# AEROSPACE STANDARD

| AS50571™ | REV. C |
|---|---|

Issued 1999-04
Revised 2016-03
Stabilized 2025-02

Superseding AS50571B

## Lights, Instrument, Individual, General Specification For

RATIONALE

AS50571C is being stabilized as the individual lamps are obsolete. Last change in 2016 was to update the wire specification.

STABILIZED NOTICE

This document has been declared “STABILIZED” by SAE A-20A Crew Station Lighting Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.





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## 1. SCOPE

This specification covers the general requirements for red and white individual instrument lights. This document has been streamlined. Appendix A to MIL-L-5057F lists those documents required for MIL-L-5057F acquisition and is a mandatory part of MIL-L-5057F. Those documents listed in Appendix A have the same status as those referenced directly in MIL-L-5057F (first tier documents). All other documents, referenced through tiering, may be used as guidance and information to supplement MIL-L-5057F. This document's scope is limited to lamp source designs solely. Furthermore, the use of red lighting should not be considered for new design and included within this document to support requirements for existing military aircraft that still operate with this system of lighting.

### 1.1 Classification

The lights shall be suitable for clamp- or flange-mounted instruments or for polysign indicators as specified. The lights shall be furnished in the MS part numbers listed on the standard or for qualified lights which do not conform to any standard, the manufacturer's part numbers listed on the manufacturer's drawing (see 6.2).

## 2. APPLICABLE DOCUMENTS

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and 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.

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

MILITARY SPECIFICATIONS

| | |
|---|---|
| MIL-I-631 | Insulation, Electrical, Synthetic-Resin Composition, Nonrigid |
| MIL-C-6390 | Clamps and Instruments, Aircraft, Installation of |
| MIL-DTL-6839 | Indicator, Symbol Indicating, Landing Gear, Position |
| MIL-DTL-6363/8 | Lamps, Incandescent Aircraft Service, Single Contact, Midget Flanged Base T-1 ¾ Bulb |
| NASM6818 | Clamp, Instrument, Mounting, Aircraft |

STANDARDS

Federal

| | |
|---|---|
| FED-STD-595 | Colors |

Military

| | |
|---|---|
| MIL-STD-1916 | DOD Preferred Methods for Acceptance of Product |
| MIL-STD-129 | Marking for Shipment and Storage |
| MIL-STD-130 | Identification Marking of U.S. Military Property |
| MIL-STD-810 | Environmental Engineering Considerations and Laboratory Tests |
| MIL-STD-2073-1D | Standard Practice for Military Packaging |
| NASM9006 | Recesses - Cross, Low Torque Drive, Dimensions and Gage Dimensions for |
| MS 33545 | Case, Instrument, 5 x 5-1/4, Standard Dimensions for |
| MS 33638 | Cases, Instrument, Flange-Mounted, Aircraft |
| MS 33639 | Cases, Instrument, Clamp-Mounted, Aircraft |

(Copies of specifications, standards, drawings, and publications required by contractors 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 document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

2.2.1 Consolidated Classification Committee

Available from the Consolidated Classification Committee, 202 Chicago Union Station, Chicago, IL 60610.

Uniform Freight Classification Rules

2.2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM D3951 Packaging, Commercial

ASTM D6251 Standard Specification for Wood-Cleated Panelboard Shipping Boxes

2.2.3 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AS25050 Color, Aeronautical Lights and Lighting Equipment, General Requirements For

3. REQUIREMENTS

3.1 First Article

Unless otherwise specified, the lights furnished under this specification shall be a product which has been inspected and has passed first article inspection specified herein (see 4.3 and 6.3).

