

SECTION 15040**SEAL WATER SYSTEM****PART 1 - GENERAL**

1.01 SCOPE OF WORK

The Contractor shall furnish materials, equipment and labor to furnish, install and test the duplex seal water pumping system complete with the close coupled pumps, motors, piping, valves, pressure switches, pressure gauge, solenoid valve, mercury float switch, fabricated pump platform, stainless steel tank and appurtenances as indicated on the Department's Standard Pump Station Drawings.

1.02 REFERENCE STANDARDS

The work in this section is subject to the requirements of applicable portions of the following standards:

- A. Hydraulic Institute standards
- B. IEEE standards
- C. NEMA standards
- D. OSHA Rules and Regulations

PART 2 - PRODUCTS

2.01 SEAL WATER SYSTEM, GENERAL

- A. The seal water system provides lubrication and flushing action of clean water for the mechanical seals and packing boxes in the sewage pumps. Water pressure is forced into the stuffing box thereby flushing away contaminants.
- B. The capacity of the seal water pumps shall be calculated based on 2 GPM for each stuffing box to be served with the pressure 20'-25' greater than the design conditions for the sewage pumps.

2.02 MATERIALS OF CONSTRUCTION, PUMP

- A. Casing - Cast Iron (ASTM A48)
- B. Impeller - Bronze (ASTM B62)
- C. Shaft - Stainless Steel (AISI 416) (JM Motor shaft)
- D. Channel Rings - Bronze (ASTM B62)

2.03 CASING

The casing shall have a side suction inlet and a centerline discharge outlet. Suction connection and discharge connection shall be NPT threaded. Mounting feet shall be integrally cast with the casing.

2.04 IMPELLER

The impeller shall be of the regenerative turbine or periphery vane type, with the pumping vanes machined on both sides of the impeller to balance hydraulic thrust. The impeller shall be keyed to the shaft, but not locked in place, to allow the impeller to self-balance between the channel rings. Balancing holes shall be machined into the impeller to facilitate this floating action as required.

2.05 SHAFT

- A. The shaft shall be turned and polished and have a keyway machined on the inboard extension to accept a coupling half. The shaft shall be common to both the pump and the motor.
- B. The outboard extension of the shaft shall be threaded to accept a shaft nut to prevent excessive lateral shaft movement.
- C. The pump shaft shall be integral to the electrical motor provided as part of the pump.

2.06 CHANNEL RINGS

The channel rings shall have an individual water passageway machined and cleaned of all burrs, trimmings and irregularities. The channel rings shall be pinned to the bearings covers to prevent rotation.

2.07 BEARINGS

The pump shall be operated from the motor shaft which shall have adequate strength and bearing support for the design of the pump at its maximum operating pressures.

2.08 MECHANICAL SEAL

Shaft sealing shall be accomplished by means of a mechanical seal with a Ni-Resist seat, carbon washer, Buna-N elastomers and stainless steel metal parts.

2.09 SEAL GLAND

The bearing cover shall be machined to accept the seal cup to assure positive alignment of the seal faces and eliminate the need for a separate seal gland.

2.10 COUPLING

Pumps shall be direct coupled to the JM Frame motors supplied as part of the pumps.

2.11 FABRICATED RESERVOIR TANK AND MOUNTING ASSEMBLIES

- A. The mounting assemblies and the reservoir tank shall be completely fabricated Type 316 stainless steel construction utilizing 14 gauge sheets, welded flat bar for mounting the reservoir and fastening it to the wall with stainless steel fasteners for ease of tank removal

for cleaning.

- B. The pump mounting platform shall be welded and fabricated from aluminum as shown in the Department's Standard Pump Station Drawings. Both pump assemblies will be mounted on one common aluminum platform.

2.12 BYPASS AND RELIEF VALVE

The pump system shall have bypass piping from the discharge manifold, up through, and into the supply tank equipped with a relief valve for regulating the bypass flow. Furnish a bronze, spring type relief valve. Bypass and relief valve shall be 3/4" and capable of continuous operation and discharge by-pass to regulate the overall system pressure to the main sewage pumps.

