INCH-POUND
MIL-PRF-31013
25 April 1996

PERFORMANCE SPECIFICATION

SPECTACLES, SPECIAL PROTECTIVE EYEWEAR CYLINDRICAL SYSTEM (SPECS)

This specification is approved for use by all departments and agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the requirements for a special protective eyewear cylindrical system (SPECS) to provide ballistic and laser eye protection.

1.2 Classification. The lenses shall be of the following four classes as specified (see 6.2).

Class 1 Clear, ballistic
Class 2 Neutral gray, ballistic
Class 3 Laser protective, two wavelength, ballistic
Class 4 Laser protective, three wavelength, ballistic

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents

2.2.1 Specifications, standards, and handbooks. The following specifications, standards and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Defense Personnel Support Center, Clothing and Textiles Directorate, Attn: DPSC-FNS, 2800 South 20th Street, Philadelphia, PA 19145-5099, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 8465

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STANDARDS

FEDERAL
A-A-55273 Retainer, Eyewear

MILITARY
MIL-STD-662 V_{50} Ballistic Test for Armor

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Documents Order Desk, 700 Robbins Avenue, Building #4, Section D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications.
The following other Government documents, drawings and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DRAWINGS

U.S. Army Natick Research, Development, and Engineering Center
Drawing No. 8-2-1102 - Kit, Eye Armor, Cylindrical

(Copies of drawings are available from U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014. Some drawings may contain Limited Rights and Patent Legends.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of the documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
ASTM D 1003 - Standard Test Method For Haze and Luminous Transmittance of Transparent Plastics
ASTM D 1044 - Standard Test Method For Resistance of Transparent Plastics to Surface Abrasion

(Application for copies should be addressed to American Society for Testing and Materials, (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
ANSI-Z80.1 - Ophthalmics - Prescription Ophthalmic Lenses - Recommendations
ANSI-Z80.3 - Ophthalmics - Nonprescription Sunglasses and Fashion Eyewear Requirements
ANSI-Z87.1 - Practice for Occupational and Educational Eye and Face Protection

(Application for copies of ANSI publications should be addressed to ANSI, 11 West 42nd Street, New York, NY 10036.)

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(Non-Government standards and other publications are normally available from organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.5) as specified in 4.2.

3.2 System definition. SPECS shall consist of one complete spectacle with spatula temples, size regular or large, with clear (class 1) lens, one eyewear retaining strap, one spare neutral gray (class 2) lens with black nasal piece, one pair of interchangeable cable temples in polybag, one instruction booklet, and one SPECS belt case.

3.3 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.4 Design and construction. SPECS provide ballistic and laser eye protection. The ballistic protection is provided by a size regular or large, one-piece lens with integrally molded side shields for lateral protection. The lens snap fits into a multi-component frame with adjustable temples and has an adjustable soft nasal piece. Sun or laser protection is provided by interchangeable lenses that replace the standard clear lens. Class 3 spectacles shall provide laser protection at 694.3 nm (ruby laser wavelength) and at 1064 nm (neodymium laser wavelength). Class 4 spectacles shall provide laser protection at 694.3 nm, at 1064 nm, and at 532 nm (frequency doubled neodymium laser wavelength). See drawing 8-2-1102.

3.4.1 The special protective eyewear cylindrical lens. The SPECS shall allow binocular vision and provide impact resistance. The finished parts shall be free of sharp edges which could result in discomfort or abrasion to the face. The SPECS, available in size regular or large, shall permit a snug and smooth operating fit with use of the adjustable cable temples and the adjustable nasal piece. The same size lenses shall be interchangeable within the SPECS frame assembly. The SPECS two size system shall be adjustable to accommodate the 5th percentile female to the 95th percentile male military population.

3.4.2 Brow assembly. The multi-component frame shall permit a secure snap fit in three locations to the SPECS lens. The assembly provided in size regular or large shall permit a snug fit and integral cushioning to dampen impact to the forehead of the wearer. The hinge ratchet components shall be permanently attached to the frame brow and shall allow lens inclination for individual pantoscopic fit.

3.4.3 Temples. The two-component temples shall be interchangeable between size regular and size large SPECS eyewear. They shall provide a 15 mm range of length adjustment in 5 mm increments. The temple end pieces shall be provided in an interchangeable spatula and cable-type configuration to provide a comfortable and secure fit depending upon user preference or level of activity.

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3.4.4 Nasal piece. The nasal piece shall lock securely to the SPECS lens, but may be removed when necessary. It shall have a means to maintain adjustments made during initial fitting. A SPECS nasal piece shall be provided with each lens and each replacement lens.

3.4.5 Eyewear Retainer. The eyewear retainer shall fit snugly over the free end of the temple and shall stay in place once adjusted.

3.4.6 Belt case. A hard plastic vertical carrying case, which shall have good performance characteristic between -40°F and +135°F, shall be mildew resistant, and shall incorporate ultraviolet inhibiters. The carrying case shall be provided with drain holes. The carrying case shall minimize dirt infiltration and scratching of lenses. The carrying case shall contain the spectacles in such a way that the optical surface of the lens is not permitted to rub against the inside of the case. Carrying case shall be olive green in color and shall be non-reflective; it shall attach to a soldier's equipment belt, and shall not exceed 4 ounces in weight. It shall carry one complete SPECS item, one spare lens with nasal piece, and one pair of interchangeable temples.

3.4.7 Instruction booklet. The instruction booklet shall be small enough to enable packing in the SPECS belt case with components as specified in 3.2. A standard sample of the instruction booklet shall be furnished (see 6.6).

3.5 Performance requirements

3.5.1 Mechanical

3.5.1.1 Ballistic resistance. The ballistic resistance of the spectacles shall be such that they will pass a Vo test using a 0.15 caliber, 5.8 grain, T37 shaped projectile at a velocity of 640 to 660 feet per second when tested as specified in 4.4.1.1.

3.5.1.2 Abrasion resistance. The percent haze gain of the SPECS lens shall not exceed 6 percent when tested as specified in 4.4.1.2.

3.5.2 Optical

3.5.2.1 Prismatic deviation. The vertical prism shall not be greater than 0.18 prism diopters for either eye nor shall the algebraic difference of the vertical prism for the left and right eyes be greater than 0.18 prism diopters. The algebraic sum of the horizontal prism for the left and right eyes shall be not greater than 0.50 prism diopters, and the algebraic difference for the horizontal prism for the left and right eyes shall not be greater than 0.18 diopters when tested as specified in 4.4.2.1.

3.5.2.2 Power. The refractive power of the SPECS lens shall not exceed 0.0625 diopter when tested as specified in 4.4.2.2.

3.5.2.3 Optical distortion. The SPECS lens shall be free of optical distortion when tested as specified in 4.4.2.3.

3.5.2.4 Astigmatism. The maximum degree of astigmatism in the SPECS lens shall not exceed 1/16 diopter when tested as specified in 4.4.2.4.

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3.5.2.5 Ultraviolet absorption. The SPECS lens shall absorb at least 90 percent of the incident ultraviolet radiation in the range 290 to 380 nm when tested as specified in 4.4.2.5.

3.5.2.6 High energy laser optical density for class 3 lens. The class 3 SPECS lens shall yield optical densities equal to or greater than 4 at 694.3 nm (ruby laser wavelength) and 4 at 1064 nm (Nd:YAG laser wavelength) for laser radiation incident normal to the surface of the spectacles, with any polarization state, when tested against laser radiation having a radiant exposure of 20 milliJoules per square centimeter for Q-switched emissions less than 40 nanoseconds and greater than 1 nanosecond when tested as specified in 4.4.2.6.

