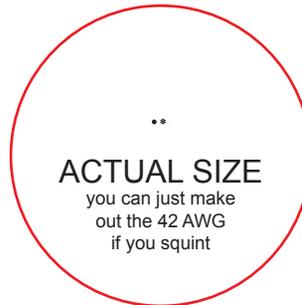


DRAWN TO SCALE



Wire Gauge

In the USA, electrical wire sizes are defined by a standardized wire gauge system called the **American wire gauge (AWG)**. The sizes range from **0000 (4/0)**, which is about half an inch in diameter, to **56**, which is about .00049 inches in diameter (that's 49 one-hundred-thousandths of an inch, or half of a thousandth).

In the guitar community, the most common wire gauge used to wind pickups is 42 AWG, which is about .0025 inches in diameter. This is the wire gauge used in the original Strat pickups, as well as the original PAF humbuckers from Gibson.

But this wire is too small for humans to safely handle (it's easily broken), so both Fender and Gibson attach 22 AWG wire to their pickup coils so that humans can safely and conveniently handle and solder the pickup's leads to the rest of the guitar's circuit.

Stranded vs. Solid

Most wire gauges are available in solid or stranded versions. You can see this in the illustration at left. The 22 AWG solid wire is just one solid piece of round wire, whereas the 22 AWG stranded wire is comprised of seven strands of 30 AWG wire (this is referred to as 7/30 wire). Both of these are rated to carry the same amount of current (about 7 amps). The stranded wire is more flexible than the solid wire, which makes it convenient to use in guitar circuits. However, it's more expensive to produce, and more likely to fail due to internal corrosion. Still, it's by far the most common wire type used in guitars.

Ampacity

To the right of the 22 AWG wire is an illustration of 42 AWG wire, the wire used in many pickup coils. You can see how tiny its cross-section is compared to the 22 AWG wire, less than 1/100 as large:

WIRE TYPE	AREA	AMPACITY
22 AWG Solid	640 Mils	7 Amps
22 AWG Stranded 7/30	700 Mils	7 Amps
42 AWG Solid	6.25 Mils	>.01 Amp

The 42 AWG wire is so tiny that it's typically not rated for ampacity (the amount of amperage it can carry), but suffice it to say that its ampacity is less than .01 amps.

Pickup outputs are measured in millivolts, which the 42 AWG wire easily handles. So if you see someone making a claim like "We use 20 AWG wire rather than 22 AWG for the simple reason that it sounds better", you can be assured that this is nonsense. If 42 AWG wire will carry the load, then 22 AWG 7/30 wire - with a cross-section more than 100 times larger - is already vastly larger than the task requires. Again, the reason for the 22 AWG wire is not tonal, it's so the human can handle the wire without breaking it.

Insulation

Wire insulation used to be made of cloth (textile), but most wire insulation now is PVC. Cloth wire is still available for people who want it for one reason or another, but is not widely used in industry.

PVC insulation is adequate for most needs, though at Tone Shapers we buy PTFE-insulated wire (*Teflon* is DuPont's trade name for PTFE). This insulation doesn't melt nearly as easily as most PVC insulation.

Finally, some wire is available in different versions that support different voltages (300V & 600V for instance), This is simply a function of the insulation. The wire will get hotter with 600V present than with 300V, so will have thicker insulation to prevent the insulation from melting.



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