MIL-S-1398E(AR)
12 December 1984
SUPERSEDING
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MILITARY SPECIFICATION

SIGNALS, ILLUMINATION, AIRCRAFT DOUBLE-STAR AN-M37A2 THROUGH AN-M42A2 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 as follows:

AN-M37A2	- Red Stars
AN-M38A2	- Yellow Stars
AN-M39A2	- Green Stars
AN-M40A2	- Red and Yellow Stars
AN-M41A2	- Red and Green Stars
AN-M42A2	- Green and Yellow 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

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

8847462 - Signal, Illumination, Aircraft, Double Star, AN-M37A2 through AN-M42A2 Assemblies
8836949 - Box, Fiberboard, 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.)

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 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.) 8847462 and with all requirements specified in applicable specifications.

3.3 Moisture content.

3.3.1 Star charge composition. The moisture content of the red star charge composition at the loading station shall not exceed 0.1 percent and the moisture content of the green and yellow star charge compositions at the loading station shall not exceed 0.5 percent when determined as specified in 4.5.1.1.

3.3.2 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 percent when determined as specified in 4.5.1.2.

3.3.3 Paper, and chipboard components. The moisture content of the paper, and chipboard components, at the loading station at the time of loading the signals, shall not exceed 6 Percent when determined as specified in 4.5.1.3.

3.3.4 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 4.5.1.3.

3.4 Transportation vibration. The signal assemblies 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 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 burning stars shall not fail to attain a minimum (rein) altitude of 150 feet above the firing point.

3.5.5 The stars shall not fail to ignite and reach approximately 1/4 of full brilliance within 2 seconds after firing.

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

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

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, unblended radii, surface defects, chips, dirt, grease, and oil (except where specifically required) corrosion products, and other foreign matter, and all manufacturing, processing, and assembly operations shall be correctly performed. 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. (All packing components shall be dry) .

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 in Table I.

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

MIL-S-1398E

PARAGRAPH	TITLE		SHEET 1 OF 3		DRAWING NUMBER
	Signal, Illumination, Aircraft Double Star AN-M37A2 thru AN-M42A2 Parts, and Loading, and Assembling and Packing				See below
					NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
	Case, Signal (Dwg. 8847475)				
	Examination for Defects	30		3.2	4.4.2.1
	Signal Case Assembly (Dwg. 8847468)				
	Examination for Defects	30		3.2	4.4.2.2
	Cup (Dwg. 9240782)				
	Examination for Defects	30		3.2	4.4.2.3
	Baffle (Dwg. 9288942)				
	Examination for Defects	30		3.2	4.4.2.4
	Star Assembly (Dwg. 8847461)				
	Examination for Defects	30		3.2	4.4.2.5
	Static Test (10 of each color)	30(a)		3.2	4.5.5
	Top (Dwg. 8847473)				
	Examination for Defects	30		3.2	4.4.2.6

NOTES:

(a) Above items to be tested.

DRSMC (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-1398E

PARAGRAPH	TITLE: Signal, Illumination, Aircraft Double Star AN-M37A2 thru AN-M42A2 Parts, and Loading, and Assembling and Packing		SHEET 2 OF 3		DRAWING NUMBER: See below NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
	Assembly (Prior to Inserting Star Assemblies, Retaining Washer and Wad-Disc Assembly) (Dwg. 8847462)				
	Examination for Defects	30		3.2	4.4.2.7
	Chamber gaging	30(a)		3.2	4.5.6
	Assembly (Prior to Inserting Star Assemblies) (Dwg. 8847462)				
	Examination for Defects	30		3.2	4.4.2.8
	Assembly (Prior to Inserting Top) (Dwg. 8847462				
	Examination for defects	30		3.2	4.4.2.9
	Signal Assembly (Dwg. 8847462) (30 of each assembly)				
	Examination for defects	180		3.2	4.4.2.10
	Transportation vibration	180(b)		3.4	4.5.2
	Air leakage	180		3.6	4.5.4
	Static test	180		3.2	4.5.5
	Functioning	180		3.5	4.5.3

NOTES:
(a) Above units to be tested.
(b) Test to be performed in sequence listed.

