



## 8"–12" Hydraulic Submersible Chopper Pumps

### Materials of Construction:

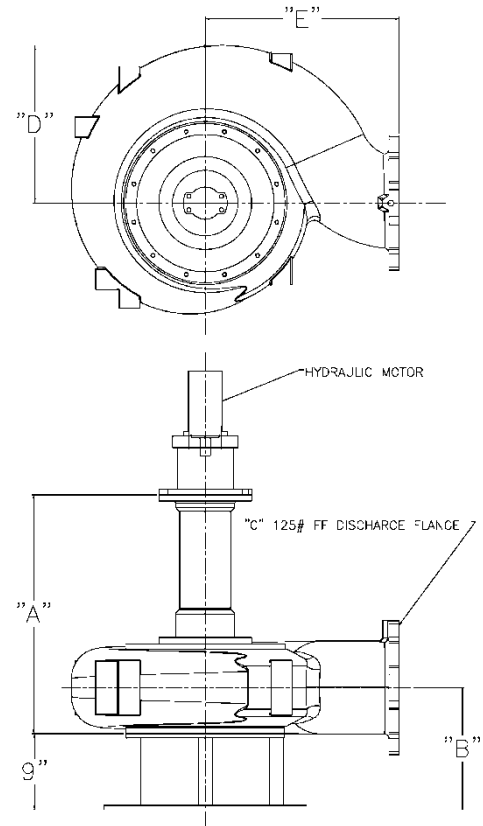
#### Impeller / Upper Cutter /

- External Cutter:** ..... Cast Steel, heat treated to minimum Rockwell C 60.  
**Cutter Bar:** ..... Plate Steel, heat treated to minimum Rockwell C 60.  
**Casing/Back Pull-Out Plate:** ..... Ductile Cast Iron.  
**Mechanical Seal:** ..... Cartridge type with silicon carbide  
 (or tungsten carbide) faces.  
**Seal Sleeve:** ..... Stainless steel.  
**Thrust Bearings:** ..... Back-to-back angular contact ball type.  
**Radial Bearings:** ..... Ball type.  
**Shaft:** ..... Heat treated steel.  
**Lubrication:** ..... ISO Gr. 46 oil.  
**Discharge Flange:** ..... 125 lb. ANSI rated.  
**Mounting Plate:** ..... Carbon Steel.  
**Paint:** ..... Ceramic Epoxy.

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

MODEL	A	B	C	D	E
HY8N	27	13 7/8	8	13 13/16	17 3/4
HY8P	25 3/8	13	8	12 1/4	18 3/4
HY10R	28 1/4	14 7/16	10	18 11/16	22 15/16
HY12W	28 9/16	14 13/16	12	21 7/8	27 1/16

UNITS: INCHES



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CURRENT U.S. PATENTS: Nos. 7,125,221,  
 5,460,482; 5,460,483; 5,456,580; 5,256,032;  
 5,076,757; 4,840,384; 4,842,479.

CURRENT FOREIGN PATENTS: Nos. 2 371  
 834; 2 188 138; 1,290,981; 276224; 0 774 045.

OTHER PATENTS PENDING.

## SPECIFICATIONS – 8”-12” 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, Back Pull-Out Adapter Plate and Wear Plate: The pump casing shall be of volute design, spiraling outward to the flanged centerline discharge. A ½"-NPT pressure tap shall be included on or near the discharge flange. Back pull-out adapter plate shall allow removal of pump components from outboard of the casing, and allow external adjustment of impeller-to-cutter bar clearance. Casing and adapter plate shall be ductile cast iron with all water passages to be smooth, and free of blowholes and imperfections for good flow characteristics. The back pull-out wear plate shall be heat treated low-alloy steel plate. Backplate will include a replaceable Rockwell C 60 steel wear plate 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 maximum set clearance between the impeller and cutter bar of 0.015" - 0.025". Impeller shall be cast steel, heat treated to minimum Rockwell C 60 and dynamically balanced. The impeller shall be threaded 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 0.020" - 0.040" for 8"-10" pumps and 0.040"-0.060" for 12" pumps of the rotating external cutter tooth, for the purpose of preventing intake opening blockage and wrapping of debris at the shaft area. Chopper pumps utilizing individually mounted shear bars, and which do not have a rotating external cutter extending through to the opposite side of the shear bar, shall not be acceptable. Cutter bar shall be alloy steel heat-treated to minimum Rockwell C 60.
- D. Upper Cutter: Shall be bolted 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 3.6 or less.
- E. External Cutter: The external cutter shall be used to eliminate binding or build-up of stringy materials at the pump inlet. The external cutter shall consist of opposing cutter wings which shear against the outside surface of the shear bars and the anvil, an integral cast tooth which shears against the adjacent surface of the shear bars, and a hex head sufficiently sized for ease of removal. The external cutter shall be cast alloy steel and heat treated to a minimum Rockwell C 60.
- F. Pump Shafting: Shall be 2-7/16" diameter minimum and shall be heat treated steel.
- G. Pump Shaft Ball Bearings: Shall be oil bath lubricated by I.S.O. Grade 46 turbine oil. The bearings shall have a minimum B-10 life rated 100,000 hours. Shaft thrust shall be taken up by two back-to-back mounted single row 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 2.75", with a mechanical seal to isolate the bearings from the pumped media at up to 250 F.
- H. Mechanical Seal: The mechanical seal shall be located immediately behind the impeller hub to eliminate the stuffing box and maximize the flushing available from the impeller pumpout vanes. The seal shall be a screw-in, cartridge-type mechanical seal with Viton O-rings and silicon carbide (or tungsten carbide) faces. This cartridge seal shall be a pre-assembled, 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 iron seal gland.
- I. Automatic Oil Level Monitor: Shall be located above the mounting plate and be fitted with an internal oil level switch to detect oil level and shut off the motor in event of low oil level.
- J. Stainless Steel Nameplates: Shall be attached to the pump and drive motor giving the manufacturer's pertinent data.
- K. 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.
- L. **Surface Preparation:** Solvent wash and a single coat of Tnemec 431 epoxy applied at 5 MDFT minimum (except motor).
- M. **OPTIONAL Surface Preparation:** SSPC-SP6 commercial sandblast (except motor), a prime coat of Tnemec 431 epoxy and a finish coat of Tnemec 431 epoxy for total finish of 30 MDFT minimum (except motor).