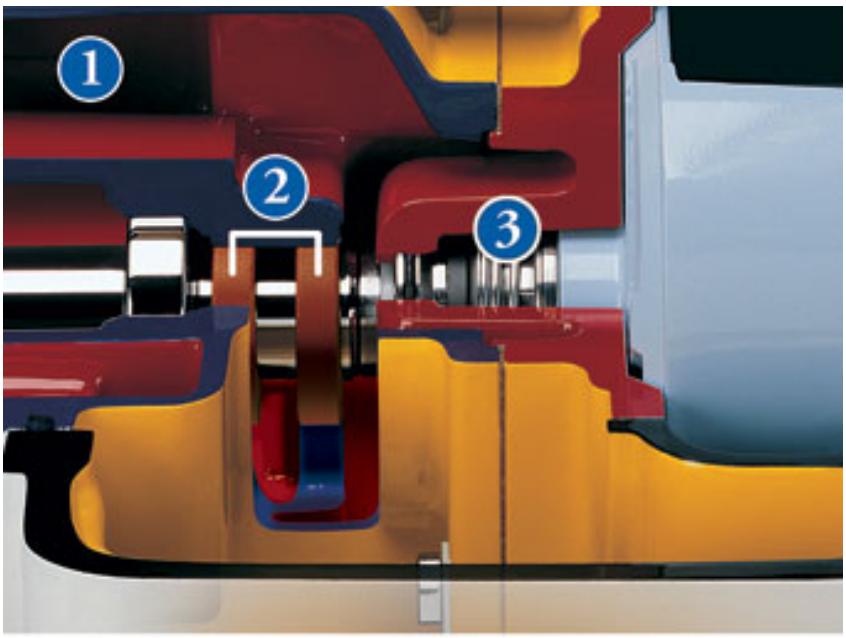
Points To Ponder Before Purchasing A Pump

By Craig Redmond, The Gorman-Rupp Co.

Today, information is readily available regarding most pumping applications. How to size a pump correctly, how to buy a pump and surface level considerations when approaching a new pump application are now commonplace. But what's not readily shared when it comes to making a decision pertaining to a solid pump application could lead to disappointment and unnecessary heartache.

Many areas should be considered that could, indeed, affect the life of the product, the quality of the product and the quality of the application, overall – above and beyond the actual performance of the pump. To increase the life of the pump, some key areas must be considered before final choices are made. Doing so can substantially lower the cost of total ownership while increasing the product's return on investment as well.



1. Oversized Seal Oil Chamber
2. Double Lip Seals
3. Cartridge Mechanical Seal

Abrasives Many applications have particles in the fluid – ranging from small particles of sand and rock to potato scraps and sewage. In these situations, what's being pumped could be a very abrasive material with the consistency of sandpaper. In these abrasive pumping environments, materials can be quickly worn away. Being educated about materials that can assist in warding off impending erosion can be extremely helpful.

Austempered ductile iron (ADI) is a very hard material that can protect the inner workings in an abrasive environment. CD4McU, a hardened stainless steel that's ideal for chemical and abrasive applications, is also ideal for wear parts, including wear plates, seal plates and impellers. Many other components are also at risk within the application,n however – such as the volute and shaft of the pump. In some cases, a hardened volute of either ADI or CD4McU, and hardened shaft manufactured with 17-4 PH, a type of stainless steel, is available to meet the rugged needs that some pumping applications demands.

Hardened shaft sleeves are also available for those tough applications – as are hard mechanical seal faces, such as silicon carbide or tungsten carbide. These hard seal faces won't rapidly deteriorate in a harsh abrasive environment.

For some end-users, a less than suitable material could already be installed in an existing abrasive pump application. In this case, knowing what to ask when considering new solutions can be critical. If you're pumping abrasives, the above provisions are necessary. Premature seal failures lead to increased downtime and maintenance expense, while worn impellers and other wear parts can lead to decreased pressure and flow from the pump.

Serviceability One of the primary costs of ownership is the time required to maintain a pump. Inevitably at some point in time, maintenance will be required. If the pump can be repaired quickly and efficiently, time and money can be retained.

If the pump housing itself attaches to the floor – and the rotating portion of the pump can be removed without disturbing the plumbing, valuable time can be saved. Investing in a pump with a back cover plate is a smart move. And, noting that all clearances wear and open up over time, does your pump have a method to renew those clearances easily? Can efficiency be restored in a quick and accurate manner? If not, extended downtime should be expected to keep the pump operating at its best.

Further, self-cleaning features help to reduce the frequency of clogs occurring with stringy matter being pumped. Examples may include typical sewage applications, meat processing, hair and rags – anything that wraps around the pump itself. By resisting clogs, efficiencies are maintained and downtime decreased.

OEM Parts & Availability Ask yourself, how quickly can a part be secured if needed? Professionals in a plant, a municipality or other areas typically don't buy a pump just for it to be admired. They buy pumps to get the work done. And, if a pump fails, that work still continues. Therefore, the question remains. How quickly can that pump get back up and running?

There are several smart reasons to invest in OEM parts. The manufacturer's reputation is at stake, so your assurance of quality and reliability are optimized. Further, years – and often decades – of investments in research and development have been made by the manufacturer to ensure the quality of the product. When you add it all up, investing in OEM parts is an intelligent insurance policy.

Seals All pumps must have a way to seal off the rotating shaft from dripping oil through and to the environment. Historically there are two approaches used to do so.

