Busbar Size from Current Density

Cross-section and width of a copper or aluminium busbar for a current at a chosen current density and bar thickness, with the bars per phase.

Method: A = I / J (current density method)

Input parameters

Unit system: SI

Parameter	Value	Unit
Current per phase	2,000.0	A
Current density Your design figure for the metal, enclosure and temperature rise; it decides the size.	1.2000	A/mm²
Bar thickness	10.000	mm
Bars per phase	2.0000	

Calculated results

Parameter	Value	Unit
Cross-section needed per phase	1,666.7	mm²
Width of each bar	83.333	mm

Notes for this case

- A first size only: the temperature rise depends on the enclosure, bar spacing and skin effect, and the short-circuit strength must be checked separately.

Formula and method

$$A = \frac{I}{J}, \quad w = \frac{A}{n\,t}$$

Variables

I	Current per phase	A
J	Current density	A/m²
t	Bar thickness	m
n	Bars per phase	-
A	Cross-section needed per phase	m²
w	Width of each bar	m

Method and standards

Current density method.

Assumptions and limits

- Uniform current density, shared equally by the bars. In AC service several bars per phase share unevenly (proximity and skin effect); more than two bars per phase are flagged.

References

- A = I / J (current density method)

Report details

Report reference	FCC-6NJ4-6CD9 (the same inputs always give the same reference)
Generated	17 November 2026, 19:44 UTC
Calculator	Busbar Size from Current Density
Method last reviewed	12 November 2026
Software release	FireCAD Calc, release of 17 November 2026
Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/electrical/cables/busbar-size-current-density

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.