Ev charger wire awg chart

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I am installing a EV charger for my car in my garage and I"ve been all over the internet with a dozen different calculators and they all give different results for what AWG i need to use for my install. some say 1 AWG and some say 6 AWG, I"m pretty sure i need to use 3 AWG but want to verify.

The charger will be on a 100A breaker drawing 80A continuous at 240V and it will be 30ft from breaker to charger, 2 hot and a ground, NO neutral line required, and it will be run inside a 1 inch schedule 40 conduit. Also please correct me if I"m wrong but the ground line can be smaller than the feed lines like if i use 3 AWG for the hot i can use 4 AWG for the ground.

But you MUST do a Load Calculation. Typical service is 200A. If you have smaller service then you almost certainly can NOT allocate 100A (80A continuous) to EV charging. Even if you have 200A, how much is available will vary depending on:

If anyone told you #4 copper or #2 aluminum, they should be barred from giving any further EV advice. They pulled that out of Table 310.12 which is for entire service to a dwelling, and relies on the "load diversity" that a dwelling normally has. (not everything is maxed out at once). Using them for an EV station would be a disaster, because an EV station is the exact opposite of a dwelling - a hard continuous load pegged right at wire rating.

Now, over on Reddit and other EV forums, we see a lot of meltdowns. Boy howdy! The triggering event of these meltdowns is that the terminals are running at their thermal limits already merely by the continuous load right at thermal max rating. And then, a flaw or blemish creates a hotspot, which oxidizes, making it worse, causing a vicious cycle of destruction.

Therefore -- especially because aluminum wire is CHEAP -- I recommend bumping 2 numerical wire sizes, to 2/0 aluminum and #1 copper, or whatever the largest wire the terminals on both ends will accept. (this may be a limitation at the 100A breaker or EVSE). This will keep things significantly cooler, and very significantly reduce the risk of meltdowns.

Note that quality of work is absolutely essential, and you MUST use torque wrenches on all terminals per instructions and per NEC 110.14. "Gud-n-Tite" is scientifically proven to be unreliable.

NEC’s 80% rule states that current passing through a wire should not exceed 80% of its current carrying capacity. So, for a 50 amp charger, that would come to 62.5 amps. If one has to account for line losses and voltage drop, then increase this number further by 10%, which is 68.75A.

Now, if you search the AWG vs. Ampacity tables, you will find that 4 and 6 AWG might be the most suitable options for our current ratings. But I would recommend going for 6 AWG and 75A ampacity wire for ease of installation and cost reduction.

Wire material is as important as its size. It is highly recommended that you use high-quality copper wires. All the variables discussed though this article will be for copper wires. One can choose an aluminum or silver wire but would need a thicker wire to hold the same amount of current.

For an efficient and safe EV charging process, choosing a car charger with the correct wire size is pertinent. If the wire size of your car charger is too small, it can melt and burn down. A thick wire may be expensive to buy and difficult to install.

In any electrical application, choosing a wire with the correct size is important. EV charging cables are no different. You must know that car chargers come in all sizes and power ratings. A regular charging cable allows passage to 3-9 kW of electrical power.