TCG100[™] Series Arc Flash Coat and Bib PPE

Technical Documentation





Technical Documentation Outline

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Object and General Requirements

0. Object

Type TCG100 coat and bib PPE garments are designed to protect against thermal hazards associated with an electrical arc flash of 7kA (Class 2), manufactured by Oberon Company, 375 Faunce Corner Road, Unit E, North Dartmouth, Massachusetts, USA in accordance with the general health and safety requirements specified in Annex II of The Regulation (EU) 2016/425 of the European Parliament and of the Council of March 9, 2016 on personal protective equipment and, in particular, the specifications contained in standards EN ISO 13688:2013, and EN 61482-2:2020, edited by the European Committee on Normalization (CEN), as Category III PPE.

1. General Scope of Requirements

1.1 Concept Principals

The garment PPE consists of a coat and a bib pant and has been designed to protect the body excluding the head, hands and feet of the user from thermal risk of flammability, and against thermal hazards associated with an electrical arc flash.

The ergonomic design is intended for use by the wearer and affords protection during normal activities and conditions of use without exposing them to additional risk, except in the case of an individual's oversensitivity to those conditions.

1.2 Innocuousness

The materials and components of the PPE DO NOT adversely affect the wearer under normal conditions of use, nor do they produce known toxic or allergenic effects as they are made from commonly used materials.

All parts that are in contact with the wearer are free of roughness, sharp edges and/or protrusions that could cause harm, because they are made with patterns that fit the morphology of the human body.

The PPE has a pH value between 3,5 and 9,5 as required by standards EN ISO 13688:2013.

No prohibited azo dyes have been detected in the PPE, in accordance with European Directive 2002/61/EC, as required by EN ISO 13688:2013.

1.3 Comfort and Efficiency

The garment's cutting pattern ensures that it offers the greatest degree of comfort possible as expected of a garment designed to offer protection to the risks it is designed for. Its design allows correct fitting and ensures that it remains in place during use. Its use is compatible with other PPE worn by the user at the same time.

2. Complementary Requirements

The TCG100 Garments conform to the general design, adjustment, comfort, ageing, size and labelling requirements defined below.

2.1 Design and Systems of Adjustment

The design and systems of adjustment allow for full adaptability to the wearer as is shown in the following documentation:

- Description of PPE according to Annex I.
- Materials and components specifications according to Annex I.

2.2 Comfort

Aramid resistance to moisture is low. The elimination of perspiration is achieved through the use of natural breathable materials.

2.3 Ageing

The equipment must be washed in compliance with the instructions included in the information sheet.

2.4 Sizes

Worker Body Measurements	Chest Measurement (cm)	Waist Measurement (cm)
Small	83,82 - 91,44	68,58 - 76,2
Medium	91,44 - 99,06	76,2 - 83,82
Large	99,06 - 106,68	83,82 - 91,44
X-Large	106,68 - 116,84	91,44 - 101,6
2X-Large	116,84 - 127	101,6 - 117,76
3X-Large	127 - 137,16	117,76 - 121,92
4X-Large	137,16 - 147,32	121,92 - 132,08
5X-Large	147,32 - 157,48	132,08 - 142,24



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Coat Measurements	Chest Measurement (cm)
Small	109,22 - 116,84
Medium	116,84 - 124,46
Large	124,46 - 132,08
X-Large	132,08 - 142,24
2X-Large	142,24 - 152,4
3X-Large	152,4 - 162,56
4X-Large	162,56 - 172,72
5X-Large	172,72 - 182,88

Bib Measurements	Waist Measurement (cm)
Small	78,74 - 86,36
Medium	86,36 - 93,98
Large	93,98 - 101,6
X-Large	101,6 - 111,76
2X-Large	111,76 - 121,92
3X-Large	121,92 - 132,08
4X-Large	132,08 - 142,24
5X-Large	142,24 - 152,4

2.5 Labeling

The PPE TCG100 Garments must be clearly, legibly and permanently labelled with:

- Manufacturer's name and/or identification mark.
- EC marking in accordance with the characteristics defined in Article 30 of the Regulation (EC) nº 765/2008.
- EN 13688:2013 and EN 61482-2:2020.
- Relevant pictogram and levels of conformity.
- Washing and cleaning instructions and the maximum permitted cycles.



