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MIL-DTL-0050863D (AR)

01 January 2004

USED IN LIEU OF

MIL-C-50863C (AR)

26 January 1993

MIL-C-50861A(5) (PA)

29 March 1976

MIL-C-50862A(1) (PA)

29 March 1976

MIL-C-48115A(5) (PA)

29 March 1976

## DETAIL SPECIFICATION

## CARTRIDGE, 40MM - HEDP, M430A1

This specification is approved for interim use by the U.S. Army Armament Research, Development and Engineering Center (ARDEC). Other activities in the Department of Defense may use this interim revision or may continue using MIL-C-50863C (AR) and MIL-C-50861A (AR).

## 1. SCOPE

1.1 Scope. This specification covers the metal parts, assemblies, and the loading, assembling, and packing for one type of 40MM, High-Explosive, Dual-Purpose (HEDP) cartridge, designated Cartridge, 40MM: HEDP, M430A1.

## 2. APPLICABLE DOCUMENTS

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

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|---|
| Comments, suggestions, or questions on this document should be addressed to: Commander, US Army ARDEC, ATTN: AMSRD-AAR-QES-E, Picatinny, New Jersey 07806-5000, or e-mailed to <a href="mailto:ardec-stdzn@pica.army.mil">ardec-stdzn@pica.army.mil</a> . Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <a href="http://assist.daps.dla.mil">http://assist.daps.dla.mil</a> |
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AMSC N/A

FSC 1310

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2.2 Government documents.

2.2.1 Specifications, standards and handbooks. The following specifications, standards and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

## DEPARTMENT OF DEFENSE SPECIFICATIONS

|             |  |
|-------------|--|
| MIL-P-60942 | Primer Percussion for 40 mm, Loading, Assembling and Packaging             |
| MIL-A-70625 | Automated Acceptance Inspection Equipment Design, Testing and Approval, of |

## DEPARTMENT OF DEFENSE STANDARDS

|              |   |
|--------------|---|
| MIL-STD-1168 | Ammunition Lot Numbering and Ammunition Data Card |
| MIL-STD-1916 | DOD Preferred Methods for Acceptance of Product   |

(Copies of these documents are available online at <http://assist.daps.dla.mil/quicksearch/> or <http://assist.daps.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications, form a part of this document, to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation or contract (see 6.2).

## U.S. ARMY (ARDEC) DRAWINGS (see 6.3)

## PRODUCT AND PACKING DRAWINGS

|          |   |
|----------|---|
| 8886327  | - Cartridge Case Assembly   |
| 8886352  | - Liner Spitback  |
| 8886405  | - Linking of 40MM High Velocity Ammunition  |
| 9287854  | - Body Assembly   |
| 9287862  | - Spitback Assembly   |
| 9287864  | - Spitback Loading Assembly   |
| 9287855  | - Body  |
| 9287865  | - Housing Spitback  |
| 12926811 | - Cartridge, 40MM, HEDP, M430A1   |
| 12926812 | - Projectile Assembly   |
| 12926813 | - Liner   |
| 12926814 | - Body Loading Assembly   |
| 12928042 | - Packing and Marking of Shipping and Storage Container PA120 with Linked 40MM Cartridges |
| 12944747 | - Fuze PIBD, M549A1   |

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## INSPECTION EQUIPMENT DRAWINGS

- 8869822 - Ultrasonic Test Equipment
- 9202253 - Chamber Gage
- 9202254 - Gage Plug Wear Limit Check
- 9202255 - Gage Plug Acceptance Check
- 9202528 - Flush Pin Gage
- 9202529 - Flush Pin Gage
- 9202929 - Action Time

(Copies of these drawings may be requested online at [drawing-request@pica.army.mil](mailto:drawing-request@pica.army.mil), or from U.S. Army ARDEC, ATTN: AMSRD-AAR-AIS-TD, Picatinny NJ 07806-5000.)

2.3 Non-Government publications. The following document form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS INTERNATIONAL  
(ASTM)

- |            |   |
|------------|---|
| ASTM B117  | Standard Method of Salt Spray (Fog) Testing |
| ASTM E1255 | Standard Practice for Radioscopy            |

(Copies may be requested online at [www.astm.org](http://www.astm.org) or ordered from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959).

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 First article. When specified in the solicitation or contract order (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.3.

3.2 Materials. Materials, parts and assemblies shall comply with requirements specified on the applicable drawings and referenced specifications.

3.3 X-ray examination of ballistic samples. Prior to forwarding the cartridges to the Government approved test facility for ballistic testing, they shall be subjected to x-ray examination for any critical and major defects.

3.4 Functioning. The cartridge assembly shall function high order upon impact, not cause any weapon stoppages due to the operation of loading, uncoupling, firing and ejecting, and comply with the following:

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3.4.1 Velocity. When fired from the MK19, MOD III, Grenade Machine Gun, the average velocity of the sample cartridges shall be  $790 \pm 10$  feet per second (fps) with a standard deviation not exceeding 12.0 fps or less.

3.4.2 Security of crimp of base plug and action time. When fired from the M129 Grenade Launcher, the action time of the cartridge, shall not exceed 4 milliseconds and there shall be no base plug movement more than .005 above flush with the rear of cartridge case after firing.

3.4.3 Impact functioning. When fired single shot from a MK19, MOD III, Grenade Machine Gun the projectile assembly upon impact shall function satisfactorily as evidenced by smoke, flash and sound. There shall be no evidence of an early burst (see 6.12.2).

3.4.4 Safety. When fired from the MK19, MOD III, Grenade Machine Gun and M129 Grenade Launcher the projectile shall not lodge in the bore of the weapon and there shall be no evidence of a premature burst (see 6.12.3).

3.4.5 Penetration. When fired from the M129 Grenade Launcher, the shaped charge in the projectile shall penetrate a minimum of 3 inches of mild steel. There shall be no evidence of an early burst (See 6.12.2).

3.4.6 Rapid fire. When rapid fired from Mk19, Mod III, Grenade Machine Gun there shall be no evidence of an early burst (see 6.12.2).

3.4.7 Primer functioning. The primer shall function without evidence of misfires (see 6.12.5) and in accordance with MIL-P-60942. There shall be no evidence of primer leak as evidenced by perforation of primer cup or smoke deposit on base plug or cartridge case.

3.5 Ammunition lot numbering. Ammunition lot numbers shall be assigned in accordance with MIL-STD-1168.

3.6 Workmanship. All parts and assemblies shall be fabricated and finished in a thorough and workmanlike manner. They shall be free of burrs, chips, sharp edges, cracks, unblended radii, surface defects, dirt, grease, rust, corrosion products and other foreign matter. The cleaning method used shall not be injurious to any parts, nor shall the parts be contaminated by the cleaning agents. All marking and stamping shall be neat and sharply defined.

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## 4. VERIFICATION

TABLE I. Requirement/Inspection Cross Reference MatrixMethod of inspection

N/A – Not Applicable (N/A)

1 – Analysis

2 – Demonstration

3 – Examination

4 – Test

Classes of inspection

A – First article

B – Conformance

| SECTION 3<br>REQUIREMENT | INSPECTION METHODS |   |   |   |   | INSPECTION<br>CLASS |   | SECTION 4<br>INSPECTION<br>METHOD |
|--------------------------|--------------------|---|---|---|---|---------------------|---|-----------------------------------|
|                          | N/A                | 1 | 2 | 3 | 4 | A                   | B |                                   |
| 3.1                      |                    |   | X | X | X | X                   |   | 4.3                               |
| 3.2                      |                    |   | X | X | X | X                   | X | 4.3, 4.4                          |
| 3.3                      |                    |   |   | X |   | X                   | X | 4.5.9                             |
| 3.4                      |                    |   |   |   | X | X                   | X | 4.5.13                            |
| 3.4.1                    |                    |   |   |   | X | X                   | X | 4.5.13                            |
| 3.4.2                    |                    |   |   | X | X | X                   | X | 4.5.4                             |
| 3.4.3                    |                    |   |   | X | X | X                   | X | 4.5.13                            |
| 3.4.4                    |                    |   |   | X | X | X                   | X | 4.5.13, 4.5.13.1,<br>4.5.14       |
| 3.4.5                    |                    |   |   |   | X | X                   | X | 4.5.13.1                          |
| 3.4.6                    |                    |   |   |   | X | X                   | X | 4.5.14                            |
| 3.4.7                    |                    |   |   |   | X | X                   | X | TABLE III                         |
| 3.5                      |                    |   |   | X |   | X                   | X | 4.5.20                            |
| 3.6                      |                    |   |   | X |   | X                   | X | 4.5.21                            |

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

- a. First article inspections (see 4.3).
- b. Conformance inspections (see 4.4).

4.2 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified in section 4.5.

4.3 First article inspection. When specified in the solicitation or contract, a sample of cartridges, 40MM: HEDP, M430A1, and subcomponents shall be subjected to first article inspection in accordance with section 4.3.1 and Table II.

