# Wire & Cable Technical Data

Using the wrong type of wire can cost you more in the long run. Insist on Marine Grade® Boat Cable by Ancor. It is UL approved for the corrosive marine environment and charter boat service. Marine Grade Boat Cable is specially designed to exceed all test standards for cold bend, moisture and oil resistance, heat shock and flammability. This ensures the safest, easiest to install, longest lasting and ultimately the least expensive electrical system you can buy. Only Ancor offers a complete line of Marine Grade Boat Cable for every need.

**"Can I use 'regular wire' for my boat?"** The answer to this common question is a qualified "yes." However, caution is advised and the installer must understand the circumstances in which SAE (Society of Automotive Engineering) J378, J1127 or J1128 wire can, and can not be used. Keep in mind that these wires are designed for "surface vehicles," not for the special requirements of the marine industry. Even if tinned copper, they should not be run in bilge spaces or other areas subject to moisture from spray or dripping. They should not be run in engines spaces, unless marked "oil resistant" and "75°C". They should not be used in applications where subjected to vibration or frequent flexing and must never be used for 110 volt applications. For safety, use only wire which is marked with size, type and temperature rating.

Most importantly, SAE wire is up to 12% smaller than AWG Boat Cable which means that, in many applications, larger gauge wire must be used to stay within the voltage drop limits recommended by experts. The wire charts found in "Chapman's Piloting" and other publications are all for "AWG" wire like Ancor, not "SAE" type wire.

## ABYC Recommended Usages

| Color | Item | Use |
|---|---|---|
| Red | DC Positive Conductor | Positive Mains |
| Black or Yellow | DC Negative Conductor | Return, Negative Mains |
| Green or Green w/ Yellow Stripe | DC Grounding Conductor | Bonding System<br>Bonding Wires (if insulated) |
| Light Blue | Oil Pressure | Oil Pressure Sender to Gauge |
| Dark Blue | Cabin & Instrument Lights | Fuse or Switch to Lights |
| Brown | Generator Armature | Generator Armature to Regulator |
| | Alternator Charge Light | Generator Terminal/Alternator<br>Auxiliary Terminal to Light to Regulator |
| | Pumps | Fuse or Switch to Pumps |
| Grey | Navigation Lights | Fuse or Switch to Lights |
| | Tachometer | Tachometer Sender to Gauge |
| Orange | Accessory Feed | Ammeter to Alternator<br>or Generator Output and Accessory<br>Fuses or Switches |
| | Common Feed | Distribution Panel to Accessory Switch |
| Pink | Fuel Gauge | Fuel Gauge Sender to Gauge |
| Purple | Ignition | Ignition Switch to Coil & Electrical Instruments |
| | Instrument Feed | Distribution Panel to Electric Instruments |
| Brown w/ Yellow Stripe | Bilge Blowers | Fuse or Switch to Blower |
| Yellow w/ Red Stripe | Starting Circuit | Starting Switch to Solenoid |
| Tan | Water Temperature | Water Temperature Sender to Gauge |
| Green/Stripe (G/x) (except G/Y) | Tilt Down and/or Trim In | Tilt and/or Trim Circuits |
| Blue/Stripe (Bl/x) | Tilt Up and/or Trim Out | Tilt and/or Trim Circuits |

# Conductors Sized (AWG) for 3% Voltage Drop

**Use 3% voltage drop for any "critical application" affecting the safety of the vessel or its passengers: bilge pumps, navigation lights, electronics, etc....**

**Length (feet):** Determined by measuring the length of the conductor from the positive (+) power source connection to the electrical device and back to the negative (-) power source connection. Note that the power source connection may be either the battery, panelboard or switchboard.

**Current (amps):** Determined by adding the total amps on a circuit.

Conductor sizes not covered in the following tables may be calculated by using the following formula:

$$CM = \frac{K \times I \times L}{E}$$

After calculating the Circular Mil Area (CM), use the temperature rating chart to determine the proper conductor size (National Fire Protection Agency and Coast Guard require that the next larger conductor be used when the calculated CM area falls between the two conductor sizes).

