and low-starting current, as specified by NEMA Design B characteristics. They shall have forced air circulation by an integral fan. Openings for ventilation shall be uniformly spaced around the motor frame. Leads shall be terminated in a cast connection box and shall be clearly identified.

The motors shall have 1.15 service factor. The service factor shall be reserved for the owner's protection. The motors shall not be overloaded beyond their nameplate rating, at the design conditions, nor at any head in the operating range as specified under Operating Conditions.

The motor-pump shaft shall be centered, in relation to the motor base, within .005" (0.127 mm). The shaft runout shall not exceed .003" (0.076 mm).

The motor shaft shall equal or exceed the diameter specified under Main Pumps at all points from immediately below the top bearing to the top of the impeller hub.

A bearing cap shall be provided to hold the bottom motor bearing in a fixed position. Bearing housings shall be provided with fittings for lubrication as well as purging old lubricant.

The motor shall be fitted with heavy lifting eyes or lugs, each capable of supporting the entire weight of the pump and motor.

## CONTROLS

The control equipment shall be mounted in a NEMA Type 1 steel enclosure with 2 hinged access doors.

A grounding-type convenience outlet shall be provided on the side of the cabinet for operation of 120-volt AC devices.

Thermal magnetic air circuit breakers shall be provided for branch disconnect service and short circuit protection of all motor control and auxiliary circuits.

Magnetic across-the-line starters with under-voltage release and overload coils for each phase shall be provided for each pump motor to give positive protection. Each single-phase auxiliary motor shall be equipped with an over-current protection device in addition to the branch circuit breaker, or shall be impedance protected.

All wiring shall be labeled with thermal transfer self-laminating labels and a coded wiring diagram shall be provided.



## FLOAT SWITCH LEVEL CONTROLS

To control the operation of the pumps with variations of liquid level in the wet well, a minimum of three (3) displacement switches shall be provided. A 30' (9 m) cord shall be provided with each switch. The cord shall have a corrosion-resistant vinyl jacket and be multi-stranded in order to prevent fatigue.

The displacement switch cords shall enter the wet well through cord grip seals mounted to a removable, gasketed floor plate. The floor plate shall allow the displacement switches to be adjusted or removed and replaced without having to enter or reach into the wet well.

An automatic alternator with manual switch shall be provided to change the sequence of operation of the pumps every eight hours. Alternating the pumps at less than eight-hour intervals will not be acceptable.

Provisions shall also be made for the pumps to operate in parallel should the level in the wet well continue to rise above the starting level for the low level pump.

## HIGH WET WELL LEVEL ALARM

An adjustable displacement switch shall be provided to sense a high water level condition. The switch shall hang into the wet well and shall activate a contact to indicate the high water condition.

## SURGE PROTECTIVE DEVICE

A surge protective device for lightning and surge protection with an internal automatic discharge circuit and rated for three-phase service shall be provided.

## PHASE MONITOR

A relay with double pole, double throw contacts shall be provided to monitor and protect against phase loss (single-phasing), under voltage (brownouts) and phase reversal (improper sequence). It shall automatically reset when three-phase service returns to normal.

## RUNNING TIME METER

A running time meter shall be supplied for each pump to show the number of hours of operation. The meter shall be enclosed in a dust and moisture-proof molded plastic case. The flush-mounted dial shall register in hours and tenths of hours up to 99,999.9 hours before repeating. The meter shall be suitable for operation from a 115-volt, 60 (50)-cycle supply.

## PUMP RUNNING LIGHTS

A green panel light to indicate "Pump On" shall be provided for each main pump.

## PUMP FAILURE TO PRIME OR FAILURE TO PUMP ALARM (CHECK VALVE SWITCH TYPE)

To sense failure to deliver normal flow for any reason, including failure to prime, each pump shall be provided with a sealed, non-contact, non-mercury type solid state, UL labeled sensor switch mounted with an adjustable universal mounting bracket to the external arm of each discharge check valve. The mounting bracket shall allow the adjustment of the sensor switch with a single locking pivot adjustment. A red LED indicating light shall be provided on each switch unit to facilitate accurate setting of the switch for proper operation. The sensor switch shall monitor the movement of the check valve arm and thereby detect failure of the pump to deliver normal operating flow when called on to run. An auxiliary time delay relay shall be provided to prevent an alarm signal during the pump priming and startup period.

