

Chapter **5**

**ROCKET
AND
MISSILE**



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FAJR -1 Rocket Spin Stabilized - (107 mm)



General Specifications

107mm Fajr1 rocket has been designed and produced to annihilate enemy's offensive and hidden forces in an ordinary trench. It can be also used to silent artillery battery fires and destroy platoons of tanks, armored vehicles, naval vessels and hostile technical equipment on the ground and sea. This rocket has a favourite capability to strike ground equipment, command posts and ordnance depots.



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TECHNICAL SPECIFICATIONS

Max. range in sea level	8.3 km
Length	838mm
Caliber	107mm
Weight	18 kg
Warhead weight	7.9 kg
Packing Type	Two rounds in a wooden box
Warhead Type	High Explosive
Propellant Type	Double base, solid
Fuse Type	Impact
Shelflife	15 years



General Specifications

The 122mm-GRAD, standard range rocket has a range of 21 km and is equipped with high explosive fragmentation warhead having high destructive power. It is used to defend or attack against targets such as infantries positioned in open terrain or in trenches and shelters, as well as light armored vehicles, mortar and artillery sites, commanding posts, garrisons, single and collective trenches, and similar targets. The 122mm-SR (short range) is designed to attack against the same targets and it can also be used on high speed boats as a sea rocket. The 122mm-LR (long range) rocket is equipped with the same warhead as the standard type, but has a maximum range of 40km and is used to create huge fire over the above-mentioned targets. This type is also capable of destroying fortifications and similar targets.

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STANDARD LR SR

TECHNICAL SPECIFICATIONS

Model	Standard	LR	SR
Fuze type	Mechanical impact		
Warhead Caliber (mm)	122	122	122
Weight (kg)	65	66	42
Length (mm)	2850	2892	1885
Max. Effective Range at Sea Level (km)	21	40	12
Lethal Radius (m)	20	20	20



FAJR 2 and FAJR 3 Rockets-Fin Stabilized – (240 mm)



General Specifications

240mm Fajr 2 and Fajr 3 unguided rockets have been designed and produced to expand and increase artillery weapons' powers in offensive and defensive operations, against close targets. Fajr 2 and Fajr 3 unguided rockets are used to destroy strategic and critical military forts, bridges, bases and concentration areas up to depth of 23km and 43km respectively.



TECHNICAL SPECIFICATIONS

Model	FAJR 2	FAJR 3
Max. range (km)	23	43
Min. range (km)	10	18
Caliber (mm)	240	240
Length (mm)	3550	5200
Weight (kg)	283	407
Warhead weight (kg)	85	85
Fragmental radius (m)	300	300
Propellant Type	Double base, solid	Double base, solid
Warhead Type	High explosive	High explosive
Fuse Type	Impact	Impact
Shelflife (years)	15	15



FAJR 4 & FAJR5 Rockets-Fin Stabilized - (333 mm)

General Specifications

333mm Fajr 4 solid propellant, multiple launch rocket system has been designed to execute special tactical artillery missions. This massive fire rocket is applied to destroy hostile forts, trenches, garrisons, concentration areas, unconventional hideaways and other critical targets, in short range area.

333mm Fajr 5 rocket is also designed and produced to expand artillery weapons' powers and to increase combat power against regional oppositions and targets. This unguided rocket is used for destroying forts, command and communication centers, critical bridges, military bases, airfields, radar stations concentration areas and other main targets up to depth of 75 km.



TECHNICAL SPECIFICATIONS

Model	FAJR 4	FAJR 5
Max. range (km)	26	75
Min. range (km)	15	44
Caliber (mm)	333	333
Length (mm)	4950	6485
Weight (kg)	750	915
Warhead weight (kg)	300	175
Fragmental radius (m)	500	500
Propellant type	Double base, solid	Double base, solid
Warhead type	High explosive	High explosive
Fuse type	Impact	Impact
Shelflife (years)	15	15



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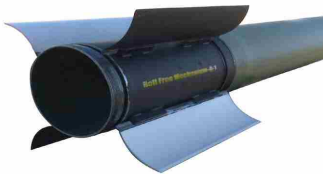
General Specification

In today's warfare, especially in civil conflicts, to avoid close combats, it is necessary to use short range rockets.

333mm Guided Fajr4 Rocket (GF4R) is one of these short range rockets designed to accomplish special tactical missions. This rocket has high explosive power and massive retaliation. Its mission is to annihilate military installations, command centers, assembly areas, ramparts, bunkers, fortifications, garrisons, and hidden forces in safe hideaways and buildings, with high accuracy and power.

333mm Guided Fajr5 rocket is also a medium range, low cost technology rocket that provides the field artillery user with enhanced capabilities on the battlefield and is used in similar missions.

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GF4



GF5

TECHNICAL SPECIFICATIONS

Model	GF4	GF5
Max. range (at sea level) (km)	23	68
Min. range (km)	19	45
Caliber (mm)	333	333
Length (mm)	4955	6465
Weight (kg)	755	920
Warhead weight (kg)	260	112
Fragmental radius	500	500
Propellant type	Double base, solid	Double base, solid
Shelf life (years)	5	10
Warhead type	HE	HE- fragmentation
Fuse type	Mechanical-impact	Electronic Impact
Target hit pointing accuracy	Less than 50 meters	Less than 50 meters
Launching Type	-	Tube Launched (launch and storage box)
Charge type	H6	H6



General Specifications

240mm Falagh1 and 333mm Falagh2 are defensive and offensive rockets with massive fire, suitable range and high destruction power. These rockets are used to annihilate enemy's military and economic targets, such as command centers, forts, fire support centers, traffic lines, communication centers and naval vessels. Easy and quick transportation, quick preparation and usage, compatibility with ground and sea conventional equipment, high reliability, easy storage and long shelf life are among its other considerable features.

