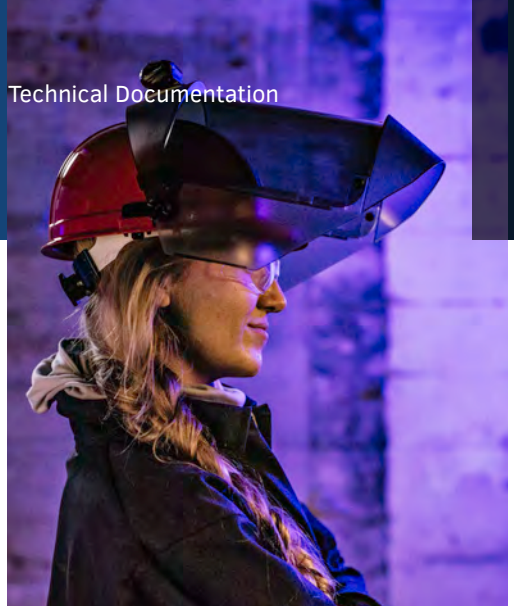
TCG-EU-G2-K25 Series Face Shield

Technical Documentation

According to standardized regulations
EN 166:2001, EN 170:2002 and
GS-ET-29:2019

OBERON



Technical Documentation Outline

Object and General Requirements

0. Object

Type TCG-EU-G2-K25 Face Shields are designed to protect against thermal hazards associated with an electrical arc flash of 7kA (Class 2), to protect the user from UV radiation with enhanced capability of color recognition (scale number (2C-2)) and for protection against high-speed particles (medium energy impact, B). PPE 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 andthe specifications contained in standards EN 166:2001, EN 170:2002 and GS-ET-29:2019-06 as a category III PPE.

1. General Scope of Requirements

1.1 Design Principals

This PPE has been designed to protect the Face and portions of the Head of the user against thermal hazards associated with an electrical arc flash, UV radiation and against high-speed particles. This PPE is designed to be used with other similarly rated PPE that protects the remainder of the body.

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

1.2 Declaration of Harmlessness

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.

Signed by Zac Twight
VP Sales and Marketing
Oberon Company

Signature: _____
Date: _____

1.3 Comfort and Efficiency

The molding pattern ensures that it offers the greatest degree of comfort possible as expected of a visor 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.

1.4 Manufacturer's Instructions and Information

It is provided with each PPE a specific information sheet relating the correct use and performance properties of its equipment (Annex II).

2. Complementary Requirements

The TCG-EU-G2-K25 Face Shields 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

The elimination of perspiration on the face is achieved through natural airflow under the visor from open spaces at the bottom, sides and top of the visor.

2.3 Ageing

The equipment can retain its protective features unchanged over time. It has a useful life in compliance with the instructions included in the information sheet (Annex II).

2.4 Components Which Can Be Adjusted or Removed by the User

The TCG-EU-G2-K25 Face Shields are sold in one size and are used in conjunction with a hard cap for which the size is adjustable and thus fits a full range of human head sizes.

2.5 Identification Markings (ANNEX IV)

The PPE must have clear, legible and permanent marking with:

- Protection class.
- Identification of the manufacturer.
- Optical class.
- Symbol of mechanical strength.
- Short circuit electric arc fastness symbol.
- Symbol of resistance to high-speed particles (medium energy impact).
- Symbol of resistance to Surface Damage by Fine Particles.

2.6 Multi-Risk

The PPE is designed to protect against simultaneous risks of electric arc, UV radiation and/or impacts of high-speed particles.

3. Particular Complementary Requirements

3.1 Protection Against Mechanical Impact

The face shield is designed to endure the impact of high-speed particles with medium energy impact (120 m/s).

3.2 Radiation Protection

The PPE is specific for UV protection in conformity with the Standard EN 170:2002.

4. Field of Application for GS-ET 29 Box Test

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.

5. General Requirements of GS-ET 29

The face shield is sold in one size and is used in conjunction with a clip with a design compatible with a hard cap for which the size is adjustable and thus fits a full range of human head sizes.

