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Superseding
MIL-L-25971A(ASG)
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MILITARY SPECIFICATION

# LIGHT, AIRPORT TRAFFIC CONTROL, SDU-4/U

This specification has been approved by the Department of the Air Force and by the Naval Air Systems Command

## 1. SCOPE.

1.1 This specification covers one type of airport traffic control light designated SDU-4/U.

## 2. APPLICABLE DOCUMENTS.

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

### SPECIFICATIONS

#### Federal

| | |
|---|---|
| W-C-596 | Connector, Plug, Electrical; Connector, Receptacle, Electrical; Plate, Wall, Electrical |

#### Military

| | |
|---|---|
| MIL-E-5558 | Enamel; Wrinkle-Finish, for Aircraft Use |
| MIL-C-5756 | Cable and Wire, Power, Electric, Portable |
| MIL-E-7851 | Enamel; Wrinkle-Finish, for Aircraft Use, Application of |
| MIL-C-7989 | Covers, Light-Transmitting, for Aeronautical Lights, General Specification for |
| MIL-F-14072 | Finishes for Ground Signal Equipment |
| MIL-E-17555 | Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery of |
| MIL-C-25050 | Colors, Aeronautical Lights and Lighting Equipment, General Requirements for |

### STANDARDS

#### Military

| | |
|---|---|
| MIL-STD-100 | Engineering Drawing Practices |
| MIL-STD-105 | Sampling Procedures and Tables for Inspection by Attributes |

| | |
|---|---|
| MIL-STD-130 | Identification Marking of US Military Property |
| MIL-STD-143 | Specifications and Standards; Order of Precedence for the Selection of |
| MIL-STD-810 | Environmental Test Methods for Aerospace and Ground Equipment |
| MS3102 | Connector, Receptacle, Electrical, Box Mounting |
| MS33586 | Metals, Definition of Dissimilar |

(Copies of documents required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification. Unless otherwise indicated the issue in effect on date of invitation for bids or request for proposal shall apply:

Federal Aviation Administration

| | |
|---|---|
| FAA E 2214 | Gun, Signal Light, Portable |
| Drawings D-5056-1 through -12 | Portable Signal Light Gun, Type W-1 |

(Application for copies should be addressed to the Federal Aviation Administration, Attn: RD-420, Washington, D.C. 20590.)

3. REQUIREMENTS.

3.1 Preproduction. This specification makes provision for preproduction inspection (see 4.3).

3.2 Data. Unless otherwise specified in the contract or order, no data (other than reports and drawings accompanying preproduction samples) are required by this specification or any of the documents referenced in section 2 (see 6.2).

3.3 Selection of specifications and standards. Specifications and standards for necesary commodities and services not specified herein shall be selected in accordance with MIL-STD-143, except as provided in 3.3.1.

3.3.1 Use of commercial parts. Bolts, nuts, washers, cotter pins, lock rings, and similar fastening devices used for assembly, may be selected from commercial sources, provided military or other standard parts are not specifically called out by this specification or associated standards. If such commercial parts are used, they shall possess suitable properties and shall be replaceable by Military Standard (MS) parts without alteration, and provided the corresponding MS part numbers are referenced in the parts list, and, if practicable, on the contractor's drawings.

3.4 Materials.

3.4.1 Fungus-proof materials. Materials that are nutrients for fungi shall not be used where it is practical to avoid them. When used and not hermetically sealed, they shall be treated with a fungicidal agent acceptable to the procuring activity. However, if they will be used in a hermetically sealed enclosure, fungicidal treatment will not be necessary.

3.4.2 Metals. The metals shall be as specified herein. Unless otherwise specified, metals shall be of the corrosion-resistant type or suitably treated to resist corrosion due to fuels, salt spray, atmospheric conditions or chemical reaction when installed. The use of dissimilar metals shall be avoided where practicable. When used, dissimlar metals shall be in accordance with MS33586.