4.3.1 First article quantity. The contractor shall submit a first article for evaluation in accordance with the provisions of 4.3.2. The first article sample shall consist of the following items in sample quantities as indicated.

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| <u>Parts description</u>            | <u>Drawings</u> | <u>Quantity</u>     |
|-------------------------------------|-----------------|---------------------|
| Cartridge Case Assembly             | 8886327         | 325 <sup>1</sup>    |
| Body Loading Assembly               | 12926814        | 325 <sup>1</sup>    |
| Body Assembly                       | 9287854         |                     |
| - (prior to painting)               |                 | 50                  |
| - (for Salt Spray after painting)   |                 | 4                   |
| Body                                | 9287855         | 20                  |
| - (Embossed stock prior to forming) |                 | 2 <sup>3</sup>      |
| Liner                               | 12926813        | 25                  |
| Projectile Assembly                 | 12926812        | 325 <sup>1</sup>    |
| Fuze PIBD, M549A1                   | 12944747        | 325 <sup>1</sup>    |
| Spitback Assembly                   | 9287862         | 325 <sup>1</sup>    |
| Liner Spitback                      | 8886352         | 24                  |
| Housing Spitback                    | 9287865         | 24                  |
| Cartridge                           | 12926811        | 325 <sup>1, 2</sup> |
| Linked Ammunition, Prior to Pack    | 8886405         | 325 <sup>1</sup>    |
| Shipping and Storage Container      | 12928042        | 10                  |

<sup>1</sup> All quantities shall be subcomponents within final assembly. The subcomponents shall be individually examined for all listed characteristics prior to further assembly.

<sup>2</sup> Functioning test quantities include 10 samples for plate penetration against 3 inch thick RHA for information only.

<sup>3</sup> Size of sample - width of coil by 20 inches.

4.3.2 Inspections to be performed. The first article inspection shall be 100% examination for defects of all drawing characteristics (listed and unlisted) including workmanship requirements for the parts and assemblies listed in 4.3.1 and the tests specified in Table II herein.

4.3.3 First article rejection. If any assembly, component or test specimen fails to comply with any of the applicable requirements, the first article sample shall be rejected. The Government reserves the right to terminate inspection upon any failure of an assembly, component or test specimen to comply with any of the requirements.

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TABLE II. First Article Inspection  
M430A1 Cartridge, Sub-Assemblies and Components

| EXAMINATION OR TEST   | NØ. OF<br>SAMPLE<br>UNITS | REQUIREMENT<br>PARAGRAPH | PARAGRAPH<br>REFERENCE<br>INSPECTION<br>METHOD |
|---|---------------------------|--------------------------|--|
| <u>Cartridge Case Assembly (Dwg 8886327)</u>                  |                           |                          |  |
| Propellant charge weight                                      | 325                       | 3.2                      | 4.5.3  |
| Security of crimp of base plug and action time                | 20                        | 3.4.2                    | 4.5.4  |
| <u>Body Assembly (Dwg. 9287854)</u>                           |                           |                          |  |
| Salt spray  | 4                         | 3.2                      | 4.5.16   |
| Push test of rotating band                                    | 50                        | 3.2                      | 4.5.18   |
| <u>Body (Dwg. 9287855)</u>                                    |                           |                          |  |
| Ultrasonic inspection   | 20                        | 3.2                      | 4.5.17   |
| Dimensional inspection of embossed stock                      | 2                         | 3.2                      | 4.5.15   |
| <u>Projectile Assembly (Dwg. 12926812)</u>                    |                           |                          |  |
| Security of fuze  | <u>50</u>                 | 3.2                      | 4.5.6  |
| Disassembly torque test                                       | 50                        | 3.2                      | 4.5.7  |
| <u>Fuze (Dwg. 12944747)</u>                                   |                           |                          |  |
| X-ray   | 325                       | 3.2                      | 4.5.5  |
| <u>Cartridge (Dwg. 12926811)</u>                              |                           |                          |  |
| X-ray   | 325                       | 3.3                      | 4.5.8/4.4.2.16                                 |
| Pull test   | 50                        | 3.2                      | 4.5.9  |
| Air pressure test   | 50                        | 3.2                      | 4.5.10   |
| Functioning tests, MK19, MOD III, Machine Gun - (Single Shot) | 144 <u>1/</u>             | 3.4                      | 4.5.12   |
| Functioning tests, MK19, MOD III, Machine Gun – (Rapid Fire)  | 96 <u>1/</u> <u>2/</u>    | 3.4                      | 4.5.13   |
| Functioning tests, M129 Grenade Launcher – (Mild Steel)       | 75 <u>1/</u>              | 3.4                      | 4.5.12.1                                       |
| Functioning tests, M129 Grenade Launcher - RHA (info only)    | 10 <u>1/</u>              | 3.4                      | 4.5.12.1                                       |

Notes:

1/. See TABLE III for defect classification and acceptance/rejection criteria.

2/. From three (3) PA120.

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4.4 Conformance inspections.

4.4.1 Inspection lot formation. Lot formation shall be in accordance with MIL-STD-1916. For the components identified below, each inspection lot of cartridges shall be produced with components complying with the following constraints:

- a. Cartridge case assembly metal parts from no more than three (3) consecutive lots from one lot interfix number and one manufacturer.
- b. Primers from one lot number and one manufacturer.
- c. Fuzes from no more than two (2) consecutive lots from one lot interfix number and one manufacturer.
- d. Propellant from no more than one (1) lot number and one manufacturer.
- e. Only cartridges from one lot per ammunition belt shall be used. No short belts permitted.
- f. Links from one lot interfix number and one manufacturer.
- g. Metal parts from one lot interfix number and one manufacturer.
- h. Comp A5 from one interfix number and one manufacturer.
- i. Loaded spitback assemblies from one interfix number and one manufacturer.

4.4.2 Classification of characteristics.

a. Sampling requirements. Inspection sampling requirements for Critical, Major, and Minor characteristics are defined in MIL-STD-1916. Unless specified otherwise, Verification Level IV shall be used for all characteristics defined as Majors and Verification Level II for all Minor characteristics; Critical characteristics shall be addressed in accordance with MIL-STD-1916.

b. Conformance inspection. Conformance inspection shall be performed in accordance with paragraph 4.4.2.1 through 4.4.2.19. For all conformance inspections the same sample specimen may be used for all non-destructive examinations or tests.



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## CLASSIFICATION OF CHARACTERISTICS

|  |   |                         |                          |                                  |
|--|---|-------------------------|--------------------------|----------------------------------|
| PARAGRAPH<br><br>4.4.2.1   | TITLE<br><br>Cartridge Case Assembly,<br>Prior to Loading | SHEET 1 OF 1            |                          | DRAWING NUMBER<br>8886327        |
|  |   |                         |                          | NEXT HIGHER ASSEMBLY<br>12926811 |
| CLASSIFICATION   | EXAMINATION OR TEST                                       | CONFORMANCE<br>CRITERIA | REQUIREMENT<br>PARAGRAPH | INSPECTION METHOD<br>REFERENCE   |
| <u>CRITICAL</u>  |   |                         |                          |                                  |
| 1.   | Closing cup missing                                       | 100%                    | 3.2                      | AAIE/4.5.1                       |
| 2.   | Three (3) or more vent holes blocked<br>or missing        | 100%                    | 3.2                      | AAIE/4.5.1                       |
| <u>MAJOR</u>   |   |                         |                          |                                  |
| 101.   | One (1) or two (2) vent holes blocked<br>or missing       | 100%                    | 3.2                      | AAIE/4.5.1                       |
| 102.   | Two or more closing cups <u>1/</u>                        | 100%                    | 3.2                      | AAIE/<br>Radiography/4.5.1       |
| <u>MINOR</u>   |   |                         |                          |                                  |
| 201.   | Evidence of poor workmanship                              | Level II                | 3.6                      | Visual/4.5.20                    |
| Notes:<br><u>1/</u> . May be inspected at higher level assembly. |   |                         |                          |                                  |

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## CLASSIFICATION OF CHARACTERISTICS

| PARAGRAPH       | TITLE   | SHEET 1 OF 1            |                          | DRAWING NUMBER<br>8886327        |
|-----------------|---|-------------------------|--------------------------|----------------------------------|
| 4.4.2.2         | Cartridge Case Assembly Prior to<br>Assembling Base Plug and Primer                           |                         |                          | NEXT HIGHER ASSEMBLY<br>12926811 |
| CLASSIFICATION  | EXAMINATION OR TEST   | CONFORMANCE<br>CRITERIA | REQUIREMENT<br>PARAGRAPH | INSPECTION METHOD<br>REFERENCE   |
| <u>CRITICAL</u> |   |                         |                          |                                  |
| 1.              | Propellant charge weight less than 75%<br>or more than 125% of assessed weight                | 100%                    | 3.2                      | AAIE/4.5.1/<br>4.5.3             |
| <u>MAJOR</u>    |   |                         |                          |                                  |
| 101.            | Propellant charge weight out of<br>drawing tolerance but within +/- 25%<br>of assessed weight | 100%                    | 3.2                      | AAIE/4.5.1/<br>4.5.3             |
| <u>MINOR</u>    |   |                         |                          |                                  |
| 201.            | Evidence of poor workmanship  | Level II                | 3.6                      | Visual/4.5.20                    |
| Notes:          |   |                         |                          |                                  |