**CM** = Circular Mil Area of Conductors

**K** = 10.75 (Constant representing the mil-foot resistance of copper)

**I** = Current - amps

**L** = Length - feet

**E** = Voltage drop at load (drop x working voltage)

TECH tip

## ABYC Recommends...

"Conductors used for panelboard or switchboard main feeders, bilge blowers, electronic equipment, navigation lights, and other circuits where voltage drop must be kept to a minimum, shall be sized for a voltage drop not to exceed three percent. " *ABYC 11.16.1.2.7.*

### 3% Voltage Drop at 12 Volts

| Length | | Current (Amps) 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10' | 3 m | 18 | 14 | 12 | 10 | 10 | 8 | 6 | 6 | 6 | 6 | 6 | 4 | 4 |
| 15' | 5 m | 16 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 4 | 4 | 4 | 2 | 2 |
| 20' | 6 m | 14 | 10 | 10 | 8 | 6 | 6 | 6 | 4 | 4 | 2 | 2 | 2 | 2 |
| 25' | 8 m | 12 | 10 | 8 | 6 | 6 | 6 | 4 | 4 | 2 | 2 | 2 | 1 | 1 |
| 30' | 9 m | 12 | 10 | 8 | 6 | 4 | 4 | 4 | 2 | 2 | 2 | 2 | 1 | 1 |
| 40' | 12 m | 10 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1/0 | 1/0 | 2/0 | 2/0 |
| 50' | 15 m | 10 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1/0 | 2/0 | 3/0 | 4/0 | 4/0 |
| 60' | 18 m | 10 | 6 | 6 | 4 | 2 | 2 | 1 | 1/0 | 2/0 | 3/0 | 3/0 | 4/0 | 4/0 |
| 70' | 21 m | 8 | 6 | 4 | 2 | 2 | 1 | 1/0 | 2/0 | 3/0 | 3/0 | 4/0 | 4/0 | |
| 80' | 24 m | 8 | 6 | 4 | 2 | 2 | 1 | 1/0 | 2/0 | 3/0 | 4/0 | 4/0 | | |
| 90' | 27 m | 8 | 4 | 2 | 2 | 1 | 1/0 | 2/0 | 3/0 | 4/0 | 4/0 | | | |
| 100' | 30 m | 6 | 4 | 2 | 2 | 1 | 1/0 | 2/0 | 3/0 | 4/0 | | | | |
| 110' | 33 m | 6 | 4 | 2 | 2 | 1 | 1/0 | 2/0 | 3/0 | 4/0 | | | | |
| 120' | 36 m | 6 | 4 | 2 | 1 | 1/0 | 2/0 | 3/0 | 4/0 | | | | | |
| 130' | 40 m | 6 | 2 | 2 | 1 | 1/0 | 2/0 | 3/0 | 4/0 | | | | | |
| 140' | 43 m | 6 | 2 | 2 | 1/0 | 2/0 | 3/0 | 4/0 | | | | | | |
| 150' | 46 m | 6 | 2 | 1 | 1/0 | 2/0 | 3/0 | 4/0 | | | | | | |
| 160' | 49 m | 6 | 2 | 1 | 1/0 | 2/0 | 3/0 | 4/0 | | | | | | |
| 170' | 52 m | 6 | 2 | 1 | 2/0 | 3/0 | 3/0 | 4/0 | | | | | | |

