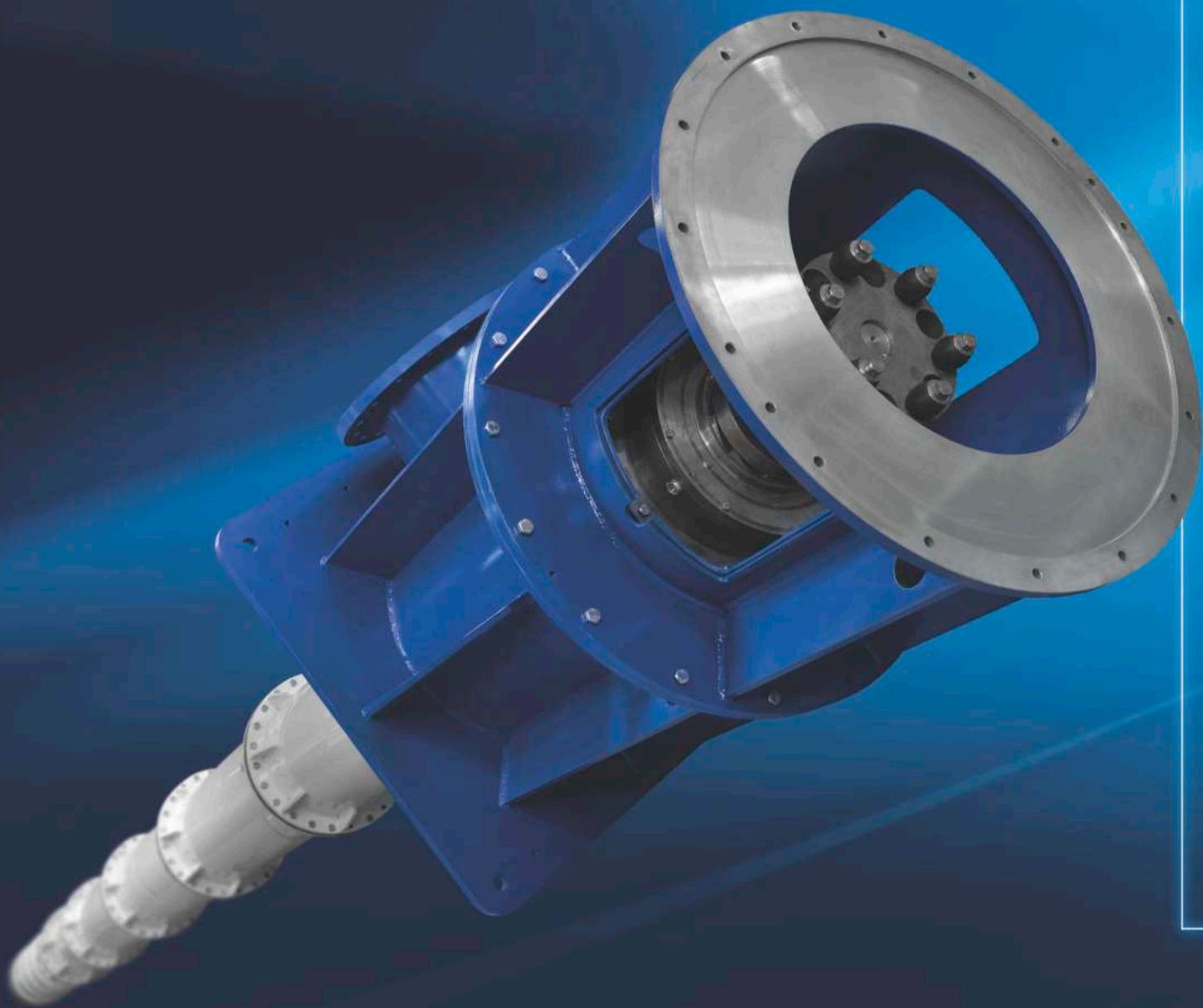


VERTICAL TURBINE PUMPS

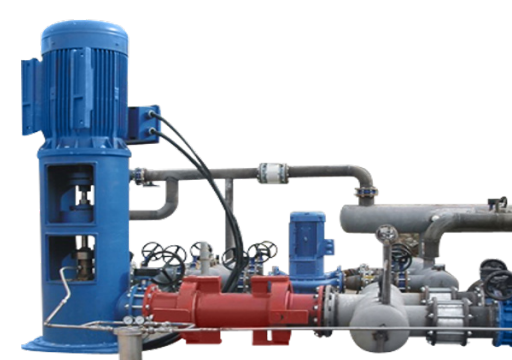


EVDP

VERTICAL TURBINE PUMPS
GENERAL INFORMATION



EBARA





ABOUT US

EBARA Pumps Americas Corporation (EPAC), the US subsidiary of EBARA Corporation, Japan, provides engineered pumps, pump products and related services for the water, wastewater, commercial, municipal, energy and power industries offering reliable product knowledge, application expertise and responsive support including aftermarket replacement parts services.

