

PICKING A PUMP

By Pam Meyer

Understanding pump types and water contents to choose the right equipment for the job

Centrifugal. Semi-trash. Trash. Diaphragm. These are the primary examples of the different types of pumps available to municipalities. While this variety offers plenty of options to pick from, it also can make the process a bit overwhelming. Whether an engineer, corporate manager or technician, selecting a pump for a water or wastewater application is a highly important decision. There are many styles to choose from and each is designed a bit differently.

While all pumps will move liquid effectively from one location to another, all pumps are not created equal. Some pumps are designed to move thick, muddy water, while others are capable only of handling clean, clear water. Certain pumps allow sticks, stones and various trash to flow through, whereas others would become clogged with such debris.

Choosing an incorrect pump can result in poor performance and damage to the pump's components. Pumps should be selected based on the type of water being moved. But what makes a certain type of water acceptable for one pump but not for another? How does one differentiate slightly dirty water from debris-littered water? To accurately choose the best pump for the job, the

user must look below the surface and investigate what is in the water.

The Clear Choice

For applications in which clean water must be moved, centrifugal pumps offer the best and most inexpensive solution.

Centrifugal pumps have narrow impeller vanes, which means that clear water virtually free of debris is the only type of water this pump is able to handle. Of course, there always is a chance that seemingly clear water will contain at least a small amount of debris. That is why these pumps are equipped with a strainer, which acts as a safety net and stops unseen debris from entering the intake hose. Draining a pond or aiding in an emergency water supply project are examples of when a centrifugal model would be suitable.

But what if the water is even slightly muddy, sandy or littered with debris? The strainer will help prevent unexpected particles from damaging the pump, but if a user detects any amount of debris in the water, he or she should be aware that another type of pump exists specifically for this situation. For water that may contain debris that could clog or damage a centrifugal pump, a semi-trash pump is the best option.



A diaphragm pump will handle any type of debris that can fit through the opening, such as sticks, stones, mud, sand or trash.



A cast-iron impeller is one sign of a quality pump. Heavy-duty materials are especially important in pumps that handle debris.



Centrifugal pumps offer a basic, inexpensive way to move water with little to no debris.



Heavy-duty parts hold up better to the rigors of the rental industry. A metal strainer will keep oversized debris from entering the intake hose.

When Centrifugal Won't Pump It

In the simplest terms, semi-trash pumps work in the same way as centrifugal pumps, but they have thicker impeller vanes and a larger volute discharge opening to allow small debris to flow through. As a general rule of thumb, debris up to 0.75 in., or about the size of a dime, should pass through without any problems.

A semi-trash pump should be used in any situation in which there is uncertainty that a centrifugal pump will be able to handle the job. Water that appears a bit dirty or sandy should be moved using this type of pump. If there is even a hint of debris, err on the side of caution and go with a semi-trash pump.

While a semi-trash pump is capable of handling more than a centrifugal pump, it can have problems if the debris is too large. It is incapable of handling sticks, stones or rock particles. If a user detects any such debris in the water, he or she should opt for the next level of pump—a trash pump.

Sticks and Stones Won't Break These Bones

For items that are too big for a semi-trash pump to handle, a trash pump is the best choice. With thicker vanes than a semi-trash pump and the same large volute discharge opening, a trash pump operates the same way but allows larger debris to flow through.

Small sticks, stones and other debris from 0.75 to 1.25 in., or up to the size of

a half-dollar coin, can go through a trash pump successfully. This makes it ideal to handle thicker, sandier and dirtier water than a semi-trash pump.

These pumps are a good choice for situations in which high volumes of water that may contain trash need to be moved, especially if there is uncertainty that the debris would be too large to be handled by a semi-trash pump. Removing excess water from a reservoir or basin after a flash flood is an example of an application that may require a trash pump. A trash pump will be able to keep the water moving, even with bits of rocks and other similarly sized items hiding beneath the surface.

A trash pump can handle thicker water and fairly large debris. But what about really muddy or viscous water that may contain larger solids, trash or other particles, or water that is so thick that it is almost impossible to detect what kinds of debris may be submerged? A diaphragm pump will handle the toughest water with large debris best.

Diagnosis for Diaphragm

Often referred to as a “mud hog” or “mud pump,” the diaphragm pump is the one to choose when the water is so thick or dirty that the user cannot detect what may be lurking beneath the surface.

Diaphragm pumps are capable of handling sticks, stones, mud, trash and other debris up to 2 in., or a bit larger than a golf ball. Basically anything that can fit through the opening will be able to go

through. Useful in wastewater management applications, it is able to pump muddy water, sludge and other thick liquids that have the ability to flow.

All of these capabilities mean a higher price tag for this type of pump. For this reason, a diaphragm pump is typically used only when it is the sole machine that can handle the job. It operates at a slower rate than the others, so be prepared for the job to take a bit longer. For instance, a 3-in. trash pump will move water at a rate of about 315 gal per minute (gpm), compared with a 3-in. diaphragm pump, which will move water at a rate of about 60 to 70 gpm.

The Bottom Line

With so many pumps available, it can be difficult to know if you are using the correct one. Improper selection may result in unsatisfactory pump performance, not to mention possible damage to the machine's components. Having knowledge of each type of pump and, more importantly, what is in the water being pumped, will ensure the best selection is made for the job at hand. **PS**

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A semi-trash pump moves muddy water from a jobsite. Semi-trash and trash pumps' impellers are made with thicker vanes than those in standard centrifugal pumps, which enables them to move larger debris.



With even thicker vanes than a semi-trash pump and the same large volute discharge opening, a trash pump allows larger debris to flow through. Like a semi-trash pump, a trash pump effectively moves muddy, littered water from a jobsite.



Pumps that frequently handle debris will last longer when they are built with a wear plate, and it is less expensive to get a new wear plate than it is to replace the impeller and volute it protects.