

UNCLASSIFIED

AD NUMBER

AD395257

CLASSIFICATION CHANGES

TO: UNCLASSIFIED

FROM: CONFIDENTIAL

LIMITATION CHANGES

TO:
Approved for public release; distribution is unlimited.

FROM:
Distribution authorized to U.S. Gov't. agencies and their contractors;
Administrative/Operational Use; APR 1954. Other requests shall be referred to U.S. Army Materiel Command, Washington, DC 20315.

AUTHORITY

AGO D/A ltr, 16 Aug 1979; AGO D/A ltr, 16 Aug 1979

THIS PAGE IS UNCLASSIFIED

UNCLASSIFIED

AD-395 257

CLASSIFICATION CHANGED
TO: UNCLASSIFIED
FROM CONFIDENTIAL
AUTHORITY:

USARACOM 1st, 16 Aug 79



UNCLASSIFIED

THIS REPORT HAS BEEN DELIMITED
AND CLEARED FOR PUBLIC RELEASE
UNDER DOD DIRECTIVE 5200.20 AND
NO RESTRICTIONS ARE IMPOSED UPON
ITS USE AND DISCLOSURE.

DISTRIBUTION STATEMENT A

APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION UNLIMITED.

SECURITY

MARKING

The classified or limited status of this report applies to each page, unless otherwise marked.

Separate page printouts MUST be marked accordingly.

THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE LAWS, TITLE 18, U.S.C., SECTIONS 793 AND 794. THE TRANSMISSION OR THE REVELATION OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

NOTICE: When government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related government procurement operation, the U.S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

TECHNICAL INFORMATION REPORT 3-1-3M1

OFFICE, CHIEF OF ORDNANCE 17 April 1954

AD 39525

DA-36-034-AMC-3785(X)

DEVELOPMENT OF

120-MM GUN TANK, T43E1

PREPARED FOR THE U. S. ARMY MATERIAL COMMAND BY THE ARMY MATERIAL RESEARCH STAFF, UNIVERSITY OF PITTSBURGH, UNDER CONTRACT DA-36-034-AMC-3785(X).

18 AMC

19 TIR-3-1-3M1

In the latter part of 1948 studies preparatory to the opening of a project for the development of a 120-mm gun tank were begun. The tank desired was to meet all requirements for assault action, anti-tank missions, and the support of infantry and other tanks in offensive and defensive operations. It was to be superior to the already-developed experimental T34 heavy tank, which also mounted a 120-mm gun; specifically, this superiority was to be most pronounced in maneuverability, flexibility of performance, and the availability of components. The vehicle to meet these requirements was designated the T43 heavy tank, and the project for its development was given final official approval on 5 May 1949.

The military characteristics originally established for the T43 included a maximum gross weight of 55 tons, a maximum length of 275 inches for the tank itself, and a ground pressure of 11.3 psi. The main armament was to be a 120-mm gun with quick-change tube, mounted in a sloped turret on an elliptical hull; the designs of both turret and hull were to be worked out so as to present a minimum area of flat surface to enemy fire. As the development proceeded, many changes were made in both the characteristics and the design developed to meet them; for the most part, they were introduced to improve different features of the tank, to facilitate its transportation, and to reduce production problems to a minimum. In recognition of these changes, in July 1952 the item was redesignated the T43E1 120-mm gun tank.

The T43E1 is a full-track-laying combat vehicle with individual torsion bar suspension, center guide track, and rear sprocket drive. Its gross weight is 60 tons, which is 12 tons less than the weight of the T34 experimental heavy tank. The length has been maintained at 275 inches; with the gun forward, the over-all length of the vehicle is 448 inches and, with the gun to the rear, 397 inches. Although the over-all width is 144 inches, it can be reduced to 131 inches for transport by rail by removing tracks, fenders, hubs, and sprockets. Similarly, the maximum over-all height of 140 inches can be reduced to 127 inches to facilitate transport. The T43E1's ground clearance is 16.125 inches, and it exerts a unit ground pressure of 12.4 psi.

DOWNGRADED AT 12 YEAR INTERVALS NOT AUTOMATICALLY DECLASSIFIED

Reproduction of this document in whole or in part is prohibited except with permission of the issuing office.

FEB 5 1969

DOD DIR 5200.10

Copy of copies

Regraded CONFIDENTIAL by authority of CHIEF, AMC, by Na Barber on 17 Feb 1964

DDC AVAILABILITY NOTICE: Qualified requesters may obtain copies of this report from DDC.

CONFIDENTIAL

COPY

Army Materiel Command

ATTN: AMCXD-P

CONFIDENTIAL ~~SECRET~~

TIR 3-1-3M1

120-MM GUN TANK, T43E1



120-MM GUN TANK, T43E1

Maximum speed on roads is 22 mph and cruising speed is 18 mph; at the latter speed, cruising range is about 80 miles. The tank operates satisfactorily in temperatures between -25° and 125° F; when fitted with its Arctic kit, it will start and operate satisfactorily in temperatures as low as -65° F. It can be stored without danger to its components in temperatures from -80° to 160° F.

