ARTICLE

110 REQUIREMENTS FOR ELECTRICAL INSTALLATIONS

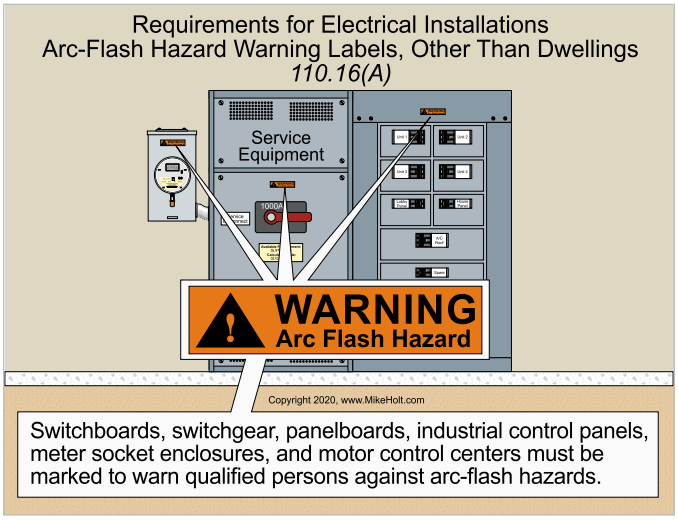
Introduction to Article 110—Requirements for Electrical Installations

Article 110 sets the stage for how the rest of the *NEC* is implemented. It is critical for you to completely understand all aspects of this article since it is the foundation for much of the *Code*. As you read and master Article 110, you are building your foundation for correctly applying the *NEC*. While the purpose of the *National Electrical Code* is to provide a safe installation, this article is perhaps focused a little more on providing an installation that is safe for the installer and maintenance electrician, so time spent here is a good investment.

110.16 Arc Flash Hazard Warning

Scan this QR code for a video of Mike explaining this topic; it's a sample from the videos that accompany this textbook.
www.MikeHolt.com/20UN1videos

(A) Arc Flash Hazard Warning Label. In other than dwelling units, switchboards, switchgear, panelboards, industrial control panels, meter socket enclosures, and motor control centers must be marked to warn qualified persons of the danger associated with an arc flash resulting from a short circuit or ground fault. The arc flash hazard warning label must be permanently affixed, have sufficient durability to withstand the environment involved [110.21(B)], and be clearly visible to qualified persons before they examine, adjust, service, or perform maintenance on the equipment. ▸Figure 110–45



▸Figure 110–45

Author's Comment:

- According to Article 100, a "Qualified Person" is one who has the skill and knowledge related to the construction and operation of electrical equipment and its installation. This person must have received safety training to recognize and avoid the hazards involved with electrical systems.
- NFPA 70E, *Standard for Electrical Safety in the Workplace*, provides information on the safety training requirements expected of a "qualified person."
- Examples of this safety training include (but are not limited to) training in the use of special precautionary techniques, personal protective equipment (PPE), insulating and shielding materials, and in the use of insulated tools and test equipment when working on or near exposed conductors or circuit parts that can become energized.
- In many parts of the United States, electricians, electrical contractors, electrical inspectors, and electrical engineers must complete from 6 to 24 hours of *NEC* review each year as a requirement to maintain licensing. This does not necessarily make one qualified to deal with the specific hazards involved with electrical systems.
- This rule is intended to warn qualified persons who work on energized electrical systems that an arc flash hazard exists and to the level of danger present. They will then be able to select the necessary personal protective equipment (PPE) in accordance with industry accepted safe work practice standards. ▸Figure 110–46

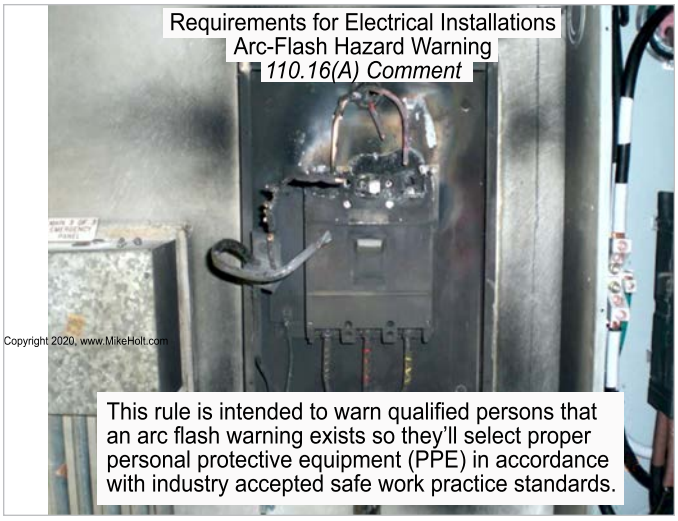


Figure 110–46

(B) Service Disconnect. In addition to the requirements in 110.16(A), a service disconnect rated 1,200A or more must have a field or factory installed label containing the following details and have sufficient durability to withstand the environment: Figure 110–47