3.5.2.7 High energy laser optical density for class 4 lens. The class 4 SPECS lens shall yield optical densities equal to or greater than 4 at 532 nm (frequency doubled Nd:YAG laser wavelength), 4 at 694.3 nm (ruby laser wavelength), and 4 at 1064 nm (Nd:YAG laser wavelength) for laser radiation incident normal to the surface of the spectacles, with any polarization state, when tested against laser radiation having a radiant exposure of 20 milliJoules per square centimeter for Q-switched emissions less than 40 nanoseconds and greater than 1 nanosecond when tested as specified in 4.4.2.6.

3.5.2.8 Luminous transmittance (class 1). The photopic luminous transmittance (for the light adapted eye) for the class 1 SPECS lens shall not be less than 89 percent when tested in accordance with 4.4.2.7.

3.5.2.9 Luminous transmittance (class 2). The luminous transmittance of the class 2 SPECS lens shall be within 12 to 18 percent, and the total visible transmittance shall not vary more than 3.0 percent when tested as specified in 4.4.2.8.

3.5.2.10 Luminous transmittance (class 3). The scotopic and photopic luminous transmittance shall be not less than 40 percent when tested as specified in 4.4.2.7.

3.5.2.10.1 Luminous transmittance (class 3) for P43 phosphor. The photopic luminous transmittance of the class 3 SPECS lens shall be not less than 40 percent when the source spectral emission is that of the P43 phosphor when tested as specified in 4.4.2.7.

3.5.2.11 Luminous transmittance (class 4). The photopic luminous transmittance shall not be less than 12 percent when tested as specified in 4.4.2.7.

3.5.2.11.1 Luminous transmittance (class 4) for P43 phosphor. The photopic luminous transmittance of the class 4 SPECS lens shall not be less than 9 percent when the source spectral emission is that of the P43 phosphor when tested as specified in 4.4.2.7.

3.5.2.12 Neutrality of (class 2). The spectral transmittance of the class 2 lens may vary with wave lengths between 430 and 730 nm; the average percentage deviation within nine spectral bands shall be less than 12 when tested as specified in 4.4.2.9. The spectral distribution curve shall show a reasonable even distribution throughout the visible spectrum to insure that the color distortion will not be excessive.

3.5.2.13 Chromaticity of (class 2). The chromaticity coordinates x and y of the class 2 lenses shall be within the limits indicated in Figure 2 when computed as specified in 4.4.2.10.

3.5.2.14 Haze. The haze of the SPECS lens shall be less than 3 percent when tested as specified in 4.4.2.11.

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3.5.3 Environmental

3.5.3.1 Chemical resistance. The SPECS components shall be resistant to attack from chemicals including, but not limited to, the following:

Insect repellent, controlled release (DEET)
Combat vehicle fluid (Dexron)
Gasoline
Motor oil
JP8 Aircraft fuel

when tested as specified in 4.4.3.1. Class 3 and class 4 SPECS lenses shall meet the requirements for optical density and luminous transmittance after testing.

3.5.3.2 Temperature. The SPECS lens shall not be visibly degraded following exposure for 72 hours at 160°F and 72 hours at -60°F ± 3°F when tested as specified in 4.4.3.2. Class 3 and class 4 lenses shall meet the requirements for optical density and luminous transmittance after testing.

3.5.3.3 Solar radiation. The SPECS lens shall not be visibly degraded when tested against 60 hours of simulated solar radiation as specified in 4.4.3.3. Class 3 and class 4 lenses shall meet the requirements for optical density and luminous transmittance after testing.

3.5.3.4 Humidity. The SPECS lens shall not be visibly degraded after exposure to 10 cycles for a combined total of 240 hours of temperature and humidity when tested as specified in 4.4.3.4. Class 3 and class 4 lenses shall meet the requirements for optical density and luminous transmittance after testing.

3.6 Workmanship. The SPECS shall be free from all defects which would affect proper functioning in service.

3.7 Compliance with ANSI Z87.1. In addition to the detailed performance requirements of this specification, the eyewear shall meet all the performance and marking requirements of ANSI Z87.1.

3.8 Marking of the class 3 and class 4 lenses. For the markings required by ANSI Z87.1, paragraph 8.9, the class 3 lens shall be marked "S2" and the class 4 lens shall be marked "S3".

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.2).
b. Conformance inspection (see 4.3).

4.2 First article inspection. When a first article is required (see 3.1 and 6.2), the first article lot size in complete systems shall be specified (see 6.2). System shall be subjected to the tests indicated in Table I. In addition, the first article shall be examined for the defects specified in 4.3.2 and 4.3.4. The sample sizes for the tests as specified in 4.3.2 and 4.3.4 shall be specified (see 6.2). The presence of any defect or failure to pass any test shall be cause for rejection of the first article.

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TABLE I. First article tests

Requirement	Requirement paragraph	Test paragraph
Ballistic	3.5.1.1	4.4.1.1
Abrasion	3.5.1.2	4.4.1.2
Prism	3.5.2.1	4.4.2.1
Power	3.5.2.2	4.4.2.2
Optical distortion	3.5.2.3	4.4.2.3
Astigmatism	3.5.2.4	4.4.2.4
UV absorption	3.5.2.5	4.4.2.5
Luminous transmittance for (class 2)	3.5.2.9	4.4.2.8
Neutrality of (class 2)	3.5.2.12	4.4.2.9
Chromaticity of (class 2)	3.5.2.13	4.4.2.10
Haze	3.5.2.14	4.4.2.11
High energy laser (class 3)	3.5.2.6	4.4.2.6
High energy laser (class 4)	3.5.2.7	4.4.2.6
Transmittance (class 1)	3.5.2.8	4.4.2.7
Transmittance (class 3)	3.5.2.10	4.4.2.7
Transmittance (class 3) for P43 phosphor	3.5.2.10.1	4.4.2.7
Transmittance (class 4)	3.5.2.11	4.4.2.7
Transmittance (class 4) for P43 phosphor	3.5.2.11.1	4.4.2.7
Chemical resistance	3.5.3.1	4.4.3.1
Transmission temperature	3.5.3.2	4.4.3.2
Solar radiation	3.5.3.3	4.4.3.3
Humidity	3.5.3.4	4.4.3.4

4.3 Conformance inspection. Components and materials shall be inspected in accordance with all the requirements of reference documents unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

4.3.1 In-process inspection. Inspection of subassemblies shall be made to ascertain that construction details which cannot be examined in the finished product are in accordance with specified requirements. The Government reserves the right to exclude from consideration for acceptance any material or service for which in-process inspection has indicated nonconformance.

4.3.2 End item dimensional examination. The end items shall be examined for conformance to the dimensions specified in the applicable drawings. Each sample shall be disassembled to a principal component stage, and the components randomly interchanged with components of other systems within the sample. The disassembly and reassembling cycle shall be repeated for three cycles ending on reassembling. Inability to correctly disassemble and reassemble shall constitute a defect (see 6.7).