5.1 Material of Visor

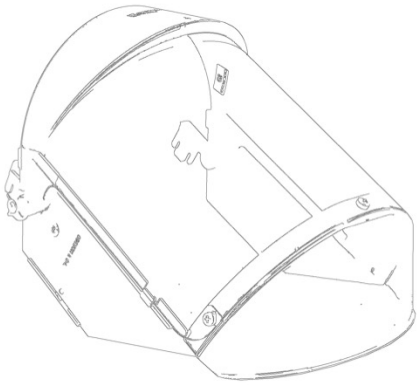
The Visor is molded from polycarbonate with a thickness of 2.6 mm.

5.2 Other Materials

- The Hard Cap is molded from ABS or polycarbonate.
- Any other exterior material of PPE such as clothing, balaclava, gloves or boots must conform to the Class 2 test.

5.3 Design

The face shield is designed in such a way that it does not influence or complicate the wearer's task. The face shield may have accessories such as an attached light. Every part of the face shield will be made of arc flash-proof material of the same characteristics as that generated in compliance testing for GS-ET 29 Box Test, Class 2 (7 kA).



6. Harmonized Standards Applied to the Design and Manufacturer of PPE

Requirements for GS-ET 29 (arc testing), once the electric arc has extinguished:

- The specimen after flame time must not be greater than 5 s.
- Melting through of the specimen must not be evident.
- Holes or perforations in the specimen must not be evident.
- The value pairs of all calorimetres on the test head must lie below the relevant values in Table 5 of GS-ET-29:2019-06.

In compliance with GS-ET 29 (arc testing), the following values were obtained:

- Material: Class-2 (7 kA).
- Arc flash standard requirements.
- Electrical resistance.

The materials used on the PPE have an electrical resistance of 2,2·107 ohms. Requirements: > 105 ohms.

The TCG-EU-G2-K25 Face Shields have been designed to meet the requirements standard EN 166:2001, EN 170:2002, and GS-ET-29:2019.

Tests have been performed according to EN 167:2001 and EN 168:2001, and GS-ET-29:2019. The reports in which the test results can be found are 2018EC0070, 2019EC0020, and 2021EC6794.

7. Samples Presented

Samples are presented of type TCG-EU-G2-K25 Face Shields.

8. 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 face and portions of the head worn with equally rated hard caps, balaclava, shirt, pants, gloves and boots
	Wear due to use	Resistance to scratching
Thermal hazards produced by electric arc	Electrical equipment malfunction, heat from an arc flash, exposed flame	Level of heat exposure from an arc flash, small splash of molten metal (copper, iron or aluminum) from an arc flash
Burns on the eyes	UV radiation	Select the correct filter for the related use. Do not look directly to the luminous source.

9. Control Methods

Model TCG-EU-G2-K25 Face Shields are subjected to the following control mechanisms as described in our ISO 9001 documentation:

- Raw materials control.
- Product control during the manufacturing process:
  - Molding department:
    - 100% visual inspection by operator at machine for defects.
    - Records daily production and defects.
    - Specific shields are scanned for their IR rating.
    - Daily performance sheet is used for each work order and reject parts are recorded daily.
  - Coating department:
    - During the coating process each shield is inspected after it has been coated and thermally cured.
    - 100% inspection.
  - Assembly & Packaging:
    - All shields are visually inspected prior to assembly of packaging.
    - 100% inspection of all shields.
    - 2% of the daily production are IR scanned.
- Final made-up product control by random sampling and under below process.

10. Information Sheet

The information sheet that accompanies every type TCG-EU-G2-K25 Face Shield model is included in Annex II, will be written in the official language of the country of sale, and other translations may be included.

