

INCH - POUND

MIL-R-46089C (MI)  
 28 February 1991  
 SUPERSEDING  
 MIL-R-46089B (MI)  
 12 February 1981

## MILITARY SPECIFICATION

## RUBBER, SPONGE, SILICONE, CLOSED CELL

This specification is approved for use by the U.S. Army Missile Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

## 1. SCOPE

1.1 Scope. This specification covers requirements for a silicone sponge (synthetic) rubber of the closed cell type.

1.2 Classification. The sponge rubber covered by this specification will consist of the following grades, forms, and sizes, as specified (see 1.2.1, 1.2.2, 1.2.3, 6.2, and 6.4).

1.2.1 Grades. M - Medium grade  
 F - Firm grade

1.2.2 Forms. S - Sheets (see 1.2.3)  
 MP - Molded parts  
 EP - Extruded parts

1.2.3 Sizes. (Sheets only) (see table I).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, U.S. Army Missile Command, ATTN: AMSMI-RD-SE-TD-ST, Redstone Arsenal, AL 35898-5270 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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TABLE I. Classification of grades and sizes.

Thickness (see 3.4)		Grade	Sheet Size (-0%, +3%)					
Code	inches	Code	Code	inches	Code	inches	Code	inches
A	0.0625	F	1	12 x 12	2	24 x 24	3	36 x 36
B	0.125	F	1	12 x 12	2	24 x 24	3	36 x 36
C	0.1875	M or F	1	12 x 12	2	24 x 24	3	36 x 36
D	0.25	M or F	1	12 x 12	2	24 x 24	3	36 x 36
E	0.3125	M or F	1	12 x 12	2	24 x 24	3	36 x 36
F	0.375	M or F	1	12 x 12	2	24 x 24	3	36 x 36
G	0.5	M or F	1	12 x 12	2	24 x 24	3	36 x 36

## 2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks 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, cited in the solicitation (see 6.2).

## SPECIFICATIONS

## FEDERAL

U-T-30	-	Talcum Powder
PPP-B-566	-	Boxes, Folding, Paperboard
PPP-B-636	-	Boxes, Shipping, Fiberboard
PPP-B-676	-	Boxes, Setup

## MILITARY

MIL-P-116	-	Preservation, Methods of
MIL-B-117	-	Bags, Sleeves and Tubing
MIL-P-17667	-	Paper, Wrapping, Chemically Neutral (Non-Corrosive)

## STANDARDS

## MILITARY

MIL-STD-129	-	Marking for Shipment and Storage
MIL-STD-190	-	Identification Marking of Rubber Products
MIL-STD-289	-	Visual Inspection Guide for Rubber Sheet Material

**MIL-R-46089C (MI)****MIL-STD-1190 - Minimum Guidelines for Level C  
Preservation, Packing and Marking**

(Unless otherwise indicated, copies of the federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Ave., 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 cited 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 (see 6 2).

**AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)**

- ASTM D 1056 - Flexible Cellular Materials-Sponge or Expanded Rubber, Standard Specification for
- ASTM D 3574 - Flexible Cellular Materials-Slab, Bonded, and Molded Urethane Foams, Standard Methods of Testing

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

(Non-Government standards and other publications are normally available from the organizations that prepare or 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 specific exemption has been obtained.

**3. REQUIREMENTS**

**3.1 First article.** When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.4.

**3.2 Material.** This product shall be constructed of synthetic silicone sponge rubber of the closed cell or non-interlocking cell type.

**3.3 Properties.** Material properties shall conform to tables I and II (see 4.6.2, 4.6.3, 4.6.4, 4 6.5, and 4.6.6)

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TABLE II. Physical properties.