3.5 Design and construction. The light shall be designed and constructed in accordance with FAA Drawing D-5056, and shall provide equivalent performance to the light specified in FAA Specification E-2214. The light shall be designed to be held, aimed, and operated with one hand.

3.5.1 The light shall be constructed to withstand the strains, jars, vibrations, and other conditions incident to shipping, storage, installation, and service. The light shall be so constructed that any necessary repairs or maintenance can be readily made by the personnel of operating units or overhaul bases without the use of special tools.

3.6 Components. The light shall consist of the following major components:

| Item No. | Quantity | Description | See requirement |
|---|---|---|---|
| 1 | 1 | Housing | 3.6.1.1 |
| 2 | 1 | Principal reflector | 3.6.1.2 |
| 3 | 1 | Auxiliary reflector | 3.6.1.3 |
| 4 | 1 | Lamp | 3.6.1.4 |
| 5 | 2 | Colored filters | 3.6.1.5 |
| 6 | 1 | Cover | 3.6.1.6 |
| 7 | 1 | Color indicator | 3.6.1.7 |
| 8 | 1 | Sighting device | 3.6.1.8 |
| 9 | 1 | Handle | 3.6.1.9 |
| 10 | 1 | Hanger | 3.6.1.11 |
| 11 | 1 | Transformer | 3.6.1.12 |
| 12 | 1 | Primary lead | 3.6.1.12.2 |
| 13 | 1 | Secondary lead | 3.6.1.12.3 |
| 14 | 1 | Auxiliary lead | 3.6.1.13 |

3.6.1 Details of components.

3.6.1.1 Housing. The optical system shall be enclosed in a dustproof housing fabricated of aluminum. The housing shall be rigid and strong enough to protect and support components mounted on or within the housing. Housing dimensions shall be as specified in 3.9.

3.6.1.2 Principal reflector. The principal reflector shall be a parabolic precision mirror of silver-backed glass. The silver coating shall be protected by backing material and coats of paint. The reflector shall be so mounted that it is not subjected to undue strains and is protected from contact with metal.

3.6.1.3 Auxiliary reflector. A metal spherical reflector shall be so mounted in the light that the focus of the spherical reflector falls on the axis of the lamp. The overall diameter and the position of the spherical reflector and mounting shall be such that no direct light from the lamp is emitted. The spherical reflector shall be no larger than necessary to prevent emission of direct light.

3.6.1.4 Lamp. The light shall use a 50 candelas, 6-8V, RP-11 clear bulb, C-6 filament, 200-hour life, 7/8-inch light center length, 2-1/4 inch maximum overall length, single-contact prefocused base lamp, American Standards Association Trade No. 1501. The lamp shall be accurately positioned at the focus of the principal reflector and securely held in the light by a socket of the prefocus type. Unless otherwise specified, the lamp shall be installed and furnished with the light.

3.6.1.5 Colored filters. The light shall be provided with one aviation red and one aviation green color filter. The filters shall be of class B, heat-resistant glass in accordance with MIL-C-7989. The color transmission of the filters shall be type I, grade A in accordance with MIL-C-25050. The filters shall be correctly positioned and firmly held in the light by a holder designed to minimize breakage of the filters. When either filter is positioned between the lamp and principal reflector, all light from the lamp incident upon the reflector shall pass through the filter. There shall be no direct light from the lamp.

3.6.1.6 Cover. A clear cover shall be provided at the front of the housing. The cover shall be class D plastic in accordance with MIL-C-7989. The color and transmission of the cover shall be type I, grade D, aviation white ware in accordance with MIL-C-25050.

3.6.1.6.1 The cover shall be firmly held in a holder designed to fit on the front of the housing. This holder and cover assembly shall allow quick removal of the assembly without the use of tools.

3.6.1.7 Color indicator. A plastic prism device shall be provided at the front of the light to redirect a small part of the main beam to the operator's eye. The color indicator shall be of sufficient brightness that an operator with normal vision can distinguish the color of the filter in use in bright daylight. A dimming method shall be provided to regulate this color-indicating beam when the redirected light is too bright for comfortable use at night.

