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# A Global View of Electric Arc Standards

Those who work in the industrial environment face multiple threats. In this instance, we'll focus on intense electric-related hazards, specifically electric arcs. During an electric arc, temperatures can reach up to 35,000°F, or 20,000°C (that's hotter than the surface of the sun), so wearing the proper flame-retardant (FR) PPE is paramount. Let's take a look at how you can help make sure your team is up to standard and adequately protected—and how your location globally plays a critical role in doing just that.

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Chances are, you've come across definitions of both FR fabrics and flame-retardant and arc-rated (FR/AR) fabrics. But what's the difference? The short answer: all arc-rated fabrics are FR, but not all FR fabrics have been arc rated. Arc-rated fabrics have been tested for protection against an electric arc exposure and have an arc rating that indicates the level of incident injury it will protect you against. Prior to the use of the term FR/AR, the NFPA 70E® standard only required arc-rated fabrics to be tested for flame retardance. Now, arc fabrics are required to be tested for both flame retardance and electric arc protection. The electrical industry standards all over the world require workers to dress in arc-rated PPE. We are going to break down two of the main global electric arc standards—IEC 61482-2 and NFPA 70E.

# IEC

Outside of the United States, IEC 61482-2 is the international standard that specifies fabric and garment certification requirements for protecting workers against electric arc hazards. Under IEC 61482-2, PPE should be tested and certified using one or both of following methods:

## IEC 61482-1-1: Open Arc Test Method

Provides the arc rating of the fabric or garment in  $\text{cal/cm}^2$  (ATPV or  $E_{BT50}$ —whichever is lower).

IEC 61482-2-tested and certified garments will be identified by the pictogram to the right, marked by either the arc rating or arc protection class.

All FR/AR garments in the EU must also be CE-marked per EU PPE Users Directives (89/656).

## IEC 61482-1-2: Box Test Method

Determines the arc protection class rating (class 1 or 2) of the fabric or garment using a constrained and directed electric arc.



Replaced in 2018



Established in 2018

# NFPA 70E

NFPA 70E is the United States standard for policies and protocols designed to safeguard employees faced with the threat of electric arcs. This includes ASTM F1506, which is the standard NFPA 70E cites for fabric and garment testing and certification.

- ▶ Per ASTM 1506, ASTM F1959 (or F1959M for FR fabric) is the test method used to determine the arc rating (ATPV or  $E_{BT50}$ ). This is the same open arc method used in IEC 61482-1-1.
- ▶ Once the arc rating of the fabric is determined, a garment can be evaluated in an electric arc exposure to also test the finished product using ASTM F2621.

Under NFPA 70E, all PPE receives an incident energy level determined by the fabric or garment's arc rating from the ASTM test method. There are four PPE categories stating the minimum arc rating required to meet each level—beginning with Cat 1 which has the lowest minimum arc rating of  $4 \text{ cal/cm}^2$ . The subsequent three PPE categories have minimum arc ratings set at 8, 25 and  $40 \text{ cal/cm}^2$ . Per OSHA standard and NFPA regulation, compliant clothing has the ATPV or incident energy level identified on the garment label.

# RECAP

The main difference between these two standards is that IEC 61482-2 utilizes a 2-level classification system while NFPA 70E relies on 4 levels of incident energy categorization.

NFPA (USA)	IEC (OUTSIDE US)
<b>Overarching Standard</b>	
NFPA 70E	IEEE 1584
<b>Garment Certification</b>	
ASTM 1506	IEC 61482-2
<b>Protection Level Test Methods</b>	
ASTM F2621	IEC 61482-1-1
ASTM F1959/ F1959M for FR Fabric	IEC 61482-1-2

## GLOBAL STANDARDS

Many companies operate in various regions around the world, often requiring additional information to find the right solutions. Westex technical experts can help answer your questions—and point you to products that meet your unique needs as well as a wide range of global standards.