NEW ELECTRICAL ARC FLASH GUIDANCE FROM OSHA

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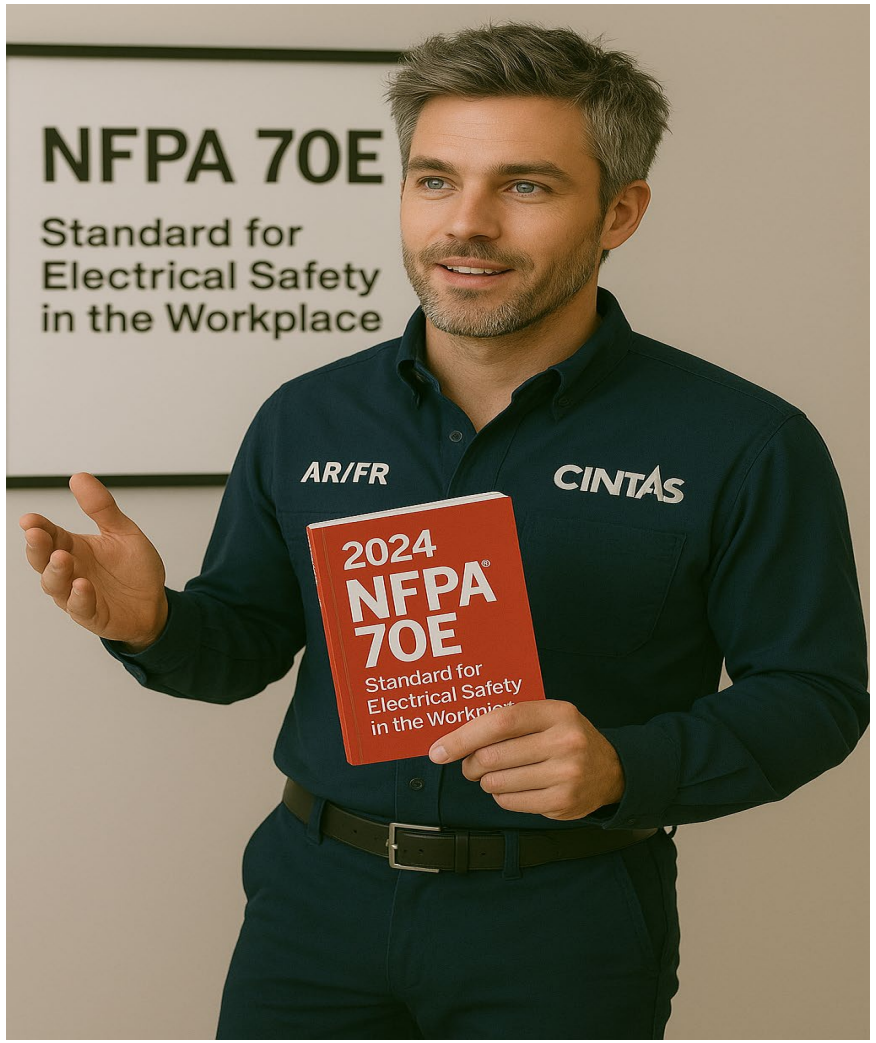
Our Agenda

- OSHA Guidance Update Nov 2024
- Understanding the Hazards
- 2024 Edition Key Updates
- Risk Assessments the Why
- Comprehensive NFPA 70E Program
- Difference Non-FR vs FR
- Proper PPE and Options
- Care, Maintenance, & Proper Use
- Best Practices
- Conclusions & Next Steps
- Questions



Introduction – what does this guidance say?

- For the first time in 20 years, OSHA released new guidance on electrical Arc Flash. This is NOT a regulatory change, and NO NEW Law was created.

- It is estimated that over 600,000 workers do not have the necessary PPE to prevent injury from arc-flash hazards.

