

PUMP GLOSSARY

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A.N.S.I Standards	American National Standards Institute. Set of specifications for centrifugal pump manufactured in the U.S.A.
Adapter	Connects and aligns the power end of a pump to the wet-end
Affinity laws	Predict how capacity, head and horsepower are affected by changes in impeller diam and shaft speed
Air ingestion	Air entering the stuffing box due to negative suction pressure
Alignment	When centerline of pump is perfectly aligned to centerline of driver
Application	Description of the fluid and operating conditions you are trying to pump
Atmospheric pressure	Pressure of the atmosphere on earth. Sea level is 14.7 PSI
B.E.P.	The best efficiency point. It is the point where the power coming out of the pump (water horse power) is the closest to the power coming into the pump (brake horse power) from the driver. This is also the point where there is no radial deflection of the shaft cause by unequal hydraulic forces acting on the impeller.
B.H.P.	Brake horse power. The actual amount of horsepower being consumed by the pump as measured on a pony brake or dynamometer.
Back plate	Used in some centrifugal pumps to position stuffing box and provide a wear surface for the impeller
Base Plate	The pump and motor mount on this unit
Bernoulli's Law	A moving stream of liquid or gas exerts less sideway pressure than if it were at rest. The result is that material appears to be drawn into the stream, but are actually being pushed in by higher pressure from outside
Booster pump	Surface pump used to increase pressure in a fluid line or to pull from a storage tank or pit. Also used to pressurize a water system
Brinnell hardness	A method of measuring hardness of metal parts. Hardness higher than 350 can be difficult to machine
Bypass line	Recirculates fluid from pump discharge to stuffing box
Capacity	Fluid flow measured in gpm, liters/min, M ³ /hr. etc.
Cavitation	Vacuum created when discharge capacity of pump exceeds the replacement in the suction line. Cavitation can occur when diameter of the input line is too small or too long. These bubbles vibrate and can damage pump
Centrifugal pump	Pump that mechanically spins solution in order to push it out by centrifugal force
Check valve	Valve that allows solution to flow in one direction only
Close coupled	Pump impeller mounts directly to drive mechanisms shaft
Compression set	Change to elastic shape when exposed to heat. Round O-ring becomes flat
Critical speed	Any object of elastic material has a natural period of vibration. At this speed, minor vibrations will be magnified
Cut water	Directs pumped solution to the discharge port. May be a high wear point
Damping	Touching of a component to dissipate vibration
Deflection	Movement or displacement of a shaft in the radial dimension. (run-out)
Dial indicator	Precise tool used to measure deflection or shape of shaft
Diffuser	Housing or part that fits around impeller. Strips solution from the rotating impeller & forces it out the discharge line, reducing solution velocity while increasing static pressure. Sometimes this feature is designed into volute
Double volute	This design incorporates two cut waters to prevent shaft deflection when pump is running off-B.E.P.. Lowers efficiency and not used in smaller pumps

Ductility	Property of a metal allowing deformation without cracking
Dynamic Head	The pump head created by friction in the piping system
Efficiency	Power in / power put
Elastomer	A rubber like material that when compressed, will return to 90% of original shape in less than five seconds
Eye of the Impeller	The center of the impeller where fluid enters
Expeller	A second impeller used to lower the stuffing box pressure.
Float valve	Responds to changes in fluid level, preventing overflow by blocking input flow
Flow rate	Volume of fluid moving past a given point, in a unit time. (gal/min)
Foot	Part of frame that supports wet and power end of pump. Attaches to base plate
Foot valve	(check valve) Placed below a surface pump to prevent reverse flow in a pipe when pump is off. So pump will not loose prime
Francis' vane	Common impeller shape used in the range of 1500-4000 rpm
Friction loss	loss of fluid pressure due to length of pipe or elbows on discharge
Galvanic series	List of metals where in a certain medium(eg: salt water) the more noble metals will be attacked by the less noble
Gland	The part that holds one half of the mechanical seal to the stuffing box
Head pressure	The equivalent height of the liquid. 20°C. water is used as the standard where 10 meters (33.9 ft.) of water equals one atmosphere (14.7 psi. or 1 bar). The term head is used instead of pressure in the centrifugal pump business.
Horse power	33,000 foot pound / min
Impeller	Rotating centrifugal pump part with vanes propelling solution outward creating centrifugal force and driving solution to the discharge. Three basic design types: Closed / open and semi-open
Impeller setting	Open impellers require a clearance between the volute or the pump back plate depending upon design. This clearance must be set when the pump is at operating temperature and must be reset to compensate for wear. (0.015" to 0.020" or 0,04 mm to 0,05 mm is typical)
Closed impeller	Open eye in center with vanes on both sides
Open	Open eye with water wheel shape
Semi-open	Eye in center with vane on one side only
Impeller shroud	Plates located on both sides of impeller to prevent solids from penetrating
Impeller vane	Blade between eye and outside diam of impeller directing solution flow
Implode	Cavitation or compression of air bubbles making noises and damaging pump parts
Inducer	Small axial flow vane attached to impeller to increase N.P.S.H. available
Intergranular corrosion	Corrosion at the grain boundaries of a body of material
Internal recirculation	Loss of efficiency caused by solution flow between wear rings or impeller/volute clearance.
Lantern Ring	A device used to supply lubricant to packing. Usually located in the middle of the packing ring set.
Low flow	Can cause excess heat inside pump. Rise of 10 degrees C is excessive. Usually caused by throttling discharge valve or reduced pipe ID due to residue build-up
Minimum Flow	A condition that can cause excessive heat inside the pump volute. A temperature rise of 10°C (18°F) across the operating pump is considered excessive. Normally caused by throttling a pump discharge valve.
N.P.S.H.A.	The net positive suction head available to prevent cavitation of the pump. It is defined as: Atmospheric pressure + gage pressure + static pressure - vapor pressure - friction loss in the suction piping
N.P.S.H.R.	Net Positive Suction Head required to stop a pump from cavitating, Number is usually supplied by manufacturer
O.E.M.	Original Equipment Manufacturer of the pump, not the distributor
pH	(potential Hydrogen) Measure of acidity or alkalinity of a solution. Where 7 is neutral, a higher number is alkaline and a lower number is acidic
Pipe strain	Strain put on a pump which can change the shape causing impeller contact
Pitting	Surface voids in metal caused by corrosion, erosion or cavitation
Priming	Initiating solution flow in a dry pump by manually filling volute

