

AIB MAGAZINE

Food Processing Arc Thermal Resistant Garments

The task of implementing and executing compliance to multiple, divergent standards (HACCP, FDA, USDA standards and OSHA safety standards) can be daunting. The implementation and execution of a HACCP compliant program requires the food processing/manufacturing operators to wear a garment system compatible with the food processing industry to prevent contamination of the products and processes during manufacturing. Additionally, a widely accepted industry standard, NFPA 70E was revised to include requirements for protective apparel for those employees working on or near energized parts. This applies directly to many employees working in the food processing industry. So the question remains, how does a company comply with NFPA 70E and HACCP?

What is NFPA 70E?

The NFPA 70E standard addresses the electrical safety requirements for all employees who install, maintain, or repair electrical systems. It recognizes the hazards associated with the use of electrical energy and includes guidelines to take precautions against injury or death. Specifically, compliance to NFPA 70E requires that all personnel working on electrical equipment operating at >50V wear arc-flash protective garments to prevent injury. Arc-flash is an electric current that passes through the air when the insulation between electrified conductors can no longer withstand an applied voltage. A flash can last less than a second and its results can be severe and even lead to fatalities.

NFPA 70E Compliance in Food Processing Companies

Compliance to NFPA 70E in any company begins with a risk assessment of the hazards associated with the tasks employees perform. In Table 130.7 (C) (9) (a), the standard lists the various tasks and assigns a Hazard/Risk Category (HRC) for each of these tasks. Within each HRC is a minimum arc rating required for the protective garments. The arc rating or arc thermal performance value (ATPV), measured in cal/cm^2 , represents the thermal exposure from an electric arc that will create a second degree burn in human tissue. The minimum requirements are found in Table 130.7 (C) (11) of the standard. The purpose is to provide garments with arc ratings that match those of the Hazard/Risk categories.

After conducting the hazard risk assessment one must consider the following toward the final objective of properly protecting your employees:

- Selecting the Proper Personnel Protective Equipment (PPE)
- Caring for and Repairing the PPE

Selecting the Proper Personnel Protective Equipment (PPE)

If you have employees that perform jobs that are in HRC 1 for half of the day and HRC 2 for the remainder of the day yet every few days a job will be in HRC 4, how do you provide your employees with protective equipment to meet minimum requirements of each of these categories? Many companies are using a simplified approach as described in Annex H of the Standard for Electrical Safety in the Workplace, 2004 Edition. This simplified approach breaks the clothing requirements into a two-category system rather than a four-category system. To meet the clothing requirements for the HRC 1 and HRC 2 categories, the company may provide employees with one set of clothing to meet the minimum requirements for HRC 2 protection, which will provide adequate protection for most jobs. Then to meet HRC 4 protection for those days when needed, companies may have a few sets of HRC 4 PPE for employees to wear. Therefore, you would be using a two category system, providing HRC 2 protection as your daily-wear and HRC 4 protection when needed.

Typical food processing garments constructed of flame resistant fabric meet NFPA 70E HRC 2. To meet the HRC 2 requirements of 8 cal/cm^2 , food processing shirts, pants and coveralls are typically constructed of the Indura® Ultra Soft® fabric. Additionally, construction features such as no pockets or buttons must be observed when selecting food processing flame resistant garments to comply with FDA food code 2-304.11 and minimize the risk of food contamination.

Other clothing requirements address other hazard/risk categories. Employees working in the food processing industries may also wear flame resistant hairnets, face shields, safety glasses, voltage rated gloves and use tools to enhance compliance to NFPA 70E. Constant research and development is ongoing to find other compliant materials for food processing applications.

Caring for and Repairing Food Processing Flame Resistant Garments

Next in determining how to properly protect employees, you must decide how to care and repair the PPE. The flame resistant fabric must be laundered correctly to maintain durability and effectiveness. It is not recommended that flame resistant fabrics be laundered at home. Wash chemical formulas must be validated to assure that soils and wash chemical residuals are removed thoroughly with adequate rinses. Chemical residuals of detergent, bleach or fabric softeners negate the effectiveness of the flame resistant fabrics. Additionally, food processing companies are concerned with the risk of cross contamination from home laundries to the manufacturing facility and vice versa. The food processing garments must be inspected and repaired correctly with similar flame resistant fabrics to achieve both the sanitation and safety requirements of the food processing industry.

Why is NFPA 70E important to the Food Processing Industry?

Automation is prevalent in any industry including food processing. Constant preventive and corrective maintenance of the automated systems create processing efficiencies and increase profits. However, to protect the food processing employees maintaining and operating these automated systems; employers must assess the risk of potential arc-flash and establish the safe arc-flash boundaries in the production process. Training for all employees and auditing for implementation and effectiveness is a key element within any HACCP program.

Documenting the Program and Training

The final step to compliance is the training of all employees on arc-flash protection and appropriate use of the personal protective equipment based on the compilation of all documentation of the food processing flame resistant garment system supporting the selection, care and repair of the PPE, including all the results of the tests performed to confirm flame resistance and results of audits of suppliers. Final implementation and execution of compliance to NFPA 70E, which is also required by FDA cGMP 21CFR110.10 (c) (d) and HACCP 21 CFR 120.13, is achieved with specific training according to the employees assigned task. Many food processing companies outsource this training to the companies supplying the PPE.

Integration of HACCP programs and Flame Resistant Protection

If food processing operations require compliance to NFPA 70E Hazard/Risk Category (HRC) 2, an integration of the safety of the food processing operators/electricians working around the equipment with the sanitary standard operating procedures of the HACCP program must be derived through the risk assessment. Constant research and development of the construction of these garments and of meeting the requirements of the regulatory agencies, durability and flame resistance characteristics is being conducted by fabric and garment manufacturers worldwide. Compliance to HACCP and NFPA 70E is the way to protect your employees, your processes and your products.