

MIL-S-1399E(AR)
24 August 1984

SUPERSEDING
MIL-S-1399D(PA)
25 July 1974

MILITARY SPECIFICATION

SIGNALS, ILLUMINATION, AIRCRAFT TRACER, DOUBLE-STAR AN-M53A2 THROUGH An-m58A2 PARTS, AND LOADING, ASSEMBLING AND PACKING

This specification is approved for use by the 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 contains requirements not covered by the drawings and provides quality assurance provisions for the fabrication of parts, assembly and packing of one type of aircraft double-star signal with tracer designated as follows:

AN-M53A2	- Yellow tracer, red and yellow stars
AN-M54A2	- Green tracer, red stars
AN-M55A2	- Green tracer, green and red stars
AN-M56A2	- Red tracer, green stars
AN-M57A2	- Red tracer, red stars
AN-M58A2	- Red tracer, green and red stars

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified (see 6.2), 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-P-116	- Preservation, Packaging, Method of
MIL-A-48078	- Ammunition, Standard Quality Assurance Provisions; General Specification For

FSC 1370

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. DRSMC-QA, Dover, New Jersey 07801 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

MIL-S-1399E(AR)

STANDARDS

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes (ABC-STD-105)
- MIL-STD-286 - Propellants; Solid, Sampling, Examination and Testing
- MIL-STD-331 - Fuze and Fuze Components, Environmental and Performance Tests For
- MIL-STD-1234 - Pyrotechnics: Sampling, Inspection and Testing

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

U.S. ARMY ARMAMENT RESEARCH AND DEVELOPMENT CENTER (ARDC)

PRODUCT AND PACKAGING DRAWINGS

- 8847441 Signal, Illumination, Aircraft, Tracer, Double Star AN-M53A2 Thru AN-M58A2 Assemblies
- 8836949 Carton, Packing, For Signals, Illumination, Aircraft, and Simulator, Projectile, Air Burst
- 8836950 Box, Packing, Ammunition, For Signals, Illumination, Aircraft and Simulator, Projectile, Air Burst

INSPECTION EQUIPMENT DRAWINGS

- 9201136 - Tunnel, Light
- 9201268 - Procedure, Light Output Measurement
- 9201390 - Procedure, Photocell Checkout
- 9201392 - Procedure, Color Value Measurement
- 9247071 - Photocell

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

MIL-S-1399E(AR)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. The issue of the document which are indicated as DOD adopted shall be the issue listed in the current DODISS and the supplement thereto, if applicable.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM Designation E300 - Recommended Practice for Sampling Industrial Chemicals

(Applications for copies should be addressed to the American Society for Testing Materials, 1916 Race Street, Philadelphia, PA 19103) 1

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

3. REQUIREMENTS

3.1 Material. Material and parts shall be in accordance with the applicable drawings and specifications.

3.2 Assembly. The assembly shall comply with all requirements specified on Drawing (dwg.) 8847441 and with all requirements specified in applicable specifications.

3.3 Moisture content.

3.3.1 Star charge composition. The moisture content of the star charge composition, at the loading station shall not exceed 0.1 percent when determined as specified in 4.5.1.1 or 4.5.1.2.

3.3.2 Tracer charge composition. The moisture content of the tracer charge composition, at the time of loading the signals, shall not exceed 0.1 percent when determined as specified in 4.5.1.2.

3.3.3 Black powder. The moisture content of the black powder, at the loading station at the time of loading the signals shall not exceed 0.3 perecent when determined as specified in 4.5.1.3.

3.3.4 Paper, cotton and chipboard components. The moisture content of the paper, cotton and chipboard components, at the loading station at the time of loading the signals, shall not exceed 6 percent when determined as specified in 4.5.1.4.

3.3.5 Polypropylene felt. The moisture content of the polypropylene felt components, at the loading station at the time of loading shall not exceed 0.1 percent when determined as specified in 4.5.1.4.

MIL-S-1399E(A)

3.4 Transportation vibration. The signal assembly shall comply with the following requirements:

3.4.1 The signal assembly shall not function during the test,

3.4.2 The signal assembly shall be safe to transport following the test (see 6.7).

3.4.3 There shall be no evidence of external damage to the signal assembly that will affect the intended function (see 6.8).

3.4.4 There shall be no evidence of damage in the packing or packaging that would affect the storage life of the signal assemblies.

