



PROTECTIVE CLOTHING



USER MANUAL



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Notified body which performed the EU Type- examination (Module B) and issued EU type-examination certificate and is also responsible for the assessment procedure conformity to type based on internal production control plus quality assurance of the production process (Module D) for products that are Category III.



PROTECTIVE CLOTHING

EN ISO 11612:2015



A B C D E F

EN ISO 11611:2015



CLASS 1/2

EN 1149-5:2018



IEC 61482-2:2018



APC 1/2

EN ISO 20471:2013
+A1:2016



CLASS 1/2/3

EN 343:2019



CLASS 1/2/3/4

X
Y
R

USER MANUAL

1. ABSTRACT

These protective clothes are in compliance with PPE Regulation (EU) 2016/425 and EN ISO 13688:2013. Before using the protective clothing please carefully read the following safety instructions.

2. DESCRIPTION

Protective garments that are produced individually for each risk group like thermal hazards due to the Electric Arc, molten metal splashes, high temperatures, welding operations, etc. provide optimum protection when used properly. Appropriate clothes should be preferred according to each risk group. For full protection you must wear hood, gloves, helmet, eyewear and boots with these clothes. There is a pictogram label on protective clothes that shows relevant standards of the garment. Protective goods have no electrical insulation. They do not provide protection against electric shock.

3. RECOMMENDATIONS

Electric Arc Guard Clothes are protective garments only against thermal hazard and heat of Electric Arc flash. Hence, it is not suitable for trying to extinguish or enter the fire. These garments were not designed with the aim to work inside or face to face with flame for a long time. They do not protect the respiratory system, head, face, eyes, hands and feet. It is necessary to use additional equipment to protect these parts of the body. Moreover, these clothes are not durable to biological, chemical and radiological hazards and risks. Jacket and trousers ensure protection against related hazards in case when they are worn together. Therefore, they should never be worn separately.

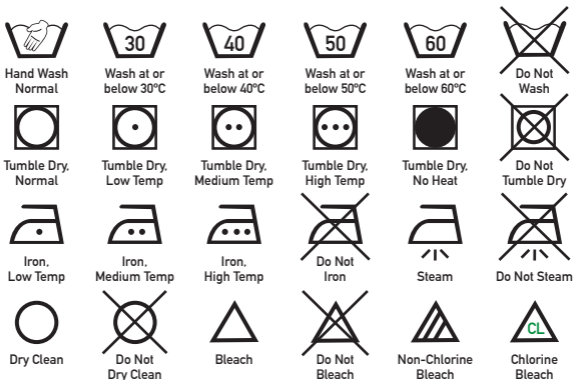
4. CLEANING & CARE

Washing and care instructions, style reference, date and place of manufacture, material compositions and related standards together with the levels of protections can be found on the labels inside the garments. Clothing to be cleaned regularly in accordance with the manufacturers recommendations as shown on the care labels to maximize the useful life. After cleaning, the clothing shall be visually



inspected for any signs of damage. Protective clothing that are no longer deemed serviceable for reasons of damage, contamination, or other unsafe condition must be disposed of in a fashion whereby the clothing cannot be reused and in accordance with your local regulations. Do not attempt to repair your clothing.

Below are examples of washing symbols.



5. USE ADVICES

After each use, it must be controlled whether there is any damage on the garment because of the scratches and tears. If so, please inform relevant person for repairing it. These clothes should always be worn in a clean and dry form. It is important to fit over the wearer's clothes; it must be nor slack neither tight. Inappropriate clothing worn in dangerous conditions may increase the risk of accident. In case of problem with the cloth's size, you should inform the related personnel. If there is any closure system in the garments (zipper, velcro, etc.), it should definitely be closed during using. If the closure system is used as open, the garments do not provide required protection.

