MIL-G-3036C
20 March 1978
SUPERSEDING
MIL-G-3036B
15 May 1975
(See Section 6)

MILITARY SPECIFICATION

GROMMETS, RUBBER, HOT-OIL AND COOLANT RESISTANT

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers two compositions of grommet suitable for use in applications requiring resistance to hot petroleum-based oil, coolant, fungus or ozone and for use in less severe applications.

1.2 Classification. The grommets shall be of the following composition (see 6.2):

Composition A. - Synthetic rubber
Composition B. - Silicone rubber

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

FEDERAL

O-A-548	Antifreeze/Coolant, Engine : Ethylene Glycol, Inhibited, Concentrated
TT-S-735	Standard Test Fluids; Hydrocarbon
PPP-B-636	Boxes, Shipping, Fiberboard
PPP-T-60	Tape: Packaging, Waterproof

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: (Commanding Officer, Naval Ordnance Station, Standardization Division (611), Indian Head, MD 20640, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document, or by letter.

FSC 5325

MILITARY

MIL-P-116	Preservation-Packaging, Methods of
MIL-R-3065	Rubber, Fabricated Products

STANDARDS

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-177	Rubber Products, Terms for Visible Defects of
MIL-STD-454	Standard General Requirements for Electronic Equipment
MIL-STD-1523	Age Controls of Age-Sensitive Elastomeric Materiel
MS 35489	Grommets, Synthetic and Silicone Rubber, Hot-Oil and Coolant Resistant

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D395-75	Compression Set of Rubber
ASTM D412-75	Tension Testing of Rubber
ASTM D471-75	Change in Properties of Elastomeric Vulcanizates Resulting from Immersion in Liquids
ASTM D518-61	Surface Cracking Resistance of Stretched Rubber Compounds
ASTM D573-67	Accelerated Aging of Vulcanized Rubber by the Oven Method
ASTM D746-73	Brittleness Temperature of Plastics and Elastomers by Impact
ASTM D1149-64	Accelerated Ozone Cracking of Vulcanized Rubber

ASTM D2000-77 Classification System for Rubber Products in Automotive Applications

ASTM D2240-75 Indentation Hardness of Rubber and Plastics by Means of a Durometer

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

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

(Application for copies should be addressed to American Trucking Associations, Inc., Traffic Department, 1616 P Street, NW, Washington, DC 20036).

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classificaiton

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

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies).

3. REQUIREMENTS

3.1 Design. The design, dimensions, tolerances and sizes shall conform to MS 35489.

3.2 Material. Material used in the manufacture of the grommets shall conform to MIL-R-3065 and the requirements stated herein. The classification of compositions A and B materials shall be BG515A14B24C32E036F19Z and FC512A18B24C32E016F1-11Z, respectively, in accordance with ASTM D2000-77.

3.2.1 Composition A. Composition A grommets shall be black synthetic rubber.

3.2.2 Composition B. Composition B grommets shall be blue silicone rubber.

3.3 Chemical and physical properties. The chemical and physical properties of the grommets shall be in accordance with TABLE I when tested as specified in 4.4.

3.3.1 Flexibility. Grommets shall withstand insertion into a panel of thickness "G" through a hole of diameter "C" as shown on MS 35489, while at any temperature between -18 and 65°C without being cut or damaged.

TABLE I. Chemical and physical properties.

Property	Composition A	Composition B
Hardness number (Shore A)	50 ± 5	50 ± 5
Tensile strength, psi (MPa), min	1500(10.5)	1200 (8.5)
Ultimate elongation, %, min	400	500
Compression set, %, max	35	40
Heat resistance		
Hardness change, points, max	+15	+10
Tensile strength change, %, max	-20	-40
Elongation change, %, max	-40	-50
Oil resistance		
Hardness change, points, max	±10	-15
Volume change, %, max	+15	+15
Coolant resistance		
Hardness change, points, max	±15	±15
Ozone resistance	pass	pass
Brittleness temperature, °C, max	-55	- 75

3.3.2 Fungus resistance. Grommets shall be made from a compound which is fungus resistant in accordance with requirement 4 of MIL-STD-454.

