*TB 9-1340-201

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

Superseded by TM 9-1340-201

ROCKET, HIGH EXPLOSIVE, 2.75-INCH; ROCKET, PRACTICE 2.75-INCH; ROCKET, TARGET MARKER 2.75-INCH; ROCKET, WHITE PHOSPHOROUS 2.75-INCH; AND ROCKET, ANTIPERSONNEL 2.75-INCH FOR ROCKET LAUNCHERS
DESCRIPTION AND USE

Refs: TM 9-1950; TM 9-1300-206

Headquarters, Department of the Army, Washington, D.C.
12 August 1969

1. Purpose. The purpose of this bulletin is to acquaint personnel with the characteristics of the 2.75-inch, low-spin, folding-fin aircraft rocket and to give instructions for use and handling of the rocket.

2. General. The 2.75-inch, low-spin, folding-fin aircraft (fig. 1) rocket is forward fired from a rocket launcher. Stabilization in flight is accomplished by four pivoted fins. The fins are folded during packing and shipping. The pressure of the propellent gases actuates a piston and crosshead which pushes against the heels of the fins, extending them at a 45° angle during flight. The nozzles of the motor are scarfed to induce a low spin in the rocket during flight to increase stability and decrease dispersion. The 2.75-inch rocket consists of a nose fuze, warhead and motor.

*This bulletin supersedes TB 9-1950/1, 22 January 1964, including all changes.

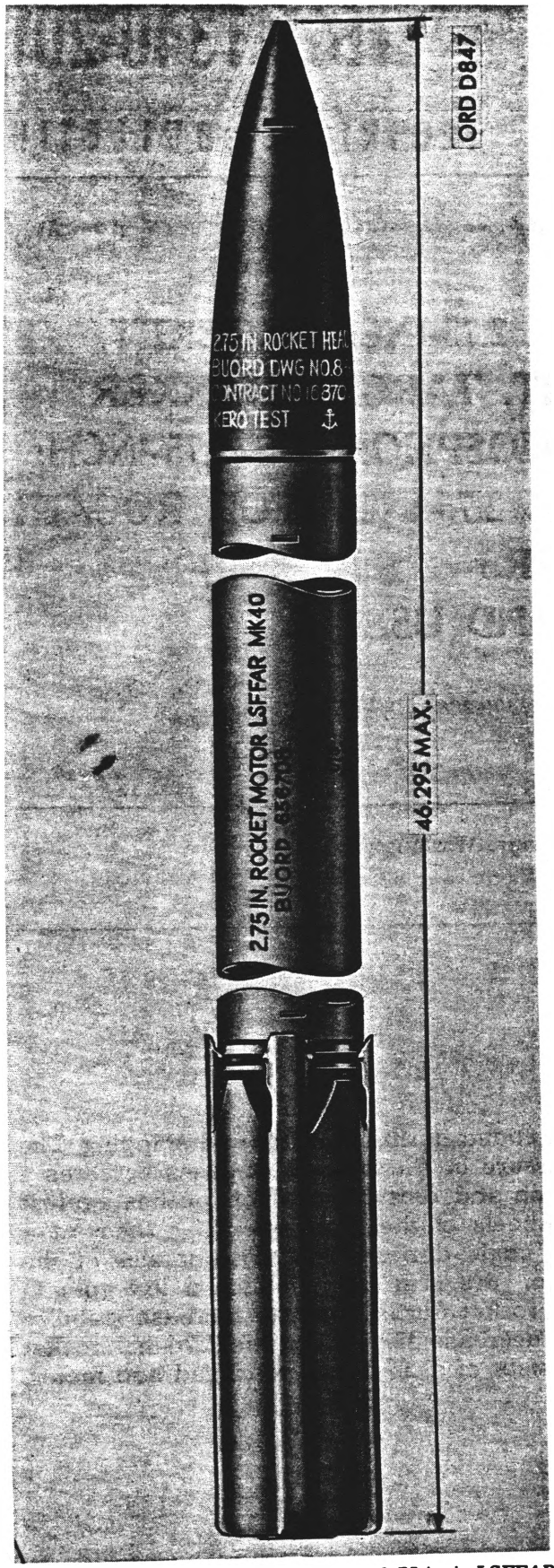

Figure 1. Rocket, high explosive, 2.75-inch: LSFFAR.

3. Classification. Ammunition for rocket launchers consists of the following types, which are classified according to their warhead types.

a. High-explosive (HE) (fig. 1 and 2), which contains a high explosive charge is intended for blast, fragmentation or demolition effect.