4.3.3 End item testing. The end items shall be tested for the characteristics listed in Table II (see 6.7).

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TABLE II. End item tests

Characteristic	Requirement paragraph	Test method paragraph
Mechanical		
Ballistic	3.5.1.1	4.4.1.1
Abrasion (see note 1)	3.5.1.2	4.4.1.2
Optical		
Prism	3.5.2.1	4.4.2.1
Power	3.5.2.2	4.4.2.2
Optical distortion	3.5.2.3	4.4.2.3
Astigmatism	3.5.2.4	4.4.2.4
UV absorption	3.5.2.5	4.4.2.5
High energy laser (class 3)	3.5.2.6	4.4.2.6
High energy laser (class 4)	3.5.2.7	4.4.2.6
Transmittance (class 1)	3.5.2.8	4.4.2.7
Luminous transmittance for (class 2)	3.5.2.9	4.4.2.8
Transmittance (class 3)	3.5.2.10	4.4.2.7
Transmittance (class 3) for P43 phosphor	3.5.2.10.1	4.4.2.7
Transmittance (class 4)	3.5.2.11	4.4.2.7
Transmittance (class 4) for P43 phosphor	3.5.2.11.1	4.4.2.7
Neutrality of (class 2)	3.5.2.12	4.4.2.9
Chromaticity of (class 2)	3.5.2.13	4.4.2.10
Haze	3.5.2.14	4.4.2.11
Environmental		
Chemical resistance	3.5.3.1	4.4.3.1
Transmission temperature	3.5.3.2	4.4.3.2
Solar radiation	3.5.3.3	4.4.3.3
Humidity	3.5.3.4	4.4.3.4

Note 1: The test shall be performed on flat witness pieces which where coated at the same time as the spectacles.

4.3.4 End item visual examination. The end items shall be examined for the defects listed in Table III (see 6.7).

TABLE III. End item visual defects

Examine	Defect	Major	Minor
Eyewear - quality of plastic material	Break, crack or fracture	101	
	Crazing, scratch, or otherwise impaired within a 30 mm circle centered vertically 32mm from horizontal center line	102	
	Crazing, scratch, fissure or otherwise impaired		201
	Color of nosepiece, temple assembly or brow assembly off shade, mottled or streaky		202
	Contact surfaces of mounting nosepiece or temple rough enough to cause skin abrasion		203
	Lens not high gloss finish	103	
	Lens contains stain or discoloration not readily removed within a 30 mm circle centered vertically 32mm from horizontal center line		
	Lens shows bubbles or surface deterioration	104	

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TABLE III. End item visual defects (cont'd.)

Examine	Defect	Major	Minor
Eyewear - quality of plastic material (cont'd.)	Edge of lens rough, not smooth finish or has flash		204
Case-quality of plastic material	Crazing, cracks, warped sidewalls, off shade, mottled or streaky	105	
	Defective hinge pin	106	
Design and construction	Varies from applicable drawings	107	
Workmanship and assembly of eyewear	Any component missing	108	
	Component malformed, warped, chipped or otherwise damaged	109	
	Temple tips more than 3/8 inch difference in vertical direction after assembly with temples extended		205
	Not connected or joined as specified or assembly is poorly accomplished		206
	Hinge pin will not stay in place	110	
	Mounted nosepiece not properly positioned: e.g. crooked, set at an angle, set in reversed position		207
Instruction booklet	Instruction booklet missing	111	
	Cut, hole, tear, or break in instruction book		208
	Instruction booklet not in one piece		209
	Instructions vary from specified wording or wording is not placed as specified		210

4.4 Methods of inspection

4.4.1 Mechanical tests

4.4.1.1 Ballistic resistance. The test shall be a Vo test conducted as specified in MIL-STD-662 using a 0.15 caliber, 5.8 grain, T37 shaped projectile (see Figure 3) with the following exceptions: electronic velocity detection devices (light beam or acoustic type) may be used to determine the velocity of the projectile, such devices placed no less than 8 inches and no more than 24 inches from the target; compressed gas propulsion of the projectile may be used. The eyewear shall be mounted on an Alderson 50th percentile male headform in the as-worn position. The 0.002 inch thick aluminum foil witness sheet shall be mounted within 2 inches of the eyewear behind the area of impact. The sample shall be hit once at normal incidence within a 1-inch diameter at a point centered vertically and at a horizontal distance of 32 mm from the centerline. The sample shall be considered a failure if the aluminum foil witness sheet is punctured or if the sample is cracked.

4.4.1.2 Abrasion resistance. The test specimens shall be flat samples which have been coated with the same coating as the lenses from the same lot. The haze of the sample shall be determined before and after the abrasion test. The abrasion test will be performed in accordance with ANSI/ASTM D 1044. The test shall be performed using CS10F calibrase wheels for fifty (50) cycles under a 500 gram load. The percent haze gain is the difference between the haze readings taken before and after the abrasion test.

4.4.2 Optical tests

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4.4.2.1 Prismatic deviation. The sample shall be tested for prismatic deviation along the line of sight at a pupillary distance of 64 mm. A telescope, lensometer, or equivalent test method may be used which is capable of indicating prism to an accuracy of 0.03 prism diopters.

4.4.2.2 Power. The sample shall be tested for power at the center of the critical optical area. The critical optical area is defined by a circle having a 20 mm radius centered vertically and at a horizontal distance of 32 mm from the centerline. The power shall be measured with a focimeter, lensometer or telescope capable of measuring power to 0.03 diopters.

4.4.2.3 Optical distortion. The SPECS lens shall be inspected for optical distortion or localized power errors by the method described in ANSI Z80.1. A grid pattern shall be viewed through the lens. If any distortion is discernible, the lens shall be inspected with a lensometer. Any blurring of the image in the lensometer shall be cause for rejection. The critical optical area is defined by a circle having a 20 mm radius centered vertically and at a horizontal distortion of 32 mm from the centerline.

4.4.2.4 Astigmatism. The sample shall be tested for astigmatism along the line of sight at a 65 mm pupillary distance by the method described in ANSI Z87.1.

4.4.2.5 Ultraviolet absorption. The spectral transmittance of the sample shall be measured with a standard spectrophotometer from 290 nm to 380 nm and the mean transmittance shall be calculated as described in ANSI Z80.3.

4.4.2.6 High energy laser and optical density (class 3 and class 4)

4.4.2.6.1 General requirements for each laser wavelength. The optical density of the SPECS lens shall meet or exceed the requirements for a radiant exposure of 20 milliJoules (mJ) per square centimeter for Q-switched laser emissions having a pulse width of less than 40 nanoseconds (ns) and greater than 1 nanosecond. The exposure shall be made normal to the surface under test, and the beam shall be incident from the convex side of the spectacle lens at the center of the critical optical area. The diameter of the beam shall be 4 mm at the surface of the sample, and the spatial distribution of the beam shall be as uniform as possible.

4.4.2.6.2 Test set-up. The test set-up is shown schematically in Figure 1. It includes the following:

1. laser (ruby, Nd:YAG and frequency doubled Nd:YAG)
2. beam expander
3. beamsplitter
4. neutral density filter
5. 4 mm diameter aperture
6. sample holder
7. appropriate neutral density filters
8. narrow band transmittance filter
9. calibrated radiometer sensor
10. calibrated reference radiometer
11. readout device

The beam expander may be one that is commercially available or a simple arrangement of a negative lens to diverge the beam followed by a positive lens to re-collimate the beam. The expansion shall be such that the beam overfills the 4 mm diameter aperture for the purpose of selecting the central most uniform part of the beam.

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Neutral density filters are placed in the beam between the laser and the sample to adjust the energy so that the energy density incident on the sample is 20 mJ/cm^2. The area of the 4 mm diameter aperture is 0.126 cm^2. The total energy passing through the aperture and incident on the sample must then be 2.51 mJ to yield the required energy density.

