

ENGINEERING DATA



Smith &
Loveless, Inc.®

14040 West Santa Fe Trail Drive
Lenexa, Kansas 66215-1284

Wet Well Mounted
MINI-JECT® Ejector Station
Specification
June, 2012
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SPECIFICATION WET WELL MOUNTED MINI-JECT® EJECTOR STATION

GENERAL

The contractor shall furnish and install one factory-built, automatic wet well mounted pumping station as manufactured by Smith & Loveless, Inc., Lenexa, Kansas. The station shall be complete with all needed equipment as shown on the drawings and specified herein.

The principal items of equipment shall include a **MINI-JECT®** ejector, two (rotary-type) (piston-type) air pumps, central control panel, electrical controls, fiberglass equipment housing and wet well mounting plate with access manway and ejector cover plate.

OPERATING CONDITIONS

The ejector station shall be capable of delivering a field adjustable flow rate from 1 GPM to __ GPM of raw water or wastewater against a total dynamic head of __'. The discharge rate shall approximate the rate of flow into the wet well without the use of variable speed or other flow regulating control devices. All openings and passages shall be large enough to permit the passage of the industry standard 3" diameter spherical solid. Pumping devices not meeting this non-clog requirement will not be acceptable.

Each air pump shall be capable of delivering a minimum of __ CFM against a discharge head of __' at an altitude of __' above mean seal level. The minimum rating of each air pump motor shall be _____ HP, _____ phase, _____ cycle, _____ volt.

CONSTRUCTION

The station manufacturer shall provide the steel ejector-receiving tank with 4" inlet check valve and (3") (4") discharge flange for connection of the force main. He shall further provide the factory-built air pump and control center, and the air venting exhaust valve. These components shall be shipped separately and shall be installed by the contractor.

The air pump and control center shall incorporate a minimum 3/8" thick mounting plate to cover the wet well. The cover plate shall have an access manway cover with padlocking provisions and a bolted cover plate for removal of the ejector receiver. The air pumps, air manifold piping and controls shall be enclosed by a fiberglass housing hinged to the mounting plate. A hasp shall be provided for locking the housing to the mounting plate.

The steel ejector tank shall incorporate a 4" wafer-type inlet check valve as the only moving part. The clapper disc shall be stainless steel with stainless hardware. The clapper shall seat against a resilient seat to ensure leak-tight closing. The valve shall be mounted so that foreign material in the check valve will not prevent operation but will be cleared in succeeding cycles. Ejectors incorporating electrodes or other means to detect the level inside the receiver are specifically unacceptable.

A (3") (4") spring-loaded wafer type check valve with clapper and resilient seat shall be furnished and installed by the contractor and located in the discharge piping in the wet well as shown on the drawings.

EXHAUST VALVE

An air venting exhaust valve shall be provided to automatically vent the receiver after each ejection and close after the receiver is filled. The valve shall be actuated by the air supply to the ejector and shall discharge the vented air into the wet well.

ROTARY AIR BLOWERS

(SELECTABLE ITEM – CHECK IF REQUIRED)

The air blowers shall be rotary type with oil lubrication of all bearings and gears. The timing gears shall be helical gears. The blowers shall be capable of running continuously at the set pressure. The blower shall have a combination inlet-filter silencer. The discharge shall have a pressure relief valve set at the discharge head required on the air supply. The relief valve shall be free of blowdown and capable of relieving the capacity of the blower without excessive pressure rise. A pressure gauge shall be

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provided to set the relief valve pressure. A 1-1/2" ball valve shall be provided for control of pumping rate.

The motors shall be of standard horizontal drip-proof construction. Synchronous speed shall be 1800 RPM. The motor shall drive the blower by V-belt. Motors shall have a 1.15 service factor and shall be suitable for duty in 40°C ambient air.

PISTON AIR COMPRESSORS

(SELECTABLE ITEM – CHECK IF REQUIRED)

The air compressors shall be non-lubricated piston type, built together with open drip-proof induction motor. The motors shall have normal starting torque and low starting current as specified for NEMA Design B characteristics. The piston connecting rod bearings and the motor bearings shall be permanently lubricated. The compressor pistons shall have filled Teflon rings and skirts. The motor and compressor shall be capable of being run continuously at the set pressure. The compressor shall have a combination inlet-filter silencer. The discharge shall have a pressure relief valve free from blowdown. The relief valve shall be set at the pressure required for the ejector operation. The relief valve shall be adjustable. A pressure gauge shall be provided to set the relief valve. The relief valve shall be capable of relieving the full capacity of the compressor without excessive pressure rise.

ELECTRICAL CONTROLS

The electrical control center shall be housed in a NEMA 1 enclosure. Each air pump motor shall be protected and operated by a thermal magnetic circuit breaker and a motor starter. The motor starter shall be controlled by High-Level-On and Low-Level-Off displacement switches. When a high level is reached, the high-level switch will initiate the motor-starter control circuit, causing the air pump to run. When a low level is reached, the low-level switch will deactivate the motor-starter control circuit, causing the air pump to stop. A Hand-Off-Auto switch shall be provided for each air pump. The displacement switches shall be epoxy-encapsulated mercury switches with a minimum of 30' of cord.

An automatic alternator shall be provided to alternate operation of the air pumps.

HIGH WET WELL LEVEL ALARM

(OPTIONAL ITEM – CHECK IF REQUIRED)

An adjustable mercury displacement switch shall be provided by the pump station manufacturer 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.

