SAE Aerospace
An SAE International Group

AEROSPACE STANDARD

SAE AS5502 | REV. A

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Superseding AS5502

Standard Requirements for Aerospace Sealants

1. SCOPE:

This document establishes standard requirements for aerospace sealants, which may be incorporated as part of Aerospace Material Specifications (AMS) for such products. This document provides for commonality of methods and procedures for responsibility for inspection, source inspection, classification of tests, establishment of/and qualification to qualified products lists, approval, reports, resampling and retesting, packaging, and marking.

1.1 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.

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.

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

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AS7001	National Aerospace and Defense Contractors Accreditation Program (NADCAP) - Program Description
AS7002	National Aerospace and Defense Contractors Accreditation Program (NADCAP) - Rules for Implementation
AS7003	National Aerospace and Defense Contractors Accreditation Program (NADCAP) - Program Operation
AS7200/1	National Aerospace and Defense Contractors Accreditation Program (NADCAP) - Audit and Inspection Procedures and Checklists for the Sealant Manufacturers Accreditation Program
AS7201	National Aerospace and Defense Contractors Accreditation Program (NADCAP) - Requirements for Accreditation of Pass-Thru Distributors
AS7202	National Aerospace and Defense Contractors Accreditation Program (NADCAP) - Requirements for Accreditation of Value Added Distributors
PD 2000	Procedures for an Industry Qualified Product Management Process

2.2 U.S. Government Publications:

Available from DAPS, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-S-38714	Sealant Cartridge for Two Component Materials
PPP-C-96	Cans, Metal, 28 Gage and Lighter
PPP-P-704	Pails, Metal (Shipping, Steel, 1 through 12 Gallons)

3. TECHNICAL REQUIREMENTS:

For purposes of this standard, sealant shall be synonymous with "sealing compound".

Technical requirements for a specific class of sealant shall be defined by the Aerospace Materials Specification (AMS). In case of conflict in requirement(s), the AMS takes precedence over this Aerospace Standard (AS).

3.1 Date of Packaging:

Date of packaging is defined as the date finished material is packaged from its components, base compound and curing agent, into a package and labeled kit or unit by the manufacturer or repackager. Date of packaging (DOP) shall be no more than 90 days from the last day of full quality conformance testing in accordance with the applicable AMS. The manufacturer may retest material at any time to determine conformance to full quality conformance testing in accordance with the applicable AMS. The first surveillance test for a batch may be conducted on, or before the conclusion of the initial 90-day period, by testing the application properties only of the quality acceptance requirements of the pertinent AMS. Any extension testing thereafter shall require full quality acceptance testing in accordance with the applicable AMS, and shall be limited to three 90-day periods from the date of initial batch approval.

3.2 Toxicological Formulations:

The material shall have no adverse effects on the health of personnel when used for its intended purpose in accordance with manufacturer's instructions and with appropriate handling procedures. Questions pertinent to this effect shall be referred by the contracting activity to the appropriate medical service who will act as an advisor to the contracting agency.

3.3 Quality:

The base compound and the curing agent, as received by the purchaser, shall each be of uniform blend and shall be free of excessive air, skins, lumps, and gelled or coarse particles. There shall be no separation of ingredients which cannot be easily redispersed.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The manufacturer of the sealant shall supply all samples and shall be responsible for performance of all required tests. Purchaser reserves the right to sample and perform any confirmatory testing deemed necessary to ensure that the sealant conforms to the requirements of the AMS.

4.1.1 Source Inspection (NADCAP): Material procured under this specification shall be third party approved prior to shipment, to ensure that material meets acceptance tests (as defined by the sealant specification). Third party approval shall be by a third party accreditation process in accordance with AS7001, AS7002, AS7003, and AS7200/1. Sealant shall be from a manufacturer that currently holds a third party accreditation and shall be from a batch of material that has been third party source inspected in accordance with AS7200/1. Distributors supplying sealant shall supply material from an accredited manufacturer and from a batch of material that has been third party source inspected. Distributors shall also be third party accredited in accordance with AS7201 or AS7202, whichever is applicable.

4.1.2 Sampling: The minimum number of samples to be tested during shelf-life surveillance and updating is shown in Table 1.

TABLE 1 - Sampling

Items in Stock	Samples to be Tested
Up to 100, excl	3
100 to 500, incl	5
Over 500	7

4.2 Classification of Tests:

4.2.1 Qualification Tests: All technical requirements are qualification tests and shall be performed prior to or on the initial shipment of the sealant by the manufacturer, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.2 Preproduction Tests: All technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of the sealant to a purchaser, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

NOTE: The difference between preproduction and qualification testing is that in the case of qualification, the products are listed on a Qualified Products List (QPL) (see 4.7).

4.2.3 Acceptance Tests: Technical requirements that are tested on each batch of material are acceptance tests. Initial acceptance tests are performed after production, but before packaging. Final acceptance tests are performed after packaging.

4.3 Sampling and Testing:

4.3.1 For Acceptance Tests: Sufficient sealant shall be taken at random from each batch to perform all required tests. The number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified herein, not less than three. Multiple testing is not required for viscosity, application time, flow, tack-free time, and hardness.

4.3.1.1 A batch shall be the quantity of sealant run through a mill or mixer at one time.

4.3.1.2 Compound for testing shall be mixed, whenever possible, in the same containers in which the sealants were procured.

