

INCH-POUND

MIL-G-16491F

1 May 1989

SUPERSEDING

MIL-G-16491E

4 October 1986

## MILITARY SPECIFICATION

GROMMET, METALLIC,  
GENERAL SPECIFICATION FOR

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

## 1. SCOPE

1.1 Scope. This specification covers grommets with washers or rings for use with miscellaneous canvas and leather equipment.

1.2 Classification. Grommets shall be of the following types, as specified.

- Type I - Plain Grommet With Plain Washer (See MS20230)
- Type II - Plain Grommet With Toothed Washer
- Type III - Rolled Rim Grommet With Spur Washer (See MS20230)
- Type IV - Oblong Grommet With Flat Washer
- Type V - Oblong Grommet With Raised Washer
- Type VIII - Eyelet Grommet With Ring

## 2. APPLICABLE DOCUMENTS

2.1 Government documents.

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

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Engineering Division, San Antonio ALC/MMEDO, Kelly AFB, TX 78241-5990 using the self addressed Standardization Document Improvement Proposal (DD Form 1426) at the end of this document or by letter.

## MIL-G-16491 F

## SPECIFICATIONS

## FEDERAL

QQ-A-250/11 - Aluminum Alloy 6061, Plate and Sheet  
 QQ-N-290 - Nickel Plating (Electrodeposited)  
 QQ-P-416 - Plating, Cadmium (Electrodeposited)  
 TT-E-489 - Enamel, Alkyd, Gloss (for Exterior and Interior Surface)  
 PPP-H-1581 - Hardware, Packing of

## MILITARY

MIL-F-495 - Finish, Chemical, Black, for Copper Alloys  
 MIL-A-8625 - Anodic Coatings, for Aluminum and Aluminum Alloys  
 DOD-P-16232 - Phosphate Coating, Heavy Manganese or Zinc Base (for Ferrous Metals)  
 MIL-G-16491/1 - Grommet, Metallic, Plain With Toothed Washer (Type II)  
 MIL-G-16491/2 - Grommet, Metallic, Oblong With Flat Washer (Type IV)  
 MIL-G-16491/3 - Grommet, Metallic, Oblong With Raised Washer (Type V)

## STANDARDS

## MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes  
 MS20230 - Grommet, Metallic, Plain and Spur With Washer (Type I and Type III)

(Copies of specifications, standards, and other government documents required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

## ASTM

ASTM A47 - Malleable Iron Casting  
 ASTM A366 - Steel Sheets, Carbon Cold Rolled, Commercial Quality  
 ASTM A510 - General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel  
 ASTM A619/A619M - Steel Sheet, Carbon Cold Rolled, Drawing Quality  
 ASTM B36 - Brass Plate, Sheet, Strip, and Rolled Bar  
 ASTM B633 - Electrodeposited Coatings of Zinc or Iron and Steel

(Application for copies should be addressed to the ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.)

## MIL-G-16491 F

(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 specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet. In the event of any conflict between the requirements of this specification and the specification sheet, the latter shall govern (see 6.2).

#### 3.2 Material.

3.2.1 Brass sheet. Brass sheet shall be 260 (UNS C26000) or 268 (UNS C26800) in accordance with ASTM B36.

3.2.2 Aluminum sheet. Aluminum sheet shall be condition T6 in accordance with QQ-A-250/11.

3.2.3 Steel sheet. Steel sheet shall be formed of cold rolled sheet steel in accordance with ASTM A366 or ASTM A619.

3.2.4 Steel wire. Steel wire shall be in accordance with ASTM A510.

3.2.5 Malleable iron. Malleable iron shall be in accordance with ASTM A47.

3.3 Dimensions. Dimensions and tolerances for all grommets and washers shall be in accordance with the dimensional requirements of the applicable specification sheet or military standard.

3.4 Protective finish. The protective finishes in the applicable specification sheet or military standard shall be as follows:

3.4.1 Nickel plating (electrodeposited). Nickel plating shall be Class 1, Grade G (.0002 inch thick) in accordance with QQ-N-290.

## MIL-G-16491 F

3.4.2 Cadmium plating (electrodeposited). Cadmium plating shall be Type II, Class 2 (.00030 thick) in accordance with QQ-P-416.

3.4.3 Black enamel finish. Black enamel finish shall be Class B, in accordance with TT-E-489.

3.4.4 Black chemical finish for copper alloys. Black chemical finish shall be in accordance with MIL-F-495.

3.4.5 Anodic coatings for aluminum and aluminum alloys. Anodic coating, Type 2, Class 2 shall be in accordance with MIL-A-8625.

3.4.6 Phosphate coating (for ferrous metals). Phosphate coating shall be in accordance with DOD-P-16232.

3.4.7 Zinc plating. Zinc plating shall be Type II, Class Fe/Zn 5 in accordance with ASTM B633.

3.5 Marking. All rolled rim grommets and spur type washers shall have the size number stamped on the face. The surface opposite these stamp marks shall show no signs of penetration or unevenness and stamping shall not cause distortion. All other types of grommets and washers shall be clear of size numbers or marks of any kind.

3.6 Workmanship. The grommet shall be uniform in quality and shall be free from irregularities or defects which could adversely affect performance, reliability or durability.

#### 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 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 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 must 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 assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

## MIL-G-16491 F

4.2 Quality conformance inspection. Quality conformance inspections shall be as specified in Table I. Each grommet or washer that does not pass any of the tests specified shall be defective.