2.13 MOTOR

- A. The motor shall be horizontal and in accordance with the latest NEMA standards and shall have the following characteristics as standard:

1. Enclosure: TEFC
2. Voltage, Phase, Hz.: 115/230V, 1 ϕ , 60
3. Speed: 1750 RPM
4. Horsepower: 1
5. Frame: JM

- B. Each motor shall have a sufficient horsepower rating to operate the pump at any point on the pump's head-capacity curve without overloading the nameplate horsepower rating of the motor regardless of service factor. The motor shall have a service factor of 1.15. The service factor is reserved for variations in voltage and frequency.

2.14 STRUCTURAL CONFIGURATION

- A. A 14 gauge stainless steel tank measuring 20" x 20" x 24". This tank will have an internal capacity of 40 gallons (working volume) of water shall be provided as an integral part of the seal water system and shall be mounted above the pump system in such a way as to provide a flooded suction for the seal water system pumps.
- B. The tank shall be fitted with a C.P.V.C. liquid level indicator mounted on the left side of the reservoir tank.
- C. Recirculation bypass water connections shall be located as indicated on the Department's Standard Pump Station Drawings.
- D. Provide a 3/4" bronze "Y" strainer on the inlet water line before the solenoid valve.
- E. An air break installed 6 inches above the top of the tank is required to prevent contamination of the water supply. The seal water system shall be provided with an ASCO "RED HAT" Series II, Model 8211, 3/4-inch two-way, slow-closing solenoid valve, 115 VAC, normally closed/energize to open. Provide the solenoid valve with 5 feet of power cord for the purpose of plugging into a standard outlet or a piggy back float switch

controller. The inlet solenoid valve shall be installed in the inlet water feed line to the position above the system reservoir tank with a wye strainer.

- F. Provide a piggy back mercury float switch to be installed in series with the power to the inlet solenoid valve.
- H. The reservoir tank and all pumps shall be isolated components via bronze pipe unions connecting them to the associated piping systems.
- I. Provide all bronze piping, valves and fittings throughout the piping system.
- J. Provide a fully adjustable pressure switch set at 30 psi or system pressure failure alarm connection.
- K. Provide a stainless steel liquid filled pressure gauge, 0 - 100 psi, in the by-pass manifold for ease of relief valve adjustments.

2.15 SYSTEM OPERATION

- A. As a sewage pump is required, the seal water pump shall be selected automatically by the control panel.
- B. Seal water will automatically fill and refill the supply tank via the mercury float switch which signals the solenoid valve to open and close accordingly.
- C. System supply pressure shall be maintained and controlled by the bypass relief valve which shall return and recirculate all water produced at pressure, over and above the required flows and set point pressures.
- D. System water shall be delivered to each respective pump's stuffing box.

2.16 APPURTENANCES

- A. Water supply and seal water pressure piping shall be rigid copper or brass.
- B. Seal water suction, drain and overflow piping shall be PVC schedule 80. All others shall be PVC Schedule 40.
- C. Check valves, gate valves and strainers shall have a bronze body.

2.17 SYSTEM CONTROLS

- A. Located in the control panel, all system controls shall consist of individual pump disconnects hand-off-automatic (H.O.A.) switches, pump alternators, remote telemetry interface terminals for remote monitoring as indicated in the control panel wiring schematic on Drawing No. S-12729-A of the Department's Standard Pump Station Drawings . The pressure switch provided at the pump and tank shall signal failure of the system in the event of a problem.

B. Individual pump disconnects shall be provided in the control panel.

PART 3 - EXECUTION

3.01 INSTALLATION

The Contractor shall insure that the seal water system is properly installed with no pipe strain transmitted to the pump casing.

3.02 CONDITIONS OF SERVICE

A. The following conditions of service shall be strictly adhered to:

1.	Number of pumps per unit:	2
2.	Type of drive (variable or constant):	constant
3.	Pump discharge size, minimum:	1-1/4"
4.	Pump Suction size, minimum:	1-1/4"
5.	Design capacity:	4 g.p.m.
6.	Design head:	120 ft.
7.	Rotative speed, maximum:	1750 RPM
8.	Shut-off head, minimum:	275
9.	Driver horsepower, minimum:	1
10.	NPSHR at design, maximum:	5 feet
11.	Voltage / Phase / Hz.	115/230 / 1φ / 60
12.	Manufacturer	Aurora 135-F05, or equal

END OF SECTION