SANFORD UNDERGROUND RESEARCH FACILITY
SOUTH DAKOTA SCIENCE AND TECHNOLOGY AUTHORITY

SURF ARC FLASH LABEL DESIGN REQUIREMENTS

Document-xxxxxxxxx
Revised: 10/23/2025
Supersedes: REV2

GENERAL REQUIREMENTS:

- Label designs shall conform to the latest NFPA 70E and ANSI Z535 standards.
- Labels placed on equipment installed outdoors shall be UV resistant and have sufficient durability to withstand the environment involved.
- Label dimensions shall be 4"H x 6"W. For small equipment where a 4"H x 6"W label would be too large for the door or would obstruct other important labels, label dimensions may be reduced to a size of 2"H x 3"W.

PREFERRED

WARNING

Arc Flash and Shock Risk
Appropriate PPE Required

ARC FLASH PROTECTION		SHOCK PROTECTION	
System Voltage	**480 VAC**	Limited Approach Boundary	**42 in**
Arc Flash Boundary	**94 in**	Restricted Approach	**12 in**
Incident Energy	**16.7 cal/cm²**	Glove Class	**00**
Working Dist. Boundary	**18 in**		
Site PPE Level	**4**		

Bus Device: BUS-0002
Protected By: DRYER MAIN BRKR
Date Performed: Jul 16, 2020

ALTERNATE

WARNING

Arc Flash and Shock Risk
Appropriate PPE Required

ARC FLASH PROTECTION		SHOCK PROTECTION	
System Voltage	**480 VAC**	Limited Approach Boundary	**42 in**
Arc Flash Boundary	**94 in**	Restricted Approach	**12 in**
Incident Energy	**16.7 cal/cm²**	Glove Class	**00**
Working Dist. Boundary	**18 in**		
Site PPE Level	**4**		

Bus Device: BUS-0002
Protected By: DRYER MAIN BRKR
Date Performed: Jul 16, 2020

PREFERRED

DANGER

Arc Flash and Shock Risk
Appropriate PPE Required

ARC FLASH PROTECTION		SHOCK PROTECTION	
System Voltage	**480 VAC**	Limited Approach Boundary	**42 in**
Arc Flash Boundary	**324 in**	Restricted Approach	**12 in**
Incident Energy	**43.8 cal/cm²**	Glove Class	**00**
Working Dist. Boundary	**18 in**		
Site PPE Level	**Unavailable**		

Bus Device: BUS-SWBRD22
Protected By: XFMR SEC BRKR
Date Performed: Aug 24, 2020

ALTERNATE

DANGER

Arc Flash and Shock Risk
Appropriate PPE Required

ARC FLASH PROTECTION		SHOCK PROTECTION	
System Voltage	**480 VAC**	Limited Approach Boundary	**42 in**
Arc Flash Boundary	**324 in**	Restricted Approach	**12 in**
Incident Energy	**43.8 cal/cm²**	Glove Class	**00**
Working Dist. Boundary	**18 in**		
Site PPE Level	**Unavailable**		

Bus Device: BUS-SWBRD22
Protected By: XFMR SEC BRKR
Date Performed: Aug 24, 2020

MESSAGE PANEL
(See Page 2)

SIGNAL WORD PANEL:

Labels with **WARNING** titles shall be used for equipment where the calculated incident energies are less than or equal to 40 cal/cm².

- The WARNING signal word shall be Sans Serif typeface.
- The WARNING title shall be black letters on an orange background.

Labels with **DANGER** titles shall be used where the where the calculated incident energies are greater than 40 cal/cm².

- The DANGER title text shall be Sans Serif typeface.
- The DANGER signal word panel shall be white letters on a red background.

The "safety hazard alert" symbol (⚠) shall be included on the signal word panel and be placed to the left of the signal word.

Symbols shall have one of the following color schemes with (a) being the most preferred:
(a) Black with a yellow background inside the symbol
(b) Black on a white background inside the symbol

HAZARD WARNING HEADINGS & SAFETY SYMBOLS:

The headings "Arc Flash and Shock Risk" and "Appropriate PPE Required" shall be included.

The "arc flash" hazard symbol (⚠) shall be used on the label to signal that there are arc blast/flash hazards.

The text "ARC FLASH PROTECTION" shall be used as a subheading for the arc flash information section on the left side of the message panel.

The "shock hazard" symbol (⚠) shall be used on the label to signal that there are shock hazards present.

