



AEROSPACE MATERIAL SPECIFICATION

AMS-P-21600™**REV. B**

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Superseding AMS-P-21600A

Paint System, Fluorescent, Removable, for
Aircraft Application

RATIONALE

This document has been determined to contain basic and stable technology which is not dynamic in nature.

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1. SCOPE

This specification establishes the requirements for a high visibility, durable, exterior fluorescent coating system consisting of a pigmented fluorescent coating with a clear protective overcoat containing a weathering stabilizer. This coating system is capable of being removed without softening the permanent undercoats.

1.1 Application

The coating materials (Flourescent Coating and Clear Overcoat), covered by this specification are typically applied to the outer moldline of aircraft for high visibility.

1.2 Classification

The coating materials covered by this specification shall be classified as one grade of fluorescent coating system furnished in the following colors, as specified (See 8.6).

Army - Navy Aeronautical Color Number	Fed Std 595 Color number	Color Name
633	28913	Fluorescent red-orange
634	28915	Fluorescent yellow-orange

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

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.

AMS3819 Cloths, Cleaning for Aircraft Primary and Secondary Structural Surfaces

AMS-QQ-A-250/5 Aluminum Alloy ALCLAD 2024. Plate and Sheet

2.2 U.S. Government Publications

Available from the Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6257, <https://assist.daps.dla.mil/quicksearch/>.

TT-I-735 Isopropyl Alcohol

TT-N-97 Naphtha; Petroleum, Aromatic (for use in organic coatings)

A-A-857 Thinner, Dope and Lacquer (cellulose nitrate)

A-A-2793 Cleaner – Disinfectant (Pine Type) (Commercial Item Description)

A-A-59107 Toluene, Technical (Commercial Item Description)

A-A-59760 Ten Degree Xylene (Commercial Items Description)

A-A-59921 Cleaning Compounds, Aircraft Surface

MIL-A-8625 Anodic Coatings, for Aluminum and Aluminum Alloys

MIL-C-8514 Coating, Pretreatment, Smooth Finish, Spray Type

MIL-PRF-680 Degreasing Solvent

MIL-PRF-81352 Coatings, Aircraft Touch-Up

FED-STD-141 Paint, Varnish, Lacquer and Related Materials; Methods of Inspection, Sampling and Testing

FED-STD-313 Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities

FED-STD-595 Colors used in Government Procurement

MIL-STD-129 Military Marking for Shipment and Storage

MIL-STD-1916 Department of Defense Test Method Standard

2.3 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 D 330 Standard Specification for 2-Butoxyethanol
- ASTM D 476 Standard Classification for Dry Pigmentary Titanium Dioxide Products
- ASTM D 823 Standard Practice for Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels
- ASTM D 1200 Cup, Viscosity by Ford Viscosity
- ASTM D 1210 Fineness of Dispersion of Pigment – Vehicle Systems, by Hegman – Type Gage
- ASTM D 1296 Volatile Solvents and Diluents, Odor of
- ASTM D 1974 Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes
- ASTM D 2244 Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
- ASTM D 2369 Standard Test Method for Volatile Content of Coatings
- ASTM D 3960 Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
- ASTM G 7 Standard Practice for Atmospheric Environmental Exposure Testing of Nonmetallic Materials
- ASTM G 155 Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

2.4 ANSI Publications

Available from the American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

- ANSI Z400.1 Hazard Evaluation and Safety Data Sheet and Precautionary Labeling Preparation

2.5 ISO Publications

Available from the American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

- ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories
- ISO 11890-1 Paints and Varnishes – Determination of Volatile Organic Compound (VOC) Content

3. REQUIREMENTS

3.1 Material Qualifications

The basic ingredient shall be a mineral spirits soluble polybutylmethacrylate for the pigmented coating and an unmodified acrylic which shall be soluble in aromatic hydrocarbons and shall contain no ketones, cellosolve acetate or aliphatic hydrocarbons for the clear overcoat. The pigment material shall consist of a powdered resin which contains the fluorescent dye(s).

3.1.1 Prohibited Materials

The coating materials shall contain no benzene.

3.1.2 Toxicity

The coating materials shall have no adverse effects on the health of personnel when used for its intended purpose in accordance with the manufacturer's instructions and with appropriate handling procedures per the Material Safety Data Sheet (MSDS), see 4.8.2.

3.1.3 Composition

The composition of the fluorescent coating and the clearcoat overlay shall be in accordance with Table 1.

TABLE 1 - COMPOSITION

Property	Pigmented Coating (percent by weight)	Clear Overcoat (percent by weight)
Volatile	48 max	64 max
Nonvolatile	52 max	36 min
Substituted dihydroxy benzophenone 1/ (percent of total solids)		2 min

1/ A maximum of 10 percent (based on total solids) of this stabilizer may be included in the pigmented coating

3.2 Quality

The coating material as received by the purchaser, shall be uniform in quality and condition, as free from foreign materials as commercially practical and free from imperfections detrimental to the usage of the coating. There shall be no separation of ingredients that cannot be readily dispersed by hand mixing.