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| PARAGRAPH   | TITLE  | SHEET 1 OF 1            |                          | DRAWING NUMBER<br>8886327            |
|---|--|-------------------------|--------------------------|--------------------------------------|
| 4.4.2.3   | Cartridge Case Assembly                                  |                         |                          | NEXT HIGHER ASSEMBLY<br>12926811     |
| CLASSIFICATION  | EXAMINATION OR TEST                                      | CONFORMANCE<br>CRITERIA | REQUIREMENT<br>PARAGRAPH | INSPECTION METHOD<br>REFERENCE       |
| <u>CRITICAL</u>   |  |                         |                          |                                      |
| 1.  | Primer above flush with base plug                        | 100%                    | 3.2                      | AAIE/4.5.1                           |
| <u>MAJOR</u>  |  |                         |                          |                                      |
| 101.  | Security of crimp of base plug and action time           | 80 <u>2</u> /           | 3.5.2                    | 4.5.4/9202929                        |
| 102.  | Base plug above flush                                    | Level IV                | 3.2                      | Gage/9202528                         |
| 103.  | Depth of base plug, max                                  | Level IV                | 3.2                      | Gage/9202528                         |
| 104.  | Depth of primer from base plug, max.                     | Level IV                | 3.2                      | Gage/9202529                         |
| 105.  | Primer damaged   | Level IV                | 3.2                      | Visual with min.<br>3X magnification |
| 106.  | Excessive sealing compound on exterior surface of primer | Level IV                | 3.2                      | Visual                               |
| 107.  | Primer deterioration                                     | <u>1</u> /              | 3.2                      | 4.5.2                                |
| <u>MINOR</u>  |  |                         |                          |                                      |
| 201.  | Evidence of poor workmanship                             | Level II                | 3.6                      | Visual/4.5.20                        |
| Notes:  |  |                         |                          |                                      |
| <u>1</u> /. Sampling and rejection shall be in accordance with MIL-P-60942. |  |                         |                          |                                      |
| <u>2</u> /. Accept on zero (0) and reject on one (1).                       |  |                         |                          |                                      |

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## CLASSIFICATION OF CHARACTERISTICS

|                          |   |                      |                       |                                  |
|--------------------------|---|----------------------|-----------------------|----------------------------------|
| PARAGRAPH<br><br>4.4.2.4 | TITLE<br><br>Body Loading Assembly            | SHEET 1 OF 1         |                       | DRAWING NUMBER<br>12926814       |
|                          |   |                      |                       | NEXT HIGHER ASSEMBLY<br>12926812 |
| CLASSIFICATION           | EXAMINATION OR TEST                           | CONFORMANCE CRITERIA | REQUIREMENT PARAGRAPH | INSPECTION METHOD REFERENCE      |
| <u>CRITICAL</u>          | None defined                                  |                      |                       |                                  |
| <u>MAJOR</u>             |   |                      |                       |                                  |
| 101.                     | Depth to liner                                | Level IV             | 3.2                   | Gage                             |
| 102.                     | Diameter of rotating bands                    | Level IV             | 3.2                   | Gage                             |
| 103.                     | True position of liner                        | Level IV             | 3.2                   | Gage                             |
| 104.                     | Cap missing, loose or torn exposing explosive | Level IV             | 3.2                   | Visual/Manual                    |
| <u>MINOR</u>             |   |                      |                       |                                  |
| 201.                     | Thread damaged                                | Level II             | 3.2                   | Visual                           |
| 202.                     | Evidence of poor workmanship                  | Level II             | 3.6                   | Visual/4.5.20                    |
| Notes:                   |   |                      |                       |                                  |

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| PARAGRAPH   | TITLE  | SHEET 1 OF 1            |                          | DRAWING NUMBER<br>9287854        |
|---|--|-------------------------|--------------------------|----------------------------------|
| 4.4.2.5   | Body Assembly, prior to painting                             |                         |                          | NEXT HIGHER ASSEMBLY<br>12926814 |
| CLASSIFICATION  | EXAMINATION OR TEST  | CONFORMANCE<br>CRITERIA | REQUIREMENT<br>PARAGRAPH | INSPECTION METHOD<br>REFERENCE   |
| <u>CRITICAL</u>   | None defined   |                         |                          |                                  |
| <u>MAJOR</u>  |  |                         |                          |                                  |
| 101.  | Pitch diameter of thread                                     | Level IV                | 3.2                      | Gage                             |
| 102.  | Minor diameter of thread, max.                               | Level IV                | 3.2                      | Gage                             |
| 103.  | Concentricity of indicated point on taper with body diameter | Level IV                | 3.2                      | Gage                             |
| 104.  | Diameter of rotating bands                                   | Level IV                | 3.2                      | Gage                             |
| 105.  | Body diameter  | Level IV                | 3.2                      | Gage                             |
| 106.  | Diameter of sealing groove                                   | Level IV                | 3.2                      | Gage                             |
| 107.  | Concentricity of rotating band with pitch diameter of thread | Level IV                | 3.2                      | Gage                             |
| 108.  | Profile of rotating band                                     | Level IV                | 3.2                      | Gage                             |
| 109.  | Push test of rotating band                                   | 80 <u>1</u> /           | 3.2                      | 4.5.18                           |
| <u>MINOR</u>  |  |                         |                          |                                  |
| 201.  | Total length   | Level II                | 3.2                      | Gage                             |
| 202.  | Distance from open end to back of rotating band              | Level II                | 3.2                      | Gage                             |
| 203.  | Length of full thread  | Level II                | 3.2                      | Gage                             |
| 204.  | Evidence of poor workmanship                                 | Level II                | 3.6                      | Visual/4.5.20                    |
| Notes:<br><u>1</u> /. Accept on zero (0) and reject on one (1). |  |                         |                          |                                  |

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|  |  |                         |                          |                                  |
|--|--|-------------------------|--------------------------|----------------------------------|
| PARAGRAPH<br><br>4.4.2.6   | TITLE<br><br>Body Assembly, after painting | SHEET 1 OF 1            |                          | DRAWING NUMBER<br>9287854        |
|  |  |                         |                          | NEXT HIGHER ASSEMBLY<br>12926814 |
| CLASSIFICATION   | EXAMINATION OR TEST                        | CONFORMANCE<br>CRITERIA | REQUIREMENT<br>PARAGRAPH | INSPECTION METHOD<br>REFERENCE   |
| <u>CRITICAL</u>  | None defined                               |                         |                          |                                  |
| <u>MAJOR</u>   |  |                         |                          |                                  |
| 101.   | Salt spray                                 | <u>1</u> /              | 3.2                      | 4.5.16                           |
| 102.   | Body diameter (rear of rotating band only) | Level IV                | 3.2                      | Gage                             |
| <u>MINOR</u>   |  |                         |                          |                                  |
| 201.   | Evidence of poor workmanship               | Level II                | 3.6                      | Visual/4.5.20                    |
| Notes:<br><u>1</u> /. One (1) specimen from each day's production shall be selected. If the sample fails during this test the lot represented by the sample shall be rejected and set aside for disposition in accordance with MIL-STD-1916. |  |                         |                          |                                  |

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## CLASSIFICATION OF CHARACTERISTICS

|   |  |                         |                          |                                 |
|---|--|-------------------------|--------------------------|---------------------------------|
| PARAGRAPH   | TITLE  | SHEET 1 OF 1            |                          | DRAWING NUMBER<br>9287855       |
| 4.4.2.7   | Body   |                         |                          | NEXT HIGHER ASSEMBLY<br>9285854 |
| CLASSIFICATION  | EXAMINATION OR TEST  | CONFORMANCE<br>CRITERIA | REQUIREMENT<br>PARAGRAPH | INSPECTION METHOD<br>REFERENCE  |
| <u>CRITICAL</u>   | None defined   |                         |                          |                                 |
| <u>MAJOR</u>  |  |                         |                          |                                 |
| 101.  | Dimensional inspection of embossed stock                                     | <u>1</u> /              | 3.2                      | 4.5.15                          |
| 102.  | Diameter between knurl   | Level IV                | 3.2                      | Gage                            |
| 103.  | Runout of outside body diameter with pitch diameter of thread and front face | Level IV                | 3.2                      | Gage                            |
| 104.  | Presence of cracks, voids, pipes or inclusions, etc.                         | 100%                    | 3.2                      | 4.5.17                          |
| <u>MINOR</u>  |  |                         |                          |                                 |
| 201.  | Diameter of rotating band surface (after knurling)                           | Level II                | 3.2                      | Gage                            |
| 202.  | Width of rotating band surface   | Level II                | 3.2                      | Gage                            |
| 203.  | Radius from centerline to base of body                                       | Level II                | 3.2                      | Gage                            |
| 204.  | Evidence of poor workmanship   | Level II                | 3.6                      | Visual/4.5.20                   |
| Notes:<br><u>1</u> /. Two samples, width of coil by 20 inches from each coil prior to forming body. |  |                         |                          |                                 |

