Whatever your profession, we have the right safety clothing for your job. Perfect fit, comfort and ultimate protection with a professional image. Our team of dedicated specialists is always on hand to help you select the right garments for your needs.

Sioen keeps you Warm,
Sioen keeps you Dry,
Sioen keeps you Safe!

- Bart Vervaeccke, CEO Sioen Apparel
ARC Class 2 protection
Protection against the risks caused by an electric flashover

An electric arc flashover is caused by an accidental or unexpected link between 2 conductors (one of both to be live). This can occur for example when accidentally dropping tools or in case of improper use of live testing equipment...

The unexpected contact between electrodes creates an arc that ionizes the surrounding air. Electric arcs produce the highest possible temperatures (2-3 times the temperature of the sun).

This results in a very powerful blast that generates a sudden release of bright light and intensive heat and can cause very serious or even fatal burn injuries.

Characteristics of an electric flashover:
• develops a very strong radiant heat (several thousands °C) which can cause secondary fires or explosions.
• creates a powerful shock wave.
• creates a sound shock of more than 165 db.
• generates a splash of molten metal particles or even generates vaporized metal.
• lasts for a very short time less than a second but can last longer.

Appropriate protective clothing must be worn while performing activities with a risk of an arc flashover. Wearing the proper protective clothing will increase the chances of survival of the worker.

Sioen offers Arc protective garments that are conform to IEC 61482-2 with protection level class 1 and class 2.

In this catalogue we focus on the ARC CI 2 solutions Sioen can offer you.

The ARC Class 2 level of protection can be obtained by producing workwear ARC Class 2 in double layers of fabric or by combining and wearing different garments together (combinations to be tested on ARC CI 2 performance). In the next pages you will find an overview of the possibilities.
### ARC Class 2 (IEC 61482-2) workwear

The ARC Class 2 level of protection can be obtained by making garments in double layers of fabric. Thanks to the combination of an ARC Cl 1 outer fabric with a highly technical, 3D tubular lining, Sioen can offer you ARC Cl 2 garments that are very lightweight, supple and comfortable to wear. Thanks to the 3D tubular lining, optimal ventilation and good moisture management can be guaranteed.

In addition: Sioen workwear garments are completely (360°) lined (back, sleeves and front). This offers increased protection in case when it really matters conform to the highest standards with regards to an ARC Flashover. Most of the competitors offer double layered garments only in the front part and sleeves of the garment. This means that they can only label their garment as an ARC Class 1 product conform to the lowest level of protection offered by the garment (back of the garment is only 1 layer).

Sioen offers fully certified solutions in different fabric constructions conform to IEC 61482-2.
**Alfeld** New 033VA2PIL

**Jacket with ARC protection (Cl 2)**

Very lightweight / Comfortable and breathable fabric & lining, soft & supple / Combines the comfort of wool and the thermal performance of meta-aramid / Inherently flameretardant properties / lightweight 3-D Aramid lining / High level thermal protection / Very good moisture management properties / Non-allergenic and harmless to the skin / Reinforced seams for an increased durability and longer lifetime / Higher abrasion resistance / Dimensionally stable / Total weight of complex: ± 380 g/m²

**Exterior**
- Straight collar
- Zip closure under flap with concealed press studs
- 2 patched chest pockets with flap closed by concealed press studs
- 2 patched slanted pockets with flap closed by concealed press studs
- 1 Napoleon pocket
- 1 loop for gas detector
- Round inset sleeves
- Sleeve narrowing by press studs
- Stitched seams
- Extended back

**Interior**
- Fixed 3D aramid lining (140 g/m²)
- Identification label

**Fabric**
69% Nomex - 31% Wool/Viscose + AST; ± 240 g/m²

**Sizes**
EUR: 44-64 ((For conversion to national sizing check the backside of this catalogue)

**Colour**
- BSP Blue

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**Dernau** New 036VA2PIL

**Trousers with ARC protection (Cl 2)**

Very lightweight / Comfortable and breathable fabric & lining, soft & supple / Combines the comfort of wool and the thermal performance of meta-aramid / Inherently flameretardant properties / lightweight 3-D Aramid lining / High level thermal protection / Very good moisture management properties / Non-allergenic and harmless to the skin / Reinforced seams for an increased durability and longer lifetime / Higher abrasion resistance / Dimensionally stable / Total weight of complex: ± 380 g/m²

