



1. SCOPE

1.1 Scope. This specification covers the requirements for low volatile organic compound (VOC), chemical and solvent resistant primer coatings formulated primarily for application by various spray techniques.

1.2 Classification. The primer coatings shall be furnished in the following types and classes as specified:

- Type I - Standard
- Type II - Low Infrared (IR) Reflective
- Class 1 - General Usage Hydraulic Fluid Resistant
- Class 2 - Phosphate Ester Hydraulic Fluid Resistant

1.3 Application. The primer covered by this specification when mixed as specified by the manufacturer shall produce a material of suitable viscosity for application to vertical and horizontal surfaces by spray application.

2. APPLICABLE DOCUMENTS

2.1 Issues of documents. The following documents of the issue in effect on date of invitation for bids or request for proposal form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

- QQ-A-250/4 Aluminum Alloy 2024, Plate and Sheet.
- QQ-A-250/5 Aluminum Alloy Alclad 2024, Plate and Sheet.
- QQ-A-250/12 Aluminum Alloy 7075, Plate and Sheet.

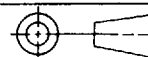
① INACTIVE FOR NEW DESIGN AFTER APRIL 15, 1993. NO SUPERSEDING STANDARD.

LIST OF CURRENT SHEETS

NO.	REV.	NO.	REV.	NO.	REV.	NO.	REV.
1	1	7	NEW	13	NEW	19	NEW
2	NEW	8	NEW	14	NEW	20	NEW
3	NEW	9	NEW	15	NEW	21	NEW
4	NEW	10	NEW	16	NEW	22	NEW
5	NEW	11	NEW	17	NEW	23	NEW
6	NEW	12	NEW	18	NEW	24	NEW

CUSTODIAN Materials and Structures Committee

THIRD
ANGLE
PROJECTION



PROCUREMENT
SPECIFICATION

TITLE

PRIMER COATING: LOW VOLATILE ORGANIC COMPOUND,
CHEMICAL AND SOLVENT RESISTANT

CLASSIFICATION
SPECIFICATION

NAS 1534

Sheet 1 of 24

- QQ-M-44 Magnesium Alloy Plate and Sheet (AZ31B).
- TT-M-261 Methyl Ethyl Ketone, Technical.
- TT-N-95 Naphtha, Aliphatic.
- TT-S-735 Standard Test Fluids, Hydrocarbon.
- CCC-C-419 Cloth, Duck Cotton, Unbleached, Plied Yarns, Army and Numbered.
- PPP-P-1892 Paint, Varnish, Lacquer and Related Materials; Packaging, Packing, and Marking.

MILITARY

- MIL-C-5541 Chemical Conversion Coatings on Aluminum and Aluminum Alloys.
- MIL-T-5624 Turbine Fuel, Aviation, Grades JP-4 and JP-5.
- MIL-C-8507 Coating, Wash Primer (Pretreatment) for Metals, Application of (For Aeronautical Use).
- MIL-C-8514 Coating Compound, Metal Pretreatment, Resin-acid (ASG).
- MIL-A-8625 Anodic Coatings for Aluminum and Aluminum Alloys.
- MIL-S-8802 Sealing Compound, Temperature-resistant, Integral Fuel Tanks and Fuel Cell Cavities, High Adhesion.
- MIL-L-23699 Lubricating Oil, Aircraft Turbine Engine, Synthetic Base.
- MIL-M-45202 Magnesium Alloys, Anodic Treatment of.
- MIL-T-81533 Trichloroethane, 1,1,1, (Methyl Chloroform) Inhibited, Vapor Degreasing.
- MIL-H-83282 Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Aircraft.
- MIL-C-83286 Coating, Urethane, Aliphatic Isocyanate, for Aerospace Applications.
- MIL-G-83410 Graphite Fiber Resin Impregnated Tape and Sheet, for Hand Lay-up.
- MIL-S-83430 Sealing Compound, Integral Fuel Tank & Fuel Cell Cavities, Intermittent Use to 360°F (182°C).