DRSMC-OA (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-1398E

PARAGRAPH	TITLE: Signal, Illumination, Aircraft Double Star AN-M37A2 thru AN-M42A2 Parts, and Loading, and Assembling and Packing		SHEET 3 OF 3		DRAWING NUMBER: See below NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
	Box (Dwg. 8836949) Examination for defects	2 boxes		3.2	4.4.2.11
	Heat seal test	30(a)		3.2	4.4.3.7
	Sealed Box (Dwg. 8836949) Examination for defects	2 boxes		3.2	4.4.2.12
	Wood Packing Box (Dwg. 8836950) Examination for defects	1 box		3.2	4.4.2.13
	Sealed Wood Packing Box (Dwg. 8836950) Examination for defects	1 box		3.2	4.4.2.14
	Transportation vibration	1 box		3.2	4.5.2

NOTES:
(a) Above items to be tested.

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

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 simulators 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.

4.4.2 Examination. (See MIL-A-48078).

a. Sampling plans. 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.

CLASSIFICATION OF DEFECTS & TESTS

PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER
4.4.2.1	Case, Signal				8847475
					NEXT HIGHER ASSEMBLY 8847462
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
Critical	None defined				
Major					
101	Diameter of primer hole, maximum (max.)		0.40%	3.2	Gage
102	Inside diameter of chamber, maximum (max).		100%	3.2	4.5.6
Minor					
201	Outside diameter, 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 area		0.65%	3.2	Gage
205	Thickness of base in area above propelling charge cavity		0.65%	3.2	Gage
206	Radii missing		0.65%	3.2	Visual
207	Finish improper		0.65%	3.2	Visual
208	Poor workmanship		1.0%	3.8	Visual

NOTES:

QUALITY CONFORMANCE INSPECTION

CLASSIFICATION OF DEFECTS & TESTS

MIL-S-1398E(AR)

PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER
4.4.2.2	Signal Case Assembly				8847468
					NEXT HIGHER ASSEMBLY 8847462
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
Critical	None defined				
Major					
101	Primer above flush or more than max. below flush		0.40%	3.2	Gage
102	Primer not sealed 360°		0.40%	3.2	Visual
Minor					
201	Poor workmanship		1.0%	3.8	Visual

NOTES:

DRSMC-OA (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-1398E(AR)

PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER
4.4.2.3	Cup				9240782
					NEXT HIGHER ASSEMBLY 8847462
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
Critical	None defined				
Major					
101	Inside diameter		0.40%	3.2	Gage
102	Thickness of wall		0.40%	3.2	Gage
Minor					
201	Diameter of bottom hole		0.65%	3.2	Gage
202	Poor workmanship		1.0%	3.8	Visual

NOTES:

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

CLASSIFICATION OF DEFECTS & TESTS

MIL-S-1398E(AR)

PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER
4.4.2.4	Baffle				9288942
					NEXT HIGHER ASSEMBLY
					8847462
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
Critical	None defined				
Major					
101	Small hole(s) missing		0.40%	3.2	Visual
Minor					
201	Diameter of baffle		0.65%	3.2	Gage
202	Thickness		0.65%	3.2	Gage
203	Poor workmanship		1.0%	3.8	Visual

NOTES:

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QUALITY CONFORMANCE INSPECTION

CLASSIFICATION OF DEFECTS & TESTS

MIL-S-1398E(AR)

PARAGRAPH	TITLE	SHEET 1 OF 1	DRAWING NUMBER
4.4.2.5	Star Assembly		8847461
			NEXT HIGHER ASSEMBLY 8847462

CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
Critical					
1	Color identification incorrect		100%	3.2	Visual
Major					
101	Length of protruding quickmatch		0.40%	3.2	Gage
102	Priming charge distribution of total hole area disc and bottom, less than 2/3 min.		0.40%	3.2	Visual
103	Quickmatch missing		0.40%	3.2	Visual
104	Disc loose		0.40%	3.2	Manual
105	Length of protruding quickmatch (with baffle when applicable)		0.40%	3.2	Gage
106	Static test	4.4.3.4		3.2	4.5.5
Minor					
201	Crimp not full 360°		0.65%	3.2	Visual
202	Poor workmanship		1.0%	3.8	Visual

NOTES:

