

## Arc Flash Solutions

- *Ensure compliance with regulatory requirements*
- *Improve worker safety*
- *Reduce lost worker productivity*
- *Ensure optimum system performance, and efficiency*
- *Single point solutions for every threat facing your critical facility*



### Introduction

Electrical hazards—specifically shock, arc flash, and arc blast—can result in serious injury or death to electrical workers. Ensuring worker safety and meeting the challenges of the new arc flash safety requirements can be a difficult task to accomplish in-house without the assistance of resources familiar with industry standards and recommended practices. Consider the benefits of partnering with

Emerson to help develop and implement a complete, cost-effective arc flash solution. As the leader in electrical testing, maintenance and engineering services, we are equipped to provide single point solutions for every area affecting arc flash hazards. From arc flash calculations, personal protective equipment (PPE) recommendations and engineering

support, to complete program development, implementation and training, Emerson can help you ensure worker safety and regulatory compliance. Avoid accidents, productivity losses, costly fines and higher insurance costs by working with the industry experts.

### **Arc Flash Solutions**

Select a single component, a combination of components or an entire program from a comprehensive portfolio of arc flash solutions:

- *Arc Flash Hazard Analysis*
- *Arc Flash Hazard Labeling Plan*
- *Site Review / Compliance Assessment*
- *Design Review*
- *Single-Line Diagrams*
- *Short Circuit and Coordination Studies*
- *Preventive Maintenance*
- *Electrical Safety Program Review / Development*
- *Training and Performance Evaluation*
- *Personal Protective Equipment Plan*
- *Optional Annual Re-certification*
- *Documentation*

### **Arc Flash Hazard Analysis**

The National Fire Protection Association Guidelines (NFPA 70E) requires facility owners to perform an arc flash hazard analysis prior to allowing a worker to perform a task on energized equipment. The arc flash analysis identifies the presence and location of potential hazards

and provides recommendations for PPE, boundaries for limited, restricted and prohibited approaches, recommendations for flash protection, and safe work practices. To calculate incident energy, technical data is reviewed and additional data is collected such as equipment type, voltage, ratings, impedance, etc. The safest option to conduct this analysis is to utilize an outside contractor trained in this procedure. Emerson's technical staff is "qualified" according to the new NEC definition and has undergone specific training in the hazards of working on energized equipment, and the use and proper application of PPE.

To provide accurate results, state-of-the-art software is utilized to perform the arc flash calculations and then compares both the NFPA and IEEE standards. The software enables users to evaluate alternatives quickly and easily to establish an optimal design.

### **Arc Flash Hazard Labeling Plan**

Electrical inspectors are enforcing the labeling requirements published in the most recent National Electrical Code (NEC 110.16) that states a warning label must be placed on electrical equipment that may remain energized during maintenance or repair. Emerson can assist with compliance during each phase of an arc flash hazard analysis. In the initial phase, Emerson supplies

the labels and can also assist in applying the appropriate warning labels and signs. As part of an on-going labeling plan, updated labels can be provided to accommodate equipment, system or regulatory updates.

### **Site Review / Compliance Assessment**

The Occupational Health and Safety Administration (OSHA) is diligent in enforcing the NFPA 70E guidelines. To ensure compliance, Emerson can determine the necessary steps to fulfill the more general statements in the OSHA standards. We conduct a comprehensive assessment at your facility to identify areas of risk and non-compliance. A plan is then formulated to bring your facility into compliance in the most efficient way possible.

### **Design Review**

Emerson's technical staff can conduct a design review of your electrical distribution system to identify areas to reduce potential arc flash hazards. Several areas are evaluated including fault levels, exposure times, remote operations, remote racking, and system grounding. Employing special devices and altering current design can significantly reduce fault levels, arcing time, arc incident energy, and arc blast force. Conducting a design review is the most effective way to uncover potential hazards so these types of solutions can be

# Electrical Reliability Services

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employed.

## Single-Line Diagrams

NFPA-70E requirements mandate accurate, up-to-date single-line diagrams. These documents are essential for documenting, troubleshooting, and communicating information about your power systems. To meet these requirements, Emerson can conduct a comprehensive site survey that is essential to developing or updating existing single-line diagrams or complete electrical system drawings.