THIS DRAWING SUPERSEDES ALL ANTECEDENT STANDARD DRAWINGS FOR THE SAME PRODUCT AND SHALL BECOME EFFECTIVE NO LATER THAN SIX MONTHS FROM THE LAST DATE OF APPROVAL SHOWN HEREON.

STANDARDS

FEDERAL

FED-STD-595

Colors.

Fed. Test Method
Std. NO. 141Paint, Varnish, Lacquer and Related Materials;
Method of Inspection, Sampling and Testing.

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

NATIONAL AEROSPACE

NAS-1545 Coating: Low Volatile Organic Compound, For Topcoat Applications.

Application for copies should be addressed to The National Standards Association, 5161 River Road, Bethesda, MD 20816.

- 2.2 Other Publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply, except for the specific issue adopted by the Department of Defense as listed in the current Department of Defense Index of Specifications and Standards.

SOCIETY OF AUTOMOTIVE ENGINEERS, INC.

AMS-4911; Titanium Alloy Sheet, Strip, and Plate, 6Al - 4V, Annealed.

AS 1241 Fire Resistant Phosphate Ester Hydraulic Fluid For Aircraft, Type IV, Class 1.

(Application for copies should be addressed to the Society of Automotive Engineers, Inc., SAE Order Dept, 400 Commonwealth Drive, Warrendale, PA 15096.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B117 Salt Spray (Fog) Testing.

ASTM D522 Elongation of Attached Organic Coatings with Conical Mandrel Apparatus.

ASTM D1193 Reagent Water.

ASTM D1200 Viscosity of Paints, Varnishes, and Lacquers by Ford Viscosity Cup.

ASTM D1210 Fineness of Dispersion of Pigment Vehicle Systems, Test for.

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- ASTM D1296 Odor of Volatile Solvents and Diluents, Test for.
- ASTM D1308 Effect of Household Chemicals on Clear & Pigmented Organic Finishes.
- ASTM D1640 Drying, Curing, or Film Formation of Organic Coatings at Room Temperature, Test for.
- ASTM D1849 Package Stability of Paint, Test for.
- ASTM D2247 Coated Metal Specimens at 100% Relative Humidity, Test for.
- ASTM D2369 Volatile Content of coatings, Test for.
- ASTM D2621 Infrared Identification of Vehicle Solids from Solvent Type Paints, Test for.
- ASTM D2650 Chemical Composition of Gases by Mass Spectrometry, Test for.
- ASTM D2794 Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact), Test for.
- ASTM D3335 Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy.
- ASTM D3792 Water Content of Waterborne Paints by Direct Injection Into a Gas Chromatograph, Test for.
- ASTM D3960 Volatile Organic Content (VOC) of Paints and Related Coatings.
- ASTM D3973 Low Molecular Weight Halogenated Hydrocarbons in Water.
- ASTM STP 500 Paint Testing Manual.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

CODE OF FEDERAL REGULATIONS

- 29 CFR 1910.1200. Material Safety Data Sheets; Preparation and Submission of.
- 49 CFR 171-178 Department of Transportation Regulations for the Transportation of Explosives and other Dangerous Articles by Land or Water.

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 20402. Orders should cite the latest edition and supplements thereto.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

