

MIL-F-48370A (AR)  
1 July 1985  
 SUPERSEDING  
 MIL-F-48370 (AR)  
 18 January 1977

## MILITARY SPECIFICATION

### FUZE M934E6, HYBRID MICROCIRCUITS FOR

This specification is approved for use by US Army Armament, Munitions and Chemical Command, and is available for use by all Departments and Agencies of the Department of Defense.

#### 1. SCOPE

1.1 Scope. This specification establishes the performance, test, manufacture and acceptance requirements for hybrid microcircuits, hereinafter to be called hybrids, to be used in the M934E6 Stinger fuze.

#### 2. APPLICABLE DOCUMENTS

##### 2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified, the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation, form a part of this specification to the extent specified herein.

#### SPECIFICATIONS

##### MILITARY

MIL-I-23011	- Iron-Nickel Alloys for Sealing to Glasses and Ceramics
MIL-C-26074	- Coating, Electroless Nickel, Requirements for
MIL-M-38510	- Microcircuits, General Specifications for
MIL-A-48078	- Ammunition, Standard Quality Assurance Provisions, General Specifications for
MIL-M-55565	- Microcircuits, Preparation for Delivery of

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, US Army Armament Research and Development Center, Attn: AMSMC-QA, Dover, New Jersey 07801-5001 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 1336

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

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FEDERAL

- QQ-S-766 - Steel Plates, Sheets, and Strip-Corrosion Resisting

STANDARDS

MILITARY

- MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts  
MIL-STD-883 - Test Methods and Procedures for Microelectronics

2.1.2 Other Government documents, drawings, and publications.  
The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein.

DRAWINGS

US ARMY ARMAMENT RESEARCH AND DEVELOPMENT CENTER (ARDC)

- 9297034 - Microcircuit, Digital - Firing Circuit  
9297063 - Microcircuit, Digital - Safing and Arming

(Copies of specifications, standards, drawings, and publications required by manufacturers in connection with specific acquisition functions should be obtained from the procuring activity or as directed by the Contracting Officer.)

2.1.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of the specification shall take precedence.

3. REQUIREMENTS

3.1 Materials.

3.1.1 Parts, materials and processes. Parts, materials and processes shall be in accordance with the applicable drawings, specifications and standards.

3.1.2 Metals. External metal surfaces shall be corrosion resistant or shall be plated or treated to resist corrosion.

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3.1.3 Other materials. External parts, elements or coatings including markings shall be inherently non-nutrient to fungus and shall not blister, crack, outgas, soften flow or exhibit defects that adversely affect storage, operation or environmental capabilities of hybrids.

3.1.4 Case material and finish. The case material shall conform to one of the following:

a. Iron, Nickel, Cobalt alloy (KOVAR) per MIL-I-23011, Class 1, with a Rockwell B hardness of 70 typical and a grain size of ASTM 6  $\pm$  1. The KOVAR shall be plated with 150  $\pm$  50 micro-inches of electroless nickel per MIL-C-26074, Class 1.

b. Steel, Corrosion Resisting (Stainless steel) per Specification QQ-S-766, Class 304.

3.1.5 Lead material and finish. The lead material shall consist of Iron, Nickel, Cobalt alloy (KOVAR) per MIL-I-23011, Class 1, with a Rockwell B hardness of 70 typical and a grain size of ASTM 6  $\pm$  1. The external lead finish shall conform to one of the following:

a. Hot solder dip. The hot solder dip shall be homogeneous with a minimum thickness at the crest of the major flats of 200 microinches of solder (SN60 or SN63) over the primary finishes in accordance with (b) or (c) below or over nickel plate with a plating thickness of 100 microinches minimum and 200 microinches maximum.

b. Bright acid tin plate. Thickness of 100 microinches minimum and 400 microinches maximum.

c. Gold plate. Gold plating shall be a minimum of 99.7 percent gold (0.3 percent maximum for all impurities and other metals combined). Gold plating shall be a minimum of 50 micro-inches and a maximum of 225 microinches thick.

d. Other finish. Any finish which meets the solderability requirements of MIL-STD-883, Method 2003 and has been approved by the procuring activity.

