

$$P_c = \frac{u_t}{D_c \left( \frac{D_c^2 + D_i^2}{E_i (D_c^2 - D_i^2)} \right) + \left( \frac{D_o^2 + D_c^2}{E_o (D_o^2 - D_c^2)} \right) - \frac{\nu_i}{E_i} - \frac{\nu_o}{E_o}}$$

Pc = interface pressure

Ut = total displacement (shaft + hub)

Dc = contact diameter

Di = inner dia of shaft

Do = outer dia of hub

Vi = Poisson's ratio shaft material

Vo = Poisson's ratio hub material

Ei = Young's modulus shaft material

Eo = Young's modulus hub material

$$T = COF \cdot P_c \cdot \frac{\pi \cdot d^2 \cdot l}{2}$$

T = torque

COF = friction between two materials

Pc = interface pressure

d = contact dia

l = length of engagement