

## CHART ANALYTICAL DETERMINATION TORQUE OF GEROTOR HYDRAULIC MOTOR

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**Abstract:** *Hydraulic motor are increasingly used in various types of drives. An important feature is the torque. It is therefore necessary to be able to calculate in advance that torque from the beginning of design of the hydraulic motor. This article gives a chart analytical methodology for finding this one.*

**Key Words:** *hydraulic motor, torque, chart analytical, gerotor .*

### 1. Introduction

Main function of hydraulic motor is transforming the hydraulic pressure and flow rate into torque. Hydraulic motors are widely used because of its qualities, namely:

- small gauge;
- the possibility to generate high torque;
- easy change of direction;
- the ability to start under load;
- easy maintenance;
- low noise;
- small torque fluctuations.

An important feature of the hydraulic motor's power generating. Ideally, the power is determined from the equation:

$$P = Q\Delta p = M\omega \quad (1)$$

where:  
 $Q$  – flow rate;  
 $\Delta p$  – pressure drop in the hydraulic motor;  
 $M$  – torque;  
 $\omega$  – angular velocity;

The output torque of gerotor hydraulic motor is a function of:

- eccentricity;
- the power generated by the fluid.

Mathematically, torque is defined as the cross product of the eccentricity, as distance vector, and the force vector, which tends to produce rotation.

Since eccentricity is constant, torque of gerotor hydraulic motor is determined by the area on which apply the fluid, passing between the inlet and outlet of the hydraulic motor. This area is variable at any time, which in turn creates ripple.

The force can be calculated form via the formula:

$$F = pS \quad (2)$$

where:

$p$  – the pressure which is generated by the fluid;  
 $S$  – the area on which the fluid applied.