Calibrated neutral density filters may be used as required between the sample and the detector to reduce the energy to a level that will not damage the detector. A convenient set up would include a filter having an OD of 4 which can be readily inserted and removed from the beam. The test then becomes a simple "go/no-go" procedure as follows: Note the energy reading at the output with the OD 4 filter in the beam with no sample. Remove the OD 4 filter and insert the sample and again note the energy reading. If the reading is higher with the sample than with the OD 4 filter, the OD of the sample is less than 4 and the sample fails. If the reading is lower with the sample than with the OD 4 filter, the OD of the sample is greater than 4 and the sample passes.

The beamsplitter and reference detector guarantee that the output energy of the laser is constant and correct from shot to shot. Radiometers are commercially available which include two inputs and which will automatically ratio one to the other and will also automatically calculate and display the average and standard deviation of a given number of shots.

4.4.2.6.3 Data collection and reduction. With suitable calibrated filters in place but no sample in the beam, an average energy shall be measured for ten laser shots. This average is designated as E_O. The sample shall then be placed in the beam at normal incidence at the specified locations. Calibrated neutral density filters between the sample and the detector may be removed from the beam as required to maintain a reading which is within the range of the detector. The average energy for ten shots shall again be measured and shall be designated as E_S. The optical density of the sample is given by

$$OD = -Log(E_S/E_O) + D$$

where D is the sum of the optical densities of the filters that were removed from the beam, if any.

4.4.2.6.4 Optical density at the ruby laser wavelength. The class 3 and class 4 SPECS lens shall be tested as specified in 4.4.2.6.1 through 4.4.2.6.3 where the laser used for this test shall have a wavelength of 694.3 nm.

4.4.2.6.5 Optical density at the neodymium laser wavelength(s). The class 3 and class 4 SPECS lens shall be tested as specified in 4.4.2.6.1 through 4.4.2.6.3 where the laser used for this test shall have a wavelength of 1064 nm. The class 4 lens shall also be tested with a frequency doubled neodymium laser having a wavelength of 532 nm.

4.4.2.6.6 First article testing. Some absorptive dyes used in the fabrication of SPECS lenses may saturate or temporarily bleach in the presence of the level of laser irradiance specified in 4.4.2.6.1. Compensation may be made by increasing the concentration of the dye to allow for saturation. An increased dye concentration implies a corresponding increase in the optical density when measured at a low irradiance. The level of compensation required is characteristic of the particular dye.

The first article testing shall be done by using a laser as specified in sections 4.4.2.6.1 through 4.4.2.6.5. In addition, as part of the first article test, the high energy laser test results shall be correlated with low energy optical density measurements made with either a spectrophotometer or densitometer.

The spectrophotometer or a suitably constructed densitometer must be capable of measuring the optical density directly in the required range or indirectly at a secondary wavelength. If the absorbance at the threat wavelength exceeds the range of the instrument, it is permissible to meas-

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ure the absorbance at another absorption band when absorbance at that band is also directly related to the dye concentration. Commercially available spectrophotometers measure to an absorbance of 4 in the visible. The measurement accuracy can be increased by placing a neutral density filter, typically OD = 2, in the reference beam of the spectrophotometer. The OD of the sample is then the indicated measured value plus the OD of the neutral density filter. A densitometer for use at the 1064 nm wavelength may be constructed by using a high intensity light source, narrow band pass filters (bandwidth less than 25 nm), a silicon detector and a picoammeter readout device.

4.4.2.6.7 Alternate quality conformance test method. Once the relationship between the measured OD for high energy laser testing and the measured OD for low energy spectrophotometer or densitometer measurements is established in the first article testing (section 4.4.2.6.6), the spectrophotometer or densitometer may then be used for routine quality conformance testing in place of the laser.

4.4.2.7 Luminous transmittance. The spectral transmittance shall be measured with the use of a spectrophotometer from 380 nm to 780 nm in increments of 10 nm or less. The photopic, scotopic and P43 transmittances shall be calculated according to the methods of 4.4.2.7.1, 4.4.2.7.2, 4.4.2.7.3, and 4.4.2.7.4.

4.4.2.7.1 Method of calculation. The average luminous transmittance T is given by the general relationship

$$T = \int_{380}^{780} (1/k)\ T(L)\, E(L)\, V(L)\, dL$$

where

$$k = \int_{380}^{780} E(L)\, V(L)\, dL$$

and

T(L) = spectral transmittance of material at wavelength L
E(L) = relative spectral irradiance of source
V(L) = luminous efficiency as a function of wavelength

The spectral transmittance of the sample shall be measured with a spectrophotometer and the integrals computed. A 2 nm increment for the integration is recommended, particularly if the source emission bands (e.g. that of the P43 phosphor) or the absorption/rejection bands are narrow. The calculations for photopic and scotopic transmittance may be done concurrently with the use of a computer or programmable calculator.

4.4.2.7.2 Photopic transmittance. Photopic luminous transmittance Tp (transmittance for the light adapted eye) is calculated by using for V(L) the photopic luminous efficiency values and the spectral irradiance function for CIE Illuminant C which are listed in Table IV.

SAMPLE – NOT FOR OFFICIAL USE

Table IV. Weighting Factors for Transmittance Calculations

	Luminous Efficiency		Source Distribution	
Wave- length in nm	V(L) Photopic	Scotopic	E(L) Ill C	P43
380	0	5.90	33.00	83
382	0	7.90	35.77	125
384	1	10.06	38.54	139
386	1	13.30	41.42	109
388	1	17.70	41.00	51
390	1	22.10	47.40	21
392	1	31.38	50.51	13
394	2	40.66	53.62	4
396	2	54.82	56.80	0
398	3	73.86	60.05	0
400	4	92.90	63.30	0
402	5	129.74	66.70	0
404	6	166.58	70.11	0
406	7	217.68	73.57	2
408	10	283.04	77.08	5
410	12	348.40	80.60	8
412	16	450.64	84.17	31
414	20	552.88	87.74	68
416	26	676.40	91.24	118
418	33	821.20	94.67	143
420	40	966.00	98.10	102
422	53	1154.00	101.18	66
424	66	1342.00	104.26	29
426	82	1548.40	107.12	10
428	99	1773.20	109.76	9
430	116	1998.00	112.40	7
432	137	2248.80	114.54	20
434	158	2499.60	116.68	33
436	180	2756.20	118.50	48
438	205	3018.60	120.00	66
440	230	3281.00	121.50	84
442	257	3541.00	122.28	57
444	284	3801.00	123.06	30
446	314	4054.80	123.56	14
448	347	4302.40	123.78	7
450	380	4550.00	124.00	0
452	420	4781.60	123.84	4
454	460	5013.20	123.68	7
456	504	5237.60	123.50	11
458	552	5454.80	123.30	16
460	600	5672.00	123.10	21
462	656	5885.20	123.18	13
464	711	6098.40	123.26	4
466	773	6315.20	123.40	1
468	842	6535.60	123.60	4
470	910	6756.00	123.80	6
472	996	6988.40	123.88	12
474	1083	7220.80	123.96	18

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TABLE IV. Weighting Factors for Transmittance Calculations. (cont'd)

