

## **OSHA Training Toolbox Talk: Basic Electrical Safety – Avoiding the Hazards of Reverse Polarity**

*[Reference 1910 Subpart S / 1926 Subpart K]*

We discussed in an earlier toolbox talk about how electrical tools or equipment which are double insulated have a power cord with a two-pronged plug on the end and no ground prong. But have you ever noticed how one of the two prongs (or blades) is wider than the other? And perhaps you have also noticed one of the two vertical slots is also larger on most electrical receptacles (*refer to handout to see examples of these*). The reason for this is because it is critical to our safety that the electricity flowing to and through the tool or equipment and back through the wiring system follow the proper path.

When electricity flows to and through the receptacle to the plug to the tool or equipment, it should be traveling through the “hot” wire. Once it gets to the tool or equipment, it typically flows to the on-off switch or control, and once the switch is turned on or activated, the current flows on to the motor, heating element, light bulb or whatever else needs electricity to make the device function. From there it flows back out of the tool or equipment to the receptacle via the “neutral” wire, and from there back through the electrical system to the ground.

But if for some reason somebody switched around the “hot” and “neutral” wires in the system, a condition known as “reversed polarity” occurs. The electricity no longer stops at the on-off switch, but instead runs through the entire circuit inside the tool or equipment up to the point where the on-off switch or control is located. This may not seem like a big deal because the tool or equipment will typically run like normal when the on-off switch is activated (even if it is wired backwards). But reverse polarity can present a very serious potential danger for a couple of reasons.

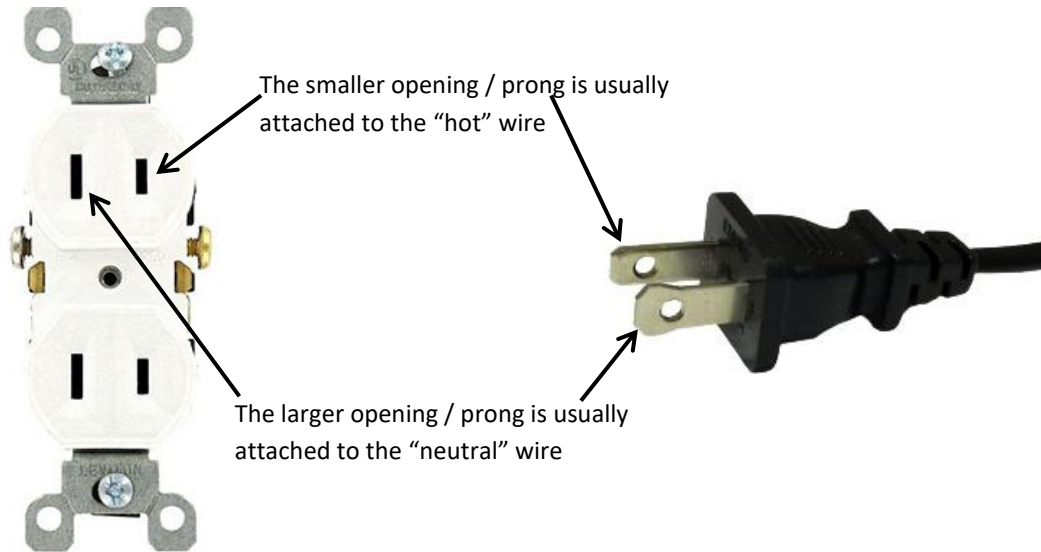
First of all, if a tool such as a portable grinder wired in a reverse polarity situation were to short out, the grinder would suddenly turn on and start to run even without the on-off switch being activated. To make matters worse, you would not be able to turn the grinder back off unless you unplugged it from the receptacle. Also, with devices like lamps and light fixtures with standard screw-in light sockets, the neutral wire that is attached to the socket would effectively become a hot wire in a reverse polarity situation, energizing the screw-in portion of the light socket. That means that anyone who accidentally touched the screw-in part of the socket while installing or removing a bulb could be accidentally electrocuted. These are reasons why plugs and receptacles are polarized; to prevent them from being plugged in backwards.

So why should we be aware of the hazards of reverse polarity? Because most electrocutions and other accidents that occur due to reverse polarity do so because someone who is not a qualified electrician decides to try and repair a broken or non-functioning circuit, switch, receptacle, tool, or piece of equipment, and they mistakenly get their hot and neutral wires crossed. So long story short, it is VERY CRITICAL that you DO NOT ever make any unauthorized repairs on any electrical circuitry, tool, or piece of equipment. Instead, report the condition to your supervisor or safety rep, so the work can be done by a qualified electrician who can also conduct tests necessary to ensure everything is wired correctly.

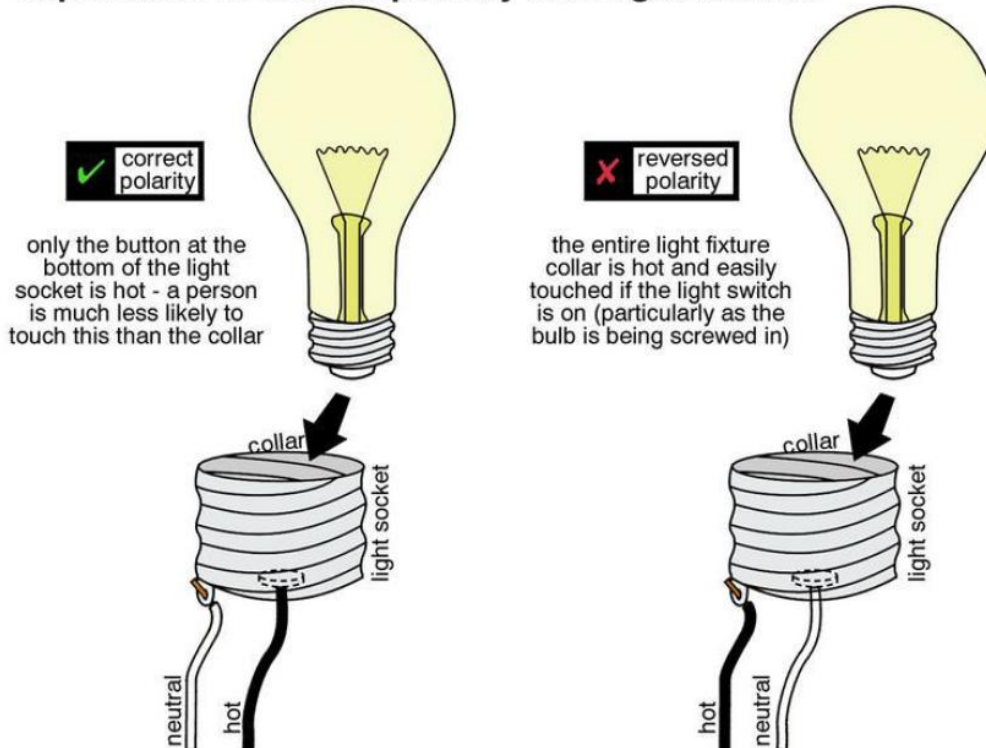
Are there any questions or comments about today’s discussion on the hazards of reverse polarity? Thank you for attending today’s OSHA training toolbox talk. Please be sure to sign your name on the training certification form so you will get credit for being here today.

## REVERSE POLARITY – The Hazards and How to Avoid Them

### *How Properly Wired Polarized Receptacles & Plugs Work*



### **Importance of correct polarity with light fixtures**



Source of Image: White House Inspections