

# Stoughton Utilities

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## **FLAME RESISTANT (FR) CLOTHING POLICY**

**Approved by:**

*Stoughton Utilities Committee on* \_\_\_\_\_  
*Common Council on* \_\_\_\_\_

## **Introduction**

There are many different types of flame resistant clothing and they can be required for various job activities such as performing electrical line work or low voltage cabinets work in a Stoughton Utilities facility. Where there is potential for arc flash, proper flame resistant (FR) clothing must be worn. Potential sources of ignition include: Open flames, electric arc flashes, sparks, and radiant heat. The type of flame-resistant clothing to be used varies greatly and should be determined on a case-by-case basis (Table 3).

It shall be noted that the wearing of FR clothing will not ensure a worker will not be injured by arc flash burns. Following this policy, National and State Codes, and wearing Personal Protective Equipment will significantly reduce the possibility and/or severity of arc flash burns.

## **Purpose**

Working on energized conductors and/or electrical equipment should only be performed when one of the following conditions applies:

1. It is impractical to de-energize the equipment due to design or operational limitations.
2. De-energizing introduces additional or increased hazards.
3. It is deemed safe to do so using proper techniques that will ensure the personal safety of those involved.

## **Scope**

This program shall apply to all Stoughton Utilities employees that may be exposed to an arc flash or other means of radiant heat. This written plan was developed to supplement the Occupational Safety and Health Administration's (OSHA) Personal Protective Equipment (PPE) Standard (29 CFR 1910.132) adopted by the Wisconsin Department of Commerce (DCOMM), the National Electric Safety Code (NESC 410), Institute of Electronics and Electrical Engineers (IEEE 1584) and NFPA 70E. This program is to provide guidance for divisions affected by this subject and serve as a resource for employee training.

This written plan does not provide any direct guidance on the subject of eye and face protection. For information on this subject consult Stoughton Utilities Personal Protective Equipment written program, MEUW Safety Manual Section 115, Eye and Face Protection Article M, and 29 CFR 1910.133.

## **Determination of Hazard**

Stoughton Utilities contracted Forester Electrical Engineering to survey and calculate arc flash hazards for all facilities electrical equipment and distribution system to comply with the above mentioned standards.

**Job functions that require Flame Resistant clothing and arc flash suits: (including but not limited to)**

- Switching
- Transformer installation/maintenance
- Substation maintenance
- Primary/secondary maintenance and construction
- Operating fused breakers
- Opening/exposing of low voltage electrical cabinets

**Tables for Hazard Class Determination:**

Arc flash hazard exposure depends on where (on the distribution system) employees could potentially be exposed to arc flash hazards. Listed below is an overview of the general locations and corresponding maximum calculated arc flash categories:

Hazard Risk Category for substation circuit reclosers		Table 1
kV	Arc Flash Category	
12.47 distribution on load side	2	
12.47 distribution on source side	0	

When working on energized transformers, use the following table to determine the level of arc flash protection that is required. Using the hazard risk category will allow the employee to ensure they are using the proper level of fire resistant clothing.

Hazard Risk Category for secondary side of transformer. (Service voltage = 120/208 or 277/480 volts, please refer to Representative Arc Flash Hazard Calculations for Utility Applications for Stoughton Utilities, Appendix B for full transformer arc flash protection list)

Table 2	
kVA	Arc Flash Category
45	1
75	3
112.5	3
150	3
225	4
300	4
500	4
1000	Dangerous

All work performed with a Hazard risk Category "Dangerous" will be performed de-energized.

## Arc Flash Hazard Categories

**Table 3**

Incident Energy Range (cal/cm <sup>2</sup> )	Hazard Risk Category	Clothing Layers	Minimum Arc Rating of PPE (cal/cm <sup>2</sup> )	Table 3 Clothing Description
0-1.2	0	1	0	Untreated Cotton
1.2-4.0	1	1	4	FR Shirt, FR Face Shield (8 cal) and FR Pants
4.0-8.0	2	1-2	8	Cotton Underwear + FR Shirt, FR Pants and FR Face Shield (8 cal)
8.0-25.0	3	2-3	25	Cotton Underwear + FR Shirt and Pants + FR Coverall+FR Face Shield (8 cal)
25.0-40.0	4	3-4	40	Cotton Underwear + FR Shirt and Pants + Multi Layer Flash Suit +Full Hood
40<	Dangerous	N/A	N/A	N/A

For all other applications follow the labels located on low voltage cabinets.