## MIL-DTL-0050863D (AR)

Conformance Inspection

## CLASSIFICATION OF CHARACTERISTICS

| PARAGRAPH       | TITLE  | SHEET 1 OF 1            |                          | DRAWING NUMBER<br>12926813       |
|-----------------|--|-------------------------|--------------------------|----------------------------------|
| 4.4.2.8         | Liner  |                         |                          | NEXT HIGHER ASSEMBLY<br>12926814 |
| CLASSIFICATION  | EXAMINATION OR TEST  | CONFORMANCE<br>CRITERIA | REQUIREMENT<br>PARAGRAPH | INSPECTION METHOD<br>REFERENCE   |
| <u>CRITICAL</u> | None defined   |                         |                          |                                  |
| <u>MAJOR</u>    |  |                         |                          |                                  |
| 101.            | Index angle  | Level IV                | 3.2                      | Gage                             |
| 102.            | Wall thickness at large datum diameter   | Level IV                | 3.2                      | Gage                             |
| 103.            | Wall thickness at small datum diameter   | Level IV                | 3.2                      | Gage                             |
| 104.            | Wall thickness of straight portion,<br>small end   | Level IV                | 3.2                      | Gage                             |
| 105.            | Location of large datum diameter   | Level IV                | 3.2                      | Gage                             |
| 106.            | Location of small datum diameter   | Level IV                | 3.2                      | Gage                             |
| 107.            | Concentricity of outside diameter small<br>end with large outside diameter<br>including perpendicularity | Level IV                | 3.2                      | Gage                             |
| <u>MINOR</u>    |  |                         |                          |                                  |
| 201.            | Total length   | Level II                | 3.2                      | Gage                             |
| 202.            | Large outside diameter, min.   | Level II                | 3.2                      | Gage                             |
| 203.            | Evidence of poor workmanship   | Level II                | 3.6                      | Visual/4.5.20                    |
| Notes:          |  |                         |                          |                                  |



## MIL-DTL-0050863D (AR)

Conformance Inspection

## CLASSIFICATION OF CHARACTERISTICS

| PARAGRAPH  | TITLE   | SHEET 1 OF 1            |                          | DRAWING NUMBER<br>12926812       |
|--|---|-------------------------|--------------------------|----------------------------------|
| 4.4.2.9  | Projectile Assembly   |                         |                          | NEXT HIGHER ASSEMBLY<br>12926811 |
| CLASSIFICATION   | EXAMINATION OR TEST   | CONFORMANCE<br>CRITERIA | REQUIREMENT<br>PARAGRAPH | INSPECTION METHOD<br>REFERENCE   |
| <u>CRITICAL</u>  | None defined  |                         |                          |                                  |
| <u>MAJOR</u>   |   |                         |                          |                                  |
| 101.   | True position of rotating bands with outside diameter of fuze | Level IV                | 3.2                      | Gage                             |
| 102.   | Gap, min, between fuze and body                               | Level IV                | 3.2                      | Gage                             |
| 103.   | Security of fuze, prior to sealant cure                       | Level III               | 3.2                      | 4.5.6                            |
| 104.   | Disassembly torque test                                       | 80 1/                   | 3.2                      | 4.5.7                            |
| <u>MINOR</u>   |   |                         |                          |                                  |
| 201.   | Evidence of poor workmanship                                  | Level II                | 3.6                      | Visual/4.5.20                    |
| Notes:<br>1/. Accept on zero (0) and reject on one (1) |   |                         |                          |                                  |

| PARAGRAPH       | TITLE   | SHEET 1 OF 1            |                          | DRAWING NUMBER<br>12926812       |
|-----------------|---|-------------------------|--------------------------|----------------------------------|
| 4.4.2.10        | Projectile Assembly, prior to assembly to Cartridge Case Assembly |                         |                          | NEXT HIGHER ASSEMBLY<br>12926811 |
| CLASSIFICATION  | EXAMINATION OR TEST   | CONFORMANCE<br>CRITERIA | REQUIREMENT<br>PARAGRAPH | INSPECTION METHOD<br>REFERENCE   |
| <u>CRITICAL</u> | None Defined  |                         |                          |                                  |
| <u>MAJOR</u>    |   |                         |                          |                                  |
| 101.            | O-ring missing from groove  | Level IV                | 3.2                      | Visual                           |
| <u>MINOR</u>    |   |                         |                          |                                  |
| 201.            | Evidence of poor workmanship                                      | Level II                | 3.6                      | Visual/4.5.20                    |
| Notes:          |   |                         |                          |                                  |

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Conformance Inspection

## CLASSIFICATION OF CHARACTERISTICS

| PARAGRAPH   | TITLE                             | SHEET 1 OF 1            |                          | DRAWING NUMBER<br>12944747       |
|---|-----------------------------------|-------------------------|--------------------------|----------------------------------|
| 4.4.2.11  | Fuze PIBD M549A1                  |                         |                          | NEXT HIGHER ASSEMBLY<br>12926812 |
| CLASSIFICATION  | EXAMINATION OR TEST               | CONFORMANCE<br>CRITERIA | REQUIREMENT<br>PARAGRAPH | INSPECTION METHOD<br>REFERENCE   |
| <u>CRITICAL</u>   |                                   |                         |                          |                                  |
| 1.  | X-ray examination <u>1</u> /      | 100%                    | 3.3                      | 4.5.5                            |
| <u>MAJOR</u>  |                                   |                         |                          |                                  |
| 101.  | X-ray examination <u>2</u> /      | 100%                    | 3.3                      | 4.5.5                            |
| 102.  | Pushout test of spitback assembly | 80 <u>3</u> /           | 3.2                      | 4.5.11                           |
| <u>MINOR</u>  |                                   |                         |                          |                                  |
| 201.  | Evidence of poor workmanship      | Level II                | 3.6                      | Visual/4.5.20                    |
| Notes:<br><u>1</u> /. Critical Defect is defined as:<br>a. Setback pin protrusion short<br>b. Setback spring missing<br>c. Setback pin missing or retracted<br>d. Rotor assembly in armed or partially armed position<br>e. Spin locks not engage in rotor<br>f. Setback pin not blocking rotor<br>g. Both spin locks/spring combination missing or out of position<br>h. Verge/Pinion Assembly missing<br><br><u>2</u> /. Major Defect is defined as:<br>a. Setback spring not level or leg bent.<br>b. Foreign material present.<br>c. One spin lock/spring combination missing or out of position<br><br><u>3</u> /. Accept on zero (0) and reject on one (1). |                                   |                         |                          |                                  |

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Conformance Inspection

## CLASSIFICATION OF CHARACTERISTICS

| PARAGRAPH       | TITLE                                    | SHEET 1 OF 1            |                          | DRAWING NUMBER<br>9287864       |
|-----------------|--|-------------------------|--------------------------|---------------------------------|
| 4.4.2.12        | Spitback Loading Assembly                |                         |                          | NEXT HIGHER ASSEMBLY<br>9287862 |
| CLASSIFICATION  | EXAMINATION OR TEST                      | CONFORMANCE<br>CRITERIA | REQUIREMENT<br>PARAGRAPH | INSPECTION METHOD<br>REFERENCE  |
| <u>CRITICAL</u> | None defined                             |                         |                          |                                 |
| <u>MAJOR</u>    |  |                         |                          |                                 |
| 101.            | Charge above flush, small end            | Level IV                | 3.2                      | Gage                            |
| 102.            | Charge above flush, liner end            | Level IV                | 3.2                      | Gage                            |
| <u>MINOR</u>    |  |                         |                          |                                 |
| 201.            | Caked explosive on liner seating surface | Level II                | 3.2                      | Visual                          |
| 202.            | Evidence of poor workmanship             | Level II                | 3.6                      | Visual/4.5.20                   |
| Notes:          |  |                         |                          |                                 |

| PARAGRAPH       | TITLE                        | SHEET 1 OF 1            |                          | DRAWING NUMBER<br>9287862        |
|-----------------|------------------------------|-------------------------|--------------------------|----------------------------------|
| 4.4.2.13        | Spitback Assembly            |                         |                          | NEXT HIGHER ASSEMBLY<br>12944747 |
| CLASSIFICATION  | EXAMINATION OR TEST          | CONFORMANCE<br>CRITERIA | REQUIREMENT<br>PARAGRAPH | INSPECTION METHOD<br>REFERENCE   |
| <u>CRITICAL</u> | None defined                 |                         |                          |                                  |
| <u>MAJOR</u>    |                              |                         |                          |                                  |
| 101.            | Total length                 | Level IV                | 3.2                      | Gage                             |
| 102.            | Liner missing                | Level IV                | 3.2                      | Visual                           |
| 103.            | Charge above or below flush  | Level IV                | 3.2                      | Gage                             |
| <u>MINOR</u>    |                              |                         |                          |                                  |
| 201.            | Crimp not full 360° degrees  | Level II                | 3.2                      | Visual                           |
| 202.            | Evidence of poor workmanship | Level II                | 3.6                      | Visual/4.5.20                    |
| Notes:          |                              |                         |                          |                                  |

