Artillery-Systems

Rheinmetall Defence Technology

RHEINMETALL
GmbH

Field Howitzer FH 155-1 (FH 70)

The Field Howitzer 70 (FH 70) in its standard version has been introduced by the NATO countries United Kingdom, Italy and West Germany; Japan and Saudi Arabia have also procured the FH 70. The FH 70 complies with the requirements of the quadrolateral ballistic agreement NBMR 39 between USA, UK, IT and GE. With regard to the gun, this means:

- caliber 155 mm
- chamber volume 18 l
- barrel length 39 cal.

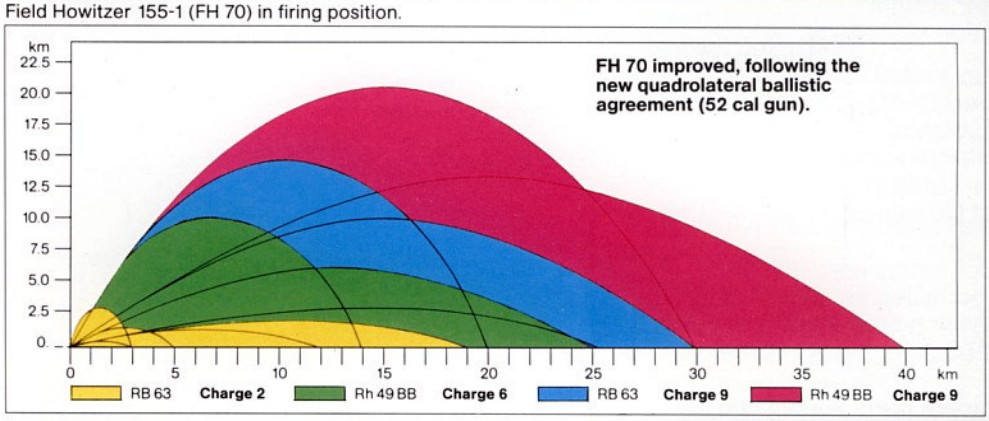
achieving a maximum range of 24 km with standard projectiles at a muzzle velocity of 827 m/s and a maximum gas pressure of 3350 bar at +21 °C.

In response to new user requirements, the NATO standard version FH 70 can be improved to an efficient version.

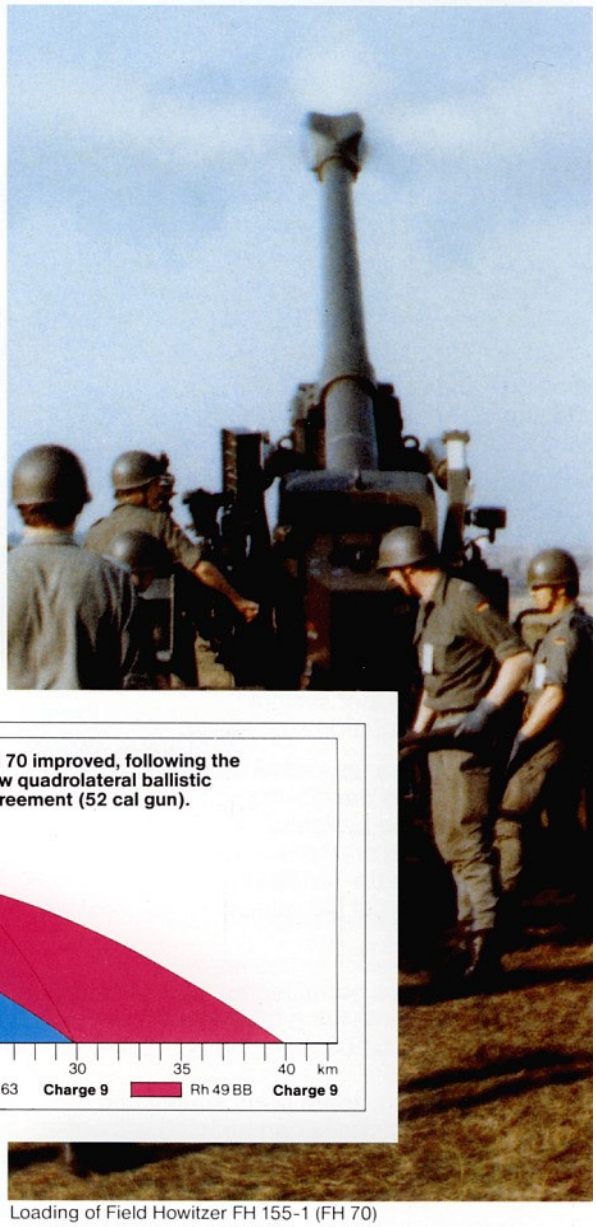
With this product improvement, it follows the new requirements of the quadrolateral ballistic agreement (52 cal gun), we achieve a range of 30 km with the L 15 A 1 projectile.