The Falagh2 rocket also has other advantages such as: possessing complete native production process, ineffectiveness of jamming on the rocket, high destruction (power), using impact fuse with arming mechanism and being usable in various geographical climates.



FALAGH 1

FALAGH 2

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TECHNICAL SPECIFICATIONS

Model	FALAGH 1	FALAGH 2
Max. range (sea level) (km)	10	10
Fragmental radius (m)	150	300
Max. speed	460	440
Length (mm)	1318	1823
Caliber (mm)	240	333
Weight (kg)	112	255
Warhead weight (kg)	52.5	137
Packing type	Box, box launch	Box, box launch
Warhead type	High explosive	HE
Propellant type	Double base, solid	Double base, solid
Shelf life (naval conditions) (years)	10	10
Shelf life (standard conditions) (years)	15	15
Motor Operation Average Time	1.34 s	1.8 s



HADAF Rocket (240 mm)



General Specification

Enjoying 240mm rocket platform and having increased its radar coverage in both KU and C bands, HADAF rocket is recognized as a rocket with ultra-sonic flight capability to evaluate defendable missiles subsystems such as primary warning and observation systems, command and control systems and then engaging those systems.



TECHNICAL SPECIFICATIONS

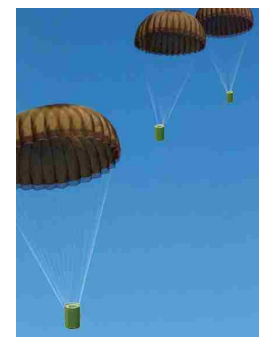
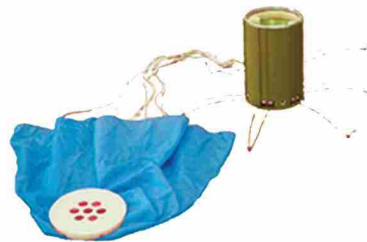
Max. range (at sea level)	36 km
Min. range (at sea level)	22 km
Max. flight altitude (at sea level)	14 km
Min. flight altitude (at sea level)	3 km
Max. velocity (at least of flight angle)	750 m/s
Max. velocity (at most of flight angle)	500 m/s
Caliber	240mm
Length	5200mm
Weight	441 kg
Propellant type	Solid, double base
Warhead type	Reflective
Fuse type	Lack of fuse
Shelf life	15 years

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BARAD Rocket (122mm)

General Specification

Barad1 rocket has been designed to increase 122mm rocket ability, by changing warhead type. This rocket contains 4 anti-tank mines. Also, it is compatible with 122mm rocket launcher system. It scatters mine's at a depth of 14 km.



TECHNICAL SPECIFICATIONS

Max. range (at sea level)	14 km
Min. range (at sea level)	11 km
Number of Mine	4
Weight	74 Kg
Caliber	122mm
Mine Caliber	110mm





General Specifications

The Iranian Fadak 1 is air launched anti-tank, anti-personnel, anti-armor and anti-light armors multipurpose rockets. They can be fired from mil 17 helicopters and also Su22, Su24, Su25 and MIG29 fighting aircrafts.

The Iranian Fadak training rocket is fired from helicopters and fighting aircrafts. This rocket with dummy fuse and warhead is used for training pilots.

FADAK 1



FADAK 2



FADAK Trainig



ROCKET AND MISSILE

TECHNICAL SPECIFICATIONS			
Model	FADAK 1	FADAK 2	FADAK Training
Weight (kg)	11.2	11/4	11.2
Length (mm)	1535	1435	1535
Caliber (mm)	80	80	80
Range (m)	1300-4000	1300 - 4000	1300-4000
Initial velocity (m/sec)	60-80	60-80	60-80
Maximum velocity (m/sec)	610	550	610
Application	Anti-person, anti-tank, anti-light armors	Anti-person, anti-light armors	Training
Impact Angle	0 to 75 degree from the normal of target	0 to 75 degree from the normal of target	-
Warhead type	HEAT – Fragmentations	Fragmentation	Dummy
Warhead weight (kg)	3/6	3/8	3.6
Weight of warhead explosive (kg)	1	1/2	-
Penetration in armor (m)	400	-	-
Number of fragments	440<	480<	-
Fuze type	Mechanical- pyrotechnics	Impact fuze	-
Application temperature (°C)	-46 to 60	-46 to 60	-46 to 60
Maintenance temperature (°C)	-10 to +35	-10 to +35	-10 to +35



KOSAR Rocket



General Specification

According to operational requirement of users (defence forces), Kosar is an air launched light rocket that can be installed on UAVs and other aircrafts to destroy soft targets and infantry troops. Kosar multipurpose rocket with low weight can be fired from many UAVs. Kosar has fragmentation warhead and also could be equipped to utilize proximity fuse in order to increase effectiveness of rockets.



TECHNICAL SPECIFICATIONS

Total weight	4.5 kg
Length	1000 mm
Caliber	57 mm
Range	1300-3000 m
Application	Antipersonnel, equipments and tools
Warhead Type	Fragmentation
Weight of warhead(with fuse)	1.3 kg
Type fuse	Impact
Operational temperature	-46 to +60 C
Maintenance temperature	-10 to +35 °c

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S -24 Rocket

General Specification

The Iranian SHAFAGH(S24) rocket which is manufactured by defense industries organization is used against ground targets and for effective destruction on refuge in shelter targets, ferroconcrete of building and ammunition depot. This rocket is fired from fighting aircrafts. The training version of these rockets with dummy fuze and warhead are used for pilots training.



TECHNICAL SPECIFICATIONS

Rocket weight	232 kg
Weight of warhead	125 kg
Max. range	12 km
Max. velocity	410 m/sec
Effective range	2000-2200 m (for air launch)
Warhead weight	HE - frag
Target	Ground targets, shelter, building and ammunition depot
Fuze type	impact
Operation temperature	-30 to +50 °c



2.75" Air Launch Rocket



General Specification

2.75 inch is an air launch rocket, that can be launched from the kobra helicopter and F4,F5 fighting aircrafts, and its applications are being anti-tank anti-personnel and anti-light armors. The warhead of these rockets is fragmentation shape charge and hence it can be used against both soft and hard targets. Therefore, we can say this rocket is multipurpose.

