

INCH-POUND

**MIL-R-83283A(USAF)**  
**12 June 1991**  
**SUPERSEDING**  
**MIL-R-83283(USAF)**  
**8 July 1970**

## MILITARY SPECIFICATION

### RUBBER SILICONE, HIGH STRENGTH, CABIN PRESSURE SEAL MATERIAL, DIAPHRAGM TYPE

This revision forms a part of MIL-R-83283(USAF) dated 8 July 1970, and is approved for use by the Department of the Air Force and is available for use by all Departments and Agencies of the Department of Defense.

#### 1. SCOPE

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

#### 2. APPLICABLE DOCUMENTS

##### 2.1 Government documents

2.1.1 Specifications and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, in the solicitation (see 6.2).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: ASD/ENES, Wright-Patterson AFB, Ohio 45433-6503 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 9320

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

**MIL-R-05205A(USAF)**

## SPECIFICATIONS

## FEDERAL

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

## STANDARDS

## MILITARY

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

(Unless otherwise indicated copies of federal and military specifications and standards are available from the Standardization Documents Order Desk, Building 4D, Robbins Avenue, Philadelphia, PA 19111-5094).

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation.

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 297 Standard Test Method for Rubber Products – Chemical Analysis (DoD adopted)  
 ASTM D 395 Standard Test Method for Rubber Property – Compression Set (DoD adopted)  
 ASTM D 412 Standard Test Method for Rubber Properties in Tension Testing (DoD adopted)  
 ASTM D 573 Standard Test Method for Rubber Deterioration in an Air Oven (DoD adopted)  
 ASTM D 624 Standard Test Method for Rubber Property – Tensile Resistance (DoD adopted)  
 ASTM D 813 Standard Test Method for Rubber Deterioration – Crack Growth (DoD adopted)  
 ASTM D 1329 Standard Test Method for Evaluating Rubber Property – Retraction of Lower-Temperatures (TR Test) (DoD adopted)  
 ASTM D 2240 Standard Test Method for Rubber Property – Durometer Hardness (DoD adopted)  
 ASTM D 2632 Standard Test Method for Rubber Property – Resilience by Vertical Rebound (DoD adopted)

(Applications for copies should be addressed to American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1137).

MIL-R-65205A(USAF)

## UNIFORM CLASSIFICATION COMMITTEE, AGENT

### Uniform Freight Classification Rules

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

(Nongovernment standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specified exemption has been obtained.

### 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.

MIL-R-05205A(USAF)

#### 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 the 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 $\pm$ 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 <u>1/</u>	
Compression set, 70 $\pm$ 2 hrs at 302 $\pm$ 4°F	40 % max.
Air aged: 22 $\pm$ 2 hrs at 437 $\pm$ 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  $\pm$ 0.02.

**MIL-STD-203A(USAF)**

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  $\pm$ 15 percent relative humidity and at a temperature of 75F°  $\pm$ 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 indicted 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 extend specified, or if none, in accordance with this specification (see 4.1). In the event of conflict, this specification shall govern.

## MIL-STD-203A(USAF)

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, tests shall be performed on 6 by 6 by 0.075 ±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:

Original (Table III)Air aged (4.6.3)

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 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.

MIL-R-65205A(USAF)

TABLE II. Packaging inspection

Examine	Defects
Packaging (finished parts)	<p>Not the level specified. Not packaged as specified or required.</p> <p>Packaging material, closures not as specified. Unit items not individually wrapped when specified.</p>
Packing  aged	<p>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.</p>
Count	<p>Less than specified or indicated quantity, linear footage, or units, as applicable.</p>
Weight	<p>Gross weight exceeds specified requirements.</p>
Markings	<p>Interior or exterior markings, as applicable omitted, illegible, incorrect, incomplete, or not in accordance with contract requirements. Date of cure, storage instructions, missing.</p>

## MIL-R-65205A(USAF)

4.6 Inspection test methods

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

TABLE III. Physical properties tests.

<u>Characteristics</u>	<u>ASTM Method</u>
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).



MIL-R-63205A(USAF)

## 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)..

5.1.2 Level C. The silicone rubber shall be preserved and packaged to protect against deterioration and physical damage during shipment. This level may conform to the supplier's commercial practice when the practice meets the requirements of this level.

5.2 Packing. Packing shall be level A, B, C, as specified (see 6.2).

5.2.1 Level A Unless otherwise specified by the procuring activity, rubber material shall be packed in wood, cleated-plywood shipping containers conforming to PPP-B-601, overseas type. As far as practical, containers shall be uniform in shape and size and contain identical quantities. Container closure and strapping shall be in accordance with the appendix to PPP-B-601. Gross weight of containers shall not exceed 200 pounds.

5.2.2 Level B. Level B shall be the same as level A except containers shall conform to domestic type and gross weight shall not exceed 500 pounds.

5.2.3 Level C. Packages which require overpacking for acceptance by the carrier shall be packed in exterior-type shipping containers in a manner that will insure transportation at the lowest rate to the point of delivery. Containers shall conform to the Uniform Freight Classification Rules or regulations of other common carrier, as applicable to the mode of transportation. This level may conform to the supplier's commercial practice when the practice meets the requirements of this level.

**MIL-R-83283A(USAF)****5.3 Marking**

5.3.1 Level A, B, C. In addition to any special marking or other identification markings required by the contract (see 6.2), each unit pack and exterior container shall be marked in accordance with MIL-STD-129 and as follows:

Rubber (silicone, cabin pressure seal, diaphragm type)  
Cross section and length (inches) or part number  
Manufacturer's name and address  
Compound number, lot number  
Specification MIL-R-83283A(USAF)  
Cure date (quarter and year)  
STORE IN A COOL DRY PLACE

6. NOTES (This section contains information of a general explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The rubber covered by this specification is intended for use as a diaphragm type, cabin pressure seal.

6.2 Acquisition document. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Dimensions and tolerances (see 3.3)
- c. Quantity
- d. Detail drawing and additional specification, if any.
- e. Unit quantity of molded parts if other than specified.
- f. Whether first article sample is required (see 3.1).
- g. Applicable levels of preservation and packing (see 5.1 and 5.2).

6.3 First article. When first article inspection is required for the silicone rubber material furnished to this specification. A copy of the first article test report shall be furnished the Wright Laboratory, Attn: WL/MLSE, Wright-Patterson AFB, OH 45433-6503. The first article test need not be repeated for new orders provided the materials and processes have not been changed and a certified statement to this effect is furnished to the procuring activity. The waiving of the first article tests will be strictly at the discretion of the procuring activity. First article tests will not be acceptable if they are more than 3 years old

MIL-R-65205A(USAF)

6.4 Subject term (key word) listing

Elongation  
Molded parts  
Temperature retraction (TR-10)  
Tensile strength

6.6 Change from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Preparing activity:

Air Force – II

Air Force – 11

Review activity:

(Project No. 5330-F004)

Air Force – 71