

# Pump Types Guide - Find the right pump for the job

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There are lots of pump types available, but which one is right for you? Understanding which pump type is right for your application is critical to reduce costs and increase the life of your pump and system. We've worked with leading pump experts to put together this comprehensive guide to the most popular pump types. The individual pump types are listed in the left column and are grouped by either centrifugal pumps or positive displacement pumps.

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| Pump Type                          | Basic Description                                                                                                                                                                                                                                                                                                       | Key Features                                                                                                                                                                                                                                   | Applications Used                                                                                                                                                                                                                                                          | Recommended Media (Fluid)                                                                                                                                                           | Advantages                                                                                                                                                                                                                                                                                                                                 | Flow Rate Ranges                                    | Total Head (Pressure) Ranges              | Horse Power Ranges |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------|--------------------|
| <a href="#">Centrifugal Pumps</a>  | General name for pumps with one or more impellers. Many types and configurations for different applications. See below for specific centrifugal pump types.                                                                                                                                                             | One or more impellers. Casing is volute or diffuser type. Normally electric motor driven, but other drive types available.                                                                                                                     | All sorts of liquids can be pumps with centrifugal pumps. Highest flow rates of all pump types. Handles clean or dirty liquids, and liquids with low viscosity. Liquid should not contain air or vapors.                                                                   | Water and relatively thin liquids (won't pump thicker oils). Can pump liquids with or without solids if proper impeller type is chosen. Available in alloys for corrosive services. | Best pump choice for lower viscosity (thin) liquids and high flow rates. No pulsations that may be found in some positive displacement pumps.                                                                                                                                                                                              | 5 - 200,000 gpm<br>-----<br>19 - 757,080 lpm        | 10 - 7,500 ft<br>-----<br>3 - 2,286 m     | 0.125 - 5,000 hp   |
| <a href="#">ANSI Process Pumps</a> | ANSI Process pumps are the only dimensionally standard pump type in the U.S. pump industry (e.g., comparable sizes of all manufacturers have identical envelope and interface dimensions.) ANSI process pumps are, by definition, a horizontal, end suction, single stage pump. The pump meets ANSI B73.1 (ASME B73.1). | Considered an end suction pump, frame mounted. Normally supplied with open impellers. Dimensionally standard sizes supplied by all manufacturers. Available in a wide variety of alloys and non-metals for many corrosive services.            | Transfer and process applications in chemical plants, pulp and paper mills, refineries, food processing plants, and general services in manufacturing plants of all types.                                                                                                 | Water and relatively thin liquids (won't pump thicker oils). Can pump liquids with or without solids if proper impeller type is chosen. Available in alloys for corrosive services. | Dimensional standardization allows the complete piping, foundation, and building design to be completed before the pump supplier is chosen. Also, this permits the pump brand to be switched in the field without having to re-pipe or modify the motor, coupling, or bedplate. This pump type has more material options than other types. | 10 - 5,000 gpm<br>-----<br>38 - 18,927 lpm          | 50 - 750 ft<br>-----<br>22 - 325 psi      | 1 - 250 hp         |
| <a href="#">API Process Pumps</a>  | The API pump type applies to pumps built to the API 610 standard for pumps for refineries, pipelines, and other hydrocarbon processing applications. It includes end suction, horizontal split case, vertical turbine, and other types.                                                                                 | Meets API 610 standard for hydrocarbon services. Includes closed impellers, with locked wearing rings. Normally centerline mounted to minimize thermal movement.                                                                               | Hydrocarbon transfer and processing services in refineries, pipelines, and hydrocarbon processing plants.                                                                                                                                                                  | Crude oil and all types of hydrocarbons.                                                                                                                                            | Meets API 610 requirements, assuring safety and reliability for high pressure, high temperature hydrocarbon services.                                                                                                                                                                                                                      | 10 - 10,000 gpm<br>-----<br>38 - 37,854 lpm         | 50 - 7,500 ft<br>-----<br>22 - 3251 psi   | 1 - 5,000 hp       |
| <a href="#">Axial Flow Pumps</a>   | Axial Flow pumps are a very high flow, low head type of pump. Also called a propeller pump.                                                                                                                                                                                                                             | Single stage, high specific speed impeller for high flow low head.                                                                                                                                                                             | Flood dewatering, power plant circulating water pump, evaporator services, and irrigation.                                                                                                                                                                                 | Water and relatively thin liquids. Can pump liquids with or without solids if proper impeller type is chosen.                                                                       | This pump type is the best type to achieve very high flow rate with very low head, a hydraulic requirement needed for certain applications such as flood dewatering.                                                                                                                                                                       | 5,000 - 200,000 gpm<br>-----<br>18,927 - 757,08 lpm | 10 - 30 ft<br>-----<br>4 - 13 psi         | 10 - 1,500 hp      |
