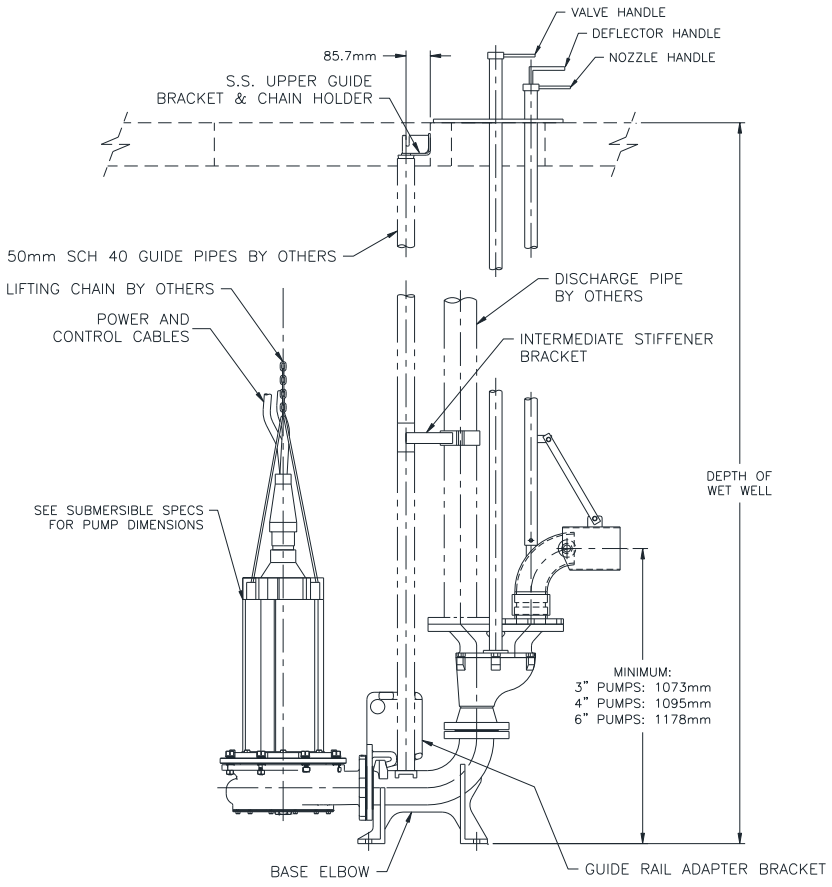
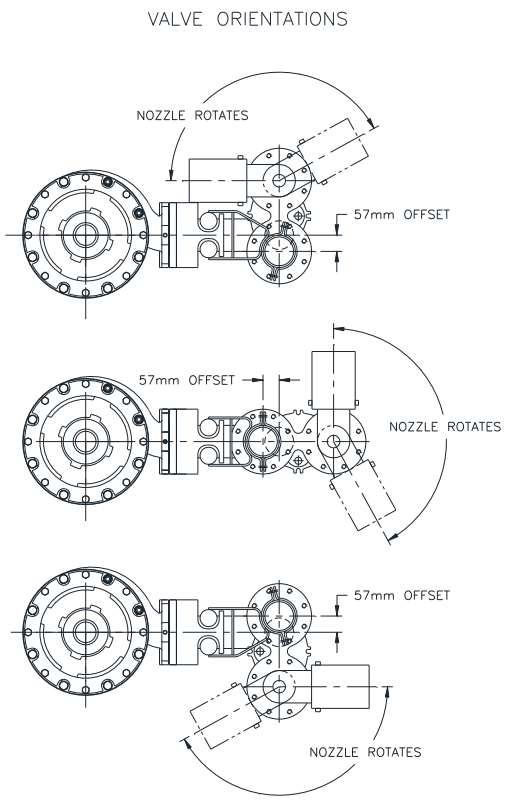
3”-6” E-Series Submersible Recirculator Chopper Pumps
Metric Specs

Materials of Construction:

Impeller/Upper Cutter/
Cutter Nut/Cutter Bar: ..... Cast Steel, heat treated to minimum 60 Rockwell C Hardness.
Casing/Back Pull-Out Plate/Valve Body/
Guide Bracket/Base Elbow: ..... Ductile Cast Iron.
Mechanical Seal: ..... Silicon carbide or tungsten carbide.
Flange: ..... 125 lb. ANSI rated.
Paint: ..... Epoxy.

DRAWINGS AND DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE. DO NOT USE FOR CONSTRUCTION PURPOSES. CONTACT VAUGHAN FOR CERTIFIED CONSTRUCTION PRINTS.





