



AEROSPACE MATERIAL SPECIFICATION

AMS3175™**REV. B**Issued 2008-06
Revised 2026-05

Superseding AMS3175A

(R) Chrome-Free Surface Pretreatment Prior to Painting

RATIONALE

Changes were made to allow manufacturers to define the cleaning and deoxidizing process and clarify the acceptance testing requirements, qualification test requirements, test methods, and quality assurance procedures. Also, the specification was reformatted per the latest G8 template.

1. SCOPE

1.1 Form

This specification establishes requirements for chrome-free surface pretreatment materials used for surface preparation of metallic surfaces prior to applying organic coatings.

1.2 Application

The pretreatment materials covered by this specification are typically used on metallic surfaces in preparation for application of MIL-PRF-23377 or MIL-PRF-85582 primers, but usage is not limited to such applications. The pretreatment materials may be applied to external and internal aircraft surfaces, off-aircraft part surfaces, and aircraft surfaces undergoing touch-up/repairs.

1.3 Classification

The pretreatment materials shall be classified as follows:

- Type 1 Suitable for spray application
- Type 2 Suitable for immersion application
- Type 3 Suitable for manual or hand application (i.e., brush, wipe, or other touch-up methods)

- Class C Qualified for use with primers that contain hexavalent chromium
- Class N Qualified for use with primers that contain no hexavalent chromium

- Grade I 0 to 2.1 lb/gal (0 to 250 g/L) volatile organic content (VOC)
- Grade II 2.11 to 6.55 lb/gal (251 to 780 g/L) VOC

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.

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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: 1-877-606-7323 (U.S. and Canada only) or 1-724-776-4970 (outside U.S. and Canada), www.sae.org.

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 (2024-0), 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
AMS4041	Aluminum Alloy, Sheet and Plate, Alclad, 4.4Cu - 1.5Mg - 0.60Mn (2024, -T3 Sheet/-T351 Plate with 1-1/2% Alclad), Solution Heat Treated, Cold Worked, and Naturally Aged
AMS4045	Aluminum Alloy, Sheet and Plate, 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr, 7075: (-T6 Sheet, -T651 Plate), Solution and Precipitation Heat Treated
AMS4049	Aluminum Alloy, Sheet and Plate, Alclad, 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (Alclad 7075; -T6 Sheet - T651 Plate), Solution and Precipitation Heat Treated
AMS4911	Titanium Alloy, Sheet, Strip, and Plate, 6Al - 4V, Annealed
AMS-STD-595	Colors Used in Government Procurement
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 Apparatus
ASTM D740	Standard Specification for Methyl Ethyl Ketone
ASTM D1974	Standard Practice for Methods of Closing, Sealing and Reinforcing Fiberboard Boxes
ASTM D3359	Standard Test Method for Measuring Adhesion by Tape Test
ASTM D3960	Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
ASTM D6905	Standard Test Method for Impact Flexibility of Organic Coatings

2.3 U.S. Government Publications

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

MIL-C-8514 (ASG)	Coating Compound, Metal Pretreatment, Resin-Acid
MIL-DTL-5541	Chemical Conversion Coatings on Aluminum and Aluminum Alloys
MIL-DTL-81706	Chemical Conversion Materials for Coating Aluminum and Aluminum Alloys
MIL-PRF-23377	Primer Coatings: Epoxy, High-Solids
MIL-PRF-85285	Topcoat, Aircraft and Support Equipment
MIL-PRF-85570	Cleaning Compounds, Aircraft, Exterior
MIL-PRF-85582	Primer Coatings; Epoxy, Waterborne

2.4 PRI Publications

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

PD2000	PRI-QPL Program Requirements
PRI QPL-AMS3175	Products Qualified under AMS3175

2.5 ANSI Publications

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

ANSI Z400.1/Z129.1	Hazardous Workplace Chemicals - Hazard Evaluation and Safety Data Sheet and Precautionary Labeling Preparation
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2.6 ISO Publications

Copies of these documents are available online at www.iso.org/store.

ISO/IEC 17025	General Requirements for the Competence of Testing and Calibration Laboratories
ISO 4628-2	Paints and varnishes - Evaluation of degradation of coatings –[Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 2: Assessment of degree of blistering
ISO 4628-8	Paints and varnishes - Evaluation of degradation of coatings - Designation of quantity and size of defects, and of intensity of uniform changes in appearance - Part 8: Assessment of degree of delamination and corrosion around a scribe or other artificial defect
ISO 11890-1	Paints and varnishes - Determination of volatile organic compounds (VOC) and/or semi volatile organic compounds (SVOC) content - Part 1: Gravimetric method for VOC determination

3. TECHNICAL REQUIREMENTS

3.1 Materials

Composition of the pretreatment material is not specified, except for the following:

3.1.1 Prohibited Materials

The manufacturer of the pretreatment material shall certify that no chromium or chromium compounds have been intentionally added to the formulation.