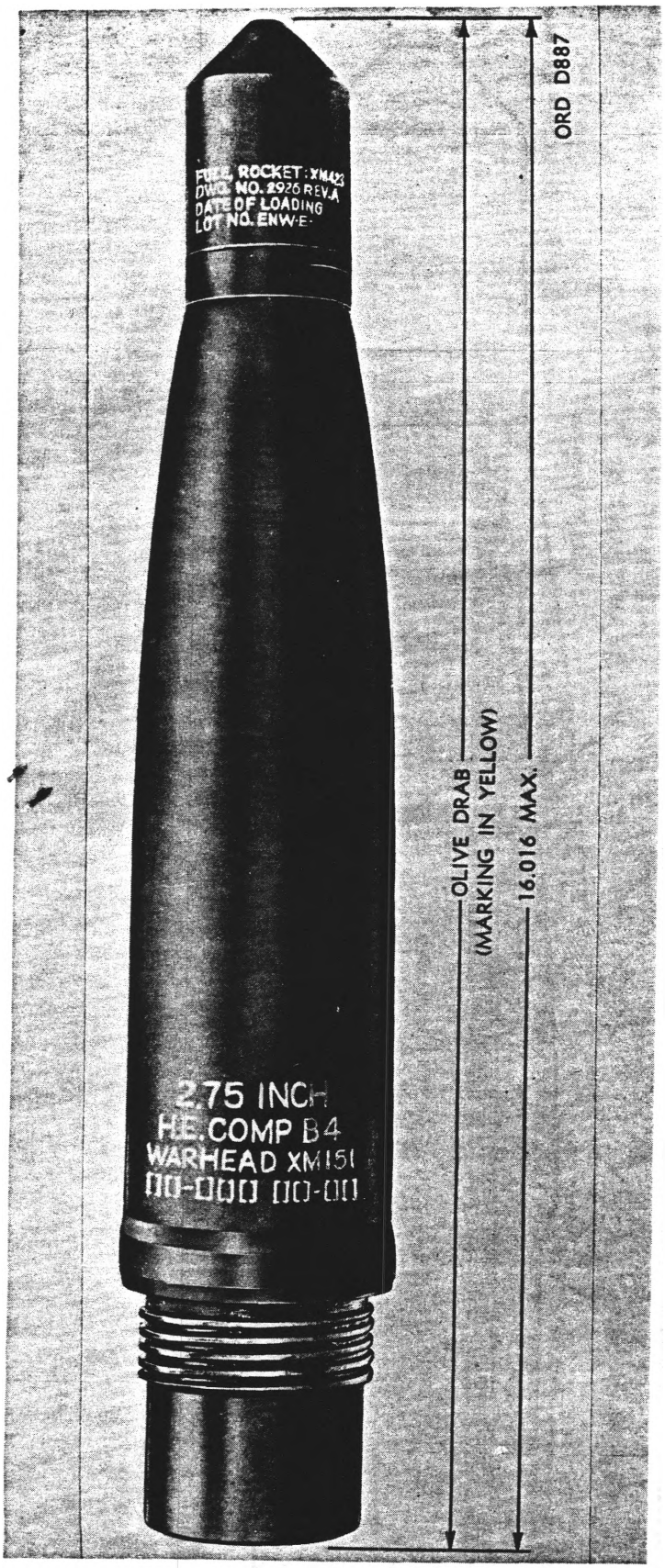

Figure 2. Warhead 2.75-inch Rocket HE., XM151 with rocket fuze PD XM 423E1.

b. Practice, which simulates the service warhead, has an inert warhead and inert fuze, and is intended for target practice purposes.

c. Target marker high-explosive (HE) (fig. 3), which contains explosive and smoke dye, is intended for blast, fragmentation and demolition effect and for target marking. Target marker heads are available in yellow and red smoke.