6. USER RESPONSIBILITIES

During and after each use, you should note the following cases:

- Closure Systems
- Stitches
- Reflective Tapes
- Fabric (torn, punctured, colour change, wear and tear etc.)
- Cutouts

7. STORAGE

Do not fold and put the garments to the wardrobe if they are still wet due to the different reasons such as washing and sweat. In such cases, please, hang them on hangers and put on the appropriate wardrobe. Clothing should not be exposed to high temperatures and should be stored in a dry place, away from sunlight.

8. STANDARDS

EN ISO 11612:2015 Protective Clothing to Protect against Heat and Flame



EN 11612:2015

This standard specifies performance requirements for garments made from flexible materials which are designed to protect the wearer's body (except the hands) from heat and/or flame. The performance requirements set out in this international standard are applicable to garments, which could be worn for a wide range of end uses, where there is a need for clothing with limited flame spread properties and where the user can be exposed to radiant, convective or contact heat or molten metal splashes. This test uses standard methods and conditions to predict the performance of fabric/garments in the event of contact with heat or flames. Garment features such as seams, closures and logos must be tested as well as the fabric. Tests must be carried out on pre-treated components according to the manufacturers care label

Code A: Limited Flame Spread (A1 / A2)

Code B: Protection against Convective Heat (B1 / B2 / B3)

Code C: Protection against Radiant Heat (C1 / C2 / C3 / C4)

Code D: Protection against Molten Aluminium Splash (D1 / D2 / D3)

Code E: Protection against Molten Iron Splash (E1 / E2 / E3)

Code F: Protection against Contact Heat (F1 / F2 / F3)

- If in the event of an accidental splash of chemical or flammable liquids on clothing's covered by this International Standard while being worn, the wearer should immediately withdraw and carefully remove the garments, ensuring that the chemical or liquid does not come in contact with any part of the skin. The clothing shall then be cleaned or removed from service.

EN ISO 11611:2015 Protective Clothing for Use in Welding and Allied Processes



EN 11611:2015

This type of protective clothing is intended to protect the wearer against small splashes of molten metal, short contact time with flame, radiant heat and the arc, and minimises the possibility of electrical shock by short- term, accidental contact with live electrical conductors at voltages up to approximately 100 V d.c in normal conditions of welding. Sweat, soiling or other contaminants can affect the level of protection provided against short-term accidental contact with live electric conductors at these voltages.

- Follow the grid from the below table for the appropriate choice of class of welder's protective clothing.
- For operational reasons not all welding voltage carrying parts of arc welding installations can be protected against direct contact. Additional partial body protection may be required e.g. for welding overhead, hand protection and foot protection.
- The garment is only intended to protect against brief inadvertent contact with live parts of an arc welding circuit, and that additional electrical insulation layers will be required where there is an increased risk of electric shock; garments meeting the requirements of EN ISO 11611 are designed to provide protection against short term, accidental contact with live electric conductors at voltages up to approximately 100 V d.c.
- The level of protection against flame will be reduced if the welders' protective clothing is contaminated with flammable materials.
- An increase in the oxygen content of the air will reduce the protection of the welders' protective clothing against flame. Care should be taken when welding in confined spaces if it is possible that the atmosphere may become enriched with oxygen.
- The protective clothing itself does not provide protection against electric shock.
- During welding, suitable insulating layers should be provided to prevent the welder contacting electrical conductive parts of his equipment.

- The hazards against which the clothing is intended to protect includes flames, molten metal splatter, radiant heat, short term accidental electrical contact.
- The electrical insulation provided by clothing will be reduced when the clothing is wet, dirty or soaked with sweat
- Two-piece protective clothing shall be work together to provide the specified level of protection.