3.1.2 Toxicity

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

3.2 Quality

The pretreatment material, as received, shall be uniform in quality and condition and free from foreign materials and from imperfections detrimental to the usage. There shall be no separation of ingredients that cannot be readily dispersed by hand mixing and no skinning, gelling, hard settlement, or other objectionable properties that would prevent satisfactory application to produce a defect-free pretreatment.

3.2.1 Clear pretreatment components supplied in liquid form shall be homogenous and either transparent or translucent.

3.2.2 Pretreatment components supplied in powder form shall be free flowing and free of any agglomerates that cannot be readily broken up and dissolved under normal agitation in preparation for use. Pretreatment powders shall be readily soluble when mixed according to the manufacturer's instructions.

3.3 VOC Content

The VOC content of the admixed pretreatment material shall comply with the ranges specified by Grade (see 1.3). It shall be reported in lb/gal (g/L) on the qualification test report 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). ASTM and ISO values shall be included in the report.

3.4 Properties

The pretreatment material, when prepared in accordance with the manufacturer's instructions, shall conform to the requirements shown in Table 1, determined in accordance with the specified test methods.

Table 1 - Properties

Paragraph	Property	Requirement	Test Method Paragraph
3.4.1	Pot Life ⁽¹⁾	8 hours, min	4.7.5.1
3.4.2	Drying Time	4 hours, max	4.7.5.2
3.4.3	Wet Tape Adhesion	No delamination or peel and a rating of 4A or better.	4.7.5.3
3.4.4	Cross-Hatch Adhesion	No delamination or peel and a rating of 4B or better.	4.7.5.4
3.4.5	Aged Cross-Hatch Adhesion	No delamination or peel and a rating of 4B or better.	4.7.5.5
3.4.6	Flexibility	No decrease in elongation caused by the surface pretreatment compared to the control specimen.	4.7.5.6
		Class C: No blisters or undercutting from the scribe; no discoloration in the scribe and no pitting in the scribe.	4.7.5.7
3.4.7	Corrosion Resistance - Neutral Salt Spray	Class N: Corrosion width 0.125 inch (3.2 mm), maximum, when evaluated per ISO 4628-8. No blistering away from the scribe line of size S(2) or greater when evaluated per ISO 4628-2.	
3.4.8	Corrosion Resistance - Filiform	No filiform corrosion extending beyond 0.25 inch (6.35 mm) from the scribe, with the majority of the filaments less than 0.125 inch (3.18 mm) in length.	4.7.5.8

⁽¹⁾ Pot Life references are only applicable to multicomponent systems and powders.

3.5 Shelf Life

Shelf life shall be a minimum of 12 months from the date of packaging when stored in the original, unopened containers at a temperature between 40 and 95 °F (4.4 and 35 °C). If repackaged, pretreatment material documentation shall maintain the original date of packaging for shelf life verification.

3.5.1 Accelerated Storage Stability

The pretreatment material, after storage in the original, unopened containers for 45 days at 125 °F ± 5 °F (51.7 °C ± 3 °C), and applied near the end of the minimum 8-hour pot life, if applicable, as in 3.4.1, shall conform to the requirements of Drying Time (see 3.4.2), Wet Tape Adhesion (see 3.4.3), Cross-Hatch Adhesion (see 3.4.4), and Flexibility (see 3.4.6). The control panels used in Flexibility (see 3.4.6) shall also be used during accelerated storage stability testing for this property.

4. QUALITY ASSURANCE PROVISIONS

4.1 Qualification of Pretreatment Material

Qualification is the process by which material properties of a pretreatment material are verified through testing at a certified laboratory prior to inclusion on a qualified products list (QPL). All pretreatment materials sold to this specification shall be listed, or approved for listing, on an approved QPL in accordance with PD2000.

4.1.1 Qualified Products Lists

PRI QPL-AMS3175 is the approved QPL managed by the Performance Review Institute (PRI), 161 Thorn Hill Road, Warrendale, PA 15086-7527, Tel: 724-772-1616. Information pertaining to qualification of pretreatment material may be obtained from PRI.