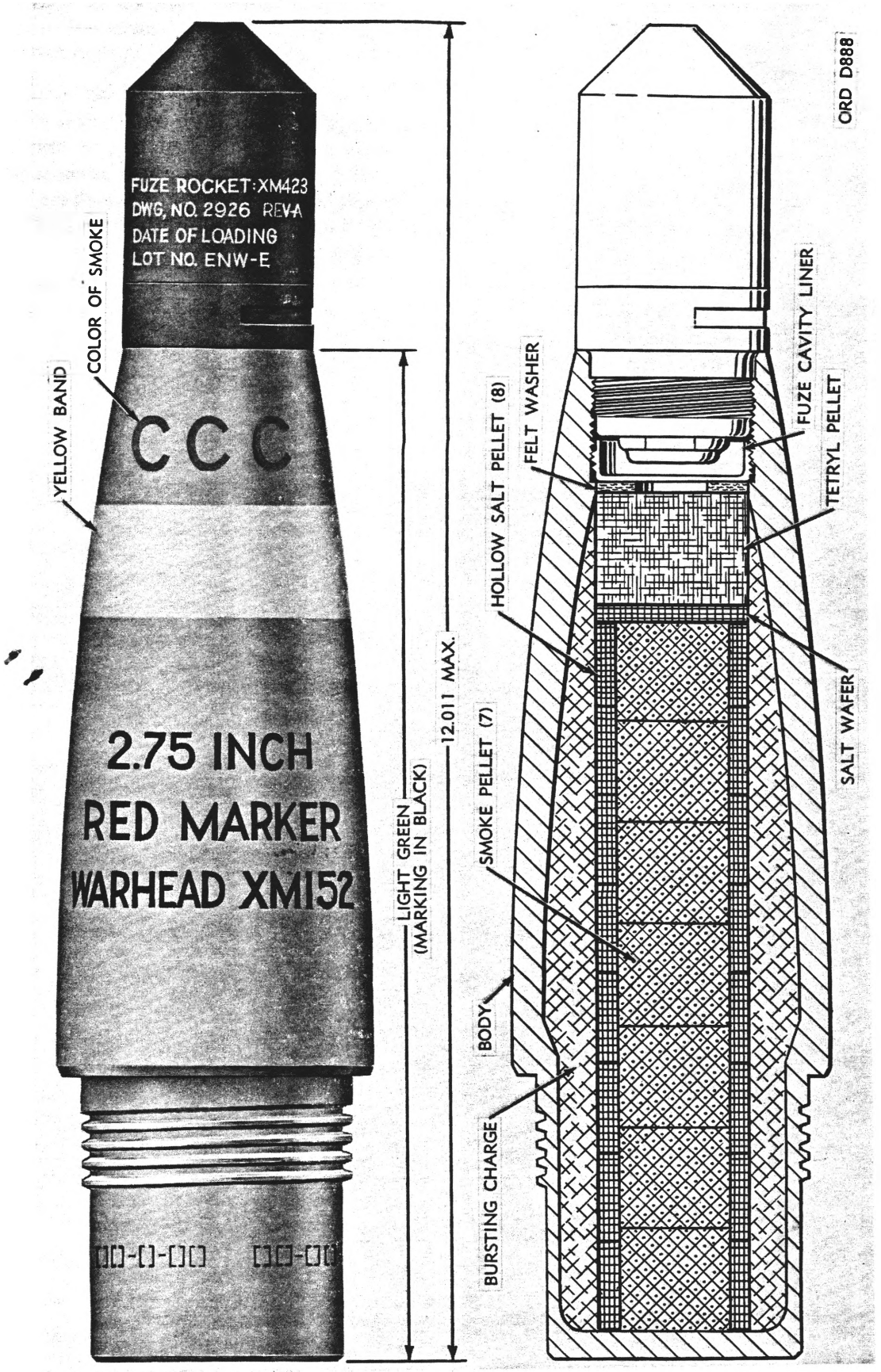

Figure 3. Target marker (HE) warheads XM152 or XM156.

d. White phosphorous (WP) (fig. 4), which contains a burster charge of high-explosive (HE) and white phosphorous, is used for marking targets with white smoke.

