NCCER Module 26102-20

Safety for Electricians

Section Three

Electrical Safety Standards

Objective

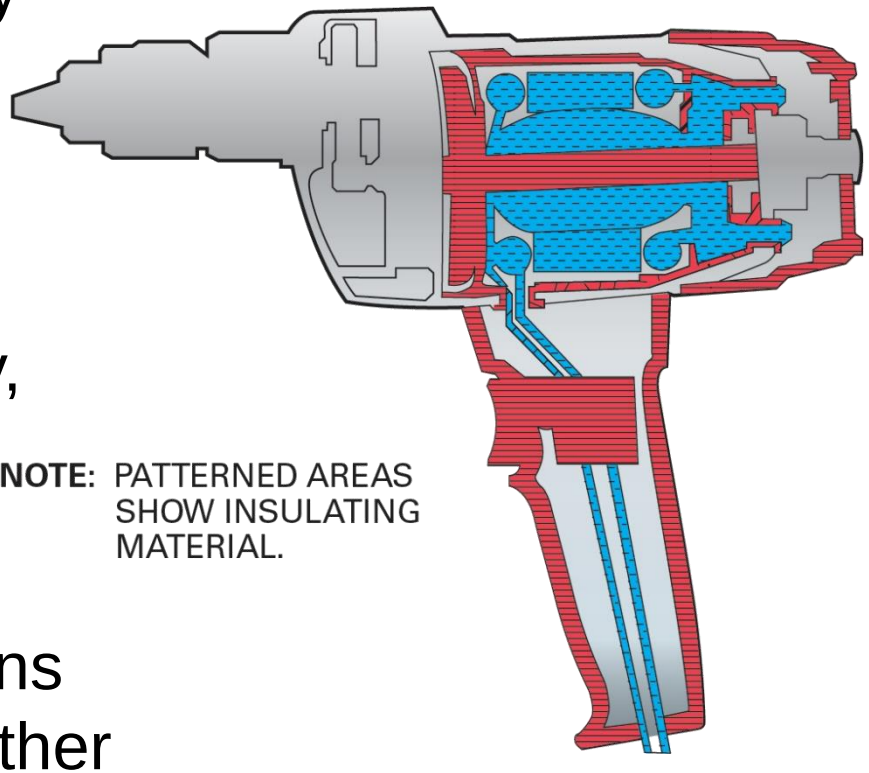
3. Identify the standards that relate to electrical safety.
   a. Apply OSHA requirements in the workplace.
   b. Understand the purpose of *NFPA 70E*®.

Performance Task

There are no Performance Tasks associated with this section.

3.0.0 – 3.1.2 Electrical Safety Standards

- The purpose of OSHA is to ensure a safe and healthy working environment.
- OSHA publishes many standards, including *CFR 1910*, for general industry, and *CFR 1926*, for the construction industry.
- OSHA electrical regulations require that all tools be either grounded or double-insulated.



3.1.3 OSHA Requirements for Electrical Safety

- Receptacles other than 125 volts, single-phase, 15 amps, 20 amps, and 30 amps should be ground fault protected if possible.
- In lieu of a GFCI receptacle, an assured equipment grounding conductor program must be in place.

3.1.4 OSHA Lockout/Tagout Rule (1 of 2)

(A) ELECTRICAL LOCKOUT

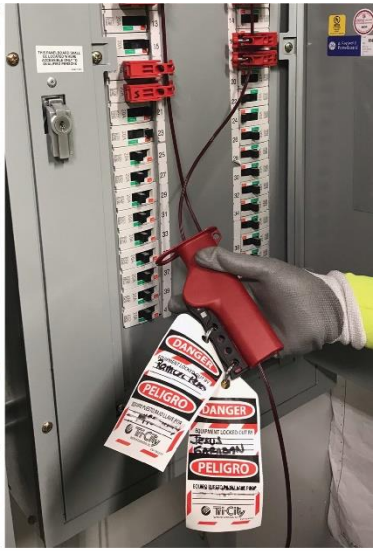
(B) PNEUMATIC LOCKOUT

- All sources of energy must be locked out and tagged prior to equipment service or maintenance. This includes all sources of electrical, mechanical, hydraulic, thermal, and chemical energy.
- Always follow the lockout/tagout procedure for the specific job site.

3.1.4 OSHA Lockout/Tagout Rule (2 of 2)

- Each authorized employee must affix a separate lock and key.
- OSHA has specific procedures that must be followed for emergency removal of a lockout/tagout device.
- In addition to OSHA regulations, employers/employees must understand and follow the requirements of *NFPA 70E®*.