3.2 Precedence

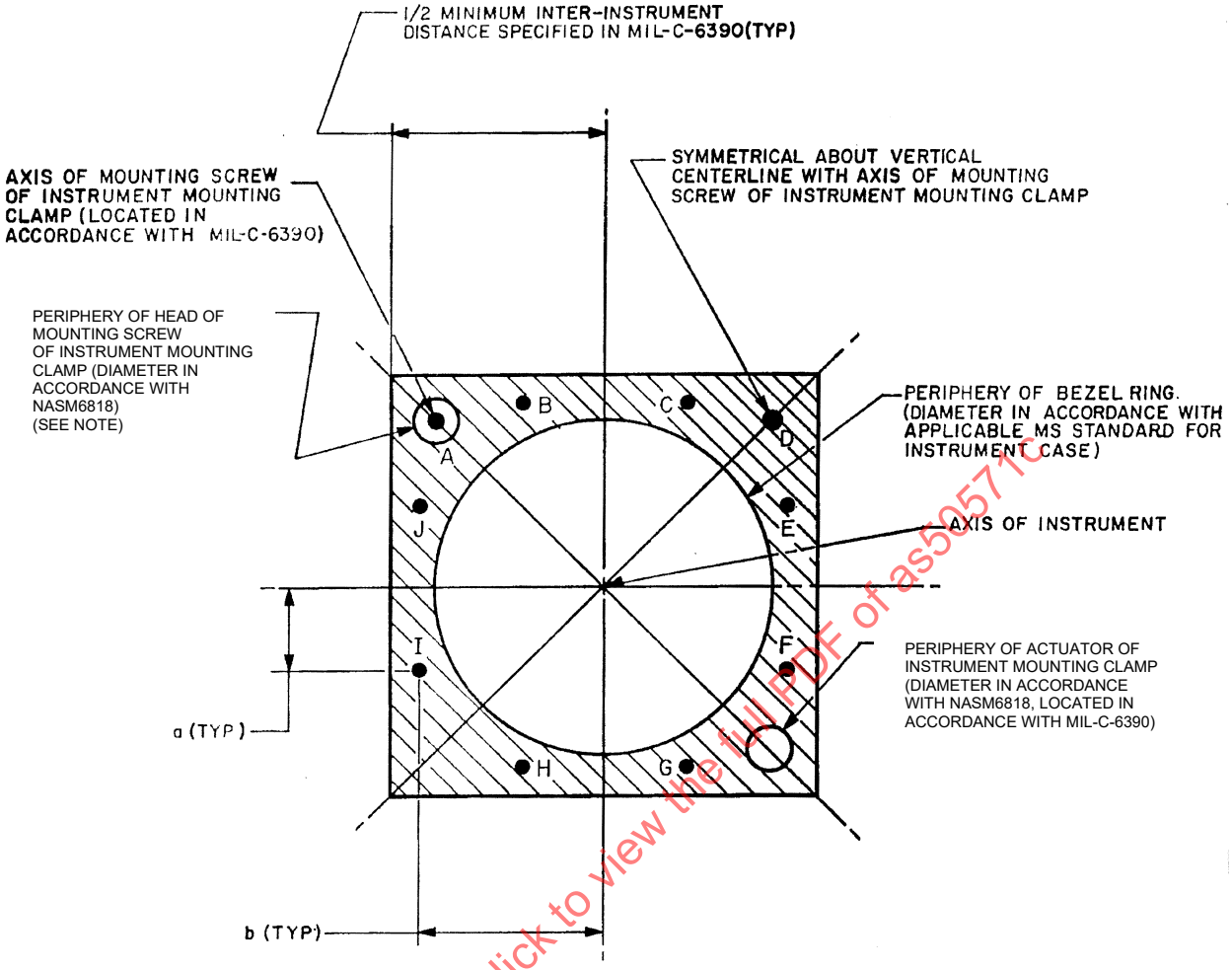
When the requirements of this specification and the applicable MS standard are in conflict, the requirements of the MS standard shall apply.

3.3 Design and Construction

Lights shall conform to the MS standard or, for qualified lights which do not conform to any standard, to the manufacturer's drawing. Lights for clamp-mounted instruments shall be contained within the outline shown in Figure 1. Lights for flange-mounted instruments shall be contained within the circumscribing square of the mounting flange of the instrument. Lights for polysign indicators shall be contained within the outline shown in Figure 2. No part of any light shall be more than 0.875 inch forward (away from the instrument panel) from the extreme front surface of the instrument case, exclusive of knobs, pushbuttons, etc., nor contained within a right truncated circular cone, the axis of which is the axis of the case of the instrument, the periphery of the truncated end of which is the periphery of the aperture of the case of the instrument, and the side of which makes an angle of 30 degrees with its axis. Lights shall not interfere with operation of any adjusting knobs or screws on the instrument case.

