Hydraulic Motor Torque, Speed and Power

Output torque, speed and power of a hydraulic motor from displacement, pressure drop and flow, with volumetric and mechanical efficiencies.

Method: Hydraulic motor relations T = V_g Δp η_m/(2π); n = Q η_v / V_g

Input parameters

Unit system: SI

Parameter	Value	Unit
Displacement per revolution	100.00	mL
Flow to the motor	80.000	L/min
Pressure drop across the motor	150.00	bar
Volumetric efficiency	95.000	%
Mechanical efficiency	92.000	%

Calculated results

Parameter	Value	Unit
Output speed	760.00	rpm
Output torque	219.63	N·m
Output power	17.480	kW

Formula and method

$$n = \frac{Q\,\eta_v}{V_g}, \quad T = \frac{V_g\,\Delta p\,\eta_m}{2\pi}$$

Variables

V_g	Displacement per revolution	m³
Q	Flow to the motor	m³/s
Δp	Pressure drop across the motor	Pa
η_v	Volumetric efficiency	-
η_m	Mechanical efficiency	-
n	Output speed	1/s
T	Output torque	N·m
P	Output power	W

Method and standards

Displacement relations.

Assumptions and limits

- Steady running.

References

- Hydraulic motor relations T = V_g Δp η_m/(2π); n = Q η_v / V_g

Report details

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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/mechanical/hydraulics-pneumatics/hydraulic-motor-torque-speed

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.