



**EEHC DISTRIBUTION MATERIALS SPECIFICATION**

**EDMS 30-307-1**

**20-09-2022**

**EDMS 30-307-1**

**SPECIFICATION**

**FOR**

**PERSONAL PROTECTIVE EQUIPMENT**

**EYE and FACE PROTECTION**

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**EEHC DISTRIBUTION MATERIALS SPECIFICATION****EDMS 30-307-1****20-09-2022****1. SCOPE**

This specification covers the minimum technical requirements for manufacturing, testing, and supplying of eye and face protection devices as personal protective equipment (PPE). The required eye and face protection device is intended to prevent injuries and protect workmen of Egyptian Electricity Distribution Companies (EDCs) against such hazards as the impact of nonionizing radiation and liquid splash exposures in occupational and educational environments including, machinery operations, material welding and cutting, chemical handling, and assembly operations. Certain hazardous exposures are not covered in this specification, that include blood-borne pathogens, X-rays, high-energy particulate radiation, microwaves, radio-frequency radiation, lasers, masers, and sports and recreation.

**2. APPLICABLE STANDARDS**

The equipment/material covered in this specification shall comply with the latest edition/amendment of the standards given in Table (1). Where any provision of this specification differs from those of the standards listed below, the provisions of this specification shall apply. Any deviations from the listed standards or the provisions of this specification shall be clearly set out in the offer.

**Table (1)**

<b>Standard No.</b>	<b>Description</b>
ANSI Z80.1	American National Standard for Ophthalmics - Prescription Ophthalmic Lenses – Recommendations
ANSI/ISEA Z87.1	American National Standard Practice for Occupational and Educational Personal Eye and Face Protective Devices
ANSI Z80.3	American National Standard for Ophthalmics - Nonprescription Sunglasses and Fashion Eyewear – Requirements

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ANSI/ISO 7998 / 8624 / 12870	Optics Set, Ophthalmic Optics - Spectacle Frames - Lists of Equivalent Terms and Vocabulary, Measuring System and Terminology, And Requirements and Test Methods
ASTM D1003- 13	Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics
EN 168	European Standard – Personal eye protection – Non-optical test methods.

**3. ENVIRONMENTAL CONDITIONS**

The safety behavior of the required material shall be guaranteed under the environmental conditions given in Table (2).

**Table (2)**

Ambient temperature	-5°C to +55°C
Maximum relative humidity	95 %
Storage temperature	Dry place
Lifetime	Not less than 3 years

**4. DEFINITIONS****4.1 Safety Glasses**

- Consists of lens, safety frame and side shields, should be ANSI approved marked with Z-87 and have approved side shield.

**4.2 Goggles**

- A protector intended to fit the face surrounding the eyes in order to shield the eyes from certain hazards, depending on goggle type, (Can be worn over glasses if necessary).

**4.3 Face Shield**

- A protector is intended to shield the wearer's face or portions thereof, from specific hazards, as indicated by the face shield's markings.



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- Do not provide enough protection on their own.
- Wear them with safety glasses or goggles.



Safety Goggles



Safety Glasses



Oxy-Acetylene Welding Goggles



Safety Visor





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**4.4 PC**

- Polycarbonates are a group of thermoplastic polymers containing carbonate groups in their chemical structures.
- Polycarbonates used in engineering are strong, tough materials, and some grades are optically transparent.
- They are easily worked, molded, and thermoformed

**4.5 PVC**

- Polyvinyl chloride (colloquial: polyvinyl, or simply vinyl; abbreviated: PVC) is the world's third-most widely produced synthetic polymer of plastic.

**4.6 PP**

- Polypropylene plastic is the second most extensively used plastic.
- It is known for being durable, robust, and resistant to many external factors.

**5. DESIGN CRITERIA****5.1 Lens and face Materials**

- Poly Carbonates – effective against impacts form flying objects but not suitable to protect against corrosive chemicals.
- Acrylic resins – suitable for protect against chemical hazard but weaker against impacts.
- Fiber based plastics having the advantage of adding anti fogging coating.

**5.2 Frame Materials**

- Low phthalate plasticizer, medical grade virgin PVC.
- Thermoplastic Elastomers.
- Plastic.
- Metal.
- PP.



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**6. GENERAL REQUIREMENTS****6.1 Optical Requirements**

- **Optical Quality:** When tested in accordance with Section 9.1 in ANSI/ISEA Z87.1, protector lenses shall be free of striae, bubbles, waves, and other visible defects which would impair the wearer's vision.
- **Luminous Transmittance:** When tested in accordance with Section 9.2 in ANSI/ISEA Z87.1, clear lenses shall have a luminous transmittance of not less than 85%.
- **Haze:** When tested in accordance with Section 9.3 in ANSI/ISEA Z87.1, clear plano lenses shall not exhibit more than 3% haze.