3.4.5 The signal assembly shall comply with the requirements of 3.5 following this test.

3.5 Functioning. The signals shall function in accordance with the following requirements:

3.5.1 No tracer or star shall burst in the pistol.

3.5.2 The signal case shall not split, rupture, or bulge to the extent that it sticks or "freezes" in the pistol barrel.

3.5.3 The primer shall not fail to function.

3.5.4 The tracer shall ignite within 1 second after firing
p i s t o l .

3.5.5 The stars shall not ignite within 1 1/2 seconds after firing.

3.5.6 The burning stars shall not fail to attain a minimum (min.) altitude of 150 feet above the firing point.

3.5.7 The tracer and both stars shall not fail to function and shall not burn longer than 1 1/2 seconds simultaneously.

3.5.8 The interval between extinction of the tracer and initiation of both stars shall not exceed 1 second.

3.5.9 Portions of composition that become detached during star burning shall not burn for more than 2 seconds.

3.6 Air leakage test. The signal shall show no evidence of leakage when tested as specified in 4.5.4.

MIL-S-1399E(AR)

3.7 First article inspection. This specification contains technical provisions for first article inspection. Requirements for the submission of first article samples by the contractor shall be as specified in the contract.

3.8 Workmanship. All parts and assemblies shall be fabricated and loaded in a thorough, workmanlike manner. They shall be free of burrs, sharp edges, cracks, dirt, rust, and other foreign matter. The cleaning method used shall not be injurious to any part nor shall the parts be contaminated by the cleaning agent. Exterior surface coatings shall be continuous except for a few light scratches not exposing base material. All required markings shall be neat and sharply defined.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection and standard quality assurance provisions. 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 inspections. 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 consist of the following items in sample quantities as indicated.

4.3.2 Inspections to be performed. See MIL-A-48078 and Table I specified herein.

4.3.3 Rejection. See MIL-A-48078.

TABLE I. First article inspection

CLASSIFICATION OF DEFECTS & TESTS

PARAGRAPH	TITLE	NO. OF SAMPLE UNITS	AQL OR 100%	SHEET 1 OF 3	MIL-S-1399E DRAWING NUMBER	
					See below	NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST			REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE	INSPECTION METHOD
	Inert Parts (See TDPL for Drawing) Examination for defects	Note 1		3.2	Visual/Gage	
	Star Assembly (Dwg. 8847448) Examination for defects Static Test (10 of each color)	30 30(a)		3.2 4.3.3.5	4.4.2.3 4.5.5	
	Tracer Assembly (Dwg. 8847453) Examination for defects Static test (10 of each color)	30 30(a)		3.2 4.3.3.5	4.4.2.5 4.5.5	
	Illumination and Tracer Assembly (Dwg. 8847441) Examination for defects Chamber gaging	30 30(a)		3.2 3.2	4.4.2.8 4.5.6	
	Signal Assembly (Prior to Inserting Illuminant and Tracer Assembly) (Dwg. 8847441) Examination for defects	30		3.2	4.4.2.9	

note: 1. Fifteen (15) complete sets of each component and inert subassembly shall be inspected in accordance with specification and drawing requirements.
(a) Above items to be used for test.

DRSMC-NA (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

TABLE I. First article inspection**CLASSIFICATION OF DEFECTS & TESTS**

MIL-S-1399E									
CLASSIFICATION OF DEFECTS & TESTS									
PARAGRAPH	TITLE	SHEET		DRAWING NUMBER					
	Signal, Illumination, Aircraft Tracer, Double Star, AN-M53A2 thru AN-M58A2	2	3	See below					
				NEXT HIGHER ASSEMBLY					
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD				
	Signal Assembly (Prior to Inserting Top) (Dwg. 8847441) Examination for defects	30		3.2	4.4.2.10				
	Signal Assembly (Dwg. 8847441) Examination for defects Transportation vibration Air leakage Functioning	30 (a)		3.2 3.4 3.6 3.5	4.4.2.11 4.5.2 4.5.4 4.5.3				
	Carton (Prior to Sealing) (Dwg. 8836949) Examination for defects	1 cart.		3.2	4.4.2.12				
	Sealed Carton (Dwg. 8836949) Examination for defects	1 cart.		3.2	4.4.2.13				
NOTES									
(a) To be tested in sequence noted after examination for defects.									

DRSMC-0A (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

TABLE I. First article inspection

CLASSIFICATION OF DEFECTS & TESTS

MIL-S-1399E

PARAGRAPH	TITLE	SHEET 3 OF 3		DRAWING NUMBER	
	Signal, Illumination, Aircraft Tracer, Double Star, AN-M53A2 thru AN-M58A2			See below	NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE / INSPECTION METHOD
	Wood Box (Prior to Sealing) (Dwg. 8836950) Examination for defects	1 box		3.2	4.4.2.14
	Sealed Wood Packing Box (Dwg. 8836950) Examination for defects	1 box		3.2	4.4.2.15
	Barrier Bag (Dwg. 8836949) Examination for defects Heat seal test	3 boxes 30 (a)		3.2 3.2	4.4.2.16 4.4.3.8
NOTES: (a) Above units to be used for test.					

