



AEROSPACE MATERIAL SPECIFICATION	AMS3092™	REV. B
	Issued 2003-03 Revised 2021-12	
Superseding AMS3092A		
Release Agent, for Use During Form-in-Place Gasket Preparation		

RATIONALE

This document is being revised for its Five-Year Review update. Revised cleanability test and mechanical release test procedures. As an acceptance test, replaced the composition test with the mechanical release test. Removed a note that relates to Federal Supply Classification (FSC) 9150. Added additional informational clarifications.

1. SCOPE

1.1 Form

This specification establishes requirements for solvent-based and water-based release agents, in bulk or aerosol form.

1.2 Usage

The release agents are typically used to provide a release between a sealing compound and forming surface or substrate during preparation of form-in-place (FIP) gaskets, but usage is not limited to such applications.

NOTE: The manufacturer shall provide instructions to ensure adequate coverage and optimal release characteristics.

1.3 Classification

Release agents covered by this specification are classified by composition as follows:

1.3.1 Types

Type I Fluorochemical/fluoropolymer release agents.

Type II Release agents with non-fluorine containing substances as the active ingredients that impart the release properties.

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 that 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 respective safety data sheets for health and safety information on specific products.

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2. APPLICABLE DOCUMENTS

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

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.

AMS3167	Solvents, Wipe for Cleaning Prior to Application of Primer and Top Coat Materials, or Sealing Compounds
AMS3276	Sealing Compound, Integral Fuel Tanks and General Purpose, Intermittent Use to 360 °F (182 °C)
AMS3819	Cloths, Cleaning, for Aircraft Primary and Secondary Structural Surfaces
AMS4037	Aluminum Alloy, Sheet and Plate, 4.4Cu - 1.5Mg - 0.60Mn (2024; -T3 Flat Sheet, -T351 Plate), Solution 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
AS5127	Aerospace Standard Test Methods for Aerospace Sealants, Methods for Preparing Aerospace Sealant Test Specimens

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 C297	Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions
ASTM D1193	Standard Specification for Reagent Water
ASTM D3359	Standard Test Methods for Measuring Adhesion by Tape Test
ASTM E1252	Standard Practice for General Techniques for Obtaining Infrared Spectra for Qualitative Analysis

2.3 U.S. Government Publications

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

MIL-DTL-81706	Chemical Conversion Materials for Coating Aluminum and Aluminum Alloys
MIL-PRF-22750	Coating, Epoxy, High Solids
MIL-PRF-23377	Primer Coatings, Epoxy, High Solids
MIL-PRF-85285	Coating: Polyurethane, Aircraft and Support Equipment
MIL-PRF-85582	Primer Coatings, Epoxy, Waterborne

2.4 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

2.5 PRI Publications

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

OP 2007 QPG Operation

OP 2007 Appendix G9 Additional Requirements for the Aerospace Sealants and Associated Materials (G9) QPG

PD2000 Governance and Administration of an Industry Managed Product Qualification Program

PRI-QPL-AMS3092 Products Qualified Under AMS3092

3. TECHNICAL REQUIREMENTS

3.1 Material

Type I release agents shall consist of fluoropolymers dissolved or dispersed in solvent or water to meet the requirements of this specification. Fluoropolymers include low molecular weight polytetrafluoroethylene (PTFE) such as fluorotelomers, higher molecular weight PTFE, and non-PTFE fluoropolymers and other fluorochemicals.

Type II release agents shall consist of non-fluorine containing release components in solvent or water to meet the requirements of this specification.

Both types of release agents may contain, in addition to the major active ingredient that imparts release properties, adhesion promoters (binders) or other additives designed to enhance the performance of the release agents. The release agents shall contain no free silicone compounds that can transfer to released parts and interfere with post-finishing operations. There shall be no phase separation in the liquid product.

3.2 Application

Application of the release agent shall be by spray, brush, or wipe techniques per the manufacturer's instructions. Multiple applications of the release agent may be applied to achieve release requirements. To ensure adequate coverage and optimal release characteristics, the release agent should be reapplied each time the forming surface or substrate is used. Curing/drying of release agent shall be per the manufacturer's instructions, with the exception that no heat cure shall be required.

