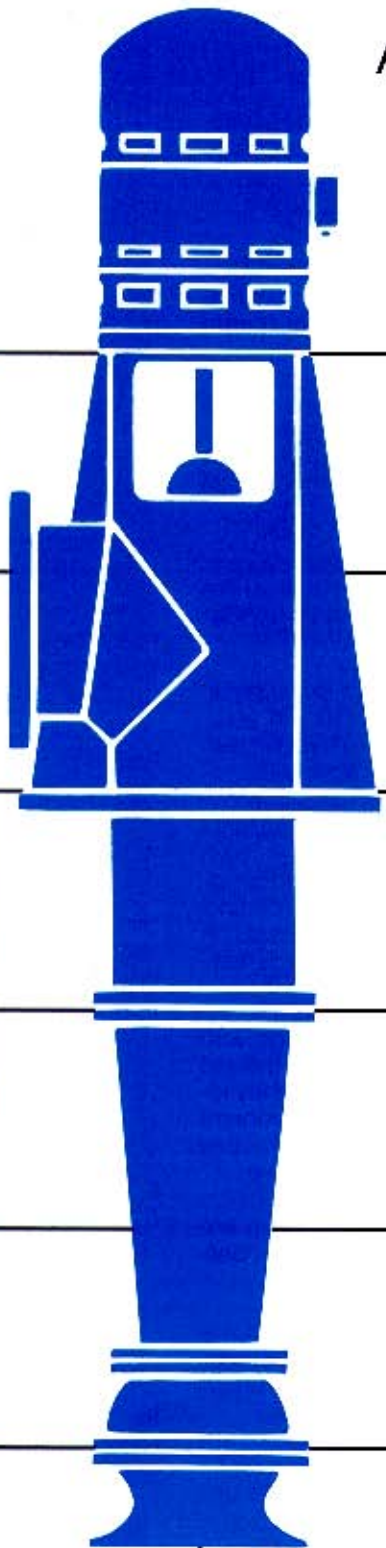
Peerless Pump

HYDRO-FOILS

Axial Flow and Mixed Flow Pumps



PEERLESS PUMP®

Brochure B-300

Peerless Hydro-Foil Pumps

for moving large volumes of water.

Providing a wide range in both hydraulic and mechanical coverage for effective and economical application of pumps to big volume pumping jobs.

Quality Uncompromising high standards in the manufacture of each Peerless pump are your guarantee of quality. Peerless design and construction features instantly reveal Peerless superiority.

Economy Peerless welcomes comparison of price on the basis of amortization over five year, ten year or longer periods. The most economical pump is the one which gives maximum *sustained* efficiency day after day, year after year. Hydro-Foil pumps are economical to own and to operate.

Leadership Peerless is one of the leading manufacturers of vertical line shaft pumps. This leadership has been built on the basis of high product quality, superior service and dependable, long-lived performance.

Design More than seventy years of engineering experience and know-how in the design of pumping equipment is your assurance of the latest, most modern features in your new Peerless Hydro-Foil pump.

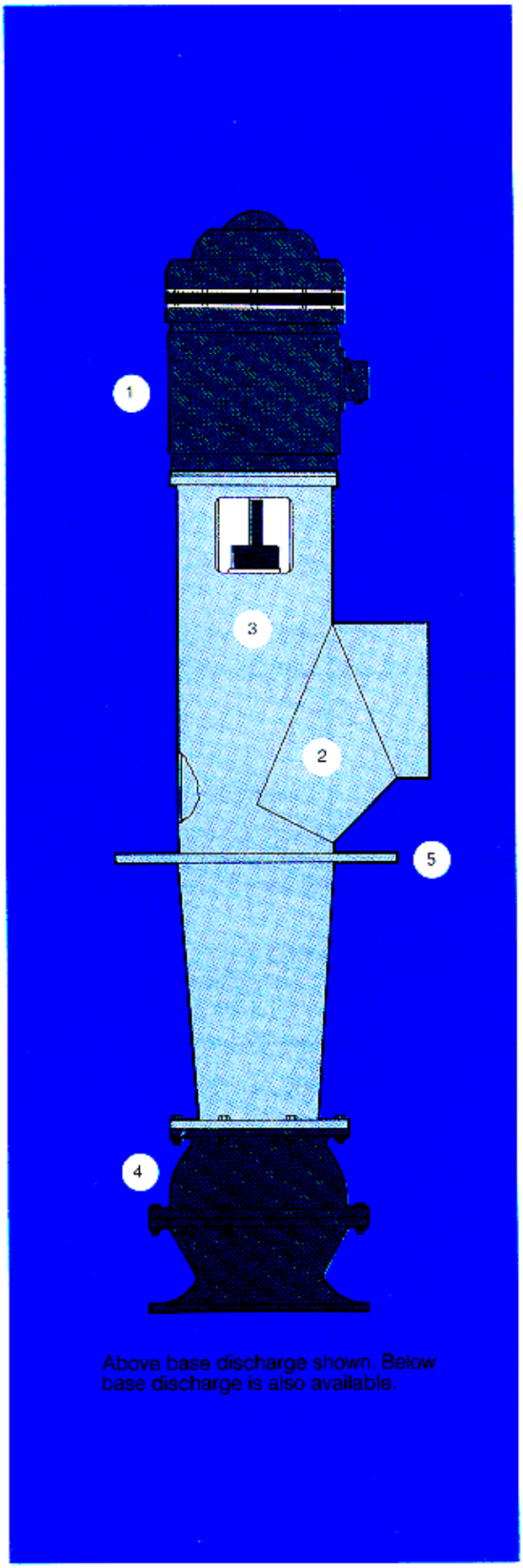
Manufacturing Each step in the manufacture of Peerless Hydro-Foil pumps is carefully controlled, from Peerless' own foundry to final inspection and assembly, crating and shipping. Specifications for Peerless materials, components and fits are firm, exacting and rigidly enforced. Intensive research and development are continually carried on to maintain Peerless superiority.

Facilities Peerless Pump offers international coverage with manufacturing, sales and service facilities. Factory-trained distributors, dealers and sales engineers are conveniently located throughout the U.S.A. and the world. These convenient locations of facilities and district offices assure quick, effective communication with your nearest Peerless representative.

Efficiency Mechanical and hydraulic design features are combined to equal or surpass the highest efficiency, peak performance and lowest pumping costs in the industry.

Consultation Engineering-trained Peerless personnel are available to assist you with your pump selection. Qualified counsel on all your pumping needs is available from Peerless.