DRSMC-0A (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

MIL-S-1399E(AR)

4.4 Quality conformance inspection.

4.4.1 Inspection lot formation. Inspection lots shall comply with the lot formation provisions of MIL-A-48078. In addition, inspection lots of signals shall contain:

- a. Primers of one lot interfix number from one manufacture.
- b. Black powder from not more than one lot.
- c. Signals of one designation only.
- d. Star charge composition produced by one manufacturer under one continuous set of operating conditions and which consists of one or more batches that have been subjected to the same unit chemical or physical mixing process intended to make the final product homogeneous.
- e. Tracer charge composition produced by one manufacturer under one continuous set of operating conditions and which consists of one or more batches that have been subjected to the same unit chemical or physical mixing process intended to make the final product homogeneous.

4.4.2 Examination. (See MIL-A-48078). Unless otherwise specified in the classification of defects and test tables, sampling plans for major and minor defects shall be in accordance with MIL-STD-105, Inspection Level II.

QUALITY CONFORMANCE INSPECTION

CLASSIFICATION OF DEFECTS & TESTS

MIL-S-1399E(AR)

PARAGRAPH	TITLE	SHEET		1 OF 1		DRAWING NUMBER
4.4.2.1	Case, Signal					8847475
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	NEXT HIGHER ASSEMBLY	
					8847441	
					PARAGRAPH REFERENCE / INSPECTION METHOD	
<u>Critical</u>	None defined					
<u>Major</u>	Diameter of primer hole, maximum (max.)		0.40%	3.2	Gage	
<u>101</u>						
<u>Minor</u>	Inside diameter max.		0.65%	3.2	Gage	
201	Outside diameter minimum (min.)		0.65%	3.2	Gage	
202	Diameter of flange		0.65%	3.2	Gage	
203	Angle of flange		0.65%	3.2	Gage	
204	Thickness of base at primer hole		0.65%	3.2	Gage	
205	Thickness of base in area above		0.65%	3.2	Gage	
206	propelling charge cavity					
207	Radii missing		0.65%	3.2	Gage	
208	Finish improper		0.65%	3.2	Visual	
209	Poor workmanship		1.0%	3.8	Visual	
NOTES:						

DPSMC-0A (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

QUALITY CONFORMANCE INSPECTION

CLASSIFICATION OF DEFECTS & TESTS

PARAGRAPH	TITLE	SHEET 1 OF 1		MIL-S-1399E(AR)	
				DRAWING NUMBER	
				8847468	
				NEXT HIGHER ASSEMBLY	
				8847441	
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE / INSPECTION METHOD
<u>Critical</u>	None defined				
Major <u>101</u>	Primer above flush or more than max. below flush		0.40% 0.40%	3.2 3.2	Gage Visual
102	Primer not sealed 360°				
Minor <u>201</u>	Poor workmanship		1.0%	3.8	Visual
NOTES:					

DPSMC-0A (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

REVISIONS CONTAINED HEREIN

MIL-S-1399E (AR)

CLASSIFICATION OF DEFECTS & TESTS

PARAGRAPH	TITLE	SHEET 1 OF 1		DRAWING NUMBER	
4.4.2.3	Star Assembly			8847448	
				NEXT HIGHER ASSEMBLY	
				8847441	
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE / INSPECTION METHOD
<u>Critical</u> I	Color identification incorrect		100%	3.2	Visual
Major 101 102	Length of protruding quickmatch priming charge distribution of total hole area, less than 2/3 min.		0.40%	3.2	Gage
103	Quickmatch missing		0.40%	3.2	Visual
104	Disc loose		0.40%	3.2	Visual Manual
Minor 201 202	Crimp not full 360 degrees poor workmanship		0.65% 1.0%	3.2 3.8	Visual Visual
NOTES:					

DRSMC-NA (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

QUALITY CONFORMANCE INSPECTION**CLASSIFICATION OF DEFECTS & TESTS**

MI L-S-1399E (AR)

PARAGRAPH	TITLE	SHEET		DRAWING NUMBER	
		1	1	8847473	
		OF		NEXT HIGHER ASSEMBLY	
				8847411	
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE / INSPECTION METHOD
4.4.2.4	Top				
Critical	None defined				
Major 101	Crack or split		0.40%	3.2	Visual
Minor 201	Thickness		0.65%	3.2	Gage
202	Outside diameter at datum height		0.65%	3.2	Gage
203	Protrusion of side above bottom		0.65%	3.2	Gage
204	Length of side		0.65%	3.2	Gage
205	Bare spot in protective coating or coating missing		0.65%	3.23	Visual
206	Poor workmanship		1.0%	3.8	Visual
Notes:					

DRSMC-0A (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

QUALITY CONFORMANCE INSPECTION**CLASSIFICATION OF DEFECTS & TESTS**

PARAGRAPH		TITLE		SHEET		MIL-S-1399E(AR)	
4.4.2.5		Tracer Assembly		1 of 1		DRAWING NUMBER 8847453	
CATEGORY		EXAMINATION OR TEST		AQL OR 100%		NEXT HIGHER ASSEMBLY 8847441	
		NO. OF SAMPLE UNITS		REQUIREMENT PARAGRAPH		PARAGRAPH REFERENCE / INSPECTION METHOD	
<u>Critical</u> 1		Color identification incorrect		100%		Visual	
<u>Major</u> 101		Priming charge distribution of total hole area less than 2/3 min.		0.40%		Visual	
102		Component missing or loose		0.40%		Visual/Manual	
103		Component damaged to extent that function may be impaired		0.40%		Visual	
<u>Minor</u> 201		Cement missing		0.65%		Visual	
202		Poor workmanship		1.0%		Visual	
NOTES:							

