

## DETAIL SPECIFICATION

### CLIP, ELECTRICAL, GRID AND ANODE, GENERAL SPECIFICATION FOR

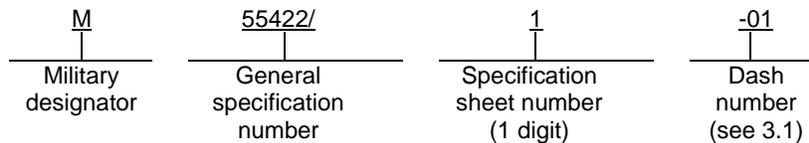
This specification is approved for use by all Departments and Agencies of the Department of Defense.

#### 1. SCOPE

1.1 Scope. This specification establishes the general requirements for grid and anode types of electrical clips for electron tubes.

#### 1.2 Classification.

1.2.1 Part or Identifying Number (PIN). The PIN is to be as shown in the following example:



#### 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

#### 2.2 Government documents.

2.2.1 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).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to Defense Supply Center, Columbus, Post Office Box 3990, Columbus, OH 43216-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

SPECIFICATIONS

FEDERAL

QQ-P-416 - Plating Cadmium (Electrodeposited).

DEPARTMENT OF DEFENSE

MIL-DTL-16878 - Wire, Electrical, Insulated, General Specification for.  
MIL-DTL-55422/1- Clip, Electrical, Grid.

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-129 - Military Marking.  
MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.  
MIL-STD-810 - Environmental Engineering Considerations and Laboratory Tests.  
MIL-STD-889 - Dissimilar Metals.  
MIL-STD-1285 - Marking of Electrical and Electronic Parts.

COMMERCIAL ITEM DESCRIPTIONS

A-A-59588 - Rubber, Silicone

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks, are available from the Document Automation and Production Service, Building 4D (DPM-DODSSP), 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following document(s) 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 B194 - Standard Specification for Copper-Beryllium Alloy Plate, Sheet, Strip, and Rolled Bar.  
ASTM B545 - Standard Specification for Electrodeposited Coatings of Tin.

(Application for copies should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

2.4 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specification (example: MIL-DTL-55422/1)), the text of this specification takes precedence. Nothing in this specification, however, supersedes 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 sheets. In the event of any conflict between requirements of this specification and the applicable specification sheet, the latter shall govern.

3.2 Material. The material for each part shall be as specified (see 3.1). When a definite material is not specified, a material that will enable the clips to meet the requirements of this specification shall be used. Acceptance or approval of a constituent material shall not be construed as a guarantee of the acceptance of the finished product. Materials shall be non-nutrient to fungus growth. Submission of certification that materials used are

non-nutrient to fungus growth will be considered compliance with this requirement without testing. If certification is not furnished, clips shall be subjected to the fungus-resistance test of method 508, procedure I, of MIL-STD-810.

3.2.1 Ceramic. Ceramic material shall conform to requirements in Table I or better.

TABLE I. Ceramic requirements.

Dielectric constant	12 or under
Dielectric loss index at 1 MHz	.016 maximum
Dielectric strength average	200 to 249, inclusive
Flexural strength (modulus of rupture)	12,000 to 19,900 inclusive

3.2.2 Metals.

3.2.2.1 Beryllium-copper alloy. Beryllium-copper alloy shall conform to ASTM B194 and shall be suitably heat treated after forming and prior to cleaning and plating.

3.2.3 Silicone rubber. Silicone rubber shall conform to class3B, of A-A-59588.

3.2.4 Corrosion-resistance. The clips shall be fabricated of a corrosion-resistant material or be treated to prevent corrosion formation.

3.3 Design and construction. The clips shall be of the material, design, construction, and physical dimensions specified (see 3.1).

3.4 Finish. Finish shall be electro-tin plate as specified in ASTM B545. The clips shall be plated so that before and after the environmental tests specified herein, there shall be evidence of peeling, cracking or corrosion. No additional insulating material shall be applied unless specifically approved by the procuring activity.

3.4.1 Cadmium plating. Cadmium plating shall conform to class 2, type II of QQ-P-416.

3.5 Dissimilar metals. When dissimilar metals are used in intimate contact with each other, protection against electrolysis and corrosion shall be provided. The use of dissimilar metals which, in contact, tend toward active electrolytic corrosion (particularly brass, copper, or steel used in metals) shall be as specified in MS33586.

3.6 Salt spray (corrosion). When clips are tested as specified in 4.5.2.1, the base metal shall show no evidence of corrosion on blistering of plated surfaces.

3.7 Vibration. When tested as specified in 4.5.2.2 the clip shall display no evidence of cracking, breaking, loosening of parts, wear or damage to the clip, nor loss of electrical continuity of the contact circuit for a period greater than 10 microseconds.

