Hydraulic Pump Formulae

Determining the operating characteristics		
Flow	$q_v = \frac{V_g \times n \times \eta_v}{1000}$	[l/min]
Torque	$T = \frac{V_g \times \Delta p}{20 \times \pi \times \eta_{mh}}$	[Nm]
Power	$P = \frac{2 \pi \times T \times n}{60000} = \frac{q_v \times \Delta p}{600 \times \eta_t}$	[kW]

Key		
V_g	=	Displacement per revolution [cm³]
Δp	=	Differential pressure [bar]
n	=	Rotational speed [rpm]
η_v	=	Volumetric efficiency
η_{mh}	=	Mechanical-hydraulic efficiency
η_t	=	Total efficiency ($\eta_t = \eta_v \times \eta_{mh}$)

Hydraulic Motor formulae

Determining the operating characteristics

Input flow	$q_v = \frac{V_g \bullet n}{1000 \bullet \eta_v}$	[L/min]
Speed	$n = \frac{q_V \bullet 1000 \bullet \eta_v}{V_g}$	[min^{-1}]
Torque	$T = \frac{V_g \bullet \Delta p \bullet \eta_{mh}}{20 \bullet \pi}$	[Nm]
Power	$P = \frac{2 \pi \bullet T \bullet n}{60000} = \frac{q_v \bullet \Delta p \bullet \eta_t}{600}$	[kW]

V_g = Displacement per revolution in cm³

Δp = Differential pressure in bar

n = Speed in rpm

η_v = Volumetric efficiency

η_{mh} = Mechanical-hydraulic efficiency

η_t = Total efficiency ($\eta_t = \eta_v \bullet \eta_{mh}$)