WELDING

All steel structural members shall be joined by electric arc welding with welds of adequate section for the joint involved.

PROTECTION AGAINST CORROSION

All structural steel surfaces shall be factory blasted with steel grit to remove rust, mill scale, weld slag, etc. All weld spatter and surface roughness shall be removed by grinding. Surface preparation shall comply with SSPC-SP6 specifications. Immediately following cleaning, a single 6-mil dry film thickness of **VERSAPOX**® shall be Factory applied. This coating shall be as formulated by Smith & Loveless for abrasion and corrosion-resistance.

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 such as the electrical enclosure, ventilating blower and vacuum pumps shall be furnished with the original manufacturer's coating.

Finish coating shall be accomplished prior to shipment of the station 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 mars or scratches occurring during shipping and installation. This kit shall contain detailed instructions for use, and shall be the same material as the original coating.

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FACTORY TEST

All components of the air pump and control center shall undergo both a dry logic test and full operational test at the ejector station manufacturers facility to check operation of the air pump-motor units and measure amperes, volts, kilowatts and power factor.

INSTALLATION AND OPERATING INSTRUCTIONS

Installation of the Wet Well Mounted Ejector Station shall be done in accordance with the written instructions provided by the manufacturer.

The Manufacturer shall further provide a complete and detailed Installation, Operation and Maintenance Manual. This manual shall cover, in addition to installation and general operating procedures, the operation, maintenance and servicing procedures of the major individual components provided with the ejector station.

START-UP

The Manufacturer shall provide the services of a factory-trained representative for a maximum period of one (1) day to perform initial start-up of the ejector station and to instruct the owner's operating personnel in the operation and maintenance of the equipment.

WARRANTY

The manufacturer of the ejector station shall warrant for one (1) year from date of startup, 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 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.

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 major components such as the steel structure, main air pumps, main air pump motors and main piping manifold. After start-up service has been performed, the labor to replace accessory items such as the alternator, etc., shall be the responsibility of others.

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

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.

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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.

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MANUFACTURED EQUIPMENT

OPTION 1 (STANDARDIZATION) [DELETE THIS LINE FROM FINAL SPEC TEXT]

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 treatment equipment. Equipment substitutions, since incompatible with the district's standardizations program, will not be considered.

OPTION 2 (BASE BID WITH BID SUBMITTAL) [DELETE THIS LINE FROM FINAL SPEC]

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 this equipment for the purpose of determining the low bid without consideration of a possible substitute. Substitution of other makes may be considered if the equipment proposed for substitution is superior or equal in quality and efficiency to the standards of quality named in the specifications, and this is demonstrated to the satisfaction of the engineer. Contractors wishing to offer a deduct for substitute equipment shall include the following submittal information with their proposal.

BID SUBMITTAL

This submittal shall include all necessary information for the proper determination of the acceptability of the proposed substitution, and shall not necessarily be limited to the following:

- A. Complete description of the equipment, system, process, or function, including a list of system components and features, drawings, catalog information and cuts, manufacturer's specifications, including materials description.
- B. Performance data and curves, and horsepower requirements.
- C. Outside utility requirements, such as water power, air, etc.
- D. Functional description of any internal instrumentation and control supplied, including list of parameters monitored, controlled or alarmed.
- E. Addresses and phone numbers of nearest service centers, and a listing of the manufacturer's or manufacturer's representatives' services available at these locations, including addresses and phone numbers of the nearest parts warehouses capable of providing full parts replacement and/or repairs services.
- F. A list of five (5) installations in the states where similar equipment by the manufacturer is currently in similar service; include contact name, telephone number, mailing address of the municipality or installation, engineer, owner, and installation contractor; if five installations do not exist, the list shall include all that do exist, if any.
- G. Detailed information on site, architectural, structural, mechanical, plumbing, electrical, and control, and all other changes or modifications to the design and construction work necessary to adapt the equipment or systems to the arrangement shown and/or functions described on the drawings and in the technical specifications. This shall include plan view and section sketches illustrating any additional space requirements necessary to provide the minimum adequate clear space within and around the equipment for operation and maintenance, as shown on the drawings and specified.
- H. All differences between the specifications and the proposed substitute equipment shall be clearly stated in writing under a heading of "differences".
- I. Other specified submittal requirements listed in the detailed equipment and material specifications.

EVALUATION

Approval of the substitution to bid as an alternate shall, in no way, relieve the contractor from submitting the specified shop drawings for approval or complying fully with all provisions of the specifications and drawings.

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If substituted equipment is accepted, the contractor shall, at his own expense, make any changes in the structures, piping, electrical, etc., necessary to accommodate the equipment. If engineering is required due to substitution of alternate equipment, the contractor shall pay for all engineering charges.

To receive final consideration, copies of the manufacturers' quotations for the equipment may be required to document the savings to the satisfaction of the engineer. It is the intent that the owner shall receive the full benefit of the savings in cost of equipment, and the contractor's bid price shall be reduced by an amount equal to the savings. In all technical and other evaluations, the decision of the engineer is final.

TYPICAL BID FORM

[ADD TO BID FORM AS APPLICABLE TO ABOVE SELECTED OPTION]

OPTION 1

For reasons of standardization, bids shall be based on the named equipment. Alternate bids will not be allowed.

OPTION 2

The bid shall be based on the named equipment. Alternate/substitute equipment may be offered as a deduct, provided all conditions of the "manufactured equipment" section are met.

Alternate/Substitute Manufacturer

Deduct \$ _____.