Safe Work Practices at a Customer’s site

Course Objective
Identify Roles and Responsibilities of Host and Contract Employers
Job Briefing and Planning Checklist
Discuss the Limits of Approach for Shock and Arc Flash
Recognize compliance of equipment labeling
Select PPE based on Labels or tables (Tables - if parameters are met)

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OSHA
29 CFR 1910

1. Subpart I – PPE

2. Subpart J – LO/TO

3. Subpart S – Electrical

4. NFPA 70E 2015 Edition
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OSHA
29 CRF 1910.147(f)(2)(i)

The on-site employer and the outside employer shall inform each other of their respective lockout or tagout procedures.

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2015 NFPA 70E
110.3
(A) Host Employer Responsibility

The Host shall inform contract employers of the following:

Known Hazards

Employer’s Installation
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2015 NFPA 70E
130.3

(B) Contract Employer Responsibilities

1. Shall ensure each employee is instructed on the hazards communicated by the host shall be in addition to the basic training required by this standard.

2. The contract employer shall ensure that each of his or her employees follows the work practices required by this standard and safety-related work rules required by the host employer.

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Job Briefing and Planning Checklist

Identify

- Hazards
- Voltage Levels involved
- Skills required
- Any “foreign” (secondary source) voltage source
- Any unusual work conditions
- Number of people to do the job
- Shock protection boundaries
- Available incident energy
- Potential for arc flash (conduct an arc flash hazard analysis)
- Arc Flash Boundary
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Job Planning and Briefing Checklist

ASK
• Can the equipment be de-energized?
• Are back feeds of the circuit to be worked on possible?
• Is a standby person required?

Check
• Job Plans
• Single-line diagrams and vendor prints
• Status board
• Information on the plant and vendor resources up to date
• Safety procedures
• Vendor information
• Individuals are familiar with the facility
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Job Planning and Briefing Checklist

KNOW
- What the job is
- Who else needs to know, communicate
Who is in charge

Think
- About the unexpected event…what if?
- Lock – Tag – Test – Try
- Test for voltage First
- Use the right tool and equipment, including PPE
- Install & remove temporary protective grounding equipment
- Install barriers and barricades
- What ELSE?
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**Limits of Approach**

Shock
Limited Approach Boundary

Restricted Approach Boundary

Arc Flash
Arc Flash Boundary
2015 NFPA 70E Table 130.4(D)(a)

<table>
<thead>
<tr>
<th>Nominal System Voltage Range Phase to Phase</th>
<th>Limited Approach Boundary</th>
<th>Restricted Approach Boundary</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50 VAC</td>
<td>Not Specified</td>
<td>Not Specified</td>
</tr>
<tr>
<td>50 – 150 VAC</td>
<td>3’ 6” (42”)</td>
<td>Not Specified</td>
</tr>
<tr>
<td>151 – 750 VAC</td>
<td>3’ 6” (42”)</td>
<td>1’</td>
</tr>
<tr>
<td>751 – 15 kVAC</td>
<td>10’</td>
<td>2’ 2”</td>
</tr>
</tbody>
</table>
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Equipment Labeling
130.5(D)

Nominal System Voltage
Arc Flash Boundary
At least one of the following:
1. Available incident energy and the corresponding working distance, or the PPE category in table 130.7(C)(15)(A)(b) or Table 130.7(C)(15)(B) for the equipment, but not both
2. Minimum arc rating of clothing
3. Site-Specific PPE

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Arc Flash Information

<table>
<thead>
<tr>
<th>Category</th>
<th>Use this information in accordance with applicable OSHA standards, NFPA 70E, and other required safe electrical work practices.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Flash Protection Boundary</td>
</tr>
<tr>
<td>18 inches</td>
<td>1.2 cal/cm² Max Incident Energy at 18” Working Distance</td>
</tr>
<tr>
<td>480 V</td>
<td>Shock hazard when cover is open</td>
</tr>
<tr>
<td>42 inches</td>
<td>Limited Approach</td>
</tr>
<tr>
<td>12 inches</td>
<td>Restricted Approach</td>
</tr>
<tr>
<td>1 inch</td>
<td>Prohibited Approach</td>
</tr>
</tbody>
</table>

Values produced by a Schneider Electric engineering analysis.
Any system modification, adjustment of protective device settings, or failure to properly maintain equipment will invalidate this label.
For more information, contact Schneider Electric at 1-800-776-2733.

