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NORINCO Type 85-II AP MBT in service with Pakistan and showing roof mounted 12.7 mm machine gun 1403755

The 125-II projectile has a muzzle velocity of 1,740 m/s and will penetrate 600 mm of RHA at a range of 2,000 m. The projectile weighs 7.44 kg and has a diameter of 26 mm.

According to NORINCO, this round can also be fired from the 125 mm smoothbore gun installed in the Russian T-72 MBT. With a modified fire-control system it can also fire a laser-guided projectile. This is a Russian design and has a maximum range of 5,000 m.

As of early 2013, this 125 mm laser-guided projectile, which is based on a Russian design, had not been offered on the export market by NORINCO, although a 105 mm version has been marketed for several years.

A 7.62 mm machine gun is mounted coaxially with the main armament and a bank of six electrically-operated smoke grenade dischargers is mounted either side of the turret. In addition the vehicle can lay its own smoke screen by injecting diesel fuel into the exhaust.

The Image-Stabilised Fire-Control System (ISFCS) includes a laser rangefinder integrated into the stabilised gunner's sight, control panels, ballistic computer and sensors which give a high first round hit probability against both stationary and moving targets while the Type 85-IIIM is stationary or moving. Second-generation image intensification night vision equipment is standard for the commander, gunner and driver.

The supercharged V-12 diesel engine develops 730 hp and is coupled to a transmission of an undisclosed type. It is possible that the power pack is the same as that installed in the Type 80 MBT.

The earlier NORINCO Types 59, 69 and 79 MBTs have their exhaust outlets located on the left side of the hull, just above the last roadwheel station as on the Russian T-54, T-55 and T-62 MBTs. The hull of the Type 85-IIIM is a new design and does not appear to be based on the Type 80 MBT.

The suspension either side consists of six dual rubber-tired roadwheels with torsion bars, hydraulic shock-absorbers, an idler at the front, drive sprocket at the rear and track-return rollers. The upper part of the suspension is covered by a skirt. The steel tracks have replaceable rubber pads.

Standard equipment includes a Type 889B radio system, NBC system and fire and explosion detection/suppression system.

Variants

Type 88C MBT

It is understood that the People's Liberation Army designation for the Type 85-IIIM MBT is the Type 88C and was first seen late in 1999. This weighs 41.5 tonnes and has an overall length of 10.65 m (turret traversed to the front), width of 3.3 m and a height of 2.3 m. It has a crew of three and is armed with a 125 mm smoothbore gun fed by an automatic loader. The ISFCS-212 computerised fire-control system is fitted.

Some Type 88C MBTs have been observed fitted with a laser jammer type device on the left side of the turret roof. This is operated by remote-control from within the turret.

Type 85 IIAP MBT

This is the version of the Type 85-II MBT built in Pakistan.

It should be noted that the Type 85 IIAP has the roof mounted 12.7 mm machine gun on a fixed mount rather than on the commanders cupola.

Type 85-III MBT

Details of this version that features a 125 mm smooth bore gun fed by an automatic loader are given in a separate entry in *IHS Jane's Land Warfare Platforms: Armoured Fighting Vehicles*.

As of early 2013 NORINCO was not marketing the Type 85-III MBT.

Other variants

These are understood to include a multipurpose mineclearing tank and a fire fighting vehicle. The latter has its turret removed and is fitted with a new superstructure with a remote-controlled fire hydrant on the roof. Mounted at the front of the hull is a full wide hydraulically operated dozer blade.

Type 654 Armoured Repair and Recovery Vehicle

This is the latest NORINCO vehicle of this type and is based on automotive components of the more recent Type 90-II (MBT 2000) and details are provided in this entry in *IHS Jane's Land Warfare Platforms: Armoured Fighting Vehicles*.



NORINCO Type 85-II AP MBT in service with Pakistan and with turret traversed to the right 1403756

This is the latest ARV to be offered on the export market by NORINCO but at this stage it is now known as to whether the Type 654 Armoured Repair and Recovery Vehicle was developed to meet the requirements of the Peoples Liberation Army or to support the export market.

It is possible that this vehicle was developed to meet the requirements of Pakistan to support its expanding fleet of heavier MBTs such as the Al Khalid and T-80UD supplied by Ukraine.