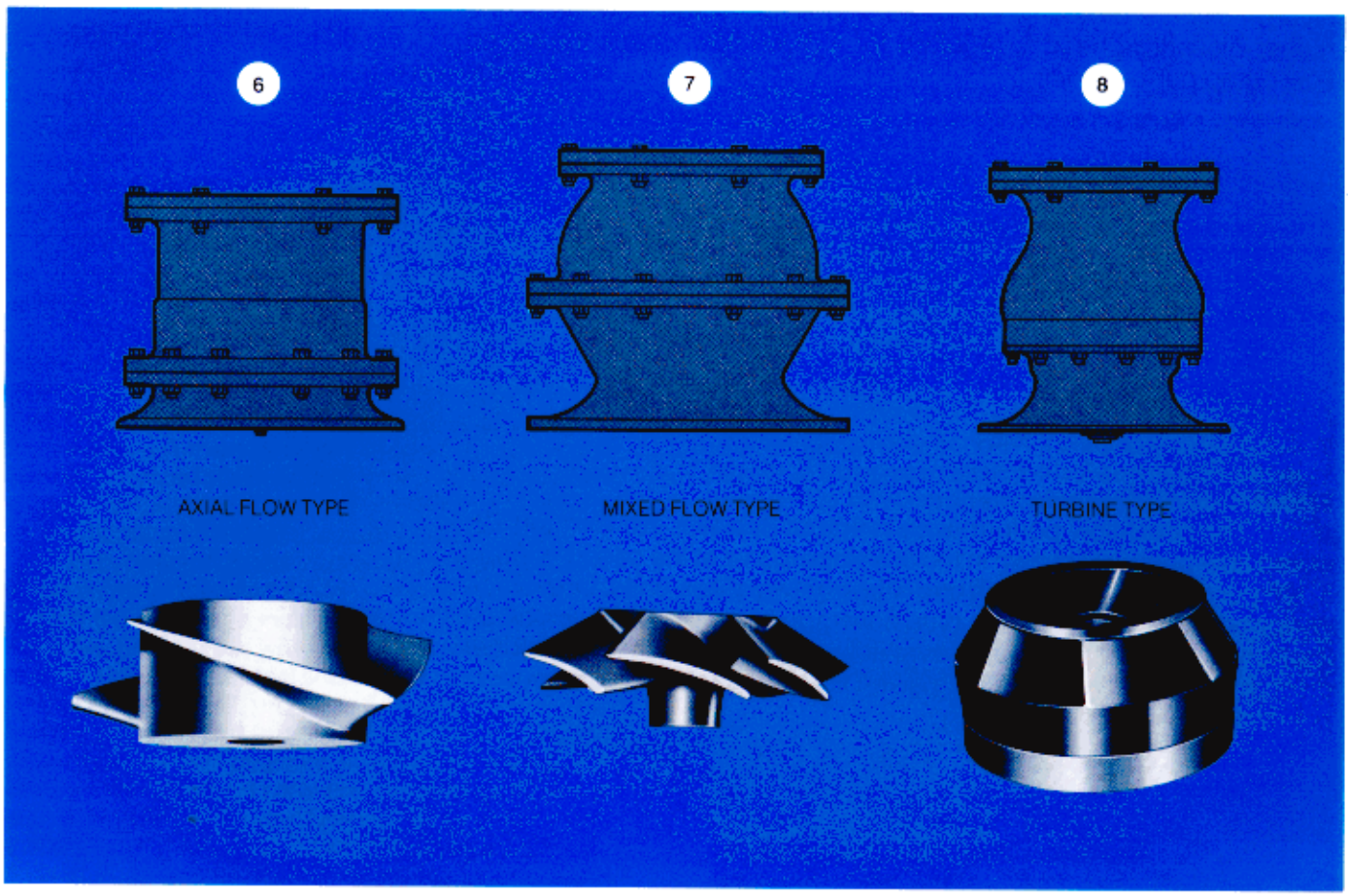
Responsibility In addition to quality of product, premium performance and service before and after sale, Peerless Pump offers a degree of responsibility to customers unmatched by most other manufacturers.



Above base discharge shown. Below base discharge is also available.

Basic Construction Details

The Hydro-Foil pump is a vertical, shaft-driven, bottom suction pump. In general it consists of four basic elements — (1) the pump drive, (2) the fabricated insert elbow with additional column as required and (3) open or enclosed line shaft, (4) the pump bowl assembly which may be of the axial (propeller), mixed flow or turbine type. The drawing at the left shows a fabricated steel elbow with its discharge above the base plate (5) from which the entire pump assembly is supported. (The discharge can also be located below the base plate). The configuration of the pump bowl assembly (normally one stage) is shown for: (6) the axial flow propeller, (7) the mixed flow impeller and (8) the turbine type impeller. The pump drive can be a vertical hollow-shaft motor, a vertical solid shaft motor, a steam turbine or a right angle gear drive.



Three Impeller Types

Peerless Hydro-Foil pumps are available in three different types, the type designations indicating the impeller design utilized — axial flow, mixed flow or turbine. With the availability of many selections, Peerless offers measurable advantages of applications flexibility in correctly applying pumps for moving relatively large volumes of water against low to moderate heads.

These vertical Hydro-Foil pumps find a host of uses in flood control and drainage, effluent transfer, condenser service, cooling tower service, raw water intake and in numerous high volume, lower head, industrial, commercial, public works and agricultural applications. Characterized by highest quality materials of construction and workmanship, Peerless Hydro-Foil pumps, properly applied, will invariably provide peak performance, long life and reliable maintenance-free operation. They truly reflect the total expert pump manufacture knowledge amassed by Peerless Pump in over seven decades of pump design, construction and application

The Hydro-Foil line embraces the broadest, most solid range of hydraulic coverage of any similar equipment available. Peerless' wealth of application and operational experience with this type of pumping equipment assures you of excellent engineering consultation, help and advice for each individual application, guaranteeing the optimum pump selection for your particular needs. Peerless Pump manufacturing plants, district sales engineering offices and a world-wide network of competent distributors assure before-and-after application service and counsel. Look to the leader, look to Peerless. Feature by feature, point by point, we believe Peerless Hydro-Foil pumps are unexcelled in design, construction and operation.

Hydro-Foil Performance

Axial flow pump performance.

The head-flow performance range of Peerless 10" through 72" axial flow (propeller) pumps is shown in the envelope curve at the top of page 5. Peerless can furnish an axial flow pump to perform at any head-flow point within the envelope outline shown. Peerless axial flow Hydro-Foils are ordinarily furnished with single-stage bowl units. If a higher discharge head is required for a given flow, check the mixed flow pump performance.