	Luminous Efficiency		Source Distribution	
Wave- length in nm	V(L) Photopic	Scotopic	E(L) Ill C	P43
476	1179	7455.60	123.98	19
478	1284	7692.80	123.94	16
480	1390	7930.00	123.90	12
482	1511	8161.60	123.51	21
484	1632	8393.20	123.12	30
486	1771	8615.80	122.48	59
488	1925	8829.40	121.59	110
490	2080	9043.00	120.70	160
492	2282	9222.20	119.18	165
494	2485	9401.40	117.66	170
496	2715	9556.20	115.94	146
498	2972	9686.60	114.02	91
500	3230	9817.00	112.10	36
502	3567	9883.80	110.05	26
504	3904	9950.60	108.00	15
506	4264	9980.40	106.04	8
508	4647	9973.20	104.17	4
510	5030	9966.00	102.30	0
512	5451	9879.60	100.90	0
514	5872	9793.20	99.51	0
516	6286	9670.40	98.43	0
518	6693	9511.20	97.66	0
520	7100	9352.00	96.90	0
522	7433	9129.60	96.85	0
524	7766	8907.20	96.80	0
526	8070	8658.80	97.02	0
528	8345	8384.40	97.51	0
530	8620	8110.00	98.00	0
532	8832	7798.80	98.78	0
534	9043	7487.60	99.55	0
536	9227	7165.00	100.37	16
538	9384	6831.00	101.24	48
540	9540	6497.00	102.10	50
542	9626	6155.80	102.84	198
544	9645	5814.60	103.58	434
546	9750	5476.80	104.20	669
548	9832	5142.40	104.70	974
550	9891	4808.00	105.20	593
552	9950	4490.80	105.39	463
554	9971	4173.60	105.58	238
556	9992	3869.60	105.60	137
558	9992	3578.80	105.45	36
560	9971	3288.00	105.30	23
562	9950	3028.40	104.82	17
564	9884	2768.80	104.35	12
566	9819	2526.40	103.75	7
568	9733	2301.20	103.02	4

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TABLE IV. Weighting Factors for Transmittance Calculations. (cont'd)

	Luminous Efficiency		Source Distribution	
Wave- length in nm	V(L) Photopic	Scotopic	E(L) Ill C	P43
570	9520	2076.00	102.30	0
572	9374	1886.40	101.40	0
574	9227	1696.80	100.50	0
576	9063	1524.00	99.60	2
578	8882	1368.00	98.70	7
580	8700	1212.00	97.80	12
582	8485	1086.80	96.85	28
584	8270	961.60	95.90	61
586	8044	850.20	94.98	104
588	7807	752.60	94.09	160
590	7570	655.00	93.20	199
592	7322	580.60	92.41	153
594	7073	506.20	91.62	107
596	6821	441.70	90.92	69
598	6566	387.10	90.31	39
600	6310	332.50	89.70	9
602	6053	291.98	89.35	5
604	5796	251.46	89.00	2
606	5540	216.82	88.74	0
608	5285	188.06	88.57	0
610	5030	159.30	88.40	0
612	4783	139.10	88.32	3
614	4536	118.90	88.23	7
616	4292	101.78	88.17	10
618	4051	87.74	88.14	25
620	3810	73.70	88.10	59
622	3570	64.10	88.08	115
624	3330	54.50	88.07	136
626	3098	46.43	88.05	94
628	2874	39.89	88.02	39
630	2650	33.15	88.00	17
632	2458	28.95	87.94	10
634	2266	24.55	87.89	3
636	2086	20.87	7.85	1
638	1918	17.92	87.82	4
640	1750	14.97	87.80	6
642	1603	13.00	87.88	8
644	1456	11.03	87.95	9
646	1320	9.39	88.03	9
648	1195	8.08	88.12	7
650	1070	6.77	88.20	5
652	968	5.90	88.20	7
654	867	5.03	88.20	10
656	775	4.30	88.14	10
658	692	3.71	88.02	7
660	610	3.13	87.90	5
662	544	2.74	87.63	7

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TABLE IV. Weighting Factors for Transmittance Calculations. (cont'd)

	Luminous Efficiency		Source Distribution	
Wave- length in nm	V(L) Photopic	Scotopic	E(L) Ill C	P43
664	479	2.34	87.36	10
666	421	2.01	87.04	13
668	370	1.75	86.67	18
670	320	1.48	86.30	23
672	285	1.30	85.90	21
674	250	1.12	85.50	20
676	220	.96	85.04	18
678	195	.84	84.52	17
680	170	.72	84.00	16
682	150	.63	83.28	21
684	129	.54	82.57	16
686	112	.47	81.81	11
688	97	.41	81.00	6
690	82	.35	80.20	0
692	72	.31	79.42	0
694	62	.27	78.63	0
696	54	.24	77.85	0
698	47	.21	77.08	0
700	41	.18	76.30	0
702	36	.16	75.52	0
704	31	.14	74.75	0
706	27	.12	73.97	0
708	24	.11	73.18	0
710	21	.09	72.40	0
712	19	.08	71.60	0
714	16	.07	70.80	0
716	14	.06	69.98	0
718	12	.06	68.14	0
720	10	.05	68.30	0
722	9	.04	67.50	0
724	8	.04	66.70	0
726	7	.03	65.92	0
728	6	.03	65.16	0
730	5	.03	64.40	0
732	5	.02	63.76	0
734	4	.02	63.12	0
736	4	.02	62.54	0
738	3	.02	62.02	0
740	3	.01	61.50	0
742	3	.01	60.98	0
744	2	.01	60.46	0
746	2	.01	60.00	0
748	1	.00	59.60	0
750	1	.00	59.20	0
752	1	.00	58.92	0
754	1	.00	58.64	0
756	1	.00	58.42	0

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TABLE IV. Weighting Factors for Transmittance Calculations. (cont'd)

	Luminous Efficiency		Source Distribution	
Wave- length in nm	V(L) Photopic	Scotopic	E(L) Ill C	P43
758	1	.00	58.96	0
760	1	.00	58.10	0
762	1	.00	58.06	0
764	0	.00	58.02	0
766	0	.00	58.04	0
768	0	.00	58.12	0
770	0	.00	58.20	0
772	0	.00	34.92	0
774	0	.00	11.64	0
776	0	.00	.00	0
778	0	.00	.00	0
780	0	.00	.00	0

4.4.2.7.3 Scotopic transmittance. Scotopic luminous transmittance T_S (transmittance for the dark adapted eye) is calculated by using for V(L) the scotopic luminous efficiency values and the spectral irradiance function for CIE Illuminant C which are listed in Table IV.

4.4.2.7.4 P43 transmittance. The P43 transmittance T_{P43} (for displays using the P43 phosphor) is calculated by using for V(L) the photopic luminous efficiency values as listed in Table IV and the spectral irradiance function for the unfiltered P43 phosphor emission which is also listed in Table IV.

4.4.2.8 Luminous transmittance (class 2). The Luminous transmittance for class 2 lenses shall be measured as specified in ASTM D 1003.

4.4.2.9 Neutrality of class 2 test. The spectral transmittance of the class 2 lenses, as applicable, shall be measured by a spectrophotometer having a monochromator band width of 10nm or less and a reproduction of plus or minus 1 percent. The neutrality shall be calculated by the Judd Daylight Duplication Method. Table V shows an example for the calculation of spectral transmittance deviations.