Specifications

	Type 85-II
Dimensions and weights	
Crew:	3
Length	
overall:	10.28 m
hull:	6.325 m
Width, overall:	3.45 m
Height, to turret roof:	2.30 m
Ground clearance, hull:	0.48 m
Weight, combat:	41,000 kg
Mobility	
Configuration, running gear:	tracked
Power-to-weight ratio:	15.50 hp/t
Speed, max speed:	57.25 km/h
Fording, without preparation:	1.4 m
Gradient:	60%
Vertical obstacle, forwards:	0.80 m
Trench:	2.7 m
Engine	VR-36, V-12, supercharged, diesel, 730 hp
Suspension:	torsion bar
Firepower	
Armament:	1 × turret mounted 125 mm smoothbore gun
Armament:	1 × coaxial mounted 7.62 mm (0.30) machine gun
Armament:	1 × roof mounted 12.7 mm (0.50) machine gun
Armament:	12 × turret mounted smoke grenade launcher (2 × 6)
Ammunition	
main total:	40
7.62/0.30:	2,000
12.7/0.50:	500
Turret power control, type:	powered/manual
Main armament traverse, angle:	360°
Main armament elevation/depression	
armament front:	+14°/-4.5°
Gun stabiliser	
vertical:	yes
horizontal:	yes
Range-finding device:	yes, laser
Survivability	
Night vision equipment, vehicle:	yes
NBC system:	yes
Armour	
hull/body:	steel + composite
turret:	steel + composite

Status

Production complete. No longer marketed. In service with the following countries:



K1 armoured vehicle-launched bridge

0018797

The fire-control system includes a General Dynamics Canada digital ballistic computer with a number of sensors including crosswind and allows the tank to engage both stationary and moving targets while it is stationary or moving itself.

Main armament comprises a US-designed 105 mm M68A1 (which is based on the then UK Royal Ordnance Factories L7 rifled tank gun) rifled gun which is also fitted on many South Korean M48A5 MBTs and for which ammunition is made in South Korea, including APFSDS. The barrel has a fume extractor, thermal sleeve and a muzzle reference system.

A 7.62 mm M60E2 machine gun is mounted coaxially with the main armament. The loader has a 7.62 mm M60D roof-mounted machine gun while the commander has a .50 (12.7 mm) K6 roof-mounted machine gun. Mounted either side of the forward part of the turret is a bank of six electrically operated smoke grenade dischargers.

An unusual feature of the K1 is the hybrid suspension system with improved torsion bars in the centre and hydropneumatic suspension units at each end. This allows the tank to kneel so that the 105 mm main armament can be depressed to -10° . The remote track adjusting system has two mode settings.

The drive sprocket is at the rear, idler at the front, with six dual rubber-tyred roadwheels, track-return rollers with the upper part of the track being covered by an armoured skirt. For the track, either the replaceable or integral rubber pad can be fitted.

The rear-mounted power pack consists of a German MTU MB 871 Ka-501 1,200 hp diesel coupled to a German Renk LSG 3000 fully-automatic transmission with acceleration from 0 to 32 km/h in 9.4 seconds.

Standard equipment includes a passive image intensification periscope for the driver, hydraulic bilge pump, heater, automatic Halon fire detection and suppression system for both crew and engine compartments and a VRC-947K and/or VRC-964K radio and a VIC-7K for intercom system.

The NBC system consists of an M8A1 alarm system and an M13A1 gas particle filter.

K1A1 MBT

In 1996, the now Hyundai Rotem completed two prototypes of the K1A1 MBT based on the proven mobility and fire-control system of the earlier M1 MBT.

These two prototype vehicles successfully passed all severe testing conducted through February 1997.

The K1A1 MBT has an increased firepower performance over the earlier K1 MBT owing to the adoption of a Korean Commander's Panoramic Sight (KCPS) which has been locally developed.

This has a greatly improved performance and function compared with the existing Commander's Panoramic Sight (CPS) for the K1. The K1A1 is also armed with the 120 mm M256 smoothbore gun, which is also installed in the General Dynamics Land Systems M1A1 and M1A2 Abrams MBTs. The main armament of the M1 (105 mm) and K1A1 (120 mm) is made by the WIA Corporation. The K1A1 has a combat weight of 53.2 tonnes. The tank



K1 armoured recovery vehicle with crane traversed to front and stabiliser/ dozer blade lowered and lifting complete K1 MBT turret

0011641

commander's sight also has a thermal channel. The main computer is a 32 bit model, compared to the 16 bit of the earlier K1 MBT.