11. Essential Health and Safety Requirements Applicable to the PPE

ANNEX II Regulation 2016/425	Clauses of Standard EN 166:2001
1.1. Design principles	6.1, 6.2, 6.3
1.1.1. Ergonomics	6.3, 7.1.1
1.1.2. Levels and classes of protection	7.1, 7.2, 7.3
1.1.2.1. Optimum level of protection	7.1, 7.2, 7.3
1.2.1.2. Suitable constituent materials	6.2
1.2.1.2. Satisfactory surface condition of all PPE in contact with the user	6.1
1.2.1.3. Maximum permissible user impediment	6.3, 7.1.1
1.3. Comfort and effectiveness	6.3, 7.1.1
1.3.1. Adaptation of PPE to user morphology	6.3, 7.1.1
1.3.2. Lightness and strength	7.1.4, 7.2.2
1.4. Manufacturer's instructions and information	10
2.3. PPE for the face, eyes, and respiratory system	Every clause
2.4. PPE subject to ageing	7.1.5
2.9. PPE incorporating components which can be adjusted or removed by the user	6.3, 9.2.8
2.12. PPE bearing one or more identification markings or indicators directly or indirectly relating to health and safety	9
2.14. Multi-risk PPE	Every clause
3.1. Protection against mechanical impact	7.1.4, 7.2.2
3.1.1. Impact caused by falling or ejected objects and collisions of parts of the body with an obstacle	7.1.4, 7.2.2
3.9. Radiation protection	7.2.1

ANNEX II Regulation 2016/425	Clauses of Standard EN 170:2002
1.1.1. Ergonomics	1, Annex B (EN 166:2001; 7.1.1)
1.1.2.1. Optimum level of protection	5
1.1.2.2. Classes of protection appropriate to different levels of risk	5, Annex B (EN 166:2001; 7.1.1)
1.2.1. Absence of inherent risks and other nuisance factors	1
1.2.1.1. Suitable constituent materials	1 (EN 166:2001; 6.2)
1.2.1.2. Satisfactory surface condition of all PPE in contact with the user	1 (EN 166:2001; 6.3)
1.2.1.3. Maximum permissible user impediment	1 (EN 166:2001; 6.3, 7.1.1)
1.3.2. Lightness and strength	1 (EN 166:2001; 7.1.4, 7.2.2, 7.3.4)
1.4. Manufacturer's instructions and information	1 (EN 166:200; 10)
2.3. PPE for the face, eyes, and respiratory system	5.2
2.4. PPE subject to ageing	1 (EN 166:2001; 7.1.5)
2.12. PPE bearing one or more identification markings or indicators directly or indirectly relating to health and safety	4
3.9.1. Non-ionizing radiation	5, Annex B

ANNEX II Regulation 2016/425	Clauses of Standard EN GS-ET 29:2019
1.1.2. Levels and classes of protection	4.1.1.1, 4.1.2, 4.1.3, 4.2.6
1.4. Manufacturer's instructions and information	4.3, 4.4
2.4. PPE subject to ageing	4.2, 8.3
3.6.1. PPE constituent materials and other components	4

12. Marking

The TCG-EU-G2-K25 Face Shields are clearly marked on the side of the face shield as well as on the back inside panel of the face shield. Each label indicates what standards the component adheres to. The examples of each label are listed below.

12.1 Marking of Face Shield

- Where: Side of face shield
- 2C-2: Scale number for UV transmittance filter
- Identification of the manufacturer: OBC
- Optical class: 1
- Mechanical solidity symbol: B
- Resistance to surface deterioration: K
- Short-circuit electric arc fastness symbol: 8
  (according to GS-ET-29:2019-06, Rev. 01)
- 2: Electric arc class is 2 (according to GS-ET-29:2019-06, Rev. 01)
- 2: This product is assigned to Light Transmittance Class 2 (LT Class 2).

2C-2 OBC 1 B K CE 0161
GS-ET 29:2019

8-2-2

Light Transmittance Class 2:
Additional lighting is required under normal working conditions. In any case, check your ability to detect color in the work environment before using this product, according to GS-ET-29:2019-06, Rev. 01.