TECHNICAL SPECIFICATIONS

Weight	9.96 kg
Length	1342 mm
Caliber	70 mm
Range	500 - 4000 m
Initial velocity of rocket	40 m/sec
Max. velocity of rocket	550 m/sec
Application	Anti-person, anti-tank, anti-light armors
Impact angle	65 relative to the vertical line
Warhead type	Fragmentations, Heat
Weight of warhead	3.9 kg
Fuze type	Mechanical- pyrotechnics
Application temperature	-46 to +60 °c
Maintenance temperature	-10 to +35 °c



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133 mm Air Target Imitator Rocket (OKM)

General Specification

It is designed to be used as an aerial target for practice firing of IR homing surface to air missile.

TECHNICAL SPECIFICATIONS

Maximum range	5000 m
Angle of fire	30 ~ 40 deg.
Minimum Altitude	1200 m
Caliber	132 mm
Total weight	44 kg
Maximum velocity	280 m/s
Length	1420 mm
Flight Duration	30 seconds
Number of flares	6
Visibility of flares	Up to 5 km





General Specification

Thermobaric rockets (TBG-7&7V) are equipped with a 105mm caliber warhead, designed to destroy trenches, tunnels, underground shelters, fuel and oil reservoirs and installations, brick-wall and concrete buildings as well as incapacitation of infantries inside them. The destructive power of the warhead is so high that can incapacitate living creatures inside a space of 150 m³.

Anti-Personnel Rocket (OG-7) is equipped with a 40mm caliber fragmentation warhead, designed to incapacitate soft-skinned targets including infantries situated in open and closed areas, trenches, shelters, brick-wall buildings and lightly armored vehicles.

Anti-Armor Rocket (PG-7VR) is equipped with a 105mm caliber, tandem shaped charge warhead that is designed to destroy all types of tanks and armored vehicles equipped with explosive reactive armor (ERA). Anti-Armor Rocket (PG-7V) has a similar capability.

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TECHNICAL SPECIFICATIONS

Model	PG-7V	PG-7VR	TBG-7	TBG-7V	OG-7
Length (mm)	920	1250	820	895	590
Weight (g)	2400	4450	2650	4450	1500
Warhead Caliber (mm)	85	105	82	105	40
Point-Blank Range (m)	300	150	300	150	300
Max. Sighting Range (m)	500	200	1000	200	1300
Max. Range Using Fire Control Quadrant	-	-	-	150 m ³	700 m
Warhead Destructive power	-	-	50 m ³	Mechanical impact	-
Lethal Radius (m)	-	-	-	-	5 m
Warhead Penetration (mm)	300 in RHA	500 in RHA after ERA	-	-	-
Fuze type	Piezoelectric	Piezoelectric	Mechanical impact	Mechanical impact	Mechanical impact



General Specification

Anti-Armor Rockets (PG-9V) is equipped with tandem shaped charge warhead designed to destroy all types of tanks, personnel carriers and armored vehicles. Anti-Armor Rockets (PG-9VT) have similar warheads designed to destroy all type of tanks and armored vehicles equipped with Explosive Reactive Armor (ERA).

Thermobaric Rocket (TBG-9) is equipped with thermobaric warhead designed to incapacitate soft-skinned targets including infantries situated in open and closed areas, trenches, shelters, brick-wall buildings and lightly armored vehicles. The destructive power of warhead is so high that can incapacitate the living creatures inside a space of 50 m³.

Anti-Structure Rocket (PG-9 AST) is equipped with Blast-Fragmentation warhead, designed to penetrate reinforced concrete structures (with 10 cm thickness) and brick walls to incapacitate the infantries situated inside them by fragments and blast wave.

The Anti-Personnel Rocket (OG-9VM) is equipped with fragmentation warhead designed to incapacitate soft skinned targets, including infantries situated in open and closed areas, trenches, shelters, brick-wall buildings and lightly armored vehicles.



ROCKET AND MISSILE

TECHNICAL SPECIFICATIONS

Model	PG-9V	PG-9VT	TPG-9	TBG-9AST	OG-9VM
Length (mm)	1110	1300	1020	930	1060
Weight (g)	4390	5300	5300	5300	5500
Warhead Caliber (mm)	73	73	73	73	73
Point-Blank Range (m)	800	600	600	600	345
Max. Sighting Range (mm)	1300	200	1000	1000	1300
Max. Range Using Fire Control Quadrant (m)	-	-	-	-	4500
Warhead Destructive power	-	-	50 m ³	Mechanical impact	-
Lethal Radius (m)	-	-	-	-	9
Warhead Penetration	300 in RHamm	300 in RHA after ERAmm	50 m ³	35 m ³	-
Fuze type	Piezoelectric	Piezoelectric	Mechanical impact	Mechanical Delay	Piezoelectric



General Specification

Anti-Armor Rocket (PG-15V) is equipped with tandem shaped charge warhead designed to destroy all types of tanks, personnel carriers and armored vehicles. Anti-Armor Rocket (PG-15VT) has a similar warhead and is designed to destroy all types of tanks and armored vehicles equipped with explosive reactive armor (ERA).

Thermobaric Rocket (TBG-15) is equipped with thermobaric warhead designed to incapacitate soft-skinned targets including infantries situated in open and closed areas, trenches, shelters, brick-wall buildings and lightly armored vehicles. The destructive power of the warhead is so high that can incapacitate the living creatures inside a space of 50 m³.

