



AEROSPACE MATERIAL SPECIFICATION

AMS7202™

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Temporary Protective Coating and Remover

RATIONALE

This is a new material specification which establishes requirements for a temporary protective coating and remover.

1. SCOPE

1.1 Form

This specification establishes requirements for a temporary protective coating (TPC) intended to protect aluminum surfaces from damage and corrosion. This specification also establishes requirements for an alkaline remover used to strip the specified TPCs.

1.2 Application

The coating covered by this specification is typically used to protect exterior surfaces of aircraft skins and fasteners from scratches or corrosion during fabrication, assembly, transport, storage, and depot repaint operations. The coating is intended for both indoor and outdoor use.

1.3 Classification

The coatings and removers covered by this specification shall be classified as follows:

Type I - Temporary protective coating

Class 1 - Corrosion inhibited

Class 2 - Non-corrosion inhibited

Form A - Bulk (translucent)

Form B - Aerosol (translucent)

Form C - Aerosol (opaque)

Grade 1 - Standard

Grade 2 - Rain erosion resistant

Type II - Temporary protective coating remover

Class 1 - Acrylic/polycarbonate compatible

Class 2 - Not compatible with acrylics or polycarbonates

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1.4 Safety - Hazardous Materials

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

2. APPLICABLE DOCUMENTS

The issue of the following document 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 +1 724-776-4970 (outside USA), www.sae.org.

AMS3204	Rubber, Synthetic, Low-Temperature Resistant, 25 - 35
AMS3209	Chloroprene (CR) Rubber, Weather Resistant, 65 - 75
AMS3277	Sealing Compound, Polythioether Rubber, Fast Curing for Integral Fuel Tanks and General Purpose, Intermittent Use to 360 °F (182 °C)
AMS3721	Tape for Organic Coatings Adhesion Testing
AMS3819	Cloths, Cleaning, for Aircraft Primary and Secondary Structural Surfaces
AMS4035	Aluminum Alloy, Sheet and Plate, 4.4Cu - 1.5Mg - 0.60Mn (2024-O), Annealed; or when specified, "As Fabricated" (2024-F)
AMS4037	Aluminum Alloy, Sheet and Plate, 4.4Cu - 1.5Mg - 0.60Mn (2024; -T3 Flat Sheet, -T351 Plate), Solution Heat Treated
AMS4377	Magnesium Alloy, Sheet and Plate, 3.0Al - 1.0Zn - 0.20Mn (AZ31B-H24), Cold Rolled, Partially Annealed
AMS4462	Aluminum Alloy, Sheet and Plate, Alclad, 4.4Cu - 1.5Mg - 0.60Mn (Alclad 2024, -T3 Sheet, -T351 Plate), Solution Heat Treated, Cold Worked and Naturally Aged
AMS4911	Titanium Alloy, Sheet, Strip, and Plate, 6Al - 4V, Annealed
AMS5596	Nickel Alloy, Corrosion and Heat Resistant, Sheet, Strip, Foil, and Plate, 52.5Ni - 19Cr - 3.0Mo - 5.1Cb (Nb) - 0.90Ti - 0.50Al - 18Fe, Consumable Electrode Remelted or Vacuum Induction Melted, 1775 °F (968 °C) Solution Heat Treated
AMS6345	Steel, Sheet, Strip, and Plate, 0.95Cr - 0.20Mo (0.28 - 0.33C) (SAE 4130), Normalized or Otherwise Heat Treated
AMS6415	Steel, Bars, Forgings, and Tubing, 0.80Cr - 1.8Ni - 0.25Mo (0.38 - 0.43C) (SAE 4340)
AMS-M-3171	Magnesium Alloy, Processes for Pretreatment and Prevention of Corrosion on
AMS-P-83310	Plastic Sheet, Polycarbonate, Transparent
AMS-QQ-P-416	Plating, Cadmium (Electrodeposited)

AMS-S-8802	Sealing Compound, Fuel Resistant, Integral Fuel Tanks and Fuel Cell Cavities
AS5127	Aerospace Standard Test Methods for Aerospace Sealants Methods for Preparing Aerospace Sealant Test Specimens
AS5127/1	Aerospace Standard Test Methods for Aerospace Sealants, Two-Component Synthetic Rubber Compounds
AS9100	Quality Management Systems - Requirements for Aviation, Space, and Defense Organizations

