

# GATSAV

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# KASAN

[www.kasantrade.com](http://www.kasantrade.com)

# GATSAV



# KASAN



**Güçlü  
VE GÜVENİLİR  
YARINLARA  
GURURLA**

**With HONOUR OF STRONG  
AND SAFETY FUTURE...**

**GATSAV**

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**KASAN**



30/11/2017

Attention: UNDERSECRETARIAT FOR DEFENCE INDUSTRIES

Subject: Letter of authorization ("Mandate Letter") to act on behalf of TEHNOGLOBAL SYSTEMS DOO (the "Company") in the matter of carrying out communications with the Undersecretariat For Defence Industries ("SSM").

Dear Sirs,

The Company confirms that with this Mandate Letter, GATSAV SAVUNMA SAN. VE TİC. A.Ş. with its headquarters at Papirus Plaza Merkez Mah. Ayazma Yolu Cad. No:37, Kat:6 34410 İstanbul with the phone number 02123121789 ("GATSAV") including Mr. Gürsoy Turan (mobile:05325505466/email:gursoy.turan@gatsav.com/gursoyturan@hotmail.com) and Mr. Mr. Taner Akkaya (mobile:0905336422401/email:taner.akkaya@gatsav.com) acting as the real person representative as well as any authorized representatives of GATSAV (all together "Representatives") are authorized to liaise with the SSM and persons authorized by the SSM, on behalf of the Company in relation to the provision of ammunition and production of such products by the Company ("Transaction").

This Mandate Letter grants exclusivity to the Representatives in terms of the Transaction within the duration of this Mandate Letter.

With this Mandate Letter the Representatives are hereby authorized for 12 (twelve) months from the signing date of this Mandate Letter, to hold meetings, correspond with the SSM, negotiate terms, execute all types of procedures for the fulfillment of the Transaction and share information and details in relation to the Company's products and services.

Yours truly,

Director

Nebojsa SARENAC, authorized signatory of the Company


TEHNOGLOBAL SYSTEMS doo  
Br. 06-02-1692/17  
30. 11. 2017 god.  
BEOGRAD, Maglajska 19





30/11//2017

Attention: REPUBLIC OF TURKEY MINISTRY OF NATIONAL DEFENSE

Subject: Letter of authorization ("Mandate Letter") to act on behalf of TEHNOGLOBAL SYSTEMS DOO

(the "Company") in the matter of carrying out communications with the Republic of Turkey Ministry of National Defense ("Ministry").

Dear Sirs,

The Company confirms that with this Mandate Letter, GATSAV SAVUNMA SAN. VE TİC. A.Ş. with its headquarters at Papirus Plaza Merkez Mah. Ayazma Yolu Cad. No:37, Kat:6 34410 İstanbul with the phone number 02123121789 ("GATSAV") including Mr. Gürsoy Turan (mobile:05325505466/email:gursoy.turan@gatsav.com/gursoyturan@hotmail.com) and Mr. Taner Akkaya (mobile:0905336422401/email:taner.akkaya@gatsav.com) acting as the real person representative as well as any authorized representatives of GATSAV (all together "Representatives") are authorized to liaise with the Ministry and persons authorized by the Ministry, on behalf of the Company in relation to the provision of ammunition and production of such products by the Company ("Transaction").

This Mandate Letter grants exclusivity to the Representatives in terms of the Transaction within the duration of this Mandate Letter.

With this Mandate Letter the Representatives are hereby authorized for 12 (twelve) months from the signing date of this Mandate Letter, to hold meetings, correspond with the Ministry, negotiate terms, execute all types of procedures for the fulfillment of the Transaction and share information and details in relation to the Company's products and services.

Yours truly,

Director

Nebojsa SARENAC, authorized signatory of the Company



TEHNOGLOBAL SYSTEMS doo

Br. 06-02-1993/17

30.11.2017 god.

BEOGRAD, Maglajska 19







Български индустриален инженеринг и мениджмънт АД  
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Bulgarian industrial engineering and management JSC  
BG UIC: 202212452  
15-17, Belavodski pat Str., 1616 Sofia, Bulgaria  
Tel.: (+359) 2 917 02 02, Fax: (+359) 2 917 02 40

Ref. 276 dated 27.02.2018

**Attention:** REPUBLIC OF TURKEY MINISTRY OF NATIONAL DEFENCE

**Subject:** Letter of authorization ( " Mandate Letter " ) to act behalf of **BULGARIAN INDUSTRIAL ENGINEERING and MANAGEMENT JSC** (the " Company " ) in the matter of carrying out communications with the Under secretariat For Defence Industries ( " SSM " ).

Dear Sir,

The Company confirms that with this Mandate Letter , GATSAV SAVUNMA SAN. VE TIC A.S. with its headquarters at Papyrus Plaza Merkez Mah. Ayazma Yolu Cad. No:37, Katt:6 34410 , Istanbul with the phone 02123121789 ( " GATSAV " ) including **Mr. Gursoy Turan** (mobile: 05325505466 / email:gursoy.turan@gatsav.com/ gursoyturan@hitmail.com and **Mr. Taner Akkya** (mobile:0905336422401/ email:taner.akkua@gatsav.com acting as the real persons representative as well as any authorized representatives of GATSAV (altogether "Representatives") are authorized to liaise with the SSM and persons authorized by the SSM, on behalf of the Company in relation to the provision of ammunition and production of such products by Company ("Transaction").

With this Mandate Letter the Representatives are hereby authorized for 12 (twelve) months from the date of this Mandate Letter, to hold meetings, correspond with the SSM negative terms, execute all types of procedures for the fulfillment of the Transaction and share information and details in relation to the Company's products and services.

Yours truly,

Executive Director

Stefan Penchev authorized signatory of the Company









## BACKGROUND

Formation of the present Company Krušik is connected to the year 1937, when the adventurous engineer Nikola Stankovic decided to build a factory of armament and ammunition in Valjevo, similar to the one that had already existed in Višegrad. The factory got its first name after the parent factory from Višegrad.

Based on the Decision of the Sarajevo Royal Bank, on February 22nd, 1939, the Trade Sector of the Ministry of Trade and Industry issued the permit (Conf. III No. 17) stating that the Company “Vistad” in Valjevo may engage in industrial production of primers. Very soon, the factory took over the monopoly of No. 8 primers production. Shortly after, the Company „Vistad” started the production of hand offensive grenades, infantry rifle ammunition and also the preparation of manufacture of small caliber (12kg) aircraft bombs began. During the Second World War, the Company „Vistad” practically had a decisive role in the supply of war-material products to the battle front.

By transition into the jurisdiction of the Ministry of National Defense on June 10th, 1945, the factory got the name Military-Technical Institute of Valjevo and on January 23rd, 1948, the Company was registered under the name of „Krušik”. 75 years of existence are characterized by alternating periods of growth and stagnation in business activities and company development.

Having in mind the above said, the last decades of Krušik existence may be divided provisionally in four crucial periods:

THE FIRST PERIOD, between 1948 and 1970, is significant for the development of inherited products, but also for the introduction of new programs into the war-material items production. Reorientation of free capacities in military production to the production of civil programs was seen as an especially important activity at this period of time.

THE SECOND PERIOD, between 1975 and 1985, belongs to a decade of investments, development and business expansion of the Company. This period is called the Golden Age of Krušik.

A remarkable 80 million dollar export on annual basis has been achieved, thus enabling intensive modernization of the production programs and service capacities. In this period, Krušik was one of the biggest economic companies in Yugoslavia, with ten thousand employees and the products mostly designated for foreign markets.

Defense production, with its rocket program technologies of high quality, occupies a particular place in the entire system of Krušik, constituting the very backbone of the development function of the Company and export results.



THE THIRD PERIOD in Krušik history started in 1985, along with the occurrence of rapid recession of business dealings, being the result of global changes as well as the collapse of Yugoslavia, and followed by the introduction of sanctions against our country, wars in the region and NATO bombings. Due to interrupted business connections with the world and sudden loss of projects, all the companies within the system found themselves in a difficult position, especially the Defense production. Consequently, all the energy was put into the pursuit of a new organizing system and in 1992 the Company Krušik has been organized as a holding corporation. In the Defense production the focus was on an intensive work on restructuring the part of its capacities aiming at the production of profitable programs for new markets. Accordingly, development and production of anti-hail rockets, electric detonators, cam switches, gas meters and other products was initiated.

Krušik succeeded in implementing the Government's Social Program and the number of employees had been adjusted to the current level of production.



THE FOURTH PERIOD, ongoing to the day, is the period of widening product assortments by way of introducing new ones into the production, modernizing the existing products in accordance with the market requirements, increasing the number of customers as well as production efficiency, maintaining permanent quality which is one of the features Krušik is widely known for, continuous improvement of personnel, equipment modernization, introduction of new technologies, hiring of young staff, adjustment of production processes and products to environmental requirements, permanent investment in process automation and electronic monitoring.

Holding Corporation Krušik a.d., with its vastly experienced workforce and the name ever-present on the world market, permanently connected with quality, imposed itself as a reliable partner, open for all kinds of cooperation, both in the field of production and development.



## COMPANY PROFILE

Company Name: HK „Krušik“ a.d.  
 Established: February 22nd, 1939  
 Number of Employees: 2261  
 Type of Company:  
     Closed joint-stock company  
 Address: 59 Vladike Nikolaja,  
     14000 Valjevo, Serbia  
 General Manager: Mladen Petković  
 Phone: +381 14 221 593  
 Fax: +381 14 220 516  
 E-mail: krusikdirektor@ptt.rs  
 Web site: www.krusik.rs



### Military program

- Mortar Shells of all calibers (high explosive, smoke and illuminating), guided and unguided rockets (high explosive and antitank), aircraft bombs, artillery projectiles, 40mm ammunition, 82mm cartridges, cumulative mines, hand grenades, antitank mines, fuzes and initial devices.
- Overhaul of the ammunition for all production program items
- Control-technical inspection and survey for the purpose of the rocket systems shelf life extension
- Transfer of technologies and construction of factories for all types of proper production programs

### Civil program

- Krušik's antihail system, electric detonators, containers for explosive disposal, cam switches, gun and primers for cattle stunning, technical parts made of Al and Cu alloys, technical parts made of thermosetting resins, tools manufacture, metrological laboratory services, metal processing, thermal treatment and chemical protection.

The Holding Corporation "Krušik" a.d. is the name recognized worldwide among the users of products that the Company "Krušik" produces. Owing to the seventy-five years of tradition and over ten million of sold items in more than 60 countries in the world, the Company „Krušik“ is ranked among the leading armament manufacturers in this part of Europe.

"Krušik" has the integrated quality management system certified as per:

**ISO 9001:2008; ISO 14001:2004; OHSAS 18001:2007 and SRPS ISO 17025:2005.**

Strategic goals of the Company "Krušik" are as follows: widening the products range by way of introducing new ones into the production, modernization of the existing products in accordance with the market requirements, increasing the number of customers, boosting production efficiency; maintaining high quality which is one of the features we are internationally known for, continuous training of personnel, equipment modernization, introducing new technologies, hiring young employees, adjustment of manufacturing processes and products with the environmental protection requirements, continual investment in process automation and electronic surveillance.

The Holding Corporation "Krušik" a.d. is one of the companies with the longest tradition of participating in national and international fairs. The beginning of the factory presentation at fairs coincided with the beginning of the first Technology Fair in 1956 in Belgrade. In the course of all these years, "Krušik" has participated in more than 300 manifestations both in the country and



abroad. Many partnerships with great number of domestic and foreign companies have been established. Partners of strategic importance for the Company „Krušik“ are the Company Yugoimport SDPR and the Serbian Army.

„Krušik“ establishes with potential partners worldwide different forms of cooperation of mutual interest, including the following:

- delivery of completed items or item parts from its own production program;
- joint participation in the sale of products on new markets;
- independent or mutual development of products at market requests;
- manufacturing technologies transfer, by sale or exchange;
- improvement of existing items in order to enhance the characteristics as per customer's requests.

Support which factory receives from the Serbian Government is very important for its development and business activities.



## **FIELD OF ACTIVITY**

### **PRODUCTION OF ARMAMENT AND MILITARY EQUIPMENT**

We produce armament and military equipment for Military Aviation and Air Defence, Ground troops, Navy and other, as well as practice devices.

### **OVERHAUL OF ARMAMENT AND MILITARY EQUIPMENT**

We perform overhaul of armament from our production program or overhaul of similar devices from other producers.

### **ENGINEERING BUSINESSES**

Technology transfers and erection of plants and production facilities with diverse production programs.

### **MARKET ORIENTED PROGRAMS**

We produce products that can be applied in different branches of industry.

### **SERVICES**

We perform the following services: metal manufacturing, heat treatment and protective coatings.

We perform the assembling and safe destruction of war devices that went out of use and the usage period of which shelf life has expired.





# MILITARY PROGRAM

**HK „KRUŠIK” a.d. , 14000 VALJEVO, REPUBLIC of SERBIA**  
**Phone 381-14-223-121, 221-121, Marketing 381-14-226-822, Telefax 381-14-220-149**  
**e-mail: [krusikmarketing@eunet.rs](mailto:krusikmarketing@eunet.rs), web site: [www.krusik.rs](http://www.krusik.rs)**





## 60 mm MORTAR AMMUNITION FAMILY

Modern solutions have been applied in developing II generation of shells. These include:

- optimised aero-dynamic shape securing improved external ballistic characteristics, accuracy and precision at all ranges;
- advanced shell body production technology which provides forming of great number of fragments, has been applied in production of the shell body; this technology, together with the TNT/RDX explosive charge provides optimal efficiency at target.









Masking of friendly troops movement as well as blinding of enemy observers, fire support artillery and anti-tank weapon crews is achieved by use of modern, low-drag and highly efficient white phosphorus-based smoke shells.

With use of illuminating mortar shells, mortars provide night battlefield illumination, as well as blinding of enemy crews and observers.

The shells are completed with fuzes which are also indigenously produced: point detonation, superquick/delay fuzes, time pyrotechnical fuzes.

The propellant charge consists of base and increment propellant charge. The base propellant charge is filled with EI powder fitted into aluminium bushing. The increment propellant charge is also filled with EI powder fitted in reinforced celluloid shells resulting in good distribution of the projectile initial velocities and good range overlapping.

## MORTAR AMMUNITION FAMILY

60 mm								
Shell designation/type	HE M73P4	HE Mk10	HE Mk10P1	Smoke M73P2	Smoke Mk10	ILL. M67P2	ILL. M91	Practice M62
Length of shell with fuze (mm)	286	410	410	286	410	330	495	202/193
Weight of shell with fuze (kg)	1.35	2.1	2.1	1.35	2.1	1.27	2.1	1.08/ 0.235
Type of shell charge	TNT	RDX/TNT or TNT	RDX/TNT or TNT	WP	WP	ILL.	ILL.	
Shell charge weight (kg)	0.22	0.4	0.4	0.19	0.3	0.2	0.3 (illuminating candle)	
Fuze type/designation	UTM68P1	UTM88P1	UTM93 SQ/D	UTM68P1	UTM88P1	TPM67	TPM67	
Muzzle safety (m)	8	70	50	8	70			
ProPELLANT charge	O + 4	O + 6	O + 6	O + 4	O + 6	O + 4	O + 6	
Max. Working pressure (bar)	414	647	647	414	647	414	647	
Maximum range (m)	2550 Mortar M57 Barrel length 720 mm	5100 Mortar M90 Barrel length 1300 mm	5100 Mortar M90 Barrel length 1300 mm	2550 Mortar M57 Barrel length 720 mm	5100 Mortar M90 2700 Mortar M57	2450 Mortar M57 Barrel length 720 mm	4000 Mortar M90 2500 Mortar M57	280
Minimum range (m)	94	90	90	94	90	400 (O+1)	400 (O+1)	50
Efficiency on target	10 m (effective lethal radius penetration /m <sup>2</sup> )	14 m (effective lethal radius penetration /m <sup>2</sup> )	14 m (effective lethal radius penetration /m <sup>2</sup> )			180.000 Cd for 35s candle speed of descent 2.5 m/s	350.000 Cd for 30s candle speed of descent 3.0 m/s	



## 81/82 mm MORTAR AMMUNITION FAMILY

Modern solutions have been applied in developing II generation og shells. These include: optimised aero-dynamic shape securing external ballistic characteristics, accuracy and precision at all ranges; appliance of advanced shell body manufacturing technology which provides forming of great number of fragments, has been applied in production of the shell body; this technology together with the TNT/RDX explosive charge provides optimum efficiency at target. The new generation shell weight corresponds to the heavy shell weights of the previous generation and importantly increased their range, precision and terminal efficiency.

Masking of friendly troops movement as well as blinding of enemy observers, fire support artillery and anti-tank weapon crews is achieved by use of modern, low-drag and highly efficient white phosphorus-based smoke shells. With use of illuminating mortar shells, mortars provide night battlefield illumination, as well as blinding of enemy crews and observers.

Antisabotage under water-operating HE mortar shells developed in 81/82 caliber, with special point-detonating, superquick and delay-action fuzes significantly expand the tactical use of mortars – providing antisabotage underwater operation though the shock wave action against saboteurs-diving commandoes, clearing of underwater mine fields-with the purpose of initiating a particular type of mine sensor in underwater mine-field through the action of shock-wave, as well as antilanding operation-by fragmentation effect on the water-sea surface or land, with the purpose of annihilating personnel and unarmoured vehicles and equipment.


The antisabotage mortar shells characterize fuze delay time from 0,09 to 0,19 s, depth of underwater burst from 4 to 10 m and shock wave intensity in the water of 1,7 MPa at the distance of burst site of 20 m and 1 MPa at the distance of burst site of 30 m.

The shells are completed with fuzes which are also indigenously produced: point detonation, superquick/delay fuzes, time pyrotechnical fuzes.

The propellant charge consists of base and increment propellant charge. The base propellant charge is filled with EI powder fitted into a aluminium bushing. The increment propellant charge is also filled with EI powder fitted in reinforced celluloid shells resulting in good distribution of the projectile initial velocities and good range overlapping.



## MORTAR AMMUNITION FAMILY

81/82 mm										
Shell designation/type	HE M72/M74	HE Mk11	HE Mk11P1	Smoke M72/M74	Smoke Mk11	ILL. M67P2	ILL. M95	Practice M68**	Practice M62*	Antisabotage shell M89
Length of shell with fuze (mm)	375	480	480	375	480	410	530	380	287/193	480
Weight of shell with fuze (kg)	3.05	4.1	4.3	3.05	4.1	2.95	4.1	2.3	2.48/ 0.23	4.1
Type of shell charge	TNT	RDX/TNT or TNT	RDX/TNT	WP	WP	ILL.	ILL.	Target-parashuter		RDX/TNT
Shell charge weight (kg)	0.68	0.85	0.75	0.55	0.63	0.4	0.65			0.85
Fuze type/designation	UTM68P1	UTM88P1	UTUM93 SQ/D	UTM68P1	UT M88P1	TPM67	TPM67			UTUM93P2 SQ/D with delay time 0.09-0.19s
Muzzle safety (m)	8	70	50	8	70					50
Propellant charge	O + 6	O + 6	O + 6	O + 6	O + 6	O + 4	O + 6	O + 1		O + 6
Max. Working pressure (bar)	647	647	647	647	647	422	647			647
Maximum range (m)	5070 Mortar M69 B-D Barrel length 1450 mm	6500 Mortar M69 B-D Barrel length 1450 mm	6500 Mortar M69 B-D Barrel length 1450 mm	5070 Mortar M69 B-D Barrel length 1450 mm	6500 Mortar M69 B-D Barrel length 1450 mm	3400 Mortar M69 B-D Barrel length 1450 mm	5000 Mortar M69 B-D Barrel length 1450 mm	600	280	6500 Mortar M69 B-D Barrel length 1450 mm
Minimum range (m)	91	100	100	91	100	250 (O + 1)	300 (O + 1)	90	50	100
Efficiency on target	14 m (effective lethal radius- 1 penetration /m)	18 m (effective lethal radius- 1 penetration /m)	18 m (effective lethal radius- 1 penetration /m)			500.000 Cd for 40s candle speed of descent 2.5 m/s	750.000 Cd za 40s pri brzini propadanja osv. baklje 3.0 m/s			18m Shock-wave overpressrre in the water 20m 1.7MPa 30m 1MPa

\* **The practice shell contains small projectile**

\*\* **Target-parashuter, 350mm x 850mm, height of target 600m, target descent velocity 5-7m**



## 120 mm MORTAR AMMUNITION FAMILY

Modern solutions have been applied in developing II generation of shells. These include: optimised aerodynamic shape securing external ballistic characteristics, accuracy and precision at all ranges; appliance of advanced shell body casting technology which provides forming of great number of fragments, has been applied in production of the shell body; this technology together with the TNT/RDX explosive charge provides optimum efficiency at target. The new generation shell weight corresponds to the heavy shell weights of the previous generation and importantly increased their range, precision and terminal efficiency.

Masking of movements of friendly troops, as well as blinding of enemy observers and fire support and anti-tank weapon crews is achieved by use of modern, low-drag and highly efficient white phosphorus and HC based smoke shells.








With use of illuminating mortar shells, mortars provide night battlefield illumination, as well as blinding of enemy crews and observers.

The shells are completed with fuzes which are also indigenously produced: point detonation, superquick/delay fuzes, time pyrotechnical fuzes.

The propellant charge consists of base and increment propellant charge. The base propellant charge is filled with EI powder fitted into aluminium bushing. The increment propellant charge is also filled with EI powder fitted in reinforced celluloid shells resulting in good distribution of the projectile initial velocities and good range overlapping.



## MORTAR AMMUNITION FAMILY

<b>120</b> mm							
Shell designation/type	HE M62P	HE Mk12P1	HE Mk12P1-L	Smoke M64P2	High smoke M89	ILL. M87P1	ILL. M91
Length of shell with fuze (mm)	606	800	800	606	670	670	752
Weight of shell with fuze (kg)	12.6	14.8	14.8	12.6	11.25	10.7	11.5
Type of shell charge	RDX/TNT or TNT	RDX/TNT or TNT	RDX/TNT or TNT	WP	HC in ejected pot	ILL.	ILL.
Shell charge weight (kg)	2.5	2.9	2.9	2.45	1.65	1.2	1.2
Fuze type/designation	UTU M93-N	UTU M93-N	UTU M93-N	UTM68P1	TPM87 Time, pyrotechnical, circonium-based fuze, time setting from 5 to 50 sec.	TPM87 Time, pyrotechnical, circonium-based fuze, time setting from 5 to 50 sec.	TPM87 Time, pyrotechnical, circonium-based fuze, time setting from 5 to 50 sec.
Muzzle safety (m)	50	50	50	8			
Proppellant charge	O + 6	O + 8	O + 10	O + 6	O + 5	O + 5	O + 5
Max. Working pressure (bar)	922	922	1250	922	620	620	980
Maximum range (m)	6500 Mortar M75 Barrel length 1500 mm	7400 Mortar M75 Barrel length 1500 mm	9400 Mortar M95 Barrel length 1900 mm	6500 Mortar M75 Barrel length 1500 mm	6000 Mortar M75 Barrel length 1500 mm	6000 Mortar M75 Barrel length 1500 mm	6600 Mortar M75 Barrel length 1500 mm
Minimum range (m)	255	255	275	255	400 (O + 1)	400 (O+1)	400 (O+1)
Efficiency on target	20 m (effective letelhal radius- 1 penetration /m <sup>3</sup> )	24 m (effective letelhal radius- 1 penetration /m <sup>3</sup> )	24 m (effective letelhal radius- 1 penetration /m <sup>3</sup> )		On hitting the ground, the smoke pot emits a thick white smoke for the time of 4-6 minutes	1.000.000 Cd for 60s candle speed of descent 3 m/s	1.000.000 Cd for 60s candle speed of descent 3 m/s

## BR-1-57 mm Air-to-surface rocket launcher



### Aircraft Rocket BR-1-57

BR -1- 57 rocket projectile is the Rocket of high explosive effect, 57 mm caliber and assembled with impact fuze, type UTI-1. Purpose of this rocket is destruction of air targets at the altitudes up to 30.000 m it is the modern aircraft amament.

BR-1-57 rocket with the UTI-1 fuze can also be used for the ground targets destruction ( aircraft, cars, warehouses and similar military objects).

BR -1 -57 rocket with the fuze UTI-1 is fired from the tube launchers (with rear part opened) , which are placed in the honeycomb launchers L-57.

#### Tehnical data

Caliber: 57mm

Length of the rocket with the fuze: 882mm

Mass of the assembled rocket:  $3.86 \pm 0.06$  kg

Mass of the explosive charge: 0.285 kg

#### Ballistic characteristics

Maximum speed: 673 to 617 m/s

Flying time for the distance of 1000 m: 1.89 to 2.19s

Maximum allowed pressure in the rocket chamber: 380kg/cm<sup>2</sup>



BR-1-57



INITIATION BY MEANS  
OF PLUG

BR-1-57 P1



INITIATION BY MEANS OF AUTOMATIC  
SWITCHING ON THE CIRCUIT

## Aircraft Rocket BR-2-57

Rocket BR-2-57 is of the hollow charge effect. It is 57 mm caliber assembled with the impact inertial UTI-2 fuze. The rocket is used to destroy armoured ground targets, tanks, self-propelled artillery, armoured vehicles, armoured personnel carriers etc. It serves as the rocket armament of modern jet airplanes.

Rocket BR-2-57 is launched with the UTI-2 fuze from the launcher tube (with the opened rear ends) which is assembled in honeycomb rocket package.

### Technical data

Caliber: 57 mm

Length of the rocket with the fuze: 824 to 835 mm

Mass of completely assembled rocket: 3.64 kg

Mass of the explosive charge: 0.29 kg

Thickness of the pierced armour when the rocket strikes at the angle of 300° from the vertical: 100 to 150 mm

Rocket firing: Electric, with two electric igniters

### Ballistic characteristics

Maximum velocity: 563 to 620 m/s

Time of rocket flight up to the distance of 1000 m: 2.461 to 2.179 s

Maximum allowable pressure in the (rocket) combustion chamber: 375 kg/cm<sup>2</sup>



BR-1-57



INITIATION BY MEANS OF PLUG

BR-1-57 P1



INITIATION BY MEANS OF AUTOMATIC SWITCHING ON THE CIRCUIT



## Aircraft Rocket cal.57 mm BR-20-57 P1

### General

In addition to the aircraft rockets BR-1-57 mm and BR-2-57 mm manufactured to date, "Krusik" has developed the production of a new service rocket, named the Universal BR-20-57 P1, and corresponding practice rocket.

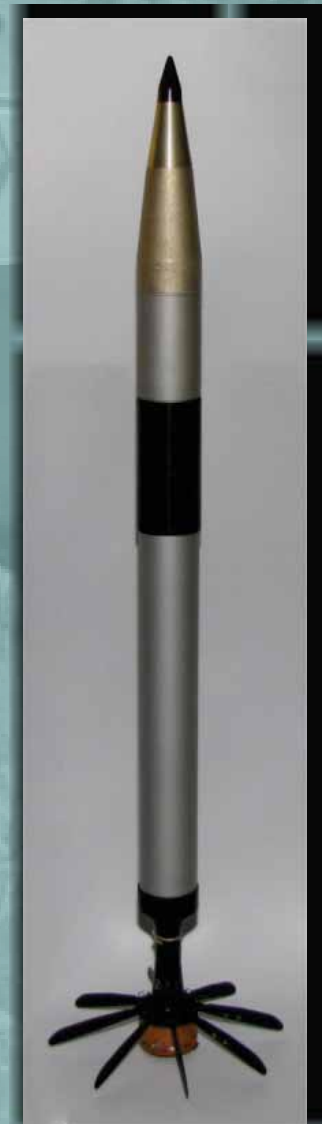
BR-20-57 P1 nun rocket is a rocket of a combined hol low-charge and fragmentation effect, so that it incorporates the application of the rocket BR-1-57 mm, which means that a single rocket type can be employed in different fighting missions. The arming so far has to be performed with a specific type of rockets (either hollow -charge or high -explosive), depending on a particular combat action, which is now no longer necessary, owing to the new universal-employment rocket. This practically provides multiple employment advantages.

### Technical characteristics

The aircraft rocket of a hollow -charge and fragmentation effect BR-20-57 P1 is a system of Cal.57 mm unguided air-to-ground and air- to-air rockets and is used for mass arming of aircrafts. The rocket includes a warhead with hollow charge and fragmentation effect and impact type UTI-2 fuze and superquick - inertial action. The rockets are used to annihilate air targets at altitudes of up to 30.000 m, for assault actions against mobile and stationary armoured targets such as tanks, armoured vehicles, carriers, light weapon and vehicles, aircrafts on the ground and personnel around the stated combat means.

### Tehnickal data

Rocket mass: 4.5 kg  
Explosive charge mass: 0.32 kg  
Propellant mass: 1.13 kg  
Penetration: 160-200 m  
Quantity of fragments on burst: 200 pcs  
Killing range: 18-20 m (40 m circle)  
Muzzle safety: 110  
Packing of 8 rockets per wooden case  
Special air-tight packaging for the fuze  
Warranty period: 5 years



## BR-1-57 V, BR-2-57 V and BR-20-57 V Practice Rockets

The Practice rockets BR-1-57 V, BR-2-57 V and BR-20-57 V are used for training of pilots when firing 57 mm caliber rockets.

The warhead and the fuze are inert (made of metal). Its mass, centre of gravity and shape are matched to live rockets, so that its ballistic trajectories are identical to those of the service rockets.

Packing of 12 rockets per wooden case with the total mass of packing amounting to 67 kg.

Warranty period is 5 years.



BR-1-57



INITIATION BY MEANS  
OF PLUG

BR-1-57 P1



INITIATION BY MEANS OF AUTOMATIC  
SWITCHING ON THE CIRCUIT

## PROGRAMMABLE GUIDED ROCKET - 200 (PRM-200)

PRM-200 is a programmable guided rocket with self-contained guidance system, used as a target for:

- Live firing by medium - range AD missiles with radar or IR guidance;
- Live firing by air-to-air missiles with radar or IR homing systems;
- Live firing by light AA artillery systems equipped with radar FCS.



PRM-200 is fitted with two optical and two IR or smoke flares for increase of IR contrast. The flares are adjustable to ignite from 10 to 80 seconds upon launching and then burn for 35 seconds.

PRM-200 radar signature is provided by Luneberg lens (passive radar reflector) built in the forward and aft sections of the rocket target.

PRM-200 can be launched from the advanced trainer/combat G-4 "Super Galeb" or similar aircraft provided with additional relevant equipment and target carrying and launching kit.

PRM-200 is launched-and-forgotten by the pilot at aircraft speeds of Mach 0.5 to 0.8. If the target is not hit, the programmer unit activates the target self-destructing device.

The guidance system is self-contained, programmable and comprises a barometric altimeter and two free gyroscopes. Its guidance is programmed before fixing PRM-200 on the launcher along the aircraft platform.

### Performances:

Operating altitude range	300(±10%) to 7.000 m(±10%)
Preprogrammed number of pitchings	2
Preprogrammed number of yawings	2
Yaw angle	± 30° (± 30)
Pitch angle	± 27° (± 30)
Target range:	
-launched at the altitude of 300 m	22km (± 0.5 km)
-launched at the altitude of 7.000 m	48 km (± 2km)

### Contrast characteristics:

Target radar head-on signature:	
For X range (l= 3cm)	6.53 m <sup>2</sup>
For G range (l= 5cm)	2.35 m <sup>2</sup>
For S range (l= 10cm)	0.58m <sup>2</sup>
IR radiation level	mm. 2 x 2.000 Cd





## **QUICK ATS 128 mm**

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Quick air target simulator is non-guided rocket-target. Operators of army air defense systems use it for practicing the use of short range air defense rocket system. Shooting practicing is done with incoming (type A) and departing (type B) unguided rocket on ballistic trajectory.

