AEROSPACE STANDARD

AS18276™	REV. B

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Reaffirmed 2020-08

Superseding AS18276A

Lighting, Aircraft Interior, Installation of

FSC 6220

RATIONALE

Updated Applicable Documents; added consideration for non-incandescent/halogen lighting; added alternate to NVIS goggle for observation of light leaks; removed some “redundant” information.

1. SCOPE

1.1 This specification covers the installation of aircraft interior lighting for military aircraft.

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 SAE Publications

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

AS18012 Markings for Aircrew Station Displays, Design and Configuration of

AS25027 Light Assembly, Cockpit, Fixed

AS25050 Colors, Aeronautical Lights and Lighting Equipment, General Requirements for

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

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/AS18276B

2.2 Specifications Military

MIL-C-6781 Control Panel: Aircraft Equipment, Rack or Console Mounted

MIL-M-8650 Mockups, Aircraft Construction of

MIL-L-25467 Lighting, Integral, Red, Aircraft Instrument, General Specification for

MIL-DTL-25866 Light, Emergency Exit, Aircraft LEU-1/A

MIL-DTL-7788 Panels, Information, Integrally Illuminated

2.3 Standards Military

MIL-STD-203 Aircrew Station Controls and Displays; Location, Arrangement and Actuation of, for Fixed-Wing Aircraft

MIL-STD-411 Aircrew Station Alerting Signals

MIL-STD-810 Environmental Engineering Considerations and Laboratory Tests

MIL-STD-3009 Lighting, Aircraft, Night Vision Imaging System (NVIS) Compatible

MIL-STD-7080 Selection and Installation of Aircraft Electrical Equipment

AIR FORCE-NAVY AERONAUTICAL

AN3037 Light Assembly, Cabin Dome

Copies of the above specifications and standards are available from DLA Document Services, Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6396, http://quicksearch.dla.mil/.

3. REQUIREMENTS

3.1 General Requirements

3.1.1 Installation

Interior lighting equipment shall be installed in accordance with MIL-STD-7080.

3.1.2 Mockup

The lighting mockup shall conform to MIL-M-8650 and as noted in 3.5.4 herein.

3.1.3 Locations of Lighting Fixtures

The locations of lighting fixtures shall be given careful consideration in order to provide satisfactory illumination, to prevent undesirable reflections in windshields, canopies and other enclosures, and to prevent glare from a direct or reflected view of lamps, lenses and surfaces. Lighting installation shall conform to MIL-STD-203.

3.1.4 Reflections

Reflections of instruments and consoles in windshields and other enclosures shall be avoided. If necessary, a suitable nonrigid shield shall be provided around the instrument panel or console.

3.1.5 Lighting Colors and NVIS Radiance

3.1.5.1 Instrument Panel Light (IPL) Red or White

The light emitted by the illumination source (either lamp, lamp-filter or LED or LED-filter combination), to illuminate the panel, shall conform to AS25050 if red or white.

3.1.5.2 Instrument Panel Light (IPL) - NVG

If NVG colors are required to illuminate the panel, the chromaticity limits and NVIS radiance requirements shall conform to MIL-STD-3009, not only on the panel but as reflected from any surrounding components.

3.1.6 Lighting Power

All lights shall operate from a power source compatible with the aircraft power bus noted in 3.5.10.3.3.

3.1.7 Explosive Atmosphere

Whenever a light is installed in an area normally containing an explosive vapor, the light shall be a vapor proof light conforming to the test requirements of MIL-STD-810, Method 511.5, Procedure II, explosion and flame arresting characteristics of equipment designed for that purpose. Lights installed in areas which may contain explosive vapors shall be equipped with covers to prevent inadvertent breakage of the lamp(s).

3.1.8 Mechanical Damage

Whenever a light is installed so as to be subject to damage from cargo, passenger, or crew normal movement, it shall be protected by a cover to prevent breakage of the lamp(s).

3.1.9 Control Configuration and Markings

Control configuration and markings for information panels, control panels, and placards shall be chosen, arranged and marked in accordance with AS18012.

3.2 Aircrew Station Signals

Visual aircrew station signals, illuminated aircrew station signals shall conform to MIL-STD-203, MIL-STD-411, or MIL-STD-3009 as required.

3.3 Circuit Breaker Panels

Circuit breaker panels shall be lighted when the aircraft is designed for in-flight maintenance.