2.2 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 B117	Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM B244	Standard Test Method for Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments
ASTM D562	Standard Test Methods for Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer-Type Viscometer
ASTM D740	Standard Specification for Methyl Ethyl Ketone
ASTM D1193	Standard Specification for Reagent Water
ASTM D1894	Standard Test Method for Static and Kinetic Coefficients of Friction of Plastic Film and Sheet
ASTM D1974	Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes
ASTM D2197	Standard Test Method for Adhesion of Organic Coatings by Scrape Adhesion
ASTM D2240	Standard Test Method for Rubber Property - Durometer Hardness
ASTM D2344	Standard Test Method for Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates
ASTM D2369	Standard Test Method for Volatile Content of Coatings
ASTM D3335	Standard Test Method for Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy
ASTM D3359	Standard Test Methods for Rating Adhesion by Tape Test
ASTM D3363	Standard Test Method for Film Hardness by Pencil Test
ASTM D3718	Standard Test Method for Low Concentrations of Chromium in Paint by Atomic Absorption Spectroscopy
ASTM D3960	Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
ASTM D4060	Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser
ASTM D6905	Standard Test Method for Impact Flexibility of Organic Coatings

ASTM E70	Standard Test Method for pH of Aqueous Solutions With the Glass Electrode
ASTM F483	Standard Practice for Total Immersion Corrosion Test for Aircraft Maintenance Chemicals
ASTM F484	Standard Test Method for Stress Cracking of Acrylic Plastics in Contact with Liquid or Semi-Liquid Compounds
ASTM F485	Standard Practice for Effects of Cleaners on Unpainted Aircraft Surfaces
ASTM F502	Standard Test Method for Effects of Cleaning and Chemical Maintenance Materials on Painted Aircraft Surfaces
ASTM F519	Standard Test Method for Mechanical Hydrogen Embrittlement Evaluation of Plating/Coating Processes and Service Environments
ASTM F1110	Standard Test Method for Sandwich Corrosion Test
ASTM F1111	Standard Test Method for Corrosion of Low-Embrittling Cadmium Plate by Aircraft Maintenance Chemicals

2.3 U.S. Government Publications

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

A-A-58054	Abrasive Mats, Non-Woven, Non-Metallic
MIL-A-8625	Anodic Coating for Aluminum and Aluminum
MIL-DTL-5541	Chemical Conversion Coating on Aluminum and Aluminum Alloys
MIL-DTL-81706	Chemical Conversion Materials for Coating Aluminum and Aluminum Alloys
MIL-PRF-5425	Plastic Sheet, Acrylic, Heat Resistant
MIL-PRF-22750	Coating, Epoxy, High Solids
MIL-PRF-23377	Primer Coating, Epoxy, High Solids
MIL-PRF-25690	Plastic, Sheets, and Formed Parts, Modified Acrylic Base, Monolithic, Crack Propagation Resistant
MIL-PRF-81733	Sealing and Coating Compound, Corrosion Inhibitive
MIL-PRF-85285	Sealing and Coating Compound, Corrosion Inhibitive

2.4 PRI Publications

Available from Performance Review Institute, 161 Thorn Hill Road, Warrendale, PA 15086-7527, Tel: 724-772-1616, www.pri-network.org.

PD2000	Governance and Administration of an Industry Managed Product Qualification Program
PD2001	Manufacturer Request for Product Approval and Qualification Process
PRI-QPL-AMS7202	Products Qualified Under AMS7202

2.5 ISO/ANSI Accredited Publications

Copies of these documents are available online at <http://webstore.ansi.org/>.

ISO 9001	Quality Management System
ISO 11890-1	Paints and Varnishes - Determination of Volatile Organic Compound (VOC) Content - Part 1: Difference Method
ISO/IEC 17025	General Requirements for the Competence of Testing and Calibration Laboratories
ANSI/ASQ Z1.4	Sampling Procedures and Tables for Inspection by Attributes
ANSI Z400.1/Z129.1	Hazardous Workplace Chemicals - Hazard Evaluation and Safety Data Sheet and Precautionary Labeling Preparation

3. TECHNICAL REQUIREMENTS

3.1 Materials

Composition of the coating material and remover are not specified, providing they will meet the performance requirements set forth in this specification and are suitable for spray or brush application.

3.1.1 Prohibited Materials

The coating material, when tested in accordance with ASTM D3335, shall contain no cadmium or cadmium compounds and no more than 0.06% lead or lead compounds. It shall also contain no chromium or chromium compounds, with incidental chromium content not exceeding 5 ppm, when tested in accordance with ASTM D3718. Suppliers of the remover shall certify that the formulation contains no cadmium or cadmium compounds, lead or lead compounds, and chromium or chromium compounds.

3.1.2 Toxicity

The coating material and remover shall have no adverse effect on the health of personnel when used for its intended purpose in accordance with manufacturer's instructions and with appropriate handling procedures and precautions per the safety data sheet (see 4.8.2).

