

**MIL-STD-1434**

**20 July 1970**

**MILITARY STANDARD**

**GOGGLES, INDUSTRIAL, SAFETY**



**FSC 4240**

MIL-STD-1434  
20 July 1970

DEPARTMENT OF DEFENSE  
Washington, D.C. 20301

Goggles, Industrial, Safety

MIL-STD-1434

1. This Military Standard is mandatory for use by all departments and agencies of the Department of Defense, to assure that selection of new items is limited to essential items, for which no comparable standard item exists. This document is not intended to restrict any service in selecting new items required to support state-of-the-art changes.
2. Recommended corrections, additions, or deletions should be addressed to Commanding Officer, Edgewood Arsenal, ATTN: SMUEA-TSE-SM, Edgewood Arsenal, Maryland 21010.

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## FOREWORD

This is the first book format standard generated on goggles, industrial, safety. This standard is mandatory for use by all departments and agencies of the Department of Defense in the selection of items for application. It is intended to prevent the entry of unnecessary items (sizes, types, varieties) into the Department of Defense logistics systems. This is not a procurement document.

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## 1. SCOPE

1.1 Coverage. This standard is a presentation of nomenclature, requirements for fabrication, directions for use, packaging data, marking, general safety precautions, storage information, and shelf life of goggles, industrial, safety. This standard does not necessarily include all classifications of the items represented by the title or those which are commercially available. It does contain items preferred for use in the selection of industrial safety goggles for application by the Department of Defense. This standard covers the following items:

<u>NAME</u>	<u>NO. OF ITEMS</u>
GOGGLES, INDUSTRIAL, SAFETY, CHIPPER'S	1
GOGGLES, INDUSTRIAL, SAFETY, WELDER'S	1
GOGGLES, INDUSTRIAL, SAFETY, ALL PLASTIC, CLEAR LENS	1
GOGGLES, INDUSTRIAL, SAFETY, ALL PLASTIC, ANTI-GLARE LENS	1
GOGGLES, INDUSTRIAL, SAFETY, RUBBER FRAME, VENTILATED	1
GOGGLES, INDUSTRIAL, SAFETY, RUBBER FRAME, NON-VENTILATED	1

1.2 Application. Items listed herein accommodate essential requirements of the military and defense agencies, and will effect continued economies in all logistics functions when properly employed in new applications. This standard will supersede the following military standard sheet form standard part numbers:

MS36395	Goggles, Industrial, Single Aperture Style
MS36396	Goggles, Industrial, Double Lens Style
MS36397	Goggles, Industrial, Chippers Eyecup Style
MS36398	Goggles, Industrial, Rubber Frame

## 2. REFERENCED DOCUMENTS

The issue of the following documents in effect on the date of invitation for bids form a part of this standard to the extent specified herein.

## Federal Specifications

GGG-G-513	Goggles, Industrial (Eyecup); and Lens, Goggles, Industrial
GG-G-531	Goggles, Industrial and Spectacles, Industrial, All Plastic
GGG-G-521	Goggles, Industrial, Rubber Frame

## Standard

Z87.1	United States of America Standards Institute (USASI), Practice for Occupational and Educational Eye and Face Protection
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### 3. GLOSSARY

#### 3.1 Definitions.

Cover goggles - Goggles designed to be worn over corrective spectacles.

Definition - The degree of clarity of reproduction of the object that depends upon a combination of resolving power and contrast.

Diopter - A unit of refractive power of a lens or prism. In a lens or lens system, it is numerically equal to the reciprocal of the focal length measured in meters.

Haze - An aggravated form of fog in a polished surface caused by light scattering. The defects causing haze are larger than those causing fog, but not large enough to be seen by the unaided eye as separated.

Lens - The transparent glass or plastic device through which the wearer of the protective goggles or spectacles sees.

Ophthalmic - Pertaining to the human eye.

Plano lens - A lens which does not incorporate correction.

Prism diopter - A unit of measure of the refracting power of a prism. One diopter is the power of a prism that deviates a ray of light by one centimeter at a distance of one meter from the prism.

