



<b>AEROSPACE MATERIAL SPECIFICATION</b>	<b>AMS3100™</b>	<b>REV. E</b>
	Issued 1986-07 Reaffirmed 2000-08 Revised 2021-10	
Superseding AMS3100D		
(R) Adhesion Promoter for Polysulfide Sealing Compounds		

### RATIONALE

This revision represents the Five-Year update of the standard.

#### 1. SCOPE

##### 1.1 Form

This specification covers adhesion promoters in liquid form for use with aerospace sealing compounds.

##### 1.2 Application

This product has typically been used to enhance the adhesion of polysulfide sealing compounds or adhesives to AMS-C-27725 integral fuel tank coating, MIL-PRF-23377 epoxy primer, MIL-PRF-85582 waterborne primer, and bare titanium alloy substrates, but usage is not limited to such applications. Care should be exercised around plastic substrates (e.g., polycarbonates, acrylics) as the formulary solvents may tend to craze these surfaces.

##### 1.3 Classification

Adhesion promoters shall be classified by formulary ingredient(s) and volatile organic compound (VOC) content as follows:

Class 1 - Nonhalogenated organic solvent(s)

Class 2 - Nonrestricted organic solvent(s)

Class 3 - Water-based composition

Type 1 - Standard VOC content (greater than 250 g/L)

Type 2 - Low VOC content (250 g/L or less)

NOTE: Class 2 adhesion promoters may contain halogenated solvents that could cause stress-corrosion cracking when used on titanium alloys subjected to temperatures above 450 °F (232 °C) or on high strength steels.

##### 1.4 Safety - Hazardous Materials

While the materials, methods, applications, and processes described or referenced in this standard may involve the use of hazardous materials, this standard 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. Refer to the safety data sheet (see 4.6.1) for health and safety information.

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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. In the event of conflict between this specification and the documents listed herein, this specification shall take precedence.

### 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](http://www.sae.org).

AMS2473	Chemical Treatment for Aluminum Alloys General Purpose Coating
AMS2629	Fluid, Jet Reference
AMS3276	Sealing Compound, Integral Fuel Tanks and General Purpose, Intermittent Use to 360 °F (182 °C)
AMS3281	Sealing Compound, Polysulfide (T) Synthetic Rubber for Integral Fuel Tank and Fuel Cell Cavities Low Density for Intermittent Use to 360 °F (182 °C)
AMS4037	Aluminum Alloy, Sheet and Plate 4.4Cu - 1.5Mg - 0.60Mn (2024; -T3 Flat Sheet, -T351 Plate) Solution Heat Treated
AMS4045	Aluminum Alloy Sheet and Plate 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr 7075: (-T6 Sheet, -T651 Plate) Solution and Precipitation Heat Treated
AMS4268	Aluminum Alloy, Sheet and Plate 4.4Cu - 1.5Mg - 0.60Mn (2024-T81 Sheet, -T851 Plate) Solution Heat Treated, Cold Worked and Artificially Aged
AMS4911	Titanium Alloy, Sheet, Strip, and Plate 6A1 - 4V Annealed
AMS-C-27725	Coating, Corrosion Preventative, for Aircraft Integral Fuel Tanks for Use to 250 °F (121 °C)
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
AS5502	Standard Requirements for Aerospace Sealants and Adhesion Promoters

### 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](http://www.astm.org).

ASTM D1193	Standard Specification for Reagent Water
ASTM D3960	Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings

### 2.3 U.S. Government Publications

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

MIL-PRF-5425	Plastic Sheet, Acrylic, Heat Resistant
MIL-PRF-23377	Primer Coatings: Epoxy, High-Solids
MIL-PRF-85582	Primer Coatings: Epoxy, Waterborne

### 2.4 PRI Publications

Available from Performance Review Institute, 161 Thornhill Road, Warrendale, PA 15086-7527, Tel: 724-772-1616, [www.pri-network.org](http://www.pri-network.org).

