

Assume ideal solenoid:



$$B = 5 \text{ mT}$$



$$d = \text{wire diameter}$$

$$N \text{ turns}$$

$$L = Nd$$

For wire wound tightly: $L = Nd$

For wire #1: $d_1 = 1.02 \text{ mm}$ $I_{\text{max}_1} = 6 \text{ A}$

$$\text{Number of turns, } N_1 = \frac{L}{d_1} = 196 \text{ turns}$$

and

$$B = \mu_0 n I_1 = \frac{\mu_0 N_1 I_1}{L}$$

$$\text{So: } I_1 = \frac{BL}{\mu_0 N_1} = 4.06 \text{ A} < I_{\text{max}_1}$$

For wire #2: $d_2 = 0.41 \text{ mm}$ $I_{\text{max}_2} = 1 \text{ A}$

$$N_2 = \frac{L}{d_2} = 488 \text{ turns}$$

and

$$I_2 = \frac{BL}{\mu_0 N_2} = 1.63 \text{ A} > I_{\text{max}_2}$$

∴ you should use wire #1

and the current should be $I_1 = 4.06 \text{ A}$