

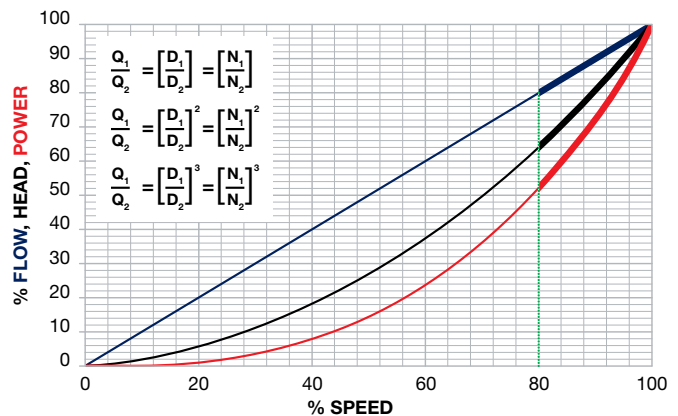


Change Diameter & Speed - Pump Affinity Laws

Sulzer Pump Service Reliability Tips

Affinity Laws:

- Capacity, Q, changes in direct proportion to the impeller diameter ratio, or the speed ratio.
- Head, H, changes in direct proportion to the square of the impeller diameter ratio, or the square of speed ratio.
- Power, P, changes in direct proportion to the cube of the impeller diameter ratio, or the cube of the speed ratio.
- If you use impeller trim laws to calculate a new impeller diameter, the results are quite often different to what you expected:
 1. The reason for this is that the Affinity laws are only valid under conditions of geometric similarity. When the diameter is trimmed the pump specific speed changes and the condition of similarity is violated.
 2. Manufacturers quite often compensate for this by utilizing a compensation factor based on proprietary trim corrections.
 3. Sulzer will be happy to help customers with these changes.
- It must also be noted that when increasing speed, or impeller diameter, you need to check pump mechanical design limitations:
 1. Is the motor/driver big enough?
 2. Is the shaft strong enough, coupling, etc.



Extract from Hydraulic Institute paper showing how flow, head and power change with reduction of speed.

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