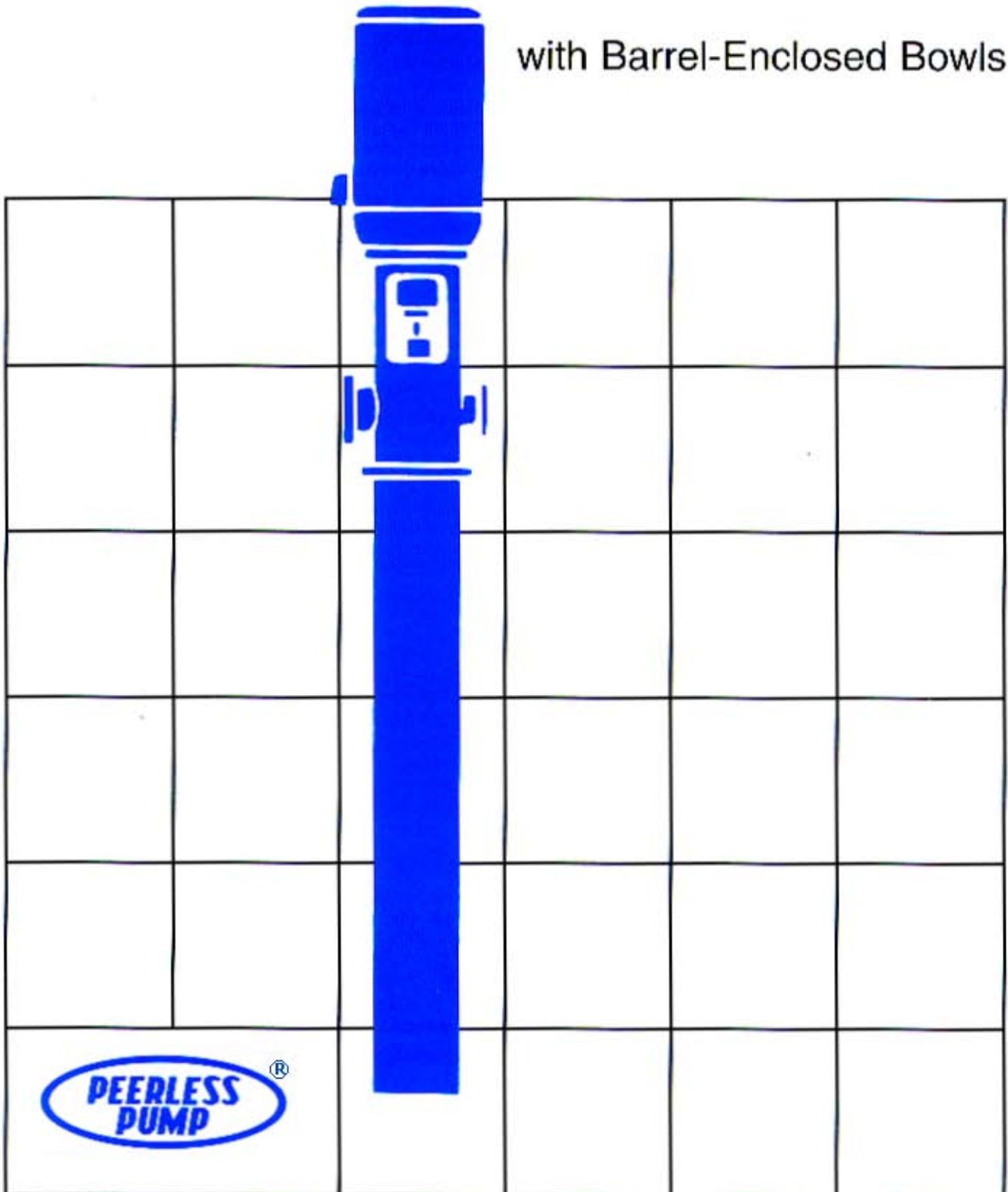


Peerless Pump

HYDRO-LINE INDUSTRIAL
TURBINE PUMPS

with Barrel-Enclosed Bowls



Peerless Hydro-Line Pumps

Peerless Hydro-Lines are close coupled industrial vertical turbine pumps which have single or multi-stage bowl units enclosed in pressure containing barrels. For applications such as transfer, pressure boost, circulating or water flood injection, Peerless Hydro-Lines offer the ultimate in quality, performance, and sustained operating efficiency.

