SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS3144

Issued 2012-11

Primer, Anodic Electrodeposition for Aircraft Applications

RATIONALE

This is a new document to cover the need for an electrodeposition primer specification.

1. SCOPE

1.1 Form

This specification establishes the requirements for a waterborne, corrosion inhibiting, chemical and solvent resistant, anodic electrodeposition epoxy primer capable of curing at 200 to 210 °F (93 to 99 °C).

1.2 Application

The primers covered by this specification are typically applied as base primers on military, general aviation, and commercial aircraft aluminum surfaces to protect against corrosion. They are suitable for use in a service temperature range from -65 to 250 °F (-54 to 121 °C).

1.3 Classification

The coating materials covered by this specification shall be classified as follows:

Type 1 – Standard pigments
Type 2 – Low IR (Infrared) pigments

Class C – Chromated – contains chromium based corrosion inhibitors
Class N – Chrome-Free – contains no chromium based corrosion inhibitors

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 canceled 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.

AMS1640	Corrosion Removing Compound, for Aircraft Surfaces
AMS2629	Fluid, Jet Reference
AMS2825	Material Safety Data Sheets
AMS3277	Sealing Compound, Polythioether Rubber, Fast Curing for Integral Fuel Tanks and General Purpose, Intermittent Use to 360 °F (182 °C)
AMS-QQ-A-250/4	Aluminum Alloy 2024, Plate and Sheet
AMS-QQ-A-250/5	Aluminum Alloy, Alclad 2024, Plate and Sheet
AMS-S-8802	Sealing Compounds, Temperature Resistant, Integral Fuel Tanks and Fuel Cell Cavities, High Adhesion
AS1241	Fire Resistant Phosphate Ester Hydraulic Fluid for Aircraft
AS5127/1	Aerospace Standard Test Methods for Aerospace Sealants Two Component Synthetic Rubber Compounds

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 B 117	Operating Salt Spray (Fog) Apparatus
ASTM D 329	Standard Specification for Acetone
ASTM D 522	Mandrel Bend Test of Attached Organic Coatings
ASTM D 740	Standard Specification for Methyl Ethyl Ketone
ASTM D 1974	Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes
ASTM D 2247	Water Resistance of Coatings in 100% Relative Humidity
ASTM D 2794	Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D 3359	Measuring Adhesion by Tape Test
ASTM D 3363	Film Hardness by Pencil Test

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ASTM D 3960 Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings

ASTM D 4399 Measuring Electrical Conductivity of Electrocoat Baths

ASTM D 5402 Standard Practice for Assessing the Solvent Resistance of Organic Coatings Using Solvent Rubs

ASTM D 7091 Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals

ASTM G 85 Modified Salt Spray (Fog) Testing

2.3 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/.

29 CFR 1910.1200 Occupational Safety and Health Hazards (Hazard Communication)

FED-STD-141 Paints, 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

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

MIL-DTL-5541 Chemical Conversion Coatings on Aluminum and Aluminum Alloys

MIL-PRF-7808 Lubricating Oil, Aircraft Turbine Engine, Synthetic Base

MIL-PRF-23377 Primer Coatings: Epoxy, High Solids

MIL-PRF-23699 Lubricating Oil, Aircraft Turbine Engine, Synthetic Base, NATO Code Number 0-156

MIL-PRF-81733 Sealing and Coating Compound, Corrosion Inhibitive

MIL-PRF-83282 Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Aircraft, Metric, NATO Code Number H-537

MIL-PRF-85285 Coating: Polyurethane, Aircraft and Support Equipment

MIL-PRF-85582 Primer Coatings, Epoxy, Waterborne

TT-R-2918 Remover, Paint, No Hazardous Air Pollutants (HAPS)

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 Procedures for an Industry Qualified Product Management Process

PRI QPL-AMS3144 Products Qualified Under AMS3144

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2.5 ISO Publications

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

ANSI Z400.1 Material Safety Data Sheets

ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories

ISO 11890-1 Determination of Volatile Organic Compound (VOC) Content

3. TECHNICAL REQUIREMENTS

3.1 Materials

The primer shall be formulated in accordance with the manufacturer's material specification for anodic electrodeposition primer such that it meets the performance requirements set forth in this specification.

3.1.1 Composition

3.1.1.1 Resin feed component

The resin feed component shall consist of epoxy or epoxy-urethane resin combined with flow control agents and volatile solvents.

