



NFWA 70E

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TECHNICAL TRAINING GROUP®

Electrical Safety and NFPA 70E 1/2 Day Awareness Class

Jim Phillips, P.E. is author of the guide *How to Perform an Arc Flash Study in 12 Steps*. His Arc Flash Training Courses have become the industry standard. Even instructors from other training companies have attended Jim's classes to see how it's done.

Train your staff with this shorter 1/2 Day electrical safety awareness class that takes you through the steps necessary to understand the requirements of NFPA 70E. The 1/2 day program provides electrical safety and arc flash awareness training but without the in depth problem solving found in the 1 Day course. Learn about the shock hazard and flash hazard analysis requirements as well as the purpose of energized work permits. See how to properly select Personal Protective Equipment based on the NFPA 70E Hazard/Risk Categories and how to comply with approach limits including the flash protection boundary.

Get your company into compliance today!

1/2 Day - 0.4 CEUs or 4 PDHs



What you **WILL** receive:

- Instructions on how to **Comply with NFPA 70E**
- How to develop an Electrical Safety Program
- Training manual containing over 100 pages
- Many examples and problems
- 4 hours of Continuing Education Credit

What you **WILL NOT** receive:

- A commercial to sell you PPE or equipment
- A sales pitch to sell engineering study services
- A class that is just an overview or teaser

What is so special about Jim Phillips' Arc Flash Class?

Jim is not only one of the most popular and sought after instructors in the industry, he is also directly involved with the development of arc flash standards and practices. He is a member of the IEEE working group that develops *IEEE Std. 1584tm, IEEE Guide for Performing Arc Flash Hazard Calculations*. This enables him to go well beyond the "typical" arc flash and electrical safety class taking you behind the scenes with information about arc flash tests, interpretations, current research as well as a very candid discussion of holes in the current standard and the direction of future research.



Biography

Jim Phillips, P.E.

Member of IEEE 1584 *IEEE Guide for Performing Arc Flash Hazard Calculations*

Co-Chairman of the IEEE Task Group - *IEEE 1584.1 Guide for the specification of scope and deliverable requirements for an arc-flash hazard calculation study in accordance with IEEE 1584*

Author of the book: *How to Perform an Arc Flash Calculation Study* available from NFPA's publisher Jones and Bartlett late 2009.

Has a regular column in Electrical Contractor Magazine *Arc Flash - Unplugged*

Founder of the internationally known website www.ArcFlashForum.com

For almost 30 years, Jim has been helping tens of thousands of people around the world understand electrical power systems design, safety, theory and applications. Having taught almost 2000 seminars during his career to people from all seven continents (Yes Antarctica is included!), he has developed a reputation for being one of the best trainers and public speakers in the electric power industry.

Jim does not just talk about arc flash and electrical safety - he is part of the development of the actual arc flash standards! He is also the instructor that has taught other instructors in the industry. Jim is a member of the IEEE 1584 Committee - *IEEE Guide for Performing Arc Flash Hazard Calculations* which is the predominant method for performing arc flash calculation studies. He is Co-Chairman of the IEEE Task Group - IEEE 1584.1 "Guide for the specification of scope and deliverable requirements for an arc-flash hazard calculation study in accordance with IEEE 1584"

He wrote "How to Perform an Arc Flash Study in 12 Steps" which was published by the NFPA. He just completed the book "How to Perform an Arc Flash Calculation Study" that will be released later in 2009 by NFPA's publisher. This book is a step by step approach for conducting the arc flash study and it answers many of the controversial questions about the codes and standards.

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Jim created the internationally known website www.ArcFlashForum.com which is used by the global community for understanding arc flash and electrical safety.

He writes a regular column titled *Arc Flash - Unplugged* for Electrical Contractor Magazine and previously was one of the main writers for the NEC Digest. He also authored several articles published in Europe as well as speaking at several European conferences about Arc Flash.

Throughout his career he has served on many committees including the Energy Policy Committee of IEEE in Washington DC. He is a member of The National Fire Protection Association - NFPA, The Power Engineering Society and the Industry Applications Society.

Jim earned a BSEE Degree in Electrical Engineering at the Ohio State University. After Ohio State, his first job was with Square D Company's Power System Analysis Group where he was responsible for system studies, power system software development and training at their engineering training programs. Jim is a Registered Professional Engineer in Ohio and Kentucky.

