

GENERAL

all needed equipment, factory-installed in a dual compartment welded steel chamber consisting of a separate entrance to the wet well and an equipment chamber. The equipment chamber shall have a separate split fiberglass cover.

"pumps; valves; internal piping; central control panel with circuit breakers; motor starters and automatic pumping level controls; lighting; sump pump; ventilating blower; priming pumps and appurtenances; and all internal wiring.

These specifications describe equipment as manufactured by Smith & Loveless Division - Ecodyne Corporation. This is no. done, however, to eliminate others equally as good and efficient. Any substitution of equipment or materials will be considered for one reason only: that the equipment proposed for substitution is superior or equal in construction and/or efficiency to that described in the specifications and work space equal to or greater than shown on the drawings is provided, and that high quality has been demonstrated by at least

five years of service in similar installations. If prior to the execution of the contract, the engineer's approval is obtained for alternate equipment, the contractor shall, at his own expense, make any changes in the structures, building, piping or electrical necessary to accommodate the equipment and if engineering is required due to substitution of other material, the contractor shall pay the engineer for the engineering service.

It will be assumed that the cost to the contractor of the equipment proposed to be substituted is less than the specified equipment and if the substitution is approved, the contractor's bid price shall be reduced by an amount equal to the net

Substitution of equipment other than that specified and shown will not be considered after the execution of the contract.

OPERATING CONDITIONS

Each pump shall be capable of delivering 150 GPM of raw unscreened sewage against a total dynamic head of 50 feet. The maximum allowable speed shall be //70 RPM.) rated horsepower of each pump motor shall be 5 HP. T maximum static suction lift shall be 201.

passage of a sphere 3" in diameter and any trash or stringy material which will pass through a 4" house collection system. The anticipated operating head range is from 46.2 feet minimum to 50,4 feet maximum.

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. The supporting floor plate shall be minimum 3/8" thick steel, reinforced as required to prevent deflection and to ensure a rigid support. The shell shall be of 1/4" minimum thickness ASTM A-36 steel plate rolled to 6'-10" inside diameter.

The equipment chamber shall be completely isolated from the wet well in a gas-tight configuration. Wet well access shall be completely separate from the equipment chamber and shall be provided with the access manway exposed only to the at-

The equipment chamber shall be provided with a split fiberglass cover hinged at the partition wall separating the equipment chamber from the access manway to the wet well. The fiberglass cover shall be formed with a drip-lip around the edge and a labyrinth at the top. Brackets shall be provided to support the cover in the open position and to restrain it under load. An aluminum ladder shall be located in the equipment chamber to provide easy access. Only one segment of the fiberglass cover need be opened for access into the equipment chamber.

A steel manway cover located exterior to the pump chamber shall be provided. The manway shall be an integral part of the station head plate and shall provide access into the wet well. Both equipment chamber and wet well access covers shall be provided with hasp and staple arrangement for padlocking. Option: A lifting socket shall be bolted to the wall over each pump. A stanchion with lifting arm shall be provided to support a hoist (provided by others) to facilitate easy removal of the motors, impellers and pumps.

All steel in the station structure shall be joined by electric arc welding with fillets of adequate section for the joint involved. Where required to exclude ground water, all welded joints on the exterior of the station shall be continuous throughout

PROTECTION AGAINST CORROSION After welding, all inside and outside surfaces of the structure mum profile commercial blast. Immediately after cleaning, a

pumps and piping shall be steel shot-blasted to a 2-mil minisingle 6-mil minimum thickness inert coating shall be factory applied to all inside and outside surfaces. The coating shall be Versapox epoxy resin, formulated for abrasion and corrosion resistance. The dry coating shall contain a minimum of 85% epoxy resin with the balance being pigments and thixotropic

scratches occurring during installation. This kit shall contain

the original coating.

detailed instructions for use and shall be the same material as

connections.

SEWAGE PUMPS

The pumps shall be (4"): vertical, non-clog sewage pumps of heavy cast iron construction, especially designed for the use of mechanical seals and vacuum priming. In order to minimize seal wear caused by lineal movement of the shaft, the shaft bearing nearest the pump impeller shall be locked in place so that end play 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" for motor frame sizes 213 through 286; 2 1/8" for motor frame sizes 324 and 326; and 3" for frame 364 and larger. The dimension from the lowest

bearing to the top of the impeller shall not exceed 6 The bearing nearest the impeller shall be designed for the combined thrust and radial load. The upper bearing shall be free to move lineally with the thermal expansion of the shaft

and shall carry only radial loads. The shaft shall be solid stainless steel through the pump and bottom bearing to eliminate corrosion within the pump or the mechanical seal. Removable shaft sleeves will not be acceptable if the shaft under the sleeve does not meet the specified minimum diameter.