3.1.1.2 Pigment paste component

The pigment paste component shall consist of a resin combined with pigments, extenders, and volatile solvents.

3.1.1.3 Characteristics

The following characteristics (expressed as tolerance ranges) of the resin feed and pigment paste components shall be established by the manufacturer at the time of initial process approval.

a. Total solids, percent by weight

b. Weight per gallon

c. pH range (resin dispersion only)

d. Viscosity, centipoise-second

e. Condition in container

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3.1.1.4 Mixed primer

The following characteristics (expressed as tolerance ranges) of the mixed primer shall be established by the manufacturer at the time of initial process approval.

a. Total solids, percent by weight

b. Pigment/Binder content

c. pH range

d. Conductivity, micromhos

e. Volatile organic compounds (VOC), lbs/gal (gm/L)

f. Cure time and temperature

g. Dry film thickness

3.1.2 Prohibited Materials

The primer shall contain no lead or cadmium. Class N primer shall additionally contain no chromium compounds.

3.1.3 Toxicity

The primer 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 material safety data sheet (See 4.8.2).

3.2 Odor

The odor of the primer components and the mixed primer shall not be obnoxious nor cause discomfort to personnel during mixing or application.

3.3 VOC Content

The volatile organic compound (VOC) content of the mixed primer shall be reported in lbs/gal (g/L) on the qualification test report when tested in accordance with ASTM D 3960 (calculate using Paragraph 10.2 and Appendices X2 and X3) and ISO 11890-1 (calculate using Method 3).

3.4 Storage Stability

The primer components (resin feed and pigment paste), in its original packaged and unopened condition, shall meet all the requirements in this specification for a period of twelve months from date of manufacture when stored in a temperature range of 60 °F (15 °C) to 90 °F (32 °C).

3.5 Properties

The primer, 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.

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TABLE 1 - PROPERTIES

Paragraph	Property	Test Requirement
3.5.1	Quality	Visual
3.5.2	Color	Visual
3.5.3	Thickness	4.7.5.1
3.5.4	Hardness	4.7.5.2
3.5.5.1	Flexibility – Impact Resistance	4.7.5.3.1
3.5.5.2	Flexibility – Low Temperature	4.7.5.3.2
3.5.5.3	Flexibility – Elongation	4.7.5.3.3
3.5.6.1	Adhesion – Wet Tape Test	4.7.5.4.1
3.5.6.2	Adhesion – Dry Tape Test	4.7.5.4.2
3.5.7.1	Compatibility – Topcoats	4.7.5.5.1
3.5.7.2	Compatibility – Repair Primer	4.7.5.5.2
3.5.7.3	Compatibility – Sealant Adhesion	4.7.5.5.3
3.5.8	Fluid Resistance	4.7.5.6
3.5.9	Humidity Resistance	4.7.5.7
3.5.10	Solvent Resistance	4.7.5.8
3.5.11.1	Corrosion Resistance – Neutral Salt Spray	4.7.5.9.1
3.5.11.2	Corrosion Resistance - Filiform	4.7.5.9.2
3.5.11.3	Corrosion Resistance – Sulfur Dioxide Salt Spray	4.7.5.9.3
3.5.12	Infrared Reflectance (Type 2 only)	4.7.5.10
3.5.13	Rain Erosion Resistance	4.7.5.11
3.5.14	Strippability	4.7.5.12

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3.5.1 Quality

The primer components (resin feed and pigment paste) shall be uniform in quality and condition, free of grit, seeds, lumps, abnormal thickening or livering. The components shall not show pigment flotation nor excessive settling, and shall mix to a smooth, homogeneous, and pourable condition.

3.5.2 Color

The mixed primer shall exhibit the colors per Type as follows:

3.5.2.1 Type 1 shall be the natural color of the corrosion inhibiting pigments used in the formulation unless otherwise agreed upon by the purchaser and the primer manufacturer.

3.5.2.2 Type 2 shall be dark green, dark grey or black in color determined by the low infrared pigments used.

3.5.3 Thickness

The dry film thickness of the thermally cured primer (as defined in 4.7.4.2) shall be in the range of 0.7 to 1.2 mil when tested in accordance with 4.7.5.1. The topcoat (when needed) shall be applied to a dry film thickness of 1.7 to 2.3 mils.