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CLASSIFICATION OF DEFECTS & TESTS

MIL-S-1398E(AR)

PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER
4.4.2.6	Top				8847473
					NEXT HIGHER ASSEMBLY
					8847462
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
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	Length of side		0.65%	3.2	Gage
204	Bare spot in protective coating, or coating missing		0.65%	3.2	Visual
205	Poor workmanship		1.0%	3.8	Visual

NOTES:

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CLASSIFICATION OF DEFECTS & TESTS

MIL-S-1398E(AR)

PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER
4.4.2.7	Assembly (Prior to Inserting Star Assemblies, Retaining Washer and Wad-Disc Assembly				8847462
					NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
Critical					
1	Propellant charge missing		100%	3.2	Visual
2	Propelling charge weight less than min. (See Notes)		100%	3.2	Balance
Major					
101	Chamber gaging		4.4.3.5	3.2	Gage
Minor					
201	Poor workmanship		1.0%	3.8	Visual

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 hours production of powder loaded signal cases. If a "weight under min." critical defect is found in the thirty-two (32) unit sample, the hours production represented by the sample plus enough additional units to total 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.

NOTES:

CLASSIFICATION OF DEFECTS & TESTS

MIL-S-1398E(AR)

PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER
4.4.2.8	Assembly (Prior to Inserting Star Assemblies)				8847462
					NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
Critical 1	Wad-disc assembly missing, not seated, or disc punctured		100%	3.2	Visual/Manual
Major 101	Baffle missing (when applicable)		0.40%	3.2	Visual
Minor 201	Poor workmanship		1.0%	3.8	Visual

NOTES:

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CLASSIFICATION OF DEFECTS & TESTS

MIL-S-1398E(AR)

PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER
4.4.2.9	Assembly (Prior to Inserting Top)				8847462
					NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
Critical 1	Color combination of star assemblies incorrect		100%	3.2	Visual
Major 101	Star assembly missing, inverted or damaged to extent that function may be impaired		0.40%	3.2	Visual
102	Cushioning wad or spacer disc missing		0.40%	3.2	Visual
Minor 201	Poor workmanship		1.0%	3.8	Visual

NOTES:

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QUALITY CONFORMANCE INSPECTION

CLASSIFICATION OF DEFECTS & TESTS

MIL-S-1398E(AR)

PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER
4.4.2.10	Signal Assembly				8847462
					NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
Critical					
1	Band color incorrect		100%	3.2	Visual
Major					
101	Top insecure or not fully seated		0.40%	3.2	Manual
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 from mating surfaces of top and signal case		0.40%	3.2	Visual
107	Air leakage test		100%	3.6	4.5.4
108	Functioning		4.4.3.3	3.5	4.5.3
Minor					
201	Total length		0.65%	3.2	Gage
202	Poor workmanship		1.0%	3.8	Visual

NOTES:

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CLASSIFICATION OF DEFECTS & TESTS

PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER
4.4.2.11	Box (Prior to Sealing)				8836949
					NEXT HIGHER ASSEMBLY 8836950
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
Critical					
1	Color identification missing or incorrect		100%	3.2	Visual
Major					
101	Number of assemblies in box incorrect		0.40%	3.2	Visual
102	Assembly improperly packed in box (inverted or packing material missing)		0.40%	3.2	Visual
Minor					
201	Poor workmanship		1.0%	3.8	Visual

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CLASSIFICATION OF DEFECTS & TESTS

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PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER
4.4.2.12	Sealed Box				8836949
					NEXT HIGHER ASSEMBLY 8836950
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
Critical	None defined				
Major					
101	Sealing strip improperly applied		0.40%	3.2	Visual
102	Box damaged to extent that contents are exposed or liable to become exposed		0.40%	3.2	Visual
103	Seal improper or incomplete		0.40%	3.2	Visual
104	Bag punctured, torn or cut		0.40%	3.2	Visual
105	Heat seal		4.4.3.7	3.2	MIL-P-116
Minor					
201	Contents loose		0.65%	3.2	Manual
202	Marking missing, misleading or unidentifiable		0.65%	3.2	Visual
203	Poor workmanship		1.0%	3.8	Visual

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CLASSIFICATION OF DEFECTS & TESTS

