

# TM 9-7018

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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## MEDIUM TANK M4A3



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## MEDIUM TANK M4A3

	<i>Paragraphs</i>	<i>Page</i>
CHAPTER 1. INTRODUCTION		
Section I. General.....	1, 2	3
II. Description and data.....	3-6	7
CHAPTER 2. OPERATING INSTRUCTIONS		
Section I. Service upon receipt of materiel.....	7-10	28
II. Controls and instruments.....	11-53	32
III. Operation under usual conditions.....	54-61	62
IV. Operation of materiel used in conjunction with major item.....	62-68	71
V. Operation under unusual conditions.....	69-75	78
CHAPTER 3. ORGANIZATIONAL MAINTENANCE IN- STRUCTIONS		
Section I. Parts, special tools, and equipment for organiza- tional maintenance.....	76-78	86
II. Lubrication and painting.....	79-82	96
III. Preventive maintenance services.....	83-86	119
IV. Troubleshooting.....	87-104	138
V. Entrance description and maintenance in vehicle.....	105-114	194
VI. Engine removal and installation.....	115-117	213
VII. Fuel, air intake, and exhaust systems.....	118-130	226
VIII. Ignition system.....	131-135	260
IX. Starting system.....	136-138	277
X. Cooling system.....	139-148	281
XI. Battery and generating system.....	149-152	293
XII. Instrument panel, signal sending units, switches, and gages.....	153-178	302
XIII. Terminal and control boxes, wiring, electrical equipment, and lighting system.....	179-202	324
XIV. Radio-interference suppression system.....	203-209	350
XV. Clutch.....	210-215	355
XVI. Propeller shafts, and universal joints.....	216-218	371

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<b>CHAPTER 3. ORGANIZATIONAL MAINTENANCE INSTRUCTIONS—Continued</b>	<i>Paragraphs</i>	<i>Page</i>
Sec. XVII. Transmission, differential, differential housings, and final drive.....	219-226	374
XVIII. Steering brakes.....	227-230	393
XIX. Tracks and suspension—vertical volute springs....	231-237	414
XX. Tracks and suspension—horizontal volute springs.....	238-248	455
XXI. Hull.....	249-259	502
XXII. Turret.....	260-275	511
XXIII. Auxiliary generator and engine.....	276-285	529
XXIV. Fire extinguisher system.....	286-290	541
XXV. Major armament mounts.....	291, 292	546
XXVI. Machine gun mounts.....	293-296	551
XXVII. Stabilizer.....	297-309	556
XXVIII. Maintenance under unusual conditions.....	310-317	572
<b>CHAPTER 4. MATERIEL USED IN CONJUNCTION WITH MAJOR ITEM</b>		
Section I. Armament (75-mm gun M3).....	318-326	576
II. Sighting and fire control instruments (75-mm gun M3).....	327-336	597
III. Ammunition for 75-mm gun M3.....	337-341	635
IV. Armament (76-mm guns M1A1C and M1A2).....	342-350	645
V. Sighting and fire control instruments (76-mm guns M1A1C and M1A2).....	351-360	664
VI. Ammunition for 76-mm guns M1A1C and M1A2.....	361-365	680
VII. Armament (105-mm howitzer M4).....	366-374	695
VIII. Sighting and fire control instruments (105-mm howitzer M4).....	375-384	714
IX. Ammunition for 105-mm howitzer M4.....	385-389	722
X. Communication system.....	390-399	745
<b>CHAPTER 5. SHIPMENT AND LIMITED STORAGE AND DESTRUCTION OF MATERIEL TO PREVENT ENEMY USE</b>		
Section I. Shipment and limited storage.....	400-403	763
II. Destruction of materiel to prevent enemy use....	404-408	779
<b>APPENDIX. REFERENCES.....</b>		<b>785</b>
<b>INDEX.....</b>		<b>790</b>

# CHAPTER 1

## INTRODUCTION

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### Section I. GENERAL

#### 1. Scope

*a.* This manual is published for the information and guidance of the personnel to whom the materiel is issued. It contains information on the operation and organizational maintenance of the materiel as well as description of major units and their functions in relation to other components of the materiel.