Limited System NPSH

Peerless Hydro-Line pumps are designed especially for applications where the available NPSH is limited. (NPSH—net positive suction head—is the excess pressure, above the vapor pressure of the liquid pumped, available to the lowest impeller.) Every centrifugal pump has a minimum required NPSH. If the NPSH available is less than the NPSH required, the pump will cavitate and serious operating problems may occur—reduced capacity and efficiency, excessive vibration and noise, cavitation-caused erosion damage, etc. The Peerless Hydro-Line can be designed for ser-

vice with any available NPSH. It is ideal for condensate return service and for pumping hydrocarbons, refrigerants, dilute alcohols and most other liquids with high vapor pressures.

Sustained Performance

Pressure losses through piping systems usually increase as systems age. Peerless Hydro-Line pumps have relatively steep head-capacity curves. Thus, as discharge pressures rise to meet head requirements, capacities diminish only slightly.

Performance Characteristics

Performance values for both standard and custom engineered Hydro-Lines are shown at the right. While Sterling has manufactured thousands of standard models, we have also manufactured substantial numbers of "specials" of two types:

Special Materials or Configurations: Various configuration or materials requirements arise across the broad spectrum of industrial applications which require deviations from our standard construction. Sterling has successfully designed and manufactured thousands of Hydro-Lines to meet unusual application requirements.

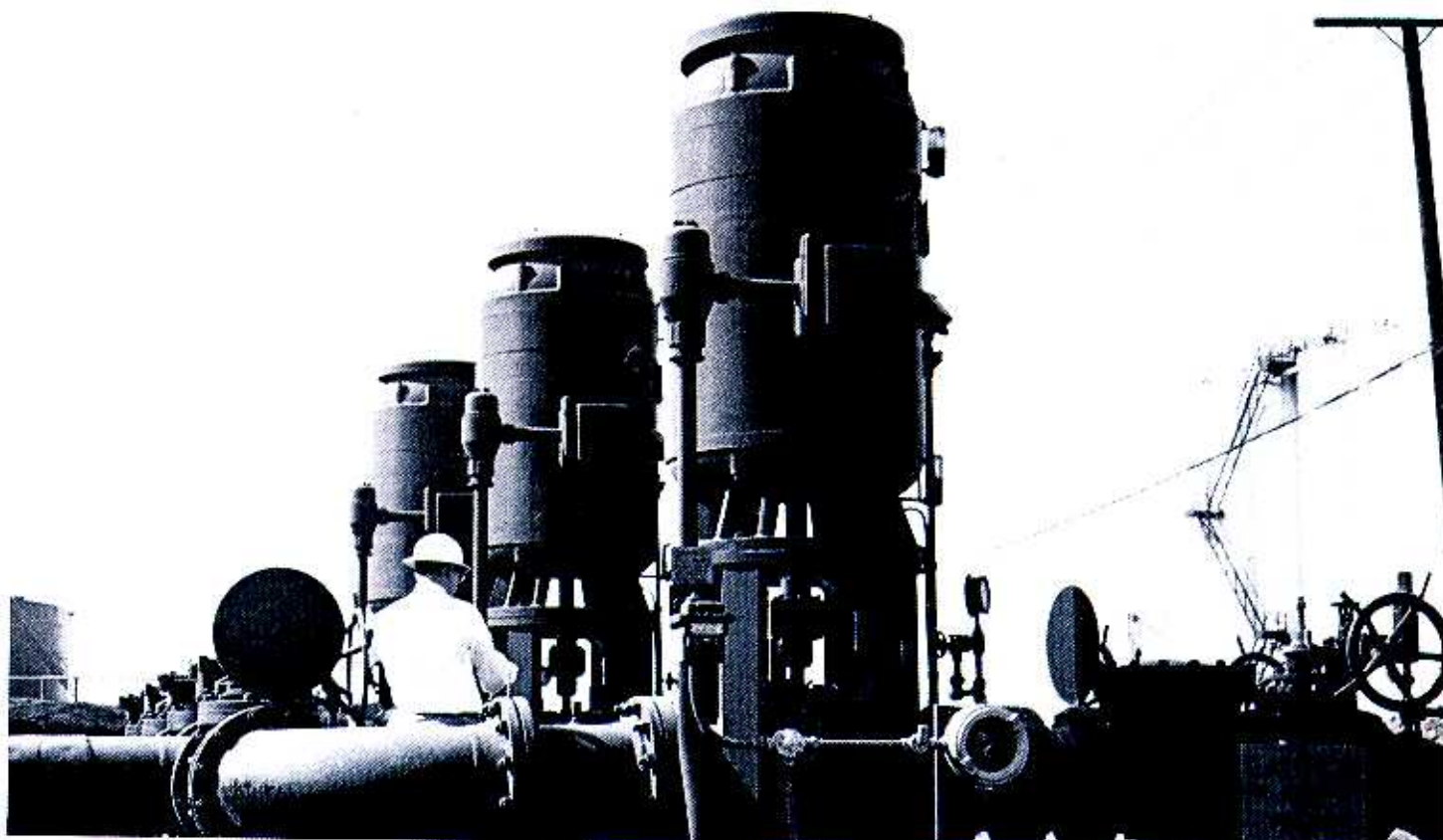
Large Sizes: Sterling regularly manufactures Hydro-Lines with bowl unit sizes through 56 inch (142.2 cm). These larger units are custom engineered to the specific requirements of each application. Rates of flow at B.E.P are available up to 75,000 gpm (17,040 m³/hr) at heads to 68 ft/29.4 psi (20.7 m/2.07 kg/cm²) and 1,500 hp (1115 kw) per stage at 505 rpm.