**TYPE - A**



**TYPE - B**



**Technical data:**

-Caliber -----	128 mm
-Stabilizer range -----	270 mm
-Length of rocket with tracer -----	1256 mm
-Rocket mass, type - <b>A</b> -----	33,6 kg
-Rocket mass, type - <b>B</b> -----	35 kg
-Mass of ignition charge -----	9,7 kg
-El. resistance of the ingnition circuit -----	1,25 W do 2,25 W
-No. of tracers :	
type "A" -----	6 pcs.
type "B" -----	4 pcs.
-No. of modified IC-5 decoys -----	4 pcs.
-Temperature range -----	-30° do +50°C





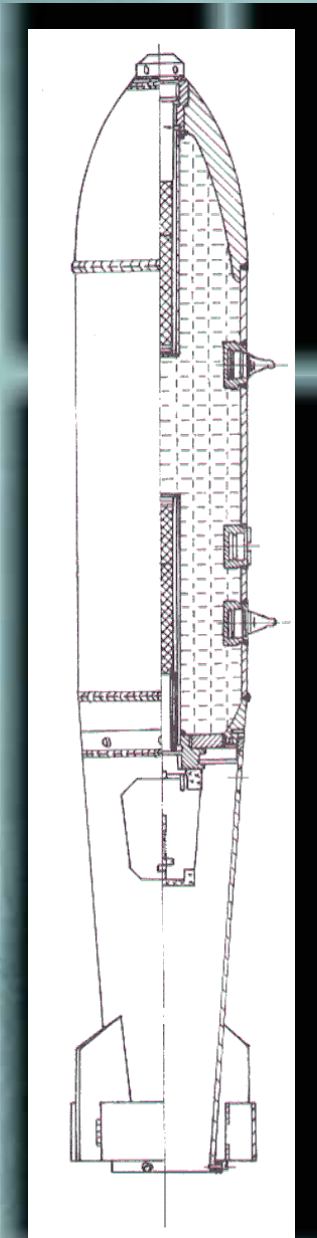
## **FAB-100 M80 HE FREE-FALL BOMB**

FAB-100 M80 HE bomb is intended for attack against targets of low and medium fortification level, such as: industrial facilities, railroad junctions, roads, storehouses manpower, army assets and the like.

It is suitable for all current and projected aircrafts capable to carry bombs of such weight and where bomb racks with free-fall weapon release units having 250mm or 355.6mm (standard NATO 14-inch) hook spacing.

The bomb may be released safe or armed at speeds up to 1000 km/h.

## FAB-100 M80 Characteristics



Bomb type.....	FAB-100 M80
Diameter.....	230mm
Length.....	1490 mm
Hook spacing (adaptable to A/C bomb rack).....	250 and 355.6 mm
Weights	
-Without fuses.....	117 kg
-Main explosive charge (TNT).....	39 kg
Fuses	
-Type AUV-E.....	1 off
-Type AUFK.....	1 off
Packing:	
-Bomb (3 off).....	In one crate
-Fins (12 off).....	In one crate



## **FAB-100 M80 HE Retarded Bomb with UKB-100 M80 Retarder System**

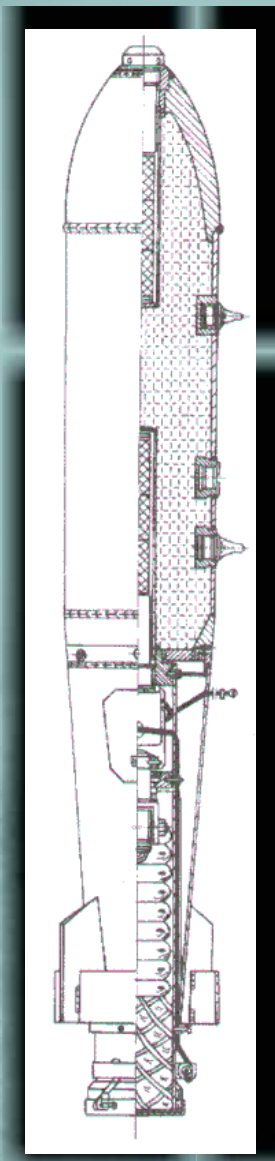
FAB-100 M80 HE bomb is designed for safe and effective bombing in the low-level strike role. It is suitable for all current and projected aircraft capable to carry bombs of such weight and where bomb racks with free-fall weapon release units having 250 mm or 355.6 mm (standard NATO 14-inch) hook spacing.

The bomb may be released safe or armed with speeds from 700 to 900 km/h and altitudes over 55 m.

The bomb is intended for attack against defended target areas of low and medium fortification level, such as: industrial facilities, railroad junctions, roads, storehouses, manpower, army assets and the like.

Bomb retardation reduces high risk of fragment damage to the aircraft by ensuring a safe separation distance of 500 m approximately between aircraft and bomb detonation site.

## FAB-100 M80 HE Retarded Bomb with UKB-100 M80 Retarder System Characteristics



Bomb type.....	FAB-100 M80 with UKB-100 M80
Diameter.....	230mm
Weight of bomb without fuse.....	128 kg
Length.(without fuse) .....	1617 mm
Hook spacing (adaptable to A/C bomb rack).....	250 and 355.6 mm
<b>Weights</b>	
-With UKB-100 and fuses.....	132 kg
-With UKB-100 without fuses.....	128 kg
-Main explosive charge (TNT).....	39 kg
<b>Fuse</b>	
-Type AUFK.....	2 off
<b>Packing:</b>	
-Bomb (3 off).....	In one crate
-Fins (12 off).....	In one crate
-UKB-100 (2 off).....	In one wooden box





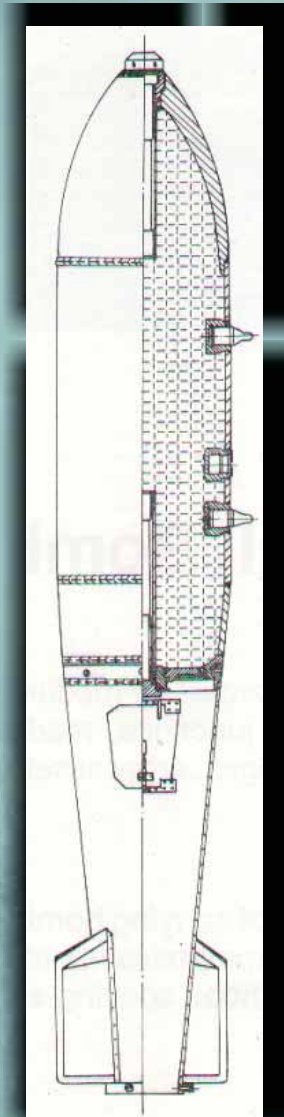
## **FAB-250 M79 HE Free-Fall Bomb**

FAB-250 M79 HE bomb is intended for attack against targets of medium fortification level, such as: industrial facilities, railroad junctions, roads, storehouses, command posts, air base installations, bridges, army assets, naval vessels and the like.

It is suitable for all current and projected aircraft capable to carry bombs of such weight and where bomb racks with free-fall weapon release units having 250mm or 355.6mm (standard NATO 14-inch) hook spacing.

The bomb may be released safe or armed at speeds up to 1000 km/h

## FAB -250 M79 Characteristics



Bomb type.....FAB-250 M79

Diameter.....325 mm

Length.....2015 mm

Hook spacing  
(adaptable to A/C bomb rack).....250 and 355.6 mm

Weights  
-Without fuses.....240 kg  
-Main explosive charge (TNT).....105 kg

Fuses  
-Type AUV-E.....1 off  
-Type AUFK.....1 off

Packing:  
-Bomb .....Inside protective rings  
-Fins (9 off).....In one crate



### **FAB-250 M79 HE Retarded Bomb with UKB-250 M80 Retarder System**

FAB-250 M79 HE bomb is designed for safe and effective bombing in the low-level strike role. It is suitable for all current and projected aircraft capable to carry bombs of such weight and where bomb racks with free-fall weapon release units having 250 mm or 355,6 mm (standard NATO 14-inch) hook spacing.

The bomb may be released safe or armed at speeds from 700 to 900 km/h and altitudes over 55 m.

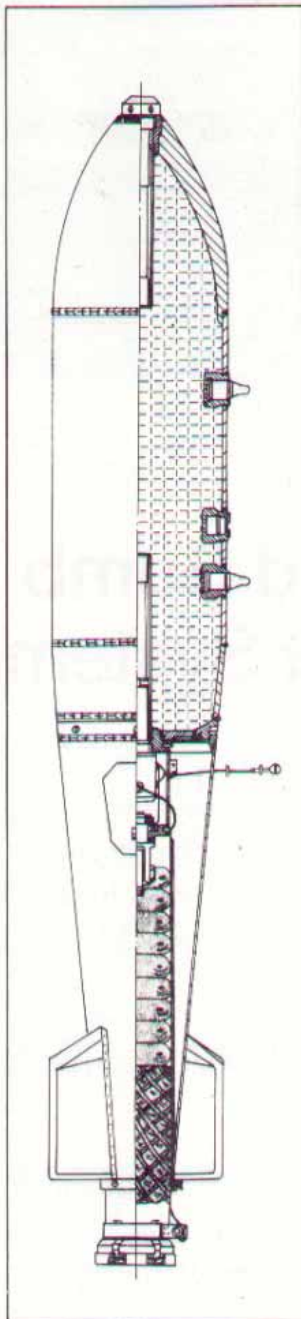
The bomb is intended for attack against defended target areas of medium fortification level, such as: industrial facilities, railroad junctions, roads, storehouses, command posts, air base installations, bridges, army assets, naval vessels and the like.

Bomb retardation reduces high risk of fragment damage to the aircraft by ensuring safe separation distance of 500 m approximately between aircraft and bomb detonation site.



## FAB-250 M79 HE Retarded Bomb with UKB-250 M80 Retarder System

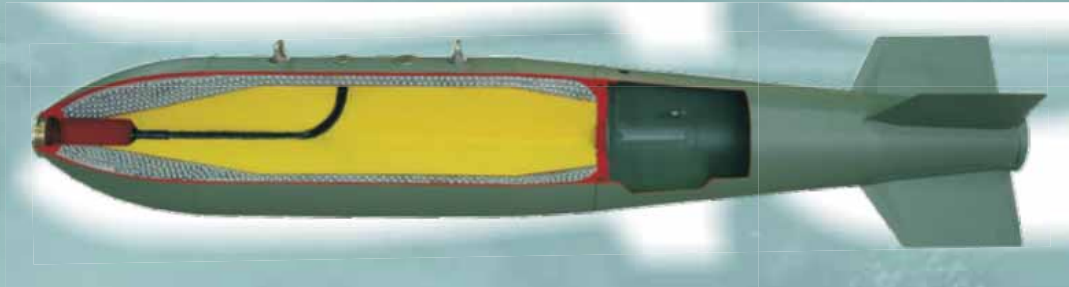
### Characteristics



Bomb type	FAB-250 M79 with UKB-250 M80
Diameter	325 mm
Length (without fuze)	2200 mm
Hook spacing (adaptable to A/C bomb rack)	250 and 355.6 mm
Air-brake retarder canopy area	4 m <sup>2</sup>
Weights	
- With UKB-250 and fuzes	259.5 kg
- With UKB-250 but without fuzes	255.5 kg
- Main explosive charge (TNT)	105 kg
Type AUFK fuze	2 off
Packing:	
- Bomb	Inside protective rings
- Fins (9 off)	In one crate
- UKB-250 (2 off)	In one wooden box



## RAB-250 M91 Air Bomb



**FUZE UPB M91**

This Air Bomb is intended for annihilation and disabling of live force and technical devices such as: light armor combat and non-combat vehicles, artillery, rocket, radar devices and installations, landed aircraft etc.

Air Bomb can have free or impulse release from aircraft equipped with bomb carriers of required carrying capacity and with 250mm or 355.6mm (standard NATO 14-inch) distance of "bomb locks" for hanging.

### TECHNICAL DATA

- Mass of Air Bomb .....	252 kg
- Mass of bomb body .....	231 kg
- Tail Unit mass .....	14,5 kg
- Type of explosive charge .....	TNT
- Mass of the explosive charge .....	70 kg
- Number of steel balls Ø12 mm .....	15000
- Diameter of the body .....	320 mm
- Length of Air Bomb .....	2085 mm
- Distance between fins in the Tail Unit .....	462 mm
- Distance between suspension lugs .....	355,6 and 250 mm
- Fuze type .....	UPB M91, 1 off *

\* NOTE: RAB-250 Air Bomb can be completed with different types of fuzes.

## 107 mm M06 artillery rocket



### Unguided extended range 107 mm rocket (107 mm M06)

Unguided extended range 107 mm artillery rocket (with designation 107 mm M06)  
With UTI fuse makes a part of the 107 mm self-propelled multi-launcher rocket system and standard 107 mm rocket launchers

Unguided extended range 107 mm rocket is designed to:

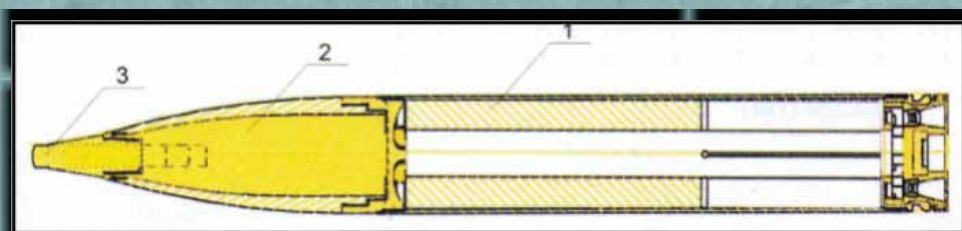
- incapacitate enemy troops and equipment,
- incapacitate or destroy enemy forces at meeting places,
- incapacitate or block enemy convoys,
- prevent assaults by parachute troops and invasions from the sea
- neutralize or destroy enemy command posts and communication centers inside range area

The rocket head has the HE warhead

#### Technical characteristics

- rocket caliber.....107 mm
- rocket length with UTI M84 fuse.....825,0 mm
- rocket weight.....17,6 kg
- UTI M84 fuse weight.....0,35 kg
- warhead explosive weight.....1,250 kg
- maximum range.....11,5 km
- total motor impulse.....9500 Ns
- operating temperature range.....-32°C to +60°C
- set weight (2 rockets in a wooden case.....49 kg
- set weight (24 rockets in a composite pod,  
with 24 launching barrels in a wooden case.....650 to 700 kg
- the rocket can be transported by all transportation means

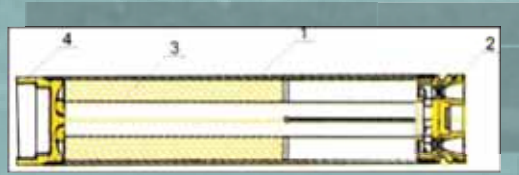
**Extended range 107 mm rocket** consists of a rocket motor (1), warhead (2) and fuse (3).



Main parts of extended range 107 mm rockets

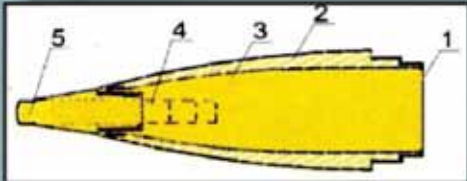
**Rocket motor consists of:**

- rocket motor chamber (1),
- nozzle assembly (2),
- rocket propellant (3)
- front base with ignition subassembly (4).



Main parts of 107 mm rocket motor

**Rocket propellant** is the modern thermoplastic composite propellant made according to the original technology.



Warhead of 107 mm rocket motor

**Warhead** consists of steel implant (1), shell body (2) explosive charge (3). Detonation cups (4) are mounted behind the fuse (5).

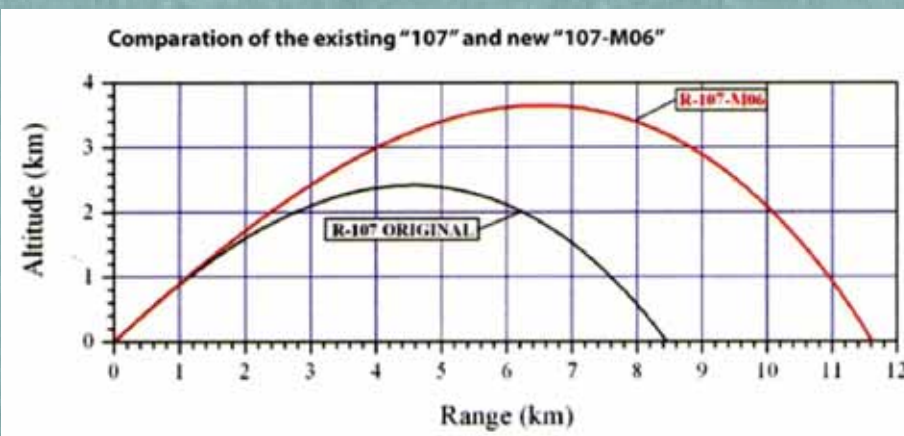
Shell body (2) is ogival shaped. It is forged and made of steel. Thickness is not uniform across the body and that allows maximum fragmentary efficiency against the target.



Packing of extended range 107 mm rocket (107mm M06) with fuse UTI M84  
2 rounds in a wooden case  
W/C dimension: 1081 x 360 x 203 (kg)  
Case gross mass with two rounds: 49 kg



Package-Bottom and corners are hardened



In order to prove the quality of our rockets and accentuation of their advantages we are ready to perform flight tests on your or our flight-test facilities



## SELF-PROPELLED MULTI-TUBE MISSILE LAUNCHER 122 mm – “GRAD”

“GRAD” is self-propelled multi-tube missile launcher intended for impact, sudden and quick fire assaults on the surface targets in the depth of the enemy. It is efficient against all types of targets: personnel, non-armoured and armoured vehicles.

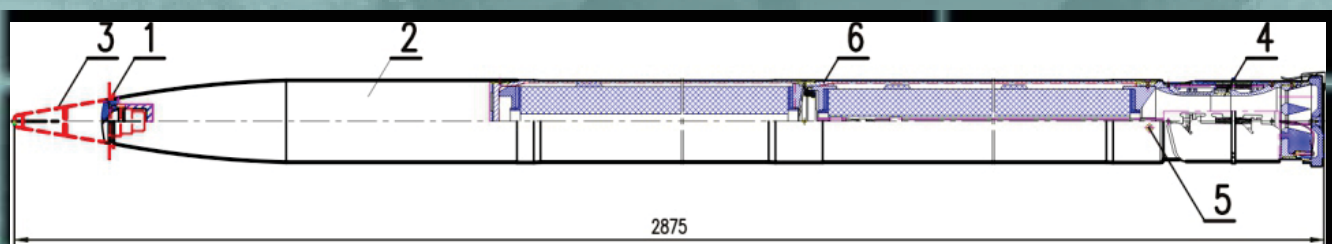
System “GRAD” fires three types of missiles: GRAD, GRAD M and GRAD 2000.

The launcher is carried on the vehicle TAM 150 T11 BV 6x6.

It is possible to mount it on other vehicles of the similar characteristics (for example FAP 1417).



Rocket GRAD cal. 122 mm



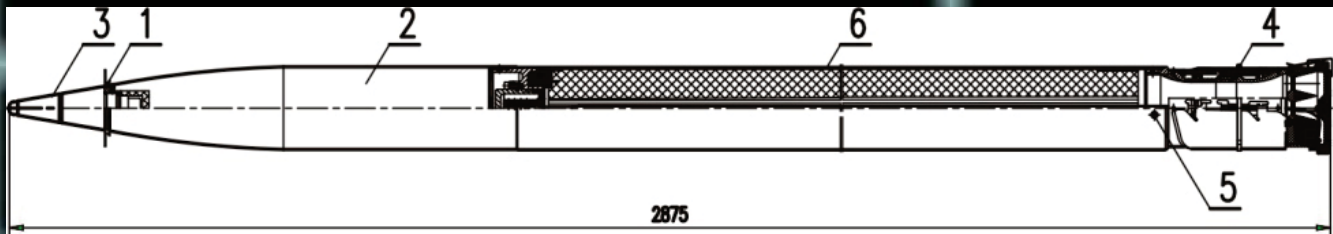
### PERFORMANCE

Caliber .....	122 mm
Length .....	2875 mm
Total mass .....	66 kg
Warhead mass with fuse .....	19,1 kg
Propellant mass .....	20,45 kg
Motor total impulse .....	39700 Ns
Motor specific impulse .....	1940 Ns
Temperature range .....	-30° to +50°C
Elevation .....	48.48°
Range .....	20.1 km

### MAJOR PARTS

1. Aerodynamic ring for drag increasing
2. Warhead
3. Fuse
4. Nozzle assembly with fins and contact cover
5. Rocket driver
6. Twin combustion chamber and twin grain motor

## GRAD M-rocket cal. 122 mm



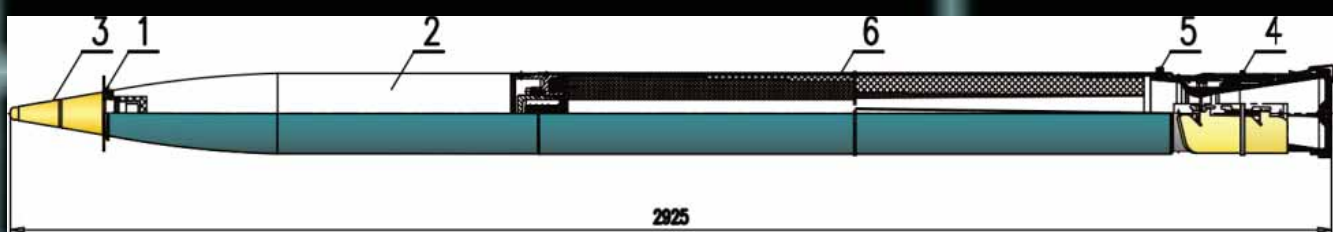
### PERFORMANCE

Caliber .....	122 mm
Length .....	2875 mm
Total mass .....	69.3 kg
Warhead mass with fuse .....	19.1 kg
Propellant mass .....	25.6 kg
Motor total impulse .....	51400 Ns
Motor specific impulse .....	2010 Ns
Temperature range .....	-30° to +50°C
Elevation .....	48.48°
Range .....	27.8 km

### MAJOR PARTS

1. Aerodynamic ring for drag increasing
2. Warhead
3. Fuse
4. Nozzle assembly with fins and contact cover
5. Rocket driver
6. Single combustion chamber and single star shaped grain motor

## GRAD 2000-rocket cal. 122 mm



### PERFORMANCE

Caliber .....	122 mm
Length .....	2925 mm
Total mass .....	68.3 kg
Warhead mass with fuse .....	19.1 kg
Propellant mass .....	27.3 kg
Motor total impulse .....	62250 Ns
Motor specific impulse .....	2280 Ns
Temperature range .....	-30° to +50°C
Range (elevation 50°).....	38.4 km
* Optimal angle of elevation .....	55°
* Range .....	40 km

### MAJOR PARTS

1. Aerodynamic ring for drag increasing
2. Warhead
3. Fuse
4. Single nozzle assembly with fins and contact cover
5. Rocket driver
6. Single combustion chamber and single cylindrical grain motor



## M63/94 SELF-PROPELLED MULTI-TUBE MISSILE LAUNCHER 128 mm - PLAMEN C

"Plamen C" is self-propelled multi-tube missile launcher intended for impact, sudden and quick fire assaults against personnel and non-armoured vehicles. It appeared as a result of merging of the launching device and towing vehicle for the M63 LRSV 128 mm system by adding some newly designed assemblies.

"Plamen C" fires two types of missiles: PLAMEN-A, M63 and PLAMEN-D, M87 with extended range.

The launcher is carried on the vehicle TAM 150 T11 BV 6x6.

It is possible to mount it on other vehicles of the similar characteristics (for example FAP 1417).

The system is of a modular concept in such a way as to permit mounting of the "OGANJ" launching device with 24 or 32 tubes on the multi-purpose upper carriage instead of PLAMEN launching device.

The design of the launcher meets all ergonomic requirements providing easy and safe handling.

Manual mechanism drive can be changed into semi-automatic on user's request.

Deployment time is 30 seconds. The time needed for leaving of firing position is 30 seconds.

Mass distribution provides proper center of gravity during transportation with FULL-EMPTY combination in the way that launching device is turned for 1600 in respect to the basic position.



### Technical data of the system

	"PLAMEN-A", M63	"PLAMEN-D"
Maximum range	8.600 m	12.625 m
Firing rate	5; 2.5; 1.66 missiles/s	5; 2.5; 1.66 missiles/s
Temperature range of use	-30o to + 50oC	-30o to + 50oC
Transportation	TAM 150 T11 BV 6 x 6	TAM 150 T11 BV 6 x 6
Total mass of the system	9.600 kg	9.600 kg

### Technical data of the missile

Missile diameter	128 mm	128 mm
Warhead caliber	128 mm	128 mm
Missile length	837 mm	971 mm
Missile mass	23.1 kg	25.5 kg
Mass of (warhead) explosive charge	2.6 kg	3.3 kg

### Technical data of the launching tube

Internal diameter	128 mm	128 mm
Tube length	1030 mm	1030 mm
Mass of the tubes (with mechanism)	15 kg	15 kg



## **M77 SELF-PROPELLED MULTI-TUBE MISSILE LAUNCHER 128mm OGANJ C**

OGANJ C is self-propelled multi-tube missile launcher intended for impact, sudden and quick fire assaults on surface targets in the depth of the enemy. It is efficient against all types of the targets: personnel, unshielded and armored vehicles.

OGANJ C, for firing from multi-tube missile launcher, uses point-detonating-demolition missile M77 (OGANJ M77). The launcher is loaded on the vehicle TAM 150 T11 BV 6 x 6.

It is possible to mount it on other vehicles of similar characteristics (FAP 1417, for example). The system is modularly designed in such a way as to permit mounting of the "PLAMEN" launching device with 32 tubes, put on the universal upper carriage. The launcher design meets all the ergonomic requirements providing comfortable and safe work. Mechanism drive is manual. On the user's request, it can be modified to semi-automatic operation. The launcher deployment time is 30 seconds. Time, needed for firing position leave, is 30 seconds. Masses distribution provides proper center of gravity position during transportation with FULL -EMPTY combination while the launching device has been turned over to the original position by 180°.

### **THE SYSTEM FEATURES**

Maximum range	21500 m
Firing rate	2 missiles / sec
Number of tubes	24 or 32
Combat kit	64 missiles
Number of operators	2 + 4
System total mass	22000 kg
Temperature range of use	-30° to +40° C

### **TECHNICAL DATA for THE ROCKET OGANJ M77**

Missile diameter	128 mm
Warhead caliber	128 mm
Length	2600 mm
Missile mass	67 kg
Warhead mass	19,5 kg
Field of action by direction	180°
Field of action by elevation	0 - 50°
Radius of warhead efficient action	40 m
Surface of point detonating demolition warhead effects	0,36 ha
Fuze	UTU, M77

### **TECHNICAL DATA for THE LAUNCHING TUBE**

Internal diameter	128 mm
Length	2800 mm
Mass of tube with the tube mechanism	40 kg
Packing	one missile in a wooden case



## PRACTICE SYSTEMS INTENDED FOR SHOOTING SHORT DISTANCE TARGETS

### VBR 128 mm M63; LRSV 128 mm M63/94 and LRSV 128

Armament of Army of Serbia includes multiple barrel rocket launchers:

VBR 128 mm M63 PLAMEN

LRSV 128 mm M63/94 PLAMEN S

LRSV 128 mm M77 OGANJ

Crew training is important factor in conducting successful and quick performance of combat systems. This practice system allows complete training to be held in existing testing fields with significant cost reduction, by avoiding the use of combat rockets. The practice system is intended for shooting short distance targets up to 3.500 m for common training of all trainees in one army division.

This system contains the following elements:

128 mm practice rocket

57 mm practice rocket with signal head (GO)

The practice system is used for training of:

Charging and controlling of the firing range

Rocket firing.

57mm practice rocket with signal head (GO)

This rocket contains rocket engine and signal head with UTI-2P3 fuses. 57 mm practice rocket with signal head (GO) is of 57 mm caliber and 3.7 kg mass.

Stabilization of the rocket in its trajectory is achieved aerodynamically with 8 fins.

The signaling compound total mass 0.2 kg, is basically the mixture of photoflash compound (0.15 kg) and black powder No.8 (0.05) kg.

128 mm practice PLAMEN rocket

The outer design of 128 mm practice PLAMEN rocket is fully in accordance with the design of the original PLAMEN rocket. Practice rocket contains an inserted barrel that is used for launching 57 mm rockets.

-The design of the rocket provides the locking of 57 mm rockets with GO inside 128 mm PLAMEN rocket.

128 mm practice OGANJ rocket for LRSV 128 mm M77

The outer design of 128 mm practice OGANJ rocket is fully in accordance with the design of the original OGANJ rocket. Practice rocket contains an inserted barrel that is used for launching 57 mm rockets with GO.

The design of the rocket provides the locking of 57 mm rockets with GO inside 128 mm OGANJ rocket.



## ARTILLERY SHELLS, FUZES AND GUN



Krusik produces different caliber shells: 100, 105, 125, 130, 152 and 155mm used for completion of artillery missiles, as well as fuses and gun primers. We perform completion of artillery missiles. We are equipped for all types of acceptance control tests done prior to including the device into the armament of an army.





## **MISSILE 9M14P1 and 9M14PB1**

### ***"MALJUTKA"***

#### **Antitank guided missile 9M14P1 and 9M14PB1 with nose probe extended**

Wire guided antitank missile with semiautomatic guidance system (SACLOS) 9M14P1 ( and improved 9M14PB1 with nose probe extended) is effective antitank combat weapon at ranges up to 3000 m with high hit probability and high armour penetrating capability up to 460 mm (9M14P1), i.e. 580 mm (9M14PB1) thickness.

### System Characteristics:

Maximum range	3000 m
Maximum effective firing range	500 m
Maximum range flight time	25 s
Firing rate (missile/min)	2
Functional efficiency	97 %
Armour penetrating capability	
- missile 9M14P1	460 mm
- missile 9M14P1B1	580 mm
Operating temperature range	-40° to +50°C

### Missile Data:

Guidance:	wire-guided command optical tracking by sighting line
Propulsion:	solid-propellant motor, 2-stage
Warhead:	hollow charge
Missile diameter	120 mm
Warhead caliber	120 mm
Length, (9M14P1)	865 mm
(9M14P1B1)	890 mm
Fin span	460 mm
Launch weight	11 kg

Missile PM14P1 (or improved 9M14P1B1) is a part of the system comprising the following:

#### a) Manual guidance (MCLOS)

- Portable manual guidance unit PO41LV
- Portable launching box 9P111B1, and
- Missile 9M14P1 or 9M14P1B1

#### b) Semiautomatic guidance (SACLOS)

- Launcher installed on the vehicle
- Guidance system in the vehicle
- Missile 9M14P1 or 9M14P1B1

The missile can be launched from the portable launching box 9P111B1 (also known as the "suitcase") in the manual guidance system (MCLOS), or from special, i.e. adapted combat vehicles, in the semi-automatic or manual guidance system

The special vehicles include the one of Russian origin (BRDM-1, BRDM-2, BMP-1, BMD) as well as armored personnel carrier (APC and IFV) of Yugoslav origin (BVP M80A and BVP M80P0).

The French helicopter GAZELLE has been adapted for launching of the missile.

Depending on the variant used, the packing may be in the form of:

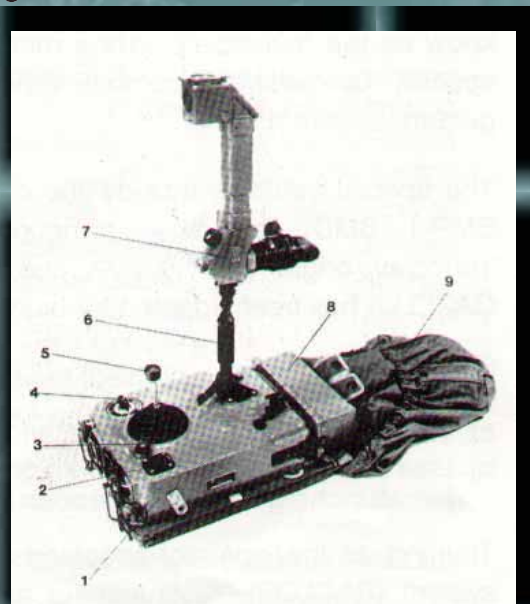
- a) Wooden box with one missile, and
- b) Launching case 9P111B1, with one missile and two launching cases per wooden box.

Training of the operator-shooter is easier in the semiautomatic guidance system(SACLOS).