The main characteristics of the K1A1 MBT have been summarised by the manufacturer as follows:

- The significantly enhanced armour penetration power and combat firing range due to the installation of a 120 mm M256 smoothbore gun instead of the 105 mm M68A1 rifled gun of the earlier K1
- Improved performance in the driving and stabilisation of the gun and turret by improving the gun/turret drive system for the 120 mm gun
- Enhanced processing speed and capability of the ballistic computer
- Enhanced night combat and operation capability by adding a thermal imaging capability to the commander's panoramic sight
- Improved sealing capability in fording operations and the turret slewing characteristics during moving by improvement of the race ring (or turret bearing) as well as enhanced survivability for the crew by adoption of the improved fire suppression system including thermal wire sensor for the engine bay
- Easier maintainability and lowered maintenance cost by utilising a track with replaceable pads.

Armoured vehicle-launched bridge

Early in 1989, Vickers Defence Systems (which today is BAE Systems) of the UK was awarded a contract by the then Hyundai Precision and Industry Co Ltd to design and build the prototype of an Armoured Vehicle-Launched Bridge (AVLB) system and bridge.

The AVLB launches a scissors-type bridge similar to the British No 8 tank-bridge, which is carried and launched over the front of a Chieftain. This bridge has an overall length of 22 m and can span a gap up to 20.5 m depending on the firmness of the bank.

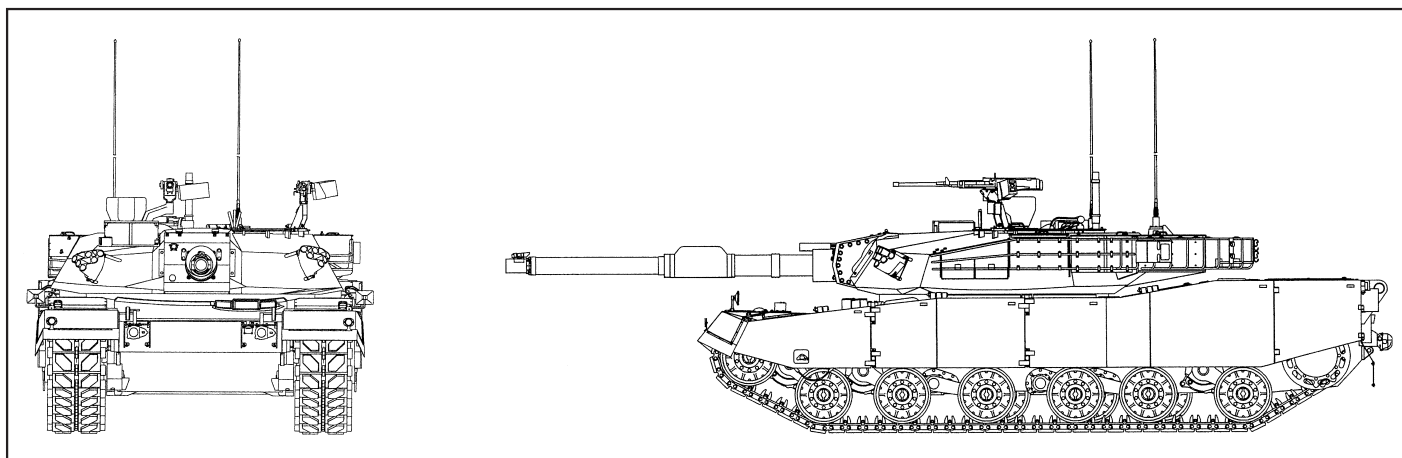
The bridge and its associated launching system was built at the now BAE Systems Newcastle-upon-Tyne facility and shipped to South Korea in 1990 where it was integrated with the hull, based on the K1 MBT, designed and built by the now Rotem.

Late in 1993, the company awarded the now BAE Systems a contract worth GBP23 million to supply the bridges for the K1 AVLB.

The contract covered the manufacture of eight bridges and 41 launching mechanisms in the UK which were installed on the K1 AVLB hull by Rotem. The total South Korea requirement was for 56 K1 AVLBs and the balance of the bridges and launching mechanisms were built in South Korea under a technology transfer agreement.

The bridge takes three minutes to be launched and 10 minutes to be recovered, with maximum bank height differences being 2.4 m.