### 3% Voltage Drop at 24 Volts

| Length | | Current (Amps) 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10' | 3 m | 18 | 18 | 16 | 14 | 12 | 12 | 10 | 10 | 10 | 8 | 8 | 8 | 6 |
| 15' | 5 m | 18 | 16 | 14 | 12 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 6 | 6 |
| 20' | 6 m | 18 | 14 | 12 | 10 | 10 | 10 | 8 | 6 | 6 | 6 | 6 | 4 | 4 |
| 25' | 8 m | 16 | 12 | 12 | 10 | 10 | 8 | 6 | 6 | 6 | 4 | 4 | 4 | 4 |
| 30' | 9 m | 16 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 4 | 4 | 4 | 2 | 2 |
| 40' | 12 m | 14 | 10 | 10 | 8 | 6 | 6 | 6 | 4 | 4 | 2 | 2 | 2 | 2 |
| 50' | 15 m | 12 | 10 | 8 | 6 | 6 | 6 | 4 | 4 | 2 | 2 | 2 | 1 | 1 |
| 60' | 18 m | 12 | 10 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1 | 1/0 | 1/0 |
| 70' | 21 m | 12 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1 | 1/0 | 1/0 | 2/0 |
| 80' | 24 m | 10 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1/0 | 1/0 | 2/0 | 2/0 |
| 90' | 27 m | 10 | 8 | 6 | 4 | 4 | 2 | 2 | 1 | 1/0 | 1/0 | 2/0 | 2/0 | 3/0 |
| 100' | 30 m | 10 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1/0 | 2/0 | 2/0 | 3/0 | 3/0 |
| 110' | 33 m | 10 | 6 | 6 | 4 | 2 | 2 | 1 | 1/0 | 1/0 | 2/0 | 3/0 | 3/0 | 4/0 |
| 120' | 36 m | 10 | 6 | 4 | 4 | 2 | 2 | 1 | 1/0 | 2/0 | 3/0 | 3/0 | 4/0 | 4/0 |
| 130' | 40 m | 8 | 6 | 4 | 2 | 2 | 2 | 1 | 1/0 | 2/0 | 3/0 | 3/0 | 4/0 | 4/0 |
| 140' | 43 m | 8 | 6 | 4 | 2 | 2 | 1 | 1/0 | 2/0 | 3/0 | 3/0 | 4/0 | 4/0 | |
| 150' | 46 m | 8 | 6 | 4 | 2 | 2 | 1 | 1/0 | 2/0 | 3/0 | 3/0 | 4/0 | 4/0 | |
| 160' | 49 m | 8 | 6 | 4 | 2 | 2 | 1 | 1/0 | 2/0 | 3/0 | 4/0 | 4/0 | 4/0 | |
| 170' | 52 m | 8 | 6 | 2 | 2 | 1 | 1 | 2/0 | 3/0 | 3/0 | 4/0 | 4/0 | | |

### 3% Voltage Drop at 32 Volts

| Length | | Current (Amps) 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10' | 3 m | 18 | 18 | 16 | 16 | 14 | 14 | 12 | 12 | 10 | 10 | 10 | 8 | 8 |
| 15' | 5 m | 18 | 16 | 14 | 14 | 12 | 12 | 10 | 10 | 8 | 8 | 8 | 6 | 6 |
| 20' | 6 m | 18 | 16 | 12 | 12 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 6 | 6 |
| 25' | 8 m | 18 | 14 | 12 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 6 | 6 | 4 |
| 30' | 9 m | 16 | 14 | 10 | 10 | 10 | 8 | 8 | 6 | 6 | 6 | 4 | 4 | 4 |
| 40' | 12 m | 16 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 4 | 4 | 4 | 2 | 2 |
| 50' | 15 m | 14 | 12 | 8 | 8 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 2 | 2 |
| 60' | 18 m | 14 | 10 | 8 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 2 | 2 | 1 |
| 70' | 21 m | 12 | 10 | 6 | 6 | 6 | 6 | 4 | 2 | 2 | 2 | 1 | 1 | 0 |
| 80' | 24 m | 12 | 10 | 6 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1 | 0 | 0 |
| 90' | 27 m | 12 | 8 | 6 | 6 | 6 | 4 | 2 | 2 | 2 | 1 | 1/0 | 1/0 | 2/0 |
| 100' | 30 m | 12 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1/0 | 1/0 | 2/0 | 2/0 |
| 110' | 33 m | 10 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1/0 | 1/0 | 2/0 | 2/0 |
| 120' | 36 m | 10 | 8 | 6 | 4 | 4 | 2 | 2 | 1 | 1/0 | 1/0 | 2/0 | 2/0 | 3/0 |
| 130' | 40 m | 10 | 8 | 6 | 4 | 4 | 2 | 2 | 1 | 1/0 | 2/0 | 2/0 | 3/0 | 3/0 |
| 140' | 43 m | 10 | 6 | 6 | 4 | 2 | 2 | 1 | 1/0 | 1/0 | 2/0 | 3/0 | 3/0 | 3/0 |
| 150' | 46 m | 10 | 6 | 6 | 4 | 2 | 1 | 1 | 1/0 | 2/0 | 2/0 | 3/0 | 3/0 | 4/0 |
| 160' | 49 m | 10 | 6 | 4 | 4 | 2 | 1 | 1 | 1/0 | 2/0 | 3/0 | 3/0 | 4/0 | 4/0 |
| 170' | 52 m | 8 | 6 | 4 | 2 | 2 | 1 | 1 | 1/0 | 2/0 | 3/0 | 3/0 | 4/0 | 4/0 |

