
PUMP APPLICATION ENGINEERS

All we provide are solutions

There are fundamental principles which can be used to predict the changes in performance of a centrifugal pump when variations are made to the impeller speed or diameter. The mathematical relationships that exist between flow rate, head, power and speed and based on a known pump performance are referred to as the Affinity Laws.

The Affinity Laws state

Changes in the speed or diameter change

- CAPACITY by direct proportion
- HEAD by the square
- HORSEPOWER by the cube

CS = Current Speed

Q = Capacity

NS = New Speed

H = Head

HP = Horsepower

NS/CS = Ratio

CS Q x Ratio = Q@NS

CS H x Ratio = H @ NS

CS HP x Ratio = HP @ NS

Important

It should be remembered that the Affinity Laws are more accurate when used to calculate speed variations than for impeller diameter variations. Many pump manufacturers produce a range of curves that illustrate performance at various impeller diameters. If a large reduction of impeller diameter is required, then only trim down to within 5 - 6% of the calculated impeller diameter and test the unit prior to final trimming.