



AEROSPACE INFORMATION REPORT

AIR5689™**REV. B**

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Superseding AIR5689A

(R) Light Transmitting Glass Covers for Exterior Aircraft Lighting

RATIONALE

This document is being updated to add definitions for surface quality defects, redefine glass “part” or “lens” as a “glass cover,” and to add additional information to the publication and coating sections.

1. SCOPE

This SAE Aerospace Information Report (AIR) provides definitions of and inspection criteria for defects commonly encountered in molded glass covers for exterior aircraft lighting.

1.1 Purpose

This document covers, but is not limited to, visual inspection and evaluation recommendations for molded glass covers used in exterior aircraft lighting applications. The included definitions are for those defects most commonly encountered. The goal is to provide specific evaluation criteria in the following areas.

- a. Color
- b. Internal Quality
- c. Surface Quality
- d. Dimension
- e. Coatings

Inspection of glass covers shall be made at a typical reading distance with normal or corrected 20-20 vision under adequate lighting (refer to ASTM C1036 for reference/guidance). Glass covers shall be free from defects that will prevent the cover from meeting intensity and beam distribution, strength, thermal shock resistance, and other physical requirements. All glass covers shall meet drawing specifications.

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.

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Documents

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2.1 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 Colors, Aeronautical Lights and Lighting Equipment, General Requirements For

2.2 U.S. Government Publications

Copies of these documents are available online at <http://quicksearch.dla.mil>.

MIL-DTL-7989C Covers, Light-Transmitting for Aeronautical Lights, General Specification For (This is an inactive document. However, it is still generally used as a reference source.)

MIL-G-174 Glass, Optical

MIL-PRF-13830 General specification governing the manufacturing, assembly, and inspection of Optical Components for Fire Control Instruments

3. RECOMMENDATIONS

3.1 Color

3.1.1 The color shall meet the specifications defined in the detailed item drawing. The drawing shall indicate the desired chromaticity in CIE 1931 coordinates, the applicable light source, and the operating temperature of the glass cover. In the event that no color specifications are indicated, the glass cover shall be produced to meet the requirement of specification AS25050 using a standard CIE Illuminant A (2854 K) source with a glass cover temperature between 20 °C and 25 °C.

3.1.2 The color shall be homogeneous throughout the glass cover.

3.1.3 It should be noted that colored glassware has the tendency to change with operating temperature. This property is most apparent with sharp-cut yellow and sharp-cut red filter glass. The operating temperature of the glass cover should be specified on the detailed drawing for all applications where chromaticity and photometric output are critical. The glass composition shall then be chosen to meet the desired requirements of the glass cover.

3.1.4 Detectable or noticeable color shall not be seen through the optically effective area of clear, uncoated glass covers.

3.2 Internal Quality

3.2.1 A "check" is a crack or fracture usually starting from an edge of the glass cover. A "crizzle" is a series of fine checks occurring in one area near the glass cover surface. Cracks, checks, and crizzles are actual fractures in the glass cover and shall not be accepted.

3.2.2 An "inclusion," or "stone," is an opaque, non-glassy material located within the bulk of the glass cover. A fractured inclusion has small cracks surrounding the area of the stone and leading into the glass cover. Fractured stones shall not be accepted. The maximum acceptable inclusion size is related to the overall dimension of the item and the magnitude of thermally induced stress in the glass cover during operation.

3.2.3 "Knots" are semi-transparent areas of incompletely melted glass. The inspection criteria for knots are the same as those for inclusions in 3.2.2.

3.2.4 "Striae," or "cords," appear as lines or threads within the glass cover, and are caused by slight variations of the refractive index in the bulk of the glass. Cords that are not visible to the unaided eye and that do not affect the light output of a cover shall not be a cause for rejection. Striae, which are light and scattered when viewed perpendicular to the optically effective surface, are acceptable so long as the output of the glass cover is not affected. Heavy cords which appear on the surface of the glass cover or degrade the physical integrity or photometric output of the glass cover are unacceptable.