The pump impeliers shall be of the enclosed type made close-grained cast iron and shall be balanced. The impeller shall be keyed with a stainless steel key and secured to the motor shaft by a stainless steel cap acrew 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 shroud. The shroud shall remain full diameter so that close minimum clearance from shroud to volute is maintained. Both the end of the shaft and the bore of the impeller shall be tapered to permit easy remove

of the impeller from the shaft. The pump shall be so constructed so as to permit priming from the low pressure area behind the impeller. Priming from high pressure connections which allow solids to enter and clog thr priming system, will not be acceptable. The priming bowl shall CONTROLS be transparent to enable the operator to monitor the priming

The pump shall be arranged so that the rotating element can easily be removed from the volute 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.

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 ceramic mating surface 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 pump motors shall be vertical, solid shaft, NEMA P-base, squirrel-cage induction type, suitable for 🕱 phase, 60 cycle, 220 volt electric current. They shall have Class F insulation, suitable for temperatures up to 115° C, but the motors shall have Class B temperature limits of 90° C rise by resistance, at 115% of rated load. The motors shall have normal starting torque and low starting current, as specified for NEMA Design E characteristics. They shall be open drip-proof design with forced air circulation by 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

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 condition, 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". The shaft runout shall not exceed

The motor shaft shall equal or exceed the diameter specified under sewage 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, each capable of supporting the entire weight of the pump and motor.

breakers, starter reset buttons, and control switches shall be

The control equipment shall be mounted in a NEMA Type 1

steel enclosure with a removable access cover. The circuit

face of the cabinet for operation of 115 volt AC devices.

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 switches shall be labeled and a coded wiring diagram shall be provided.

To control the operation of the pumps with variations of sewage level in the wet well, a minimum of three (3) mercury resistant vinyl jacket and be multi-stranded in order to prevent

Cord grips shall be located approximately 8" below the manway cover to the wet well to provide for visual inspection and ar iustment of the displacement switches.

An automatic alternator with manual switch shall be provided to change the sequence of operation of the pumps every eight hours. The manual switch shall allow for either pump to be selected as base pump or for automatic alternation. Alternating the pumps at less than 8-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. **VACUUM PRIMING SYSTEM**

A separate and independent priming system shall be furnished. for each sewage pump, providing complete standby operation. Each priming system shall include a separate vacuum pump. Vacuum pumps shall have corrosion resistant internal components. They shall each be capable of priming the sewage pump and suction piping in not greater than 60 seconds, under rated static suction lift conditions of 20' at mean sea level.

Each priming system shall be complete with vacuum pump, vacuum control solenoid valve, prime level sensing probe, and a float-operated check valve installed in the system ahead of the vacuum pump to prevent liquid from entering the vacuum pump. The float-operated check valve shall have a transparent body for visual inspection of the liquid level and shall be automatically drained when the vacuum pump shuts off.

The priming system shall automatically provide positive lubrication of the mechanical seal each time the sewage pump is primed. To prevent excessive stoppage due to grease accumulasewage must pass shall be smaller than the equivalent of a 2 1/2" opening.

A manual switch located in the equipment chamber shall be **VENTILATING BLOWER**

A ventilating blower shall be provided, capable of delivering (200 cfm) 60 air changes per hour, in the equipment chamber. The blower shall be rigidly mounted to the chamber shell and shall discharge to atmosphere as shown on the plans. It shall be controlled by a percentage timer to provide essentially contin-

SUMP PUMP

A submersible sump pump with close-coupled motor shall be installed in the sump. It shall be rated 500 GPH at design head. A mechanical seal on the shaft shall exclude water from the motor housing. The sump pump shall be controlled automatically by a float switch capable of operation on a 5" differential. It shall discharge into the entryway to the wet well through a 3/4" steel pipe as shown on the drawings.

SEWAGE PIPING

The pump suction shall be drilled and tapped for a 125 pound. American Standard flange for connection of the suction riser. 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 a resilient seat for added assurance against vacuum leaks. An operating wrench shall be provided for the plug valves.

All protrusions through the floor plate shall be welded gas-tight to effect sealing between the equipment chamber and the wet well; in order to prevent corrosive, noxious fumes from entering the station. The lift station manufacturer shall extend the suction connections below the floor plate at the factory, so that field connections can be made without disturbing the gas-

The discharge pipe shall exit the station through the side, as shown on the drawings, and shall be welded to the chamber

120 volt neon test light within the control panel for the operator's use in determining a maifunction in the various control components. All test points shall be wired to the terminal test strip. A step-by-step troubleshooting guide shall be furtest system shall have the capability of testing at least the

