ProGARM®

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 35,000ºF, 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.

TEMPERATURES OF UP

35,000ºF

FOUR TIMES HOTTER THAN THE SURFACE OF THE SUN

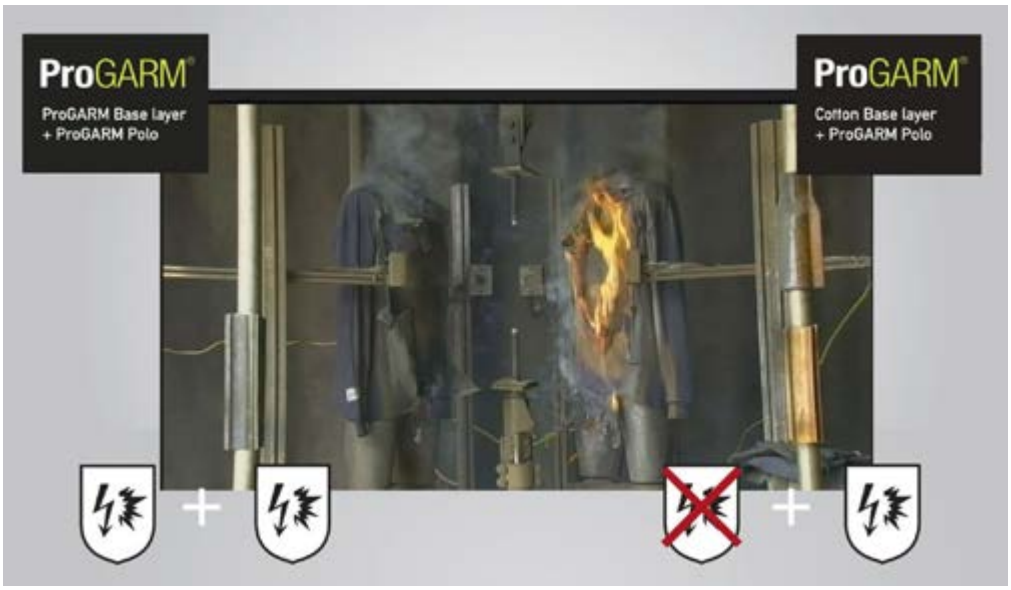
LAYERING IS KEY

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 here

FLAME RETARDANT DOESN'T MEAN ARC FLASH RESISTANT

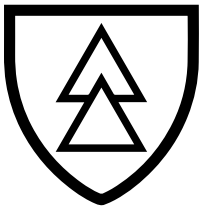
While many could be forgiven for thinking that flame retardant (FR) PPE can also provide protection in an Arc Flash incident, this is not the case.

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.

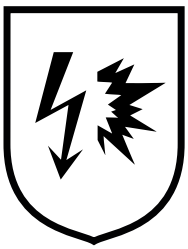
Arc Flash protective clothing is designed to not only protect operatives from fire, but from the thermal energy generated by an Arc Flash, which can also cause external and internal burns. In fact, fabric used in Arc resistant garments must meet higher tear resistance and tensile strength than those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



IEC 61482-2



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

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 OR WEAR OR WASHING

PPE DESIGNED SPECIFICALLY FOR BOTH MEN AND 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.

THE NEW STANDARD FOR CAL RATINGS

In May 2019, a new version of IEC 61482-1-1 is expected to be published, changing the way Arc Flash garments are tested. ELIM is a new method for calculating arc ratings.

Previously, arc ratings have been calculated using a minimum of 20 data points. These data points are then used to create a prediction of the incident energy level at which there's a 50% probability that the heat transfer will cause the material to break open and expose the operative, leaving them susceptible to serious injury and burns.

However, the new ELIM value is designed to be more conservative than the previous method and will be measured by averaging the three highest incident energy data points, without breakopen and without reaching the onset of a second-degree skin burn injury.

When it comes to businesses, it's important to ensure that health and safety managers have a comprehensive understanding of the impact of the new ELIM testing. For example, if an organisation has performed a risk assessment and concluded that its operatives are required to wear PPE with an 8cal rating, then these businesses should clarify whether the PPE being worn needs to be 8cal ELIM, or 8cal ATPV. This is because products that are Arc Flash certified could have a different ATPV rating to ELIM and if this is confused it could lead to operatives wearing an insufficient level of protection.

WHEN IT COMES TO BUSINESSES, IT'S IMPORTANT TO ENSURE THAT HEALTH AND SAFETY MANAGERS HAVE A COMPREHENSIVE UNDERSTANDING OF THE IMPACT OF THE NEW ELIM TESTING

THE NEW STANDARD FOR CAL RATINGS CONTINUED...

It's also important to note that products could have a lower ELIM rating compared with ATPV ratings, which means to achieve the 8cal protection, wearers may be required to wear Arc Flash base layers underneath their outer PPE, to increase the layers of Arc Flash protection, or wear a heavier garment to provide the ELIM value if required.

To ensure that PPE across the business is fully compliant with its needs, it's best to opt for a supplier that can provide clear guidance and expertise. Speak to your supplier and ascertain how aware they are of the new testing standard. When you're choosing a supplier, opt for a brand that is researching and introducing the best possible materials and manufacturing techniques to make sure their PPE clothing and equipment is as safe as possible.

LOOK OUT FOR THE NEW STANDARD BEING USED ON PRODUCTS CERTIFIED AFTER MAY 2019

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 MATERIALSIMPACT OF THE NEW ELIM TESTING

ThermSAFE™

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 post-production, 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

PROGARM® UNITED KINGDOM
HEAD OFFICE, UNICORN HOUSE, BROAD LANE,
GILBERDYKE, BROUGH, EAST YORKSHIRE, HU15 2TS

TEL: +44 (0)1482 679600
FAX: +44 (0)1482 638233
EMAIL: SALES@PROGARM.COM

WWW.PROGARM.COM @PROGARMSAFETY PROGARM LTD.