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PROTECTING LIVES

7 TOP CONSIDERATIONS

WHEN IT COMES TO ARC FLASH PPE

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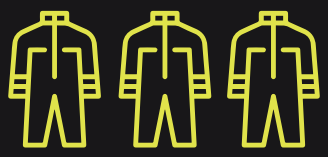
In industries working around high and low voltage electricity, the importance of PPE is widely recognised, and the latest safety requirements are understood by managers and operatives alike.

However the dangers posed by an Arc Flash are not so well known in comparison. But with temperatures of up to 35,000°F, which is more than four times hotter than the surface of the sun, an Arc Flash has the potential to burn an operative's skin within fractions of a second, meaning PPE really is the last line of defence for workers.

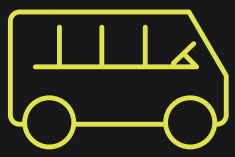
Yet there's a surprising lack of knowledge when it comes to relevant legislation and appropriate protection. Here, we highlight the top considerations when it comes to Arc Flash PPE.

4 times hotter than the sun



2/3 of arc incidents are as a result of human error

Droplets of molten metal move at 700MPH



Copper expands at 67,000 times its volume during an Arc Flash.
A small pea-size piece of copper can expand to the size of a bus!

1 LAYERING IS KEY

The material worn beneath an Arc Flash protective jacket is just as crucial to protecting from the event as outer clothing.

While the outer garments are key components for providing protection, they are not enough to match the risk posed to an operative's safety and effective base layers are needed to defend against the risk of an Arc Flash, meaning Arc Flash PPE base layers should be worn at all times.

This is because, while the flames caused by an Arc Flash may not actually come into contact with skin through the protective outer layers, the extreme heat from the event can melt the materials used to manufacture everyday undergarments, including nylon, cotton, and polypropylene. This will inflict burns on an operative and potentially cause non-Arc Flash protective undergarments to melt into the skin underneath their PPE.

WHEN IT COMES TO LAYERING UP, IT'S IMPORTANT TO ENSURE ALL BASE LAYERS ARE ARC-RESISTANT – EVERYTHING FROM BASE LAYER LEGGINGS, TOPS AND EVEN UNDERWEAR!

See the difference in performance when we compare a cotton baselayer with an arc-rated baselayer.
You can also watch the testing video below...

2 FLAME RETARDANT DOESN'T MEAN ARC FLASH RESISTANT

While many could be forgiven for thinking that flame retardant (FR) PPE can also provide protection in an Arc Flash incident, this is not the case.

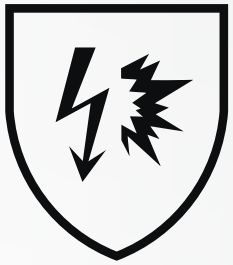
There are in fact separate safety standards for Arc Flash clothing, which go further than the ones for fire resistance, meaning that the level of protection provided by FR clothing does not match that of arc resistant PPE.

Arc Flash protective clothing is designed to not only protect operatives from fire, but from the thermal energy generated by an Arc Flash, which can also cause external and internal burns. In fact, fabric used in arc resistant garments must meet higher tear resistance and tensile strength than those used for fire-resistant clothing.

While the threads used for the structural seams must be fire-resistant, under IEC 61482, Arc Flash resistant clothing has various standards that separate it from FR clothing. Each arc resistant garment must be designed in a way to allow the wearer to quickly remove the item; must always have long sleeves rather than short sleeves; and feature no exposed metal.

WHEN PURCHASING CLOTHING TO PROTECT AGAINST ARC FLASH, LOOK FOR THE SAFETY ICON WITHIN THE PRODUCTS TECHNICAL DOCUMENTATION

Products certified from May 2019 onwards will use this new icon on the right.



EN 61482-2

You can view the difference in performance of Arc v FR garments on the video above.