3. Field of Application For EN 61482-1-2:2014

The aim of the experimental standard is to determine whether thermal protection against arc flash is achieved and does not include protection against the passage of an electrical current through the body.

The tests are divided into two parts:

- Method 1: Material tests
- Method 2: Clothing tests

4. General Requirements of EN 61482-2:2020

The dimensions of the PPE are defined in the size chart which indicates the body dimensions for each size, defined in point 2.4 of the technical documentation.

4.1 Material

- Time the material resists a flame: \leq 5 s, after exposure to arc flash.
- Melting: no melting through the material, except perforations.
- Formation of perforations: holes no bigger than 5 mm, measured in any direction.

4.2 Clothing

- Time the material resists a flame: \leq 5 s, after exposure to arc flash.
- Melting: no melting through the clothing, except perforations.
- Formation of perforations: holes no bigger than 5 mm, measured in any direction.
- Function: the closing systems must operate after exposure.

4.3 Other Materials

Any other exterior material of the clothing must conform to a Class 2 test.

4.4 Design

The garment is designed in such a way that it does not influence or complicate the wearer's task. The garment will be accompanied with a helmet with face-screen, electric arc gloves and electric arc boots to protect the body parts uncovered by the garments.

The garment consists of coat and pants. The coat is fastened with a bone gear zipper. The zipper is covered with a stripe made of outer fabric. The stripe is fastened with a Velcro band.

Every part of the garment must be made of arc flash-proof material of the same characteristics as that generated in compliance testing for IEC 61482-1-2:2014, class 2 (7kA). Accessories used with the garment must also conform to a Class 2 test (electrical arc protective balaclava, visor, boot, gloves etc.).

4.5 Heat Resistance

Materials shall not ignite, melt or shrink by more than 5%.

4.6 Volume Resistance

Materials of the garment using electrically conductive fibres shall have a volume resistance of at least $10^5\Omega$.

4.7 Limited Flame Propagation

- That no sample flames vertically or outwards.
- That no sample is perforated in any layer.
- That no sample burns or drips.
- The average post inflammation value is ≤ 2 s.
- The average post incandescence value is ≤ 2 s.

4.8 Mechanical Properties of Outer Material

Tensile strength: The materials used on the PPE must have a minimum tensile strength of 400 N. Tear resistance: The materials used on the PPE must have a minimum tear resistance strength of 15 N.

4.9 Dimensional Stability

The dimensional stability of the PPE is less than 3%, in compliance with ISO 5077, using the washing procedure in compliance with the information sheet.

5. Specific Requirements For IEC 61482-2:2020

When tested in accordance with IEC 61482-1-2, an APC 1 or APC 2 will be assigned to the protective clothing, depending on the test conditions and the thermal protection of the resulting arc. Protective clothing must demonstrate a minimum thermal arc protection of APC 1. An APC 2 indicates a higher arc thermal protection.

- Material: APC=2
- Garment: APC=2

Requirements:

APC=1	APC=2
4kA	7kA



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6. Samples Presented

Four samples are presented of type TCG100 Garments PPE. Each sample consists of one coat and one bib pant.

7. Assessment of the Risk

What is the risk?	Origin/form of risks	What factors should we take into account from the point of view of safety for the choice/ use of PPE?
General actions	By contact: fire, explosions	Protection of the body by Coat and Bib pant, but worn with equally rated Hood, gloves and boots
	Wear due to use	Resistance to tearing, elongation, and abrasion
Electricity hazards	Electrical equipment malfunction, heat from an arc flash, exposed flame	Electrical isolation, level of heat exposure from an arc flash, small splash of molten metal (iron or aluminum) from an arc flash

8. Control Methods

Model TCG100 Garments are subjected to the following control mechanisms:

- Raw materials control.
- Product control during the manufacturing process.
- Final made-up product control by random sampling and under below process.