| <a href="#">Booster Pumps</a>      | Booster pumps are used to further boost the pressure in a system. It may be an end suction, in-line circulator, horizontal split case, or vertical turbine in a can type of pump.                                                                                                                                       | Booster pumps are almost always a multi-stage pump (has more than one impeller). All other features are quite specific to the application.                                                                                                     | Potable water distribution, irrigation booster, cooling water booster, process booster service                                                                                                                                                                             | Water and relatively thin liquids (won't pump thicker oils). Normally not used for liquids containing solids. Available in alloys for corrosive services.                           | Allows the building up of additional pressure that is required to move liquid a long distance or to use the high pressure for spraying or other services.                                                                                                                                                                                  | 5 - 10,000 gpm<br>-----<br>19 - 37,854 lpm          | 200 - 7,500 ft<br>-----<br>87 - 3,251 psi | 1 - 5,000 hp       |
| <a href="#">Canned Motor Pumps</a> | Canned Motor pumps are sealless centrifugal pumps. The impeller is directly attached to the motor rotor, with a can separating the wetted rotor from the motor stator.                                                                                                                                                  | Pump and motor are close coupled, so no mechanical seal. Pump rotor includes a circulating path of pumped liquid to lubricate sleeve bearings and thrust surfaces. These wear areas are made of ceramic, silicon carbide, or tungsten carbide. | Pumping chemicals, hydrocarbons, or other liquids that are difficult to seal, or where the consequences of leakage are serious. Pumping heat transfer fluids which are high temperature or which are prone to costly evaporative losses with traditional mechanical seals. | All types of thin (non-viscous liquids).                                                                                                                                            | Eliminates the mechanical seal, one of the largest components of pump maintenance cost. Plus, the pump is assured to be leak-free.                                                                                                                                                                                                         | 5 - 1,500 gpm<br>-----<br>19 - 5,678 lpm            | 25 - 400 ft<br>-----<br>11 - 173 psi      | 0.5 - 300 hp       |
| <a href="#">Chopper Pumps</a>      | Chopper Pumps are a type of centrifugal pump that is designed to chop up solids and stringy material as it pumps. It is available in a vertical column and end suction configuration.                                                                                                                                   | Pump impeller contains heavy duty grinding teeth, and many have replaceable wear plates in the casing, to allow chopping of solids as the pump operates.                                                                                       | Chopper pumps are used in applications that plug conventional solids handling wastewater pumps in industrial, chemical, and food processing facilities.                                                                                                                    | Liquids containing solids and stringy material that would otherwise be difficult to pump.                                                                                           | Able to pump liquids containing long stringy materials or other solids that would plug up in other pump types.                                                                                                                                                                                                                             | 50 - 10,000 gpm<br>-----<br>189 - 37,854 lpm        | 15 - 200 ft<br>-----<br>7 - 87 psi        | 1 - 500 hp         |
| <a href="#">Circulator Pumps</a>   | Circulator pumps is generally a pump with in-                                                                                                                                                                                                                                                                           | In-line suction and discharge piping                                                                                                                                                                                                           | Circulator pumps are used in HVAC                                                                                                                                                                                                                                          | Water and relatively thin liquids.                                                                                                                                                  | In-line design saves on floor space.                                                                                                                                                                                                                                                                                                       | 5 - 750 gpm                                         | 20 - 180 ft                               | 1 - 50 hp          |

|                                             |                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                            |                                                                                                                                                                                     |                                                                                                                                                                                                                                |                                                          |                                           |                   |
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|                                             | line suction and discharge flanges.                                                                                                                                                                                                                                                                                                                          | connections. Pump may be equipped with a traditional motor and coupling, or may have a wetted rotor motor that eliminates the seal.                                                                                                                                                                                                                                                               | systems in buildings (chilled water circulation, hot water circulation, potable water circulation). Also circulation of cooling water in plants.                                                                                                                           |                                                                                                                                                                                     |                                                                                                                                                                                                                                | -----<br>19 - 2,839<br>lpm                               | -----<br>9 - 78 psi                       |                   |