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3.1.6 Internal lead finish. The finish for the portion of the lead internal to the hybrid shall be compatible with the type of wire and the bonding method used.

3.2 Design and construction. Hybrid design and construction shall be in accordance with the requirements specified herein and in the applicable drawings.

3.2.1 Package. All hybrids shall be hermetically sealed in glass, metal or ceramic (or combinations of these) packages. No organic or polymeric materials (lacquers, varnishes, coatings, adhesives, greases, etc.) shall be used inside the hybrid package.

3.2.2 Design documentation. When specified in the procurement document, the topography for all hybrids shall be submitted to the procuring activity. Design documentation shall be traceable to the specific part, drawing or type numbers to which it applies, and to the production lot(s) and inspection lot codes under which hybrids are manufactured and tested so that revisions can be identified.

3.2.3 Internal conductors. Internal conductors (metallization stripes, contact areas, bonding interfaces, wires or other current carrying elements) of the hybrids shall be designed so that no properly fabricated conductor shall experience, in normal operation, a current density in excess of  $2 \times 10^5$  amperes/square centimeter, including allowances for normal production tolerances on design dimensions, and actual thicknesses at critical areas such as steps in elevation or contact windows.

3.2.4 Preseal bake. The hybrids shall be baked at  $150^{\circ}\text{C}$  in a dry nitrogen atmosphere for twenty-four hours minimum immediately prior to sealing.

3.2.5 Test data and sample parts. Test data and sample parts shall be submitted as specified in the procurement document.

### 3.3 Performance characteristics.

3.3.1 High temperature storage. Hybrids, after being subjected to high temperature storage per MIL-STD-883, Method 1008,  $150^{\circ}\text{C}$  temperature for 1000 hours duration, shall meet the final electrical requirements of the detailed drawing.

3.3.2 Temperature cycling. Hybrids, after being subjected to temperature cycling as specified in MIL-STD-883, Method 1010, Test Condition C and cycling between steps 1 and 3, shall meet the final electrical requirements of the detailed drawing.

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3.3.3 Solderability. Hybrids shall meet the solderability requirements specified in MIL-STD-883, Method 2003.

3.3.4 Seal.

3.3.4.1 Fluorocarbon gross leak. Hybrids shall meet the requirements specified in MIL-STD-883, Method 1014, Test Condition C.

3.3.4.2 Tracer gas (HE) fine leak. Hybrids shall meet the requirements specified in MIL-STD-883, Method 1014, Test Condition A2 (Flexible Method).

3.3.5 Thermal shock. Hybrids, after being subjected to thermal shock as specified in MIL-STD-883, Method 1011, Test Condition A, shall meet the final electrical requirements of the detailed drawing.

3.3.6 Mechanical shock. Hybrids, after being subjected to mechanical shock as specified in MIL-STD-883, Method 2002, subject to limits of detailed drawing shall meet the final electrical requirements specified therein.

3.3.7 Vibration. Hybrids, after being subjected to vibration as specified in MIL-STD-883, Method 2007, Test Condition A, shall meet the final electrical requirements of the detailed drawing.

3.3.8 Lead integrity. Hybrids shall meet the requirements of MIL-STD-883, Method 2004, Test Condition B1.

3.3.9 Bond strength. Hybrid wirebonds, when tested as specified in MIL-STD-883, Method 2011, Test Condition D, shall exhibit a minimum bond strength as follows:

<u>WIRE MATERIAL</u>	<u>WIRE DIAMETER</u>	<u>MINIMUM BOND STRENGTH</u>
Au	1 mil	3 grams
Au	2 mil	6 grams
Al	1.25 mil	2 grams
Al	2 mil	3.8 grams
Al	3 mil	8 grams
Al	4 mil	14 grams
Al	5 mil	22 grams
Al	8 mil	54 grams
Al	10 mil	80 grams

3.3.10 Burn-in. Hybrids after being subjected to burn-in in accordance with the detailed drawing and MIL-STD-883, Method 1015, Test Condition D, for 160 hours at +125C minimum,, shall meet the final electrical requirements of the detailed drawing.