- “Don’t WEAR Fuel”

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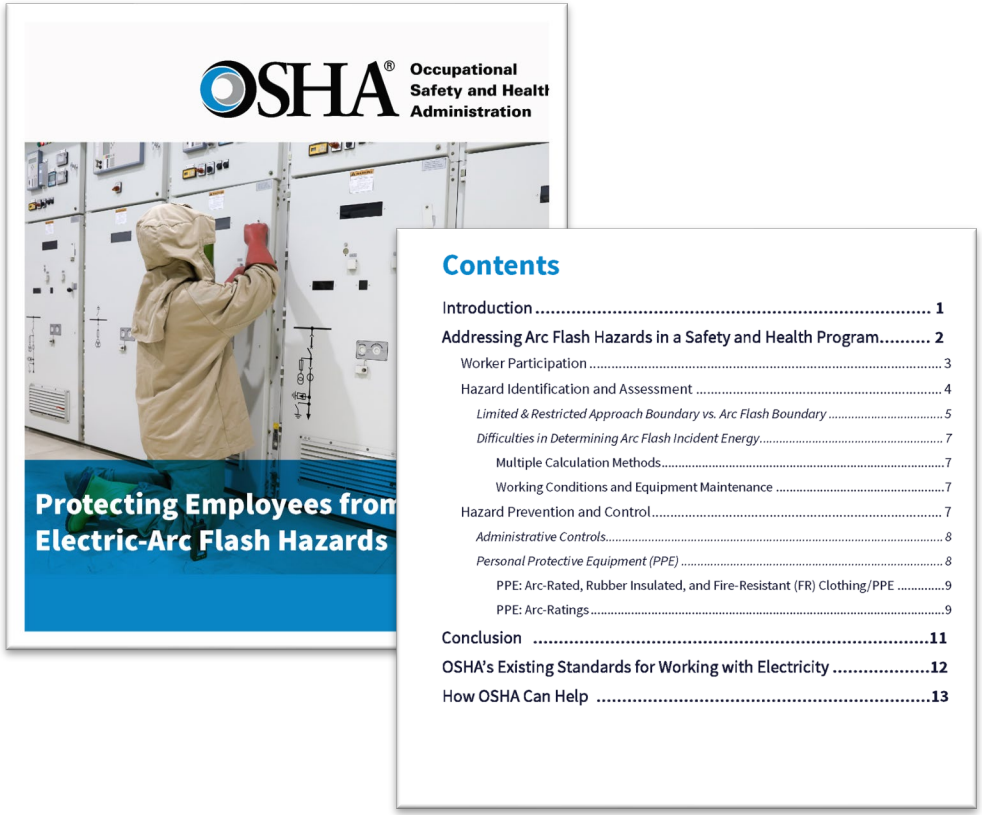
What is the Updated OSHA Guidance

13-page document for employers:


OSHA Occupational Safety and Health Administration

Protecting Employees from Electric-Arc Flash Hazards

Contents

3 one-page documents for workers:


Being Aware of Arc Flash Hazards

Anyone who works around energized electrical equipment is at risk of arc flash hazards. It is important to identify, assess, and control these hazards to maintain a safe work environment

What is an Arc Flash?

An electric arc is an electrical explosion that produces a bright flash gas, where temperatures can **exceed 35,000 °F** (19,400 °C), nearly four times the heat of the sun's surface. The energy released in the arc vaporizes the metal conducting the electricity and produces an explosive arc blast with deafening noises, supersonic concussive forces, and super-heated shrapnel.

Arc flash incidents can ignite clothing, cause structural fires, and produce particles of molten metal, resulting in severe or fatal burn injuries. At these high temperatures, most items within 3 feet (0.9 meters), including skin and flammable clothing, will burn, melt, or vaporize. Most arc flash burn injuries are a result of the arc igniting **flammable clothing** and not from the arc itself.

Damaged electrical boxes.

Causes

There are several conditions that contribute to arc flashes. Faulty, damaged, dirty, or improperly maintained electrical equipment increases the risk for an arc flash incident to occur while the magnitude of the electrical energy/voltage increases its severity. Any inadvertent movement within the restricted or arc flash boundaries, especially when conductive tools are used, also increases the likelihood of an arc flash incident.

Prevention Methods

Methods to prevent arc flashed include:

- Using of lockout/tagout procedures, in compliance with 29 CFR 1910.147, and ensuring the deenergization of electrical equipment is the strongest mitigation measure against all electrical hazards as it eliminates and removes the hazard entirely.
- Identifying and using approach boundaries for qualified and unqualified employees (For more information on Approach Boundaries, see: Establishing Boundaries Around Arc Flash Hazards).

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Establishing Boundaries Around Arc Flash Hazards

Arc flash incidents pose significant risks to worker safety. However there are three types of boundaries to consider when approaching energized electrical equipment. It is important to know all approach boundaries and who may cross them and remain safe.