| <a href="#">Cryogenic Pumps</a>             | Cryogenic pumps are used to handle very low temperature liquids.                                                                                                                                                                                                                                                                                             | Special materials, seals, and clearances to tolerate very low temperatures.                                                                                                                                                                                                                                                                                                                       | Low temperature applications in process industries, LNG supply, and semiconductor manufacturing.                                                                                                                                                                           | Ideal for very low temperature liquids.                                                                                                                                             | Able to tolerate the low temperatures found in certain applications.                                                                                                                                                           | 5 - 1,000<br>gpm<br>-----<br>19 - 3,785<br>lpm           | 25 - 1,000 ft<br>-----<br>11 - 434 psi    | 0.5 - 500<br>hp   |
| <a href="#">Drum Pumps</a>                  | Drum pumps are used to pump small quantities of liquid out of drums and carboys. Pump is very slim to fit in drum opening. Normally supplied as centrifugal pump, but positive displacement pump types are available for thicker liquids and pastes.                                                                                                         | Small diameter tube surrounding the shaft fits into the opening of a 55 gallon drum. Normally has a hand-trigger controlled motor.                                                                                                                                                                                                                                                                | Pumping small quantities of liquids out of 55 gallon drums and larger carboys.                                                                                                                                                                                             | Wide variety of thin and thick liquids, including corrosive liquids.                                                                                                                | Very practical way to pump small amounts of various fluids that are stored in drums or carboys.                                                                                                                                | 0.5 - 70 gpm<br>-----<br>2 - 265 lpm                     | 20 - 75 ft<br>-----<br>9 - 33 psi         | 0.25 - 1 hp       |
| <a href="#">End Suction Pumps</a>           | End suction pumps are the common type of centrifugal pump. Has horizontal shaft with overhung impeller. Flow goes in the end of the casing, and out the top.                                                                                                                                                                                                 | Horizontal shaft, single impeller (see multi-stage category for pumps with more impellers). Various impeller types for clean and dirty services, many material options                                                                                                                                                                                                                            | Any transfer or circulation of liquid. Handles clean or dirty liquids, and liquids with low viscosity. Liquid should not contain air or vapors.                                                                                                                            | Water and relatively thin liquids (won't pump thicker oils). Can pump liquids with or without solids if proper impeller type is chosen. Available in alloys for corrosive services. | Lowest first cost option for most applications. Stocked by most distributors in common sizes.                                                                                                                                  | 5 - 7,000<br>gpm<br>-----<br>19 - 26,498<br>lpm          | 10 - 750 ft<br>-----<br>4 - 325 psi       | 0.125 - 250<br>hp |
| <a href="#">Fire Pumps</a>                  | Centrifugal pump used for fire fighting in buildings, plants, and other locations. May meet UL/NFPA standards for fire pumps. Normally this is a horizontal split case or vertical turbine pump for UL/FM services. Non listed pumps may be end suction type.                                                                                                | Listed pumps meet the requirements of UL/FM for firefighting services.                                                                                                                                                                                                                                                                                                                            | Fire fighting services of all types, both UL/FM listed and unlisted.                                                                                                                                                                                                       | Water                                                                                                                                                                               | Meets requirements of UL/FM for fire fighting pumps. Suppliers often include complete system, including engine and controls.                                                                                                   | 20 - 5,000<br>gpm<br>-----<br>76 - 18,927<br>lpm         | 100 - 1,200 ft<br>-----<br>43 - 520 psi   | 10 - 800 hp       |
| <a href="#">Grinder Pumps</a>               | Grinder pumps are a type of submersible sewage pump that has cutting teeth incorporated onto the impeller, to grind the sewage for pressure sewer applications. Also available in progressing cavity pump positive displacement type.                                                                                                                        | Grinding teeth on the inlet of the impeller, submersible motor.                                                                                                                                                                                                                                                                                                                                   | Residential pressure sewer systems.                                                                                                                                                                                                                                        | Sewage and other wastewater.                                                                                                                                                        | This type of sewage pump allows smaller diameter sewage lines than typical gravity drain sewers. Also, the sewer lines can follow the contour of the land since they don't have to continuously drain to the collection point. | 5 - 50 gpm<br>-----<br>19 - 189 lpm                      | 50 - 150 ft<br>-----<br>22 - 65 psi       | 0.5 - 5 hp        |