Refractive power - A measurement of the extent of convergence or divergence of parallel rays of light because the lens is not plano.

Resolving power - A measure of the ability of a lens or optical system to form separate and distinct images of two objects close together.

Striae - Internal imperfections of lens appearing as wavy distortion.

3.2 Abbreviations. The same abbreviation is used for all tenses, the possessive case, and the singular and plural forms of a given word.

MIL-STD - Military Standard

mm - millimeter

### 4. GENERAL REQUIREMENTS

4.1 Minimum requirements. Goggles shall meet the following minimum requirements:

a. They shall provide adequate protection against the hazards for which they are designed.



b. They shall fit snugly to the contour of the average face to safeguard the eyes of the wearer and shall not interfere with movements of the wearer.

c. They shall be durable and reasonably comfortable.

4.2 Materials. Materials used in the manufacture of goggles shall combine mechanical strength and lightness of weight. They shall be nonirritating to the skin and shall withstand frequent disinfection. Any metal used shall be inherently corrosion resisting.

4.3 Marking. Each pair of goggles shall be distinctly and permanently marked to identify the manufacturer.

4.4 Issue of goggles. Goggles are a personal item and should be issued for the exclusive use of one person. If circumstances require reissue, they should be thoroughly cleaned and disinfected in accordance with paragraph 6.4.3 of USASI(ANSI) Standard 287.1.

4.5 Safety precautions. It is the responsibility of management to provide the proper eye protection and to instruct personnel in the proper use and care of specific types. It is the responsibility of the wearer to make certain that he wears the proper protection for the work he is doing. The goggles described in this standard are designed for eye protection only and for use in certain general areas of employment. When other hazards are present in the occupational environment, additional protective measures may be required. Appropriate medical or safety authorities should be consulted to determine personal protective measures or environmental controls.

4.6 Shelf life. Factors such as moisture, temperature, type of container and extended exposure to direct sunlight may cause variations in shelf life. Under ideal conditions (par 5.1.8, 5.2.8, 5.3.8 - Storage), the frames and lenses should have indefinite shelf life. The headbands could be expected to lose their elasticity after five years. The exposure of goggles to storage conditions other than ideal may cause cracks, checks, blisters, softening or brittleness that would lessen the resiliency and useful life of the item. Shelf life is dated from the date of manufacture.

4.7 Interchangeability. All goggle parts of the same manufacturer's model shall be constructed to definite standards and tolerances in order that such parts may be interchanged, replaced, or adjusted without modification.

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## 5. DETAIL REQUIREMENTS

5.1 Name. GOGGLES, INDUSTRIAL, SAFETY, CHIPPER'S AND WELDER'S

5.1.1 Specification. Federal Specification GGG-G-513, Goggles, Industrial, (Eyecup); and Lens, Goggles, Industrial.

5.1.2 Technical description. The goggles shall consist of two basic types as follows: Cup-Type goggles designed to be worn by individuals who do not wear corrective spectacles and Cover-Cup-Type goggles designed to fit over corrective spectacles. The goggles shall consist of two eyecups of high grade thermosetting or thermoplastic material connected by a flexible adjustable nose bridge, lenses (if required), lens retainers and an easily replaceable, adjustable, elastic headband.



