

**AEROSPACE  
MATERIAL  
SPECIFICATION**

**SAE** AMS-R-83283

REV. A

Issued 1998-05  
Stabilized 2014-03

Superseding AMS-R-83283

Rubber Silicone, High Strength, Cabin  
Pressure Seal Material, Diaphragm Type

RATIONALE

This document has been determined to contain basic and stable technology which is not dynamic in nature.

STABILIZED NOTICE

This document has been declared "Stabilized" by SAE AMS CE, Elastomers Committee, and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

SAENORM.COM : Click to view the full PDF of AMSR83283a

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 reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2012 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:

**SAE values your input. To provide feedback  
on this Technical Report, please visit  
<http://www.sae.org/technical/standards/AMSR83283A>**

## NOTICE

This document has been taken directly from U.S. Military Specification MIL-R-83283A and contains only minor editorial and format changes required to bring it into conformance with the publishing requirements of SAE technical standards. The initial release of this document is intended to replace MIL-R-83283A. Any part numbers established by the original specification remain unchanged.

The original Military Specification was adopted as an SAE standard under the provisions of the SAE Technical Standards Board (TSB) Rules and Regulations (TSB 001) pertaining to accelerated adoption of government specifications and standards. TSB rules provide for (a) the publication of portions of unrevised government specifications and standards without consensus voting at the SAE Committee level, and (b) the use of the existing government specification or standard format.

Any material relating to qualified product lists has not been adopted by SAE. This material was part of the original military specification and is reprinted here for historic reference only.

## 1. SCOPE:

### 1.1 Scope:

This specification covers 45 durometer hardness, high strength silicone rubber.

## 2. APPLICABLE DOCUMENTS:

The following publications, of the issues in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SAENORM.COM : Click to view the full PDF of AMS-R-83283A

## 2.1 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-105 Sampling Procedures and Tables for Inspection by Attributes  
MIL-STD-129 Marking for Shipment and Storage  
MIL-STD-407 Visual Inspection Guide for Rubber Molded Items

PPP-B--601 Boxes, Wood, Cleated-Plywood  
PPP-B-636 Box, Shipping, Fiberboard

## 2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 297 Rubber Products - Chemical Analysis  
ASTM D 395 Rubber Property - Compression Set  
ASTM D 412 Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension  
  
ASTM D 573 Rubber-Deterioration in an Air Oven  
ASTM D 624 Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers  
  
ASTM D 813 Rubber Deterioration - Crack Growth  
ASTM D 1329 Evaluating Rubber Property - Retraction of Lower-Temperatures (TR Test)  
ASTM D 2240 Rubber Property - Durometer Hardness  
ASTM D 2632 Rubber Property - Resilience by Vertical Rebound

## 2.3 Uniform Classification Committee, Agent:

Available from the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.

Uniform Freight Classification Rules

## 3. REQUIREMENTS:

### 3.1 First article:

When specified (see 6.2) the silicone rubber furnished to this specification shall be a product subject to first article inspections in accordance with 4.4. The approval of the first article sample authorizes the commencement of production, but does not relieve the supplier of responsibility for compliance with all applicable provisions of this specification. The first article sample shall be manufactured in the same facilities to be used for the manufacture of the production items.

### 3.2 Materials:

The material shall be a silicone base synthetic elastomer formulated and processed to meet the requirements of this specification. All materials which are not specifically described herein shall be of high quality and suitable for the intended purpose and shall be of the same composition as the material used for the first article sample. The silicone rubber shall not deteriorate finished surfaces of wood, metal, or fabric which it contacts during normal usage. Unless otherwise specified, vulcanized joints shall be of the same size as the remaining part and shall possess at least 65 percent of the tensile strength of the parent material.

### 3.3 Dimensions and tolerances:

Dimensions and tolerances of the silicone rubber shall be as specified on the applicable drawing as supplied by the procuring activity (see 6.2).

