SECTION I  INTRODUCTION

1. Purpose. This bulletin provides supplemental maintenance level information on Rocket, 2.75-Inch, Flare: XM278 (IR) Illuminating Warhead with M442 Fuze, with MK66, Mod 2 Motor.

2. General. This bulletin contains data that will be incorporated into the following ammunition technical manuals.

   a. TM 43-0001-30 Army Ammunition Data Sheets for Rockets, Rocket Systems, Rocket Fuzes, and Rocket Motors.

   b. TM 9-1340-222-20 Unit Maintenance Manual (Including Repair Parts and Special Tools List) for 2.75-Inch Low Spin, Folding Fin Aircraft Rockets; 2.75-Inch Spin Stabilized, Wrap Around Fin Aircraft Rockets; 66MM Light Antitank Weapon Systems; 3.5-Inch Rockets and M3A2E1 Rocket Motor (JATO).


   d. SB 742-1 Ammunition Surveillance Procedures.
3. **General.** The information in the following paragraphs will be incorporated as changes to the affected manuals.

4. **Description and Tabulated Data.**

**Description:**

- a. This low-spin folding-fin aircraft rocket (LSFFAR) is an air-to-ground rocket primarily deployed from rotary-wing and other low-speed aircraft.

- b. The XM278(IR) illuminating warhead (fig. 1) consists of an ignition system, flare, main parachute, drogue parachute assembly, and an integral fuze and delay assembly. The warhead is enclosed in an aluminum case.

- c. The setback-actuated fixed time integral fuze provides a standoff distance of approximately 3,500 meters. The fuze and candle igniter arming are actuated by rocket motor acceleration.

- d. The rocket motor is described in TM 430001-30, Chapter 5.

**Differences Between Models:** N/A

**Functioning:**

- a. The rocket with warhead, flare, XM278(IR) is fired from helicopter with standard 2.75-in. motor Mk 66 to attain elevation between 2000 and 4000 ft at 3000 m downrange. Upon rocket launch, the M442 fuze arms upon acceleration (17 G's approximately required). After 1.0 seconds (at motor burnout) the fuze functions, initiating delay train. After nine seconds, delay ignites first expulsion charge in fuze assembly. Gas pressure forces pusher plate forward, shears pin, separates motor and adapter section from remainder of warhead. Rocket velocity is now 800 fps approximately.

- b. The deflector plate, attached by cable to motor adapter, is extended into airstream, deflects path of motor and adapter. Pusher plate, attached to drogue chute, deploys drogue. Rocket warhead velocity then decreases to 200 fps, approximately, during next two seconds.

- c. Upon deployment of drogue chute, the gas generator is activated by pull on lanyard attached to drogue. After two seconds, the gas generator functions the second expulsion charge located in retainer block of drogue housing. Gas pressure forces pusher plate forward, shearing pins and separating drogue housing from main chute insert and candle assembly.

- d. The pusher plate is attached by a thread-line to the pilot chute. The pilot chute is deployed, and, in turn, pulls bag off main chute. The main chute now deploys the steel cable which is attached to the main chute shroud lines on one end, and, in turn, pulls a lanyard attached to candle igniter assembly.

- e. The pull on the lanyard rotates a bellcrank, releasing the firing pin. The firing pin fires a rifle primer, which fires boron pellets. The boron pellets ignite a propellant wafer. Propellant ignites the candle. Ignition gases pressurize nose cap, blowing it free.

- f. The candle, suspended from the main chute is now burning. During the first 15 seconds, the igniter housing is burned away. The candle descends at 13 fps, burns for 180 seconds with a light output of 222 watts per steradian in the near infrared spectrum, and a maximum of 1000 candlepower in the visible spectrum.

**Use:**

To provide helicopters with target illuminating capability from a safe standoff distance in a hostile environment.

**Tabulated Data:**

**Rocket:**

<table>
<thead>
<tr>
<th>Type</th>
<th>MK66, Mod 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>2.75 in. nominal</td>
</tr>
<tr>
<td>Length (max)</td>
<td>71.12 (w/warhead)</td>
</tr>
<tr>
<td>Weight</td>
<td>24.4 lb (w/MK66, Mod 2 motor)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assembly drawing</th>
<th>12944412</th>
</tr>
</thead>
</table>

**DODAC**

| 1340-H154 |

**Performance:**

- Operating temperature limits: -25°F to + 140°F (-31.35°C to +59.40°F)

- Maximum velocity: 1600 fps (488 mps)
Figure 1. Rocket, flare, 2.75-inch, w/XM278 illuminating warhead.