Figure 1. - Typical illustration of goggles, industrial, safety, chippers

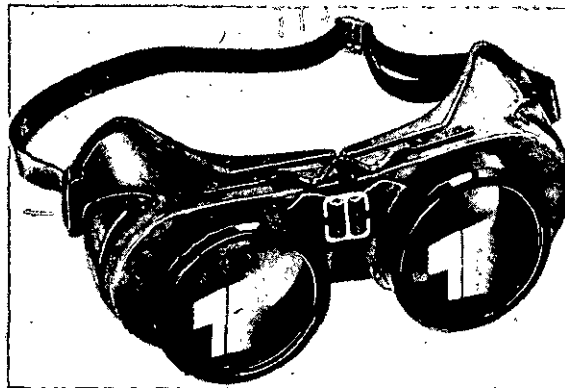


Figure 2. - Typical illustration of goggles, industrial, safety welders

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5.1.2.1 Eyecups. (1) Cup-Type Goggles. Eyecups shall be right and left in pairs and shall permit an effective angle of vision not less than 105 degrees, assuming that the pupil of the eye is located 17 millimeters behind the inner surface of the lens. The edge of the eyecup which bears against the face shall have a smooth surface free from roughness or irregularities which might exert undue pressure or cause discomfort to the wearer. The eyecups shall be of such shape and size as to protect completely the entire eye sockets. (2) Cover-Cup-Type Goggles. Eyecups shall be right and left in pairs and shall permit an effective angle of vision not less than 90 degrees. The goggles shall be designed to provide ample clearance and will not interfere with the spectacles of the wearer. The edges of the goggles which bear against the face shall have a smooth surface free from roughness or irregularities which might exert undue pressure or cause discomfort to the wearer. The eyecups of both type goggles will be made from plastic or other material of a composition that will withstand the disinfection, heat deformation, water absorption and flammability tests referenced in Federal specification. The eyecups for welder's goggles shall be connected by a semirigid brow-bar which will permit adjustment in the horizontal plane but prevent movement of the separate eyecups in the vertical plane.

5.1.2.1.1 Lens retainers. Each eyecup shall be provided with a lens seat wide enough to support the lens or lenses and resist the falling inward of the broken lens when the lens is subjected to the impact test specified in Federal specification GGG-G-513. The retainers shall be designed for ready removal or replacement of lenses without tools. Lens retainers for welder's models shall be constructed to accept a filter lens, gasket and cover lens.

5.1.2.1.2 Ventilation. Eyecups shall be ventilated in a manner to permit circulation of air to prevent fogging of the lenses. The ventilation openings in the chipper's models shall be a size that will exclude a spherical particle 0.04 inch in diameter. The ventilation openings in the welder's models shall be installed in a manner that shall exclude all direct light not passing through the filter lenses from a source in front of the wearer and shall also exclude all intense light at the sides. The equivalent areas of openings in each eyecup shall meet the requirements of referenced Federal specification.

5.1.2.2 Lenses. All lenses shall be made of a material suitable for ophthalmic use and shall be free from striae, bubbles, waves, or other visible defects and flaws which may impair their optical quality. The lenses shall be well polished, smooth and free from sharp edges or irregularities which may present a potential hazard through cutting or scratching the wearer. Lenses shall be permanently and legibly marked with a distinctive mark by which the manufacturer may be identified. The marking shall be placed so as not to interfere with the vision of the wearer. When tested as specified in the Federal specification, lenses shall meet the requirements for prismatic effect, refractive power and definition.



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5.1.2.2.1 Clear lenses. Clear lenses for use in chipper's models shall be single solid heat treated glass plate and shall transmit not less than 89% of the incident visible light.

5.1.2.2.1.1 Impact resistance. The clear lenses shall be capable of withstanding the fracture resistance tests specified in referenced documents.

5.1.2.2.1.2 Dimensions. Clear lenses shall measure  $50 \pm 0.2$  mm in diameter and not less than 3.0 mm nor more than 3.8 mm in thickness. The edges of the lenses will be beveled and will have a smooth dull finish.

5.1.2.2.2 Filter lenses. Filter lenses shall be single solid, heat treated glass plate, shall be supplied, as specified, in the shades shown in Table I and shall meet the requirements of Table I.

5.1.2.2.2.1 Impact resistance. Filter lenses shall be capable of withstanding the fracture resistance tests specified in Federal specification GGG-G-513.

5.1.2.2.2.2 Dimensions. Filter lenses shall measure  $50 \pm 0.2$  mm in diameter and not less than 3.0 mm or more than 3.8 mm in thickness. The edges of the lenses will be cut square and the corners slightly chamfered.