### 3.4 Physical properties:

The physical properties of the silicone rubber shall conform to the requirements specified in table I.

### 3.5 Workmanship:

The product shall be free from defects, and foreign materials and shall be uniform in quality; also it shall be smooth and free from flash unless otherwise specified on the drawing or contract.

## 4. QUALITY ASSURANCE PROVISIONS:

### 4.1 Responsibility for inspection:

Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use their own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

- 4.1.1 Responsibility for compliance: All items shall meet all the applicable requirements of section 3 and 5. They shall meet all inspections set forth in the inspection system or quality program. The absence of any inspection requirements in this specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspections as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

TABLE I. Physical properties

Physical properties	Requirements
Original	
Tensile strength	1300 psi, min
Elongation	550%, min.
Hardness, Type A durometer	45 ± 5 points
Tear strength	165 lbs/inch, min.
Tear propagation, cycles	50,000 min.
Temperature retraction, (TR-10), 5°F	-65 max
Tensile set	10%, max.
Resilience, vertical impact	30%, min.
Specific gravity 1/	
Compression set, 70 ± 2 hrs at 302 ± 4°F	40% max.
Air aged: 22 ± 2 hrs at 437 ± 4°F	
Tensile strength change	-35%, max.
Elongation change	-35%, max.
Hardness change	+10 points
Tear strength change	-15%, max
Bend, flat	no cracking or checking

1/ Value determined during first article testing. The quality conformance test values shall not deviate from the original first article values by more than ±0.02.

#### 4.2 Classification of inspections:

The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.4)
- b. Quality conformance inspection (4.5)

#### 4.3 Inspection conditions:

Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified in section 4.

- 4.3.1 Test condition: Unless otherwise specified herein, all test specimens shall be conditioned and tested at normal laboratory conditions or in accordance with table III. In case of dispute over test results, the tests shall be repeated using standard conditions in accordance with 4.3.2.
- 4.3.2 Standard conditions: Standard conditions shall be 50 ± 15 percent relative humidity and at a temperature of 75°F ± 5°F.

4.3.4 Lot: A lot shall consist of all material of the same identity cured in the same production run, from the same batch, and submitted at the same time for inspection.

4.3.5 Batch: A batch shall be the quantity of material compounded on a mill or mixer at one time.

4.4 First article inspection:

First article inspection shall consist of all the tests specified herein (see 4.6).

4.4.1 First article samples: First article test samples shall be obtained from 6 by 6 by  $0.075 \pm 0.005$  inch molded sheets.

4.4.2 First article tests: The first article tests shall meet all the requirements in 3.4 when tested in accordance with 4.6.

4.5 Quality conformance inspection:

Quality conformance inspection shall consist of sampling plans, A, B, C and D.

4.5.1 Sampling: Unless otherwise indicated herein, sampling for quality conformance inspection shall be in accordance with MIL-STD-105. Quality conformance tests are required on final parts for all production lots of material.

4.5.2 Inspection of materials and components: The supplier is responsible for insuring that materials and components used where manufactured, tested, and inspected in accordance with referenced subsidiary specifications and standards to the extent specified, or if none, in accordance with this specification (see 4.1). In the event of conflict, this specification shall govern.

4.5.3 Sampling plan A: Whenever possible, the end item, or specimens cut from the end item, shall be used as the sample. If these items are unsuitable for use as test samples, such as being fabric reinforced, test shall be performed on 6 by 6 by  $0.075 \pm 0.005$  inch samples of identical composition and comparable state of cure as that of the end item. The samples shall be subjected to the following tests that are conducted on each lot of material:

<u>Original (Table III)</u>	<u>Air aged (4.6.3)</u>
Tensile strength	Tensile strength
Elongation	Elongation
Hardness	Hardness
Tear strength	Compression set
Tension set	
Specific gravity	

4.5.3.1 Rejection criteria: A lot shall be rejected upon the failure of the samples to meet the test requirements specified herein. A lot that has been rejected may be reworked to correct the deficiencies and resubmitted for acceptance.