3.3.1 Mounting

The light shall be mountable on an instrument panel of any thickness between 0.060 and 0.190 inch inclusive. Lights for clamp-mounted instruments and polysign indicators shall be mounted by means of 1 or 2 circular holes, each not more than 0.260 inch in diameter in the instrument panel in the locations indicated for capital letters in Figures 1 and 2 as applicable. Lights for flange-mounted instruments shall be mounted by means of 1 or more of the mounting screws of the instrument, or by means of equivalent devices installed through the mounting holes of the instrument which are part of, or are furnished with the light, which shall serve to mount the instrument as well as the light.




DIMENSIONS IN INCHES. TOLERANCES ± .016.

LIGHT(S) SHALL BE CONTAINED IN SHADED REGION.

NOTE: IF THE LIGHT IS NOT MOUNTED IN THE MOUNTING LUG OF THE INSTRUMENT MOUNTING CLAMP OR BY MEANS OF A SCREW OR OTHER DEVICE SCREWED INTO THE MOUNTING LUG OF THE INSTRUMENT MOUNTING CLAMP, NO PART OF THE LIGHT SHALL BE CONTAINED WITHIN THE PERIPHERY OF THE HEAD OF THE MOUNTING SCREW OF THE INSTRUMENT MOUNTING CLAMP.

| INSTRUMENT SIZE | a | b |
|---|---|---|
| 1 - INCH | .400 | .500 |
| 1½- INCH | .594 | .766 |
| 2 - INCH | . 62 | 1.062 |
| 3 - INCH | 1.047 | 1.500 |



***Figure 1 - Dimensions and mounting of lights for clamp-mounted instruments***

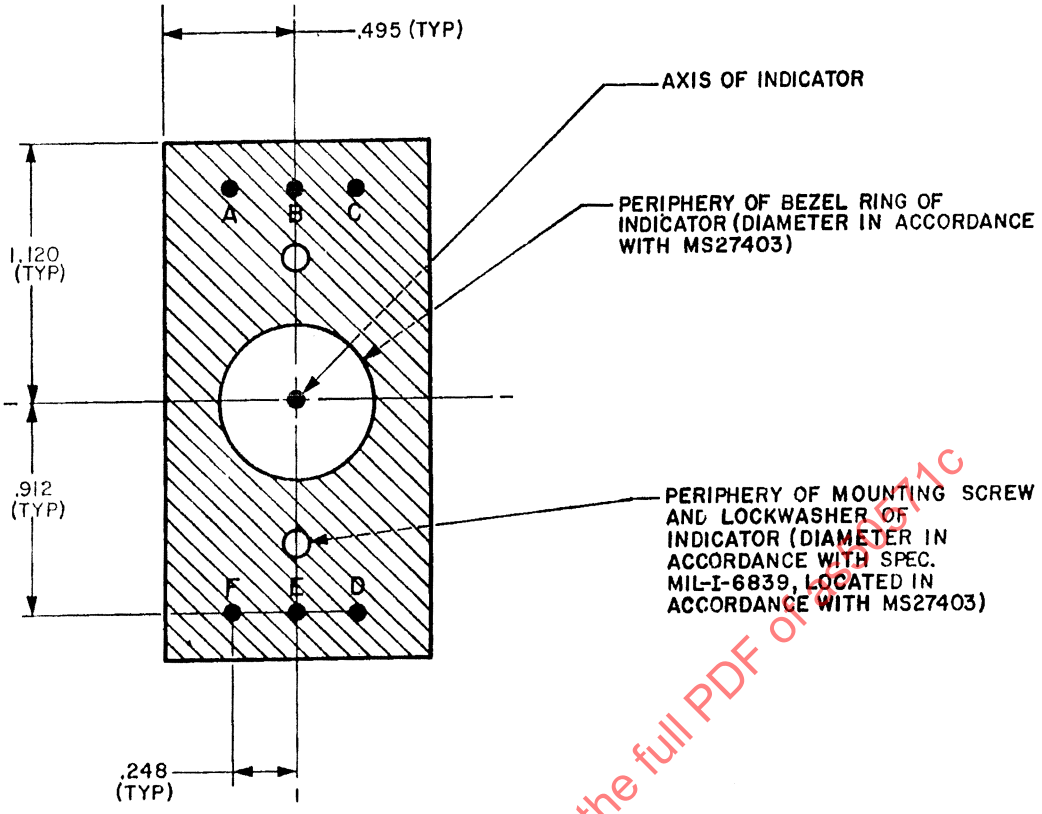



***Figure 2 - Dimensions and mounting of lights for polysign indicators***

3.3.1.1 Holes for Lead Wires

Lights for flange-mounted magnetic compasses may also employ 1 circular hole not more than 0.188 inch in diameter on the instrument panel, or 2 circular holes, each not more than 0.125 inch in diameter, in the instrument panel for lead wires. Lights for other instruments may also employ 1 circular hole not more than 0.125 inch in diameter in the instrument panel for a lead wire.