5.1.2.2.2.3 Transparency. The maximum transparency for filter lenses shall be between 485 and 600 millimicrons gradually decreasing on either side. Glasses when viewed in transmitted light shall have a dominant hue ranging from blue, bluish-green, yellowish-green to greenish-yellow, depending on the composition of the glass.

5.1.2.2.2.4 Marking. In addition to the mark identifying the manufacturer, filter lenses will bear the shade number and the capital letter H to indicate heat treating. The marking shall not interfere with the vision of the wearer.

5.1.2.2.3 Cover lenses. Cover lenses will be single solid glass plate or will be made of allyl plastic sheet, as specified. The glass cover lens shall transmit not less than 89 percent of incident visible light and the plastic lens shall transmit not less than 86 percent of incident visible light. The lenses shall not be affected by sudden temperature changes between 40 and 150 degrees Fahrenheit.

5.1.2.2.3.1 Dimensions. The cover lenses shall measure  $50 \pm 0.2$  mm in diameter. The glass lenses shall be not less than 1.3 mm nor more than 2.8 mm in thickness, shall not be heat treated for impact resistance

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and the thickness of allyl plastic-sheet cover lenses shall be  $0.06 \pm 0.01$  inch. The edges will be cut square and chamfered to remove sharp edges.

5.1.2.2.4 Sodium light filter lenses. When required, glass, heat treated, sodium light filter lenses shall be furnished in the shades shown in Table II. Lenses shall have a strong absorption band in the region of the sodium line (589.3 millimicrons). The lenses shall meet the requirements of Table II and shall have a dominant hue ranging from blue, bluish-green, yellowish-green to greenish-yellow, depending on the composition of the glass.

TABLE II Sodium light transmission

Shade No.	Percent transmission of sodium light (589.3 millimicrons)		
	max	std	min
2.5	4.35	3.45	2.70
3.0	2.69	2.09	1.31
4.0	1.28	0.78	0.49
5.0	0.47	0.29	0.18
6.0	0.18	0.11	0.07

5.1.2.2.4.1 Impact resistance. Sodium light filter lenses shall be capable of withstanding the fracture resistance tests specified in Federal Specification GGG-G-513.

5.1.2.2.4.2 Dimensions. Sodium light filter lenses shall measure  $50 \pm 0.2$  mm in diameter and not less than 2.2 mm nor more than 4.0 mm in thickness.

5.1.2.2.4.3 Marking. In addition to the identifying mark of the manufacturer, sodium light filter lenses shall bear the shade number and the capital letter H to indicate heat treating. The marking shall not interfere with the vision of the wearer.

5.1.2.3 Nose bridge. The nose bridge shall be flexible, easily replaced and easily adjusted by hand to provide a proper fit on the wearer.

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5.1.2.4 Headband. The goggles shall be provided with an easily replaceable and adjustable headband made of oil-resisting rubber or synthetic rubber not less than 3/8 inch wide. It shall hold the eyecups firmly and comfortably in position to protect the eyes of the wearer.

5.1.3 Use data. Goggles provide protection to the eyes only. In areas where there is danger of injury to the face or head, additional precautionary measures must be taken.

5.1.3.1 Chipper's goggles. Chipper's goggles afford protection from relatively large flying objects in jobs such as: chipping, finishing of iron and steel castings and forgings; lathe work; jobs using tools such as chisels, swages, jackhammers, rock drills and sledges; sealing and grinding of metals; stone dressing; and rivetting and rivet cutting.

5.1.3.2 Welder's goggles. Welder's goggles provide protection from ultraviolet, infrared and visible rays according to the composition and density of the lenses. In addition they provide protection against flying objects, sparks, metal splashes, chips and scale. Sodium light filter lenses afford protection where the fluxes are rich in sodium compounds, such as in aluminum welding. For protection from other than sodium light, and intended uses of the various filter shades are as follows:

a. Lenses with shade number 1.7 and 3.0 are intended to protect the eyes from glare of reflected sunlight from snow, water, roofs, road beds and sands. They are also used to protect the eyes from stray light from cutting and welding and the glare from metal pouring and furnace work.

b. Lenses with shade number 4 are intended for the same uses as shade number 1.7 to 3.0, under conditions of greater light intensity.

c. Lenses with shade number 5 are intended for light gas cutting and welding.

d. Lenses with shade number 6 and 7 are intended for gas cutting, medium gas welding, and for arc welding up to 30 amperes.

