Easy Guide
Pump Sizing / Modelling
a System Curve
This example demonstrates how Flowmaster can be used to model the head loss created in a system and so be used to size a pump. The example below uses a very simple system based around a ball valve controlling flow to a downstream reservoir, but the method is applicable to all systems which require a centrifugal pump.

**Example**

In order to size a centrifugal pump for a given network, it is necessary to simulate it over a range of flow rates. To do this, create a curve which encompasses the range of interest – in this case we know that the system in question will never have to deal with flows greater than 6 cubic metres a second.

Connect this curve to an upstream flow source.

Run the network for 60 seconds to cover the range of possible flow rates for the system. To create a system curve, select the flow rate results for the valve and click “X axis for plotting.”
Repeat the process for the pressure results from the node. The resulting curve illustrates the variation in system back pressure vs flow rate; i.e. it tells us the pressure that is required to overcome the frictional, head and terminal losses of the system for a given flow rate. By superimposing pump curves on the same axis (see below) it is possible to size the pump required by a particular system and choose its optimal running point, given by the intersection of the system and pump curves.

In the example below, two pumps are plotted along with the system curve (the purple line). The intersection of the system curve with each pump curve represents the point at which the energy provided by the pump matches that required by the system.
Pump curves can be created in a manner similar to that described above: create a network with a nominal pump in the place of the variable flow source.

In this case, the valve will be slowly opened over 60 seconds simulating a range of system head losses.

By selecting the valve arm 2 flow rate result (select “x axis for plotting as before”) and the upstream node pressure, a pump curve showing the drop in back pressure with increasing flow rate can be achieved.