| <a href="#">Horizontal Split Case Pumps</a> | Horizontal Split Case pumps are a types of centrifugal pump type has a single double suction impeller supported between bearings. Casing is split horizontally for maintenance. Suction and discharge flanges are opposed to each other.                                                                                                                     | Double suction impeller gives better NPSH and lower axial thrust. Casing is normally double volute, to reduce radial bearing loads. Pump has two seals, both sealing suction pressure.                                                                                                                                                                                                            | Usually higher flow rate applications than end suction pumps. Used for cooling water, plant make-up water, potable water distribution, fire pumps, pipelines, and other main process flows.                                                                                | Water and relatively thin liquids (won't pump thicker oils). Normally not used for liquids containing solids. Available in alloys for corrosive services.                           | This pump type permits much higher flow rates than end suction pumps. The double suction impeller has no axial thrust loads, and is less likely to cavitate.                                                                   | 100 -<br>100,000<br>gpm<br>-----<br>379 -<br>378,540 lpm | 50 - 1,500 ft<br>-----<br>22 - 650 psi    | 3 - 5,000<br>hp   |
| <a href="#">Jet Pumps</a>                   | Jet pumps are a type of home water well pump that is used for lower flow rates than vertical turbine types. It is a horizontal end suction pump, put makes use of an ejector to assist the flow.                                                                                                                                                             | Horizontal end suction pump with ejector either mounted on the pump (for shallow well services), or located down in the well.                                                                                                                                                                                                                                                                     | Domestic water wells                                                                                                                                                                                                                                                       | Water                                                                                                                                                                               | Lower cost domestic well pump than submersible.                                                                                                                                                                                | 1 - 70 gpm<br>-----<br>4 - 265 lpm                       | 20 - 200 ft<br>-----<br>9 - 87 psi        | 0.5 - 5 hp        |
| <a href="#">Magnetic Drive Pumps</a>        | Magnetic drive pumps are a type of sealless centrifugal pump. It transmits the torque from the motor to the impeller by means of a rotating outer magnet which transmits the magnetic flux through a can to an inner magnet that is attached to the impeller. The inside of the can is thus isolated, with no shaft penetration, and the seal is eliminated. | Magnets are typically made of ceramic, samarium cobalt, or neodymium. Bushings and thrust surfaces inside the can are made of silicon carbide or tungsten carbide, or ceramic, to handle the potentially abrasive liquid that circulates inside the can. Most must be protected against loss of flow, which could seriously damage the pump due to temperature build-up due to the magnetic flux. | Pumping chemicals, hydrocarbons, or other liquids that are difficult to seal, or where the consequences of leakage are serious. Pumping heat transfer fluids which are high temperature or which are prone to costly evaporative losses with traditional mechanical seals. | All types of thin (non-viscous liquids).                                                                                                                                            | Eliminates the mechanical seal, one of the largest components of pump maintenance cost. Plus, the pump is assured to be leak-free.                                                                                             | 5 - 4,000<br>gpm<br>-----<br>19 - 15,142<br>lpm          | 25 - 1,000 ft<br>-----<br>11 - 434 psi    | 0.5 - 300<br>hp   |
| <a href="#">Multistage Pumps</a>            | Multistage pumps use multiple impellers with either diffusers or volutes generate more head than single stage (single impeller) pumps. Available in horizontal and vertical orientations.                                                                                                                                                                    | Casing may be split radially or axially. Axial thrust may or may not be balanced out, depending on design. Impellers are enclosed design with diffuser or volute casing.                                                                                                                                                                                                                          | Higher pressure services such as boiler feed water, condensate, pipelines, reverse osmosis, and decaling.                                                                                                                                                                  | Water and relatively thin liquids (won't pump thicker oils). Normally not used for liquids containing solids. Available in alloys for corrosive services.                           | Best ways to get high pressure with a centrifugal pump. Thrust loads may be lower than single stage designs.                                                                                                                   | 5 - 10,000<br>gpm<br>-----<br>19 - 37,854<br>lpm         | 200 - 7,500 ft<br>-----<br>87 - 3,251 psi | 1 - 5,000<br>hp   |

|                                                    |                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                             |                                                                                                                                                                                     |                                                                                                                                                                                                                                                 |                                                |                                             |                |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|---------------------------------------------|----------------|