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## CLASSIFICATION OF CHARACTERISTICS

| PARAGRAPH       | TITLE                                 | SHEET 1 OF 1         |                       | DRAWING NUMBER              |
|-----------------|---------------------------------------|----------------------|-----------------------|-----------------------------|
| 4.4.2.14        | Liner Spitback                        |                      |                       | 8886352                     |
|                 |                                       |                      |                       | NEXT HIGHER ASSEMBLY        |
|                 |                                       |                      |                       | 9287862                     |
| CLASSIFICATION  | EXAMINATION OR TEST                   | CONFORMANCE CRITERIA | REQUIREMENT PARAGRAPH | INSPECTION METHOD REFERENCE |
| <u>CRITICAL</u> | None defined                          |                      |                       |                             |
| <u>MAJOR</u>    |                                       |                      |                       |                             |
| 101.            | Outside diameter                      | Level IV             | 3.2                   | Gage                        |
| 102.            | Minimum wall thickness, after forming | Level IV             | 3.2                   | Gage                        |
| <u>MINOR</u>    |                                       |                      |                       |                             |
| 201.            | Spherical radius                      | Level II             | 3.2                   | Gage                        |
| 202.            | Height                                | Level II             | 3.2                   | Gage                        |
| 203.            | Evidence of poor workmanship          | Level II             | 3.6                   | Visual/4.5.20               |
| Notes:          |                                       |                      |                       |                             |

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## CLASSIFICATION OF CHARACTERISTICS

| PARAGRAPH       | TITLE   | SHEET 1 OF 1            |                          | DRAWING NUMBER<br>9287865       |
|-----------------|---|-------------------------|--------------------------|---------------------------------|
| 4.4.2.15        | Housing Spitback  |                         |                          | NEXT HIGHER ASSEMBLY<br>9287864 |
| CLASSIFICATION  | EXAMINATION OR TEST   | CONFORMANCE<br>CRITERIA | REQUIREMENT<br>PARAGRAPH | INSPECTION METHOD<br>REFERENCE  |
| <u>CRITICAL</u> | None defined  |                         |                          |                                 |
| <u>MAJOR</u>    |   |                         |                          |                                 |
| 101.            | Smallest outside diameter   | Level IV                | 3.2                      | Gage                            |
| 102.            | Second largest inside diameter  | Level IV                | 3.2                      | Gage                            |
| 103.            | True position of second largest inside diameter with smallest outside diameter including perpendicularity with flange | Level IV                | 3.2                      | Gage                            |
| 104.            | Diameter of counterbore   | Level IV                | 3.2                      | Gage                            |
| 105.            | Concentricity of counterbore with second largest inside diameter  | Level IV                | 3.2                      | Gage                            |
| 106.            | Distance from small end to flange   | Level IV                | 3.2                      | Gage                            |
| 107.            | Depth of counterbore  | Level IV                | 3.2                      | Gage                            |
| 108.            | Location small basic diameter   | Level IV                | 3.2                      | Gage                            |
| 109.            | Location large basic diameter   | Level IV                | 3.2                      | Gage                            |
| <u>MINOR</u>    |   |                         |                          |                                 |
| 201.            | Distance from large end to front face of flange   | Level II                | 3.2                      | Gage                            |
| 202.            | Thickness of flange   | Level II                | 3.2                      | Gage                            |
| 203.            | Diameter of flange  | Level II                | 3.2                      | Gage                            |
| 204.            | Body diameter   | Level II                | 3.2                      | Gage                            |
| 205.            | Large Chamfer on flange missing   | Level II                | 3.2                      | Visual                          |
| 206.            | Evidence of poor workmanship  | Level II                | 3.6                      | Visual/4.5.20                   |
| Notes:          |   |                         |                          |                                 |

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Conformance Inspection

## CLASSIFICATION OF CHARACTERISTICS

| PARAGRAPH       | TITLE   | SHEET 1 OF 2                                    |                       | DRAWING NUMBER<br>12926811           |
|-----------------|---|---|-----------------------|--------------------------------------|
| 4.4.2.16        | Cartridge, 40mm, M430A1                                       |   |                       | NEXT HIGHER ASSEMBLY                 |
| CLASSIFICATION  | EXAMINATION OR TEST   | CONFORMANCE CRITERIA                            | REQUIREMENT PARAGRAPH | INSPECTION METHOD REFERENCE          |
| <u>CRITICAL</u> |   |   |                       |                                      |
| 1.              | X-Ray examination of ballistic sample <u>1</u> /              | 100%  | 3.4                   | 4.5.8                                |
| <u>MAJOR</u>    |   |   |                       |                                      |
| 101.            | X-ray examination of ballistic sample <u>2</u> / <u>3</u> /   | 100%  | 3.4                   | 4.5.8                                |
| 102.            | Pull test of projectile                                       | Level III                                       | 3.2                   | 4.5.19                               |
| 103.            | Air pressure test   | Level III                                       | 3.2                   | 4.5.10                               |
| 104.            | Chamber gage failure  | 100%  | 3.2                   | Gage/9202253,<br>9202254,<br>9202255 |
| 105.            | Total length, maximum   | 100%  | 3.2                   | Gage                                 |
| 106.            | O-ring exposed  | Level IV  | 3.2                   | Visual                               |
| 107.            | Gap, maximum, at rear of rotating band                        | Level IV  | 3.2                   | Gage                                 |
| 108.            | Functioning tests, MK19, MOD III, Machine Gun - (Single Shot) | 144 Samples <u>4</u> /                          | 3.4                   | 4.5.12                               |
| 109.            | Functioning tests, MK19, MOD III, Machine Gun – (Rapid Fire)  | 96 Sample <u>5</u> / <u>4</u> /                 | 3.4                   | 4.5.13                               |
| 110.            | Functioning tests, M129 Grenade Launcher – (Mild Steel)       | 75 Samples <u>4</u> /                           | 3.4                   | 4.5.12.1                             |
| 111.            | Functioning tests, M129 Grenade Launcher - RHA (info only)    | 10 samples every 5 <sup>th</sup> lot <u>4</u> / | 3.4                   | 4.5.12.1                             |
| <u>MINOR</u>    |   |   |                       |                                      |
| 201.            | Marking missing   | Level II  | 3.2                   | Visual                               |
| 202.            | Evidence of poor workmanship                                  | Level II  | 3.6                   | Visual/4.5.20                        |

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Conformance Inspection

## CLASSIFICATION OF CHARACTERISTICS

|  |  |                      |                       |                             |
|--|--|----------------------|-----------------------|-----------------------------|
| PARAGRAPH<br><br>4.4.2.16  | TITLE<br><br>Cartridge, 40mm, M430A1 (con't) | SHEET 2 OF 2         |                       | DRAWING NUMBER<br>12926811  |
|  |  |                      |                       | NEXT HIGHER ASSEMBLY        |
| CLASSIFICATION   | EXAMINATION OR TEST                          | CONFORMANCE CRITERIA | REQUIREMENT PARAGRAPH | INSPECTION METHOD REFERENCE |
| Notes:<br><u>1/</u> . A critical is defined as any defect listed in Note <u>1/</u> of 4.4.2.11 plus a low or high propellant charge (4.4.2.2, Critical 2) or a missing closing cup<br><u>2/</u> . A major defect is defined as any defect not specified in Note <u>1/</u> .<br><u>3/</u> . Any major defect found shall be reported with the exception of two (2) closing cups which shall result in the rejection of the lot and ballistic sample.<br><u>4/</u> . See TABLE III for defect classification and acceptance/rejection criteria.<br><u>5/</u> . From three (3) PA120. |  |                      |                       |                             |

|                           |  |                      |                       |                             |
|---------------------------|--|----------------------|-----------------------|-----------------------------|
| PARAGRAPH<br><br>4.4.2.17 | TITLE<br><br>Linked Ammunition, prior to Packing   | SHEET 1 OF 1         |                       | DRAWING NUMBER<br>8886405   |
|                           |  |                      |                       | NEXT HIGHER ASSEMBLY        |
| CLASSIFICATION            | EXAMINATION OR TEST  | CONFORMANCE CRITERIA | REQUIREMENT PARAGRAPH | INSPECTION METHOD REFERENCE |
| <u>CRITICAL</u>           | None defined   |                      |                       |                             |
| <u>MAJOR</u><br>101.      | Linked improperly (anyone of the four (4) tabs of link not in groove; link inverted; link damaged; link distorted) | 100%                 | 3.2                   | Visual                      |
| <u>MINOR</u><br>201.      | Evidence of poor workmanship   | Level II             | 3.6                   | Visual/4.5.20               |
| Notes:                    |  |                      |                       |                             |