*b.* A list of references, including supply and technical manuals, forms, and other available publications applicable to the materiel is contained in the appendix.

*c.* This manual differs from TM 9-759, 15 September 1944, as indicated in (1) through (3) below.

- (1) Adds information on: Name, caution, and instruction plates; forms, records, and reports; operation of the vehicle; maintenance under unusual conditions; destruction of materiel to prevent enemy use; driver's or operator's preventive maintenance service—unusual conditions; fan and generator drive belt adjustment; timing magneto with engine; auxiliary engine fuel shutoff valve; removal of fuel shutoff valves; auxiliary generator and engine.
- (2) Revises information on: Description and data; tabulated data; operation under unusual conditions; preventive maintenance services; troubleshooting; lubrication under unusual conditions; special organizational tools and equipment; loading and blocking of the vehicle; painting and lubrication; radio-interference suppression system; spark plugs; oil filter; engine removal and installation; run-in procedure; propeller shafts and universal joints; magnetos; instrument panel; tracks and suspensions; auxiliary engine and generator; operation of controls; transmission oil cooler; drain valves; fuel shutoff valves on main engine fuel tanks; power train assembly; fuel filters; turret; fire-extinguisher system; armament; and sighting and fire control.

- (3) Deletes reference to: Compass; 75-mm gun wet stowage vehicles; 76-mm gun wet stowage vehicles; removal of engine cylinder heads; common tools; vehicle equipment; and spare parts.

*d.* In general, the prescribed organizational maintenance responsibilities will apply as reflected in the allocation of tools and spare parts in the appropriate columns of the current ORD 7 supply manual pertaining to this vehicle and in accordance with the extent of disassembly prescribed herein for the purpose of cleaning, lubricating, or replacing authorized spare parts. In all cases where the nature of repair, modification, or adjustment is beyond the scope or facilities of the using organization, the supporting ordnance maintenance unit should be informed in order that trained personnel with suitable tools and equipment may be provided or other proper instructions issued.

*Note.* The replacement of certain assemblies, that is, power train and differential, is normally an ordnance maintenance operation, but may be performed in an emergency by the using organization, provided authority for performing these replacements is obtained from the responsible commander. A replacement assembly, any tools needed for the operation that are not carried by the using organization, any special instructions regarding associated accessories, etc., may be obtained from the supporting ordnance maintenance unit.

## **2. Forms, Records, and Reports**

*a. General.* Responsibility for the proper execution of forms, records, and reports rests upon officers of all units maintaining this equipment. However, the value of accurate records must be fully appreciated by all persons responsible for their compilation, maintenance, and use. Records, reports, and authorized forms are normally utilized to indicate the type, quantity, and condition of materiel to be inspected, to be repaired, or to be used in repair. Properly executed forms convey authorization and serve as records for repair or replacement of materiel in the hands of troops and for delivery of materiel requiring further repair to ordnance shops in arsenals, depots, etc. The forms, records, and reports establish the work required, the progress of the work within the shops, and the status of the materiel upon completion of its repair.

*b. Authorized Forms.* The forms generally applicable to units operating and maintaining these vehicles are listed in the appendix. For a current and complete listing of all forms, see SR 310-20-6.

*c. Weapon Record Book.* Procedures and precautions to be observed by responsible personnel in the recording of pertinent data in the Weapon Record Book (DA Forms 9-13 (Part I) and 9-13-1 (Part II), formerly Artillery Gun Book, OO Form 5825) and instructions relative to its disposition are described in (1) through (10) below.

- (1) *Purpose.* The Weapon Record Book (DA Forms 9-13 and 9-13-1, formerly Artillery Gun Book, OO Form 5825) is used to keep an accurate record of the weapon.