At launching and during flight the operator tracks the target movement through his reticle and the missile is automatically guided by sighting line.

### GUIDING DESK 9S415

1. Control panel body
2. Launching knob
3. Control lamp
4. Switch
5. Joystick
6. Telescopic sight holder
7. Optical sight
8. Battery
9. Carrying bag





## MALYUTKA 2

### ADVANCED ANTI ARMOUR MISSILE SYSTEM



Intended for antitank fight by neutralizing or destroying armoured vehicles with or without ERA (MALYUTKA 2M and MALYUTKA 2T) and fortified objects and manpower (MALYUTKA 2F).



Three versions of missiles are developed so far:

- Malyutka 2M with HEAT warhead and enhanced penetration capability,
- Malyutka 2T with tandem warhead and
- Malyutka 2F with thermobaric warhead.

Basic characteristics:	MALYUTKA 2M	MALYUTKA 2T	MALYUTKA 2F
Penetration(mm)	800	800+ERA	8kg TNT*
Range(m)	2.800	2.800	2.800
Caliber(mm)	120	120	90
Missile length(mm)	1.097	1.264	968
Weight(kg)	13,4	13,8	13,5
Average flight speed(m/s)	110	110	110

\* TNT equivalent for thermobaric warhead



## CARTRIDGE 82 mm WITH REACTIVE-CUMULATIVE SHELL M72 FOR THE RECOILLESS GUN 82 mm, M60

Cartridge 82 mm with reactive-cumulative shell M72 is intended for destroying tanks, self-propelled weapons and other armoured and combat vehicles. It can be used as well for the annihilation of live force and the fire-arms of the enemy, that are in pillboxes or blockhouses (fortified buildings) far up to 1000 meters.



### A. TECHNICAL DATA

- Calibre ..... 82 mm
- Weight ..... 7,800 kg
- Explosive sharge (TNT + RDX) ..... 0,710 kg
- Super quick fuze UT, M731
- Muzzle safety ..... 2,0 m
- Propellant charge NC ..... 1,360 kg
- Propellant charge NC ..... 1,360 kg
- Rocket sharge NGR ..... 0,900 kg
- Electric primer

### B. BALLISTIC DATA

- Muzzle velocity ..... 390 m/s
- Maximum pressure ..... 750 bara
- Angular penetration of an armoured  
stell plate (Hb 340) ..... 400 mm
- Range ..... 1000 m
- Ordinate ..... 2 m

### C. PACKING

1 complete round in a cardboard box  
3 cardboard boxes in a wooden case

- case dimensions (cm) ..... 110x34x13
- case volume (m<sup>3</sup>) ..... 0,047

## 40mm Bullet with Blasting Projectile



Designed to be used against live force, in both open and sheltered space. It is fired from grenade launcher GP-25 mounted under the barrel of the Kalashnikov machinegun ( AK-74, AKS-74, AKM, AK-101 ) as well as new M21 rifles produced by "Zastava" Kragujevac. This bullet can be fired directly ( holding the device on the shoulder) to the range 50 to 400m, and indirectly (curved trajectory ) to the range 200 to 350m.

- Caliber ..... 40 mm
- Round mass .....260 g
- Round length ..... 105 mm
- Explosive charge FH-5.....49 g
- Muzzle velocity .....76,5 m/s
- Powder charge weight .....0,6 g
- Max pressure of powder gases..... 900 bar.
- Vertical target accuracy at 150 m
  - per height  $V_v < 0,5$  m
  - per direction  $V_p < 0,5$  m
- Max. range .....400 m
- Accuracy at max range
  - per distance  $V_{dt} < 14$ m
  - per direction  $V_{pt} < 7$ m
- Casualty radius ..... min. 9 m
- Fuse .....UT, M02 SP
- Muzzle safety .....min. 15 m
- Burning time of self-destruction device.....15<sup>+5</sup> s
- The fuse has interrupted initial chain
- Bullet and fuse are waterproof
- Temperature range .....- 53° C to +71° C
- Suitable for all kinds of transportation



### PACKING

- The bullet is packed in hermetically sealed plastic container
- 40 containers are packed in wooden boxes
- Box dimensions ..... 59,6 x 36,6 x 19,6 cm
- Total mass ..... 23,5 kg
- Total volume ..... 0,043 m<sup>3</sup>

## 40mm Bullet with Blasting Bounding Projectile, M07

Designed to be used against live force, in both open and sheltered space. It is fired from grenade launcher GP-25 and GP-30 mounted under the barrel of the Kalashnikov machinegun ( AK-74, AKS-74, AKM, AK-101 ) as well as new M21 rifles produced by "Zastava" Kragujevac. This bullet can be fired directly ( holding the device on the shoulder) to the range 50 to 400m, and indirectly (curved trajectory ) to the range 200 to 350m.



- Caliber ..... 40 mm
- Round mass .....300 g
- Round length .....125 mm
- Explosive charge FH-5.....40 g
- Muzzle velocity .....75 m/s
- Powder charge weight .....0,6 g
- Vertical target accuracy at 150 m
  - per height  $V_v < 0,5$  m
  - per direction  $V_p < 0,5$  m
- Max. range .....400 m
- Accuracy at max range
  - per distance  $V_{dt} < 14$ m
  - per direction  $V_{pt} < 7$ m
- Casualty radius ..... min. 6 m
- Fuse .....UT, M07
- Muzzle safety .....min. 15 m
- Burning time of self-destruction device.....15<sup>+5</sup>s
- The fuse has interrupted initial chain
- Bullet and fuse are waterproof
- Temperature range .....- 53° C to +71° C
- Suitable for all kinds of transportation



## 40mm Bullet with Cumulative Projectile



Intended for use against light armour combat and non-combat vehicles at distances up to 150m. Beside this primary cumulative effect, there is also the secondary effect on enemy live force.

The bullet is fired from under-barrel grenade launcher 40mm GP-25, mounted under the barrel of Kalashnikov machinegun ( AK-74, AKS-74, AKM, AK -101 ), as well as new M21 rifles produced by "Zastava" Kragujevac.

- Caliber ..... 40 mm
- Round mass..... 260 g
- Round length..... 108 mm
- Explosive charge..... 32 g
- Muzzle velocity..... 76,5 m/s
- Mass of the powder charge..... 0,6 g
- Max. pressure of powder gases..... 900 bar
- Penetration through steel plate  
under the angle of 90° ..... min.50 mm
- Vertical target accuracy at 150 m
  - per height  $V_{vt} < 0,5$  m
  - per direction  $V_{pt} < 0,5$  m
- Max. range..... 400 m
- Accuracy at max. range
  - per distance  $V_{dt} < 14$  m
  - per direction  $V_{pt} < 7$  m
- Fuse..... UT, M02 SP
- Casualty radius..... min. 3 m
- Muzzle safety..... min. 15 m
- Safe activation distance..... 50 m
- Burning time of self-destructing device..... 15<sup>+5</sup> s
- The fuse has interrupted initial chain
- Bullet and fuse are waterproof
- Temperature range..... -53° C to +71° C
- The bullet is packed in hermetically sealed plastic container, 40 containers are packed in wooden box
- Suitable for all kinds of transportation



## 40mm Bullet with Incendiary Projectile



Intended for incending easily inflammable materials as well as wounding enemy live force. The fragments of incendiary mixture can wound or inflame easily inflammable materials at distance up to 5m. The bullet is fired from under-barrel grenade launcher 40mm GP-25, mounted under the barrel of Kalashnikov machinegun (AK-74, AKS-74, AKM, AK-101), as well as new M21 rifles produced by "Zastava" Kragujevac. This bullet can be fired directly (holding the device on shoulder), to the range 50 to 400m, and indirectly (curved trajectory), to the ranges 200 to 350m.

- Caliber ..... 40 mm
- Round mass..... 260 g
- Round length..... 105 mm
- Mass of smoke mixture..... 80 g
- Muzzle velocity..... 76,5 m/s
- Mass of the powder charge..... 0,6 g
- Max. Pressure of powder gases..... 900 bar
- Vertical target accuracy at 150 m
  - per height  $V_{vt} < 0,5$  m
  - per direction  $V_{pt} < 0,5$  m
- Max. range..... 400 m
- Accuracy at max range
  - per distance  $V_{dt} < 14$  m
  - per direction  $V_{pt} < 7$  m
- Fuse..... UT, M02 SP
- Muzzle safety..... min. 15 m
- Safe activation distance..... 50 m
- Burning time of self-destructing device.....  $15^{+5}$  s
- The fuse has interrupted initial chain
- Bullet and fuse are waterproof
- Temperature range.....  $-53^{\circ}\text{C}$  to  $+71^{\circ}\text{C}$
- The bullet is packed in hermetically sealed plastic container, 40 containers are packed in wooden box
- Suitable for all kinds of transportation



## 40mm Bullet with Smoke Projectile



Intended for marking ground targets as well as blinding enemy live force. The cloud made after the smoke mixture is incended is compact, with diameter of min. 3m. The smoke cloud can last 15 to 30s, and in normal weather conditions is visible at 2-3 km distance. The bullet is fired from under-barrel grenade launcher 40mm GP-25, mounted under the barrel of Kalashnikov machinegun ( AK-74,AKS-74,AKM, AK -101), as well as new M21 rifles produced by "Zastava" Kragujevac. This bullet can be fired directly (holding the device on shoulder ), to the range 50 to 400m, and indirectly (curved trajectory), to the ranges 200 to 350m.



- Caliber ..... 40 mm
- Round mass..... 260 g
- Round length.....108 mm
- Mass of smoke mixture.....100 g
- Muzzle velocity..... 76,5 m/s
- Mass of the powder charge..... 0,6 g
- Max. Pressure of powder gases..... 900 bar
- Vertical target accuracy at 150 m
  - per height  $V_{vt} < 0,5$  m
  - per direction  $V_{pt} < 0,5$  m
- Max. range.....400 m
- Accuracy at max range
  - per distance  $V_{dt} < 14$ m
  - per direction  $V_{pt} < 7$ m
- Fuse..... UT,M02 SP
- Muzzle safety..... min. 15 m
- Safe activation distance..... 50 m
- Burning time of self-destructing device.....  $15^{+5}$ s
- The fuse has interrupted initial chain
- Bullet and fuse are waterproof
- Temperature range..... -53°C to +71°C
- The bullet is packed in hermetically sealed plastic container, 40 containers are packed in wooden box
- Suitable for all kinds of transportation



## 40mm Bullet with Practice Projectile



Intended for training of soldiers for all tactical actions carrying out with live projectile. The smoke mixture marks the spot where the projectile has fallen, and the released gases can be seen from the distance of 500m. The bullet is fired from under-barrel grenade launcher 40mm GP-25, mounted under the barrel of Kalashnikov machinegun (AK-74, AKS-74, AKM, AK-101), as well as new M21 rifles produced by "Zastava" Kragujevac. This bullet can be fired directly (holding the device on shoulder) to the range 50 to 400m, and indirectly (curved trajectory), to the range 200 to 350m.

- Caliber..... 40 mm
- Round mass..... 260 g
- Round length..... 105 mm
- Mass of incendiary mixture..... 10 g
- Muzzle velocity ..... 76,5 m/s
- Mass of the powder charge..... 0,6 g
- Max. pressure of powder gases..... 900 bar
- Vertical target accuracy at 150 m
  - per height  $V_{vt} < 0,5$  m
  - per direction  $V_{pt} < 0,5$  m



- Max. range..... 400 m
- Accuracy at max range
  - per distance  $V_{dt} < 14$  m
  - per direction  $V_{pt} < 7$  m
- Fuse..... UT, M02 SP
- Muzzle safety..... min. 15 m
- Safe activation distance..... 50 m
- Burning time of self-destructing device..... 15<sup>+5</sup>s
- The fuse has interrupted initial chain
- Bullet and fuse are waterproof
- Temperature range..... -53°C do + 71°C
- The bullet is placed in hermetically sealed plastic container, 40 containers are packed in wooden boxes
- Suitable for all kinds of transportation.

## 40mm x 46 Bullet with HE Projectile



Intended for use against live enemy force, in both opened and sheltered space. The bullet is fired from under-barrel grenade launcher 40mm M203, M79, HK 69A1. It can be used for firing at targets at the distance from 30 to 400m.

- Caliber..... 40 mm
- Round mass.... 190 g
- Round length.....103 mm
- Explosive charge..... RDX/TNT
- Number of fragments..... 425
- Muzzle velocity ..... 78,5 m/s
- Vertical target accuracy at 150 m
  - per height  $V_{vt} < 0,5$  m
  - per direction  $V_{pt} < 0,5$  m
- Max. range.....400 m
- Casualty radius..... min. 5 m
- Fuse ..... UT,M04
- Muzzle safety..... 8 m
- Safe activation distance..... 30 m
- Burning time of self-destructing device..... 9 s



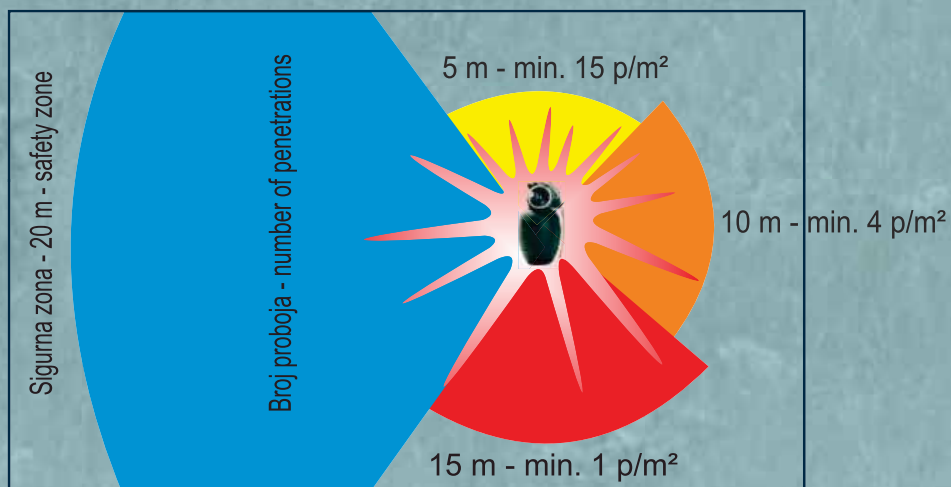
## Bomba ručna M-84 Hand grenade M-84

- težina/mass.....480 g
- dimenzije/dimensions..... $\emptyset$  60x115
- eksplozivno punjenje - plastični eksploziv  
explosive charge - plastic explosive.....95 g
- telo bombe - plastično sa čeličnim kuglicama  
grenade body - plastic with steel balls..... $\emptyset$  2-2,3 mm
- sila izvlačenja osigurača/pulling force of safety element.....110 N
- sigurnosni ugao otklona kašike/  
/safety angle of declination of fuze lever.....min 50°
- vreme usporenja/ fuze:mechanic with delay of.....3,0 to 5,7 s
- sposobna za funkciju u temperaturnom intervalu/  
/ use in temperature range of..... -30°C to + 60°C
- sposobna za sve vrste transporta/  
capable for any kind of transportation



### PACKING

- 1 complete grenade per plastic box
- 24 psc per wooden case
- Wooden case dimensions (cm) ..... 50 x 35 x 23
- Case gross weight (kg) ..... 23.5
- Case volume (m<sup>3</sup>) ..... 0.040





## Bomba ručna M-75 Hand grenade M-75

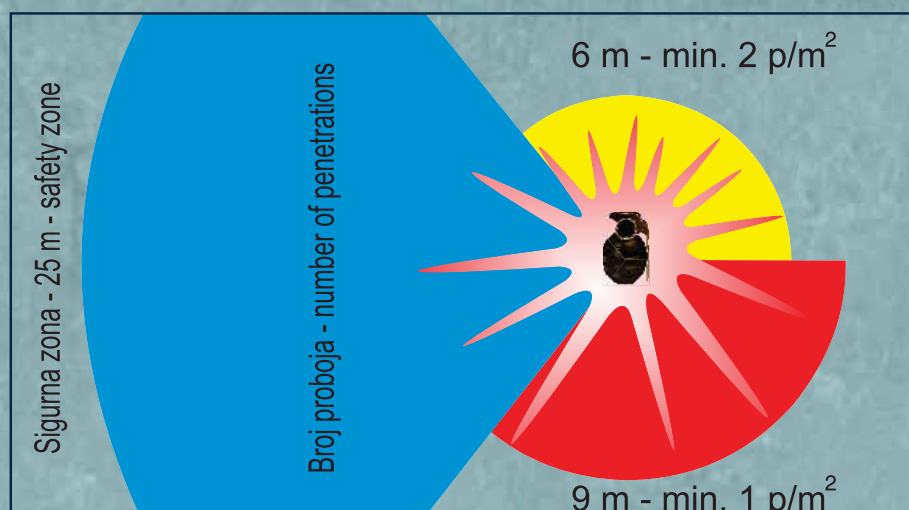


- težina/ mass.....355 g
- dimenzije/dimensions.....Ø 57x89 mm
- eksplozivno punjenje - plastični eksploziv  
/explosive charge - plastic explosive.....36 g
- telo bombe - plastično sa čeličnim kuglicama  
/grenade body - plastic with steel balls.....Ø 2.5-2.9 mm
- sila izvlačenja osigurača  
/ pulling force of safety element.....7-18 kg
- sigurnosni ugao otklona kašike  
/safety angle of declination of fuze lever.....min 35°
- vreme usporenja / fuze: mechanic with delay of.....3 - 4,4 s
- sposobna za funkciju u temperaturnom intervalu  
/use in temperature range.....-30°C to + 50°C
- sposobna za sve vrste transporta/  
/ capable for any kind of transportation



### PACKING

- 1 complete grenade per plastic box
- 36 pcs. per wooden case
- Wooden case dimensions (cm) ..... 54 x 44 x 15
- Case gross weight (kg) ..... 23
- Case volume (m<sup>3</sup>) ..... 0.038



## CHAPED-CHARGE HAND GRENADE ( BRK )

### INTENDED USE

The chaped-charge hand grenade BRK, hereinafter referred to as the BRK, is intended to be used for disablement and annihilation of tanks and other stationary or moving armour.

It belongs to the group of grenades thrown by hand-without any additional equipment such as tube, launcher, etc.

On impact with the armour, the task of BRK is to defeat it with the shaped-charge jet and to disable or annihilate the armour interior with the remaining hot gases from the jet.



### TECHNICAL DATA

- Length ..... 399 mm
- Warhead diameter ..... 74,5 mm
- Mass ..... 1kg
- Explosive mass ..... 0,34 kg
- Steel plate penetration ..... 280 mm
- Service temperature range ..... -30°C to +50°C

### PACKING

The BRK grenades are packed into the wooden box suitable for mountain transportation, as follows:

- 12 pieces of warheads;
- rectangular sheet - metal container with 12 pieces of separately paper-wrapped handles;
- round sheet-metal container with 12 pieces of ignition systems-firing devices, each packed in styrofoam bearing.

## Hand shock bomb



One of the new products in Krušik is "shock" bomb used by special police forces. "Shock" bomb has been developed for special purposes, i.e. when it is necessary to attack kidnapers or assassins, who hold hostages, in both open and closed space without causing injuries. The bomb has no particles but can disable with its sound and light effect. It is suitable for use in the means of public transport. It is possible to gain double or triple sound/light effect, when needed.



### Main characteristics:

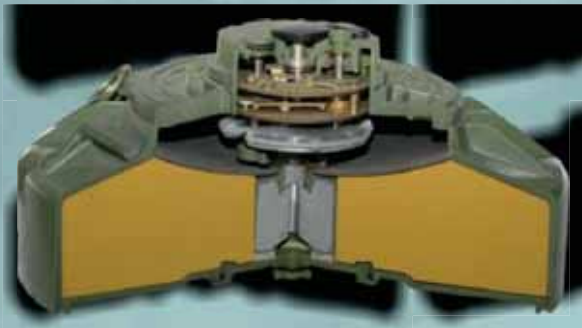
Fuse delay time:	1,5 s
Time interval between the sound effects:	0,7 s
Sound effect intensity:	130db to 15 m
Mass of the initial charge:	0,454 kg
Mass of the increment charge:	0,150 kg
Temperature range:	- 30°C do + 55°C
Shelf life:	5 years

### Packing:

- 10 complete bombs per carton
- Carton dimensions 585 x 340 x 75 mm
- Total mass 7,5 kg



## ANTI-TANK DESTRUCTIVE PIERCING MINE - 6



**PURPOSE:** FOR DISABLEMENT AND DESTRUCTION OF TANKS AND OTHER FIGHTING AND NON-FIGHTING VEHICLES BY DESTRUCTIVE PIERCING ACTIVITY

- |  |  |
|--|--|
| 1. Item dimensions .....                 | Ø 290 x 132 mm   |
| 2. Item mass .....                       | 7.2 kg   |
| 3. Explosive charge type .....           | Cast TNT   |
| 4. Explosive charge mass .....           | 5.1 kg   |
| 5. Way of initiation .....               | Through the fuze   |
| 6. Fuze arming (time) .....              | 1 or 4 minutes   |
| 7. Way of fuze activation .....          | - Through a lever<br>- By stepping on a mine plate       |
| 8. Activation force (daN) .....          | - Through a lever 1.3 - 1.7<br>- By stepping 150 -350    |
| 9. Stepping on area .....                | 214 cm <sup>2</sup>                                      |
| 10. Resistance to air impact wave .....  | To 3 daN/cm <sup>2</sup>                                 |
| 11. Functions in temperature range ..... | - 30° C to + 60° C                                       |
| 12. Airtightness (waterproof) .....      | To 0.2 bar   |
| 13. Way of setting .....                 | By hand<br>Minelaying PMR-3b                             |
| 14. Way of transport .....               | Capable for any type of transportation                   |
| 15. Stability in mine field .....        | 6 months in the most unfavourable conditions             |
| 16. Way of packing .....                 | In a box, 4 (four) mines complete                        |
| 17. Package dimensions .....             | 330 x 650 x 330 mm                                       |
| 18. Gross weight .....                   | 43 kg  |
| 19. Storage time .....                   | 15 years   |
| 20. Piercing action .....                | Penetrates 40 mm stell plate from the distance of 800 mm |

## ANTIMAGNETIC ANTITANK MINE - 4 (TMA-4)



**PURPOSE: FOR DESTRUCTION OF TANKS AND OTHER FIGHTING AND TRANSPORT VEHICLES**

1. Activation force .....	100 - 200 daN
2. Stepping-on area .....	Ø 200 mm (314 cm <sup>2</sup> )
3. Explosive charge type .....	Cast TNT
4. Explosive charge mass .....	5.5 kg
5. Functions in temperature range .....	- 30°C to - 60°C
6. Safety in transport and packing .....	Capable for any type of transportation
7. Resistance to air impact wave .....	To 3 bars
8. Airtightness .....	To 0.2 bars
9. Way of initiation .....	Through a fuze
10. Way of setting .....	- Manually - By mine-layer
11. Stability in mine field .....	6 months in the most unfavourable conditions
12. Item dimensions .....	Ø 285 x 110 mm
13. Item mass .....	6.3 kg
14. Kind of packing .....	Barel
15. Number of pieces in a packing set .....	4
16. Package dimensions .....	Ø 330 x 370 mm (0.032 m <sup>3</sup> )
17. Gross weight .....	28 kg
18. Storage time .....	20 years

## EXPLOSIVE CUMULATIVE CHARGE - 1 (PEK - 1)

### Use

Explosive Cumulative Charge-1 (PEK-1) is used for quick mining of roads, landing tracks and fields.

### Main tactical characteristics

PEK-1 is activated by a detonator primer that can be initiated electrically or by means of fuse. PEK-1 explosion in roads, landing tracks and fields creates a mine hole, depth 1.5 to 2 m and average diameter of 110mm. PEK-1 use temperature range is -30 to +50°C.

### Characteristics

Diameter 112 mm  
Height 195 mm  
Height with tripod 550 mm  
Mass 2.4 kg  
Mass of the explosive 1.78 kg  
Diameter of the penetration opening in the steel plate 360 mm



### Functioning

In order to create the mine hole, PEK-1 ought to be assembled with tripod and placed in the desired spot. Detonator primer is placed in its bearing and initiated. It activates the booster which activates the cumulative explosive charge. The detonation creates a hole in the ground that can be used directly, without any additional works.

### Packing

10 pieces of PEK-1 are packed into one wooden case.  
The mass of the packed case is 30 kg.



## RAFAL BOMB FOR AEL MINE CATCHER (RBAEL)

By series of underwater explosions this bomb creates the sound that lasts for several seconds, and imitates the sound of a moving boat or ship, only stronger than the engine signal itself (20-30 db). Such created signal activates the acoustic signal of the floating mine in the distance where it can not damage the ship.

Use of this bomb provides safe movement of boats and ships in water possibly containing floating mines.



## FUZES

"Krusik" is actively employed in research, development and production of classic military program as well as complex rockets systems. We also produce fuzes and initial devices that are assembled in our products.



### "KRUSIK" PRODUCES FUZES THAT ARE ASSEMBLED IN THE FOLLOWING:

**Mortar shells** (HE, Smoke, Illuminating) in calibers: 60, 81/82 and 120 mm

#### **Artillery projectiles for:**

- Gun calibers: 76 mm, 85mm, 90mm, 100mm, 122mm and 130 mm.
- Tank gun, calibers: 115 mm and 125 mm
- Anti-tank gun, calibers: 82 mm, 100 mm and 105 mm
- Howitzer calibers: 105 mm, 122 mm and 152 mm

**Airbombs** weight 100 and 250 kg

#### **Air to air and air to ground rockets:**

- 57 mm HE rocket (BR-1)
- 57 mm cumulative rocket (BR-2)
- 57 mm cumulative-fragmentation type (BR-20)
- 128 mm HE and cumulative ("MUNJA")

#### **Ground to ground rockets:**

- 128 mm HE rocket ("PLAMEN" M63)
- 128 mm HE rocket ("OGANJ" M77)

#### **Anti-armour devices:**

- 120 mm semiautomatic guided rocket ("MALJUTKA")
- Heat shells M79; M88; M72 i M91 used with recoilless guns 82 mm M79 and M60A
- Cumulative shells 82 mm M80 for manual launchers 44 mm.

#### **Mine-explosive devices**

## INITIAL DEVICES

INITIAL DEVICES INCLUDE:



Initials primer intended for shooting ammunition and gun primers

Primers (detonator, duplex, initial, electric) used with artillery, mortar and rocket fuzes and explosive devices.

Different types of delays, boosters and transmitters.



## OVERVIEW OF THE ASSORTMENT

The overview of the assortment can be shown through several elements, such as:

- a)** Used initial explosives and types of mixtures;
- b)** Type of primer and higher assembly;
- c)** Function;
- d)** Special requirements

**a)** The following initial explosives are used for production of mixtures: Mercury Fulminate, Lead-Azide (several types), Tetrazene, Tricinate, and with other components (fuels, oxidants, sensitizers,..), the listed

mixtures and primers can be classified as:

- fulminate type
- non-corrosive type.

**b)** Classified by type of primer and higher assembly, they include:

- berdan (for shooting ammunition)
- gevellot (for mortar ammo propellant charges and shotgun ammunition)
- boxer (for shooting ammunition and special type of ammo - we are currently involved in intensive development);

**c)** Classified by function, the existing assortment includes:

- initial (puncturing, firing, striking,...);
- duplex (double effect primers);
- detonator (with a range of initial and high explosives);
- electric and electric inflammatory (depending on use and type of higher assembly)
- delay, transmitting, boosting (depending on use).

**d)** This group includes:

- delays and delay elements for different types of hand grenade fuzes with different types of mixtures used (adjustment of delay times optional);
- all types of initial, pyrotechnic, delay, smoke, flash and other types of mixtures,...
- all types of electric detonators, No and per special request;

It is important to emphasize that all the requirements regarding the serial production of the above listed products have been met, as follows:

- serial production authorizations issued by relevant authorities;
- the products are controlled and verified according to valid national and military standards (JUS, SNO, PKP);
- all control-inspection procedures have strictly prescribed testing methods that include control gauges and measuring devices;
- required certificates, licenses, export and transportation documents can easily be obtained from the competent authorities;
- all products are manufactured and tested according to the procedures prescribed by the following standards: JUS, ISO 9000 and SNO 9000.

When developing a new product with a customer, verification programs are made, including non-standard methods required for proving the desired quality.

Engineering and technical staff of FIS & ED are trained and capable to provide technical assistance in engineering businesses, preparation of Design and Technical Documentation, as well as documentation Required for construction and projecting the production facilities that fall under their domain of work.

## CONTAINERS FOR STORAGE OF EXPLOSIVE MATERIALS - 500 ( KSEM - 500 )



KSM-500 container is designed for storing of 500 kg of explosive.

### Characteristics of the container:

-height.....	1 800 mm
-width.....	1 300 mm
-length.....	1 800 mm
-mass of empty container.....	1 480 kg

The container consists of two chambers. The basic one is made of minimum 7 mm thick steel plate, while the 300 mm high 500 mm wide and 500mm, long initial devices chamber is made of minimum 10 mm thick steel plate, so that no detonation of any accidentally or intentionally provoked explosion would be transmitted to the explosive storing chamber.

The inside of the container is covered with 57 mm thick wooden coat that doesn't absorb humidity.

The container possesses a "sled" and holes for cables that serve to drag the container from one place to another. An anchor can be attached to the bottom of the container thus avoiding any smaller vehicle to drag it.

The container has two grounding cross connections that leave no need for building of any high lightning rod installation. The grounding must be done in accordance with the current JUS regulations and must be less than 10 Ω. On the container's door, there is a rubber that ensures its tightness.

The container's door locks with three padlocks.

The door on the initial devices chamber locks with two padlocks.

Self-extinguish paint represents container's final protection.

Appropriate warning signs, that are in accordance with the UN symbols for class 1 of danger materials, are put on the container.



# PRODUCTION TECHNOLOGIES

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**e-mail: [krusikmarketing@eunet.rs](mailto:krusikmarketing@eunet.rs), web site: [www.krusik.rs](http://www.krusik.rs)**



## PRODUCTION TECHNOLOGIES

### I Machining of rotary parts

- Turning of parts with dia. up to  $\text{Ø}400$  mm and length  $L=2000$  mm.
- Machining on CNC Lathe of parts with dia. up to  $\text{Ø}350$  mm and length  $L=1000$  mm.
- Machining on six spindle automatic machine parts of dia. up to  $\text{Ø}67$  mm.
- Machining on six spindle semi automatic machine parts of dia. up to  $\text{Ø}160$  mm.
- Deep hole drilling of parts with hole dia. up to  $\text{Ø}120$  mm and length from  $L=700$ mm.



### II Machining of prismatic parts

- Machining on Machining Centers
  - Horizontal Machining Centers parts with dimensions up to  $500 \times 400 \times 400$  mm.
  - Vertical Machining Centers- parts with dimensions up to  $500 \times 400 \times 350$  mm.
- Machining on Flat-surface Grinding Machines.



### III Heat treatment

- Heat treatment of steel parts with dia. up to  $\text{Ø}400$  mm, length up to  $L=1250$  mm and weight up to 300 kg.
- Heat treatment of non ferrous metals.



### IV Manufacturing of plastic parts

- Pressing of thermosetting plastics in hydraulics presses, pressing force from 600 kN to 6000 kN.
- Injection of thermoplastic.



### V Chemical and electrochemical plating

- Electroplating (Zinc plating, Cadmium plating, Tinning plating, Nickel plating and Silver) with dia. up to  $\sim 400$  mm and length  $L=600$  mm.
- Chromium plating up to  $L=200$  mm.
  - Oxidation (normal, hard and chrome acid) up to  $L=600$  mm.
- Nickel chemical plating.
- Chrome plating of aluminum, copper and their alloys, up to  $L=400$ mm.
- Phosphatization of parts with  $L=1600$  mm.
- Varnishing of parts with  $L=1000$  mm



### VI Production of die forging

- Pressure castings
  - Casting of non-ferrous metals (Al and Zn alloys). weight up to 2 kg.
- Sand casting and metal coquilles up to 50 kg.