Description	Standard Construction	Special Construction
Rates of flow to ...	2,500 gpm, 568 m ³ /hr	75,000 gpm, 17,040 m ³ /hr
Heads to ...	4,600 ft., 1400 m	145 ft., 44 m per stage
Pressures to ...	2,000 psi, 140 kg/cm ² † ‡2 pumps in series	60 psi, 4.2 kg/cm ² per stage
Temperature range ...	-60° to +450°F -51° to +232°C	-60° to +450°F -51° to +232°C
Discharge sizes to ...	10 inch, 25.4 cm	48 inch, 121.9 cm
Lubrication ...	Open line shaft pumpage lubricated	As required
Horsepower ...	600 hp, 447 kw	1785 hp, 1330 kw per stage Maximum 5,000 hp, 3725 kw.
Drivers ...	All types of commercially available electric motor, engines with gear drives, combination drives, steam turbines.	

Typical Applications

	Booster	Chemicals	Circulator	Condensate	Heater Drain	Injection, water flood	Petroleum products	Transfer	Water, brine	Water, hot & cold
Chemical Plants	*	*	*	●	●		*	*	●	●
Industrial Plants	●	●	●	●	●		●	●	●	●
Municipalities	●		●				●	●		●
Petroleum Refineries	*	*	*	●	●		*	*	●	●
Petroleum Production					●	*	*	●	●	
Power Plants	●	●	●	●	●		●	●	●	●
Steel Mills	●		●	●			●	●	●	●

* Absorber oil, Acetonyl acetone, Alkylate, Anhydrous ammonia, Aqueous ammonia, Aviation fuels, Blending fluids, Brine, Butadiene, Butane, Butane-acetic acid, Butane-butylenes, Crude oil, Diesel fuel, Dytrene, Fuel oil, Furnace oil, Gasoline, Isobutane, Kerosene, Lean oil, Methanol & water, Narta, Pentane, Propane, Propylene, Rich oil, Xylene and many other organic and inorganic liquids.

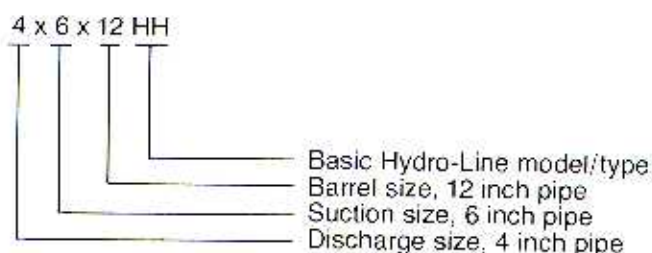


Bowl Unit Characteristics

Head and capacity are imparted to the liquids pumped by Peerless vertical turbine bowl units. The bowl models furnished with standard Hydro-Lines are listed in the table below with their major performance characteristics. (Each bowl model has various impellers of different diameters which provide performance variations.) Basically, the larger the bowl unit, the greater its capacity (output flow); the greater the head required, the larger the number of stages required. Thus for example, if 2,000 gpm (454 m³/hr) were required at a discharge head of 150 ft. (45.7 m) a 14MC 4-stage bowl unit could be used. For performance curves and additional details, consult your Sterling representative.