3.3.2 Lamp

The lights shall conform to this specification, except for the maximum weight requirement, with 1 or more MIL-DTL-6363/8 lamps installed, but shall not include any lamp unless so indicated by its part number. For lights including lamps, the dash number only for the lamp shall be added to the part number of the light. Part numbers of lights which include lamps shall be marked on their shipping containers only.

3.3.3 Electrical Circuit

Electrical circuits of lights for flange-mounted magnetic compasses shall not be connected to the bodies, cases, frames, or means for mounting of the lights. Lights for all other instruments shall employ a ground return through the instrument panel for 1 side of their electrical circuits. If 2 or more lamps are used, they shall be connected parallel to each other. No light shall include any other part having any significant electrical parameter.

3.3.4 Lead Wires

Lead wires shall conform to M81044/9, and shall be at least 36 inches long. If the wire passes through a hole in the instrument panel, it shall be covered from inside the light to at least 2 inches from the panel with an insulating sleeving conforming to type F, form U, Grade A of MIL-I-631.

3.3.5 Use of Tools

The lights shall be made so that the amount and distribution of the light output cannot be changed without the use of tools, but so that the lamp(s) can be removed and replaced without the use of tools.

3.3.6 Mounting Screws

The mounting screws shall be in accordance with NASM9006.

3.4 Color of Light

Light provided by each red light shall conform to AS25050 for aviation red and also shall be not paler or yellower than NBS No. 3215 filter. Optical paths of white lights shall be color nonselective. When Instrument Panel Lighting (IPL) white or Air Force Blue white lighting are used, they shall be in accordance with AS25050.

3.5 Performance

3.5.1 Dielectric

When tested in accordance with 4.6.4, there shall be no breakdown of insulation.

3.5.2 Operation

For all tests requiring operation of the light, energization shall be accomplished as specified below. The error of the voltmeter used for measuring the potential shall not exceed 0.05 V. The lights shall conform to all requirements of this specification with a potential having an effective value of 28 V and a frequency of 400 cps ± 20 cps, or direct current (DC), applied to its electrical connections (see 4.6.5 through 4.6.8).

3.5.2.1 Operation at Low Temperature

The light shall operate satisfactorily when subjected to the test specified in 4.6.6.

3.5.2.2 Operation at High Temperature

The light shall operate satisfactorily when subjected to the test specified in 4.6.7.

3.5.2.3 Operation Under Vibration

The light shall operate satisfactorily, and shall show no signs of breakage when subjected to the test specified in 4.6.8.

3.5.3 Resistance to Shock

The light shall show no signs of breakage, and shall operate properly when subjected to the test specified in 4.6.9.

3.5.4 Resistance to Fungus

There shall be no noticeable effect of exposure to fungus when subjected to the test specified in 4.6.10.

3.5.5 Resistance to Humidity

The light shall operate satisfactorily when subjected to the humidity test specified in 4.6.11.

3.5.6 Resistance to Corrosion

The light shall operate satisfactorily after being subjected to the salt spray test specified in 4.6.12.

3.5.7 Light Output

The light output shall be within the tolerances specified in 4.6.13 when tested as specified in 4.6.13.

3.5.8 Angle of Visibility

Lights shall be such that, when mounted on the instrument, and located within a cone of visibility from 4 degrees above to 40 degrees below the horizontal axis of the observer and from 40 degrees on 1 side to 40 degrees on the other side of the straight forward direction of the observer, the light shall not reduce the instrument visibility which exists without a light (see 4.6.14).

3.5.9 Dimensions

The dimensions of the light shall be as specified on the applicable standard.

3.5.10 Weight

The weight of the light shall not exceed the value specified on the applicable MS standard or, for qualified lights which do not conform to any standard, on the manufacturer's drawing.

3.6 Finish

All parts of the light, except those from which the light is emitted which are visible from the front (dial) side of the instrument panel when the light is installed, shall have a black finish conforming to Color No. 37038 of Federal Standard No. 595.

