

EET 150
Introduction to EET
Resistor Color Code Worksheet 1

The Resistor Color Code

The general purpose carbon film resistors which are used in electrical and electronic circuits are marked using a four colored bands system. The 4th color band indicates the resistor's tolerance and is normally gold. This means that the resistor is within 5% plus or minus of the marked value. A silver 4th color band indicates a 10% tolerance. The first three bands determine the value of the resistor. The first two bands determine the value of the resistor and the third band determines the multiplier for the first two digits. Simply stated, the value of the third band determines the number of zeros to add to the first two color values.

Example 1

Resistor color bands: Blue, Grey, Brown, Gold. The color code is reproduced for convenience.

Band 1: Blue = 6

Band 2: Grey = 8

Band 3: Brown = 1, add one zero to the first two numbers

Therefore the value of this resistor is 680 Ohms. This is written as 680R.

color	band1	band2	band3
black	0	0	none
brown	1	1	0
red	2	2	00
orange	3	3	000
yellow	4	4	0000
green	5	5	00000
blue	6	6	000000
violet	7	7	0000000
grey	8	8	00000000
white	9	9	000000000

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The second resistor color code skill is converting a numerical resistor value into the correct color bands. Since most circuit diagrams list numerical values on schematic symbols, this skill allows design engineers and technicians to select the correct device from a stock of resistors.

Example 2

What are the color bands on a 10 k Ω resistor with a 5% tolerance?

Step 1: Convert from kilo-Ohms to Ohms 10 k Ω = 10 000 Ohms.

Step 2: Look at the first digit is 1. 1 = Brown. This will be the first color band on the left.

Step 3: Look at the next digit after the number 1. This is a 0. 0= Black. This will be the second color band.

Step 4: What remains is 000 (three zeros). An Orange third band indicates three zeros. This will be the third color band.

Step 5: The fourth band is the tolerance, which is 5%. This is represented by the color Gold.

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Complete the following exercises and submit them for grading.

Exercise 1

Using the color chart above, decode the value of the following resistors and indicate the tolerance:

1. Brown, Black, Red, Gold. _____
2. Yellow Violet, Yellow, Gold. _____
3. Brown, Black, Green, Gold. _____
4. Blue, Grey, Black, Gold. _____
5. Orange, White, Orange, Gold. _____

Exercise 2

What are the color bands on the following value resistors all of which have a 5% tolerance?

1. 22 k Ω _____
2. 10 Ω _____
3. 10 k Ω _____
4. 470 k Ω _____
5. 33 k Ω _____
6. 220 k Ω _____