

Fact Sheet #5 - Flash Hazard Assessments

An arc flash is the result of a rapid release of energy due to an arcing fault between conductors. The conductive material usually burns away from the intense heat. If conditions are right, the flow of energy can continue through a highly conductive plasma region established in the vicinity of the arc. The result is a violent discharge that vaporizes the conductors, creating an arc blast. This blast can release lethal amounts of heat, molten metal, and shrapnel into the surrounding area.

Considering the possible consequences of an arc flash, it is not surprising that the *National Fire Protection Association (NFPA) 70E - Standard for Electrical Safety in the Workplace* requires that a flash hazard analysis be conducted and mitigation strategies be implemented to prevent an arc flash event.



Possible Result of an Arc Flash

An arc-flash hazard analysis is a study of a worker's potential exposure to arc-flash energy conducted for the purpose of injury prevention and determination of safe work practices, arc-

flash-protection boundary distances, and appropriate levels of Personal Protective Equipment (PPE). Calculations take into account the magnitude of available incident energy and the duration that this energy is available based on shutdown times of equipment protective devices, such as circuit breakers and fuses.

To perform the arc-flash hazard analysis, a description of the electrical distribution system is needed. This information includes the nameplate ratings of the devices, how the equipment is arranged, and lengths and cross-sections of the conductors. Much, but not all, of this information is included in "Electrical One-line" diagrams. For existing systems, a comprehensive field assessment is necessary to obtain and verify the data.

Once all the required information is gathered, it is input into a computer program that performs the actual calculations based on formulas from the *Institute of Electrical and Electronics Engineers (IEEE) standard, 1584 - 2002*. Using the results of these calculations, engineers conduct a coordination study to ensure that all in-line component characteristics, such as wire sizes and over-current protective devices are chosen and adjusted to minimize the flash hazard potential. The program also provides the content for warning labels intended to be affixed to the equipment. These labels identify the level of arc-flash hazard, PPE to be worn when working on the equipment, and the associated flash protection boundary.

The intense heat, molten metal, and shrapnel expelled during an arc flash could present a significant hazard to staff. An arc flash hazard analysis helps to assure employee safety against the dangers associated with an arc flash by identifying the hazard level, work zones, and appropriate PPE to be worn when working on this type of equipment.