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3.3.11 Stabilization bake. Sealed hybrids, after being subjected to Stabilization Bake shall meet the final electrical requirements of the detailed drawing.

3.3.12 Internal visual. Hybrids shall meet the requirements of MIL-STD-883, Method 2017.

3.3.13 External visual. Hybrids shall meet the requirements of MIL-STD-883, Method 2009.

3.3.14 Constant acceleration. Hybrids, when tested in accordance with MIL-STD-883, Method 2001, Test Condition A, Y1 axis, shall meet the final electrical requirements of the detailed drawing.

3.3.15 End point electrical. Hybrids shall meet the requirements of the detailed drawing.

3.3.16 Final electrical. Hybrids shall meet the electrical requirements of the detailed drawing.

3.3.17 Internal visual (Post Stress). Hybrids shall meet the requirements of 4.5.3.

3.4 Marking. Marking shall be in accordance with the detailed drawing and shall include as a minimum the following:

- a. Index point
- b. Procuring activity part number
- c. Lot number and date (month and year)
- d. Serial number
- e. Code identification number

3.4.1 Marking location. The Lot Number and Date, Serial Number and procuring activity part number shall be marked on the frontside as a minimum. The code identification number may be marked on the front or backside. The index point shall be marked as specified in the detailed drawing.

3.4.2 Marking permanency and legibility. Marking shall be correct, permanent, legible and capable of withstanding the requirements of MIL-STD-202, Method 215.

3.5 Rework provisions. All rework permitted on hybrids shall be accomplished in accordance with procedures and safeguards of MIL-M-38510 and available for review by the

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procuring activity. Rework of the package seal for hybrids shall be permitted a maximum of two times after final seal and only for packages which have an outer seal perimeter of at least three inches in total length. Allowable rework of sealed hybrids shall be limited to recleaning of any hybrid or portion thereof, restamping to correct defective marking, and lead straightening (provided the reworked hybrids meet the requirements of "lead integrity").

### 3.5.1 In-process rework.

#### 3.5.1.1 Substrate rework.

a. One scratched, open or discontinuous metallization path or conductor pattern may be repaired by bridging with a minimum of two bonding wires having equivalent current carrying capacity.

b. Metallization paths containing voids may be repaired as in a. above or, where approved by the procuring activity, by an epoxy void-repair procedure.

#### 3.5.1.2 Rebonding and element replacement.

a. The total number of wire rebond attempts shall be limited to a maximum of 10 percent of the total number (or the nearest whole number) of bonds in the hybrids. A bond shall be defined as a wire to post or wire to pad bond (i.e., for a 14 lead wire-bonded package there are 28 bonds). Bond-offs required to clear the bonder after an unsuccessful first bond attempt need not be considered as rebonds provided they can be identified as bond-offs by being made physically off the plated post or if they contain a non-typical number of bonding tool marks. The initial bond attempt need not be visible. The replacement of one wire bonded at one end shall be considered as one rebond; a replacement of a wire bonded at both ends, or an unsuccessful bond attempt of a wire already bonded at the other end shall be considered as two rebonds. Compounding bonding is not permissible.

b. A maximum of two replacements of each element or die shall be permitted, except that there shall be no more than 20% replacement of the total elements or dice. Within the 20% replacement allowance, replacement of active devices following electrical testing, as defined in detailed drawing, shall be limited to 10% of total elements or dice.

c. No more than one rebond attempt shall be permitted at any pad, and no rebonds shall be made directly over an area where metallization of intended wire bond areas has been lifted.

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d. A hybrid may be subjected to a maximum total of four interconnect bonding or element replacement cycles following completion of the first electrical test as defined by the detail drawing (i.e. after completion of the first electrical test cycle, the hybrid cannot be subjected to more than four rework/repair cycles). Rebonding to substrate pad or package post when performed to effect element replacement shall not be counted against the total rebond limitations. Element removal will not be performed using techniques which expose other dice to temperatures in excess of 150°C.