5.1.4 Safety precautions. The goggles should be inspected before each use. Pitted or scratched lenses impair vision and could seriously reduce protection. Such lenses should be replaced immediately. Slack, wornout, knotted, or twisted headbands do not hold the eye protectors in the proper position and should be replaced immediately.

5.1.5 Packaging. Unless otherwise specified, the goggles and lenses will be packed in accordance with the supplier's commercial practice.

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5.1.6 Packing. Unless otherwise specified, goggles and lenses will be packed in accordance with the supplier's standard commercial practice to permit acceptance by common carrier at the lowest applicable rate, and to afford maximum protection from normal hazards of transportation.

5.1.7 Marking. In addition to any special marking required by the contract or order, interior packages and shipping containers shall be marked in accordance with MIL-STD-129.

5.1.8 Storage data. Goggles should be stored in their original packing in a storage facility that is normally cool and dry. Under these ideal storage conditions, packages need only be spot-checked every six months for evidence of deterioration, or more frequently if storage conditions vary from the ideal.

5.2 Name. GOGGLES, INDUSTRIAL, SAFETY, ALL PLASTIC

5.2.1 Specification. Federal Specification GGG-G-531, Goggles, Industrial and Spectacles, Industrial, All Plastic.

5.2.2 Technical description. The goggles shall consist of a plastic frame with integral or replaceable plastic, clear or anti-glare lens and an elastic headband. The goggles shall be designed to be worn over conventional type corrective spectacles and shall conform to the contour of the average face. They shall fully protect the eyes from front and side exposure. The goggles shall conform to the applicable requirements of USASI(ANSI) Standard Z87.1 unless otherwise specified.

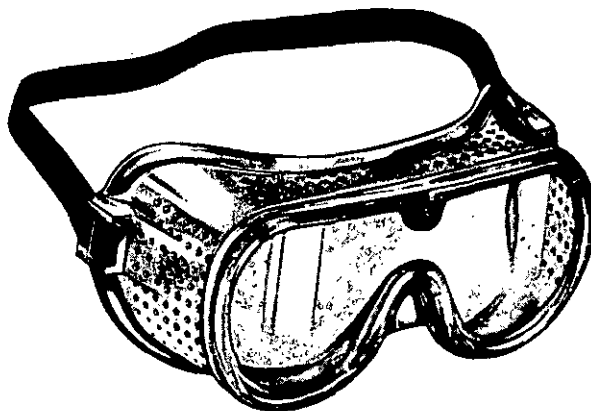


Figure 3. - Typical illustration of goggles, industrial, safety, all plastic, clear lens.



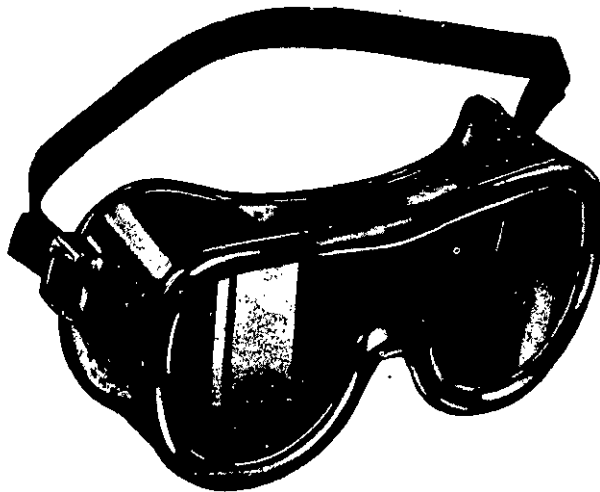


Figure 4. - Typical illustration of goggles, industrial, safety, all plastic, anti-glare lens.