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What are Approach Boundaries?

NFPA 70E recommends that the closer a worker gets to an electrical hazard the more training and protection they should have.

These specific approach boundaries can vary depending on factors such as the voltage level of the equipment[1] and the type of work being performed. Other factors to consider when determining the approach boundary is the electrical equipment configuration and working condition, such as enclosure type or the presence of insulating barriers.

There are three types of approach boundaries. Two of them, the restricted approach boundary and the limited approach boundary, protect against electric shock. The third, the arc flash boundary, protects against exposure to arc flash.

Figure 1. Different arc flash boundaries. The arc flash boundary does not have a set rule for placement. It could be inside or outside the limited/restricted approach boundary.

1. Higher voltages may result in larger approach boundaries

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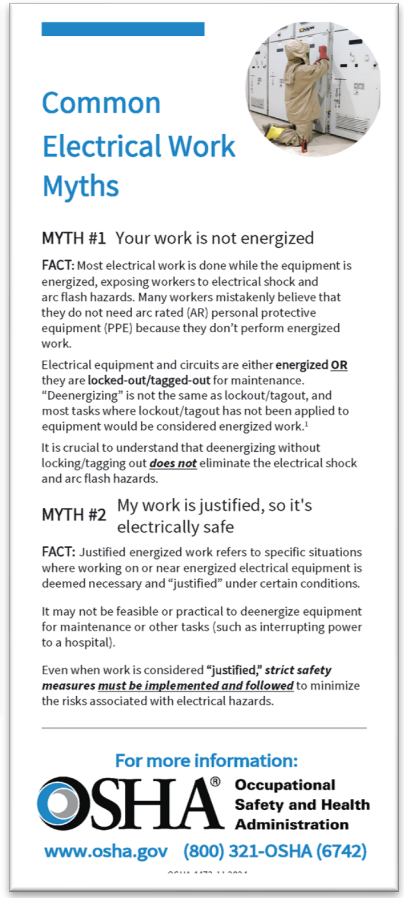
Common Electrical Work Myths

MYTH #1 Your work is not energized

FACT: Most electrical work is done while the equipment is energized, exposing workers to electrical shock and arc flash hazards. Many workers mistakenly believe that they do not need arc rated (AR) personal protective equipment (PPE) because they don't perform energized work.

Electrical equipment and circuits are either **energized OR** they are **locked-out/tagged-out** for maintenance. "Deenergizing" is not the same as lockout/tagout, and most tasks where lockout/tagout has not been applied to equipment would be considered energized work.[1]

It is crucial to understand that deenergizing without locking/tagging out ***does not*** eliminate the electrical shock and arc flash hazards.

MYTH #2 My work is justified, so it's electrically safe

FACT: Justified energized work refers to specific situations where working on or near energized electrical equipment is deemed necessary and "justified" under certain conditions.

It may not be feasible or practical to deenergize equipment for maintenance or other tasks (such as interrupting power to a hospital).

Even when work is considered **"justified," *strict safety measures must be implemented and followed*** to minimize the risks associated with electrical hazards.

For more information:

OSHA Occupational Safety and Health Administration

www.osha.gov (800) 321-OSHA (6742)

OSHA

https://www.osha.gov/electrical/flash-hazards

OSHA 1910.132 vs NFPA70E – Which do I use?

- **OSHA 1910.132** - General Requirements
  1. *PPE for eyes, face, head and extremities, protective clothing, shall be provided, used and maintained in a good sanitary and reliable condition. If hazards are present, the employer shall select and have each affected employee use the types of PPE that will protect the affected employee from the hazards.*
  2. Addresses proper care, fit, maintenance, useful life and disposal of PPE
  3. Proper training (Cintas FAS Division)

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OSHA 1910 – Does a hazardous environment exist?

- **Personal Protective Equipment (PPE)** is worn to minimize exposure to hazards.
  - Examples of PPE include shock and arc rated (AR) garments, including clothing, footwear, gloves, safety glasses/face shields, hearing protection, coats, hard hats, and coveralls.

- When workers use PPE, employers must implement a PPE program according to **1910.132** or **1926.95** & **1926.97**.