3.5.4 Hardness

The scratch hardness shall be a minimum pencil hardness of F when tested in accordance with 4.7.5.2.

3.5.5 Flexibility

3.5.5.1 Impact Resistance

The primer shall exhibit no cracking or loss of adhesion at 50 inch-pounds forward and 40 inch-pounds reverse when tested in accordance with 4.7.5.3.1.

3.5.5.2 Low Temperature Flexibility

The primer shall exhibit no cracking or delamination under visual examination when bent over a mandrel in accordance with 4.7.5.3.2.

3.5.5.3 Elongation

The primer shall exhibit an elongation of not less than 10 percent when tested in accordance with 4.7.5.3.3.

3.5.6 Adhesion

3.5.6.1 Wet Tape Test

The primer must have a rating of no less than 4B when tested in accordance with 4.7.5.4.1.

3.5.6.2 Dry Tape Test

The primer must have a rating of no less than 4B when tested in accordance with 4.7.5.4.2.

3.5.7 Compatibility

3.5.7.1 Topcoats

The topcoated primer shall pass the adhesion requirements of 3.5.6 when tested in accordance with 4.7.5.5.1, using MIL-PRF-85285, Type I Class H polyurethane topcoat.

3.5.7.2 Repair Primer

The repair primer shall pass the adhesion requirements of 3.5.6 when tested in accordance with 4.7.5.5.2, using MIL-PRF-23377, Type I, Class C2 or MIL-PRF-85582, Type I, Class C2 primer.

3.5.7.3 Sealant Adhesion

The sealant shall have an average peel strength of at least 20 lbs per inch of width with no value lower than 15 lbs per inch of width. The separation during peel shall be at least 95 percent cohesive in sealant. Tests shall be in accordance with 4.7.5.5.3 using AMS-S-8802 sealant, MIL-PRF-81733 Type II sealant, and AMS3277 sealant.

3.5.8 Fluid Resistance

When tested in accordance with 4.7.5.6, the primer shall withstand immersion in the fluids and conditions listed below with a pencil hardness no softer than HB and without any failures such as blistering, cracking, or peeling.

1. Hydraulic Fluids, MIL-PRF-83282: 30 days 75 °F ± 5 (24 °C ± 3)
2. Lubricating Oil MIL-PRF-7808 14 days at 75 °F ± 5 (24 °C ± 3)
3. Lubricating Oil MIL-PRF-23699 Grade 3: 14 days at 75 °F ± 5 (24 °C ± 3)
4. Hydraulic Fluid MIL-H-5606: 14 days at 75 °F ± 5 (24 °C ± 3)
5. Fluid, Jet Reference, AMS 2629 Type I: 14 days at 75 °F ± 5 (24 °C ± 3)
6. Fire resistant phosphate ester hydraulic fluid, SAE AS1241: 14 days at 75 °F ± 5 (24 °C ± 3)

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3.5.9 Humidity Resistance

The primer shall not blister, soften, or peel after exposure for 30 days in a humidity chamber at 95% ± 5 relative humidity and 120 °F ± 5 (49 °C ± 3) when tested in accordance with 4.7.5.7.

3.5.10 Solvent Resistance (cure)

The primer shall withstand 200 passes (100 back and forth rubs) by a cloth rag soaked in ASTM D 740 methyl ethyl ketone (MEK) or ASTM D 329 acetone when tested in accordance with 4.7.5.8. Rubbing through to bare substrate constitutes failure of the primer.

3.5.11 Corrosion Resistance

3.5.11.1 Neutral Salt Spray

The primer, with and without a topcoat, shall exhibit no blistering or loss of adhesion beyond 0.125 inch from scribe line after exposure to a 5 percent salt spray for 3000 hours when tested in accordance with 4.7.5.9.1. There shall be no corrosion products or pitting in the scribe for Class C. There shall be no pitting in the scribe for Class N, but some discoloration and corrosion products are acceptable.

3.5.11.2 Filiform

The primer, with and without topcoat, shall exhibit no filiform corrosion extending beyond 0.25 inch from the scribe (outside of the upper edge of the grid.), and no more than a rating of 60 squares in the outer grid after exposure for 1000 hours when tested in accordance with 4.7.5.9.2.

