



7 Key Elements When Sourcing Arc Rated PPE Clothing

Understanding the safety and testing values

Putzbrunn, September 2021 – In the electrical engineering industry, an awareness of standards of safety wear has by necessity and law been around for some years, with research, new product developments and new standards emerging in this ever-developing field. Protecting engineers exposed to electrical hazards whilst carrying out their daily work is paramount. Electric arc standards are not only subject to change from time to time but can be a source of confusion and doubt for employers who have a duty of care to their employees. Employers must ensure that risk assessments and the resulting PPE specifications are correct for each working scenario.

Key points and facts about electrical arc protection.

1. Thermal Arc Protection IEC 61482-2, this is the basic legal requirement for PPE in this sector and thus of crucial importance. It is the key standard that covers protective clothing against the thermal arc hazards of an electric arc. The IEC 61482-2 standard includes various aspects of garment design and employers must only procure PPE which carries this level of arc flash protection. In order for a garment to reach or exceed the requirements of this IEC standard it must pass one or ideally both test methods used for testing the clothing and material. These can be separated into EN 61482-1-1 known as the Open Arc Test Method and EN61482-1-2 known as the Box Test Method.

2. The Open Arc Test is a method for determining the Arc Thermal Protection Value (ATPV) of a garment, based on the Stoll Curve, which is itself a graph that shows the point at which greater protection should be provided in order to avoid injuries due to heat energy transfer levels. The ATPV shows how much thermal energy any arc flash PPE can withstand to avoid the wearer getting second-degree burns. Thus, the Open Arc Test produces an arc rating.

3. ATPV/EBT Rating this is, simply put, a measurement of a fabric's ability to protect an individual from a burn due to exposure to incident energy resulting from an arc flash. This thermal resistance rating is measured in calories per square centimeter.

Arc Ratings are calculated using at least 20 data points and a logistic regression to determine the incident energy level of a 50% probability that there is enough heat transfer to cross the Stoll Curve (ATPV), or for the material to break open and create exposure, called EBT or the Energy Breakopen Threshold. The higher the numerical rating/value, the higher the level of protection.

4. ELIM Value – this stands for Incident Energy Limit Value and has been added to the 2019 revision of the IEC 61482-1-1 Open Arc Test standard. The ELIM value is defined as the numerical value of incident energy attributed to a product below which all product responses are below the Stoll curve and without break open. The ELIM is calculated as the average the three highest incident energy data points just below the so-called mix zone. The “mix zone” is the range in testing between the lowest incident energy level that crossed the Stoll Curve, and the highest incident energy level that did not cross the Stoll Curve.

5. Box Test Method is another method of testing using electrodes arranged in a particular order in a box to produce the electrical arc. This method of testing does not produce an arc rating per se. Rather, it determines the Class Rating of specific garments. Protective wear passing this test will be rated Class 1 or Class 2. The Box Test standard defines two testing conditions, Class 1 and Class 2, according to different arc incident energy levels.

6. Box Test Class 1 tests at an arc current of 4kA and a duration of 500ms. This classification is given when clothing material and material pass the test of lower level of simulated arc exposure which is carried out in laboratory

conditions. PPE at this level is the basic requirement and affords a lower level of protection to end users.

7. Box Test Class 2, a higher test than Class 1, tests at an arc current of 7kA and a duration of 500ms, so PPE at this level is more secure. Class 2 is attributed to clothing material and clothing when both pass the performance criteria in laboratory conditions at the higher level of arc exposure. Today, innovations are being made in regard to providing Class 2 PPE which is lightweight, breathable and provide comfort to the wearers, such as new Arc Rated GORE® PYRAD® Protective clothing for everyday wear.

Understanding the levels of protection needed to ensure the adherence of the best and highest safety levels required for workers at risk of the potential dangers of arc related incidents need not be confusing. Keeping up to date on the key terms, safety tests and new protection standards, mentioned here, is a firm step in the right direction. It is always advisable to engage with established and trusted PPE manufacturers who will guide through wearer trials and the procurement process.

For any enquiries about arc rated PPE provision please visit:

<https://www.goretexprofessional.com/uk/technologies/gore-pyrad>

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