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HEADQUARTERS,  
DEPARTMENT OF THE ARMY  
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**GRENADE LAUNCHERS, XM79 AND T148E2**

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## CHAPTER 1

### DESCRIPTION AND MECHANICAL TRAINING

#### Section I. INTRODUCTION

**1. Purpose and scope.** This circular provides information to commanders, staff officers, and other concerned individuals, on the XM79 and T148E2 grenade launchers and their associated ammunition. It covers mechanical training, technique of fire, and tactical employment of the launchers in sufficient detail to be used by officers and NCO's to train qualified grenadiers and to employ the weapon in tactical operations.

**2. General.** *a.* The XM79 and the T148E2 grenade launchers, employing 40-mm HE ammunition, permit the concentration of lethal fire in a selected area at ranges varying from the maximum distance the average soldier can throw a hand grenade (about 40 meters (43-44 yards)) to the minimum mortar support range (about 400 meters (435 yards)). The launchers may be employed against area or point targets.

*b.* Since the launchers are organic to the rifle squad's fire teams, they provide small infantry units with their own fire support with minimum safety-distance restrictions and without the time delay that is usually incurred in obtaining comparable support from other sources.

#### Section II. MECHANICAL TRAINING

**3. Description.** *a.* The XM79 grenade launcher is shown in figure 1. It is a single-shot, break-open, percussion fired, shoulder weapon that fires 40-mm projectiles.

*b.* The T148E2 grenade launcher is shown in figure 2. It is a 3-round, magazine fed, semiautomatic, shoulder weapon that fires 40-mm projectiles.

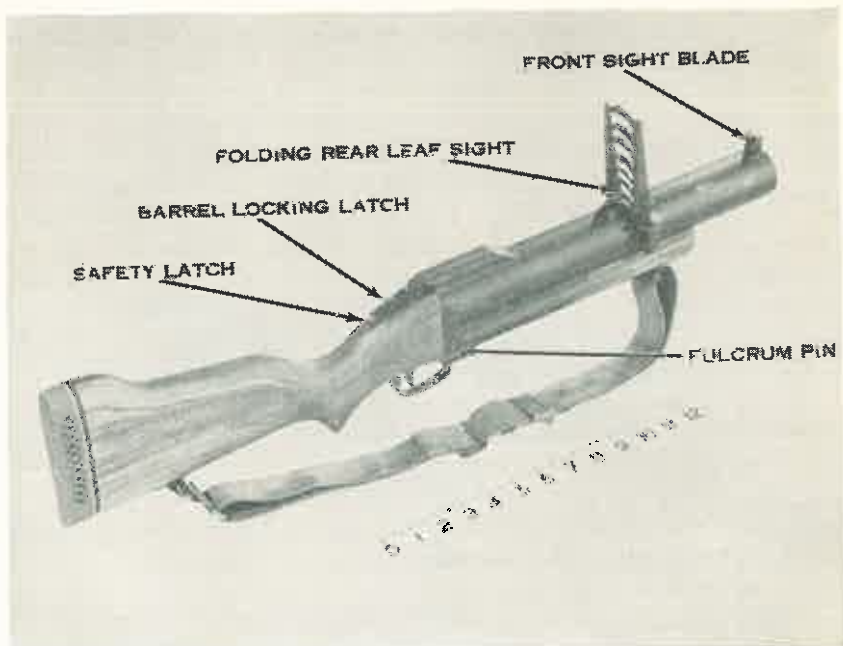


Figure 1. The XM79 grenade launcher.