The K1 AVLB has a total weight of 53.7 tonnes and in travelling configuration is 12.56 m long, 4.0 m wide and 4.0 m high. The bridge itself weighs 12.9 tonnes and is MLC 66 (this means that it can take AFVs to a maximum combat



Front and side drawings of K1A1 MBT which is armed with a 120 mm L/44 smoothbore gun (Hyundai Rotem)

1365064

Not only will the TIGER programme reduce costs but also will double the service life of overhauled AGT 1500 gas turbine engines from 700 to 1,400 hours. The AGT 1500 develops 1,500 hp at 30,000 rpm and gives the M1A2 Abrams a maximum road speed of 67 km/h.

Under the terms of the contract, the company will improve service life of the AGT 1500 turbine engine using Six Sigma processes to gather data on performance and then make data-driven decisions to affect repairs and engineering improvements.

The AGT 1500 turbine was developed over 35 years ago by the then Avco-Lycoming Textron and a total of 12,162 engines were completed when final deliveries were made in 1992.

For the TIGER programme, Honeywell teamed with the US Army's Program Manager Heavy Brigade Combat Team, TACOM Life Cycle Management Command and the Anniston Army Depot (ANAD) under a longer term agreement.

Most of the work will be carried out at ANAD, with Honeywell acting as prime contractor and providing engineering support, durability design improvements, integrated supply chain management, field repair support, field and overhaul data and Fact-Based Maintenance (FMB).

The FBM process will provide detailed engine operational data across the Abrams MBT fleet and will enable maintenance and parts management through a web-based database.

Other M1 developments

Late in 1986, General Dynamics and others were awarded a two-year contract from TACOM to build and demonstrate a transversely mounted engine propulsion system for the M1 MBT. This utilised an advanced AGT 1500 engine that achieves 15 per cent fuel savings and develops 1,540 hp. The system was completed and successfully demonstrated in 1990. The engine is mounted transversely and aft against the transmission so saving 35 per cent of the engine compartment.

FMC (now United Defense LP), General Motors and General Dynamics Land Systems each completed full-scale wooden mock-ups of a 120 mm Manned Weapon Station (MWS) for the M1 in mid-1986.

In July 1987, TACOM issued an RFP for a new track for the M1/M1A1 to replace the current T156 track which has a short life.

In July 1988, it was announced that the then Steel Products Division of the then FMC Corporation (today BAE Systems) had won the competition to produce the new T158 track for the M1/M1A1 MBT. The T158 is a joint development between the US Army Tank Automotive Command, FMC Steel Products and Goodyear. The first year of a five-year contract was worth USD9.6 million to FMC with the second worth USD20.9 million. Production of the T158 was undertaken by FMC at Anniston, with Goodyear the main subcontractor for rubber components.

The new T158 track is of the double-pin type with replaceable rubber pads and is designed to last at least 3,400 km before replacement, a 300 per cent increase over the current T156 track. No modifications are required to install the T158 track on the M1/M1A1. All new production M1A1/M1A2 MBTs are fitted with the new T158 track.

An M1 with a complete in-arm hydropneumatic suspension system was completed in October 1985. Following company trials in 1986 it was sent to the Waterways Experimental Station (WES) where its test results over a course were compared to those of a standard M1 fitted with torsion bar suspension.

The US Army has trialled an M1 series MBT fitted with a hydropneumatic suspension system but, at present, there is no funding for this to move into the production phase.

M1 with APU

In September 1993, General Dynamics Land Systems was awarded a contract valued at USD9.37 million for the installation of 1,500 External Auxiliary Power Units for the M1A1 MBT.

Greek M1A1 MBT

Late in 2012 it was stated that the Hellenic Army was seeking free transfer of ex-US Army M1A1 MBTs.



Original Joint Assault Bridge laying its scissors bridge over the front of the modified M1 Abrams series MBT hull (US Army) 1340084

A Greek Army committee visited US Army Depots in the USA in October and November 2012 to inspect M1A1's that had been released for export.

As of March 2013 no Hellenic Army contracts had been placed for the acquisition of surplus M1A1 MBTs from the US.

Moroccan M1A1 MBT

In June 2012 the Defense Security Corporation notified Congress of a possible Foreign Military Sale to the Kingdom of Morocco for the supply of 200 M1A1 MBTs and associated parts, equipment, logistical support and training at a total cost of USD1.015 billion.

