

What is the difference between Rated Resistance Values and Measured Resistance Values?

Based on the colored stripes on the resistor, we can say that the *Rated Resistance Value* is $1\text{K } \Omega$ or $1000 \Omega \pm 5\%$.



Brown = 1 **Black** = 0 **Red** = $\times 100$ **Gold** = $\pm 5\%$

$10 \times 100 = 1000\Omega$ or $1\text{K } \Omega$ Resistor $\pm 5\%$



The *Measured Resistance Value* on the multimeter gives us a value of 987Ω .



The $\pm 5\%$ of the *Rated Resistance Value* tells us that we can expect a *Measured Resistance Value* that will be between 950Ω and 1050Ω ($\pm 50 \Omega$).

TIP:

5% of 1000 is 50!



The *Measured Resistance Value* on the multimeter gives us a value of 987Ω which falls between the expected range of 950Ω to 1050Ω ($\pm 5\%$).



How to find the Percent Tolerance?

Let's look at a resistor that has a *Rated Resistance Value* of $270\ \Omega \pm 5\%$.



Red = 2 **Violet** = 7 **Brown** = $\times 10$ **Gold** = $\pm 5\%$



To determine what $\pm 5\%$ of $270\ \Omega$ use the following steps!

STEP 1: Convert 5% into its decimal equivalent.

$$\%5 = 0.05$$

STEP 2: Multiple 0.05 and $270\ \Omega$ to find what 5% of $270\ \Omega$ is.

$$0.05 \times 270\ \Omega = 13.5\ \Omega$$

STEP 3: Add $13.5\ \Omega$ to $270\ \Omega$ to find the top end of the expected range and subtract $13.5\ \Omega$ from $270\ \Omega$ to find the bottom end of the expected range .

$$13.5\ \Omega + 270\ \Omega = 283.5\ \Omega$$

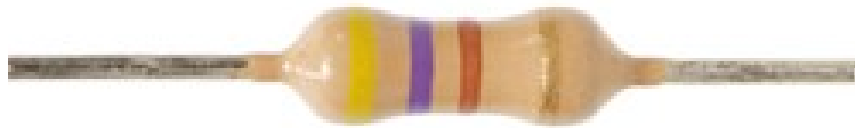
$$13.5\ \Omega - 270\ \Omega = 256.5\ \Omega$$

In conclusion, if the *Rated Resistance Value* of a resistor is $270\ \Omega \pm 5\%$, then we can expect a *Measured Resistance Value* that will be in the range of $256.5\ \Omega$ to $283.5\ \Omega$!



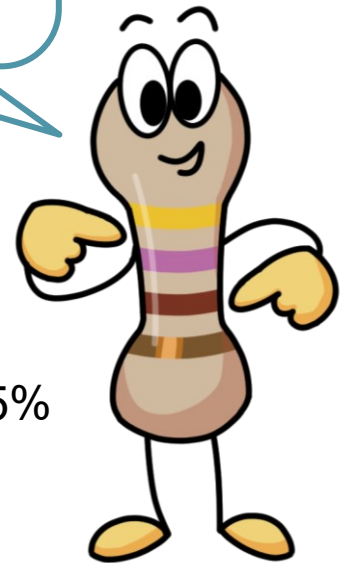
Can you determine if the Measured Resistance Value falls within the Rated Resistance Range?

Based on the colored stripes on the resistor, we can say that the *Rated Resistance Value* is $470\ \Omega \pm 5\%$.



Yellow = 4 Violet = 7 Brown = $\times 10$ Gold = $\pm 5\%$

$47 \times 10 = 470\ \Omega$ Resistor $\pm 5\%$



The *Measured Resistance Value* on the multimeter gives us a value of $470\ \Omega$.



The $\pm 5\%$ of the *Rated Resistance Value* tells us that we can expect a *Measured Resistance Value* that will be between what range?

The *Measured Resistance Value* on the multimeter gives us a value of $470\ \Omega$ which falls between the expected range of _____ to _____.



Can you determine expectable Measured Resistance Range given the Rated Resistance?



Yellow = 4 **Violet** = 7 **Orange** = $\times 1000$ **Gold** = $\pm 5\%$

$47 \times 10 = 47,000 \Omega$ or **47K Ω** Resistor $\pm 5\%$

Expected *Measured*
Resistance Range is between
_____ to _____.



Red = 2 **Red** = 2 **Red** = $\times 100$ **Gold** = $\pm 5\%$

$22 \times 10 = 2200 \Omega$ or **2.2K Ω** Resistor $\pm 5\%$

Expected *Measured*
Resistance Range is between
_____ to _____.



Brown = 4 **Green** = 5 **Red** = $\times 100$ **Gold** = $\pm 5\%$

$45 \times 100 = 4700 \Omega$ or **4.7K Ω** Resistor $\pm 5\%$

Expected *Measured*
Resistance Range is between
_____ to _____.

