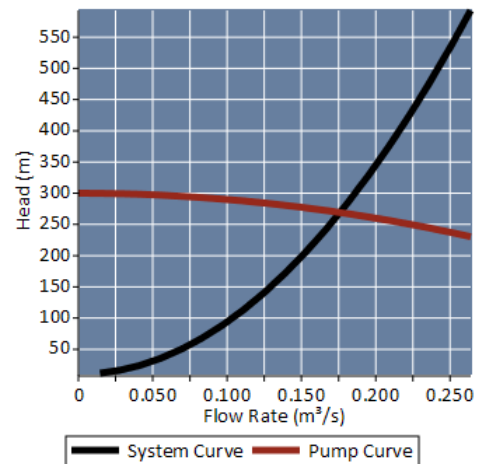
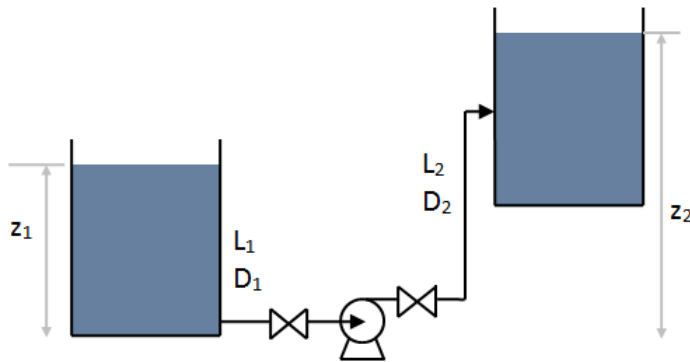


Pump Power for Flow between Two Reservoirs

A pump transfers liquid from one tank to another according to the following schematic, with check valves placed on either side of the pump. Each tank is open to the atmosphere. This worksheet calculates the flow rate in the pipe by solving the Bernoulli equation for the system, taking into account the head added by the pump, and the head loss due to friction and pipe fittings.



Parameters				
Pipe Lengths (m)	L_1	<input type="text" value="20"/>	L_2	<input type="text" value="10"/>
Pipe Diameters (m)	D_1	<input type="text" value="0.1"/>	D_2	<input type="text" value="0.3"/>
Pipe Roughness (m)		<input type="text" value="0.001"/>		
Elevations (m)	z_1	<input type="text" value="10"/>	z_2	<input type="text" value="20"/>
Pump Head Curve (m)		<input type="text" value="300"/>	-	<input type="text" value="1000"/> Q^2
Pump Loss Coefficients	Ent.	<input type="text" value="0.5"/>	Exit	<input type="text" value="1"/>
Valve Loss Coefficient		<input type="text" value="2"/>		
Liquid Density (kg m^{-3})		<input type="text" value="1000"/>		
Liquid Viscosity (Pa s)		<input type="text" value="0.001"/>		
Pump Efficiency		<input type="text" value="0.7"/>		

Results		
Flow Rate	0.176	$\text{m}^3 \text{s}^{-1}$
Pump Head	269	m
Pump Shaft Power	889	HP

Update