Taiwan M1A1 MBT

In mid-2012 it was stated that Taiwan was hoping to procure surplus US Army M1A1 Abrams MBTs but as of March 2013 no contracts had been placed.

Saudi Arabian M1A2 MBTs

The Kingdom of Saudi Arabia took delivery of a total of 315 brand new M1A2 MBTs which incorporated a number of modifications to meet specific local requirements with final deliveries taking place in 1994.

These included the installation of UK supplied Jaguar frequency hopping radios, an external auxiliary power unit, and advanced digital Inter-Vehicular Information System (IVIS) capability and the ability to be fitted with mine clearing equipment on the front of the hull.

Since then an additional 15 vehicles have been supplied to bring the total fleet up to 330 units.

The Kingdom of Saudi Arabia M1A2 MBTs are now going through a series of upgrades which brings them up to the M1A2S configuration with this work being carried out at Lima, Ohio, USA.

The M1A2S incorporates a number of enhancements from the US Army M1A2 SEP previously mentioned.

A number of specific new components have been added to the M1A2S including a new hull power control box, commander's display panel, a turret control box and new communications equipment.

First vehicles were delivered to the Kingdom of Saudi Arabia in the second quarter of 2012 and by mid-February 2013 a total of 57 had been delivered.

Visually Modified M1A1

The National Training Center, Fort Irwin, California, has 28 Visually Modified M1A1 MBTs to resemble Russian designed T-80 for training purposes.

