For clean or slightly contaminated sulfur, Hayward Gordon offers its proven vertical lineshaft design incorporating the features described below:

1. Impeller Clearance Adjustment
   - Convenient internal impeller clearance adjustment can be made using shims and built-in jacking screws.

2. Thrust Bearings
   - The upper bearing housing is integral with the motor support pedestal, ensuring accurate alignment. Bearings are replaceable, double or triple angular contact type selected for an L₁₀ life of 30,000 hours and housed in a machined steel cartridge.

3. Shaft Seal
   - To prevent the escape of vapor a minimum of six rings is provided in the stuffing box. Optional seal and outlet connectors allow for packing or seal lubrication.

4. Support Columns
   - Pump support columns feature double walled construction and precision spigot mating of the welded column flanges in order to assure rigid and accurate alignment of bearings.

5. Submerged Bearings
   - Specially designed in-resist or carbon graphite grooved bearings provide radial support for the shaft and impeller assembly. Size and number of bearings is selected for an L₁₀ life of 30,000 hours and pump operation below first critical speed.

6. Bearing Lubrication System
   - An internally piped molten sulfur circulation system provides positive lubrication to each lineshaft bearing even during pump down.

7. Jacketing
   - Columns, discharge pipe, and optional casing jackets are provided to maintain close temperature control with low pressure steam or glycol.

8. Wet-Ends
   - ANSI process pump wet-ends with open impellers are offered as standard. Where hydraulic conditions preclude use of the standard, specially selected closed impeller designs are available.

9. Strainers
   - Optional strainers are available for protection against large solids.

For corrosive services, Hayward Gordon also produces non-jacketed versions of each of the horizontal and vertical pumps described in this bulletin. These pumps can be manufactured from most available metal and metal alloys to handle a wide range of corrosive and abrasive applications such as those found in acid plants, petrochemical facilities, metal refining operations, and FGD processes.

Non-jacketed vertical pumps can be produced with or without submerged bearings (i.e. lineshaft or cantilever) depending on the level of abrasion resistance required and the degree of solids contamination in the fluid. The full line of horizontal ANSI B73.1 chemical process pumps offers many of the same performance features as their jacketed counterparts including the unique alignment positioning back-foot and the micro-screw impeller clearance adjustment. Further bulletins and information on these pumps are available from Hayward Gordon at the location listed below or the website haywardgordon.com.

Impeller Clearance Adjustment
- Convenient internal impeller clearance adjustment can be achieved using shims and built-in jacking screws.

Thrust Bearings
- The upper bearing housing is integral with the motor support pedestal, ensuring accurate alignment. Bearings are replaceable, double or triple angular contact type selected for an L₁₀ life of 30,000 hours and housed in a machined steel cartridge.

Shaft Seal
- To prevent the escape of vapor a minimum of six rings is provided in the stuffing box. Optional seal and outlet connectors allow for packing or seal lubrication.

Support Columns
- Pump support columns feature double walled construction and precision spigot mating of the welded column flanges in order to assure rigid and accurate alignment of bearings.

Submerged Bearings
- Specially designed in-resist or carbon graphite grooved bearings provide radial support for the shaft and impeller assembly. Size and number of bearings is selected for an L₁₀ life of 30,000 hours and pump operation below first critical speed.

Bearing Lubrication System
- An internally piped molten sulfur circulation system provides positive lubrication to each lineshaft bearing even during pump down.

Jacketing
- Columns, discharge pipe, and optional casing jackets are provided to maintain close temperature control with low pressure steam or glycol.

Wet-Ends
- ANSI process pump wet-ends with open impellers are offered as standard. Where hydraulic conditions preclude use of the standard, specially selected closed impeller designs are available.

Strainers
- Optional strainers are available for protection against large solids.

For molten sulfur and other fluids requiring pumping at controlled temperatures.

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www.haywardgordon.com
JACKETED VERTICAL CANTILEVER PUMPS

Bearing Seals
Unique, Hayward Gordon designed labyrinth seals protect the upper and lower bearings from contamination without any moving contact with the shaft. This feature provides a significant maintenance advantage over regular lip seals.

Impeller Clearance Adjustment
Convenient external impeller clearance adjustment can be achieved using stems and built-in jacking screws.

Bearings
All radial and thrust bearings are located above the cover plate in a grease lubricated pedestal. Bearings are selected to provide 1.5 times excess of 30,000 hours.

Shaft Seals
Metal-to-metal labyrinth sealings are included as standard to minimize vapor escape. Optional packed stuffing boxes and seal housings are available.

Support Columns
Support columns feature double walled construction and precision spigot mating to base plate and casing to assure rigid and accurate alignment of rotating parts.

Jacketing
Column, discharge pipe, and optional casing jackets are designed to provide a large radiating surface and oil reservoir to carry away excess heat. Although optional, the heavily radial and double-row thrust bearings are lubricated by the jacketed housing and casings and reduce pressure in the sealing area. Impeller clearances are easily adjustable externally through shimming or a "micro-screw" mechanism.

Shafts and Sleeves
Rigged brush-type seals are designed for minimum deflection under load and are manufactured to a surface finish of less than 32 micron inches through the sealing area. Hook type, dimensionally driven shaft sleeves are utilized in various materials and hardness.

Bearings and Bearing housings
Hayward Gordon power-frames have excellent heat dissipation characteristics allowing them to be used on many high temperature applications without additional cooling. However, bearing housing cooling coils can be added as an option. The heavily radial and double-row thrust bearings are lubricated by a large oil reservoir fed by a constant level oiler. Bearings are selected to provide 1.5 life, that exceeds the ANSI B73.14-1991 standards.

Seals • Glands • Seal Housings
Seals are the most vulnerable components of molten sulfur pumps. Hayward Gordon has worked with major mechanical seal manufacturers and customers for over 50 years to develop a reliable and field proven combination of special seal, jacketed housing, and jacketed gland. In molten sulfur service, a high degree of temperature control in the seal area is essential for proper pump operation and long seal life.

Casings
The complete rotating assembly is removed without disturbing the suction or discharge piping.

Back Pull-Out
All Hayward Gordon pumps feature back pull-out power frames for fast and low-cost maintenance. The complete rotating assembly can be removed without disturbing the suction or discharge piping.