

# Electrical Hazards & Arc Flash Awareness for the Unqualified Employee

## ARE YOU QUALIFIED?

OSHA requires that only “qualified” employees shall work on energized electrical equipment. Check with your supervisor. Follow your procedures. A Qualified Person is one who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training on the hazards involved. A Qualified Person is capable of identifying the electrical safety hazards and selecting the appropriate PPE (personnel protective equipment) for the specific job/task.

## WHAT ARE ELECTRICAL HAZARDS?

Electrical Shock (electrocution), Arc Flash, and Arc Blast

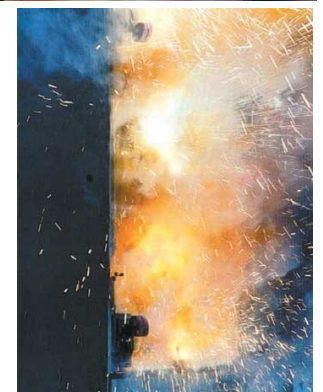
## WHAT IS AN ARC FLASH?

An Arc Flash is a dangerous explosion initiated by a short circuit between electrically energized parts or between an energized part and a grounded part. The explosion is a result of the ionization and breakdown of the air. The temperature of an Arc Flash can reach 35,000 deg. F (hotter than the surface of the sun).



## WHAT IS AN ARC BLAST?

The tremendous temperatures of the arc flash cause the explosive expansion of both the surrounding air and the metal in the arc path. For example, copper expands by a factor of 67,000 times when it turns from a solid to a vapor. The rapid expansion results in high pressures, loud noise and shrapnel release.



## WHAT CAUSES AN ARC FLASH?

Anything that can cause an electrical short circuit such as: dropped tools, accidental contact with “live” parts, deteriorating electrical system, build-up of conductive dust on electrical parts.

## TYPICAL INJURIES CAUSED BY AN ARC FLASH/BLAST:

Burns, hearing damage, concussion, broken bones, shrapnel injury, long-term disability, even death.

## HOW TO AVOID INJURY:

1. Only “qualified” personnel shall perform energized electrical work under an approved Energized Electrical Work Permit.
2. Avoid working on or near energized electrical equipment. Turn-off power. Follow your lock-out/tag-out procedures.
3. Follow your safety & work procedures.
4. If an electrician is working in an opened panel then stay away.
5. Electrical rooms are not a safe place to “hang out” or to come in from out of the cold. Keep out of Electrical Rooms.
6. Do not use Electrical Rooms for storage closets.



# Electrical Hazards & Arc Flash Awareness for the Unqualified Employee (cont'd)

## TASKS THAT MAY EXPOSE YOU TO HAZARDS:

1. Opening/closing a circuit breaker or disconnect switch can be dangerous. This task can cause an Arc Flash and the equipment could blow up in your face. Appropriate PPE should always be worn when performing this task.
2. Resetting a tripped circuit breaker or motor starter overload. This can cause an Arc Flash similar to above. Even after turning off power to the starter bucket, 480 volt and possibly 120 volt (control power) shock hazards are still present.
3. Just simply walking into an electrical room puts you at a higher chance of being injured from and electrical arc flash or from electrocution.
4. Standing near electrical equipment when an arc flash occurs. You can be injured/burned even if you are 10 feet away from the source.
5. Ignoring safety signs, barricades and warning labels.
6. Talking to an electrician while he/she is trying to perform their job. This could lead to distraction resulting in an electrocution or arc flash.

## EXAMPLE WARNING SIGNS & LABELS:



**WARNING**

**Arc Flash and Shock Hazard  
Appropriate PPE Required**

<b>2.5</b> cal/cm <sup>2</sup>	<b>Incident Energy at 18.0 Inches</b>
<b>2' - 4"</b>	<b>PPE: Arc-rated shirt and arc-rated pants or arc-rated coverall + arc-rated face shield (balaclava)</b>
<b>480 V</b>	<b>Arc Flash Boundary, PPE per NFPA 70E-2018 Table 130.5(G)</b>
<b>3' - 6"</b>	<b>Shock Hazard (Volts) when cover is removed</b>
<b>1' - 0"</b>	<b>Limited Approach Boundary</b>
	<b>Restricted Approach - Class 00 Voltage Gloves</b>

Equipment Name: **MCC-A9**      Isc= 17.9 kA    Feb. 2018  
 Fed By: SWBD-A1

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**DANGER**

**Arc Flash And Shock Hazard  
Appropriate PPE Required**

Do not operate controls or open covers without appropriate personal protection equipment

Failure to comply  
Refer to NFPA 70E

**WARNING**

**ARC FLASH & SHOCK HAZARD**

**Appropriate personal protection equipment required**

## PPE / ARC-RATED CLOTHING:

The Arc Flash Warning Label on the electrical equipment indicates the Incident Energy (cal/cm<sup>2</sup>). Arc-rated clothing and PPE with an arc rating equal to or greater than the determined incident energy must be used.

Reference: NFPA 70E-2021 Table 130.5(G).



<1.2 cal/cm<sup>2</sup>  
(low hazard)

1.2-12 cal/cm<sup>2</sup>  
(med.hazard)

12-40 cal/cm<sup>2</sup>  
(high hazard)