With horsepower ranges up to 800 HP and capacities to 35,000 GPM, EPAC's cast iron submersible pumps meet a wide range of industrial, municipal, flood control, and residential water and wastewater applications. The cast iron line of pumps includes submersible sewage, submersible sump, semi-vortex, vortex, grinder, non-clog and dry pit models.

EPAC offers a comprehensive line of corrosion-resistant formed stainless-steel pumps that include end suction centrifugal, multistage, and submersible sump, effluent and sewage pumps.

Recognizing the continued strain on water and wastewater facilities and infrastructures with increased maintenance, energy and environmental demands and costs, EBARA Pumps Americas Corporation strives to deploy the best water, wastewater pumps, pump products, and technologies to meet these requirements.



Mixed Flow Vertical Turbine Pumps

4 - 5



Applications/Markets Served

- ▶ Municipal Water/Stormwater
- ▶ Industrial Water Supply
- ▶ Secondary Wastewater/Post-processing
- ▶ Power plants
- ▶ Mining
- ▶ Process cooling water
- ▶ Commercial irrigation
- ▶ River Water Intake
- ▶ Sea Water Intake



Performance Range

- ▶ Discharge Size: 8" - 20"
- ▶ Q: up to 6,600 gpm
- ▶ Total Dynamic Head: up to 500 ft.
- ▶ Solids Handling: 3/4" to 2"
- ▶ Water, oil & grease lubrication options
- ▶ Specific designs and materials available



Features

Pattern Shop

EBARA has a complete pattern shop, in house, powered by CAD-CAM programs. It's abilities allow for quick action on new designs and improvements.

Foundries

Thanks to the location of the factory, EBARA has a wide range of alternative foundries for different materials.

Welding Process

Fabrication is made by qualified and certified welders who utilize M.I.G, T.I.G, and innershield welding processes.

Machinery

CNC boring machines up to 2500mm diameter, Vertical & Horizontal lathes and individual production equipment support an efficient and flexible manufacturing process.

Coating

Coating options are available for potable and nonpotable services

Assembly

All components are assembled precisely according to customer specifications for best efficiency, prolonged service life and best appearance.

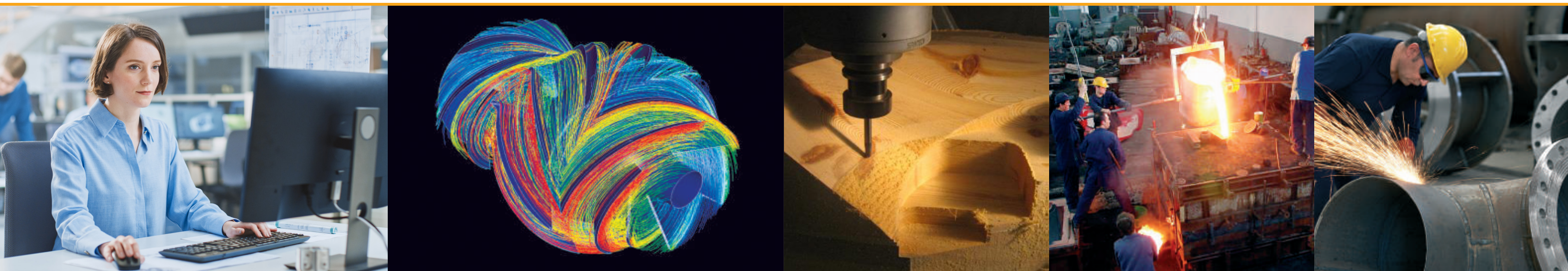
Test

EBARA has ability to test up to 30,000 m³/h flow capacity with magnetic flowmeters rangers from Φ 40mm up to Φ 1200mm.

The test bench has voltage variety from 400V - 690V - 1,000V - 3.300V - 6.300V and power up to 3600 kW.

The test bench also is capable to test the pump in various speeds by frequency convertors and is fully computerized.





Powered by Engineering

Research and Development

EBARA R&D Department uses a proprietary software developed by EBARA Engineers to ensure highest performance when designing impellers and diffusers. Prototype designs are confirmed by CFD programs before preparing build patterns. This ability provides great flexibility to develop a new pump in a short period of time with high performance and efficiency.

High Efficiency

20% of produced energy in the world is consumed by pumps. Saving 30% of this energy is possible with a good system design and well designed pumps. With this awareness, our purpose is to produce pumps with high efficiencies up to 93%. The most important criteria for the EBARA Team is total cost of ownership.

Different Material Option

EBARA gives a great material selection option to the customers for different applications such as cast iron, cast steel, non-alloyed and low alloy steel grades, stainless CrNi Steel grades, duplex and super duplex steel grades, Bronze, Ni-Al Bronze and others.

Quality Assurance

Quality Control is a continuous process of EBARA. It starts from the quotation phase, ordering phase, manufacturing process, installation & operation phase, warranty period & after sales operations.