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3. REQUIREMENTS

- 3.1 Qualification. The primers furnished under this specification shall be products which have been qualified to the requirements of this specification at the time set for opening of bids (see 4.3 and 6.3). Any change in the formulation of a qualified product will necessitate its requalification.
- 3.1.1 Retention of Qualification. To retain qualification, the Manufacturer shall verify by certification, that his product has not been changed in any way. The time span allowed before requalification becomes mandatory, shall be two (2) years unless the manufacturer has furnished material to this specification in the interim following initial qualification. It is the responsibility of the manufacturer to retain qualification by certification.
- 3.1.2 Temporary Qualification. Upon successful completion of the qualification tests specified herein, except for Storage Stability (3.5.3), a coating material may receive temporary approval for this specification. Final approval shall then be based on successfully passing the tests for storage stability.
- 3.2 Toxicity. The manufacturer shall certify that the coatings contain no substance known to be toxic to the user under normal conditions of usage. Material safety data sheets shall be prepared and submitted in accordance with 29 CFR 1910.1200. The formulation of this coating shall not contain lead or aziridine (ethylimine m.w. = 43.0) when tested in accordance with 4.6.2.
- 3.3 Composition. The primers shall be furnished in one or more components. The vehicle shall be a resin system meeting the requirements of this specification. The primer shall not contain chlorinated solvents when tested in accordance with 4.6.2.1.
- 3.3.1 Volatile Organic Compounds. The primers, when ready for application, shall contain no more than 350 grams per liter of volatile organic compounds (VOC) less water, when tested per 4.6.1. The percentage of water in the as-received primer shall be determined (for information purposes only) in accordance with 4.6.1.1.
- 3.3.2 Thinner (Reducer). The thinner (if required) shall be specified by the primer manufacturer. Thinner, when used to adjust the primer for spray application, shall not cause the VOC to exceed 350 grams per liter, when tested per 4.6.1.
- 3.3.3 Infrared Signature. The infrared signature of the as-received primer (both Type I and Type II) shall be established at the time of qualification from three (3) separate batches. Each new batch shall be tested for its infrared signature. The IR signature of the new batch shall match the averaged signature of the qualification lots within 10% of the peak values. Additional major peaks or missing major peaks (observed previously), when tested in accordance with the provisions

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3.3.3 of 4.6.3.1 shall be cause for rejection of the batch. A copy of the (cont.) spectrum signature shall accompany each batch of primer.

3.3.3.1 Type II Infra-Red Signature. The maximum percent infrared total reflectance of the type II primer, when determined in accordance with the provisions of 4.6.3.2, shall be less than 10% that of magnesium carbonate throughout the range of 1000 to 2700 nanometers.

3.4 Quantitative Requirements.

3.4.1 Total Solids. Total solids of the batch conformance sample shall not vary more than $\pm 2\%$ by weight of the reported value for the qualification sample, when tested in accordance with 4.6.4. The nonvolatile content of each of the components shall be determined separately in accordance with 4.6.4.

3.4.2 Fineness of Grind. Fineness of grind shall not be less than 5, when tested in accordance with 4.6.5.

3.5 Physical Properties - Liquid

3.5.1 Odor. The odor of the primer, as packaged, or as a wet (or dry) film after application, shall be characteristic of the resins and thinners used and shall not be obnoxious when tested in accordance with 4.6.7.

3.5.2 Appearance and Condition in Container. Packaged primer, that has been allowed to stand without agitation for at least two weeks in closed containers at a temperature of 5° to 40°C (40° to 100°F), shall be free of caking, skins, lumps, grit, pressure, odor of spoilage, corrosion of the container, and all foreign contaminants and shall be capable of being easily stirred to a smooth homogeneous condition when tested in accordance with 4.6.8.

3.5.3 Storage Stability. The product as packaged by the manufacturer shall still meet all the requirements specified herein after a period of one year from the date of manufacture when stored between 5° to 40°C (40° to 100°F), when tested in accordance with 4.6.10.

3.5.3.1 Shelf Life. Shelf life shall be at least one year from the date of manufacture. Shelf life may be extended up to one additional year upon verifying conformity to paragraph No.'s 3.5.2, 3.6.4, 3.6.5, 3.6.6, 3.7.2, 3.7.3, and 3.7.4.

3.5.3.2 Freeze/Thaw Stability. The product as packaged by manufacturer shall score no less than seven (7) average rating when tested in accordance with 4.6.10.1.

3.5.4 Accelerated Storage Stability. The product, as packaged by the manufacturer, shall meet all the requirements specified herein after 7 days, when tested in accordance with 4.6.11.

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NATIONAL AEROSPACE STANDARD

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3.6 Working Properties.

3.6.1 Mixing. The components (if more than one), in the ratio specified by the manufacturer, shall easily blend to a smooth homogeneous product (see 4.6.28).

3.6.2 Viscosity. The viscosity of the freshly mixed, ready-to-use primer shall be the viscosity recommended by the manufacturer for spray application, when tested in accordance with 4.6.9.

3.6.3 Settling. After standing undisturbed for 8 hours, the mixed and reduced coating material shall be free of curdling, precipitation and separation which cannot be easily redispersed by remixing (60 seconds of vigorous shaking in a stoppered graduate). Examine per 4.6.8.