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

Signed by Zac Twight
VP Sales and Marketing
Oberon Company

Signature: _____
Date: _____

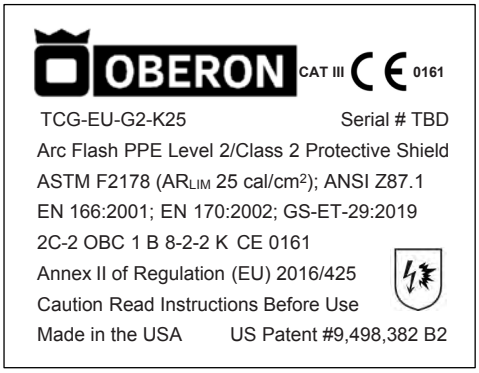
Annex I Description of PPE

TCG-EU-G2-K25 Series Face Shield Product Data Sheet

Oberon Company's innovative True Color Grey (TCG™) arc flash face shield features a a patented nearly clear technology that allows a maximum color acuity while performing common electrical work tasks. Dual certification has been done in accordance with European and North American standards. Face Shield Kit includes TCG™ G2 shield with side shield extenders, lower chin guard anti-scratch coating, and attachment clips (available for different caps). Current clip types include SF8000, SF5000, SF4000, SF4000B, SF3000PS, SF3000WBS, and SF3000.

- Meets ASTM F2178; ANSI Z87.1, ANSI /ISEA 125 Level 2 Conformity and Arc Flash PPE Category 2 standards. Please refer to NFPA 70E or CSA Z462 Standards for specific selection requirements. Also meets EN166:2001, EN170:2001 and GS-ET 29:2019-06.
- Window provides 100% true color acuity and comes with anti-scratch coating.
- Optional LED light is available.

Name: TCG-EU-G2-K25 Series Face Shield
European Standards: EN 61482-2:2019 Class 2; EN166:2001; EN170:2002; GS-ET 29:2019 Class 2
Face Shield Material: Polycarbonate
Color: Clear Grey (TCG™)
Fabric Weight: 425 grams
Customs Tarif No: 9004900000
EN Marking Example: 2C-2 OBC 1 B 8-2-2 K CE 0161



Important Note: In addition to the European Standards previously listed, this face shield has also been tested in accordance with ASTM F2178-17 and has achieved a determination of ATPV, 50% of probability of the onset of a 2nd degree burn result, of 42 cal/cm². Results are shown in report 2018US0187. This face shield will be marked with an Arc Rating Limit of 25 cal/cm² per ASTM F2178 guidelines.

These face shields are manufactured in accordance with NFPA 70E Arc Flash PPE Category 2 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 Face Shield in direct sunlight. Do not place Face Shield next to a heat source. Do not use Face Shield for electric arc welding exposures.

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

CE 0161

CAT III

GS-ET 29:2019

APC 2

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 166:2001: "Personal eye-protection. Specifications", EN 170:2002: "Personal eye-protection. Ultraviolet filters. Transmittance requirements and recommended use" and GS-ET-29:2019-06: "Principles of testing and certification of face shields for electrical work as stated in certificate No 19/1148/02/0161 and AITEX, Plaza Emilio Sala No. 1, Alcoi, Spain, Notified Body 0161.

This face shield PPE is manufactured with a polycarbonate face shield.

Storage Instructions:
Each face shield 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 30ºC, with a humidity lower than 60%.

Use Instructions:
To properly don the face shield, clip the face shield into the slot adapters of an approved hard cap manufacturer and adjust the suspension system of the helmet to create a snug fit. Make sure the face shield is in a down and secure position.

Cleaning and Disinfecting Recommendations:
The first step to cleaning and disinfecting an Oberon TCG™ face shield is to unclip it from the helmet. Once done, if the shield has dirt or grit, flush it off with room temperature tap water. The next step to disinfecting a TCG™ face shield is to take a soft cloth with isopropyl alcohol or use a Lysol® wipe and gently clean both sides of the shield. This process may leave streaks as the surface dries. Once dry, use a soft clean cloth and lightly wipe off any streaks or film left on the shield from impurities in the wipes.

Maintenance and Revision Instructions:
To protect the face shield, it should be cleaned after use and stored in accordance with the storage instructions. Check before use that the eyepiece has not been scratched and that the frame does not show cracks.

Packaging:
From the minimum unit of sale: each face shield is supplied individually in a bag that includes the brochure.