3.5.2 Delidding and rework of sealed hybrids. Delidding and rework of sealed hybrids shall be permitted with the following limitations:

a. Delidding, rework and reseal of a hybrid shall be permitted a maximum of one time following initial package seal.

b. Rework of a sealed hybrid may be accomplished at any point in the normal manufacturing process flow prior to the Quality Conformance Inspection lot acceptance testing of 4.4.2.2.

c. All resealed hybrids shall be subjected to the requirements of 4.4.2.1. All resealed hybrids shall be formed into unique lots and shall be subjected to the requirements of 4.4.2.2.

d. The total cumulative in-process and post-seal rework shall not exceed that specified in 3.5.1.

3.6 First article inspection. This specification contains technical provision for first article inspection. Requirements for the submission of first article samples shall be as specified in the contract.

3.7 Product assurance program. The manufacturer shall establish a product assurance program in accordance with the requirements of MIL-M-38510, Appendix A. After receipt of First Article acceptance, the manufacturer shall not implement any changes in the product assurance program documentation. When the process control or quality control documents listed in the approved product assurance program plan are changed, the manufacturer shall notify the procuring activity.

3.8 Workmanship. The component shall be fabricated and finished in a thorough, workmanlike manner. It shall be free of burrs, chips, sharp edges, unblended radii, cracks, surface defects, dirt, grease, rust, corrosion products and other foreign matter. The cleaning methods used shall not be injurious to any part, nor shall parts be contaminated by the cleaning agents.



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## 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified herein or in the contract, the provisions of MIL-A-48078 shall apply and are hereby made a part of this detail specification.

4.2 Classification of inspection. See MIL-A-48078. The following types of inspection shall be conducted on this item:

- a. First article inspection
- b. Quality conformance inspection

4.3 First article inspection.

4.3.1 Submission The contractor shall submit a first article sample as designated by the Contracting Officer for evaluation in accordance with provisions of 4.3.2. The first article sample shall have passed the tests of 4.4.2.1 and the end point electrical tests\*, and shall consist of the following items in sample quantities as indicated:

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QUANTITY</u>
9297034	Microcircuit, Digital - Firing Circuit	65
9297063	Microcircuit, Digital - Safing and Arming	65

\*Electrical reject units may be utilized for tests of Table 1, Group I, however reject units must have been subjected to the test environment.

4.3.2 Inspection to be performed. The first article sample may be subjected by the Government to any or all of the requirements of the applicable drawings and to the inspections of Table 1. No defects are permitted, except for bond strength and solderability as defined by the LTPD (Lot Tolerance Percent Defective). All defects are classified as major unless otherwise specified.

TABLE I. First Article Inspection

**CLASSIFICATION OF DEFECTS & TESTS**

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PARAGRAPH	TITLE	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	ADL OR 100%	SHEET 1 OF 2	DRAWING NUMBER	
						92 97034 / 92 97063	NEXT HIGHER ASSEMBLY
CATEGORY				REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE / INSPECTION METHOD		
	Microcircuit, Digital - Firing Circuit Microcircuit, Digital - Safing & Arming	<u>GROUP I - 1/</u>  Physical Dimensions Marking Permanence External Visual Solderability Lead Integrity Seal Bond Strength	15	<u>2/</u>  <u>3/</u>	3.1.1 3.4.2 3.3.13 3.3.3 3.3.8 3.3.4 3.3.9	Gage MIL-STD-202 MIL-STD-883 MIL-STD-883 MIL-STD-883 MIL-STD-883 4.5.1	
		<u>GROUP II - 1/</u>  Thermal Shock Temperature Cycling Seal External Visual Final Electrical	15		3.3.5 3.3.2 3.3.4 3.3.13 3.3.16	MIL-STD-883 MIL-STD-883 MIL-STD-883 MIL-STD-883 Detailed drawing	

NOTES: 1/ Each unit in the group shall be subjected to all the examinations or tests in that group unless otherwise specified.  
2/ An LTPD=15 (Lot Tolerance Percent Defective) applied to hybrid leads per MIL-M-38510 Table B-1, shall be used for ACC /REJ limits. Minimum sample size shall be 2 hybrids.  
3/ An LTPD=7 shall be applied to the wirebonds, with minimum sample size of 2 hybrids. Equal number of wirebonds shall be tested of each, initially.