3.3 Volatile Organic Compound (VOC) Content

The VOC content of the admixed coating material (when thinned to a typical spraying consistency) shall be reported in lb/gal (g/l) on the qualification test report when tested in accordance with ASTM D 3960 and ISO 11890-1. Both values shall be included in the report. The volatile portion of the pigmented coating shall be aliphatic and aromatic hydrocarbons. The volatile portion of the clear overcoat shall be aromatic hydrocarbons. Benzene shall not be present in either the pigmented coating or the clear overcoat coating.

3.4 Properties

The coating materials, when prepared in accordance with the manufacturer's instructions, shall conform to the requirements described in the following paragraphs of Table 2 determined in accordance with the specified test methods.

TABLE 2 - PROPERTIES

3.4.1	Fineness of Grind	Fineness of grind of the pigmented paint shall be a minimum of 5, reference 4.7.1.
3.4.2	Drying Time	When tested as specified in 4.7.2, separate films of pigmented paint and clear overcoat shall both dry hard within one hour. When the clear overcoat is drawn down over the pigmented film, the system shall dry hard and exhibit no tack (to touch) within 3 hours and shall dry tack free within 4 hours when tested per FED-STD-141, Method 4061.3.
3.4.3	Color (Spectrophotometric)	After drying for 24 hours, the color values of the red-orange and yellow-orange paint systems shall be in accordance with the respective "Before Exposure" values specified in Tables 3 and 4, reference 4.7.3
3.4.4	Accelerated Weathering	After exposure in the weatherometer for 300 hours (See 4.7.4), the red- orange or yellow-orange paint systems, shall meet the respective requirements specified in Tables 3 and 4 and there shall be no evidence of deterioration of the film properties (loss of intercoat adhesion, cracking, flaking, peeling, etc.).
3.4.5	Weather Resistance	The red-orange system when exposed in southern Florida for 120 000 Langley units or the yellow-orange system when exposed in southern Florida for 90 000 units, shall meet the respective requirements specified in Tables 3 and 4 and there shall be no evidence of deterioration of the film properties (loss of intercoat adhesion, cracking, flaking, peeling, etc.) reference 4.7.5
3.4.6	Condition in Container	The packaged paint, pigmented and clear, shall pour freely without stirring. There shall be no traces of grit, coarse particles, or separation of pigments, nor shall there be settling which cannot be readily redispersed with a paddle to a uniform and homogeneous state, reference 4.7.1
3.4.7	Working Properties	When the unstrained pigmented or clear paint is reduced for spraying (naphtha, TT-N-97, Type I, Grade B for the pigmented paint and toluene (A-A-59107) or xylene (A-A-59760) for the clear coat), there shall be no evidence of separation and the paint (pigmented or clear) shall show good working properties and shall dry to a uniform smooth surface free of runs, sags, bubbling, wrinkling, streaking, or other defects. When the clear coat is applied by spray over the pigmented coating, the complete fluorescent system shall be uniformly smooth and free of the above noted defects (a 1-mil film of clear is applied over a 3-mil film of pigmented coating after the latter has air-dried 4 hours at reference 4.5.2).
3.4.8	Odor	The odor of the pigmented or clear coating, wet or dry, shall be characteristic of the solvents specified in Tables 3 and 4, reference 4.7.1
3.4.9	Reduced Viscosity	Upon reducing 3 volumes of the pigmented paint with 2 volumes of aromatic naphtha (TT-N-97, Type I, Grade B) the viscosity shall be not more than 24 seconds (#4 Ford Cup). Upon reducing one volume of the clear coating with one volume of toluene A-A-59107, the viscosity shall be not more than 15 seconds (#4 Ford Cup), reference 4.7.1
3.4.10	Solvent Resistance	The clear coating shall not be affected by mineral spirits when tested as specified in 4.7.7.
3.4.11	Dilution Stability	There shall be no evidence of incompatibility when one volume of the pigmented paint is reduced with one volume of aromatic naphtha (TT-N-97, Type I, Grade B) and when one volume of the clear coating is reduced with one volume of toluene (A-A-59107) or xylene (A-A-59760). Examination of the reduced coatings shall be made after one hour, reference 4.7.1
3.4.12	Appearance (Clear Coating)	A flow-out of the clear coating as received on a glass panel shall be clear and show no evidence of incompatibility, reference 4.7.8
3.4.13	Adhesion (Knife Test)	The red-orange and yellow-orange paint systems shall show satisfactory adhesion and shall ribbon without flaking or chipping when tested in accordance with 4.7.1