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## CLASSIFICATION OF CHARACTERISTICS

| PARAGRAPH       | TITLE  | SHEET 1 OF 1            |                          | DRAWING NUMBER<br>12928042     |
|-----------------|--|-------------------------|--------------------------|--------------------------------|
| 4.4.2.18        | Shipping and Storage Container<br>(unsealed)     |                         |                          | NEXT HIGHER ASSEMBLY           |
| CLASSIFICATION  | EXAMINATION OR TEST                              | CONFORMANCE<br>CRITERIA | REQUIREMENT<br>PARAGRAPH | INSPECTION METHOD<br>REFERENCE |
| <u>CRITICAL</u> | None defined                                     |                         |                          |                                |
| <u>MAJOR</u>    |  |                         |                          |                                |
| 101.            | Cartridge inverted                               | Level IV                | 3.2                      | Visual                         |
| 102.            | Incorrect number of cartridges                   | Level IV                | 3.2                      | Visual                         |
| 103.            | Fillers missing                                  | Level IV                | 3.2                      | Visual                         |
| 104.            | Support, top or bottom missing (when applicable) | Level IV                | 3.2                      | Visual                         |
| 105.            | Spacer, missing                                  | Level IV                | 3.2                      | Visual                         |
| 106.            | Top pad missing (when applicable)                | Level IV                | 3.2                      | Visual                         |
| <u>MINOR</u>    |  |                         |                          |                                |
| 201.            | Evidence of poor workmanship                     | Level II                | 3.6                      | Visual/4.5.20                  |
| Notes:          |  |                         |                          |                                |



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## CLASSIFICATION OF CHARACTERISTICS

| PARAGRAPH       | TITLE                                     | SHEET 1 OF 1            |                          | DRAWING NUMBER<br>12928042     |
|-----------------|---|-------------------------|--------------------------|--------------------------------|
| 4.4.2.19        | Shipping or storage Container (sealed)    |                         |                          | NEXT HIGHER ASSEMBLY           |
| CLASSIFICATION  | EXAMINATION OR TEST                       | CONFORMANCE<br>CRITERIA | REQUIREMENT<br>PARAGRAPH | INSPECTION METHOD<br>REFERENCE |
| <u>CRITICAL</u> | None defined                              |                         |                          |                                |
| <u>MAJOR</u>    |   |                         |                          |                                |
| 101.            | Box or container damaged                  | Level IV                | 3.2                      | Visual                         |
| <u>MINOR</u>    |   |                         |                          |                                |
| 201.            | Contents loose                            | Level II                | 3.2                      | Manual                         |
| 202.            | Can seal missing or improperly positioned | Level II                | 3.2                      | Visual                         |
| 203.            | Marking incorrect or illegible            | Level II                | 3.2                      | Visual                         |
| 204.            | Evidence of poor workmanship              | Level II                | 3.6                      | Visual/4.5.20                  |
| Notes:          |   |                         |                          |                                |

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TABLE III. Functioning Defect Classification  
Acceptance/Rejection Criteria

|   | Acceptance Number              |                 | Rejection Number               |                 | Defect Classification |
|---|--------------------------------|-----------------|--------------------------------|-----------------|-----------------------|
|   | MK19 Single Shot<br><u>2</u> / | MK19 Rapid Fire | MK19 Single Shot<br><u>2</u> / | MK19 Rapid Fire |                       |
| I. PAD PHASE (MK19 – SINGLE SHOT)                             |                                |                 |                                |                 |                       |
| a. Failure to meet Average Velocity (see 3.4.1)               | <u>1</u> /                     | --              |                                | --              | Major                 |
| b. Standard deviation of velocity over max. (see 3.4.1)       | <u>1</u> /                     | --              |                                | --              | Major                 |
| II. PAD PHASE (MK19 – RAPID FIRE)                             |                                |                 |                                |                 |                       |
| a. Weapon stoppage excluding primer misfire (see 3.4)         | --                             | 0               | --                             | 1               | Major                 |
| III. PLATE PHASE (M129)                                       |                                |                 |                                |                 |                       |
| a. Incomplete penetration (see 3.4.5)                         | 4                              | --              | 5                              | --              | Major                 |
| b. Low order occurrence (see 3.4 and 6.12.1)                  | 1                              | --              | 2                              | --              | Major                 |
| IV. COMBINED PHASES (PAD PHASE (SINGLE SHOT) AND PLATE PHASE) |                                |                 |                                |                 |                       |
| a. Impact functioning failure (see 3.4.3)                     | 7                              | --              | 8                              | --              |                       |
| Low order occurrence (see 3.4, 6.12.1)                        | 0                              | --              | 1                              | --              |                       |

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TABLE III. Functioning Defect Classification  
Acceptance/Rejection Criteria - Continued

|   | Acceptance Number              |                 | Rejection Number               |                 | Defect Classification |
|---|--------------------------------|-----------------|--------------------------------|-----------------|-----------------------|
|   | MK19 Single Shot<br><u>2</u> / | MK19 Rapid Fire | MK19 Single Shot<br><u>2</u> / | MK19 Rapid Fire |                       |
| OR  |                                |                 |                                |                 |                       |
| b. Impact functioning failure (see 3.4.3)   | 6                              | --              | 7                              | --              |                       |
| Low order occurrence (see 3.4 and 6.12.1)   | 1                              | --              | 2                              | --              |                       |
| OR  |                                |                 |                                |                 |                       |
| c. Impact functioning failure (see 3.4.3)   | 5                              | --              | 6                              | --              |                       |
| Low order occurrence (see 3.4 and 6.12.1)   | 2                              | --              | 3                              | --              |                       |
| V. ALL PHASES (PAD PHASE (SINGLE SHOT), PAD PHASE (RAPID FIRE) PLATE PHASE  |                                |                 |                                |                 |                       |
| a. Projectile lodges in weapon bore (see 3.4)   | 0                              | 0               | 1                              | 1               | Critical              |
| b. Premature burst (see 3.4, 6.12.3)  | 0                              | 0               | 1                              | 1               | Critical              |
| c. Primer leak as evidence by perforation of primer cup or smoke deposit on base plug or cartridge case (see 3.4.7) | 0                              | 0               | 1                              | 1               | Major                 |

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TABLE III. Functioning Defect Classification  
Acceptance/Rejection Criteria - Continued

|  | Acceptance Number             |                 | Rejection Number              |                 | Defect Classification |
|--|-------------------------------|-----------------|-------------------------------|-----------------|-----------------------|
|  | MK19 Single Shot<br><u>2/</u> | MK19 Rapid Fire | MK19 Single Shot<br><u>2/</u> | MK19 Rapid Fire |                       |
| d. Primer misfire (see 3.4.7, 6.12.5)  | 0                             | 0               | 1                             | 1               | Major                 |
| e. Early burst (see 3.4, 3.4.3, 6.12.2)  | 0                             | 0               | 1                             | 1               | Major                 |
| Notes:<br><u>1/</u> . Lot acceptable if requirements of paragraph 3.4.1 are met.<br><u>2/</u> . M129 Grenade Launcher is used to measure Action Time & Security of crimp of base plug. |                               |                 |                               |                 |                       |

4.5 Methods of inspection.

4.5.1 Inspection Equipment. The inspection equipment required to perform the examination and tests prescribed herein is described in the Inspection Method Column in the tables starting with paragraph 4.4.2.1. Inspection equipment used for acceptance of product shall be capable of repeatable measurements, by various experienced inspection/test personnel, to an accuracy of 10% or better of the total tolerance of the characteristic being inspected. Any automated acceptance inspection equipment (AAIE) prove-out shall be performed in accordance with MIL-A-70625 (see 6.13).

4.5.2 Check test for deterioration of primers. If the total time between original acceptance of any lot and the assembly of that lot into the cartridge exceeds two years, or if the primers have been subjected to adverse conditions, however brief, at any time since previous tests, the primer lot shall be subjected to and must satisfactorily pass the check test for deterioration specified in MIL-P-60942 immediately before the primer lot is assembled into the cartridge. The test shall be performed at the facility assembling the primers into the cartridge.

4.5.3 Propellant weight. The propellant quantity shall be determined and weighed 100% percent. Any charge that fails to comply with the drawing requirement (taking into account machine accuracy) shall be classified defective and removed from the lot. The accuracy of the machine shall be determined and the prove-out test performed to validate the machine's ability to remove charges outside of the drawing tolerance range. The machine must be capable of detecting and rejecting critical propellant weights, such that the end-product contains less than 1 in a million critical defects (machine error rate not to exceed 1/500 and maximum defect rate not to exceed 0.05%).