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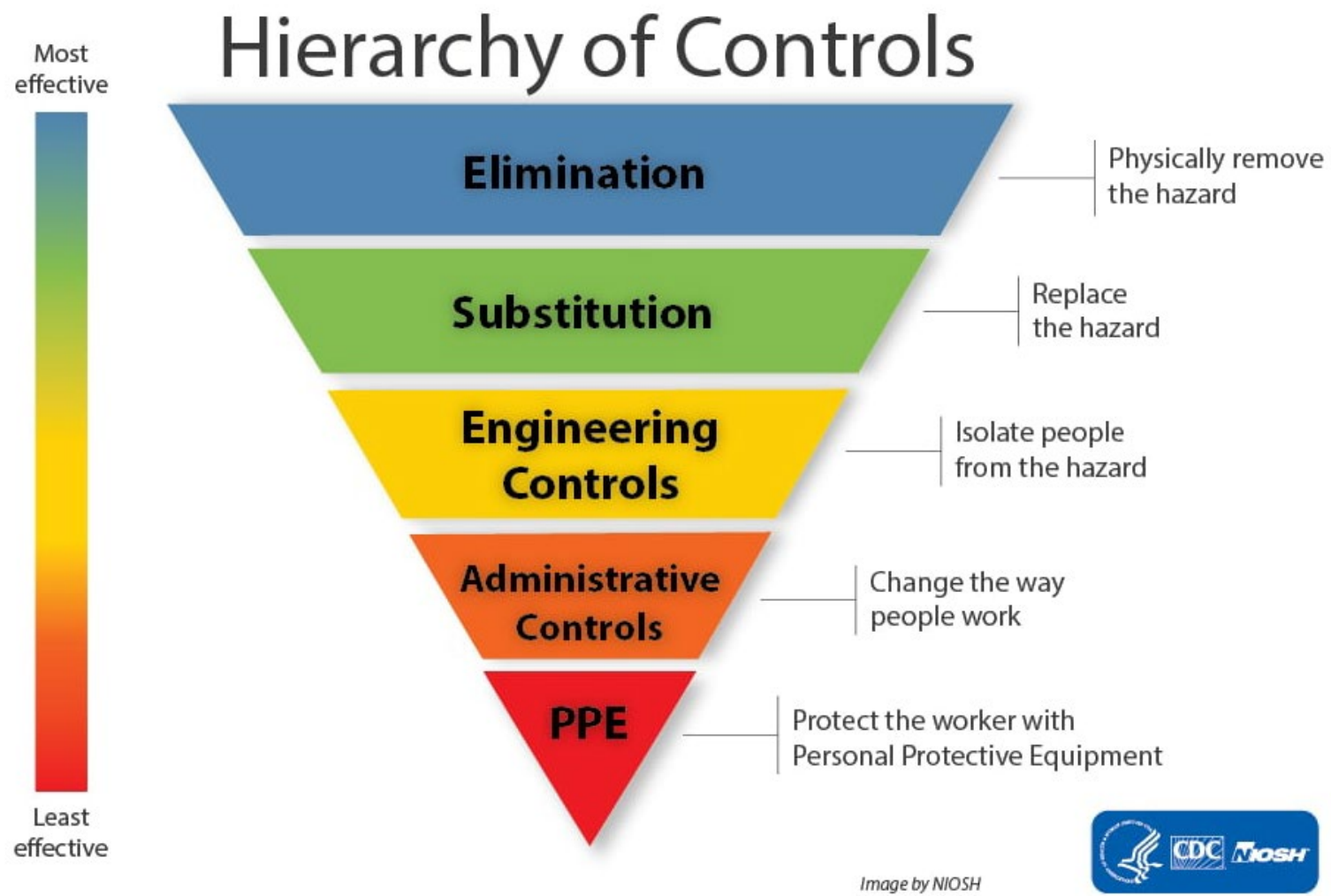
Hazard Prevention and Control



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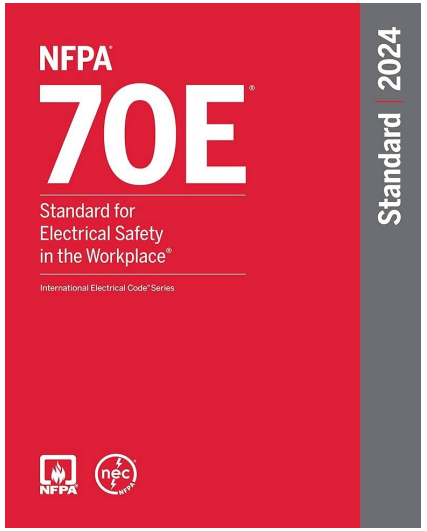

https://www.youtube.com/watch?v=GyNqmcqKZ-8

"Most arc flash burn injuries are a result of the arc igniting flammable clothing and not from the arc itself."
-OSHA