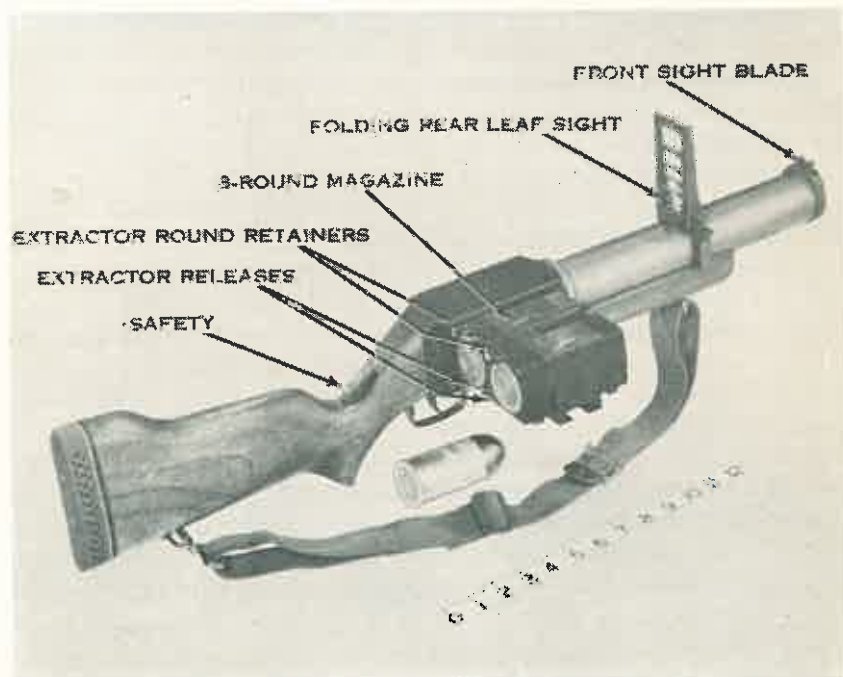


Figure 2. The T148E2 grenade launcher.

c. The following are comparative descriptive data on the XM79 and the T148E2 launchers:

	<i>XM79</i>	<i>T148E2</i>
Weight loaded.....	6.71 lb.....	8.41 lb.
Unloaded.....	6.16 lb.....	6.63 lb.
Length (overall).....	28.62 in.....	29.5 in.
Barrel:		
Weight (barrel group).....	1.51 lb.....	1.3 lb.
Length.....	14.71 in.....	12.00 in.
Rifling:		
Length.....	14.00 in.....	12.00 in.
Number of grooves.....	6.....	6.
Depth of grooves.....	0.01 in.....	0.01 in.
Twist, uniform, right hand, one turn in.	48.00 in.....	48.00 in.
Action.....	Break-open, shot- gun type.	Semiautomatic.
Magazine operation.....	None.....	Negator spring.
Number of rounds.....	1.....	3.
Sights:		
Front (adjustable in azi- muth).	Blade.....	Blade.
Rear.....	Folding leaf, mounted on barrel.	Folding leaf, mounted on barrel.
Muzzle velocity.....	250 f.p.s.....	250 f.p.s.
Maximum range.....	400 m. (435 yd.)....	400 m. (435 yd.).
Minimum range.....	50 m. (54-55 yd.)... 50 m. (54-55 yd.).	

4. **Assembly and disassembly.** See TM 9-1010-205-12, "Operational and Organizational Maintenance, Grenade Launcher, XM79" (when published).

5. **Loading.** a. *XM79.*

- (1) To load the XM79 (fig. 1), first press the barrel locking latch to the right. This unlocks the barrel from the receiver and moves the actuator rearward, pushing the safety mechanism into the safe position. As the barrel opens, pivoting on a fulcrum pin, the firing pin hammer is moved into the cocked position and the latch lock is allowed to move upward to retain the latch in the open position. The barrel pivots downward approximately 30° to the loading position until it rests against a stop located on the front end of the receiver.
- (2) Insert a round into the chamber and close the barrel. As the barrel closes, its rear end depresses the latch lock, freeing the spring loaded latch which then pivots and locks the barrel to the receiver. Move the safety latch forward to expose the letter F on the receiver. The weapon is then ready to be fired.

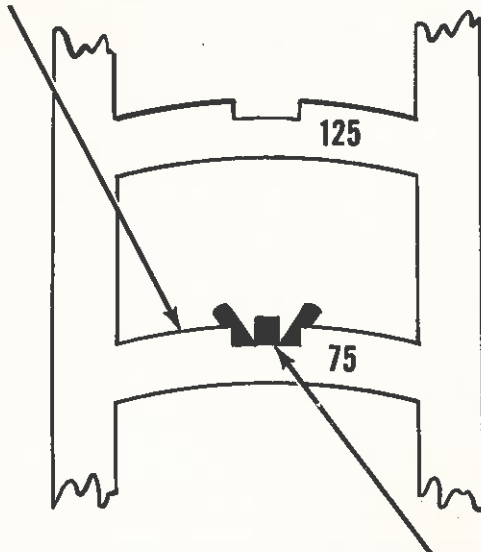
- (3) To reload after firing, repeat the unlocking cycle described in (1) above. This will cause the spring-loaded extractor to withdraw the spent case about 1 inch from the chamber. Pull the case the rest of the way from the chamber with either hand. Insert a new round as described in (2) above.

b. *T148E2*. The T148E2's 3-round magazine (fig. 2) is loaded either before or after it is inserted into the weapon.