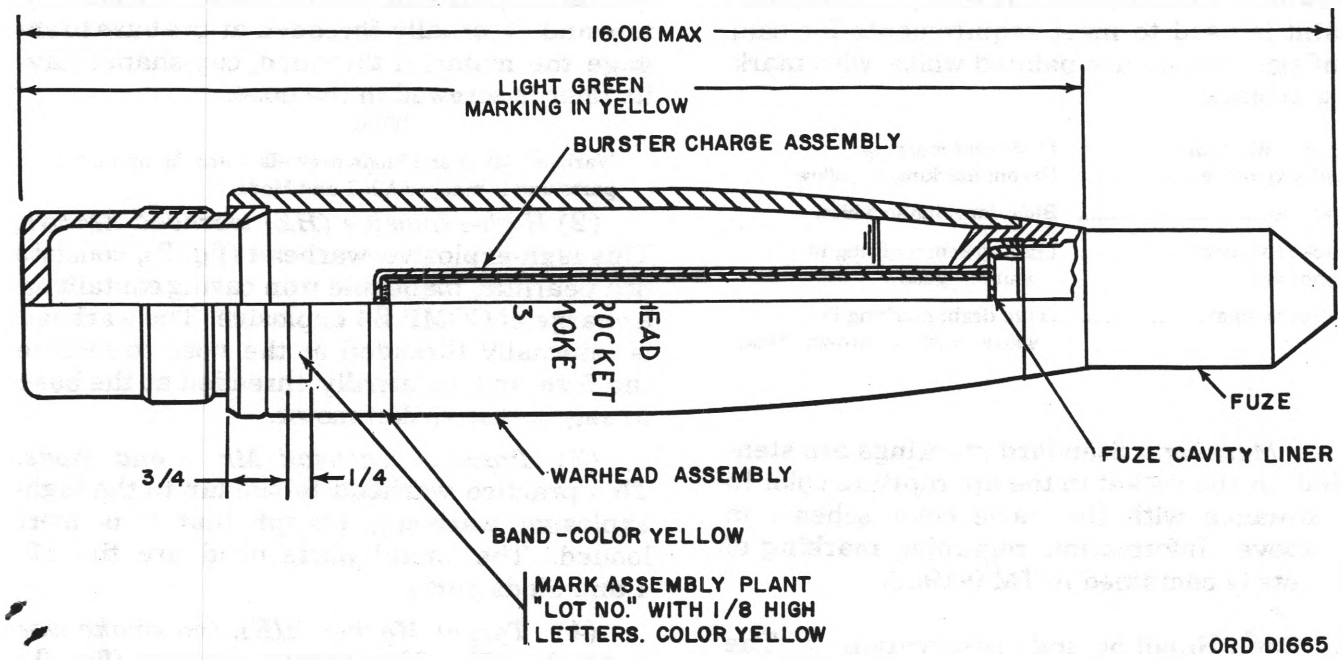

Figure 4. White phosphorous (WP) warhead M156 (E13).

e. Antipersonnel (APERS) (fig. 5), which contains a payload of flechettes, a fuze and an expelling charge for use against personnel.

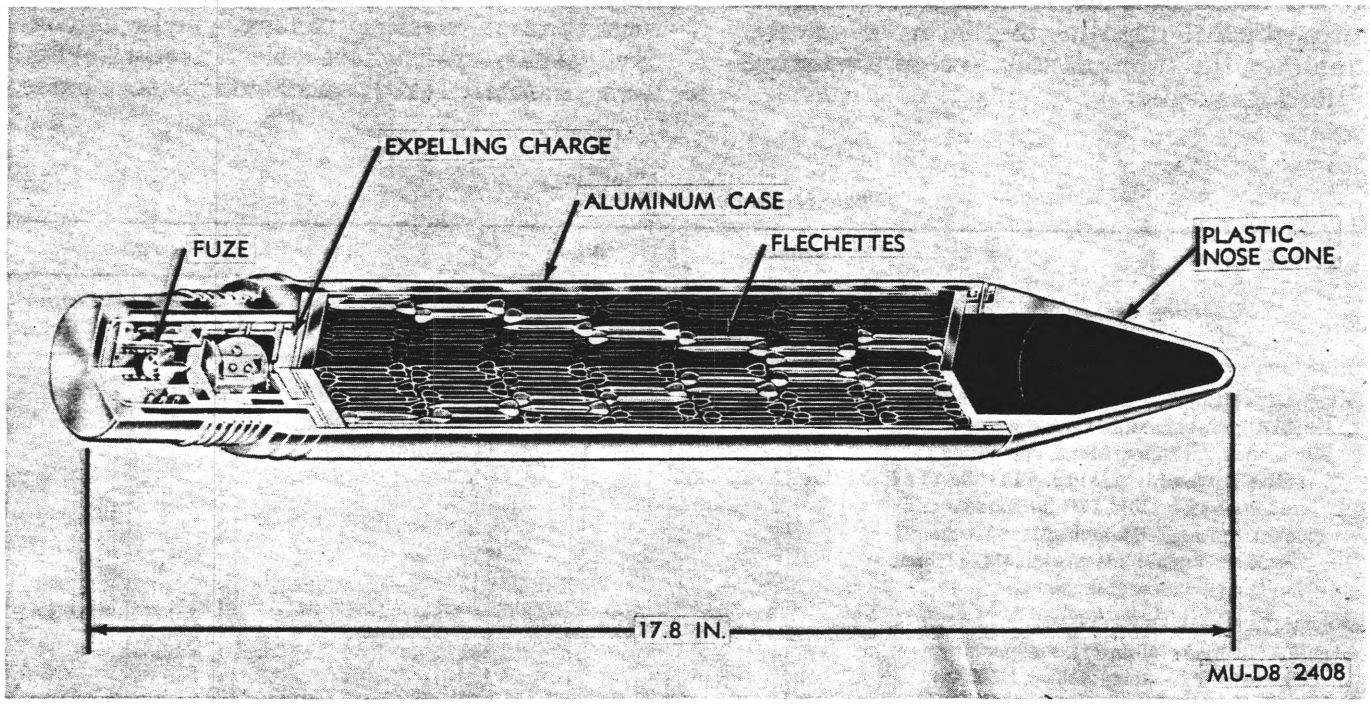

Figure 5. Antipersonnel (APERS) warhead WDU 4A/A.