- (2) *Scope of weapon record books.*
- (a) They serve as the record of use and maintenance of the materiel.
  - (b) They inform unit commanders of the condition and serviceability of weapons under the commander's jurisdiction.
  - (c) They serve as a source of technical data to the Ordnance Corps for the improvement of materiel and furnish valuable performance data for the development of new equipment.
- (3) *Arrangement.* The weapon record book is divided into two parts.
- (a) *Part I—Major item complete record.* Part I (DA Form 9-13 replaces OO Form 5825, which may be used) of the weapon record book is to remain with the carriage or mount at all times during its serviceable life. It contains—
    - Instructions for making entries, adding to filled books, replacement of lost books, and disposal of books.
    - A summary sheet—weapon component performance, identifying weapon components, dates of their installation and removal, and total rounds fired to these dates.
    - Record of assignments to battery and unit.
    - Weapon data record—noting results of inspections, repairs, alterations, replacements, and condition of principal components.
  - (b) *Part II—Cannon data.* Part II (DA Form 9-13-1) of the weapon record book is to remain with the gun tube, liner, or cannon at all times during its serviceable life. It contains—
    - Identification of weapon components.
    - Battery commander's record of rounds fired.
    - Bore inspection record—chronological star gage and pullover gage readings.
    - Bore inspection record—chronological estimations of remaining accuracy life (per TB 9-1860-2) and remarks on bore and chamber condition.
- (4) *Instructions for use.* The weapon record book contains instructions for making entries and for adding a new part I or II when the original has been filled. It is imperative that the entries be kept complete and up to date. It is also imperative that carbon paper be inserted between the pairs of pages when making entries in part II. Perforated copies of pages will not be removed. When the gun tube, liner, or cannon (breech ring and tube) is condemned, part II will

be removed from the book and forwarded to Office, Chief of Ordnance, Department of the Army, Washington 25, D. C., ATTN: ORDFM-Weapons.

- (5) *Additional prescribed entries.* In order to facilitate proper maintenance of the weapon and to avoid unnecessary duplication of repairs and maintenance, a record of completed work (MWO's, TB's, etc.) will be entered in the book. This entry, in addition to indicating the modifications completed, will also bear the signature of personnel responsible for the completion of the modifications.
- (6) *Security during shipment or transfer.* The procedures in (a) through (c) below are prescribed to insure that the book (part I plus part II) will always accompany the complete materiel whenever it is shipped or transferred from one organization to another.
  - (a) During transfer or shipment, the book will be kept in a waterproof envelope securely fastened to the materiel with waterproof tape in its designated location.
  - (b) Under one of the wrappings of tape, one end of a small tab will be inserted reading "Weapon Record Book Here."
  - (c) Ordnance direct and heavy support units and depots will insist that the book accompany each weapon when it enters their shop for repair or maintenance.
- (7) *Replacement cannon or tubes.* In the event that part II is missing on receipt of replacement cannon or tube, it should be immediately requisitioned directly from Rock Island Arsenal as described in (9) below. The serial number of the mount or carriage must be included. The serial number of the breech ring or the tube is neither wanted nor required.
- (8) *Forms for proofed weapons.* If the weapon requires proofing after repair and this is to be accomplished by another facility, the proofing facility will requisition the required forms.
- (9) *Procedure when weapon record book is lost or separated from the weapon.* If the book is lost, it will be replaced immediately and all available data will be entered in the new book. Pending receipt of the new book, a temporary record should be prepared and maintained. Number of rounds fired will be estimated by comparison of the pullover gage measurement with the appropriate curve shown in TB 9-1860-2. The Weapon Record Book, Part I (DA Form 9-13, Stock No. J003-8407300, formerly OO Form 5825) and/or Part II (DA Form 9-13-1, Stock No. J003-8407301) (part I plus part II. Stock No. J003-8408957) will be requisitioned when required from Rock Island Arsenal, Rock Island, Illinois, ATTN: ORDBC-S. A complete justification and explana-

tion, including serial number of the weapon for which the book is required, will be included on each requisition submitted. A record book that has become separated from a weapon to which it pertains will be forwarded to Office, Chief of Ordnance, Department of the Army, Washington 25, D. C., ATTN: ORDFM-Weapons. All perforated pages that contain notes and are separated from the record book will also be forwarded to this address.

