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Even in the best of times, you couldn't afford to gamble on the efficiency and reliability of your pumping systems. Don't start now.

One of the most costly mistakes that almost every company makes with its pumps is to actually buy the wrong pump. Sadly, this is a situation that occurs with much more frequency than anyone would care to admit. The ramifications are truly enormous—and they are magnified even more in tough economic environments. Efficiency drops. Reliability plummets. Maintenance costs rise dramatically.

Two of the most common reasons behind buying the wrong pump are:

1. Providing the supplier with incomplete information.
2. Buying the cheapest pump.

Providing incomplete information to suppliers

Frequently, when a pump is being selected, it is known that the unit will need to operate at more than a single condition. Unfortunately, this information is not always transmitted to the supplier, and it is the customer's engineer who decides for which of these conditions the pump will be sized. It is not uncommon for that decision to be made based on what is considered to be the "Worst Condition." The thought process being that, "if it can handle the worst condition, it should be able to handle all the others." Such is not the case. In fact, when a pump is selected for the "Worst Condition," that immediately becomes the "Best Condition," by virtue of the fact that it is the duty for which the pump has been selected.

The resultant problems show up in two ways: when the Static Head in a system undergoes a change and also when Friction Losses change.

Static Head changes…

A classic example of such a situation is in a batch transfer system, where the Total Head is constantly adjusting as a result of the change in tank levels throughout the batch process. Consequently, when the supplier is given only one set of operating conditions for this application, he is receiving inaccurate and misleading information.

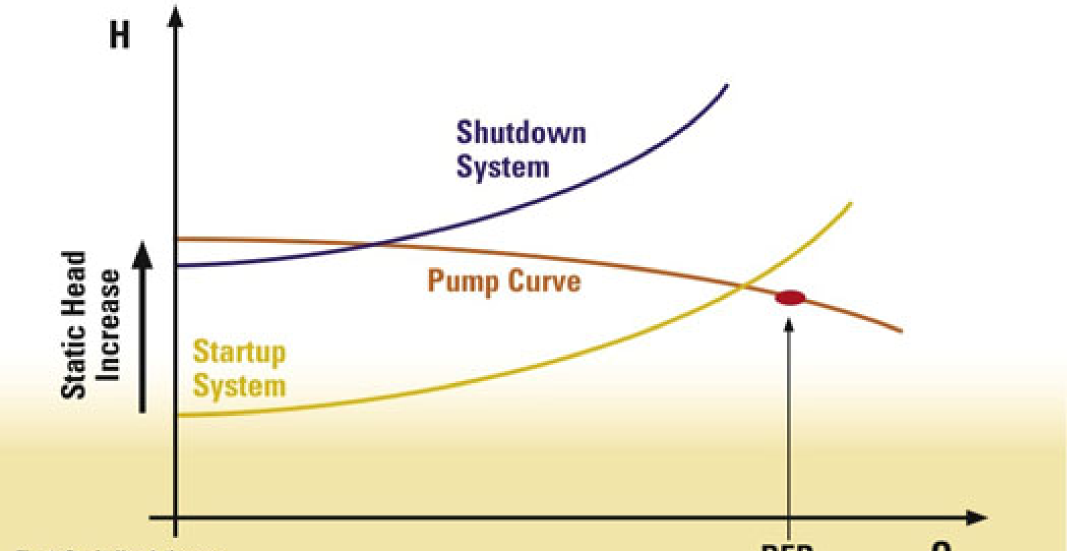

Fig. 1. Static Head changes

Let's assume that the operating conditions supplied will be the startup conditions where the level of liquid in the supply tank will be at its highest, while the level in the discharge tank could be zero. This will translate into a low value of Static Head as is depicted in Fig. 1. The pump also will be selected to operate close to the Best Efficiency Point (BEP)—which also happens to be the most reliable operating condition of that pump.

However, as the level of liquid in the supply tank drops and the level in the discharge tank increases, the Static Head will steadily increase. By the time there is no longer any liquid in the supply tank, the level in the discharge tank will be at its maximum. At this point the Static Head will also be at its maximum and the Pump Performance Curve will be as shown. At this point, the pump should be shut down.

As the pump operation moves steadily from startup to shutdown, there will be a corresponding change in pump capacity. However, as the system approaches the shutdown point, the pump performance will become unstable, thus resulting in low reliability and high maintenance costs.

Had the complete system information been provided to the pump supplier, an alternative selection with a steeper performance curve could have been made—placing the BEP midway between the startup and shutdown conditions. As shown in Fig. 2, this is a more reliable pump selection as it provides a more stable operation within a smaller range of flow rates.