The power plant of the T43E1 tank is an air-cooled Continental AV-1790-7 engine with cross-drive transmission; the engine develops 810 hp at 2,800 rpm. Development is being continued to provide a power package that will deliver more power with greater fuel economy, increased simplicity of maintenance, and increased dependability. Employment of the CD-850-4 cross-drive transmission enables the T43E1 tank to turn on pivot, which greatly increases its maneuverability.

One of the most outstanding features of the T43E1 is the curved contours of its hull and turret (the elliptical hull was first developed for this vehicle). By departing radically from conventional practice, the designers produced a hull which, instead of having flat sides and a sloped flat front, is elliptical both in the contour of its sides and the slope of its front; the purpose of this change, as has been noted, is to present a minimum of flat area to enemy fire. With the exception of its bottom and the rear of its top deck, the hull is a single casting of homogeneous armor steel. Armor of equivalent thicknesses ranging from 5 to 4.5 inches at obliquities of from 60° to 45° protects the upper and lower parts of the hull's front. The armor thickness of the sides of the hull is the equivalent of 3 inches at 0° ; the thicknesses of the rear armor vary from 1.5 inches

- 2 -

~~SECRET~~

CONFIDENTIAL

~~SECRET~~

CONFIDENTIAL

120-MM GUN TANK, T43E1

TIR 3-1-3M1

at 30° in the upper part to 1 inch at 60° in the lower; the top is 1 inch thick, and the floor armor varies from 0.5 to 1.5 inches.

The hull contains three compartments. The driver's compartment, in the center of the forward section, contains the controls and instruments for operating the vehicle and two racks, each for ten rounds of 120-mm ammunition, on either side of the driver's position. Three T25 periscopes, set into the hull around the driver's hatch, provide 115° visibility when the driver's hatch is closed. The upper part of the fighting compartment, located directly behind the driver's compartment, is circular and machined to receive the turret ring. At the rear of the hull, the engine compartment houses the engine and cross-drive transmission, oil-cooling fans and radiator, fuel tanks, an auxiliary engine, and the carburetor air cleaners.

The turret has sharply-sloped sides and rear and is supported by an 85-inch ring mounted on top of the hull. Only the forward part is directly over the ring; it contains the T154 combination gun mount and its T123E1 120-mm gun and has space for two loaders. A turret bustle extends about 68 inches to the rear of the turret ring and provides space for the commander and the gunner; it mounts the commander's cupola, a target designating sight, and an M2 HB caliber .50 machine gun. The turret is a single homogeneous armor steel casting with a cast top plate and front cover, both attached by screws. The front of the turret is protected by armor of a thickness equivalent to 5 inches at 60° obliquity; the armor of the sides varies from equivalent thicknesses of 5.375 inches at 20° to 2.75 inches at 40°. The roof and the floor are each 1.5 inches thick.

The main armament of the T43E1 tank is the recently-developed T123E1 120-mm high-velocity tank gun, mounted on a T154 combination gun mount and fitted with both a bore evacuator and a muzzle brake. The gun can be traversed through 360°, elevated to 15°, and depressed to -8° by either hydraulic power or manual means.

Four new armor-defeating rounds, all of which are separated, are being developed for use in the T123E1 gun, as follows:

120-mm AP shot, T116E5
120-mm HVAPDS shot, T102E2
120-mm HEAT shell, T153E1
120-mm HEP shell, T143E5

Stowage facilities for 33 complete rounds are provided.

In addition to the main armament and the M2 HB caliber .50 machine gun on the commander's cupola, two M37 caliber .30 machine guns will be mounted coaxially in the turret.

Fire control equipment includes a T42E1 72-inch range finder incorporating a normally-operated cant correction device; the complete unit is used as the gunner's range finder and primary sight. A T23E2 ballistic drive, an M20A2 gunner's periscope which is used as a secondary sighting device for the main gun, a T21 elevation quad-

- 3 -

~~SECRET~~

CONFIDENTIAL

~~SECRET~~

CONFIDENTIAL

TIR 3-1-3M1

120-MM GUN TANK, T43E1

rant, and a T25 azimuth indicator make up the rest of the T43's fire control equipment.

The T43E1's crew consists of a commander, a driver, a gunner, and two loaders.

In addition to the equipment already referred to, the T43E1 is furnished with one caliber .30 carbine and one caliber .45 submachine gun.

The T43E1 120-mm gun tank was put into quantity production in February 1951, but engineering tests will not be completed until late in 1954. No definite information can be given as to when it will be released for service use.