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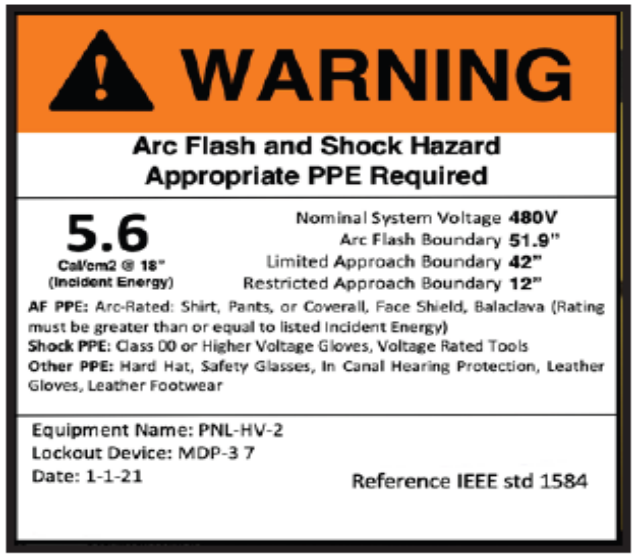
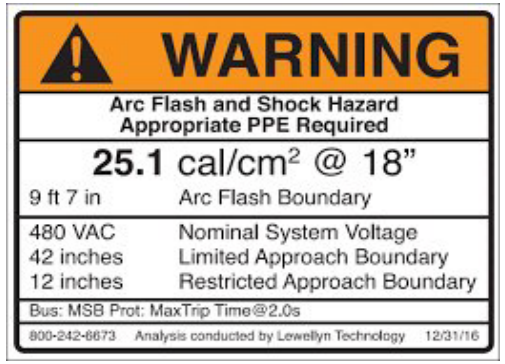
Addressing Arc Flash Hazards in a Safety and Health Program

This guidance document shows how management systems can be used to protect workers from arc flash hazards with a focus on:

- Worker Participation
- Hazard Identification and Assessment
- Hazard Prevention and Control

Conducting an arc flash study is highly recommended by OSHA for all employers whose workers may be exposed to electrical hazards, and not just utility workers.





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OSHA Call Out to Common Electrical Work Myths

MYTH #1

Many workers mistakenly assume that they do not need arc rated (AR) PPE because they are not performing energized work or because they are working on low voltage 120/208 or 277

(A building with multiple large air conditioning units, heavy machinery, or extensive lighting systems might use a 120/208v power supply to handle the high-power demands.)

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OSHA Call Out to Common Electrical Work Myths

FACT

✓Most electrical work is done while the equipment is energized.

✓ Most tasks where lockout/tagout has not been applied to equipment would be considered energized work.

✓Deenergizing requires the proper use of PPE until verified no power exists

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PPE

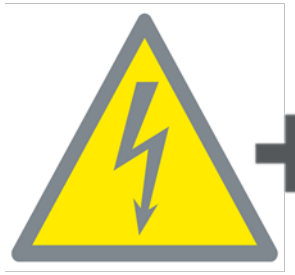
OSHA references:

- OSHA 29 CFR 1910.132 (general PPE requirements)
- OSHA 29 CFR 1926.95 (criteria for PPE)
- OSHA 1926.97 (electrical PPE requirements)

NFPA 70E TWO CATEGORY CLOTHING APPROACH

CATEGORY 2 REQUIRED PPE Also fulfills NFPA 70E requirement of Category 1	REQUIRED PPE*	CATEGORY 4 REQUIRED PPE Also fulfills NFPA 70E requirement of Category 3
✓	Arc rated long sleeve shirt/coverall (8.0 ATPV or higher)	✓
✓	Arc rated long pants/coverall (8.0 ATPV or higher)	✓
✓	Safety glasses or goggles	✓
✓	Hearing protection (inserts)	✓
✓	EH heavy-duty leather footwear	✓
✓	Hard hat with Arc rated face shield and balaclava	✓
✓	Insulated rubber gloves with leather protectors	✓
	Arc rated coveralls	✓
	Arc rated (40 cal) Arc Flash suit jacket	✓
	Arc rated (40 cal) Arc Flash suit pants	✓
	Arc rated (40 cal) Arc Flash suit hood	✓