DRSMC-0A (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

QUALITY CONFORMANCE INSPECTION**CLASSIFICATION OF DEFECTS & TESTS**

TITLE		SHEET 1 OF 1		MIL-S-1399E(AR)	
PARAGRAPH	ILLUMINANT ASSEMBLY			DRAWING NUMBER	
4.4.2.6				8847443	
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	NEXT HIGHER ASSEMBLY
					8847441
					PARAGRAPH REFERENCE / INSPECTION METHOD
<u>Critical</u>					
I					
Major					
101	Color identification incorrect		100%	3.2	Visual
102	Quickmatch fails to protrude		0.40%	3.2	Visual
103	Plug missing or weight under min.		0.40%	3.2	Visual/Balance
	Dividing charge missing		0.40%	3.2	Visual
Minor					
201	Ends not folded over for full 360 degrees		0.65%	3.2	Visual
202	Poor workmanship		1.0%	3.8	Visual
NOTES:					

DPSMC-0A (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

QUALITY CONFORMANCE INSPECTION**CLASSIFICATION OF DEFECTS & TESTS**

MIL-S-1399E(AR)

PARAGRAPH	TITLE	SHEET		NO. OF SAMPLE UNITS	EXAMINATION OR TEST	AQL OR 100%	REQUIREMENT PARAGRAPH	DRAWING NUMBER	
		1	OF					8847442	NEXT HIGHER ASSEMBLY
4.4.2.7	Illuminant and Tracer Assembly (Prior to Inserting Illuminant Assembly)		1					8847441	8847441
CATEGORY								PARAGRAPH REFERENCE	INSPECTION METHOD
Critical	None defined								
Major 101	Relay charge missing					0.40%	3.2		Visual
Minor 201	Poor workmanship					1.0%	3.8		Visual
NOTES									

DRSMC-0A (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

QUALITY CONFORMANCE INSPECTION**CLASSIFICATION OF DEFECTS & TESTS**

PARAGRAPH		TITLE		SHEET 1 OF 1		MIL-S-1399E (AR) DRAWING NUMBER	
4.4.2.8		Illuminant and Tracer Assembly				8847442	
CATEGORY		EXAMINATION OR TEST		NO. OF SAMPLE UNITS		NEXT HIGHER ASSEMBLY 8847441	
				AQL OR 100%		PARAGRAPH REFERENCE / INSPECTION METHOD	
<u>Critical</u>							
1		Color identification of illuminant assembly incorrect		100%		3.2	
2		Color identification of tracer assembly incorrect		100%		3.2	
<u>Major</u>		Filler or cover component missing or loose		0.40%		3.2	
101		Chamber sizing		44.3%		3.2	
102						Visual/Manual 4.5.6	
<u>Minor</u>		Crimp missing		0.65%		3.2	
201		Poor workmanship		0.65%		3.8	
202						Visual	
						Visual	
NOTES:							

DRSMC-QA (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

QUALITY CONFORMANCE INSPECTION**CLASSIFICATION OF DEFECTS & TESTS**

TITLE		MIL-S-1399E (AR)	
PARAGRAPH	SIGNAL ASSEMBLY (Prior to Inserting Illuminant and Tracer Assembly)	1 OF 1 SHEET	DRAWING NUMBER 8847441 NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AGL OR 100%
<u>Critical</u>			
1	Propelling charge missing		100%
2	Wad disc assembly punctured, missing, or incorrectly assembled		100%
3	Propelling charge weight less than min. (See Note)		100%
<u>Major</u>			
101	Retaining washer missing or in-correctly positioned		0.40%
<u>Minor</u>			
201	Poor workmanship		1.0%
NOTE: Volumetric weighing may be utilized as a substitute for precise weighing following qualification. Qualification shall consist of precise weighing until such time as twenty-five hundred (2,500) consecutively volumetric loaded charges are found to meet the minimum prescribed weight. After successful completion of the qualification quantity, the contractor may use a 32-0-1 check weighing sampling plan for each hour's production of powder loaded signal cases. If a "weight under min." critical defect is found in the thirty-two (32) unit sample, the hour's production represented by the sample plus an additional eight hundred and forty (840) consecutive, defect free units, must be produced and check weighed before returning to the 32-0-1 hourly sampling plan.			
<p>Visual</p> <p>Visual</p> <p>Balance</p> <p>Visual</p> <p>Visual</p>			
<p>PARAGRAPH REFERENCE / INSPECTION METHOD</p>			