5.2.2.1 Frame. The goggle frame will be clear, translucent, colored, or opaque plastic, as specified, and shall be sufficiently rigid to hold the lens securely in place. The bearing surfaces against the face shall be smooth, rounded, and at least  $3/16$  inch wide. A sufficient number of ventilation openings shall be provided to prevent fogging. The openings shall reject a sphere  $5/64$  inch in diameter. The method of attachment of lens to frame (for replaceable lens goggle) shall be such as to securely hold the lens in place when subjected to impact tests of referenced documents. The frames shall meet the flammability, water absorption, disinfection and corrosion resistance test requirements of referenced documents.

5.2.2.2 Lens. Clear or colored (antiglare) plastic lenses, as specified, shall be an integral or replaceable part of the goggles. The lens material shall be of optical quality conforming to the optical test requirements of USASI(ANSI) Standard Z87.1 and shall be free from striae, waves, or other visible defects, which might impair their optical qualities. The integral lens goggles will be either molded or bonded and the lens surface shall be free from visible surface defects. Lenses shall meet the flammability, water absorption, disinfection, fracture resistance and penetration resistance test requirements of Federal Specification GG-G-531. Antiglare lenses shall be capable of reducing harmless glare and absorbing ultraviolet radiation. The lens shall not be less than 0.050 nor greater than 0.060 inch thick.

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5.2.2.3 Nose bridge. The plastic nose bridge may be integrally molded with the frame or lens and shall be designed to conform to the contour of the average nose.

5.2.2.4 Headband. An easily replaceable elastic headband shall be provided with the goggles. It shall be not less than 7/16 inch wide and shall assure a comfortable, safe fit of the goggles. It shall be adjustable in length and shall withstand the disinfection test specified in referenced documents without visible deterioration.

5.2.2.5 Weight. The complete goggles shall weigh not more than 2.5 ounces.

5.2.3 Use data. Plastic goggles are intended for protection when there is danger of injury to the eyes from small flying particles of dust, chips, or machine cuttings. Uses include the operation of machine tools, saws, grinders, buffers and polishers. They are also used for all types of bench and machine work.

5.2.4 Safety precautions. This type of all plastic goggle shall not be used in operations requiring chipping, welding or chemical type goggles. The goggles should be carefully inspected before each use and should be replaced if the lenses are pitted or scratched. Worn-out, slack, knotted or twisted headbands should be replaced immediately.

5.2.5 Packaging. Unless otherwise specified, the goggles shall be packaged in conformance with the supplier's normal commercial practice.

5.2.6 Packing. Unless otherwise specified, the goggles shall be packed in accordance with the supplier's normal commercial practice to insure carrier acceptance and safe delivery at destination.

5.2.7 Marking. In addition to any marking required by the contract or order, the interior packages and shipping containers shall be marked in accordance with MIL-STD-129.

5.2.8 Storage data. Goggles should be stored in the original packing in a storage facility that is normally cool and dry. Under these ideal storage conditions, packages need only be spot-checked every six months for evidence of deterioration, or more frequently if storage conditions vary from the ideal.

5.3 Name. GOGGLES, INDUSTRIAL, SAFETY, RUBBER FRAME

5.3.1 Specification. Federal Specification GGG-G-521, Goggles, Industrial, Rubber Frame. Requirements not included in this standard

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will be in accordance with Federal Specification GGG-G-521 or subsequent revisions.

5.3.2 Technical description. The goggles shall consist of a molded rubber frame, a lens or lenses, and an elastic headband. The goggles shall be designed to be worn over conventional type corrective spectacles, shall conform to the contour of the average face and fully protect the eyes from the specified front and side exposure.

5.3.2.1 Frame. The goggle frame shall be molded of natural or synthetic rubber. It may have a single lens aperture or double lens apertures. The lens or lenses shall be held firmly in place and be easily replaced. The frame will be designed to provide an effective angle of vision not less than 90 degrees. As specified, the goggle frame may be ventilated or not ventilated. The ventilated frame will be designed to permit circulation of air to prevent fogging of the lens or lenses and the ventilation openings shall be designed in a manner to render the goggles splashproof.