4. Identification. *a. General.* Information regarding identification of rocket ammunition is contained in TM 9-1950.

b. Painting. Warheads are painted to prevent rust and to provide, by the color, ready means of identification as to type. Lusterless paint is used to meet requirements for camouflage. Motors are painted white, with marking in black.

Type of Warhead	*Color and marking*
High-explosive	Green; marking in yellow.
Practice	Blue; marking in white.
Smoke (white phosphorus)	Light green; marking in white or yellow
Antipersonnel	Olive drab; marking in white, with a brown band.

c. Marking. Standard markings are stenciled on the rocket in the appropriate color in accordance with the basic color scheme in *b*, above. Information regarding marking of rockets is contained in TM 9-1950.

5. Care, Handling and Preservation. The general provisions for care, handling and preservation of rocket ammunition are contained in TM 9-1950 and TM 9-1300-206.

6. Authorized Rounds. Ammunition authorized is listed in table 1. Standard nomenclature, which is used in the listing, completely identifies the ammunition, except for ammunition lot number.

a. Warhead

(1) *High-explosive warhead Mk 2 and Mods.* This high-explosive warhead (fig. 1) consists of a steel casing containing a 1.40-pound HBX-1 explosive charge. The warhead is internally threaded at the nose to receive the fuze and externally threaded at the base to engage the motor. A threaded, cup-shaped cavity liner is screwed in the nose.

NOTE

Warhead Mk 2 and Mods uses Mk 1 and Mods metal parts and is marked Mk 1 and Mods.

(2) *High-explosive (HE) warhead XM151.* This high-explosive warhead (fig. 2), consists of a pearlitic, malleable iron casing containing a charge of COMP B4 explosive. The warhead is internally threaded at the nose to receive the fuze and externally threaded at the base to engage the rocket motor.

(3) *Practice warhead Mk 1 and Mods.* This practice warhead is similar to the high-explosive warhead, except that it is inert loaded. The metal parts used are the Mk 1 and Mods parts.

(4) *Target Marker (HE), red smoke warhead XM152.* The target marker (fig. 3), loaded with baratol bursting charge, red smoke dye pellets, salt pellets and a tetryl pellet, uses modified Mk 1 and Mods metal parts.

(5) *Target marker (HE), yellow smoke XM153.* This target marker (fig. 3), loaded with baratol bursting charge, yellow smoke dye pellets, salt pellets, and a tetryl pellet, uses modified Mk 1 and Mods metal parts.

Table 1. Authorized Rounds

Standard Nomenclature	*Warhead*		*Motor*		*Fuze Action*	*Fuze*	
	Weight (lb)	*Length (in)*	*Weight (lb)*	*Length (in)*		*Weight (lb)*	*Length (in)*
ROCKET, HIGH EXPLOSIVE, 2.75-INCH: LSFFAR (unassembled) consists of Warhead, 2.75-inch Mk 2 and mods (HBX-1 loaded) w/Fuze, PD, Mk 178 and mods or Mk 176 and mods and Rocket motor, 2.75-inch, Mk 40 and mods w/ propellant grain, Mk 31 and mods or Mk 43 and mods.	5.72	8.88	12.70	39.92	Delay (Mk 176) Superquick (Mk 178).	0.75	2.98
ROCKET, HIGH EXPLOSIVE, 2.75-INCH: LSFFAR (unassembled) consistsof: Warhead, 2.75-inch Rocket, HE: XM 151 (COMP B4 loaded) w/Fuze, Rocket, PD, XM423E1.	8.60	12.90	12.70	39.92	Superquick (XM 423E1).	1.00	4.03