**Exterior**
- Closure by 1 hidden button / Front fly with zip closure
- 2 inset pockets with flap
- 1 patched thigh pocket with flap closed by hidden press studs
- 1 back pocket with flap closed by concealed press studs
- 1 ruler pocket with flap closed by concealed press studs
- Elasticated waist
- Knee pockets
- Waistband with loops for belt
- Stitched seams

**Interior**
- Fixed 3D aramid lining (140 g/m²)
- Identification label

**Fabric**
69% Nomex - 31% Wool/Viscose + AST; ± 240 g/m²

**Sizes**
EUR: 48S-58S / 44R-64R / 46L-56L ((For conversion to national sizing check the backside of this catalogue)

**Colour**
- BSP Blue
**Anberg New**

034VA2PF9

**Hi-vis jacket with ARC protection (Cl 2)**

Lightweight / Comfortable and breathable fabric, soft & supple / Inherently flameretardant properties / lightweight 3-D Aramid lining / High level thermal protection / Very good moisture management properties / Non-allergenic and harmless to the skin / Reinforced seams for an increased durability and longer lifetime / Higher abrasion resistance / dimensionally stable / excellent pilling resistance

<table>
<thead>
<tr>
<th>Exterior</th>
<th>Interior</th>
</tr>
</thead>
<tbody>
<tr>
<td>» Straight collar</td>
<td>» Fixed 3D aramid lining (140 g/m²)</td>
</tr>
<tr>
<td>» Zip closure under flap with concealed press studs</td>
<td>» Identification label</td>
</tr>
<tr>
<td>» 2 patched chest pockets with flap closed by concealed press studs</td>
<td></td>
</tr>
<tr>
<td>» 2 patched slanted pockets with flap closed by concealed press studs</td>
<td></td>
</tr>
<tr>
<td>» 1 Napoleon pocket</td>
<td></td>
</tr>
<tr>
<td>» 1 loop for gas detector</td>
<td></td>
</tr>
<tr>
<td>» Round inset sleeves</td>
<td></td>
</tr>
<tr>
<td>» Sleeve narrowing by press studs</td>
<td></td>
</tr>
<tr>
<td>» Stitched seams</td>
<td></td>
</tr>
<tr>
<td>» Extended back</td>
<td></td>
</tr>
</tbody>
</table>

**Fabric**

Sio-safe Extra: 54% modacrylic + 45% viscose + 1% AST; ± 300 g/m²

**Sizes**

EUR: 44-64 (For conversion to national sizing check the backside of this catalogue)

**Colour**

» 049 Hi-Vis Yellow/Navy

**Volta New**

037VA2PF9

**Hi-vis trousers with ARC protection (Cl 2)**

Lightweight / Comfortable and breathable fabric, soft & supple / Inherently flameretardant properties / Very good moisture management properties / Non-allergenic and harmless to the skin / Reinforced seams for an increased durability and longer lifetime / Higher abrasion resistance / dimensionally stable / excellent pilling resistance

<table>
<thead>
<tr>
<th>Exterior</th>
<th>Interior</th>
</tr>
</thead>
<tbody>
<tr>
<td>» Closure by 1 hidden button / Front fly with zip closure</td>
<td>» Fixed 3D aramid lining (140 g/m²)</td>
</tr>
<tr>
<td>» 2 inset pockets with flap</td>
<td>» Identification label</td>
</tr>
<tr>
<td>» 1 patched thigh pocket with flap closed by hidden press studs</td>
<td></td>
</tr>
<tr>
<td>» 1 back pocket with flap closed by concealed press studs</td>
<td></td>
</tr>
<tr>
<td>» 1 ruler pocket with flap closed by concealed press studs</td>
<td></td>
</tr>
<tr>
<td>» Elasticated waist</td>
<td></td>
</tr>
<tr>
<td>» Knee pockets</td>
<td></td>
</tr>
<tr>
<td>» Waistband with loops for belt</td>
<td></td>
</tr>
<tr>
<td>» Stitched seams</td>
<td></td>
</tr>
</tbody>
</table>

**Fabric**

Sio-safe Extra: 54% modacrylic + 45% viscose + 1% AST; ± 300 g/m²

**Sizes**

EUR: 48S-58S / 44R-64R / 46L-56L (For conversion to national sizing check the backside of this catalogue)