Mixed flow pump performance

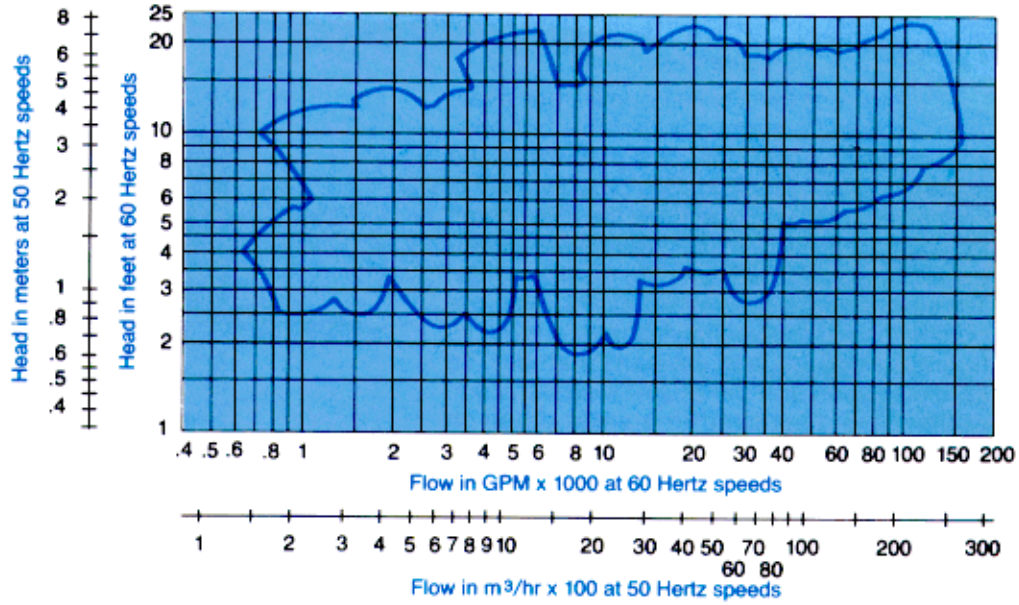
The head-flow performance range of Peerless 10" through 72" mixed flow pumps is shown in the envelope curve at the center of page 5. MF pumps are available as one-stage or two-stage units. One-stage performance is shown by the blue envelope lines; the black envelope lines show the additional head available from 2-stage units. If a higher discharge head is required for a given flow, check the turbine impeller pump performance.

Turbine impeller pump performance.

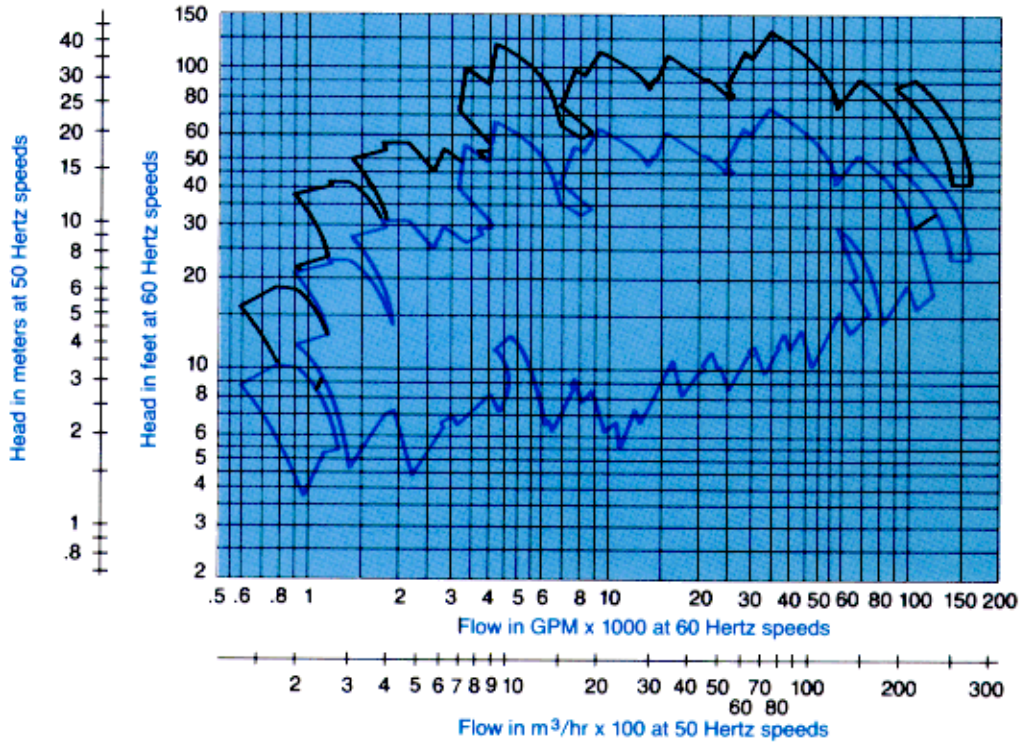
The head-flow performance range of Peerless single-stage 14" through 66" turbine impeller Hydro-Foils is shown at the bottom of page 5. If higher heads (discharge pressures) are required, the bowl unit can be multi-staged up to 86.5 psi (200 feet of water), the units' nominal maximum operating pressure. For higher operating pressures, consult your Peerless Pump representative.