| <a href="#"><u>Regenerative Turbine Pumps</u></a>  | Regenerative turbine pumps are not considered a true centrifugal, but works on the same kinetic principal as a centrifugal pump. Instead of an impeller with vanes, the turbine impeller has blades similar to turbines, which generate the head. Normally it is end suction, single stage, though multi-stage versions are available.                                     | Normally single stage, though multi-stage is available. Pump has very tight internal clearances, so liquid pumped must be quite clean. Pump has very steep head-capacity curve, so pump must be protected against possibly operating against closed valve.                                      | Small boiler feed pumps for dry cleaners, bakeries, and similar small commercial boilers. Also used in OEM applications such as chiller and laser cooling.                                                                  | Thin, clear liquids.                                                                                                                                                                | Very compact pump for low flow, high head applications. This may result in space savings and reduced cost for small boiler feed pumps. This pump type handles vapor and air mixed in with the liquid better than traditional centrifugal pumps. | 1 - 200 gpm<br>-----<br>4 - 757 lpm            | 50 - 1,200 ft<br>-----<br>22 - 520 psi      | 0.5 - 75 hp    |
| <a href="#"><u>Slurry Pumps</u></a>                | Slurry pump is a general term for a pump that handles an abrasive slurry. They may be considered an end suction pump, vertical column pump, or submersible pump.                                                                                                                                                                                                           | Pumps are constructed either of high nickel cast iron (white iron) to withstand the abrasive wear of slurries, or the pump is lined with rubber for more round-edged slurries. Pumps often have replaceable wear plates on one or both sides of the impeller.                                   | Mining, minerals processing, transportation of slurries for processing, and dredging. Also pumps used in slurry applications in coal fired power plants, steel mills, cement mills, etc.                                    | Very abrasive liquids of all types.                                                                                                                                                 | Ordinary pumps wouldn't withstand the abrasive wear that slurries cause on pump parts. Slurry pumps are designed to handle abrasive slurries and give pumps the longest life possible.                                                          | 10 - 30,000 gpm<br>-----<br>38 - 113,560 lpm   | 30 - 250 ft<br>-----<br>13 - 108 psi        | 1 - 2000 hp    |
| <a href="#"><u>Self-Priming Pumps</u></a>          | Self-Priming pumps are a type of centrifugal that can be located above the suction reservoir without an external priming system. End suction configuration, but enlarged case to support priming.                                                                                                                                                                          | No need for external priming or foot valves.                                                                                                                                                                                                                                                    | Sump pumps and dewatering applications. Transfer services where pump must be located above the suction vessel.                                                                                                              | Water and relatively thin liquids (won't pump thicker oils). Can pump liquids with or without solids if proper impeller type is chosen. Available in alloys for corrosive services. | No need for external priming                                                                                                                                                                                                                    | 5 - 7,000 gpm<br>-----<br>19 - 26,498 lpm      | 10 - 350 ft<br>-----<br>4 - 152 psi         | 1 - 150 hp     |
| <a href="#"><u>Submersible Pumps</u></a>           | Submersible pumps involve a submersible motor with a close coupled to single stage pump that allows the entire assembly to operated submerged.                                                                                                                                                                                                                             | Submerged motor, either air-filled or oil-filled. Different impellers are designed to accommodate solids of various sizes.                                                                                                                                                                      | Sump pump services, effluent and sewage services ranging in size from products for homes to main sewage treatment plants.                                                                                                   | Water and relatively thin liquids (won't pump thicker oils). Can pump liquids with or without solids if proper impeller type is chosen.                                             | Eliminates column shaft and bearings found in column sump pump. More compact, reduced sump installation cost. May be located in areas prone to flooding.                                                                                        | 5 - 7,500 gpm<br>-----<br>19 - 26,391 lpm      | 10 - 200 ft<br>-----<br>4 - 87 psi          | 0.25 - 250 hp  |
| <a href="#"><u>Trash Pumps</u></a>                 | Trash pumps are a type of self-priming centrifugal or submersible centrifugal pump designed to handle rocks and other solids while dewatering.                                                                                                                                                                                                                             | Open or non-dog enclosed impellers, designed to pass rocks and other debris. Pumps may be self-priming. Seals usually have hardened faces.                                                                                                                                                      | Dewatering construction sites, mines, and utility pits.                                                                                                                                                                     | Dirty water containing mud, rocks, stone, and other debris.                                                                                                                         | Designed to pump the solids and abrasives found in many dewatering applications.                                                                                                                                                                | 5 - 1,000 gpm<br>-----<br>19 - 3,785 lpm       | 25 - 150 ft<br>-----<br>11 - 65 psi         | 0.25 - 50 hp   |
