Glossary
Landscape Irrigation Pumps

Atmospheric pressure—The force exerted by the atmosphere on the earth's surface, which allows a centrifugal pump to operate. At sea level, the atmospheric pressure equals 14.7 PSI. As elevation increases, atmospheric pressure decreases, therefore pump performance also decreases.

Brake horsepower—Pump performance can be expressed in horsepower using the following formula: Brake HP = GPM × Ft./Head / 3940.

Capacity—The water handling capability (volume) of a pump expressed as gallons per minute (GPM).

Cavitation—Status in which the pump impeller is not receiving a full supply of material. This can be due to reduced flow or over rotation. Excessive pump RPM can cause a vortex in the eye of the impeller. Air bubbles attach to the metal surfaces and, under extreme pressure, implode, taking tiny bits of metal away with each implosion, pitting the impeller and volute surfaces. Excessive cavitation can cause severe and permanent damage to the pump components, resulting in poor performance.

Centrifugal force—The action that causes something to move away from its center of rotation.

Centrifugal pump—Uses centrifugal force to move water or other liquids. Centrifugal pumps use an impeller and a volute to create the partial vacuum and discharge pressure necessary to move water through the casing. The impeller and volute form the heart of a pump—their design determines its flow, pressure, and solid handling characteristics.

Check valve (swing check valve or poppet check valve)—A device used in a suction or discharge line that allows flow in only one direction to prevent reverse flow, thus isolating the material being pumped.

Critical lifts (maximum suction lift)—Suction lifts greater than 25'. This is beyond the capability of a standard centrifugal pump.

Cut-in—Pressure at which pump will be activated (start pumping) due to action of a pressure switch

Cut-out—Pressure at which pump will be deactivated (stop pumping) due to the action of a pressure switch

Drawdown—The amount of water to supply to the system between cut-in and cut-out.

Duty point—The point on a performance curve that plots flow (GPM) and head (feet).

Dynamic discharge head—The sum of the static discharge head and the discharge friction loss in the discharge line. Also referred to as Total Discharge Head.

Dynamic suction head—The sum of the static suction lift and the suction friction loss in the suction line. Also referred to as Total Suction Head.

Flow rate—How many gallons per minute (GPM) of pump flow are required. Flow can also be expressed in gallons per hour (GPH) and in million gallons per day (MGD). 1 MGD = 700 GPM

Float Switch—A device used to start and stop a pump based on preset water levels.

Friction loss—Reductions in flow due to turbulence as water passes through hoses, pipes, valves, and fittings. This includes both suction and discharge friction losses.

Head—Gains or losses in pressure caused by gravity and friction as water moves through a system. It can be measured in lbs. per square inch (PSI) or feet of water. A pump must produce 1 PSI to push a column of water vertically 2.31 feet. Use the following formulas to convert: Max. pressure × 2.31 = Max. Head Rating; Max. Head Rating ÷ 2.31 = Max. pressure.

High head (high-pressure) pump—Capable of handling flows at significantly higher total dynamic head ratings (TDH). They utilize a closed design impeller and a compact volute called a diffuser to generate the high discharge pressure needed and cannot handle large solids.

Hose length (or pipe)—The suction and discharge hose or pipe lengths required for a given application. Longer hoses increase friction loss, thereby reducing pump performance. Therefore, hose lengths should be kept as short as possible.

Impeller—A rotating disk with a set of vanes coupled to the engine or drive shaft that produces centrifugal force within the pump casing of a centrifugal pump.

Maximum suction lift—The height (approx. 25') that water can be lifted by a centrifugal pump in actual conditions, taking into consideration altitude, friction loss, temperature, suspended particles, and the inability to create a perfect vacuum. The 25' suction lift is attainable for cold water (60°F) at sea level. Suction lift diminishes as elevation increases, due to the reduction in atmospheric pressure. In addition, suction lift decreases as the water temperature increases since warm water contains more entrained air.

Mechanical seal—A spring-loaded pump component that forms a seal between the pump and the engine or motor. Pumps designed for working in harsh environments require a more abrasive resistant seal.

Net Positive Suction Head (NPSH)—Positive flow of water to suction part of pump.

NPSHr—The amount of pressure (in feet) that a pump needs available to the centerline of the pump's intake in order to pump water effectively

NPSHa—The amount of pressure (in feet) that is available to the centerline of the intake side of the pump. In order to a pump to work, the NPSH available always has to be greater than the NPSH required for the pump (at the GPM being pumped)

Performance curve—A chart or graph that illustrates pump performance by plotting the total head and flow rate at various suction lifts. Performance curves for diesel-driven pumps also show pump performance at various engine RPM's.

Prime—The creation of a partial vacuum inside the pump casing, which allows water to flow into the pump.

Self-priming—The ability of a pump to purge air from its casing and suction hose, creating a partial vacuum and allowing water to flow freely into the pump. Many smaller portable centrifugal pumps (2" to 4" in diameter) require an initial manual priming before operation and then operate as self-priming.

Static discharge head—The vertical distance from the centerline of the pump impeller to the point of discharge. (See definition for dynamic discharge head.)

Static suction lift—The vertical distance from the lowest suction point to the centerline of the pump impeller. This distance should be kept to a minimum for maximum pump performance. (See definitions for theoretical and maximum suction lift.)

Strainer—A fitting at the end of a suction hose that prevents solids larger than its solids handling capability from entering the pump.

Submersible pump—A centrifugal pump designed to operate within the water source being pumped, thereby eliminating the suction lift limitations common to other types.

Theoretical suction lift—The maximum height (33.9') that water can be lifted inside a tube under perfect conditions (perfect vacuum) at sea level. At this point, the water inside exerts a pressure equal to the weight of the atmosphere pushing down on the ocean's surface. Theoretical suction lift is calculated by dividing the atmospheric pressure at sea level (14.7 lbs. per square inch) by the weight of one cubic inch of water (0.0361 lbs.). This equals 407.2" or 33.9'.

Total dynamic head (TDH)—The sum of the dynamic suction head and the dynamic discharge head. Also referred to as Total Head.

Trash pump—Designed to handle large amounts of debris, with a solid handling capability of 25% by volume. As a rule of thumb, trash pumps can handle spherical solids up to one-half the diameter of the suction inlet.

Viscosity—The resistance to flow of a liquid at a given temperature. Highly viscous liquids are thick and tend to flow slower than liquids of low viscosity.

Volute—The casing surrounding the impeller in a centrifugal pump that collects the liquid discharged from the impeller.