Hydro-Foil Envelope Performance Curves

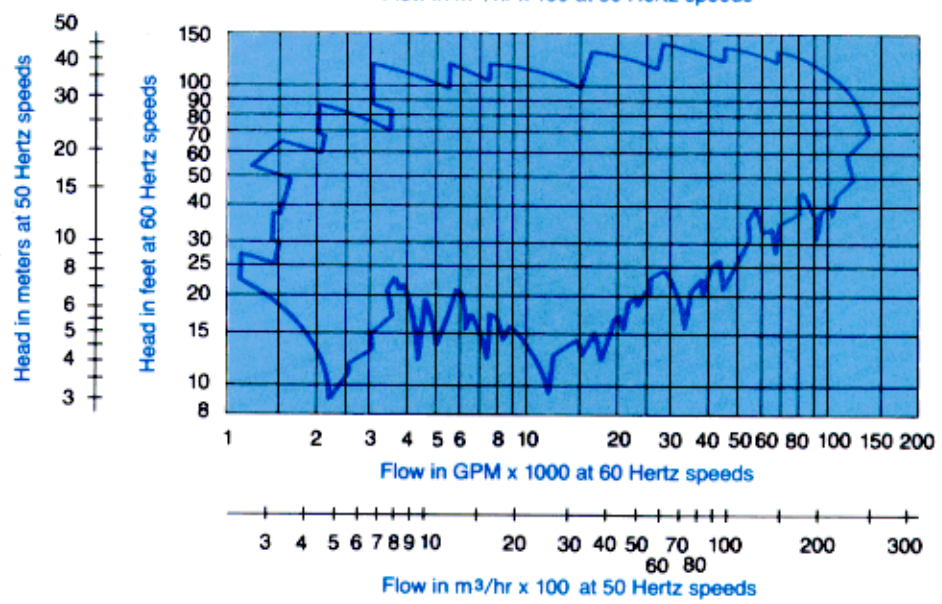
AXIAL FLOW PUMPS



MIXED FLOW PUMPS

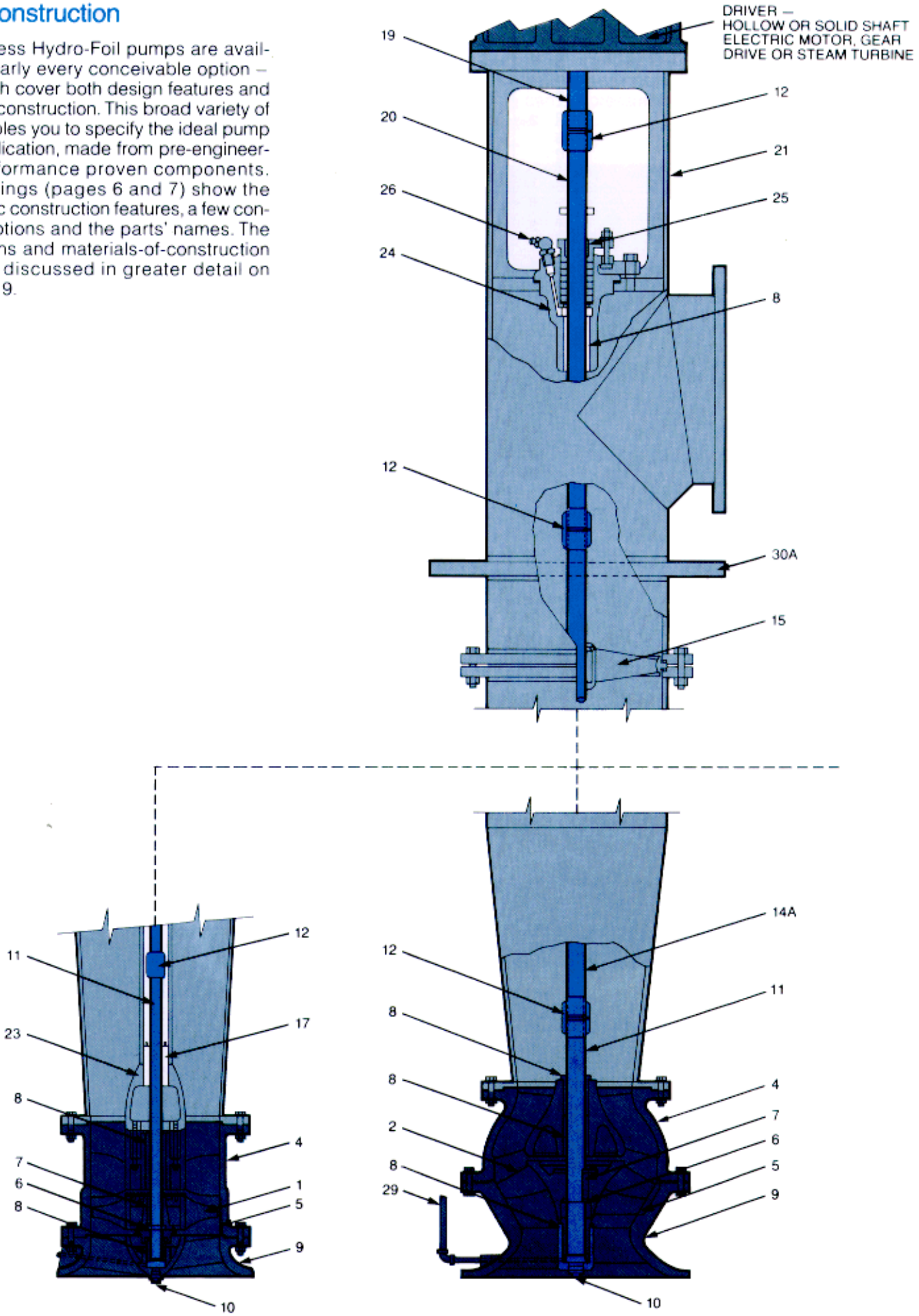


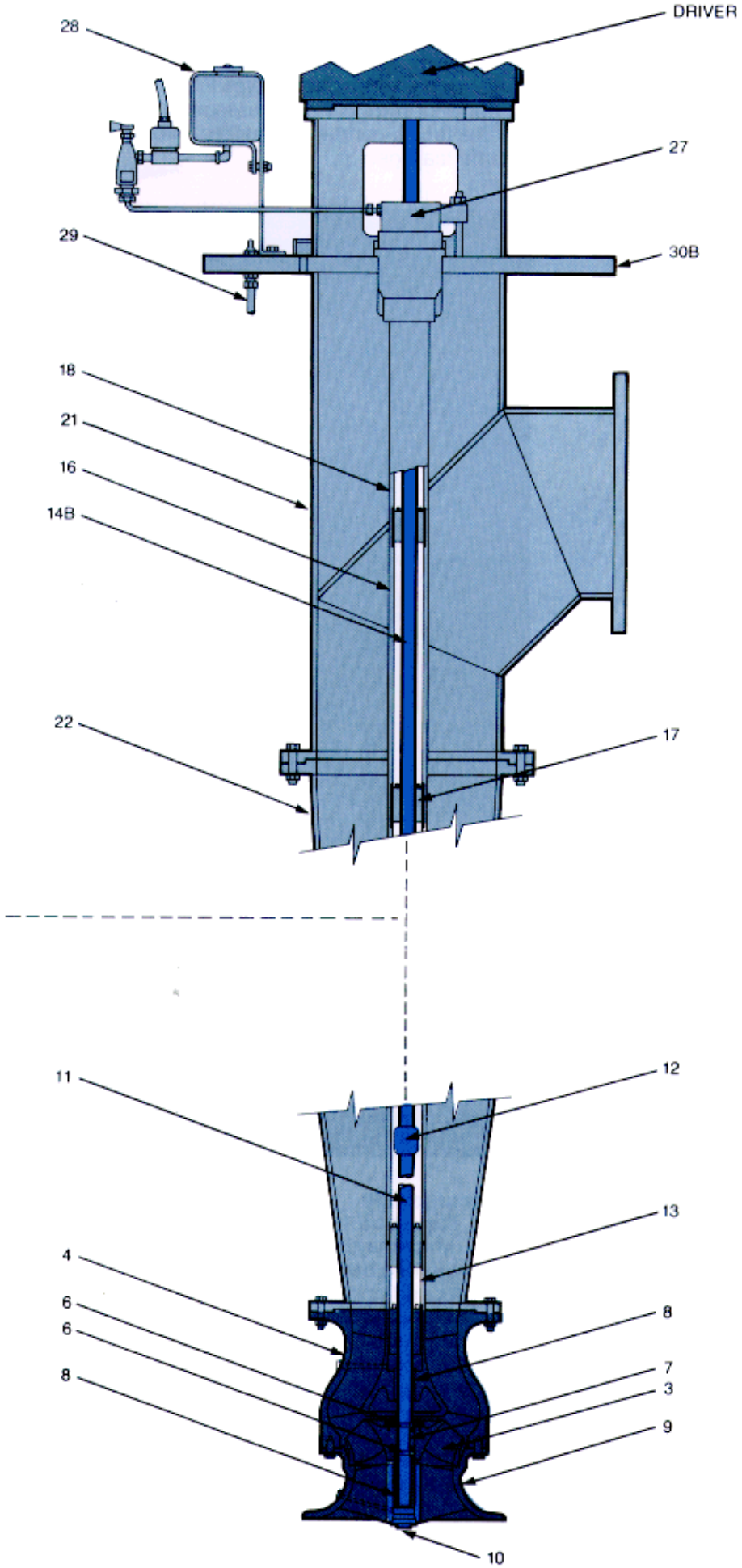
TURBINE IMPELLER PUMP



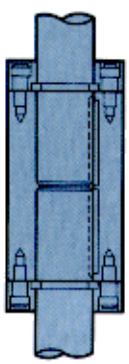
Typical Construction

Peerless Hydro-Foil pumps are available with nearly every conceivable option – options which cover both design features and materials of construction. This broad variety of options enables you to specify the ideal pump for your application, made from pre-engineered and performance proven components. These drawings (pages 6 and 7) show the pumps' basic construction features, a few configuration options and the parts' names. The configurations and materials-of-construction options are discussed in greater detail on pages 8 and 9.





Item No.	Part Name
1.	Axial impeller
2.	Mixed flow impeller
3.	Turbine impeller
4.	Bowl
5.	Bowl liner
6.	Split ring
7.	Key
8.	Sleeve bearing
9.	Suction manifold
10.	Plug
11.	Impeller shaft
12.	Shaft coupling*
13.	Tubing adapter
14A.	Line shaft, OLS construction
14B.	Line shaft, ELS construction
15.	Bearing retainer assembly
16.	Tubing
17.	Tube bearing
18.	Top tube
19.	Top shaft
20.	Second top shaft
21.	Fabricated elbow assembly
22.	Fabricated tapered section
23.	Diffusor cone
24.	Packing container
25.	Packing gland
26.	Grease fitting
27.	Tube nut assembly
28.	Oil container
29.	Grease line to bottom bearing (incomplete)
30A.	Base plate, above base discharge
30B.	Base plate, below base discharge



*Optional ring and key shaft coupling for high horsepower applications.

Construction Options

You can be confident that the right Peerless Hydro-Foil pump is available for your application. The numerous configuration options and materials of construction options offered by Peerless provide assurance that virtually every application requirement can be met.

Configuration Options

Drivers

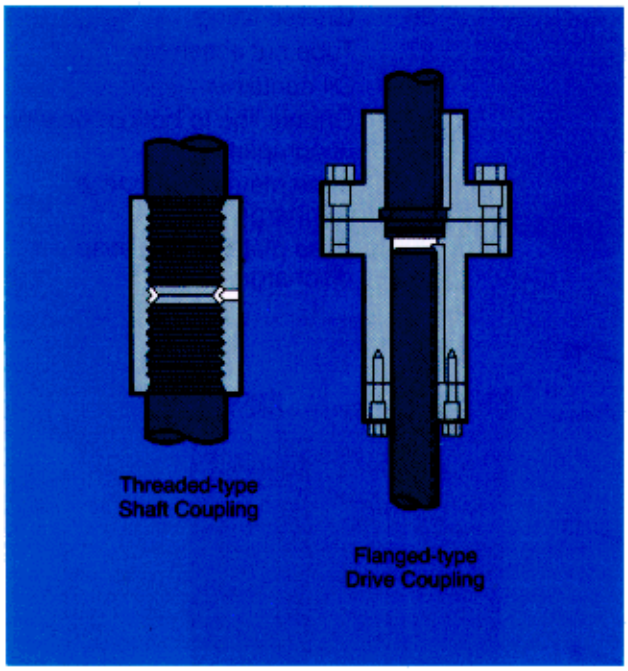
The driver may be an electric motor, a gear drive, with an engine and a drive shaft, or a steam turbine. Normally hollow shaft drivers are preferred but solid shaft types may also be specified.

Top shafts

Top shafts may be either one piece or two piece. When a hollow shaft driver is used and the pump is shipped assembled, when requested, a 2-piece top shaft is recommended to minimize the risk of bending the shaft during shipment. Or, if a one piece top shaft is preferred, special shipping protection can be furnished.

Drive couplings

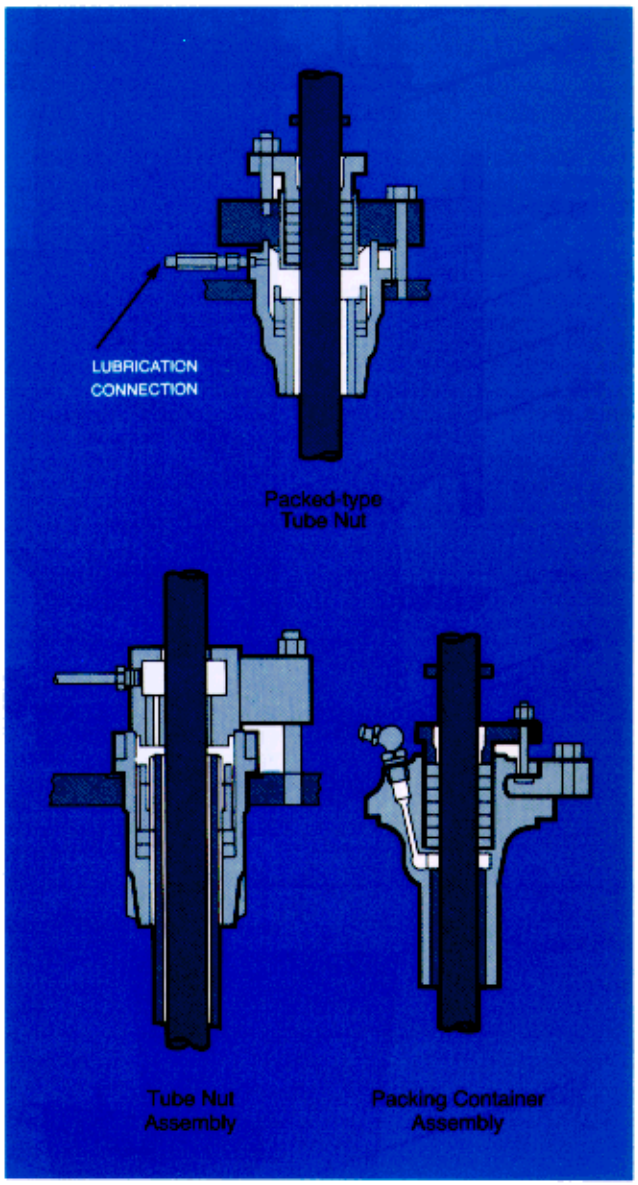
A top drive coupling is a part of a hollow shaft driver. If a 2-piece top shaft is furnished, a threaded shaft coupling is recommended. If a solid shaft driver is specified, a flanged-type drive coupling is furnished.