# Conductors Sized (AWG) for 10% Voltage Drop

Use 10% voltage drop for any "non-critical" applications: windlass, cabin lights, etc....

**For Example...**

**Q:** A bilge pump draws 10 amps. The positive run is 11 feet from the power panel, including the float switch. The negative run is only 10 feet. What size is the wire?

**A:** Use the formula to reach the correct answer:

$$CM = \frac{\text{10.75 x 10 (amps) x 21 (total length of run)}}{\text{0.36 (3\% of 12V)}} = 6.271$$

*Ancor cable specifications show that 12 AWG wire has a CM area of 6,500 and is the correct choice. However, SAE wire has a CM area of only 5,833. Under NFPA and USCG regulations, 10 SAE wire must be used.*

TECH tip

## ABYC Recommends...

"Conductors used for lighting, other than navigation lights, and other circuits where voltage drop is not critical, shall be sized for a voltage drop not to exceed 10 percent." *ABYC 11.16.1.2.7.*

**10% Voltage Drop at 12 Volts**

| Length | | Current (Amps) 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10' | 3 m | 18 | 18 | 18 | 16 | 16 | 14 | 14 | 12 | 12 | 10 | 10 | 10 | 10 |
| 15' | 5 m | 18 | 18 | 16 | 14 | 14 | 12 | 12 | 10 | 10 | 8 | 8 | 8 | 8 |
| 20' | 6 m | 18 | 16 | 14 | 14 | 12 | 12 | 10 | 10 | 8 | 8 | 8 | 6 | 6 |
| 25' | 8 m | 18 | 16 | 14 | 12 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 6 | 6 |
| 30' | 9 m | 18 | 14 | 12 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 6 | 6 | 4 |
| 40' | 12 m | 16 | 14 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 6 | 4 | 4 | 4 |
| 50' | 15 m | 16 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 4 | 4 | 4 | 2 | 2 |
| 60' | 18 m | 14 | 12 | 10 | 8 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 2 | 2 |
| 70' | 21 m | 14 | 10 | 8 | 8 | 6 | 6 | 6 | 4 | 2 | 2 | 2 | 2 | 1 |
| 80' | 24 m | 14 | 10 | 8 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 2 | 1 | 1 |
| 90' | 27 m | 12 | 10 | 8 | 6 | 6 | 6 | 4 | 2 | 2 | 2 | 1 | 1 | 1/0 |
| 100' | 30 m | 12 | 10 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1 | 1/0 | 1/0 |
| 110' | 33 m | 12 | 8 | 8 | 6 | 6 | 4 | 2 | 2 | 2 | 1 | 1/0 | 1/0 | 1/0 |
| 120' | 36 m | 12 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1 | 1/0 | 1/0 | 2/0 |
| 130' | 40 m | 12 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 1 | 1/0 | 1/0 | 2/0 | 2/0 |
| 140' | 43 m | 10 | 8 | 6 | 6 | 4 | 2 | 2 | 1 | 1 | 1/0 | 2/0 | 2/0 | 2/0 |
| 150' | 46 m | 10 | 8 | 6 | 4 | 4 | 2 | 2 | 1 | 1/0 | 1/0 | 2/0 | 2/0 | 3/0 |
| 160' | 49 m | 10 | 8 | 6 | 4 | 4 | 2 | 2 | 1 | 1/0 | 2/0 | 2/0 | 3/0 | 3/0 |
| 170' | 52 m | 10 | 6 | 6 | 4 | 2 | 2 | 2 | 1 | 1/0 | 2/0 | 2/0 | 3/0 | 3/0 |