3.4 Chart Board Lighting

Chart boards not self-lighted shall be provided with lighting sufficient for reading maps and charts, and for navigation.

3.5 Cockpit Lighting

3.5.1 Instrument Lighting

The instrument lighting shall conform to this specification, unless the contractor is authorized in writing by the procuring activity to install an alternate nonstandard instrument lighting system which does not conform to this specification. The request for authorization to install an alternate lighting system shall be made before the lighting mockup inspection and shall include samples, photographs, drawings, or other data to indicate its superiority over the requirements of this specification for installation in the particular aircraft under consideration. The right is reserved to require the contractor to mock up both the alternate and the standard installations.

3.5.2 Installation of Equipment

All items of lighting equipment specified for installation shall conform to their respective drawings, specifications, or both, and shall be installed without modification, except for electrical leads.

3.5.3 Selection of Lights

When specified by the procuring activity, as soon as possible after each instrument panel design or design change has been determined, the contractor shall furnish the procuring activity with one sample of each instrument panel, the instrument panel drawings involved, or both, for use by the procuring activity for lighting studies before making recommendations relative to the types of lights to be used. The drawings shall show the layout of each instrument panel and the relative position of the crew member's normal eye level with respect to the instrument panel under his observation.

3.5.4 Mockup

In order to determine the adequacy of the instrument lighting systems for each new model aircraft, or modification thereof, which would affect the design of the instrument panel layout or the lighting system, a complete mockup or a 3-D lighting simulation (if agreed with procuring activity) of the instrument lighting system involved shall be prepared by the aircraft contractor for inspection and approval by the procuring activity. The mockup shall be provided with the actual lighting equipment and instruments or models of instruments to be illuminated, insofar as practicable, which will afford a reasonable indication of the effectiveness of the lighting involved. Cardboard templates of instrument dials will not be satisfactory for this mockup.

3.5.5 Instrument Lighting Systems

The instruments shall be provided with primary and secondary lighting systems.

3.5.5.1 Primary Lighting System

The primary lighting system shall consist of integrally lighted instruments using MIL-L-25467 as a guide. The color of the instrument lighting shall be IPL - Red or IPL - White as dictated by operational requirements. When NVG lighting is specified then the requirements of MIL-STD-3009 shall apply.

3.5.5.2 Secondary Lighting System

The secondary instrument lighting system shall be provided with lights in accordance with AS25027 or as agreed with the procuring activity. Sufficient lights shall be employed to provide adequate illumination subject to the mockup approval. Where practicable, these lights shall be installed under the glare shield of the instrument panel, as far away from the instrument panel as practicable.

3.5.6 Console Lighting System

The consoles shall be provided with primary and secondary lighting systems.

3.5.6.1 Primary Lighting System

The primary console lighting system shall consist of integrally lighted information panels conforming to MIL-DTL-7788. The color of the panels shall be black when IPL - Red lighting is employed and may be either black or gray when IPL - White lighting is employed.

3.5.6.2 Secondary Lighting Systems

The secondary console lighting system shall provide visibility of switch handles, knobs, and controls. The fixtures employed shall be as approved by the procuring activity. Sufficient fixtures shall be employed to adequately light the switch handles, knobs, and controls.

3.5.7 Emergency Lighting System

An emergency lighting system shall be provided for use in the event of failure of the primary and secondary instrument lighting systems or the primary console lighting system. If the secondary console lighting fixtures can be removed from their bases for hand holding, these lights may be employed for the emergency lights. The emergency lights shall be readily changeable from red to white light while in use. At least one of the emergency lights shall be directable by hand or movable from its base to within 2 feet of all parts of the cockpit.

3.5.8 High Intensity Lighting System

Aircraft which have a service ceiling higher than 40 000 feet or are designed to deliver nuclear weapons for air or surface burst, shall be provided with an additional system for illuminating the instrument panels and consoles with white light. The illumination provided shall be a minimum of 150 foot-candle for the primary flight instruments and a minimum of 75 foot-candle for other instruments and controls in the cockpit. Continuously variable manual control shall be provided. In addition, in aircraft equipped with an automatic thermal protective closure system, the light(s) shall be automatically turned on to full bright when the closure is closed. A momentary contact reset switch shall be provided to regain manual control.