**6.2 Physical Requirements**

- Protectors shall be free from projections, sharp edges, or other defects likely to cause discomfort or injury during use.
- **Drop Ball Impact Resistance:** When tested in accordance with Section 9.6 in ANSI/ISEA Z87.1, the protector lenses shall not fracture when impacted by a 25.4 mm (1 in.) steel ball when dropped from a height of 127 cm (50 in.).
- **Protector Acceptance Criteria:** A complete device shall fail if any of the following occurs:
  - piece fully detached from the inner surface;
  - lens (lens only) fractures;
  - penetration of the rear surface;
  - lens not retained;
- **Ignition:** When tested in accordance with Section 9.7 in ANSI/ISEA Z87.1, protectors shall not ignite or continue to glow once the rod is removed.
- Each externally exposed material (exclusive of textiles or elastic bands) shall be tested.
- **Corrosion Resistance of Metal Components:** When tested in accordance with Section 9.8 in ANSI/ISEA Z87.1, metal components used in protectors shall be corrosion resistant to the degree that the function of the protector shall not be impaired by the corrosion.

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- Lenses and electrical components are excluded from these requirements.

**6.3 Minimum Coverage Area**

- The eyewear and lens shall cover in plane view an area of not less than 40 mm in width and 33 mm in height (elliptical) in front of each eye, centered on the geometrical center of the lens.
- Frames designed for small head sizes shall cover in plain view an area of not less than 34 mm in width and 28 mm in height (elliptical), centered on the geometrical center of the lens.
- Frames designed for small head sizes shall be tested on the 54mm PD head form and are permitted to have an eye size, including eyewear thickness, as small as 34\*28mm.
- Frames that are tested using the small head form shall be marked on the frame with the letter "H".

**6.4 Minimum lens thickness for prescription spectacles**

- The minimum lens thickness for specified protectors shall be those indicated in Table (3).

**Table (3)**

Protector	Minimum thickness
Goggles	$\geq 3$ mm, glass $\geq 1.27$ mm, non-glass
Goggles, impact rated	No minimum thickness requirement
Face shield	$\geq 1$ mm
Face shield, impact rated	No minimum thickness requirement

**6.5 Specimen**

- One specimen of the offered protector shall be submitted with the offer for evaluation prior to issuance of the purchase order. The specimen should correspond in all respects with the material they intend to supply. Dimensional verification, indelible markings and finishing shall be checked.





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**7. EYE and FACE PROTECTOR SELECTION GUIDE**

<b>Hazard</b>	<b>Protectors</b>	<b>Limitations</b>	<b>Marking<sup>1</sup></b>
<b>IMPACT - Chipping, grinding, machining, masonry work, riveting, and sanding</b>			
Flying fragments, objects, large chips, particles, sand, dirt, etc.	<ul style="list-style-type: none"> <li>• Spectacles with side protection</li> <li>• Goggles with direct or indirect ventilation</li> <li>• Face shield worn over spectacles or goggles</li> <li>• Welding helmet worn over spectacles or goggles</li> </ul>	<p>Caution should be exercised in the use of metal frame protective devices in electrical hazard areas. Metal frame protective devices could potentially cause electrical shock and electrical burn through contact with, or thermal burns from exposure to the hazards of electrical energy, which include radiation from accidental arcs.</p> <p>To provide adequate protection, ensure goggles fit tightly to the face.</p> <p>Atmospheric conditions and the restricted ventilation of a protector can cause lenses to fog. Frequent cleaning may be required.</p>	<p><b>Impact rated:</b></p> <p>+ (spectacle lens)</p> <p>Z87+ (all other lens)</p> <p>Z87+ (plano frame)</p> <p>Z87-2+ (Rx frame)</p>
<b>HEAT, gas cutting, and welding</b>			
Hot sparks	<ul style="list-style-type: none"> <li>• Spectacles with side protection</li> <li>• Goggles with direct or indirect ventilation</li> <li>• Face shield worn over spectacles or goggles</li> </ul>	<p>Spectacles, cup and cover type goggles do not provide unlimited facial protection.</p> <p>Operations involving heat may also involve optical radiation. Protection from both hazards shall be provided.</p>	<p>NOTE: There are currently no marking designations for eye protection to heat or high-temperature exposure in the ANSI/ISEA Z87.1-2020 standard.</p>



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DUST - Woodworking, buffing, general dusty conditions			
Nuisance dust	<ul style="list-style-type: none"> <li>Goggles with direct or indirect ventilation (eyecup or cover type)</li> </ul>	<p>Atmospheric conditions and the restricted ventilation of a protector can cause lenses to fog. Frequent cleaning may be required.</p> <p>To provide adequate protection, ensure goggles fit tightly to the face.</p>	Dust: D4
Fine dust	<ul style="list-style-type: none"> <li>Goggles with indirect ventilation or no ventilation</li> </ul>	<p>To provide adequate protection, ensure goggles fit tightly to the face.</p>	Fine dust: D5
OPTICAL RADIATION			
Visible Light (Glare)	<ul style="list-style-type: none"> <li>Spectacles with side protection</li> <li>Goggles with direct or indirect ventilation</li> <li>Face shield worn over spectacles or goggles</li> <li>Welding helmet worn over spectacles or goggles</li> </ul>	<p>For proper fit of protector; there shall be no penetration of direct visible light in all non-lens areas. Side shields shall have filtering capability equal to or greater than the front lenses</p>	Visible: L and scale number

