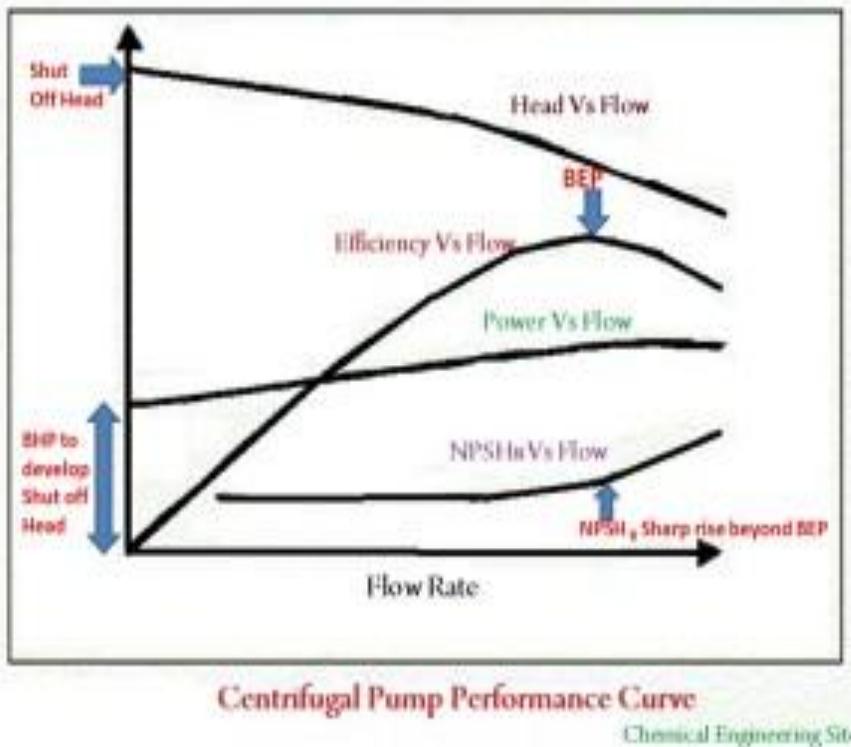


Centrifugal Pump Characteristic Curve

For an Operations Engineer who is working in a Chemical Process industry or a Process engineer who is involved in Hydraulic calculations understanding the Centrifugal Pump Performance Curve is an important aspect.

Components of Centrifugal pump performance curve

1. Head Vs Flow Curve : H-Q Curve
2. Efficiency Vs Flow Curve: Efficiency Curve
3. Brake Horse Power Vs Flow Curve: Energy Curve
4. NPSH_r Vs Flow Curve



H-Q Curve:

Pump manufacturers use the terminology called “Head” and Pump users use “Pressure” to measure the performance. On x-y plot, Head is plotted in y axis while Flow is plotted in x axis. Shut off head is the Head developed by the pump at zero flow. For a Pump user Shut off pressure of the centrifugal pump is an important tool to identify the priming loss/Cavitation of the pump. Head curve will fall for increased flow rates.

Efficiency Curve:

In a Performance Characteristic curve of the Centrifugal pump Efficiency curve starts from zero at zero flow and goes like a trajectory having a Best Efficiency point and then the efficiency starts falling for increased flow rates. Best Efficiency Point – BEP is the point on a pump performance curve corresponding to the flow rate with the highest possible efficiency.

Energy Curve:

Brake Horse power is plotted against the Flow to obtain energy curve in a centrifugal pump performance curve. It is a simple straight line. There will be minimum power consumed by the pump even at zero flow which is used to develop shut off head of the pump. Brake horse power rises with the flow.

NPSH_R Curve:

Net Positive Suction Head Required is plotted against the Flow rate. NPSH_R curve is a flat curve till the BEP of the pump and then it rises sharply beyond the Best efficiency point. Net Positive Suction Head Available must be greater than the Net Positive Suction Head Required to avoid Cavitation of the pump. NPSH Available is calculated based on the friction losses in the system while NPSH Required is specified by a pump vendor.

SOURCE: <http://www.chemicalengineeringsite.com/centrifugal-pump-characteristic-curve/228>