Head and Barrel Sizes

The nominal inch pipe sizes of the various Hydro-Line models are indicated as shown in this example:



Major bowl performance characteristics

Hydro-Line models described on pages 4 through 7	Bowl Model	Rate of Flow at B.E.P.		Head / Stage at B.E.P.		RPM for Rating at Left	Maximum Pressure Differential Thru Bowl Wall					
		GPM	m ³ /hr	PSI	Kg/cm ²		Standard Construction				High Pressure Construction	
							CI 30 Cast Iron		Ductile Iron		PSI	
HE, HL, HM, HH HL, HM, HH, HP-1, HP-2 HP-1, HP-2	6LB 6LB 7LA	203 203 286	46.1 46.1 65.0	27 27 32	1.9 1.9 2.2	3460 3460 3460	627 — —	44.0 — —	714 — —	50.2 — —	— 1,000 1,000	— 70.3 70.3
HE, HL, HM, HH HE, HL, HM, HH HL, HM, HH, HP-1, HP-2 HE, HL, HM, HH	7LB 8LB 8LB 9LA	336 460 453 825	76.3 104.5 102.9 187.4	46 55 55 63	3.2 3.8 3.8 4.4	3460 3460 3460 3460	410 390 — 390	28.8 27.4 — 27.4	478 622 — 471	33.6 43.7 — 33.1	— — 1,000 —	— — 70.3 —
HL, HM, HH, HP-1, HP-2 HF HE, HL, HM, HH HE, HL, HM, HH	9LA 10LB 10MA 12LD	820 510 665 900	186.3 115.8 151.0 204.5	58 22 17 35	4.0 1.5 1.2 2.5	3460 1760 1760 1760	— 325 497 385	— 22.8 34.9 27.0	— 400 765 498	— 28.1 53.7 35.0	1,000 — — —	70.3 — — —
HE, HL, HM, HH HE, HL, HM, HH HE, HL, HM, HH	12MB 14LD 14MC	1150 1400 2050	261.2 318.0 455.7	23 45 37	1.6 3.2 2.6	1760 1760 1760	357 325 303	25.1 22.8 21.3	439 498 366	30.8 35.0 25.7	— — —	— — —

Models HL, HM and HH Hydro-Lines

Performance Characteristics

Rates of Flow To 2,500 gpm (568 m³/hr)
Heads To 1,350 ft. (411 m)
Pressures To 600 psi (42 kg/cm²)
Temperatures With stuffing box: 0 to 200°F (-17° to +93°C)
 With mechanical seal: -60° to +450°F (-51°C to +232°C)

Maximum Operating Pressure Ratings

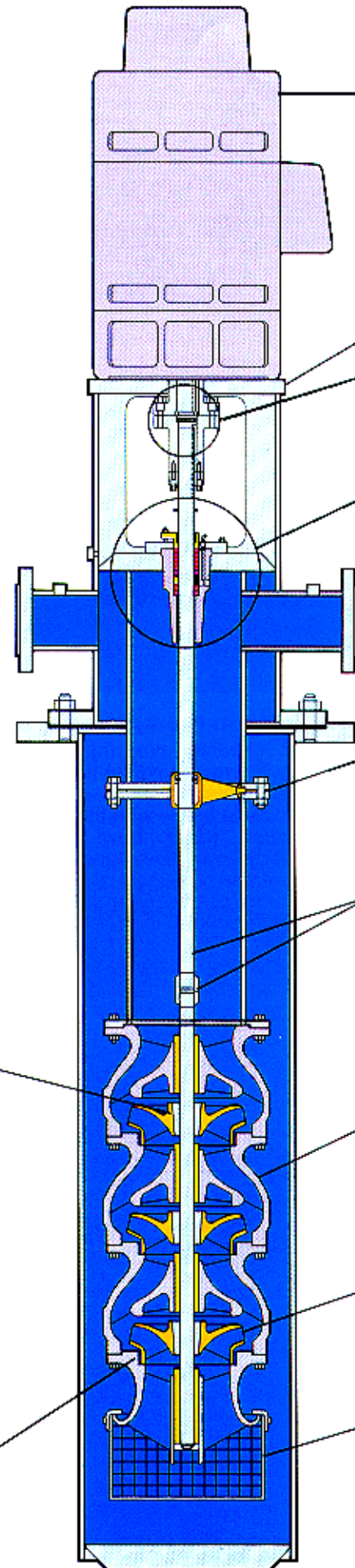
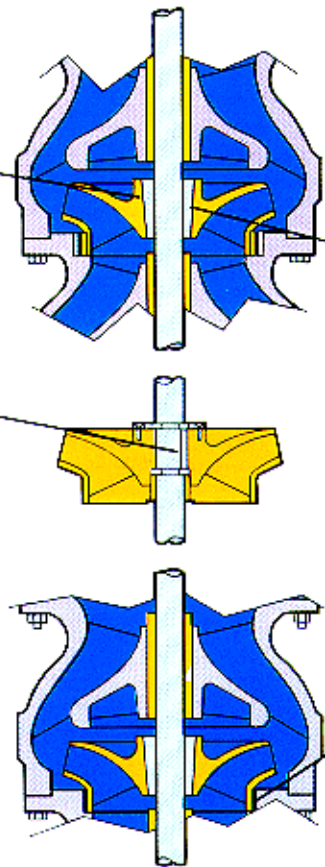
Head & Barrel Designation	Suction		Discharge	
	HL & HM	HH	HL	HM & HH
2x3x8*	150 psi, 10.5 kg/cm ²	300 psi, 21.0 kg/cm ²	230 psi, 16.1 kg/cm ²	600 psi, 42.1 kg/cm ²
3x4x10*				
4x6x10*				
4x6x12*				
6x8x16*				
6x8x18*				
8x10x18*				