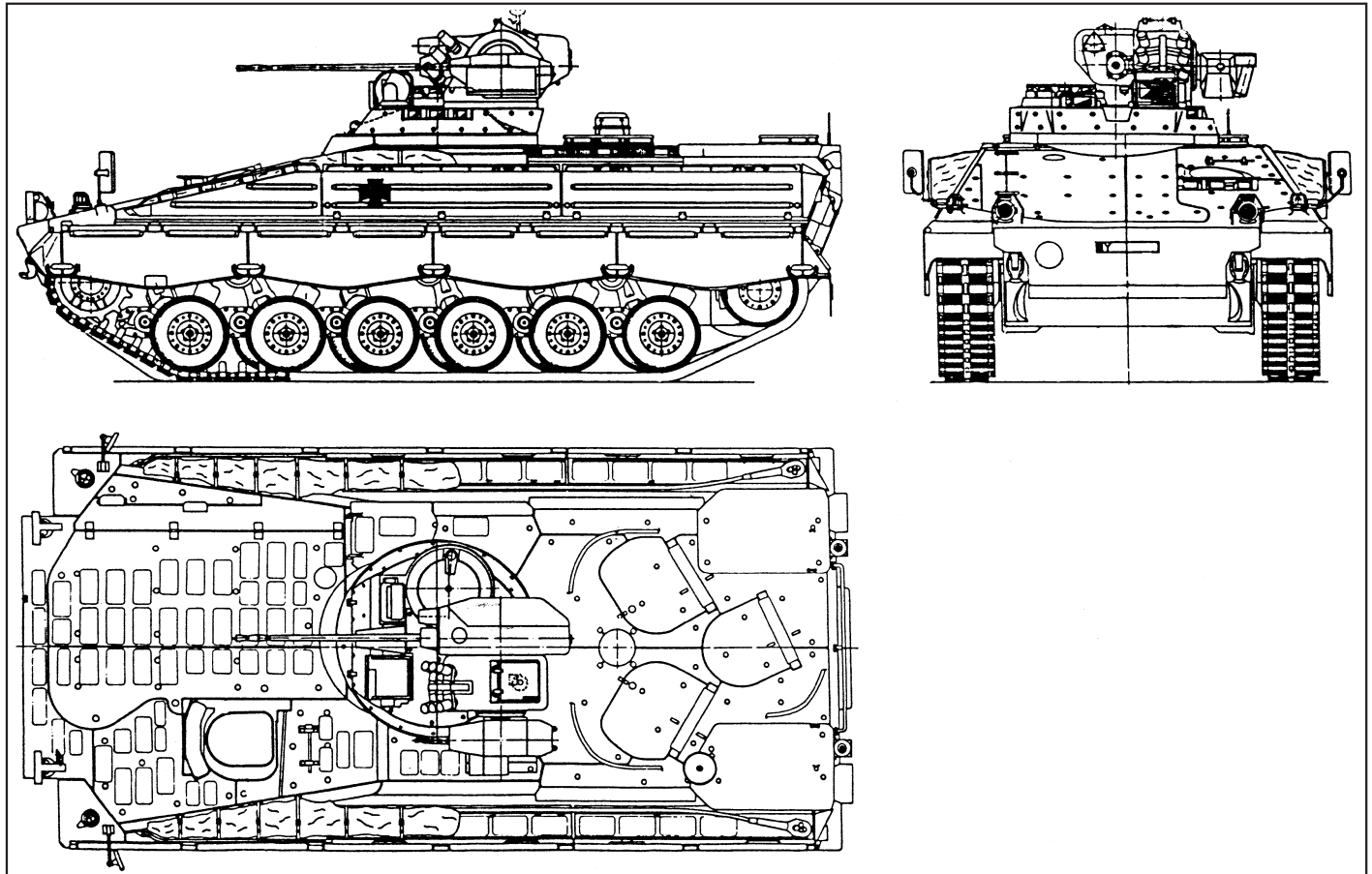
M1 Abrams bulldozer kit

In 1978, the Defense Division of the Chrysler Corporation (now General Dynamics Land Systems) studied the possibility of adapting the M9 bulldozer kit to fit the M1 Abrams MBT. The result of this study was a recommendation that a new kit be designed with a revised mould-board geometry to improve



Heavy Assault Bridge with 26 m bridge being extended over front of vehicle

0569723



Three-view general arrangement drawing of the Marder 1 A3 showing additional armour and revised roof hatches

0500486

Some of the Marder 1A5A1 upgraded vehicles will also be fitted with the Barracuda multispectral camouflage system which is already fitted to many vehicles deployed to Afghanistan which also helps to reduce the internal temperature of the vehicle.

Marder M12 IFV

This was developed by the then KUKA to meet the operational requirements of the Swiss Army. It was an upgraded Marder 1 chassis fitted with a new two-person E4 turret, armed with a 30 mm cannon and 7.5 mm MG. This vehicle is no longer marketed.

Marder 1 without turret

The German Army has a number of Marder 1 series vehicles with their turrets removed, which are used for training purposes.

Marder MK 30 AIFV

To meet the potential requirements of the Hellenic Army for a cost-effective Armoured Infantry Fighting Vehicle (AIFV) RLS developed the Marder MK 30 AIFV.

This was developed by Rheinmetall Landsysteme for the export market and initially aimed at the Hellenic Army. A prototype was completed but it is no longer being marketed.

Marder 1 driver training tank

Krauss-Maffei Wegmann delivered 36 Driver Training Tank versions of the Marder 1 infantry combat vehicle to the German Army. These have all had their two-person power-operated turrets replaced by a fixed cupola with seats for the instructor and pupils under instruction. These are called the Fahrschul SPz driver training vehicles and are based on the Marder 1 A1A2 chassis.



The latest version is the Marder 1A5A1 which has additional enhancements for Afghanistan (Rheinmetall)

1423713

Roland surface-to-air missile system

In total 144 MBDA Roland 2 surface-to-air missile systems on the Marder 1 chassis have been built for the German Army, with a further four systems delivered to Brazil.

These Roland SAM have now been phased out of service with Brazil and Germany.

TAM medium tank family

Details of this vehicle, developed to meet the requirements of Argentina, are given in the MBTs and Medium Tanks section of *IHS Jane's Land Warfare Platforms: Armoured Fighting Vehicles*. The now Rheinmetall Landsysteme developed a similar vehicle called the R 301 but this is no longer being marketed by the company.

Specifications

	Marder 1
Dimensions and weights	
Crew:	9
Length, overall:	6.79 m
Width, overall:	3.24 m
Height	
overall:	2.985 m
hull:	1.9 m
axis of fire:	2.56 m
Ground clearance, hull:	0.44 m
Track, vehicle:	2.62 m
Track width, normal:	450 mm
Length of track on ground:	3.9 m
Weight	
standard:	28,200 kg
combat:	29,207 kg
Ground pressure, standard track:	0.83 kg/cm ²
Mobility	
Configuration, running gear:	tracked
Power-to-weight ratio:	20.54 hp/t
Speed, max speed:	75 km/h
Range, main fuel supply:	520 km
Fording	
without preparation:	1.5 m
with preparation:	2.5 m
Gradient:	60%
Side slope:	30%
Vertical obstacle, forwards:	1.00 m
Trench:	2.5 m