3.4 Age. Accumulated age requirements for composition A grommets shall be in accordance with MIL-STD-1523. Composition B grommets shall not be subject to age control.

3.5 Conflicting requirements. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall apply.

3.6 Workmanship. The grommets shall be hand or machine trimmed or suitably tumbled to remove flash. They shall be free of dirt, oil, or other foreign matter. They shall be free of defects listed in TABLE II.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Inspection conditions. Unless otherwise specified (see 6.2), all inspections shall be performed under the following conditions

a. Temperature: Room ambient 18 to 35°C
b. Altitude: Normal ground
c. Vibration: None
d. Humidity: Room ambient to 95 percent relative, maximum

4.3 Sampling for inspection.

4.3.1 Lot. A lot shall consist of all grommets of one size and one composition, manufactured under essentially the same conditions, by one manufacturer, at one plant, and offered for delivery at one time.

4.3.2 Sampling for tests. Sampling for tests specified in 4.4 shall be in accordance with MIL-STD-105, inspection level II. Separate samples shall be selected for each test, except that the same samples may be used for the tensile and elongation tests.

4.3.3 Sampling for examination. A random sample of grommets shall be taken from each lot for visual and dimensional examination in accordance with MIL-STD-105, inspection level II.

4.3.4 Sampling for packaging examination. Sampling for the packaging examination specified in 4.6 shall be in accordance with inspection level II of MIL-STD-105.

4.4 Tests. All the tests except that specified in 4.4.10 shall be performed on raw material from the same batch from which the grommets are molded. The test in 4.4.10 shall be performed on grommets of the size specified in the contract. If more than one size is specified, tests on one of the specified sizes shall be sufficient for the entire contract. The Acceptable Quality Level (AQL) shall be 2.5 percent defective.

4.4.1 Hardness. The hardness shall be determined in accordance with ASTM D2240-75 using a Shore A durometer.

4.4.2 Tensile strength. The tensile strength shall be determined in accordance with ASTM D412-75, using a dumbbell shaped specimen cut with a die conforming to the dimensions of die C.

4.4.3 Ultimate elongation. The ultimate elongation shall be determined in accordance with ASTM D412-75 using a dumbbell specimen cut with die C.

4.4.4 Compression set. The compression set shall be determined in accordance with method B of ASTM D395-75, except that the specimens shall be aged for 70 h at 100 ± 2°C.

4.4.5 Heat resistance. The resistance to heat aging shall be determined in accordance with ASTM D573-67 using specimens cut with a die conforming to die C of ASTM D412-75. Composition A specimens shall be aged for 70 h at 100 ± 2°C. Composition B specimens shall be aged for 70 h at 200 ± 2°C.

4.4.6 Oil resistance. The oil resistance shall be determined in accordance with ASTM D471-75 on specimens cut with a die conforming to die C of ASTM D412-75. The hardness change shall be determined in accordance with the immediate deteriorated properties method. The hardness after immersion shall be determined in accordance with 4.4.1. Composition A material shall be immersed in ASTM reference oil # 3 (Type VI of TT-S-735) for 70 h at 150 ± 2°C. Composition B material shall be immersed in ASTM reference oil #1 (Type IV of TT-S-735) for 70 h at 150 ± 2°C.

4.4.7 Coolant resistance. Sample material shall be immersed in ethylene glycol conforming to O-A-548 for 70 h at 150 ± 2°C. The hardness shall then be determined in accordance with 4.4.1.

4.4.8 Ozone resistance. The ozone resistance shall be determined in accordance with Procedure B of ASTM D 518-61 using the controlled ozone concentration method of ASTM D 1149-64 with an ozone concentration of 50 parts per hundred million, an exposure time of 168 h, and at a temperature of 40 ± 1°C. Any specimen having a crack attributable to this test shall be considered a defect.