*Model HL, HM or HH, as applicable.

Peerless Model HL, HM and HH Hydro-Line pumps are low, medium and high pressure versions of the same basic design. They are rugged, continuous duty pumps designed for trouble-free service and easy maintenance primarily in power plant, refinery and petrochemical plant and secondary recovery injection service. Materials of construction can be selected which fulfill the requirements of nearly any liquid pumping application. Configurations can be modified to meet most installation requirements. When length permits, units are shipped assembled (barrel not installed) to simplify installation.

Peerless **impeller taperlock bushings** have been used and proven in literally hundreds of thousands of vertical turbine pumps to provide reliable, trouble-free impeller locking to the impeller shaft. However, as an alternative, Peerless offers the optional keyed construction shown at the right.

Generous wearing surfaces are integrally cast on Peerless impeller skirts. At the time of overhaul, it is necessary only to true the impeller skirts and add wear rings. However, replaceable **impeller and/or bowl wear rings** of any suitable machinable material can be specified on new pumps. Note: on some smaller sizes, replacing impellers is less costly than replacing wear rings; check with your Sterling representative.



Construction Options

Drivers may be any commercially available type of solid shaft electric motor, engine with right angle gear drive or steam turbine.

Heads and barrels can be fabricated in accordance with ASME Boiler and Pressure Vessel Code, Section VIII. Pressure retaining parts include 1/8" corrosion allowance. Head and barrel pairs are proof pressure tested. Standard material is steel; optional materials include 316 stainless steel. Flanged-type drive coupling is standard. Spacer-type drive coupling, for use with mechanical shaft seal, is available.

Rugged **stuffing box assemblies** assure accurate leakage control, long trouble-free service life and easy maintenance. O-ring sealed removable shaft sleeves are available to prevent shaft wear under the packing. Materials suitable for service with nearly all pumped chemicals and petrochemicals are available.

Mechanical shaft seals of various types and materials are available to meet most service conditions. Seal containers can be arranged for bypass flow, cooling circulation or seal face flushing.

