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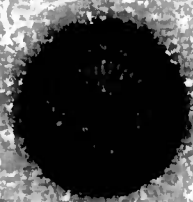
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TECHNICAL INFORMATION REPORT, 3-1-2H1

OFFICE, CHIEF OF ORDNANCE
11 Apr 1954

18 AMC

19 TIR-3-1-2H1

6 DEVELOPMENT OF 90-MM GUN TANK, T49

*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)".

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A recurring problem of tank design is the increasing of fire-power, armor protection, and mobility without a comparable increase in weight and size. During the last decade, as the potentialities of steel armor have come closer and closer to realization and metallurgy has so far been unable to provide a satisfactory substitute for steel as the basic armor material, this problem has become increasingly difficult to solve. The development of the T49 90 mm gun tank, which combines the armament of a medium gun tank with the armor protection and mobility of a light gun tank, represents one attack upon it at the medium gun tank level.

Studies conducted for several years before mid-1951 indicated the possibility of mounting a 90-mm tank gun in a 76-mm gun tank if the gun selected were a low-pressure weapon designed for firing fin-stabilized HEAT rounds; adoption of a low-pressure gun would make possible the saving of weight needed to offset the results of increasing the weapon's caliber by 14 mm. As a result, development of a smoothbore gun of this type, designated the T132 90-mm gun, was put under way, with the requirement that its tube be quickly replaceable in the field. At first it was believed that the T132 gun could be mounted in a T41E1 tank without making major changes in the vehicle or increasing its over-all weight. However, it soon was found that both a new gun mount and a new turret were desirable, and the problem then became one of designing these so that they would not increase vehicle weight. During 1950 and early 1951 work was concentrated on the development of a mount and turret which would meet all the conditions set.

In June 1951 the different phases of the work were brought together under a project for development of the T49 90-mm gun tank. The objective of this project was a lightly-armored high-speed tank of the light gun class but with the firepower of a medium gun tank, to be used principally for antitank missions.

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In compliance with the quick-removal-of-tube requirement, the T132 smoothbore gun had been designed so that its tube could quickly

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90-MM GUN TANK, T49

be changed in the field. The gun was originally to be installed in the T138E1 combination gun mount of the T41E1 76-mm gun tank; however, because the T138E1 mount had been designed for a gun with a nonremovable tube and could not satisfactorily be adapted to the T132 weapon, a new combination gun mount was designed. This was the T145 mount with T87 recoil mechanism. Development of the T145 mount, in its turn, compelled altering of the T132 gun's contour so that it would fit the T145, rather than the T138E1.

The next major change in design was necessitated by the results of tests of the ammunition developed for use in the T132 gun, which tests had revealed the improbability of the gun-ammunition combination attaining the ballistic results desired. Accordingly, the design of the T132 gun was modified to call for very shallow rifling of the tube and a slight increase in chamber pressure; the revised design, designated T132E1, was nevertheless that of a low-pressure gun to fire fin-stabilized HEAT projectiles. Since this change in plans, the development of the gun has proceeded from the T132E1 to the T132E3 model. The T132E2 differs from the T132E1 only in certain modifications of the chamber, which has been further modified in the T132E3. All models from T132E1 through T132E3 have light rifling of

one twist in twenty-five calibers. Each is a thin-walled gun for firing 16-pound fin-stabilized HEAT projectiles at a muzzle velocity of approximately 2,800 fps. From these models, the T132E3 has been selected as the main armament of the T49 tank.

No new HEAT ammunition is being developed for use in the T132E3 gun, which will fire the T108E40 90-mm HEAT shell. The original requirement that the T49's gun should fire only HEAT rounds has been modified, and the following rounds now under development are now specified for use in the T132E3:

- 90-mm HEP shell, T142E8
- 90-mm HE shell, T91
- 90-mm WP smoke shell, T92

As developed to date, the T49 90-mm gun tank is a lightly-armored full-track-laying vehicle of 25.5 ton combat weight; it is 278 inches long, 124 inches wide, and 108 inches high.

Except for turret and main armament and very minor differences in hull, the T49 tank is identical with the M41 and M41A1 76-mm gun tanks. The turret developed for the T49 is made up of arc-welded castings and plate, and is rotatable through 360° on a ball-bearing ring. An amplidyne system controls the electric motors used to traverse it; this represents a recent development, intended to replace the commonly-employed constant-pressure hydraulic traversing system. Protected by armor varying in thickness from 0.5 to 1.25 inches and mounted at obliquities ranging from 0° to 72°, the turret has space for the 90-mm tank gun, a T41E3 range finder, and a caliber .50 machine gun on the T145 combination gun mount. The weight of the 90-mm gun is counterbalanced by radio equipment, ventilator blower, and other equipment located or stowed in the turret's rear. A pintle mount for an M2 HB machine gun is located on the turret's top.