**10% Voltage Drop at 24 Volts**

| Length | | Current (Amps) 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10' | 3 m | 18 | 18 | 18 | 18 | 18 | 18 | 16 | 16 | 14 | 14 | 14 | 12 | 12 |
| 15' | 5 m | 18 | 18 | 18 | 18 | 16 | 16 | 14 | 14 | 12 | 12 | 12 | 10 | 10 |
| 20' | 6 m | 18 | 18 | 18 | 16 | 16 | 14 | 14 | 12 | 12 | 10 | 10 | 10 | 10 |
| 25' | 8 m | 18 | 18 | 16 | 16 | 14 | 14 | 12 | 12 | 10 | 10 | 10 | 8 | 8 |
| 30' | 9 m | 18 | 18 | 16 | 14 | 14 | 12 | 12 | 10 | 10 | 8 | 8 | 8 | 8 |
| 40' | 12 m | 18 | 16 | 14 | 14 | 12 | 12 | 10 | 10 | 8 | 8 | 8 | 6 | 6 |
| 50' | 15 m | 18 | 16 | 14 | 12 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 6 | 6 |
| 60' | 18 m | 18 | 14 | 12 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 6 | 6 | 4 |
| 70' | 21 m | 16 | 14 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 6 | 6 | 4 | 4 |
| 80' | 24 m | 16 | 14 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 6 | 4 | 4 | 4 |
| 90' | 27 m | 16 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 6 | 4 | 4 | 4 | 2 |
| 100' | 30 m | 16 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 4 | 4 | 4 | 2 | 2 |
| 110' | 33 m | 14 | 12 | 10 | 8 | 8 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 2 |
| 120' | 36 m | 14 | 12 | 10 | 8 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 2 | 2 |
| 130' | 40 m | 14 | 12 | 10 | 8 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 2 | 2 |
| 140' | 43 m | 14 | 10 | 8 | 8 | 6 | 6 | 6 | 4 | 2 | 2 | 2 | 2 | 1 |
| 150' | 46 m | 14 | 10 | 8 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 2 | 2 | 1 |
| 160' | 49 m | 14 | 10 | 8 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 2 | 1 | 1 |
| 170' | 52 m | 12 | 10 | 8 | 6 | 6 | 6 | 4 | 2 | 2 | 2 | 2 | 1 | 1 |

**10% Voltage Drop at 32 Volts**

| Length | | Current (Amps) 5 | 10 | 15 | 20 | 25 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10' | 3 m | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 16 | 16 | 14 | 14 | 14 | 14 |
| 15' | 5 m | 18 | 18 | 18 | 18 | 18 | 18 | 16 | 14 | 14 | 14 | 12 | 12 | 12 |
| 20' | 6 m | 18 | 18 | 18 | 18 | 16 | 16 | 14 | 14 | 12 | 12 | 12 | 10 | 10 |
| 25' | 8 m | 18 | 18 | 18 | 16 | 16 | 14 | 14 | 12 | 12 | 10 | 10 | 10 | 10 |
| 30' | 9 m | 18 | 18 | 18 | 16 | 14 | 14 | 12 | 14 | 10 | 10 | 10 | 10 | 8 |
| 40' | 12 m | 18 | 18 | 16 | 14 | 14 | 12 | 12 | 10 | 10 | 8 | 8 | 8 | 8 |
| 50' | 15 m | 18 | 16 | 14 | 14 | 12 | 12 | 10 | 10 | 8 | 8 | 8 | 6 | 6 |
| 60' | 18 m | 18 | 16 | 14 | 12 | 12 | 10 | 10 | 8 | 8 | 8 | 6 | 6 | 6 |
| 70' | 21 m | 18 | 14 | 14 | 12 | 10 | 10 | 8 | 8 | 8 | 6 | 6 | 6 | 6 |
| 80' | 24 m | 18 | 14 | 12 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 6 | 6 | 4 |
| 90' | 27 m | 18 | 14 | 12 | 10 | 10 | 10 | 8 | 6 | 6 | 6 | 6 | 4 | 4 |
| 100' | 30 m | 16 | 14 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 6 | 4 | 4 | 4 |
| 110' | 33 m | 16 | 14 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 6 | 4 | 4 | 4 |
| 120' | 36 m | 16 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 6 | 4 | 4 | 4 | 2 |
| 130' | 40 m | 16 | 12 | 10 | 10 | 8 | 8 | 6 | 6 | 6 | 4 | 4 | 2 | 2 |
| 140' | 43 m | 14 | 12 | 10 | 8 | 8 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 2 |
| 150' | 46 m | 14 | 12 | 10 | 8 | 8 | 6 | 6 | 6 | 4 | 4 | 2 | 2 | 2 |
| 160' | 49 m | 14 | 12 | 10 | 8 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 2 | 2 |
| 170' | 52 m | 14 | 12 | 10 | 8 | 8 | 6 | 6 | 4 | 4 | 2 | 2 | 2 | 2 |