| <a href="#"><u>Vertical Sump Pumps</u></a>         | Vertical sump pumps involve a vertical shaft supported in a center column. Single impeller, open or enclosed, pumps through a volute casing and then out a discharge column pipe.                                                                                                                                                                                          | Various impeller types for clean and dirty services. Sleeve bearings in the column pipe need to be lubricated by the sump water, or externally with water or grease.                                                                                                                            | Sump pump services.                                                                                                                                                                                                         | Water and relatively thin liquids (won't pump thicker oils). Can pump liquids with or without solids if proper impeller type is chosen. Available in alloys for corrosive services. | Relatively low cost sump pump. Most designs need no shaft seal, since shaft column not pressurized.                                                                                                                                             | 5 - 7,500 gpm<br>-----<br>19 - 28,391 lpm      | 15 - 150 ft<br>-----<br>7 - 65 psi          | 0.5 - 250 hp   |
| <a href="#"><u>Vertical Turbine Pumps</u></a>      | Vertical turbine pumps are a vertical shaft pump that is designed to fit in a bore-hole well. Can also pump out of open reservoir, river, intake structure, or tank, or can be mounted in barrel for booster pump applications. Pump can have one or more impellers and diffuser bowls, depending on total head requirement.                                               | Available with open and enclosed impellers. Sleeve bearings in pump diffuser bowls are lubricated by liquid pumped. Vertical high thrust motor mounted on top for product lubricated lineshaft bearings, or submersible motor mounted below pump to eliminate lineshaft and lineshaft bearings. | Irrigation, potable water supply, plant make-up water, cooling water, fire pumps, potable water distribution, booster pumps, process pumps.                                                                                 | Water and relatively thin liquids (won't pump thicker oils). Can pump liquids with or without solids if proper impeller type is chosen. Available in alloys for corrosive services. | Only practical way to pump from a deep well. Wide flow and head ranges. Low floor space usage. Immersed pump eliminates priming. Canned pump version excellent for low NPSH services                                                            | 50 - 150,000 gpm<br>-----<br>189 - 567,810 lpm | 15 - 2,000 ft<br>-----<br>7 - 867 psi       | 1 - 5,000 hp   |
| <a href="#"><u>Well Pumps</u></a>                  | A type of vertical turbine pump designed especially for use in a drilled bore-hole well. Also, for lower flow rates refer to jet pump type above.                                                                                                                                                                                                                          | Available with open and enclosed impellers. Sleeve bearings in pump diffuser bowls are lubricated by liquid pumped. Vertical high thrust motor mounted on top for product lubricated lineshaft bearings, or submersible motor mounted below pump to eliminate lineshaft and lineshaft bearings. | Irrigation, potable water supply, plant make-up water, cooling water, fire pumps, potable water distribution                                                                                                                | Water and relatively thin liquids. Can pump liquids with or without solids if proper impeller type is chosen.                                                                       | Only practical way to pump from a deep well. Wide flow and head ranges. Low floor space usage. Immersed pump eliminates priming.                                                                                                                | 50 - 20,000 gpm<br>-----<br>189 - 75,708 lpm   | 20 - 1,000 ft<br>-----<br>9 - 434 psi       | 1 - 3,000 hp   |
| <a href="#"><u>Positive Displacement Pumps</u></a> | A positive displacement (PD) pump is a general name for a pump type that does not have impellers, but rather relies on rotating or reciprocating parts to directly push the liquid in an enclosed volume, until enough pressure is built up to move the liquid into the discharge system. This includes many specific types for specific applications, as described below. | Pump works on positive displacement principal, either rotary or reciprocating type. See below for features of specific types.                                                                                                                                                                   | All types of services in many industries where positive displacement pumps are favored over centrifugal pumps due to high viscosity, presence of fragile or shear sensitive solids, or need for low flow and high pressure. | High viscosity fluids, some thinner fluids, fluids containing solids, especially fragile solids, and shear sensitive liquids.                                                       | Best choice for higher viscosity services, and to move liquids gently. May also be needed for low flow, high pressure combination, or other application niches. Some types are inherently self-priming, and several types are sealless.         | 0.1 - 15,000 gpm<br>-----<br>.38 - 56,781 lpm  | 10 - 100,000 psi<br>-----<br>.7 - 6,895 bar | 0.5 - 5,000 hp |

|                                              |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                         |                                                                                           |                                                                                                                                                                                                                                                          |                                            |                                            |                |
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| <a href="#">AODD Pumps</a>                   | AODD pumps are any type of reciprocating diaphragm pump containing two diaphragms and driven by air instead of by electric motor.                                                                                                                                                                  | Air section with shuttle valve applies air alternately to the two diaphragms. Each diaphragm has a set of check valves.                                                                                                                                                                                                             | Many applications in general plant service where electricity isn't available, or where the liquid being pumped has high solids content or high viscosity.                                               | Wide range of liquids, including liquids containing solids, and corrosive liquids.        | Can be used where no electricity is available, if compressed air is available. Available in a variety of metal and non-metallic materials depending on the fluid pumped. Able to pump liquids containing large solids. Pump is sealless and can run dry. | 0.25 - 300 gpm<br>-----<br>1 - 1,136 lpm   | 10 - 125 psi<br>-----<br>.7 - 9 bar        | 0.25 - 30 hp   |
| <a href="#">Concrete Pump</a>                | Concrete pumps are a type of reciprocating positive displacement pump that is specially designed to pump concrete and other mixed aggregate solutions.                                                                                                                                             | High pressure discharge for pumping concrete long distances or up high elevations. Materials of construction that can handle the abrasive aggregate.                                                                                                                                                                                | Concrete pouring, construction projects.                                                                                                                                                                | Concrete and other aggregate solutions.                                                   | Best way to move concrete long distances and up heights during pour.                                                                                                                                                                                     | 10 - 1,000 gpm<br>-----<br>38 - 3,785 lpm  | 25 - 1,000 psi<br>-----<br>2 - 69 bar      | 10 - 500 hp    |