Anti-Structure Rocket (PG-15 AST) is equipped with Blast-Fragmentation warhead, designed to penetrate reinforced concrete structures (with 10 cm thickness) and brick walls to incapacitate the infantries situated inside them by fragments and blast wave.

The Anti-Personnel Rocket (OG-15VM) is equipped with fragmentation warhead designed to incapacitate softskinned targets, including infantries situated in open and closed areas, trenches, shelters, brick-wall buildings and lightly armored vehicles.

ROCKET AND MISSILE



TECHNICAL SPECIFICATIONS

Model	PG-15V	PG-15VT	TBG-15	TBG-15 AST	OG-15VM
Length (mm)	870	1060	780	895	590
Weight (g)	3450	4640	4340	4450	1500
Warhead Caliber (mm)	73	73	73	73	73
Point-Blank Range (m)	800	600	600	930	345
Max. Sighting Range (m)	1300	1000	1000	600	1300
Max. Range Using Fire Control Quadrant (m)	-	-	-	-	4500
Warhead Destructive power (m ³)	-	-	50	35	-
Lethal Radius	-	-	-	-	9 m
Warhead Penetration (mm)	300 in RHA	300 in RHA after ERA	-	-	-
Fuze type	Piezoelectric	Piezoelectric	Mechanical impact	Mechanical impact	Mechanical impact



General Specification

Anti-Personnel Airburst Type Rocket (OG-29 AB) is equipped with fragmentation warhead containing more than 2000 pcs of premade fragments and equipped with an adjustable fuse which can be set to detonate at desired distance over particular targets such as canals, holes and natural pits, in order to incapacitate the infantries positioned inside. Anti-Personnel Rocket (OG-29V), equipped with thermobaric fragmentation warhead, is also designed to incapacitate soft-skinned targets including infantries situated in open and closed areas, trenches, shelters, brick-wall buildings and lightly armored vehicles.

Thermobaric rocket (TBG-29V) is equipped with thermobaric warhead, designed to destroy trenches, tunnels, underground shelters, fuel and oil reservoirs and installations, brick-wall and concrete buildings and to incapacitate infantries inside them. The destructive power of warhead is so high that can incapacitate the living creatures inside a space of more than 150 m³.

Anti-Structure Rocket (PG-29 AST) is equipped with tandem shaped charge thermobaric warhead and designed to penetrate reinforced concrete structures to incapacitate the infantries inside them. The destructive power of warhead is so high that can incapacitate the living creatures inside a space of 35 m³ after penetrating a concrete wall of 20cm thickness.

Anti-Armor Rocket (PG-29V) is equipped with a 105-mm caliber, tandem shaped charge warhead, and designed to destroy all types of tanks and armored vehicles equipped with Explosive Reactive Armor (ERA).



ROCKET AND MISSILE

TECHNICAL SPECIFICATIONS					
Model	OG-29 AB	OG-29V	TBG-29V	PG-29AST	PG-29V
Length (mm)	920	1250	820	895	1100
Weight (g)	2400	4450	2650	4450	6900
Warhead Caliber (mm)	105	105	105	105	105
Point-Blank Range (m)	300	300	300	300	300
Max. Sighting Range (m)	500	1000	1000	500	-
Lethal Radius	12	12	-	-	-
Warhead Penetration (m ³)	-	-	150	35	500mm in RHA after ERA
Fuze type	Electrical Impact	Mechanical impact	Mechanical impact	Piezoelectric Mechanical Delay	Piezoelectric



Tactical Specifications (Basic TOOPHAN)

Basic Toophan missile is one of the most advanced anti-armor guided missiles of the world, capable of destroying stationary and moving targets. The Toophan missile system uses semi-automatic command to line of sight guidance, that is to say, the operator shall simply keep the cross-hair of the launcher's camera on the target until the missile hits it. During the flight, control commands are sent automatically to the missile by the Missile Guidance Set (MGS). This missile can also be fired from Cobra helicopters.

Tactical Specifications (TOOPHAN 3-M)

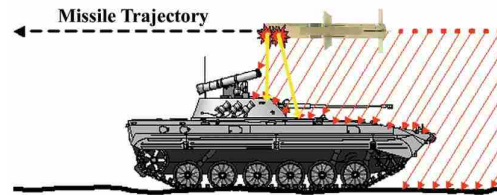
"Toophan 3-M", that is an anti-tank missile with top attack capability, can be used against the modern armors of the world. This missile hits the most vulnerable point of the tanks as well as targets hidden behind the embankments and destroys them.



Basic Toophan



Toophan 3-M



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TECHNICAL SPECIFICATIONS

Type	Basic Toophan	Toophan 3-M
Penetration Depth (mm)	650 (No ERA)	Min. 150
Min. & Max. Range (m)	100-3750	100-3750
Guidance	SACLOS	SACLOS
Warhead	shaped charge	2 EFP
Warhead Weight (kg)	3.6	2 x 2
Missile Weight (kg)	18.5	21.5
Missile Length (cm)	117	117
Missile Diameter (cm)	15.3	15.3
Time of Flight (Max. range) (sec)	19	21
Average Velocity (m/s)	178	178
Rate of Fire	1-2 rounds per minute	1-2 rounds per minute
Operating Temperature(°C)	-32 to +60	-30 to +50



Tactical Specifications (Toophan 2-M)

The Toophan2-M Missile, having two warheads, is capable of destroying various types of reactive armors in the moving and stationary targets. In order to destroy ERA and increase the penetration depth, the warhead of this missile is equipped with a mechanical telescopic probe. The missile with two warheads is capable of destroying different ERAs, including moving and stationary targets. If the Missile Guidance Set-2 (MGS-2) is used, the missile will enjoy anti-jamming system.

Tactical Specifications (Toophan 5)

“Toophan 5” is one of the world’s advanced missiles. That has two warheads, namely a precursor and a main one, which are designed to destroy ERA and increase the penetration depth inside the armor. The missile can be fired from tripod and armored vehicle.