**Colour**

» 049 Hi-Vis Yellow/Navy
**Abach New**

**Hi-vis jacket with ARC protection (Cl 2)**

Lightweight / Comfortable and breathable fabric, soft & supple / Inherently flameretardant properties / Very good moisture management properties / Non-allergenic and harmless to the skin / Reinforced seams for an increased durability and longer lifetime / Higher abrasion resistance / dimensionally stable / excellent pilling resistance

**Exterior**
- Straight collar
- Zip closure under flap with concealed press studs
- 2 patched chest pockets with flap closed by concealed press studs
- 2 patched slanted pockets with flap closed by concealed press studs
- 1 Napoleon pocket
- 1 loop for gas detector
- Round inset sleeves
- Sleeve narrowing by press studs
- Stitched seams
- Extended back

**Interior**
- Fixed 3D aramid lining (140 g/m²)
- Identification label

**Fabric**
Sio-safe Extra: 31% polyester + 28% modacrylic + 20% aramid + 20% viscose FR + 1% AST; ± 320 g/m²

**Sizes**
EUR: 44-64 (For conversion to national sizing check the backside of this catalogue)

**Colour**
- 048 Hi-Vis Orange/Navy

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**Minzow New**

**Hi-vis trousers with ARC protection (Cl 2)**

Lightweight / Comfortable and breathable fabric, soft & supple / Inherently flameretardant properties / Very good moisture management properties / Non-allergenic and harmless to the skin / Reinforced seams for an increased durability and longer lifetime / Higher abrasion resistance / dimensionally stable / excellent pilling resistance

**Exterior**
- Closure by 1 hidden button / Front fly with zip closure
- 2 inset pockets with flap
- 1 patched thigh pocket with flap closed by hidden press studs
- 1 back pocket with flap closed by concealed press studs
- 1 ruler pocket with flap closed by concealed press studs
- Elasticated waist
- Knee pockets
- Waistband with loops for belt
- Stitched seams

**Interior**
- Fixed 3D aramid lining (140 g/m²)
- Identification label

**Fabric**
Sio-safe Extra: 31% polyester + 28% modacrylic + 20% aramid + 20% viscose FR + 1% AST; ± 320 g/m²

**Sizes**
EUR: 48S-58S / 44R-64R / 46L-56L (For conversion to national sizing check the backside of this catalogue)

**Colour**
- 048 Hi-Vis Orange/Navy
**Erling New**

**Jacket with ARC protection (CI 2)**

 Lightweight / Comfortable and breathable fabric, soft & supple / Inherently flameretardant properties / Very good moisture management properties / Non-allergenic and harmless to the skin / Reinforced seams for an increased durability and longer lifetime / Higher abrasion resistance / dimensionally stable / excellent pilling resistance

**Exterior**
- Straight collar
- Zip closure under flap with concealed press studs
- 2 patched chest pockets with flap closed by concealed press studs
- 2 patched slanted pockets with flap closed by concealed press studs
- 1 loop for gas detector
- 1 Napoleon pocket
- Round inset sleeves
- Sleeve narrowing by press studs
- Stitched seams
- Extended back

**Interior**
- Fixed 3D aramid lining (140 g/m²)
- Identification label

**Fabric**
Sio-safe Extra: 54% modacrylic + 45% viscose + 1% AST; ± 300 g/m²

**Sizes**
EUR: 44-64 (For conversion to national sizing check the backside of this catalogue)

**Colour**
- B98 Navy Blue
- M44 Grey
- H46 Royal Blue

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**Birkig New**

**Trousers with ARC protection (CI 2)**

 Lightweight / Comfortable and breathable fabric, soft & supple / Inherently flameretardant properties / Very good moisture management properties / Non-allergenic and harmless to the skin / Reinforced seams for an increased durability and longer lifetime / Higher abrasion resistance / dimensionally stable / excellent pilling resistance

**Exterior**
- Closure by 1 hidden button / Front fly with zip closure
- 2 inset pockets with flap
- 1 patched thigh pocket with flap closed by hidden press studs
- 1 back pocket with flap closed by concealed press studs
- 1 ruler pocket with flap closed by concealed press studs
- Elasticated waist
- Knee pockets
- Waistband with loops for belt
- Stitched seams