3.7 Identification Marking

Parts, subassemblies, and lights shall be marked for identification in accordance with MIL-STD-130.

3.8 Workmanship

The light, including all parts and accessories shall be fabricated and finished in a thoroughly workmanlike manner. Particular attention shall be given to freedom from burrs and sharp edges, accuracy of dimensions, and marking of parts and assemblies.

3.8.1 Cleaning

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

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 in the contract or purchase order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by 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.

4.1.1 Responsibility for Compliance

All items must meet all requirements of Sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.2 Classification of Inspection

The examination and testing of the lights shall be classified as follows:

a. First article: First article inspection consists of examinations and tests performed on samples which are representative of the production item after award of a contract to determine that the production conforms to the requirements of this specification (see 3.1 and 6.3).

b. Quality conformance inspection: Quality conformance inspection consists of examinations and tests performed on individual products or lots to determine conformance of the products or lots with the requirements set forth in this specification (see 4.4.1 and 4.4.2).

4.3 First Article Tests

4.3.1 Sampling Instructions

A sample for first article testing shall consist of at least 2 lights of a given manufacturer's part number. Samples shall be furnished as directed by the contracting officer. The following information shall be furnished with each sample:

a. Government designation (if any).

b. Manufacturer's designation.

c. Instrument case with which to be used.

d. Location(s) of any adjusting knobs and screws on the instrument case.

e. Aperture diameter and mounting hole style of instrument case (for lights for use with MS33545 instrument cases only).

f. Whether instrument is to be installed with mounting flange on front or back side of instrument panel (for flange-mounted instruments only).

g. For use with magnetic compasses (for lights used with flange-mounted magnetic compasses only).

h. Number of lights to be used with each instrument, and the positions (and orientations, if applicable) in which they are to be installed.

i. Manufacturer's drawing and installation instructions only for lights which do not conform to any standard).

4.3.2 Tests

The first article tests shall consist of all the tests specified under 4.6 Test methods, and shall be performed in the order listed.

4.4 Quality Conformance Tests

The quality conformance tests shall consist of individual tests and sampling tests.

4.4.1 Individual Tests

The lights shall be subjected to the following tests:

a. Examination of product (4.6.1)

b. Dimensions (overall) (4.6.2)

c. Weight (4.6.3)

d. Dielectric strength (4.6.4)

e. Operation (4.6.5)

4.4.2 Sampling Tests

The lights shall be subjected to the following tests. Lot acceptance shall be in accordance with the sampling requirements of MIL-STD-1916, Inspection level S-3, Acceptable Level (AQL) 1.5. A light with 1 or more defects shall be considered 1 defective light in the application of MIL-STD-1916.

a. Operation at low temperature (4.6.6)

b. Operation at high temperature (4.6.7)

c. Operation under vibration (4.6.8)

d. Resistance to shock (4.6.9)

4.5 Test Conditions

4.5.1 Ambient Temperature

Unless otherwise specified, all tests of this specification shall be performed at 70 °F ± 5 °F.

4.5.2 Lamp Luminous Intensity

The lamps used shall be aged not less than 10 hours and shall be capable of emitting an average intensity of 0.34 ± 0.02 mean spherical candlepower per lamp when operated at rated voltage.

4.5.3 Mounting

When specified, the light shall be installed with an instrument case, in accordance with the applicable MS standard, Figure 1 or 2, or the manufacturer's drawing, on a hard aluminum panel 0.125 inch ± 0.010 inch thick, and shall be tested with the panel vertical and the light and instrument in their normal orientations.

4.5.4 Light Installation

The light shall be installed with an instrument case. The front (dial) side of the panel shall have a grey finish conforming to Federal Standard No. 505, Color No. 36231 for at least 2 inches in all directions from the instrument case and the light. The instrument case shall include a window glass, and shall contain a dial, parallel to the window glass of the case and at least as large as the window aperture of the instrument case. The visible side of the dial shall have a white finish conforming to Federal Standard No. 595, Color No. 37875. The distance from the extreme front surface of the instrument case, exclusive of knobs, pushbuttons, etc. but including the bezel ring, if any, to the visible side of the dial shall be as in Figure 3:

| Instrument Case | Depth of Dial (inches) |
|---|---|
| MS33639 1-Inch | 0.175 + 0.015 |
| MS33639 1 ½-Inch | 0.225 + 0.020 |
| MS33639 2-Inch | 0.275 + 0.025 |
| MS33639 3-Inch | 0.325 + 0.030 |
| MS33638 1 ½-Inch | 0.225 + 0.020 |
| MS33638 2-Inch | 0.275 + 0.025 |
| MS33638 3-Inch | 0.325 + 0.030 |
| MS33545 | 0.375 + 0.035 |