Type of welders' clothing	Selection criteria relating to the process:	Selection criteria relating to the environmental conditions
CLASS 1	Manual welding techniques with light formation of splatters and drops, e.g. <ul style="list-style-type: none"> • Gas Welding • TIG welding • MIG welding • Micro Plasma Welding • Brazing • Spot Welding • MMA welding (with rutile-covered electrode) 	Operation of machines, e.g. <ul style="list-style-type: none"> • Oxygen Cutting Machines • Plasma Cutting Machines • Resistance Welding Machines • Machines For Thermal Spraying • Bench Welding
CLASS 2	Manual welding techniques with heavy formation of splatters and drops, e.g.: <ul style="list-style-type: none"> • MMA welding (with basic or cellulose - covered electrode) • MAG welding (with CO₂ or mixed gases) • MIG welding (with high current) • Self-Shielded Flux Cored Arc Welding • Plasma Cutting • Gouging • Oxygen Cutting • Thermal Spraying 	Operation of machines, e.g. <ul style="list-style-type: none"> • In Confined Spaces • At Overhead Welding/ Cutting or In Comparable Constrained Positions

EN 1149-5:2018 Protective Clothing to protect – Electrostatic Properties



EN 1149-5:2018

This standard specifies electrostatic requirements and test methods for electrostatic dissipative protective clothing to avoid incendiary discharges. This standard is not applicable for protection against mains voltages.

This European standard is part of a series of standards for test methods and requirements for electrostatic properties of protective clothing. The standard specifies material and design requirements for garments used as part of a total earthed system, to avoid incendiary discharges. The requirements may not be sufficient in oxygen enriched flammable atmospheres.

EN 1149 consists of the following parts:

EN 1149-1: Test method for measurement of surface resistivity.

EN 1149-2: Test method for measurement of the electrical resistance through a material (vertical resistance)

EN 1149-3: Test methods for measurement of charge decay

EN 1149-4: Garment Test (under development)

EN 1149-5: Material performance and design requirements.

Electrostatic dissipative protective clothing shall be able to permanently cover all non-complying materials during normal use. Conductive parts (zippers, buttons etc.) are permitted on the condition that they are covered by the outermost material during use.

- The person wearing the electrostatic dissipative protective clothing shall be properly earthed. The resistance between the person's skin and earth shall be less than $10^8 \Omega$, e.g. by wearing adequate footwear on dissipative or conductive floors;
- Electrostatic dissipative protective clothing shall not be open or removed whilst in presence of flammable or explosive atmospheres or while handling flammable or explosive substances;
- Electrostatic dissipative protective clothing is intended to be worn in Zones 1, 2, 20, 21 and 22 (see EN 60079-10-1 [7] and EN 60079-10-2 [8]) in which the minimum ignition energy of any explosive atmosphere is not less than 0,016 mJ;
- Electrostatic dissipative protective clothing shall not be used in oxygen enriched atmospheres, or in Zone 0 (see EN 60079-10-1 [7]) without prior approval of the responsible safety engineer;

- The electrostatic dissipative performance of the electrostatic dissipative protective clothing can be affected by wear and tear, laundering and possible contamination;
- Electrostatic dissipative protective clothing shall be worn in such a way that it permanently covers all non-complying materials during normal use (including bending movements).

IEC 61482-2:2018 Protective Clothing against the Thermal Hazards of an Electric Arc



IEC 61482-2:2018
APC 1/2

This standard specifies requirements and test methods applicable to materials and garments for protective clothing against the thermal effects of an electric arc event.

An electric arc is a continuous electric discharge of high current between conductors generating very bright light and intensive heat. Electric Arc hazards normally generate higher level of incident energy on to the surface of the protective clothing than do flash fires, but for a much shorter length of time. Two international test methods have been developed to provide information on the resistance of clothing to the thermal effects of electric arcs.

Each method gives different information. To comply with the standard either or both tests must be carried out.

Open Arc Method EN 61482-1-1

This test method aims to establish the ATPV (Arc Thermal Performance Value) or EBT (Energy Breakopen Threshold) of a fabric.

The ATPV is the amount of energy required to cause a 2nd degree burn through the material prior to breakopen (50% probability).

The EBT is the amount of energy where the material breaks-open (50% probability).