TABLE I. First Article Inspection

**CLASSIFICATION OF DEFECTS & TESTS**

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PARAGRAPH	TITLE	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	SHEET		DRAWING NUMBER
				%	2	
CATEGORY				AGL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE / INSPECTION METHOD
	Microcircuit, Digital - Firing Circuit Microcircuit, Digital - Safing & Arming		15			9297034/9297063 NEXT HIGHER ASSEMBLY
		<u>GROUP III - 1/</u> Mechanical Shock Vibration Constant Acceleration Seal Final Electrical Internal Visual			3.3.6 3.3.7 3.3.14 3.3.4 3.3.16 3.3.17	MIL-STD-883 MIL-STD-883 MIL-STD-883 MIL-STD-883 Detailed drawing 4.5.3
		<u>GROUP IV - 1/</u> End Point Electrical 4/ High Temperature Storage Final Electrical	20		3.3.15 3.3.1 3.3.16	Detailed drawing MIL-STD-883 Detailed drawing

NOTES: 4/ Ten of the units shall be tested at high temperature; the other ten units shall be tested at low temperature.

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4.3.3 Rejection. See MIL-A-48078. Resubmission for first article tests shall be in accordance with the appropriate contract clause.

4.4 Quality conformance inspection.

4.4.1 Inspection lot formation. Inspection lots shall comply with the lot formation provisions of MIL-A-48078.

4.4.2 Examination. See MIL-A-48078. Sampling shall be performed to the levels shown in this specification. All defects are classified as major unless otherwise specified. The tests and examinations listed in 4.4.2.1 shall be performed in the order listed for each inspection lot. The inspections listed in paragraph 4.4.2.2 shall be performed on each inspection lot submitted for acceptance. Where first article testing is specified in the procurement document, the quality conformance tests of 4.4.2.2 will not be performed for the first 450 pieces of product. The tests and examinations of 4.4.2.2 shall be performed in the order listed for each group.

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**CLASSIFICATION OF DEFECTS & TESTS**

PARAGRAPH	TITLE	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	SHEET		DRAWING NUMBER 92 97034/92 97063
				AGI OR 100%	REQUIREMENT PARAGRAPH	
CATEGORY	NEXT HIGHER ASSEMBLY					
MAJOR	PARAGRAPH REFERENCE / INSPECTION METHOD					
4.4.2.1	Microcircuit, Digital - Firing Circuit Microcircuit, Safing & Arming					
101	Internal Visual (Pre-seal)			100%	3.3.12	MIL-STD-883
102	Stabilization Bake			100%	3.3.11	4.5.2
103	Temperature Cycling			100%	3.3.2	MIL-STD-883
104	Constant Acceleration			100%	3.3.14	MIL-STD-883
105	Seal			100%	3.3.4	MIL-STD-883
106	Final Electrical			100%	3.3.16	Detailed drawing
107	Burn-In			100%	3.3.10	MIL-STD-883
108	Final Electrical			100%	3.3.16	Detailed drawing
109	External Visual			100%	3.3.13	MIL-STD-883
110	Case material & finish			--	3.1.4	Certificate of conf.
111	Lead material & finish			--	3.1.5	Certificate of conf.

NOTES:

QUALITY CONFORMANCE INSPECTION

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CLASSIFICATION OF DEFECTS & TESTS

PARAGRAPH	TITLE	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	SHEET	BY	3	DRAWING NUMBER	
								9297034/9297063	NEXT HIGHER ASSEMBLY
CATEGORY								PARAGRAPH REFERENCE / INSPECTION METHOD	
4.4.2.2	Microcircuit, Digital - Firing Circuit Microcircuit, Digital - Safing & Arming								
		<u>GROUPS I THROUGH IV</u>							
		<u>Inspection Lot Size</u>							
		5-150	4						
		151-300	4						
		301-500	5						
<u>MINOR</u>		<u>GROUP I (Non-Destructive)</u>	2						Gage
201		<u>Physical Dimensions</u>							
202		<u>GROUP II (Destructive) 2/</u>	4						MIL-STD-202
		<u>Marking Permanence</u>							
<u>MAJOR</u>		<u>Internal Visual</u>	2						MIL-STD-883
101		<u>Bond Strength</u>	3/						4.5.1
102									
103		<u>GROUP III 2/</u>	4/						MIL-STD-883
		<u>Solderability</u>							