- (1) To load the magazine outside the weapon, press each round forward into its chamber until the extractor round retainers lock over the base of the round. Insert the loaded magazine into the receiver from the right side of the launcher, pressing it against the driving spring, until the right chamber is alined with the barrel. A magazine retainer on the receiver keeps the magazine from being ejected. Move the safety from S to F. To fire the weapon, depress the safety device on the grip as you squeeze the trigger.
- (2) When the rounds are loaded into the magazine, the rotating band of each projectile presses against a spring-loaded indexing plunger on the underside of each chamber. As each round is fired, the indexing plunger lever moves into the space vacated by the fired projectile and the driving spring indexes the magazine to the right, alining the next chamber with the barrel.
- (3) To remove the empty cartridge cases from the magazine chambers, depress the extractor releases with your fingers. The cases in the right and middle chambers are extracted and ejected from the right side of the weapon; the case in the third (left) chamber is extracted and ejected from the left side of the weapon.
- (4) To load the magazine when it is in the receiver, aline the third (left) chamber with the barrel and insert rounds in the first and second (right and middle) chambers. Push the the magazine all the way to the left and insert a round into the third (left) chamber.

**6. Sights.** The folding rear leaf sights of the XM79 and the T148E2 are calibrated to ranges of 75, 125, 225, 325, and 375 meters. Correct sight alinement is attained by positioning the front sight blade directly in the center of the U notch (fig. 3). Large errors in deflection can be corrected by moving the front sight blade to the right or left.

REAR LEAF SIGHT



FRONT SIGHT BLADE

Figure 3. Correct sight alinement.

### Section III. AMMUNITION

**7. Description.** *a. General.* The 40-mm cartridge is fixed-type ammunition with an impact-detonating fuze. The complete round consists of two major assemblies: the cartridge case and the projectile.

*b. Cartridge case.* The aluminum cartridge case is made with an integral propellant retainer. Into this retainer is inserted a thin-walled brass cup which contains 330 milligrams of 81-mm mortar type propellant. An aluminum base plug which seals the back end of the cartridge case is then pressed and crimped into the propellant retainer. Finally, an M42 percussion primer is pressed and crimped into the base plug.

*c. Classification.* The 40-mm round is classified in one of two categories: high explosive or practice.

- (1) The *high explosive round* consists of a grenade  $1\frac{1}{2}$  inches in diameter containing approximately 1.25 ounces of explosive. The grenade is formed of rectangular, wrapped steel wire. The wire is notched at intervals to allow fragmentation on detonation. When the grenade detonates, fragments are distributed uniformly over the target area. The average initial velocity of the fragments is 4,800 f.p.s. which makes them extremely lethal.

- (2) The *practice round* is similar to the HE round except that the projectile is made of .067-inch thick steel. The space in the grenade below the fuze booster is filled with yellow dye powder. When the projectile is detonated, the fuze booster breaks open the grenade and disperses the yellow powder as a smoke puff which is clearly visible at the maximum range. The practice round is used for firing practice and range determination.

*d. Fuzes.* The T333E1 and T359E1 impact detonating fuzes are used with the HE and practice rounds. The major differences between the two fuzes are that the T333E1 arms on spin and is armed about 10 feet from the muzzle, whereas the T359E1 requires setback and spin to arm and arms 45 to 90 feet from the muzzle. When firing the XM381E1 or the XM382E2 in the grenade launcher, XM79 or T148E2, areas to the front and overhead must be free of obstructions from a distance of 10 feet from the firer to the target to prevent possible premature detonation of the projectile.

*e. Type rounds.* Listed below are the type rounds available for the grenade launcher.