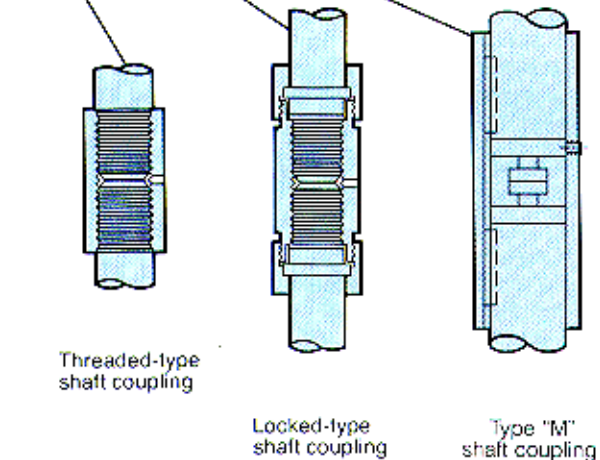
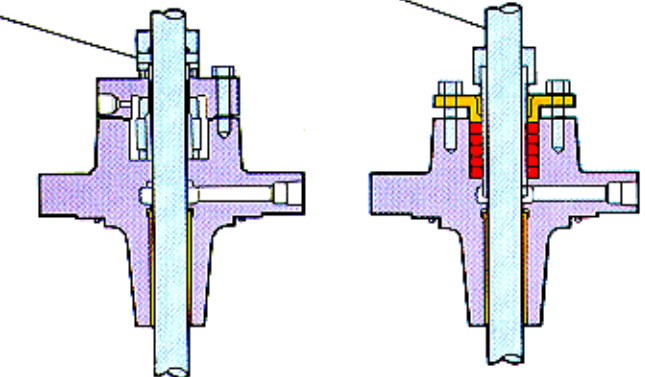
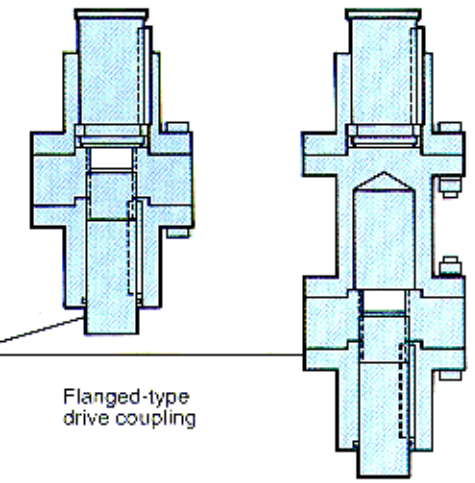
Bearing retainers, if required, are normally bronze per ASTM B145 Alloy 5A (except 7% max. zinc) with SAE 660 bronze bearings. Alternate bearing retainer materials include ductile iron, ni-resist type 1 or type 2 and carbon steel. Bearing material options include neoprene, carbon, cast iron and Teflon.

Impeller shafts and top shafts are normally one piece when length permits; standard material is 416 stainless steel. Optional materials include 316 and 17-4PH stainless steel. All Peerless pump shafting is precision pump-grade shafting specially straightened to run true. If a shaft coupling is required, it is normally of the threaded type; locked-type; and Type "M" couplings are available options.

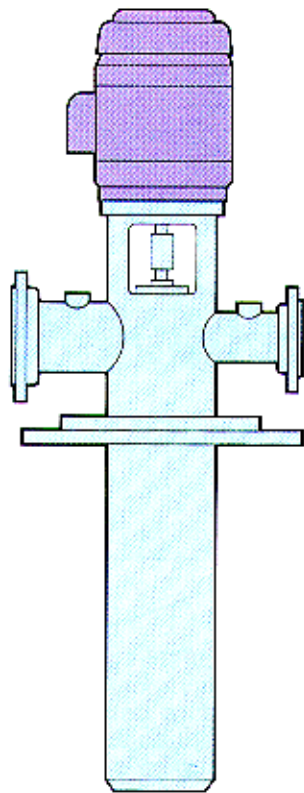
Bowls are normally Class 30 cast iron with vitreous enameled flow passages for maximum efficiency and minimum wear. Standard bearing material is SAE 660 bronze. Optional bowl materials include SAE 63 bronze, steel, 316 stainless steel or any suitable material which can be cast and machined. Optional bearing materials include carbon, Teflon and other metallic and non-metallic materials.

Impellers are normally Bronze; material options include SAE 63 bronze, Class 30 cast iron, steel, 410 or 316 stainless steel or any suitable material which can be cast and machined. All Peerless impellers are statically balanced; two-plane dynamic impeller balancing can be specified.

Vortex suppressors of unique Peerless design are recommended for difficult suction conditions. By breaking down incipient eddies, the performance deterioration, vibration and noise, and mechanical damage normally associated with vortexing are practically eliminated.



Model HE Hydro-Lines



Typical configuration.
Model HE Hydro-Lines

Performance Characteristics

Rates of Flow	To 2,500 gpm (568 m ³ /hr)
Heads	To 575 ft. (175 m)
Pressures	To 250 psi (17.5 kg/cm ²)
Temperatures	With Group A construction*: 0 to 115°F (-17° to +46°C) With Group B construction**: 0 to 170°F (-17° to +76°C)
Drivers	Vertical hollow shaft electric motors or right angle gear drives

Maximum Operating Pressure Ratings

Model	Head & Barrel Designation	Suction		Discharge	
		PSI	Kg/cm ²	PSI	Kg/cm ²
HE	2x3x8HE 3x4x10HE 4x6x10HE 4x6x12HE 6x8x16HE 8x10x18HE	150	10.5	230	16.1

Model HE Hydro-Lines are close coupled industrial turbine pumps with fabricated steel heads and barrels. They are widely used for heavy duty transfer or pressure boost of water, hydrocarbons or other non-corrosive liquids.