DRSMC-NA (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

QUALITY CONFORMANCE INSPECTION**CLASSIFICATION OF DEFECTS & TESTS**

PARAGRAPH	TITLE	SHEET OF		NO. OF SAMPLE UNITS	EXAMINATION OR TEST	AQL OR 100%	REQUIREMENT PARAGRAPH	MIL-S-1399E(AR)	
								DRAWING NUMBER	NEXT HIGHER ASSEMBLY
4.4.2.10	Signal Assembly (Prior to Inserting Top)							3847441	
CATEGORY								PARAGRAPH REFERENCE / INSPECTION METHOD	
<u>Critical</u>									
Major 101 102	None defined								
	Illuminant and tracer assembly	0.40%					3.2	Visual	
	Spacer missing	0.40%					3.2	Visual	
Minor 201	Poor workmanship	1.0%					3.8	Visual	

NOTES:

QUALITY CONFORMANCE INSPECTION

CLASSIFICATION OF DEFECTS & TESTS

PARAGRAPH		TITLE	SHEET		MIL-S-1399E (AR)	
4.4.2.11		Signal Assembly	1 OF 1		DRAWING NUMBER	8847441
CATEGORY		EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	NEXT HIGHER ASSEMBLY
					PARAGRAPH REFERENCE / INSPECTION METHOD	
Critical 1	Band color incorrect	100%	3.2	Visual		
Major 101	Diameter of top crimp	0.40%	3.2	Gage		
102	Contents loose	0.40%	3.2	Manual		
103	Color band missing	0.40%	3.2	Visual		
104	Marking misleading or unidentifiable	0.40%	3.2	Visual		
105	Case split or assembly otherwise damaged	0.40%	3.2	Visual		
106	Sealing compound missing for mating surfaces of top and signal case	0.40%	3.2	Visual		
Minor 201	Total length	0.65%	3.2	Gage		
202	Poor workmanship	1.0%	3.8	Visual		
NOTE:						

DRSMC-0A (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

QUALITY CONFORMANCE INSPECTION

MIL-S-1399E(AR)

CLASSIFICATION OF DEFECTS & TESTS

PARAGRAPH	TITLE	SHEET		DRAWING NUMBER	
		1	1	8836949	
			OF		NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE / INSPECTION METHOD
<u>Critical</u>	None defined				
<u>Major</u> 101 102	Number of assemblies in box incorrect Assembly improperly packed in box (inverted or packing material missing)		0.40%	3.2	Visual
<u>Minor</u> 201	Poor workmanship		0.40%	3.2	Visual
			1.0%	3.8	Visual
NOTE:					

DRSMC-0A (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

QUALITY CONFORMANCE INSPECTION**CLASSIFICATION OF DEFECTS & TESTS**

MIL-S-1399E(AR)

PARAGRAPH	TITLE	SHEET		DRAWING NUMBER	
		1	1	8836949	
		OF		NEXT HIGHER ASSEMBLY	
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE / INSPECTION METHOD
4.4.2.13	Sealed Box, Fiberboard				
Critical	None defined				
Major	Sealing strip improperly applied				
101	Box damaged to extent that contents				
102	are exposed or liable to become exposed		0.40%	3.2	Visual
			0.40%	3.2	Visual
Minor	Contents loose		0.65%	3.2	Manual
201	Marking missing or unidentifiable		0.65%	3.2	Visual
202	Poor workmanship		1.0%	3.8	Visual
203					
NOTES:					

DRSMC A (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

QUALITY CONFORMANCE INSPECTION

CLASSIFICATION OF DEFECTS & TESTS

MIL-S-1399E(AR)

PARAGRAPH	TITLE	SHEET 1 OF 1		DRAWING NUMBER	
4.4.2.14	Wood Packing Box (Prior to Sealing)			3836950	
				NEXT HIGHER ASSEMBLY	
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE / INSPECTION METHOD
<u>Critical</u>	None defined				
Major 101	Box, Fiberboard inverted (primer end up)		0.40%	3.2	Visual
Minor 201 202	Incorrect number of cartons Poor workmanship		0.65% 1.0%	3.2 3.8	Visual Visual
NOTE:					

DPSMC-DA (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

QUALITY CONFORMANCE INSPECTION

CLASSIFICATION OF DEFECTS & TESTS

MIL-S-1399E(AR)

PARAGRAPH	TITLE	SHEET		DRAWING NUMBER	
		1	1	8836950	NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE / INSPECTION METHOD
4.4.2.15	Sealed Wood Packing Box				
Critical	None defined				
Major	Box damaged to extent that contents are exposed or liable to become exposed				
101	Hardware or strapping missing, broken, loose or improperly engaged or assembled				
102	DOT symbol missing or unidentifiable		0.40%	3.2	Visual
103			0.40%	3.2	Visual/Manual
Minor			0.40%	3.2	Visual
201	Metallic seal missing, unsealed or improperly positioned		0.65%	3.2	Visual
202	Contents loose		0.65%	3.2	Manual
203	Marking missing, misleading or unidentifiable (other than marking)		0.65%	3.2	Visual
204	Poor workmanship		1.0%	3.8	Visual
NOTES:					