PD2000	PRI-QPL Program Requirements
PRI-QPL-AMS3100	Products Qualified Under AMS3100

### 2.5 ANSI Accredited Publications

Copies of these documents are available online at <http://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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## 3. TECHNICAL REQUIREMENTS

### 3.1 Material

Class 1 - The adhesion promoter composition shall contain no halogenated compounds. It shall be tinted, imparting a stain on the substrate (see 4.5.4).

Class 2 - The adhesion promoter composition has no restrictions in regards to halogenated compounds. The manufacturer shall identify any halogenated compounds contained in Class 2 promoters. It shall be tinted, imparting a stain on the substrate (see 4.5.4).

Class 3 - The adhesion promoter composition shall be primarily purified water (distilled or equivalent), with minor nonhalogenated solvent additions allowed (less than 5% by volume). It shall be tinted, imparting a stain on the substrate (see 4.5.4).

### 3.2 VOC Content

The adhesion promoter VOC content shall meet the limits specified by Type classification per 1.3 (see 4.5.10).

### 3.3 Composition Control

A Fourier transform infrared spectroscopy (FT-IR) analysis shall be conducted on the adhesion promoter at the time of qualification testing (see 4.5.11). This spectrum shall be retained by the supplier for the purpose of qualitative comparison should the composition of subsequent batches be called into question.

### 3.4 Quality and Appearance

The adhesion promoter, when visually examined, shall be uniform in quality and condition, free of sedimentation and turbidity, and free from foreign materials, particulate matter, and other contaminants detrimental to use of the adhesion promoter.

### 3.5 Shelf Life

The adhesion promoter shall have a minimum shelf life of 6 months from the date of packaging (DOP), as defined by AS5502 (3.1.2), when stored between 40 °F (4.4 °C) and 80 °F (27 °C) in the original unopened container. Packaging shall occur no more than 90 days from the date of manufacture (DOM), as defined by AS5502 (3.1.1), unless the manufacturer has extended the time interval between DOM and DOP per 4.2.4.

### 3.6 Properties

The adhesion promoter shall conform to requirements of, and determined in accordance with, test procedures specified in Table 1.

**Table 1 - Properties**

Property	Requirement	Test Procedures (Paragraph)
Peel Strength	See Table 2	4.5.5
Long-Term Storage Stability	See Table 4	4.5.7
Short-Term Storage Stability	See Table 4	4.5.8
Aging After Application	See Table 4	4.5.9

**Table 2 - Peel strength requirements**

Applicable Class	Panel Material and Preparation <sup>(5)</sup>	Adhesion Promoter Applied	Immersion Medium <sup>(6)</sup>	Minimum Peel Strength, Pounds Force/Inch	Minimum Peel Strength, N/m	Cohesive Failure, %
1, 2, 3	4.5.3.1.5	Yes	None	20	3500	100
1, 2	4.5.3.1.3	Yes	None	20	3500	100
3	4.5.3.1.2	Yes	None	20	3500	100
1, 2, 3	4.5.3.1.5	Yes	(1)	20	3500	100
1, 2, 3	4.5.3.1.4	Yes	(1)	20	3500	100
1, 3	4.5.3.1.2	Yes	(1)	20	3500	100
1, 2, 3	4.5.3.1.5	Yes	(2)	20	3500	100
1, 2, 3	4.5.3.1.4	Yes	(2)	20	3500	100
1, 3	4.5.3.1.2	Yes	(2)	20	3500	100
1, 2, 3	4.5.3.1.6	Yes	(3)	20	3500	100
1, 2, 3	4.5.3.1.7	Yes	(3)	20	3500	100
1, 2, 3	4.5.3.1.6	Yes	(4)	20	3500	100
1, 2, 3	4.5.3.1.7	Yes	(4)	20	3500	100

<sup>(1)</sup> 7 days immersion in equal parts of AMS2629, Type 1, Jet Reference Fluid and 3% aqueous solution of sodium chloride.