Mechanical seals allow for virtually zero leakage. Mechanical packing allows a small amount of leakage through the pump along the shaft. Mechanical packing, however, is not considered state of the art, and decreases efficiency while increasing the need for maintenance. This approach can be problematic. The packing often digs in and scores the shaft of the pump itself, making it difficult to seal again – when a repair or a replacement of the shaft is required and necessary.

A question that may be important to note is whether there is a reservoir of lubrication for the seal. An oil reservoir helps to lubricate and cool the seal, extending the life of the seal. Of further concern, if the opportunity exists whereby the pump may run dry, or if a blockage in the suction line occurs, and the pump is simply not pumping fluid, the life of the seal will be greatly increased when the seal is oil lubed.

Still, if maintenance is frequently required, a cartridge seal is often optimum. Although this feature often comes at a premium, there are other alternatives. The Gorman-Rupp Co., for example, has developed a proprietary and relatively inexpensive fully internal pump cartridge seal, which can be used on various pump models. It requires little disassembly to properly install.

Furthermore, seal sleeves, which are used to protect the mechanical seal, are a vital consideration. Without a sleeve, the shaft itself may become damaged over the life of the pump – in which case replacing the entire shaft is often a reality. Sleeves act as sacrificial parts. But in an effort to cut financial corners, end-users at times overlook the additional value of having a shaft sleeve in the pump.

Package Fabrication When pump users invest in a pump – getting the pump driven and mounted is a key challenge. How will the entire package be mounted –

the pump, the motor, the base, the guards and the controls? Either the end-user, a distributor or an OEM are typically involved.

Involving the OEM in the package fabrication process involves the decades of experience they have gained in putting packages together. Considering each step involved in the proper design, sourcing, control selection and manufacturing of the components, it’s often best to use the OEM’s experience in putting the package together, and reap the benefits and rewards of time, a secured investment and, in short, peace of mind.

Condition Points When sizing a pump, most experts will encourage you to select a pump according to a system curve. The point of intersection between the system curve and the pump curve is the point whereby the pump will operate – referred to as the condition point.

Still, that point of intersection is based on several assumptions and uncertainties. The need to change plumbing, a valve or the operating point itself could all arise. As a result, a fair amount of uncertainty exists with most system head calculations. Still, certain pumps are more forgiving of a “less than perfect” condition point assumption. This technology can play well in the end-user’s favor.

In a steep performance curve scenario, where the head drops relatively rapidly compared to the flow, an error in the system calculation won’t likely result in an error that will dramatically alter your condition point. A flatter curve, however, is much more of a concern.

To compensate for lower flow than expected or if the flow demand has increased, a trimmed impeller can often be replaced with a larger impeller. Additionally, the pump’s speed can be increased, so long as it stays within the operating range, according to the manufacturer’s standards. Purchasing a pump with the ability to alter its speed is a big advantage, and pump purchases should be made with this feature in mind. Changes in belts and sheaves may yield the performance originally desired.

Many pump manufacturers do not design pumps to allow for V-belt loads on the units, which adds an additional force to the shaft. Uncovering suitable technology that does allow for V-belt loads also allows for simple changes in belts and sheaves to compensate for achieving the flow and performance that was originally expected or to meet increased demand.

At times, there will be multiple applications within one facility or operation where different operating points are desired. In these situations, impellers are often trimmed to meet specific applications. As a result, it’s feasible that an environment could be created whereby four pumps of the same pump model with four unique impeller diameters are in use. This makes stocking replacement parts for emergencies more expensive.

A better approach would be to specify the same pump at different speeds instead of different impeller diameters. This way, only one set of repair parts need to be kept

on hand. This becomes even more of an advantage when the pump uses a rotating assembly that can easily be installed.

Other Add-Ons

Thermal shut down devices are one of several options end-users may want to consider at the onset of pump planning. If the pump is expected to run dry at any point in time, it may generate additional heat. How will that system be protected? Today, technology can be enlisted and installed directly onto the actual unit, and wired back to the control. If the pump exceeds a certain temperature, the unit will be turned off. Will the pump be operated in an extreme cold environment outdoors? If so, a casing heater could be a smart investment, ensuring water doesn't freeze within the pump.

Some additional points that may be helpful to ponder prior to making the final decisions about an application or solution:

- How will the unit turn on and off? Will it be handled manually with user interaction, or tied into an automated system with floats, pressure switches and/or level transducers?
- Packages with natural gas back ups are often a smart way to go, in the event of power outages – whereby pumps will continue to operate in mission critical applications, even when the power ceases.
- Most systems will also require a discharge check valve at some point. How will this be sourced? Will it be part of the pump, or will it be installed later or should it be purchased from the OEM? Asking questions up front can be helpful in the quest to offset expenses in the later stages of the engagement, or throughout the life of the application.
- Is the technology a self-priming pump? If so, it's possible that an air release valve will be needed.
- If troubleshooting is necessary, gauge readings will make the process considerably easier. End-users may also, in this case, want to order pumps with suction and discharge gauges already mounted on the pump – so sourcing individual components is no longer necessary.

In short, beginning a pump journey with the end goal in mind can pay dividends to the plant or operation. For additional information or to address specific issues, contact your distributor or reach out to a pump expert, such as Gorman-Rupp, to educate yourself. When it comes to pumping applications, a dose of prevention is often worth a lifetime of hurt.

Craig Redmond is the manager of engineering at The Gorman-Rupp Co. For more information, please contact him via 419.755.1011 or credmond@gormanrupp.com [1], or visit www.gormanrupp.com. [2]

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