3.3 Film Appearance

When in its cured/dried state, the release agent shall be uniform in appearance and without surface defects. Colorants may be added at the purchaser's request to impart color to the film, provided that they have no detrimental effect on the release or cleanability characteristics of the product.

3.4 Test Properties

The release agent shall conform to the requirements found in Table 1.

Table 1 - Test properties

Paragraph	Property	Requirement	Test Method
3.4.1	Cleanability	No separation of topcoat from primer during wet tape adhesion test—no less than 4A per ASTM D3359.	4.5.3
3.4.2	Mechanical Release	a) A smooth surface on the released sealant. b) 100% adhesive debond between the sealant and the panel with release agent applied. c) A maximum flatwise tensile load of 75 psi (517 kPa) to achieve separation of cured sealant from substrate.	4.5.4
3.4.3	Composition	Same as that of qualification test sample.	4.5.5

3.5 Shelf Life

The release agent shall have a minimum shelf life of 1 year from date of manufacture in its original and unopened packaging at storage temperatures of 40 to 90 °F (4 to 32 °C).

3.6 Quality

The release agent, as received by purchaser, shall be uniform in quality and condition, and free from foreign materials and other contaminants detrimental to usage of the product.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Testing

The manufacturer of the release agent shall supply all samples needed and shall be responsible for the performance of all required tests of this specification.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Requirements in Table 2 are acceptance tests and shall be performed on each lot.

Table 2 - Acceptance tests

Property	Requirement	Test Method
Film Appearance	3.3	Visual
Mechanical Release	3.4.2	4.5.4

4.2.2 Qualification Tests

All technical requirements (see Section 3) are mandated for product qualification. Conformance to these requirements shall be established prior to inclusion on the Qualified Products List (QPL), PRI-QPL-AMS3092, or when a change in ingredients and/or processing requires reapproval per 4.4.2. All testing shall be accomplished by an approved laboratory per OP 2007 Appendix G9.

4.3 Sampling and Testing

Shall be as follows:

4.3.1 Qualification Tests

Samples shall consist of approximately 2 gallons (7.6 L) of material (if in bulk form) or 128 fluid ounces (if in aerosol form) from a single lot. The material shall be furnished in containers of the type to be used in filling contract orders. Samples shall be identified as follows and forwarded to the laboratory responsible for testing:

RELEASE AGENT, FOR USE DURING FORM-IN-PLACE GASKET PREPARATION
AMS3092B TYPE
MANUFACTURER'S IDENTIFICATION
LOT NUMBER
DATE OF MANUFACTURE
APPROPRIATE WARNINGS AND PRECAUTIONARY NOTICES
SUBMITTED BY (NAME) (DATE) FOR QUALIFICATION TESTS IN ACCORDANCE WITH AMS3092B

4.3.1.1 A lot shall be all release agent produced in a single production run from the same batch of raw materials under the same fixed conditions and presented for manufacturer's inspection at one time.

4.3.2 Acceptance Tests

Sufficient release agent shall be taken at random from each lot to permit performing all required tests. The number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified therein, shall not be 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 Qualification, Reapproval, and Requalification

Approval of qualification test results, reapproval, and requalification shall be in accordance with PD2000, OP 2007, and OP 2007 Appendix G9, unless otherwise specified herein. Data shall be reviewed by the G-9 Qualified Products Group (QPG).

4.4.1 Qualification

Release agent supplied to this specification shall be listed, or approved for listing, on PRI-QPL-AMS3092.

4.4.2 Reapproval

The manufacturer shall use ingredients, manufacturing procedures, processes, and methods of inspection on production release agent that are essentially the same as those used on the approved qualification sample. If it is necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, the manufacturer shall submit for reapproval a statement of the proposed changes in ingredients and/or processing and, when requested, a sample of release agent. Production release agent made by the revised procedure shall not be shipped prior to notice of reapproval.

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

4.4.3 Requalification

Requalification is required every 5 years. Requalification consists of a letter certifying that there have been no changes in the material ingredients, manufacturing processes, or site of production since initial qualification or the previous requalification, and that the release agent meets all of the requirements of this specification. In addition, a test report shall be provided from an approved laboratory per OP 2007 Appendix G9 showing compliance with all the qualification tests.