9. Information Sheet

The information sheet that accompanies every type of TCG100 Garment PPE is included in Annex II and will be written in the official language of the country of sale. Other translations may be included.



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Annex I Description of PPE

TCG100 Series Arc Flash Coat and Bib Data Sheet

OBERON's innovative TCG100 Series arc flash protective clothing features a proprietary ultralight fabric technology and allows maximum durability and protection while performing common electrical tasks. Dual certification has been done in accordance with European and North American standards.

- Meets ANSI /ISEA 125 Level 2 Conformity and Arc Flash PPE Category 4 standards with an arc rating of 100 cal/ cm². Please refer to NFPA 70E or CSA Z462 Standards for specific selection requirements. Also meets Class 2 of IEC 61482-2:2020.
- Made from a durable ultralight Aramid fabric for maximum durability and protection.
- Optional LED light is available.

Name: TCG-EU-G2-K Face Shield

Standards: ANSI 125 Level 2 Conformity; ASTM 1959; NFPA70E PPE Cat. 4; CSA Z462; ASTM 1506; EN 13688:2013; EN 61482-2:2020 Fabric Material: 99% Aramid / 1% Anti-Static Color: Clear Grey (TCGTM) Fabric Weight: 16.5 oz/yd² ATPV: 100 cal/cm² Customs Tarif No: 6203293000 EN Marking Example: 2c-2 OBS 1 B K CE 01561

With an Arc Thermal Protective Value (ATPV) at 100 cal/cm² these face shields are manufactured in accordance with NFPA 70E, Arc Flash PPE Cat. 4. incident energy analysis. The user must perform an incident energy analysis to determine the level of potential exposure. This task can be accomplished with the proper training and software. Professional assistance is available at www.arcflash.com.

*Warning: Do not store Hood in direct sunlight. Do not place hood next to a heat source. Do not use hood for electric arc welding exposures.







Oberon Company 375 Faunce Corner Road, Unit E North Dartmouth, MA 02747 USA

CAT III 0161



Manufacturer's Statement: This product has been manufactured following the requirements of Regulation (EU) 2016/425, for its basic use, according to the standard EN 61482-2:2020: "Live working – Protective clothing against the thermal hazards of an electric arc" and EN 13688:2013 "Protective clothing general requirements" as stated in certificate No. 19/1386/00/0161 and AITEX, Plaza Emilio Sala No. 1, Alcoi, Spain, Notified Body 0161.

This coat and bib PPE is manufactured with a woven Aramid outer material in black and an additional quilted layer in yellow with a total weight of 16.5 oz/yd^2 .

Storage Instructions:

Each coat and bib is packed in a bag that protects it from dust and moisture. Replace in the protective bag when not in use.

Store between -0 and 30°C, with a humidity lower than 60%.

Use Instructions:

To properly don the coat and bib put the bib on first and adjust the suspenders to the desired length. Make sure the bib covers your ankles and rests on the top of your footwear. Next, put the coat on and zip up the front. Carefully secure the coat Velcro flap to protect the zipper.

Cleaning and Disinfecting Recommendations:

One method currently available is to turn the suit inside out and spray with an <u>approved disinfectant</u> on the inside of the hood and suit. This will not kill 100% of all bacteria and viruses, but it is one of the best defenses currently available. When spraying the inside of the suit and hood, be careful not to get any spray on the outside of the suit. It is also very important to let the suit dry *completely* before putting it back into service.

Another method to clean the suit is to launder it according to the directions on the label. It is recommended to wash separately in warm water and mild detergent. Tumble dry on low heat and remove immediately. If higher temperatures are needed to kill bacteria and viruses the suits can be washed and dried at higher temperatures without diminishing their protective qualities. This may, however, cause additional shrinkage that could hamper the overall fit of the suit.

