

# Do you know where your arc flash suit has been?

## THE VALUE OF TESTING DOCUMENTATION

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You have now completed the hazard identification and risk assessment procedure as outlined in CSA Z462. In the process of deploying the appropriate personal protective equipment (PPE), you should be aware of the required testing documentation. Otherwise, how do you know the PPE will perform as expected in the event of a catastrophic arc flash accident?

Electrical-specific PPE, such as arc-rated arc flash suits, coveralls and faceshields, can be managed effectively within your electrical safety program. The required testing and/or certification documentation for each PPE item shall be filed in the PPE section of your program, but where do you start? Who should be your first point of contact if you now find yourself having to backtrack and collect the documentation for arc-rated PPE you previously deployed?



### Where do you get started?

The answer to all of the above is the manufacturer or supplier of the finished product. Regardless of who manufactured the various components, it is the finished product manufacturer that is responsible for certifying the PPE item to such standards as ASTM F1506-10a “Standard Performance Specification for Flame Resistant Textile Materials for Wearing Apparel for Use by Electrical Workers Exposed to Momentary Electric Arc and Related Thermal Hazards”.

In most cases, the manufacturers of arc-rated apparel have never seen the inside of a testing laboratory. Instead, only the textile material or fabric component has been tested. This leaves many consumers questioning whether the arc-rated apparel currently being worn by their electrical workers will perform as expected with respect to closures, stitching, seams, etc., that could compromise the safety of the worker in the event of an arc flash accident.

ASTM F2621-06 “Standard Practice for Determining Response Characteristics and Design Integrity of Arc Rated Finished Products in an Electric Arc Exposure” was developed to satisfy the uncertainty of arc-rated PPE consumers and provide testing results for finished goods. However, this testing method is one of the industry’s best-kept secrets, and is neither listed in CSA Z462-12 nor NFPA 70E-12. This testing documentation might be available from your PPE manufacturer, but it is the consumer’s responsibility to require this as part of his tender specifications.

Do you value the safety of your worker’s face and head as much as you do their body? The answer, of course, is Yes but, with respect to testing documentation, the head and face are the areas of your worker’s body that are

most commonly overlooked. Arc-rated arc flash suit hoods and faceshields are tested as finished products. When ASTM F2178-08 “Standard Test Method for Determining the Arc Rating and Standard Specification for Face Protective Products” was first approved in 2002, this requirement changed the electrical-specific PPE industry forever.

Prior to the introduction of ASTM F2178, arc flash hoods with clear, non-arc-rated faceshields were being used. When evaluating arc flash suits (in lieu of having an ASTM F2621-06 test report for the finished product), the ASTM F2178-08 test report is only way of knowing whether your worker’s face and head protective equipment has been tested.

In a perfect world, both the ASTM F2621-06 and ASTM F2178-08 test reports would be available for any arc flash suit. Understanding the arc-rated arc flash suit hood testing method is conducted using the finished product; the arc rating is a system value attributed to the protection provided from both the textile material and the hood window or faceshield. Even when the manufacturer of the arc flash suit uses the same fabric in the construction of all suit components (hood, coat, bib-overall, etc.) the arc rating of the hood is usually different.

It is extremely rare for the hood arc rating to match the performance of the suit material, and such an anomaly should raise a red flag for any consumer concerned about product compliance. ASTM F2178-08 is both a testing method and standard specification that includes requirements for the hood window to be impact-rated (high mass and high velocity) as per ANSI Z87.1-2010, and marked accordingly with a “+” symbol. Therefore, when your arc flash suit hood is compliant with ASTM F2178-08, the product will also provide high-impact protection.



### Testing as per standards

At present, the electrical-specific PPE industry allows for self-certification to standards such as ASTM F1506-10a. For better or worse, PPE manufacturers are trusted when their labels read “Compliant with...” or “Meets...” the required standard(s). In the process of manufacturing apparel for use by electrical workers, manufacturers usually purchase the textile materials from various external sources.

At the very heart of any compliant arc-rated apparel will be a flame-resistant textile material that was tested at the Kinectrics laboratory by either the textile manufacturer or a testing consultant. These reputable sources will then provide the finished product manufacturer with testing documentation such as an ATSM F1959-06 Test Summary (“Standard Test Method for Determining the Arc Rating of Materials for Clothing”). This testing report is one of the many documents you should have on file for every item and/or system of arc-rated apparel currently in use by your electrical workers.

ASTM F1959-06 test reports are required for single-layer and multi-layer fabric systems; never add arc ratings without having the test report documenting the performance of the layered textile materials in the exact order in which your worker will wear the clothing system.

### Importance of documentation

As the industry evolves and new versions of testing methods are released, it is important to keep your testing documentation records current. As an example, earlier versions of the ASTM F1959-06 test procedure did not address the double hump or ablation phenomenon when testing multi-layered fabric systems.

Knowing that the textile material was tested—and having this documentation on file—is one step toward understanding your electrical-specific PPE. There are other ways to verify whether your arc-rated apparel meets ASTM F1506-10a, such as the garment label.

At their own expense, most consumers of electrical-specific PPE will not hire a testing consultant to verify compliance with the requirements of any specification. One easy, cost-effective way to evaluate product compliance is to understand the garment labelling requirements of ASTM F1506-10a:

**ASTM F1506-10a**

6.3 Garments shall be labeled with the following information:

- 6.3.1 Tracking identification code system,
- 6.3.2 Meets requirement of Performance Specification F1506,
- 6.3.3 Manufacturer's name,
- 6.4.4 Size and other associated standard labeling,
- 6.3.5 Care instructions and fiber contents, and
- 6.3.6 Arc rating (ATPV) or arc rating ( $E_{bt}$ )

TABLE 1

STANDARD	DESCRIPTION	WHAT TO REQUEST
ASTM F1959-06	Fabric arc rating test	Laboratory testing documentation
ASTM F2178-08	Hood/shield combination test & performance criteria	Laboratory testing documentation
ASTM F2621-06	Finished product testing for arc-rated apparel	Laboratory testing documentation
ASTM F1506-10a	Performance specification for construction of garments	Statement of compliance on garment label
ANSI Z87.1-2010	High mass and high velocity test for impact strength (ANSI Z87.1+ is superior to CSA Z94.3). Visual light transmission (measurement of shield visible light transmittance)	Statement of compliance and/or 3rd-party laboratory testing documentation. Visible light spectral scan including data across all wavelengths from 400 nm to 760 nm.

Creating a garment label is the easiest part to constructing any arc-rated apparel, so when the label is not compliant, then buyer beware!

Table 1 summarizes the applicable testing and/or certification documentation required for arc-rated PPE.

Knowing where your arc flash suit has been requires that you have collected and filed all of the appropriate testing and/or certification documentation. Catalogues, websites and other forms of manufacturer marketing are not acceptable in lieu of actual documentation.

Product manufacturers, meantime, are required to provide compliance testing and certification documentation to the purchaser as per standards such as ASTM F2178. The safety of your electrical workers depend on your due diligence when selecting appropriate arc-rated PPE. Trust in any electrical-specific PPE manufacturer must be earned, and can only be demonstrated through testing documentation. **E3**

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