

WHAT IS AN ARC FLASH?

An arc flash is a phenomenon where a flashover of electric current leaves its intended path and travels through the air from one conductor to another, or to the ground. The results of this blast are often violent. When a person is near an arc flash, serious injury and even death may occur.

An arc flash can be caused from:

- Dust Accumulation
- Accidental touching
- Condensation
- Material failure
- Corrosion
- Faulty installation

The most common results of an arc flash include:

- Burns (non-fire-retardant clothing can burn onto skin)
- Fire (could spread rapidly through building)
- Flying objects (often molten metal)
- Blast pressure (upwards of 2,000 lbs. / sq. ft.)
- Sound blast (noise can reach 140 dB – as loud as a gun)
- Heat (upwards of 35,000 degrees F)

To be compliant with OSHA, a company must adhere to the following six-point plan:

- A facility must provide, and be able to demonstrate, a safety program with defined responsibilities
- Calculations for the degree of arc flash hazard
- Correct personal protective equipment (PPE) for workers
- Training for workers on the hazards of arc flash
- Appropriate tools for safe working
- Warning labels on equipment



For more information on our services or to request a quote, contact us today!



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ARC FLASH ANALYSIS INFORMATION



WHAT IS AN ARC FLASH ANALYSIS?

An arc flash analysis is a continuation of a short circuit and coordination study. These studies are done to determine the amount of current flow that can occur at points in an electrical system as a result of a short. The findings indicate whether the electrical system could interrupt the power with the use of equipment. The final analysis is geared towards understanding and preventing arc flash hazards.

At Jaminet Engineering, we utilize SKM Power*Tools, a specialized power analysis software, to aid in developing an accurate and detailed report.

OUR PROCESS

Data Collection:

We start the research phase of our analysis by collecting data from the facility with the use of one-line diagrams. Each drawing indicates circuit breakers, conductors and power sources. The modes of operation are then used to study worst case scenarios that may lead to arc flash.

Examination:

Once we have collected the initial data, our team will complete a short circuit study for the electrical distribution system. Spreadsheets will be developed to itemize the equipment in the facility with a kAIC rating of the equipment installed, and available fault currents at the equipment. In addition, we will perform an over current device coordination study that includes protective device coordination charts. Finally, we will produce a file that documents all current setting on adjustable protective devices, as well as suggested modifications to the settings, that would result in a safer, more coordinated electrical system.

Development of the Arc Flash Hazard Analysis:

Once we have finalized our study, we determine incident energies and flash protection boundaries, respectively, for all equipment at the facility. The incident energy is the energy needed for an arc flash to cause a second-degree burn. The flash protection boundary is specified as the distance where the incident energy, or second-degree burns, are caused. The incident energy and arc flash boundaries are calculated using equations recommended by either the NFPA or IEEE.

WARNING	
Arc Flash and Shock Risk	
Appropriate PPE Required	
240 VAC	Shock Risk when cover is removed
42 in	Limited Approach
12 in	Restricted Approach
23 in	Flash Risk Boundary
1.8 cal/cm²	Flash Risk at 18 in
Identification:	EQUIP
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Warning: Changes in equipment settings or system configuration will invalidate the calculated values.	

Why is the arc flash study important?

Arc flashes are very dangerous and can be fatal to those exposed. Victims who survive the blast may require extended medical care and will most likely never regain their past quality of life. In most cases, the financial cost of a person being harmed by an arc flash will be detrimental to a business.

In the early 1980's, Ralph Lee published an article in IEEE Transactions on Industrial Applications that was titled, "The Other Electrical Hazard: Electric Arc Blast Burns." This publication helped create new industry standards for protecting people from the hazards of an arc flash.

The industry standards concerning the prevention of arc flash incidents include:

- OSHA 29 Code of Federal Regulations (CFR) Part 1910 Subpart S.
- NFPA 70-2002 National Electrical Code
- NFPA 70E-2000 Standard for Electrical Safety Requirements for Employee Workplaces
- IEEE Standard 1584-2002 Guide for Performing Arc Flash Hazard Calculations