- Do not wash above 40°C
- Do not use bleach
- Dry cleaning is permitted
- Dry in the shade
- Do not wring dry
- Do not iron

Maintenance and Revision Instructions:

To protect the coat and bib, they should be cleaned after use and stored in accordance with the storage instructions. Check before use that the coat and bib do not have any rip, tears, or holes. Also look for stains or any other signs of damage. If damage is found do not use.

Assembly Instructions:

No Assembly required.

Packaging:

From the minimum unit of sale: each coat and bib is supplied individually in a bag that includes the brochure.

Appropriate Accessories and Spare Parts of This PPE:

The coat and bib should be used with an Oberon Hood.

The useful life will also depend on the use of PPE, maintenance, storage, etc. Under normal conditions the coat and bib have a useful life of 3 years.

Year of production: 2021

Access to the Declaration of Conformity:

https://373384-1168396-raikfcquaxqncofqfm.stackpathdns.com/wpcontent/uploads/2021/01/EU-Declaration-of-Conformity-for-Arc-Flash-Suits-V2.1.0.pdf

Applicable Field of Use to This PPE:

This coat and bib are intended to protect the body against activities where protection against the following risk/risks is/are required according to its design:

- Heat hazards experienced by a wearer at a distance of 300 mm from an arc flash produced by a current of 7kA between 2 electrodes spaced 30 mm apart.
- For full-body protection, the PPE must be worn fully fastened and accompanied by other appropriate protective gear such as a hood, gloves and boots that protect from the same risks as that of the coat and bib pant PPE.
- The environmental conditions and/or risks associated with the operator's surroundings must be considered.
- For correct performance, the garment must be correctly adjusted.
- This PPE protects the wearer in medium-risk situations.

Limitations of Use:

- This PPE must not be used against risks other than those previously described.
- This PPE is designed to protect the body and must be worn with a hood to protect the head along with gloves and boots to protect the hands and feet.
- Dirt and molten metal adhering to the garment may affect its performance.
- Never remove the PPE when in an explosive or flammable environment or when handling explosive or flammable material.
- An increase in oxygen content in the air may considerably reduce the level of protection offered by the PPE.
- The electrical insulation capability of the PPE may be seriously affected by dampness, dirt, or when soaked with perspiration.
- The user must not repair any tears, but instead all repairs must be done by the original manufacturer or its approved agent. A flammable yarn or one which can melt, used for repair, may be extremely dangerous in the case of explosion or fire.
- Clothing made of polyamide, polyester, or acrylic fibers, such as t-shirts and underwear, must not be worn under the PPE as they may melt in an arc flash.

Rest of Standards Can Be Found At:

https://www.en.une.org/encuentra-tu-norma/busca-tu-norma



Oberon Company 375 Faunce Corner Road, Unit E North Dartmouth, MA 02747 USA



Marking and Performance Recorded in Technical Tests Applicable to This PPE:

Coat Marking:

EN 61482-1-2:2014, Class 2 EN 61482-2:2020

Where: Heat press label located on inside back of coat Identification of the manufacturer: Oberon Company Arc Protection Class: 2

Symbol as per IEC 60417-6353 (2016-02) – Protection against the thermal effect of the electric arc.



Coat Measurements	Chest Measurement (cm)
Small	109,22 - 116,84
Medium	116,84 - 124,46
Large	124,46 - 132,08
X-Large	132,08 - 142,24
2X-Large	142,24 - 152,4
3X-Large	152,4 - 162,56
4X-Large	162,56 - 172,72
5X-Large	172,72 - 182,88

Bib Marking:

EN 61482-1-2:2014, Class 2 EN 61482-2:2020

Where: : Heat press label located on inside back of coat Identification of the manufacturer: Oberon Company Arc Protection Class: 2

Symbol as per IEC 60417-6353 (2016-02) – Protection against the thermal effect of the electric arc.