TABLE I. QUALITY CONFORMANCE INSPECTION

INSPECTION	REQUIREMENT PARAGRAPH	TEST PARAGRAPH
Group A		
Dimensions	3.3	4.4.1
Protective finish and surface treatment	3.4	4.4.2

4.2.1 Inspection lot. An inspection lot shall consist of all grommets and washers covered by a single specification sheet or military standard, produced under essentially the same conditions, and offered for inspection at one time.

4.2.2 Sampling for Group A inspection. Sampling for Group A inspection shall be as specified in 4.2.2.1 and 4.2.2.2.

4.2.2.1 Sampling for dimensions. Sampling shall be in accordance with MIL-STD-105, Inspection Level I. The Acceptable Quality Level (AQL) shall be as indicated in Table II. The AQL shall apply to each individual defect, not to a group of defects.

4.2.2.2 Sampling for protective finish and surface treatment. Sampling for protective finish and surface treatment test of grommets and washers shall be in accordance with the applicable specifications referenced in 3.4 thru 3.4.7.

4.3 Inspection of packaging. The sampling and inspection of the preservation, packaging, packing, and container marking shall be in accordance with the requirements in PPP-H-1581.

#### 4.4 Methods of inspection.

4.4.1 Visual and dimensional examination. Each grommet and washer taken as specified in 4.2.2.1 shall be examined to verify conformance with this specification. Examination shall be conducted in accordance with Table II.

MIL-G-16491 F

TABLE II. CLASSIFICATION OF DEFECTS

CATEGORY	DEFECT	INSPECTION METHOD
CRITICAL	NONE DEFINED	
Major 101	AQL - 2.5 Percent defective Dimensions	CIE <u>1/</u>
Minor	AQL - 2.5 Percent defective	
201	Protective finishes (see 3.4 thru 3.4.7)	Visual
202	Marking (see 3.5)	Visual
203	Workmanship (see 3.6)	Visual

1/ Commercial Inspection Equipment

4.4.2 Protective finish and surface treatment test. Grommets and washers shall conform to the applicable protective finish and surface treatment tests as specified in 3.4 thru 3.4.7.

4.5 Material inspection. Material inspection shall consist of certification supported by verifying data that the materials used in fabricating the grommets and washers are in accordance with the requirements of 3.2 prior to such fabrication.

## 5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with PPP-H-1581 (see 6.2).

## 6. NOTES

6.1 Intended use. Grommets covered by this specification are intended for use as follows:

6.1.1 Type I. Type I grommets with washers are an inexpensive type of grommet for use where very little strength is required.

6.1.2 Type II. Type II grommets with washers are similar in use to Type I, but afford a slight increase in strength.

## MIL-G-16491F

6.1.3 Type III. Type III grommets with washers are for use where a rigid setting is required with a high bearing strength.

6.1.4 Types IV and V. Types IV and V grommets with washers are for use in connection with straps or loops where a round grommet would be inadequate.

6.1.5 Type VIII. Type VIII grommets with rings are for use where the full strength of the fabric is required.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number and date of this specification.
- b. Applicable military specification sheet part number(s), MS sheet part number, (see 3.1), or type, class, material and finish.
- c. Level (degree) of protection in accordance with PPP-H-1581 (see 5.1).

6.3 Subject term (key word) listing.

Grommet, plain  
Grommet, oblong

6.4 Cross-reference data. Table III identifies the relationship between the non-definitive part numbers of the general specification with the definitive part numbers of the military standard and specification sheets.

6.5 Changes from previous issue. Asterisks (or vertical lines) are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

## MIL-G-16491 F

TABLE III

MIL-G-16491 REV E (and prior rev)		MIL-G-16491 REV F
Type	Class(es) <sup>1/</sup>	Use
I	1 2, 3, 4A, 4B 5, 6 7, 8, 9	MS20230 General Specification MS20230 General Specification
II	1, 2, 3 4A, 4B, 5, 6, 7, 8, 9	MIL-G-16491/1 General Specification
III	1, 2, 3, 4A, 4B, 5, 7, 8, 9 6	General Specification MS20230
IV	1, 2, 3 4A, 4B, 5, 6, 7, 8, 9	MIL-G-16491/2 General Specification
V	1, 2, 3 4A, 4B, 5, 6, 7, 8, 9	MIL-G-16491/3 General Specification

<sup>1/</sup> Class codes referenced in prior revisions of this document are as follows:

Class 1 - Brass, bright finish.  
Class 2 - Brass, nickel plated.  
Class 3 - Brass, black chemical finish.  
Class 4A - Brass, bright finish and steel or malleable iron.  
Class 4B - Brass, black chemical finish, and steel or malleable iron ring, zinc coated.  
Class 5 - Aluminum, natural finish (anodized)  
Class 6 - Steel, cadmium plated.  
Class 7 - Steel, black enamel finish.  
Class 8 - Steel, electrozinc plated.  
Class 9 - Steel, phosphate finish.

## Custodians:

Army - AR  
Navy - YD  
Air Force - 99

## Review Activities:

Army - GL, MI  
Navy - AS  
DLA - IS

## User Activities:

Navy - MC, SA, SH

## Preparing Activity:

Air Force - 82

## Agent:

DLA - IS

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