* According to 2018 Edition of NFPA 70E, Simplified Two-Category Clothing Approach



Arc Rated Clothing

+

Head Protection

+

Hand Protection

=

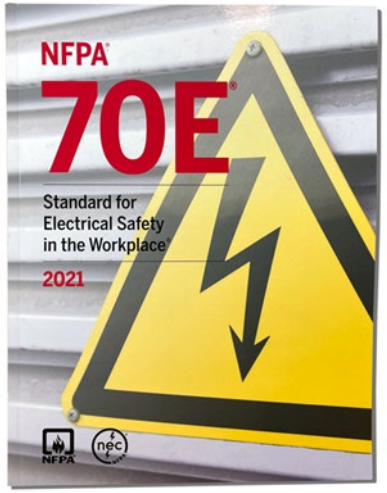
AED

+

CPR/AED Training

+

NFPA 70E Training



Comprehensive NFPA 70E Program

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Arc Rated PPE – FR Daily Wear

Carhartt Featherweight FR Shirt

Carhartt FR Pants

Carhartt Featherweight Coverall

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Arc-Rated Base Layers and Outwear

FR Base Layer

+

Carhartt FR Front Zip Sweatshirt

+

Carhartt FR Full Swing Duck Jacket

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FRC Standards for Outerwear and Underneath

- **NFPA 70E 130.7 (c)(9)(b)- Outer Layers**
- Garments worn as outer layers over arc-rated clothing, such as jackets high visibility apparel, or rainwear, shall also be made from arc-rated material.

- **NFPA 70E 130.7 (c)(9)(c)- Underlayers**
- Meltable fibers such as acetate, nylon, polyester, polypropylene, and spandex shall not be permitted in fabri underlayers (An incidental amount of elastic used on non-melting fabric underwear or socks shall be permitted.

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Voltage Rated Gloves – Shock and Arc Flash PPE

Rubber Insulating Gloves

Leather Glove Protectors

AR/FR Glove Liner

Glove Bag

AR/FR Balaclava

AR/FR Face Shield

AR/FR Shroud

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Electrical Hazard Wearer- 40 CAL SUITS

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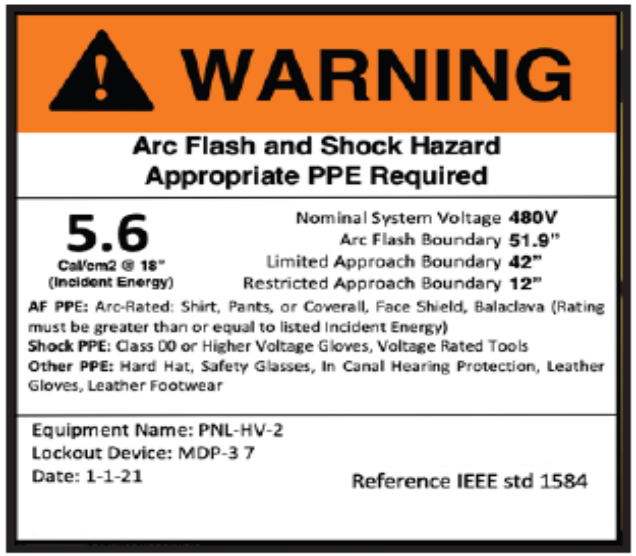

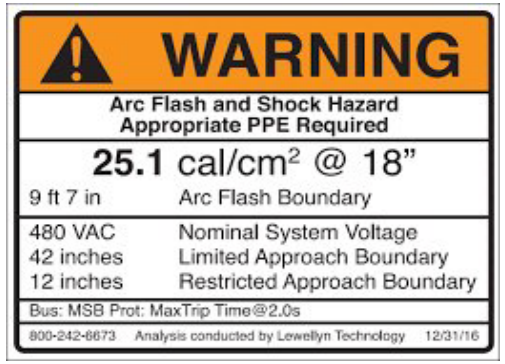

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In Conclusion:

Employers should emphasize the distinction between ‘deenergized’ and ‘locked out/tagged out,’ and highlight the **consistent use** of AR PPE.

Employers will find that implementing a safety and health program also brings other benefits.