Toophan 2-M



Toophan 5

ROCKET AND MISSILE

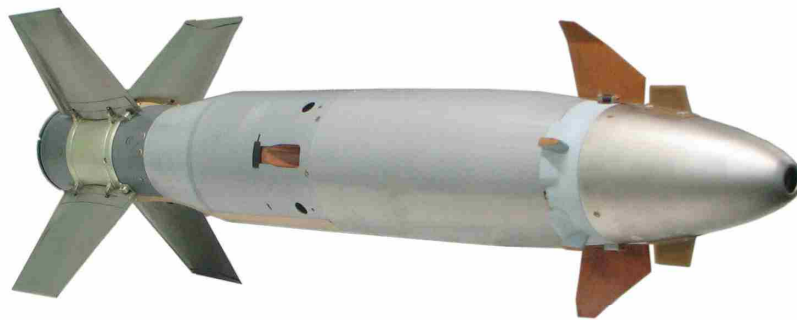
TECHNICAL SPECIFICATIONS		
Type	Toophan 2-M	Toophan 5
Penetration Depth (mm)	650 (in ERA)	900
Min. & Max. Range (m)	100 - 3750	100 -3500
Guidance	SACLOS	SACLOS
Warhead	tandem heat	tandem heat
Warhead Weight (kg)	4.1	6.2
Missile Weight (kg)	21	23
Missile Length (Extended Probe) (cm)	147	147
Missile Length (Non-Extended Probe) (cm)	117	117
Missile Diameter (cm)	15.3	15.3
Average Velocity (m/s)	178	167
Rate of Fire	1-2 rounds per minute	1-2 rounds per minute
Operating Temperature(°C)	-32 to +60	-32 to +60



Tactical Specifications

Dehlavieh missile is considered as one of the most sophisticated anti-armor missiles, developed to destroy a wide variety of modern tanks equipped with the reactive armors. The missile uses laser-beam riding guidance system against different kinds of enemy's jamming. Heavy destructive, long-range, light-weight, low-height and man-portable launcher caused Dehlavieh missile system to be recognized as an effective anti-tank weaponry in the battle field.

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TECHNICAL SPECIFICATIONS	
Penetration Depth	1000 - 1200 mm
Min. & Max. Ranges	100 - 5000 m
Guidance	SACLOS (Laser Beam Rider)
Warhead	Tandem Heat
Warhead Weight	6.8 kg
Precursor Warhead Weight	560 g
Missile Weight	22.7 kg
Missile Weight With Case	29.5 kg
Missile Length With Case	121 cm
Missile Diameter	15.2 cm
Time of Flight	25 s (Max. Range)
Max. Velocity	260 m/s
Rate of Fire	1-2 rounds per minute
Operating Temperature	-20°C to +60°C



Tactical Specifications (SAEGHE)

“SAEGHE” missile, competitive with American Dragon and Russian Metis, is a short-range missile with the carrying weight of 14.5 kg, so that it can be easily carried by a single person. Guidance of the missile is through wires and Commands to the Line of Sight (CLOS). Guidance system of this missile is SACLOS and operator shall keep the reticle’s cross-hair on the target till the missile hits the target automatically. Due to high accuracy of tracking system, the missile system is capable of destroying different kinds of moving and stationary targets.

Tactical Specifications (SAEGHE 2)

“SAEGHE 2” missile is a short-range anti-armor guided missile. Its guidance system is SACLOS, operator shall keep the reticle’s cross-hair on the target till the missile hits the target automatically. This missile which is designed for the use of the infantry, is man-portable. Effective range is 900 meters. It can hit stationary and moving targets with the speed of 35 Km/h.

“Saeghe2” missile with two warheads is capable of destroying different kinds of tanks equipped with ERA, vehicles, as well as bunkers. Significance of this system is in its light-weight, man-portability and fast operation.



Tracker and missile

SAEGHE



SAEGHE2



ROCKET AND MISSILE

TECHNICAL SPECIFICATIONS

Type	SAEGHE	SAEGHE2
Penetration Depth (mm)	500	Min. 450
Range (m)	65-1000	65-900
Guidance	SACLOS	SACLOS
Warhead	Shaped Charge	Tandem Heat
Weight (kg)	6.1	7.4
Length (cm)	74.4	100 (Extended probe)
Diameter (cm)	12.7	12.7
Max. Velocity (m/s)	97.5 m/s	85 m/s
Time of Flight (s)	11.3 s	10.5 s
Rate of Fire	3-4 fire/min	3-4 fire/min
Operating Temperature	-32°c +62°c	-32°c +62°c
Tracker Weight (kg)	3.1	3.1
Carrying Weight (Missile & Launcher) (kg)	14.5	15.8
Encased Missile Weight (kg)	-	12.7



Tactical Specifications

Dehlavieh portable missile system (Pirooz) is based on Dehlavieh's advanced system and has automatic tracking capability. The system could promote its tactical and operational capabilities by combination of electro-optical tracking system, two-degree freedom platform and Dehlavieh ground laser-site. It could be installed on various types of tactical and armor vehicles and is also equipped with a proper hoist which enables it to be hidden during non-operational situations. The system has capability to attack different armor targets, fortifications and aerial targets with a height of 2 Km and in distance of 5 kilometers.



ROCKET AND MISSILE

TECHNICAL SPECIFICATIONS

Rapid and accurate target detection angle value	360 degrees
Time for two consecutive fires for two targets	50 s
The number of launch-ready missiles	2-4 rounds
Application capability in the low-target air-defense	To the height of 2 Km in 5 km range
Daily and overnight operation capability	5 km
Resistance to jamming.	
Being less dependent on the gunner and elimination of human errors with automatic tracking.	
Increase in the tactical capability with installation on light-weight vehicles, tanks, personnel vehicles and warships.	
To seek and track through an independent and strong electro-optical system at the same time.	
To pass through an active defense through two consecutive fires.	
Increase in operation speed through rapid detection of the target.	