<sup>(2)</sup> 70 days immersion in equal parts of AMS2629, Type 1, Jet Reference Fluid and 3% aqueous solution of sodium chloride.

<sup>(3)</sup> 7 days immersion in ASTM D1193, Type IV, water.

<sup>(4)</sup> 7 days immersion in 3% aqueous solution of sodium chloride.

<sup>(5)</sup> A minimum of two panels for each condition shall be tested.

<sup>(6)</sup> Panels shall be conditioned in immersion media at elevated temperature of 140 °F (60 °C) for specified time, then cooled in immersion media for 24 hours ± 0.5 hour at standard test conditions.

**Table 3 - Acceptance peel strength requirements**

Applicable Class	Panel Material and Preparation <sup>(2)</sup>	Adhesion Promoter Applied	Immersion Medium <sup>(3)</sup>	Minimum Peel Strength, Pounds Force/Inch	Minimum Peel Strength, N/m	Cohesive Failure, %
1, 2, 3	4.5.3.1.5	Yes	None	20	3500	100
1, 2, 3	4.5.3.1.4	Yes	(1)	20	3500	100
1, 2, 3	4.5.3.1.5	Yes	(1)	20	3500	100
	or					
1, 2	4.5.3.1.3	Yes	None	20	3500	100
1, 2	4.5.3.1.4	Yes	(1)	20	3500	100

<sup>(1)</sup> 7 days immersion in equal parts of AMS2629, Type 1, Jet Reference Fluid and 3% aqueous solution of sodium chloride.

<sup>(2)</sup> A minimum of two panels for each condition shall be tested.

<sup>(3)</sup> Panels shall be conditioned in immersion media at elevated temperature of 140 °F (60 °C) for specified time, then cooled in immersion media for 24 hours ± 0.5 hour at standard test conditions.

**Table 4 - Long-term storage stability, short-term storage stability, and aging after application requirements**

Applicable Class	Panel Material and Preparation <sup>(2)</sup>	Adhesion Promoter Applied <sup>(3)</sup>	Immersion Medium <sup>(4)</sup>	Minimum Peel Strength, Pounds Force/Inch	Minimum Peel Strength, N/m	Cohesive Failure, %
1, 2, 3	4.5.3.1.5	Yes	None	20	3500	100
1, 2	4.5.3.1.3	Yes	None	20	3500	100
3	4.5.3.1.2	Yes	None	20	3500	100
1, 2, 3	4.5.3.1.5	Yes	(1)	20	3500	100
1, 2	4.5.3.1.4	Yes	(1)	20	3500	100
3	4.5.3.1.2	Yes	(1)	20	3500	100

<sup>(1)</sup> 7 days immersion in equal parts of AMS2629, Type 1, Jet Reference Fluid and 3% aqueous solution of sodium chloride.

<sup>(2)</sup> A minimum of two panels for each condition shall be tested.

<sup>(3)</sup> See 4.5.7, 4.5.8, and 4.5.9 for adhesion promoter conditioning prior to test.

<sup>(4)</sup> Panels shall be conditioned in immersion media at elevated temperature of 140 °F (60 °C) for specified time, then cooled in immersion media for 24 hours ± 0.5 hour at standard test conditions.

#### 4. QUALITY ASSURANCE PROVISIONS

##### 4.1 Responsibility for Inspection

Shall be in accordance with AS5502 (4.1).

##### 4.1.1 Source Inspection

Shall be in accordance with AS5502 (4.1.1).

##### 4.2 Classification of Tests

Shall be in accordance with AS5502 (4.2).

##### 4.2.1 Qualification Tests

All technical requirements (see Section 3) are qualification tests. Conformance to these requirements shall be established prior to inclusion on the Qualified Products List, PRI-QPL-AMS3100, as well as other circumstances noted in AS5502 (4.2.1).

##### 4.2.1.1 Qualification

All products sold to this specification shall be listed, or approved for listing, on PRI-QPL-AMS3100 per AS5502 (4.7) unless otherwise specified herein. The qualified products list shall be in accordance with PD2000 unless otherwise specified herein.