4.4.9 Brittleness temperature. The brittleness temperature test shall be in accordance with ASTM D746-73. The modified T-50 specimen shall be used with the exception that the overall length of the specimens shall be 5.0 ± 1.0 cm. Procedure B shall be used to determine acceptance or failure of the material. The test temperature shall be -55°C for composition A material and -75°C for composition B material.

TABLE II. Classification of defects.

CATEGORY	DEFECT	INSPECTION METHODS
Critical	None Defined	
Major	AQL=2.5 Percent Defective	
101	Hole Diameter	Measure
102	Depth of Groove	Measure
103	Groove Width	Measure
104	Crack Extending 25 to 100% through Body	Visual
105	Blister Extending 25 to 100% through Body	Visual
106	Delamination	Visual
Minor	AQL=4.0 Percent Defective	
201	Outside Diameter	Measure
202	Grommet Width	Measure
203	Crack Extending 0 to 25% through Body	Visual
204	Blister Extending 0 to 25% through Body	Visual
Minor	AQL=10.0 Percent Defective	
205	Flash or Mold Marks Present	Visual
206	Contamination, Oil, Dirt or Foreign Matter	Visual

4.4.10 Flexibility at low temperature. MS 35489 grommets of the size specified in the contract and a suitable test jig shall be conditioned at -18 ± 2°C for 24 h. The test jig shall consist of a metal plate of thickness equal to grommet groove width (dimension G on MS 35489) +0, -0.4 mm having a drilled hole equal to grommet groove diameter (dimension C on MS 35489) -0, +0.8 mm. Each grommet shall be inserted in the test jig by hand within 30 seconds (s) after removal from the low temperature environment. When the grommets cannot be installed within 30 s without warming, or if they become cut or damaged, they shall be rejected.

CAUTION: Rubber gloves should be worn to protect hands.

4.4.11 Fungus resistance. The contractor shall identify the elastomer used in the manufacture of the grommets and shall verify conformance to requirement 4 of MIL-STD-454.

4.5 Visual and dimensional examination. Each sample grommet shall be visually inspected without magnification to verify conformance with this specification. Acceptable Quality Levels (AQLs) and defect classification shall be in accordance with TABLE II. Defects other than dimensional discrepancies are as defined in MIL-STD-177. The grommets shall be rejected when conformance to 3.4 cannot be verified.

4.6 Packaging examination. The packing, packaging and marking shall be examined for compliance with the requirements of Section 5. The AQL shall be 2.5 percent defective.

5. PACKAGING

5.1 Packaging. Packaging shall be Level A or C, as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Unit package. Unless otherwise specified, 100 grommets of the same MS35489 part number, 19.05 mm outside diameter (OD) or less, or 50 grommets, of MS 35489 part number, over 19.05 mm OD shall be packaged per unit container. The unit container shall be in accordance with Method IC-2 of MIL-P-116.

5.1.1.2 Intermediate packaging. The number of unit packages of grommets of the same MS35489 part number for the intermediate container shall be at the option of the contractor within the weight limitations of the container. The intermediate containers in a single shipment shall be of uniform size and shall conform to grades W5C or W5S of PPP-B-636. Each intermediate container shall be closed in accordance with the appendix of PPP-B-636.

5.1.1.2.1 When all joints and seams of the intermediate container are sealed with waterproof tape in accordance with the appendix of the container specification, it may be used as the shipping container.

5.1.2 Level C.

5.1.2.1 Unit package. Grommets, in unit quantities as specified in 5.1.1.1, shall be packaged in a manner to afford the minimum degree of protection necessary to prevent deterioration or damage during shipment under normal environmental conditions and commercial modes of transportation.