3.8 Thermal shock. When tested as specified in 4.5.2.3, the clip shall retain a force on the test plug of not less than 80 percent as measured before the test. There shall be no cracking or chipping of the ceramic insulated clips.

3.9 Shock. When tested as specified in 4.5.2.4, there shall be no evidence of mechanical damage to the clip. The clip shall retain a force on the test plug of not less than 80 percent as measured before the test.

3.10 Retaining and release force. When clips are tested as specified in 4.5.2.5, the force required to couple and uncouple the clip shall be within the limits specified (see 3.1).

3.11 Dielectric withstanding voltage. When clips are tested as specified in 4.5.2.6, there shall be no evidence of damage, arcing, or breakdown.

3.12 Cleaning and drying. Gaskets shall be cleaned and dried by any suitable process or processes that are not injurious to the item.

3.13 Identification marking. The clips shall be legibly and durably marked with the part number and the manufacturer's identification and with the Part Identifying Number (PIN) in accordance with MIL-STD-1285.

3.14 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.15 Workmanship. The clips shall show no evidence of cracks, fissures, peeling, or chipping of the plating or finish. When examined (see 4.4.1), there shall be no evidence of poor molding, poor fabrication techniques, or foreign material.

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. Component-materials inspection (see 4.2).
- b. Conformance inspection (see 4.4).

4.2 Component-materials inspection. Component-materials inspection shall consist of verification that the component materials listed in table II fabricating the electrical clips, are in accordance with the applicable referenced specifications or requirements prior to such fabrication.

TABLE II. Component-materials inspection.

Component material	Requirement paragraph
Insulation:	
Ceramic	3.2.1
Silicone rubber	3.2.3
Metals:	
Beryllium-copper alloy	3.2.2.1
Finish:	
Tin plating	3.4

4.3. Inspection conditions. Test conditions shall be as specified in MIL-STD-202 unless otherwise specified herein.

4.4 Conformance inspection.

4.4.1 In-process inspection. Inspection of product for delivery shall consist of groups A and B. Sampling plans and procedures for inspection shall be as specified in table III.

4.4.1.1 Inspection lot. An inspection lot shall consist of all the clips of the same material, configuration and dimensions, manufactured under essentially the same conditions and submitted for conformance inspection and testing at one time.

4.4.1.2 Rejected lots. If an inspection lot is rejected, the supplier may withdraw the lot, rework it to correct the defects, or screen out defective units, as applicable, and reinspect. Such lots shall be separated from new lots and shall be clearly identified as reinspected lots. Rejected lots shall be inspected using tightened inspection.

4.4.1.3 Group A inspection. Group A inspection shall consist of the inspections of table III.

Table III. Group A inspection.

LOT SIZE	Inspection of product <sup>1/</sup>	
	Major	Minor
2 to 8	100 percent	3
9 to 15	13	3
16 to 25	13	3
26 to 50	13	5
51 to 90	13	6
91 to 150	13	7
151 to 280	20	10
281 to 500	29	11
501 to 1,200	34	15
1,201 to 3,200	42	18
3,201 to 10,000	50	22
10,001 to 35,000	60	29
35,001 to 150,000	74	29
150,001 to 500,000	90	29
500,000 and over	102	29

<sup>1/</sup> Inspection of product would, in this case, be to 4.5.1.

4.4.1.3.3 Disposition of sample units. Sample units which have been subjected to group A inspection shall be delivered on the contract or order.

4.4.1.4 Group B inspection. Group B inspection shall consist of the tests specified in table IV in the order shown.

TABLE IV. Group B inspection.

Test	Requirement paragraph	Method paragraph
Group I		
Vibration	3.7	4.5.2.2
Thermal Shock	3.8	4.5.2.3
Shock	3.9	4.5.2.4
Retaining and release force	3.10	4.5.2.5
Group II		
Dielectric withstanding voltage	3.11	4.5.2.6
Salt spray	3.6	4.5.2.1

4.4.1.4.1 Sampling plan. Each year six sample units shall be selected from the first lot and divided into two subgroups of three each. No failures shall be allowed. Group B inspection shall be performed on sample units that have passed group A inspection, unless the Government considers it more practical to select a separate sample from the lot for group B inspection.

4.4.1.4.2 Disposition of sample units. Sample units which have been subjected to group B inspection shall not be delivered on the contract or order.

#### 4.5 Methods of inspection.

4.5.1 Inspection of product. Clips shall be examined for compliance with applicable design, construction, physical dimensions, marking and workmanship requirements (see 3.1, 3.13, and 3.15).