**Interior**
- Fixed 3D aramid lining (140 g/m²)
- Identification label

**Fabric**
Sio-safe Extra: 54% modacrylic + 45% viscose + 1% AST; ± 300 g/m²

**Sizes**
EUR: 48S-58S / 44R-64R / 46L-56L (For conversion to national sizing check the backside of this catalogue)

**Colour**
- B98 Navy Blue
- M44 Grey
- H46 Royal Blue
Rainwear

ARC CLASS 2 RAINWEAR – SIO-SAFE™ Aqua

Sio-Safe™ Aqua is a top-notch protection fabric. It offers protection against ARC flashover, heat, flames and welding sparks and is also permanently antistatic. Sio-Safe™ Aqua will also shelter you from the harshest weather conditions. It is a laminated fabric that is perfectly wind- and waterproof. It received a durable water and dirt/oil repellent finish, offering the wearer protection against splashes of chemical products. It doesn’t get soaked and stays clean longer.

Fabric: available in different weights and fabric compositions.

<table>
<thead>
<tr>
<th>Newton</th>
<th>Atmore</th>
<th>Riverton</th>
<th>Kelford</th>
</tr>
</thead>
<tbody>
<tr>
<td>7240A2LE9</td>
<td>6144A2LE9</td>
<td>7241A2LKA</td>
<td>1005A2LK2</td>
</tr>
<tr>
<td>Anderson</td>
<td>Pedley</td>
<td>Bowes</td>
<td></td>
</tr>
<tr>
<td>7242A2LE9</td>
<td>1004A2LK2</td>
<td>1006A2LK2</td>
<td></td>
</tr>
</tbody>
</table>
Newton 7240A2LE9
Rain jacket with ARC protection (Cl 2)

Exterior
- Straight collar
- Provided for hood (hood available separately)
- Zip closure under flap with touch & close fastening
- 1 patched chest pocket
- 2 patched pockets with flap
- 2 loops for gas detectors
- 1 Napoleon pocket
- 1 sleeve pocket + pen pocket
- Round inset sleeves
- Sleeve narrowing by touch and close fastening
- Elasticated waist in the back
- Taped seams
- Back length 85 cm (L)

Interior
- Fixed flame retardant cotton lining
- 1 inside pocket
- Inside pocket for storage of hood
- Zipper in back lining for placing logos
- Different linings/fleece can be zipped in

Fabric
Sio-safe Aqua: 2-layer laminated fabric: 88% cotton FR + 12% PA (& AST) in ripstop with PU laminate; ± 335 g/m²

Sizes
S - XXL

Colour
- BS0 Blue

I.L.S.
7230 - 7690 - 9633 - 9634 - 9643 - 9644 - 9896

Combining products
6144 - 7242

Atmore 6144A2LE9
Bib & brace trousers with ARC protection (Cl 2)

Exterior
- Front fly with zipper
- 1 patched chest pocket with zip closure
- 2 side slits
- Braces with buckle
- Leg narrowing below by touch and close fastening
- Zip closure under flap with touch and close fastening at leg end
- Elasticated waist in the back
- Bib in front and back

Interior
- Fixed flame retardant cotton/polyamide lining

Fabric
Sio-safe Aqua: 2-layer laminated fabric: 88% cotton FR + 12% PA (& AST) in ripstop with PU laminate; ± 335 g/m²

Sizes
S - XXXL

Colour
- BS0 Blue

Combining products
1005 - 7240 - 7241
Riverton

**Hi-vis rain jacket with ARC protection (Cl 2)**

**Exterior**
- Straight collar
- Provided for hood (hood available separately)
- Zip closure under flap with touch & close fastening
- 1 patched chest pocket
- 2 patched pockets with flap
- 2 loops for gas detectors
- 1 Napoleon pocket
- 1 sleeve pocket + pen pocket
- Round inset sleeves
- Sleeve narrowing by touch and close fastening
- Elasticated waist in the back
- Taped seams
- Back length 85 cm (L)

**Interior**
- Fixed flame retardant cotton lining
- 1 inside pocket
- Zipper in back lining for placing logos
- Different linings/fleece can be zipped in

**Fabric**
Sio-safe Aqua: 2-layer laminated fabric: 60% modacrylic FR + 40% FR cotton (& AST) in ripstop with PU laminate; ± 310 g/m²

**Sizes**
S - XXXL

**Colour**
- 143 Hi-Vis Yellow/Navy

**I.L.S.**
7230 - 7690 - 9633 - 9634

**Combining products**
1004 - 6144 - 7242

---

Kelford

**New**

**Hi-vis bomber jacket with ARC protection (Cl 2)**

**Exterior**
- Straight collar
- Provided for hood (hood available separately)
- Zip closure under flap with touch & close fastening
- 2 patched pockets with gusset
- 1 Napoleon pocket
- 2 loops for gas detectors
- Round inset sleeves
- Narrowing with touch and close fastening at sleeve end and at sides
- Elongated back tail
- Taped seams
- Back length 82 cm (L)

**Fabric**
Sio-safe Aqua: 2-layer laminated fabric: 60% FR modacrylic + 40% FR cotton (& AST) ripstop with PU laminate; ± 310 g/m²

**Sizes**
S - XXXL

**Colour**
- 143 Hi-Vis Yellow/Navy

**I.L.S.**
7230 - 7690 - 9633 - 9634

**Combining products**
1004 - 6144 - 7242
Create your own microclimate

By zipping the lining into the jacket.
### Anderson

**Hood with ARC protection (Cl 2)**

<table>
<thead>
<tr>
<th>Exterior</th>
<th>Interior</th>
</tr>
</thead>
<tbody>
<tr>
<td>» Detachable hood with chin protection and peak</td>
<td>» Fixed flame retardant cotton lining</td>
</tr>
<tr>
<td>» Hood with chin protection and drawstring in hem, narrowing by touch and close fastening</td>
<td></td>
</tr>
<tr>
<td>» Taped seams</td>
<td></td>
</tr>
</tbody>
</table>

**Fabric**
Sio-safe Aqua: 2-layer laminated fabric: 88% cotton FR + 12% PA (& AST) in ripstop with PU laminate; ± 335 g/m²

**Sizes**
S - XXXL

**Colour**
» BS0 Blue

**Combining products**
1005 - 1006 - 7240 - 7241

### Pedley

**New**

**Hi-vis bib & brace trousers with ARC protection (Cl 2)**

**High performance laminated fabric. Highly breathable.**

<table>
<thead>
<tr>
<th>Exterior</th>
<th>Interior</th>
</tr>
</thead>
<tbody>
<tr>
<td>» Front fly with zipper</td>
<td>» Fixed flame retardant cotton lining</td>
</tr>
<tr>
<td>» 1 patched chest pocket with zip closure</td>
<td></td>
</tr>
<tr>
<td>» 1 patched pocket with touch &amp; close fastening</td>
<td></td>
</tr>
<tr>
<td>» Leg narrowing below by touch and close fastening</td>
<td></td>
</tr>
<tr>
<td>» Knee reinforcement</td>
<td></td>
</tr>
<tr>
<td>» Zip closure with gusset under flap at leg end</td>
<td></td>
</tr>
<tr>
<td>» Waistband with elastic at the back</td>
<td></td>
</tr>
<tr>
<td>» Bib in front and back</td>
<td></td>
</tr>
<tr>
<td>» Taped seams</td>
<td></td>
</tr>
</tbody>
</table>

**Fabric**
Sio-safe Aqua: 2-layer laminated fabric: 60% FR modacrylic + 40% FR cotton (& AST) ripstop with PU laminate; ± 310 g/m²

**Sizes**
S - XXXL

**Colour**
» 143 Hi-Vis Yellow/Navy

**Combining products**
1005 - 7241
Hi-vis rain coverall with ARC protection (Cl 2)


**Exterior**
- Straight collar
- Provided for hood (hood available separately)
- Zip closure under double flap with touch and close fastening and press studs
- 1 inset chest pocket
- 1 patched pocket with touch & close fastening
- 1 patched phone pocket with gusset and closing by touch and close fastening on the left sleeve
- Round inset sleeves
- Sleeve and ankle narrowing by touch & close fastening
- Knee reinforcement
- Zip closure with gusset under flap at leg end
- Elastic drawstring in waist
- Taped seams

**Interior**
- Fixed flame retardant cotton lining
- Knitted wind cuffs in sleeves
- 1 inside pocket with zip closure

**Fabric**
Sio-safe Aqua: 2-layer laminated fabric: 60% FR modacrylic + 40% FR cotton (& AST) ripstop with PU laminate; ± 310 g/m²

**Sizes**
S - XXXL

**Colour**
- 143 Hi-Vis Yellow/Navy

**Combining products**
7242
This multi-norm workwear layer is designed to combine optimal multi-norm protection and wearer comfort at the same time. All garments correspond to the latest standards with regards to safety risks in day-to-day work environments: protection against flames, welding sparks, arc protection, anti-static, chemical splash protection etc. Various fabric qualities have been developed for the harshest work environments and different applications. The new range combines the highest levels of safety protection with excellent wear comfort and superb washing properties in an optimal mix.
ARC Class 2 (IEC 61482-2) by multi-layering of different garments

The ARC Class 2 level of protection can also be obtained by combining and wearing different ARC Cl 1 garments together. When combining different layers of garments the level of protection increases. For example when an ARC Class 1 longsleeved polo-shirt is worn together with ARC Class 1 workwear the ARC Cl 2 protection level is reached.