Bib Measurements	Waist Measurement (cm)
Small	78,74 - 86,36
Medium	86,36 - 93,98
Large	93,98 - 101,6
X-Large	101,6 - 111,76
2X-Large	111,76 - 121,92
3X-Large	121,92 - 132,08
4X-Large	132,08 - 142,24
5X-Large	142,24 - 152,4



Annex III Photos





Annex IV TCG100 Coat & Bib Labels

TCG100^{™ Electrical Arc} Flash Coat

For electric arc exposures, perform an electric arc hazard assessment and wear the properly rated flame resistant clothing

Use this Coat with suitably arc rated Hood & Pants

Meets ASTM F1506, NFPA 70E & CSA Z462,

ANSI/ISEA 125 Conformity Level 2 Arc 100 cal/cm² (ATPV)

Rating **LUU** (ATPV) Fabric System tested in accordance with ASTM F1959

99% Aramid, 1% Anti-static

Caution

Flammable contaminants will reduce the thermal performance of any flame resistant garment. Wash garment to ensure that no greases, oily soils or other flammable contaminants are present when garment is worn. Repairs to the garment must be made with the same thread and fabric.

Do not reuse this product after an arc exposure

Washing Instructions



Fabric: WASH – Wash this garment separately from other types of garments or fabrics. Use warm water & mild detergent. DO not use detergents or additives containing (or creating) chlorine bleach or oxygen bleach (example: Hydrogen Peroxide) or enzymes. Do not use soap or fabric softeners. Do not wring dry.

X Q

DRY – Tumble dry low heat and remove immediately. Do not iron. Garment can be dry cleaned. Do not use disinfectants

Important Warning

This product does not provide insulation from electric shock. This product, when properly selected and worn, is designed to provide protection from burn injuries resulting from an electrical arc flash in accordance with ASTM F1506 & NFPA 70E. It is important to note that this product will provide limited or no protection against sound, pressure, projectiles and respiratory hazards which may result from an arc incident.

Face protective products which are effective against the arc flash hazard can reduce visibility. NFPA 70E calls for the use of additional lighting if work conditions require.



■ TCG100[™] Electrical Arc Flash Bib-Overall

For electric arc exposures, perform an electric arc hazard assessment and wear the properly rated flame resistant clothing

Use this **Bib-Overall** with suitably arc rated **Hood & Coat**

Meets ASTM F1506, NFPA 70E & CSA Z462, ANSI/ISEA 125 Conformity Level 2

> Arc 100 cal/cm² Rating 100 (ATPV)

Fabric System tested in accordance with ASTM F1959

99% Aramid, 1% Anti-static

Caution

Flammable contaminants will reduce the thermal performance of any flame resistant garment. Wash garment to ensure that no greases, oily soils or other flammable contaminants are present when garment is worn. Repairs to the garment must be made with the same thread and fabric.

Do not reuse this product after an arc exposure

Washing Instructions

Fabric: WASH – Wash this garment separately from other types of garments or

fabrics. Use warm water & mild detergent. DO not use detergents or additives containing (or creating) chlorine bleach or oxygen bleach (example: Hydrogen Peroxide) or enzymes. Do not use soap or fabric softeners. Do not wring dry.

DRY – Tumble dry low heat and remove immediately. Do not iron. Garment can be dry cleaned. Do not use disinfectants

Important Warning

This product does not provide insulation from electric shock. This product, when properly selected and worn, is designed to provide protection from burn injuries resulting from an electrical arc flash in accordance with ASTM FISO6 & NFPA 70E. It is important to note that this product will provide limited or no protection against sound, pressure, projectiles and respiratory hazards which may result from an arc incident.

Face protective products which are effective against the arc flash hazard can reduce visibility. NFPA 70E calls for the use of additional lighting if work conditions require.







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