Engineering Reference Tables

# AWG to mm² and Approximate European Cable Types

|  |  |  |
| --- | --- | --- |
| AWG/MCM | Cross-Section (mm²) | Approx. European Cable Type |
| 1000 MCM | 507.0 | 500 mm² |
| 750 MCM | 380.0 | 400 mm² |
| 600 MCM | 304.0 |  |
| 500 MCM | 253.0 | 300 mm² |
| 400 MCM | 202.0 |  |
| 300 MCM | 152.0 |  |
| 250 MCM | 127.0 | 150 mm² |
| 4/0 AWG | 107.0 | 120 mm² |
| 3/0 AWG | 85.0 | 95 mm² |
| 2/0 AWG | 67.4 | 70 mm² |
| 1/0 AWG | 53.5 |  |
| 1 AWG | 42.4 | 50 mm² |
| 2 AWG | 33.6 | 35 mm² |
| 3 AWG | 26.7 |  |
| 4 AWG | 21.1 | 25 mm² |
| 6 AWG | 13.3 | 16 mm² |
| 8 AWG | 8.37 | 10 mm² |
| 10 AWG | 5.26 | 6 mm² |
| 12 AWG | 3.31 | 4 mm² |
| 14 AWG | 2.08 | 2.5 mm² |
| 16 AWG | 1.31 | 1.5 mm² |
| 18 AWG | 0.823 | 1.0 mm² |
| 20 AWG | 0.518 |  |
| 22 AWG | 0.326 | 0.5 mm² |

# Copper Busbar Ampacity Table (Final)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Commercial Size (inches) | Commercial Size (mm) | Thickness (mm) | Width (mm) | Cross-Section (mm²) | Cross-Section (in²) | Ampacity (A) | Ampacity Basis |
| 1/8 x 1 | 3.18 mm x 25.40 mm | 3.18 | 25.4 | 80.77 | 0.1252 | 270 | Based on free air rating, 30°C rise |
| 1/4 x 1 | 6.35 mm x 25.40 mm | 6.35 | 25.4 | 161.29 | 0.25 | 470 | Based on free air rating, 30°C rise |
| 1/4 x 2 | 6.35 mm x 50.80 mm | 6.35 | 50.8 | 322.58 | 0.5 | 840 | Based on free air rating, 30°C rise |
| 3/8 x 2 | 9.53 mm x 50.80 mm | 9.53 | 50.8 | 483.87 | 0.75 | 1100 | Based on free air rating, 30°C rise |
| 1/2 x 4 | 12.70 mm x 101.60 mm | 12.7 | 101.6 | 1292.32 | 2.0031 | 2000 | Based on free air rating, 30°C rise |

# Cable Color Code Comparison

|  |  |  |
| --- | --- | --- |
| Color | USA Usage | EU Usage |
| Black | Line (Hot) - US | Line (L1, L2, L3) - EU |
|  |  |  |
| Red | Line (Hot) - US | Line (L2, L3) - EU |
| Blue | Neutral - US | Phase (L3) or Neutral - EU |
| White | Neutral - US | Not used for line conductors |
| Green | Ground - US | Ground (Earth) - EU |
| Yellow/Green | Not used | Protective Earth - EU |
| Gray | Line (optional) - US | Line (L1, L2) - EU |
| Brown | Not common - US | Line (L1) - EU |

# NEMA vs IEC Protection Type Comparison

|  |  |  |
| --- | --- | --- |
| NEMA Type | Application Description | Approx. IEC IP Equivalent |
| NEMA 1 | Indoor, basic protection | IP10 |
| NEMA 3R | Outdoor, rain, sleet, ice | IP24 |
| NEMA 4 | Indoor/Outdoor, water tight | IP66 |
| NEMA 4X | Same as 4 + corrosion resistant | IP66 |
| NEMA 12 | Indoor, dust, falling dirt, dripping non-corrosive liquids | IP52 |
| NEMA 7 | Hazardous (explosion-proof) | No direct IP equivalent |
| NEMA 13 | Oil/coolant seepage resistance | IP54 |

# CT/PT Class Comparison: USA vs Europe

|  |  |  |
| --- | --- | --- |
| Type | USA Classifications (ANSI/IEEE) | European Classifications (IEC) |
| CT | 0.3, 0.6, 1.2, C200, C400 | 0.1, 0.2, 0.5, 1, 3, 5 (IEC 61869-2) |
| PT | 0.3, 0.6, 1.2 | 0.1, 0.2, 0.5, 1 (IEC 61869-3) |
| Note | Classes in US are burden and accuracy-based (e.g., C100, B0.5) | IEC defines class by % error at rated burden; not directly equivalent to US |