Heads and Barrels: Model HE Hydro-Line heads and barrels are fabricated of steel. All welds are dye penetrant inspected.

Stuffing Box or Mechanical Seal: Either a stuffing box (packing container) or an outside mechanical shaft seal may be specified. With a stuffing box, a non-sparking Bronze packing gland may be specified. An o-ring sealed wear resistant replaceable shaft sleeve, to prevent shaft wear under the packing, is optional. When an outside shaft seal is used, no shaft sleeve is required.

Bowl Unit Materials: The bowl unit materials for Model HE Hydro-Lines are the same as those for Model HF Hydro-Lines described at the right. Model HE Hydro-Lines are available with either Group A or Group B construction, described above. Group A construction is recommended for water service; Group B construction is recommended for service with hydrocarbons or other liquids where rubber would be inappropriate.

Wear Rings: If machining bowls or impellers for wear rings at the time of overhaul is impractical, Peerless can furnish replaceable bronze or cast iron bowl and/or impeller wear rings on new pumps.

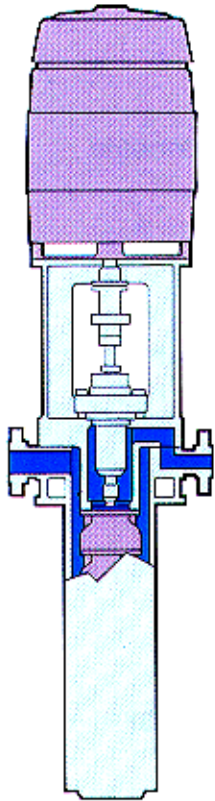
Standard Materials of Construction

Item	Materials	Comment
Head Fabrication	Carbon Steel (316 stainless steel also available)	Head & barrel pairs are hydrostatic proof pressure tested.
Barrel Fabrication		
Shafting	17-4PH stainless steel	High tensile strength stainless steel with corrosion resistance similar to 303 stainless steel.
Bowls	Class 40 cast iron	Used for 6" and 7" sizes.
	Ductile iron	Used for 8" and 9" sizes.
Bowl Bearings	SAE 660 Bronze	Carbon bearings optional.
Impellers	Cast iron or Bronze	Any suitable materials which can be cast and machined can be specified.

*Group A Construction: Intermediate bowls are equipped with dual bearings and lateral bowl wear rings. Dual bearings consist of SAE 660 bronze and neoprene bearings in each intermediate bowl. Lateral bowl wear rings are steel core neoprene coated rings between each impeller skirt end seal and its mating bowl surface. Combined, these exclusive Peerless features promote sustained operating efficiency when small amounts of entrained solids are present in the water.

**Group B Construction: All bowl unit bearings are SAE 660 bronze. No bowl lateral wear rings are used.

Models HP-1 and HP-2 Hydro-Lines for Pressures to 2,000 PSI



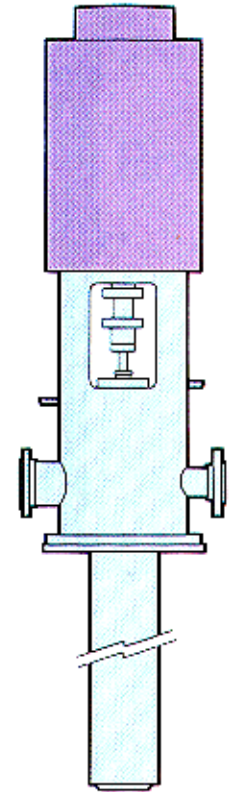
Pull-out design used for head sizes 2 x 3 x 10, 2 x 3 x 12 and 3 x 4 x 10.

Performance Characteristics

Rates of Flow To 600 gpm (136 m³/hr)
Heads To 1,000 psi (70 kg/cm²) 1 pump
 To 2,000 psi (140 kg/cm²) 2 pumps in series. Higher pressures available.
Drivers Vertical solid shaft electric motors, right angle gears or steam turbines, as required.
Temperatures 0 to 170°F (-17° to +76°C)
Applications High pressure applications such as pressure boost and water flood injection for secondary recovery.

Maximum Operating Pressure Ratings

Model	Head & Barrel Designation	Suction		Discharge	
		PSI	Kg/cm ²	PSI	Kg/cm ²
HP-1	2x3x10HP-1	275	19.3	1,000	70.3
	2x3x12HP-1	275	19.3	1,000	70.3
	3x4x10HP-1	275	19.3	1,000	70.3
	4x6x12HP-1	150	10.5	1,000	70.3
HP-2	2x3x10HP-2	1,000	70.3	2,000	140.6
	2x3x12HP-2	1,000	70.3	2,000	140.6
	3x4x10HP-2	1,000	70.3	2,000	140.6
	4x6x12HP-2	1,000	70.3	2,000	140.6



Standard Tee-head construction used for head size 4 x 6 x 12.

