



AEROSPACE MATERIAL SPECIFICATION

AMS1321™

Issued

2022-09

Putty, General Purpose, Non-Hardening,
Corrosion-Inhibiting

RATIONALE

New specification generally based on MIL-PRF-8116 requirements for non-curing, corrosion-inhibiting putty materials. Restriction against use in fuel tank applications allow removal of fuel contamination (non-volatile and stoved gum residue) tests. Various types, grades, and classes allow for qualification of putties of varying viscosities to match typical applications as well as option for better fluid resistance and higher temperature capabilities. Class C (from previous draft) has been removed due to discontinuation of Mastinox 6856K product originally qualified to MIL-PRF-8116. All other comments from previous draft have been incorporated without track changes unless there has been additional technical verbiage/instruction to address the changes.

1. SCOPE

1.1 Form

This specification covers a general purpose, non-curing, corrosion-inhibiting putty compounds with non-hexavalent chromium corrosion inhibitors.

1.2 Application

The products covered by this specification are intended for use as general-purpose sealers for cracks, gaps, small voids, pinholes, and seams or mating areas where non-hardening corrosion inhibitive materials are required. These materials may also be used at dissimilar metal joints, fay surfaces, or fasteners where capability for removal is desirable. Putty compounds are not to be used as fuel tank or pressure cabin sealants. Intermixing of compounds is not recommended.

1.3 Classification

Putty compounds covered by this specification are classified as follows:

1.3.1 Types

Type I - Corrosion-inhibiting putty compound with immersion resistance to hydrocarbon-based aircraft fluids.

Type II - Corrosion-inhibiting putty compound with limited immersion resistance to hydrocarbon-based aircraft fluids.

1.3.2 Classes

Putty compounds may be supplied in the following classes:

Class A - Light paste consistency suitable for brush or spatula application; non-sag at thicknesses of less than 0.020 inch (0.51 mm).

Class B - Paste consistency suitable for spatula application; non-sag at thicknesses of less than 0.100 inch (2.54 mm).

SAE Executive Standards Committee 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 © 2022 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
http://www.sae.org

SAE WEB ADDRESS:

Full document details: SAE AMS1321

For more information on this standard, visit
<https://www.sae.org/standards/content/AMS1321/>

Documents

Document Sharing Hub

1.3.3 Grades

The material shall be supplied in the following grades.

Grade 1 - Continuous operating temperature capability of -65 to 140 °F (-54 to 60 °C); this grade may be supplied as a petroleum-based product.

Grade 2 - Continuous operating temperature capability of -65 to 240 °F (-54 to 116 °C); this grade may be supplied as a polysulfide-based product.

Grade 3 - Continuous operating temperature capability of -65 to 320 °F (-54 to 160 °C); this grade may be supplied as a polyester urethane-based product.

1.4 Safety - Hazardous Materials

Shall be in accordance with AS5502 (1.1).

2. APPLICABLE DOCUMENTS

Shall be in accordance with AS5502 (2).

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.

AMS2629	Fluid, Jet Reference
AMS3020	Oil, Reference, for "L" Stock Rubber Testing
AMS3819	Cloths, Cleaning for Aircraft Primary and Secondary Structural Surfaces
AMS4045	Aluminum Alloy Sheet and Plate, 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr, 7075: (-T6 Sheet, -T651 Plate), Solution and Precipitation Heat Treated
AMS4049	Aluminum Alloy, Sheet and Plate, Alclad, 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr (Alclad 7075; -T6 Sheet - T651 Plate), Solution and Precipitation Heat Treated
AMS4377	Magnesium Alloy, Sheet and Plate, 3.0Al - 1.0Zn - 0.20Mn (AZ31B-H24), Cold Rolled, Partially Annealed
AMS4911	Titanium Alloy, Sheet, Strip, and Plate, 6Al - 4V, Annealed
AMS-M-3171	Magnesium Alloy, Processes for Pretreatment and Prevention of Corrosion on
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 U.S. Government Publications

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

MIL-PRF-23377 Primer Coating, Epoxy High Solids

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

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

MIL-PRF-85582 Primer Coatings: Epoxy, Waterborne

2.3 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 Appendix G9 Additional Requirements for the Aerospace and Associated Materials (G9) QPG