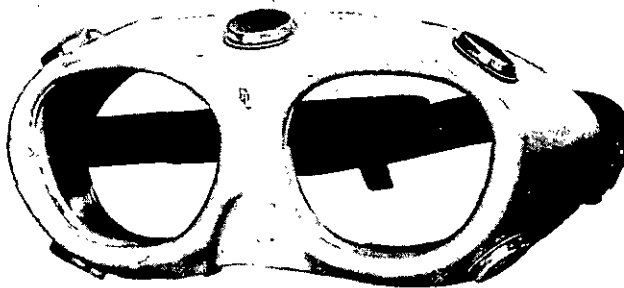


Figure 5. - Typical illustration of goggles, industrial, safety, rubber frame, ventilated



Figure 6. - Typical illustration of goggles, industrial, safety, rubber frame, non-ventilated

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5.3.2.2 Lens. Lenses shall be made of a material suitable for ophthalmic use and shall be free from striae, bubbles, waves or other visible defects which may impair their optical quality. The lenses shall be well polished, smooth and free from sharp edges of irregularities which may present a potential hazard through cutting or scratching the wearer and shall bear a permanent, legible mark by which the manufacturer may be identified. The marking shall be placed so that it will not interfere with the vision of the wearer. When tested as specified in Federal Specification GGG-G-521, lenses shall meet the requirements for prismatic effect, refractive power, definition and impact resistance. In addition, glass lenses shall meet the breakage pattern requirement and plastic lenses shall meet the penetration resistance, haze and flammability requirements of referenced document.

5.3.2.2.1 Dimensions. Glass lenses shall be not less than 3.0 mm nor more than 3.8 mm in thickness. Plastic lenses shall be not less than 0.050 inch in thickness. Circumferential tolerances of lenses shall be held sufficiently close to permit easy interchangeability or replacement within the respective frames of one manufacturer's model.

5.3.2.3 Headband. The headband may be made of molded natural or synthetic rubber or elastic webbing. It shall be easily replaced or adjusted and shall be not less than 5/8 inch wide. It shall hold the frame of the goggles firmly and comfortably in position to protect the eyes of the wearer.

5.3.2.4 Case. When specified, a suitable, well made, unlined metal case with rounded corners will be provided with each pair of goggles.

5.3.3 Use data. Rubber frame goggles are intended for protection when there is danger of injury to the eyes from chemical splashes, spray, dust concentrations, foreign particles and light impact. When unventilated they also protect against irritating vapors and fumes. Goggles afford protection for the eyes only. In areas where there is danger to the face and head, additional precautionary measures must be taken.

5.3.4 Safety precautions. The goggles should be carefully inspected before each use. Pitted or scratched lenses impair vision and could seriously reduce protection. Such lenses should be immediately replaced. Knotted, twisted, or slack headbands do not hold the rubber frame in the proper position to protect the eyes and should be replaced immediately.

5.3.5 Packaging. Goggles and lenses shall be packaged in accordance with the supplier's commercial practice unless otherwise specified.

5.3.6 Packing. Unless otherwise specified, goggles and lenses shall be packed in accordance with the normal commercial practice of the supplier to assure carrier acceptance and safe delivery at destination.

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5.3.7 Marking. In addition to any special marking required by the contract or order, the interior packages and shipping containers shall be marked in accordance with MIL-STD-129.

5.3.8 Storage data. Goggles should be stored in the original packing in a storage facility that is normally cool and dry. Under these ideal storage conditions, packages need only be spot-checked every six months for evidence of deterioration, or more frequently if storage conditions vary from the ideal.

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Notice: - Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring agencies or as directed by the contracting officer.

Custodians: Army - MU  
Navy - SH  
Air Force - 84

Preparing activity: Army - MU

Review activities: MD, 84, SH,  
YD, MS

User activities: EL, ME, AV, MC

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