3.6.1.8 Sighting device. A sighting device with front and rear sights shall be provided along the top of the light so that the light can be properly aimed. The centerline of the sight shall be parallel to the optical axis of the light.

3.6.1.9 Handle. The light shall be provided with a handle of such design that the light can be held, aimed, and operated by one hand. The handle and associated controls shall be equal to those defined by FAA Specification E-2214 and FAA Drawings D-5056-1 through -12, except as specified in 3.9. The following controls shall be provided:

(a) A trigger button for turning the light on and flashing it.
(b) A trigger level for selecting and positioning the red or green color filter. The red filter shall be properly positioned to provide a red signal beam when the trigger lever is in its normal, unpressed position.
(c) A trigger lever for selecting a clear signal.

3.6.1.9.1 A handle with components different from those defined above will be considered satisfactory if performance is equivalent and the design is approved by the acitivity responsible for qualification.

3.6.1.10 Receptacle. An MS3102A-10SL-4P receptacle shall be provided on the side of the light for attaching the power lead.

3.6.1.11 Hanger. A yoke-type hanger or other means shall be provided so that the light can be suspended from an overhead wire. The axis of the housing shall be essentially parallel to the ground when the light is hanging from the overhead wire. If a yoke-type hanger or similar device is used, it shall be readily removable from the light.

3.6.1.12 Transformer. A two-coil isolating transformer shall be provided as a separate unit in order that the light can be operated from a commercial 60-cycle, 120V source. The transformer shall have a minimum rating of 50 va and shall be weatherproof. With 120V, 60-cycle current applied to the primary, and with the specified lamp and lead installed, the transformer shall supply a voltage of 7 +0.1V at the lamp. The transformer case shall have at least two holes for 1/4-inch mounting bolts.

3.6.1.12.1 Fuse. A small fuse, enclosed so that it is waterproof, shall be provided in the transformer secondary circuit. The fuse shall be rated at 32V, 10 amp. The fuse shall be easily accessible for changing.

3.6.1.12.2 Primary lead. The primary lead of the transformer shall be 3 feet in length and shall be permanently connected to the transformer. The cable in the lead shall be two-conductor, 16 AWG in accordance with MIL-C-5765. The lead shall terminate in a two-pole, parallel blade, attachment plug cap in accordance with W-C-596.

3.6.1.12.3 Secondary lead. The secondary lead from the transformer to the light shall be 20 feet in length, permanently connected to the transformer and shall terminate in a female angle plug which matches the receptacle on the light. The cable in the lead shall be two-conductor, 16 AWG in accordance with MIL-C-5756.

3.6.1.13 Auxiliary lead. An auxiliary lead, 10 feet in length, shall be furnished for emergency operation of the light from a battery. One end of this lead shall terminate in a female angle plug which matches the receptacle on the light. At the other end, the cable sheath shall be removed freeing a 12-inch length of the two insulated conductors. Each conductor shall terminate in a spring clip capable of being connected to the terminals of a storage battery. The cable in the lead shall be two-conductor, 16 AWG in accordance with MIL-C-5756.

3.6.1.14 Optical. The optical system shall be of the fixed, prefocus type requiring no focusing by personnel of the operating units. Provisions for making adjustments during manufacture may be used if the adjustments are rigidly locked in place and will not be disturbed during routine maintenance. All components of the optical system shall be properly braced and supported to prevent their getting out of alignment.

3.6.1.15 Wiring. The light shall be completely wired and ready for operation upon attachment of the power leads.

3.7 Performance.

3.7.1 Operation. When tested as specified in 4.5.2, the light shall operate satisfactorily, all controls shall work freely, and the color filters and color indicator shall be positioned correctly. Any sticking, jamming, or malfunction shall be cause for rejection.

3.7.2 Sights. When tested as specifed in 4.5.3, the axis of the sight shall be no more than 1 foot from the center of the target when the target is at 400 feet, or the equivalent of 1 foot in 400 feet when the target is at another distance.