3 IS THE MATERIAL TREATED OR INHERENT?

The two phrases regularly used when shopping for appropriate PPE clothing are 'treated fabric' and 'inherent fabric'. Treated fabric is made from fibres which are not flame retardant by nature but have undergone a chemical process to add a fire resistance quality to them.

The protection given by a treated fabric relies on that treatment not being degraded or worn off in any way during its lifetime. However, washing or long-term use can reduce the protection these safety garments offer, which is why this type of clothing is generally cheaper.

Inherent fabric, on the other hand, refers to material which has fire retardant properties as part of its natural make-up. In other words, they needn't undergo a chemical process to become flame-retardant, as the polymers which make up the clothing are inherently so.

Inherent fabric does not lose any of its protective qualities after long periods of wear or washing but does tend to be more expensive due to its durability.

INHERENT FABRIC DOES NOT LOSE ANY OF ITS PROTECTIVE QUALITIES AFTER LONG PERIODS OF WEAR OR WASHING

4 PPE DESIGNED SPECIFICALLY FOR BOTH MEN & WOMEN

The number of female workers in the industry is on the incline, and while increasingly mixed gender workforces is a positive change, the traditional universal fit of PPE can pose risks to female workers.

The universal fit of safety garments combined with increasingly mixed gender workforces across all industries is posing a great risk to female workers, due to protective clothing that is not tailored to their size and shape.

Many women are often faced with wearing either unisex or men's jackets, which are sizes too big and not suitably fitted, making them bulky and often uncomfortable to wear. While many may not realise it, these ill-fitting clothes hugely impact the level of protection.

Uncomfortable and baggy jackets make it all too easy and tempting to roll up the sleeves or unfasten the jacket, which leaves areas of the body unprotected. Those looking to address the issue of protective clothing for women, should look to specially designed PPE for women, feature no exposed metal.

5 THE NEW STANDARD FOR CAL RATINGS

In May 2019, the Arc Flash safety standard IEC61482-1-1:2019 introduced more stringent testing conditions for Arc Flash products, with the ELIM (Energy Incident Limit) becoming the new benchmark.

This standard requires testing garments to determine the calories per square centimetre (cal/cm²) they can withstand, known as the cal rating. Previously, the Arc Thermal Performance Value (ATPV) was used to measure the incident energy level at which there's a 50% probability of second-degree burns through the fabric. However, ELIM provides a more conservative and comprehensive measure, using the average of the three highest incident energy data points to determine a nearly 0% chance of second-degree burns.

ELIM combines the ATPV and the Energy Breakopen Threshold (EBT) — the point at which a garment ruptures, exposing the wearer to burn risks — to set a safe energy limit for garments. This helps organizations mitigate Arc Flash risks and ensure compliance with industry standards. Clothing certified before 2020 may still carry ATPV or EBT values due to the five-year validity of certificates, but the updated EN 61482-2 standard now requires all garments to be labeled with the ELIM rating. This dual labelling allows for a comprehensive evaluation of protective clothing, providing insights into both thermal protection and material integrity.

ELIM COMBINES THE ATPV AND THE ENERGY BREAKOPEN THRESHOLD (EBT) TO SET A SAFE ENERGY LIMIT FOR GARMENTS.

THE NEW STANDARD FOR CAL RATINGS ELIM ADVANTAGES

ELIM offers several advantages over ATPV and EBT. It establishes safer exposure thresholds by taking the averaxqge of the highest incident energies that didn't cause second-degree burns, rather than the 50% burn probability used by ATPV.

Additionally, ELIM considers broader safety implications beyond just fabric rupture, encompassing factors like equipment ratings and system configurations for a more holistic risk assessment. This approach ensures that protective equipment is effective across various operational scenarios, reflecting more realistic safety criteria.

Adopting ELIM in Arc Flash testing represents a significant advancement in safety standards, offering a systematic method for assessing protective equipment performance. By incorporating ELIM results into PPE selection criteria, organisations can enhance safety, minimise equipment damage, and ensure compliance with regulations in industrial environments. This comprehensive approach to evaluating Arc Flash hazards helps in making informed decisions to protect workers and equipment effectively.

