

3.6 Less Efficient Impellers

For each pump there is a range of impeller sizes which can be fitted, each size producing different pump performance. Often pump characteristics are displayed as in Fig 2 to demonstrate this.

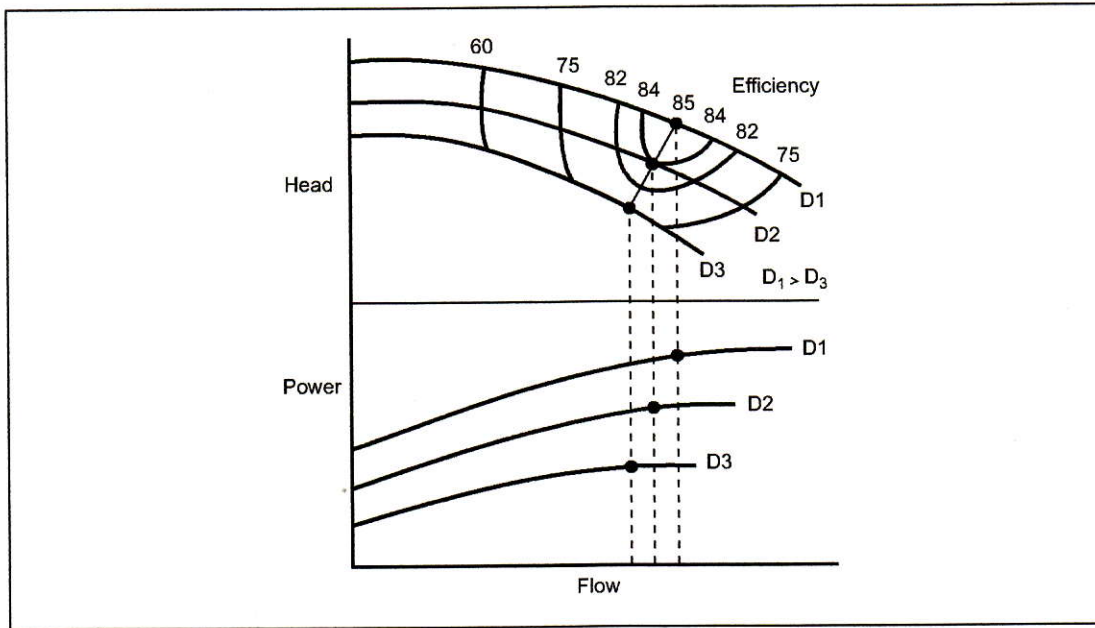


Fig 2 Pump characteristics showing various impeller diameters

The characteristics usually show maximum and minimum permissible diameters, plus one mid-range. Note that the maximum efficiency value is usually achieved with the largest impeller size, in this example 85% with impeller diameter D1. The peak efficiency value falls off as the size decreases. However, the peak efficiency flow also decreases. System designers make use of this fact by opting to use pumps that can achieve the desired duty with less than the maximum impeller size. This allows them to fit a larger impeller at some later date should the water requirements increase. Unfortunately, this can lead to a larger pump than necessary being fitted, and can also cause a marginal loss of efficiency.

The important points to note here are that:

- a pump fitted with a reduced-size impeller will be less efficient than a smaller pump fitted with a full-sized impeller when matched to the same duty;
- although smaller impellers are less efficient they also develop less head and flow whilst using less power.