Table 1. Authorized Rounds —Continued

Standard Nomenclature	*Warhead*		*Motor*		*Fuze Action*	*Fuze*	
	Weight (lb)	*Length (in)*	*Weight (lb)*	*Length (in)*		*Weight (lb)*	*Length (in)*
ROCKET, PRACTICE, 2.75-INCH: LSFFAR (unassembled) consists of: Warhead, 2.75-inch, Mk 1 and inert loaded and Rocket motor, 2.75-inch Mk 40 and mods w/propellant grain, Mk 31 and mods or Mk 43 and mods.	5.72	8.88	12.70	39.92	Dummy nose fuze for 2.75-inch rocket warhead.	.75	2.83
ROCKET, TARGET MARKER, HIGH EXPLOSIVE, 2.75-INCH: LSFFAR (unassembled) consists of: Warhead, 2.75-inch XM152 Baratol loaded yellow smoke w/Fuze, Rocket, PD, XM423E1.	5.90	8.88	12.70	39.92	Superquick (XM 423 or XM423E1).	1.00	4.03
ROCKET, TARGET MARKER, HIGH EXPLOSIVE, 2.75-INCH: LSFFAR (unassembled) consists of: Warhead 2.75-inch XM153 Baratol loaded yellow smoke w/Fuze, Rocket, PD, XM423E1.	5.90	8.88	12.70	39.92	Superquick (XM 423 or XM423E1).	1.00	4.03
ROCKET, WHITE PHOSPHOROUS (WP), 2.75-INCH: LSFFAR (unassembled) consists of: Warhead, 2.75-inch E12, w/Fuze, PD, XM423 and XM423E1 and Rocket motor, 2.75-inch, Mk 40 series and mods w/Propellant grain, Mk 31 and mods or Mk 43 and mods.	6.00	8.88	12.70	39.92	Superquick (XM 423 or XM423E1)	1.00	4.03
ROCKET, WHITE PHOSPHOROUS (WP), 2.75-INCH: LSFFAR (unassembled) consists of: Warhead, 2.75-inch, M 156 w/Fuze, PD, M 423 and Rocket motor, 2.75-inch, Mk 40 series and mods w/propellant grain Mk 31 and mods or Mk 43 and mods.	6.5	12.90	12.70	39.92	Superquick (XM423)	1.00	4.03
ROCKET, ANTIPERSONNEL (APERS), 2.75-INCH: LSFFAR (unassembled) consists of: Warhead, 2.75-inch, WDU 4A/A and Rocket motor, 2.75-inch, Mk 40 series and mods w/propellant grain, Mk 31 and mods or Mk 43 and mods.	9.3	18.6	12.70	39.92	Deceleration		

(6) *White phosphorous (WP) warhead E12.* This warhead, filled with white phosphorous and COMP B bursting charge, uses modified MK 1 and Mods metal parts.

(7) *White phosphorous (WP) warhead M156 (E13) (fig. 4).* This warhead, filled with WP and COMP B burster charge, uses metal parts similar to HE warhead M151.

(8) *Antipersonnel (APERS) warhead WDU 4 A/A.* This warhead contains a payload of flechettes, a fuze and an expelling charge.

b. Motor. The motor MK 40 series consists of an aluminum-alloy motor tube containing propellant and an igniter and a nozzle-fin assembly attached to the aft end. The fin assembly incorporates four nozzles, scarfed to an angle of 24° to induce rotation during flight. The motor tube closure is internally threaded at the forward end to receive the

warhead.

(1) *Propellant.* The propellant is one inhibited grain of ballistite.

(2) *Igniter.* The igniter consists of a tin case containing a mixture of black powder and magnesium powder and an electric squib. The igniter is located at the forward end of the motor tube. Two lead wires extend from the squib through the perforation in the propellant grain to the nozzle fin assembly where one lead wire is grounded to the nozzle plate. The other lead wire passes through a nozzle or piston and is connected to the contact disk at the aft end of the motor tube as a line contact.

(3) *Nozzle-fin assembly.* The nozzle-fin assembly consists of a nozzle plate, four nozzle inserts, a finactuating mechanism, four fins, a fin retainer and a contact disk. The aluminum-alloy fins are rectangular and pivoted on the nozzle plate. As packed and shipped, the fins are within the 2.75-inch diameter of the rocket. When the rocket is fired, the propellent gas pressure, acting on the fin-acuating mechanism, causes the fins to extend from the motor at a 45° angle. The contact disk, which is insulated from the rocket, serves as a live contact during firing.

c. Fuze. Refer to paragraph 7 for information pertaining to fuzes used with this ammunition.

7. Fuzes. *a. General.* A fuze is a device used with ammunition to cause it to function at the time and under the circumstances desired.

b. Classification. Rocket fuzes are classified according to location in the head as PD (point detonating) or BD (base detonating). Fuzes are classified according to functioning as time, proximity, PI (point initiating), or impact. Fuzes are classified also according to a combination of location and functioning as PI, BD (point initiating, base detonating). Time fuzes function a preselected number of seconds after the round is fired. Impact fuzes function upon impact with superquick, nondelay, or delay action. In the case of superquick action, the fuze functions almost instantaneously on impact, initiated by a firing pin driven into a detonator. Nondelay action occurs in impact fuzes initiated by inertia-driven firing pins or detonators, being only slightly slower than superquick action. In delay action fuzes, the fuze functions a fixed time after impact to permit penetration of the target before the projectile explodes. Arming may be accomplished by mechanical means: gear trains, airstream (air arming), spring action, centrifugal force or inertia, gas pressure (pressure arming), or a combination thereof.

c. Fuze, PD: Mk 176 and Mods.