## 18–4/0 AWG Wire and Cable Specifications

| AWG | mm² | AWG CM area | SAE CM area | Ampacity Engine Space Outside | Inside |
|---|---|---|---|---|---|
| 18 | 0.8 | 1,600 | 1,537 | 20 | 17 |
| 16 | 1 | 2,600 | 2,336 | 25 | 21 |
| 14 | 2 | 4,100 | 3,702 | 35 | 30 |
| 12 | 3 | 6,500 | 5,833 | 45 | 38 |
| 10 | 5 | 10,500 | 9,343 | 60 | 51 |
| 8 | 8 | 16,800 | 14,810 | 80 | 68 |
| 6 | 13 | 26,600 | 24,538 | 120 | 102 |
| 4 | 21 | 42,000 | 37,360 | 160 | 136 |
| 2 | 34 | 66,500 | 62,450 | 210 | 178 |
| 1 | 42 | 83,690 | 77,790 | 245 | 208 |
| 1/0 | 53 | 105,600 | 98,980 | 285 | 242 |
| 2/0 | 68 | 133,100 | 125,100 | 330 | 280 |
| 3/0 | 85 | 167,800 | 158,600 | 385 | 327 |
| 4/0 | 107 | 211,600 | 205,500 | 445 | 378 |

## Temperature Rating of Conductor Insulation

### The Law

**The Code of Federal Regulations (CFR) 183.425 Conductors**

**(b)** Except for intermittent surges each conductor must not carry a current greater than that specified for the conductor's gauge and temperature rating.

**(c)** For conductors in engine spaces, amperages must be corrected by the appropriate correction factor in Note 1.

Due to engine heat, the ambient temperature in engine spaces is usually higher than in other spaces of the boat. Wiring in and passing through engine spaces must be able to operate at these higher ambient temperatures. The ampacity values are based on an ambient temperature of 86°F / 30°C which is considered reasonable for use on boats except in engine spaces. The correction factors in Note 1 converts the ampacities to acceptable values in an ambient temperature of 122°F / 50°C. This higher temperature has been selected as satisfactory for engine spaces. Note 1 is supplied to eliminate the need for calculating the corrections. The values are already corrected.

| Conductor Size AWG | Ampacity Outside of Engine Space | Ampacity Inside of Engine Space (Note 1) |
|---|---|---|
| 18 | 20 | 17 |
| 16 | 25 | 21 |
| 14 | 35 | 30 |
| 12 | 45 | 38 |
| 10 | 60 | 51 |
| 8 | 80 | 68 |
| 6 | 120 | 102 |
| 4 | 160 | 136 |
| 3 | 180 | 153 |
| 2 | 210 | 178 |
| 1 | 245 | 208 |
| 1/0 | 285 | 242 |
| 2/0 | 330 | 280 |
| 3/0 | 385 | 327 |
| 4/0 | 445 | 378 |

*De-rating for engine space is 0.85 for 221°F / 105°C rated wire.

