



HAYWARD GORDON

Solids Handling Pumps

5 Brigden Gate, Halton Hills, ON L7G 0A3

Tel: (905) 567-6116 • Fax: (905) 567-1706 • www.haywardgordon.com

CHOPX Chopper Pumps Base Mounted

SPECIFICATIONS

General

Pumps will be a centrifugal chopper design of heavy duty construction intended for services requiring a combined chopping and pumping action on fluids with entrained solids. Acceptable manufacturers are Hayward Gordon CHOPX Series or approved equal.

Performance

Pumps shall be sized to meet the following design criteria:

A. Fluid Properties:

Fluid _____ S.G
Viscosity _____ Temp
Solids % _____ Solids Type/Size _____/_____

B. Pump Characteristics:

Capacity _____ TDH
Suction Head _____ NPSHA
Minimum Disch. Size _____ Motor RPM
Max. Pump RPM _____ Motor HP _____

C. Pump Efficiency:

To minimize operational power costs, the minimum hydraulic efficiency of the pump at the design duty point shall be _____% and shall be no less than _____% at the Best Efficiency Point at the selected pumps' RPM.

Pump Construction

- A. Casing: The pump casing will be constructed of ASTM A48 Cast Iron (*Optional: High Chrome Iron 450 BHN minimum, 316SS or CD4MCU*). Flanged suction and discharge connections shall conform to the requirements of ANSI B16.1, Class 125. Casings with 4" or larger discharge diameter shall have an inspection port with removable cover to allow access to the casing passage. An inspection port shall also be provided in the suction spool piece to allow access to the front of the impeller and cutter bars. The casing backplate shall have spiral cutting groove on the surface that is in close clearance to the rear of the impeller. The casing shall be a clamp type design, with integrally cast feet to allow removal of the power frame for maintenance without disturbing the suction or discharge piping.
- B. Impeller: The pump impeller shall be an open type with or sharpened vane edges incorporated into the rear of the impeller which provides cutting action against the backplate spiral groove, preventing fouling behind the impeller. Primary chopping/conditioning of materials shall be accomplished by the action of the 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 .010" to .015" on pumps with less than 14" diameter impellers or 0.020" to 0.030" on pumps with 14" diameter or larger impellers. Impeller shall be constructed of cast alloy steel, case hardened to minimum Rockwell C 60 (*Optional: High Chrome Iron 450 BHN minimum, 316SS, or CD4MCU*) and shall be dynamically balanced. The impeller shall be keyed to the shaft and the axial clearance at the front and rear of the impeller shall be externally adjustable.
- C. Cutter Bar: The casing will be fitted with a replaceable, externally-adjustable suction plate with integral cutter bars constructed of cast alloy steel case hardened to minimum Rockwell C 60 (*Optional: High Chrome Iron 450 BHN minimum, 316SS or CD4MCU*). The surface of the suction plate facing the impeller shall have multiple radial cutting slots to prevent binding of material between it and the impeller vanes. Pumps with 15" or larger impeller diameters shall have separately replaceable cutter bars independent of the main suction cover.



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- D. Deflector Nut: The impeller shall be secured to the shaft using a deflector nut made from 420 Stainless Steel hardened to 400 BHN, designed protrude in front of the cutter bars and deflect stringy materials and prevent binding.
- E. Upper Cutter: The area behind the impeller shall be protected from fouling by the cutting and expulsion action of sharpened vane edges sweeping across spiral grooves in the casing backplate.
- F. Shaft & Sleeve: The shaft will be constructed of 4140 carbon steel, protected through the seal area by a renewable 420 Stainless Steel sleeve hardened to 400BHN (*or: 316SS sleeve where mechanical seals are specified*). An O-ring between sleeve and shaft will prevent pumped fluid from leaking along the shaft.
- G. Bearings: Radial bearings on all sizes of pump shall be cylindrical roller type to withstand high radial loads during chopping. Axial thrust in both directions shall be taken up by double row angular contact thrust bearings on pumps with less than 14" diameter impellers or by higher capacity double row tapered roller bearings for pumps with 14" diameter or larger impellers. The bearing lives are to be rated for a minimum of 100,000 hrs. L_{10} life, based on calculated loads due to hydraulic thrust encountered at the duty point, as well as other mechanical loading due to belt drives or shaft and impeller weight.
- H. Bearing Housing: The bearing frame shall be A48 Class 30 cast iron and should be fitted with grease nipples for grease lubrication or with an oil level sight gauge, vent and drain plugs for oil lubrication. The axial thrust bearing shall be contained in a separate housing mounted within the powerframe to allow for external axial adjustment of the impeller clearance. The bearing frame shall be removable for servicing without disturbance of the suction or discharge piping.
- I. Seal Housing: The stuffing box will be constructed of A48 Class 30 cast iron (*Optional: 316SS*).
- J. Seal Types:
- i) Graphite acrylic braided packing with a Teflon lantern ring, retained by a bronze, split adjustable gland plate and lubricated with clean water flush.
 - ii) Single mechanical seal with throttling bushing or double mechanical seal, either configuration to be fitted for clean water flush.
 - iii) Flushless mechanical seal system designed to require no clean water flushing. System to consist of the stuffing box portion of the seal housing having a tapered opening of no less than 20° to promote the expulsion of solids back into the pumped flow. The seal shall be front loading and of the cartridge type with Viton O-rings, silicon carbide faces and 316SS metal parts. The cartridge seal shall be pre-assembled and pre-tested so that no seal settings or adjustments are required. Any springs used to push the faces of the seals together must be shielded from the pumped fluid to prevent binding or hang-up of the seal. A separate oil chamber shall not be required for the mechanical seal.

Any leakage will be retained by a drainable reservoir, with a 0.75" NPT hole provided to connect drainage piping.

- K. Pump and Motor Base: (*Horizontal*): The pump and motor base shall be fabricated from steel, designed to provide rigid support of the pump and foot mounted motor. Each base shall be furnished with suitable bolt and grout holes to facilitate mounting at site. Units shall be provided with either V-Belts and sheaves or a direct drive coupling to provide the required pump speed to meet performance conditions. Suitable OSHA guards are required.

(*Vertical Dry Pit Mounting*): The pump shall be supported by an independent pedestal base fabricated from steel or Cast Iron, designed to provide rigid support of the pump and motor. The independent pump support pedestal shall be designed for easy access to the handhole cleanout and such that the suction elbow can be removed for maintenance without having to remove or dismantle any of the pump components.