### VII Cold formation technology

- Cutting of tin, thickness  $s=4$  mm and  $L=2500$  mm.
- Flattening and cutting tin stripes.
- Cutting and punching of elements in eccentric presses from 120 kN to 2500 kN.
- Manufacturing of complex parts in CNC presses.
- All types of extrusions, thickness  $s=6$  mm and height  $H=350$  mm.
- Manufacturing by method of injection.
- Folding of metal parts
  - Flat,  $L=2500$  mm, thickness  $s=4$  mm
  - Rotary,  $L=2500$  mm, thickness  $s=1.6$  mm.
- Welding



### VIII Explosive charge technologies

- Initial explosives
- Pressing of explosives
- Explosive casting
- Production and pressing of delay and increment compounds.



### IX Metrological laboratory

### X Test ground







# QUALITY IN KRUŠIK

**HK „KRUŠIK” a.d. , 14000 VALJEVO, REPUBLIC of SERBIA**  
**Phone 381-14-223-121, 221-121, Marketing 381-14-226-822, Telefax 381-14-220-149**  
**e-mail: [krusikmarketing@eunet.rs](mailto:krusikmarketing@eunet.rs), web site: [www.krusik.rs](http://www.krusik.rs)**



# POLICY OF INTEGRATED MANAGEMENT SYSTEMS

The mission of the Holding Corporation Krušik a.d. is development and production of Armament and Military Equipment.

- ▶ Organizational vision reflects on aim to become a leader in the domain of the region and wider.
- ▶ Basic activity directs towards fulfilling the vision by: designing and development of new AME (Armour and Military Equipment), continuation of successful production and further improvement of production programme.
- ▶ Business priority of HK "Krušik" a.d. regards to satisfying Client and other interested parties.
  
- ▶ Orientation of the Krušik, an employer and its employees is as follows:
  - Establishment and maintenance of integrated manager systems with engagement in continious enhancement;
  - Delivery of the products that completely satisfy requirements and expectations of interested parties, including legal regulations and standards.
  - Testings, measurements and calibrations accomplished within regulations and agreed standards;
  - Fulfillment of ecological environmental requirements in accordance with legal regulations and accepted standards;
  - Active protection and occupational safety and health of employees from hazardous risks, occured during the working process.
  
- ▶ Procedural approach to activities.
- ▶ The decision are made according to authorizations and objective facts, therefore, without possible improvisations.
  
- ▶ Satisfied clients, certain complaints, objections and suggestions are accepted as possibility for improvement.
  
- ▶ Stimulation and motivation of employees directly relates to the work quality.
  
- ▶ According to generally accepted notion, only satisfied employees may provide maximum in participating working process.

Valjevo, March 2015

General Manager



Mladen Petković, B. Sc.

## QUALITY IN KRUŠIK

Quality in „Krušik“ is carefully controlled.

Quality management had been implemented in accordance with the Standard JUS ISO 9001/2001.

The first certification was realized in 2002. and was followed by another certification in 2006. The recertification, performed according to the regulations of certificate validity process after the year of 2009 , we provided certificate for integrated management system, which, apart from the Standard 9001, also includes Environment Protection Standard (SRPS 14001), Health and Worker Protection Standard (OHSAS 18001) and Standard SRPS 17025.



Metrology takes an important place in this system.

Metrological laboratory has been conducting assessments and evaluation for „Krušik“ and for other parties for years now.

The Factory has a laboratory for material evaluation where chemical and mechanical characteristics of all materials are defined.





In accordance with the demand, product tests are being done in the premises of the Factory.





Krusik has been awarded two certificates for the Quality Management System:  
**SRPS ISO 9001:2008; ISO 9001:2008; SORS 9000/05,**  
**ISO 14001:2004, OHSAS 18001:2007 and SRPS ISO/ IEC 17025:2006.**



**FQCE**

**FOND ZA KULTURU KVALITETA I IZVRSNOST**  
**FUND FOR QUALITY CULTURE AND EXCELLENCE**

**NACIONALNA NAGRADA ZA**  
**POSLOVNU IZVRSNOST SRBIJE**

**OSKAR KVALITETA**  
*Kategorija velikih organizacija*

 **Krusik**  
HOLDING KORPORACIJA

**APSOLUTNI POBEDNIK**  
**AWARD WINNER**

  
*Predsednik*  
**ZIRJA NAGRADE**  
*Mr Mladan Dinkić*



*Predsednik FQCE*  
*Fond za kulturu kvaliteta i izvrsnost*  
*Vladimir Trajković*

U Beogradu, 11. novembra 2010.



## WORLD QUALITY COMMITMENT AWARD

The International World Quality Commitment Convention was held in Paris on October 15<sup>th</sup> and 16<sup>th</sup>, 2016.

On this occasion, HK Krušik a.d. has been granted the World Quality Commitment Award in the Gold Category.

The Business Initiative Directions (BID) recognized the contribution of HK Krušik a.d. in terms of Leadership, Quality, Innovation and Excellence and as a result ranked our Company among the top companies committed to quality of its products.





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## FACTORY FOR PRODUCTION OF INITIAL DEVICES AND ELECTRIC DETONATORS



### Initial devices



#### OVERVIEW OF THE ASSORTMENT

The overview of the assortment can be shown through several elements, such as:

- a) used initial explosives and types of mixtures;
- b) type of primer and higher assembly;
- c) function;
- d) special requirements

a) Following **initial explosives** are used for production of mixtures: Mercury Fulminate, Lead-Azide (several types), Tetrazene, Tricinate, and with other components (fuels, oxidants, sensitizers,...), the listed mixtures and primers can be classified as:

- fulminate type
- non-corrosive type.

b) Classified by **type of primer and higher assembly**, they include:

- berdan (for shooting ammunition)
- gevellot (for mortar ammo propellant charges and shotgun ammunition)
- boxer (for shooting ammunition and special type of ammo - we are currently involved in intensive development);

c) Classified by **function**, the existing assortment includes:

- initial (puncturing, firing, striking...);
- duplex (double effect primers);
- detonator (with a range of initial and high explosives);
- electric and electric-inflammatory (depending on use and type of higher assembly)
- delay, transmitting, boosting (depending on use).

d) This group includes:

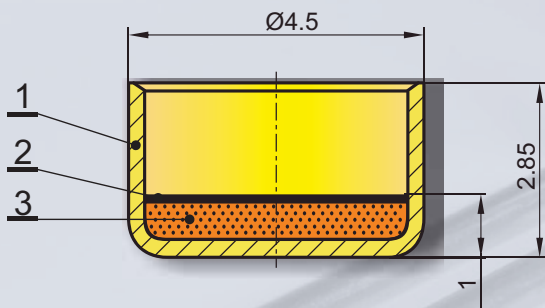
- delays and delay elements for different types of hand grenade fuzes with different types of mixtures used (adjustment of delay times optional);
- all types of initial, pyrotechnic, delay, smoke, flash and other types of mixtures,...
- all types of electric detonators, No and per special request;



**BERDAN (without anvil, for ammunition)**



**Initial primer 4.5**



Assignment: Bullet 7,62 mm



**Technical characteristics**

Item	Material	Dimensions
1- Cup	CuZn28 ½ t	0,42 +0,02 mm
2- Disc	Foil	0,05 -0,02 mm
Varnish type	Nitro, red	
3- Mixture	Fulminate	

**SENSITIVITY:**

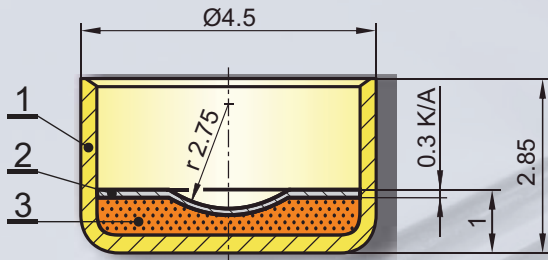
Ball weight	111,7 g
Upper sensitivity limit	H+ 5s ≤ 15"
Lower sensitivity limit	H- 2s ≥ 3"
Firing pin	Ø2 mm; R1 mm
To be tested in	Cartridge case of 7,62 mm TT

**Packing**

Number of pieces in a cardboard box	4.000 pcs
Number of boxes in a package/ no. of pieces	5 cardboard boxes x 4.000 pcs 20.000 pcs
Number of packages in a wooden case	8 packages x 20.000 pcs 160.000 pcs



### Initial primer 4.5/9



Assignment: Bullet 9 mm PARA



#### Technical characteristics

Item	Material	Dimensions
1- Cup	CuZn28 ½ t	0,42 +0,02 mm
2- Disc	Foil	0,05 -0,02 mm
Varnish type	Nitro, red	
3- Mixture	Fulminate	

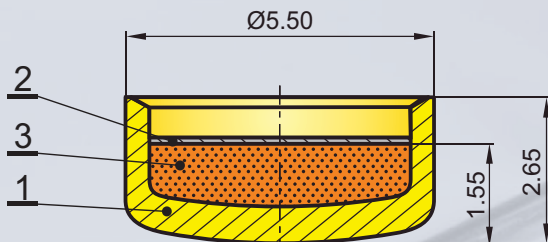
#### SENSITIVITY:

Ball weight	111,7 g
Upper sensitivity limit	H+ 5s ≤ 15"
Lower sensitivity limit	H- 2s ≥ 3"
Firing pin	Ø2 mm; R1 mm
To be tested in	Cartridge case of 9 mm PARA

#### Packing

Number of pieces in a cardboard box	4.000 pcs
Number of boxes in a package/	
no. of pieces	5 cardboard boxes x 4.000 pcs
	20.000 pcs
Number of packages in a wooden case	8 packages x 20.000 pcs
	160.000 pcs

### Initial primer 5.5-2P1



Assignment: Bullet 7,62 mm



#### Technical characteristics

Item	Material	Dimensions
1- Cup	CuZn28 ½ t	0,71 -0,02 mm
2- Disc	Foil	0,05 -0,02 mm
Varnish type	Nitro, red	
3- Mixture	Fulminate	

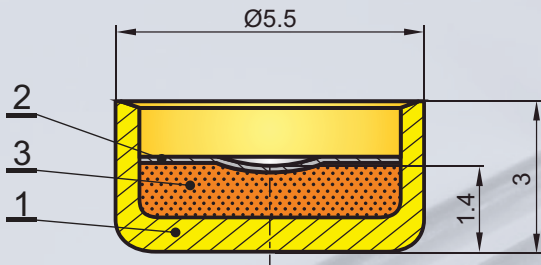
#### SENSITIVITY:

Ball weight	111,7 g
Upper sensitivity limit	H+ 5s ≤ 16"
Lower sensitivity limit	H- 2s ≥ 3"
Firing pin	Ø2,75 mm; R6,5 mm
To be tested in	Cartridge case of 7,62 mm

#### Packing

Number of pieces in a cardboard box	2.500 pcs
Number of boxes in a package/	
no. of pieces	5 cardboard boxes x 2.500 pcs
	12.500 pcs
Number of packages in a wooden case	8 packages x 12.500 pcs
	100.000 pcs

### Initial primer 5.5-1



Assignment: Bullet 7,9 mm



### Technical characteristics

Item	Material	Dimensions
1- Cup	CuZn28 ½ t	0,71 -0,02 mm
2- Disc	Foil	0,05 -0,02 mm
Varnish type	Nitro, red	
3- Mixture	Fulminate	

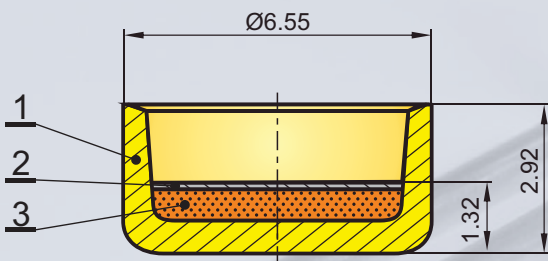
### SENSITIVITY:

Ball weight	225,7 g
Upper sensitivity limit	H+ 5s ≤ 11"
Lower sensitivity limit	H- 2s ≥ 3"
Firing pin	Ø2,75 mm; R6,5 mm
To be tested in	Cartridge case of 7,9 mm

### Packing

Number of pieces in a cardboard box	2.500 pcs
Number of boxes in a package/ no. of pieces	5 cardboard boxes x 2.500 pcs 12.500 pcs
Number of packages in a wooden case	8 packages x 12.500 pcs 100.000 pcs

### Initial primer 6.55-DT



Assignment: Bullet 7,62 mm  
and 7,62 mm manev.



### Technical characteristics

Item	Material	Dimensions
1- Cup	CuZn28 ½ t	0,71 -0,02 mm
2- Disc	Foil	0,06 -0,02 mm
Varnish type	Nitro, red	
3- Mixture	Fulminate	

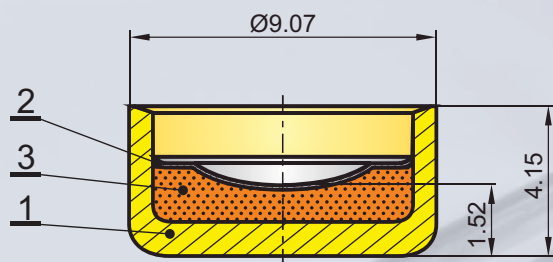
### SENSITIVITY:

Ball weight	111,7 g
Upper sensitivity limit	H+ 5s ≤ 15"
Lower sensitivity limit	H- 2s ≥ 3"
Firing pin	Ø2 mm; R1 mm
To be tested in	Cartridge case of 7,62 mm DT

### Packing

Number of pieces in a cardboard box	2.500 pcs
Number of boxes in a package/ no. of pieces	5 cardboard boxes x 2.500 pcs 12.500 pcs
Number of packages in a wooden case	8 packages x 12.500 pcs 100.000 pcs

### Initial primer 12.7-DŠK



Assignment: Bullet 12,7 mm DŠK  
and 20 mm Hispano



#### Technical characteristics

Item	Material	Dimensions
1- Cup	CuZn28 ½ t	0,91 -0,03 mm
2- Disc	Foil	0,03 +0,02 mm
Varnish type	Nitro, red	
3- Mixture	Fulminate	

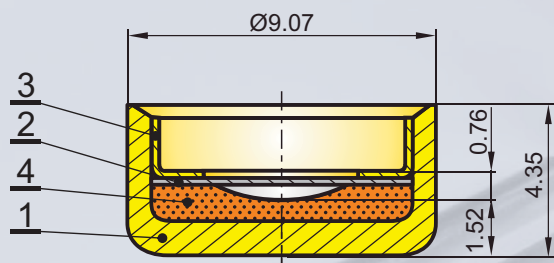
#### SENSITIVITY:

Ball weight	307 g
Upper sensitivity limit	450 mm
Lower sensitivity limit	100 mm
Firing pin	Ø3,45 mm; R2,45 mm
To be tested in	Cartridge case of 12,7 mm DŠK

#### Packing

Number of pieces in a cardboard box	650 pcs
Number of boxes in a package/ no. of pieces	5 cardboard boxes x 650 pcs 3.250 pcs
Number of packages in a wooden case	8 packages x 3.250 pcs 26.000 pcs

### Initial primer TK-23



Assignment: Bullet 23 mm



#### Technical characteristics

Item	Material	Dimensions
1- Cup	CuZn28 ½ t	0,91 -0,03 mm
2- Disc 1	Foil	0,06 +0,02 mm
3- Disc 2 ring	CuZn10	0,14 ±0,01 mm
Varnish type	Nitro, red	
3- Mixture	Fulminate	

#### SENSITIVITY:

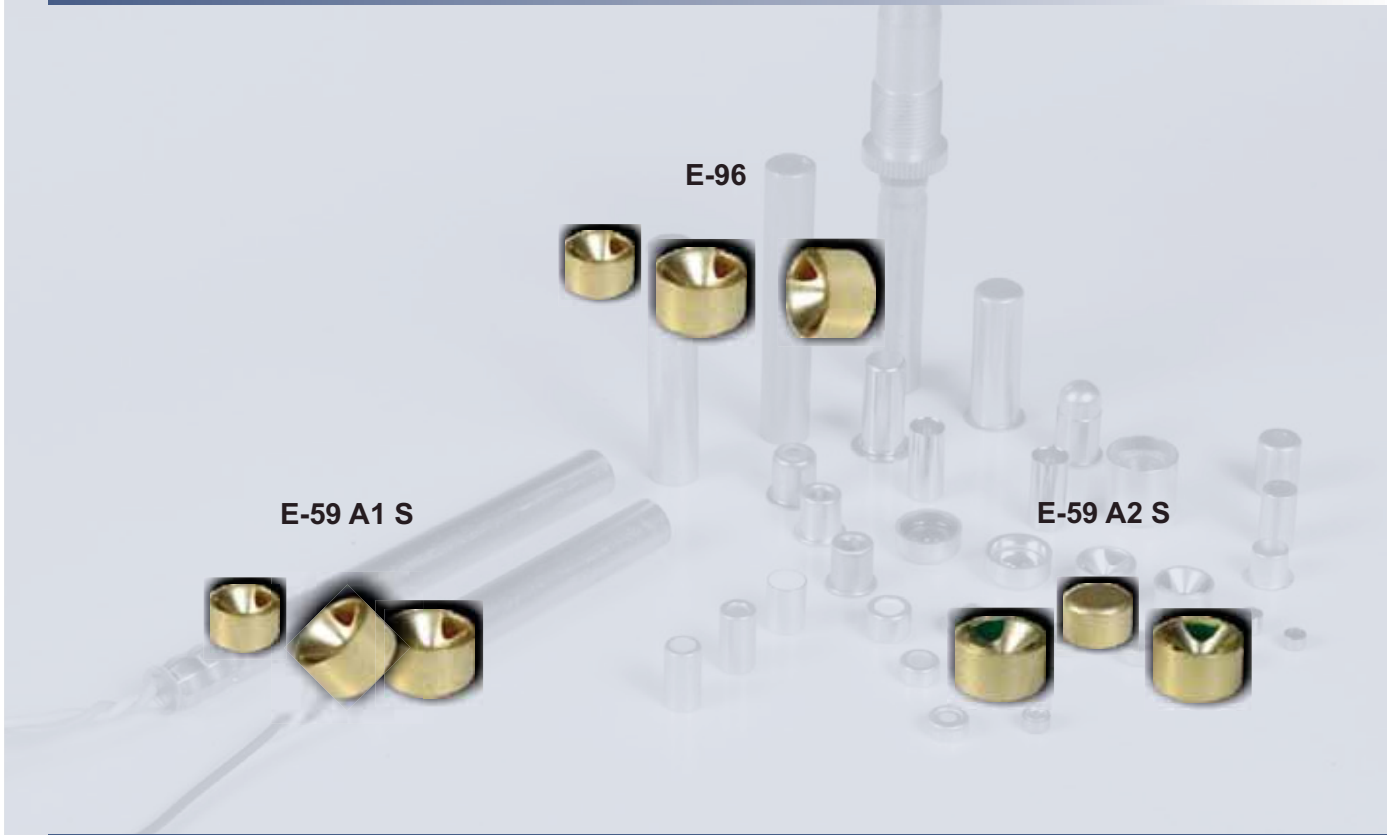
Ball weight	307 g
Upper sensitivity limit	450 mm
Lower sensitivity limit	100 mm
Firing pin	Ø4x2 mm; R0,6 mm
To be tested in	Cartridge case of 23 mm

#### Packing

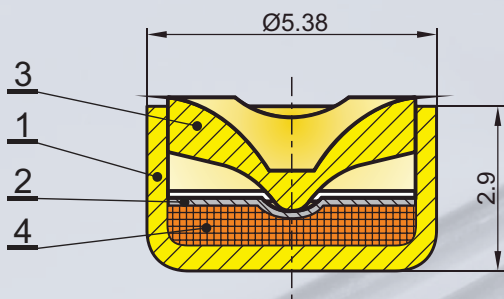
Number of pieces in a cardboard box	600 pcs
Number of boxes in a package/ no. of pieces	5 cardboard boxes x 600 pcs 3.000 pcs
Number of packages in a wooden case	8 packages x 3.000 pcs 24.000 pcs



**BOXER TYPE**



**Initial primer E-96**



**Assignment: UD M76P1, VUD  
and fuze M84**



**Technical characteristics**

Item	Material	Dimensions
1- Cup	CuZn28 ½ t	0,42 +0,02 mm
2- Disc 1	Foil	0,05 -0,02 mm
3- Three-way anvil	CuZn28 ½ t	0,98 -0,08 mm
Varnish type	Nitro, red	
4- Mixture	Synoxide, non-corrosive	

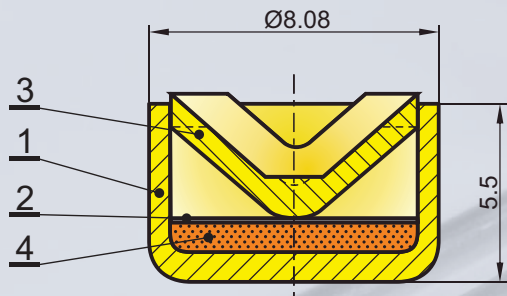
**SENSITIVITY:**

Ball weight	225 g
Upper sensitivity limit	H+ 5s ≤ 12"
Lower sensitivity limit	H- 2s ≥ 3"
Firing pin	Ø2 mm; R1 mm
To be tested in	Tool, bearing, steel

**Packing**

Number of pieces in a cardboard box	2.500 pcs
Number of boxes in a package/ no. of pieces	5 cardboard boxes x 2.500 pcs
Number of packages in a wooden case	8 packages x 12.500 pcs
	100.000 pcs

### Initial primer E-59A1S



Assignment: Gun primer (TK)  
M55, M28, M41,..



#### Technical characteristics

Item	Material	Dimensions
1- Cup	CuZn28 ½ t	0,90 ±0,02 mm
2- Disc 1	Foil	0,05 -0,02 mm
3- Anvi bifurcated	CuZn28 ½ t	1,22 ±0,02 mm
Varnish type	Nitro, red	
3- Mixture	Synoxide, non-corrosive	

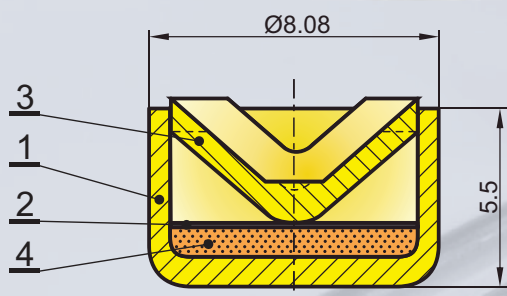
#### SENSITIVITY:

Ball weight	225 g
Upper sensitivity limit	H+ 5s ≤ 12"
Lower sensitivity limit	H- 2s ≥ 6"
Firing pin	Ø2 mm; R1 mm
To be tested in	Body TK, percussive roller, ring

#### Packing

Number of pieces in a cardboard box	600 pcs
Number of boxes in a package/ no. of pieces	5 cardboard boxes x 600 pcs 3.000 pcs
Number of packages in a wooden case	8 packages x 3.000 pcs 24.000 pcs

### Initial primer E-59A2S



Assignment: Gun primer (TK) M71



#### Technical characteristics

Item	Material	Dimensions
1- Cup	CuZn28 ½ t	0,90 ±0,02 mm
2- Disc 1	Foil	0,05 -0,02 mm
3- Anvi bifurcated	CuZn28 ½ t	1,22 ±0,02 mm
Varnish type	Nitro, green	
3- Mixture	Synoxide, non-corrosive	

#### SENSITIVITY:

Ball weight	460 g
Upper sensitivity limit	H+ 3s ≤ 18"
Lower sensitivity limit	H- 2s ≥ 6"
Firing pin	Ø2 mm; R1 mm
To be tested in	Body TK, percussive roller, ring

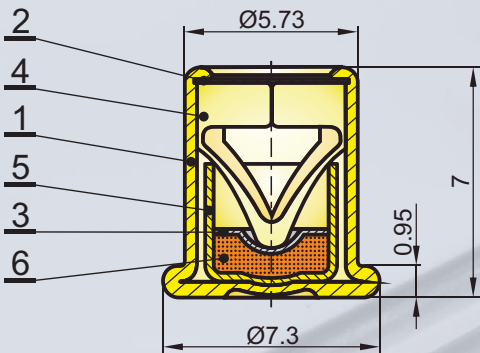
#### Packing

Number of pieces in a cardboard box	600 pcs
Number of boxes in a package/ no. of pieces	5 cardboard boxes x 600 pcs 3.000 pcs
Number of packages in a wooden case	8 packages x 3.000 pcs 24.000 pcs

**GEVELLOT TYPE**



**Initial primer E-68**



Assignment: Practice devices



**Technical characteristics**

Item	Material	Dimensions
1- Cup, outer	CuZn10	0,48 +0,02 mm
2- Disc 1	Foil	0,045 -0,015 mm
3- Disc 2	Foil	0,045 -0,015 mm
4- Anvil, gevelot	CuZn28 ½ t	0,71 -0,02 mm
5- Cup, initial	Cu99,5	0,18 +0,015 mm
Varnish type	Shellac, alcohol, colorless	
6- Mixture	Nitro, green Fulminate	

**SENSITIVITY:**

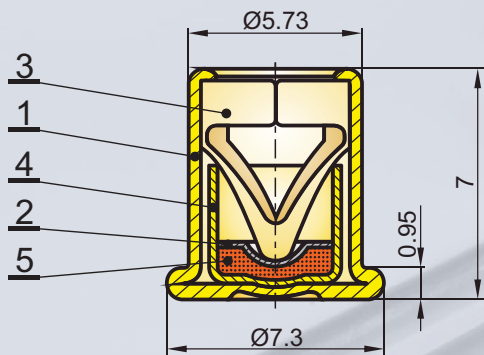
Ball weight	307 g
Upper sensitivity limit	110 mm
Lower sensitivity limit	5 mm
Firing pin	Ø4,5 mm; R1 mm
To be tested in	Tool, bearing, steel

**Packing**

Number of pieces in a cardboard box	600 pcs
Number of boxes in a package/ no. of pieces	5 cardboard boxes x 600 pcs 3.000 pcs
Number of packages in a wooden case	8 packages x 3.000 pcs 24.000 pcs



### Initial primer E-71



Assignment: Bullet hunting



#### Technical characteristics

Item	Material	Dimensions
1- Cup, outer	CuZn10	0,48 +0,02 mm
2- Disc 1	Foil	0,045 -0,015 mm
3- Anvil, gevelot	CuZn28 ½ t	0,71 -0,02 mm
4- Cup, initial	Cu99,5	0,18 +0,015 mm
Varnish type	Shellac, alcohol, colorless	
5- Mixture	Fulminate	

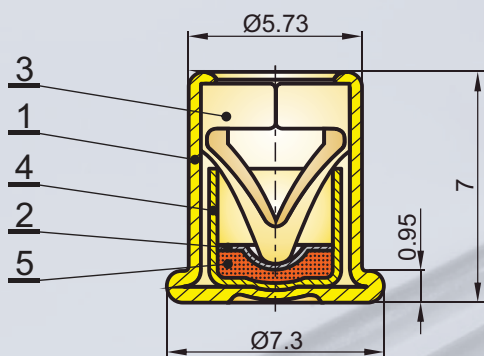
#### SENSITIVITY:

Ball weight	307 g
Upper sensitivity limit	70 mm
Lower sensitivity limit	5 mm
Firing pin	Ø4,5 mm; R2 mm
To be tested in	Tool, bearing, steel

#### Packing

Number of pieces in a cardboard box	600 pcs
Number of boxes in a package/ no. of pieces	5 cardboard boxes x 600 pcs 3.000 pcs
Number of packages in a wooden case	8 packages x 3.000 pcs 24.000 pcs

### Initial primer E-72



Assignment: Ignition cartridges  
for mortar shells



#### Technical characteristics

Item	Material	Dimensions
1- Cup, outer	CuZn10	0,48 +0,02 mm
2- Disc 1	Foil	0,045 -0,015 mm
3- Anvil, gevelot	CuZn28 ½ t	0,71 -0,02 mm
4- Cup, initial	Cu99,5	0,18 +0,015 mm
Varnish type	Shellac, alcohol, colorless	
5- Mixture	Fulminate	

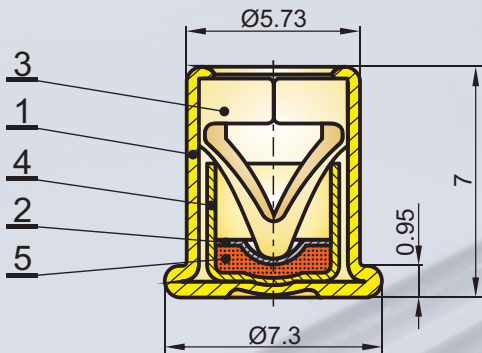
#### SENSITIVITY:

Ball weight	307 g
Upper sensitivity limit	60 mm
Lower sensitivity limit	5 mm
Firing pin	Ø4,5 mm; R2 mm
To be tested in	Tool, bearing, steel

#### Packing

Number of pieces in a cardboard box	600 pcs
Number of boxes in a package/ no. of pieces	5 cardboard boxes x 600 pcs 3.000 pcs
Number of packages in a wooden case	8 packages x 3.000 pcs 24.000 pcs

### Initial primer E-72S



Assignment: Fuze for bullet 40 mm



#### Technical characteristics

Item	Material	Dimensions
1- Cup, outer	CuZn10	0,48 +0,02 mm
2- Disc 1	Foil	0,045 -0,015 mm
3- Anvil, gevelot	CuZn28 ½ t	0,71 -0,02 mm
4- Cup, initial	Cu99,5	0,18 +0,015 mm
Varnish type	Shellac, alcohol, colorless	
5- Mixture	Synoxide, non-corrosive	

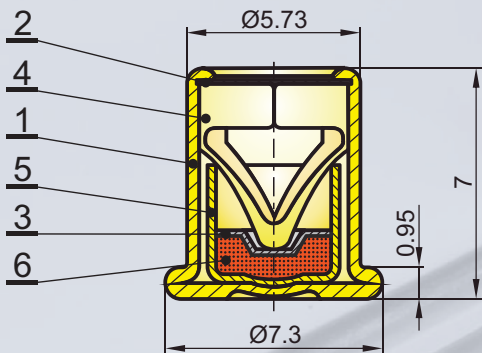
#### SENSITIVITY:

Ball weight	307 g
Upper sensitivity limit	60 mm
Lower sensitivity limit	5 mm
Firing pin	Ø4,5 mm; R2 mm
To be tested in	Tool, bearing, steel

#### Packing

Number of pieces in a cardboard box	600 pcs
Number of boxes in a package/ no. of pieces	5 cardboard boxes x 600 pcs 3.000 pcs
Number of packages in a wooden case	8 packages x 3.000 pcs 24.000 pcs

### Initial primer E-84



Assignment: Practice devices



#### Technical characteristics

Item	Material	Dimensions
1- Cup, outer	CuZn10	0,48 +0,02 mm
2- Disc 1	Foil	0,045 -0,015 mm
3- Disc 2	Foil	0,045 -0,015 mm
4- Anvil, gevelot	CuZn28 ½ t	0,71 -0,02 mm
5- Cup, initial	DVP2, Cu.10	0,18 +0,015 mm
Varnish type	Shellac, alcohol, colorless	
6- Mixture	Nitro, green Thiocyanate	