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

5.2.1 Level A. Grommets packaged as specified in 5.1 shall be packed in containers conforming to PPP-B-636, Class weather resistant, grade V2s. Closure shall be effected with PPP-T-60 waterproof tape, and reinforced in accordance with the appendix of the container specification. Containers shall be of uniform size and shape, be of minimum cube and tare consistent with the protection required and shall contain identical quantities.

5.2.2 Level B. Grommets packaged as specified in 5.1 shall be packed in containers conforming to PPP-B-636, Class domestic. Closure shall be effected in accordance with the appendix of the container specification.

5.2.3 Level C. Grommets shall be packed in a manner that will insure safe transportation at the lowest rate to the point of delivery. Containers shall be in accordance with Uniform Freight Classification, National Motor Freight Classification, or rules of other carriers applicable to the mode of transporation.

5.3 Marking. In addition to any special marking required by the contract (see 6.2), interior and exterior containers shall be marked in accordance with MIL-STD-129 and with the cure date (quarter and year) in accordance with MIL-STD-1523.

6. NOTES

6.1 Intended use. The grommets covered by this specification are intended for use as a protection from abrasion or vibration for rods, wires, and cables passing through walls, bulkheads, and partitions. They may be used in aircraft, missiles, and in other applications where the ability to withstand hot petroleum based oil or coolant is required. They may also be used in less severe applications. Composition B grommets are intended for use at higher or lower temperature extremes than Composition A grommets (see 4.4.5 and 4.4.9). Oil resistance of the grommets is as specified in 4.4.6.

6.2 Ordering data. Procurement documents should specify the following.

6.2.1 Procurement requirements.

a. Title, number and date of this specification.

b. Part number (s) required per MS 35489 (see 1.2 and 3.1)
c. Quantity required.
d. Inspection conditions if other than as specified (see 4.2).
e. Special markings, if required (see 5.3).
f. Levels of packaging, A or C (see 5.1) and packing A, B, or C (see 5.2).

6.2.2 Contract data requirements. Any data required for delivery in connection with this document shall be specified on a DD Form 1423 incorporated into the contract. Such data will be delivered as identified on completed (numbered) DIDs (Data Item Descriptions/DD 1664) which will be documented in the Applicable ADL (Authorized Data List).

6.3 Supersession information. Composition A grommets procured in accordance with this specification include the requirements of MIL-G-20699A and MIL-G-3036B and may be used to replace those grommets. However, MIL-G-20699A grommets are not suitable for replacement of MIL-G-3036 grommets in all cases. Fungus resistant grommets may be used in applications where fungus resistance is not a specific requirement.

6.4 Changes from previous issue. Due to the comprehensive nature of this revision, the margins of this specification have not been marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue have been made. Bidders and contractors are advised to evaluate the requirements of this document based on the entire content irrespective of the relationship to the last previous issue.

Custodians.

Army - AR
Navy - OS
Air Force - 99

Review Activities:

Army - GL, EL
DLA - IS
Other - NS

User Activities:

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Preparing Activity:

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Project No. 5325-0182

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5. PROBLEM AREAS

a. Paragraph Number and Wording

b. Recommended Wording

c. Reason/Rationale for Recommendation

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7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
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DD FORM 82 MAR 1426

PREVIOUS EDITION IS OBSOLETE

MILITARY SPECIFICATION

GROMMETS, RUBBER, HOT-OIL AND COOLANT RESISTANT

This amendment forms a part of Military Specification MIL-G-3036C, dated 20 March 1978, and is approved for use by all Departments and Agencies of the Department of Defense.

PAGE 2

2.1 Delete "MIL-STD-1523" and associated title.

PAGE 3

3.2.2 Delete "blue" and substitute "red or orange".

PAGE 5

3.4 Delete in its entirety.

PAGE 8

4.5 Delete last sentence in its entirety.

Custodians:
Navy - OS
Air Force - 99
Army - AR

Review Activities
Army - GL, ER, MI
DLA - IS
Other - NS

User Activities:
Navy - MC, EC, SA, AS, YD

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Project No. 5325-0191

FSC 5325