- 4.5.4 Sampling plans B, C, and D: Examination of the end item shall be in accordance with the classification of defects, inspection levels, and acceptance quality levels (AQL's) set forth herein. The lot size, for the purpose of determining the sample size in accordance with MIL-STD-105, shall be expressed in units of finished parts, for examinations as specified herein (see 4.5.4.1, 4.5.4.2, and 4.5.4.3).
- 4.5.4.1 Sampling plan B - Examination for defects in appearance and workmanship: The sample unit shall be one finished part and the examination shall be in accordance with MIL-STD-407. The sample size shall be in accordance with MIL-STD-105, inspection level II, and the AQL related to percent (%) defective shall be 1.5.
- 4.5.4.2 Sampling plan C - examination for dimensional defects: The sample unit shall be one finished part. The dimensions shall be within the tolerances specified on the drawing as supplied by the procuring activity (see 6.2). The sample size shall be in accordance with inspection level II of MIL-STD-105 and the AQL related to percent defective shall be 1.5.
- 4.5.4.3 Sampling plan D - inspection for defects in packaging for delivery: An examination in accordance with table II shall be made to determine that the packaging, packing, and markings comply with section 5 and are in accordance with the applicable methods specified in table II. The sample unit for this inspection shall be one shipping container fully packed, selected just prior to the closing operation. Shipping containers fully prepared for delivery shall be inspected for closure defects.

TABLE II. Packaging inspection

<u>Examine</u>	<u>Defects</u>
Packaging (finished parts)	Not the level specified. Not packaged as specified or required.
Packing	Packaging material, closures not as specified. Unit items not individually wrapped when specified. Not level specified; not in accordance with contract requirements. Container not as specified, closures not accomplished by specified or required methods or materials. Any nonconforming component, component missing, damaged or otherwise defective, affecting serviceability. Inadequate application of components such as; incomplete flaps loose or inadequate strapping bulged or distorted containers.
Count	Less than specified or indicated quantity, linear footage, or units, as applicable.
Weight	Gross weight exceeds specified requirements.
Markings	Interior or exterior markings, as applicable omitted, illegible, incorrect, incomplete, or not in accordance with contract requirements. Date of cure, storage instructions, missing.

#### 4.6 Inspection test methods:

- 4.6.1 Physical properties test: Conformance with the physical properties shall be determined in accordance with the applicable test methods specified in table III.

TABLE III. Physical properties tests

Characteristics	ASTM Method
Tensile strength and elongation	D 412
Hardness	D 2240
Tear strength and tear propagation	D 624 (use die B)
Tear propagation	D 813
Temperature retraction (TR-10)	D 1329
Tension 1/	D 412
Resilience, vertical impact	D 2632

1/ The test specimen shall be held for 10 minutes at 300 percent elongation and be allowed 5 minutes for recovery prior to the tension set measurement.

- 4.6.2 Compression set test: Compression set shall be determined in accordance with ASTM D 395, method B, except that the aging time and temperature shall be in accordance with table I. Test specimens shall be plied up to obtain required thickness.
- 4.6.3 Air aging: Air aging shall be conducted in accordance with ASTM D 573, except that the aging time and temperature shall be in accordance with table I. Tensile strength, elongation, and hardness changes shall be determined as specified (see 4.6.1).
- 4.6.3.1 Bend, flat test: Bend flat test shall be conducted by bending a sample 180 degrees flat upon itself, after being exposed to the air aging as specified (see table I).

#### 5. PACKAGING:

##### 5.1 Preservation:

Preservation shall be level A or C, as specified (see 6.2).

##### 5.1.1 Level A:

- 5.1.1.1 Finished parts: Finished rubber parts shall be packaged in containers conforming to PPP-B-636. The unit quantity shall be as specified by the procuring specification activity (see 6.2).