## 4.2.1.2 Re-approval

Qualification shall be re-approved every 7 years.

## 4.2.2 Initial Acceptance Tests

Requirements shown in Table 5 are initial acceptance tests and shall be performed on each batch. A batch shall be defined as the quantity of material run through a mixer at one time.

**Table 5 - Initial acceptance tests**

Requirement	Paragraph/Table
Color	3.1, 4.5.4
Quality and Appearance	3.4
Acceptance Peel Strength	4.5.6, Table 3

## 4.2.3 Final Acceptance Tests

Requirements shown in Table 6 are final acceptance tests and shall be performed on each lot. A lot shall be defined as the quantity of material from one batch of finished product packaged in one size and/or type of container at the same time.

**Table 6 - Final acceptance tests**

Requirement	Paragraph/Table
Color	3.1, 4.5.4
Quality and Appearance	3.4

## 4.2.4 Extension Between DOM and DOP

Adhesion promoter that has reached the end of the 90-day time period after DOM may have the time interval between DOM and DOP extended an additional 90 days with successful completion of the initial acceptance tests (Table 5). This allowance is limited to one extension.

## 4.3 Sampling and Testing

Shall be in accordance with AS5502 (4.3).

## 4.3.1 For Qualification Tests

Samples shall consist of three brown glass small-mouth bottles, with the exception that Class 3 samples may consist of plastic bottles (see 5.1.1). Each bottle shall contain at least 16 ounces (473 cc) of adhesion promoter. Samples shall be identified as specified herein and forwarded to the activity responsible for qualification testing. Samples for qualification shall be identified as follows:

## ADHESION PROMOTER FOR POLYSULFIDE SEALING COMPOUND

Specification AMS3100E Class Type \_\_\_\_\_  
 Name of Manufacturer \_\_\_\_\_  
 Manufacturer's Product Designation \_\_\_\_\_  
 Date of Packaging \_\_\_\_\_  
 Expiration Date \_\_\_\_\_  
 Lot Number \_\_\_\_\_  
 Submitted by (Name) (Date) for qualification tests in accordance with AMS3100E \_\_\_\_\_

#### 4.3.2 For Initial and Final Acceptance Tests

Sufficient adhesion promoter for initial acceptance shall be packaged in the same type containers that are being procured. After successful completion of the initial acceptance tests, the batch shall be released for final packaging. Packaged adhesion promoter shall be taken at random from each lot to perform final acceptance testing. The number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified therein, not less than three.

4.3.2.1 When a statistical sampling plan has been agreed upon by purchaser and supplier, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.2 and the report of 4.6 shall state that such plan was used.

#### 4.4 Approval

Shall be in accordance with AS5502 (4.4).

##### 4.4.1 Purchaser Approval

Shall be in accordance with AS5502 (4.4.1).

##### 4.4.2 Methods of Inspection

Shall be in accordance with AS5502 (4.4.2).

#### 4.5 Test Methods

Standard test methods are in accordance with AS5127 (Section 8) and AS5127/1. In the event of a conflict between the text of this document and AS5127 and/or AS5127/1, the text of this document takes precedence.

##### 4.5.1 Standard Tolerances

Unless otherwise specified herein, standard tolerances of AS5127 (Section 3) shall apply.

##### 4.5.2 Standard Test Conditions

Unless otherwise specified herein, test specimens shall be prepared and cured, and all tests performed, at standard laboratory conditions as specified in AS5127 (Section 4).

##### 4.5.3 Preparation of Test Specimens

###### 4.5.3.1 Panel Material, Size, and Coating

Shall be as follows:

###### 4.5.3.1.1 Aluminum Alloy

AMS4037, AMS4268, or AMS4045 aluminum alloy sheet, nominally 0.040 x 2.75 x 6 inches (1.02 x 69.8 x 152 mm) with Type I or Type II chemical film applied in accordance with AMS2473.