Using this type of multiple layer solutions offers a high degree of flexibility for your workers. When workers are doing maintenance or other repair works on an electrical installation where the risk analysis indicated that ARC Cl 2 level of protection is required then they can decide to wear an extra workwear jacket or softshell on top of their ARC longsleeved polo-shirt.

Thus increasing the level of protection offered by the combination of these garments.

When doing other maintenance work where no ARC CL 2 is required, according to the safety risk analysis, the worker can take off one of the garments, thus going back to an ARC Cl 1 level of protection.

Please find overview on the next page for the combinations of Sioen ARC Cl 1 garments that offer ARC CL 2 protection when wearing them together. All these combinations have been fully tested and certified according to IEC 61482-2.
ARC class 2 by multi-layering

Please find overview on the next page for the combinations of Sioen ARC CI 1 garments that offer ARC CL 2 protection when wearing them together. All these combinations have been fully tested and certified according to IEC 61482-2.

How does this work?

Class 1
EBT50 = 7,2 cal/cm²

Class 2
ATPV = 15,2 cal/cm²

Class 2 protection
ATPV > 22,4 cal/cm²

FORBES 496AA2MR2 + MILLAU 010VA2PFA
## ARC class 2
### Multi-layering combinations

<table>
<thead>
<tr>
<th>Workwear</th>
<th>Sio-Safe™ Essential</th>
<th>Sio-Safe™ Extra</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forbes</td>
<td>Class 2 36.6 cal/cm²</td>
<td>Class 2 ± 31.5 cal/cm²*</td>
</tr>
<tr>
<td>Obera</td>
<td>Class 2 22.4 cal/cm²*</td>
<td>Class 2 ± 31.5 cal/cm²*</td>
</tr>
<tr>
<td>Montero</td>
<td>Class 2 22.4 cal/cm²*</td>
<td>Class 2 ± 31.5 cal/cm²*</td>
</tr>
<tr>
<td>Millau</td>
<td>Class 2 22.4 cal/cm²*</td>
<td>Class 2 ± 31.5 cal/cm²*</td>
</tr>
<tr>
<td>Anaco</td>
<td>Class 2 22.4 cal/cm²*</td>
<td>Class 2 ± 31.5 cal/cm²*</td>
</tr>
<tr>
<td>Carlow</td>
<td>Class 2 22.4 cal/cm²*</td>
<td>Class 2 ± 31.5 cal/cm²*</td>
</tr>
<tr>
<td>Autun</td>
<td>Class 2 22.4 cal/cm²*</td>
<td>Class 2 ± 31.5 cal/cm²*</td>
</tr>
</tbody>
</table>

*Estimated values, all other values were tested
EN IEC 61482-2: Protective clothing against the thermal hazards of an electric arc

This standard specifies requirements applicable to materials and garments (excl. protection of head, hands and feet) for protective clothing for electrical workers against the thermal hazards of an electric ARC. The requirements do not address electric shock hazards nor the effects of noise, UV emissions, pressure shrapnel or toxic influences. Depending on the characteristics of the network and the equipment used; the location of the network where live working is performed the possible energy of the arc is different.

Depending on the needs, the users should specify for one or the other of the following test methods and performance specifications:

- Arc in a box testing according to EN IEC 61482-1-2
- Open Arc testing according to IEC 61482-1-1

Arc in a box testing (EN IEC 61482-1-2)

This test simulates ARC exposures in low voltage service or maintenance conditions: switching boxes, cable distribution, distribution sub-stations, where the ARC is directed to the front of a worker at chest height. This test is performed on the fabric as well as on the complete garment.

SIOEN offers product solutions to both performance classes:

- Class 1 prospected short-circuit current 4kA
- Class 2 prospected short-circuit current 7 kA

Open Arc testing (IEC 61482-1-1)

In this test the pulsating open arc blast spreads 360° on 3 surrounding fabric samples exposed at the same time.