TABLE V. Example for calculation of spectral transmittance deviations

	Band						
Average Wave length (nm)	T	n	wave length range	transmittance Tn	Percent deviation 100 (1-Tn/Tc)	Weight	Product
430	0.114						
440	0.118						
450	0.128						
460	0.137	1	430-490	0.133	14	5	70
470	0.142						
480	0.144						
490	0.145	2	460-520	0.145	7	10	70
500	0.147						
510	0.149						

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TABLE V. Example for calculation of spectral transmittance deviations (cont'd)

Average Wave length (nm)	Band T	Band n	wave length range	transmittance Tn	Percent deviation 100 (1-Tn/Tc)	Weight	Product
520	1.151	3	490-550	0.151	3	10	30
530	0.153						
540	0.154						
550	0.155	4	520-580	0.155	0	10	0
560	0.157						
570	0.158						
580	0.159	5	550-610	0.159	2	10	20
590	0.160						
600	0.160						
610	0.160	6	580-640	0.160	2	10	30
620	0.161						
630	0.161						
640	0.160	7	610-670	0.160	3	10	30
650	0.159						
660	0.159						
670	0.158	8	640-700	0.158	2	5	10
680	0.157						
690	0.156						
700	0.153	9	670-730	0,153	1	1	1
710	0.151						
720	0.149						
730	0.148						
					Totals	71	261

NOTES:
a. Spectral transmittance, Tc = 0.155.
b. T = Transmittance at 10nm intervals.
c. Tn = Average transmittance of 60nm band.
d. The average transmittance Tn for a given band is the average of the seven tabulated values within that band except that the first and last values are divided by 2 and the average computed by dividing the sum of the values by 6.
e. Average percentage deviation of spectral transmittance within nine spectral bands. (Average deviation - 261/71 = (3.7%)
f. This Table is based on illuminant "C".

4.4.2.10 Chromaticity of class 2 test. The chromaticity coordinates x and y shall be calculated from spectrophotometric data. Table VI illustrates a sample calculation.

TABLE VI. Sample computation table of coordinates

Wave length (nm)	$\bar{x}$	$\bar{y}$	$\bar{z}$	T	$x\bar{T}$	$y\bar{T}$	$z\bar{T}$
380	4		20	0.104	0	0	2
390	19		89	0.240	5	0	21
400	85	2	404	0.301	26	1	122
410	329	9	1,570	0.175	90	2	432

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TABLE VI. Sample computation table of coordinates(cont'd)

Wave length (nm)	$\bar{x}$	$\bar{y}$	$\bar{z}$	T	$\bar{x}T$	$\bar{y}T$	$\bar{z}T$
420	1,238	37	5,949	0.174	215	6	1,035
430	2,997	122	14,628	0.110	330	13	1,609
440	3,975	262	19,938	0.093	370	24	1,854
450	3,915	443	20,638	0.092	360	41	1,899
460	3,362	694	19,299	0.100	336	69	1,930
470	2,272	1,058	14,972	0.110	250	116	1,647
480	1,112	1,618	9,461	0.122	136	197	1,154
490	363	2,358	5,274	0.132	48	311	696
500	52	3,401	2,864	0.140	7	476	401
510	89	4,833	1,520	0.142	13	686	216
520	576	6,462	712	0.142	82	918	101
530	1,523	7,934	388	0.141	215	1,119	55
540	2,785	9,149	195	0.141	393	1,290	27
550	4,282	9,832	86	0.155	664	1,524	13
560	5,880	9,841	39	0.170	1,000	1,673	7
570	7,322	9,147	20	0.167	1,223	1,528	3
580	8,417	7,992	16	0.153	1,288	1,223	2
590	8,984	6,627	10	0.142	1,276	941	1
600	8,949	5,316	7	0.136	1,217	723	1
610	8,325	4,176	2	0.136	1,312	568	0
620	7,070	3,153	2	0.137	969	432	
630	5,309	2,190		0.137	727	300	
640	3,693	1,443		0.138	510	199	
650	2,349	886		0.150	352	133	
660	1,361	504		0.199	256	94	
670	708	259		0.270	191	70	
680	369	134		0.368	136	49	
690	171	62		0.475	81	29	
700	82	29		0.576	47	17	
710	39	14		0.620	24	9	
720	19	6		0.636	12	4	
730	8	3		0.643	5	2	
740	4	2		0.642	3	1	
750	2	1		0.632	1	1	
760	1	1		0.630	1	1	
770	1			0.600	1	0	
				Totals	13,992	14,790	13,228

NOTES: $\bar{X}$ $\bar{Y}$ $\bar{Z}$

a. $X = \Sigma xT$, $Y = \Sigma yT$, $Z = \Sigma zT$

b. Spectral transmittance, Tc = Y/1,000 = 14.8 percent

c. Chromaticity coordinates:

$x = X/(X + Y + Z) = 13,992/(13,992+14,790+13,228) = 0.3331$

$y = Y/(X + Y + Z) = 14,790/(13,992+14,790+13,228) = 0.3521$

d. Spectral transmittance, Tc, and chromaticity coordinates, x and y, for standard illuminant "C".

e. The symbol "T" represents the transmittance, the ratio of transmitted to homogeneous radiant flux.

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4.4.2.11 Haze. The haze shall be measured according to the method described in ASTM-D-1003.

4.4.3 Environmental tests

4.4.3.1 Chemical resistance. The surface shall be exposed to the specified chemicals for a 24 hour period. The chemical may be contained by sealing an O-ring to the surface using silicone grease. The O-ring shall be filled with the chemical and left for a 24 hour period. At the end of the test period the surface shall be cleaned and inspected for visible damage and optical distortion. In addition, for the class 3 and class 4 lenses, the luminous transmittance and the optical density at each of the laser wavelengths shall be measured to assure that the basic product function has not been compromised. The sample must still meet the requirements of 3.5.2.6, 3.5.2.7, 3.5.2.10, 3.5.2.10.1, 3.5.2.11, and 3.5.2.11.1.

4.4.3.2 Temperature. The sample shall be exposed for 72 hours at 160°F and 72 hours at -60°F, held to within ±3°F throughout the entire period. Following this exposure, the samples shall show no visible sign of distortion or discoloration, and the class 3 and class 4 SPECS lenses shall be tested for compliance with the luminous transmittance and optical density requirements of 3.5.2.6, 3.5.2.7, 3.5.2.10, 3.5.2.10.1, 3.5.2.11, and 3.5.2.11.1.

4.4.3.3 Solar radiation. The samples shall be placed in a solar simulator using a xenon arc lamp filtered with two borosilicate glass filters to simulate the spectral energy distribution of direct sunlight. The sample shall be placed at a suitable distance from the source and the source intensity adjusted so that the total integrated irradiance at the surface of the sample is 1120 Watts/m^2. The total exposure shall be three cycles. In each cycle the sample shall be exposed for 20 hours to the full intensity followed by a period of no exposure for 4 hours. The total exposure shall be 60 hours. At the end of this test, the samples shall show no visible sign of degradation or discoloration and the class 3 and class 4 SPECS lenses shall be tested for compliance with the optical density and luminous transmittance requirements as specified in 3.5.2.6, 3.5.2.7, 3.5.2.10, 3.5.2.10.1, 3.5.2.11, and 3.5.2.11.1.

4.4.3.4 Humidity. The samples shall be placed in a chamber which is capable of cycling the humidity and temperature according to Table VII. The samples shall be exposed to 10 complete cycles. At the end of this test the samples shall show no visible sign of degradation, and the class 3 and class 4 spectacles shall be tested for compliance with the optical density and luminous transmittance requirements as specified in 3.5.2.6, 3.5.2.7, 3.5.2.10, 3.5.2.10.1, 3.5.2.11, and 3.5.2.11.1.