4.5 Test Methods

4.5.1 Standard Conditions

Standard laboratory conditions shall be as specified in AS5127 (Section 4).

4.5.2 Standard Tolerances

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

4.5.3 Cleanability Test

Prepare three panels conforming to AMS4037 or AMS4268. Test panel sizes shall be 0.040 × 2.75 × 6.00 inches (1.02 × 69.8 × 152 mm). Prepare the panels for testing per AS5127 (6.4) using MIL-PRF-23377 or MIL-PRF-85582 epoxy primer. Apply release agent per manufacturer's instructions to primed side of the panels. Allow the release agent to cure/dry at standard conditions (4.5.1) in accordance with manufacturer instructions.

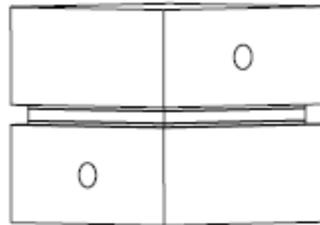
Wet a clean AMS3819 Grade A cloth heavily damp, but not dripping with AMS3167 cleaning solvent. Wipe the panel surfaces five times using a clean, wet cloth each time. Immediately wipe the surface dry with AMS3819 cloth prior to solvent evaporation. Lightly scuff sand the surface with an aluminum oxide abrasive mat or an aluminum oxide abrasive paper with very fine grit size (280 to 400). Repeat (one pass of) the solvent cleaning steps followed by a dry wipe until the dry AMS3819 Grade A cloth used for wiping off solvent displays no visible contamination. Air dry panels a minimum of 30 minutes at standard conditions (see 4.5.1). Apply MIL-PRF-22750 or MIL-PRF-85285 topcoat to the panels, in accordance with manufacturer's instructions, to produce a dry film thickness of 0.0017 to 0.0023 inch (43 to 58 μm). Allow the topcoat to cure for 1 hour at standard conditions, then for 24 hours at 140 °F ± 5 °F (60 °C ± 3 °C). Perform wet tape adhesion test per ASTM D3359 Method A after 4 days immersion in ASTM D1193 Type IV reagent water at 120 °F ± 5 °F (49 °C ± 3 °C).

4.5.4 Mechanical Release Test

Prepare two sets of three test panels conforming to AMS4037 or AMS4268. Test panel sizes shall be 0.25 × 2.00 × 2.00 inches (6.35 × 50.8 × 50.8 mm). Prepare the panels for testing per AS5127 6.4 using MIL-PRF-23377 or MIL-PRF-85582 epoxy primer. Apply release agent per manufacturer's instructions to primed side of the first set of panels. Allow the release agent to cure/dry at standard conditions (4.5.1) in accordance with manufacturer instructions.

Lightly scuff sand the primed side of the second set of panels and clean per AS5127 (6.4.1.2). Apply AMS3276 Class B (e.g., B-1/2 or B-2) sealing compound to the abraded primed surface of the panels. Apply a panel with release agent from the first set on top of the sealant and use spacers and splints, as required, to achieve a 0.125 inch ± 0.020 inch (3.18 mm ± 0.64 mm) sealant thickness when cured as shown in Figure 1. Ensure that sealant covers entire surface area between panels and that the edges of the panels are parallel. Excess sealant squeeze-out shall be removed or trimmed after cure. Cure the sealant in accordance with AMS3276 4.5.4.5.

Using ASTM C297 and Figure 1 as a guide, lightly scuff the bonding surfaces of each assembly using 240 grit aluminum oxide sandpaper, Scotch-Brite 7447 aluminum oxide pad, or equivalent prior to bonding and bond to test blocks using a room temperature curing epoxy adhesive and 1 to 5 psi (9 to 34.5 kPa) pressure. The flatwise tensile test assembly shall be tested per ASTM C297 using a crosshead rate of 0.5 in/min (12.7 mm/min) until the panel with the release agent panel separates from the sealant. The maximum failing load shall be reported for each assembly and all assemblies must meet the requirement in 3.4.2.