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PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER
4.4.2.13	Wood Packing Box (Prior to Sealing)				8836950
					NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
Critical	None defined				
Major					
101	Fiberboard box inverted (primer end up)		0.40%	3.2	Visual
Minor					
201	Incorrect number of boxes		0.65%	3.2	Visual
202	Poor workmanship		1.0%	3.8	Visual

NOTES:

CLASSIFICATION OF DEFECTS & TESTS

MIL-S-1398E(AR)

PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER
4.4.2.14	Sealed Wood Packing Box				8836950
					NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
Critical	None defined				
Major					
101	Box damaged to extent that contents are exposed or liable to become exposed		0.40%	3.2	Visual
102	Hardware or strapping missing, broken or loose		0.40%	3.2	Visual/Manual
103	DOT marking missing, incorrect or unidentifiable		0.40%	3.2	Visual
104	Transportation vibration		4.4.3.2	3.2	4.5.2
Minor					
201	Hardware or strapping improperly engaged or assembled		0.65%	3.2	Visual/Manual
202	Metallic seal missing, unsealed, or improperly positioned		0.65%	3.2	Visual
203	Contents loose		0.65%	3.2	Manual
204	Marking missing, misleading or unidentifiable		0.65%	3.2	Visual
205	Poor workmanship		1.0%	3.8	Visual

NOTES:

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

4.4.3 Testing.

4.4.3.1 Moisture content. (See Table II) - Major Defect.

TABLE II

Material
Star charge composition (see 3.3.1)
Black powder (see 3.3.2)
Felt (see 3.3.4)
Paper (see 3.3.3)
Chipboard (see 3.3.3)

The contractor shall provide controls to insure that the material comply with the requirements. For verification the contractor shall select and test one sample of each material used in each eight hours production. A composition sample shall not be used. If the moisture content of a sample exceeds the requirement and loading has not begun, the material represented by the sample shall be rejected. If components have been loaded with material containing excessive moisture, the remaining unloaded material and loaded components shall be rejected. Test procedures shall be as specified in 4.5.1. The sample of star charge composition shall be selected prior to consolidating the star assemblies.

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 - Defect Classification

Defect	Classification
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

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 in accordance with the procedure specified in 4.5.2. The lot shall be rejected if any defect classified in Table III occurs.

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 - Defect Classification

Defect	Classification
Star color incorrect (see dwg. 8847461)	Critical
Star bursts in pistol (see 3.5.1)	Critical
One star fails to ignite (see 3.5.5)	Critical
Case sticks in barrel (see 3.5.2)	Major
Primer fails to function (see 3.5.3)	Major
Star intensity and ignition time over max. (see 3.5.6)	Major
Detached composition burning time over max. (see 3.5.6)	Major
Altitude below min. (see 3.5.4)	Major
Star burning time below min. (See dwg. 8847461)	Major

4.4.3.3.1 First three (3) lots. 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 Major defect are found during the test (see Table IV).

4.4.3.3.2 After three (3) consecutive lots. 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 defect are found during the test (see Table IV).

4.4.3.4 Static test of star assembly (see dwg. 8847461). The* star assemblies shall be tested and observed for the defects as classified in Table V.

TABLE V - Static Test Classification

Defect	Classification
Assembly fails to ignite	Major
Candlepower under min.	Major
Color value under min.	Major

4.4.3.4.1 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 of each color 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 defective are found during the test.

4.4.3.4.2 After three (3) consecutive lots. After three consecutive lots have complied with the acceptance criteria of 4.4.3.4.1, thirty-two (32) star 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.

4.4.3.5 Chamber gaging. (see dwg. 8847462). 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.

4.4.3.6 Deterioration of the primer. 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.

4.4.3.7 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 in this specification is identified in the Examination (4.4.2) and Test Method (4.5) paragraphs herein. See 6.3 for details concerning responsibilities for inspection design and approval.