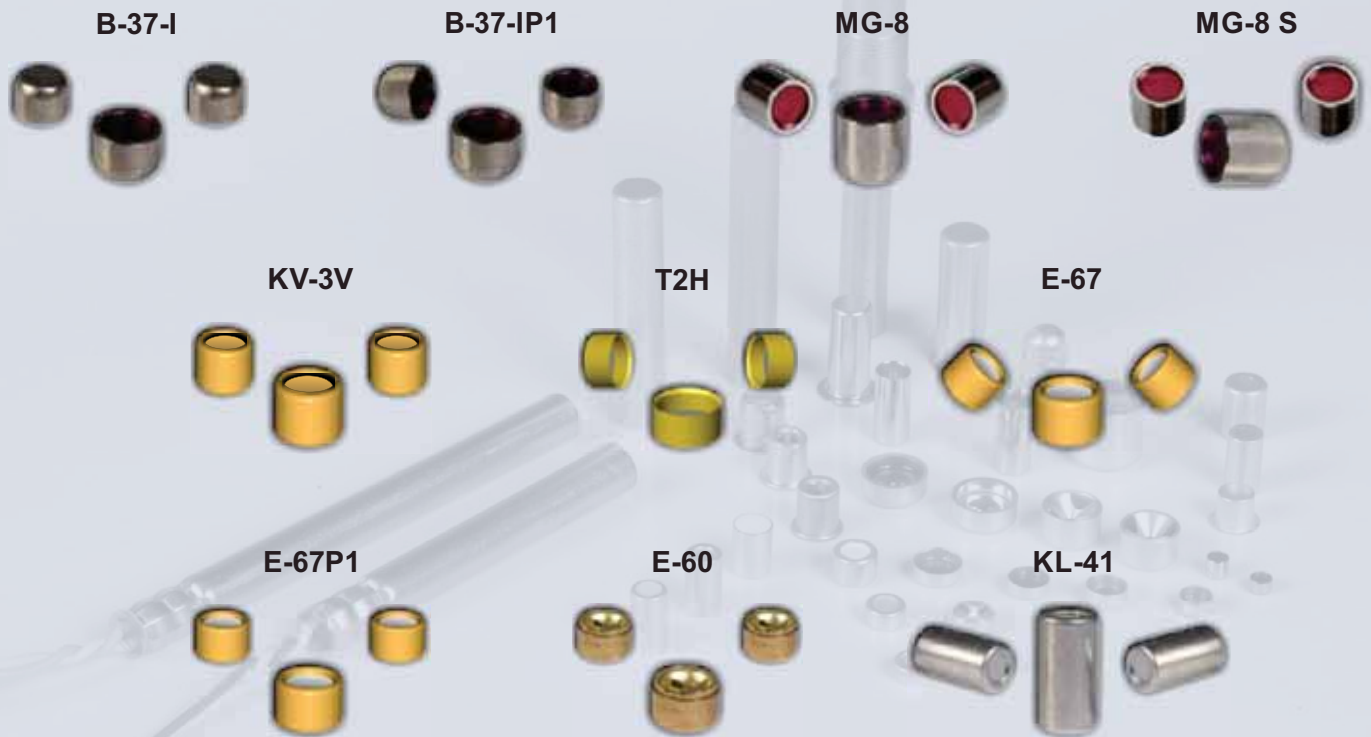
#### SENSITIVITY:

Ball weight	307 g
Upper sensitivity limit	110 mm
Lower sensitivity limit	5 mm
Firing pin	Ø4,5 mm; R2 mm
To be tested in	Tool, bearing, steel

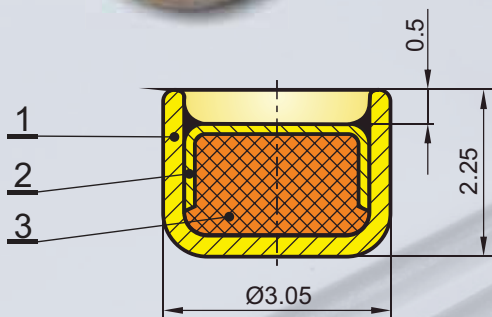
#### Packing

Number of pieces in a cardboard box	600 pcs
Number of boxes in a package/ no. of pieces	5 cardboard boxes x 600 pcs 3.000 pcs
Number of packages in a wooden case	8 packages x 3.000 pcs 24.000 pcs

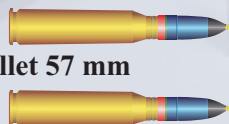
## INITIAL - FUZES



## Initial primer B-37i



Assignment: Anti-aircraft bullet 57 mm



### Technical characteristics

Item	Material	Dimensions
1- Cup	DVP-2 Cu.10	0,3±0,03 mm
2- Disc	DVP-1 Cu.10	0,07 ±0,01 mm
3- Mixture	Shellac, alcohol, red Fulminate	

### SENSITIVITY:

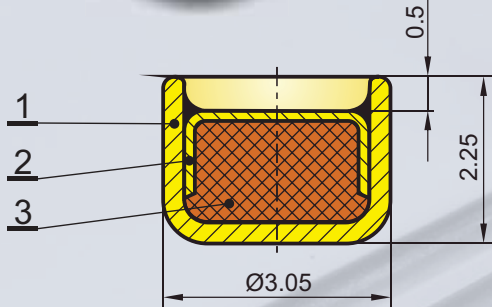
Ball weight	100 g
Upper sensitivity limit	100 mm
Lower sensitivity limit	5 mm
Firing pin	Ø3 mm; 20° 30'
To be tested in	Tool, bearing, steel

### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	8 box x 35 pcs / 280 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 280 pcs 1.400 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 1.400 pcs 11.200 pcs



### Initial primer B-37i P1



Assignment: Fuze AU-18



#### Technical characteristics

Item	Material	Dimensions
1- Cup	DVP-2 Cu.10	0,3±0,03 mm
2- Disc	DVP-1 Cu.10	0,07 ±0,01 mm
Varnish type	Shellac, alcohol, red	
3- Mixture	Synoxide, non-corrosive	

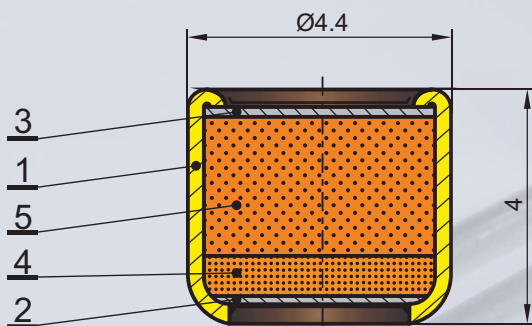
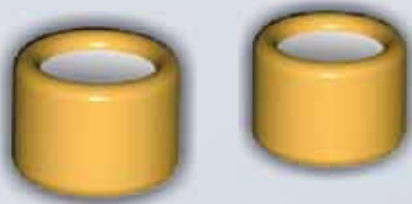
#### SENSITIVITY:

Ball weight	100 g
Upper sensitivity limit	70 mm
Lower sensitivity limit	5 mm
Firing pin	Ø3 mm; 20° 30'
To be tested in	Tool, bearing, steel

#### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	8 box x 35 pcs / 280 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 280 pcs 1.400 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 1.400 pcs 11.200 pcs

### Initial primer E-67



Assignment: Fuzesi UTI



#### Technical characteristics

Item	Material	Dimensions
1- Cup	Cu 99.5	0,5 +0,02 mm
2- Disc	Foil	0,045 ±0,015 mm
3- Disc II	DVP-2 Cu.10	0,3 -0,015 mm
Varnish type	Nitro, red	
4- Charge I	Nitro, green	
5- Charge II	Fulminate	
	Initial mixture	

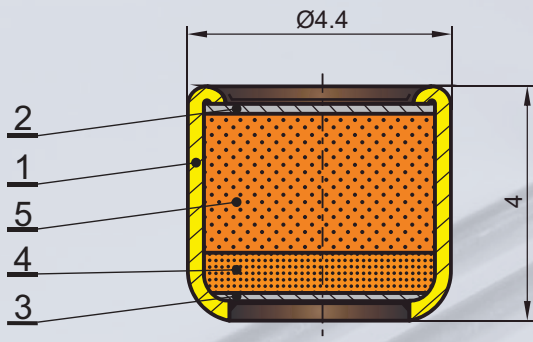
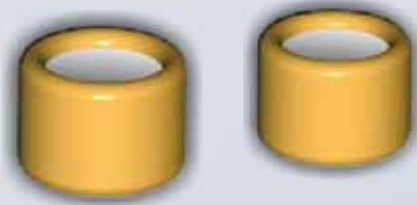
#### SENSITIVITY:

Ball weight	55 g
Upper sensitivity limit	120 mm
Lower sensitivity limit	5 mm
Firing pin	Ø3 mm; 20°30, Ø0,2 at the top
To be tested in	Tool, bearing, steel

#### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	8 box x 35 pcs / 280 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 280 pcs 1.400 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 1.400 pcs 11.200 pcs

### Initial primer E-67 P1



Assignment: Fuze for bullet 40 mm



### Technical characteristics

Item	Material	Dimensions
1- Cup	Cu 99.5	0,5 ±0,02 mm
2- Disc	Foil	0,045 ±0,015 mm
3- Disc II	Al Mn1	0,3 -0,015 mm
Varnish type	Nitro, red Nitro, green	
4- Charge I	Pb-azid, white	
5- Charge II	Synoxide, non-corrosive	

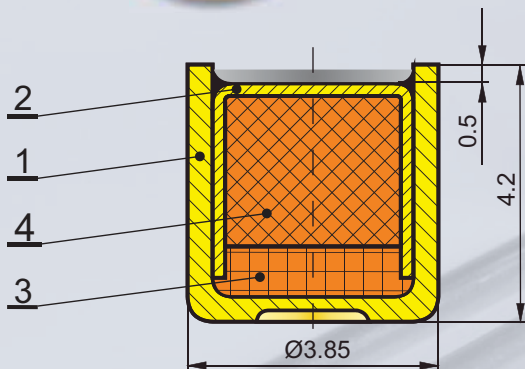
### SENSITIVITY:

Ball weight	55 g
Upper sensitivity limit	120 mm
Lower sensitivity limit	5 mm
Firing pin	Ø4,5 mm; 20°30, 0,1-0,28 at the top, R 0,05
To be tested in	Tool, bearing, steel

### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	8 box x 35 pcs / 280 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 280 pcs 1.400 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 1.400 pcs 11.200 pcs

### Initial primer KV-3V



Assignment: Anti-aircraft bullet 30 mm



### Technical characteristics

Item	Material	Dimensions
1- Cup	Cu 99.5	0,5 ±0,02 mm
2- Disc	Al 99.5½t	0,2 ±0,015 mm
Varnish type	Shellac-alcohol, red	
3- Initial charge I	Synoxide with Pb-azide	
4- Initial charge II	Synoxide with Pb-azide e	

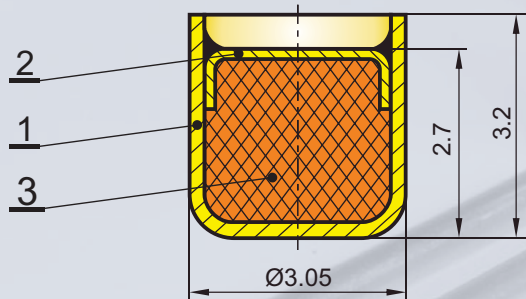
### SENSITIVITY:

Ball weight	100 g
Upper sensitivity limit	100 mm
Lower sensitivity limit	5 mm
Firing pin	Ø4,5 mm; 23° 30'; r0,05 max, 0, 25 at the top
To be tested in	Tool, bearing, steel

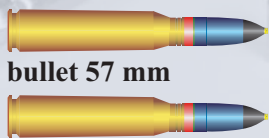
### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	8 box x 35 pcs / 280 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 280 pcs 1.400 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 1.400 pcs 11.200 pcs

### Initial primer MG-8



Assignment: Anti-aircraft bullet 57 mm



#### Technical characteristics

Item	Material	Dimensions
1- Cup	DVP-2 Cu.10	0,3±0,015 mm
2- Disc	DVP-1 Cu.10	0,07 ±0,01 mm
Varnish type	Shellac, alcohol, red	
3- Mixture	Fulminate	

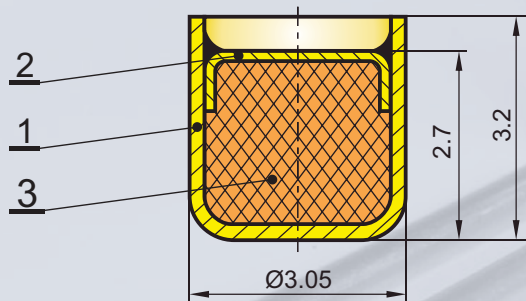
#### SENSITIVITY:

Ball weight	200 g
Upper sensitivity limit	50 mm, 200g ball
Lower sensitivity limit	5 mm, 100g ball
Firing pin	Ø3 mm; 20°30'
To be tested in	Tool, bearing, steel

#### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	8 box x 35 pcs / 280 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 280 pcs 1.400 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 1.400 pcs 11.200 pcs

### Initial primer MG-8 S



Assignment: Fuze for bullet 40 mm



#### Technical characteristics

Item	Material	Dimensions
1- Cup	DVP-2 Cu.10	0,3±0,015 mm
2- Disc	DVP-1 Cu.10	0,07 ±0,01 mm
Varnish type	Shellac, alcohol, red	
3- Mixture	Synoxide, non-corrosive	

#### SENSITIVITY:

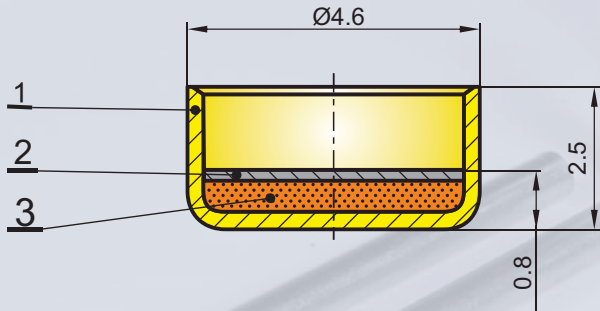
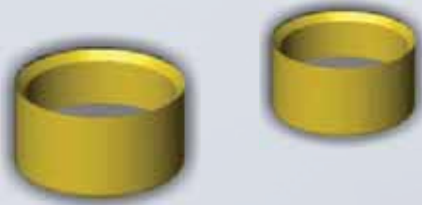
Ball weight	200 g
Upper sensitivity limit	50 mm, 200g ball
Lower sensitivity limit	5 mm, 100g ball
Firing pin	Ø3 mm; 20°30'
To be tested in	Tool, bearing, steel

#### Packing

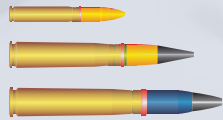
Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	8 box x 35 pcs / 280 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 280 pcs 1.400 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 1.400 pcs 11.200 pcs



### Initial primer T2H



Assignment: Anti-aircraft  
bullet 23, 37 i 40 mm



#### Technical characteristics

Item	Material	Dimensions
1- Cup	DVP-1 Cu.10	0,3±0,015 mm
2- Disc	Foil	0,05 -0,02 mm
Varnish type	Nitro, red	
3- Mixture	Fulminate	

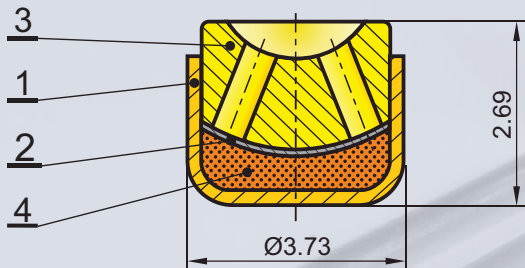
#### SENSITIVITY:

Ball weight	388 g
Upper sensitivity limit	70 mm
Lower sensitivity limit	10 mm
Firing pin	Ø4,5 mm; R3 mm
To be tested in	Tool, bearing, steel

#### Packing

Number of pieces in a cardboard box	4.000 pcs
Number of boxes in a package/ no. of pieces	5 cardboard boxes x 4.000 pcs 20.000 pcs
Number of packages in a wooden case	8 packages x 20.000 pcs 160.000 pcs

### Initial primer E-60/II



Assignment: Fuze UTU M93 (TK-150)



#### Technical characteristics

Item	Material	Dimensions
1- Cup	CuZn10	0,21 -0,02 mm
2- Disc	Paper, type II, trade quality	0,0889 ±0,0127 mm
3- Anvil	CuZn28 ½ t	
Varnish type	Nitro, red	
4- Mixture	Thiocyanate	

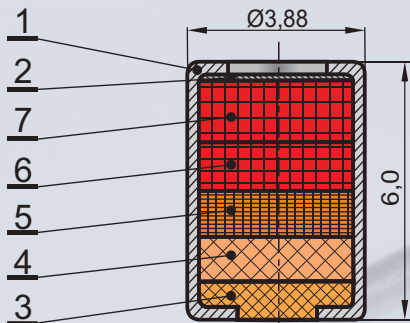
#### SENSITIVITY:

Ball weight	55 g
Upper sensitivity limit	H+ 5s ≤ 8"
Lower sensitivity limit	H- 2s ≥ 1"
Firing pin	Ø4,5 mm; 28, represented at 0,38 mm, r0,1 max
To be tested in	Tool, bearing, steel

#### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	10 box x 35 pcs / 350 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 350 pcs 1.750 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 1.750 pcs 14.000 pcs

### Initial primer KL-41



Assignment: Fuze UTU M93 (TK-150)



### Technical characteristics

Item	Material	Dimensions
1- Cup	Al 99,5	0,25 ±0,015 mm 0,1 ±0,02 mm
2- Disc	Al 99,5	
3- Igniting charge	Based on Zr	
4- Delay charge	Si - Pb minium	
5- Initial charge	Pb-azide, white	
6- Detonating charge I	Pentrite	
7- Detonating charge II	Pentrite	
Varnish type	Nitro, green	

### SENSITIVITY:

Activation	EZG MB 2N
Delay time	30-50 ms
Material action	Penetration of Pb-board of 3 mm thickness
To be tested in	Testing tool, photo diode, oscilloscope

### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	4 box x 35 pcs / 140 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 140 pcs 700 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 700 pcs 5.600 pcs

### DETONATER

M 17 P4



M 24 P4



DK-17



KL-34 P1



KS-1C



DK-34



IDK-34



PDK-34



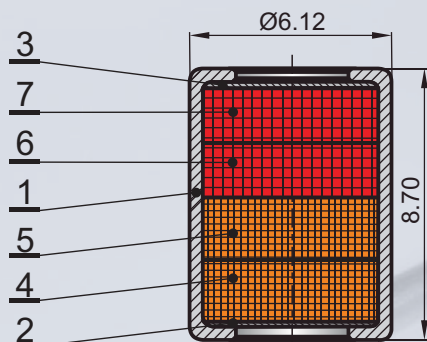
KL-35  
(DK-8-Cu)



KL-35 P1  
(DK-8-Cu P1)



## Detonating primer M-17 P4



Assignment: Anti-tank mine - 4  
(TMA-4)



### Technical characteristics

Item	Material	Dimensions
1- Cup	Al Mn 1	0,77 ±0,02 mm
2- Upper disc	Silk cloth	
3- Lower disc	Al 99,5	0,25 ±0,015 mm
Varnish type	Nitro, green	
4- Initial charge 1	Trizinate	
5- Initial charge 2	Pb-azide, white	
6- Brisant charge 1	Tetryl	
7- Brisant charge 2	Tetryl	

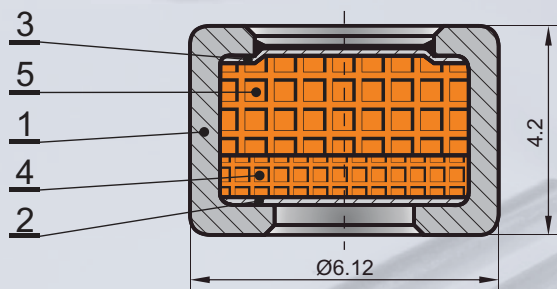
### SENSITIVITY:

Initiation	Safety fuse
Initiator	Booster M7AP2
To be tested in	Tool, Pb block
Material action 1	(powder column + M17P4)
Material action 2	Penetration of Pb-boards of 3 mm thickness, Ø>=6,12 mm (Safety fuse + M7AP2) Extension of Pb block, min 3,0 cm <sup>3</sup>

### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	3 box x 35 pcs / 105 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 105 pcs 525 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 525 pcs 4.200 pcs

## Duplex primer M 24 P4



Assignment: Fuze AU-18;  
Art. Shells



### Technical characteristics

Item	Material	Dimensions
1- Cup	Al Mn 1	0,77 ±0,02 mm
2- Upper disc	Al 99,5	0,05 0,0 2 mm
3- Lower disc	Al 99,5	0,25 ±0,015 mm
Varnish type	Nitro, red Nitro, white	
4- Initial charge 1	Synoxide, non-corrosive	
5- Initial charge 2	Pb-azide, white	

### SENSITIVITY:

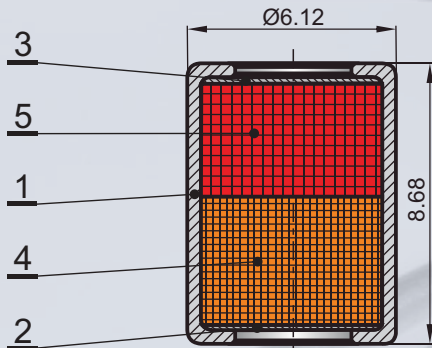
Ball weight	200 g
Upper sensitivity limit	40 mm
Lower sensitivity limit	5 mm
Firing pin	Ø4,2 mm; 20°30, sharply
To be tested in	Tool, bearing, steel
Material action	Penetration of Pb-boards of 1,65 mm, Ø>=6,12 mm

### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	3 box x 35 pcs / 105 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 105 pcs 525 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 525 pcs 4.200 pcs



### Detonating primer DK-17



Assignment: Art. Shells



#### Technical characteristics

Item	Material	Dimensions
1- Cup	Al Mn 1	0,77 ±0,02 mm
2- Upper disc	Al 99,5	0,05 ±0,01 mm
3- Lower disc	Al 99,5	0,25 ±0,015 mm
Varnish type	Nitro, red Nitro, green	
4- Initial charge	Pb-azide, white	
5- Brisant charge	Pentrite	

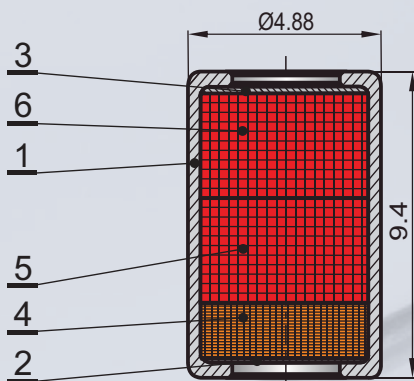
#### SENSITIVITY:

Initiation	Safety fuse
Initiator	Booster M7AP2
To be tested in	Tool, bearing, steel
Material action 1	Penetration of Pb-boards of 3 mm thickness, Ø>=6,12 mm
Material action 2	Extension of Pb block, min 4,0 cm <sup>3</sup>

#### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	3 box x 35 pcs / 105 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 105 pcs 525 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 525 pcs 4.200 pcs

### Detonating primer KL-34P1



Assignment: Fuze AU-18;  
Art. Shells



#### Technical characteristics

Item	Material	Dimensions
1- Cup	Al Mn 1	0,32 ±0,02 mm
2- Upper disc	Al 99,5	0,25 ±0,01 mm
3- Lower disc	Al 99,5	0,25 ±0,015 mm
Varnish type	Nitro, red Nitro, green	
4- Initial charge	Pb-azide, white	
5- Detonating charge 1	Tetryl	
6- Detonating charge 2	Tetryl	

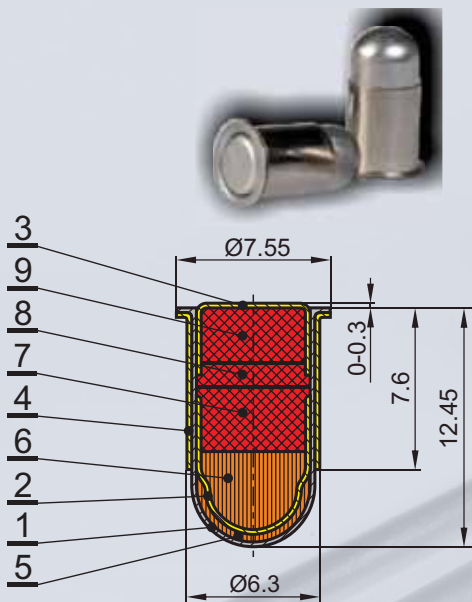
#### SENSITIVITY:

Initiation	Duplex primer M 24 P4 for a distance of 40 mm
To be tested in	Tool, bearing, steel
Material action	Penetration of Pb-boards of 3 mm thickness, min 5,0 mm

#### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	4 box x 35 pcs / 140 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 140 pcs 700 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 700 pcs 56 00 pcs

### Detonating primer KS-1C



Assignment: **Reac.-cumul.**  
Shell 82 mm

#### Technical characteristics

Item	Material	Dimensions
1- Cup	Al 99,5	0,30 ±0,015 mm
2- Anvil	CuZn28	0,31 ±0,015 mm
3- Disc	Al 99,5	0,25 ±0,015 mm
4- Covering	CuZn10	0,30 ±0,015 mm
Varnish type	Nitro, green	
5- Initial charge 1	Non-corrosive, synoxide	
6- Initial charge 2	AT 70:30, azide-trizinate	
7- Brisant charge 1	Pentrite	
8- Brisant charge 2	Pentrite	
9- Brisant charge 3	Pentrite	

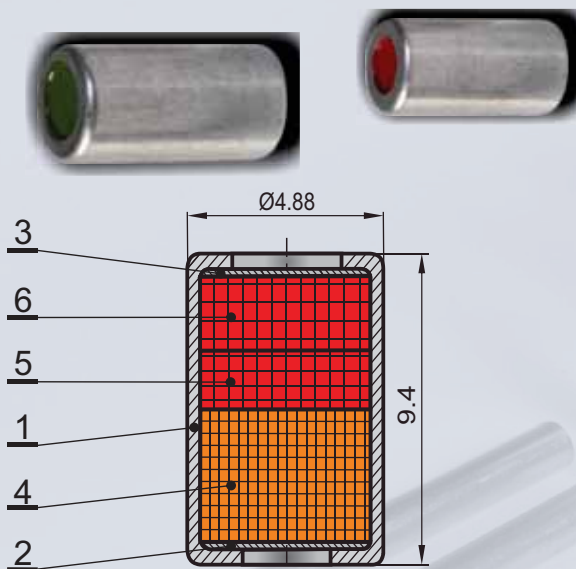
#### SENSITIVITY:

Weight mass	300 g
Upper sensitivity limit	500 mm, 90°, 600 mm, 30°
Lower sensitivity limit	80 mm, 90°, 100 mm, 30°
To be tested in	Tool, bearing, steel
Material action	(Safety fuse + M7A) Pb board 4 mm, Ø>=6,3 mm

#### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box/no. of pcs	3 box x 35 pcs / 105 pcs
Number of boxes in a packag/no. of pcs	5 cardboard boxes x 105 pcs
N° of packages in a wooden case/no. of pcs	8 pack. x 525 pcs/4.200 pcs

### Detonating primer DK-34



Assignment: **Fuze AU-18;**  
Art. Shells

#### Technical characteristics

Item	Material	Dimensions
1- Cup	Al Mn 1	0,32 ±0,02 mm
2- Upper disc	Al 99,5	0,25 ±0,01 mm
3- Lower disc	Al 99,5	0,25 ±0,015 mm
Varnish type	Nitro, red Nitro, green	
4- Initial charge	Pb-azide, white	
5- Detonating charge 1	Pentrite	
6- Detonating charge 2	Pentrite	

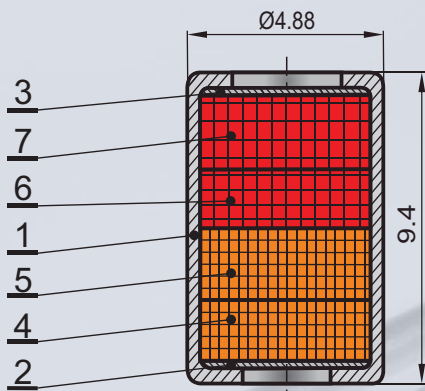
#### SENSITIVITY:

Initiation	Safety fuse
Initiator	Booster M7AP2
To be tested in	Tool, Pb block
Material action 1	(powder column + M17P4)
Material action 2	Penetration of Pb-boards of 3 mm thickness, Ø>=6,12 mm (Safety fuse + M7AP2) Extension of Pb block, min 3,0 cm <sup>3</sup>

#### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box/no. of pcs	3 box x 35 pcs / 105 pcs
Number of boxes in a packag/no. of pcs	5 cardboard boxes x 105 pcs
N° of packages in a wooden case/no. of pcs	8 pack. x 525 pcs/4.200 pcs

### Detonating primer IDK-34



Assignment: Fuze for Art. Shells



#### Technical characteristics

Item	Material	Dimensions
1- Cup	Al Mn 1	0,32 ±0,02 mm
2- Upper disc	Al 99,5	0,05 ±0,015 mm
3- Lower disc	Al 99,5	0,25 ±0,015 mm
Varnish type	Nitro, red Nitro, yellow	
4- Initial charge 1	Synoxide, non-corrosive	
5- Initial charge 2	Pb-azide, white	
6- Brisant charge 1	Pentrite	
7- Brisant charge 2	Pentrite	

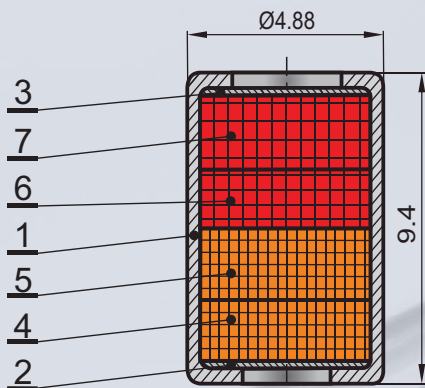
**SENSITIVITY:**

Ball weight	52 g
Upper sensitivity limit	80 mm
Lower sensitivity limit	5 mm
Firing pin	Ø3,0 mm; 23° ±30; Ø 0,2 -0,1 at the top
To be tested in	Tool, bearing, steel
Material action	Penetration of Pb-boards of 3 mm thickness, Ø>=4,8 mm

#### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box/no. of pcs	3 box x 35 pcs / 105 pcs
Number of boxes in a packag/no. of pcs	5 cardboard boxes x 105 pcs
N° of packages in a wooden case/no. of pcs	8 pack. x 525 pcs/4.200 pcs

### Detonating primer PDK-34



Assignment: Fuze for Art. Shells



#### Technical characteristics

Item	Material	Dimensions
1- Cup	Al Mn 1	0,32 ±0,02 mm
2- Upper disc	Silk cloth	
3- Lower disc	Al 99,5	0,25 ±0,015 mm
Varnish type	Nitro, green	
4- Initial charge 1	Tricinate	
5- Initial charge 2	Pb-azide, white	
6- Brisant charge 1	Pentrite	
7- Brisant charge 2	Pentrite	

**SENSITIVITY:**

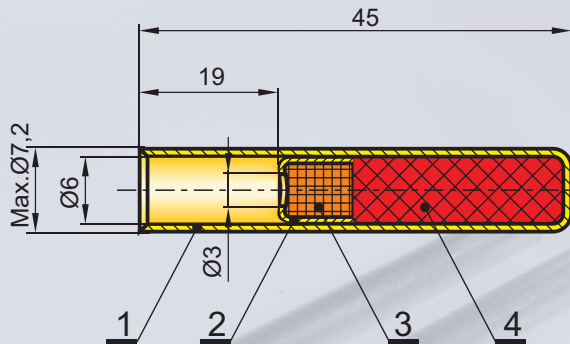
Initiation	Safety fuse
Initiator	Booster M7
To be tested in	Tool, Pb block
Material action 1	(powder column + PDK-34)
Material action 2	Penetration of Pb-boards of 3 mm thickness, Ø>=4,8 mm (Safety fuse + PDK-34)
	Extension of Pb block, min 3,0 cm <sup>3</sup>

#### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box/no. of pcs	3 box x 35 pcs / 105 pcs
Number of boxes in a packag/no. of pcs	5 cardboard boxes x 105 pcs
N° of packages in a wooden case/no. of pcs	8 pack. x 525 pcs / 4.200 pcs



### Detonating primer KL-35 (DK-8-Cu)



Assignment: Fuze for HG M84



#### Technical characteristics

Item	Material	Dimensions
1- Cup	Cu-DHP R240 or CuZn10	0,75 ±0,02 mm
2- Upper disc	Cu-DHP R240 or CuZn10	0,5 ±0,015 mm
3- Initial charge	Hg fulminate	
4- Detonating charge	Pentrite	

