

Conductor Temperature Rise Calculator

Calculate conductor temperature rise and operating temperature from load current, reference ampacity, ambient temperature, and an entered temperature rating.

Generated October 10, 2026

<https://www.elecatrrix.com/wire-raceway-ampacity/conductor-temperature-rise-calculator/>

Inputs		
Input	Value	Unit
Load current	80	A
Reference ampacity	100	A
Ambient temperature	30	deg C
Conductor temperature rating	75	deg C
Results		
Result	Value	Unit
Load-to-reference ratio	80	%
Allowable temperature rise	45	deg C
Estimated temperature rise	28.8	deg C
Estimated operating temperature	58.8	deg C
Rating margin	16.2	deg C
Status		
Status	Value	Unit
Temperature check	Within Entered Temperature Window	
Calculation details		
Detail	Value	Unit
Calculation basis	Temperature rise is estimated with an I^2 screen: entered allowable rise multiplied by the square of load current divided by reference ampacity.	
Thermal model boundary	Screening estimate only; real conductor temperature depends on insulation, raceway, ambient correction, grouping, terminals, installation, and manufacturer data.	

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Formulas

$$r = \frac{I}{I_{\text{reference}}}$$

$$\Delta T_{\text{allowable}} = T_{\text{rating}} - T_{\text{ambient}}$$

$$\Delta T_{\text{estimated}} = \Delta T_{\text{allowable}} \times r^2$$

$$T_{\text{operating}} = T_{\text{ambient}} + \Delta T_{\text{estimated}}$$

Warnings and limitations

This is an I-squared temperature-rise check from user-entered assumptions. It does not model installed heat transfer, conductor insulation limits, terminal ratings, raceway grouping, or adopted code ampacity rules.