3.7.3 Focus. When tested as specified in 4.5.4, the center of the image as shown on figure 1 shall have the same spacing as the holes in the screen.

3.7.4 Photometry. When tested as specified in 4.5.5, the signal beam emitted from the light shall be of a circular cross section. The spread of the beam in any plane through the axis shall be not less than 1/2 degree at 180,000 candelas when the specified lamp is operated at 90 spherical candelas without a color filter but with the clear cover in place. The spread of the beam shall not exceed 2 degrees at 50,000 candelas. The filter colors shall meet the requirements of 3.6.1.5.

3.7.5 High temperature. When tested as specified in 4.5.6.1, there shall be no evidence of damage and the light shall operate satisfactorily at the conclusion of the test.

3.7.6 Low temperature. When tested as specified in 4.5.6.2, there shall be no evidence of damage and the light shall operate satisfactorily at the conclusion of the test.

3.7.7 Humidity. When tested as specified in 4.5.6.3, there shall be no evidence of damage and the light shall operate satisfactorily at the conclusion of the test.

3.7.8 Sand and dust. When tested as specified in 4.5.6.4, there shall be no evidence of damage and the light shall operate satisfactorily at the conclusion of the test.

3.7.9 Transformer temperature rise. When tested as specified in 4.5.7, the temperature rise shall not exceed 65° C, and there shall be no damage to the transformer.

3.7.10 Transformer individual. When tested as specified in 4.5.8, the insulation resistance shall be not less than 30 megohms, and the output voltage shall be 7 $\pm$0.1V.

3.8 Interchangeability. All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable. The drawing number requirements of MIL-STD-100 shall govern the changes in the manufacturer's part numbers.