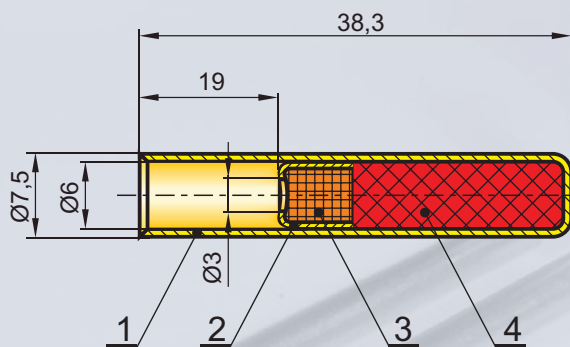
#### SENSITIVITY:

Initiation	Safety fuse
To be tested in	Tool
Material action 1	Penetration of Pb board of 5,0 mm thickness, $\text{Ø} \geq 7,2$ mm
Material action 2	Extension of Pb block, min 25 cm <sup>3</sup>

#### Packing

Number of pieces in a cardboard box	100 pcs
Number of cardboard boxes in a package/ no. of pieces	5 cardboard boxes x 100 pcs
Number of packages in a wooden case / no. of pieces	8 packages x 500 pcs/4.000 pcs

### Detonating primer KL-35 P1 (DK-8-Cu P1)



Assignment: Fuze for HG M75



#### Technical characteristics

Item	Material	Dimensions
1- Cup	Cu-DHP R240 or CuZn10	0,75 ±0,02 mm
2- Upper disc	Cu-DHP R240 or CuZn10	0,5 ±0,015 mm
3- Initial charge	Hg fulminate	
4- Detonating charge	Pentrite	

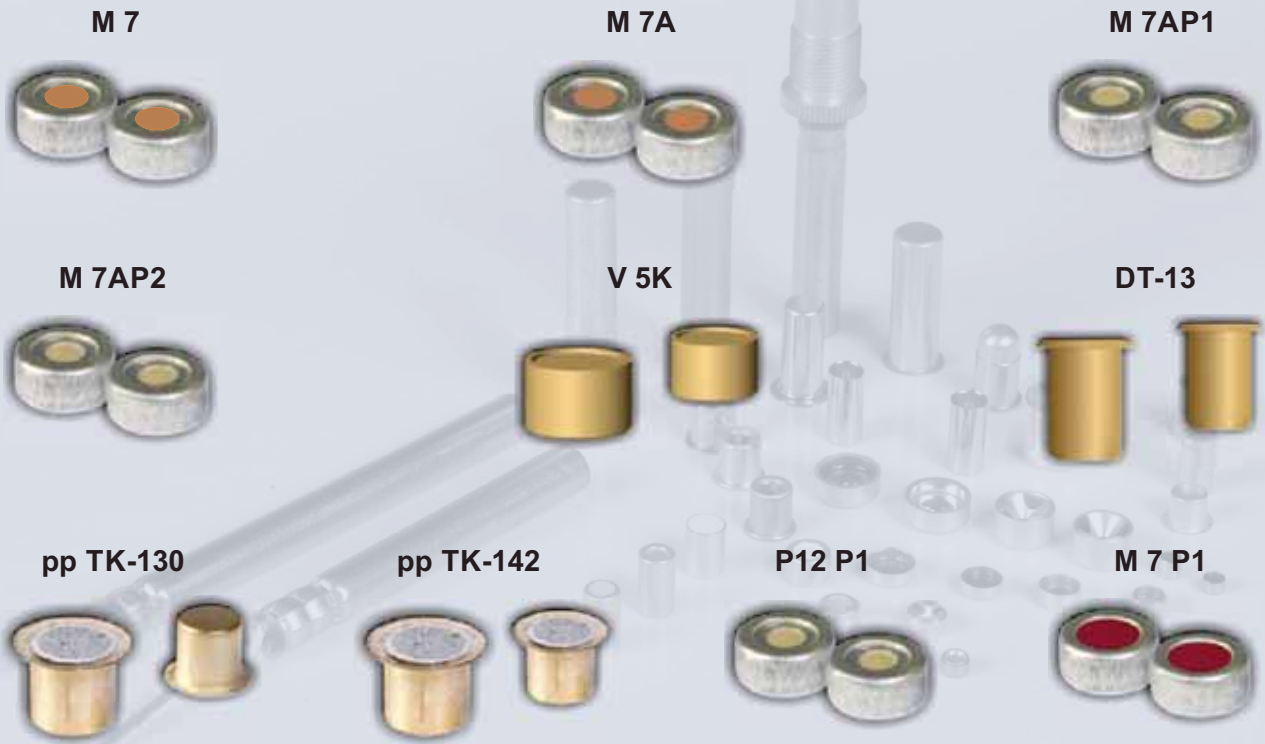
#### SENSITIVITY:

Initiation	Safety fuse
To be tested in	Tool
Material action 1	Penetration of Pb board of 5,0 mm thickness, $\text{Ø} \geq 7,2$ mm
Material action 2	Extension of Pb block, min 25 cm <sup>3</sup>

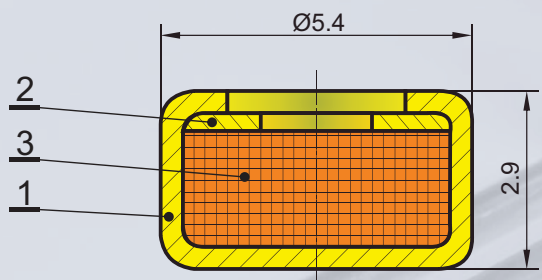
#### Packing

Number of pieces in a cardboard box	100 pcs
Number of cardboard boxes in a package/ no. of pieces	5 cardboard boxes x 100 pcs
Number of packages in a wooden case / no. of pieces	8 packages x 500 pcs/4.000 pcs

**BOOSTINGS, RELAY CHARGES**



**Boosting M 7**



Assignment: Artillery shells



**Technical characteristics**

Item	Material	Dimensions
1- Cup	Al 99,5	0,25 ±0,015 mm
2- Ring disc	Al 99,5 ½ t	0,14 ±0,01 mm
3- Charge	Pb-azide, white	

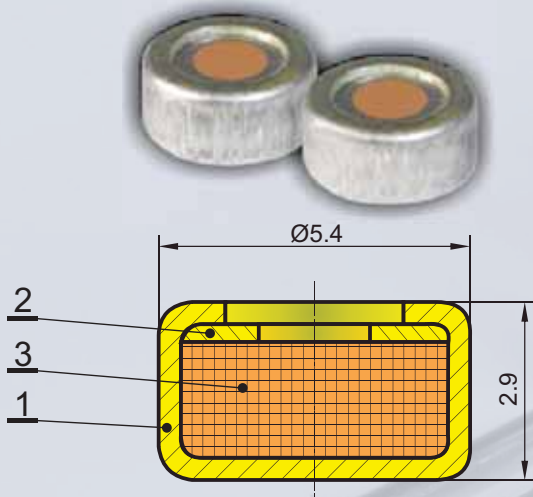
**SENSITIVITY:**

Ignition	Flame of powder column, Safety fuse
Material action	Pb-board, of 1,65 mm thickness, penetration more than Ø5,4 mm
To be tested in	Tool, bearing

**Packing**

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	10 box x 35 pcs / 350 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 350 pcs / 1.750 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 1.750 pcs / 14.000 pcs

## Boosting M 7A



### Assignment:

- Air. rocket cumul. 57mm BR-1, BR-2 I BR-20;
- Reac.-cumul. shells (RKZ) 82 mm;
- Cumul. shell 80 mm for Hand launcher 44mm



### Technical characteristics

Item	Material	Dimensions
1- Cup	Al 99,5	0,25 ±0,015 mm
2- Ring disc	Al 99,5 ½ t	0,14 ±0,01 mm
Varnish type	Shellac, alcohol	
4- Charge AT mixture 80:20	Pb-azide-trizinate	

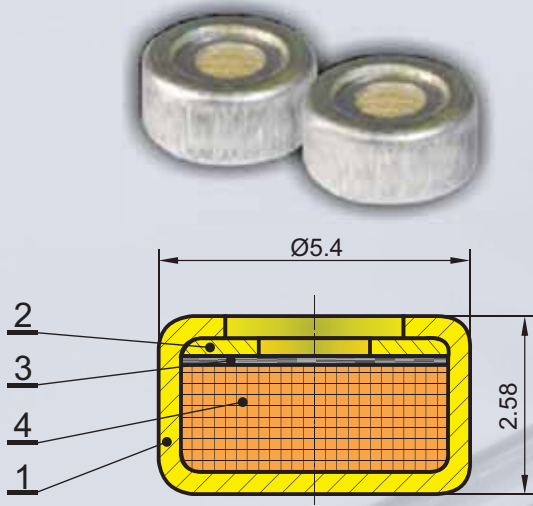
### SENSITIVITY:

Ignition	Flame of powder column, Safety fuse
Material action	Pb-board, of 1,65 mm thickness, penetration more than Ø5,4 mm
To be tested in	Tool, bearing

### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	10 box x 35 pcs / 350 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 350 pcs
	1.750 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 1.750 pcs
	14.000 pcs

## Boosting M 7A P1



### Assignment:

- Air. rocket cumul. 57mm BR-1, BR-2 I BR-20;
- Reac.-cumul. shells (RKZ) 82 mm;
- Cumul. shell 80 mm for Hand launcher 44mm



### Technical characteristics

Item	Material	Dimensions
1- Cup	Al 99,5	0,25 ±0,015 mm
2- Ring disc	Al 99,5 ½ t	0,14 ±0,01 mm
3- Silk disc	Silk cloth	
4- Charge AT mixture 80:20	Pb-azide-trizinate	

### SENSITIVITY:

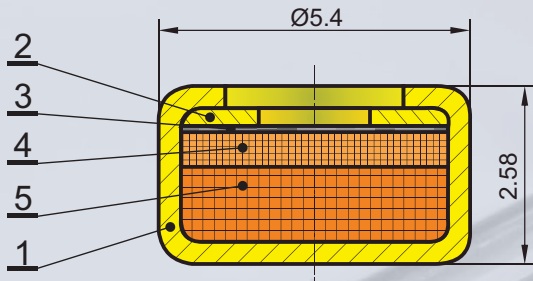
Ignition	Flame of powder column, Safety fuse
Material action	Pb-board, of 1,65 mm thickness, penetration more than Ø5,4 mm
To be tested in	Tool, bearing

### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	10 box x 35 pcs / 350 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 350 pcs
	1.750 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 1.750 pcs
	14.000 pcs



## Boosting M 7A P2



### Assignment:

- Air. rocket cumul. 57mm BR-1, BR-2 I BR-20;
- Reac.-cumul. shells (RKZ) 82 mm;
- Cumul. shell 80 mm for Hand launcher 44mm



### Technical characteristics

Item	Material	Dimensions
1- Cup	Al 99,5	0,25 ±0,015 mm
2- Ring disc	Al 99,5 ½ t	0,14 ±0,01 mm
3- Silk disc	Silk cloth	
4- Charge 1	Pb-azide	
5- Charge 2	Trizinate	

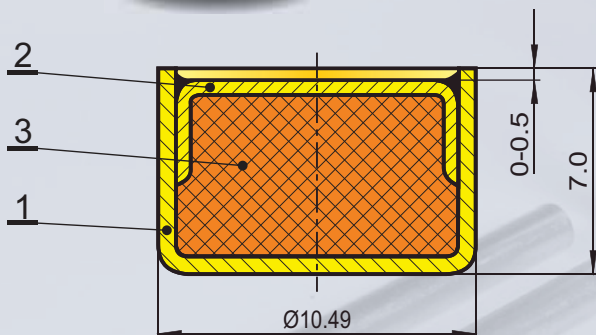
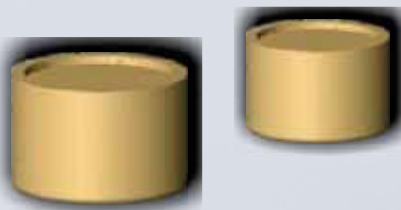
### SENSITIVITY:

Ignition	Flame of powder column, Safety fuse
Material action	Pb-board, of 1,65 mm thickness, penetration more than Ø5,4 mm
To be tested in	Tool, bearing

### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	10 box x 35 pcs / 350 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 350 pcs / 1.750 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 1.750 pcs / 14.000 pcs

## Relay charge V 5K



### Assignment:

Air. Rocket-cumul. 57mm  
( BR-2 i BR-20)



### Technical characteristics

Item	Material	Dimensions
1- Cup	HT-30, steel strip	0,32 ±0,02 mm
2- Disc	HT-30, steel strip	0,18 ±0,015 mm
3- Charge	Pentrite	
Varnish type	Shellac, alcohol, flanged	

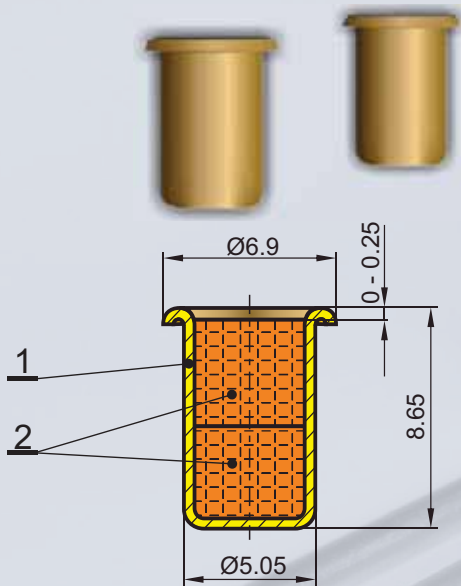
### SENSITIVITY:

Pressing density	1,55-1,65 g/cm <sup>3</sup> , laboratory-measured
Material action	In the fuze assembly (greater assembly)

### Packing

Number of pieces in a cardboard box	20 pcs in a box
N° of boxes in a cardboard box / no. of pcs	4 box x 20 pcs / 80 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 80 pcs / 400 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 400 pcs / 3.200 pcs

### Relay charge DT-13



Assignment: Artillery shells



#### Technical characteristics

Item	Material	Dimensions
1- Cup	CuZn10	0,13 ±0,02 mm
2- Charge	Tetryl	

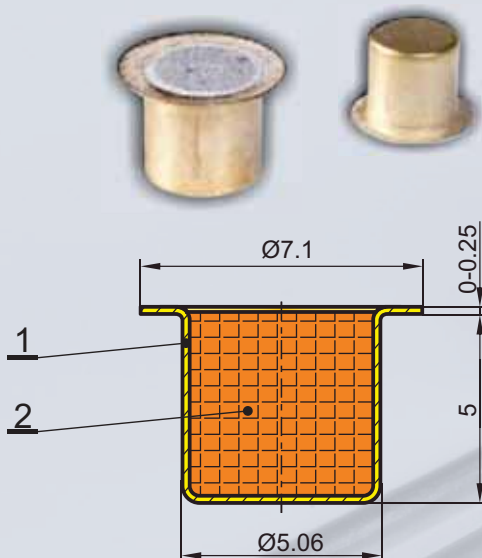
#### SENSITIVITY:

Pressing density 1,55-1,65 g/cm<sup>3</sup>, laboratory-measured  
Material action In the fuze assembly (greater assembly)

#### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	3 box x 35 pcs / 105 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 105 pcs 525 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 525 pcs 4.200 pcs

### Relay charge pp TK-130



Assignment: Fuze UTU M93 for mortar shell



#### Technical characteristics

Item	Material	Dimensions
1- Cup	CuZn10	0,15 ±0,02 mm
2- Charge	Tetryl	

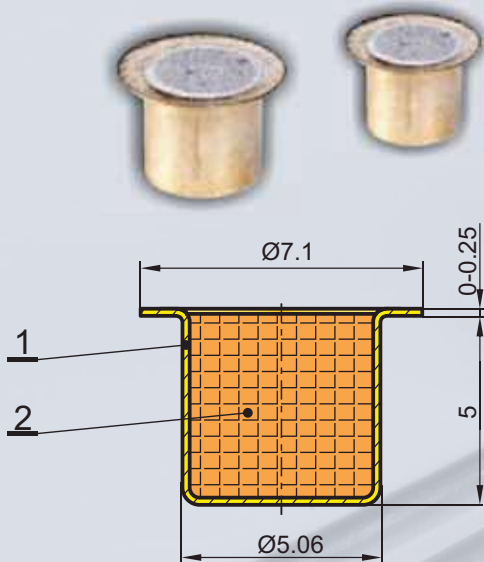
#### SENSITIVITY:

Pressing density 1,55-1,65 g/cm<sup>3</sup>, laboratory-measured  
Material action In the fuze assembly (greater assembly)

#### Packing

Number of pieces in a cardboard box	800 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 800 pcs 4.000 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 4.000 pcs 32.000 pcs

### Relay charge pp TK-142



Assignment: Fuze UT M88 for mortar shell



#### Technical characteristics

Item	Material	Dimensions
1- Cup	CuZn10	0,15 ±0,02 mm
2- Charge	Pentrite	

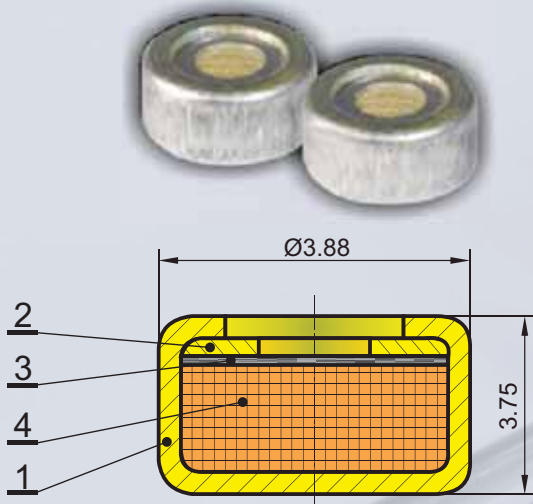
#### SENSITIVITY:

Pressing density 1,55-1,65 g/cm<sup>3</sup>, laboratory-measured  
Material action In the fuze assembly (greater assembly)

#### Packing

Number of pieces in a cardboard box	800 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 800 pcs 4.000 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 4.000 pcs 32.000 pcs

### Boosting P12 P1



Assignment: Fuze for Artillery shells



#### Technical characteristics

Item	Material	Dimensions
1- Cup	Al 99,5	0,28 ±0,015 mm
2- Ring disc	Al 99,5 ½ t	0,14 ±0,01 mm
3- Silk disc	Silk cloth	
4- Charge AT mixture 80:20	Pb-azide-trizinate	

#### SENSITIVITY:

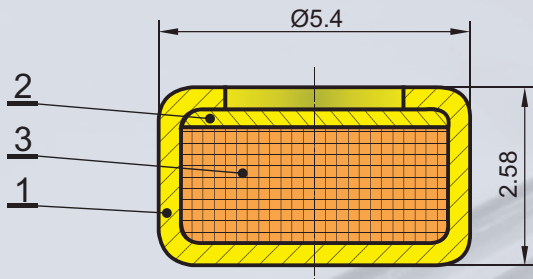
Ignition Flame of powder column, Safety fuse  
Material action Pb-board, of 2,0 mm thickness, penetration more than Ø5,4 mm  
To be tested in Tool, bearing

#### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	10 box x 35 pcs / 350 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 350 pcs 1.750 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 1.750 pcs 14.000 pcs



## Boosting M 7 P1



Assignment: Fuze for Artillery shells



### Technical characteristics

Item	Material	Dimensions
1- Cup	Al 99,5	0,25 ±0,015 mm
2- Disc	Al 99,5 ½ t	0,25 ±0,01 mm
Varnish type	Nitro, red	
3- Charge	Pb-azide, white	

### SENSITIVITY:

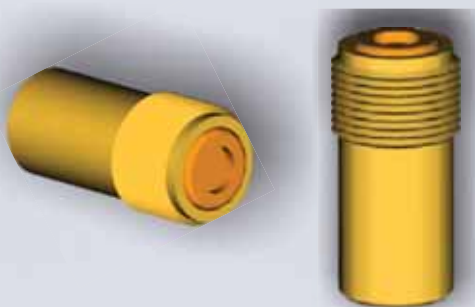
Ignition	Flame of powder column, Safety fuse
Material action	Pb-board, of 1,65 mm thickness, penetration more than Ø5,4 mm
To be tested in	Tool, bearing

### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box / no. of pcs	10 box x 35 pcs / 350 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 350 pcs 1.750 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 1.750 pcs 14.000 pcs

## DUPLEX TYPE

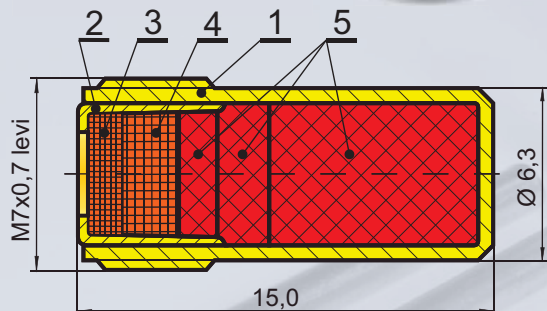
IDK-3



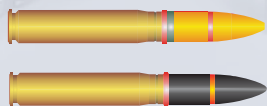
KL-34



## Duplex primer IDK-3



Assignment:  
Anti-aircraft bullet 20 mm  
(PAV 20mm)



### Technical characteristics

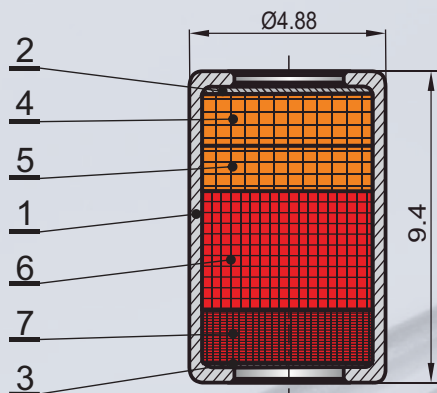
Item	Material	Dimensions
1- Cup (cartridge case)	Al Cu5PbBi.54	0,7 -0,05 mm
2- Disc (cup)	Al Mg2.10	0,6 ±0,02 mm
Varnish type	Nitro, red	
3- Initial charge 1	Non-corrosive, synoxide	
4- Initial charge 2	Pb-azide, white	
5- Brisant charge	Pentrite	

SENSITIVITY:	
Ball weight	52 g
Upper sensitivity limit	80 mm
Lower sensitivity limit	5 mm
Firing pin	Ø1,0 mm; sharply, with limited access
To be tested in	Tool, bearing, steel
Material action 1	Penetration of Pb-boards of 4 mm thickness, Ø>=6,3 mm
Material action 2	Extension of Pb block, min 8,0 cm <sup>3</sup>

### Packing

Number of pieces in a cardboard box	20 pcs in a box
N° of boxes in a cardboard box / no. of pcs	2 box x 20 pcs / 40 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 40 pcs 200 pcs
N° of packages in a wooden case / no. of pcs	8 packages x 200 pcs 1.600 pcs

## Detonating primer KL-34



Assignment: Fuzes UT M88 and  
UTU M93 for Mortar shells



### Technical characteristics

Item	Material	Dimensions
1- Cup	Al Mn 1	0,32 ±0,02 mm
2- Upper disc	Al 99,5	0,05 ±0,01 mm
3- Lower disc	Al 99,5	0,25 ±0,015 mm
Varnish type	Nitro, red	
4- Initial charge 1	Nitro, green	
5- Initial charge 2	Synoxide, non-corrosive	
6- Brisant charge 1	Pb-azide, white	
7- Brisant charge 2	Tetryl	
	Tetryl	

SENSITIVITY:	
Ball weight	52 g
Upper sensitivity limit	80 mm
Lower sensitivity limit	5 mm
Firing pin	Ø4,2 mm; 26° ±30'; Ø 0,38 ±0,05, R 0,1
To be tested in	Tool, bearing, steel
Material action	Penetration of Pb-boards of 3 mm thickness, Ø>=4,8 mm

### Packing

Number of pieces in a cardboard box	35 pcs in a box
N° of boxes in a cardboard box/no. of pcs	4 box x 35 pcs / 140 pcs
Number of boxes in a package/no. of pcs	5 cardboard boxes x 140 pcs
N° of packages in a wooden case/no. of pcs	8 pack. x 700 pcs/5.600 pcs

**DETONATORS FOR HAND GRENADE**

**UD M76 P1**



**VUD M76 P1**



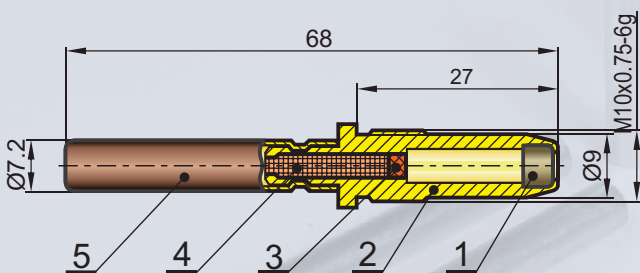
**UD-E97**



**VUD-E97**



**Impact detonator M76 P1 (UD M76 P1)**



**Technical characteristics**

Item	Material	Dimensions
1- Initial primer	E-96, boxer, synoxide	Ø5,38 x 3,2
2- Delay element body	CuZn 39 Pb2.43	Ø12,0
3- Igniting mixture	Zr - Pb minimum	
4- Delay mixture	Based on Zr (4 layers)	
5- Detonating primer	KL-35 P1, fulminate, pentrite	Ø7,3 max x 38,3

**SENSITIVITY:**

Initiation	E-96
Delay time (21 ±2°C)	3,5 ±0,5 sec
To be tested in	Tool, bearing, steel
Material action	Penetration of Pb board of 5 mm thickness, Ø>=7,3 mm

**Packing**

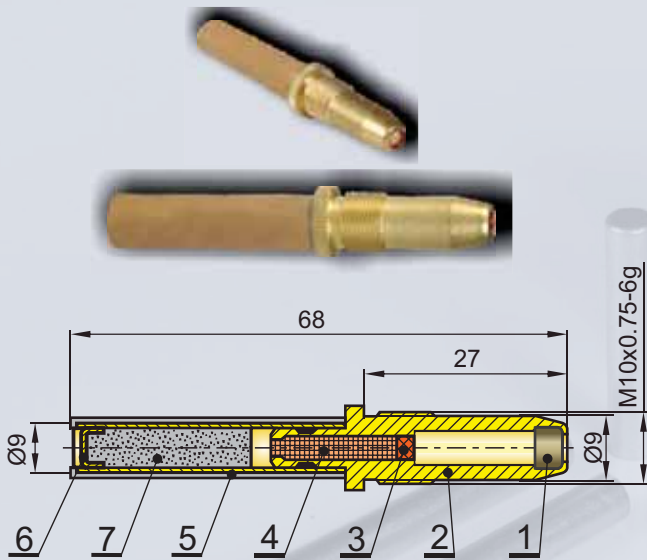
Number of pieces in a cardboard box	24 pcs in a box
Number of boxes in a cardboard box / no. of pcs	1 box x 24 pcs / 24 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 24 pcs/ 120 pcs
Number of packages in a wooden case / no. of pcs	10 packages x 120 pcs/ 1.200 pcs

Assignment:  
Hand grenade (HG) M75





**Practice impact detonator M76 P1 (VUD M76 P1)**



Assignment: Practice HG M75



**Technical characteristics**

Item	Material	Dimensions
1- Initial primer	E-96, boxer, synoxide	Ø5,38 x 3,2
2- Delay element body	CuZn 39 Pb2.43	Ø12,0
3- Igniting mixture	Zr - Pb minium	
4- Delay mixture	Based on Zr (4 layers)	
5- Carboard tube	Natron paper	Ø9,0 ±0,05 x 45,0
6- Disc	Pressboard card	0,43 mm
7- Burst mixture	K perchlorate - Al powder	

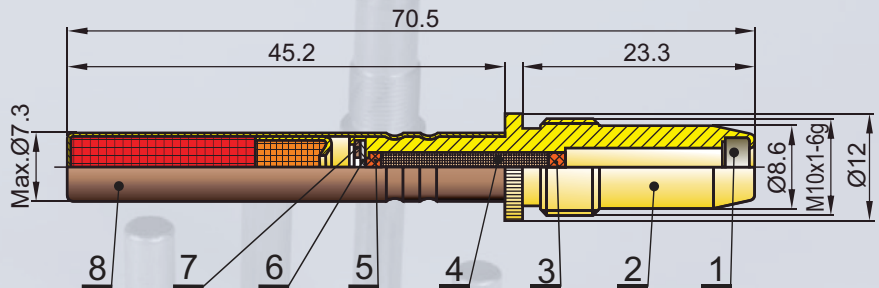
**SENSITIVITY:**

Initiation	E-96
Delay time (21 ±2°C)	3,5 ±0,5 sec
To be tested in	Tool, bearing, steel

**Packing**

Number of pieces in a cardboard box	24 pcs in a box
Number of boxes in a cardboard box / no. of pcs	1 box x 24 pcs / 24 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 24 pcs/ 120 pcs
Number of packages in a wooden case / no. of pcs	10 packages x 120 pcs/ 1.200 pcs

**Impact detonator E-97 (UD E-97)**



**Technical characteristics**

Item	Material	Dimensions
1- Initial primer	E-96, boxer, synoxide	Ø5,38 x 3,2
2- Delay element body	CuZn 39 Pb2.43	Ø12,0
3- Igniting mixture 1	Zr - Pb minium	
4- Delay mixture	Based on Zr (4 layers)	
5- Igniting mixture 2	Zr - Pb minium	
6- Safety disc	SnSb2, strip	0,42 ±0,02
7- Ring disc	Cu DHP R290	0,62 ±0,02
8- Detonating primer	KL-35 P1, fulminate, pentrite	Ø7,3 max x 38,3

**SENSITIVITY:**

Initiation	E-96
Delay time (21 ±2°C)	4,0 ±0,5 sec
To be tested in	Tool, bearing, steel
Material action	Penetration of Pb board of 5 mm thickness, Ø>=7,3 mm

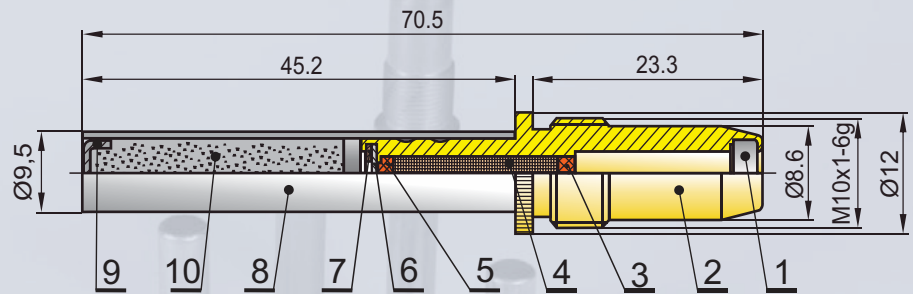
**Packing**

Number of pieces in a cardboard box	24 pcs in a box
Number of boxes in a cardboard box / no. of pcs	1 box x 24 pcs / 24 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 24 pcs/ 120 pcs
Number of packages in a wooden case / no. of pcs	10 packages x 120 pcs/ 1.200 pcs

Assignment:  
Hand grenade (HG) M84



## Practice impact detonator E-97 (VUD E-97)



### Technical characteristics

Item	Material	Dimensions
1- Initial primer	E-96, boxer, synoxide	Ø5,38 x 3,2
2- Delay element body	CuZn 39 Pb2.43	Ø12,0
3- Igniting mixture 1	Zr - Pb minium	
4- Delay mixture	Based on Zr (4 layers)	
5- Igniting mixture 2	Zr - Pb minium	
6- Safety disc	SnSb2, strip	0,42 ±0,02
7- Ring disc	Cu DHP R290	0,62 ±0,02
8- Carboard tube	Natron paper	Ø9,0 ±0,05 x 45,0
9- Disc	Pressboard card	0,43 mm
10- Burst mixture	K perchlorate - Al powder	

SENSITIVITY:  
 Initiation E-96  
 Delay time (21 ±2°C) 4,0 ±0,5 sec  
 To be tested in Tool, bearing, steel

### Packing

Number of pieces in a cardboard box	24 pcs in a box
Number of boxes in a cardboard box / no. of pcs	1 box x 24 pcs / 24 pcs
Number of boxes in a package / no. of pcs	5 cardboard boxes x 24 pcs/ 120 pcs
Number of packages in a wooden case / no. of pcs	10 packages x 120 pcs/ 1.200 pcs

Assignment:  
Practice hand grenade (PHG) M84



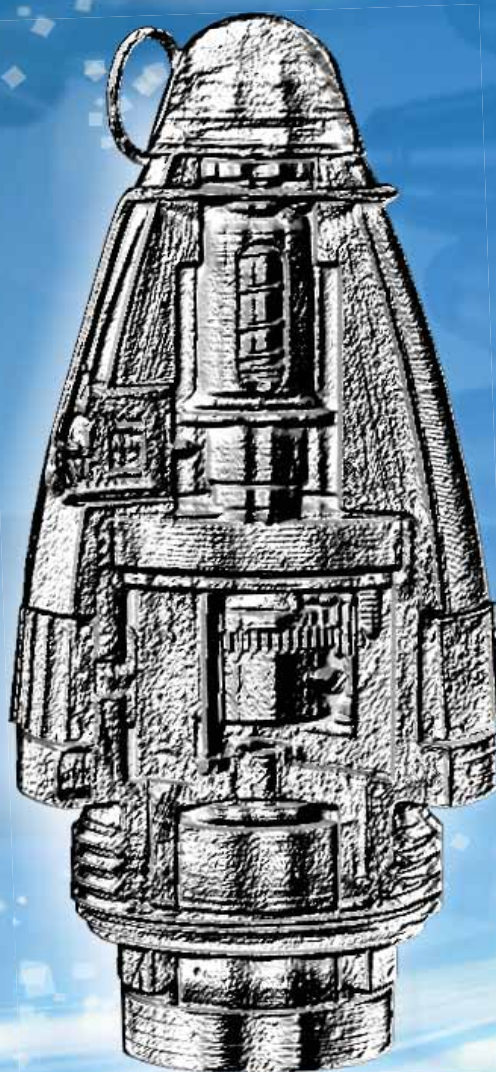
## QUALITY

„KRUSIK" has been awarded two certificates for the Qualit Management System:  
 SRPS ISO 9001:2008; ISO 9001:2008; SORS 9000/05; ISO 14001:2004; OHSAS 18001:2007 i SRPS ISO/IEC 17025:2005.