Property	Value
Tensile strength	40 pounds force per square inch (lbf/in <sup>2</sup> ) (minimum)
Water absorption	5 percent (maximum) 24 hours at 24° Celsius (C) 2 x 2 by 0.125 inch specimen
Low temperature brittleness	No cracking after 2 hours exposure at -74°C
Density lb/cu inch: Grade M Grade F	0.010 to 0.020 0.015 to 0.030
Compression set after 22 hours at: -53°C +100°C	20 percent of deflection 90 percent of deflection

3.3.1 Compression deflection (resistance). The load required to compress a 0.5 inch thick sample of the material to 75 percent of its original thickness, with temperatures from -53 to 249°C, shall be in accordance with table III (see 4.6.1).

TABLE III. Compression deflection (resistance).

Temperature	Grade M deflection (lbf/in <sup>2</sup> )	Grade F deflection (lbf/in <sup>2</sup> )
-53°C	5 - 16	12 - 23
21.1°C	6 - 14	14 - 20
249°C	6 - 17	14 - 24

3.4 Tolerance. The variation in sheet thickness (see 1.2.3) shall be not greater than the tolerances shown in table IV, in accordance with 4.5.2.

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TABLE IV. Sheet thickness and tolerances.

Sheet thickness, inches	Tolerance, inches
0.0625	$\pm 0.015625$
0.125	$\pm 0.03125$
0.1875	$\pm 0.03125$
0.25	$+ 0.046875 - 0.03125$
0.3125	$+ 0.046875 - 0.03125$
0.375	$\pm 0.046875$
0.5	$\pm 0.046875$

3.5 Color. Color shall be as specified on the engineering drawing or purchase order.

3.6 Marking. Each part or sheet shall have, in a non-functional position, the specification part number, manufacturer's trade mark, detail drawing or part number, or other identification marks as specified by the applicable drawing, purchase order or by MIL-STD-190 (see 4.5.2).

3.7 Workmanship. The material shall be uniform in construction and appearance and shall be free from holes, pits, weak sections, foreign matter and other defects affecting serviceability. Parts shall have a skin on some or all sides made by contact of the synthetic rubber with the mold or die.

#### 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 his 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 this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall 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 inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of

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known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

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 (see 4.5).

4.3 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified in 4.4, 4.5, and 4.6.

4.3.1 Lot. A lot shall consist of sheets or fabricated rubber parts of the same composition, construction, design and size submitted for delivery at the same time.

4.4 First article inspection. When specified in the contract or order (see 6.2), a first article sample shall be subjected to first article inspection. The first article inspection shall consist of all inspections and tests specified herein. Lot size and number of samples for first article shall be specified in the contract or order (see 6.2).

4.5 Quality conformance inspection. Quality conformance inspections shall be as specified in table V.

TABLE V. Quality conformance inspection.

Inspection	Requirement paragraph	Test paragraph
Tolerance	3.4	4.5.2
Marking	3.6	4.5.2
Workmanship	3.7	4.5.1

4.5.1 Sampling. Sampling for tests shall be as specified in table VI.

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TABLE VI. Sampling plan A.

Lot Size	Sample Size
2 to 5	All
6 to 50	5
51 to 90	7
91 to 150	11
151 to 280	13
281 to 500	16
501 to 1200	19
1201 to 3200	23
3201 to 10,000	29
10,001 to 35,000	35
35,001 and over	40
In all cases: Acceptance number is ZERO Rejection number is ONE	

4.5.2 Inspection. Dimensional and visual inspection of samples shall be performed to determine compliance with the requirements specified for tolerance in 3.4 and marking in 3.6 using table VII. The visual inspection guide for rubber sheet material shall comply with MIL-STD-289.

TABLE VII. Sampling plan B.

Lot Size	Sample Size
2 to 3	All
4 to 25	3
26 to 50	5
51 to 90	6
91 to 150	7
151 to 280	10
281 to 500	11
501 to 1200	15
1201 to 3200	18
3201 to 10,000	22
10,001 and over	29
In all cases: Acceptance number is ZERO Rejection number is ONE	

4.6 Tests.

4.6.1 Compression resistance. Tests to determine compliance with the requirements of table III shall be in accordance with ASTM D 1056 and 3 3.1

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4.6.2 Low temperature. Tests to determine compliance with the requirements of table II shall be in accordance with ASTM D 1056 and 3.3.