Test Capabilities

- ▶ Performance test
- ▶ Noise level testing
- ▶ Vibration analysis
- ▶ Liquid dye penetrant testing
- ▶ Magnetic particle testing
- ▶ Radiographic examination of welding
- ▶ Ultrasonic examination of raw materials & welding
- ▶ Metallurgical analysis

PRODUCT PARTS FEATURES

Specifications

Suction Bell

Each suction bell includes entrance guide vanes to prevent prerotation while guiding the liquid flow parallel to the drive shaft for maximum efficiency. Suction bells can be fitted with strainers to restrict entry of foreign objects during operation.

Impellers

Impellers, enclosed or semi-open, are precisely trimmed and balanced to reduce vibration and wear. Impellers are secured firmly to the shaft by means of a key and a split thrust ring or by a taper colled for small pump sizes.

Bowls

Bowl guide vanes are precisely designed for the maximum conversion of kinetic energy to the pressure energy to achieve peak efficiency. The bowls are flanged and the material selection is made according to the pumping fluid. Bowls can be enamelled, plastic or ceramic coated to reduce the friction losses and to maintain a protective layer. Single or dual bronze and rubber bearings provide alignment and dampen vibration. Bowls are supplied with a replaceable wear rings.

Shafts

The pump shaft is divided into three sections: head shaft, line shaft and bowl shaft. Shafts are turned, ground and polished and the material selection varies depending on the application. The shaft is tailor made to the service needs and sized individually for each installation; calculated for maximum torque.

Discharge Head

The discharge head consists of a surface or underground sectional elbow. Heads are available in high strength cast iron, fabricated steel or other materials that are compatable to the pumped fluid. Heads may be coated internally to further resist product corrosion. In addition efficiency improvement NSF coatings for potable water are available.

Column Assembly

Column pipes can be threaded or flanged according the size and customer request. Pipes are machined between the centers to ensure perfect alignment. The lubrication of the column assembly can be in three ways:

Oil Lubrication: Oil is supplied to bronze lineshaft bearings by an oiler, secured on the motor base. Oiler can be hand operated or solenoid for automatic lubrication. Oil lubricated columns contain a lineshaft enclosing tube. The suction bell bearing is packed with water resistant grease, ensuring a long period operation.

Grease Lubrication: Grease is supplied to bronze lineshaft bearings by a grease pump, secured the motor base.

Water Lubrication: The rubber lineshaft bearings are lubricated by the pumped water. The suction bell bearing is grease lubricated.

ShaftSeal

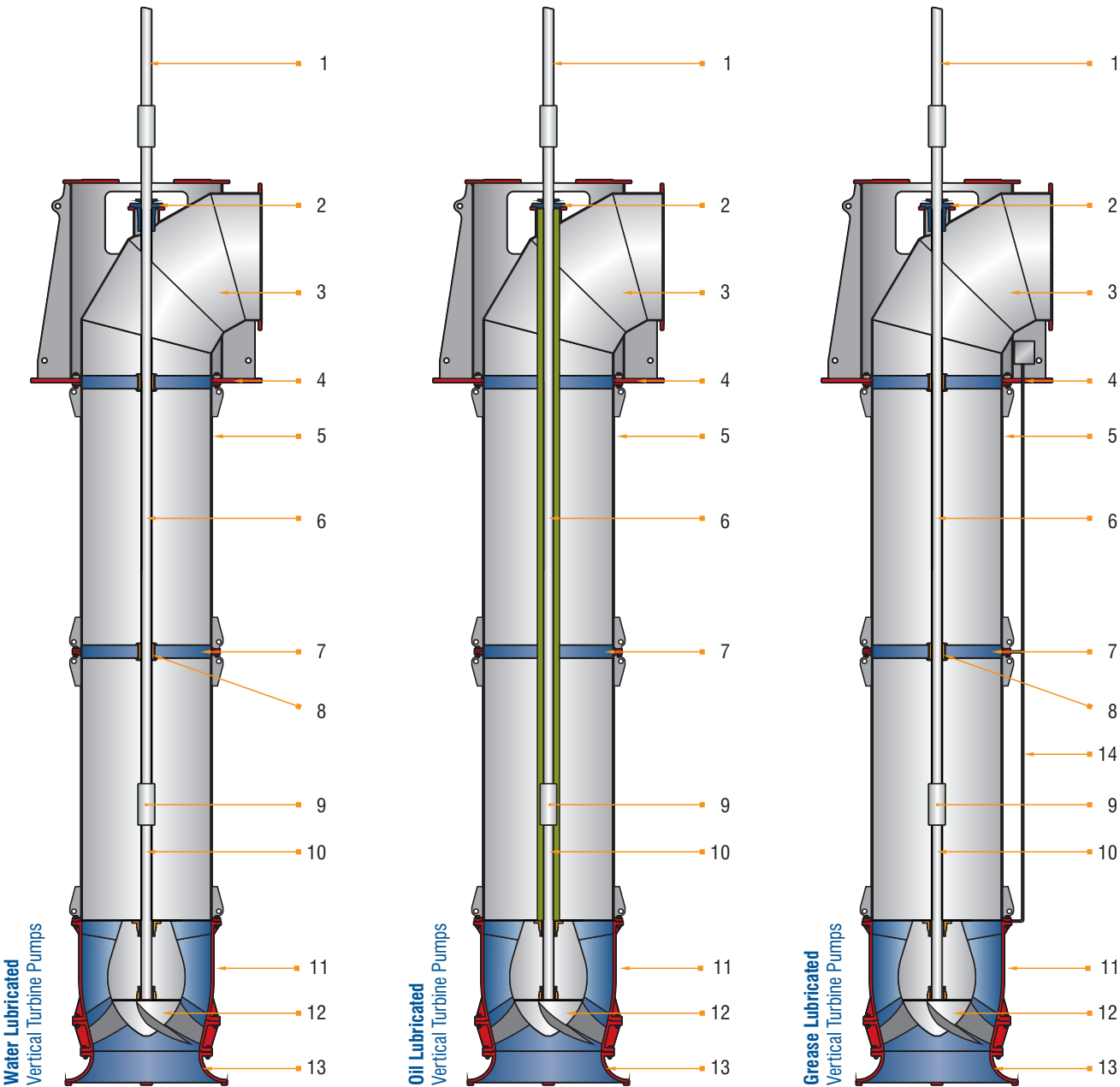
Options are provided for reliable sealing and simple maintenance including gland packing and various mechanical seal arrangements.

Drivers

Vertical electric motors are connected directly to the pump. With hollow shaft motors, the pump downthrust is carried by a thrust bearing built in the motor. The drive shaft extends up through the motor shaft and is properly secured at the top.

With solid shaft motors, the headshaft is connected to a heavy oil lubricated ball bearing thrust assembly, located on the pump base plate. If the thrust load is more than the ball bearing assembly capacity then tilting pad type bearings are located on the base plate. Bearings are oversized to assure a minimum life of 40.000 hours operation.

Horizontal electric motors or internal combustion engines are connected to the pump through suitable right angle gear drive or belt drive.



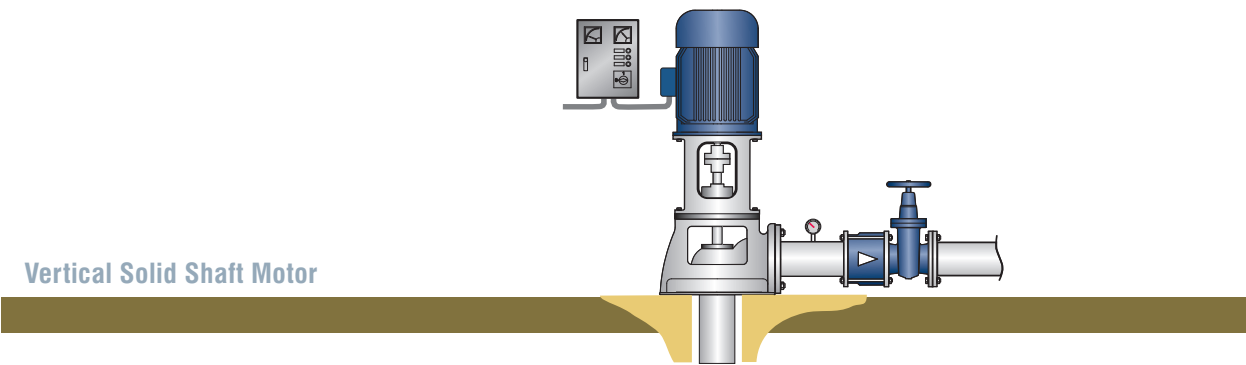
Part List For Standard Application

ITEM	DESCRIPTION	MATERIAL
1	Head Shaft	AISI 420
2	Stuffing Box	ASTM A48
3	Discharge Elbow	ASTM A48 / Fabricated Steel
4	Base Plate	ASTM A48 / Fabricated Steel
5	Column Pipe	Fabricated Steel
6	Line Shaft	AISI 420 / AISI 316
7	Bearing Retainer	ASTM A48

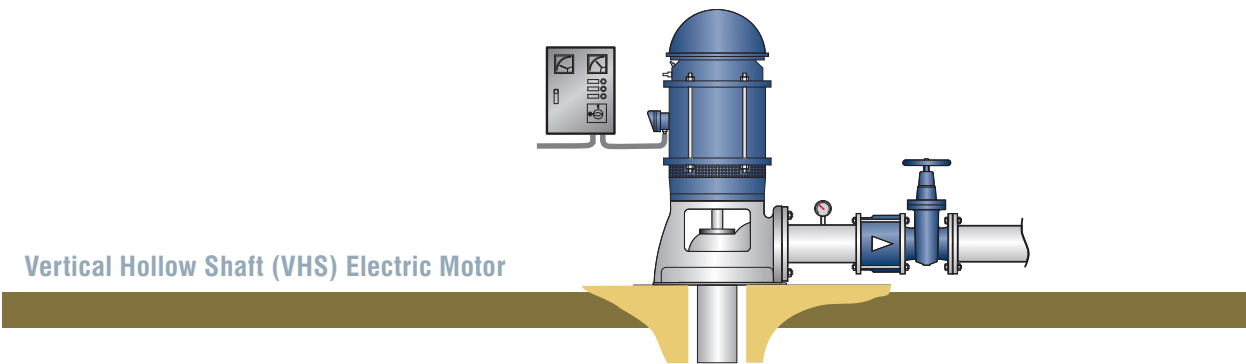
ITEM	DESCRIPTION	MATERIAL
8	Bearing	Rubber / SAE 63
9	Shaft Coupling	AISI 420 / AISI 316
10	Pump Shaft	AISI 420 / AISI 316
11	Diffuser	ASTM A48
12	Impeller	ASTM A48 / SAE 63 / AISI 316
13	Suction Bell	ASTM A48
14	Grease Tube	AISI 316

Different material options available ⓘ

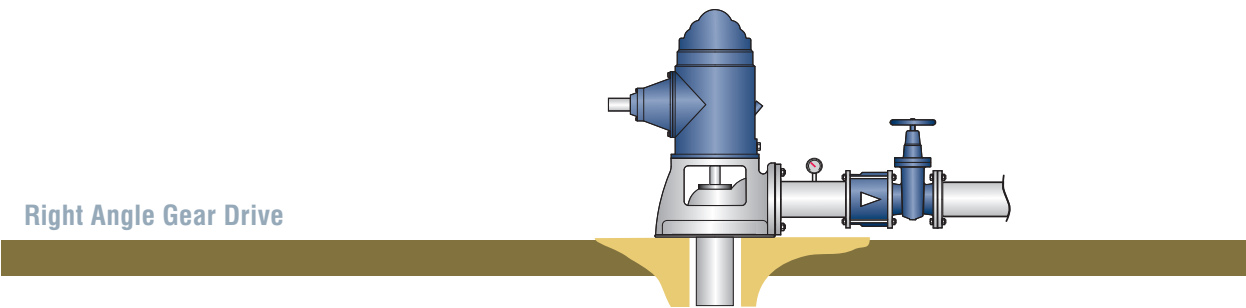
VERTICAL TURBINE PUMPS DRIVE VARIETIES



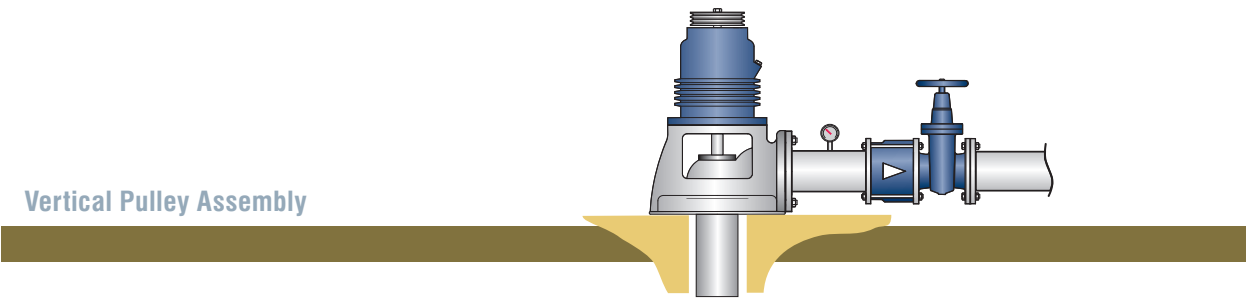
Vertical Solid Shaft Motor



Vertical Hollow Shaft (VHS) Electric Motor



Right Angle Gear Drive



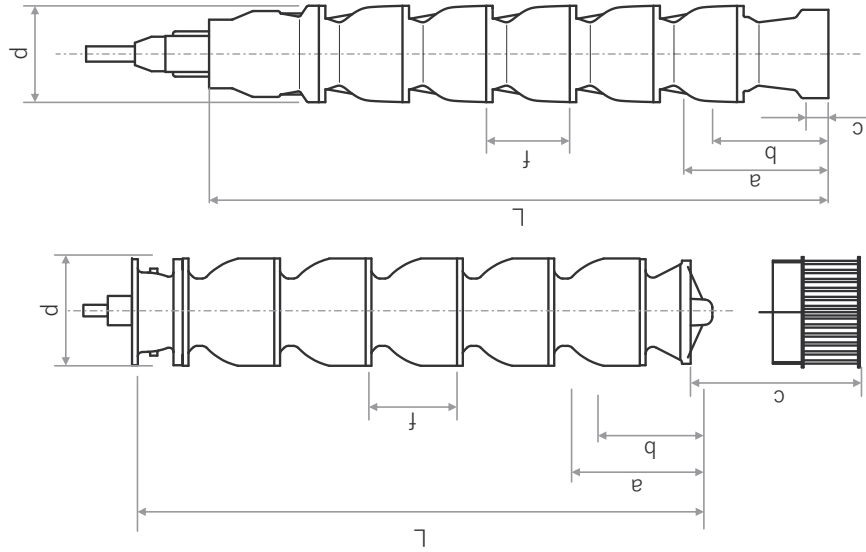
Vertical Pulley Assembly

Materials

Standard Materials	Impellers		Bowls		Impeller Lock Collet		LineShafts		LineShaft Couplings	
	Cast Iron ASTM A48 CLASS 30B	Bronze ASTM B145-4A	Cast Iron ASTM A48 CLASS 30B		Stainless Steel ASTM A582 Type 416-420	Carbon Steel ASTM A108-61 Gr 1035	Stainless Steel ASTM A582 Type 416-420	Carbon Steel ASTM A108-61 Gr 1045	Stainless Steel ASTM A582 Type 416-420	Carbon Steel ASTM A108-61 Gr 1035
VDP 0831	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 0832	✓	✓	✓			✓	✓	✓	✓	✓
VDP 0833	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 0834	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 0853	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 0854	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 1032	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 1033	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 1034	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 1053	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 1054	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 1232	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 1234	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 1252	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 1253	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 1254	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 1432	✓	✓	✓		✓		✓	✓	✓	✓
VDP 1433	✓	✓	✓		✓		✓	✓	✓	✓
VDP 1434	✓	✓	✓		✓		✓	✓	✓	✓
VDP 1732	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 1733	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 1734	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 1752	✓	✓	✓		✓		✓	✓	✓	✓
VDP 1753	✓	✓	✓		✓		✓	✓	✓	✓
VDP 1754	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 2032	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 2033	✓	✓	✓		✓	✓	✓	✓	✓	✓
VDP 2034	✓	✓	✓		✓	✓	✓	✓	✓	✓

* Contact EBARA Pumps America LLC for available materials required for your specific application!

Dimensions



	(A) Minimum Required Submergence (Inches/mm)	(B) Bottom of Bearing to Hub Eye (Inches/mm)	(C) Suction Case Thread Engagement (Inches/mm)	(D) Bowl Diameter (Inches/mm)	(E) Single-Stage Assembly Length (Inches/mm)	(F) Additional Stage Length (Inches/mm)
VDP 0831	15" / 381mm	7" / 178mm	1-3/8" / 35mm	7-1/2" / 190mm	22" / 561mm	6-1/2" / 165mm