This test determines an ATPV value: “Arc Thermal Performance Value” expressed in cal/cm².

The ATPV in ARC testing is the incident energy on a material or a multilayer system of materials that results in a 50% probability that sufficient heat transfer through the tested specimen is predicted to cause the onset of a second degree skin burn injury without breakopen.

This ATPV value is used to assess the fabric or material assembly in relation to its protection effect against thermal arc consequences.

In addition to this ATPV value, a new criteria (ELIM value, Incident Energy Limit) will be added in the future, so that the open arc test can also be used for EC type examination.

Each H&S officer has to make a risk assessment applicable for the work situation where the ARC flashover can occur. From this risk assessment it is known what ATPV is required for a certain work in a certain installation.

A minimum ATPV rating of 4 cal/cm² is needed. The higher the ATPV value, the better is the thermal resistance under higher incident arc energies.

By combining multiple layers of ARC protective garments (all with a minimum ATPV value of 4 cal/cm²) the total ATPV value of the multiple layers will be increased. (=NFPA 70E:2015 Approach)

To limit the needed weight and volume of the protective garments it is advised to combine multiple layers of garments.
**NFPA 70E (US Standard)**

NFPA 70E helps companies and employees avoid workplace injuries and fatalities due to shock, electrocution, arc flash, and arc blast.

This standard addresses electrical safety-related work practices for employee workplaces that are necessary for the practical safeguarding of employees relative to the hazards associated with electrical energy during activities such as the installation, inspection, operation, maintenance of electric conductors, electric equipment.

Provisions encompass safety-related work practices, safety-related maintenance requirements, and safety requirements for special equipment. The Standard includes guidance for making hazard identification and risk assessments, selecting appropriate PPE, establishing an electrically safe work condition, and employee training.

The standard provides a guideline for the selection and use of ARC protective garments. This guideline is based on the required minimum ARC rating of a PPE to be used in working conditions where a worker could be exposed to an ARC flashover.

<table>
<thead>
<tr>
<th>Hazard/risk category</th>
<th>Required minimum arc rating of PPE (cal/cm²)</th>
<th>Clothing Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>Arc rated long sleeved FR shirt, FR trousers or FR coverall</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>Arc rated long sleeved FR shirt, FR trousers or FR coverall</td>
</tr>
<tr>
<td>3</td>
<td>25</td>
<td>Arc rated long sleeved FR shirt and FR trousers or FR coverall, AND arc rated flash suit selected so that the system arc requirement complies with required minimum</td>
</tr>
<tr>
<td>4</td>
<td>40</td>
<td>Arc rated long sleeved FR shirt and FR trousers or FR coverall, AND arc rated flash suit selected so that the system arc requirement complies with required minimum</td>
</tr>
</tbody>
</table>

**NFPA 70E approach:**

The arc rating of a whole system needs to be measured on the combination of all pieces of clothing (for torso protection = long sleeved) from which the system consists worn in the correct order and is only valid when all pieces of clothing are effectively worn.
How to choose the right size?

1. Take your body measurements according to the picture:

2. A: Waist: measurement horizontally around the waist.
   B: Chest: measurement horizontally under the arms, around the widest part of the chest.
   C: Total body length: measurement from top of the head till the ground, to be measured without shoes.
   D: Inseam leg length: measurement from the crotch of the trousers till the ground, to be measured without shoes.

3. All measurements in the table are body measurements. We recommend that measurements are taken while wearing light clothing, do not measure too tight.

4. Find the correct size which corresponds with the body measurements in the table.

5. If you would require a size which deviates from the sizes mentioned in the table, we are happy to manufacture such a garment according to your specific body measurements.

---

### Bodywear, thermal wear & rainwear

<table>
<thead>
<tr>
<th>XS</th>
<th>S</th>
<th>M</th>
<th>L</th>
<th>XL</th>
<th>2XL</th>
<th>3XL</th>
<th>4XL</th>
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</thead>
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<tr>
<td>A</td>
<td>Waist (cm)</td>
<td>66.44</td>
<td>74.82</td>
<td>82.80</td>
<td>90.88</td>
<td>98.96</td>
<td>107.12</td>
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<tr>
<td>B</td>
<td>Chest (cm)</td>
<td>78.86</td>
<td>86.94</td>
<td>94.10</td>
<td>102.11</td>
<td>110.18</td>
<td>118.25</td>
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<tr>
<td>C</td>
<td>Total body length (cm)</td>
<td>164.17</td>
<td>164.17</td>
<td>172.18</td>
<td>172.18</td>
<td>180.18</td>
<td>188.18</td>
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### Multinorm workwear