| <a href="#">Diaphragm Pumps</a>              | Diaphragm pumps are a type of reciprocating positive displacement pump in which liquid is pumped by a reciprocating diaphragm, which is driven by a solenoid, a mechanical drive, or a fluid drive. Other versions are air operated (see AODD type below). Pump has inlet and outlet check valves. | Pump contains reciprocating diaphragm and inlet and outlet check valves.                                                                                                                                                                                                                                                            | Many applications in general plant service where the liquid being pumped has high solids content or high viscosity.                                                                                     | Wide range of liquids, including liquids containing solids, and corrosive liquids.        | Handles a wide range of liquids, including liquids containing solids. Pump is sealless, and can run dry without damaging the pump.                                                                                                                       | 1 - 1,800 gpm<br>-----<br>4 - 6,814 lpm    | 25 - 15,000 psi<br>-----<br>2 - 1,034 bar  | 0.5 - 2,000 hp |
| <a href="#">Flexible Impeller Pumps</a>      | Flexible impeller pumps are a type of rotary positive displacement pump that has a rotating rubber impeller with vanes that bend and then straighten as the impeller rotates to conform to the internal cam in the pump casing.                                                                    | Various rubber materials available for correct compatibility with the fluid pumped.                                                                                                                                                                                                                                                 | Used as bilge and ballast pumps in small and medium marine services. Also found in other applications in plants where fluids contain some solids.                                                       | Water, seawater, and other thin liquids, including liquids containing some solids.        | Relatively low cost way to move liquids containing some amounts of solids.                                                                                                                                                                               | 5 - 150 gpm<br>-----<br>19 - 568 lpm       | 10 - 60 psi<br>-----<br>.7 - 4 bar         | 0.25 - 10 hp   |
| <a href="#">Gear Pumps</a>                   | Gear pumps are a type of rotary positive displacement pump in which liquid is pumped by passing between two meshing gears and the surrounding casing. There are internal and external gear types.                                                                                                  | Internal and external gear types. Typically doesn't handle solids or abrasive liquids.                                                                                                                                                                                                                                              | Most common pump for clean oils and other viscous liquids.                                                                                                                                              | Oils and other high viscosity liquids. Usually only suited for clean liquids (no solids). | Most widely used for clean oil services. Few moving parts, simple construction.                                                                                                                                                                          | 1 - 1,500 gpm<br>-----<br>4 - 5,678 lpm    | 10 - 2,500 psi<br>-----<br>.7 - 138 bar    | 0.5 - 2,000 hp |
| <a href="#">Lobe Pumps</a>                   | Lobe pumps involve two shafts drive lobes which mesh with each other, but do not touch due to the use of timing gears. This allows gentle pumping of liquids containing soft or fragile solids, or viscous liquids.                                                                                | Pump has timing gears so that lobes don't contact each other while pumping. Available in sanitary options for food, pharmaceutical, and biotech services.                                                                                                                                                                           | Available in sanitary options for food, beverage, pharmaceutical, and biotech applications.                                                                                                             | Liquids which are viscous or which contain fragile solids or are shear sensitive.         | This is the normal pump of choice for sanitary applications pumping viscous liquids or liquids containing fragile solids. No metal to metal contact inside the pump.                                                                                     | 25 - 3,000 gpm<br>-----<br>95 - 11,356 lpm | 50 - 450 psi<br>-----<br>3 - 31 bar        | 1 - 500 hp     |
| <a href="#">Metering Pumps</a>               | Metering pumps are a type of reciprocating positive displacement diaphragm pump that has a very low flow rate (typically measured in gallons per hour or per day, rather than per minute). Flow rate is adjustable.                                                                                | Pump is typically a diaphragm style, though older designs are plunger type. Diaphragm is driven by solenoid, mechanical actuation, or hydraulic actuation. Pump includes inlet and outlet check valves. Normally contains stroke length adjustment to vary flow rate, and some pumps can also control flow rate with speed control. | Used to meter or dose very low flow rates with high accuracy. Most common application is chemical treatment of water in boilers, cooling towers, potable water, etc.                                    | Wide variety of thin and thick liquids, including corrosive liquids.                      | Accurate, repeatable volumetric flow measurement. Ability to easily adjust the flow rate by adjusting stroke length or speed.                                                                                                                            | .01 - 20 gpm<br>-----<br>.038 - 76 lpm     | 10 - 30,000 psi<br>-----<br>.7 - 2,068 bar | 0.125 - 60 hp  |
| <a href="#">Peristaltic Pumps(Hose Pump)</a> | Peristaltic pumps or hose pumps are a type of rotary positive displacement pump that has a roller or shoe that squeezes a tube or hose as it rotates. The squeezing action moves the liquid along the tube.                                                                                        | Includes replaceable hose that must be compatible with the pumped liquid. This hose is typically able to be replaced when worn.                                                                                                                                                                                                     | This pump type is used to handle chlorine and other disinfectants in commercial swimming pools, in wineries, in sewage treatment plants, and in many OEM applications where sealless pumping is a plus. | Wide range of liquids, including liquids containing solids, and corrosive liquids.        | This pump type requires no seal, and keeps the liquid inside the tube, so zero leakage.                                                                                                                                                                  | 0.2 - 200 gpm<br>-----<br>.78 - 757 lpm    | 10 - 250 psi<br>-----<br>.7 - 17 bar       | 0.125 - 40 hp  |