Model	Type	Length	Fuze	Total weight
XM381E1.....	HE.....	3.9 in.....	T333E1.....	8 oz.
XM406E1.....	HE.....	3.9 in.....	T359E1.....	8 oz.
XM382E1.....	Practice.....	3.9 in.....	T333E1.....	8 oz.
XM407E1.....	Practice.....	3.9 in.....	T359E1.....	8 oz.

(The major difference between the XM331E1 and the XM406E1 rounds and between the XM382E1 and XM407E1 rounds is the type of fuze.)

*f. Functioning.* To fire a projectile of the weight and caliber of these rounds a distance of 400 meters with uniform muzzle velocity, this weapon employs the high-low pressure propulsion system. When the firing pin strikes the primer, the primer flash ignites the propellant in the powder cup which burns, creating a pressure of 35,000 p.s.i. in the high pressure chamber. The gas pressure ruptures the propellant cup at the eight vent holes and the gas then escapes into the low pressure chamber (interior portion of the cartridge case). Inside the low pressure chamber the propellant gases, at a pressure of 3,000 p.s.i., propel the projectile into the barrel where the rifling imparts a spin. The projectile leaves the launcher with a muzzle velocity of 250 f.p.s. and a spin of 3,700 r.p.m. This spin stabilizes the projectile in flight. Upon impact, the fuze functions and causes the projectile to detonate.

*g. Effects.* The XM381E1 and XM406E1 rounds are considered to have an effective casualty radius of approximately 15 feet against prone troops. Within the casualty radius, they have approximately



four times more casualty producing effect than other ammunition on a pound-for-pound basis.

*h. Recommended basic load.*

<i>Type</i>	<i>Individual armed with launcher</i>	<i>Carried on unit trains</i>	<i>Carried on battle group trains</i>
HE-----	27 rounds-----	45 rounds-----	45 rounds.

#### Section IV. CAPABILITIES AND LIMITATIONS

**8. Capabilities.** A grenadier can place a lethal concentration of fire in a target area from a range of 28 meters (30 yards), the maximum arming distance of the T359E1 fuze, to 400 meters (435-440 yards) with either launcher. Due to the simplicity of loading and firing the launchers, he can cover several targets or target areas in a relatively short period of time. He can effectively engage vertical or point targets such as windows or other openings in buildings, cave entrances, openings in bunkers, and other similar targets at ranges up to 200 meters (220-230 yards). Point-target fire of this type severely wounds or kills personnel occupying the position without destroying the building or fortification.

**9. Limitations.** Due to the lethal radius of the HE rounds and the sighting system used with the launcher, a minimum range of 50 meters (54-55 yards) has been assigned this weapon for training. For combat, this minimum range may be reduced to 31 meters (33-34 yards) which is the maximum fuze arming distance. Thus, a unit's close-in fighting capability is reduced by the limitations of the fire of the launcher and by the reduction in the number of bayonets in the unit. Because of the minimum range, grenadiers also will be issued a pistol for close-in protection. (The launcher will be issued to individuals as a primary weapon.)

#### Section V. SAFETY PRECAUTIONS AND TECHNIQUE OF FIRE

**10. Safety precautions.** Minimum troop safety limits must be prescribed because of the casualty radius of the HE rounds. For training, a limit of 39 meters (42-43 yards) is considered adequate for all troops. For combat, this distance may be reduced to 31 meters (33-34 yards).

**11. Technique of fire.** The primary mission of the grenade launchers is to incapacitate enemy personnel.

*a. Range determination.* A grenadier should be able to accurately determine ranges to help increase his chance of obtaining a first round hit on a target. The pattern of burst of the projectile and the primary



mission of the weapon make first round hits highly desirable though not mandatory for the accomplishment of the fire mission.

*b. Target speed and lead determination.* Dismounted enemy personnel will be the primary target for the grenade launcher; nevertheless, speed and lead determinations will be an essential part of a grenadier's training to enable him effectively to engage rapidly moving, mounted or dismounted, enemy personnel.

*c. Adjustment of fire.* Grenadier training should stress the importance of a first round hit and the rapid adjustment of fire to cover a target effectively. A grenadier strives for a first round hit at all ranges. Since it is unreasonable to expect perfection in this respect, he must also learn to sense each round and make corrections in range and deflection to bring the next round on the target.