3.2 Quality

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

3.3 VOC Content

The volatile organic compound (VOC) content of the Type I, Form A coating material, prepared in accordance with the manufacturer's instructions, and of the Type II remover shall be less than 320 g/l when tested in accordance with ASTM D3960 (calculate using Paragraph 10.2 and Appendices X2 and X3) and ISO 11890-1 (calculate using Method 3). Both the ASTM and ISO values shall be included in the report.

3.4 Properties

The coating material and remover, when prepared in accordance with the manufacturer's instructions, shall conform to the requirements shown in Tables 1 and 2, respectively, determined in accordance with the specified test methods.

Table 1 - TPC (Type I) properties

Paragraph	Property	Requirement	Test Method Paragraph
3.4.1	Solids Content	Report % by weight	4.7.5.1
3.4.2	Viscosity (Type I, Form A only)	68-100 KU	4.7.5.2
3.4.3	Color and Translucency	Tinted to be readily discernable after application; substrate scratches discernable after weathering (Form A and B); tinted to be opaque (Form C)	4.7.5.3
3.4.4	Slip Resistance	μ_s of TPC coated panel $\geq \mu_s$ of unfinished aluminum	4.7.5.4
3.4.5	Abrasion Resistance	≥ 500 cycles/mil thickness (average)	4.7.5.5
3.4.6	Corrosion Resistance	No blistering or lifting of TPC; no substrate pitting	4.7.5.6
3.4.7	Weather Resistance	No cracking, blistering, flaking, checking, or embrittlement penetrating to substrate; $\leq 30\%$ decrease in thickness; adhesion rating $\geq 4A$; must conform to impact flexibility requirements	4.7.5.7
3.4.8	Cyclic Temperature Resistance	No blistering; no softening more than two units from unexposed hardness; adhesion rating $\geq 4A$; must conform to impact flexibility requirements	4.7.5.8
3.4.9	Adhesion - Wet Tape	Adhesion rating $\geq 4A$	4.7.5.9
3.4.10	Adhesion - Scrape	No adhesion loss	4.7.5.10
3.4.11	Impact Flexibility	$\geq 20\%$	4.7.5.11
3.4.12	Water Resistance	No blistering; no softening more than two units from unexposed hardness; adhesion rating $\geq 4A$	4.7.5.12
3.4.13	Rain Erosion Resistance (Type I, Grade 2 only)	≤ 0.25 inch (6.35 mm) peel from coating edge	4.7.5.13
3.4.14	TPC Removability	First application: $\geq 90\%$ removal center area of assembly, 100% removal remaining area of assembly, 100% removal from individual panels Second Application: 100% removal in center area of assembly	4.7.5.14

Table 2 - TPC remover (Type II) properties

Paragraph	Property	Requirement	Test Method Paragraph
3.4.15	TPC Removability	First Application: ≥90% removal center area of assembly, 100% removal remaining area of assembly, 100% removal from individual panels Second Application: 100% removal in center area of assembly	4.7.5.14
3.4.16	pH	7-12.5	4.7.5.15
3.4.17	Nonvolatile Matter	Report in %	4.7.5.16
3.4.18	Viscosity	Report in KU	4.7.5.17
3.4.19	Total Immersion Corrosion	Maximum weight loss per Table 3; no visible corrosion or pitting	4.7.5.18
3.4.20	Sandwich Corrosion	No more corrosion than control panels exposed to reagent water	4.7.5.19
3.4.21	Effects on Unpainted Metal	No streaking or permanent stains	4.7.5.20
3.4.22	Dissimilar Metal Corrosion	No more corrosion, etching, or pitting than control panels exposed to reagent water	4.7.5.21
3.4.23	Hydrogen Embrittlement	Non-embrittling (passive chemical)	4.7.5.22
3.4.24	Low-Embrittling Cadmium Plate Corrosion	Maximum weight of 0.14 mg/cm ² /24 hours	4.7.5.23
3.4.25	Effects on Polysulfide and Polythioether Sealants	≤5 durometer hardness change	4.7.5.24
3.4.26	Effects on Rubber	≤5 durometer hardness change	4.7.5.25
3.4.27	Effects on Painted Surfaces	No permanent streaking, discoloration, blistering; no softening more than two units from unexposed hardness	4.7.5.26
3.4.28	Stress Cracking of Acrylic and Polycarbonate Plastics (Type II Class 1 only)	No crazing, staining, or stretching	4.7.5.27
3.4.29	Effects on Polyimide Insulated Wiring	No dielectric leakage and no visual effect greater than that of distilled water	4.7.5.28
3.4.30	Effects on Composites	≤5% reduction in interlaminar shear strength	4.7.5.29
3.4.31	Suitability for Refinishing	Water-break free surface	4.7.5.30