## Short Circuit and Coordination Studies

The Petroleum and Chemical Industry Committee (PCIC) recommends that Arc Flash calculations be completed in conjunction with short circuit calculations and protective device coordination to achieve the most accurate arc flash hazard results. Short circuit and coordination studies verify protective devices and arc hazard ratings, calculate momentary interrupting and relay currents, establish settings for all types of protective devices, and coordinate your entire power distribution system to minimize downtime. Emerson specializes in conducting these studies that provide critical information you need to ensure compliance with NFPA and OSHA requirements.

## Preventive Maintenance

Emerson can assist in developing a preventive maintenance program to specifically address arc flash hazards. Our optimized preventive maintenance program evaluates the equipment's condition and determines the most cost-effective and manageable solution to ensure your protective devices operate properly, safely, and reliably—eliminating prolonged exposure to arc flash, which could result in disabling injuries or death.

## Electrical Safety Program Review / Development

NFPA 70E requires every facility to establish an electrical safety program. Emerson can assist in reviewing or developing a comprehensive electrical safety program that supports an overall site safety program.

An effective program should include a certified training program, awareness of electrical hazards, and self-discipline of employees. It should also identify hazard/risk evaluation procedures, electrically safe work procedures, tools and PPE, and electrical safety principles—particularly safety by design. As part of the overall safety program, Emerson can assist you in developing an effective safety audit process, creating and maintaining a safety manual, and planning and conducting safety meetings.

## Training

An effective arc flash training program should provide workers

the knowledge and understanding of the existence, nature, causes, and methods to prevent electrical hazards. Emerson's arc flash training program includes training on arc flash awareness, standards and codes, understanding of arc flash quantities, selection and use of appropriate PPE, reading and following warning signs and labels, methods to reduce risk while working on live exposed parts, arc flash hazard assessment, and documentation.

## Personal Protective Equipment Plan

Emerson's Personal Protective Equipment Plan addresses all OSHA standards regarding PPE to ensure compliance. Based on the findings of the arc flash analysis, Emerson will provide PPE category requirements and recommendations. We can also assist in the selection and supply of recommended equipment on which workers will be trained. Our team will address when the PPE is necessary and what equipment is needed. Emerson's approach covers how PPE should be worn, maintained, and disposed of after the equipment life has expired.

## Optional Annual Re-certification

Ongoing arc flash hazard research and development will likely produce additions to arc flash requirements. As modifications or expansions to your electrical distribution system are made, or

as changes occur in the electric utility system, it will be necessary to update arc flash assessment information on a regular basis. It will also be necessary to update worker training on an annual basis. Emerson can provide annual follow-up site visits to ensure continued compliance with applicable arc flash standards, practices, and regulations. The site inspection includes a written report of findings and recommendations.

## Documentation

Proper documentation ensures compliance with OSHA and NFPA standards and facilitates an investigation should an arc flash related injury occur. Thorough documentation is one of Emerson's strengths. Our arc flash compliance plan consists of a customized written report that includes the results of the arc flash analysis, updated single-line drawings of electrical

systems, signs and labels on equipment, and at hazardous areas. Also included are the type, name/ID, incident energy at working distances, flash protection boundary, hazard/risk category, and other pertinent information such as voltage, available fault current, protective device description and its trip time, arc gap, and arc current. Documentation can also be provided as part of the safety program and documentation of training provided to workers.

## Summary

Arc flash is a serious hazard with potentially devastating effects. NFPA 70E requirements aid facilities and users of electricity in understanding how to reduce the probability of an event and the devastating effect from one. Therefore, OSHA is strictly enforcing these requirements. By complying, your facility supports

the goal of reducing injuries and down time. However, you don't have to go it alone. Rely on the experts at Emerson to help you implement an arc flash program. Whether you require a full-blown program or short-term assistance with arc flash calculations, Emerson is your source. Establishing an effective arc flash program will help reduce your risk, provide required worker safety, and ensure regulatory compliance.

## Ordering Information

To learn more about this service and other Emerson Process Management solutions, please contact your local Electrical Reliability Services sales representative office or visit us on the web at: [www.assetweb.com/ers](http://www.assetweb.com/ers). In the U.S., call 1-877-468-6384.

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