NOTES: 1/ Each unit in the group shall be subjected to all examinations or tests in that group unless otherwise specified.  
 2/ Electrical rejects and empty packages may be used for Groups II, III and IV provided their construction and processing through final seal is identical to that of the device.  
 3/ An LTPD=7 per MIL-M-38510 Table B-1 applied to wirebonds shall be used for ACC/REJ limits. Equal number of wirebonds shall be tested of each hybrid, initially. Minimum sample size shall be 2 hybrids.  
 4/ An LTPD=15 shall be applied to the hybrid leads. The minimum sample size shall be 2 hybrids.

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**CLASSIFICATION OF DEFECTS & TESTS**

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PARAGRAPH	TITLE	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	SHEET 2 OF 3	DRAWING NUMBER	
						9297034 / 9296063	NEXT HIGHER ASSEMBLY
CATEGORY						PARAGRAPH REFERENCE / INSPECTION METHOD	
4.4.2.2 (Cont'd)	Microcircuit, Digital - Firing Circuit Microcircuit, Digital - Safing & Arming						
<u>MAJOR</u>	<u>GROUP IV 2/</u>		2				
104 105	Lead Integrity Seal				3.3.8 3.3.4		MIL-STD-883 MIL-STD-883
	<u>GROUPS V AND VI 5/</u>						
	<u>Inspection Lot Size</u>	<u>Sample Size</u>					
	7-50	6					
	51-150	10					
	151-300	14					
	301-500	18					
	<u>GROUP V (Destructive) 1/</u>						
106 107 108 109 110	Mechanical Shock Vibration Seal Final Electrical Internal Visual				3.3.6 3.3.7 3.3.4 3.3.16 3.3.17		Detailed Drawing MIL-STD-883 MIL-STD-883 Detailed Drawing 4.5.3

**NOTE:** 5/ Half of the samples shall be subjected to Group V testing, the other half shall be subjected to Group VI testing.

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CLASSIFICATION OF DEFECTS & TESTS

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PARAGRAPH	TITLE	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	SHEET	3 OF 3	DRAWING NUMBER	MILIT NUMBER ASSEMBLY	PARAGRAPH REFERENCE / INSPECTION METHOD
4.4.2.2	Microcircuit, Digital - Firing Circuit Microcircuit, Digital - Safing & Arming						9297034/9297063		
<u>MAJOR</u>									
111		<u>GROUP VI (Destructive) 1/</u>							
112	Thermal Shock								MIL-STD-883
113	Temperature Cycling								MIL-STD-883
114	Seal								MIL-STD-883
115	Final Electrical End Point Electrical								Detailed Drawing Detailed Drawing
			5						
117		<u>GROUP VII (Destructive) 1/ 6/</u>							
118	High Temperature Storage Electrical (High Temperature only) End Point								MIL-STD-883 Detailed Drawing

NOTES 6/ These tests shall be run at the start and the mid-point of production on each contract, unless otherwise specified. The testing is intended to verify that a continuous manufacturing process has been maintained. In the event of failure, the procuring activity shall be notified and corrective action initiated. Production hybrid deliveries shall not be delayed or be dependent upon the results of this test.



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4.4.3 Rejection. If any unit fails the tests of 4.4.2.1, the unit shall be rejected. If any test specimen fails the tests of 4.4.2.2 the lot shall be rejected unless otherwise specified. Lots shall not be resubmitted for these tests without prior approval of the procuring activity. If directed by the procuring activity, acceptance of additional hybrids of the same type shall be discontinued pending investigation of the failure and approval by the procuring activity of corrective action proposed by the contractor. Upon approval from the procuring activity, rejected lots may be reworked per 3.5.2 and resubmitted for these tests.