FACTORY TESTS All components of the pump station shall be given an operational test of all equipment at the factory to check for excessive vibration, for leaks in all piping or seals, for correct operation of the vacuum priming and control systems and all auxiliary equipment. Pumps shall take suction from a deep well, simula-

ting actual service conditions, SPARE PARTS

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

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

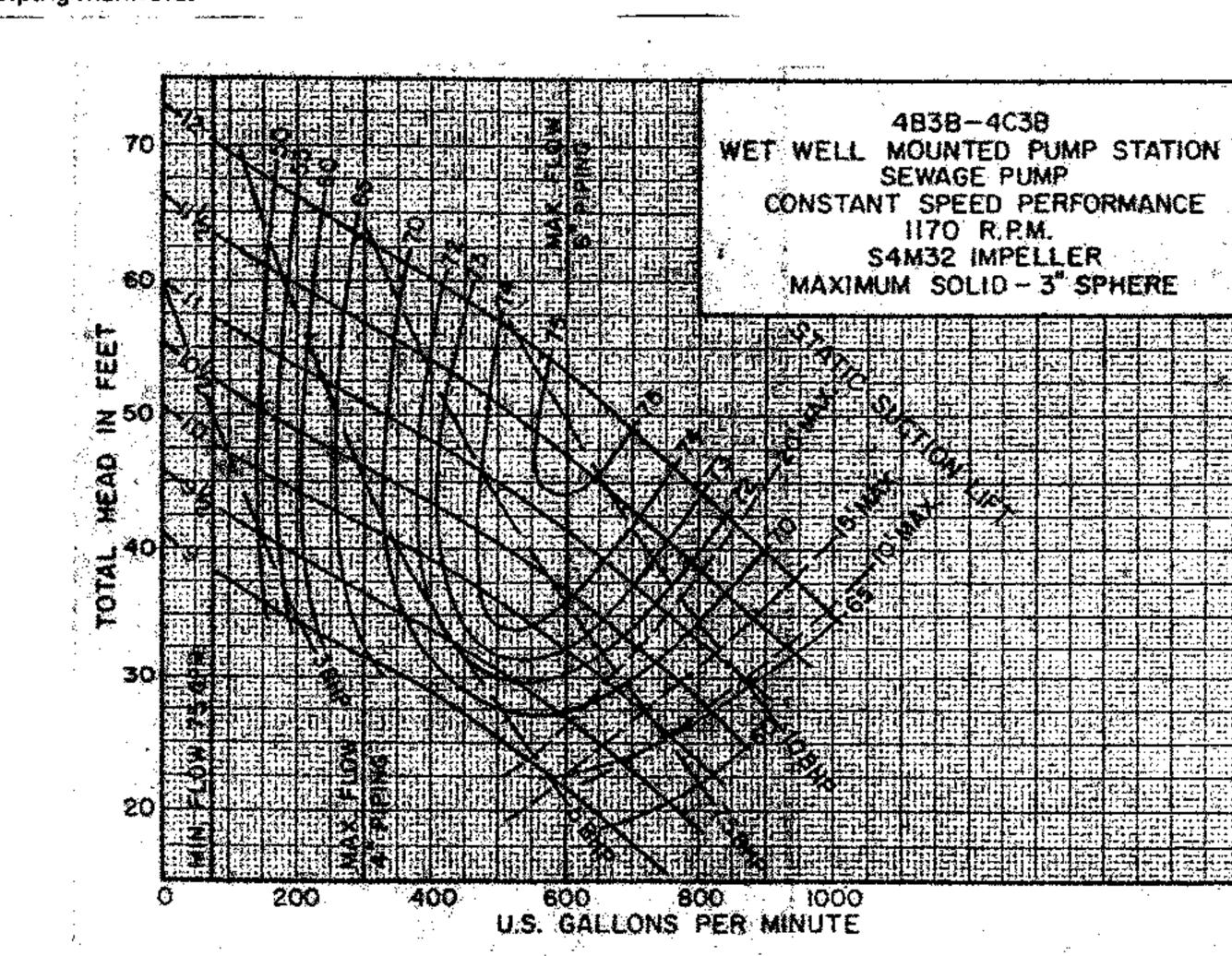
INSTALLATION AND OPERATING INSTRUCTIONS

procedures and troubleshooting guide. GUARANTEE

The Manufacturer of the lift station shall have a minimum of five years' experience in the design and manufacture of vacuum-priming type factory-built automatic pumping stations and shall guarantee the structure and all equipment to be free from defects in materials and workmanship for a period of up to one year from date of start-up, not to exceed 18 months from the date of shipment.

Warranties and guarantees by the suppliers of various components in lieu of a single-source responsibility by the Manufacturer will not be accepted. The Manufacturer shall be solely responsible for the guarantee of the station and all

In the event a component fails to perform as specified or is proven defective in service during the guarantee period, the Manufacturer shall provide a replacement part without cost to the owner. He shall further provide, without cost, such labor as may be required to replace, repair or modify major components such as the pumps, pump motors and sewage



2.0' static head 20,0' back preassure head

1.4' Stotion head suction head 16.5 dynamic head

Total head

LAREN FORESTE TOTAL

DRAWN BY June 5,1985 DATE DRAWN WMAIII DESIGNED WMAZI CHECKED