TENTATIVE PRINCIPAL CHARACTERISTICS

120-mm Tank Gun, T123E1

Caliber	120 mm
Length, over-all	291 in
Length of bore	60 cal
Travel of projectile in bore	248.3 in
Rifling	
Length	243.95 in
Number of grooves	42
Twist, uniform right-hand, one turn in	25 cal
Weight of tube	4,600 lb
Weight of breech mechanism	1,522 lb
Weight of muzzle brake	100 lb
Weight of bore evacuator	60 lb
Weight of complete gun	6,282 lb
Chamber capacity	1,021 cu in
Density of loading	0.69
Rated maximum chamber pressure	48,000 psi
Breechblock, type	vertical sliding
Breech mechanism	semiautomatic
Firing mechanism	percussion-electric
Ammunition, type	separated
Muzzle velocity (AP shot)	3,500 fps
Maximum effective range	2,000 yd
Perforation of homogeneous armor	
AP shot @ 1,000 yd	10.8 in
AP shot @ 2,000 yd	9.8 in
HEAT shell @ 0°	16 in
Rate of fire	no information

Combination Gun Mount, T154

Weight	no information
Recoil mechanism, type	hydrospring
Number of recoil cylinders	4

- 4 -

SECRET

CONFIDENTIAL

120-MM GUN TANK, T43E1

CONFIDENTIAL

TIR 3-1-3M1

Recoil length	
Normal	12 in
Maximum	14 in
Equilibrator	hydraulic
Elevating mechanism, type	hydraulic and manual
Maximum elevation	15°
Maximum depression	-8°
Traversing mechanism, type	hydraulic and manual
Maximum traverse, right or left	360°

Fire Control Equipment

Finder, range	T42E1
Drive, ballistic	T23E2
Light, instrument	M30
Quadrant, elevation	T21
Light, instrument	T22
Indicator, azimuth	T25
Periscope, gunner's	M20A2
Mount, periscope	T176E2
Periscopes, driver's (3)	T25
Sight, vane	

Ammunition Stowage

120-mm rounds	33
---------------	----

120-mm Gun Tank, T43E1

Length	
With gun forward	448.375 in
With gun to rear	397.5 in
Width	144 in
Height	140 in
Weight, over-all	120,000 lb
Ground clearance	16.125 in
Tread, from center to center of tracks	115 in
Length of ground contact	173.437 in
Suspension	
Type	torsion bar
Wheels	26 in
Tires	26 x 6
Tracks	
Type	steel and rubber
Width	28 in
Number of shoes (both tracks)	164
Armor	
Hull	
Type	cast homogeneous
Front	
Upper	equivalent to 5 in @ 60°
Lower	equivalent to 4.5 in @ 45°

CONFIDENTIAL

TIR 3-1-3M1

CONFIDENTIAL

120-MM GUN TANK, T43E1

Side	
Upper	equivalent to 3 in @ 0°
Lower	equivalent to 3 in @ 0°
Rear	1.5 to 1 in @ 30° to 60°
Top	1 in
Floor	0.5 to 1.5 in
Turret	
Type	cast homogeneous
Front	equivalent to 5 in @ 60°
Side	5.375 to 2.75 in @ 20° to 40°
Rear	1.5 in @ 40°
Roof	1.5 in
Gun shield	10 to 4 in @ 45°
Armament	
Main	120-mm tank gun, T123E1
Secondary	
Cal .30 machine gun, coaxial (2)	M37
Cal .50 machine gun, on turret	M2 HB
Communications	
Radios	as selected by Signal Corps
Interphones (5)	as selected by Signal Corps
Engine	
Type	air-cooled gasoline
Make and model	Continental AV-1790-7
Cylinders	
Number	12
Bore	5.75 in
Piston stroke	5.75 in
Piston displacement	1,791.75 cu in
Arrangement	V-type
Drive from crankshaft	direct
Induction system	natural aspiration
Ignition timing	automatic advance
Horsepower	
Gross	810 @ 2,800 rpm
Net	690 @ 2,800 rpm
Torque	
Gross	1,600 lb-ft @ 2,300 rpm
Net	1,330 lb-ft @ 2,100 rpm
Electrical system	
Number of batteries	4
Transmission	
Type	CD cross-drive
Range selector control box	
Type	mechanical
Linkage to transmission	mechanical
Torque converter	single-stage polyphase
Gear shift and steering mechanism	
Internal	hydraulic
External	mechanical
Oil system	
Capacity	72 qt
Pumps	

CONFIDENTIAL

SECRET

120-MM GUN TANK, T43E1

CONFIDENTIAL

TIR 3-1-3M1

Type	gear
Number	5
Drive	2 input and 3 output shafts
Filter, type	air maze, double
Coolant	air
Fuel capacity	230 gal
Brakes	
Service brake, type	wet, multiple disk
Parking brake, type	lock on service brake
Crew	5
Performance	
Maximum speed on level	22 mph
Maximum grade climbing ability	60%
Maximum trench crossing ability	90 in
Height of obstacles that can be crossed	27 in
Fording depth	48 in
Turning radius	pivot
Cruising range	80 mi

(7 -

SECRET

CONFIDENTIAL