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Montesano, WA 98563
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SPECIFICATIONS

3”-6” SUBMERSIBLE RECIRCULATOR CHOPPER PUMPS

The submersible recirculator chopper pump shall be specifically designed to mix and pump waste solids at heavy consistencies without plugging or dewatering of the solids. Materials shall be chopped 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 125 lb. 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 steel cutter adjustable for .13-.38mm 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 maximum set clearance between the impeller and cutter bar of .38-.64mm 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 .25-.51mm 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 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 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 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: Shall be U/L LISTED EXPLOSION PROOF for Class 1, Group D, Division 1 hazardous locations, rated at ___ KW,____ RPM, ___ Volts, ___ Hertz and 3 phase, with a 1.15 service factor and Class F insulation. Motor shall be equipped with tandem independently mounted mechanical seals in oil bath and with dual moisture sensing probes. 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 UL listed 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. Motor frame shall be cast iron, and all hardware and shaft shall be stainless steel.

H. Stainless Steel Nameplates: Shall be attached to the pump and drive motor giving the manufacturer’s model and serial number, rated capacity, head, speed and all pertinent data.

I. Guide Rail System: Provide a guide rail system consisting of two (galvanized or stainless steel) guide rails, cast ductile iron pump guide bracket and discharge elbow with mounting feet and 125 lb. flanges, an upper guide rail mounting bracket and intermediate guide brackets every 10 feet.

J. Spark Proof Guide Rail System: Provide a non-sparking guide rail system consisting of two (galvanized or stainless steel) guide rails, cast aluminum bronze pump guide bracket, cast ductile iron discharge elbow with mounting feet and 125 lb. flanges, upper guide rail mounting bracket, and intermediate guide brackets 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 of the pit contents prior to discharge. The recirculation nozzle shall be adjustable minimum 180 degrees horizontally and 45 degrees 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 SS valve disk. The operating levers shall be located above at a mounting plate for easy access.

L. *Optional* Automatic Valve Actuator: An electrically operated valve actuator shall position the valve for pumpout 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 500lb. of actuation force, with a freewheeling feature to prevent overtravel at the end of stroke. External timers, housed in a separate control unit (by others), are required to determine valve position. 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.

M. Surface Preparation: Solvent wash. Coat with minimum 3 MDFT epoxy.

N. OPTIONAL ADDER Surface Preparation: SSPC-SP5 commercial sandblast, primed with 3 MDFT zinc-filled primer and finish coated with 3 MDFT epoxy.

3”- 6” HP-Series Submersible Recirculator Chopper Pumps
Metric Specs

Materials of Construction:

Impeller/Upper Cutter/
Cutter Bar/Cutter Nut: ..... Cast Steel, heat treated to minimum Rockwell C 60.
Casing/Bearing Housing/
Guide Bracket/Elbow: ..... Ductile Cast Iron.
Mechanical Seal: ..... Silicon carbide.
Flange: ..... 150 lb. ANSI rated.
Paint:..... Stainless Epoxy.

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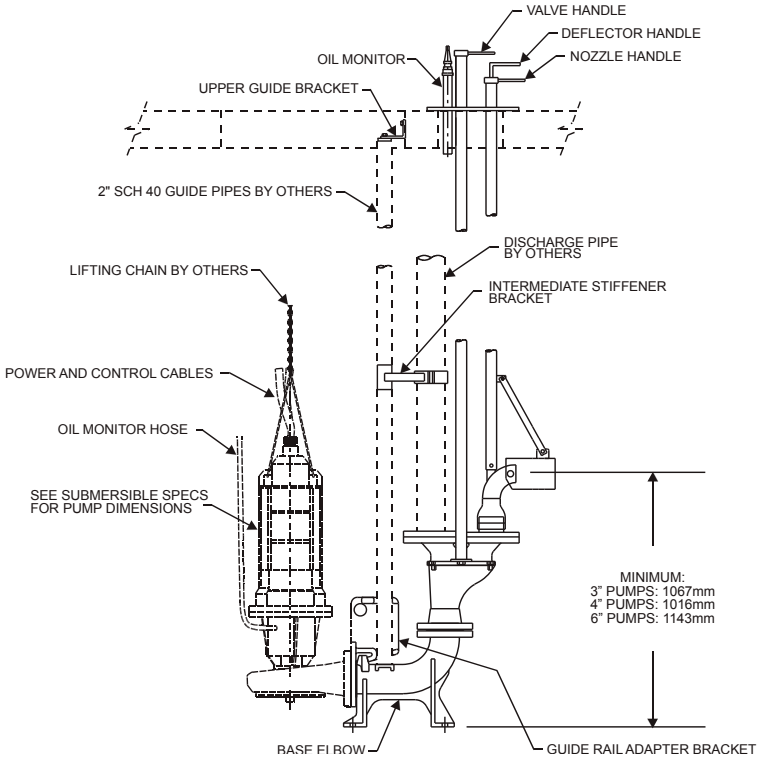
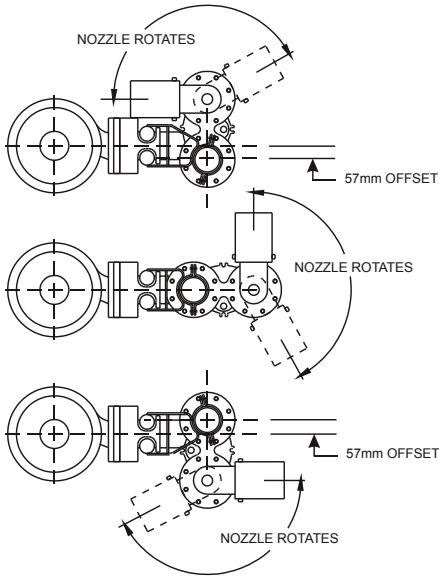