The text "SHOCK PROTECTION" shall be used as a subheading for the shock information section on the right side of the message panel.

Symbols shall have one of the following color schemes with (a) being the most preferred:
(a) Black with a yellow background inside the symbol
(b) Black on a white background inside the symbol

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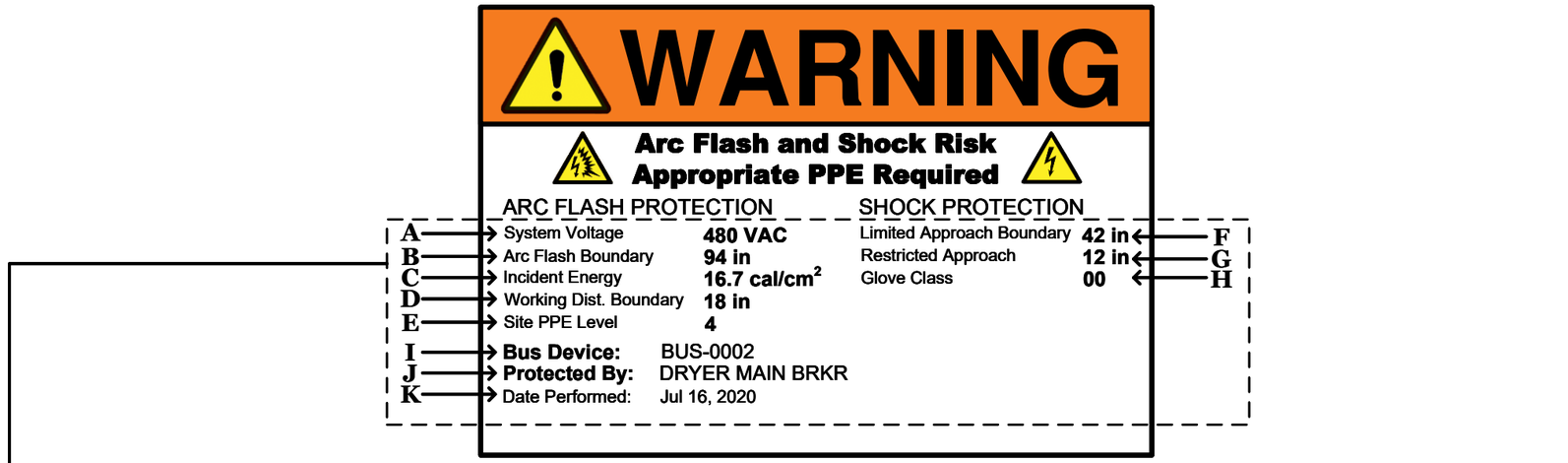
SURF ARC FLASH LABEL DESIGN REQUIREMENTS (CONTINUED)



MESSAGE PANEL:

The ARC FLASH PROTECTION subsection shall include the following data:

[A] System Voltage – The voltage rating of the equipment

[B] Arc Flash Boundary – When an arc flash hazard exists, an approach limit at a distance from a prospective arc source within which a person could receive a second degree burn if an electrical arc flash were to occur.

[C] Incident Energy – The calculated incident energy available at the working distance from the equipment during an electrical arc event.

[D] Working Distance Boundary – The distance between a person's face and chest area and a prospective arc source.

[E] Site PPE Level – The minimum recommended PPE to be worn when working on the labeled equipment with hazards present. Site PPE Levels shall be one of the following:

- **2** for calculated incident energies less than or equal to 8 cal/cm^2
- **4** for calculated incident energies greater than 8 cal/cm^2 and less than or equal to 40 cal/cm^2
- **Unavailable** for calculated incident energies greater than 40 cal/cm^2

The SHOCK PROTECTION subsection shall include the following data:

[F] Limited Approach Boundary – An approach limit at a distance from an exposed live part which a shock hazard exists.

[G] Restricted Approach Boundary – Distance from an exposed energized conductor or part in which there is an increased likelihood of electrical shock due to personnel working in close proximity of he exposed conductor or part.

[H] Glove Class – Glove class required based on equipment voltage level.

The uncategorized subsection shall include the following data:

[I] Bus Device – Represents the actual equipment being analyzed (i.e. switchgear, MCC, panel, disconnect, etc.).

[J] Protected By – Protective device that is clearing the fault for the associated equipment.

[K] Date Performed – The date of label creation.