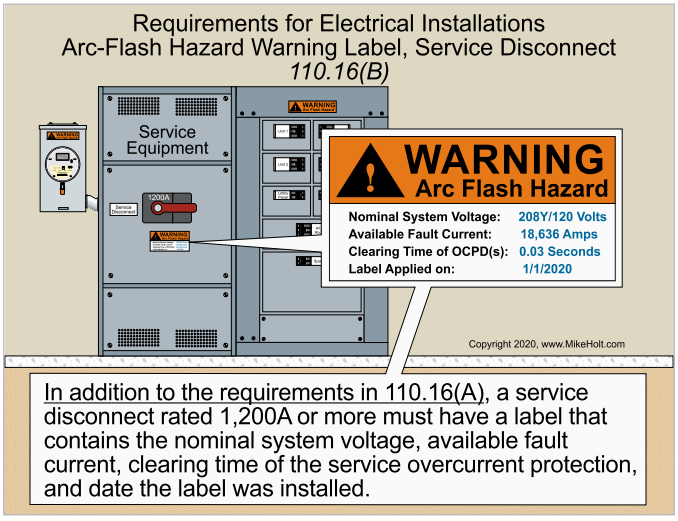


Figure 110–47

(1) Nominal system voltage

(2) Available fault current at the line-side of the service overcurrent protective device

(3) Clearing time of the service overcurrent protective device

(4) Date the label was installed

Author's Comment:

- Determining the available fault current on the line side of equipment terminals requires you to know the available fault current (provided by the electric utility), the conductor material, the length of the conductors, and the wiring method used to install the conductors. With this information, you can use an app or computer software to determine the available fault current at the line terminals.

Ex: Service disconnect fault current labeling is not required if an arc flash label in accordance with NFPA 70E, Standard for Electrical Safety in the Workplace, *is applied. See Note 3.* Figure 110–48

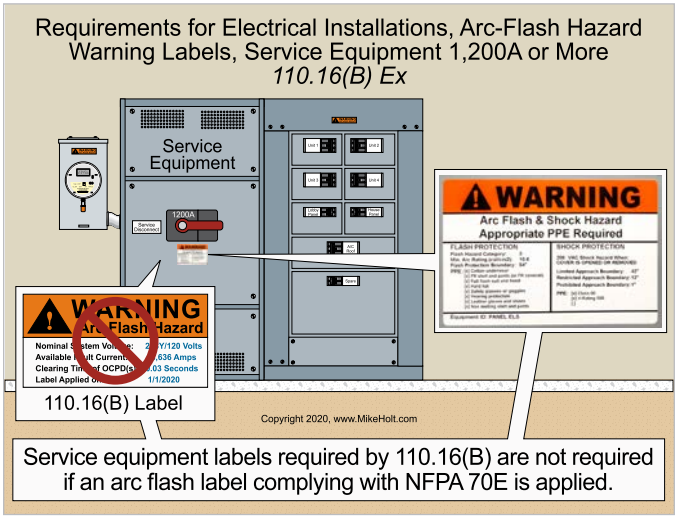


Figure 110–48

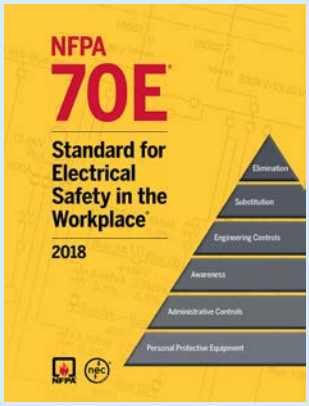
Note 1: NFPA 70E, *Standard for Electrical Safety in the Workplace,* provides guidance in determining the severity of potential exposure, planning safe work practices, arc flash labeling, and selecting personal protective equipment. Figure 110–49

Note 3: NFPA 70E, *Standard for Electrical Safety in the Workplace* provides specific criteria for developing arc flash labels such as nominal system voltage, incident energy levels, arc flash boundaries, and selecting personal protective equipment.

Author's Comment:

- The information required by 110.16(B)(1), (2), and (3) is necessary in order to determine the incident energy and arc flash boundary distance by using of an app or computer software to ensure the label complies with NFPA 70E to increase safety during future work on service equipment.

Requirements for Electrical Installations
Arc-Flash Hazard Warning Labels, Service Equipment
110.16(B) Note 1



NFPA 70E, *Standard for Electrical Safety in the Workplace*, provides guidance in determining the severity of potential exposure, planning safe work practices, arc-flash labeling, and selecting personal protective equipment.

Figure 110–49