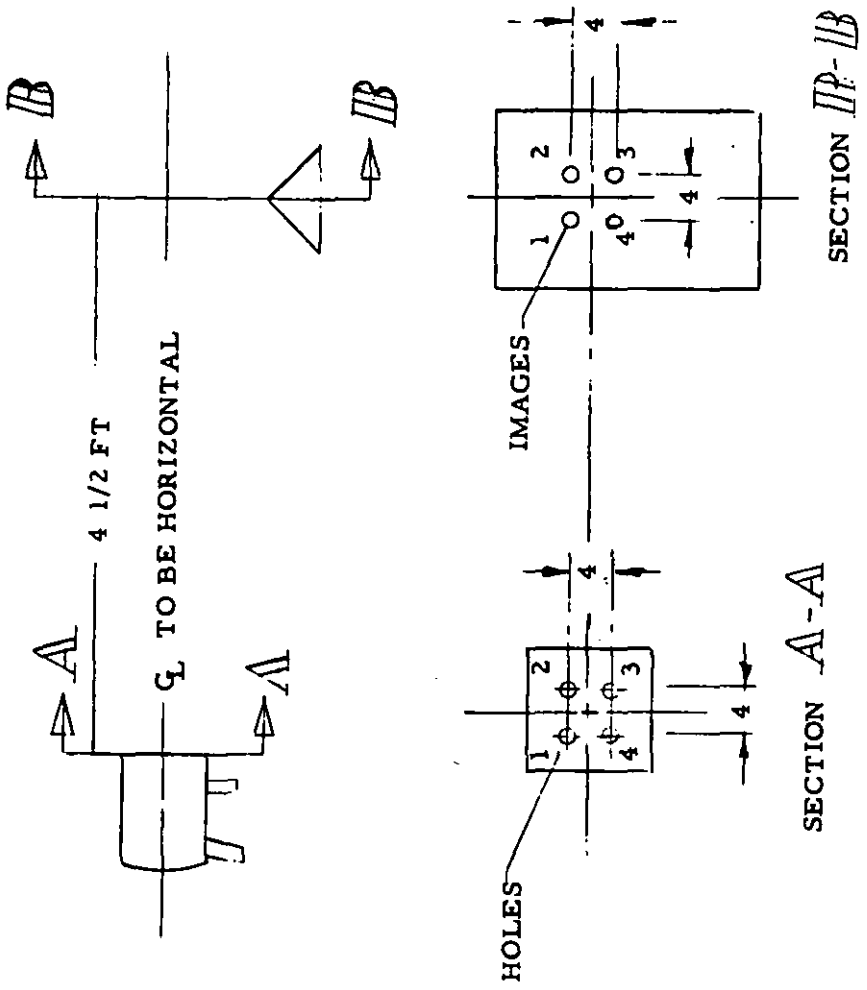


FIGURE 1. Focus test

3.9 Dimensions. The overall length of the housing shall not exceed 15 inches and the diameter shall not exceed 9 inches. The overall height, from top of the housing to the bottom of the pistol grip, shall not exceed 16-1/2 inches.

3.10 Weight. The weight of the light, without leads and transformer, shall not exceed 8 pounds.

3.11 Finishes and protective coatings.

3.11.1 Unless fabricated from corrosion-resistant material, all metal parts shall be protected against corrosion with a type II finish conforming to MIL-F-14072. The following finishes shall be provided.

3.11.2 Housing exterior. The exterior surface of the housing shall be finished with enamel conforming to MIL-E-5558, type I, color No. 515 gloss black, and applied in accordance with MIL-E-7851.

3.11.3 Housing, interior and supporting parts. The interior area of the housing and metal parts supporting the lamp and auxiliary reflector shall be finished with lusterless black enamel conforming to film A, designation B, type II of MIL-F-14072.

3.12 Operation markings. An instruction plate shall be permanently attached to the outside of the housing. Brief instructions on the lamp to be used, method of changing color of the signal light, method of aiming, etc, shall be permanently and legibly printed on the plate.

3.13 Identification of product. Equipment, assemblies, and parts shall be marked for identification in accordance with MIL-STD-130.

3.14 Workmanship. The light assembly, including all parts and accessories, shall be fabricated and finished in a workmanlike manner. Particular attention shall be given to freedom from blemishes, defects, burrs, and sharp edges; accuracy of dimensions, radii of fillets, and marking of parts and assemblies; thoroughness of soldering, welding, brazing, painting, wiring, and riveting; alignment of parts and tightness of assembly screws and bolts, etc.

3.15 Cleaning. The light assembly shall be thoroughly cleaned and loose, spattered, or excess solder, metal chips, and other foreign material removed during and after final asembly.

4. QUALITY ASSURANCE PROVISIONS.

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Classification of inspections. The examination and testing of the light shall be classified as:

| | |
|---|---|
| (a) Preproduction inspection | (4.3) |
| (b) Quality conformance inspection | (4.4) |

4.3 Preproduction inspection.

4.3.1 Preproduction sample. One sample unit shall be fabricated using the same components, materials, and production processes as will be used in normal production.

4.3.2 Tests. Preproduction inspection shall consist of all the examinations and tests specified in 4.5.

4.3.3 Test report. Upon completion of the preproduction sample inspection a test report shall be prepared in accordance with MIL-STD-831 and three complete copies of the report furnished to the procuring activity.

4.4 Quality conformance inspection. Quality conformance inspection shall consist of individual and sampling tests.

4.4.1 Individual tests. Each light shall be subjected to examination of product, operation, sights, focus, and transformer individual tests.

4.4.2 Sampling tests.

4.4.2.1 Lot. The lot definition, formation, and size shall be in accordance with MIL-STD-105.

4.4.2.2 Sampling plan. One light shall be selected at random from each lot of 100 or fraction thereof produced and subjected to the photometric test (4.5.5). The transformer component shall be subjected to the transformer temperature rise test (4.5.7).

4.5 Inspection methods.

4.5.1 Examination of product. The light shall be inspected to determine compliance with the requirements specified herein with respect to material workmanship, and marking.

4.5.2 Operation. The light shall be operated to determine that all controls work properly and the color filters and color indicator are positioned correctly.