Performance or benefits and levels or classes of protection offered by PPE intended for eye and face protection:

Optical class			1	2	3
Spherical refractive power (m^{-1})			±0.06	±0.12	±0.12
Astigmatic refractive power (m^{-1})			0.06	0.12	0.25
Difference of prismatic refractive powers (cm/m)	Horizontal	External base	0.75	1.00	1.00
		Inner base	0.25	0.25	0.25
	Vertical		0.25	0.25	0.25

Mechanical strenght and its symbols	
Symbol	**Requierement relative to increased strength**
Without symbol	Minimum robustness (22mm steel ball; strength of 100±2 N)
S	Increased strenght (22mm steel ball at 5,1 m/s)
F	Low energy impact (6mm steel ball at 45 m/s)
B	Medium energy impact (6mm steel ball at 120 m/s)
A	High energy impact (6mm steel ball at 190 m/s)

Class of protection: Characteristics of transmittance of a filter against optical radiation	
Filter denomination	**Numerical code**
Welding filter	1,2 al 16
Ultraviolet filter (it can modify the recognition of colors)	2-1,2 al 2-1,5
Ultraviolet filter (allows a Good recognition of colors)	2C-1,2 al 2C-1,5
Infrared filter	4-1,2 al 4-10
Sunglare filter without specification for the infrared	5-1,1 al 5-4,1
Sunglare filter with specification for the infrared	6-1,1 al 6-4,1

Symbol	Type of protection	Descripción del campo de uso
Without symbol	Basic use	Nonspecific mechanical risks and risks due to ultraviolet, infrared, solar and visible radiation
3	Liquids	Liquids (drops or splashes)
4	Coarse dust particles	Dust with particle thickness> 5 µm
5	Fine dust and gases.	Gas, vapors, sprays, smoke and dust with particle thickness <5 µm
8	Short circuit electric arc	Electric arc caused by short circuit in electrical equipment
9	Molten metal and hot solids	Splashes of molten metal and penetration of hot solids

Applicable Field of Use to this PPE:
This PPE is intended to protect against eye and face protection in 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 coat and bib, gloves and boots that protect from the same risks as that of the face shield 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 in low visibility in natural light.
- Additional lighting can be added to improve visibility as needed.

Limitations of Use:

- This PPE must not be used against risks other than those previously described.
- This face shield PPE is designed to protect the face and portions of the head and must be worn with other protective PPE to protect other parts of the body.
- 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.
- 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.

Assembly Instructions:
No Assembly required.

Appropriate Accessories and Spare Parts of This PPE:
PPE can be used with an Oberon face shield light.

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

Year of production: 2021

Access to the Declaration of Conformity:
https://oberoncompany.com/wp-content/uploads/2021/06/EU-Declaration-of-Conformity-for-Arc-Flash-PPE-V2.2.pdf

Detailed information related to safety helmets that may be used in conjunction with the electrician face shield:

- Electrician's helmet (e.g. In accordance with DIN EN 50365)
- Minimum and maximum distances from the filter to the forehead (inner surface of the helmet sweatband) or the helmet type designation.

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

CE 0161

CAT III

GS-ET 29:2019

APC 2

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

Face Shield Marking:

2C-2 OBC 1 B K CE 0161
GS-ET 29:2019

2C-2 OBC 1 B K CE 0161
GS-ET-29:2019

8-2-2

Where: Side of face shield
Protection class: 2C-2
Identification of the manufacturer: OBC
Optical class: 1
Mechanical solidity symbol: B
Resistance to surface deterioration: K
Short-circuit electric arc fastness symbol: 8 (according to GS-ET-29:2019-06, Rev. 01)
Electric Arc Class 2 (according to GS-ET-29:2019-06, Rev. 01)
Light Transmittance Class 1

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

Light Transmittance Class 1: This product is assigned to Light Transmittance Class 1 (LT Class 1). Additional lighting is not required under normal working conditions. In any case, check your ability to detect color in the work environment before using this product, according to GS-ET-29:2019-06, Rev. 01.

Scope of GS-ET-29:2019-06, Rev.01:
This standard applies to electrician face shields worn when working where a risk of electric arcing exists. Its principles of testing do not apply to electrician face shields that cover all areas of the head and the entire neck (360° coverage).