This is normally the upper thermal limit of the fabric where the fibres are damaged and the material loses mechanical strength.

Both ATPV and EBT are expressed in calories per cm² (cal/cm²).

APC = Arc Protection Class IEC 61482-2:2018

Protective clothing shall demonstrate a minimum arc thermal protection of APC 1. An APC 2 indicates a higher arc thermal protection.



Box Test Method EN 61482-1-2

The fabric/garment is exposed to an electric arc confined in a specific box with a specific electrode arrangement for 0.5 seconds.

Class 1 is to a current of 4 kA arc, Class 2 is to a current of 7 kA arc.

- **Class 1 – 4 kA**
- **Class 2 – 7 kA**

- The environmental conditions and the risks at the working site shall be regarded
- Deviations from the parameters in this document may result in more severe conditions
- Protective clothing shall be worn in closed state;
- Protective clothing is not intended to be used as electrical insulation protective clothing and does not provide protection against electrical shock;
- Protective clothing that becomes contaminated with grease, oil or flammable liquids or combustible materials should not be used.
- Protective clothing should be cleaned when necessary;
- Protective clothing that is damaged to the extent that its protective qualities are impaired (e.g. holes in the garment, not functioning closures) should not be used.
- For full body protection suitable additional protective equipment (helmets with protective face screen, protective gloves and footwear) shall be used
- Other garments worn with the protective clothing and dirty protective clothing can reduce the protection of the garment.
- No garments like shirts, undergarments or underwear made of for example, polyamide, polyester or acrylic fibres which melt under arc exposures, should be used.

EN ISO 20471:2013+A1:2016 High Visibility Clothing



CLASS 1/2/3

This International Standard specifies requirements for high visibility clothing, which is capable of visually signalling the user's presence. The high visibility clothing is light condition when viewed by the operators of vehicles or other mechanised equipment during daylight conditions and under illumination of headlights in the dark.

High Visibility Clothing is divided into 3 classes

Class 3: High Level

Class 2: Intermediate Level

Class 1: Minimum Level

The minimum required area of high visible material, m²

Material	Class 3	Class 2	Class 1
Base Material (fluorescent fabric)	0,80	0,50	0,14
Reflective Material	0,20	0,13	0,10
Combined Material			0,20

• The stated maximum number of cleaning cycles is not the only factor related to the lifetime of the garment. The lifetime will also depend on usage, care, storage etc.

EN 343:2019 Protective Clothing – Protection against Rain



EN 343:2019

If you work outdoors in all types of weather, it is essential that you are properly dressed. The EN 343:2019 standard has two values which indicate the level of protection the user gets when wearing the product. The first value indicates the product's waterproofness while the second value refers to the breathability of the overall product. Both values are assessed on a scale of 1-4, with 4 being the highest value.

Explanation categories:

X: Water penetration (4 levels, where class 4 is best)

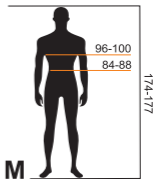
Y: Water vapor resistance /breathability (4 levels, where class 4 is best)

R: Rain tower test (optional) - X:means "not tested"

X (Resistance to water penetration)			Y (Resistance to water vapour)		
Resistance to water penetration	Class 1	≥ 8000 Pa	Water-vapour resistance m ² /Pascal/watt	Class 1	Ret > 40 m ²
	Class 2	≥ 8000 Pa		Class 2	25 < Ret ≤ 40 m ²
	Class 3	≥ 13000 Pa		Class 3	15 < Ret ≤ 20 m ²
	Class 4	≥ 20000 Pa		Class 4	Ret ≤ 15 m ²

9. SIZE TABLE

SIZE	LENGTH	CHEST	WAIST
S	168-171	88-92	76-80
M	174-177	96-100	84-88
L	180-182	104-108	92-98
XL	184-186	112-116	102-108
2XL	188-190	120-124	114-120
3XL	192-194	128-132	124-128



* All measures are given in cm