4.5.4 Security of crimp of base plug and action time. The cartridge assemblies shall be assembled to a projectile and fired from a M129 Grenade Launcher. After firing observation shall be made for base plug movement and action time. If any base plug movement or action time exceeds the applicable requirement, or any projectile lodges in the bore the quantity represented

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shall be rejected and set aside for disposition in accordance with MIL-STD-1916. The cartridge case assemblies produced by each primer assembly machine shall be kept segregated and identified. They shall not be used in production until successful completion of this test. The movement of the base plug shall be measured from the highest point on the base plug to a point on the cartridge case directly beside it, radially.

4.5.5 X-ray examination of fuze assemblies, less spitback assembly and prior to assembling to body assembly. Improperly assembled, missing, improperly formed parts, armed or partially armed fuze assemblies shall be determined by x-ray equipment or any other method satisfactory to the contracting officer. This test shall be conducted in two (2) planes. From the top of the fuze assembly down and from the side. Side view shall show the flange of the setback pin seated against the bottom surface of the rotor plate. Each view shall be read by two (2) independent inspectors. The test shall be conducted in accordance with ASTM 1255.

4.5.6 Security of fuze on projectile assembly. The projectile assembly shall be placed in an approved fixture and the torque specified on the applicable drawing shall be applied. Observation shall be made for the applicable requirement. This test is a non-destructive test. If undamaged, parts so tested may be returned to the lot.

WARNING: This test is conducted on assemblies containing an explosive element. Test barricades (where used), procedures and equipment shall have prior approval.

4.5.7 Disassembly torque test. Projectile assemblies shall be selected and held until sealant is cured, after which each of the projectile assemblies shall be placed in an approved fixture and the torque specified on the applicable drawing shall be applied. If any projectile assembly fails to comply with the drawing requirement, the lot represented by the sample shall be rejected and set aside for disposition in accordance with MIL-STD-1916.

WARNING: This test is conducted on assemblies containing an explosive element. Test barricades (where used), procedures and equipment shall have prior approval.

4.5.8 X-ray examination of ballistic sample. Prior to the forwarding of the cartridges to the Government approved testing facility for ballistic testing, the cartridges shall be inspected for defects using approved x-ray equipment. This test shall be conducted in two planes. From the top of the projectile down and from the side. If any critical defect is found, the lot shall be rejected including the ballistic sample and set aside for disposition in accordance with MIL-STD-1916. The test shall be conducted in accordance with ASTM 1255.

4.5.9 Pull test of projectile. The cartridge shall be placed in an approved fixture and the axial tension specified on the applicable drawing shall be applied. Cartridge case assemblies may be reused after undergoing a Government approved rework provided the same crimping method is used. Projectile assemblies if undamaged may be reused. The cartridge shall be pulled until separation occurs and the data recorded.

WARNING: This test is conducted on assemblies containing an explosive element. Test barricades (where used), procedures and equipment shall have prior Government approval.

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4.5.10 Air pressure. The cartridge assembly shall be placed in an approved fixture and a measured quantity of air shall be applied to produce the required air pressure. Observations shall be made for a drop in pressure indicating a leak. This is a non-destructive test. Parts successfully tested may be returned to the lot.

4.5.11 Push-out test of spitback assembly. The spitback assembly shall be crimped to a production fuze, placed in an approved fixture and the bottom plate and the spitback assembly removed, placed in an approved fixture and subjected to this test. Observation shall be made for the requirement of the applicable drawing.

WARNING: This test is conducted on assemblies containing an explosive element. Test barricades (where used), procedures and equipment shall have prior approval.

4.5.12 Functioning - Single Shot. The tests shall be conducted at a government approved installation. If new, the MK19, MOD III, Grenade Machine Gun and barrel shall have at least forty (40) rounds fired on it prior to being used for the test. The barrel selected for the test must be used throughout the entire test. The distance to the impact medium of course sand shall be 200 meters plus or minus 5 meters. The depth of the sand shall be a minimum of ten (10) inches. The rounds shall be conditioned at  $70 \pm 5^{\circ}\text{F}$  for at least eight (8) hours and then fired within 15 minutes of being removed from conditioning temperature. The cartridges shall be fired single shot from a MK19, Mod III, Grenade Machine Gun at a rate not to exceed ten (10) per minute. At least six (6) gun warmers shall be fired at the beginning of the test. All six (6) warmers shall be fired within one (1) minute. Rake sand prior to the beginning of the test (each ammunition lot). Rake sand as required such that individual impact craters do not overlap. Sand will be raked after each function failure "dud". If a round falls outside the specified impact area, it shall be declared a "no-test" for impact functioning requirements but velocity measurements must still be used. The velocity shall be measured at 30 feet from the muzzle of the launcher. If an approved radar system is not used, then the monitoring devices and time recorders shall be a dual system setup for recording two (2) separate readings that shall be within three (3) feet per second of each other. If the two readings differ by more than 3 feet per second (for a given shot), the results shall be declared a "no-test" and another round fired in its place. The number of "no-test" rounds shall be reported. "No-test" rounds shall be reported as "no-test" rounds outside the impact area or "no-test" for velocity readings. Measure the approximate range to impact of "no-test" rounds. Results shall be calculated and measured for mean velocity and standard deviation (see 6.11). Observation shall be made for compliance with Table III.

4.5.12.1 Target Plate. The samples shall be fired against and fully penetrate a vertical 3 inch mild steel plate. Distance to impact 200 feet. Traverse weapons between shots so that impacts are not overlapping. Additional samples shall be fired against a vertical 3 inch RHA plate. Depth of penetration shall be measured for information only and included in the ballistic test report for that lot.

4.5.13 Rapid fire functioning. This test shall be conducted at a Government approved installation. Rounds shall be fired from the MK19 MOD III Grenade Launcher mounted on a

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MK64 Mount and M3 Tripod in bursts of five (5) to ten (10) rounds. Target shall be a sand pad at  $200 \pm 5$  meters from the weapon. Observation shall be made for the defects specified in Table III.

4.5.14 Dimensional Control of Stamped Parts. In place of the normal sampling associated with the Classification of Defects and with the approval of the Contracting Officer, a sample of at least ten (10) parts shall be dimensionally inspected to qualify the tool used in the stamping process for use in production. In addition a random sample of five (5) parts shall be selected from the last portion of each hour's production for dimensional inspection as a control of the tool during production.

If any defective parts are found during qualification of the tool, the tool producing the defective part shall not be used in production.

If any defective parts are found when inspection is performed for control of the tool, the tool producing the defective part shall be removed from production. Further, that portion of production since the last tool control check shall be returned to the contractor for corrective action.

All tools removed from production because of some fault may, after reworking, be returned to production providing they pass the qualification test above. The contractor may request a change of inspection frequency providing he presents objective evidence to the Contracting Officer to substantiate the request.

4.5.15 Dimensional Inspection of Embossed Stock. At the start of production and for every four (4) hours production thereafter prior to forming a body, samples shall be selected from a coil of embossed stock representative of that four hours production. One sample strip shall be taken from the beginning and the end of the coil. The sample strips shall be identified as to there being from the beginning or end of the coil and also the direction of milling. If the average value for fifteen (15) measurements for center distances of embossment, embossed material thickness and depth of notch of the sample fails to comply with the requirements specified on the applicable drawing, corrective action shall be taken prior to further embossing.

An additional sample will be selected at the introduction of each new embossing roll to the production line. If the average value for fifteen (15) measurements for center distances of embossment, embossed material thickness and depth of notch of the sample fails to comply with the requirement specified on the applicable drawing, the embossing roll will not be used for production and corrective action taken.

The fifteen (15) measurements shall be conducted on the sample strip for each characteristic. These shall be three (3) points of measurements made across the width of the sample strip at five points along, the length of approximately every four inches. One measurement for each characteristic shall be maintained at each measuring point across the width of the material. An average value of each sample shall be completed for each characteristic from data obtained.

4.5.16 Salt Spray. This test shall be conducted in accordance with ASTM B117. This test shall be conducted for 48 hours along 1.25 inches of its outside length measured from the open end. The surface area rear of this point may be tested for 24 hours minimum. Salt spray test not required for inside surface of body assembly. The rotating band may be masked off for this test. Salt solution shall be 5 percent. This test is a destructive test. Parts so tested shall not be returned to the lot.

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4.5.17 Ultrasonic Inspection. Bodies shall be inspected for the presence of cracks, voids, pipes or inclusions, etc. along the cylindrical section of the body throughout the entire wall thickness including base section to a depth of .060 inches, gaged externally. This test shall be performed and calibrated as specified on Dwg. 8869822. If calibration shows equipment not to be performing correctly, the quantity represented prior to calibration shall be reprocessed.

4.5.18 Push out test of rotating band (after heat treatment). The rotating band shall be placed in an approved fixture and the minimum push out force specified on the applicable drawing shall be applied. If any rotating band fail to comply with the requirements specified on the applicable drawing, the lot represented by the sample shall be rejected. This test is a destructive test. Parts so tested shall not be returned to the lot.