GS-ET-29:2019-06 can be found at:
https://www.bgetem.de/arbeitssicherheit-gesundheitsschutz/pruefen-zertifizieren/pruef-und-zertifizierungsstelle-elektrotechnik/pruefgrundsaetze/GS-ET-29E/view

Rest of standards can be found at:
https://www.en.une.org/encuentra-tu-norma/busca-tu-norma

Warnings:

Artificial lighting can interfere with the tint of the face shield and impair color perception, especially when using fluorescent or LED lamps as illuminants. It must be ensured that all cable codes used at the workplace can be safely distinguished under actual lighting conditions.

Check your color perception prior to starting work by performing the following steps:

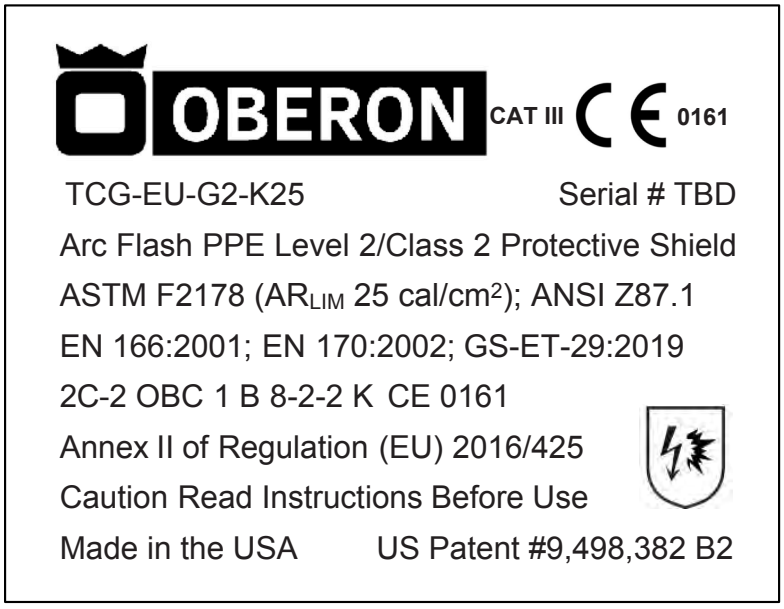
1. Gather a sampling of cable pieces having the same color coding as the cables used at your workplace.
2. Ensure that you are in a safe location, but with the same lighting (type and intensity) as anticipated at your workplace.
3. Clean the face shield and check it for damage (do not hesitate to replace the face shield if necessary - refer to the User information).
4. Don the face shield as described in the User information.
5. Quickly sort through the bundled cable samples.

If you have difficulty distinguishing between the various cable codes or are mistaken in sorting them, then the lighting is insufficient and/or the face shield is too dark. This could cause an accident at work, such as electric fault arcing.

- Materials in contact with the user's skin can cause allergies in sensitive people.
- Replace if there is any deterioration in the PPE.
- User should replace scratched or damaged eyepieces.
- High speed particle protectors, used over normal corrective glasses, can transmit the impacts creating a possible risk for the user.
- If the symbols F, B and A are not the same for the eyepiece and the frame, the one assigned to the complete protector must be the lower level of the two.
- For a face shield to comply with the field of use of symbol 8, it will be mounted with a filter of protection class 2-1.2 or 3-1.2 of at least 1.4 mm thickness.
- Is mandatory according to EN 166: If protection against high-speed particles at extremes of temperature is required then the selected eye-protector should be marked with the letter T immediately after the impact letter, i.e., FT, BT or AT. If the impact letter is not followed by the letter T then the eye protector shall only be used against high-speed particles at room temperature.

Annex III Photos of TCG-EU-G2-K25 Face Shield

Annex IV TCG-EU-G2-K25 Face Shield Marking



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OBERON

Oberon Company
375 Faunce Corner Road
North Dartmouth, MA 02747 USA
P: 800.322.3348
F: 508.999.4443
service@oberoncompany.com
www.oberoncompany.com