

## Ampacity

Using **Table 310.15(B)(16)**, for ambient temperatures other than 30°C (86°F), multiply the allowable ampacities by the appropriate correction factor.

*Example Question*

**What is the Ampacity of a copper conductor size 4/0 USE (75°C column)?**

**Answer: 230**

*Example Question*

**What is the corrected amps for a #12 RHW 27°C?**

Locate the ambient temperature in Table 310.15(B)(2)(a) and you will see the correction factor, 1.00. Use that to solve the equation along with Table 310.15(B)(16).

**Answer: 35 amps × 1.00 = 35 amps**

Solve for Corrected Amps-Given Temperature						
⑬	Conductor	CU or AL	Temperature	Ampacity	Correction Factor	Corrected Ampacity
1	8 RHW	AL	44°C			
2	2 THHN	CU	124°F			
3	10 UF	CU	52°C			
4	6 XHHW	AL	37°C			
5	4 XHH	CU	115°F			
6	3/0 USE	CU	66°C			
7	18 FEP	CU	54°C			
8	500 THHW	AL	115°F			
9	750 UF	CU	29°C			
10	1000 RHH	CU	75°F			

## Derating Ampacity Conduit Fill with more than 3 Current-carrying Conductors in the Same Conduit

***What is the derating factor of seven #10 TW in a 1¼” conduit?***

*Use Table 310.15(B)(3)(a) and find the value for seven current-carrying conductors*

***Answer: 70%***

***What is the corrected ampacity for eight #10 TW in the same conduit?***

*First find the ampacity of number 10 TW in Table 310.15(B)(16) which is 30 amps. Next find the derating factor for eight conductors in the same conduit using Table 310.15(B)(3)(a) which is 70% (Note when Temperature is not given use the 90° column)*

***Answer: 30 amps × 70% = 21 amps is the corrected ampacity***

Solve for Corrected Amps-Given Number of Conductors						
⑭	Conductor	CU or AL	# of Conductors	Ampacity	Correction Factor	Corrected Ampacity
1	8 RHW	AL	3			
2	2 THHN	CU	4			
3	10 UF	CU	6			
4	6 XHHW	AL	8			
5	4 XHH	CU	11			
6	3/0 USE	CU	15			
7	18 FEP	CU	28			
8	500 THHW	AL	35			
9	750 UF	CU	40			
10	1000 RHH	CU	50			

## Ampacity Correction Factor of a Continuous Load

A Continuous Load is defined as a load where the maximum current is expected to continue for 3 hours or more. The rule to follow is that if equipment will be used for more than 3 hours continuously then its ampacity shall be derated by 80%.

*Example Question*

***What is the corrected ampacity of a continuous load #12 THHN***

***Answer: 30 amps × 80% = 24 amps***

Solve for Ampacity When Hours of Use is Given						
⑮	Conductor	CU or AL	Hours of Use	Ampacity	Correction Factor	Corrected Ampacity
1	14 SIS	CU	3			
2	10 TW	AL	1.5			
3	8 XHHW	CU	2			
4	4 ZW	CU	4			
5	1 THW	AL	8			
6	2/0 USE-2	AL	10			
7	250 UF	CU	11			
8	400 ZW-2	CU	15			
9	500 THWN	AL	18			
10	750 THHN	CU	24			

### Ampacity Corrections for All Three Factors

⑬	Conductor	CU / AL	Temperature	Ampacity	Correction Factor	Conduit Fill	Adjustment Factor	Hours in Use	Continuous Load Factor	Corrected Ampacity
ex.	14 TW	AL	35°C	20	0.91	3	100%	3	80%	14.56
1	12 THHN	CU	33°C			3		2		
2	10 THWN	AL	47°C			5		3.2		
3	6 UF	AL	125°F			7		4		
4	3/0 USE	CU	44°C			8		9		
5	4/0 RHW	AL	135°F			6		8		
6	14 THHW	CU	65°C			44		24		
7	250 ZW-2	AL	140°F			10		7		
8	300 TBS	CU	29°C			2		2.9		
9	500 XHHW	CU	23°C			4		5		
10	750 RHH	AL	115°F			4		10		

## Voltage Drop Solve for Exact K

In order to find the Voltage Drop, you must know the value for K. The *Code* allows you to use 12.9 for Copper and 21.2 for Aluminum as approximate values for K. In order to find the accurate value for K, this formula is used:

$$K = \frac{CM \times R}{1000}$$

CM=circular mils

R=Resistance (ohm/kFT)

K=exact K

### *Example Question*

***What is the Exact K for #10 stranded uncoated copper conductor?***

*Using Table 8 in Chapter 9, first find Circular mils for #10, 10380*

*Next find the Resistance for uncoated copper, 1.24 ohm/kFT*

*Finally, use these values to solve the formula:*

$$K = \frac{10380 \times 1.24}{1000}$$

$$K=12.8712$$

## Voltage Drop - Solve for Exact K Word Problems

- 1) What is the Circular mils of #14 stranded uncoated copper conductor?
  - A) 2.08
  - B) 3.31
  - C) 4110
  - D) 0.62
  
- 2) What is the Circular mils of #10 solid uncoated Aluminum conductor?
  - A) 10380
  - B) 5.261
  - C) 0.98
  - D) 11.523

- 3) What is the resistance of #12 stranded uncoated copper conductor?
- A) 6.34
  - B) 3.57
  - C) 2.05
  - D) 1.98
- 4) What is the resistance of #8 solid coated copper conductor?
- A) 0.764
  - B) 2.579
  - C) 0.786
  - D) 0.809
- 5) What is the Circular mils of #250 stranded uncoated AL conductor?
- A) 0.2778
  - B) 250,000
  - C) 250
  - D) none of the above