PRI-QPL-AMS1321 Products Qualified Under AMS1321

2.4 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 D93 Standard Test Method for Flash Point by Pensky-Martens Closed Cup Tester

ASTM D937 Standard Test Method for Cone Penetration of Petrolatum

ASTM D1480 Standard Test Method for Density and Relative Density (Specific Gravity) of Viscous Materials by Bingham Pycnometer

ASTM D3359 Standard Test Methods for Rating Adhesion by Tape Test

2.5 ISO Publications

Available from International Organization for Standardization, ISO Central Secretariat, 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, Tel: +41 22 749 01 11, www.iso.org.

ISO 1817 Rubber, vulcanized or thermoplastic - Determination of the effect of liquids

3. TECHNICAL REQUIREMENTS

3.1 Materials

The material shall be a non-corrosive, non-drying, non-hygroscopic, putty-like, non-hardening composition containing corrosion inhibitors and free from any ingredients that might cause shrinkage by oxidation or evaporation. The material shall exhibit no lumps or separation, no precipitate formation and, where applicable, no permanent haziness in solution.

3.2 Date of Packaging

Shall be in accordance with AS5502 (3.1).

3.3 Toxicological Formulations

Shall be in accordance with AS5502 (3.2).

3.4 Quality

Shall be in accordance with AS5502 (3.3).

3.5 Shelf Life

Shelf life of Type I materials shall be a minimum of 1 year from the date of packaging when stored between 40 °F and 80 °F (4 °C and 27 °C) and may be retested for shelf life extension per 4.3.3. Type II compound shelf life shall be a minimum of 3 years when stored between 40 °F and 100 °F (4 °C and 38 °C) and may be retested for shelf life extension per 4.3.3.

3.6 Properties

The putty compound shall conform to the requirements shown in Table 1, determined in accordance with specified test methods:

Table 1 - Properties

Paragraph	Property	Requirement	Test Method
3.6.1	Nonvolatile Content, (% by weight), minimum Class A Class B	85% 87%	AS5127/1 (5.1)
3.6.2	Viscosity Type I, Class A, maximum Type I, Class B, maximum Type II, Class A	1400 poises (140 Pa·s) 1000 poises (80 Pa·s) 5.12 to 9.45 inches (130 to 240 mm)	AS5127/1 (5.3) No. 7 spindle at 20 rpm AS5127/1 (5.3) No. 7 spindle at 20 rpm ASTM D937
3.6.3	Flow, maximum At standard conditions, all grades At 140 °F (60 °C), Grade 1 only At 240 °F (116 °C), Grade 2 only At 320 °F (160 °C), Grade 3 only	0.05 inch (1.27 mm)	AMS1321 (4.6.1) AS5127/1 (5.5.1), modified
3.6.4	Specific Gravity, maximum average Type I Type II	1.50 1.00	ASTM D1480
3.6.5	Flash Point, minimum Type I Type II	75 °F (24 °C) 165 °F (74 °C)	ASTM D93
3.6.6	Resistance to Drying and Aging	No flow, loss of adhesion, hardening, cracking, or embrittlement	AMS1321 (4.6.2)
3.6.6.1	Weight Loss, maximum Grade 1 Grade 2 Grade 3	15%, by weight 15%, by weight 21%, by weight	
3.6.7	Water Solubility, maximum	3%	AMS1321 (4.6.3)
3.6.8	Fluid Resistance		
3.6.8.1	Type I	Easy disassembly, no compound washout from any fay surface edge, cohesive failure, and no compound separation	AMS1321 (4.6.4.1)
3.6.8.2	Type II	Easy disassembly, no greater than 0.125 inch (3.2 mm) washout from any fay surface edge, cohesive failure, no compound separation	AMS1321 (4.6.4.2)
3.6.9	Coating Compatibility	No softening, wrinkling, or blistering of coating	AMS1321 (4.6.5)
3.6.9.1	Adhesion Test	No less than 4A rating	ASTM D3359 AMS1321 (4.6.5.1)