1. Refer to ANSI/ISEA Z87.1 Table 3 for complete marking requirements.
2. Refer to ANSI Z49.1: "Safety in Welding, Cutting, and Allied Processes", Table 1, Guide for Shade Numbers, to select the proper lens filter protective shade based on welding process, arc current (in amperes), Electrode Size (arc welding only) and metal plate thickness (for oxyfuel and oxygen cutting only).
3. Refer to ANSI Z136.1 "Safe Use of Lasers", for guidance on choosing the correct protective eyewear when working with lasers.



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**8. MARKINGS****8.1 Marking Requirements**

- All protectors shall bear the permanent and legible markings in specified locations as shown in the following table (Table 3 in ANSI/ISEA Z87.1)

Table 3. Marking Requirements				
Type of Mark	Lenses & Replacement Lenses		Frame <sup>1</sup>	Marking for Complete Device (no replaceable components) <sup>2</sup>
	Spectacles	All Other		
All protectors shall bear the markings below.				
<b>Manufacturer's Mark or Logo</b>	Yes	Yes	Yes	Yes
<b>Standard</b>				
Plano, Readers, Magnifiers		<b>Z87</b>	<b>Z87</b>	<b>Z87</b>
Rx		<b>Z87</b>	<b>Z87-2</b>	<b>Z87-2</b>
<b>Coverage (small head sies)<sup>3</sup></b>	<b>H</b>		<b>H</b>	
The following shall be required only when claims of impact rating, a specific lens type and/or use are made by the manufacturer.				
<b>Use</b>				
Splash / Droplet			<b>D3</b>	<b>D3</b>
Dust			<b>D4</b>	<b>D4</b>
Fine Dust			<b>D5</b>	<b>D5</b>

- Markings for lens type and use applications shall be required only when claims for protection against the hazard or indicated use are made by the manufacturer.
- Fronts shall be marked with the A-dimension (eye size) and DBL (distance between lenses). Samples shall be marked with their overall length.

**8.2 Placement of Markings**

- Protector markings shall be placed in relatable proximity to each other on the product in the sequence specified below:
  - 1- Manufacturer's marks or logos.
  - 2- Designation of standard (Z87 or Z87-2, for prescription devices).
  - 3- Coverage area.
  - 4- Droplet and splash marking.

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- 5- Dust marking.
- 6- Fine dust marking.
- Manufacturer's marks or logos are exempt from the proximity requirement if they are clearly present elsewhere on the product. Markings representative of other standards shall not interfere with or be intermixed with the markings required by this standard.

**9. TESTS**

- Testing and samples for tests according to Annex A in ANSI/ISEA Z87.1

Test Attribute	Quantity for Testing
Minimum Coverage Area	1
Optical Quality	1
Transmittance	1
Haze	1
Drop Ball	4
Ignition	1
Corrosion Resistance	1
Light Tightness	1

**10. GUARANTEE**

- The supplier guarantees the supplied materials against any defects arising out of faulty design or workmanship, or of defective material for a period of one year at least from the date of delivery.

**11. TECHNICAL DATA SCHEDULE**

- The tenderer must fill in thoroughly the attached technical data schedule.
- Any offer does not accompanied with clear and complete technical data schedule shall be rejected.



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**TECHNICAL DATA SCHEDULE**  
**PERSONAL PROTECTIVE EQUIPMENT**  
**EYE and FACE PROTECTION**

\_\_ EDC Inquiry No: \_\_\_\_\_ Item No: \_\_\_\_\_

No.	DESCRIPTION	Vendor Offer*
1	Eye protection device	<ul style="list-style-type: none"> <li>• Frame Width: .....mm</li> <li>• Temple Length: ..... mm</li> <li>• Lens Height: ..... mm</li> <li>• Strap Length: ..... mm</li> <li>• Material:.....mm</li> </ul>
2	Face protection device	<ul style="list-style-type: none"> <li>• Material:.....mm</li> <li>• Glass size:.....×.....×.....mm</li> </ul>

(\*) - Values to be provided / proposed by the vendor.

(\*\*) – Please, provide explanations for deviations if any. (Use separate sheet if necessary.)

I / We guarantee the technical data given above for the offered material/equipment.

Description	Manufacturer of Material/Equipment	Vendor/Supplier
Vendor/Supplier		
Location and Office Address		
Name and Signature of Authorized Representative with Date		
Official Seal / Stamp		