## 120V ALARM LIGHT

A vapor-proof light fixture with 50-watt lamp for outdoor pole mounting shall be provided with a red globe and guard.

## VACUUM-PRIMING SYSTEM

A vacuum priming system shall be furnished to prime the main pumps. The system shall be as shown on the vacuum priming schematic and shall include two vacuum pumps, providing 100 percent standby. Vacuum pumps shall have corrosion-resistant internal components. The vacuum priming system shall be complete with large port vacuum control solenoid valves,

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**WaveStart™** prime level sensor, float-operated check valves to protect the vacuum pumps, and all necessary shut-off valves as shown on the piping schematic. The float-operated check valves shall have a transparent body for visual inspection. All hoses and tubing used in the priming system shall be at least 3/8" (9.5 mm) nominal diameter.

The solenoid valves used in the vacuum priming system shall be of the high flow, direct acting brass body type, with threaded ports, NBR seals and 300 Series stainless steel plunger, rod, plate and springs.

The minimum orifice diameter shall be 5/16" (8 mm). The solenoid valves shall be UL Listed, with Class F coil rating and of suitable voltage and thermal capacity for the application.

Liquid level in the pump priming chamber shall be monitored by a **WaveStart™** liquid level sensing probe incorporating frequency spectrum technology to evaluate the media with which it is in contact at several measurement points. At each measurement point the sensor shall take readings. Using a multi-variable sensing technology, collected over a spectrum sweep, the sensor shall create an outline of the medium, its residue and absence of medium. From these reference points the sensor shall be able to accurately determine the presence or absence of liquid, unaffected by foam, residue or deposits. The liquid level sensor algorithm shall provide prime status in less than 100 milliseconds.

Systems utilizing an electrode, mechanical means such as a float or protrusions into the pump, which may become fouled due to bridging or wrapping, or that require any type of electrical or moving parts inside the priming chamber, which may accumulate debris, short out, bind or fail will not be acceptable. Single or double medium sensing probes will be unacceptable.

The **WaveStart™** probe shall be provided with light emitting diodes. This diagnostic tool shall indicate connectivity, prime status or a fault condition. The probe shall be complete sealed and have a 316L stainless steel housing for corrosion resistance. It shall be provided with a wiring connector of molded thermoplastic for impact and chemical resistance. The probe shall have a threaded electrical connector to facilitate easy removal.

The priming system shall automatically provide positive lubrication of the mechanical seal each time a main pump is primed. To prevent excessive stoppage due to grease accumulation, no passageway in the priming system through which the pumped liquid must pass shall be smaller than the equivalent of a 2-1/2" (64 mm) opening.

The vacuum priming system shall have two field selectable modes of operation. In the "On-Demand" mode, the priming system will operate only after a pump is called on to run, and if it is not primed. Once primed, the pump will be allowed to run. In the "Constant Prime" mode, both pumps are kept primed continuously, and ready to start immediately when called for.

## ENVIRONMENTAL EQUIPMENT

A ventilating blower capable of delivering 245 CFM at 0.1" (116 l/s at 2.5 mm) static water pressure shall be provided in order to remove the heat generated by continuous motor operation. The ventilating blower shall be turned on and off automatically by a preset thermostat. A heavy extruded aluminum louvered grille with adjustable openings shall cover the discharge of the blower. A similar grille shall be provided in the other end of the station enclosure for air intake. A 500-watt electric heater controlled by a preset thermostat shall be furnished. The heater shall be rigidly mounted in the station to prevent removal.

## SINGLE-PHASE 120-VOLT POWER TRANSFORMER PACKAGE.

A 5 KVA insulating-type transformer shall be provided to supply power for lights, controls and auxiliary devices. The transformer shall have 240/480 volt primary, 120/240 volt secondary, Class F insulation, with temperature rise not to exceed 115°C above 40°C ambient. The core and coil assembly shall be given a double dip and bake. The coil shall be protected by a metal housing to prevent damage. The transformer shall be protected by a separate circuit breaker on the supply side.

