

Things to Consider

Pumping Units

There are a lot of factors to consider in pumping unit selection. In some areas, for example, system efficiency may be critical owing to high fuel costs. In other cases, the materials of construction may be the primary concern. The following list of considerations is not intended to be all-inclusive. It is intended only to raise some questions that might assist the owner/operator in making a good selection.

Flow and Head Pressure

Pumps are rated on their ability to provide flow and output pressure using water as the fluid. The other condition is the static suction lift (SSL) as this affects pumping performance.

Pump manufacturers publish curves that illustrate the pump's capabilities over differing flow and head (output pressure) conditions.

Friction losses occur as the fluid moves through discharge lines. Tables are published showing friction losses for various line sizes and materials. Elbows or other restrictions also must be taken into account to arrive at a total dynamic head (TDH) estimate.

Fluids Other than Water

Typically pumps are rated using water as the fluid so the specific gravity is 1.0. Other fluids may be more or less viscous than water and this will affect the pump's performance. Manufacturers can provide information on performance with different specific gravity fluids.

Another consideration is the effect the fluid may have on the pump's materials of construction, including the seal.

Altitude and Pump Suction

Increasing altitude decreases air pressure. Pumps cannot pull fluid into the volute except by creating a vacuum. The ambient air pressure forces the fluid into the pump to fill the vacuum. So, the ability of the pump is affected both by how perfect a vacuum it can create and by the ambient air pressure.

No matter what the altitude, pump performance is affected by the suction lift imposed on the pump.

Priming

There are different styles of pump design and that dictates whether or not the pump can self-prime or whether it requires priming assistance. As well, some pumps cannot run without fluid in the pump while others are designed to run dry. Run dry pumps will typically self-prime and can be used to maintain water levels.

Some pumps are designed for a flooded suction and will not raise water or other fluids effectively.

Efficiency

This is an often neglected aspect of pumping. Centrifugal pumps vary widely in their efficiencies, often because of design considerations such as solids handling.

Efficiency is also affected by the friction losses incurred in lines and fittings. Selecting the right diameter and material for the discharge lines, minimizing elbows, and so on can save in operating costs. Operational savings will often easily pay for increased line diameter expenses.

Savings on energy costs can be very significant if the most efficient pump for the job is selected.

Solids Handling

In some applications, pumps may encounter solids in the fluid being pumped. Some pumps are designed to handle solids and the maximum size that will pass through the pump will be stated. The pumps may also have more robust volutes and impellers that are designed to resist impact or abrasion.

Piston & Plunger Style Pumps

In piston style pumps the packing (cup) moves inside of a stationary cylinder. In a plunger pump, the packing is stationary and a solid plunger moves the fluid. In both cases the fluid is moved by the reciprocating action of the packing cup or the plunger.

Reciprocating pumps are designed to provide higher pressures and are frequently used in drilling or high pressure cleaning applications. These pumps usually offer a selection of sealing materials and fluid end materials to allow the use of corrosives, volatile fluids, abrasives and so on.

Pump Drive Systems

Pumps may be driven electrically, hydraulically or by an engine. Input speeds vary with the style of pump and the speed may have to be altered through a belt and pulley system, via a gearbox or transmission, or other means.

Couplings vary widely and should be selected so that any potentially harmful torsional forces are absorbed by the coupling and cannot damage the driving equipment.

Sound Reduction

In many urban areas and on construction sites, noise abatement is required. Pump units can be housed in sound attenuating enclosures. Exhaust noise can be reduced and operating disturbances can be minimized by incorporating simple and effective sound reduction measures.