#### Jackets

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</tr>
<tr>
<td>UK</td>
<td>S</td>
<td>M</td>
<td>L</td>
<td>XL</td>
<td>2XL</td>
<td>3XL</td>
<td></td>
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<tr>
<td>B</td>
<td>Chest (cm)</td>
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<tr>
<td>C</td>
<td>Length (cm)</td>
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#### Trousers, bib & brace and coveralls

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<tr>
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<td></td>
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<td>38R</td>
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##### Long Length

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</tr>
<tr>
<td>UK (chest)</td>
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<td>38R</td>
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</table>

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**22**

ARC CLASS 2
Wash & care instructions

Below you’ll find a summary of the meaning of the wash & care symbols. Find the correct washing instructions on the label in your garment.

**Domestic wash | ISO 6330 | ISO 3758**

<table>
<thead>
<tr>
<th>WASHING</th>
<th>DRY CLEANING</th>
<th>IRONING</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Washing 60°C" /></td>
<td><img src="image" alt="All solvents normally used" /></td>
<td><img src="image" alt="High max. 200°C" /></td>
</tr>
<tr>
<td><img src="image" alt="Washing 40°C" /></td>
<td><img src="image" alt="All solvents except trichlorethene" /></td>
<td><img src="image" alt="Max. 150°C" /></td>
</tr>
<tr>
<td><img src="image" alt="Max. 60°C" /> / reduced mechanical action / rinsing at decreasing temperature (cooling down) / reduced spinning</td>
<td><img src="image" alt="Only petroleum solvents" /> / <img src="image" alt="Mild process" /></td>
<td><img src="image" alt="Low max. 110°C / steam-ironing may be risky" /></td>
</tr>
<tr>
<td><img src="image" alt="Max. 40°C" /> / reduced mechanical action / rinsing at decreasing temperature (cooling down) / reduced spinning</td>
<td><img src="image" alt="Do not dry clean" /></td>
<td><img src="image" alt="Do not iron / no steam treatments" /></td>
</tr>
<tr>
<td><img src="image" alt="Max. 30°C" /> / mechanical action much reduced / rinsing normal / reduced spinning</td>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Hand wash only / no machine wash / max. 40°C / handle with care" /></td>
<td><img src="image" alt="Tumble drying / normal temperature" /></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Do not wash" /></td>
<td><img src="image" alt="Tumble drying / lower temperature (50°-60°C max.)" /></td>
<td></td>
</tr>
<tr>
<td><img src="image" alt="Bleaching" /></td>
<td><img src="image" alt="Do not tumble dry" /></td>
<td></td>
</tr>
</tbody>
</table>

**Industrial laundering of workwear**

**EN ISO 15797 (procedure 8) | ISO 30023**

The methods described in this International Standard simulate the effect of industrial laundering on workwear. The Standard specifies test procedures and equipment which can be used in the evaluation of workwear intended to be industrially laundered. Each washing procedure is considered to represent a single industrial wash. They serve as a basis for testing relevant properties such as e.g. dimensional stability, colour fastness, creasing and seam puckering.

The standard also specifies two drying/finishing test procedures:
- Tumble drying
- Tunnel/cabinet finishing

A complete laundering test consists of a washing and a drying/finishing procedure. For this type of workwear procedure 8 of the standard is applicable at a washing temperature of 75°C followed by tumble drying. The multinorm workwear garments of SIOEN are suitable for industrial washing and the flame retardant properties of the fabric are tested after minimum 50 industrial washing and drying cycles (or 100 cycles). Conformity to the certified flame-retardant standards is still guaranteed after the indicated number of washing and drying cycles.

**Made-to-Order**

Wherever you see this logo, these garments are not available ex-stock but will be manufactured within 30 working days from receipt of order, plus the usual transport time across Europe (*). The minimum first order quantity is 50 pieces per item (repeat orders min. 25 pieces per item). For larger orders please refer to our sales desk for a specific delivery leadtime. We take no responsibility for delivery delay due to force majeure.

(*) Our 30 days production time applies to the standard version of this product in the current standard size range. It does not apply for additional features, special measurements or bespoke productions.