

Arc Flash Hazard Analysis

Understanding arc flash,
the hazards it presents in
the workplace and how
analysis can help



Did you know?

- arc flash can reach temperatures hotter than four times the sun's surface
- five to six victims of arc flash hazards are hospitalized daily
- as many as 80% of all electrical injuries are caused by arc flash

What is arc flash?

Arc flash is often described as a short circuit through the air. It is a very hazardous situation associated with an explosive discharge of energy caused by an electric arc. Electric arcs can occur due to poor electrical contact or failed insulation. Such situations allow the passage of substantial amounts of current through the vaporized terminal material—usually metal or carbon. The arc flash comes from the heat and light produced by the arc.



Potential Injury

As many as 80% of all electrical injuries are caused by burns resulting from exposure to energy released from an arcing fault—an arc flash. Typically exposed workers receive second or third degree burns that are often fatal. Other injuries can also occur. An exposed worker can experience concussions, collapsed lungs, hearing loss and broken bones.

Industry Standards

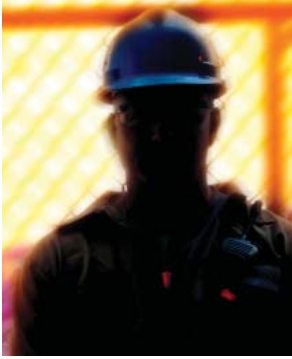
There are four separate industry standards that establish practices for the prevention of arc flash incidents. They are:



- OSHA 29 Code of Federal Regulations (CFR) Part 1910, Subpart S
- NFPA 70-2008, National Electrical Code
- NFPA 70E-2009, Standard for Electrical Safety in the Workplace
- IEEE Standard 1584-2002

Arc Flash Hazard Analysis

To determine the potential arc flash associated with exposed energized circuits, an arc flash hazard analysis is required. This analysis calculates the intensity of the arc flash at various distances.



The analysis is necessary for determining the flash protection boundary distances and the type of PPE, or personal protective equipment that is required.

Flash Protection Boundary

To establish this information, an incident energy calculation is generally necessary. Calculations that take into consideration the true operating conditions of a specific facility can be performed using the methods outlined in either NFPA 70E or IEEE Standard 1584. These calculations will result in the determination of the Flash Protection Boundary as well as the incident energy potential of the arc flash incident.

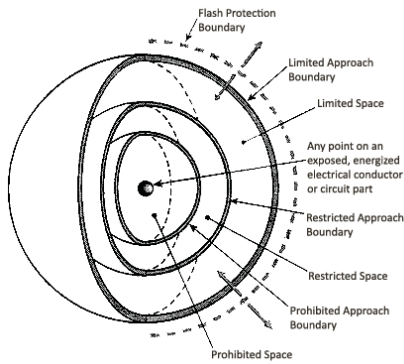


Figure C.1.2.4 Limits of Approach. Illustration from NFPA 70E 2009.

Performing an Arc Flash Hazard Analysis

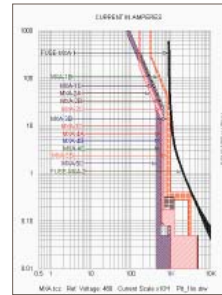
To perform an arc flash hazard analysis we have to start with a short circuit/fault current analysis and continue with a protective device coordination analysis. After these studies have been completed, we do our arc flash hazard analysis.

• Short circuit/fault current analysis

A short circuit/fault current analysis is essential for personnel safety, equipment protection and system reliability that electrical system equipment be adequately rated for the maximum short circuit currents. This study calculates the maximum available fault currents throughout the system and establishes the adequacy of the equipment short circuit ratings to assure a safe, reliable system. These fault conditions are representative of the amount of energy available to an arc flash event.

• Protective device coordination analysis

In a properly coordinated system, the protective device nearest the fault condition operates to isolate the faulted circuit without disrupting power to other portions of the system. A protective device coordination analysis determines the potential protective device trip/operating times which would apply during an arc flash event.

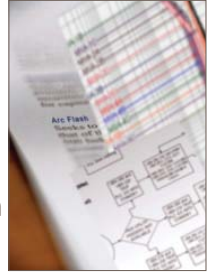


• Arc flash analysis and calculations

The incident energy generated by an arc flash event is a function of the available energy of the fault condition and the duration of the fault condition. An arc flash analysis uses the information provided by performing the short circuit/fault current analysis and the protective device coordination analysis to determine incident energies and associated working distances.

Arc Flash Hazard Analysis Report

After completing the analysis and calculations, we will prepare and submit an Arc Flash Hazards Analysis report for your review. This report will include a modeled single-line drawing, a short circuit analysis for the applicable portions of the electrical system, the applicable arc flash hazards analysis and calculations on a component basis, a summary table of the analyses for the facility and our recommendations associated with minimizing the arc flash hazards.



Implement Arc Flash Signage

! WARNING	
Arc Flash and Shock Hazard	
Appropriate PPE Required	
65 inch	Flash Hazard Boundary
5.26	cal/cm ² Flash Hazard at 24 inches
Class 2	Cotton Underwear + FR Shirt & Pants
480 VAC	Shock Hazard when cover is removed
42 inch	Limited Approach
12 inch	Restricted Approach
1 inch	Prohibited Approach
Bus Name: LC1 BLDG 1, Prot Device: LC1-1B (MAIN)	

Based on the arc flash analysis we provide arc flash signage for implementation. Labels for the electrical infrastructure equipment can be printed and affixed.

NEC Article 110.16 on Flash Protection requires labeling on switchboards, panel boards, motor control centers and industrial control panels so the electrical workers are made aware of the potential hazards and can take appropriate action. Our goal is not only to meet the industry standards, but to help our clients protect their employees from a preventable accident.

Let us help you

We take arc flash and it's deadly potential very seriously. We can show your facility the way to safety. Arc flash hazard analysis is just the first step.



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