Tube nut assembly/stuffing box assembly

With open line shaft (OLS) construction, a packing container assembly is furnished. As shown on page 6, a shaft stabilizing sleeve bearing and a grease lubrication fitting are included to contribute to long, trouble-free operation. An O-ring sealed shaft sleeve through the packing is available. These sleeves, made of especially long wearing materials, protect top shafts against wear.

A tube nut assembly is furnished with enclosed line shaft construction (ELS) when the inner column is oil lubricated. When the inner column is "water flushed" or grease packed, a packed-type tube nut (a combination tube nut and stuffing box assembly) is furnished so that the tubing can be pressurized without excessive external leakage.



Elbow assembly

The elbow fabrication consists of the "motor stand," which may be an integral or a separate fabrication, a mounting base, a floor plate from which the pump is suspended and which supports the packing container or tube nut assembly, a discharge elbow, and a flange which connects either to additional column or to the bowl assembly. The discharge elbow can be equipped for flanged, welded or Dresser coupling connection. Tie lugs and tie bolts can be furnished if specified.

The elbow can be arranged with its discharge either above or below the base plate. The distance between the base plate and the centerline of the discharge is infinitely variable, within limits, to meet the installation's needs.

Elbow wall thickness options permit optimization of corrosion allowances and, therefore, selection of long term extra heavy duty construction, heavy duty construction or short term medium duty construction.

Elbow Size	Nom. Wall Thickness, Inch		
	Extra Heavy	Heavy	Medium
10" thru 30"	0.375	0.250	—
36" thru 48"	0.500	0.375	0.3125
54", 60"	—	0.500	0.375

Lubrication/inner column options

A Peerless Hydro-Foil pump is available with one of four different inner column arrangements:

Enclosed line shaft, oil lubricated
Enclosed line shaft, "water flushed"
Enclosed line shaft, grease packed
Open line shaft, pumpage lubricated.

Each of these arrangements has variations so that virtually any combination of application requirements can be met.

ELS, oil lubricated: This is the general purpose configuration most frequently specified. A 2-gallon oil container can be furnished or omitted if some larger customer-furnished container is required. The drip valve can be a manually set metering valve or a solenoid operated valve so that oil will flow only when the pump is operating. Electric drip valves are available with or without ambient temperature compensation.

ELS, "water flushed": Ordinarily, "water flushed" inner column is specified for "dirty water" applications in which the pumpage includes silt or other entrained abrasives. Either clear water is injected into the inner column from some external source or a small amount of pumpage is drawn off, processed through a strainer or cleaning system, and injected into the inner column under the additional pressure provided by a small auxiliary boost pump. Usually the injected lubricant is clear water; but ELS "water flushed" inner column can be made to use nearly any suitable liquid as a lubricant.

ELS, grease lubricated: When the inner column is grease packed, a packed-type tube nut is furnished. A manual or an automatic grease replenishment system can be furnished. Grease packed inner column is recommended for pumps in remote locations which operate intermittently, but must always be ready for duty.

OLS, pumpage lubricated: If the pumpage offers good lubricity, as when stainless steel shaft journals are run in water lubricated rubber bushings, open line shaft construction may be desirable. With Peerless OLS construction, the bearings are retained and centered in metal spiders which are rigidly held between flanges.

Impeller/bowl configurations

The Peerless Pump product line includes a tremendous array of impeller/bowl configurations and sizes – perhaps the widest selection of any vertical pump manufacturer. This array has one purpose: to enable Peerless to provide the head-flow performance required by the application with the highest available sustained efficiency and, consequently, with the lowest feasible energy consumption.

Bowl lubrication/flushing

An inexpensive means of extending pump life is to include a grease lubrication line from the base plate to the sleeve bearing in the suction manifold.

When erosives are pumped, as with river water, water flushed bowl bearings are recommended. (See also the discussion above for water flushed ELS inner column). Peerless Pump offers various means of water flushing the bowl bearings.

One arrangement is typified by water flushed ELS inner column, a gun drilled impeller shaft, and a grease lubricated bottom bearing. Another has the water flushing line connected to the bottom of the pump (in place of the plug, item 10, shown on page 7). The impeller shaft is gun drilled upward from the bottom, with the flushing liquid ported to the bearings through holes which are perpendicular to the shaft's centerline.

Other configurations options

Unusual application requirements bring forth creative solutions. At Peerless we have encountered an astounding number of unusual applications. Whatever your unusual application problem, consult Peerless. We might already know how to solve it.

Materials options

The following table contains a summary of the optional materials of construction for Peerless Hydro-Foil pumps. For detailed information consult your Peerless Pump representative.