DRSMG-NA (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

QUALITY CONFORMANCE INSPECTION

CLASSIFICATION OF DEFECTS & TESTS

PARAGRAPH	TITLE	SHEET		MIL-S-1399E (AR)	
		1	1 OF	DRAWING NUMBER	
				8836949	NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE / INSPECTION METHOD
<u>Critical</u>	None defined				
Major 101	Seal improper or incomplete		0.40%	3.2	Visual
102	Bag punctured, torn or cut		0.40%	3.2	Visual
103	Heat seal test		0.40%	3.2	4.4.3.8
Minor 201	Marking missing, incorrect or unidentifiable		0.65%	3.2	Visual
202	Poor workmanship		1.0%	3.8	Visual
NOTES:					

DRSMC-0A (D) Form 160, 1 Aug 83 replaces edition of 1 Jul 77 which may be used until exhausted.

MIL-S-1399E(AR)

4.4.3 Testing.4.4.3.1 Moisture content. (See Table II) - Major Defect.TABLE IIMaterial

Star. charge composition (see 3.3.1)
 Tracer charge composition (see 3.3.2)
 Black powder (see 3.3.3)
 Felt (see 3.3.5)
 Paper (see 3.3.4)
 Chipboard (see 3.3.4)
 Cotton (see 3.3.4)

The contractor shall provide controls to protect the material identified in Table II from moisture pick-up. In addition, a representative sample of each of these materials shall be obtained in accordance with procedures described in ASTM E-300 from the beginning of each eight hour production cycle and tested to determine conformance with the requirements given in paragraphs 3.3.1 to 3.3.5. If the moisture content of a sample fails to meet the requirement, and loading has not started, the material should be rejected until it is dried and retested and found to conform to the moisture requirement. If assemblies have been loaded with non-conforming material (excessive moisture), those assemblies shall be rejected.

4.4.3.2 Transportation vibration. The signal assemblies shall be observed and examined visually without disassembly for any evidence of failure to comply with the requirements as classified in Table III.

TABLE III

<u>Defect</u>	<u>Classification</u>
Signal functions during test (see 3.4.1)	Critical
Signal not safe to transport following test (see 3.4.2)	Critical
Signal damaged after test (see 3.4.3)	Major
Signal packing damaged (see 3.4.4)	Major

MIL-S-1399E(AR)

4.4.3.2.1 First three (3) lots. Beginning with the first lot produced and continuing until three (3) consecutive lots have complied with the acceptance criteria specified, two hundred and forty (240) signal assemblies shall be selected from each lot for test. The lot shall be rejected if any defect as classified in Table III occurs. The test shall be performed as specified in 4.5.2.

4.4.3.2.2 After three (3) consecutive lots. After three consecutive lots have complied with the acceptance criteria 4.4.3.2.1, eighty (80) signal assemblies shall be selected from each lot for test. The lot shall be rejected if any defect as classified in Table III occurs.

4.4.3.3 Functioning. The signal assemblies shall be observed for any evidence of failure to comply with the requirements as classified in Table IV when tested-as specified in 4.5.3.

TABLE IV

<u>Defect</u>	<u>Classification</u>
Star color incorrect (see dwg. 8847448)	Critical
Star or tracer bursts in pistol (see 3.5.1)	Critical
Tracer color incorrect (see dwg. 8847453)	Critical
Tracer and one star ignite but second star fails to ignite (see 3.5.7)	Critical
Star burning time incorrect (see dwg. 8847448)	Major
Tracer burning time incorrect (see dwg. 8847453)	Major
Star ignition time less than min. (see 3.5.5)	Major
Primer fails to function (see 3.5.3)	Major
Signal case defect (see 3.5.2)	Major
Altitude below min. (see 3.5.6)	Major
Tracer ignition time over max. (See 3.5.4)	Major
Tracer and star simultaneous burning time over max (see 3.5.7)	Major

MIL-S-1399E(AR)

Tracer extinction and star initiation
interval over max (see 3.5.8)

Major

Detached composition burning time over
max (see 3.5.9)

Major

4.4.3.3.1 Two hundred forty (240) signal assemblies selected and tested in accordance with 4.4.3.2.1 shall be function tested in accordance with 4.5.3. The lot shall be rejected if a Critical defect occurs or if eight (8) or more defects are found during the test (see Table IV).

4.4.3.3.2 The eighty (80) signal assemblies selected and tested in accordance with 4.4.3.2.2 shall be tested for functioning in accordance with 4.5.3. " The lot shall be rejected if a Critical defect occurs or if four (4) or more Major defects are found during the test (see Table IV).

4.4.3.4 Air leakage test (see 3.6). This test shall be performed 100 percent in accordance with the procedure specified in 4.5.4* All assemblies that fail to comply with the requirement shall be classed defective and removed from the lot.