4.6.3 Compression set. Tests to determine compliance with the requirements of table II shall be in accordance with ASTM D 1056 and 3.3.

4.6.4 Tensile strength. Tests to determine compliance with the requirements of table II shall be in accordance with ASTM D 3574 and 3.3.

4.6.5 Density. Tests to determine compliance with the requirements of table II shall be in accordance with ASTM D 3574 and 3.3.

4.6.6 Water absorption. Tests to determine compliance with the requirements of table II shall be in accordance with ASTM D 1056 and 3.3.

4.7 Inspection of packaging. Except when commercial packaging is specified, the sampling and inspection of the preservation and interior package marking shall be in accordance with groups A and B quality conformance inspection requirements of MIL-P-116. The sampling and inspection of the packing for shipment and storage shall be in accordance with the quality assurance provisions of the applicable container specification shown in section 5. The inspection of marking for shipment and storage shall be in accordance with MIL-STD-129. The inspection of commercial packaging shall be as specified in the contract (see 6.2).

## 5. PACKAGING

5.1 Preservation, packing and marking. Preservation, packing and marking shall be level A, B or C (see 6.2).

5.1.1 Level A or B. Preservation and packing shall be in accordance with MIL-P-116, Method I-C1 as follows: Dust with Talcum U-T-30, wrap with MIL-P-17667, place in container conforming to PPP-B-636, class domestic or PPP-B-566 or PPP-B-676. Insert into MIL-B-117, class C bag

5.1.2 Level C. Level C shall be in accordance with MIL-STD-1190.

## 6. NOTES

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

6.1 Intended use. This material is intended for use as aerodynamic and rain seals on aircraft and missiles. It will be used over a temperature range of -38 to 249°C



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6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of the specification
- b. Grades, forms, and sizes as specified (see 1.2.1, 1.2.2, 1.2.3, and 6.4)
- c. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- d. When first article is required (see 3.1 and 4.4)
- e. Lot size and number of samples for first article (see 4.4)
- f. Levels of preservation, packing and marking (see 4.7 and section 5).

6.3 First article. When first article inspection is required, the contracting officer should provide specific guidance to offerers whether the item(s) should be a first article sample, a first production item, or a number of items to be tested as specified in 4.4. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract.

6.4 Part or Identifying Number (PIN). The PIN will consist of the letter M, the basic number of this specification, and dash number compiled from the classification codes:

M	46089	F	S	A3	1/
Prefix to indicate military specification	Specification number	Grade (see 1.2.1)	Form (see 1.2.2)	Size (see 1.2.3)	

1/ If the sheet size for a particular application is to be determined at the time of fabrication, the size designation of the military part number should be omitted from the call-out on the drawing and supplied by the procuring activity at the time of procurement (see 6.2).

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6.5 Metriation. Metric equivalents in accordance with FED-STD-376 are acceptable for use in this specification

6.6 Subject term (keyword) listing.

Adhesive material  
Closure, fitting  
Solid, elastic substance

6.7 Changes 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.

Custodian:  
Army - MI

Preparing activity:  
Army - MI

Reviewer activity  
Army - AR, MR, ER  
DLA-GS

Project No. 9320-A007

# STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

## INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

<b>RECOMMEND A CHANGE</b>	1. DOCUMENT NUMBER MIL-R-46089C (MI)	2. DOCUMENT DATE (YYMMDD) 28 February 1991
DOCUMENT TITLE RUBBER, SPONGE, SILICONE, CLOSED CELL		
NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed)		

### REASON FOR RECOMMENDATION

3. SUBMITTER		
4. NAME (Last, First, Middle Initial)	5. ORGANIZATION	
6. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (if applicable)	7. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY	b. TELEPHONE (Include Area Code)	
NAME COMMANDER U.S. ARMY MISSILE COMMAND	(1) Commercial (205) 876-6980	(2) AUTOVON 746-6980
9. ADDRESS (Include Zip Code)	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT	