

Amperes, Voltage, and Ohms

Ohms

➤ A material's resistance to electrical current

Metals tend to have lower resistances (Ohms) and conduct electricity well.



Rubber is highly resistant, making it a great material for electrical PPE.

Voltage

➤ Power of electrical current, similar to water pressure



Electricity is like water in a pipe. Voltage is the water pressure, ohms is the size of the pipe, and amps are how much water is in the pipe

Amperes (Amps)

➤ Amount of electrical current
➤ Dangerous part of electricity!

1.00 - Will Light a 100-Watt Light Bulb (you can't survive)
.900 - Severe Internal & External Burns
.300 - Breathing Stops (death is certain)
.100 - Heart Beat Stops (death is very likely)
.030 - Suffocation Possible (border between life and death)
.020 - Muscle Contraction
.010 - Can't Let Go
.005 - GFCI Will Trip!
.002 - Mild Shock
.001 - Sensation

Overhead Power Lines

Equipment can contact overhead power lines:

- Cranes
- Man-lifts
- Boom-lifts
- Telehandlers
- Scaffolds



Much of this equipment is metal, and capable of conducting electricity from the lines to workers on or even near the equipment!

Maintain Minimum Approach Distances (M.A.D.)

- Stay at least 10 feet away from exposed energized conductors or equipment up to 50 kV
- For every 10 kV past 50, add 4 inches to the minimum approach distance
- Example:
 - 230 kV high voltage line
 - Difference of 180 kV (230 – 50)
 - $180/10 = 18$ increments of 10
 - 18×4 inches = 72 inches or 6 additional feet
 - **M.A.D. = 16 feet**

Underground Power Lines

Always locate utilities before digging

➤ Most locate companies need to know at least 2 days before digging.



When digging within 18 inches of underground electrical, you must dig by hand until the underground lines are located.



Some areas, like the City of Chicago, require red tape to be buried within 12-18 inches of an underground power line.

➤ Some companies choose to do this even when not required by local ordinance