Later, Jim worked for Ohio Edison Company where he headed up the studies group of the System Protection Section. While working for Ohio Edison, he was part of the adjunct faculty for Stark State College where he taught evening classes in electrical power systems. Jim's experiences have included everything from planning transmission systems, to design and analysis of industrial and commercial power systems and cogeneration plants.

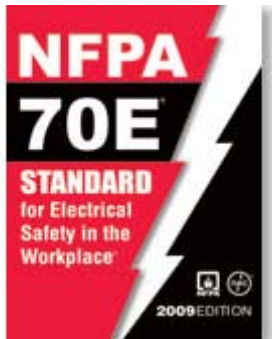
Jim's experiences have included everything from planning transmission systems, to design and analysis of industrial and commercial power systems and cogeneration plants. His teaching experience ultimately led to the creation of T2G Technical Training Group in the 1980's which provides training programs, videos and continuing education on a wide array of electrical power system topics.



Jim, in the high power lab setting up an arc flash test on a pad mount transformer.

Electrical Safety - NFPA 70E - 1/2 Day Course

Jim Phillips, P.E.



Attend this class and see how to:

- **Comply** with OSHA and NFPA 70E
- Perform the Flash Hazard and Shock Hazard assessment required by NFPA 70E when working above 50 Volts
- Define the Limited, Restricted and Prohibited Approach boundaries
- Create energized work permits
- Determine the Flash Protection Boundary
- Develop your **Electrical Safety Program**
- Determine required PPE from the NFPA 70E Tables

Receive answers to these questions and more:

- How do I use NFPA 70E Table 130.7(C)(9)(a) for the study?
- Can I use the tables and calculations?
- What do the foot notes mean on the tables?
- How do I develop an Electrical Safety Program?
- What are Hazard Risk Tables?
- What is a Shock Hazard Analysis?
- What is a Flash Hazard Analysis?
- What is an Energized Work Permit and how do I develop one?
- Who is exempt from needing an Energized Work Permit?
- How do I establish an electrically safe work condition?
- What does Limited, Restricted and Prohibited Approach Boundaries mean?
- What is a Flash Protection Boundary?
- What is significant about 1.2 Calories / cm²?
- Why are there different levels of PPE requirements for the same equipment?
- What equipment really needs labeled?
- Where do I obtain the required data?
- Are detailed arc flash labels with incident energy and boundaries required?
- Are time current curves a reliable way to determine arc flash clearing time?
- How long can an arc sustain itself? - **discussion of recent test data**.
- What about Arc Blast?
- Is 40 Calories / cm² really an upper limit?
- How can current limiting devices reduce the incident energy?
- Should I specify arc resistant equipment?
- How can I convince electrical workers and management of NFPA 70E's importance?
- Why is the *L/E ratio*tm so important?
- What is IEEE 1584 and how is it used?
- Does any standard require using IEEE 1584?
- How are arc flash tests performed?



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What is an Arc Flash?

An arc flash occurs when short circuit current flows across a gap creating an arc. and can be anything from minor embarrassing sparks to a deadly explosion.

The Arc Flash is usually caused by accidental contact between energized conductors from events such as dropping a screw driver or touching a wire. It can produce temperatures in the thousands of degrees, create extreme blast pressure, launch projectiles at hundreds of miles per hour, produce ultra-violet light that can blind. It can and does kill people!

The IEEE 1584 Working Group has been studying the effects of Arc Flash through testing and analysis which lead to the development of:

IEEE Std.1584tm, IEEE Guide for Performing Arc Flash Hazard Calculations

which defines formulas and procedures used to calculate the amount of incident energy that can be released during an arcing short circuit.

What Does OSHA Say About Arc Flash?

According to OSHA 1910.132(d) The employer is responsible to assess the hazards in the work place, select, have, and use the correct Personal Protective Equipment (PPE) and document the assessment. The use of NFPA 70E and other related industry consensus standards has been used to demonstrate whether an employer acted reasonably when there is a possible OSHA enforcement action taken.

So although NFPA 70E is not directly part of OSHA standards, it can be used as evidence of whether an employer acted reasonably in complying with OSHA standards and addressing "recognized hazards".

There are more specific links within the OSHA standards as well. A typical example is found in 1910.335, Safeguards for personnel protection which requires:

"(a)(1)(i) Employees working in areas where there are potential electrical hazards shall be provided with, and shall use, electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed."

This regulation requires that employees must be properly protected from potential electrical hazards, by using adequate PPE, but it does not provide specific detail of what specific personal protective equipment is necessary to achieve the objective. It might be considered that based on this generalized statement, the selection of the correct PPE is open to interpretation however, this would be incorrect and an Arc Flash study should be performed. NFPA 70E defines many of the methods.