Field Howitzer 155-1 (FH 70) in self propelled position.

Field Howitzer 155-1 (FH 70) in firing position.



The improved FH 70 R reaches a max. range of 40 km with base bleed projectiles.



Loading of Field Howitzer FH 155-1 (FH 70)

Self-propelled Howitzer M 109 A 3 G

The M 109 G has been introduced by West Germany, Norway and Italy.

With the introduction of the new ammunition family for the FH 70 and on the basis of the decision taken by the German armed forces to retain the M 109 G in service beyond 2000, the following main objectives were drawn up for an upgrading of the performance of the M 109 G:

- ability to maintain the systems beyond 2000
- ability to fire the new 155 mm ammunition family
- increased range from 18.6 to 24 km with standard projectiles.

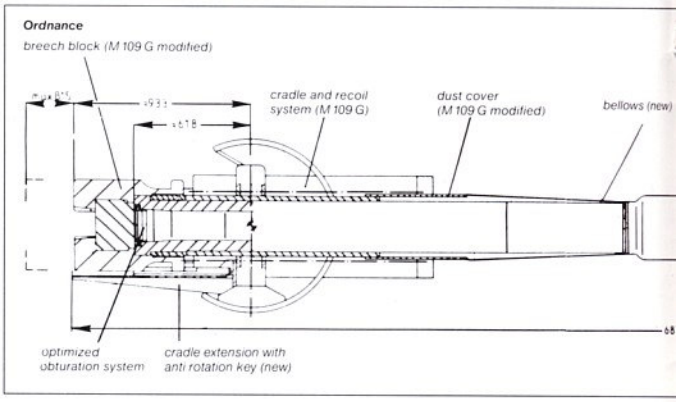
Self-propelled Howitzer M 109 A 3 G
Rheinmetall has fulfilled these requirements with a special modification kit for the M 109 G.

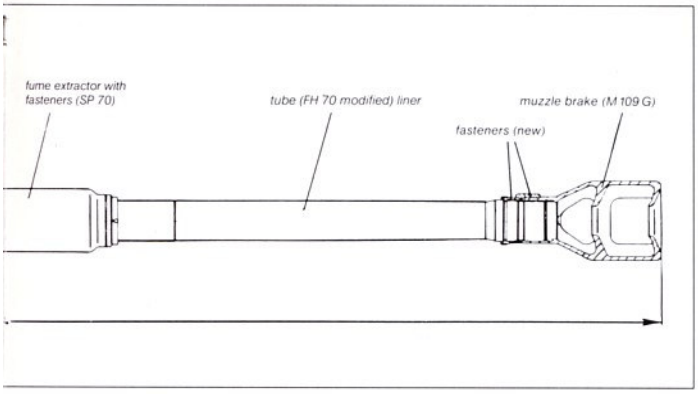
This modification kit includes the following components:
- ordnance, complete with the following components:
- barrel 39 cal.
- fasteners for muzzle brake
- fume extractor
- dust cover
- optimized obturator system
- modified anti-rotation key device.