VDP 0832	15" / 381mm	7" / 178mm	1-3/8" / 35mm	7-1/2" / 190mm	22" / 561mm	6-1/2" / 165mm
VDP 0833	15" / 381mm	7" / 178mm	1-3/8" / 35mm	7-1/2" / 190mm	22" / 561mm	6-1/2" / 165mm
VDP 0834	15" / 381mm	7" / 178mm	1-3/8" / 35mm	7-1/2" / 190mm	22" / 561mm	6-1/2" / 165mm
VDP 0853	18" / 457mm	9" / 228mm	1-3/8" / 35mm	7-1/2" / 192.8mm	24-1/2" / 623mm	7-1/2" / 190.6mm
VDP 0854	18" / 457mm	9" / 228mm	1-3/8" / 35mm	7-1/2" / 192.8mm	24-1/2" / 623mm	7-1/2" / 190.6mm
VDP 1032	21" / 533mm	11" / 280mm	1-5/8" / 42mm	9-3/8" / 238mm	24-3/8" / 618mm	8-3/8" / 212.7mm
VDP 1033	21" / 533mm	11" / 280mm	1-5/8" / 42mm	9-3/8" / 238mm	24-3/8" / 618mm	8-3/8" / 212.7mm
VDP 1034	21" / 533mm	11" / 280mm	1-5/8" / 42mm	9-3/8" / 238mm	24-3/8" / 618mm	8-3/8" / 212.7mm
VDP 1053	21-1/2" / 545mm	11-1/2" / 292mm	2" / 50mm	9-3/4" / 248mm	27" / 685mm	8-3/4" / 222.3mm
VDP 1054	21-1/2" / 545mm	11-1/2" / 292mm	2" / 50mm	9-3/4" / 248mm	27" / 685mm	8-3/4" / 222.3mm
VDP 1232	22" / 560mm	12" / 305mm	1-1/2" / 40mm	11-1/2" / 291mm	29-3/4" / 755mm	10" / 254mm
VDP 1234	22" / 560mm	12" / 305mm	1-1/2" / 40mm	11-1/2" / 291mm	29-3/4" / 755mm	10" / 254mm
VDP 1252	25" / 635mm	12" / 305mm	2-1/4" / 57mm	11-1/2" / 294mm	30-1/2" / 775mm	11" / 279.4mm
VDP 1253	25" / 635mm	12" / 305mm	2-1/4" / 57mm	11-1/2" / 294mm	30-1/2" / 775mm	11" / 279.4mm
VDP 1254	25" / 635mm	12" / 305mm	2-1/4" / 57mm	11-1/2" / 294mm	30-1/2" / 775mm	11" / 279.4mm
VDP 1432	32" / 815mm	19" / 480mm	6-7/8" / 175mm	14-3/8" / 365mm	29-1/4" / 742mm	12-1/2" / 315mm
VDP 1433	32" / 815mm	19" / 480mm	6-7/8" / 175mm	14-3/8" / 365mm	29-1/4" / 742mm	12-1/2" / 315mm
VDP 1434	32" / 815mm	19" / 480mm	6-7/8" / 175mm	14-3/8" / 365mm	29-1/4" / 742mm	12-1/2" / 315mm
VDP 1732	34" / 865mm	17" / 426mm	15-3/4" / 400mm	17" / 430mm	35-1/2" / 900mm	15-3/8" / 390mm
VDP 1733	34" / 865mm	17" / 426mm	15-3/4" / 400mm	17" / 430mm	35-1/2" / 900mm	15-3/8" / 390mm
VDP 1734	34" / 865mm	17" / 426mm	15-3/4" / 400mm	17" / 430mm	35-1/2" / 900mm	15-3/8" / 390mm
VDP 1752	35" / 889mm	17-1/2" / 435mm	15-3/4" / 400mm	17" / 430mm	35-1/2" / 900mm	15-3/4" / 400mm
VDP 1753	35" / 889mm	17-1/2" / 435mm	15-3/4" / 400mm	17" / 430mm	35-1/2" / 900mm	15-3/4" / 400mm
VDP 1754	38" / 965mm	17-1/2" / 435mm	15-3/4" / 400mm	17" / 430mm	35-1/2" / 900mm	15-3/4" / 400mm
VDP 2032	33" / 838mm	18-1/2" / 465mm	17-3/4" / 450mm	19-3/4" / 500mm	39-1/2" / 1005mm	16-1/2" / 420mm
VDP 2033	35" / 889mm	18-1/2" / 465mm	17-3/4" / 450mm	19-3/4" / 500mm	39-1/2" / 1005mm	16-1/2" / 420mm
VDP 2034	37-1/2" / 950mm	18-1/2" / 465mm	17-3/4" / 450mm	19-3/4" / 500mm	39-1/2" / 1005mm	16-1/2" / 420mm