***Figure 3 - Instrument case to depth of dial***

4.5.5 Light Measurements

All light measurements, both quantitative measurements and nonquantitative visual comparisons, shall be made in surroundings wherein the only source of light is that which is being measured.

4.5.6 Lamp Failure

Failure of a lamp during any test shall not constitute failure of the light.

4.5.7 Light Output

Unless otherwise specified, the following test procedures shall be followed:

a. Standardization of test lamps to related mean spherical intensity at rated operating voltage.

b. Evaluate chromaticity of red lights.

c. Test for contrast to establish minimum acceptable level.

4.6 Test Methods

4.6.1 Examination of Product

The light shall be carefully examined to determine conformance to this specification with respect to all requirements not covered by specific tests.

4.6.2 Dimensions

The light shall be measured for conformance to the overall dimensions of the MS standard, or for lights which do not conform to any standard, to the manufacturer's drawing.

4.6.3 Weight

Each light shall be weighed for conformance to the applicable MS standard or manufacturer's drawing.

4.6.4 Dielectric Strength

The lamp(s) shall be removed from the light. A potential of 750 V ± 50 V at 400 cps ± 20 cps shall be applied between the ungrounded electrical connection(s) of the light and all other exposed metal parts of the light for 10 seconds ± 2 seconds.

4.6.5 Operation

The light shall be installed with an instrument case and operated. During operation, the illumination of the instrument dial shall be compared with that of an identical installation which has been subjected to and has passed the test specified in 4.6.13, to determine whether the light is illuminating the instrument dial as required by 4.6.13.

4.6.6 Operation at Low Temperature

The lights shall be kept in a chamber maintained at -55 °C ± 2 °C for 24 hours ± 1 hour. Then, while remaining in the chamber at this temperature, the lights shall be subjected to the tests of 4.6.5. The standard (quantitatively measured) installation shall be 70 °F ± 5 °F, and shall not be in the chamber.

4.6.7 Operation at High Temperature

The lights shall be subjected to the test of 4.6.6 with 70 °C ± 2 °C substituted for -55 °C ± 2 °C wherever it appears.

4.6.8 Operation Under Vibration

The light shall be vibrated along each of 3 mutually perpendicular axes at a double amplitude of 0.019 inch ± 0.001 inch for 1 hour in each of the 3 axes. The frequency of vibration shall be varied sinusoidally between 300 and 12000 cycles per minute and returned once each minute for 1 hour. The light shall then be subjected to the test specified in 4.6.5 6 times, approximately equally spaced but random with respect to the frequency of vibration, during the hour of vibration.

4.6.9 Resistance to Shock

The lights installed with an instrument case, shall be subjected to 3 shocks, each having an acceleration of 30 g ± 3 g and a duration of 7.5 ms ± 1.5 ms, in each of 3 mutually perpendicular directions. The lights shall then be subjected to the test specified in 4.6.5.

4.6.10 Resistance to Fungus

The lights shall be exposed to a suspension of freely sporulating mixed spores as follows: Distilled water, with or without a wetting agent, shall be introduced directly into a stock culture of 1 fungus and shaken gently without disturbing the agar. The spore suspension shall then be sprayed with an atomizer over all exposed parts of the lights. This procedure shall be repeated with 4 more fungi. Care shall be taken when spraying each fungus onto the lights that none of the previously applied fungi shall be washed off. 1 fungus from each of the following groups shall be used:

Group I Chaetomium globosum USDA 1042.4 or Myrothecium verrucaria USDA 1334.2

Group II Rhizopus nigricans S. N. 32 or Aspergillus niger USDA TC215 4247.

Group III Aspergillus flarus AMC No. 26 or Aspergillus terreus PQMD82J.

Group IV Penicillium luteum USDA 1336.1 or Penicillium sp. USDA 1336.2.

Group V Memnoniella echinata AMC No. 37 or Fusarium moniliforme USDA 1004.1.