## Arc Flash Risk Distance

**Table 4**

Transformer Size (kVA)	Hazard Distance (feet)
45	5
75	5
112.5	5
150	5
225	16
300	16
500	16
750	16
1000	16
1500	16
2000	24

## Responsibilities:

### Employer

The employer has a duty to:

1. Adopt and implement policies and procedures to protect employee health and safety through compliance with applicable OSHA/DCOMM safety and health standards.
2. Assess work area hazards.
3. Select suitable PPE.
4. Furnish employees PPE in accordance with established policies and procedures.
5. Require employees to use PPE where hazards exist.
6. Inspect work place for the proper use, maintenance, storage and disposal of PPE.
7. Maintain records to document regulatory compliance.

### **Employee**

The employee has a duty to:

1. Inspect, use, maintain and store personal protective equipment in accordance with established practices, training received and applicable safety and health standards.
2. Use PPE where required.
3. Inspect PPE before each use.
4. Clean and properly store PPE.
5. Not to use damaged, defective or soiled PPE.
6. Place damaged or defective FR clothing in the appropriate receptacle.
7. Perform and document a monthly inspection off all arc flash clothing (Note Appendix 1).
8. Notify the line supervisor anytime arc flash apparel needs to be cleaned or replaced.

### **Selecting FR clothing**

Employees covered by 29 CFR 1910.269 (OSHA Electric Generation, Transmission, and Distribution Standard), as adopted by DCOMM, shall not wear clothing that will contribute to the severity of a skin burn if ignition occurs. For example, acetate, nylon, polyester, or polypropylene fabrics are unacceptable according to NESC 410 (A)(3). Employees covered by 29 CFR 1910.331-.335/DCOMM shall be provided with FR clothing based on the probability of being exposed to an arc flash. Areas and operations shall be identified where an arc flash could occur with sufficient energy to ignite clothing. Where suitable distance can't be maintained, FR clothing shall be provided. When exposure is infrequent, separate protective clothing shall be used. Where the exposure is routine, or frequent, the employee's regular work clothing shall be FR.

### **Protection Boundaries:**

#### **Flash protection boundary:**

All personnel that are not wearing arc flash/FR clothing must be at a minimum of 15 feet from work where there is a potential for an arc to occur. All clothing must meet the hazard risk category while the employee is working within the flash protection boundary.

#### **Limited Approach Boundary:**

The distance from an exposed live part within which a shock hazard exists. A person crossing the limited approach boundary and entering the limited region must be qualified to perform the job or task. The limited approach boundary determines the area that can be entered by qualified persons escorted by a qualified person.

#### **Restricted Approach Boundary:**

The distance from an exposed live part within which there is an increased risk of shock for personnel working in close proximity to the live part. Any person crossing the restricted approach boundary and entering the restricted space must have a documented work plan approved by authorized management and must use PPE that is appropriate for the work being performed and rated for the voltage and energy level involved.

**Prohibited Approach Boundary:**

The distance from an exposed live part within which work is considered the same as making contact with the live part. The person entering the prohibited space must have specified training to work on energized conductors or live parts. Any tools used in the prohibited space must be rated for direct contact at the voltage and energy level involved.

**Training**

The Occupational Safety and Health Act (OSHA), as adopted by DCOMM, require training for employees who used PPE. Since FR clothing may be considered PPE, the PPE training shall cover FR clothing. Attendance and a general understanding of FR clothing shall be documented during the training program. This documentation shall be kept as part of the employee's safety training history.

**Care and Maintenance of FR Clothing**

All FR and Arc Flash clothing shall be maintained within the manufactures guidelines.

Cintas will take care of the laundering and maintaining of FR shirts, pants, coveralls and winter wear.

It will be the Employees responsibility to maintain the FR clothing in accordance with the manufacture's guidelines.

List of Flame Resistant clothing (Including but not limited to):

1. Gloves - leather gloves
2. Long sleeve shirts
3. Pants
4. Sleeves
5. Face and Head Protections (face shield and hardhat)
6. Coveralls
7. Arc Flash suites
8. Coats
9. Bibs

Detach and return this page to the Department Supervisor after you have read and understood this policy.

I acknowledge receipt of the FR Clothing Policy on the date indicated below.

SIGNED: \_\_\_\_\_

DATE: \_\_\_\_/\_\_\_\_/\_\_\_\_

## **Arc Flash Suits Monthly Inspection**

**TBD**