Advantages of the upgraded concept:
- ability to fire the new FH 70 ammunition family with unchanged ballistics
- blast pressures are considerably reduced compared with the M 109 G
- direct and indirect fire values are identical with those of FH 70.
- the maximum recoil forces are within the specified values permitted for the M 109 G
- in future the same firing tables and computer programs can be used for the FH 70, SP 70 and M 109 A 3 G
- existing training, spare parts supply and maintenance facilities can be used without modification
- a low-cost, effective, technically viable solution

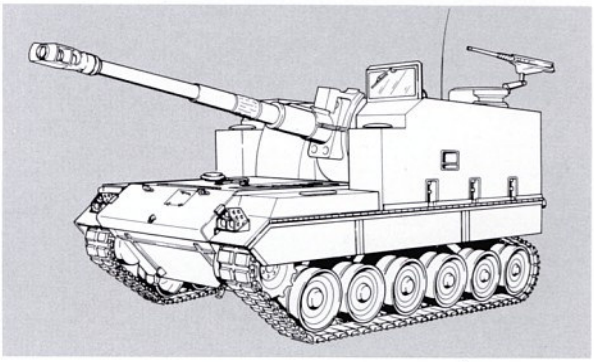
West Germany and Norway are currently refitting their M 109 G to the M 109 A 3 G solution from Rheinmetall.

Self-propelled howitzer M 109 A 3 G





Self-propelled Howitzer M 44



Upgrading concept

A German defence industry consortium consisting of MTU, Rheinmetall and GLS, has developed an improvement programme for M 44 self-propelled Howitzer to meet today's and future artillery requirements. Fire power, mobility and reliability have been improved to a standard which assures that the M 44 system can remain in service beyond the year 2000. The modernization concept provides the fulfilment of the following main requirements:

- increase of combat range up to 24 km using standard ammunition and to 30 km using special projectiles
- use of all NATO standard ammunition including future smart and brilliant munitions
- improved mobility of vehicle
- increase of RAM-D standards (Reliability, Availability, Maintainability and Durability).

For this purpose, components have been modified or exchanged.

The concept for a self-propelled howitzer 2000, TAURUS

A consortium consisting of Krauss-Maffei, KUKA, Porsche and Rheinmetall – the most experienced companies with regard to the development of modern armament and artillery systems – has been commissioned to develop the self-propelled howitzer of the future, the self-propelled howitzer 2000.

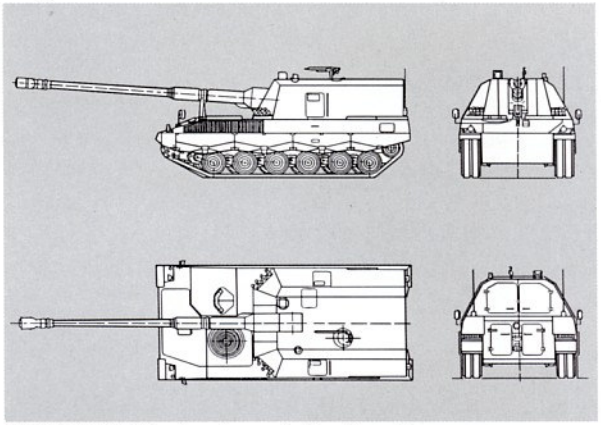
The essential features of the SP 2000 TAURUS are:
- modified Leopard 2 chassis with a front-drive engine
- large-scale tower with
- 155 mm weapon system and
  52 cal. barrel length
  23 l chamber volume
- automatic loading system
- ammunition magazine:
  60 projectiles
  66 charges

Standard projectiles can be fired up to a range of 30 km. The projectiles are driven by the new modular charge system (MTLS).

The SP 2000 TAURUS has its own navigation system and is thus able to operate completely autonomously.

A high degree of mobility and reliability are self-evident features of the SP 2000 TAURUS.

Design model SP 2000 TAURUS



SP 2000 TAURUS – top view and side silhouette

The 155 mm ammunition family

High explosiv shell
L 15 A1

Smoke shell
DM 105

Illuminating shell
DM 106

The following ammunition is available for the artillery systems presented:

- high explosive (HE) L 15 A 1
- smoke shell DM 105
- illuminating shell DM 106
- bomblet projectile DM 642 (RB 63)
- base bleed bomblet projectile Rh 49