3.5.9 Thunderstorm/Utility Lighting System

Except for fighter and interceptor aircraft, and aircraft which have high intensity lighting systems in accordance with 3.5.8, one or more lights conforming to AN3037-8B, or other designs with similar performance, shall be installed in each cockpit for emergency maintenance and flight during lightning storms. The lights shall flood the instrument panel, controls, and floor of the cockpit with at least 10 foot-candle.

3.5.10 Controls

Standard control panels in accordance with MIL-C-6781 shall be provided for control of cockpit lights.

3.5.10.1 Locations

Each crew station shall be provided with a lighting control panel, convenient for operation by that crewman, for controlling all lights which are usually used by that crewman only. For lights which are usually used by two crewmen, one lighting control panel convenient for operation by both of those crewmen shall be provided. Where required for satisfactory control because of the great number of instruments, consoles lit, or because some are overhead and some below eye level, etc., two lighting control panels shall be provided. Each lighting control panel which controls lighting of both flight and nonflight instruments of which the flight instruments constitute a total of more than four instruments, or more than one quarter of the total number of instruments, or both, shall have separate controls for the primary lighting of the flight and nonflight instruments. All other lighting control panels which control lighting of both flight and nonflight instruments shall have one control for the primary lighting of both the flight and the nonflight instruments.

3.5.10.2 Functions

Each lighting control panel shall include, as applicable, one or two instrument primary lighting system controls marked "INST", or "FLT INST" and "NON-FLT INST", as applicable, one console primary lighting system control marked "CONSOLE", and one instrument and console secondary lighting system control marked "FLOOD".

3.5.10.3 Operation

Each control shall operate as follows.

3.5.10.3.1 Primary Lighting Controls

Each primary lighting control shall be a rotary control, operated by a standard control knob. When the knob is in its extreme counter-clockwise position, the lights shall be OFF. For incandescent/halogen lamp systems, rotating the knob clockwise from its "OFF" position shall first turn the lights ON with between zero and one-seventh normal potential applied to the lamps, and then shall increase the potential applied to the lamps, either continuously or in at least seven steps, until when the knob is in its extreme clockwise position, normal potential shall be applied to the lamps. For LED or other systems, the relationship between knob position and light output shall mimic those of an incandescent/halogen lamp system unless otherwise agreed with the procuring activity.

3.5.10.3.2 Secondary Lighting Controls

Each secondary lighting control shall be a three-position toggle switch installed so that its handle is moved upward and downward to operate it. The switch shall be connected to the source of power through a means operated by the console primary lighting system control, such that when the console primary lights are off, the console and instrument secondary lights will be off. When the console primary lights are on, the console secondary lights will be on, with their brightness controlled by the secondary lighting control. The instrument secondary lights will be turned on and off by the secondary lighting control, with the initial intensity indicated, or as otherwise required for the design, as follows:

a. When the control is in its center position, marked "DIM", the input signal condition that produces one-third the maximum brightness shall be applied to the console secondary lights and no energy shall be applied to the instrument secondary lights.

b. When the control is in its lower position, marked "MED", the potential that produces two-thirds the maximum brightness shall be applied to the console secondary lights and no potential shall be applied to the instrument secondary lights.

c. When the control is in its upper position, marked "BRT", normal (meaning full brightness) input signal

condition shall be applied to the console and instrument secondary lights.

3.5.10.3.3 Power Sources

The console and instrument secondary lighting systems and the emergency lighting system shall be connected to the essential bus of the aircraft electric system. The other lighting systems shall be connected to the primary bus. Each lighting system shall be provided with an individual fuse, circuit breaker, or other electric protective device.

3.5.11 Check List and Radio Call Panels

Each check list and radio call panel shall be an integrally lighted information panel in accordance with MIL-DTL-7788, the lighting of which shall be controlled by the same device that controls the primary lighting system of the nearest instruments or consoles, as applicable, to the panel.

3.6 Lighting in Compartments Other Than Cockpits

3.6.1 Instruments and Consoles

In functional compartments and compartments where dark adaptation is required, or from which stray white light could affect dark adaptation of crewmen in other compartments, instruments and consoles shall be provided with primary and secondary lighting systems and controls in accordance with 3.5. The color of the lighting shall be IPL - Red or NVG colors as needed. For compartments where the above conditions do not exist IPL - White shall be used.