Tactical Specifications (Toophan4)

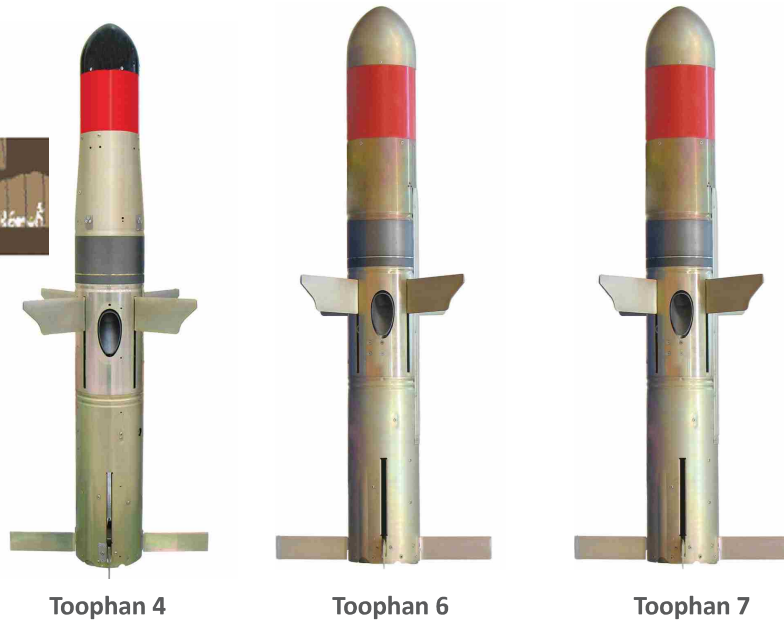
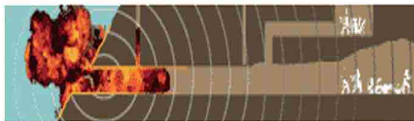
"Toophan 4" is a new generation of the Toophan missile which is equipped with a thermobaric warhead. This missile enjoys anti-jamming system that enables the ground and air forces to confront with different ground targets. The missile can be fired from tripod, armored vehicles and helicopters.

Tactical Specifications (Toophan6)

"Toophan 6" is a guided missile with highly precise tracking. It is produced to destroy different kinds of bunkers and attack the enemy's muster stations. The missile can be fired from tripod, armored vehicles and helicopters.

Tactical Specifications (Toophan7)

"Toophan 7" is a guided missile with highly precise tracking, which is designed and produced to destroy different kinds of bunkers and attack the enemy's muster stations. The thermobaric fragmentation warhead is an explosive warhead in the category of the high-explosive warheads. Functional capability of the warhead is a combination of the thermobaric warhead and fragmentation warhead capabilities.



ROCKET AND MISSILE

TECHNICAL SPECIFICATIONS			
Type	Toophan 4	Toophan 6	Toophan 7
Min. & Max. Range (m)	100-3750	150 - 3500	150 - 3500
Warhead	Thermobaric	Full-Caliber Thermobaric	Full-Caliber Thermobaric Fragmentation
Guidance	SACLOS	SACLOS	SACLOS
Warhead Weight (kg)	3.5	5	5.6
Missile Weight (kg)	20	21	21
Missile Length (cm)	117	117	117
Missile Diameter (cm)	15.3	15.3	15.3
Time of Flight (s)	21	21	21
Average Velocity (m/s)	178	170	170
Rate of Fire	1-2 rounds per minute	1-2 rounds per minute	1-2 rounds per minute
Operating Temperature (°C)	-32 to +60	-32 to +60	-32 to +60



DEHLAVIEH Thermobaric



General specification

The Dehlavieh thermobaric missile, which is one of the most advanced anti-personnel weapons, is designed and produced to destroy the enemy's fortifications and to attack their muster stations. The missile is equipped with laser-beam rider guidance that is an effective anti-jamming system against the enemy's all types of jamming. Having particular specifications, the missile is known as one of the most effective weaponry on the battlefield. It enjoys long range fire, light launcher, low flight, good manoeuvring as well as man-portability.



TECHNICAL SPECIFICATIONS

Min. & Max. Ranges	100 - 5000 m
Guidance	SACLOS (Laser Beam Rider)
Warhead	Thermobaric
Warhead Weight	6.8 kg
Missile Weight	22.7 kg
Missile Weight With Case	29.5 kg
Missile Length With Case	121 cm
Missile Diameter	152 mm
Time of Flight	25 s (Max. Range)
Max. Velocity	260 m/s
Rate of Fire	1-2 rounds per minute
Operating Temperature	-20 °C to +60 °C

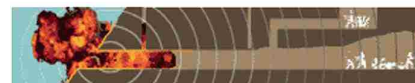
SAEGHE 4 (Thermobaric)

General Specification

"Saeghe 4" missile is a guided missile equipped with a thermobaric warhead, which is used as a weapon of infantry against enemy's soldiers and fortifications. Guidance of missile is through wire and Commands to the Line of sight (CLOS). Guidance system of this missile is SACLOS and operator shall keep the reticle cross-hair on the target till the missile hits the target automatically. Effective range is 900 meter. It is used to destroy soft targets, Bunkers, enemies muster stations. Significance of this system is in its light weight, man-portability and fast

TECHNICAL SPECIFICATIONS

Min. & Max. Range	65 - 900 m
Warhead	Thermobaric
Guidance	SACLOS
Warhead Weight	2.8 kg
Warhead Diameter	12 cm
Missile Length	74 cm
Missile Diameter	12.7 cm
Average Velocity	85 m/s
Time of Flight	10.5 s
Rate of Fire	3-4 fire/min
Tracker Weight	3.1 kg
Missile Weight	7.4 kg
Encased Missile Weight	12.7 kg
Carrying Weight(Missile & Launcher)	15.8 kg





Tactical Specifications (Toophan4)

“Sahand 3” portable air-defense missile weapon system is used to attack the flying targets with an infrared source which can be seen by naked eyes in low-altitude tail-on (or head-on in specific cases) attack. The missile can be shoulder-launched in many places, such as open-area trenches, water surface, marshland, building roof & vehicles moving on flat roads with the speed lower than 20km/h.



