

When pumping **Newtonian** fluids with a viscosity higher than that for water it may be necessary to correct the performance of the pump. Pump test and performance data is always based on clean water.

The effects of an increase in viscosity can be quite noticeable. With a liquid of viscosity say 100 cP, head and flow can reduce noticeably, but the greatest effect is in the efficiency of the pump which can reduce by 50% or more. This then has important implications for motor size and power supply.

The reason for this loss of performance is as follows ...

The pressure loss in the impeller and the diffuser channels of centrifugal pumps, the impeller friction and internal leakage losses depend to a large extent on the viscosity of the pumped liquid. Consequently the pump characteristics determined for water lose their validity when pumping liquid of other viscosities such as oil.

The higher the viscosity of the liquid compared to water the greater the loss of delivery capacity and head for a given power input. Consequently the best efficiency point moves towards the lower flow rates and the power input shifts up the parallel to that for water. Shutoff head is generally maintained.

For converting the pump's water characteristics to a liquid with a differ viscosity, correction values should be applied to the water curve. The method of determining the correction values is laid down in the Standards of the Hydraulic Institute, New York, USA, 14th Edition, 1983.

FluidFlow3 can include this correction by selecting from Options | Calculation| Global Settings.

Remember this correction should be applied only to end suction centrifugal pumps and must NOT be applied when pumping a non-Newtonian / non-settling liquid.