

ARC FLASH SOLUTIONS

Electrical Engineering Services



Electrical Reliability Services

OVERVIEW

Be Safe and Compliant

Arc flash is a serious hazard with potentially devastating effects. Ensuring worker safety and meeting the challenges of the new arc flash safety requirements can be a difficult task.

Trust Vertiv's Electrical Reliability Services (ERS) to deliver the most complete solutions for arc flash compliance. From risk assessment and labeling to personal protective equipment (PPE) and training, ERS will provide you with the industry's best safety programs, while reducing your risk and ensuring regulatory compliance.

Whether you require a complete program or short-term assistance with arc flash calculations, ERS has a solution to fit your needs.

Benefits

- Ensure compliance with regulatory requirements
- Avoid costly fines and higher insurance costs
- Improve worker safety
- Reduce lost worker productivity
- Ensure optimum system performance, safety and efficiency
- Minimize threats to your critical facility with solutions from a single source



Ensure worker safety and regulatory compliance with comprehensive arc flash solutions

Electrical hazards, specifically shock, arc flash and arc blast, can result in serious injury or death to electrical workers. Ensuring safety and meeting regulatory requirements can be difficult to accomplish in-house without the assistance of resources familiar with industry standards and recommended practices. Consider the benefits of partnering with ERS to help develop and implement a complete, cost-effective, single-point arc flash solution.

Our comprehensive portfolio of arc flash solutions includes:

- Risk assessment
- Site review / compliance assessment
- Protective scheme design review
- Short circuit and coordination studies
- Single-line diagrams
- Arc flash analysis
- Hazard labeling plan
- Electrical safety program review / development
- Training and performance evaluation
- PPE plan
- Preventive maintenance
- Documentation
- Optional annual re-certification

Risk Assessment

The National Fire Protection Association's Standard for Electrical Safety in the Workplace® (NFPA 70E) requires facility owners to perform an arc flash risk assessment prior to allowing a worker to perform a task on or near energized equipment. The risk assessment identifies the presence and location of potential hazards and provides recommendations on PPE, boundaries for limited and restricted approaches, flash protection, shock protection and safe work practices.

To calculate the incident energy, all technical data such as equipment type, voltage, ratings, impedance, etc., is collected and reviewed.

An effective way to conduct an assessment is to utilize an outside contractor trained in this procedure. The technical staff of ERS is qualified according to the National Electrical Code definition. Our qualified electrical workers have undergone specific training in the hazards of working on energized equipment, and the use and proper application of PPE.

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To provide accurate results, state-of-the-art software (e.g., SKM, ETAP®, EasyPower®) is utilized to perform arc flash calculations in accordance with the standards of NFPA and the Institute of Electrical and Electronics Engineers (IEEE). These software packages enable users to evaluate alternatives quickly and easily in order to establish optimal protective schemes and device settings.

Hazard Labeling Plan

NFPA 70E mandates that electrical equipment such as switchboards, panelboards, industrial control panels, and motor control centers, that are likely to require maintenance while energized, must be field marked with a label. ERS can assist with compliance during each phase of an arc flash risk assessment. Once the initial assessment has been performed, ERS supplies the labels and can assist in applying the appropriate hazard warning labels. As part of an ongoing labeling plan, updated labels can be provided to accommodate equipment or system changes, or regulatory updates.

⚠ DANGER	
SHOCK and ARC FLASH HAZARD	
PNL 3	
480 VAC	Shock Hazard
00	Class Glove with Leather Protectors
42 in	Limited Approach (Fixed Circuit)
12 in	Restricted Approach
<hr/>	
14 cal/cm²	Incident Energy at 18 in
82 in	Arc Flash Boundary
ARC FLASH PPE REQUIRED	
Arc-rated (AR) long sleeve shirt & AR pants or AR coverall and/or AR flash suit, AR face shield & AR balaclava or AR flash suit hood, hard hat, safety glasses/goggles, hearing protection, leather footwear	
WARNING: Power system changes will invalidate the information on this label	
VERTIV.	Electrical Reliability Services, Inc.
ers.VertivCo.com	(562) 236-9555
Job#: SAMPLE1	05/18/17 By: ERS

⚠ DANGER	
SHOCK and ARC FLASH HAZARD	
PNL 1	
480 VAC	Shock Hazard
00	Class Glove with Leather Protectors
42 in	Limited Approach (Fixed Circuit)
12 in	Restricted Approach
<hr/>	
2.0 cal/cm²	Incident Energy at 18 in
25 in	Arc Flash Boundary
ARC FLASH PPE REQUIRED	
Arc-rated (AR) long sleeve shirt & AR pants or AR coverall or AR flash suit, AR face shield & AR balaclava or AR flash suit hood, hard hat, safety glasses/goggles, hearing protection, leather gloves, leather footwear	
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Site Review / Compliance Assessment

The Occupational Safety and Health Administration (OSHA) can and does enforce its requirements. To ensure compliance, ERS will determine the steps needed to meet OSHA and NFPA requirements. By conducting a comprehensive assessment to identify areas of risk and non-compliance, we will formulate a plan to bring your facility into compliance in the most efficient way possible.

Protective Scheme Design Review

ERS's technical staff can conduct a protective scheme design review and operational assessment of your electrical distribution system to identify areas for reducing potential arc flash hazards. Several areas are evaluated including fault current levels, arc exposure times, operational procedures (such as remote breaker control and remote racking), and system grounding. Conducting a design review is the most effective way to uncover potential hazards, so options can be evaluated and mitigation strategies can be employed.



"It was necessary for us to have one vendor for our arc flash, safety, and training programs. Based on our previous experience with Vertiv's Electrical Reliability Services, we knew we would receive world-class experience and solutions that would address all of our critical needs. We are very satisfied with every phase of the program we received."

- Ramy Maharaj, Utility Maintenance Supervisor

Single-Line Diagrams

National Electrical Code (NEC) requirements mandate accurate, up-to-date single-line diagrams. These schematics are essential for documenting, troubleshooting, and communicating information about your power systems. To meet these requirements, ERS conducts a comprehensive site survey that is essential to developing or updating existing single-line diagrams or completing electrical system drawings.

Short Circuit and Coordination Studies

To achieve the most accurate arc flash hazard results, it is recommended that arc flash calculations be completed in conjunction with short circuit calculations and protective device coordination. Short circuit and coordination studies verify protective device ratings, calculate momentary and interrupting currents, establish settings for all types of protective devices, and coordinate protective devices to minimize downtime. ERS specializes in conducting these studies which provide critical information needed to ensure compliance with NFPA and OSHA requirements.

Preventive Maintenance

NFPA 70E requires maintenance to be performed on electrical equipment in accordance with manufacturers' instructions or industry consensus standards. ERS 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. Proper maintenance will ensure that you are in compliance with the NFPA 70E requirements permitting "normal operation" of equipment reducing hazards, thus often allowing tasks to be accomplished safely and without the need of extensive PPE.

Electrical Safety Program Review / Development

OSHA requires every facility to establish an electrical safety program. ERS can assist in reviewing or developing a comprehensive electrical safety program that supports an overall site safety program.

ERS can design an effective customized program to provide training and create awareness of potential electrical hazards. This program will also identify hazard / risk evaluation procedures, electrically safe work procedures, tools and PPE requirements, and risk mitigation strategies. The electrical safety program must be documented and audited at least every three years. As part of the overall safety program, we will assist you in developing an effective safety audit process, creating and maintaining a safety manual, and planning and conducting safety meetings.

Training and Performance Evaluation

An effective electrical safety training program should provide workers with the knowledge and understanding of the existence, nature, and causes of electrical hazards, and methods for preventing them. ERS's arc flash training can include sessions on building employee awareness of the potential electrical hazards present, identifying arc flash hazard and assessing risk, understanding of quantities, selection, and use of appropriate arc flash PPE, reading and following hazard warning labels, and reducing risk while working on live exposed parts. Training can also cover safety policy review and recommendations, overview of applicable standards and codes, and required documentation.

PPE Plan

PPE plans developed by ERS address all relevant OSHA standards to ensure compliance. Based on the findings of the arc flash risk assessment, we will provide incident energy information and PPE recommendations, based on calculated IE values. We can also assist in the selection and supply of recommended equipment on which workers will be trained. Our team will address when PPE is necessary and what equipment is needed. ERS's approach can cover 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.

In some cases it will be necessary to update worker training on an annual basis. ERS can provide annual follow-up site visits to ensure continued compliance with applicable arc flash standards, practices and regulations. The audit includes a written report of findings and recommendations.

Documentation

Proper documentation will help you prove compliance with OSHA and NFPA standards, and facilitate an investigation should an arc flash related injury occur. Thorough documentation is one of ERS's strengths. Our arc flash compliance plan consists of a customized written report that includes results of the arc flash risk assessment, updated single-line drawings of electrical systems, and signs and labels on equipment and in hazardous areas.

Also included are the type, name/ID, incident energy at working distances, flash protection boundary, and other pertinent information such as voltage, available fault current, protective device description and its trip time, arc gap, and arc current.

Qualified Electrical Worker program documentation can also be provided as part of the safety and worker training program, demonstrating compliance in case of an audit.

Summary

Arc flash is a serious hazard with potentially devastating effects. NFPA 70E requirements aid users of electricity in understanding how to reduce the probability of injury in case of an arc flash event. Therefore, OSHA strictly enforces these requirements. By complying, your facility supports the goal of reducing injuries and downtime.

However, you don't have to do it alone. Rely on the experts at ERS to help you implement an arc flash program. Whether you require a comprehensive program or short-term assistance with arc flash calculations, we can help.

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 Electrical Reliability Services solutions, please contact your local sales representative office or visit ers.Vertiv.com. In the United States, call 1-877-468-6384.