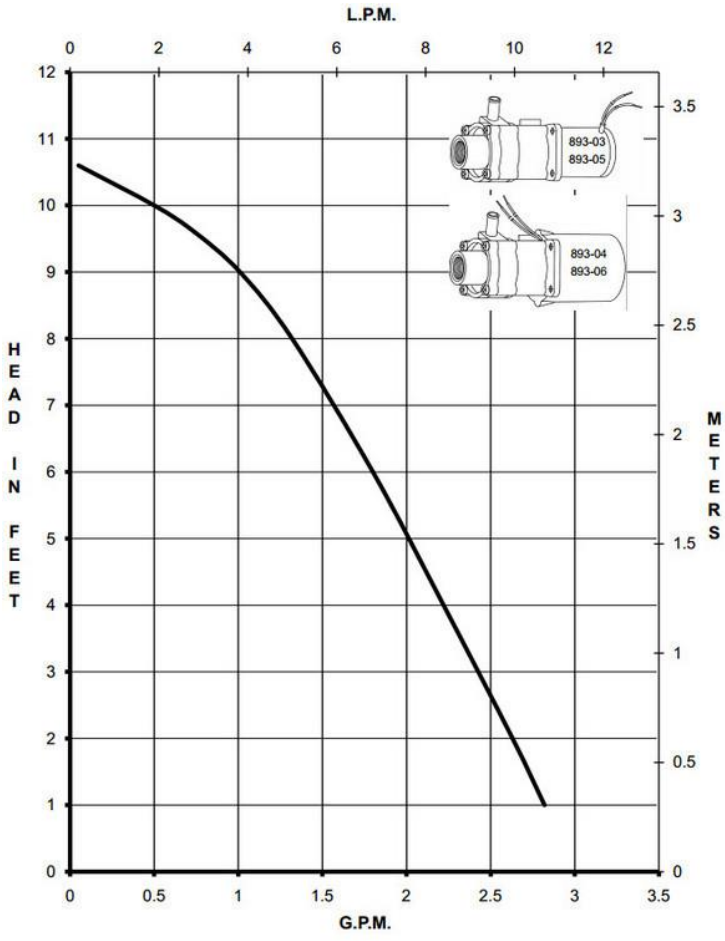
How to Read a Pump Performance Curve

There are multiple ways to select an industrial pump and multiple styles of centrifugal pumps to choose from. The primary selection tool is called a pump curve. Being able to read and understand a pump curve is frankly an essential skill if you're someone who needs to select a pump for a specific application and you want to ensure that that your pump enjoys a long service life operating at maximal efficiency.

Because we get a fair number of questions about how a pump performance curve should be used and read, we've decided to make this blog post a how-to. Pump curves are essentially data about a given pump's ability to produce flow against certain head. When you're reading a curve, the pump's flow rate will be on the top and bottom and its height to push is on the sides. You'll want to select the flow rate your application requires by drawing a line up on the chart then select your desired height by drawing a line to the right. You'll want to choose a pump with a curve just above that point.

It's really as simple as that, but here's a step by step guide to Interpreting Centrifugal Pump Curves ...



Reading a Basic Pump Curve: The sloping curve you see in the middle shows you how much flow and head the pump will produce. But remember, a pump can only generate the flow and head plotted on this line when it's operating properly and if nothing's been done to alter its speed or the impeller diameter. On most pump curves, the Horizontal Axis you see will display flow (and be shown in Gallons in the U.S. and Liters in the rest of the world) and the Vertical Axis you see will display the head put out by the pump (head is given in Feet for the US and Meters for the rest of the world).To read the curve, find a point on the bottom horizontal axis, which represents GPM (Gallons per

Minute). Draw an imaginary line from the 1GPM dash straight up to where the 1GPM line hits the pump curve. At the intersection of the 1GPM and curve, draw an imaginary line straight over to the left axis and you'll see that the number on the vertical axis is 9 Feet. Now you know that at 1GPM the pump in question will produce 9 feet. Rather than starting on the horizontal axis, you can also read from the vertical axis. For instance, if you wanted to know what flow the pump would produce at 10 feet, you'd just need to find 10 feet on the vertical axis and draw an imaginary line to the right until you hit the pump curve. Then draw an imaginary line straight down. In this example, you'd hit 0.5GPM. So you know that at 10 feet the pump will produce 0.5GPM.

Reading and Intermediate Pump Curve: First, click on the link to open the curve. On the first page you'll see that there are two curves, one labeled 60HZ and one labeled 50HZ. Whichever one represents the power supply in your country (here in the U.S. it's 60HZ) is the one you'll need to read. On the second page you'll find multiple pump curves with numbers on them. They represent the length of the diameter of the pump's impeller. As the diameter is reduced, the flow and head of the pump curve decreases as well. Another name for a reduced diameter impeller is a trimmed impeller. The standard impeller length is always the largest diameter, to obtain a smaller impeller size, the diameter must be specified. NOTE: The 50hz pump curve does less flow and head than the 60HZ curve because the pump's motor will be running slower.

Reading an Advanced Pump Curve: On the first page you'll find a listing of available impeller diameters. On the top right you'll see a specific gravity chart with suggested trim sizes. You'll definitely need to know the specific gravity of the liquid you need to pump. You see, if the specific gravity is greater than 1.0 (the weight of water), the pump, may not be able to handle the liquid without modifying its impeller diameter. You'll find suggestions found in the upper right hand corner of the curve designed to ensure that the pump will work for your application.

If you click to the second page, you'll find a more detailed curve where the largest diameter is 7.250 inches. Using what you learned above, you'll see that at 100GPM the pump will produce 144 feet of head. This curve will also tell you how much HP (horsepower) the pump will consume and the required NPSHR (Net Positive Suction Head). Find 100GPM at 144 Feet and draw an imaginary line straight down from that point until it hits the HP line. At the intersection, draw an imaginary line rightward until you hit the vertical axis with HP on it. In our example of 100GPM at 144 Feet, you'll find that horsepower being consumed is 8.8HP. If the specific gravity is anything other than the weight of water, take the HP being consumed and multiply it by the specific gravity. So if the specific gravity was 2.0, the actual HP being consumed would be 17.6HP.