4.3.1.3 If the compound is being procured in plastic injection kits, such as those conforming to MIL-S-38714, all tests shall be conducted on compound that has been packaged and mixed in the initial sample injection kits except for viscosity of base compound and viscosity of the curing agent. During filling of the initial sample injection kits, base compound and curing agent shall be placed in 1-quart (1-L) cans for the viscosity tests. If more than one size of injection kits are to be packaged from a particular batch, it is necessary to test compound from only one size kit.

4.3.1.4 If the compound is being procured in cans, pails, or drums, the batch may be tested on the compound placed in 1-quart (1-L) cans.

4.3.1.5 If the compound is being procured in both type containers, the quality conformance tests shall be conducted on the compound packaged in plastic injection kits.

4.3.1.6 A statistical sampling plan, acceptable to purchaser, may be used in lieu of sampling.

4.4 Approval:

4.4.1 Purchaser shall approve sealing compound before sealing compound for production use is supplied, unless the purchaser waives such approval. Results of tests on the production sealing compound shall be essentially equivalent to those on the approved sample.

4.4.2 Manufacturer shall use ingredients, manufacturing procedures, processes, and methods of inspection on production product which are essentially the same as those used on the approval sample. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, manufacturer shall submit for reapproval a statement of the proposed changes in ingredients and/or processing and, when requested, sample product. Production product made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Reports:

The supplier of the sealant shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance requirements, and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, batch number, AMS designation, Class and Type, and manufacturer's identification.

4.5.1 For sealants produced with source inspection, reports shall be stamped by the third party source inspector.

4.6 Resampling and Retesting:

If any specimen used in the tests fails to meet the specified requirements, disposition of the product may be based on the results of testing three additional specimens for each nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the product represented. Results of all tests shall be reported.

4.7 Qualification:

Specifications which require a Qualified Products List to be maintained by the Performance Review Institute shall include the following provisions:

4.7.1 Qualification: All products sold to the AMS shall be listed, or approved for listing, on the qualified products list, PRI QPL AMS designation. The qualified products list shall be in accordance with PD 2000.

4.7.2 Qualification of Sealant: Awards will be made only for sealants which are, prior to the award of a contract, qualified for inclusion in the applicable qualified products list (QPL) whether or not such products have been so listed to that date. The attention of contractors is called to these requirements, and manufacturers are urged to arrange to have the sealant that they propose to offer tested for qualification in order that they may be eligible to be awarded contracts or orders for the sealant covered by this specification. The activity responsible for the QPL is the Performance Review Institute, 161 Thornhill Road, Warrendale, PA 15086-7527, phone (412) 772-1616, fax (412) 772-1699. Information pertaining to qualification of sealant may be obtained from that activity.

4.7.2.1 Qualification shall be re-approved every five years in accordance with PD 2000 and the instructions from the Performance Review Institute.

5. PREPARATION FOR DELIVERY:

5.1 Packaging:

5.1.1 A batch of sealant may be packaged in small quantities and delivered under the basic batch approval provided batch identification is maintained.

5.1.2 Sealant shall be furnished in individual containers for the base compound and the curing compound or in sectional containers. The ratio of the quantity contained in the base compound container to the quantity contained in the curing agent container shall be the same as the recommended mixing ratio of the base compound to the curing agent.

5.1.3 Individual Containers: Shall be as specified in the purchase order. When not specified, the base compound shall be furnished in 1/2-pint (236-mL), 1-pint (473-mL) 1-quart (1-L), or 1-gallon (3.78-L) metal cans conforming to PPP-P-704, in 5-gallon (19-L) pails, in 55-gallon (208-L) drums conforming to PPP-D-729, Type III, except that tin plate cans with paper labels may be used or as specified in the purchase order.

5.1.3.1 The curing agent for kits 1-gallon (3.78-L) or under shall be furnished in glass jars or in suitable containers acceptable to purchaser. Glass jars or plastic containers, as applicable, shall have vertical, smooth inside walls and no internal projections or internal lips exceeding 0.062 inch (1.57 mm). The glass jars shall be closed with enameled metal or plastic continuous thread screw caps having a nonabsorbent lining material. Caps shall be tightened adequately and further sealed with cellulose bands, or equivalent. Curing agent for 5-gallon (19-L) pails shall be packaged in 1-gallon (3.79-L) cans conforming to PPP-C-96, Type 5, Class 2. Curing agent for 55-gallon (208-L) drums shall be packaged in pails conforming to PPP-P-704.

5.1.3.2 One container each of the base compound and the curing agent, individually packaged in accordance with 5.1.2 and 5.1.3, shall be enclosed in a container acceptable to purchaser and shall constitute a complete kit.

5.1.4 Sectional-Type Containers: The base compound and the curing agent shall be furnished in high-density polyethylene sectional-type 2.5 ounce (74-mL) or 6-ounce (178-mL) cartridges, conforming to MIL-S-38714, as specified in the purchase order. The total content of the base compound and curing agent contained in each sectional-type container shall be as shown in Table 3.

TABLE 2 - Contents of Sectional-Type Containers

Size of Container	Total Content (Base and Curing)
2.5 ounces (74 mL)	2.0 fluid ounces ± 0.0125 (69 mL ± 4)
6 ounces (178 mL)	3.5 fluid ounces ± 0.125 (105 mL ± 4)
6 ounces (178 mL)	4.5 fluid ounces ± 0.125 (135 mL ± 4)

5.1.5 Containers of sealant shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to handling, packaging, and transportation of the sealant to ensure carrier acceptance and safe delivery.

5.1.6 Pre-Mixed Frozen Sealant Containers: Containers for pre-mixed sealant shall be standard sealing cartridges of high density polyethylene. The quantity of sealant shall be specified by the procuring agency.