| <a href="#">Piston Pumps</a>                 | Piston pumps are a type of reciprocating positive displacement pump that has, double acting reciprocating pistons.                                                                                                                                                                                 | Pump includes one or more double acting pistons, sealed with o-rings against cylinder walls. Pump has an inlet and outlet check valve for each piston.                                                                                                                                                                              | Used in oil production, in wash down services, pressure washing, car washes, reverse osmosis, and other applications where high pressure is needed.                                                     | Water and other thin liquids, including liquids containing abrasives.                     | May be better alternative than plunger pump in certain applications, such as abrasive liquids. Slower speeds may mean less maintenance.                                                                                                                  | 5 - 700 gpm<br>-----<br>19 - 2,650 lpm     | 50 - 5,000 psi<br>-----<br>3 - 345 bar     | 1 - 500 hp     |
| <a href="#">Plunger Pumps</a>                | Plunger pumps are a type of reciprocating positive displacement                                                                                                                                                                                                                                    | Pump includes one or more single acting plungers, sealed with                                                                                                                                                                                                                                                                       | Used in oil production, in wash down services,                                                                                                                                                          | Water and other thin liquids, crude oils.                                                 | Best way to achieve very high pressures when pumping.                                                                                                                                                                                                    | 5 - 1,200 gpm<br>-----<br>.....            | 50 - 100,000 psi<br>-----<br>.....         | 1 - 5,000 hp   |



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|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|----------------------------------------|--------------|
|                                                 | pump that has, typically, three or five single acting reciprocating plungers.                                                                                                                                                                                                                | packing against cylinder walls. Pump has an inlet and outlet check valve for each plunger.                                                                                      | pressure washing, car washes, reverse osmosis, and other applications where high pressure is needed.                                                                                                                 |                                                                                                                                               |                                                                                                                                                                      | 19 - 4,543 lpm                               | 3 - 6,895 bar                          |              |
| <a href="#"><u>Progressive Cavity Pumps</u></a> | Progressive cavity pumps are a type of rotary positive displacement pump that has a single-threaded helically shaped rotor turning inside of a double-threaded helically shaped rubber stator. This produces a progressing cavity that moves the liquid through the pump and pressurizes it. | Rotor is an interference fit inside the electrometric stator to minimize leakage (slip). Starting torque may be higher than running torque because of this.                     | Used to pump polymers and dewatered sludge in sewage treatment applications, and in pumping liquids which are viscous or contain solids in industrial plants such as pulp mills, petrochemical, and chemical plants. | Wide variety of thin and thick liquids, including corrosive liquids and liquids containing solids.                                            | Sometimes considered the pump of last resort, as it will handle difficult liquids which are viscous or contain solids and which other pump types cannot accommodate. | 10 - 2,400 gpm<br>-----<br>38 - 9,085 lpm    | 50 - 2,000 psi<br>-----<br>3 - 138 bar | 1 - 500 hp   |
| <a href="#"><u>Screw Pumps</u></a>              | Screw pumps use two intermeshing screws, driven by timing gears, move oils and other viscous liquids. Also available with three screws, one driving the other.                                                                                                                               | Two screw pumps make use of timing gears so that meshing screws don't drive each other. Triple screw types have one screw driving the other two and don't include timing gears. | Fuel transfer, elevators, and other applications requiring relatively high flow rates of viscous liquids.                                                                                                            | Oils, fuels, and other high viscosity liquids. Also handles two-phase liquid/gas mixtures.                                                    | Highest flow rate of positive displacement pumps.                                                                                                                    | 50 - 15,000 gpm<br>-----<br>189 - 56,781 lpm | 50 - 4,500 psi<br>-----<br>3 - 310 bar | 5 - 5,000 hp |
| <a href="#"><u>Vane Pumps</u></a>               | Vane pumps use a rotor with vanes located in slots, rotating inside an eccentrically shaped casing. As the rotor turns, the vanes move in and out of the slots.                                                                                                                              | Sliding vanes are often made of carbon.                                                                                                                                         | An alternative to a gear pump for transferring oils and other viscous liquids. Also good for thinner liquids.                                                                                                        | Oils and other high viscosity liquids. Usually only suited for clean liquids (no solids). Also good for thin liquids like gasoline and water. | Good for both thick and thin liquids, so often chosen for terminals and truck unloading where many types of liquids are handled.                                     | 5 - 2,500 gpm<br>-----<br>19 - 9,464 lpm     | 20 - 200 psi<br>-----<br>1 - 14 bar    | 1 - 300 hp   |