## MAIN PIPING

The pump suction connections shall be drilled and tapped for a 125-pound American Standard flange for easy attachment of the suction risers. The discharge line from each pump shall be fitted with a clapper-type check valve and eccentric plug valve. Size, location and quantity of check valves and plug valves shall be as shown on the construction drawing.

The check valve shall be of the spring-loaded type with external lever arm and an easily replaced resilient seat for added assurance against vacuum leaks. Check valves shall have stainless steel shaft with replaceable bronze shaft bushings. Ball-type check valves are specifically unacceptable for this application. An operating wrench shall be provided for the plug

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valves. All station piping and fittings shall be capable of passing a 3" (76 mm) spherical solid.

## RAPID-JACK™ CHECK VALVE

The cast iron check valve body shall be designed so that the upper portion may be easily removed, without disturbing the end flange seals to adjacent piping, to service the shaft, arm and clapper or to remove any material which may be causing clogging. Provide one spare body gasket for each valve.

Protrusions through the station floor shall be sealed where necessary to effect sealing between the equipment chamber and the wet well. The suction and discharge connections, where they pass through the floor, shall be sealed by gaskets in order to prevent corrosive, noxious fumes from entering the station. Welded joints that do not allow adjustment or replacement will not be considered for this application. The pump station manufacturer shall extend the suction and discharge connections below the floor at the factory so that field connections can be made without disturbing the gas-tight seals.

The manufacturer of the pump station shall provide a compression-type sleeve coupling for installation on the common discharge pipe. A minimum of two anchoring points shall be provided on the bottom of the station baseplate for attachment of coupling joint restraints, which shall be provided by the installing contractor.

## SUCTION PIPE SUPPORT KIT

To restrain and support the two 6" diameter suction pipes in the 4'-0" inside diameter wet well, a 6" 304L stainless steel horizontal support channel with 304L stainless steel adjustable end brackets and 316 stainless steel "U" bolts and mounting hardware, shall be provided for field installation by the Installing Contractor. It shall be anchored to the wet well wall by the Contractor, using the provided 316 stainless steel 5/8" wedge anchors, and adjusted to hold the suction pipes securely in a vertical position and minimize strain on the piping. The support shall be located 4' to 10' above the bottom of the vertical piping, as shown on the drawings.

## COLD CLIMATE PACKAGE

For cold weather operation, the station shall be provided with a 1300/1500 watt, dual range auxiliary heater with automatic circulating fan, thermostat control and an On/Off switch. The auxiliary heater shall be plugged into the station's duplex receptacle. In addition, the fiberglass cover shall have a minimum of 1" thick urethane insulation, protected by fiberglass, with an "R" value of 7 or more. Also, the priming system shall be interlocked with the station temperature sensor so that, should the station ambient temperature fall below a pre-set minimum, solenoid valves shall open the priming system to atmospheric pressure, when the pumps are not running, allowing the liquid in the pumps and piping to drain back into the wet well, preventing freezing.

## PROTECTED LIQUID FILLED COMPOUND PRESSURE GAUGES

A four-inch (4") (100 mm) Bourdon tube-type compound vacuum/pressure gauge with 3-1/2" (89 mm) dial, fitted with a brass stop valve and a manual air relief valve shall be provided for each pump. The gauges shall be mounted apart from the pumps, on a bracket attached to the control panel support structure, and connected to the pump discharge taps by flexible tubing to minimize vibration. The range of each gauge shall be selected to place the normal operating discharge pressure reading in the middle one-third of the scale and the gauge shall also be capable of measuring up to 30" HG (1.0 bar) of vacuum. The dial shall be white with black markings and the gauge itself shall have an accuracy of 1% of scale. The gauge shall be American made, with a Zytel Nylon case with 1/2" (13 mm) blow-out plug, stainless steel bezel, acrylic lens and phosphorus bronze tube with brass socket. Temperature compensation shall be provided by an internal compensating diaphragm. Gauges shall be protected from the service fluid by a Buna-N elastomer "boot" diaphragm within the stem, and the Bourdon tube and the space between the Bourdon tube and the internal isolating diaphragm shall be filled with low temperature instrument oil, completely isolating the gauge components from the fluid being measured.