- (10) *Disposal of weapon record book for condemned weapon (complete combination of major item).* When a weapon has become obsolete or is condemned, destroyed, turned in for salvage, or otherwise lost from service, a notation of this fact will be entered in part II and signed and dated by the personnel who condemned the weapon. The weapon record book (part I and part II) will then be sent through channels to Office, Chief of Ordnance, Department of the Army, Washington 25, D. C., ATTN: ORDFM-Weapons.

*d. Field Reports of Accidents.* The reports necessary to comply with the requirements of the Army safety program are prescribed in detail in SR 385-10-40. These reports are required whenever accidents involving injury to personnel or damage to materiel occur. Whenever an accident or malfunction involving use of ammunition occurs, firing of the lot that malfunctions will be immediately discontinued. In addition to any applicable reports required above, details of the accident or malfunction will be reported as prescribed in SR 385-310-1.

*e. Report of Unsatisfactory Equipment or Materials.* Any suggestions for improvement in design and maintenance of equipment and spare parts, safety and efficiency of operation, or pertaining to the application of prescribed petroleum fuels, lubricants, and/or preserving materials, or technical inaccuracies noted in Department of the Army publications will be reported through technical channels, as prescribed in SR 700-45-5, to the Chief of Ordnance, Department of the Army, Washington 25, D. C., ATTN: ORDFM, using DA Form 468, Unsatisfactory Equipment Report. Such suggestions are encouraged in order that other organizations may benefit.

*Note.* Do not report all failures that occur. Report only **REPEATED** or **RECURRENT** failures or malfunctions that indicate unsatisfactory design or material. However, reports will always be made in the event that exceptionally costly equipment is involved. See also SR 700-45-5 and the printed instructions on DA Form 468.

## Section II. DESCRIPTION AND DATA

### 3. Description

*a. General.* The medium tank M4A3 is an armored, fulltrack vehicle that mounts one of the following weapons: 75-mm gun, 76-mm gun,

or 105-mm howitzer (figs. 1 through 14). The vehicle contains a crew compartment (driving and fighting) in the front and an engine compartment in the rear. The transmission is located in the driving compartment between the driver and assistant driver.

*b. Power Train and Suspension.* The vehicle is powered by a 500-horsepower 8-cylinder, liquid-cooled, V-type Ford tank engine. Power is transmitted from the engine through a clutch and propeller shaft to the power train, which consists of a transmission, controlled differential, and final drives, and to the track sprockets. This vehicle is equipped with either the vertical- or horizontal-type suspension assemblies. A complete description of both will be found in paragraphs 231 through 248.

*c. Hull.* The hull is a completely welded structure, except the engine grille doors, hull top and bottom plates, and hull rear door, which are removable for service and maintenance operations. The crew doors and escape hatch provide entrance or exit from the vehicle. The power train is bolted to the front portion of the hull. A bulkhead extends across the center of the vehicle separating the engine compartment in the rear from the crew compartment in the front of the hull. Lifting eyes (figs. 1, 2, 10, and 11) are provided for lifting the entire tank.

*Note.* The tank must not be lifted by the turret lifting eyes.

*d. Turret.* The turret is a completely cast structure, except that portion which receives the gun and the hatch doors. The turret can be traversed 360° in either direction, both manually and by means of the hydraulic power traversing mechanism. The 75-mm gun M3 can be elevated 25° and depressed 10°; the 76-mm gun M1A1C or M1A2 can be elevated 25° and depressed 10°; the 105-mm howitzer M4 can be elevated 35° and depressed 10° by the gun elevating handwheel. The late model 75-mm gun, the 76-mm gun, and 105-mm howitzer vehicles have only a partial turret platform for the gunner and commander, while the early model 75-mm gun vehicle turret has a basket, and the platform is completely circular and level with the sponson. Lifting eyes are provided for hoisting the turret clear of the tank.

*e. Auxiliary Equipment.*

- (1) The tank is equipped with an auxiliary generator and engine (fig. 48), to furnish electrical power for the vehicle's electrical equipment, in addition to that supplied by the main generator (or generators on early models). The auxiliary generator and engine can be operated while the main engine is not running, to recharge the batteries and to provide power for communications and other electrical equipment.

*Note.* The auxiliary engine also can be operated when the main engine is running.