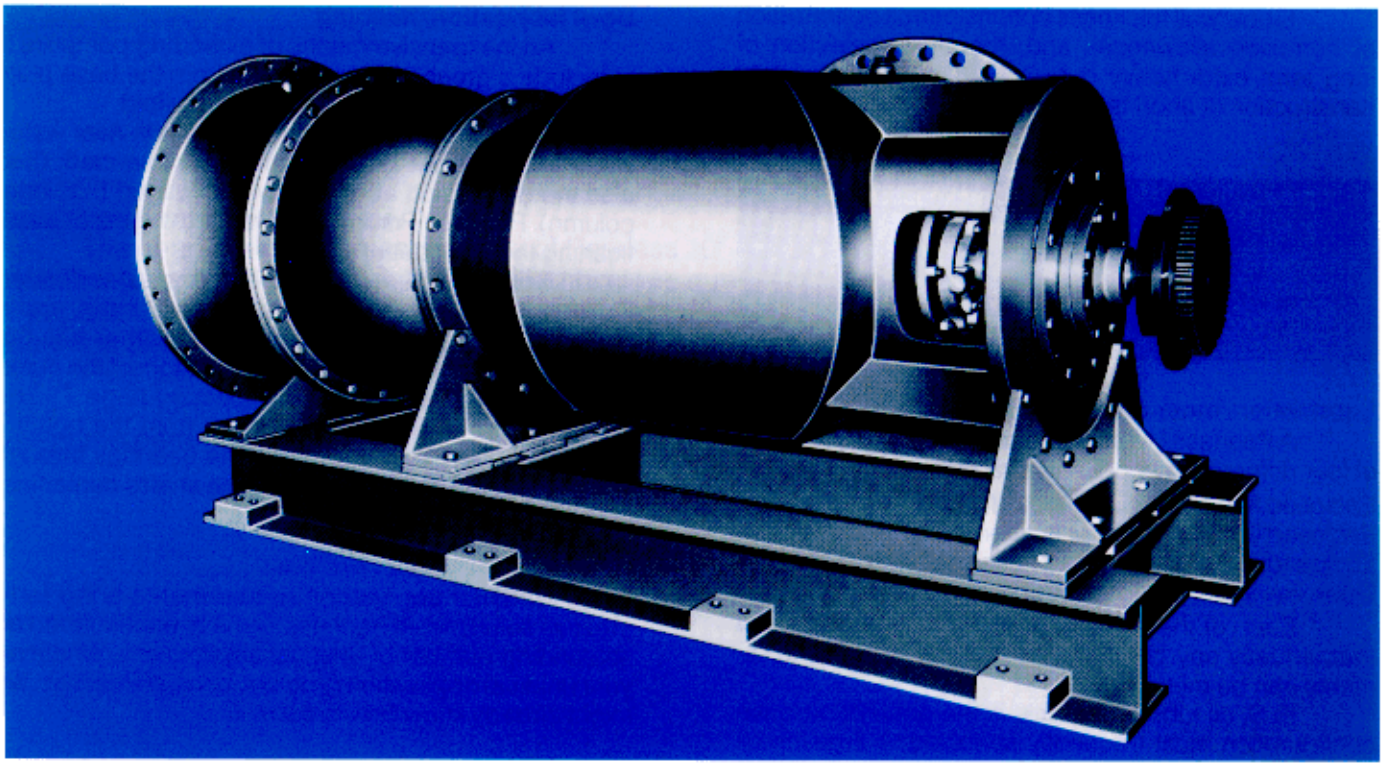
Peerless Hydro-Foil Materials

Part Name	Standard Material	Optional Material
Impeller	SAE 40 brz	SAE 63 brz, iron,* Type 2 ni-resist, 316 stainless steel, etc.
Bowl*	CL 30 cast iron	SAE 40 brz, SAE 63 brz, Type 2 ni-resist, 316 stainless steel, etc.
Impeller shaft	416 stainless steel	316 stainless steel, 17-4 PH, etc.
OLS shaft	C-1045 shaft w/ flame sprayed stls. stl. journals	416, 303 or 316 stainless steel, 17-4 PH, etc.
ELS shaft	C-1045 steel	416 or 316 stainless steel
OLS top shaft	416 stainless steel	316 stainless steel, 17-4 PH, etc.
Oil tubing	Steel	316 stainless steel
Tube bearings	SAE 40 brz.	Neoprene bushed bronze, carbon, Teflon, etc.
OLS line shaft bearings	Neoprene	G2000 cast iron, carbon, Teflon, etc.
Elbow fabrication	Steel	316 stainless steel

*Ductile iron for axial and mixed flow; CL 30 cast iron for turbine. Cast iron bowls for turbine impellers through 20" are coated inside with vitreous enamel; larger sizes are coated inside with Heresite.

Coatings

Coatings can be added to exposed surfaces to protect against corrosion or erosion. For example, "coat all over," "coat wetted surfaces only," or "coat outside surfaces only" are acceptable instructions. Your Peerless representative can help you to select and specify a coating material to meet your needs.



Horizontal mixed flow pump, 42 inch size. Note discharge (opposite side) on horizontal plane.

Peerless Horizontal Mixed Flow and Turbine Pumps

Horizontally mounted configurations of Peerless Hydro-Foil type pumps are also available, as indicated by the illustrations above and below. They are available with either mixed flow or turbine impellers.

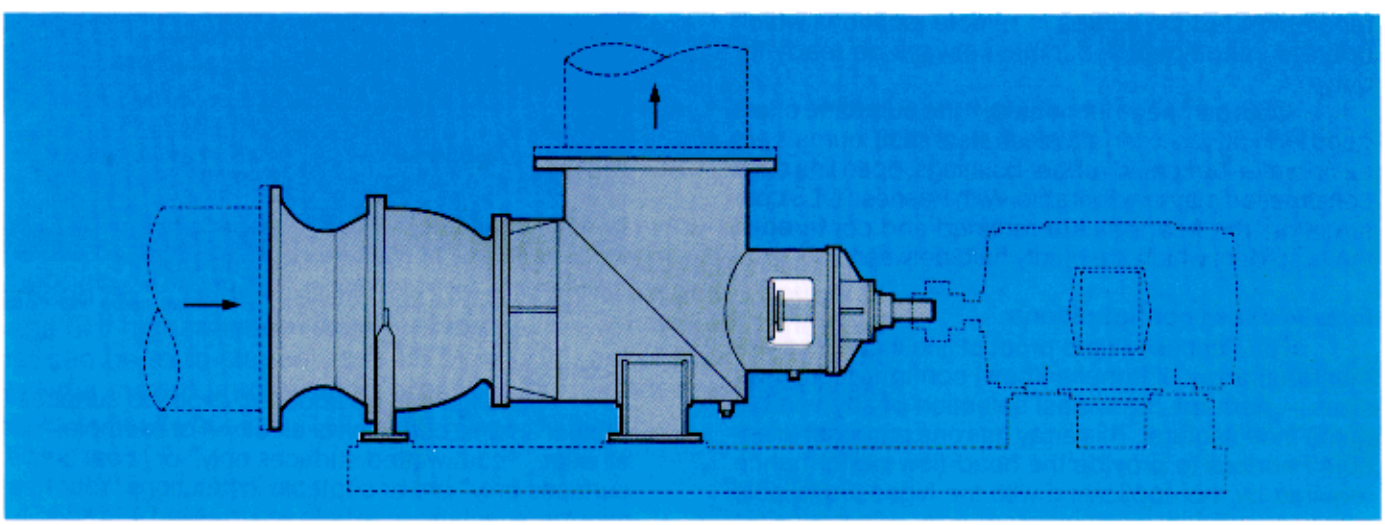
Overall, these pumps range in nominal size from 12 inch through 48 inch. Presently available models are capable of producing flows from 3,000 gpm through 60,000 gpm at heads which range from about 10 feet through 100 feet.