## CHECKLIST

The pump and pump station specifications and the following checklist must be met in total. There are many reasons for incorporating a good pump specification. For example, the stainless steel shaft with tapered impeller attachment is provided to minimize corrosion, extend seal life, and provide ease of impeller removal and seal replacement without use of a wheel puller. All items specified are for long life, durability and maintainability of the pumping equipment. Deviations from the pump specification will not be allowed.



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The checklist is also provided to insure that the proper pumping system is provided to the owner.

## FACTORY TESTS

All components of the pump station shall be given an operational test at the pump station manufacturer's facility to check for excessive vibration or leaks in the piping or seals, and to correct operation of the automatic control and vacuum priming systems and all auxiliary equipment. Installed pumps shall take suction from a deep wet well, simulating actual service conditions. The control panel shall undergo both a dry logic test and a full operational test with all systems operating.

Factory test instrumentation must include flow measuring with indicator; compound suction gauge; Bourdon tube-type discharge pressure gauge; electrical meters to measure amperes, volts, kilowatts and power factor; speed indicator; and a Vibrometer capable of measuring both amplitude and frequency.

## SPARE PARTS

A complete replacement pump shaft seal assembly shall be furnished with each pump station. The spare seal shall be packed in a suitable container and shall include complete installation instructions. A spare volute gasket and seal gasket shall be provided.

An instructional video presentation on the pump mechanical seal system in DVD format shall be included. The DVD shall contain a presentation on the following subjects: purpose and location of the mechanical seal, signs of a defective mechanical seal, how to remove the mechanical seal, troubleshooting seal failure causes, seal components, required tools, how to reinstall the seal and how to place the pump back into service. The video shall include footage of an actual seal replacement.

## INSTALLATION AND OPERATING INSTRUCTIONS

Installation of the pump chamber shall be done in accordance with the written instructions provided by the manufacturer.

Operation and maintenance manuals shall be furnished which will include parts lists of components and complete service procedures and troubleshooting guide.

## STARTUP

The Manufacturer shall provide the services of a factory-trained representative for a maximum period of one day on-site to perform initial startup of the pump station and to instruct the owners operating personnel in the operation and maintenance of the equipment.

## WARRANTY

The manufacturer of the station shall warrant for one (1) year from date of start-up, not to exceed eighteen (18) months from date of shipment, that the structure and all equipment he provides will be free from defects in material and workmanship. Warranties and guarantees of the suppliers of various components in lieu of a single-source responsibility by the Manufacturer will not be accepted. The Manufacturer shall assume prime responsibility for the warranty of the station and all components provided by them. Equipment supplied by others and incorporated into the station is not covered by this warranty.

In the event a component fails to perform as specified or is proven defective in service during the warranty period, the Manufacturer shall repair or replace, at his discretion, such defective part.

He shall further provide, without cost, such labor as may be required to replace, repair or modify the steel structure. After start-up service has been performed, the labor to replace accessory items, such as the blower, priming pumps, alternator, etc., shall be the responsibility of others.

It is not intended that the Manufacturer assume responsibility for contingent liabilities or consequential damages of any nature resulting from defects in design, material, workmanship or delays in delivery, replacement or otherwise.

The motor adapter, volute, impeller, fiberglass enclosure and steel base shall be covered by a 10-year pro-rated warranty. The fiberglass enclosure shall be warranted against failure of the fiberglass components. The steel base shall be warranted against structural failure and perforation due to corrosion. If applicable, the microprocessor controller, panel display unit and submersible level transducer shall be covered by a 5-year pro-rated warranty.

The pro-rated warranties shall be computed on a monthly basis starting at shipment and shall cover replacement parts only.

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The repair or replacement of those items normally consumed in service, such as pump seals, grease, light bulbs, etc., shall be considered as part of routine maintenance and upkeep.

This warranty is valid only when installation, operation and maintenance has been done in accordance with the manufacturer's recommendations. A start-up report filed by an authorized representative of the manufacturer must be received by the manufacturer after the unit is placed in service.

The manufacturer shall provide a warranty certificate covering specific details.