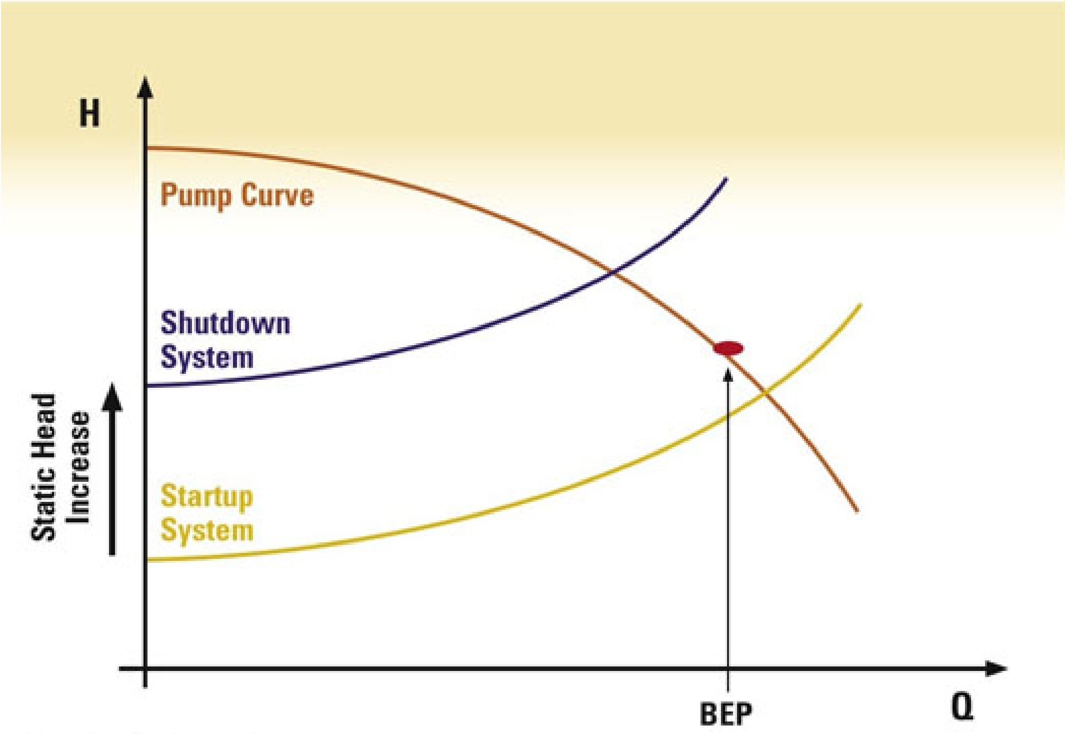

Fig. 2. More reliable pump selection

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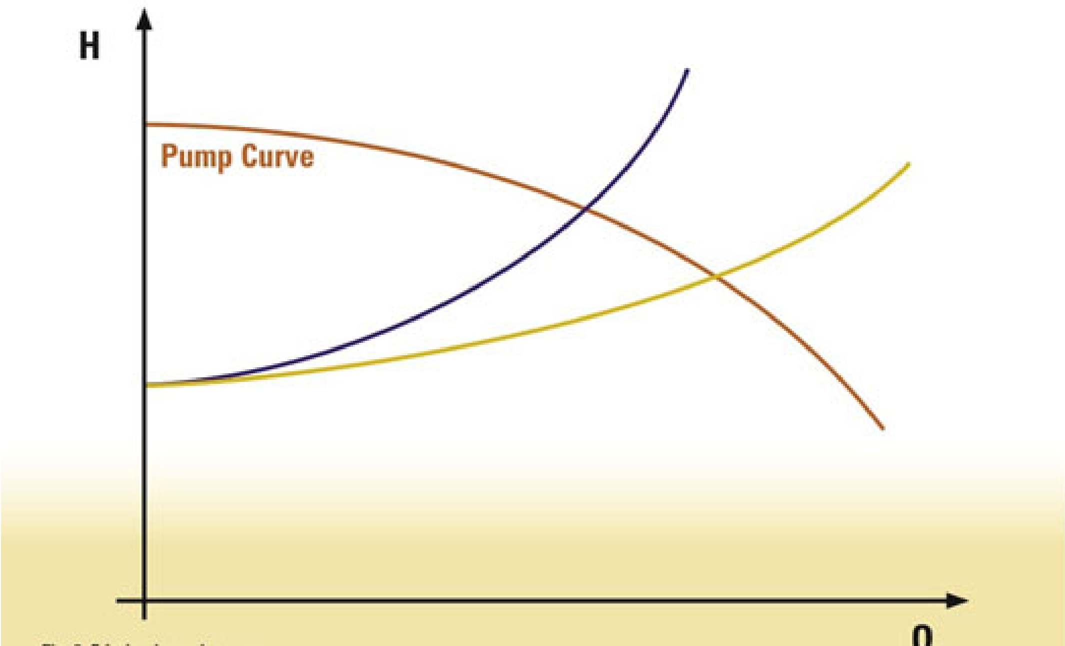

Fig. 3. Friction loss changes

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Pump Specifications

Any company whose processes depend on the efficient flow of liquids should have a standard specification to help it purchase the type and style of pump that is really needed ***by its operations for its specific services.***

- **The API Standard 610 for Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industries** is clearly market-specific and identifies the performance criteria required from the equipment to be purchased.
- **The ANSI B.73.1** specification focuses on the physical dimensions of the pumps to provide maximum interchangeability in the field. It is used extensively in the chemical process field and for "standard" water pumps.
- **A number of ASME standards** also are used for centrifugal pumps, particularly for the testing of high-energy equipment.

All of these standards serve different purposes for the end user. However, as the end user, you know you have a problem when you find yourself with a specification that gives more space to defining the way the Instruction Manual should be produced than it does to describing the pump requirements and system operation.

Many of these documents have been created and modified by generations of consulting engineers who have added their own particular area of concern without evaluating whether it is really applicable or how it affects other aspects of the spec. The main purpose of this approach is to ensure that the supplier is held responsible for any omission in the stated requirements, and that no blame can be attached to the consultant.

These types of specifications typically show up where the corporate focus tends to be on buying the cheapest pump, rather than on buying the pump that will be most reliable and need minimal maintenance. Caveat Emptor.