



AEROSPACE MATERIAL SPECIFICATION

AMS3092™**REV. A**Issued 2003-03
Revised 2015-12

Superseding AMS3092

Release Agent,
for Use During Form-In-Place Gasket Preparation

RATIONALE

This document is being revised for its five-year update.

1. SCOPE

1.1 Form

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

1.2 Application

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

1.3 Classification

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

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.

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.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2015 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: <http://www.sae.org>

SAE values your input. To provide feedback
on this Technical Report, please visit
<http://www.sae.org/technical/standards/AMS3092A>

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.

AMS-QQ-A-250/4 Aluminum Alloy, 2024, Plate and Sheet

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

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 <http://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.

PD2000 Governance and Administration of an Industry Managed Product Qualification Program

PD2001 Manufacturer Request for Product Approval and Qualification Process

PD2103 Aerospace Quality Assurance, Product Standards, Qualification Procedure, Sealants

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.

3.2 Application

Application of the release agent shall be by spray, brush, or wipe techniques per the manufacturer's instructions. Multiple coatings are allowed 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 cured/dry, the release agent appearance shall range from a transparent film to a translucent white film. Dyes may be added at the purchaser's request to impart color to the film as long as the dye has no detrimental effect on the release or cleanability characteristics.

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 tape adhesion test (wet)	4.5.4
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	4.5.5
3.4.3	Composition	Same as that of qualification test sample	4.5.6

3.5 Shelf Life

The release agent shall have a minimum shelf life of one 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
Composition	3.4.3	4.5.6

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 at an approved laboratory per PD2000, PD2001, and PD2103.

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

AMS3092A TYPE

MANUFACTURER'S IDENTIFICATION

LOT NUMBER

DATE OF MANUFACTURE

APPROPRIATE WARNINGS AND PRECAUTIONARY NOTICES

SUBMITTED BY (NAME) (DATE) FOR QUALIFICATION TESTS IN ACCORDANCE WITH AMS3092A

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 Approval, Reapproval, and Requalification

Approval of qualification test results, reapproval, and requalification shall be in accordance with PD2000, PD2001, and PD2103, unless otherwise specified herein. Data shall be reviewed by the G-9 Qualified Products Group (QPG).

4.4.1 Approval

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 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 five 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 PD2000, PD2001, and PD2103 showing compliance with all of the qualification tests.

4.5 Test Methods

4.5.1 Standard Conditions

Standard laboratory conditions for preparation and testing of specimens shall be 77 °F ± 5 °F (25 °C ± 3 °C). Unless otherwise specified, release agent specimens shall be cured at 77 °F ± 5 °F (25 °C ± 3 °C) and 50% ± 5% relative humidity.

4.5.2 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)

4.5.3 Test Substrates

Test substrates shall be as specified below. Type A rectangular test panel sizes shall be 0.040 × 2.75 × 6.00 inches (1.02 × 69.8 × 152 mm). Type B square test panel sizes shall be 0.25 × 2.00 × 2.00 inches (6.35 × 50.8 × 50.8 mm). All test substrates shall be aluminum alloy panels conforming to AMS-QQ-A-250/4 temper -T81 or -T3 treated with MIL-DTL-81706 Class 1A chemical conversion material. One side of each panel shall be coated with MIL-PRF-23377 or 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 22.9 μm). Primer cure shall be accomplished per the applicable specification, with the accelerated cure being a suitable option.

4.5.4 Cleanability Test

Apply release agent per manufacturer’s instructions to primed side of three Type A panels. Allow to cure/dry. Wet a clean AMS3819, Grade A cloth with AMS3167 cleaning solvent and wipe the panel surfaces five times using a clean, wet cloth each time. Wipe a final time using a dry cloth. Lightly scuff sand the surface with an aluminum oxide abrasive mat or an aluminum oxide abrasive paper with very fine grit size (280-400). Repeat one pass of the cleaning steps followed by a dry wipe. 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 one hour at standard conditions, then for 24 hours at 140 °F ± 5 °F (60 °C ± 3 °C). Perform tape adhesion test per ASTM D3359, Method A after 4 days immersion in ASTM D1193, Type IV distilled water at 120 °F ± 5 °F (49 °C ± 3 °C).

4.5.5 Mechanical Release Test

Apply release agent per manufacturer’s instructions to primed side of three Type B panels. Allow to cure/dry. Sandwich AMS3276 Class B sealing compound between a panel with release agent applied and a panel without release agent applied to achieve a 0.125 inch ± 0.025 inch (3.18 mm ± 0.64 mm) thickness when cured. Ensure that sealant covers entire surface area between panels, but does not extend beyond panel edges. Ensure that faces of panels are parallel. Spacers and splints may be used to achieve the desired configuration. Cure the specimens per AMS3276 requirements. Perform flatwise tensile test per ASTM C297 at 0.5 inch/minute until cured sealant separates from panel with release agent applied. Figure 1 provides a qualitative diagram of the test assembly configuration.

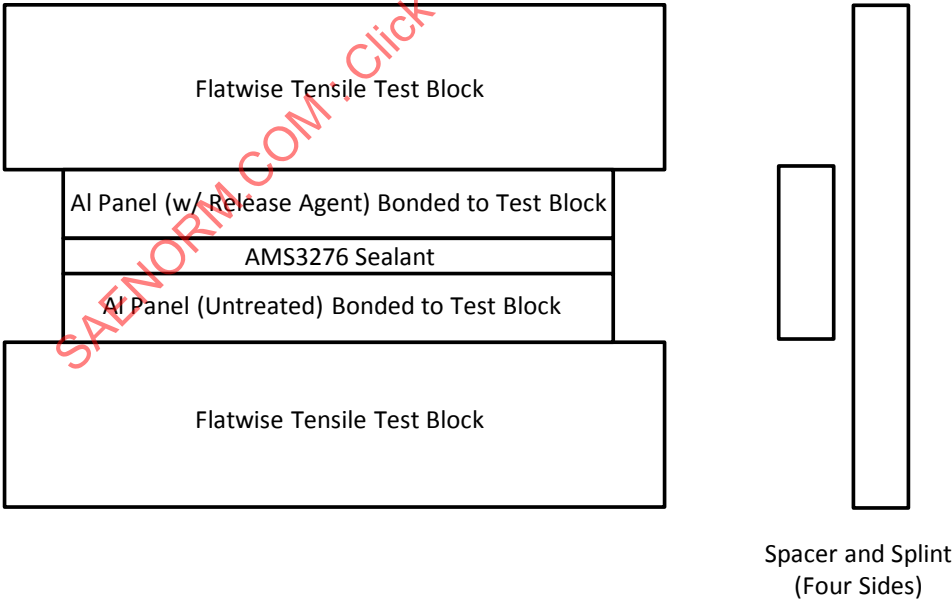


Figure 1 – Flatwise tensile test assembly