Electrical Safety - NFPA 70E - 1/2 Day Course

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NFPA 70E and Arc Flash

NFPA 70E Section 130.3(B) requires that an Arc Flash Hazard analysis "shall determine, and the employer shall document, the incident energy exposure of the worker (in calories per square centimeter). The incident energy exposure level shall be based on the working distance of the employee's face and chest areas from a prospective arc source for the specific task to be performed. It further states that "...flame-resistant (FR) clothing and personal protective equipment (PPE) shall be used by the employee based on the incident energy exposure associated with the specific task."

NFPA 70E also requires determining the arc flash protection boundary, which is the distance from a potential arc source where the incident energy falls to a value of 1.2 cal/cm². This value is considered to be the point at which the onset of a second-degree burn occurs. Live work performed outside of the flash protection boundary does not require PPE, although the risk of some injury still exists.

The concept of these requirements is simple. At each location, the arc flash study is used to determine:

- The incident energy exposure for a worker's chest and face if an arc flash occurs.
- The level of PPE a worker must wear based on the possible incident energy exposure.
- The arc flash protection boundary.

NFPA 70E provides generalized hazard risk tables that can be used as a simplified alternative for PPE selection. This information, as well as data regarding electric shock protection and approach limits, is used as part of an electrical safety program.

Before conducting live work, a qualified worker must perform the shock hazard and flash hazard analysis that NFPA 70E requires.

On Site Training - Have This Course at Your Location!

Hold this class **at your location** for a greater savings. For an all inclusive fee you receive the following for each attendee:

- Jim Phillips, P.E. as the course instructor
- Details on how to **Comply with NFPA 70E**
- How to develop an Electrical Safety Program
- Jim's arc flash calculation worksheets
- Training manual containing over 150 pages
- Jim's 30 page Arc Flash Calculation Guide
- 4 hours of Continuing Education Credit



Call Brenda at 800-874-8883 **today** for an On-Site Training Proposal!
Jim's schedule fills up early!

Electrical Safety - NFPA 70E - 1/2 Day Course

Detailed Agenda

INTRODUCTION

HUMAN EFFECTS

Physiological Effects, Tissue Damage, Internal Organ Damage, Burns Fibrillation, "Curable" 2nd Degree Burn Requirements, Arc Blast Pressure, Sound Pressure, Incident Energy and 1.2 Calories/cm²

CODES AND STANDARDS

OSHA 29 CFR - Part 1910, Subpart S, NFPA 70, National Electrical Code® ,NFPA 70E, Standard for Electrical Safety in the Workplace, IEEE Standard 1584™, Guide for Arc Flash Hazard Analysis, Legal Requirements, Liability

CATEGORIES OF ELECTRICAL HAZARDS

Electric Shock, Arc Flash, Arc Blast

ELECTRICAL CIRCUIT DYNAMICS

Short Circuit Current, Overcurrent Device Clearing Time, Impact of Long Clearing Times

QUALIFIED PERSON

NFPA 70E Definition, Trained, Knowledgeable, Understands Hazards, Training Requirements

APPROACH BOUNDARIES - SHOCK PROTECTION

Limited, Restricted, Prohibited Approach

NFPA 70E REQUIREMENTS FOR LIVE WORK

Performing the Shock and Flash Hazard Analysis

ENERGIZED WORK PERMIT

Purpose of Permit, Data Required, Approvals

ARC FLASH PROTECTION BOUNDARY

4 Ft. Boundary

HAZARD/RISK CATEGORY CLASSIFICATION

Use of NFPA 70E Table 130.7(C)(9)(a), Limitations

USE OF MATRIX FOR PPE SELECTION

Table 130.7(C)(10), Defining the Required PPE, Category by cal/cm² Class 0, 1, 2, 3, 4 Requirements

PERSONAL PROTECTIVE EQUIPMENT PPE

Protective Clothing, Flash Suits, Face Protection, Hand Protection, Foot Protection, Limitations

THE ELECTRICAL SAFETY PROGRAM

Implementing Electrical Safety Practices and Procedures, Sample Problems Using the Tables. Simplify the Program!

ARC FLASH STUDY - OVERVIEW

What is an Arc Flash Study, Understanding the Labels, Selecting PPE Based on a Study, Boundaries

For a proposal, call or email Brenda at:

brenda@brainfiller.com

800-874-8883