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DEVELOPMENT

OF

90-KM GUN TANK, T49

TECHNICAL INFORMATION

REPORT, 3-1-2H1

OFFICE, CHIEF\_OF\_ORDNANCE (I) Apr . 1954

6-034-AMC-3785(X)

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

A recurring problem of tank design is the increasing of firepower, 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 finstabilized 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 smoothbore gun of this type, designated the 1132 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 condithe 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.

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

DOWNGRADED AT 12 YEAR INTERVALS

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90-MM GUN TANK, T49

be changed in the field. The gun was originally to be installed in the T138El combination gun mount of the T41El 76-mm gun tank; however, because the T138El 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 T138El.

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

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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 lightlyar mored full-track-laying vehicle of 25.5 ton combat weight; it is 27. 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 engineer ing 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.

> TENTATIVE PRINCIPAL CHARACTERISTICS Dence - 3.4

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90-MM GUN TANK, T49

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### 90-mm Tank Gun, T132E3

Caliber Length, over-all Length of bore Travel of projectile in bore Rifling	90 mm 192.26 in 50 cal 152.65 in
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

no information
concentric hydrospring
1
no information
no information
no information
electrical and manual
200
-10°
electrical and manual
3600

### Fire Control Equipment

Quadrant, gunner's Periscope Setter, fuze Periscopes (4) Lights, instrument (3) Drive, ballistic Indicator, azimuth Periscopes (2) Finder, range Mount, periscope Mount, periscope

M1 M13 M14 or M27 M17 M36 T23E2 M31 M20A2 T41E3 M93 M94

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90-MM GUN TANK, T49

Sight, bore

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Ammunition Stowage

90-mm rounds

44

90-mm Gun Tank, T49

Length With gun forward no information With gun to rear no information 124 in Width 108.375 in Height 51,232 1b 17 in 102.5 in Weight, over-all Ground clearance Tread, from center to center of tracks 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 Туре cast homogeneous Front l in @ 600 Upper 1.25 in @ 450 Lower Side l to 0.75 in @ 0° l to 0.5 in @ 45° to 60° 0.75 in @ 45° Upper Lower Rear 0.5 to 0.75 in 1.25 in (front), 0.375 in Top Floor (rear) Turret welded homogeneous 1 in @ 72° 1 in @ 30° to 9° Туре Front Side l in @ 0° 0.5 in Rear Roof Gun shield 1.25 to 1 in Armament Main 90-mm tank gun, T132E3 Secondary cal .50 MG, M2 HB cal .50 MG, M2 HB Coaxial On turret Communications Radios as selected by Signal Corps 4 Interphones

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Engine Type Make and model Cylinders Number Bore Piston stroke Piston displacement Arrangement Drive from crankshaft Induction system Ignition timing Horsepower Gross Net Torque Gross Net Electrical system Number of batteries Transmission Туре Range selector control box Type Linkage to transmission Torque converter Gear shift and steering mechanism Internal External Oil system Capacity Pumps Туре Number Drive Filter, type Coolant Fuel capacity Brakes Service brake, type Parking brake, type Crew Performance Maximum speed on level Maximum grade climbing ability Maximum trench crossing ability Height of obstacles that can be crossed Fording depth Turning radius

air-cooled gasoline Continental AOS-895-3 6 5.75 in 5.75 in 895.9 cu in horizontal-opposed direct supercharged automatic advance set 10° BTC 500 @ 2,800 rpm 440 @ 2,800 rpm 975 ft/lb @ 2,400 rpm 900 ft/lb @ 2,100 rpm 4 CD cross-drive mechanical mechanical single-stage polyphase hydraulic mechanical 14 gal positive displacement gear 6 3 input, 2 output shafts air maze air 140 gal wet, friction disk lock on service brake 4 45 mph 60% 72 in 28 in 72 in w/kit, 40 in w/o kit pivot 77 mi

Cruising range

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90-MM GUN TANK, T49