*d. Firing positions.* Firing positions should provide cover, concealment, observation, and fields of fire consistent with the mission. The weapon may be fired from the standing, kneeling, or prone position.

## CHAPTER 2

### TACTICAL EMPLOYMENT

#### Section I. INTRODUCTION

**12. General.** The introduction of the XM79 and T148E2 grenade launchers into the battle group weapons system increases the combat capability of the battle group in all forms of offensive and defensive combat and in its security operations. This increase in combat capability does not materially affect the tactical employment of the battle group so far as formations are concerned, but it gives subordinate elements a greater capability to operate over the frontages and depths prescribed in current doctrine. A primary effect is the increased ability of the subordinate elements to accomplish their assigned missions rapidly.

**13. Organization for employment.** A launcher is assigned as a primary weapon to one man in each fire team. He is called a grenadier. The weapons are employed in all phases of tactical operations. Their principal role is the destruction of groups of enemy personnel. Other launchers are assigned to elements of the weapons platoon of the rifle company and the rifle company headquarters. Their principal role is to provide protection for weapon crews, command posts, and administrative and logistical installations.

#### Section II. OFFENSE

**14. Mission.** The mission of the launcher in offensive action is to destroy groups of enemy personnel and to provide close fire support for assaulting elements after supporting artillery and mortar fires have been lifted or shifted.

**15. Rifle company.** *a.* As a result of the increased firepower provided by the launchers, the company commander may assign a wider frontage to platoons and accept increased gaps between them during the attack. Platoon frontages and the size of the gaps cannot be standardized; the company commander must determine both on the basis of the overall mission, the enemy situation, the terrain and weather, and the current strength of his company in each situation.

*b.* The capability to accept wider separation of platoons is based on the area fire characteristic of the launcher at ranges from 50 meters (54-55 yards) to 400 meters (435 yards). With this capability, the platoon can provide its own close-in fires similar to the fires provided by supporting mortars and artillery. While the launchers are not

intended to replace the fires currently available from supporting artillery and mortars, when communications with supporting fire support elements are interrupted, the platoon can provide its own area fire support and sustain itself in an isolated situation for a longer period. The company commander also may undertake more ambitious maneuvers; for example, a more distant separation of his maneuvering element from its fire support element.

**16. Rifle platoon.** *a.* The two launchers in the rifle squad provide it with firepower of a nature formerly available only from or through the platoon leader or company commander. The increase in firepower increases the flexibility of both the squad and the platoon because they may now maneuver their supporting weapons as an integral part of the squad. With the squad having an organic area fire weapon, the platoon leader also may undertake more ambitious maneuvers. He may assign wider frontages to his squads and allow a greater separation of squads during maneuver.

*b.* In the attack, the platoon leader normally will allow his squad leaders freedom of action in the employment of their launchers. On occasion, he may withdraw one or more of the weapons from within the platoon for employment in a support role. He will base his decision to take this action on the availability of fields of fire and firing positions which will place the weapon within range of the objective.

**17. Rifle squad.** The squad launchers give it an organic firepower which was obtainable only from or through the platoon leader in the past. The fire team leaders or the squad leader should control the fires of the launchers to avoid indiscriminate firing on inappropriate targets.

**18. Assault phase of the attack.** The launchers are used in the assault to fill the gap in firepower created when friendly supporting fires are lifted from the objective area as the platoon closes on the objective. At this time, the launchers fire at their maximum rate to fix the enemy in his position.

**19. Methods of employment in the attack.** *a. General.* The direct fire accuracy of the launcher is such that it can, within its range capability, continue to fire on the objective after indirect supporting fires have been lifted. During movement toward the objective, launchers normally will accompany the maneuvering elements. Once within range of the objective, they may be employed in an accompanying role, employed in support of the assault from a fixed position, or in a combination of these two methods. Primary considerations which govern the selection of the method of employment are the—

- (1) Range capability of the weapon.

- (2) Availability of firing positions which provide observation and fields of fire into the objective area.
- (3) Capability of the launchers to move with and fire throughout the movement of the assaulting elements from the assault line to the objective.