(1) *Description.* This fuze is of the acceleration-arming, point-detonating type. This fuze is designed for delayed action; there is a delay element in the rotor, between the primer and the detonator. The fuze incorporates a rotor, a balanced escapement in the timing mechanism, and a booster cup.

(2) *Preparation for firing.* No preparation of the fuze for firing is required.

d. Fuze, PD: MK178 and Mods.

(1) *Description.* This fuze is of the acceleration-arming, point-detonating type. This fuze is designed for instantaneous action; there is no delay element in the rotor between the primer and detonator. The fuze incorporates a rotor, a balanced escapement in the timing mechanism, and a booster cup.

(2) *Preparation for firing.* No preparation of the fuze for firing is required.

e. Fuze, PD, M423, XM423E1 and XM423.

(1) *Description.* These fuzes, designed for superquick action and low-angle impact action, are of the acceleration-arming, point-detonating type. The short arming time allows the fuzed rockets to be used at short ranges by helicopters. These fuzes contain the following components: unbalanced rotor assembly, timing mechanism,, striker assembly, outer ogive, firing pin assembly, fuze body, and booster assembly. Primer and detonator element are located in the unbalanced rotor. Fuze M423 is a later design version of Fuzes XM423E1 and XM423. Fuzes XM423E1 and XM423 differ slightly, internally; externally, the fuzes are identical. Fuze XM423 uses primer Mk125 while Fuzes M423 and XM423E1 use Primer XM94E1.

(2) *Preparation for firing.* No preparation of the fuze for firing is required.

f. Fuze, Rocket, Base Detonating, Model 113A.

(1) Description. This fuze contains the following components: unbalanced rotor assembly, setback sleeve, setback sleeve spring, setback weights, firing pin, lock pin and a primer. The fuze arms under sustained acceleration and fires at the end of acceleration, (motor burnout).

(2) *Preparation for firing.* No preparation for firing is required.

3. Preparation for Firing. *a. Assembly of Rockets.*

(1) Open box(es), if applicable.

(2) Remove container, if applicable.

(3) Open containers.

(4) Remove fuzed warhead and motor from container(s).

(5) Remove head shipping support.

NOTE

On some motors there is a rubber gasket ring under the lip of the head shipping support and a shim between the head shipping support and the motor head end closure. On some warheads there is a rubber gasket ring on the end that threads into the motor and a shim in the box or container.

(6) Remove and dispose of shim(s) and gasket(s) before threading warhead to motor.

(7) Hold rocket motor with strap wrench (maximum width—2 inches) in forward 2-1/2-inch area of rocket motor warhead end.

WARNING

Report deformed tubes to ammunition personnel for disposition.

NOTE

To prevent slippage of strap wrench on rocket motor body use no-slip liquid on inner surface of strap of strap wrench.

(8) Using another strap wrench on warhead or fuze wrench, tighten warhead as much as possible without turning motor head end closure. (Turning motor head end closure would deform motor tube dimples or force lockwire into or out of elongated hole in tube. Motor tubes having no cracks or other damage, in which dimples have been inadvertently straightened, may be used if lockwire tab has not been forced into or out of elongated hole.) If examination shows damage, return to authorized ammunition personnel for disposition.

(9) Have activities having access to torque wrench and nose fuze torque wrench socket, or that are properly equipped, fabricate nose fuze torque wrench socket. Using this wrench, apply 55 foot-pounds torque to tighten warhead. (Properly made dimples will resist 80 foot-pounds torque.) If gap exists between forward end of motor and warhead after assembly, return to authorized ammunition personnel for disposition.

WARNING

Failure to torque warhead to rocket motor to required 55 foot-pounds may result in loss of warhead in flight or upon firing.

Note

A gap is considered to exist if the warhead fails to seat on the forward end of the motor at any point for a full 360° after torquing.

b. Loading of Rockets.

(1) Inspect rockets for deep scores, abrasions, deformation of motor tube or gap between warhead and motor.

CAUTION

Do not use rocket with any of above defects.

(2) Tighten all rockets returned from previous flight prior to reloading.

WARNING

Failure to torque warhead to 55 ft-pounds may result in loss of warhead in flight or upon firing.

(3) Remove electrical connections from helicopter.

(4) Move contact arm on rear of each tube so that contact point is in center of tube, if tube is to be loaded from front. Move contact arm to side if tube is to be loaded from rear.

(5) Remove fin protector from rocket.