4.5.2 Test procedures.

4.5.2.1 Salt spray (corrosion) (see 3.6). Sample clips shall be tested in accordance with MIL-STD-202, method 101, condition A. Salt concentration shall be 5 percent. After the test, the clips shall be examined for exposure of base metal or blistering of the plated surface.

4.5.2.2 Vibration, high frequency (see 3.7) Clips shall be tested in accordance with MIL-STD-202, method 204 and with the following exceptions and details:

a. Specimens shall be mounted in a normal manner to a test plug which shall be fastened to the vibration machine. The clip shall be mated to the plug or tube without the use of safety wire or other supplementary locking devices. The lead wire shall be supported by a stationary frame not closer than 12 inches from the mated clip and tube cap or test plug. The wire shall conform to MIL-W-16878.

b. Test condition letter D.

c. The clips shall be wired and current allowed to flow at the maximum operating rated voltage and current of the tube with which the clip mates.

d. The vibration shall be conducted in each of three mutually perpendicular directions at the following temperature conditions:

(1) -65°C: 25 percent of the time.

(2) +265°C: 25 per cent of the time.

(3) normal temperature conditions: 50 percent of the time.

e. The circuit shall be monitored for circuit continuity before, during, and after the vibration. A discontinuity of contact or interruption of current flow for more than ten microseconds shall not be allowed.

4.5.2.3 Thermal shock. Clips shall be tested in accordance with MIL-STD-202, method 107, test condition C and shall meet the requirements of 3.8.

4.5.2.4 Shock. Clips shall be tested in accordance with method 202 of MIL-STD-202. The following details and exceptions shall apply:

a. Mounting of specimens. By their normal mounting means with the test plug fastened to the shock machine and the clip coupled to the test plug.

b. Acceleration. 50 gravity units.

c. Number of blows. Four.

d. Direction of blows. One direction shall be in the axis of the test plug, away from the open end of the clip, and the other direction shall be perpendicular to the axis of the test plug.

e. Measurements before and after shock. Clips shall be removed from the test plug parts and the withdrawal force recorded.

4.5.2.5 Retaining and release force for electrical clips. The clips shall be rigidly mounted so as to permit coupling and uncoupling of the test plugs. The force to couple and uncouple the clips on the maximum size test plug shall be within the limits specified (see 3.1). The clip shall be coupled and uncoupled 500 times. The maximum size test plug shall have a diameter of no less than the tube cap diameter +.015 inches. A minimum size test plug shall be inserted, and the gradually applied release force shall be measured. This force shall be as specified by the retaining and release force of the specification sheets. The minimum size test plug shall have a diameter of no more than the tube cap diameter, .007 inches.

4.5.2.6 Dielectric withstanding voltage.

Clips shall be tested in accordance with method 301 of MIL-STD-202. The following details and exceptions shall apply:

- a. Special preparation or conditions:
  - (1) The maximum relative humidity shall be 50 percent.
  - (2) The center of contact of the clips shall be positioned in such a manner as to simulate actual assembly conditions.
  - (3) Precautions shall be taken to prevent air gap voltage breakdown.
- b. Magnitude of test voltage: 3,500 volts (RMS) at sea level; 1,500 volts (RMS) at 50,000 feet; 750 volts (RMS) at 70,000 feet. Voltage shall be applied instantaneously.
- c. Nature of potential: Alternating current.
- d. Points of application of test voltage: As specified on figure in specification sheets.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

5.2 Marking (see 6.1). In addition to any special marking required by the contract or order, unit packages, intermediate and exterior containers, shall be marked in accordance with MIL-STD-129.

6. NOTES

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

6.1 Intended use.

6.1.1 General. Electrical clips covered by this specification are designed for the use with electron tubes. Their principal areas of application are aircraft, missiles, spacecraft, and ground support equipment. This does not preclude the use of these clips in other military applications.

6.2 Acquisition requirements.

6.2.1 Items covered by specification sheets. Acquisition documents for gaskets covered by MIL-DTL-55422 specification sheets should specify the following:

- a. Title, number, and date of this specification.
- b. Issue of DoDISS to be cited in the solicitation and, if required, the specific issue of individual documents referenced herein (see 2.1).
- c. Title, number, and date of the applicable specification sheet and the complete PIN (see 1.2.1 and 3.1).
- d. Special or additional marking (if required) (see 5.1).

6.4 PIN. This specification requires a PIN that describes codification and/or classification and appropriate references to associated documents (see 1.2 and 3.1).

6.3 Subject term (key word) listing.

Beryllium  
Beryllium copper

6.4 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 - CR  
Navy - SH  
Air Force - 11  
DLA - CC

Preparing activity:  
DLA - CC

(Project 5999-0376)

Review activities:

Army - MI  
Air Force - 99  
DLA - GS