3.6.4 Pot Life. When mixed for spray application, the usable pot life shall be not less than eight(8) hours at $25^{\circ} \pm 3^{\circ}\text{C}$ ($75^{\circ} \pm 5^{\circ}\text{F}$). The product after standing for 8 hours shall meet all the requirements as specified herein. Continuous agitation during the pot life determination is permissible. Retest for viscosity in accordance with 4.6.9. No more than 5 seconds increase in viscosity shall be allowed.

3.6.4.1 Processing Time. The maximum time allowable after surface treatment (see Table III) prior to application of the primer shall be no more than 48 hours nor less than 24 hours.

3.6.5 Drying Time. The applied primer on any aluminum substrate prepared per 4.5.1, shall air dry at standard conditions (see 4.6.12) within the following maximum time periods when tested in accordance with 4.6.12:

- | | |
|---|------------|
| a. Dust free | 25 minutes |
| b. Dry to recoat | 45 minutes |
| c. Resistance to Marring by Tape
(Print free time) | 1 hour |
| d. Dry to Stack (Dry to handle) | 2 hours |

3.6.6 Maximum Cure Time. After curing at $25^{\circ} \pm 3^{\circ}\text{C}$ ($75^{\circ} \pm 5^{\circ}\text{F}$), in a humidity range of $50 \pm 5\%$ R.H., for a maximum of seven days, the applied primer shall be tested in accordance with 4.6.13. The substrate shall not be exposed during the first fifty (50) double strokes. Exposure of any metal constitutes a non-cured film.

- NOTES:
1. Do not test any area that has been previously wetted with MEK.
 2. Some pigment will usually be found on the cheesecloth and does not constitute film failure.

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3.7 Physical Properties - Film.

3.7.1 Color. The color of the primer shall approximate the following Fed. Std. 595 color numbers when tested in accordance with 4.6.6.

<u>Color number</u>	<u>Type</u>	<u>Class</u>
23785	I	1
23793	I	2
34052	II	1
34058	II	2

3.7.2 Surface Appearance. The admixed primer, when reduced, shall spray satisfactorily on vertical and horizontal surfaces with no sagging, running, or streaking. The dried film shall be free from surface irregularities (see 4.6.14).

3.7.3 Lifting. There shall be no evidence of lifting or any other film irregularity upon applying a topcoat meeting NAS-1545 or MIL-C-83286 after the primer has air dried for a minimum of 45 minutes to a maximum of 24 hours (see 4.6.15).

3.7.4 Adhesion (tape test).

3.7.4.1 Primer only. When tested as specified in 4.6.16, the primer film shall not peel away from the substrate.

3.7.4.2 Primer with Topcoat. When topcoated with a coating meeting NAS-1545 or MIL-C-83286, and tested as specified in 4.6.16, the primer film shall not peel away from the substrate nor shall the topcoat delaminate from the primer. If failure occurs between primer and topcoat, the tests shall be repeated (no more than once) on freshly prepared samples.

3.7.5 Flexibility.

3.7.5.1 Impact Resistance. The primer shall not crack or lose adhesion, when subjected to an impact of 11.3 N-m (80 inch-pounds) on both the coated and uncoated side of the panel when tested in accordance with 4.6.17.

3.7.5.2 Metal Anchorage (Bend Adhesion). The applied primer shall show satisfactory adhesion with no flaking and no cracking beyond 12.5 mm (1/2 inch) from the 3.0 mm (1/8 inch) end of a conical mandrel when tested in accordance with 4.6.18.

3.8 Resistance Properties.

3.8.1 Fluid Resistance. Applied to Code "B" (see Table III) panels, the primer (and the primer with specified top coat where required) shall withstand immersion at $25^{\circ} \pm 3^{\circ}\text{C}$ ($75^{\circ} \pm 5^{\circ}\text{F}$), or at the temperatures specified in Table I, for the time specified, in the fluids listed in Table I, without blistering, loss of adhesion, softening, or other film failures when tested in accordance with 4.6.19 and 4.6.20.

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