	# of Vanes	Thrust Constant (K)	Pump Outside Diameter (Inches/mm)	Max Number of Stages	Rotation	Revolutions Per Minute	Shaft Diameter (Inches/mm)	WR^2 (lbs/ft^2 - kg/m^2)	Efficiency Deduction% (Number of Stages)
VDP 0831	6	56.65 lbs/ft - 7.83 kg/m	7-1/2" / 190mm	35	CCW	1,450	1-1/4" / 30.16mm	0.00126 - 0.0063	(1) -4% (2) -2%
VDP 0832	5	81.7 lbs/ft - 11.3 kg/m	7-1/2" / 190mm	30	CCW	1,450	1-1/4" / 30.16mm	0.00134 - 0.0067	(1) -2% (2) -1% (5) -0%
VDP 0833	6	81.7 lbs/ft - 11.3 kg/m	7-1/2" / 190mm	30	CCW	1,450	1-1/4" / 30.16mm	0.00134 - 0.0067	(1) -2% (2) -1% (5) -0%
VDP 0834	8	81.7 lbs/ft - 11.3 kg/m	7-1/2" / 190mm	30	CCW	1,450	1-1/4" / 30.16mm	0.00134 - 0.0067	(1) -2% (2) -1% (5) -0%
VDP 0853	5	85.46 lbs/ft - 11.82 kg/m	7-1/2" / 192.8mm	30	CCW	1,450	1-1/4" / 30.16mm	0.00204 - 0.0102	(1) -4% (2) -2%
VDP 0854	7	85.46 lbs/ft - 11.82 kg/m	7-1/2" / 192.8mm	30	CCW	1,450	1-1/4" / 30.16mm	0.00204 - 0.0102	(1) -4% (2) -2%
VDP 1032	5	89.62 lbs/ft - 12.39 kg/m	9-3/8" / 238mm	20	CCW	1,450	1-3/4" / 42.86mm	0.00496 - 0.0248	(1) -3% (2) -1.5% (3) -1%
VDP 1033	6	89.62 lbs/ft - 12.39 kg/m	9-3/8" / 238mm	20	CCW	1,450	1-3/4" / 42.86mm	0.00496 - 0.0248	(1) -3% (2) -1.5% (3) -1%
VDP 1034	7	89.62 lbs/ft - 12.39 kg/m	9-3/8" / 238mm	20	CCW	1,450	1-3/4" / 42.86mm	0.00496 - 0.0248	(1) -3% (2) -1.5% (3) -1%
VDP 1053	5	149.42 lbs/ft - 20.66 kg/m	9-3/4" / 248mm	20	CCW	1,450	1-3/4" / 42.86mm	0.00708 - 0.0354	(1) -2% (2) -1%
VDP 1054	7	149.42 lbs/ft - 20.66 kg/m	9-3/4" / 248mm	20	CCW	1,450	1-3/4" / 42.86mm	0.00708 - 0.0354	(1) -2% (2) -1%
VDP 1232	5	125.77 lbs/ft - 17.39 kg/m	11-1/2" / 291mm	20	CCW	1,450	2" / 49.21mm	0.0101 - 0.0505	(1) -3% (2) -1%
VDP 1234	8	125.77 lbs/ft - 17.39 kg/m	11-1/2" / 291mm	20	CCW	1,450	2" / 49.21mm	0.0101 - 0.0505	(1) -3% (2) -1%
VDP 1252	5	177.35 lbs/ft - 24.52 kg/m	11-1/2" / 294mm	17	CCW	1,450	2" / 49.21mm	0.01414 - 0.0707	(1) -3% (2) -1%
VDP 1253	4	177.35 lbs/ft - 24.52 kg/m	11-1/2" / 294mm	16	CCW	1,450	2" / 49.21mm	0.01414 - 0.0707	(1) -3% (2) -1%
VDP 1254	8	177.35 lbs/ft - 24.52 kg/m	11-1/2" / 294mm	15	CCW	1,450	2" / 49.21mm	0.01414 - 0.0707	(1) -3% (2) -1%
VDP 1432	5	208.53 lbs/ft - 28.83 kg/m	14-3/8" / 365mm	20	CCW	1,450	2" / 49.21mm	0.0348 - 0.174	(1) -4% (2) -2%
VDP 1433	6	208.53 lbs/ft - 28.83 kg/m	14-3/8" / 365mm	20	CCW	1,450	2" / 49.21mm	0.0348 - 0.174	(1) -4% (2) -2%
VDP 1434	8	208.53 lbs/ft - 28.83 kg/m	14-3/8" / 365mm	20	CCW	1,450	2" / 49.21mm	0.0348 - 0.174	(1) -4% (2) -2%
VDP 1732	5	311.6 lbs/ft - 43.08 kg/m	17" / 430mm	3	CCW	1,450	2" / 49.21mm	0.0998 - 0.499	(1) -2% (2) -1% (3) -0%
VDP 1733	6	311.6 lbs/ft - 43.08 kg/m	17" / 430mm	3	CCW	1,450	2" / 49.21mm	0.0998 - 0.499	(1) -2% (2) -1% (3) -0%
VDP 1734	8	311.6 lbs/ft - 43.08 kg/m	17" / 430mm	3	CCW	1,450	2" / 49.21mm	0.0998 - 0.499	(1) -2% (2) -1% (3) -0%
VDP 1752	5	411.78 lbs/ft - 56.93 kg/m	17" / 430mm	3	CCW	1,450	2" / 49.21mm	0.1354 - 0.677	(1) -2% (2) -1% (3) -0%
VDP 1753	6	411.78 lbs/ft - 56.93 kg/m	18-1/4" / 460mm	2	CCW	1,450	2" / 49.21mm	0.1354 - 0.677	(1) -2% (2) -1% (3) -0%
VDP 1754	8	339.45 lbs/ft - 46.93 kg/m	17" / 430mm	2	CCW	1,450	2" / 49.21mm	0.1354 - 0.677	(1) -2% (2) -1% (3) -0%
VDP 2032	5	450.33 lbs/ft - 62.26 kg/m	19-3/4" / 500mm	3	CCW	1,450	2-1/2" / 61.91mm	0.1626 - 0.813	(1) -2% (2) -1% (3) -0%
VDP 2033	6	450.33 lbs/ft - 62.26 kg/m	19-3/4" / 500mm	3	CCW	1,450	2-1/2" / 61.91mm	0.1626 - 0.813	(1) -2% (2) -1% (3) -0%
VDP 2034	8	450.33 lbs/ft - 62.26 kg/m	19-3/4" / 500mm	2	CCW	1,450	2-1/2" / 61.91mm	0.1626 - 0.813	(1) -2% (2) -1% (3) -0%

INFORMATION FOR RFQ:

End User / Operator _____

Purchaser / Installer / Contractor _____

Flow (Q-GPM) _____

Head (TDH-Feet) _____

Lowest Liquid Level _____

Sump Depth _____

High Liquid Level _____

Application _____

Liquid Property _____

Required Regulations _____

Driver Type & Horsepower _____

Site Power(Voltage) / Utility Available _____

Pit Design / Foundation Structure _____

Required Discharge Pressure at
Output Nozzle Center _____

Safety/Control System _____

Commercial Conditions _____

Hollow vs. Solid Shaft _____

NOTES:
