



ARC FLASH HAZARDS IN THE WORKPLACE

What is an Arc Flash Hazard?

“... a dangerous condition associated with the release of energy caused by an electric arc.”



What is an Electric Arc?

- An electric arc is a short circuit through the air.



What Causes Arc Flash?

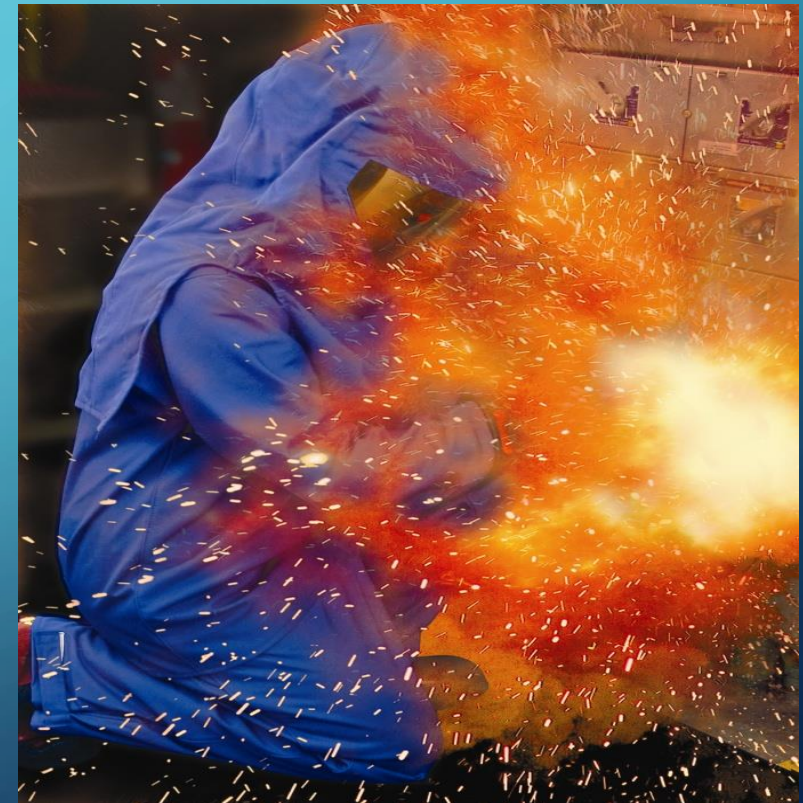
- Dust, impurities, corrosion, condensation, animals
- Spark discharge from:
 - Accidental touching
 - Dropping tools
- Over-voltages across narrow gaps
- Failure of insulating materials
- Equipment failure

What is Arc Blast?

1. The flash causes an explosive expansion of air and metal.
 - For example: When copper vaporizes it expands by a factor of 67,000.
2. The blast produces dangerous:
 - Pressure waves
 - Sound waves
 - Molten steel and shrapnel

Arc Flash Events

Electric arc → Arc flash → Arc blast



Forms of Arc Flash Energy

- Noise
- Expansion
- Vaporization
- Thermal radiation



Arc Flash Injuries



- Electric shock
- Severe burns
- Blindness
- Blast injuries
 - Shrapnel wounds
 - Lung blast injuries
 - Ruptured eardrums
 - Pressure wave injuries

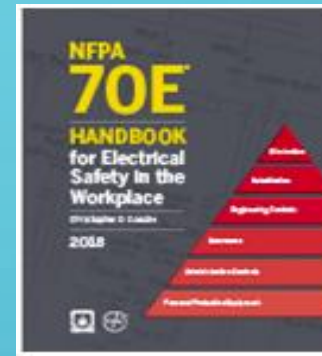
Codes and Standards

When working on or near electricity or electrical equipment you must be trained in and use ESRWP (Electrical Safety Related Work Practices).

- OSHA **Code** of Federal Regulations, 1910.331 -5, Subpart S
- NFPA 70E “**Standard** for Electrical Safety in the Workplace”
- Regional Office of Education Requires Compliance

What is NFPA 70E?

National Fire Protection Association



“Standard for Electrical Safety in the Workplace”

- Standard for electrical safety in United States
- Updated every three years as part of keeping up with current technology and safety concerns

NFPA 70E Standard Requirements:

- Electrical Safety Program
- Arc Flash Hazard Analysis
 - Flash Protection Boundary
 - Fault Current Calculations
 - Arc Fault Clearing Time
 - Incident Energy Exposure
- Equipment Labeling
- Required PPE (Personal Protective Equipment)
- Staff Training

Required Warning Label

A → **WARNING** ← **F**

B → **Arc Flash & Shock Hazard**
Appropriate PPE Required

C → <i>FLASH PROTECTION</i>	4	<i>SHOCK PROTECTION</i>
Flash Hazard Category:	4	480 VAC Shock Hazard When: <u>WHEN COVER IS OPENED OR REMOVED</u>
Min. Arc Rating (cal/cm ²):	<u>37.9</u>	Flash Protection Boundary: <u>100'</u>
PPE: [X] Cotton Underwear		Limited Approach Boundary: <u>42'</u>
[X] Short Sleeved "T" Shirt (Natural Fiber)		Restricted Approach Boundary: <u>12'</u>
[X] Arc Rated Long Sleeved Shirt, Long Pants & Coveralls		Prohibited Approach Boundary: <u>1'</u>
[X] Arc Rated (40 cal) Arc Flash Suite Jacket, Pants & Hood		Max. Available Fault Current: <u>38300 A</u>
[X] Hard Hat & Hearing Protection		PPE: [X] CAT "00" Gloves
[X] Safety Glasses or Goggles		
[X] Arc Rated Leather Gloves or Insulating Gloves w/Protectors		
[X] Leather Shoes		

D →

E → Equipment ID: Secondary XF 24 (source)

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G → **H** → **I** → **J** → **K** →

Implemented Safety Measures

- Hazard Analysis
- Staff Training
 - Qualified
 - Affected
- Maintenance Equipment
 - PPE (Personal Protective Equipment)
 - Tools

Fabyan Elementary School



The image features a blue gradient background with white circuit-like lines in the corners. These lines consist of straight paths that branch out and terminate in small circles, resembling a network or data flow diagram. The lines are positioned in the top-left, top-right, bottom-left, and bottom-right corners, framing the central text.

Questions?