4.5.3 Sights. The accuracy of the sighting device of each light shall be checked by centering the light beam upon a 3 by 3 foot target not less than 400 feet from the light, or any other combination of target and distance which presents the same angular relationship between the target and the light, and observing the alignment of the sights.

4.5.4 Focus. Each light shall be tested to determine the accuracy of the focusing of the parabolic and spherical reflectors. A plate with four holes, as shown on figure 1, shall be placed over the end of the light, and a blank screen shall be placed 4-1/2 feet from the plate. If the focusing is correct, the images as shown on figure 1 shall have the same spacing as the holes in the plate. At each point on the screen, two images shall be superimposed, one of which is caused by the spherical reflector and the other by the parabolic reflector. If the two sets of images are not superimposed with the correct spacing, the focusing is incorrect and the light shall be rejected.

4.5.5 Photometry. The light shall be operated to determine photometric compliance with light distribution requirements of 3.7.4 and color and filter requirements of 3.6.1.5.

4.5.6 Environmental. The light will be subjected to tests in accordance with the following specified procedures of MIL-STD-810 to determine proper operation and freedom from adverse effects resulting from environmental exposure.

4.5.6.1 High temperatures. The light shall be subjected to high temperature test Method 501, Procedure II, except at a temperature of 55° ±2° C for 4 hours. Controls shall be operated at this temperature to determine that there is no binding of parts or other malfunctioning.

4.5.6.2 Low temperature. The light shall be subjected to low temperature test Method 502, Procedure I for 12 hours, followed immediately by operation of controls.

4.5.6.3 Humidity. The light shall be subjected to humidity test Method 507, Procedure I, except that the 6-hour high temperature phase shall be conducted at 40° C and the relative humidity shall be held at 100 percent during the 6-hour period.

4.5.6.4 Sand and dust. The light shall be subjected to sand and dust test Method 510, Procedure I.

4.5.7 Transformer temperature rise. When subjected to a heat rise test, conducted by connecting the primary to a 120-volt, 60-cps power source and loading the secondary with a resistive load drawing 7.0 ±0.1 amperes current, the temperature rise after 1 hour continuous operation, determined by the resistance method, shall not exceed the requirement as specified in 3.7.9.

4.5.8 Transformer individual. The secondary output voltage at the lamp shall be checked to determine that it is within the tolerance specified in 3.7.10. The dielectric strength of the transformer shall be tested by applying a potential of 1,000V rms, 60 cycles for 1 minute between windings and between each winding and core, and measuring the insulation resistance.

4.5.9 Inspection for delivery. The lights shall be inspected to determine that preservation, packaging, packing, and marking are in accordance with section 5.

5. PREPARATION FOR DELIVERY.

5.1 Preservation, packaging, packing, and marking. All items of the equipment shall be preserved, packaged, packed, and marked in accordance with MIL-E-17555 for the level of shipment specified in the contract or order (see 6.2).

6 NOTES.

6.1 Intended use. The lights are intended to be used in permanent or mobile air-traffic control towers to control air traffic in the event radio transmission is not available.

6.2 Ordering data. Procurement documents should specify:

(a) Title, number, and date of this specification.
(b) Data requirements (see 3.2).
(c) Preproduction requirements (see 4.3).
(d) Level of preservation, packaging, packing, and marking (see 5.1).

Custodians:
Navy - AS
Air Force - 11

Reviewer activities:
Navy - AS
Air Force - 11

Preparing activity:
Air Force - 11

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DOCUMENT IDENTIFIER *(Number)* AND TITLE

MIL-B-15228F - BED, BUNK, ROUND TUBE,SINGLE AND DOUBLE-DECK

NAME OF ORGANIZATION AND ADDRESS OF SUBMITTER

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C. REASON FOR RECOMMENDED CHANGE(S)

2. REMARKS

SUBMITTED BY *(Printed or typed name and address — Optional)*

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EDITION OF 1 JAN 72 WILL BE USED UNTIL EXHAUSTED.