Pump curve	A diagram supplied by the pump manufacturer to describe the relationship between the head and the capacity of a particular pump using various size impellers. The curve also includes information about efficiency, horse power consumption, N.P.S.H. required, etc.
Repeller/Expeller	A second impeller used to lower the stuffing box pressure.
Self-priming pump	Centrifugal pump is designed to remove air from the suction vs. "flood" pump requiring manual priming
Series Operation	The pumps are connected with the discharge of the first pump discharging to the suction of the other. The speed and impeller must be matched or the difference in capacities could cause cavitation or overheating problems.
Shut-off head	Max head that can be generated with a given impeller design and horsepower
Slurry	Solids present in a liquid
Specific Gravity	Density (weight/unit area) vs. water (1.0)
Specific speed	Formula to describe the shape of an impeller. Higher specific speed = lower N.P.S.H.
Static head	Max height a liquid can be pumped
Submergence	Distance below static water level where a pump is set
Submersible pump	Motor/pump combination designed to be placed entirely below solution level
Suction head	Head on the suction side of pump. Subtract suction head from discharge to determine actual head.
Suction lift	Total vertical distance from the surface of a liquid to pump body
T.D.H.	Total discharge head. A combination of suction head and the head produced by the pump
Thermo plastic	Material that can be softened or melted repeatedly without losing properties (injection molding)
Thermo set plastic	Can be softened & melted, but not re-usable
Thrust	Axial movement of shaft (forward & back)
Total Head	The amount of head produced by the pump. Discharge head minus suction head. If suction head is a negative number it is added to the discharge head
Transducer	Sensor attached to pump to monitor vibration amplitude and frequency
Turbulence	Disturbance in fluid causing cavitation problem. Often caused by elbow too close to pump suction input
Vane passing syndrome	Type of cavitation caused by impeller / cutwater clearance too small
Variable speed motor	Used to control flow in a system by varying the frequency of the motor. Recommended for circulating systems and any other system where the main head is friction losses in the piping system
Vapor pressure	Pressure and temperature coordinate where liquid will vaporize
Velocity	Distance traveled by a body in a unit of time (feet/min)
Vent	Used to remove gas or air from system
Viscosity	Resistance to pouring. Higher viscosities can restrict seal movement. Centrifugal pumps can handle a maximum viscosity similar to 30 weight oil at room temperature. Above this viscosity a positive displacement pump should be used
Volute / Casing	Housing that contains impeller & diffuser. Solution is propelled through the volute's enlarging spiral chamber, increasing the centrifugal effects of the impeller
Volute shape	Spiral shape of volute that converts velocity energy to pressure energy
Vortexing liquid	Creating a "whirlpool effect" that can draw air into the suction of the pump.
Water horse power	(WHP) head X GPM / 3960
Wear ring	Used with closed impellers to resist leakage from high pressure side of pump to low. Normally replaced when clearance is doubled original
Wet end	Parts of pump that sees solution, including: volute, casing, stuffing box, impeller, wear rings and shaft