*b. Accompanying the assault elements.* Since the launcher can be carried and fired as easily as a rifle, the grenadier has no difficulty in keeping pace with the assaulting elements. This method of employment gives the fire team leader close control of the grenadier, progressively reduces the range as the grenadier approaches the objective, thus increasing the accuracy of his fire, and makes the launchers immediately available for employment during consolidation and reorganization. This is the method normally used because it provides the highest degree of close and continuous fire support.

*c. Supporting the assault from a fixed position.* When the launchers are employed in a supporting role, their positions must be within range of the objective to permit direct fire. The squad and platoon leaders do not have continuous immediate control of the grenadiers that are supporting from fixed positions and their launchers are not immediately available to support the consolidation and reorganization.

*d. Combination method of employment.* A part of the squad's (platoon's) organic launchers may be employed in fixed positions in a support role while the remainder accompany the assault elements. The advantages and disadvantages are as described in *b* and *c* above, but are in proportion to the number of launchers employed in each role.

*e. Consolidation and reorganization.* The launchers are ideally suited to destroy or repel an enemy dismounted counterattack during the critical period of consolidation and reorganization. The launchers should be located where they can best cover by fire the likely avenues of enemy foot approach into the area.

### Section III. DEFENSE

**20. Mission.** The launchers normally are employed to cover by fire the most likely avenues of enemy foot approach into the defensive position. (Since the most likely avenues of approach for a night attack may not be the same as those for a day attack, the launchers may have to be redeployed for the best coverage during hours of darkness.) Other missions may include filling gaps in the final protective fires of machineguns, reinforcing barrages and close-in concentrations, covering unoccupied gaps between units, and supporting a counterattack against enemy penetrations of forward platoon areas.

**21. Fire plans.** *a.* The company commander directs the employment of the company launchers only to the extent necessary to insure mutual support between forward elements of the company and between the company and adjacent units, and to insure protection for an exposed flank of the company.

*b.* To implement the platoon defense plan, the platoon leader may select the general firing location and the principal direction of fire for each of the platoon's launchers. Squad leaders then select the exact firing positions for their respective launchers and point out to each grenadier his principal direction and sector of fire. As a general rule, the squad leader is allowed freedom of action in the employment of the launchers organic to his squad—the platoon leader directing their employment only to the extent necessary to insure a coordinated platoon fire plan.

*c.* The normal frontage (100 meters  $\pm$ ) assigned the rifle squad in the defense and the range capability of the launcher permit mutual support between the two weapons organic to the squad. The sector of fire assigned each launcher should overlap the sectors of adjacent launchers sufficiently to insure complete coverage of the platoon area. The principal direction of fire covers the most likely avenue of enemy foot approach into the area.

**22. Selection of firing positions.** Launchers are employed along the same general line as other weapons of the platoon. Firing positions should be selected which provide maximum cover and concealment for the grenadier consistent with the assigned mission. Extreme care must be taken to insure that fields of fire are cleared of obstructions which might cause premature detonation of the projectile. Alternate and supplementary positions are selected for each weapon.

**23. Control measures.** The launchers are located within the squad defense area where they can best accomplish the assigned mission. Each fire team leader places himself where he can best control the fires of his grenadier and be in a position to operate the launcher if the grenadier becomes a casualty.

**24. Conduct of the defense.** As the enemy continues his advance toward the defensive position, he is brought under an ever-increasing volume of fire from those direct and indirect fire weapons located within the battle area. However, in order to gain an element of surprise against the enemy, the platoon leader may direct that a portion or all of the launchers withhold their fire until the enemy reaches a specified location, and then order all launchers to open fire simultaneously. This surprise fire, in conjunction with the fires of other platoon weapons, will have a devastating effect upon the enemy, particularly in the assault phase of the attack. If no restriction is

placed on the firing of the launchers, the grenadiers engage appropriate targets within their sectors as soon as they come within range. Fire team leaders insure that the grenadiers engage targets appropriate to the launcher. When final protective fires are called for, the grenadiers engage the largest mass of enemy foot elements within their assigned sectors or, if they have been assigned the mission of filling the gaps in final protective fires of other weapons, they commence firing on their assigned gaps.

By Order of *Wilber M. Brucker*, Secretary of the Army:

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*General, United States Army,*  
*Chief of Staff.*

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NG: None.

USAR: None.

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

TAGO 2710B

