



## 3"- 6" SE-SERIES SUBMERSIBLE RECIRCULATOR CHOPPER PUMPS

### Materials of Construction:

**Impeller/Upper Cutter/Cutter Nut/Cutter Bar:** ..... Cast alloy steel, heat treated to minimum Rockwell C 60 Hardness.

**Casing/Back Pull-Out Plate:** ..... Ductile Cast Iron

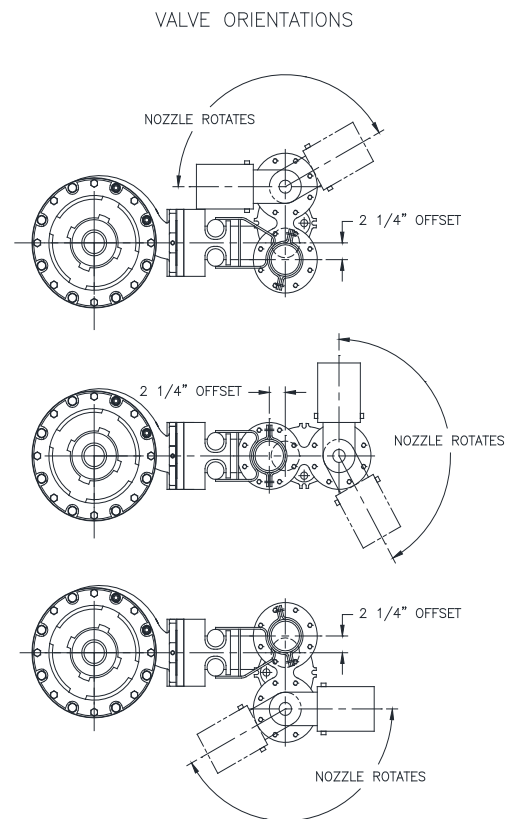
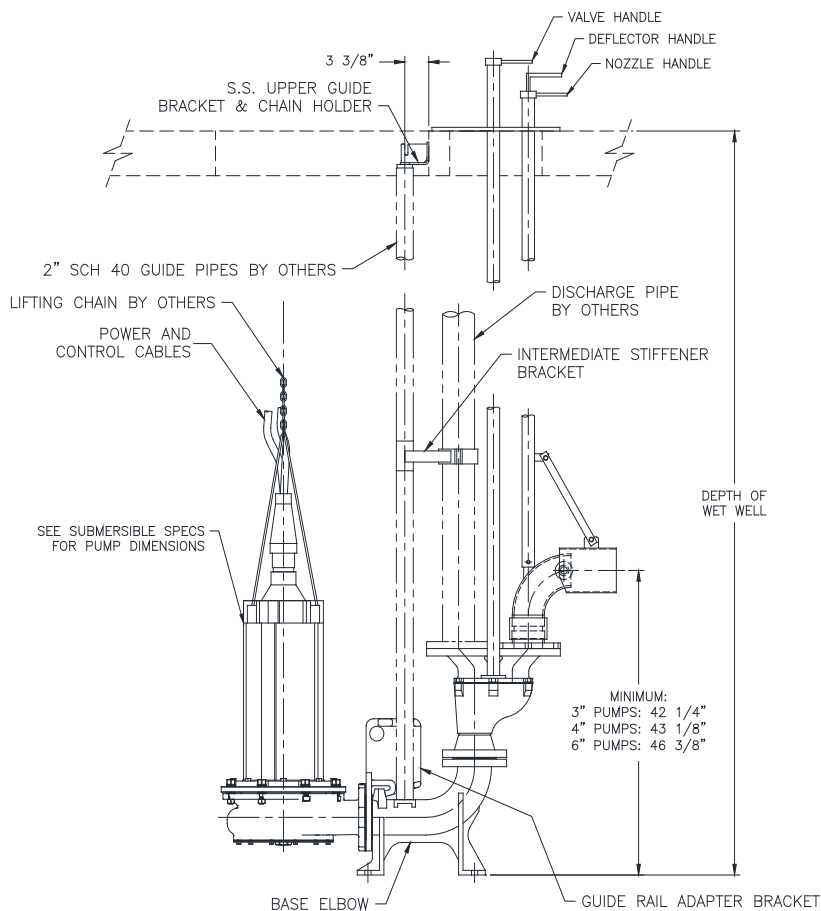
**Valve Body/Guide Bracket/Base Elbow:** ..... Ductile Cast Iron.