## Allowable Amperage of Conductors of 50 Volts or More

The current values shown in this chart and also on the wire and cable specifications chart do not consider voltage drop for conductors under 50 volts. The values shown on the ampacity table are the maximum safe amperages which the conductor can carry on a continuous basis. They do not apply to intermittent starting loads such as motor start currents. Since all Ancor Boat Cable is 105°C insulated, only that temperature rating is shown.

Due to the higher ambient temperatures in engine spaces and the heat retention of large wire bundles, a "correction factor" must be used to de rate the wire by increasing conductor size. This chart takes into consideration these factors and should be used to select conductor sizes for circuits over 50 volts. Note that for electrical systems under 50 volts, voltage drop is the controlling factor and the tables on 78 and 79 should be used.

| Conductor Size | 2 Conductors 221°F (105°C) Engine Space | | 3 Conductors 221°F (105°C) Engine Space | | 4–6 Conductors 221°F (105°C) Engine Space | | 7–24 Conductors 221°F (105°C) Engine Space | |
|---|---|---|---|---|---|---|---|---|
| AWG | Outside | Inside | Outside | Inside | Outside | Inside | Outside | Inside |
| 18 | 20 | 17.0 | 14.0 | 11.9 | 12.0 | 10.2 | 10.0 | 8.5 |
| 16 | 25 | 21.3 | 17.5 | 14.9 | 15.0 | 12.8 | 12.5 | 10.6 |
| 14 | 35 | 29.8 | 24.5 | 20.8 | 21.0 | 17.9 | 17.5 | 14.9 |
| 12 | 45 | 38.3 | 31.5 | 26.8 | 27.0 | 23.0 | 22.5 | 19.1 |
| 10 | 60 | 51.0 | 42.0 | 35.7 | 36.0 | 30.6 | 30.0 | 25.5 |
| 8 | 80 | 68.0 | 56.0 | 47.6 | 48.0 | 40.8 | 40.0 | 34.0 |
| 6 | 120 | 102.0 | 84.0 | 71.4 | 72.0 | 61.2 | 60.0 | 51.0 |
| 4 | 160 | 136.0 | 112.0 | 95.2 | 96.0 | 81.6 | 80.0 | 68.0 |
| 3 | 180 | 153.0 | 126.0 | 107.1 | 108.0 | 91.8 | 90.0 | 76.5 |
| 2 | 210 | 178.5 | 147.0 | 125.0 | 126.0 | 107.1 | 105.0 | 89.3 |
| 1 | 245 | 208.3 | 171.5 | 145.8 | 147.0 | 125.0 | 122.5 | 104.1 |
| 1/0 | 285 | 242.3 | 199.5 | 169.6 | 171.0 | 145.4 | 142.5 | 121.1 |
| 2/0 | 330 | 280.5 | 231.0 | 196.4 | 198.0 | 168.3 | 165.0 | 140.3 |
| 3/0 | 385 | 327.3 | 269.5 | 229.1 | 231.0 | 196.4 | 192.5 | 163.6 |
| 4/0 | 445 | 378.3 | 311.5 | 264.8 | 267.0 | 227.0 | 222.5 | 189.1 |

| Number of current carrying conductors: | Correction Factor |
|---|---|
| 3 | 0.70 |
| 4 to 6 | 0.60 |
| 7 to 24 | 0.50 |
| 25 and above | 0.40 |

This table is supplied to eliminate the need for calculating the corrections for multi-conductor cable bundles in the temperature rating chart. The values are already corrected.

Note: These tables only apply for 221°F (105°C) wire and other premium wire and should not be used for lesser grades of wire and cable.

Reprinted at the courtesy of the United States Coast Guard Electrical System Compliance Guideline.

* There is NO LIMIT on conductors in a bundle under 50 volts.

Use the Ciruit Wizard to easily identify what wire to use. Scan the code or go to ancorproducts.com/circuit_wizard