(A) LOCKOUT/TAGOUT WITH SEPARATE LOCKS

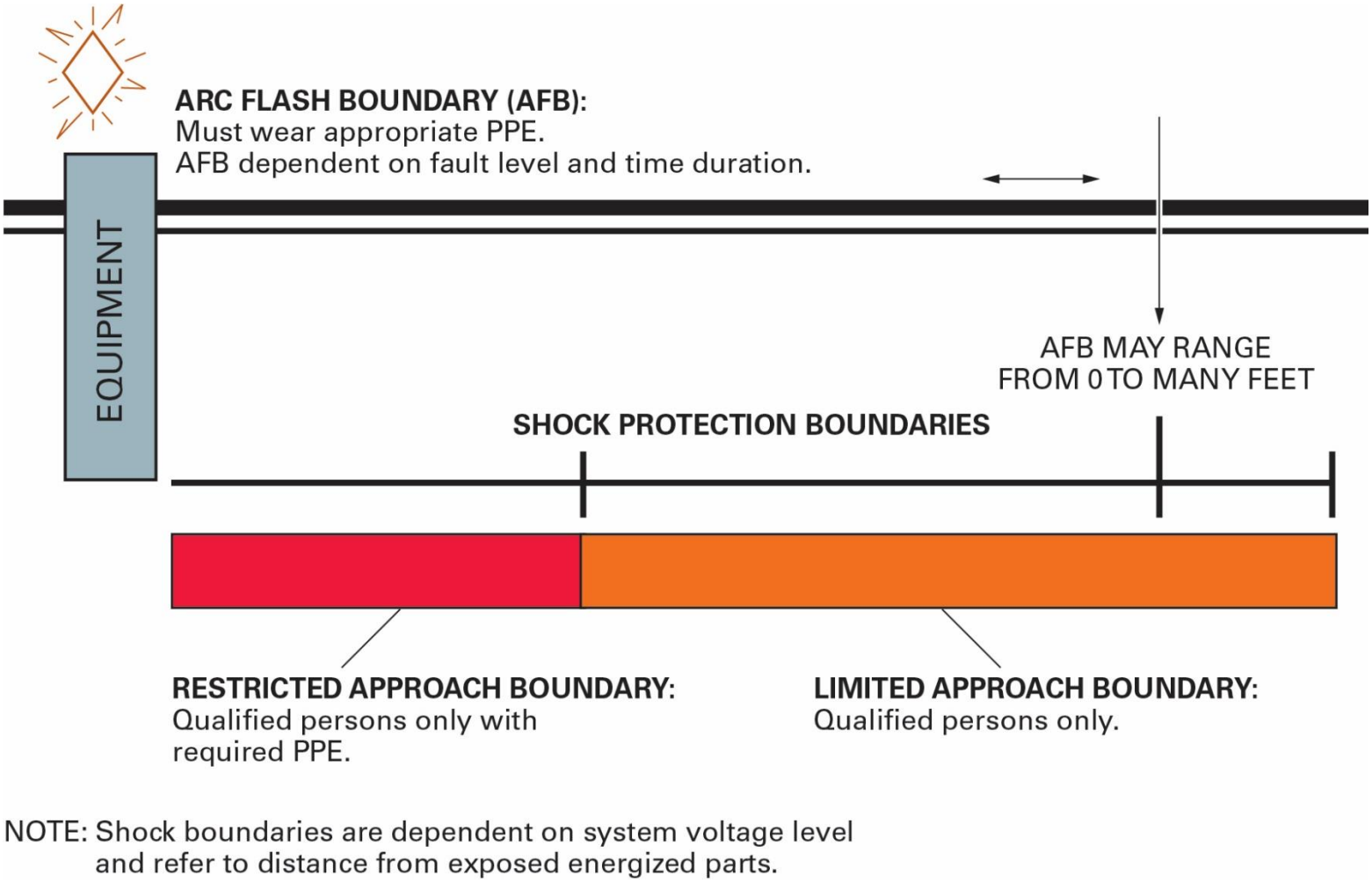


(B) LOCKOUT/TAGOUT CORD DEVICE

3.1.4 What's wrong with this picture?

Figure Credit: Mike Powers

3.2.0 – 3.2.2 NFPA 70E®



NOTE: Shock boundaries are dependent on system voltage level and refer to distance from exposed energized parts.

Wrap Up – Trade Terms (1 of 4)

Arc flash boundary (AFB): An approach limit at a distance from exposed energized electrical conductors or circuit parts within which a person could receive a second-degree burn if an electrical arc flash were to occur.

Arc flash risk assessment: A study investigating a worker's potential exposure to arc flash energy, conducted for the purpose of injury prevention and the determination of safe work practices and appropriate levels of PPE.

Wrap Up – Trade Terms (2 of 4)

Arc rating: The maximum incident energy resistance demonstrated by a material (or a layered system of materials) prior to material breakdown, or at the onset of a second-degree skin burn. Expressed in joules/cm^2 or calories/cm^2.

Error precursors: Situations that put a worker at risk due to the demands of the task, conditions, worker attitude, and/or environment.

Grounded tool: An electrical tool with a three-prong plug at the end of its power cord or some other means to ensure that stray current travels to ground without passing through the body of the user. The ground plug is bonded to the conductive frame of the tool.

Wrap Up – Trade Terms (3 of 4)

Incident energy: The amount of thermal energy impressed on a surface at a certain distance from the source of an electrical arc. Incident energy is typically expressed in calories per square centimeter (cal/cm^2).

Limited approach boundary: An approach limit at a distance from an exposed energized electrical conductor or circuit part within which a shock hazard exists.

Qualified person: One who has demonstrated the skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to identify and avoid the hazards involved.

Wrap Up – Trade Terms (4 of 4)

Restricted approach boundary: An approach limit at a distance from an exposed energized electrical conductor or circuit part within which there is an increased likelihood of electric shock.

Unqualified person: A person who is not a qualified person.

Next…

Section 4.0.0
Hazards and Safety Requirements

Read Sections 4.4.0 through 4.6.3 and complete the Section Review questions.