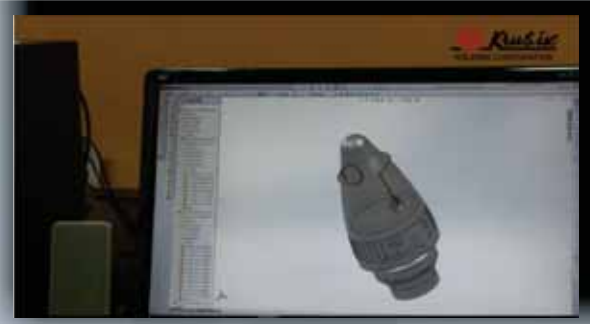




# F U Z E S







"Krusik" is actively employed in research, development and production of classic military program as well as complex rockets systems. We also produce fuzes and initial devices that are assembled to our products.



**„KRUSIK” PRODUCES FUZES THAT ARE ASSEMBLED TO THE FOLLOWING DEVICES:**

**Mortar mines** (HE, Smoke and Illuminating) - caliber: 81/82 and 120 mm

**Airbombs** weight 100 and 250 kg

**Air to air and air to ground rockets:**

- 57 mm HE rocket (BR-1)
- 57 mm cumulative rocket (BR-2)
- 57 mm cumulative-fragmentation type (BR-20)
- 128 mm HE rocket (MUNJA)



**Artillery projectiles for:**

- Gun calibers: 76 mm, 85mm, 90mm, 100mm, 122mm and 130 mm.
- Tank gun, calibers: 115 mm and 125 mm
- Anti-tank gun, calibers: 82 mm, 100 mm and 105 mm
- Howitzer calibers: 105 mm, 122 mm, 152 mm and 155 mm



**Ground to grounded rockets:**

- 107 mm HE rocket
- 122 mm HE rocket ("GRAD")
- 128 mm HE rocket ("PLAMEN")
- 128 mm HE rocket ("OGANJ")



**Anti-armour devices:**

- 120 mm semiautomatic guided rocket ("MALJUTKA")
- Heat shells M79; M88; M72 i M91 used with recoilless guns 82 mm M79 i M60A
- Cumulative shells 82 mm M80 for manual launchers 44 mm.



**Mines-explosive devices**

WEAPON - FUZE REFERENCE CHAR

WEAPON	FUZE																					
	TP,M67P1	TP,M67P1	TP,M87	ETU,M365	UT,M68P1	UT,M88P1	UT,M88P2	UTU,M93P1	UTU,M93-N	UTU,M78 (AU-29)	UTU,M77	UTI-1	UTI-2	UTI-2P1	UTI,M84	UTI,M84P1	UTIU,M72B1 (AU-18)	UTIU,M15	UTIU,M85 (AU-20E)	MRV-U (AU-32)	AUFK,M91	
57 mm BR-1 ROCKET																						
57 mm BR-2, BR-20 ROCKET																						
60 mm HE MORTAR SHELL																						
60 mm WP MORTAR SHELL																						
60 mm ILL. MORTAR SHELL																						
76 mm GUN																						
81/82 mm HE MORTAR SHELL																						
81/82 mm WP MORTAR SHELL																						
81/82 mm ILL. MORTAR SHELL																						
82 mm ANTITANK GUN																						
85 mm GUN																						
90 mm GUN																						
100 mm GUN																						
100 mm ANTITANK GUN																						
105 mm HOWITZER																						
105 mm ANTITANK GUN																						
107 mm ARTILLERY ROCKET																						
115 mm TANK GUN																						
120 mm HE MORTAR SHELL																						
120 mm WP MORTAR SHELL																						
120 mm ILL. MORTAR SHELL																						
122 mm HOWITZER																						
122 mm GUN																						
122 mm ROCKET"GRAD"																						
125 mm TANK GUN																						
128 mm ROCKET"MUJJA"																						
128 mm ROCKET"OGANJ"																						
128 mm ROCKET"PLAMEN"																						
130 mm GUN																						
152 mm HOWITZER																						
155 mm HOWITZER																						
AIRCRAFTBOMB																						



TP - M67 P1  
Page 6



TP - M67 P1  
Page 7



TP - M87  
Page 8



ETU - M365  
Page 9



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**TP - M67 P1 FUZE**

TP – M67 P1 is time - pyrotechnic fuze on zirconium basis .



**A. PURPOSE**

The fuze is intended for Illuminating mortar shell and Long-smoking shells, Cal. 60 mm .

**B. TECHNICAL DATA**

- Safety position indicated
- Acceleration ----- 12000 g
- Drop safety ----- 3 m
- Tightness ----- waterproof
- Fuze mass ----- 275 g
- Fuze length ----- max 65 mm
- Fuze length entering the shell ----- max 10 mm
- Fuze connecting thread ----- M 54 x 1,5 mm
- Maximum fuze diameter ----- 58 , 5 mm

**C. FUNCTIONAL DATA**

- Time setting ----- 5 to 35 s
- Temperature range of use ----- - 30°C to + 50°C
- High safety during handling , transportation and storing.
- Usage period is minimum 10 years under prescribed keeping and storing conditions.

**WEAPON:**



**COMBAT SYSTEM:**



**TP - M67 P1 FUZE**

TP – M67 P1 is time - pyrotechnic fuze on zirconium basis .



**A. PURPOSE**

The fuze is intended for Illuminating mortar shell and Long-smoking shells, Cal. 81/82 mm .

**B. TECHNICAL**

- Safety position indicated
- Acceleration ----- 12000 g
- Drop safety ----- 3 m
- Tightness ----- waterproof
- Fuze mass ----- 580 g
- Fuze length ----- max 75,5 mm
- Fuze length entering the shell ----- max 10 mm
- Fuze connecting thread ----- M 72 x 1,5 mm
- Maximum fuze diameter ----- 79,3 mm

**C. FUNCTIONAL DATA**

- Time setting ----- 5 to 38 s
- Temperature range of use ----- - 30°C to + 50°C
- High safety during handling , transportation and storing.
- Usage period is minim. 10 years under prescribed keeping and storing conditions.

**WEAPON:**



**COMBAT SYSTEM:**





### TP - M87 FUZE

TP - M87 is time - pyrotechnic fuze on zirconium basis .



#### A. PURPOSE

The fuze is intended for Illuminating mortar shells and Long-smoking shells, Cal.120 mm .

#### B. TECHNICAL DATA

- Safety position indicated
- Acceleration ----- 12000 g
- Drop safety ----- 3 m
- Tightness ----- waterproof
- Fuze mass ----- 1250 g
- Fuze length ----- max 107 mm
- Fuze length entering the shell ----- max 26 mm
- Fuze connecting thread ----- M 97 x 2 mm
- Maximum fuze diameter ----- 104 mm

#### C. FUNCTIONAL DATA

- Time setting ----- 5 to 50 s
- Temperature range of use ----- - 30°C to + 50°C
- High safety during handling , transportation and storing.
- Usage period is minim. 10 years under prescribed keeping and storing conditions.

#### WEAPON:



#### COMBAT SYSTEM:



### ETU, M365 FUZE

The Fuze ETU, M365 is based on modern microprocessor technology  
Time recording is performed by means of time setter.  
The set fuze time is stored for 20 minutes, thereafter being automatically erased in order to safe battery power.



#### A. PURPOSE

Electronic Time Fuze ETU, M365 is intended for assembling of Illuminating and Smoke Mortar shells of 60mm, 81/82mm and 120mm calibers.

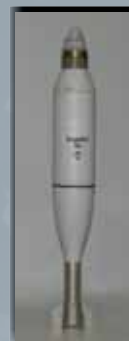
#### B. TECHNICAL DATA

- Type ----- Electronic Time Fuze ETU, M365
- Arming ----- inertial
- Ammunition caliber ----- 60, 81/82 and 120mm
- Type of ammunition ----- Illuminating, Smoke
- Safety ----- Three degrees
- Muzzle safety -----  $\geq 150m$
- Acceleration ----- 400g to 13000g
- Water tightness ----- 1 bar
- Connecting thread ----- 1,5" - 12UNF - 1A
- Maximum diameter ----- 49mm
- Fuze mass ----- 270g

#### C. FUNCTIONAL DATA

- Setting time ----- 5 to 99,9s
- Setting step ----- 0,1s
- Function temperature range ----- -46°C  $\pm$  +63°C
- Storage temperature range ----- -54°C  $\pm$  +71°C
- Shelf life -----  $\geq 10$  years
- The Fuze is safe under all storing, transportation and handling conditions.

#### WEAPON:



#### COMBAT SYSTEM:



## UT - M68 P1 FUZE

UT-M68P1 is mechanical, point- detonating, impact fuze of superquick action .



### A. PURPOSE

The fuze is intended for assembling of HE mortar shells and SMOKE mortar shells of all calibers with bearings that are compatible with connecting measures or can be assembled with appropriate adaptors.

### B. TECHNICAL DATA

- Arming ----- inertia type
- Low – explosive train interrupted
- Acceleration ----- 13000 g
- Drop safety ----- 3 m
- Fuze mass ----- 175 g
- Fuze length ----- max 85 mm
- Fuze length entering the shell ----- max 26 mm
- Fuze connecting thread ----- M 38 x 2 mm
- Maximum fuze diameter ----- 46 mm

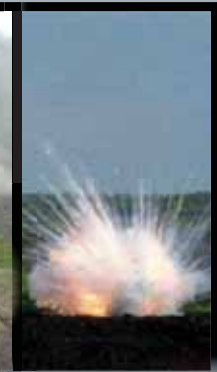
### C. FUNCTIONAL DATA

- Muzzle safety at initial velocity of 70 m/ s ----- min. 8 m
- Action type -----superquick
- Temperature range of use ----- - 30°C to + 50°C
- High safety during handling , transportation and storing.
- Usage period is minimum 15 years under prescribed keeping and storing conditions.

### WEAPON:



### COMBAT SYSTEM:



## UT - M88P1 FUZE

UT – M88 is mechanical, point-detonating, impact fuze of superquick action equipped with hard transport safety element including an ancillary safety mechanism.



### A. PURPOSE

• The fuze is intended for assembling of HE and SMOKE mortar shells of all calibers with bearings that are compatible with connecting measures or can be assembled with appropriate adaptors.

### B. TECHNICAL DATA

- Safety ----- as per MIL – STD – 1316 B
- Arming ----- inertia type
- Low – explosive train interrupted
- Equipped with status indicator (armed, non–armed)
- Acceleration ----- from 400 g to 13000 g
- Drop safety ----- 3 m
- Moisture proofness ----- at 0.5 bar pressure
- Fuze mass ----- 240 g
- Fuze length ----- max 105 mm
- Fuze length entering the shell ----- max 28 mm
- Fuze connecting thread ----- 1,5"–12 UNF-1A
- Maximum fuze diameter ----- 49 mm

### C. FUNCTIONAL DATA

- Muzzle safety at initial velocity of 70 m/ s ----- min. 70 m
- Action type -----superquick
- Temperature range of use ----- - 54°C to + 71°C
- High safety during handling, transportation and storing.
- Environment test ----- as per MIL – STD – 331 A
- Usage period is minimum 15 years under prescribed keeping and storing conditions.

### WEAPON:



### COMBAT SYSTEM:



### UT - M88P2 FUZE

UT – M88P1 is mechanical, point-detonating, impact fuze of superquick action equipped with hard transport safety element including an ancillary safety mechanism.



#### A. PURPOSE

- The fuze is intended for assembling of HE and SMOKE mortar shells of all calibers with bearings that are compatible with connecting measures or can be assembled with appropriate adaptors.

#### B. TECHNICAL DATA

- Safety ----- as per MIL – STD – 1316 B
- Arming ----- inertia type
- Low – explosive train interrupted
- Equipped with status indicator (armed, non–armed)
- Acceleration ----- from 400 g to 13000 g
- Drop safety ----- 3 m
- Moisture proofness ----- at 0.5 bar pressure
- Fuze mass ----- 250 g
- Fuze length ----- max 105 mm
- Fuze length entering the shell ----- max 28 mm
- Fuze connecting thread ----- M43 x 2 mm
- Maximum fuze diameter ----- 49 mm

#### C. FUNCTIONAL DATA

- Muzzle safety at initial velocity of 70 m/ s ----- min. 70 m
- Action type ----- superquick
- Temperature range of use ----- - 54°C to + 71°C
- High safety during handling, transportation and storing.
- Environment test ----- as per MIL – STD – 331 A
- Usage period is minimum 15 years under prescribed keeping and storing conditions.

#### WEAPON:



#### COMBAT SYSTEM:



### PD UTU - M93-N FUZE

PD UTU, M93 is mechanical, point-detonating, impact fuze of superquick and delay action adjustable by a mode selector (superquick “T” or delay “U”). It is equipped with hard transport safety element including an ancillary safety mechanism .



#### A. PURPOSE

- The fuze is intended for assembling of HE mortar shells of all calibers with bearings that are compatible with connecting measures or can be assembled with appropriate adaptors.

#### B. TECHNICAL DATA

- Safety ----- as per MIL – STD – 1316 B
- Arming ----- inertia type
- Low – explosive train interrupted
- Equipped with status indicator (armed, non – armed)
- Acceleration ----- from 400 g to 13000 g
- Drop safety ----- 3 m
- Moisture proofness ----- at 0.5 bar pressure
- Fuze mass ----- 240 g
- Detonator charge mass ----- 12.5 g
- Fuze length ----- max 105 mm
- Fuze length entering the shell ----- max 28 mm
- Fuze connecting thread ----- 1,5” – 12 UNF- 1A
- Maximum fuze diameter ----- 49 mm

#### C. FUNCTIONAL DATA

- Muzzle safety at initial velocity of 68 m/s ----- min. 50m
- Time delay--- from 30 ms to 50 ms
- Temperature range of use ----- - 54°C to + 71°C
- High safety during handling, transportation and storing.
- Environment test ----- as per MIL – STD – 331 A
- Usage period is minimum 15 years under prescribed keeping and storing conditions.

#### WEAPON:



#### COMBAT SYSTEM:





### PD UTU - M93P1 FUZE

PD UTU, M93 is mechanical, point-detonating, impact fuze of superquick and delay action adjustable by a mode selector (superquick "T" or delay "U"). It is equipped with hard transport safety element including an ancillary safety mechanism .



#### A. PURPOSE

- The fuze is intended for assembling of HE mortar shells of all calibers with bearings that are compatible with connecting measures or can be assembled with appropriate adaptors.

#### B. TECHNICAL DATA

- Safety ----- as per MIL – STD – 1316 B
- Arming ----- inertia type
- Low – explosive train interrupted
- Equipped with status indicator (armed, non – armed)
- Acceleration ----- from 400 g to 13000 g
- Drop safety ----- 3 m
- Moisture proofness ----- at 0.5 bar pressure
- Fuze mass ----- 250 g
- Detonator charge mass ----- 12.5 g
- Fuze length ----- max 105 mm
- Fuze length entering the shell ----- max 28 mm
- Fuze connecting thread ----- M43 x 2 mm
- Maximum fuze diameter ----- 49 mm

#### C. FUNCTIONAL DATA

- Muzzle safety at initial velocity of 68 m/s ----- min. 50m
- Time delay--- from 30 ms to 50 ms
- Temperature range of use ----- - 54°C to + 71°C
- High safety during handling, transportation and storing.
- Environment test ----- as per MIL – STD – 331 A
- Usage period is minimum 15 years under prescribed keeping and storing conditions.

#### WEAPON:



#### COMBAT SYSTEM:



### UTU - M78 FUZE ( AU-29 )

UTU – M78 is point – detonating, mechanical fuze of superquick and delay action adjustable by sleeve turning. It is equipped with transport safety element for handling, transportation and parachuting.



#### A. PURPOSE

The fuze is intended for HE mortar shells of superquick - action, Cal. 120 mm.

#### B. TECHNICAL DATA

- Safety ----- as per MIL – STD – 1316 B
- Arming ----- inertia type and pyrotechnical
- Minimum arming condition :  
acceleration ----- 700 g
- Drop safety ----- 3 m
- Tightness ----- waterproof
- Fuze mass ----- 430 g
- Fuze length ----- max 105 mm
- Fuze length entering the shell ----- max 34 mm
- Fuze connecting thread ----- M45 x 2Sd9
- Maximum fuze diameter ----- 49,7 mm

#### C. FUNCTIONAL DATA

- Muzzle safety ----- min. 10 m
- Action type -----superquick and delay 0,013 to 0,027 s
- Temperature range of use ----- - 30°C to +50°C
- High safety during handling, transportation and storing.
- Environment test ----- as per MIL – STD – 331 A
- Usage period is minimum 15 years under prescribed keeping and storing conditions.

#### WEAPON:



#### COMBAT SYSTEM:



## UTU - M77 FUZE

UTU – M77 is point – detonating, mechanical, impact fuze of superquick and delay action adjustable by a mode selector (superquick “T” or delay “U” ).



### A. PURPOSE

- The fuze is intended for “OGANJ” HE warhead, Cal. 128 mm.

### B. TECHNICAL DATA

- Safety ----- as per MIL – STD – 1316 B
- Arming ----- inertia type
- Low – explosive train interrupted
- Successful function at acceleration ----- 200 g
- Fuze mass ----- 1170 g
- Fuze length ----- max 195,5 mm
- Fuze length entering the missile ----- max 82,5 mm
- Fuze connecting thread ----- M52 x 2 mm
- Maximum fuze diameter ----- 60 mm

### C. FUNCTIONAL DATA

- Muzzle safety ----- 110 m
- Action type ----- superquick and delay
- Temperature range of use ----- - 30°C to + 50°C
- High safety during handling, transportation and storing.
- Environment test ----- as per MIL – STD – 331 A
- Usage period is minimum 15 years under prescribed keeping and storing conditions.

### WEAPON:



### COMBAT SYSTEM:



### NEW MODULAR COMBAT SYSTEM:



## UTI - 1 FUZE

UTI – 1 is point – detonating, mechanical, impact fuze with remote arming and self – destruction devices.



### A. PURPOSE

The fuze is intended to initiate the explosion of HE charge of the BR -1 -57 mm missile when fired from honeycomb L – 57 type launchers having the tube rear part open.

### B. TECHNICAL DATA

- Safety ----- as per MIL – STD – 1316 B
- Arming ----- inertia type
- Arming distance at ground launching:
  - low limit (100% miss) ----- at 100 m
  - upper limit (100% hit) ----- 350 m
- Self – destruction time ----- 10 to 15 s
- Minimum impact anagle at which the fuze surely acts ----- 30°
- Fuze mass ----- 265 g
- Fuze length ----- max 155,72 mm
- Fuze length entering the missile ----- max 70,13 mm
- Fuze connecting thread ----- SpW 36,18 x 1/10"
- Maximum fuze diameter ----- 40 mm

### C. FUNCTIONAL DATA

- Action type ----- superquick and inertia
- Temperature range of use ----- - 60°C to + 50°C
- High safety during handling, transportation and storing.
- Environment test ----- as per MIL – STD – 331 A
- Usage period is minimum 15 years under prescribed keeping and storing conditions.

### WEAPON:



### COMBAT SYSTEM:



## UTI - 2 FUZE

UTI - 2 is point - detonating, mechanical, impact fuze with remote arming and self - destruction devices.



### A. PURPOSE

- The fuze is intended to initiate the explosion of HEAT warhead of the 57 mm missile when fired from honeycomb L - 57 type launchers having the tube rear part open.

### B. TECHNICAL DATA

- Safety ----- as per MIL - STD - 1316 B
- Arming ----- inertia type
- Arming distance at ground launching:
  - low limit (100% miss) ----- at 110 m
  - upper limit (100% hit) ----- 400 m
- Self - destruction time ----- 10 to 15 s
- Minimum impact anagle at which the fuze surely acts ----- 30°
- Fuze mass ----- 170 g
- Fuze length ----- 125 mm
- Fuze length entering the missile ----- max 25,5 mm
- Fuze connecting thread ----- SpW 36,18x1/10"
- Maximum fuze diameter ----- 40 mm

### C. FUNCTIONAL DATA

- Action type ----- superquick and inertia
- Temperature range of use ----- - 60°C to + 50°C
- High safety during handling, transportation and storing.
- Environment test ----- as per MIL - STD - 331 A
- Usage period is minimum 15 years under prescribed keeping and storing conditions.

### WEAPON:



### COMBAT SYSTEM:



## UTI - 2P1 FUZE

UTI-2P1 is point-detonating, mechanical, and inertia impact fuse of superquick action.



### A. PURPOSE

The fuze is intended for "MUNJA" HEAT warhead, Cal. 128 mm.

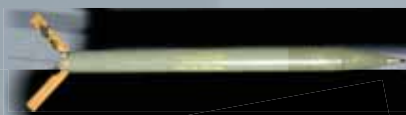
### B. TECHNICAL DATA

- Safety ----- as per MIL - STD - 1316 B
- Arming ----- inertia type
- Low-explosive train is not interrupted
- Adjustment possibility ----- none
- Successfull function at acceleration ----- 150 g
- Fuze mass ----- 176 g
- Fuze length ----- max 140,3 mm
- Fuze length entering the missile ----- max 45,5 mm
- Fuze connecting thread ----- SpW 36,18x1/10"
- Maximum fuze diameter ----- 40 mm

### C. FUNCTIONAL DATA

- Muzzle safety ----- 110 m
- Action type ----- superquick and inertia
- Temperature range of use ----- - 30°C to + 50°C
- High safety during handling, transportation and storing.
- Environment test ----- as per MIL - STD - 331 A
- Usage period is minimum 15 years under prescribed keeping and storing conditions.

### WEAPON:



### COMBAT SYSTEM:





### UTI - M84 FUZE

UTI – M84 is point – detonating, mechanical, impact fuze of superquick and inertia action.



#### A. PURPOSE

The fuze is intended for M63, M87 and PLAMEN-D missiles, Cal. 128 mm equipped with superquick blast warhead as well as for missile with smoke warhead of same caliber.

#### B. TECHNICAL DATA

- Safety ----- as per MIL – STD – 1316 B
- Arming condition ----- at 8000 – 14000 rpm
- Low – explosive train interrupted
- Drop safety ----- 3 m
- Tightness ----- waterproof
- Fuze mass ----- 357,5 g
- Fuze length ----- max 99,5 mm
- Fuze length entering the missile ----- max 35,6 mm
- Fuze connecting thread ----- M33 x 2 mm
- Maximum fuze diameter ----- 38,2 mm

#### C. FUNCTIONAL DATA

- Muzzle safety ----- min. 40 m without safety cap
- Action type -----superquick and inertia
- Temperature range of use ----- - 30°C to + 50°C
- High safety during handling, transportation and storing.
- Environment test ----- as per MIL – STD – 331 A
- Usage period is minimum 15 years under prescribed keeping and storing conditions.

#### WEAPON:



#### COMBAT SYSTEM:



### UTI - M84 P1 FUZE

UTI – M84 P1 is point – detonating, mechanical, impact fuze of superquick and inertia action.



#### A. PURPOSE

The fuze is intended for M15 rocket, Cal.107mm equipped with superquick blast warhead as well as for missile with smoke warhead of same caliber.

#### B. TECHNICAL DATA

- Safety ----- as per MIL – STD – 1316 B
- Arming condition ----- min 12000 rpm
- Low – explosive train interrupted
- Drop safety ----- 3 m
- Tightness ----- waterproof
- Fuze mass ----- 467 g
- Fuze length ----- 107,3 mm
- Fuze length entering the missile ----- 44,9 mm
- Fuze connecting thread ----- M36,18X10/1"
- Maximum fuze diameter ----- 40 mm

#### C. FUNCTIONAL DATA

- Muzzle safety ----- min. 12 m without safety cap
- Action type -----superquick and inertia
- Temperature range of use ----- - 30°C to + 50°C
- High safety during handling, transportation and storing.
- Environment test ----- as per MIL – STD – 331 A
- Usage period is minimum 15 years under prescribed keeping and storing conditions.

#### WEAPON:



#### COMBAT SYSTEM:



### UTIU – M72 B1 FUZE (AU – 18)

UTIU – M72 B1 is point – detonating, mechanical fuze of superquick, inertia and delay action adjustable by sleeve turning and cap removing.



#### A. PURPOSE

The fuze is intended for HE grenades , Cal. 85, 100, 122, 130 and 152 mm.

#### B. TECHNICAL DATA

- Safety ----- as per MIL – STD – 1316 B
- Arming type ----- inertia and pyrotechnical
- Minimum arming condition :
  - acceleration ----- 3000 g
  - rotation ----- 4000 rpm
- Drop safety ----- 1,75 m
- Tightness ----- waterproof
- Fuze mass ----- 460 g
- Fuze length ----- max 105,7 mm
- Fuze length entering the grenade ----- max 46,8 mm
- Fuze connecting thread ----- SpW 36,14 x 2,54
- Maximum fuze diameter ----- 40 mm

#### C. FUNCTIONAL DATA

- Muzzle safety ----- min. 10 m
- Action type ----- superquick, inertia and delay 0,020 to 0,050 s
- Temperature range of use ----- - 30°C to + 50°C
- High safety during handling, transportation and storing.
- Environment test ----- as per MIL – STD – 331 A
- Usage period is minimum 5 years under prescribed keeping and storing conditions.

#### WEAPON:



#### COMBAT SYSTEM:



### UTIU – M85 FUZE (AU – 20E)

UTIU – M 85 is point – detonating, mechanical fuze of superquick, inertia and delay action adjustable by sleeve turning and cap removing.



#### A. PURPOSE

The fuze is intended for non – rotating superquick – action HE projectiles , Cal. 100,115 and 125 mm .

#### B. TECHNICAL DATA

- Safety ----- as per MIL – STD – 1316 B
- Arming type ----- inertia and pyrotechnical
- Minimum arming condition :
  - acceleration ----- 3000 g
- Drop safety ----- 1,75 m
- Tightness ----- waterproof
- Fuze mass ----- 460 g
- Fuze length ----- max 105,7 mm
- Fuze length entering the
  - grenade ----- max 46,8 mm
- Fuze connecting thread ----- SpW 36,14 x 2,54
- Maximum fuze diameter ----- 40 mm

#### C. FUNCTIONAL DATA

- Muzzle safety ----- min. 10 m
- Action type ----- superquick, inertia and delay 0,020 to 0,050 s
- Temperature range of use ----- - 30°C to + 50°C
- High safety during handling, transportation and storing.
- Environment test ----- as per MIL – STD – 331 A
- Usage period is minimum 5 years under prescribed keeping and storing conditions.

#### WEAPON:



#### COMBAT SYSTEM:



### UTIU, M15 FUZE

UTIU, M15 is point – detonating, mechanical fuze of superquick, inertia and delay action adjustable by sleeve turning.



#### A. PURPOSE

The fuze is intended for HE projectile, Cal. 155 mm M107.

#### B. TECHNICAL DATA

- Safety ----- as per MIL – STD – 1316 B
- Arming type ----- inertia and pyrotechnical
- Minimum arming condition :
  - acceleration ----- 3000 g
  - rotation ----- 3100 rpm
- Drop safety ----- 3 m
- Tightness ----- waterproof
- Fuze mass ----- ~ 700 g
- Fuze length ----- ~ 160 mm
- Fuze length entering the grenade ----- max 55 mm
- Fuze connecting thread ----- NS 2"x1/12"
- Maximum fuze diameter ----- 60,4 mm

#### C. FUNCTIONAL DATA

- Muzzle safety ----- min. 10 m
- Action type ----- superquick, inertia and delay 0,020 to 0,050 s
- Temperature range of use ----- - 30°C to + 50°C
- High safety during handling, transportation and storing.
- Environment test ----- as per MIL – STD – 331 A
- Usage period is minimum 10 years under prescribed keeping and storing conditions.

#### WEAPON:



#### COMBAT SYSTEM:



### FUZE MRV-U (AU – 32)

MRV-U – M 85 is point – detonating, mechanical fuze of superquick and delay action. Action selecting by turning of sleeve.



#### A. PURPOSE

The fuze is intended for "GRAD" HE warhead, Cal. 122 mm.

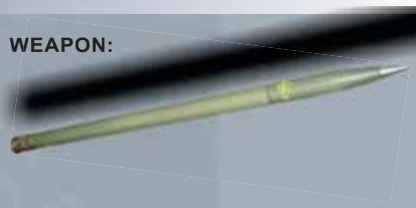
#### B. TECHNICAL DATA

- Safety type ----- Partly interrupted explosive train
- Fuze mass ----- 720 g
- Fuze length ----- max 197,1 mm
- Fuze length entering the rocket ----- max 55 mm
- Fuze connecting thread ----- SpM 44,96 x 2
- Maximum fuze diameter ----- 64 mm

#### C. FUNCTIONAL DATA

- Muzzle safety ----- During the active phase of rocket motor (1,5 s)
- Action type ----- Superquick
  - Delay 0,001 to 0,005 s
  - Delay 0,007 to 0,013 s
- Minimal arming conditions ----- Acceleration 20 g
- Drop safety ----- 3 m
- Airtightness ----- Airtight
- Temperature range of use ----- - 30°C to + 50°C
- High safety during handling, transportation and storing.
- Environment test ----- as per MIL – STD – 331 A
- Usage period is minimum 15 years under prescribed keeping and storing conditions.

#### WEAPON:



#### COMBAT SYSTEM:



#### NEW MODULAR COMBAT SYSTEM:





## AUFK – M91 FUZE

AUFK – M 91 is impact ,inertia-type of an electric - mechanical fuze for aircraft bombs with superquick (T) and delay action (U) adjustable by mode selector.



### C. FUNCTIONAL DATA

- Superquick and delayed action
- Temperature range of use ----- - 40°C to + 60°C
- Fuze in its packaging is safe in any storing conditions
- Fuze life is 10 years min. under prescribed keeping and storing conditions

### A. PURPOSE

The fuze is intended for high-explosive aircraft bombs with or without drag chute.