3.5.11.3 Sulfur Dioxide Salt Spray

The primer shall exhibit no blistering or loss of adhesion beyond 0.125 inch from the scribe line after exposure to sulfur dioxide salt spray for 500 hours when tested in accordance with 4.7.5.9.3. There shall be no corrosion or pitting in the scribe for Class C. There shall be no pitting in the scribe for Class N but some discoloration and corrosion products are acceptable.

3.5.12 Infrared Reflectance (Type 2 only)

The total reflectance (specular and diffuse) of the Type 2 primer, relative to barium sulfate, shall be no greater than 10% throughout the range of 700 to 2600 nanometers (nm) when tested in accordance with 4.7.5.10.

3.5.13 Rain Erosion Resistance

The topcoated primer shall have maximum peel of 0.25 inch from the edge and shall have no erosion to substrate when tested in accordance with 4.7.5.11.

3.5.14 Strippability

A minimum of 90 percent of the primer shall be stripped when tested in accordance with 4.7.5.12.

4. QUALITY ASSURANCE PROVISIONS

4.1 Qualification of Primer

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

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4.1.1 Qualified Products Lists

PRI QPL-AMS3144 is the approved QPL managed by the Performance Review Institute (PRI), 161 Thorn Hill Road, Warrendale, PA 15086-7527, phone (724) 772-1616, fax (724) 772-1699. Information pertaining to qualification of primer may be obtained from PRI.

4.1.2 Contract Awards

Awards will be made only for primers which are, prior to the award of contract, QPL approved. Manufacturers are urged to arrange to have the primer that they propose to offer tested for qualification in order that they may be eligible to be awarded contracts or orders for the primer covered by this specification.

4.2 Quality System of Manufacturer

Before submitting a primer for qualification to this specification for the purpose of being listed on the QPL, the manufacturer shall have a quality system in place which holds a third party accreditation to ISO9001 or AS9100.

4.3 Responsibility for Testing

The manufacturer of the primer shall supply all samples needed and shall be responsible for the performance of all required tests of this specification. Purchaser reserves the right, at own expense, to sample and to perform any confirmatory testing deemed necessary to ensure that the primer conforms to specified requirements.

4.4 Classification of Tests

4.4.1 Qualification Tests

All technical requirements of this specification (See 3) are qualification tests. Conformance to these requirements shall be established prior to QPL approval. All qualification testing shall be carried out by a laboratory which is independent of the manufacturer and is accredited per ISO 17025.

4.4.2 Acceptance Tests

The technical requirements shown in Table 2 are acceptance tests. Conformance to these requirements shall be established on each batch or lot of primer. Unless otherwise specified herein, acceptance testing may be carried out by a laboratory of the manufacturer's choosing.

TABLE 2 – ACCEPTANCE TESTS

Paragraph	Property	Test Requirement
3.5.1	Quality	Visual
3.5.2	Color	Visual

4.5 Sampling and Testing

Shall be as follows:

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4.5.1 Qualification Tests

Manufacturer will supply primed panels from a single batch of mixed primer. Test panels will be prepared in accordance with 4.7.3 and 4.7.4. Samples shall be identified as follows and forwarded to the laboratory responsible for testing:

PRIMER, ANODIC ELECTRODEPOSITION FOR AIRCRAFT APPLICATIONS
FOR CORROSION INHIBITION, CHEMICAL AND SOLVENT RESISTANCE
AMSXXXX, TYPE (1 or 2) Class (C or N)
MANUFACTURER'S IDENTIFICATION
NAME OF MANUFACTURER
BATCH (OR LOT) NUMBER OF RESIN FEED AND PIGMENT PASTE
DATE OF MANUFACTURE OF MIXED PRIMER
SUBMITTED BY (NAME) (DATE) FOR QUALIFICATION TESTS IN ACCORDANCE WITH AMSXXXXX

4.5.2 Acceptance Tests

Samples shall consist of sufficient resin feed and pigment paste taken at random from each batch or lot to perform the required tests. A batch shall be the quantity of material run through a mill or mixer at one time.

4.5.2.1 A statistical sampling plan, acceptable to purchaser, may be used in lieu of sampling as in 4.5.2.

4.6 Approval, Reapproval, and Recertification

Approval of qualification test results, reapproval, and recertification of qualification for QPL listing shall be in accordance with PD2000, unless otherwise specified herein. Data shall be reviewed by the applicable Qualified Products Group (QPG).