4.5 Methods of inspection.

4.5.1 Moisture content.

4.5.1.1 Star charge composition.

4.5.1.1.1 Preferred method. The Karl Fischer method as stated in MIL-STD-1234, Method 101.2 up to paragraph 5.3 shall be used. A sample of fifty (50) + 0.1 g shall be added to a 500 milliliter (mL) volumetric flask containing approximately 300 to 400 mL of methanol and 25 g of dry sodium nitrate. The flask shall be stoppered and the contents swirled cautiously for several minutes until the material is thoroughly dispersed. The sample shall be allowed to remain in contact with the methanol for approximately two hours. The the 500 mL of volumetric flash shall be filled up to the 500 mL mark with methanol and swirled again. A blank without the sample shall be put through the same procedure. After the sample has settled, a 50 mL aliquot of the clear supernatant liquid shall be withdrawn and, immediately 100 mL of methanol which has just been titrated to the preliminary end point as described in MIL-STD-1234, Method 101.2, paragraph 5.1. The final end point shall be reached in 3.5 minutes in the manner described in MIL-STD-1234, Method 101.2, para. 5.4. A 50 mL aliquot of the blank shall be titrated in the same manner. The water content shall be calculated as follows:

$$\text{Percent water} = \frac{(VR-S) - (V'R-S') \times 100}{W}$$

where:

F = g of water per mL of standard water in methanol solution.
V = mL of Karl Fischer reagent added to the sample.
V' = mL of Karl Fischer reagent added to the blank.
R = mL of standard water in methanol solution per mL of Karl Fischer reagent.
S = mL of standard water in methanol solution for titration of sample.
S' = mL of standard water in methanol solution for back titration of blank.
w = weight of sample in g.

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 T 101.4 of MIL-STD-286.

4.5.1.2 Black powder. The method of determining percentage of moisture in black powder shall be in accordance with specification MIL-STD-1234, Method 102.1.1 using 2 g. sample and 70° to 75°C heated for 4 hrs.

4.5.1.3 Polypropylene felt, paper and chipboard. Ten g of each material shall be accurately weighed, placed in a tared weighing dish. The dish and contents shall be weighed and placed in an oven and dried at 100 + 2°C (212 + 5°F) for 2 hours. The dish 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 shall be packaged and packed in accordance with dwg. 8836949 and 8836950. Each packed box shall be subjected to the transportation vibration test 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 packing box and the signal assemblies shall be examined to determine compliance with the requirements. (Non-Destructive Test)

4.5.3 Functioning. The signal shall be immersed to a depth between 6 and 9 inches for 2 hours, in water maintained at 21 ± 2°C (70 + 10°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 signals shall be observed for compliance with the requirements (See 6.5). Any signal which fails to comply 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 pounds 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., any test sample which fails to comply with the applicable requirements shall be classed defective. (Non-Destructive Test)

4.5.5 Static test of star assembly and tracer assembly. The assembly shall be tested by supporting the star in a horizontal position with the axis of the star perpendicular to the photometric axis, and ignited by means of quickmatch. The candlepower and color value shall be measured and recorded to determine compliance with the requirements specified on the applicable drawing (See 6.5). Determination of candlepower and color value shall be made in accordance with the procedures and equipment specified in dwgs. 9201136, 9201268, 9201390 and associated dwgs., 9201392 and 9247071. (Destructive Test)

4.5.6 Chamber gaging. The signal assembly shall be gaged with equipment specified in 4.4.4. Any signal which fails to comply with the applicable requirements shall be removed from the lot. (Non-Destructive test).

5. PACKAGING

5.1 Preservation.

5.1.1 Level A. Signals shall be packaged in accordance with dwg. 8836949.

5.2 Packing.

5.2.1 Level A. Signals shall be packed in accordance with dwg. 8836950.

5.3 Marking. Marking shall be in accordance with dwgs. 8836949 and 8836950.

6. NOTES

6.1 Intended use. The components covered by this specification are intended for use on the Signal, Illumination Aircraft Double Star AN-M37A2 thru AN-M42A2.

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 the black powder priming charge) until the time that the light from the star has decreased-to approximately less than 10 percent of the peak brillance.

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 tests. The tests shall be conducted at Government expense without cost to the contractor who loaded the primers 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 occured as a direct result of carelessness in handling, storage, etc., permitted while the primer lots were under the jurisdiction of either contractor.

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

6.8 Signal assemblies . The signal assemblies will be considered free of damage that will effect 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 Changes for Previous Issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

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