Table VII. Relative Humidity and Temperature Versus Time

	Temperature		RH
Time	°F	°C	%
0000	95	35	63
0100	95	35	67
0200	94	34	72
0300	94	34	75
0400	93	34	77
0500	92	33	79
0600	95	33	80
0700	97	36	70
0800	104	40	54
0900	111	44	42

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	Temperature		RH
Time	°F	°C	%
1000	124	51	31
1100	135	57	24
1200	144	62	17
1300	151	66	16
1400	156	69	15
1500	160	71	14
1600	156	69	16
1700	151	66	18
1800	145	63	21
1900	136	58	29
2000	122	50	41
2100	105	41	53
2200	103	39	58
2300	99	37	62

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The SPECS are for use by military personnel for eye protection against ballistic fragments and laser radiation at 694.3 nm (ruby laser wavelength), at 1064 nm (neodymium laser wavelength) and at 532 nm (frequency doubled neodymium laser wavelength).

6.2 Acquisition Requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification
b. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2.1 and 2.3)
c. Spectacle size required: regular, large
d. Class of spectacles (see 1.2)
e. When lenses are procured separately, specify size, class
f. When first article is required (see 3.1, 4.2 and 6.5), the lot size and sample size shall be specified
g. Acceptance criteria required (see 6.7)

6.3 Government unique requirements. Whenever "(Government unique requirements)" is included in the title of a paragraph under "salient characteristics," it means that the requirement is something that is not normally offered to the commercial marketplace by the manufacturer.

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6.4 Possible sources of supply. For laser protective dyes.

Polaroid Corporation
2 Osborn Street
Cambridge, MA 02139

AO American Optical Corp.
14 Mechanic St.
Southbridge, MA 01550

Gentex Optics Inc.
P. O. Box 336
Carbondale, PA 18407

Epolin, Inc.
358-364 Adams Street
Newark, NJ 07105

Uvex Safety, LLC
10 Thurber Boulevard
Smithfield, RI 02917

6.5 First article. When a first article is required, it shall be inspected and approved under the appropriate provisions of FAR 52.209. The first article should be a pre-production sample. The contracting officer should specify the appropriate type of first article and the number of units to be furnished. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.6 Standard sample. For access to a standard sample of the instruction booklet, address the contracting activity issuing the invitation for bids.

6.7 Acceptance criteria. Acceptance criteria shall be as specified in the contract or purchase order.

6.8 Subject term (key word) listing

Eye
Fragmentation
Glasses
Shatterproof
Sun

6.9 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

MILITARY INTERESTS:
Custodians
Army - GL
Navy - NU
Air Force - 99

Review activities
Army - MD
Navy - AS
Air Force - 11, 31, 45, 82

CIVIL AGENCY COORDINATING ACTIVITY:
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Project 8465-0183

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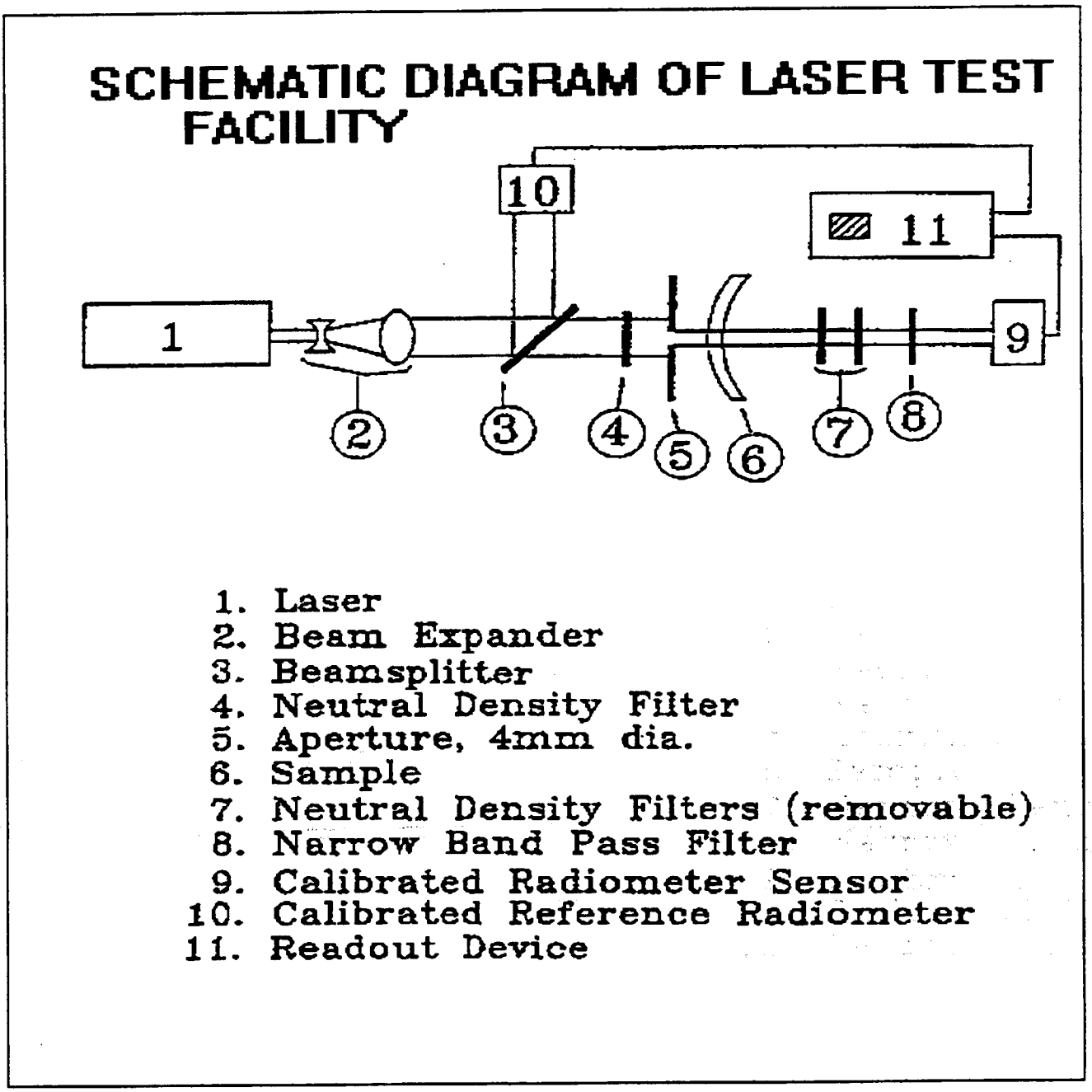