Motor:

Type: MK66, Mod 2
Igniter: 2.2-3.5 ohms resistance
DODAC: 1340-J147

Warhead:

Model: XM278
Type: Flare
Body: Aluminum
Color: Olive drab w/white markings
Diameter: 2.75 in.
Length: 31.64 in.
Weight: 10.8 lb

Candle characteristic:

Burn time: 180 sec nominals
Light output: 1000 cp max
Parachute descent rate: 13 fps approx.
Composition: Potassium, Cesium Nitrate, Hexamine, Binder
Weight: 5 lb (2.27 kg)
Infra red output: 222 Watts/Steradian

Fuze:

Model: M442
Type: Setback actuated, fixed time

Diameter: 1.5 in.
Length: 3.1 in. overall
Weight: 0.6 lb
Arming time: 1.1 sec

Packaging (Box):

Packaging and Marking
Drawing: 12624792
Dimensions: 48-1/16 in. x 12-1/4 in. x 9-3/8 in.
Total explosive weight: 12.17 lb (5.52 kg)
Total weight (w/contents): 132.5 lb (60.1 kg)

Cubic contents: 3 cu ft
Composition: Potassium, motor
Infra red output: 222 Watts/Steradian

Packaging (repair parts listing):

SMR code: XBOOO
National Stock No.: 8140-01-255-7725
5. Storage and Surveillance.

a. Quantity Distance Class and Storage Data:

   Warhead, Hydra 70, Illumination XM278:
   - QD class: 1.3
   - Storage class: G
   - Total explosive weight: 0.5 lb
   - Filler: Pyrotechnic flare

   Rocket, Hydra 70, w/Warhead, Illumination, XM278 w/Fuze M442 and Rocket
   - QD class: 1.3
   - Storage class: G
   - Total explosive weight: 12.2 lb
   - Filler: Pyrotechnic flare

6. Identification of Rocket Configuration used by Army, Navy, Air Force, and Marine Corps. The identification of rocket configuration is listed in Table 1 below.
<table>
<thead>
<tr>
<th>DODIC/NSN</th>
<th>Warhead</th>
<th>Fuze</th>
<th>Motor</th>
<th>Packing</th>
</tr>
</thead>
<tbody>
<tr>
<td>H154/1340-01-371-8611</td>
<td>XM278 Illumination</td>
<td>M442 MBO</td>
<td>MK66 Mod 2</td>
<td>3 warheads and 3 motors unassembled in wood box</td>
</tr>
</tbody>
</table>
By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
04492

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P.S.—IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.
The Metric System and Equivalents

**Linear Measure**

1 centimeter = 10 millimeters = .39 inch  
1 decimeter = 10 centimeters = 3.94 inches  
1 meter = 10 decimeters = 39.37 inches  
1 dekameter = 10 meters = 32.8 feet  
1 hectometer = 10 dekameters = 328.08 feet  
1 kilometer = 10 hectometers = 3,280.8 feet

**Weights**

1 centigram = 10 milligrams = .15 grain  
1 decigram = 10 centigrams = 1.54 grains  
1 gram = 10 decigrams = .035 ounce  
1 dekagram = 10 grams = .35 ounce  
1 hectogram = 10 dekagrams = 3.52 ounces  
1 kilogram = 10 hectograms = 2.2 pounds  
1 quintal = 100 kilograms = 220.46 pounds  
1 metric ton = 10 quintals = 1.1 short tons

**Liquid Measure**

1 centiliter = 10 milliliters = .34 fl. ounce  
1 deciliter = 10 centiliters = 3.38 fl. ounces  
1 liter = 10 deciliters = 33.81 fl. ounces  
1 dekaliter = 10 liters = 2.64 gallons  
1 hektoliter = 10 dekaliters = 26.42 gallons  
1 kiloliter = 10 hektoliters = 264.18 gallons

**Square Measure**

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch  
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches  
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet  
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet  
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres  
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

**Cubic Measure**

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch  
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches  
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

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Temperature (Exact)

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5/9 (after subtracting 32)  
°C Celsius temperature