MARINE WIRE SIZE AND AMPACITY

This article includes some handy tables you can use to select the right gauge wire for your application.

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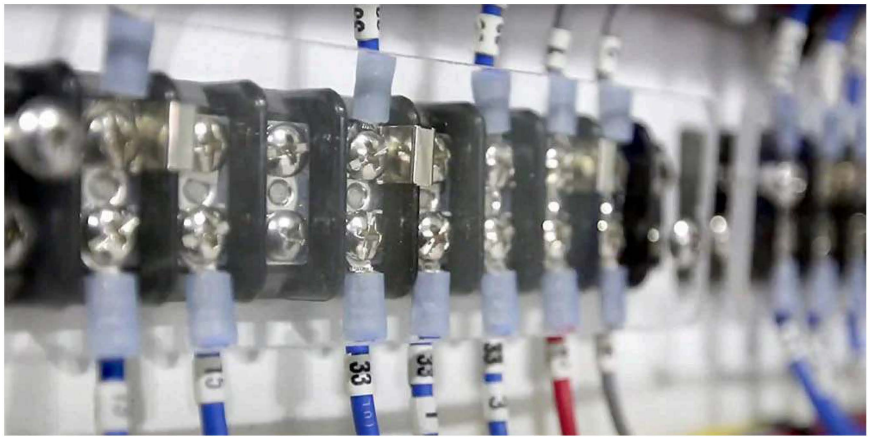

Marine grade wire is manufactured in multiple gauges for different applications. Use the charts below to determine the correct wire gauge, based on the amount of current in the circuit and the length of the wire run.

Even the experts have to check occasionally on the correct gauge and ampacity (maximum amount of electrical current a conductor can carry) of wire for a given marine DC load. The simplest method we've found uses the charts below.

- **Select either the 10% or 3% voltage drop chart**, based on the type of load you are running.
- **Find the current consumption of the load** on the horizontal axis of the chart.
- **Find the length of the circuit** on the vertical axis of the chart, noting that the length is the round-trip distance from the panel or battery to the load and back.
- **The wire size listed in the graph at the intersection denotes the gauge of wire to use.**

We've included copper wire specifications which comply with the AWG standards at the bottom.

Of particular interest is the equation:
Voltage Drop = Current x Length x Ohms per foot

This simple equation allows you to calculate the voltage drop for a circuit of any length and any current flow, if you know the resistance of the wire.

Finally, note that the amp capacity (ampacity) of the wire curtails using very short lengths of wire for large current flows, as shown by the "flat tops" of the 10% chart areas.

These graphs assume:

1. **105°C insulation rating:** All Ancor wire uses 105°C insulation rating. Lower temperature insulation cannot handle as much current

2. **AWG wire sizes, not SAE:** All Ancor wire uses AWG wire sizes. SAE wire sizes are 6 to 12 percent smaller, carry proportionally less current, and have greater resistance
3. **Wires are not run in engine spaces:** Maximum current is 15 percent less in engine spaces, which are assumed to be 20°C hotter than non-engine spaces (50°C vs. 30°C).
4. **Conductors are not bundled:** If three conductors are bundled, reduce maximum amperage by 30 percent. If 4–6 conductors are bundled, reduce maximum amperage by 40 percent. If 7–24 conductors are bundled, reduce amperage by 50 percent.

3% Voltage Drop

Use 3% voltage drop for critical applications affecting the safety of your boat and crew, such as running lights, blowers, electronics and panel board feeds. Remember that the Length is a round-trip distance. This table is for 12-Volt systems only.

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

160' (49m)	6	2	1	1/0	2/0	3/0	4/0
170' (52m)	6	2	1	2/0	3/0	4/0	4/0

10% Voltage Drop

Use 10% voltage drop for non-critical applications such as windlass, cabin lights, circuits other than running lights, electronics or panel board feeds. Remember that the Length is a round-trip distance. This table is for 12-Volt systems only.

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

160' (49m)	10	8	6	4	4	2	2	1	1/0	2/0	2/0	3/0	3/0
170' (52m)	10	6	6	4	2	2	2	1	1/0	2/0	2/0	3/0	3/0

To Complete Your Project, Don't Forget:

- Heat Shrink Tubing
- Wire strippers, cutters and crimpers
- Terminals: ring, spade, or butt connectors

AWG Wire Specs

Wire Size (AWG)	Nominal OD	Weight per 1000'	Stranding Number of 30 AWG	Cir.Mil. Area	Square mm	Ohms per 1000'	Max Amps
18	7/64"	12lb.	16	1,600	0.823	6.48	20
16	1/8"	16lb.	26	2,600	1.31	4.00	25
14	9/64"	23lb.	41	4,100	2.08	2.50	35
12	5/32"	31lb.	65	6,500	3.31	1.75	45
10	7/32"	44lb.	105	10,500	5.26	0.98	60
8	5/16"	86lb.	168	16,800	8.37	0.62	80
6	11/32"	118lb.	266	26,600	13.30	0.40	120
4	13/32"	178lb.	420	42,000	21.15	0.24	160
2	15/32"	277lb.	665	66,500	33.62	0.157	210
1	17/32"	350lb.	836	83,690	44.21	0.127	245
1/0	9/16"	437lb.	1064	105,600	53.49	0.099	285
2/0	5/8"	549lb.	1330	133,000	67.43	0.077	330
3/0	11/16"	675lb.	1685	167,800	85.01	0.062	385
4/0	13/16"	837lb.	2109	211,600	107.20	0.049	445