Q2C: 29329822
Date: 06/14/12
## Arc Flash Information

**Safe Work Practices at a Customer’s site**

### Use this information in accordance with applicable OSHA standards, NFPA 70E-2015 and other required safe electrical work practices.

<table>
<thead>
<tr>
<th>Category</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>153 inches</strong></td>
<td>Flash Protection Boundary</td>
</tr>
<tr>
<td><strong>40 cal/cm²</strong></td>
<td>Max Incident Energy at 18” Working Distance</td>
</tr>
<tr>
<td><strong>Category 4</strong></td>
<td>PPE Category (Per NFPA 70E-2012)</td>
</tr>
<tr>
<td><strong>240 V</strong></td>
<td>Shock hazard when cover is open</td>
</tr>
<tr>
<td><strong>42 inches</strong></td>
<td>Limited Approach</td>
</tr>
<tr>
<td><strong>Avoid Contact</strong></td>
<td>Restricted Approach</td>
</tr>
<tr>
<td><strong>Avoid Contact</strong></td>
<td>Prohibited Approach</td>
</tr>
</tbody>
</table>

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**Safe Work Practices at a Customer’s site**

### Use this information in accordance with applicable OSHA standards, NFPA 70E-2015 and other required safe electrical work practices.

| **6 cal/cm²** | Incident Energy at a Working Distance of 1 ft - 6 in |
| **4 ft - 1 in** | Arc Flash Boundary |

| **480V** | Shock hazard when cover is open |
| **3 ft. 6 in.** | Limited Approach |
| **1 ft. 0 in.** | Restricted Approach |

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Arc Flash Information

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<table>
<thead>
<tr>
<th>40 cal/cm²</th>
<th>Max Incident Energy at a Working Distance of 1 ft - 6 in Arc Flash Boundary</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 ft - 9 in</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>480V</th>
<th>Shock hazard when cover is open</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 ft. 6 in.</td>
<td>Limited Approach</td>
</tr>
<tr>
<td>1 ft. 0 in.</td>
<td>Restricted Approach</td>
</tr>
</tbody>
</table>

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How to Select PPE

Equipment Labels

Tables in the NFPA 70E
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**Arc Flash Information**

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</tr>
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<td>3 ft. 6 in.</td>
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<td>Restricted Approach</td>
</tr>
</tbody>
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Safe Work Practices at a Customer’s site

Tables
Table 130.7(C)(15)(A)(a) Arc Flash Hazard Identification for Alternating Current (ac) and Direct Current (dc) Systems

Colum for Task:

Colum for Equipment Condition:

Arc Flash PPE required:

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Tables
Table 130.7(C)(15)(A)(a) Arc Flash Hazard Identification for Alternating Current (ac) and Direct Current (dc) Systems

Task:
Normal operation of a circuit breaker (CB), switch, contactor or starter
For ac systems: Work on energized electrical conductor and circuit parts, including voltage testing
Removal or installation of CB’s or switches
Removal of bolted cover (to expose bare energized electrical conductors and circuit parts). For dc systems, this includes bolted covers, such as battery terminal covers
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Tables
Table 130.7(C)(15)(A)(b) Arc Flash Hazard PPE for Alternating Current (ac) Systems

Equipment:

Arc Flash PPE Category:

Arc Flash Boundary:

