

Abstract

Electroluminescent (EL) wire is a unique kind of wire because it glows when attached to a power source. EL wire has many applications, both creative and practical. For example: Burning Man enthusiasts like to adorn their clothing with the flexible wire, and emergency responders use it to mark off accidents on the road at night. What makes EL wire glow is the electrical reactions between its copper wires and phosphor coating. The problem with this wire, however, is that it is very difficult to connect it to a battery. This is due to the wire's structure. Beneath its protective plastic shielding, EL wire has a core copper wire, double wrapped with a very fine pair of copper wires. These fine copper wires are hard to solder to, and can break without much effort. Standard soldering methods use a basic alligator tooth style double clamp to hold EL wires in place for soldering. This device is very poorly made, as one must tighten and re-tighten every moveable joint for a precision solder. Adjusting these clamps can be maddening, especially when many EL solder joints must be made. There must be a better way to terminate EL wire, therefore various connection methods are considered as possible solutions. They are: improved hand soldering, machine soldering, conductive epoxy, and crimping. Ultimately it was decided that an improved solder technique would prove to be the best solution. And it entailed manufacturing a custom fixture that would hold the EL wire for easy soldering. The design went through many phases and was tested to see if it commanded a faster soldering time over its clamping counterpart. The results suggest the fixture has a mean soldering time that is statistically significantly less than the mean soldering time of the alligator clamps, with ninety-five percent confidence. An economic analysis determined that if even just one electrician were to try to profit off of making EL wire assemblies, working either full-time or part-time, he or she would

save money in labor hours by purchasing the fixture. A hobbyist on the other hand, who makes only a few EL wire assemblies a month, might be stretching his or her wallet too far by spend the money for the fixture. The bottom line is that if someone stands to make a profit off EL wire assemblies, or is serious about making all kinds of EL artwork, this fixture will save the user time.