

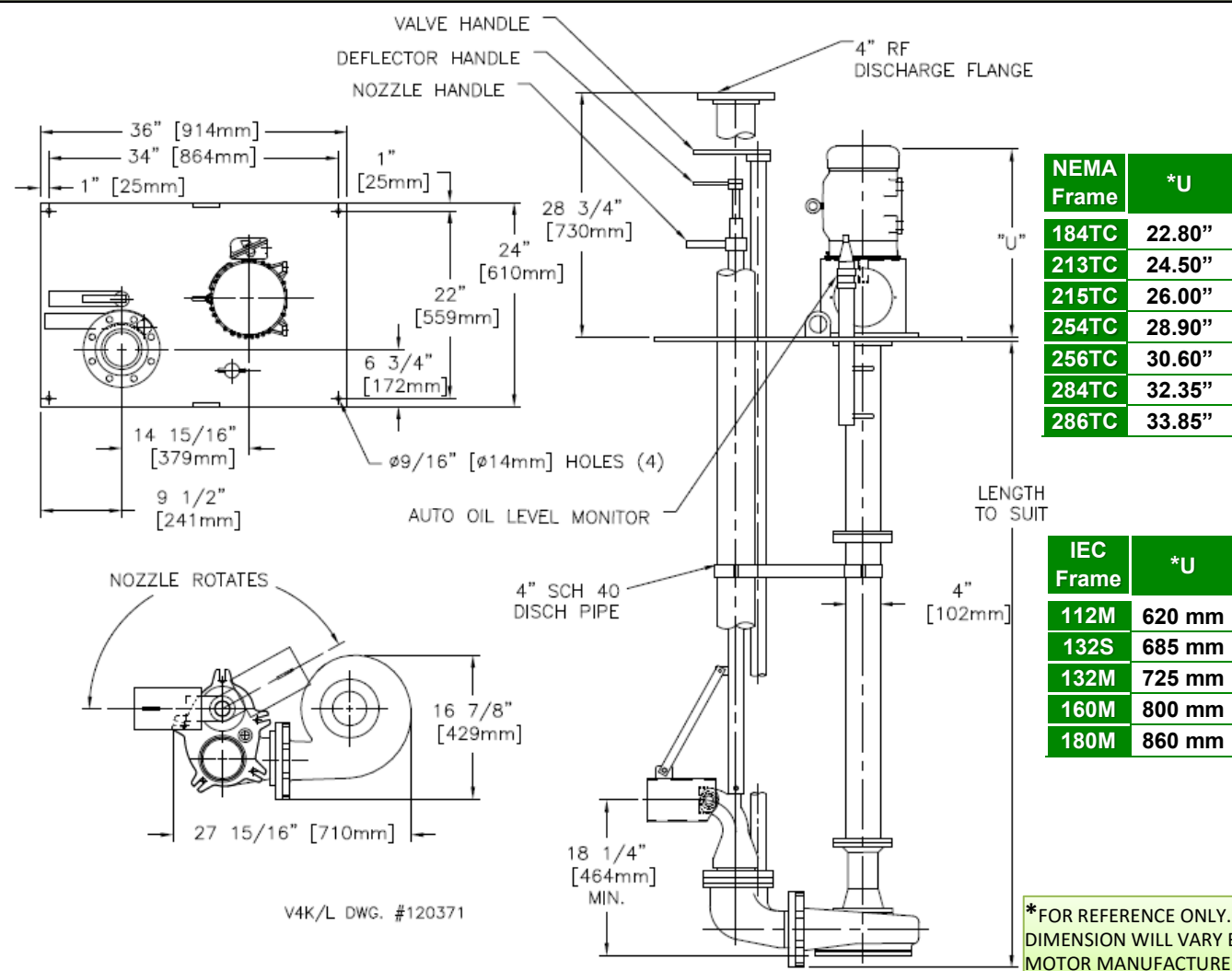


V4KR & V4LR VERTICAL WET WELL RECIRCULATOR CHOPPER PUMPS

Materials of Construction:

Casing:	Ductile cast iron.
Impeller/Cutter Bar/ Upper Cutter/Cutter Nut:	Cast alloy steel, heat treated to minimum Rockwell C60.
Mechanical Seal:	Cartridge type with silicon carbide (or tungsten carbide) faces and stainless steel sleeve.
Thrust Bearings:	Angular contact ball bearings.
Radial Bearings:	Ball bearings.
Shaft:	Heat treated alloy steel.
Lubrication:	ISO 46 hydraulic oil.
Discharge Flange:	4" ANSI Class 150.
Mounting Plate:	Carbon steel.
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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USA**

SPECIFICATION: V4KR & V4LR VERTICAL WET WELL RECIRCULATOR CHOPPER PUMPS

The Vertical Wet Well Recirculator pumps shall be specifically designed to mix and pump waste solids at heavy consistencies. 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, wood, hair balls, paper products, and stringy materials without plugging, both in tests and field applications.