**Mechanical Seal:** ..... Silicon carbide (or tungsten carbide)

**Flange:** ..... ANSI Class 125

**Paint:** ..... Epoxy.

SEE THE SE-SERIES SUBMERSIBLE PUMP SPECIFICATION FOR PUMP DIMENSIONS.



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USA**

## SPECIFICATIONS: 3"-6" SE-SERIES SUBMERSIBLE RECIRCULATOR CHOPPER PUMPS

The submersible chopper pump shall be specifically designed to pump waste solids at heavy consistencies without plugging or dewatering of the solids. Materials shall be chopped/macerated and conditioned by the pump as an integral part of the pumping action. The pump must have demonstrated the ability to chop through and pump high concentrations of solids such as plastics, heavy rags, grease and hair balls, wood, paper products and stringy materials without plugging, both in tests and field applications. Pump shall be manufactured by Vaughan Co., Inc.

### DETAILS OF CONSTRUCTION

- A. **Casing and Back Pull-Out Plate:** The pump casing shall be of volute design, spiraling outward to the Class 125 flanged centerline discharge. Back pull-out design shall incorporate jacking bolts for accurate adjustment of impeller-to-cutter bar clearance. Casing & backplate shall be ductile cast iron with all water passages to be smooth, and free of blowholes and imperfections for good flow characteristics. A pressure tap shall be included on or near the discharge flange. Backplate shall include a replaceable Rockwell C 60 cast alloy steel cutter adjustable for 0.005-0.050" clearance to cut against the rotating impeller pumpout vanes for removing fiber and debris.
- B. **Impeller:** Shall be semi-open type with pump out vanes to reduce seal area pressure. Chopping/maceration of materials shall be accomplished by the action of the cupped and sharpened leading edges of the impeller blades moving across the cutter bar at the intake openings, with a set clearance between the impeller and cutter bar of 0.015-0.025" cold. Impeller shall be cast alloy steel heat treated to minimum Rockwell C 60 and dynamically balanced. The impeller shall be keyed to the shaft and shall have no axial adjustments and no set screws.
- C. **Cutter Bar Plate:** Shall be recessed into the pump bowl and shall contain at least 2 shear bars extending diametrically across the intake opening to within 0.010-0.030" of the rotating cutter nut tooth, for the purpose of preventing intake opening blockage and wrapping of debris at the shaft area. Chopper pumps utilizing individually mounted shear bars shall not be acceptable. Cutter bar shall be cast alloy steel or alloy steel heat-treated to minimum Rockwell C 60.
- D. **Cutter Nut:** The impeller shall be secured to the shaft using a cutter nut, designed to cut stringy materials and prevent binding using a raised, rotating cutter tooth. The cutter nut shall be cast alloy steel heat treated to minimum Rockwell C 60.
- E. **Upper Cutter:** Shall be threaded into the back pull-out adapter plate behind the impeller, designed to cut against the pump-out vanes and the impeller hub, reducing and removing stringy materials from the mechanical seal area. Upper cutter shall be cast alloy steel heat treated to minimum Rockwell C 60. The upper cutter teeth are positioned as closely as possible to the center of shaft rotation to minimize cutting torque and nuisance motor tripping. The ratio of upper cutter cutting diameter to shaft diameter in the upper cutter area of the pump shall be 3.0 or less.
- F. **Shafting:** Pump shafting shall be heat-treated alloy steel. The pump shaft shall directly couple to the motor shaft, with a bolt and keyway.