Isometric view

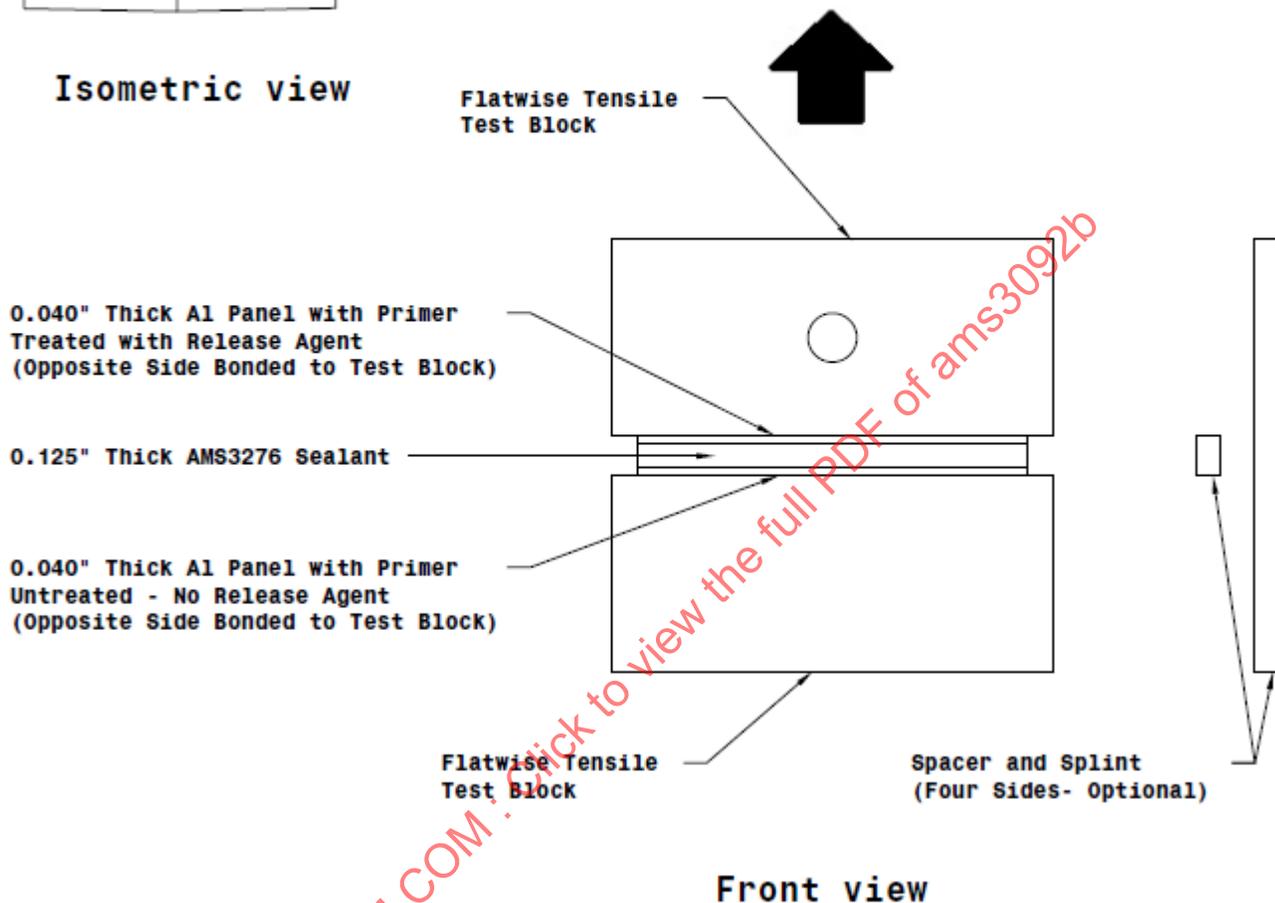


Figure 1 - Flatwise tensile test assembly

4.5.5 Composition

One infrared spectrophotometric graph of the release agent shall be prepared using methods described in ASTM E1252. The detailed method of sample preparation and preparation of the spectra shall be provided with the graph.

4.6 Reports

The manufacturer or supplier of the release agent shall furnish with each shipment, a report showing the results of tests to determine conformance to the acceptance test requirements. This report shall include the purchase order number, AMS3092B, type, lot number, manufacturer's name and product designation, date of manufacture, and quantity.

4.6.1 A safety data sheet conforming to ANSI Z400.1/Z129.1, or equivalent, shall be supplied to the purchaser prior to, or concurrent with the first shipment of the product for production use.