4.6.1 Approval

Manufacturer shall submit qualification test data to the applicable QPL managing authority for approval by the QPG. Qualification will be valid until such time that the conditions in 4.6.2 or 4.6.3 occur, or unless qualification is withdrawn per the conditions set forth in PD2000.

4.6.2 Reapproval

Manufacturer shall use ingredients of the same CAS #, manufacturing procedures, processes, and methods of inspection on production resin feed and pigment paste that is the same as those used on the qualification sample. If necessary to make any change in product formulation, raw materials, basic methods of processing, or plant site, manufacturer shall submit for reapproval a statement of the proposed changes in ingredients and/or processing and, when requested, sample resin feed and pigment paste. Production resin feed or pigment paste made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.6.2.1 A review of the submitted changes may result in reapproval without testing, reapproval after partial requalification testing, or reapproval after full requalification testing.

4.6.3 Recertification

Recertification of qualification is required every five years. Recertification consists of a letter certifying that there have been no changes in the material ingredients, manufacturing processes, or site of production since qualification, and that the coating material meets all of the requirements of this specification. In addition, a test report shall be provided from a laboratory of the manufacturer's choosing, showing compliance with all of the qualification tests.

4.7 Test Methods

Testing shall be as follows:

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4.7.1 Standard Test Conditions

Standard laboratory conditions shall be 77 °F ± 2 (25 °C ± 1) and 50 percent ± 5 relative humidity. Unless otherwise specified herein, all test specimens shall be cured and tested under these conditions.

4.7.2 Standard Tolerances

Unless otherwise specified herein, standard tolerances shown in Table 3 shall be applied throughout the test methods.

TABLE 3 - STANDARD TOLERANCES

Measurement Units	Tolerance
Temperatures	±2 °F (±1 °C)
Days	±2 hours
Hours	±5 minutes
Minutes	±10 seconds
Inches (mm)	±0.010 inch (0.25 mm)

4.7.3 Preparation of Test Panels

4.7.3.1 Description of Test Panels

Unless otherwise specified herein, all test panels shall be 0.020 inch x 3 inch x 6 inch of the panel type conforming to Table 4. Panels shall be cut to the required dimensions prior to chemical treatment.

TABLE 4 - ALUMINUM TEST PANELS

Panel	Substrate	Pretreatment
A	AMS-QQ-A-250/4 (T3 temper)	MIL-DTL-5541, Type I or Type II, Class 1A
B	AMS-QQ-A-250/4 (T0 temper)	MIL-A-8625, Type I or IC (anodize)
C	AMS-QQ-A-250/5 (T3 temper)	Deoxidized 1/
D	AMS-QQ-A-250/5 (T3 temper)	MIL-DTL-5541, Type I or Type II, Class 1A

1/ Immerse test panel for 2 minutes in corrosion removing compound conforming to AMS1640, then remove test panel and rinse with distilled water. Apply the primer within one hour.

4.7.3.2 Cleaning of Test Panels

Unless otherwise specified herein, all test panels shall be mechanically or chemically cleaned such that a water break-free surface is obtained after rinsing.

4.7.4 Preparation of Test Specimens

Unless otherwise specified herein, all materials utilized in test specimen preparation shall be prepared and cured according to manufacturer's instructions.

4.7.4.1 Scribing

Test specimens that require an X scribe shall be machined to the dimensions below utilizing a New Hermes IS 6000 or equivalent engraving machine and cutter as described in Figure 1. The scribe must penetrate all coatings, pretreatment, and clad layer (if Alclad), as indicated by Figure 1 dimensions.

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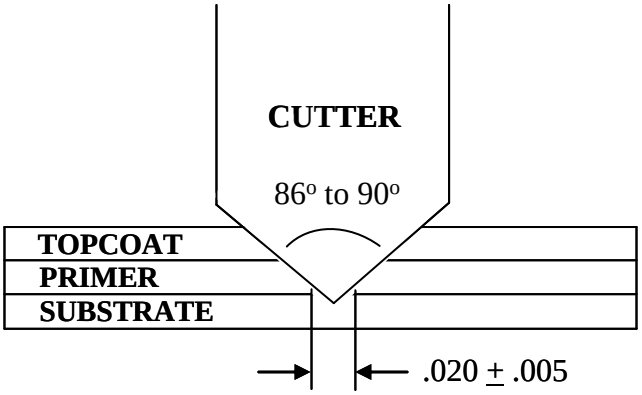

FIGURE 1 - PANEL SCRIBE REQUIREMENTS

4.7.5 Test Procedures

4.7.5.1 Thickness

The test panels shall be prepared in accordance with 4.7.3 and 4.7.4 using Panel A specimens as in Table 4. The thickness shall be tested in accordance with ASTM D 7091.