VALVE ORIENTATIONS



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SPECIFICATIONS – 3" - 6" HP SERIES SUBMERSIBLE RECIRCULATOR CHOPPER PUMPS

The submersible recirculator chopper pump shall be specifically designed to mix and 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: Shall be of volute design, spiraling outward to the 125 lb. flanged centerline discharge. Casing shall be ductile cast iron with all water passages to be smooth, and free of blowholes and imperfections for good flow characteristics.

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 maximum set clearance between the impeller and cutter bar of .38-.34mm 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 .25-.51mm 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 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 steel heat treated to minimum Rockwell C 60.

E. Upper Cutter: Shall be threaded into the casing or 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 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. Pump Shafting: The pump shaft and impeller shall be supported by ball bearings. Shafting shall be heat treated steel, with a minimum diameter of 38.1 mm in order to minimize deflection during solids chopping.

G. Bearing Housing: Shall be ductile cast iron, and machined with piloted bearing fits for concentricity of all components. Piloted motor mount shall firmly align motor on top of bearing housing.

H. Thrust Bearings: Shaft thrust in both directions shall be taken up by two back-to-back mounted single-row angular contact ball bearings. Overhang from the centerline of the lower thrust bearing to the seal faces shall be a maximum of 43.2mm. A third mechanical seal shall be provided to isolate the bearings from the pumped media at operating temperatures to 250 F. The third seal, as well as the thrust bearings shall be oil bath lubricated in the bearing housing by I.S.O. Grade 46 turbine oil, with a minimum B-10 life rated 100,000 hours. Shaft overhang exceeding 43.2mm inches from the center of the lowest thrust bearing to the seal faces shall be considered unacceptable.

I. Pump Mechanical Seal: The mechanical seal shall be located immediately behind the impeller hub to maximize the flushing available from the impeller pumpout vanes. The seal shall be a cartridge-type mechanical seal with Viton O-rings and silicon carbide or tungsten carbide faces. This cartridge seal shall be pre-assembled and pre-tested so that no seal settings or adjustments are required from the installer. Any springs used to push the seal faces together must be shielded from the fluid to be pumped. The cartridge shall also include a 17-4PH, heat-treated seal sleeve and a ductile cast iron seal gland. Seal faces shall be tested for flatness within 2 Helium light bands under a Helium light source and optical flat.

J. Automatic Oil Level Monitor: An oil level switch shall be mounted at the top of the wet well, with a hose feeding down to the side of the bearing housing to detect oil level and shut off the motor in event of low oil level. A sensitive relay shall be included for mounting in the motor control panel.

K. Shaft Coupling: The submersible motor shall be close coupled directly to the pump shaft using a solid sleeve coupling, which is keyed to both the pump and motor shafts. Slip clutches and shear pins between the shaft and the motor are considered unacceptable.

L. Stainless Steel Nameplates: Shall be attached to the pump and drive motor giving the manufacturer's model and serial number, rated capacity, head, speed and all pertinent data.

M. Submersible Motor: The submersible motor shall be U/L listed and suitable for Class I, Group D, Division I hazardous locations, rated at __ kW, ___ RPM, __ Volts, 50 Hertz and 3 phase, 1.15 service factor (1.0 for Continuous In-Air) with Class F insulation. Motor shall have tandem mechanical seals in oil bath and dual moisture sensing probes. The lower motor seal shall be exposed only to the lubricant in the bearing housing, with no exposure to the pumpage. Motor shall include two normally closed automatic resetting thermostats connected in series and imbedded in adjoining phases. Motor frame shall be cast iron, and all hardware and shaft shall be stainless steel.

N. Guide Rail System: Provide a guide rail system consisting of two (galvanized or stainless steel) guide rails, cast ductile iron pump guide bracket and discharge elbow with mounting feet and 125 lb. flanges, an upper guide rail mounting bracket and intermediate guide brackets every 3 meters.

O. Spark Proof Guide Rail System: Provide a non-sparking guide rail system consisting of two (galvanized or stainless steel) guide rails, cast bronze pump guide bracket, cast ductile iron discharge elbow with mounting feet and 125 lb. flanges, upper guide rail mounting bracket, and intermediate guide brackets every 3 meters. System design shall prevent spark ignition of explosive gases during pump installation and removal.

P. Recirculation Nozzle Assembly: The pump shall be fitted with a recirculation nozzle assembly to permit recirculation of the pit contents prior to discharge. The recirculation nozzle shall be adjustable minimum 180 degrees horizontally and 45 degrees 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.

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R. Surface Preparation: Solvent wash. Coat with minimum 3 MDFT epoxy.