4.4.4 Testing. All tests are specified in 4.4.2.1 and 4.4.2.2.

4.4.5 Inspection equipment. The inspection equipment required to perform the examinations and tests prescribed in this specification is identified, either directly or by reference, in the "Paragraph Reference/Inspection Method" column of the First Article or Quality Conformance Inspection Tables herein. The contractor shall submit inspection equipment designs to the Government for approval in accordance with the terms of the contract. See 6.3.

#### 4.5 Methods of inspection.

4.5.1 Wire bond strength. Wire bonds shall be pulled to determine the minimum strength. The minimum number of wires pulled in each sample hybrid shall be (for each wire gage): One (1) wire from each type\* of transistor, diode, capacitor, and resistor die; three (3) wires from each type of integrated circuit; and five (5) wires from a header to substrate. In no case shall the total number of wires pulled per sample hybrid be less than 15. Any failures shall be described, their location identified, and the stress value at which failure occurred shall be recorded. After the above testing, the same bonds shall be tested to destruction, for information.

\*"Type" shall be defined as any attribute which would result in the component being different, such as:

- a. Physical height of the bonding surface above the substrate.
- b. Manufacturer.
- c. Bond pad material composition.
- d. Number of bonds per device.
- e. Die topography.

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4.5.2 Stabilization bake. Sealed hybrids shall be subjected to stabilization bake in accordance with MIL-STD-883, Method 1008, Test Condition C.

4.5.3 Internal visual. Following stress testing, hybrids shall be delidded and internal visual examination performed at 30X magnification. No evidence of damage or dislocation is permitted.

## 5. PACKAGING

5.1 Packaging. Hybrids shall be protected individually to prevent damage from - electrostatic field forces in accordance with the requirements of MIL-M-55565. Other field force protection may be employed as necessary to prevent damage to the hybrids. Preservation-packaging, packing and container marking shall be in accordance with level C requirements of MIL-M-55565 unless otherwise specified in the procurement document.

## 6. NOTES

6.1 Intended use. The hybrids covered by this specification are intended for use in the M934E6 Stinger fuze.

6.2 Ordering data. See paragraph 6.1 of MIL-A-48078.

6.2.1 Contract data requirements. Data specified in paragraphs 3.2.2 and 3.2.5 of this document and in paragraphs 1.2.3 and 20.1.3 of MIL-M-38510, Appendix A, will be listed directly on a DD Form 1423 incorporated into the contract. Data item descriptions, DI-E-5054 (NSA), DI-L-5079 (NSA), DI-R-5299 (NSA) and DI-R-1700 (ARMY), will be required for data delivery in connection with this specification.

6.3 Submission of designs for approval. See MIL-A-48078. Submit equipment designs, as required, to US Army Armament Research and Development Center, ATTN: AMSMC-QAR-I (D), Dover, New Jersey 07801-5001.

6.4 Drawings. Drawings listed in Section 2 of this specification under the heading US Armament Research and Development Center (ARDC) may also include drawings prepared by, and identified as, US Army Armament Research and Development Command (ARRADCOM) or Picatinny Arsenal drawings. Technical data originally prepared by these activities is now under the cognizance of ARDC.

6.5 Changes from previous issue. Asterisks are not used in this revision, due to the extensiveness of the changes.

Custodian:  
Army-AR

Preparing Activity:  
Army-AR  
(Project 1336-A505)

## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER MIL-F-48370A		2. DOCUMENT TITLE FUZE M934E6, HYBRID MICROCIRCUITS FOR	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one)	
3b. ADDRESS (Street, City, State, ZIP Code)		<input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER <input type="checkbox"/> OTHER (Specify): _____	
5. PROBLEM AREAS			
a. Paragraph Number and Wording:			
b. Recommended Wording:			
c. Reason/Rationale for Recommendation:			
6. REMARKS			
7a. NAME OF SUBMITTER (Last, First, MI) - Optional		b. WORK TELEPHONE NUMBER (Include Area Code) - Optional	
c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional		8. DATE OF SUBMISSION (YYMMDD)	

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)