Inputs

Geometry

$N_P := 21$ $\quad N_G := 135$ Number of gear teeth

$P_{nd} := 14 \cdot \frac{1}{in}$ Normal diametral pitch

$\phi := 20 \cdot deg$ Standard pressure angle

AGMA

$C := \frac{N_G + N_P}{P_{nd}} \cdot \frac{1}{2}$ $\quad C = 5.5714in$ Standard center distance

$m_G := \frac{N_G}{N_P}$ $\quad m_G = 6.429$ Gear ratio

$R_P := \frac{N_P}{2 \cdot P_{nd}}$ $\quad R_P = 0.75in$ Pinion pitch radius

$R_{b1} := R_P \cdot \cos(\phi)$ $\quad R_{b2} := R_{b1} \cdot m_G$ Base circle radius for pinion and gear

$\phi_r := acos\left(\frac{R_{b2} + R_{b1}}{C}\right)$ $\quad \phi_r = 20 \cdot deg$ Operating pressure angle

$d := \frac{2 \cdot C}{m_G + 1}$ $\quad d = 1.5in$ Operating pitch diameter of pinion

$R_{o1} := \frac{N_P + 2}{2 \cdot P_{nd}}$ $\quad R_{o1} = 0.821in$ Pinion adendum radius
("stanard", or actual outside radius?)

$R_{o2} := \frac{N_G + 2}{2 \cdot P_{nd}}$ $\quad R_{o2} = 4.893in$ Gear adendum radius
("stanard", or actual outside radius?)

$R_{m1} := \frac{1}{2} \cdot \left[R_{o1} + \left(C - R_{o2}\right)\right]$ $\quad R_{m1} = 0.75in$

$\rho_1 := \sqrt{R_{m1}^2 - R_{b1}^2}$ $\quad \rho_1 = 0.257in$

$\rho_2 := C \cdot \sin\left(\phi_r\right) - \rho_1$ $\quad \rho_2 = 1.649in$

$$I_{AGMA1} := \left| \begin{array}{l} C_\psi \leftarrow 1 \\ m_N \leftarrow 1 \\ \dfrac{\cos\left(\phi_r\right) \cdot C_\psi^2}{\left(\dfrac{1}{\rho_1} + \dfrac{1}{\rho_2}\right) \cdot d \cdot m_N} \end{array} \right.$$

$I_{AGMA1} = 0.1391$

Pitting resistance geometry factor for external gear

- C_ψ=1 for spur gears
- m_n=1 for spur gears