###### 4.5.3.1.2 Titanium Alloy

AMS4911 titanium alloy sheet or strip, nominally 0.040 x 2.75 x 6 inches (1.02 x 69.8 x 152 mm).

###### 4.5.3.1.3 Acrylic

MIL-PRF-5425 acrylic plastic sheet, nominally 0.22 x 2.75 x 6 inches (5.58 x 69.8 x 152 mm). As an alternate, 0.040 to 0.060 inch (1.02 to 1.52 mm) acrylic sheet may be used with an adjacent aluminum backing plate of 0.040 inch (1.02 mm) minimum thickness.

#### 4.5.3.1.4 AMS-C-27725 Coating

Aluminum alloy panels as in 4.5.3.1.1 shall be coated with AMS-C-27725 Type 1, 2, or 3 corrosion preventive coating, in accordance with manufacturer's instructions, to produce a dry film thickness of 0.0008 to 0.0015 inch (20 to 38  $\mu\text{m}$ ) and cured for not less than 21 days (for Type 1 or 3) or 14 days (for Type 2) at standard test conditions. Alternatively, the cure may be accelerated by a 24-hour cure at standard test conditions followed by a 24-hour cure at 140 °F (60 °C) and a relative humidity of 50%.

#### 4.5.3.1.5 Aged AMS-C-27725 Coating

Panels prepared as in 4.5.3.1.4 shall be aged, immediately after curing, by immersion in AMS2629 Type 1 jet reference fluid for 12 days at 140 °F (60 °C), followed immediately by 60 hours at 160 °F (71 °C), followed immediately by 6 hours at 180 °F (82 °C), followed immediately by air drying in a circulating-air oven for 66 hours at 200 °F (93 °C), followed by air drying for 5 hours at 255 °F (124 °C), followed by air drying for 4 hours at 280 °F (138 °C), and finally air drying for 72 minutes at 300 °F (149 °C).

#### 4.5.3.1.6 MIL-PRF-23377 Primer

Aluminum alloy panels as in 4.5.3.1.1 shall be coated with MIL-PRF-23377 epoxy primer, in accordance with manufacturer's instructions, to produce a dry film thickness of 0.0006 to 0.0009 inch (15 to 23  $\mu\text{m}$ ), and cured for not less than 14 days at standard test conditions.

#### 4.5.3.1.7 MIL-PRF-85582 Primer

Aluminum alloy panels as in 4.5.3.1.1 shall be coated with MIL-PRF-85582 epoxy primer, in accordance with manufacturer's instructions, to produce a dry film thickness of 0.0006 to 0.0009 inch (15 to 23  $\mu\text{m}$ ), and cured for not less than 14 days at standard test conditions.

#### 4.5.3.2 Cleaning of Test Panels

Test specimens shall be cleaned in accordance with substrate-specific sections of AS5127 (Section 6).

#### 4.5.3.3 Application of Adhesion Promoter

Test specimens shall be treated with AMS3100 adhesion promoter in accordance with AS5127 (6.9).

#### 4.5.3.4 Application of Sealing Compound

Unless otherwise specified herein, freshly mixed sealing compound shall be applied to test specimens in accordance with AS5127 (6.10). Sealing compounds for preparing peel strength test specimens shall conform to AMS3276 Class B, AMS-S-8802 Class B, or AMS3281 Class B. Sealing compounds shall be within their application time and specified shelf life when used.

#### 4.5.3.5 Curing of Sealing Compounds

Shall be in accordance with AS5127 (6.11), with the following exceptions:

4.5.3.5.1 Cure the sealing compound for 14 days at standard test conditions.

4.5.3.5.2 A cure of 48 hours at standard test conditions followed by 24 hours at 140 °F (60 °C) may be used for acceptance tests.

#### 4.5.3.6 Preparation of Peel Strength Test Specimens

Test panel configuration shall be in accordance with AS5127/1 (Section 8) "Peel Strength Properties," (8.1) "Peel Strength Testing," and Figure 23 "Four-Inch peel specimen configuration."