- G. **Submersible Electric Motor:** The submersible motor shall be U/L or FM listed and suitable for Class I, Group C & D, Division I hazardous locations, rated at \_\_\_ HP, \_\_\_ RPM, \_\_\_ Volts, 50 or 60 Hertz and 3 phase, 1.15 service factor (1.0 for Continuous In-Air) with Class F insulation. Motor shall be equipped with tandem independently mounted mechanical seals in oil bath and with dual moisture sensing probes. Moisture probes must be connected to indicate water intrusion. The inner and outer seals shall be separated by an oil-filled chamber. The oil chamber shall act as a barrier to trap moisture and provide sufficient time for a planned shutdown. The oil shall also provide lubrication to the internal seal. The inner seal shall be a standard John Crane Type 21 or equal, with carbon rotating faces and ceramic stationary faces. The outer seal construction shall be designed for easy replacement. Outer mechanical seal shall be 316 stainless steel metal bellows type with silicon carbide or tungsten carbide faces. Seal shall be positively driven by set screws. Elastomers shall be of Viton®. Motor shall include two normally closed automatic resetting thermostats connected in series and imbedded in adjoining phases. The thermostats must be connected per local, state, and/or the National Electric Code to maintain hazardous location rating and to disable motor starter if overheating occurs. Motor frame shall be cast iron, and all external hardware and shaft shall be stainless steel. Motor shall be sized for non-overloading conditions.
- H. **Stainless Steel Nameplate:** The stainless steel nameplate giving the manufacturer's model and serial number, rated capacity, head, speed and all pertinent data shall be mounted to a larger stainless steel plaque. Warning tags will be mounted to this same plaque. Plaque is to be fastened to wall or structure adjacent to pump.
- I. **Guide Rail System:** Provide a guide rail system consisting of two galvanized or stainless steel guide rails (by others), cast ductile iron pump guide bracket, cast ductile discharge elbow with mounting feet and Class 125 flanges, 316 SS upper guide rail mounting bracket, and 316 SS intermediate guide rail stiffener bracket every 10 feet.
- J. **Optional Spark Proof Guide Rail System:** Provide a non-sparking guide rail system consisting of two galvanized or stainless steel guide rails (by others), cast bronze pump guide bracket, cast ductile iron discharge elbow with mounting feet and Class 125 flanges, 316 SS upper guide rail mounting bracket, and 316 SS intermediate guide rail stiffener bracket every 10 feet. System design shall prevent spark ignition of explosive gases during pump installation and removal.
- K. **Recirculation Nozzle Assembly:** The pump shall be fitted with a recirculation nozzle assembly to permit recirculation/conditioning of the pit contents prior to discharge. The recirculation nozzle shall be adjustable minimum 180° horizontally and 45° vertically. A valve assembly shall be connected to the pump discharge to adjust pump flow either to the nozzle or the pump discharge flange. Valve shall be ductile cast iron, with 316 SS valve disk. The operating levers shall be located above at a mounting plate for easy access.
- L. **Optional Automatic Valve Actuator:** **Optional Automatic Valve Actuator:** An electrically operated valve actuator shall position the valve for pump out or mixed operation. A ball screw linear actuator shall be used to provide valve positioning. Unit shall operate on 110V or 220V AC, single-phase power with 25% duty cycle, and shall be capable of producing 500 pounds of actuation force, with a freewheeling feature to prevent over travel at the end of stroke. A capacitor for single phase-motor starting shall be included in the design. All components shall be housed in an enclosure suitable for outdoor operation. Includes a limit switch for indicating valve recirculation or discharge positions. External controls, housed in a separate control unit (by others), are required to indicate valve position.
- M. **Surface Preparation:** Solvent wash and coated with minimum 4 MDFT epoxy (except motor and powder coated parts).
- N. **OPTIONAL Surface Preparation** Solvent wash, sandblast and two coats minimum 5 MDFT epoxy for a total finish of minimum 10 MDFT (except motor and powder coated parts).