FIGURE 1. SPECTACLES, PROTECTIVE, LASER, BALLISTICS (BLIPS) SCHEMATIC DIAGRAM OF LASER TEST FACILITY

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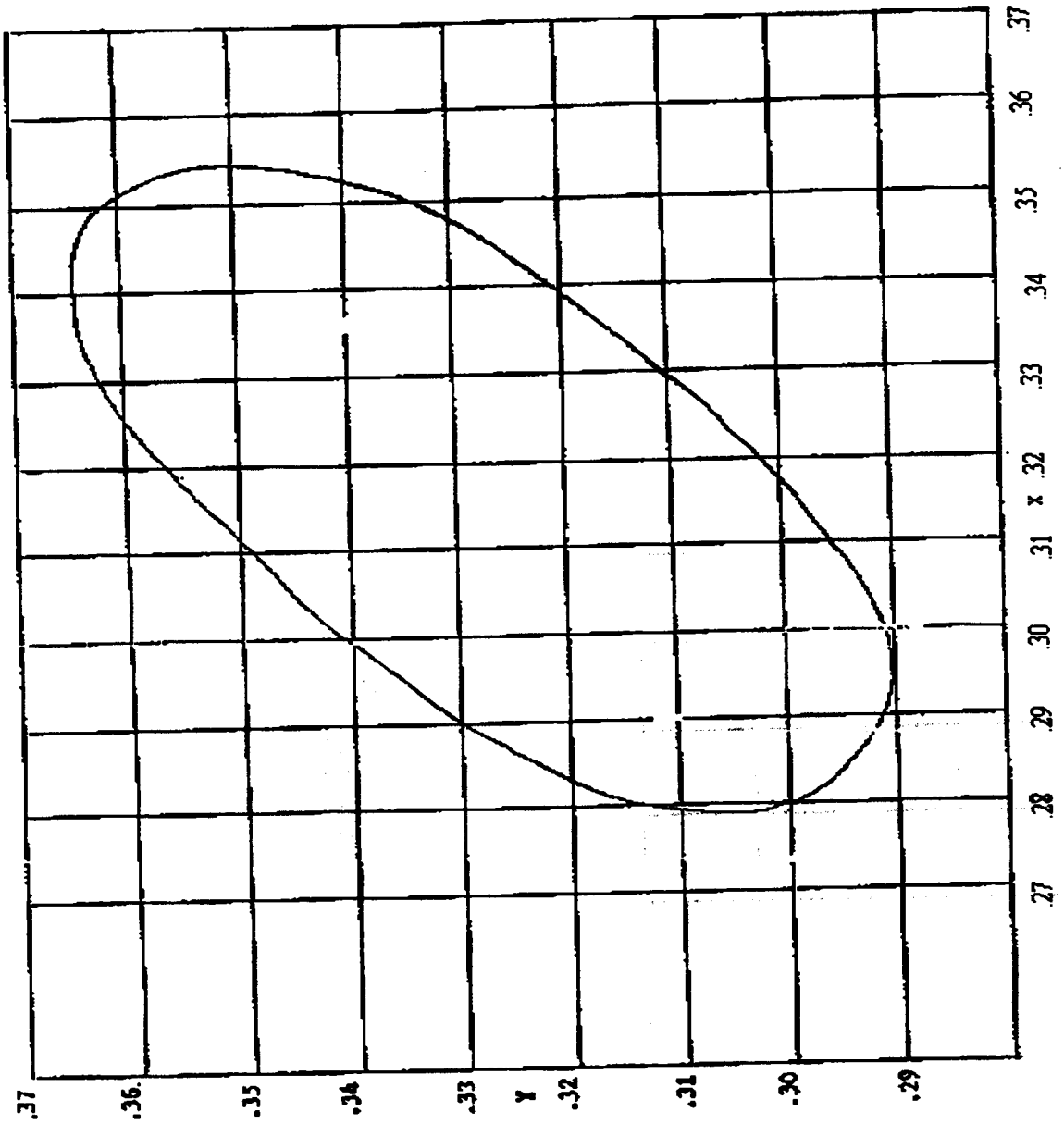

FIGURE 2. SPECTACLES, PROTECTIVE, LASER, BALLISTIC (BLPS)

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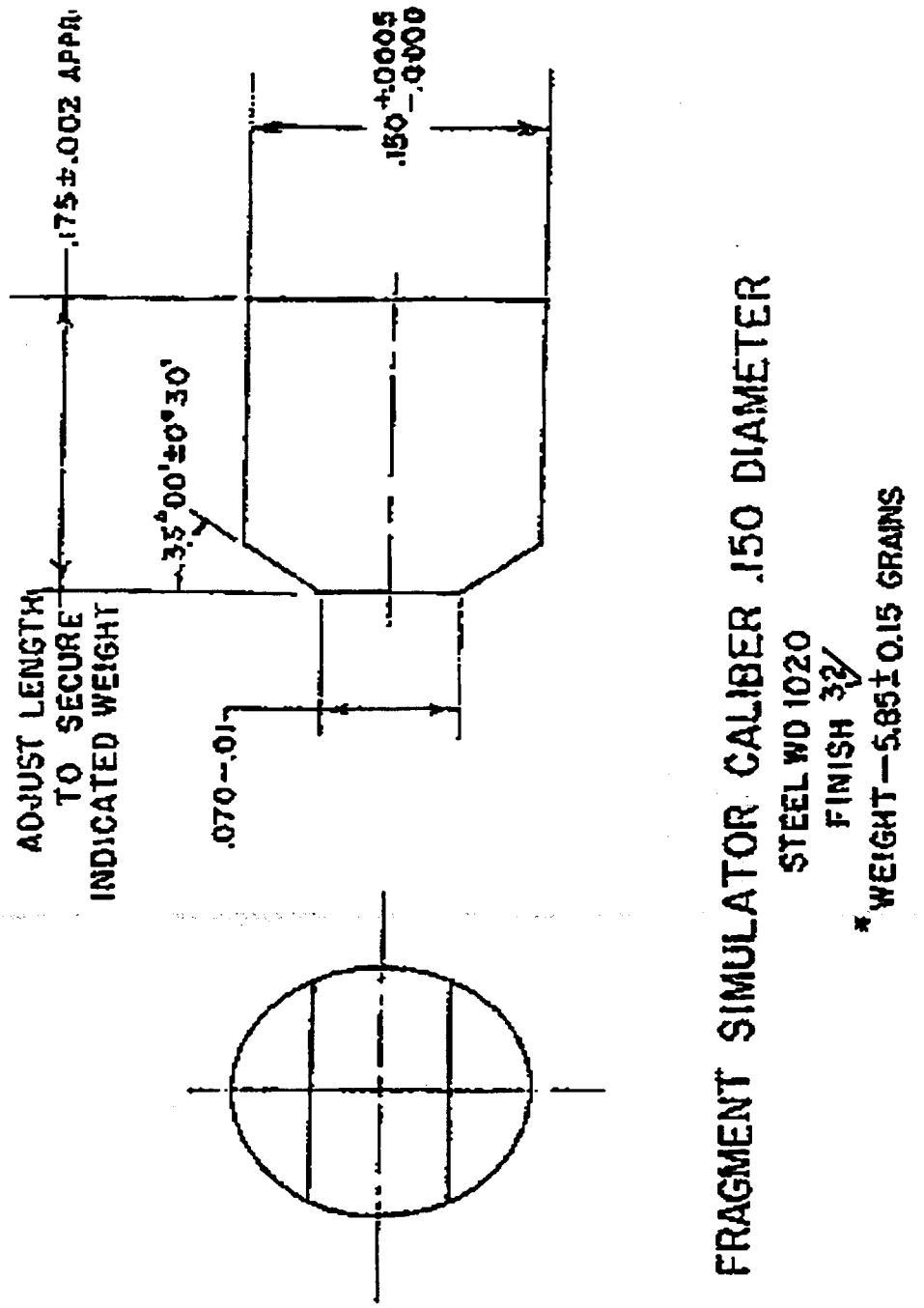

FIGURE 3. SPECTACLES, PROTECTIVE, LASER, BALLISTIC (BLPS)

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I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-PRF-31013	2. DOCUMENT DATE (YYMMDD) 25 April 1996

3. DOCUMENT TITLE
SPECTACLES, SPECIAL PROTECTIVE EYEWEAR CYLINDRICAL SYSTEM (SPECS)

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
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