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Tables
Table 130.7(C)(15)(A)(b) Arc Flash Hazard PPE for Alternating Current (ac) Systems

Equipment:
Panelboards or other equipment rated 240 V and Below
Panelboards or other equipment rated >240 V and up to 600 V
600 V class motor control centers (MCC’s) commercial and industrial
600 V class switchgear (with power circuit breakers or fused switches) and 600 V class switchboards
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Tables
Table 130.7(C)(15)(A)(b) Arc Flash Hazard PPE for Alternating Current (ac) Systems
Parameters:
- Maximum Short Circuit Current
- Maximum fault clearing time
- Minimum working distance

[Image of warning sign with parameters:]

- Nominal System Voltage: 208/120 V
- Available Fault Current: 21,757 Amperes
- Clearing Time of Service OCPD: 0.03 Seconds (1.9 Cycles)

Location: Main SWBD
Protective Device: MSB—POXFMR
### Safe Work Practices at a Customer’s site

#### Tables

Table 130.7(C)(15)(A)(b) Arc Flash Hazard PPE for Alternating Current (ac) Systems

**Equipment:**

- Panelboards or other equipment rated 240 V and Below
- Panelboards or other equipment rated >240 V and up to 600 V
- 600 V class motor control centers (MCC’s) commercial and industrial
- 600 V class switchgear (with power circuit breakers or fused switches) and 600 V class switchboards

### Safe Work Practices at a Customer’s site

#### Tables

Table 130.7(C)(15)(A)(b) Arc Flash Hazard PPE for Alternating Current (ac) Systems

**Meet Parameters:**

- Arc Flash PPE Category: 1, 2, 3 or 4
- Arc Flash boundary
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Tables
Table 130.7(C)(16) Personal Protective Equipment
PPE Category
1. Minimum Arc Rating of 4 Cal/cm²
2. Minimum Arc Rating of 8 Cal/cm²
3. Minimum Arc Rating of 25 Cal/cm²
4. Minimum Arc Rating of 40 Cal/cm²

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Tables
Table 130.7(C)(16) Personal Protective Equipment
PPE Category 1 – Minimum 4 Cal/cm²
Arc-rated long sleeve shirt and pants or arc-rated coverall
Arc rated face shield (see note 2) or an arc flash suit hood
Arc-rated jacket, parka or hard hat liner (AN)
Hard Hat
Safety glasses or goggles (SR)
Hearing protection (ear canal inserts)
Heavy duty leather gloves (see note 3)
Leather footwear (AN)
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Tables
Table 130.7(C)(16) Personal Protective Equipment
PPE Category 2 – Minimum 8 Cal/cm²
Arc-rated long sleeve shirt and pants or arc-rated coverall
Arc rated flash suit hood or arc-rated face shield (see note 2) and arc-rated balaclava
Arc-rated jacket, parka or hard hat liner (AN)
Hard Hat
Safety glasses or goggles (SR)
Hearing protection (ear canal inserts)
Heavy duty leather gloves (see note 3)
Leather footwear

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Tables
Table 130.7(C)(16) Personal Protective Equipment
PPE Category 3 – Minimum 25 Cal/cm²
Clothing system
Arc rated flash suit hood
Arc-rated jacket, parka or hard hat liner (AN)
Hard Hat
Safety glasses or goggles (SR)
Hearing protection (ear canal inserts)
Heavy duty leather gloves (see note 3)
Leather footwear
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Tables
Table 130.7(C)(16) Personal Protective Equipment
PPE Category 4 – Minimum 40 Cal/cm2
Clothing system
Arc rated flash suit hood
Arc-rated jacket, parka or hard hat liner (AN)
Hard Hat
Safety glasses or goggles (SR)
Hearing protection (ear canal inserts)
Heavy duty leather gloves (see note 3)
Leather footwear
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Job Briefing and Planning Checklist

Evaluate the situation
Plan your Job
Communicate your plan
Execute your plan
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Questions?