4.5.19 Lot identification. Visually verify that each lot of escapements is identified as the type, caliber, model and lot number in accordance with MIL-STD-1168.

4.5.20 Workmanship. Visually verify that all parts and assemblies meet requirements of paragraph 3.6.

## 5. PACKAGING

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

## 6. NOTES

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

6.1 Intended use. This specification covers the metal parts and loading, assembling and packing for Cartridge, 40MM: HEDP, M430A1.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number and date of this specification.
- b. Title, number (w/revision level) and date of all reference documents.
- c. Packaging requirements.
- d. Requirements for First Article (see 4.3).
- e. Government Furnished Material or equipment (if applicable).
- f. Requirements for acceptance inspection equipment (AIE) designs (see 6.5).
- g. Requirements for Ammunition Lot Numbering (6.6).



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- h. Applicable national stock number.
- i. Serialization requirements, if applicable.
- j. Certificate of conformance for each lot or shipment of product.
- k. Applicability of Live Fire T&E requirements under Public Law 1033-355, Section 2366 of Title 10, USC.
- l. Information needed to satisfy the requirements for qualification of energetic materials by the Army Service Qualification Authority, (see 6.6). This information can be obtained in the desktop guide titled “Explosive Hazard Classification Requirements for Performance Specifications”, Revision 2, dtd 20 May 1998 that is available from AMSRD-AAR-QES-C.
- m. Provisions for critical characteristic controls (see 6.4).
- n. Critical inspection equipment (see 6.13).

6.3 Drawings. Drawings listed in Section 2 of this specification under the heading US Army Armament Research, Development and Engineering Center (ARDEC) may also include drawings prepared by, and identified as Edgewood Arsenal, Frankford Arsenal, Rock Island Arsenal, ARRADCOM drawings. Technical data originally prepared by these activities are now under the cognizance of ARDEC.

6.4 Critical characteristic controls. All production contracts should contain requirements for handling critical defects. As part of all proposals, suppliers should be asked to describe policies, procedures and controls for all operations associated with safety characteristics, how they are documented and maintained under the supplier’s integrated management system.

6.5 Contractor acceptance inspection equipment (AIE). Provisions concerning the contractor’s AIE used to verify the requirements of this specification should be specified in the contract.

6.6 Ammunition lot numbers. Ammunition requires ammunition data cards in accordance with MIL-STD-1168.

6.7 Energetic material qualification information. Qualification of energetic materials by the Army Service Qualification Authority requires the contractor to demonstrate that the energetic material meets the requirements of MIL-STD-1751 or STANAG 4170. This task is addressed in the statement of work in the contract. Point of contact for the Army Service Qualification Authority can be obtained from AMSRD-AAR-QES-C.

6.8 Submission of alternative conformance provisions. All contractor proposed alternative conformance provisions will be submitted to the Government for evaluation/approval as directed by the contracting activity.

6.9 Submission of results of contractor conducted examinations and tests. Unless otherwise specified, the contractor should forward requested records of examination or tests to the Contracting officer.

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6.10 Submission of test data. In addition to the normal distribution of records, when the cartridges are procured by JMC, one (1) copy of all ballistic data and ammunition data cards should be forwarded to the Contracting officer.

6.11 Standard deviation should be calculated from the following formula:

$$S = \sqrt{\frac{\sum (X - \bar{X})^2}{n-1}}$$

where:  $X$  = each individual value

$$\bar{X} = \frac{\sum X}{n} = \text{sample arithmetic mean}$$

$n$  = sample size

$\sum (X - \bar{X})^2$  = the sum of the squares of the differences between the sample mean and each individual value.

6.11.1 For a faster and easier method of arriving at the standard deviation formula, the following alternate method may be used:

$$S = \sqrt{\frac{n \sum X^2 - (\sum X)^2}{n(n-1)}}$$

6.12 Definitions.

6.12.1 Low Order. A low order functioning is considered to have occurred when the functioning report is significantly less audible than the report characteristically associated with full high energy functioning.

6.12.2 Early burst. A projectile that functions in flight further than the arming distance from the weapon muzzle.

6.12.3 Premature burst. A premature burst is considered to have occurred if the projectile functions in the weapon bore or in flight up to the arming distance from the weapon muzzle.

6.12.4 Automated acceptance inspection equipment. Equipment for which no, or minimal, human involvement is required in the acceptance determination. This would include equipment employing probes/sensors/transducers that are automatically manipulated to perform measuring and detection functions. If readout is provided, the equipment will be categorized as automated even if operator interpretation is needed in the accept/reject decision.

6.12.5 Misfire. Failure of a round of ammunition to fire after the initiating impulse has been applied to the primer or the failure of the initiated primer to ignite the propellant.

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6.13 Critical Inspection Equipment.

6.13.1 System Reliability. The contractor should provide for each defect identified as Critical, a manufacturing and inspection system that assured no more than one in a million contain the defect. This should be assured by controlling the maximum defect rate produced and the error rate of the inspection equipment such that the product of the two terms is less than one in a million.

6.13.2 Maximum defect rate produced. The maximum defect rate produced should be defined as the largest defect rate expected for the characteristics of concern on a monthly or lot basis. The contractor should establish the maximum defect rate, however, it may not exceed one percent without approval of the procuring contracting officer. Once established, the contractor should monitor the defect rate to assure it does not exceed the maximum rate allotted. If the established maximum defect rate is exceeded, the production of that feature should be terminated until the cause is determined and corrected. Additionally, all products for that period of time should be rejected and reinspected.

6.13.3 Maximum error rate of the inspection system. The error rate of the inspection equipment should be defined as the expected ratio of the number of defective parts accepted to the number of defective parts inspected by the equipment. The contractor, to meet the system reliability as defined in contract, defines the maximum error rate allowed. However, it may not exceed 1/500 without approval of the procuring contracting officer. Based on the maximum error rate defined for the equipment, the contractor should develop demonstration test procedure to demonstrate the error rate of the equipment. The test should be performed using defective parts or reject standards. No part or standard should be accepted during the test. If a part or standard is accepted, the cause for failure should be isolated and the corrected and the test rerun. Unless otherwise specified in the detailed item specification, the minimum number of test samples to be run should be equal to 0.7 divided by the error rate (e.g. If the required error rate is 1/1000, the sample size would be 0.7 divided by (1/1000) = 700.)

6.13.4 Periodic verification. Periodic verification of the system error rate should be performed.

6.13.5 Redundant inspection equipment. The contractor may elect to use redundant inspection equipment in lieu of using a single piece of equipment with a very low error rate. Where redundant equipment is used, the inspection system error rate is defined as the error rates of the multiple pieces of equipment multiplied together.

6.14 Subject term (Key word) listing.

MK19, MODIII, Grenade Machine Gun  
M129 Grenade Launcher  
M549A1 Fuze

6.15 Revisions/amendments history. The following is a record of changes incorporated into this document.

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| ECP      | Description   | Date Approved |
|----------|---|---------------|
| R2S3016  | This ECP corrects 40 MM high velocity cartridge Specifications to require ballistic testing is conducted with ammunition conditioned at $70 \pm 5^{\circ}$ F and that the testing must be done with the same weapon barrel throughout testing | 07/01/2002    |
| R0S3017  | Add additional clarity to the verification of the propellant weight requirement   | 07/06/2000    |
| R9S3056  | Delete requirement for dual velocity measuring system when using Doppler radar. Delete requirement to rake sand so that individual impacts craters don't overlap and to rake after each dud   | 11/03/2000    |
| R9S2009  | Revise test requirements  | 04/29/1999    |
| R9S2005  | <ul style="list-style-type: none"> <li>• Revise Fuze PIBD M549 conformance sampling criteria</li> <li>• Revise verification method for Push out test of Spitback assembly</li> </ul>  | 03/19/1999    |
| M6Q2012  | Improve inspection requirements for the item. Draft of DTL 12926811   | 04/25/1996    |
| R3Q2063  | Correct several erroneous references in several paragraphs within the specification   | 07/03/2003    |
| R3Q2058  | This ECP eliminates the requirement to fire warmers on rapid fire. Instead, it allows to fire six (6) warmers all within one (1) minute.  | 06/13/2003    |
| R8S3022  | The ECP makes several paragraph number callouts corrections to the inspection method reference column   | 06/10/1998    |
| M6Q2020  | List of defects added for M549A1 fuze   | 05/28/1996    |
| R04Q2024 | Initial Release of M430A1 MIL-DTL Specification   | Aug 2004      |

6.16 Interim Revision This interim revision has been prepared at Program Manager request to document in ASSIST Online the version of a draft specification that was placed on contract in 2004. This interim revision has been dated to match the date of the draft specification that was placed on contract. It has been modified slightly to comply with MIL-STD-961 requirements for format, but not content. A fully coordinated revision, compliant with both MIL-STD-961 format and content requirements, will be approved for publication.

6.17 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Preparing activity:  
Army-Army  
(Project 1310-2006-008)

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NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <http://assist.daps.dla.mil>.