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AEROSPACE STANDARD

SAE AS18276

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Lighting, Aircraft Interior, Installation of

FSC 6220

NOTICE

This document has been taken directly from U.S. Military Specification MIL-L-18276C, Amendment 1 and contains only minor editorial and format changes required to bring it into conformance with the publishing requirements of SAE technical standards. The initial release of this document is intended to replace MIL-L-18276C, Amendment 1. Any part numbers established by the original specification remain unchanged.

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1. SCOPE:

1.1 This specification covers the installation of aircraft interior lighting.

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

MILITARY

MIL-E-5272	- Environmental Testing, Aeronautical and Associated Equipment, General Specification for
MIL-C-6781	- Control Panel; Aircraft Equipment, Rack or Console Mounted
MIL-E-7080	- Electric Equipment, Aircraft, Selection and Installation of
MIL-P-7788	- Panels, Information, Integrally Illuminated
MIL-M-8650	- Mockups, Aircraft Construction of
MIL-M-18012	- Control Configuration and Markings (For Plastic Lighting Panels, Control Panels and Placards)
MIL-C-25050	- Colors, Aeronautical Lights and Lighting Equipment, General Requirements for
MIL-L-25467	- Lighting, Integral, Aircraft Instrument, General Specification for
MIL-L-25866	- Light, Emergency Exit, Aircraft LEU-1/A

STANDARDS

MILITARY

MIL-STD-203	- Cockpit Controls, Location and Actuation of For Fixed-Wing Aircraft
MIL-STD-250	- Cockpit Controls, Location and Actuation of For Helicopters
MIL-STD-411	- Aircrew Station Signals
MS25027	- Light Assembly, Cockpit, Fixed

AIR FORCE-NAVY AERONAUTICAL

AN3037	- Light Assembly, Cabin Dome

(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.)

3. REQUIREMENTS:

3.1 General requirements:

3.1.1 Installation: Interior lighting equipment shall be installed in accordance with MIL-E-7080.

3.1.2 Mockup: The lighting mockup shall conform to MIL-M-8650.

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 or MIL-STD-250, as applicable.

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:

3.1.5.1 Instrument Panel Light (IPL) - Red: The red light emitted by the lamp-filter combination, to illuminate the display, shall conform to MIL-C-25050.

3.1.5.2 Instrument Panel Light (IPL) - White: The white light emitted by the lamp-filter combination, to illuminate the display, shall not differ from the spectral characteristics of the incandescent sources utilized, and shall conform to MIL-C-25050.

3.1.6 Lighting power: All lamps shall be operated from a 5- or 28-volt (V) ac or dc, or 115V ac, 400 cycles per second (cps) power source.

3.1.7 Explosive atmosphere: Whenever a light is installed in an area normally containing an explosive vapor, the light shall be a vaporproof light conforming to the test requirements of Procedure IV, explosive-proof (aeronautical) tests of MIL-E-5272. 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 MIL-C-18012.

3.2 Visual aircrew station signals, illuminated aircrew station signals shall conform to MIL-STD-203, MIL-STD-250, and MIL-STD-411.

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 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 panels: 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 in accordance with MIL-L-25467. For Naval aircraft the color of the instrument lighting shall be IPL - Red. For Army aircraft the color of the instrument lighting shall be IPL - Red or IPL - White as dictated by operational requirements.

3.5.5.2 Secondary lighting system: The secondary instrument lighting system shall be provided with lights in accordance with MS25027. 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: 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-P-7788. The color of the panels shall be black when red Instrument Panel Lighting is employed and may be either black or gray when white instrument panel 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 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-candles for the primary flight instruments and a minimum of 75 foot-candles 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 Thunderstorn/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 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-candles.

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. 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.