- Prevent workplace injuries and illnesses,
- Improve compliance with laws and regulations
- Reduce costs, including significant reductions in workers’ compensation premiums,
- Engage workers,
- Enhance their social responsibility goals and Increase productivity

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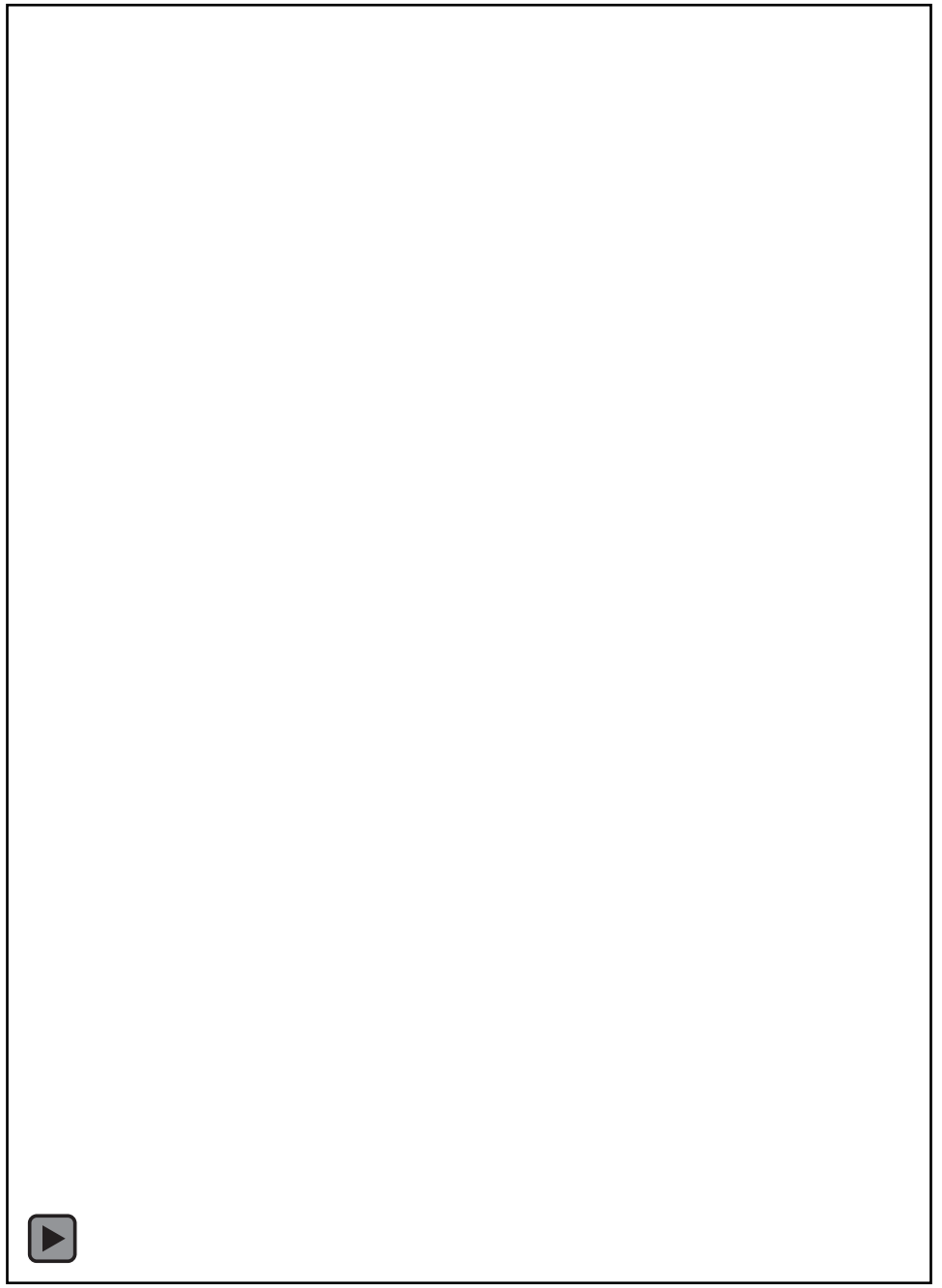
Don't be like Bob..

Suit up in the right PPE and stay safe.



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THANK YOU

For additional information visit:

www.cintas.com/nfpa70e

Drew Simashkevich

National Product Specialist – Protective Apparel

SimashkevichD@cintas.com

614-578-3411

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