4.7.5.2 Hardness

The test panels shall be prepared in accordance with 4.7.3 and 4.7.4 using Panel A specimens as in Table 4. The primer hardness shall be tested in accordance with ASTM D 3363.

4.7.5.3 Flexibility

4.7.5.3.1 Impact Resistance

The primer shall be applied in accordance with 4.7.3 and 4.7.4 using Panel C specimens per Table 4. The test panels shall be tested in accordance with ASTM D 2794.

4.7.5.3.2 Low Temperature Flexibility

The primer shall be applied in accordance with 4.7.3 and 4.7.4 using Panel C specimens per Table 4. The test panels shall be tested in accordance with ASTM D 522, Test Method B at a temperature of -65 °F ± 5 (-51 °C ± 3) using a 4 inch diameter mandrel.

4.7.5.3.3 Elongation

The primer shall be applied in accordance with 4.7.3 and 4.7.4 using Panel B specimens per Table 4 and tested using a Gardco GE Universal Impact Tester, Model #172 or equivalent as approved by the qualifying activity using a specialized impacter that weighs 3.6 lb and has formed four convex spherical segments on each end, each of different radii and extension. Place the coated panel, film side downward, on the rubber pad at the bottom of the impacter guide. Drop the impacter on the panel through the impacter guide, ensuring that the impression of the entire rim of the impacter is made in the panel. Reverse the impacter ends and drop it through the guide on the panel adjacent to the first area of impact. Using power 10 magnification, observe the percent elongation corresponding to the largest spherical impression at which no cracking occurs.

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4.7.5.4 Adhesion

4.7.5.4.1 Wet Tape Test

The primer shall be applied in accordance with 4.7.3 and 4.7.4 using Panel A specimens per Table 4. The test panels shall be immersed in distilled water for no less than 7 days at room temperature. Remove the test panels from the water, wipe dry with a soft cloth and conduct adhesion test in accordance with ASTM D 3359 test method B using 3M 250 tape, within 10 minutes of removal from water.

4.7.5.4.2 Dry Tape Test

The primer shall be applied in accordance with 4.7.3 and 4.7.4 using Panel A specimens per Table 4. Conduct adhesion test in accordance with ASTM D 3359 test method B using 3M 250 tape.

4.7.5.5 Compatibility

4.7.5.5.1 Topcoats

The primer and topcoat shall be applied in accordance with 4.7.3 and 4.7.4 using Panel A specimens per Table 4.

4.7.5.5.2 Repair Primer

The primer and repair primer shall be applied in accordance with 4.7.3 and 4.7.4 using Panel A specimens per Table 4.

4.7.5.5.3 Sealants

The primer shall be applied in accordance with 4.7.3 and 4.7.4 using six Panel C specimens per Table 4, except that the thickness of the panel shall be 0.040 inch. The sealant shall be mixed and cured per manufacturer's instructions. The sealant shall be applied per SAE AS5127/1.

4.7.5.6 Fluid Resistance

The primer shall be applied in accordance with 4.7.3 and 4.7.4 using Panel A specimens per Table 4. Panels shall be immersed in the fluids at the specified conditions, removed, and examined.

4.7.5.7 Humidity Resistance

The primer shall be applied in accordance with 4.7.3 and 4.7.4 using Panel A specimens per Table 4 and tested in accordance with ASTM D 2247.

4.7.5.8 Solvent Resistance (cure)

The primer shall be applied in accordance with 4.7.3 and 4.7.4 using Panel A specimens per Table 4 and tested in accordance with ASTM D 5402.

4.7.5.9 Corrosion Resistance

4.7.5.9.1 Salt Spray

The primer coatings with and without topcoat shall be applied as in 4.7.3 and 4.7.4 using five Panel A specimens per Table 4. Panels shall be scribed per 4.7.4.1. The machined scribes should stop one inch from each corner. The coating shall be tested in accordance with ASTM B 117.

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