



AEROSPACE RECOMMENDED PRACTICE

ARP4392™

Issued	1993-06
Reaffirmed	2022-09

Lighting, Aircraft Exterior,
Night Vision Imaging System (NVIS)
Compatible

RATIONALE

ARP4392 has been reaffirmed to comply with the SAE Five-Year Review policy.

1. SCOPE:

This SAE Aerospace Recommended Practice (ARP) describes the recommended performance levels for equipment located on the aircraft exterior which produces radiant energy which will provide desired information when viewed with NVIS goggles.

These performance intensities, normally stated in candelas for visible light, are modified to consider the goggle spectral response range. Where necessary, location of the equipment on the airplane is specified.

The spectral emission characteristics may or may not include visible light. Whether or not visible energy is emitted, this document will refer to these items of equipment as "lights".

1.1 Categories of Lights:

The two types of lights defined in this document are classified as Category I or Category II depending on the function of the light.

For the specific intensities for all lights, it may be necessary to include both minimum and maximum energy requirements. This is because NVIS goggles are equipped with an automatic gain control which limits the amount of total brightness gain. This occurs when excess energy primarily in the 600 to 900 nm range is incident to the goggles and results in the loss of goggle resolution to the point where they do not serve their intended function.

1.1.1 Category I: Category I lights are classified as lights or energy sources which are viewed with NVIS goggles to provide the desired information. This is referred to as a signalling function.

These include formation-keeping, anticollision, and rendezvous light functions.

SAE Executive Standards Committee Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2022 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

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
http://www.sae.org

SAE WEB ADDRESS:

Full document details: SAE ARP4392

For more information on this standard, visit
<https://www.sae.org/standards/content/ARP4392/>

Documents
Document Sharing Hub

- 1.1.2 Category II: Category II lights include floodlights, fuel probe inspection, refueling, landing, and searchlight functions. These lights will usually produce no visible light but will emit energy in a range greater than 780 nm. The reduction or elimination of energy less than 780 nm is usually required to maintain covertness.
- 1.2 Product Classification:
- 1.2.1 Controllable Searchlight: A spotlight or floodlight used primarily in helicopter application for illumination of ground terrain or objects in both hover and low speed ground inspection maneuvers. This light is usually controllable both in elevation and azimuth.
- 1.2.2 Landing Light: A narrow beam light used during takeoff and landing to illuminate the surface of the runway or landing area. Landing lights may either be fixed or retractable.
- 1.2.3 Hover Lights: A floodlight which is installed in the bottom surface of the aircraft with hovering capabilities (primarily helicopters). The light or lights are used to floodlight the area beneath the aircraft from low altitude.
- 1.2.4 Formation Lights: Lights installed on the fuselage, vertical stabilizer, and wing tips to provide information to the pilots of other aircraft required for formation-keeping. Electroluminescent strips are commonly used in this application. Since these lights are viewed from relatively short ranges, surface luminance is as important as radiant intensity.
- 1.2.5 Refueling Probe Light: A floodlight which is installed in the forward portion of the aircraft near the fuel probe on a receiver aircraft of a probe/drogue type refueling system (Reference ARP694). This will provide sufficient intensity to illuminate the probe tip and the immediate area so the receiver pilot can determine the position of the probe and drogue.
- 1.2.6 Rendezvous Lights: A light which provides recognition of an aircraft's location at some distance from the NVIS user. Typically, in an NVIS mode a rendezvous maneuver is performed without radio contact and the primary concern is to provide a recognizable signal while maintaining covertness. Flashing or pulsating signals are common for this application which increases the ease of detection.
- 1.2.7 Anticollision Lights: Lights which are installed on aircraft for the purpose of providing recognition of an aircraft's location at some distance from the NVIS user. They typically are designed to maintain covertness while providing useful energy in the NVIS response range. Flashing or pulsating signals are common for this application which increases the ease of detection.

2. REFERENCES:

2.1 Applicable Documents:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other documents shall be the issue in effect on the date of the purchase order.

2.1.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

ARP693B Landing and Taxiing Lights - Design Criteria for Installation
ARP694A Aerial Refueling Lights - Design Criteria
AS8017A Minimum Performance Standards for Anticollision Light Systems
AIR1106A Some Factors Affecting Visibility of Aircraft Navigation and Anticollision Lights

2.1.2 U.S. Government Publications: Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-L-006730C Lighting Equipment, Exterior Aircraft
MIL-L-6503H Lighting Equipment, Aircraft
MIL-L-85762A Lighting, Aircraft, Interior, Night Vision Imaging System (NVIS) Compatible

2.2 Definitions:

2.2.1 NIGHT VISION IMAGING SYSTEM (NVIS): A system which uses image intensifier tubes to provide an enhanced image of a scene in visible lighting conditions too low for normal visibility. This may be on the order of the lighting level produced on a dark starlit night. This system is also referred to as NVIS goggles.

2.2.2 NVIS COMPATIBLE EXTERIOR LIGHTING: Lighting compatibility with NVIS optics is achieved when the level of radiance incident on the NVIS from either the signal source or the reflected energy from the light source is sufficient to produce the information desired on the NVIS screen but not great enough to cause significant reduction in gain of the NVIS image intensifier and loss of image contrast.

2.2.3 COVERT LIGHTING: A light source with the relative absence of energy in the visible range (380 to 780 nm) usually designed for NVIS usage with a high concentration of energy in the near infrared region (wavelengths greater than 780 nm).

2.2.4 LIGHT SOURCE: Light sources utilized for exterior compatible lighting may be incandescent, electroluminescent, or infrared light-emitting diodes (IRLED). Incandescent sources are normally filtered such that energy in the visible spectrum is not emitted.