ROCKET AND MISSILE

TECHNICAL SPECIFICATIONS

Guidance	Proportional Navigation
Missile diameter	72 mm
Missile Length	1440 mm
Type of warhead	Fragmental, Shaped Charge
Type of fuse	Electromechanical contact fuse
Maximum altitude of target	2300 m
Minimum altitude of target	50 m
Maximum lethal slant distance (tail-on attack)	4200 m
Weight of the weapon in operating condition	15 kg
Control System	Self-Spinning and Single Channel Control
Operating Temperature	-32°c to +50°c



Tactical Specifications (Misagh 1)

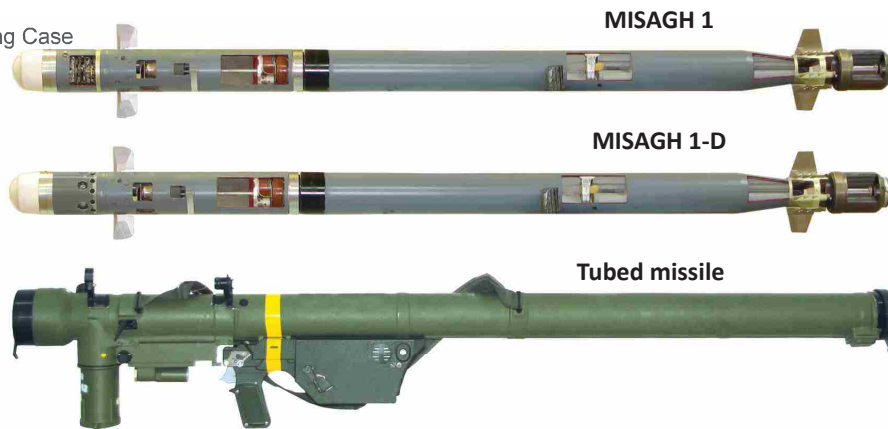
“Misagh1” missile is a second-generation low-altitude air-defense weapon system that is equipped with passive infrared tracking system. The weapon system is intended to destroy high-speed, low-altitude aerial targets and other ones that are approaching head-on and tail-on. It is also designed to destroy helicopters and low-speed aerial targets. The missile is a powerful system used for the direct protection of infantry forces, armored vehicles, paratroops and for supporting the forces. Moreover, the missile is used to protect significant sites, installations, roads, bridges, command posts and airfields. It is a shoulder-launched system that can be installed on a platform, too.

Tactical Specifications (Misagh 1-D)

“Misagh 1-D” is light-weight, man-portable, shoulder-launched missile with laser proximity fuse and powerful preformed fragmental warhead. This missile is a second-generation and short-range air-defense weapon system which features infrared passive homing with omnidirectional attack capability. This weapon system is powerful weaponry intended for direct protection of mechanized infantry forces, armored vehicles, paratroops, and for supporting the forces. It can also be utilized as an important means for the protection of sites, such as roads, bridges, airfields, ferries and command ports.

The weapon system elements

1. Ground battery/Coolant unit
2. Encased missile
3. Firing unit
4. Packing Case



TECHNICAL SPECIFICATIONS

	MISAGH 1	MISAGH 1-D
Type	MISAGH 1	MISAGH 1-D
Min. & Max. Range (m)	500 - 5000	500 - 5000
Target Altitude (m)	30 - 3500	30 - 3500
Fuse Type	Contact	Contact & Proximity
Guidance	Proportional Navigation + TAG	Proportional navigation + TAG
Warhead Type	Fragmental	Fragmental
Missile Length (mm)	1477	1477
Max. Speed (m/s)	600	600
Missile diameter (mm)	71	71
Warhead Weight	1.42 kg	1.42 kg
Control System	Self-Spinning And Single Channel Control	Self-Spinning And Single Channel Control
Operating Temperature (°C)	-32 to +60	-32 to +60
Operational System Weight (kg)	16.6	16.6
Proximity Fuse Range	-No Fuse	All Fire 1.0 m / No Fire 3 m



Tactical Specifications

“Misagh 2” weapon system is a third-generation of the shoulder-launched air-defense systems and against artificial infrared jamming. This system is utilized to destroy high-speed low-altitude aerial targets and those targets that fly head on and tail-on. It is also designed to destroy low-speed aerial targets such as helicopters. By detecting the target’s infrared spectrum difference and other thermal sources, the system can distinguish the received infrared waves from the main targets and those of the false ones. The Misagh 2 tubed missile combines with ground battery and firing unit to form missile weapon system. Tubed missile, ground battery and firing unit are composed to realize the launch of missile. The weapon system can be equipped with the night-vision camera.

MISAGH 2



Tubed missile



ROCKET AND MISSILE

TECHNICAL SPECIFICATIONS	
Target Altitude	10 m - 3500 m
Max. Range	5000 m
Min. Range	500 m
Guidance	Proportional Navigation + TAG
Warhead Type	Explosive and Fragmental
Missile Length	1526mm
Operational System	18.3 kg
Max. Speed	600 m/s
Missile diameter	71 mm
Fuse Type	Electromechanical contact fuse
Warhead Weight	1.42 kg
Control System	Self-Spinning And Single Channel Control
Operating Temperature	-32°c to +60°c



Tactical Specifications

Toophan launcher mechanism launches, tracks and guides the missile. The major part of the launcher is Missile Guidance Set (MGS).

