



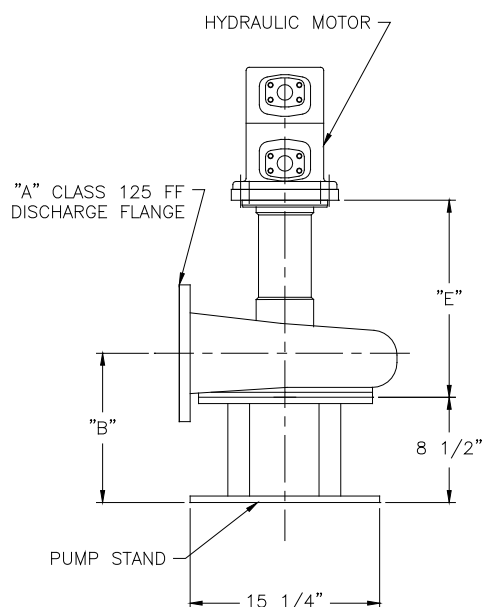
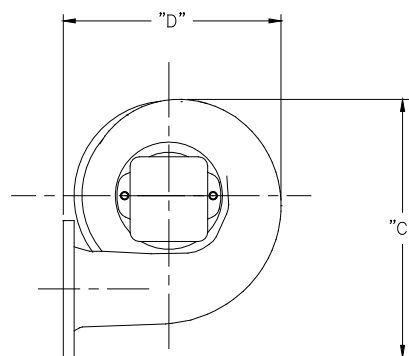
3"- 6" HYDRAULIC SUBMERSIBLE CHOPPER PUMPS

Materials of Construction:

Impeller/Upper Cutter/Cutter Bar/Cutter Nut: Cast alloy steel, heat treated to minimum Rockwell C 60.
Casing: Ductile cast iron.
Mechanical Seal: Cartridge type with silicon carbide (or tungsten carbide) seal faces and stainless steel sleeve.
Thrust Bearings: Back to back angular contact ball type.
Radial Bearings: Ball type.
Flange: ANSI Class 125
Paint: Epoxy.

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

PUMP MODEL	DIMENSIONS IN INCHES					
		A	B	C	D	E
	HY3F HY3G	3	11-7/16	16	15-1/4	15-3/8
	HY3L HY3M	3	11-1/16	16-7/8	15-1/4	14-1/2
	HY3P	3	10-15/16	17-1/2	15-5/8	14-11/16
	HY3V HY3W	3	10-7/16	15-1/4	15-1/4	14-3/8
	HY4K HY4L	4	12	18-1/4	15-9/16	15-3/4
	HY4S HY4T	4	11-1/2	16-5/8	20-1/16	15-1/2
	HY6U	6	12	20-3/4	17-1/2	15-7/8



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For all current patents, see <https://www.chopperpumps.com/patents/>

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SPECIFICATION 3"– 6" HYDRAULIC SUBMERSIBLE CHOPPER PUMPS

The hydraulic 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:** Shall be of volute design, spiraling outward to the Class 125 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 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 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 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 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. 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 alloy steel, with a minimum diameter of 1.5 inches 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 securely 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 with a minimum L-10 rated life of 100,000 hours. Overhang from the centerline of the lower thrust bearing to the seal faces shall be a maximum of 1.7". A mechanical seal shall be provided to isolate the bearings from the pumped media. The seal, as well as the thrust bearings shall be oil bath lubricated in the bearing housing by I.S.O. Grade 46 oil. Shaft overhang exceeding 1.7 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.
- 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 monitor 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.
- 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 Nameplate:** Shall be attached to the pump giving the manufacturer's model and serial number, rated capacity, head, speed and all pertinent data.
- M. **Submersible Hydraulic Motor:** The pump shall be fitted with a hydraulic motor producing _____ horsepower at _____ RPM, using _____ GPM oil flow at _____ PSI continuous operating pressure. The hydraulic drive shall require a relief valve setting of _____ PSI, in order to allow for additional chopping torque, and protect the hydraulics from any damage.
- N. **Portable Stand:** Shall be fabricated steel, with a base plate of suitable diameter to support the pump without tipping.
- O. **Surface Preparation:** Solvent wash and a single coat of Tnemec 431 epoxy (except motor).
- P. **OPTIONAL Premium Surface Preparation:** Solvent wash, sandblast, and coat with minimum 30 MDFT Tnemec Perma-Shield PL Series 431 epoxy (except motor).