System design

Sizing pipes

It is possible to calculate an approximate pipe size for a given flow rate using the following formula:

$$di = 35.7 \sqrt{\frac{Q}{V}}$$

Where
V = Flow velocity (m/s)
di = pipe inside diameter (mm)
Q = Flow rate (l/s)

It is quite common for the flow velocity to be unknown at this stage. The following values are regarded as acceptable Liquid velocities for plastic system:

Suction = 0.5 - 1.0 m/s
Delivery = 1.0 - 3.0 m/s

Example:
What will be a suitable size for a pipe carrying water at a flow rate of 100 litres per second with a flow velocity of 1.5 metres persecond?

$$di = 35.7 \sqrt{\frac{100}{1.5}}$$
$$di = 291 \text{ mm}$$

Therefore the optimum internal diameter should be 291 mm (minimum). Selecting a pipe with an internal diameter smaller that the optimum size will creat increased pressure drop.