## MANUFACTURER'S INSURANCE

ALL EQUIPMENT MANUFACTURERS, either direct or subcontractors to the general or mechanical contractors, SHALL HAVE in effect at TIME OF BID, CONTRACT AWARD, CONTRACT PERFORMANCE, and WARRANTY TERM, PRODUCT AND COMPREHENSIVE LIABILITY INSURANCE, INCLUDING SUDDEN AND ACCIDENTAL POLLUTION COVERAGE in the amount of FIVE MILLION DOLLARS, \$5,000,000, through an insurance company with a minimum rating of A+ (SUPERIOR) XV according to the BEST'S INSURANCE REPORTS. All policies must be written on an OCCURRENCE BASIS. Policies written on a CLAIMS MADE BASIS are not acceptable. A typical CERTIFICATE OF INSURANCE attesting to the specified coverage issued by the responsible carrier naming the ENGINEER OF RECORD and the OWNER as ADDITIONAL INSURED must be presented to the named additional insured prior to contract award. A FAILURE TO COMPLY with this requirement BY THE BIDDER will require DISQUALIFICATION of the BID and CONTRACT AWARD.

## MANUFACTURED EQUIPMENT

The specifications and drawings detail Smith & Loveless equipment and represent the minimum standard of quality for both equipment and materials of construction. The contractor shall prepare his bid on the basis of the particular equipment and materials specified for the purpose of determining the low bid.

The owner has standardized on the named equipment in order to optimize their operation, facilitate maintenance and safety programs, provide for interchangeability of costly equipment items, reduce stocking levels required for necessary spare parts and provide increased flexibility in the utilization of their pumping equipment. Equipment substitutions, since incompatible with the district's standardization program, will not be considered.

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## PUMP STATION CERTIFICATION AFFIDAVIT (X-PELLER® Mono-Port Impeller)

A submittal to the owner by manufacturers proposing alternate, unnamed pump stations will be required with their bid. Included in the submittal shall be detailed drawings and specifications on the proposed pump station. The bid submittal shall include the following completed checklist signed by an officer of the company.

	YES	NO
Close-coupled pump design – no motor to pump shaft coupling or drive belts		
Pump shaft diameter of 1-7/8” minimum through seal		
Full diameter impeller shrouds, top and bottom		
Stainless steel pump shaft with tapered shaft to impeller fit		
Maximum pump shaft overhang of 6” (152 mm) - lower bearing to impeller		
Bronze seal housing		
Minimum pump efficiency at design point of 400 GPM of 48 %		
Impeller eye and port pass a 3” (76 mm) sphere		
Impeller of mono-port design with a minimum area of 10.6 square inches (6840 mm <sup>2</sup> )		
Trimming of impeller vane does not alter dynamic balance		
Impeller dynamically balanced without use of weights or liquid filled chambers		
Class F motor insulation with Class B max motor temperature rise and 1.15 service factor		
Motor shaft run-out 0.003” (0.076 mm) max at end of shaft		
Motor shaft centered to motor base with 0.005” (0.127 mm)		
Locked lower bearing and floating upper bearing		
One-piece motor adapter/backhead		
Motor HP of 10 at 1760 RPM		
Complete pump station factory tested on a wet well		
Priming from low pressure area behind the impeller		
Frequency spectrum technology pump prime detection system		
Transparent priming bowl for operator monitoring		
Hollow priming adapter for positive seal lubrication		
Completely separate priming system for each pump		
Minimum 2-1/2” (64 mm) equivalent opening in priming passageways		
Maximum 20 lb. (9 kg) force required to open station cover		
All other items for the station, as specified with minimum sizes, capacities and materials indicated		
Product liability insurance, \$5 million per specification		
Structure blasted with steel grit in environmentally controlled booth prior to coating with epoxy resin		

The consulting engineer shall be the sole judge of whether the proposed equipment is acceptable. The manufacturer shall have the responsibility of submitting sufficient information in one submission. Incomplete or inaccurate submittal data shall be cause for rejection of the proposed equipment.

By signing this affidavit, the officer of the company has stated 100% compliance with the plans and specifications and further states he will supply or pay for all deficiencies found in the job submittals or after the unit is installed. The consulting engineer shall be the sole judge regarding compliance with the plans and specifications and shall be sole judge on the amount of moneys required if any deficiencies are found, related to, but not limited to, a 20-year station design life.

\_\_\_\_\_  
Signature of Company Officer

\_\_\_\_\_  
Title

Corporate Seal  
(Notarized)