4.4.3.5 Static test of star and tracer assemblies (see dwgs. 8847448 and 8847453). The star assembly and tracer assembly shall each be tested and observed for the following defects as classified in Table V.

TABLE V

<u>Defect</u>	<u>Classification</u>
Assembly fails to ignite	Major
Candlepower under min.	Major
Color value under min.	Major

4.4.3.5.1 First three (3) lots. Beginning with the first lot produced and continuing until three (3) consecutive lots have complied with the acceptance criteria specified, eighty (80) star assemblies shall be selected from each lot for test in accordance with the procedure specified in 4.5.5. The lot shall be rejected if five (5) or more defects are found during the test.

4.4.3.5.2 After three (3) consecutive lots. After three consecutive lots have complied with the acceptance criteria of 4.4.3.5.1, thirty-two (32) star assemblies of each color and thirty-two (32) tracer assemblies of each color shall be selected from each lot. for test. The lot shall be rejected if, during the test, three (3) or more assemblies exhibit any of the defects as listed in Table V.

MIL-S-1399E(AR)

4.4.3.6 Chamber gaging. (see dwg. 8847441) . Chamber gaging shall be performed 100 percent. Any assembly that binds or otherwise-fails to gage freely shall be classed defective and removed from the lot. The gaging shall be performed as specified in 4.5.6.

4.4.3.7 Check test for possible deterioration of primers (see applicable primer specification) . If the total elapsed time between original acceptance of any primer lot and the assembly of that lot into the signal assemblies exceeds two years, or if the primers have been subjected to adverse conditions, however brief, at any time since previous tests, the primer lots shall be subjected to and must satisfactorily pass the check test specified in the applicable primer specification. The check test shall be performed by the contractor (see 6.6) prior to assembling the primers into the signals.

4.4.3.8 Heat seal test of sealed bag (see dwg. 8836949). Sampling, acceptance criteria, and test methods shall be as specified in MIL-P-116.

4.4.4 Inspection equipment. The inspection equipment required to perform the examinations and test prescribed herein is described in the paragraph Reference/Inspection Method column in the tables starting with paragraph 4.4.2.1. The contractor shall submit for approval inspection equipment designs in accordance with the terms of the contract. See Section 6 of MIL-A-48078 and 6.3 herein.

4.5 Methods of inspection.

4.5.1 Moisture content.

4.5.1.1 Star charge composition.

4.5.1.1.1 Preferred method. Determine the moisture content of the star charge composition in accordance with Method 101.2 given in MIL-STD-1234 using a suitable size sample (50g).

4.5.1.1.2 Alternate method. The moisture content shall be determined in accordance with Method 101.4 of MIL-STD-286.

4.5.1.2 Tracer composition. Determine the moisture content of the tracer composition in accordance with Method 102.1.1 given in MIL-STD-1234 using 10g. sample and 70° + 2°C heat for 2 hours.

4.5.1.3 Black powder. Determine the moisture content of black powder in accordance with Method 102.1.1 given in MIL-STD-1234 using a 2g. sample and 70° to 75°C for 4 hours.

4.5.1.4 Other components (paper, cotton, chipboard and polypropylene. Determine the moisture content of the "other components" in accordance with Method 102.1.1 given in MIL-STD-1234.

MIL-S-1399E(AR)

4.5.1.5 Cotton. Ten g. of cotton shall be accurately weighed and placed in a tared weighing dish. The dish and contents shall be weighed and placed in an oven and dried at $100 \pm 2^\circ\text{C}$ for 2 hours. The dish and contents shall be cooled in a desiccator and weighed. The loss in weight shall be calculated as percent moisture in the sample.

4.5.2 Transportation vibration. The signal assemblies selected as specified in 4.4.3.2.1 or 4.4.3.2.2 shall be packaged and packed in accordance with dwg. 8836949 and 8836950. Each packed box shall be subjected to the transportation-vibration test as specified in MIL-STD-331, except that each box shall be vibrated at the specified amplitudes for four (4) hours in each of three different positions (i.e. box positioned so that signal assemblies are vertical with base end down, box positioned so that signal assemblies are horizontal, and box positioned so that the signal assemblies are vertical with base end up). After the test, the box packing and the signal assemblies shall be examined to determine compliance with the requirements.

4.5.3 Functioning. The signal shall be immersed to a depth between 6 and 9 inches for 2 hours, in water maintained at $70 \pm 10^\circ\text{F}$. At the end of the immersion time, the signals shall be removed from the water and the exterior surfaces wiped dry. The signals shall be fired in a pistol, for which the signal is standard, that is mounted on a tower platform, at a min. height of 100 feet above the ground. The signal functioning shall be observed for compliance with the requirements. Any signal which fails to conform to the applicable requirements shall be classed defective.

4.5.3.1 Test Validity. If for any reason the test conditions have detrimentally affected the test results, the test shall be declared invalid and a new test shall be performed with additional samples.