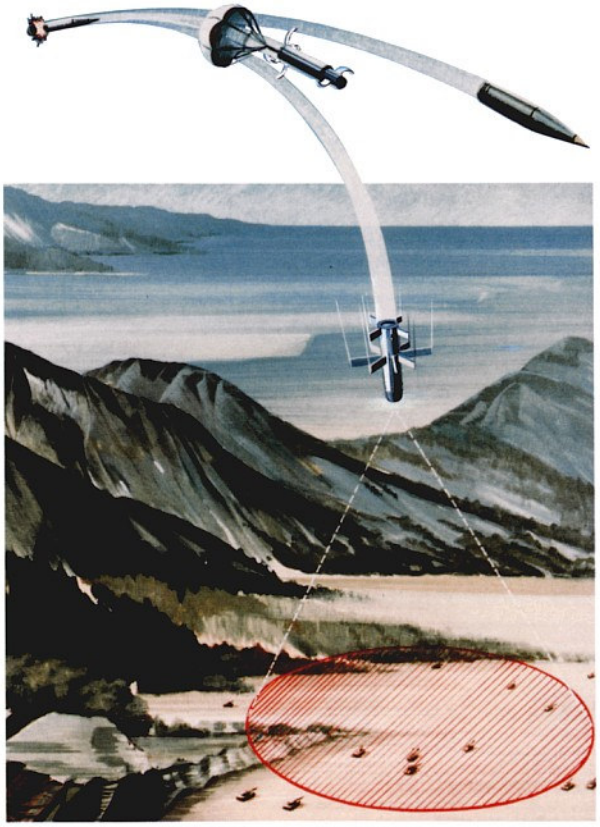
In addition, all other 155 mm ammunition introduced by NATO can be fired together with future

- sensor-fused (SM Art 155 with Diehl in GIWS) and
- terminally guided (APGM in International ADCO-Team) ammunition for tube artillery

Conventional and modern charge-systems are also available.

Bomblet projectile 155 mm Rh 49
with base bleed

Bomblet projectile 155 mm DM 642 (RB 63)



APGM: Autonomous Precision Guided Munition

SM Art 155: Sensor-fused ammunition for artillery

Technical data

FH 70

Overall weight	9300 kg
Overall length (traveling)	9800 mm
Overall length (firing)	12430 mm
Traveling height	2450 mm
Turning radius	9000 mm
Max. clearance from ground	300 mm
Laying Range: – traverse	478 mls
Laying Range: – elevation	left and right –90 to +1250 mls
Caliber	155 mm
Rifling length	6022 (cal. 39)
Barrel weight	1442 kg
Max. firing range (standard round)	24000 m
Max. firing range (special ammunition)	30000 m
Rate of sudden fire	3 shots in 13 s
Sudden fire with free flight extension device	3 shots in 8 s
Rate of continuous fire	2 shots/min for 1 hour
Muzzle velocity with charge 8	827 m/s
Barrel construction gas pressure	4400 bar
Maximum gas pressure	3350 bar
Chamber volume	18.85 l
APU	
Engine type VW 127	air-cooled 4 cylinder 4 stroke engine 1800 cm^3
Output	53 kW at 4800 rpm
Brakes	hydraulic on both main wheels (hand brake on each main wheel)
Wheel base	5150 mm
Fording depth (towed mode)	1500 mm
Wading depth (APU)	750 mm

M 109 G/M 109 A 3 G

Calibre	155 mm	155 mm
Number of grooves	48	48
Twist, clockwise, constant	8 deg 55'37"	8 deg 55'35"
Length of barrel	4422 mm	6874 mm
Length of rifled part	2900 mm	5057,7 mm
Chamber volume	13.489 l	18.845 l
Weights: barrel complete	1916 kg	2380 kg
liner	940 kg	1420 kg
Maximum range (standard round)	18.6 km	24.7 km (increased range up to 30 km)
Laying range: elevation	–44 to +1245 mls	–44 to +1245 mls
Laying range: traverse	n x 360 degrees	n x 360 degrees
Effect value of muzzle brake	approx. 40% (charge 8 DM 52)	approx. 40% (charge 8 L 10 A 1)
Maximum recoil travel over 910 mls	465 mm	465 mm
Maximum gas pressure with charge 8 DM 52	3200 bar	2300 bar
Maximum gas pressure with charge FH 155-1	–	3628 bar
Muzzle velocity with charge 8 DM 52	685 m/s	685 m/s
Muzzle velocity with charge FH 155-1	–	827 m/s

M 44 T

Firing range	24 km (standard round) 30 km (special ammunition)
Elevating range	–5 degrees – 65 degrees
Ammuniion magazine	30 rounds
Operating range	620 km
Maximum speed	56.3 km/h
Engine output	330 kW (450 Hp/DIN)

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