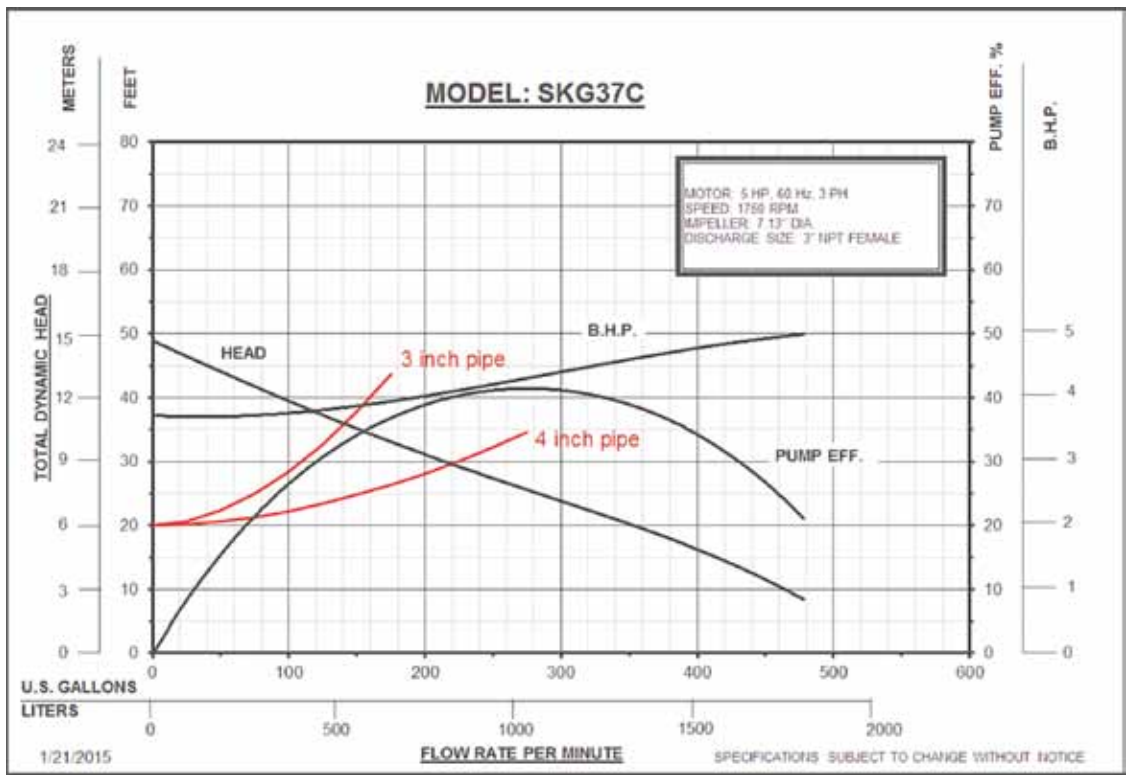
Pump Considerations for Operators

RAD-AX line of pumps features a hybrid design that combines the solids-handling features of a non-clog shredder with the macerating capabilities of a grinder pump. Both axial and radial cutting elements are incorporated in the patent-pending design. When a fibrous piece comes into the suction of the pump, it becomes engaged with the cutting mechanism both vertically and horizontally, while large hard solids kick away from the suction after a small portion is nibbled away. When the material comes out on the other side, it has been turned into a pulp that easily passes through the pump. The option of installing smaller specialty pumps is important for wastewater operators when they have to size their pumps appropriately, taking into consideration energy usage, piping issues and system design.

By Ron Woodward

Best practices for proper pump selection

Figure 1. System Curve



The idea of putting an electric motor underwater can make people uneasy, but, over the past 50 years, the use of submersible pumps has grown throughout North America. Industries here have evolved in their ways of making choices about pumping equipment. Years of improvements in sealing systems design, manufacturing and monitoring have eased the submerged motor fears. In addition, developments in the use of slide rail systems have facilitated the task of maintaining submersible pumps for wastewater applications. While the transition to using submersible pumps has been slow, it continues to become a more acceptable way of pumping, especially for wastewater treatment operators, who utilize submersible pumps in a variety of applications throughout their plants.

Overcoming Clogging Issues Caused by Wipes, Etc.

Many mainstream media outlets, including the The Washington Post, The New York Times and Consumer Reports, recently have begun to help increase awareness of an issue many wastewater operators have been facing. The proliferation of handy wipes, baby wipes and other high-tensile strength fibrous materials that are marketed as flushable have caused problems for wastewater treatment plants nationwide. As consumers continue to flush these materials, wastewater treatment plants must continue dealing with the clogging problems created downstream.

There are submersible pumps available in 5, 3 and 2 hp specifically designed to handle high-tensile-strength fibrous materials. The SKG

Sizing the Pump for a Specific Application

Purchasing and installing pumps with a review of the application's hydraulic characteristics is a critical part of pump sizing and selection work. Beginning with the required flow rate and pipe size determination, it becomes a simple matter to estimate and graphically display these characteristics with a system curve specific to the application.

There are two basic elements to any system:

1. **Static head:** For systems with an open-to-atmosphere discharge point, this is the elevation difference between the level in the pump wet well and the discharge point.
2. **Friction loss:** These are losses in the piping system that are directly related to the flow rate, size and length of piping, valves, elbows and other fittings.

Knowing these two elements will allow you to create a system curve, which will in turn help you determine the best pump to use in that specific application. (See figure 1.) The system curve here shows static head of 20 ft along the vertical y-axis, and the flow rate on the horizontal x-axis. As flow increases, the system curve swings upward due to friction losses in the pipe length, valves, elbows and other fittings. Typical centrifugal pumps produce the most head at 0 flow, and as the flow rate increases, the pressure (head) is reduced. A partially closed discharge valve adds pressure drop (friction) in the system. Fully opened, the pump will operate at the point where the system and pump curve intersect. Similarly, the effects of changing pipe size are shown here.

Considering the value of improved pump life and

reduced energy costs, it is important to spend a little time at the beginning of the pump selection process to understand the system. Plotting a system curve is a simple way of displaying and understanding how the pump will behave in the application.

Solving Problems With Information Technology & Responsive Service

Technology is always changing. Pumps are becoming more efficient and capable of handling the challenges of modern sewer systems, and pump manufacturers are developing Web-based tools to support pump selection. Distributor application engineers can log into a portal and enter the static head and length and size of the pipe, and within minutes, pick the pump that is most efficient for that specific application. Once the right pump is selected, the engineer can also use the portal to access real-time data on the availability of the pump.

When a pump goes down, wastewater operators need a fast solution. Modern information technology enables service and support providers to get online, quickly analyze a system, determine the best pump for the application, and then generate quick, reliable estimates that turn into purchase orders. What took days now takes minutes.

Not only is it important to work with a reputable distributor or directly with a responsive pump manufacturer, it is critical for wastewater operators to realize they have options. With so many consolidations of OEMs into larger organizations, it is crucial for small- and medium-sized companies to continue to provide the marketplace with specialized pumping equipment that helps pump users solve their day-to-day challenges. W&WD

Ron Woodward is president of BJM Pumps. Woodward can be reached at 860.399.5937.