ELIM CONSIDERS BROADER SAFETY IMPLICATIONS BEYOND JUST FABRIC RUPTURE.

6 COMFORT IS CRUCIAL

Arc Flash protective clothing has historically been thought of as uncomfortable. This is primarily because in the past, the clothing was typically made from fabrics that provided great protection, but were often heavy and stiff, that were rough against bare skin.

A garment can offer the ultimate protection, but if your team does not feel comfortable wearing it, that protection diminishes when they choose not to wear the garment correctly. Every feature must be designed for comfort as well as protection.

Bulky and rigid PPE is frequently worn incorrectly - it's all too easy to wear an everyday belt, to roll sleeves up or undo a jacket when a garment is uncomfortable, but all this seriously compromises the safety of an individual against an Arc Flash. However, uncomfortable PPE can now be a thing of the past. Garments made with inherent fibres instead of a coating added postproduction, allow movement, breathability and moisture management. The fabric readily absorbs sweat and then dries quickly, not only providing cooling in hot, humid conditions, but doesn't leave sweat running down the skin.

A GARMENT CAN OFFER THE ULTIMATE PROTECTION, BUT IF YOUR TEAM DOES NOT FEEL COMFORTABLE WEARING IT, THAT PROTECTION DIMINISHES WHEN THEY CHOOSE NOT TO WEAR THE GARMENT CORRECTLY.

7 ARC FLASH RESISTANT FASTENINGS

To provide the most comprehensive protection, it's important to look at each component of the Arc Flash clothing, as it's not just the fabric that needs to be Arc Flash resistant.

Garments should have every stitch, button, popper, zip, Velcro® brand fastener and press stud made from flame resistant materials to provide enhanced and effective Arc Flash protection, as well as durability. In fact, ProGARM's ThermSAFE™ fastenings are made from military-grade materials, also used by NASA, meaning you can be confident that, should the worst happen, they will provide protection.

GARMENTS SHOULD HAVE EVERY STITCH, BUTTON, POPPER, ZIP, VELCRO® BRAND FASTENER AND PRESS STUD MADE FROM FLAME RESISTANT MATERIALS.

WANT MORE HELP PROCURING THE CORRECT PPE?

At ProGARM, we pride ourselves on providing exceptional customer service and industry-specific expertise in Arc Flash and Flame Resistant clothing.

Our experienced team understands the unique challenges your business faces in hazardous sectors such as utilities, power generation, industrial electrical, petrochemicals, and rail. We stay informed about key industry standards, like HSG 47 and HSG 85, ensuring our technical knowledge supports your compliance and safety needs. Our commitment to quality is reflected in our SafetyICON marking on every garment, which clearly defines the EN standards each product meets. This information is readily accessible in our product matrix online and in our brochures, making it easy for you to find the right protective clothing for your specific hazards.

Our customer support team is dedicated to assisting you with any inquiries about our range of Arc Flash garments, ensuring you receive prompt, knowledgeable, and reliable service. We uphold our company ethos of "keeping our promises" by setting service level targets that ensure quick responses, access to specialists, and timely updates. Our team is well-versed in the details of our protective clothing, including innovations like VXS+ fabrics, ThermSAFE components, and our Lifetime Seam Guarantee. Whether you need detailed product information or have a customer query, ProGARM's 100% Arc Flash-focused support ensures you receive the best protection and service possible.

OUR TEAM ARE EXPERTS 100% FOCUSSED ON ARC FLASH PPE GIVE THEM A CALL AND THEY WILL HELP YOU FIND THE BEST SOLOUTION FOR YOUR REQUIREMENTS.

DOWNLOAD TODAY

SEE OUR CATALOGUE FOR THE COMPLETE RANGE OF ARC FLASH & FLAME RESISTANT GARMENTS

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