Model HP Hydro-Lines are multi-stage high pressure vertical turbine pumps designed for continuous operation at discharge pressures up to 2,000 psi.

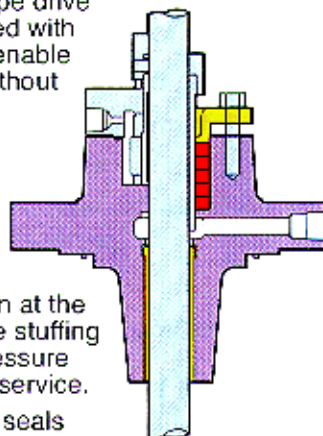
Pullout Construction: The bowl units of sizes 2 x 3 x 10, 2 x 3 x 12 and 3 x 4 x 10 can be withdrawn from their barrels without disconnecting their suction or discharge flanges from the system piping. Heads are o-ring sealed to their barrels.

Drive Couplings: With vertical solid shaft drivers, flanged-type drive couplings are furnished when stuffing boxes are used. Spacer-type drive couplings are recommended with mechanical shaft seals to enable shaft seal replacements without driver removal.

Stuffing Box or Mechanical Shaft Seal:

Either a high pressure mechanical shaft seal or a high pressure stuffing box may be specified; typical drawings of both are shown at the right. Model HP Hydro-Line stuffing boxes are rugged, high pressure units well proven in actual service.

Peerless mechanical shaft seals are commercially available products from prominent manufacturers. High pressure balanced



designs are used. Available options include by-pass piping and methanol quench systems recommended to minimize seal face damage by salt precipitates.

Standard Materials of Construction

Item	Materials	Comment
Head Fabrication	Carbon Steel (316 stainless steel also available)	Head & barrel pairs are hydrostatic proof pressure tested.
Barrel Fabrication		
Shafting	17-4PH stainless steel	High tensile strength stainless steel with corrosion resistance similar to 303 stainless steel.
Bowls	Class 40 cast iron	Used for 6" and 7" sizes.
	Ductile iron	Used for 8" and 9" sizes.
Bowl Bearings	SAE 660 Bronze	Carbon bearings optional.
Impellers	Cast iron or Bronze	Any suitable materials which can be cast and machined can be specified.

Balanced Impellers: To control hydraulic down thrust and eliminate excessive down thrust loads on drivers, hydraulically balanced construction is provided by Peerless engineers.

Wear Rings: Peerless impellers are manufactured with integrally cast skirt wear rings. At the time of overhaul, the impeller skirts can be trued and separate wear rings added. As an option, removable impeller and/or bowl wear rings can be furnished on new bowl units.

Other Peerless Vertical Industrial Pumps



Industrial Vertical Turbine Pumps...

... rugged single or multi-stage close coupled vertical turbine line shaft pumps available in numerous configurations and materials for most industrial applications.

Typical Applications	Circulators, cooling tower, condensate return, fire, transfer, etc. from sumps, ponds, etc.
Rates of flow	To 90,000 gpm (20,445 m ³ /hr)
Heads	To 1,000 psi (70.3 kg/cm ²)
Drives	Electric motors to 5,000 hp. Right angle gear drives to 2,500 hp. Steam turbines as required.
Pipe Sizes	2½" thru 72" (6.35 thru 182.9 cm)
Materials	Any machinable alloys suitable for the application.

For additional information, request brochure B-110.



Large Axial, Mixed Flow and Radial Impeller Pumps...

... vertical short setting line shaft pumps with fabricated discharge elbows for handling large volumes of fresh or salt water.

Typical Applications	Source water, cooling tower circulators, treated effluent transfer, condenser service, flood control, dewatering, etc.
Rates of flow	To 150,000 gpm (34,075 m ³ /hr)
Heads	2 to 100 feet (30.5 m)
Drives	Electric motors, right angle gear drives, steam turbines, combination drives.
Materials	Any machinable alloys suitable for the application.
Configurations	As required by the application.

For additional information, request Brochure B-300.



Peerless Pump Company

P.O. Box 7026 • Indianapolis, IN 46207-7026
Phone: (317) 925-9661 • Fax: (317) 924-7388