Missile Guidance Set (MGS) is a sub-system of Toophan launcher, which produces firing commands, receives information from optical sight and extracts the missile position with respect to line of sight. To correct the flight path it produces the required control commands, MGS-2 is capable of launching all versions of Toophan missiles.

ROCKET AND MISSILE



TECHNICAL SPECIFICATIONS

- Capable of confronting with enemy's electro-optic warfare (Anti-jamming)
- Equipped with advanced algorithm for tracking & guidance of missile.
- Equipped with digital screen for pre-fire adjustment improvement and hit accuracy.
- Capable of automatic self-test and trouble shooting.
- Capable of identifying, firing and guidance of different versions of Toophan missiles.
- Tracking of high-speed targets
- Launcher and MGS-2 weight: 64 Kg



Tactical Specifications

After firing the missile, Dehlavieh launcher system tracks and guides the missile. The system enjoys some advantages such as light-weight, low-elevation, good manoeuvring and man-portable specifications. These caused the system to be considered as an effective warfare on the battle field.



ROCKET AND MISSILE

TECHNICAL SPECIFICATIONS	
Guidance System	SACLOS (Laser Beam Rider)
Operating Temperature	-20°c to +60°c
Weight	27 kg
Rate of Fire	1-2 Rounds Per Minute
Loading Time	Max. 30 s
Thermal Camera Installation Time on Launcher	Max. 1 Minute
Max. Firing Altitude (From Sea Level)	Max. 4500 m
Max. Range For Target Detection With Thermal Camera	3000 m for Un-Cold thermal camera and other ranges depend on type of the camera
Guidance Angles (Launcher Rotation Freedom)	
Horizontal State	360 Degree
Vertical State	From -5 to +20 Degree
Day Vision Specifications	
Magnifying Scale	10X & 16X
Field of View	5 Degree (with magnifying scale of 10X)



ROCKET AND MISSILE

TECHNICAL FEATURES				
Model		TB-1909	TB-1911	TB-1914
Application		Shahed Rocket Launcher	Saeeghe Anti Armored Rocket	Sayyad Rocket
Weight	gr	360± 5	< 325	800±80
Dimension	mm	Ø56.2 X 60	Ø50 X 64.5	Ø67 X 90
Connector		(1):-40 ,(2,3): common ,(4):-22	(C,S):igniter ,(P):+20 ,(T):-10 (M):-20 ,(C):common	+ , - ,(s):igniter
Voltage	V	-40 ⁻⁴ _{+1.5}	±20 ⁻² ₊₂	27± 10%
		-22 ⁻² ₊₁	10.25 ^{-1.25} _{+1.25}	N.L : <30.5
Current	A	0-5 sec : 2.4 <5 sec : 0.8		
		0-5 sec : 0.2 <5 sec : 0.1		
Activation Time	Sec	< 1	< 0.4	< 1
Operating Time	Sec	> 40	>15	> 90
Circuit Resistance	---	---	1.3±0.2	0.35-0.8
Activation Method	---	Percussion	Electrical	Electrical
Fire current		2 oz at 13 in	2A at 25ms	2A
Safety Current		3 oz at 2 in	200mA at 5min	200mA at 5min
Constant Resistance	Ω		1.2	20
			2.5	



TECHNICAL FEATURES

Model		Rocket Battery	TB-1917	TB-1923	TB-1926	SILVER-ZINC RECHARGEABLE BATTERY
Application		Marine Cruise Missile	Marine Cruise Missile	Smart Ammunition 155mm	Anti Armored Missile	F7 and Mig-29 Fighters
Weight	gr	0.5±21.5	1345-1420	115±10	115±10	500
Dimension	mm	Non-geometric	Ø68X 144	Ø31 X 59	Ø31 X58.5	
Connector			Socket 19 pin	(1): + (2):common (3): - (4,5): igniter	(1): + (2):common (3): - (4,5): igniter	
Voltage	V	25< 30>	27 ⁺⁴ ₋₂ N.L : <32	+12 ^{+0.06} _{-1.5} +12 ^{-0.06} _{+1.5}	-12 ^{-3.5} ₊₁ +12 ^{+3.5} ₋₁	1.2< 2>
Current	A	22(1100sec) 28(100sec) 22(736)			3.3	1100
Activation Time	Sec	<1	< 1	< 0.8	< 1	Secondary
Operating Time	Sec	>2000	<150	<70	<30	
Circuit Resistance	---		10.5 – 12.7		2 – 4	
Activation Method	---		Electrical	Electrical	Electrical	
Fire current	A		1.6 A-5A at 10ms	500mA at 10ms	500mA at 10ms	
Safety Current	mA		100mA at 5min	100mA at 5min	(50mA at 10min) , (40mA at 30 min)	
Constant Resistance	Ω			2.5 – 3.5		
Storage Time(year)	Sec	10				
Operating System	Ω	Marine cruise ghadir/ghadir				F7,Mig
Production Position	---	Sample building				
Constant Current	A		20	0.4		
Life time	months					9
Capacity	---					45



ROCKET AND MISSILE

TECHNICAL FEATURES			
Model		TB-1927	TB -1953
Application		Battery Model TB-27	Fajr 5 Rocket
Weight	gr	125±5	≤2500
Dimension	mm	Ø32 X 70	Ø86X 115
Connector		(A):+20 , (D):common (B):-20 , (Y,D): igniter	+ , - , (s): igniter
Voltage	V	+20 ⁺⁵ ₋₂ -20 ⁻⁵ ₊₂	27 ⁺⁴ ₋₃
			6A +(50 pulse 20A-100 mSec)
Current	A		
Activation Time	Sec	< 0.8	< 1
Operating Time	Sec	<18	< 200
Circuit Resistance	---	4 - 6	2 – 4
Activation Method	---	Electrical	Electrical
Fire current		400mA at 50ms	1A
Safety Current		100mA at 5min	500mA at 5min
Constant Resistance	Ω	8	