DETAILS OF CONSTRUCTION

- A. **Casing:** Shall be of volute design, spiraling outward to the ANSI CL 150 discharge. Casing shall be ductile cast iron with all water passages to be smooth, and free of blowholes and imperfections for good flow characteristics. Casing shall include a replaceable Rockwell C60 alloy steel cutter to cut against the rotating impeller pump-out vanes for removing fiber and debris.
- B. **Impeller:** Shall be a two blade (4K) or four blade (4L) semi-open type with pump out vanes to reduce seal area pressure. Chopping of materials shall be accomplished by the action of the cupped and sharpened leading edges of the impeller blades moving across the stationary cutter bar at the intake openings, with a maximum set clearance between the impeller and cutter bar of 0.015-0.025" (0.40–0.65 mm) cold. Impeller shall be cast alloy steel heat treated to minimum Rockwell C60 and dynamically balanced. The impeller shall be keyed to the shaft and shall have no axial adjustments and no set screws.
- C. **Cutter Bar:** Shall be recessed into the pump bowl and shall contain at least two shear bars extending diametrically across the intake opening to within 0.010-0.030" (0.25–0.75) mm 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 heat-treated to minimum Rockwell C60.
- 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 C60.
- E. **Upper Cutter:** Shall be threaded into the casing 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 C60. 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. **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 stainless steel valve disk. The operating levers shall be located above at a mounting plate for easy access.
- G. **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.
- H. **Pump Shafting:** Shall be heat treated alloy steel. Upper shaft extension shall be turned, ground and polished. The shaft column shall be minimum 3-1/2" schedule 40 steel pipe welded to steel flanges and machined with piloted bearing fits for concentricity of all components. All support column tubes shall be leak tested. Distance between shaft bearings shall not exceed critical speed dimensions.
- I. **Pump Shaft Bearings:** Shall be oil bath lubricated by ISO 46 hydraulic oil, with the exception of the top bearing, which shall be greased packed. The bearings shall have a minimum L-10 life rated 100,000 hours. Shaft thrust shall be taken up by angular contact ball bearings which bear against a machined shoulder on one side and the seal sleeve on the other side. Overhang from the centerline of the lower thrust bearing to the seal faces shall be a maximum of 1.7" (43 mm), with a mechanical seal to isolate the bearings from the pumped media.
- J. **Pump Mechanical Seal:** The mechanical seal shall be located immediately behind the impeller hub to maximize the flushing available from the impeller pump-out 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.
- K. **Automatic Oil Level Monitor:** Shall be located above the mounting plate and be fitted with an internal oil level switch to detect low oil level and shut off the motor in event of low oil level. A relay shall be included for mounting in the motor control panel.
- L. **Pump Discharge Pipe:** The pump assembly shall be mounted vertically on a common steel base plate with a 4" ANSI CL 150 discharge flange. A 1/4" NPT discharge pressure tap shall be located above the deck plate.
- M. **Shaft Coupling:** Shall be T.B. Woods Sureflex elastomeric type with a minimum 1.5 service factor based on the drive rated power, and shall be protected with a guard meeting OSHA requirements.
- N. **Motor Stool:** Shall be a fabricated carbon steel weldment machined with piloted fits to positively align the C or B5 flanged motor and pump shaft, with no adjustments.
- O. **Pump Base Plate:** Shall be fabricated carbon steel, 1/2" minimum thickness, and shall include lifting lugs.
- P. **Stainless Steel Nameplate:** Shall be attached to the pump base plate giving the manufacturer's model and serial number, rated capacity, head, speed, and all pertinent data.
- Q. **Motor Requirements:** Drive motor shall be ____ HP (KW), ____ RPM, ____ volts, 3 phase, 60(50) hertz, 1.15 service factor, C or B5 flange mounted, TEFC enclosure. The motor shall be sized for non-overloading conditions.
- R. **Surface Preparation:** Solvent wash and coated with minimum 4 MDFT epoxy (except motor and powder coated parts).
- S. **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).