WARNING

Fin protector contains spring that serves to short circuit igniter leads. Do not remove fin protector until just prior to loading rocket in launcher.

(6) Load rockets into tubes by pushing rocket into tube with firm pressure until de-

tent snaps into groove on nozzle plate. Make certain detent is properly latched by pulling or pushing forward on rocket. (Detent should hold rocket firmly in place.) Insert shear pin into each detent on launcher after loading rockets in launcher, in order to hold rockets in place until fired.

(7) Move arm on rear of each tube so that contact point is in center of tube and rocket rests against contact of rocket fin, if loaded from rear.

(8) To test circuit continuity with circuit continuity tester specifically approved for testing electric components of rockets, refer to TM 9-1950 for testing procedures.

(9) After all rocket tubes are loaded, plug electrical connections into helicopter.

9. Rockets Prepared for Firing but not Fired. Rockets which have been prepared for firing but not fired will be handled as follows:

a. Unplug electrical connection from helicopter.

b. Unlock break on launcher and operate handcrank on actuator until front of launcher tubes are tilted downward slightly.

c. Remove shear wire from detent and swing contact arm to side. Force detent pin down or force rocket forward, releasing detent, and slide it forward out of tube. If rocket does not slide forward easily, push it with nonconductive rod. Catch rocket as it slides out of tube, being careful not to drop it.

d. Install fin protector over fins.

e. If rockets are to be reloaded for another flight and will not be disassembled, retorque warheads to 55 ft-lbs.

WARNING

Failure to torque warhead to 55 ft-pounds may result in loss of warhead in flight or upon firing.

10. Disassembly and Packaging of Rockets. *a.* If rockets are not to be reloaded in reasonable time, disassemble warheads for motors and return them to their respective shipping containers as follows:

(1) Loosen warhead from motor, using two strap wrenches: one, on warhead; other, on first 2-1/2 inches of rocket motor. Once warhead is loose from motor, unscrew warhead from rocket motor by hand.

NOTE

Do not remove fuze from warhead unless fuze and warhead were issued as separately packed items.

(2) Install head shipping support into motor if motor and warhead are to be packed in metal container MK1 or are to be packed in same container in box.

(3) Return motor to shipping container.

(4) Lightly grease threads on warhead. Position warhead in head shipping support and close shipping container, if warhead and rocket motor are packed together. If warhead and rocket motor are packed separately, replace in respective containers.

(5) Close containers; repack containers in boxes (with exception of Mk1) and secure boxes.

NOTE

If packed in latest type packing, check whether wooden box was originally packed with, and marked for four warhead containers and four motor containers or six motor containers before repacking.

b. Remove damaged rockets to authorized ammunitions personnel for disposition.

11. Precautions in Firing. The precautions in firing of rocket ammunition prescribed in TM 9-1950 and AR 385-63 should be closely observed.

12. Packing and Marking. *a. Packing.* 2.75-inch rocket ammunition is packed in metal containers with wooden boxes, or in a four compartment metal container. A representative pack of four unassembled rockets in a four-compartment metal container approximately 51-1/2 inches long, 8 inches high, and 8 inches wide weighs approximately 101 pounds and has a cubical displacement of 1.92 cubic feet. For more complete packing and shipping information refer to SC 1340/98-IL.

b. Marking. All packages are marked in accordance with regulations prescribed in TM 9-1900.

13. Nose Fuze Torque Wrench Socket. *a.* Obtain nose fuze torque wrench socket and torque wrench. Wrench and wrench socket should be kept as part of tool kit for helicopter or helicopter armorer.

b. If above nose fuze torque wrench socket cannot be obtained fabricate one if proper facilities are available.

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

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1-47	5-401	7-168 (4)
1-55	5-402	9-12
1-57	5-405	9-17
1-77	5-406	9-22
1-307	5-407	9-47
3-7	5-408	9-86
5-25	5-570	9-367
5-26	7-4 (4)	9-500 (BB,IA,
5-27	7-15 (4)	KA-KC) (1)
5-35	7-16 (4)	10-7
5-36	7-17 (4)	10-37
5-37	7-18 (4)	11-85
5-38	7-35 (4)	11-87
5-52	7-36 (4)	11-117
5-101	7-37 (4)	17-4
5-107	7-42 (4)	29-25
5-127	7-45 (4)	29-27
5-145	7-46 (4)	29-35
5-146	7-47 (4)	29-51
5-147	7-100 (4)	29-105
5-148	7-102 (4)	29-106
5-155	7-157 (4)	29-107
5-157	7-167 (4)	29-109

NG: State AG (3); Units — same as active Army except allowance is (1) copy per unit.

USAR: None

For explanation of abbreviations used, see AR 320-50.

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