A Peerless horizontal Hydro-Foil pump may be specified for flow in either direction. For example (based on the illustration below) a pump's inlet may be at the port identified by the left hand flange and its outlet by the port identified by the elbow's vertical leg; or, the pump can be made to produce flow in the opposite direction.

The port represented by the vertical leg may be oriented off true vertical in five degree increments. That is, the port may be on a vertical plane (or a plane tilted toward the driver) at any angle from the horizontal evenly divisible by five.

The configuration options and material-of-construction options discussed elsewhere in this brochure apply equally to these horizontal pumps. Through experience and engineering expertise, Peerless Pump can provide virtually any combination of desirable physical characteristics.

For additional information describing Peerless horizontal mixed flow and turbine pumps, contact your Peerless Pump professional.



Typical configuration of Peerless horizontally mounted mixed flow and turbine pumps.

Sample Specifications for Hydro-Foil Pumps

General

These specifications cover the furnishing and delivery of _____ (qty) vertical fabricated elbow pump(s) complete ☐ with, ☐ without drivers for installation by ☐ owner, ☐ others.

Operating Conditions

The pump shall be designed to pump _____ (liquid) with _____ specific gravity at an altitude of _____ (ft)(m) above sea level. The pump shall be designed to handle _____ inch solids.

The distance from the floor level to the bottom of the sump will be _____. The pump shall be designed to produce _____ GPM at a discharge head of _____ feet when operating at _____ RPM.

Operating costs as a function of efficiency will be included in bid evaluations.

Driver

☐ Hollow shaft, ☐ solid shaft driver(s) shall be furnished ☐ by the pump manufacturer, ☐ by others. The driver(s) shall be rated for _____ nominal bhp at _____ nominal RPM and shall carry all applicable thrust loads and be rated for an average life expectancy of 5 years operation at 24 hours per day. The driver(s) shall be:

☐ Electric motor, ☐ WP-1, ☐ TEFC, ☐ explosion proof (Atmosphere group _____, hazard class _____, div. _____, T-code _____) _____ volt, _____ Hertz for operation at _____°(F)(C) max. ambient temperature.

☐ Gear drive with _____ ratio

☐ Universal-type drive shaft _____ long.

☐ Engine, _____ max. RPM, ☐ Diesel, ☐ natural gas, ☐ gasoline, for operation at _____°(F)(C) max. ambient temperature.

If the driver is furnished by others, the buyer will furnish to the pump manufacturer the driver base mounting dimensions: bolt circle, number of holes, hole size and register details. If a hollow shaft driver will be used, the CD (bottom of driver to top of drive coupling) will be furnished. If a solid shaft driver will be used, the shaft extension detail information will be furnished.

Elbow Fabrication

The discharge elbow shall have ☐ above base, ☐ below base discharge. The distance from the floor to the centerline of the discharge shall be _____. The discharge leg shall be ☐ 90°, ☐ 45° to the vertical centerline. The discharge shall be arranged for ☐ flanged, ☐ welded, ☐ Dresser coupling (☐ with tie bolt lugs, ☐ with tie bolts) connection.

The elbow fabrication shall be made of:

☐ Steel, of _____ inch wall.

☐ 316 stainless steel of _____ inch wall.

Inner Column

The inner column construction shall be:

☐ Enclosed line shaft (ELS) arranged for:

☐ Oil lubrication ☐ with, ☐ without 2-gallon oil container with (check one):

☐ Manually operated oil metering valve.

☐ Solenoid operated oil metering valve ☐ with, ☐ without temperature compensation.

☐ Grease packed lubrication, including a combination tube nut/stuffing box and, ☐ manual, ☐ automatic grease injection equipment.

☐ Water flush lubrication; the flushing water will be by others.

☐ Open line shaft (OLS), pumpage lubricated. The packing container ☐ shall, ☐ shall not include an O-ring sealed wear sleeve between the packing and the stainless steel top shaft. The vendor shall list in his quotation the materials of which the inner column will be made in order to permit evaluation of their suitability for the application.

Bowl Unit

The materials of the bowl unit shall be:

Bowl and suction manifold: ☐ Class 30 cast iron, ☐ SAE 40 bronze, ☐ SAE 63 bronze, ☐ type 2 ni-resist, ☐ 316 stainless steel, ☐ other_____.

Impeller(s): ☐ SAE 40 bronze, ☐ SAE 63 bronze, ☐ type 2 ni-resist, ☐ 316 stainless steel, ☐ other _____.

Impeller shaft: ☐ 416 stainless steel, ☐ 316 stainless steel, ☐ 17-4 PH, ☐ other _____.

Bowl Unit Configuration Options:

☐ The bowl unit shall be equipped with replaceable bowl liner(s)/wear ring(s) at wearing surfaces.

☐ The bottom bearing ("tail bearing" of the suction manifold) shall be equipped with a lubrication line from the base plate.

☐ The bowl bearings shall be pressure lubricated with grease.

☐ The bowl assembly shall include a clip-on type basket strainer. Its materials shall be: ☐ galvanized steel, ☐ SAE 40 bronze, ☐ 316 stainless steel, ☐ other_____.

Coatings

The assemblies indicated below shall be coated with _____ (material) to a thickness of _____.

☐ Bowl unit, coat outside plus inside of suction bell only.

☐ Elbow, coat all except machined-gasketed surfaces ☐ all over, ☐ wetted surfaces only; ☐ inside and outside, ☐ inside only, ☐ outside only.

☐ Tubing, coat outside only.

Other Peerless Industrial Vertical Pumps

Tee-Head Canned Pumps...

...multi-stage close-coupled vertical line shaft pumps with barrel-enclosed bowl units. Recommended for low NPSH conditions.

Typical Applications: Line boost, transfer of process liquids, hydrocarbons, hot or cold water, etc.

Capacities: to 50,000 gpm (11,360 m^3/hr)

Heads: to 3,000 psi (211 kg/cm^2) – 3 pumps

Drives: Electric motors, right angle gear drives, steam turbines, combination drives.

Temperature Range: –60°F (–65°C) to +450°F (282°C)

Materials: Any machinable alloys suitable for the application.

Configurations: As required by the application.

For additional information, request Brochure B-400.

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.

Heads: To 1,000 psi (70.3 kg/cm^2)

Capacities: To 150,000 gpm (34,080 m^3/hr)

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 machineable alloys suitable for the application.

Configurations: As required by the application.

For additional information, request Brochure B-110.

PEERLESS PUMP®

Peerless Pump Company

P.O. Box 7026 • Indianapolis, IN 46207-7026

Phone: (317) 925-9661 • Fax: (317) 924-7388