

GAUGING THE DIFFERENCE

In Home Wiring, Lower Gauge Means Greater Power

Someday you may need new electrical wiring in your home and the electrician may ask if you want 12 AWG or 14 AWG (American Wire Gauge). You may not know what this means, but opt for the *lower* number. When it comes to electrical wiring, a lower gauge number means *larger* wires with lower electrical resistance, and that translates into greater load-carrying capacity.

It also means better power quality. Fatter wires produce less waste heat and less “voltage drop,” which simply means they can transmit full, unimpeded power for critical applications such as home entertainment and the home office. With 12-gauge wiring, lights will flicker less. Moreover, fatter wires provide room for growth—that is, they allow homeowners to increase electricity use without the need to rewire.

Consider this: One thousand feet of 14 AWG solid wiring has a resistance of 2.53 ohms. The same length of 12 AWG has a resistance of 1.59 ohms. That 0.94-ohm difference equals a 37.5 percent drop in resistance, and less resistance means less chance that your home’s circuits will overload because too many appliances are drawing too much power. And make sure your circuit breaker matches the wire size: 20 Amps for 12 AWG of 15 Amps for 14 AWG. Otherwise, you negate the protection the circuit breaker provides.

The Truth about Gauges

The American Wire Gauge (also spelled “Gage”) numbering system may be counterintuitive, but it is worth knowing to ensure that your home’s wiring infrastructure is equipped for the future as well as the present. In this system, resistance doubles every time the gauge number increases by 3. Oddly, only even gauge numbers are commonly available. It is easier to see this doubling effect in a table that shows resistance quadrupling when the gauge number goes up by 6.

For the math perplexed, it is enough to know that fatter wires can carry more electricity with less heating and less voltage drop. With today’s increasingly sophisticated—and expensive—home entertainment and home computing systems, power quality becomes a very important consideration.

Safety and Capacity

Residential building codes often allow 14-gauge wiring in branch circuits (for lighting, as an example), but it’s not the best choice. Codes are concerned only with fire safety and personal safety. They represent the minimum acceptable

size. As a result, many homebuilders furnish new homes with 14 AWG wiring for most branch circuits (Code minimum) unless the purchaser insists on 12 AWG. So, these recommendations apply to purchasing new homes as well as remodeled homes.

What Size Do *You* Use?

Just for fun, ask any electrician what gauge wiring *he* currently uses in his own home, or what he would install in his home when rewiring. Most likely, he would choose 12 AWG as the minimum size for most branch circuits.

“If you have an older home, one of the most effective things you can do to improve your family’s safety is to upgrade the wiring,” says Dave Brender, national electrical program manager for the Copper Development Association. “There is a vast difference between lower-resistance 12 gauge and higher-resistance 14 gauge. Do what many electricians do for themselves and insist on 12-gauge wiring for *all* of your circuits.”

For more information about copper electrical wiring and power quality, visit www.copper.org.

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