

## 1. OIL SEALED LIQUID RING PUMPS

### A. QUADRUPLEX BASE MOUNTED VACUUM SYSTEMS

1. Furnish and install, where shown on the drawings a prefabricated Quadruplex base mounted oil sealed liquid ring vacuum system model\_\_\_\_\_ as manufactured by EMSE Corporation, Fairfield, NJ (1-800-935-EMSE).
2. The unit furnished shall be a standard catalog item of the supplier regularly engaged in the business of providing packaged systems for hospitals and laboratories and shall meet and exceed the requirements of NFPA 99.
3. The package shall include four oil sealed liquid ring vacuum pumps and associated equipment, one vertical ASME tank and one Quadruplex control panel. All components shall be completely pre-piped and pre-wired to single-point service connections. All interconnecting piping and wiring shall be completed and operationally tested prior to shipment. Provide liquid tight conduit, fittings and junction boxes for all control and power wiring.
4. The medical pump system shall require neither seal water, purge water, nor chilled water. The pumps shall not have wearable vanes. They shall be totally air cooled, positive displacement, non-pulsating, capable of passing fluids and soft solids without damage.
5. Each vacuum pump shall be driven by a \_\_\_\_ HP, 3 phase, 60 cycle, \_\_\_\_\_ volt, and 1750 RPM induction type motor. Each pump shall have a capacity of \_\_\_\_\_ SCFM at 19"HG.
6. The system shall include the following accessories for each pump: inlet check valve of bronze construction, inlet isolation valve, exhaust separator equipped with a two stage coalescing filter element, sight level and back pressure indicators, separator drain valve, air-to-sealant heat exchanger with sealant line thermometer and isolation valve, thermal malfunction switch and vacuum control switch. Provide flexible connectors on inlet and exhaust of each pump as well as copper tubing with shut-off cock for gauge and vacuum switches.
7. The sealing fluid shall have a minimum life of 10,000 hours of operation or two years (whichever comes first) and shall be capable of killing bacteria at normal operating temperatures.
8. The system shall include a 200 gallon vacuum storage tank of ASME construction. The tank shall be rated for full vacuum service and shall be equipped with a valved by-pass, vacuum gauge and a manual tank drain. The inside of the tank shall be

coated for rust protection with a two component coating which provides a hard, durable lining.

9. Provide vibration mounting per NFPA 99.
10. The system shall include a UL listed control panel in a NEMA 12 enclosure with the following accessories for each pump:
  - a. Externally operable circuit breaker with door interlock, control circuit transformer with fused primary and secondary coils, H-O-A switch, magnetic starter with 3 leg overload protection, hour meter, motor running light and minimum run timer to prevent short cycle operation.
  - b. Provide the panel with a plug-in type programmable controller with removable terminals to allow quick and easy replacement in the field. The system should be designed to function even if the programmable controller fails. If one of the pumps is out of service the system control shall omit the pump from the alternating cycle, automatically alternating between the remaining pumps only. The system shall revert to normal alternation automatically when the condition is corrected. In addition to standard automatic alternation, the system shall be equipped with forced time alternation in the event that the pump is unable to satisfy the demand in 30 minutes. The system shall be equipped with a flashing light pump failure alarm/shutdown at any of the following conditions: motor overload tripped, main disconnect is off, blown fuse, control transformer failure, starter coil failure, H-O-A is off.
  - c. Provide audible and visual local alarm (complete with indicating lights and individual sets of auxiliary contacts wired to the terminal strip for remote alarm indication) for the following: vacuum pump thermal malfunction and reserve vacuum pump in use.
  - d. Provide manual reset for thermal malfunction shut-down. All control and alarm functions shall remain energized while any vacuum pump in the system remains electrically on-line. The lag vacuum pump shall be able to start automatically if the lead vacuum pump fails to operate.
11. The vacuum system shall be guaranteed in writing by the manufacturer for a period of 18 months from the date of start-up or 24 months from the date of shipment (whichever comes first) against defects in design, materials, or construction. In addition, the bare pumps shall be guaranteed for 5 years from the date of shipment.



12. The service of a factory trained representative shall be made available at the jobsite to check installation, start-up and instruct operating personnel in the proper operation and maintenance.