The fire control equipment for the T49 tank includes a T41E3 range finder, a T23E2 ballistic drive, an M31 azimuth indicator, commander's, gunner's, loader's, and driver's periscopes, and other instruments needed to make fire as accurate as possible.

The manufacture of two pilot models of the T49 tank was initiated in the spring of 1952. They are now being subjected to engineering tests, which are scheduled for completion in the near future. However, in the summer of 1953 Army Field Forces indicated that they were no longer interested in this tank, their reason being that the low-pressure guns developed for its main armament could not guarantee an 88% probability of first-round hit. Because of this withdrawal of user interest, it is possible that work on the T49 will not be continued beyond engineering testing and that the tank itself will not be put into production.

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TIR 3-1-2H1

90-MM GUN TANK, T49

90-mm Tank Gun, T132E3

Caliber	90 mm
Length, over-all	192.26 in
Length of bore	50 cal
Travel of projectile in bore	152.65 in
Rifling	
Length	152.775 in
Number of grooves	32
Twist, uniform right-hand, one turn in	25 cal
Weight of tube	970 lb
Weight of breech mechanism	390 lb
Weight of complete gun	1,440 lb
Chamber capacity	267 cu in
Density of loading	0.57
Rated maximum chamber pressure	30,000 psi
Breechblock, type	vertical sliding
Breech mechanism	semiautomatic
Firing mechanism	percussion-inertia
Ammunition, type	fixed
Muzzle velocity	2,800 fps
Maximum effective range	2,000 yd
Perforation of homogeneous armor	
HEAT shell	12 in
Rate of fire	8 rd/min

Combination Gun Mount, T145

Weight	no information
Recoil mechanism, type	concentric hydrospring
Number of recoil cylinders	1
Recoil length	
Normal	no information
Maximum	no information
Equilibrator, type	no information
Elevating mechanism, type	electrical and manual
Maximum elevation	20°
Maximum depression	-10°
Traversing mechanism, type	electrical and manual
Maximum traverse, right or left	360°

Fire Control Equipment

Quadrant, gunner's	M1
Periscope	M13
Setter, fuze	M14 or M27
Periscopes (4)	M17
Lights, instrument (3)	M36
Drive, ballistic	T23E2
Indicator, azimuth	M31
Periscopes (2)	M20A2
Finder, range	T41E3
Mount, periscope	M93
Mount, periscope	M94

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90-MM GUN TANK, T49

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Sight, bore

Ammunition Stowage

90-mm rounds 44

90-mm Gun Tank, T49

Length	
With gun forward	no information
With gun to rear	no information
Width	124 in
Height	108.375 in
Weight, over-all	51,232 lb
Ground clearance	17 in
Tread, from center to center of tracks	102.5 in
Length of ground contact	127 in
Ground pressure	9.6 psi
Suspension, type	torsion bar
Wheels	no information
Tires	no information
Tracks	
Type	steel and rubber
Width	21 in
Number of shoes (both tracks)	150
Armor	
Hull	
Type	cast homogeneous
Front	
Upper	1 in @ 60°
Lower	1.25 in @ 45°
Side	
Upper	1 to 0.75 in @ 0°
Lower	1 to 0.5 in @ 45° to 60°
Rear	0.75 in @ 45°
Top	0.5 to 0.75 in
Floor	1.25 in (front), 0.375 in (rear)
Turret	
Type	welded homogeneous
Front	1 in @ 72°
Side	1 in @ 30° to 9°
Rear	1 in @ 0°
Roof	0.5 in
Gun shield	1.25 to 1 in
Armament	
Main	90-mm tank gun, T132E3
Secondary	
Coaxial	cal .50 MG, M2 HB
On turret	cal .50 MG, M2 HB
Communications	
Radios	as selected by Signal Corps
Interphones	4

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90-MM GUN TANK, T49

Engine	
Type	air-cooled gasoline
Make and model	Continental AOS-895-3
Cylinders	
Number	6
Bore	5.75 in
Piston stroke	5.75 in
Piston displacement	895.9 cu in
Arrangement	horizontal-opposed
Drive from crankshaft	direct
Induction system	supercharged
Ignition timing	automatic advance set 10° BTC
Horsepower	
Gross	500 @ 2,800 rpm
Net	440 @ 2,800 rpm
Torque	
Gross	975 ft/lb @ 2,400 rpm
Net	900 ft/lb @ 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	14 gal
Pumps	
Type	positive displacement gear
Number	6
Drive	3 input, 2 output shafts
Filter, type	air maze
Coolant	air
Fuel capacity	140 gal
Brakes	
Service brake, type	wet, friction disk
Parking brake, type	lock on service brake
Crew	4
Performance	
Maximum speed on level	45 mph
Maximum grade climbing ability	60%
Maximum trench crossing ability	72 in
Height of obstacles that can be crossed	28 in
Fording depth	72 in w/kit, 40 in w/o kit
Turning radius	pivot
Cruising range	77 mi

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