4.5.4 Air leakage test. The signal assembly shall be placed in a cylindrical air tight chamber with the free space minimized. The air pressure within the chamber shall be raised to a min. of 3 p.s.i.g. by means of a fixed volume of air. With the air supply shut off the pressure shall be maintained for 15 seconds min. An accurate pressure measuring instrument shall be observed for evidence of signal leakage.

4.5.5 Static test of star assembly and tracer assembly. The assembly shall be supported in a horizontal position with the axis of the assembly perpendicular to the photometric axis. The assembly shall be ignited with a quickmatch, and the candlepower and color

MIL-S-1399E(AR)

value determined and recorded in accordance with the procedures and equipment specified in dwgs. 9201136, 9201268, 9201390 and associated dwgs., 9201392 and 9247071. When measuring tracer candlepower, the peak reading shall be taken in lieu of the average candlepower reading specified on dwg. 9201258.

4.5.6 Chamber gaging. The signal assembly shall be gaged with equipment specified in 4.4.4. Any assembly which fails to comply with the drawing requirement shall be classed defective.

5. PACKAGING

5.1 Preservation and packaging.

5.1.1 Level A. Signals shall be packaged in accordance with dwgs. 8836949 and 8836950.

5.2 Marking. Marking shall be in accordance with dwgs. 8836949, 8836950 and 8796522.

6. NOTES

6.1 Intended use. The components covered by this specification are intended for use on the AN-M53A2 thru AN-M58A2 Signals Illumination, Aircraft Tracer.

6.2 Ordering data. See MIL-A-48078.

6.3 Submission of Inspection Equipment for Design Approval. See MIL-A-48078. Submit equipment designs as required to: Commander, US Army Armament Research and Development Center, ATTN: DRSMC-QAT-I(D), Dover, NJ 07801.

6.4 Distribution of ammunition data cards. Distribution of data cards shall include the following: Commander, US Army Armament Research and Development Center, ATTN: DRSMC-QAT-M(D), Dover, NJ 07801.

6.5 Star burning time. The star burning time is defined as the time from the appearance of the first colored light from the illuminant assembly (not the first sputtering light from the quickmatch or black powder priming charge) until the time that the light from the star has decreased to approximately less than 10 percent of peak brilliance.

MIL-S-1399E(AR)

6.6 Cost of check test. The Contracting Officer should arrange for the contractor to be reimbursed for the expense incurred in the performance of the check test. The tests shall be conducted at Government expense without cost to the contractor who loaded the primer or to the contractor assembling the primers in the signals and shall not constitute a basis for rejection against either contractor except where deterioration has occurred as a direct result of carelessness in handling, storage, etc., permitted while the primer lots were under the jurisdiction of either contractor.

6.7 Safe to transport. The signal assembly will be considered safe to transport providing no evidence exists of loose powder or composition in the box, or missing, loose or protruding primers.

6.8 Signal free of damage. The signal assemblies will be considered free of damage that will affect the intended function provided the top seal has not been broken by movement or displacement of the top, or the case side has not been distorted sufficiently to prevent ejection of the star assembly.

6.9 Identification of international standardization agreements. Certain provisions of this specification are the subject of international standardization agreement STANAG 3398-Air Pyrotechnics Interchangeability Chart. When amendment, revision, or cancellation of this specification is proposed, the departmental custodians will inform their respective Departmental Standardization Officers so that appropriate action may be taken respecting the international agreement concerned.

6.10 Test summary.

<u>Lot</u>	<u>Sample Size</u>	<u>Test</u>	<u>Requirements</u>
First Article	30 of each color	Functioning	See Table IV
Regular production (First three consecutive acceptable lots)	240	Functioning	See Table IV
Remaining	80	Functioning	See Table IV

Custodian:
Army-AR

Preparing activity:
Army-AR

(Project 1370-A172)

INSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (*DO NOT STAPLE*), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

NOTE: This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification 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.

(Fold along this line)

(Fold along this line)

DEPARTMENT OF THE ARMY



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

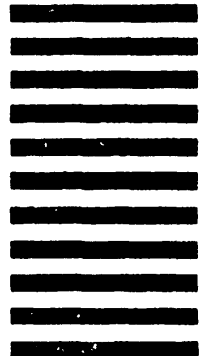
OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 12062 WASHINGTON D. C.

POSTAGE WILL BE PAID BY THE DEPARTMENT OF THE ARMY

COMMANDER
US ARMY ARMAMENT RESEARCH & DEVELOPMENT CENTER
ATTN: DRSAR QA
DOVER, NJ 07801 5001



STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL	
(See Instructions - Reverse Side)	
1. DOCUMENT NUMBER MIL-S-1399E	2. DOCUMENT TITLE Signals, Illumination, Aircraft Tracer, Doublestar AN-M53A2
3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION (Mark one) <input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER <input type="checkbox"/> OTHER (Specify): _____
b. ADDRESS (Street, City, State, ZIP Code)	
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)