### B. TECHNICAL DATA

- Front and rear inertia action
- Completely secured
- Arming time for aircraft bomb without drag chute depends on action mode as follows :
  1. 2,5 sec for delayed action
  2. 3,6 sec for delayed action
  3. 3,6 sec for superquick action
- Arming time for aircraft bomb equipped with drag chute is 2,5 sec where successful braking results in impact action, while unsuccessful braking results in delayed action.
- Delayed action time is  $22 \pm 4$  sec.
- Electrical arming
- Equipped with a status indicator (armed, unarmed, superquick or delay)
- The fuze is waterproof
- Mode selection is manual without accessories.
- Fuze mass ----- 1650 g
- Fuze length ----- 258 mm
- Max. diameter ----- 90 mm
- Fuze connecting thread ----- M52 x 3
- Fuze length entering the bomb ----- 136 mm

### WEAPON:



### COMBAT SYSTEM:



## CERTIFICATES

Krusik has been awarded two certificates for the Quality Management System:  
SRPS ISO 9001:2008; ISO 9001:2008; SORS 9000/05, ISO 14001:2004, OHSAS 18001:2007 and SRPS ISO/ IEC 17025:2006



# MORTAR AMMUNITION





## MORTAR AMMUNITION

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### 60mm, 81/82 mm i 120 mm MORTAR SHELLS



### CATALOGUE

Modern solutions have been applied in developing II generation of shells. These include: optimised aero-dynamic shape securing external ballistic characteristics, accuracy and precision at all ranges; appliance of advanced shell body casting technology which provides forming of great number of fragments, has been applied in production of the shell body; this technology together with the TNT/RDX explosive charge provides optimum efficiency at target. The new generation shell weight corresponds to the heavy shell weights of the previous generation and importantly increased their range, precision and terminal efficiency.

Masking of movements of friendly troops, as well as blinding of enemy observers and fire support and anti-tank weapon crews is achieved by use of modern, low-drag and highly efficient white phosphorus and HC based smoke shells.

With use of illuminating mortar shells, mortars provide night battlefield illumination, as well as blinding of enemy crews and observers.

The shells are completed with fuzes which are also indigenously produced: point detonation, superquick / delay fuzes, time pyrotechnical fuzes.

The propellant charge consists of base and increment propellant charge. The base propellant charge is filled with EI powder fitted into aluminium bushing. The increment propellant charge is also filled with EI powder fitted in reinforced celluloid shells resulting in good distribution of the projectile initial velocities and good range overlapping.



## 60 mm MORTAR SHELLS



## 60 mm HE MORTAR SHELL M73



### A. TECHNICAL DATA

- Length of shell with fuze ----- 291 mm
- Mass of mortar shell with fuze ----- 1350 g
- Explosive charge is trotyl (TNT)
- Mass of explosive charge ----- 220 g
- Shell is assembled with impact fuze UT M68 P1
- Muzzle safety at lowest initial velocity is ----- 8 m
- Shell is completed with ignition cartridge and four increment charges (0+4).
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

### B. BALLISTIC DATA

- When using 60 mm Mortar M57, barrel length 720 mm:
  - Maximum range (0+4) ----- 2550 m
  - Minimum range (0) ----- 94 m
- Max. mean operating pressure in mortar ----- 414 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 10 m

### C. PACKING

- 1 complete shell per carton
- 12 cartons per wooden box
- Box dimensions ----- 50 x 40 x 20 cm
- Total mass ----- 29 kg
- Total volume ----- 0,042 m<sup>3</sup>



### 60 mm HE MORTAR SHELL M73P4



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 291 mm
- Mass of mortar shell with fuze ----- 1350 g
- Explosive charge is trotyl (TNT)
- Mass of explosive charge ----- 220 g
- Shell is assembled with impact fuze UT M68 P1
- Muzzle safety at lowest initial velocity is ----- 8 m
- Shell is completed with ignition cartridge and four increment charges (0+4)
- Ignition cartridge M98 ----- waterproof.
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 60 mm Mortar M57, barrel length 720 mm:
  - Maximum range (0+4) ----- 2550 m
  - Minimum range (0) ----- 94 m
- Max. mean operating pressure in mortar ----- 414 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 10 m

#### C. PACKING

- 1 complete shell per carton
- 12 cartons per wooden box
- Box dimensions ----- 50 x 40 x 20 cm
- Total mass ----- 29 kg
- Total volume ----- 0,042 m<sup>3</sup>



### 60 mm HE MORTAR SHELL M73P3



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 301 mm
- Mass of mortar shell with fuze ----- 1350 g
- Explosive charge is trotyl (TNT)
- Mass of explosive charge ----- 220 g
- Shell is assembled with impact fuze UT M88 P1
- Muzzle safety at lowest initial velocity is ----- 70 m
- Shell is completed with ignition cartridge and four increment charges (0+4)
- Ignition cartridge M98 ----- waterproof.
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 60 mm Mortar M57, barrel length 720 mm:
  - Maximum range (0+4) ----- 2550 m
  - Minimum range (0) ----- 94 m
- Max. mean operating pressure in mortar ----- 414 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 10 m

#### C. PACKING

- 1 complete shell per carton
- 12 cartons per wooden box
- Box dimensions ----- 50 x 40 x 20 cm
- Total mass ----- 29 kg
- Total volume ----- 0,042 m<sup>3</sup>





### 60 mm HE MORTAR SHELL M73P5



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 301 mm
- Mass of mortar shell with fuze ----- 1350 g
- Explosive charge is trotyl (TNT)
- Mass of explosive charge ----- 220 g
- Shell is assembled with impact fuze UTU M93-N
- Muzzle safety at lowest initial velocity is ----- 50 m
- Shell is completed with ignition cartridge and four increment charges (0+4)
- Ignition cartridge M98 ----- waterproof.
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 60 mm Mortar M57, barrel length 720 mm:
  - Maximum range (0+4) ----- 2550 m
  - Minimum range (0) ----- 94 m
- Max. mean operating pressure in mortar ----- 414 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 10 m

#### C. PACKING

- 1 complete shell per carton
- 12 cartons per wooden box
- Box dimensions ----- 50 x 40 x 20 cm
- Total mass ----- 29 kg
- Total volume ----- 0,042 m<sup>3</sup>



### 60 mm HE MORTAR SHELL M08



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 301 mm
- Mass of mortar shell with fuze ----- 1350 g
- Explosive charge is trotyl (TNT)
- Mass of explosive charge ----- 220 g
- Shell is assembled with impact fuze UT M88 P1
- Muzzle safety at lowest initial velocity is ----- 70 m
- Shell is completed with ignition cartridge and four increment charges (0+4)
- Ignition cartridge M08 ----- waterproof.
- Reliable function of shell is obtained within temperature range of -46°C to 63°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 60 mm Mortar M57, barrel length 720 mm:
  - Maximum range (0+4) ----- 2550 m
  - Minimum range (0) ----- 94 m
- Max. mean operating pressure in mortar ----- 414 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 10 m

#### C. PACKING

- 1 complete shell per carton
- 12 cartons per wooden box
- Box dimensions ----- 50 x 40 x 20 cm
- Total mass ----- 29 kg
- Total volume ----- 0,042 m<sup>3</sup>





### 60 mm HE MORTAR SHELL M08P1



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 301 mm
- Mass of mortar shell with fuze ----- 1350 g
- Explosive charge is trotyl (TNT)
- Mass of explosive charge ----- 220 g
- Shell is assembled with impact fuze UTU M93-N
- Muzzle safety at lowest initial velocity is ----- 50 m
- Shell is completed with ignition cartridge and four increment charges (0+4)
- Ignition cartridge M08 ----- waterproof.
- Reliable function of shell is obtained within temperature range of -46°C to 63°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 60 mm Mortar M57, barrel length 720 mm:
  - Maximum range (0+4) ----- 2550 m
  - Minimum range (0) ----- 94 m
- Max. mean operating pressure in mortar ----- 414 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 10 m

#### C. PACKING

- 1 complete shell per carton
- 12 cartons per wooden box
- Box dimensions ----- 50 x 40 x 20 cm
- Total mass ----- 29 kg
- Total volume ----- 0,042 m<sup>3</sup>



### 60 mm HE MORTAR SHELL Mk10



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 410 mm
- Mass of mortar shell with fuze ----- 2100 g
- Explosive charge is hexolite (RDX/ TNT) or trotyl (TNT)
- Mass of explosive charge ----- 400 g
- Shell is assembled with impact fuze UT M88 P1
- Muzzle safety at lowest initial velocity is ----- 70 m
- Shell is completed with ignition cartridge and six increment charges (0+6)
- Ignition cartridge M10 ----- waterproof
- Reliable function of shell is obtained within temperature range of -46°C to 63°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 60 mm Mortar M95, barrel length 1300 mm:
  - Maximum range (0+6) ----- 5100 m
  - Minimum range (0) ----- 90 m
- Max. mean operating pressure in mortar ----- 647 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 14 m

#### C. PACKING

- 1 complete shell per carton
- 8 cartons per wooden box
- Box dimensions ----- 50 x 35 x 20 cm
- Total mass ----- 28 kg
- Total volume ----- 0,035 m<sup>3</sup>



### 60 mm HE MORTAR SHELL Mk10



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 410 mm
- Mass of mortar shell with fuze ----- 2100 g
- Explosive charge is hexolite (RDX/ TNT) or trotyl (TNT)
- Mass of explosive charge ----- 400 g
- Shell is assembled with impact fuze UT M88 P1
- Muzzle safety at lowest initial velocity is ----- 70 m
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition cartridge M10 ----- waterproof
- Reliable function of shell is obtained within temperature range of -46°C to 63°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 60 mm Mortar M95, barrel length 1300 mm:
  - Maximum range (0+6) ----- 5100 m
  - Minimum range (0) ----- 90 m
- Max. mean operating pressure in mortar ----- 647 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 14 m

#### C. PACKING

- 1 complete shell per carton
- 8 cartons per wooden box
- Box dimensions ----- 50 x 35 x 20 cm
- Total mass ----- 28 kg
- Total volume ----- 0,035 m<sup>3</sup>



### 60 mm SMOKE MORTAR SHELL M73



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 286 mm
- Mass of mortar shell with fuze ----- 1350 g
- Weight of smoke charge ----- 190 g
- Fuze: Impact, superquick action UT M68 P1.
- Muzzle safety at lowest initial velocity is ----- 8 m
- Shell is completed with ignition cartridge and four increment charges (0+4).
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 60 mm Mortar M57, barrel length 720 mm:
  - Maximum range (0+4) ----- 2550 m
  - Minimum range (0) ----- 94 m
- Max. mean operating pressure in mortar ----- 414 bars

#### C. PACKING

- 1 complete shell per carton
- 12 cartons per wooden box
- Box dimensions ----- 50x40x20 cm
- Total mass ----- 29 kg
- Total volume ----- 0,042 m<sup>3</sup>





### 60 mm SMOKE MORTAR SHELL M73P2



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 286 mm
- Mass of mortar shell with fuze ----- 1350 g
- Weight of smoke charge ----- 190 g
- Fuze: Impact, superquick action UT M68 P1.
- Muzzle safety at lowest initial velocity is ----- 8 m
- Shell is completed with ignition cartridge and four increment charges (0+4)
- Ignition cartridge M98 ----- waterproof
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 60 mm Mortar M57, barrel length 720 mm:
  - Maximum range (0+4) ----- 2550 m
  - Minimum range (0) ----- 94 m
- Max. mean operating pressure in mortar ----- 414 bars

#### C. PACKING

- 1 complete shell per carton
- 12 cartons per wooden box
- Box dimensions ----- 50x40x20 cm
- Total mass ----- 29 kg
- Total volume ----- 0,042 m<sup>3</sup>



### 60 mm SMOKE MORTAR SHELL Mk10



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 410 mm
- Mass of mortar shell with fuze ----- 2100 g
- Weight of smoke charge ----- 190 g
- Fuze: Impact, superquick action UT M88 P1.
- Fuze mass ----- 230 g
- Muzzle safety at lowest initial velocity is ----- 70 m
- Shell is completed with ignition cartridge and four increment charges (0+6)
- Ignition cartridge M10 ----- waterproof
- Reliable function of shell is obtained within temperature range of -46°C to 63°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 60 mm Mortar M95, barrel length 1300 mm:
  - Maximum range (0+6) ----- 5100 m
  - Minimum range (0) ----- 90 m
- Max. mean operating pressure in mortar ----- 647 bars

#### C. PACKING

- 1 complete shell per carton
- 8 cartons per wooden box
- Box dimensions ----- 50x35x20 cm
- Total mass ----- 28 kg
- Total volume ----- 0,035 m<sup>3</sup>





### 60 mm HIGH-SMOKE MORTAR SHELL M93



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 330 mm
- Mass of mortar shell with fuze ----- 1400 g
- Mass of HC composition ----- 450 g
- Shell is completed with TP M67 pyrotechnical time fuze.
- Shell is completed with ignition cartridge and four increment charges (0+4).
- Ignition cartridge M98 ----- waterproof
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 60 mm Mortar M57, barrel length 720 mm:
  - Maximum range (0+4) ----- 2400 m
  - Minimum range (0+1) ----- 300 m
- Max mean operating pressure in mortar ----- 414 bars

#### C. PACKING

- 1 complete shell per carton
- 12 cartons per wooden box
- Box dimensions ----- 52x40x20 cm
- Total mass ----- 30 kg
- Total volume ----- 0,042 m<sup>3</sup>



### 60 mm HIGH-SMOKE MORTAR SHELL Mk10



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 412 mm
- Mass of mortar shell with fuze ----- 2100 g
- Mass of HC composition ----- 360 g
- Shell is completed with TP M67P2 pyrotechnical time fuze.
- Shell is completed with ignition cartridge and four increment charges (0+6).
- Ignition cartridge M94 ----- waterproof
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 60 mm Mortar M95, barrel length 1200 mm:
  - Maximum range (0+6) ----- 4500 m
  - Minimum range (0+1) ----- 200 m
- Max mean operating pressure in mortar ----- ≤618 bars

#### C. PACKING

- 1 complete shell per carton
- 8 cartons per wooden box
- Box dimensions ----- 54x35.5x20.3 cm
- Total mass ----- 30 kg
- Total volume ----- 0,039 m<sup>3</sup>



### 60 mm ILLUMINATING MORTAR SHELL M67



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 330 mm
- Mass of mortar shell with fuze ----- 1270 g
- Mass of illuminating candle ----- 200 g
- Shell is completed with TP M67 pyrotechnical time fuze.
- Illuminating power ----- 180.000 Cd for 35 s
- Mean rate of parachute descent with candle ----- 2.5 m/s
- Shell is completed with ignition cartridge and four increment charges (0+4).
- Ignition cartridge M80 ----- waterproof
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 60 mm Mortar M57, barrel length 720 mm:
  - Maximum range (0+4) ----- 2450 m
  - Minimum range (0+1) ----- 400 m
- Max mean operating pressure in mortar ----- 414 bars

#### C. PACKING

- 1 complete shell per carton
- 12 cartons per wooden box
- Box dimensions ----- 52x40x20 cm
- Total mass ----- 27 kg
- Total volume ----- 0,042 m<sup>3</sup>



### 60 mm ILLUMINATING MORTAR SHELL M67P2



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 330 mm
- Mass of mortar shell with fuze ----- 1270 g
- Mass of illuminating candle ----- 200 g
- Shell is completed with TP M67 pyrotechnical time fuze.
- Illuminating power ----- 180.000 Cd for 35 s
- Mean rate of parachute descent with candle ----- 2.5 m/s
- Shell is completed with ignition cartridge and four increment charges (0+4).
- Ignition cartridge M98 ----- waterproof
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 60 mm Mortar M57, barrel length 720 mm:
  - Maximum range (0+4) ----- 2450 m
  - Minimum range (0+1) ----- 400 m
- Max mean operating pressure in mortar ----- 414 bars

#### C. PACKING

- 1 complete shell per carton
- 12 cartons per wooden box
- Box dimensions ----- 52x40x20 cm
- Total mass ----- 27 kg
- Total volume ----- 0,042 m<sup>3</sup>





### 60 mm ILLUMINATING MORTAR SHELL M08



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 330 mm
- Mass of mortar shell with fuze ----- 1270 g
- Mass of illuminating candle ----- 200 g
- Shell is completed with TP M67 pyrotechnical time fuze.
- Illuminating power ----- 180.000 Cd for 35 s
- Mean rate of parachute descent with candle ----- 2.5 m/s
- Shell is completed with ignition cartridge and four increment charges (0+4).
- Ignition cartridge M08 ----- waterproof
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 60 mm Mortar M57, barrel length 720 mm:
  - Maximum range (0+4) ----- 2450 m
  - Minimum range (0+1) ----- 400 m
- Max mean operating pressure in mortar ----- 414 bars

#### C. PACKING

- 1 complete shell per carton
- 12 cartons per wooden box
- Box dimensions ----- 52x40x20 cm
- Total mass ----- 27 kg
- Total volume ----- 0,042 m<sup>3</sup>



### 60 mm ILLUMINATING MORTAR SHELL M91



#### A. TECHNICAL DATA

- Shell length, with screwed - on fuze ----- 495 mm
- Shell mass, with screwed - on fuze ----- 2100 g
- Mass of illuminating candle ----- 300 g
- Shell is completed with TP M67 pyrotechnical time fuze.
- Illuminating power ----- 350000 Cd for 30 s
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition cartridge M94 ----- waterproof
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 60 mm Mortar M95, barrel length 1300 mm:
  - Maximum range (0+6) ----- 4000 m
  - Minimum range (0+1) ----- 400 m
- Max mean operating pressure in mortar ----- 647 bars
- Speed of candle descent ----- 3 m/s

#### C. PACKING

- 1 complete shell per carton
- 8 cartons per wooden box
- Box dimensions ----- 50x35x20 cm
- Total mass ----- 27 kg
- Total volume ----- 0,035 m<sup>3</sup>





**60 mm ILLUMINATING MORTAR SHELL Mk10**



**A. TECHNICAL DATA**

- Shell length, with screwed - on fuze ----- 495 mm
- Shell mass, with screwed - on fuze ----- 2100 g
- Mass of illuminating candle ----- 300 g
- Shell is completed with TP M67 pyrotechnical time fuze.
- Illuminating power ----- 350000 Cd for 30 s
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition cartridge M10 ----- waterproof
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

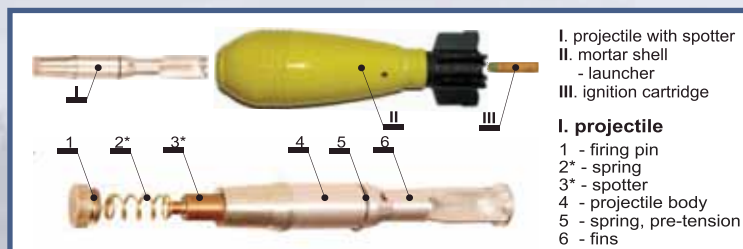
- When using 60 mm Mortar M95, barrel length 1300 mm:
  - Maximum range (0+6) ----- 4000 m
  - Minimum range (0+1) ----- 400 m
- Max mean operating pressure in mortar ----- 647 bars
- Speed of candle descent ----- 3 m/s

**C. PACKING**

- 1 complete shell per carton
- 8 cartons per wooden box
- Box dimensions ----- 50x35x20 cm
- Total mass ----- 27 kg
- Total volume ----- 0,035 m<sup>3</sup>



**60 mm PRACTICE MORTAR SHELL M62**



- I. projectile with spotter
- II. mortar shell - launcher
- III. ignition cartridge

- I. projectile**
- 1 - firing pin
- 2\* - spring
- 3\* - spotter
- 4 - projectile body
- 5 - spring, pre-tension
- 6 - fins

**DISPOSABLE ELEMENTS:**



**A. TECHNICAL DATA**

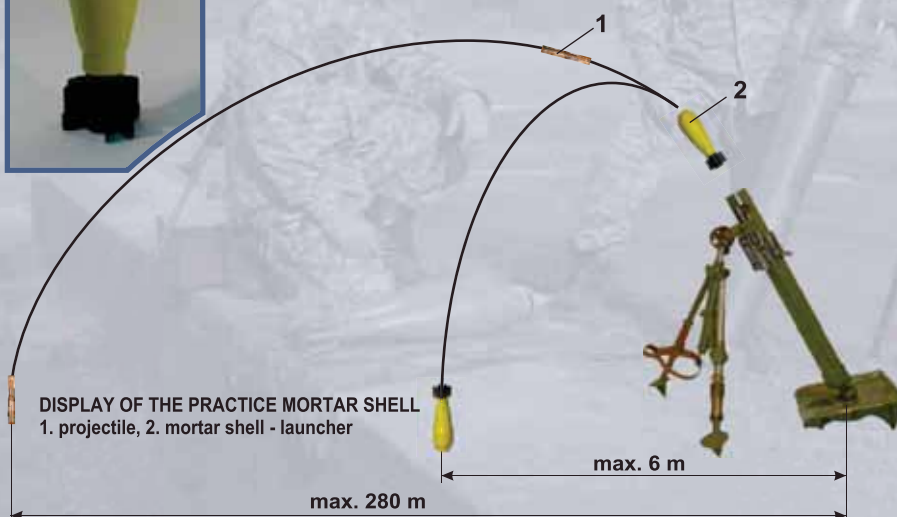
- Length of mortar shell - launcher ----- 202 mm
- Projectile length ----- 193 mm
- Mass of mortar shell - launcher ----- 1080 g
- Mass of projectile ----- 235 g

**B. BALLISTIC DATA**

- When using 60 mm Mortar M57, barrel length 720 mm and Commando M70, barrel length 650 mm:
  - Maximum range ----- 280 m
  - Minimum range ----- 50 m

**C. PACKING**

- 1 complete shell per carton
- 12 cartons per wooden box
- Box dimensions ----- 52x33x19 cm
- Total mass ----- 18 kg
- Total volume ----- 0,033 m<sup>3</sup>



## 81/82 mm MORTAR SHELLS



## 81/82 mm HE MORTAR SHELL M72/M74



### A. TECHNICAL DATA

- Length of shell with fuze ----- 375 mm
- Mass of mortar shell with fuze ----- 3050 g
- Explosive charge is trotyl (TNT)
- Mass of explosive charge ----- 680 g
- Shell is assembled with impact fuze UT M68P1
- Muzzle safety at lowest initial velocity is ----- 8 m
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

### B. BALLISTIC DATA

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 5070 m
  - Minimum range (0) ----- 91 m
- Max mean operating pressure in mortar ----- 647 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 14 m

### C. PACKING

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 54x44x16 cm
- Total mass ----- 29 kg
- Total volume ----- 0,038 m<sup>3</sup>





**81/82 mm HE MORTAR SHELL M72P4/M74P4**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 400 mm
- Mass of mortar shell with fuze ----- 3180 g
- Explosive charge is trotyl (TNT)
- Mass of explosive charge ----- 680 g
- Shell is assembled with impact fuze UT M88 P1
- Muzzle safety at lowest initial velocity is ----- 70 m
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition cartridge M06 ----- waterproof
- Reliable function of shell is obtained within temperature range of -46°C to 63°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 5070 m
  - Minimum range (0) ----- 91 m
- Max mean operating pressure in mortar ----- 647 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 14 m

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 54x44x16 cm
- Total mass ----- 29 kg
- Total volume ----- 0,038 m<sup>3</sup>



**81/82 mm HE MORTAR SHELL M72P3/M74P3**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 400 mm
- Mass of mortar shell with fuze ----- 3180 g
- Explosive charge is trotyl (TNT)
- Mass of explosive charge ----- 680 g
- Shell is assembled with impact fuze UTU M93-N
- Muzzle safety at lowest initial velocity is ----- 50 m
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition cartridge M06 ----- waterproof
- Reliable function of shell is obtained within temperature range of -46°C to 63°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 5070 m
  - Minimum range (0) ----- 91 m
- Max mean operating pressure in mortar ----- 647 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 14 m

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 54x44x16 cm
- Total mass ----- 29 kg
- Total volume ----- 0,038 m<sup>3</sup>





**81/82 mm HE MORTAR SHELL M09**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 400 mm
- Mass of mortar shell with fuze ----- 3180 g
- Explosive charge is trotyl (TNT)
- Mass of explosive charge ----- 680 g
- Shell is assembled with impact fuze UT M88 P1
- Muzzle safety at lowest initial velocity is ----- 70 m
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition cartridge M09 ----- waterproof
- Reliable function of shell is obtained within temperature range of -46°C to 63°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 5070 m
  - Minimum range (0) ----- 91 m
- Max mean operating pressure in mortar ----- 647 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 14 m

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 54x44x16 cm
- Total mass ----- 29 kg
- Total volume ----- 0,038 m<sup>3</sup>



**81/82 mm HE MORTAR SHELL M09P1**



**A. TECHNICAL DATA**

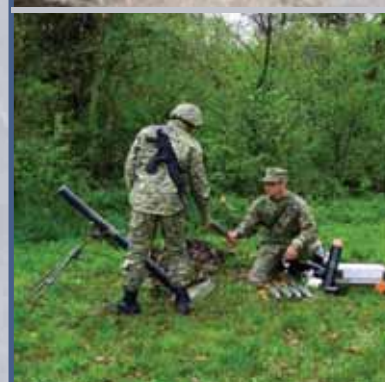
- Length of shell with fuze ----- 400 mm
- Mass of mortar shell with fuze ----- 3180 g
- Explosive charge is trotyl (TNT)
- Mass of explosive charge ----- 680 g
- Shell is assembled with impact fuze UTU M93-N
- Muzzle safety at lowest initial velocity is ----- 50 m
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition cartridge M09 ----- waterproof
- Reliable function of shell is obtained within temperature range of -46°C to 63°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 5070 m
  - Minimum range (0) ----- 91 m
- Max mean operating pressure in mortar ----- 647 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 14 m

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 54x44x16 cm
- Total mass ----- 29 kg
- Total volume ----- 0,038 m<sup>3</sup>



**81/82 mm HE MORTAR SHELL M91**



**A. TECHNICAL DATA**

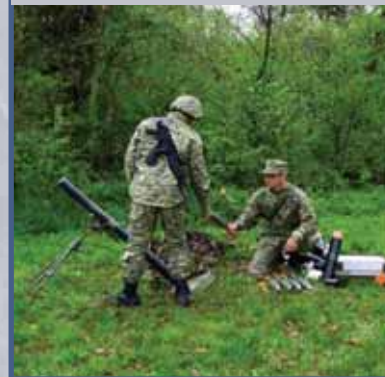
- Length of shell with fuze ----- 480 mm
- Mass of mortar shell with fuze ----- 4100 g
- Explosive charge is hexolite (RDX/ TNT)
- Mass of explosive charge ----- 850 g
- Shell is assembled with impact fuze UT M88 P1
- Muzzle safety at lowest initial velocity is ----- 70 m
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition cartridge M94 ----- waterproof
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 6500 m
  - Minimum range (0) ----- 100 m
- Max mean operating pressure in mortar ----- 647 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 18 m

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 58x55x16 cm
- Total mass ----- 34 kg
- Total volume ----- 0,051 m<sup>3</sup>



**81/82 mm HE MORTAR SHELL M91P1**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 480 mm
- Mass of mortar shell with fuze ----- 4100 g
- Explosive charge is hexolite (RDX/ TNT)
- Mass of explosive charge ----- 850 g
- Shell is assembled with impact fuze UTU M93-N
- Muzzle safety at lowest initial velocity is ----- 50 m
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition cartridge M94 ----- waterproof
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 6500 m
  - Minimum range (0) ----- 100 m
- Max mean operating pressure in mortar ----- 647 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 18 m

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 58x55x16 cm
- Total mass ----- 34 kg
- Total volume ----- 0,051 m<sup>3</sup>





**81/82 mm HE MORTAR SHELL Mk11**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 480 mm
- Mass of mortar shell with fuze ----- 4100 g
- Explosive charge is hexolite (RDX/ TNT)
- Mass of explosive charge ----- 850 g
- Shell is assembled with impact fuze UT M88 P1
- Muzzle safety at lowest initial velocity is ----- 70 m
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition cartridge M11 ----- waterproof
- Reliable function of shell is obtained within temperature range of -46°C do 63°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 6500 m
  - Minimum range (0) ----- 100 m
- Max mean operating pressure in mortar ----- 647 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 18 m

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 58x55x16 cm
- Total mass ----- 34 kg
- Total volume ----- 0,051 m<sup>3</sup>



**81/82 mm HE MORTAR SHELL M11P1**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 480 mm
- Mass of mortar shell with fuze ----- 4100 g
- Explosive charge is hexolite (RDX/ TNT)
- Mass of explosive charge ----- 850 g
- Shell is assembled with impact fuze UTU M93-N
- Muzzle safety at lowest initial velocity is ----- 50 m
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition cartridge M11 ----- waterproof
- Reliable function of shell is obtained within temperature range of -46°C do 63°C..
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 6500 m
  - Minimum range (0) ----- 100 m
- Max mean operating pressure in mortar ----- 647 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 18 m

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 58x55x16 cm
- Total mass ----- 34 kg
- Total volume ----- 0,051 m<sup>3</sup>





### 81/82 mm ANTISABOTAGE MORTAR SHELL M82/M81P1 " PLISKA"



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 400 mm
- Mass of mortar shell with fuze ----- 3180 g
- Explosive charge is trotyl (TNT)
- Mass of explosive charge ----- 680 g
- Shell is assembled with impact fuze UTU M93P2 SQ/D with delay time 0,09-0,11 s
- Muzzle safety at lowest initial speed is ----- 50 m
- Shell is completed with ignition cartridge and six increment charges (0+6)
- Ignition cartridge M06 ----- waterproof.
- Reliable function of shell is obtained at temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALISTIC DATA

- When using 81/82 mm mortar M69 B-D:barrel length 1450 mm:
  - Maximum range (0+6) ----- 6750 m
  - Minimum range (0) ----- 100 m
- Max mean operating pressure in mortar ----- 610 bars
- Shock-wave overpressure in the water for the distance from the burst site of
  - 20 m ----- 1,7 MPa
  - 30 m ----- 1 MPa
- Fragmentation action, killing range (1 penetration/ m<sup>2</sup>)- radius ---- 15 m

#### C. PACKING

- 1 complete shell per carton
- 5 carton per wooden box
- Box dimensions ----- 54x44x16 cm
- Total mass ----- 29 kg
- Total volume ----- 0,038 m<sup>3</sup>



### 81/82 mm ANTISABOTAGE MORTAR SHELL M89 " PLISKA"



#### A. TECHNICAL DATA

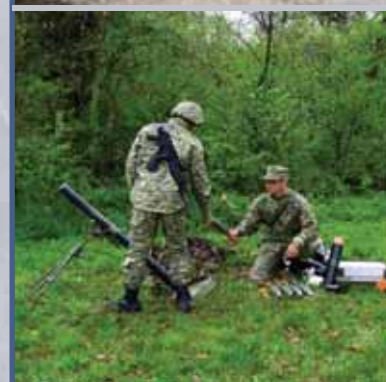
- Length of shell with fuze ----- 490 mm
- Mass of mortar shell with fuze ----- 4300 g
- Explosive charge is hexolite (RDX/ TNT) or trotyl (TNT)
- Mass of explosive charge ----- 850 g
- Shell is assembled with impact fuze UTU M93P2 SQ/D with delay time 0,09-0,19 s
- Muzzle safety at lowest initial speed is ----- 50 m
- Shell is completed with ignition cartridge and six increment charges (0+6)
- Ignition cartridge M94 ----- waterproof.
- Reliable function of shell is obtained at temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALISTIC DATA

- When using 81/82 mm mortar M69 B-D:barrel length 1450 mm:
  - Maximum range (0+6) ----- 6750 m
  - Minimum range (0) ----- 100 m
- Max mean operating pressure in mortar ----- 610 bars
- Shock-wave overpressure in the water for the distance from the burst site of
  - 20 m ----- 1,7 MPa
  - 30 m ----- 1 MPa
- Fragmentation action, killing range (1 penetration/ m<sup>2</sup>)- radius ---- 15 m

#### C. PACKING

- 1 complete shell per carton
- 5 carton per wooden box
- Box dimensions ----- 58x55x16 cm
- Total mass ----- 29 kg
- Total volume ----- 0,051 m<sup>3</sup>



**81/82 mm SMOKE MORTAR SHELL M72/M74**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 375 mm
- Mass of mortar shell with fuze ----- 3050 g
- Weight of smoke charge (WP) ----- 550 g
- Fuze: Impact, superquick action UT M68 P1
- Muzzle safety at lowest initial velocity is ----- 8 m
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 5070 m
  - Minimum range (0) ----- 91 m
- Max mean operating pressure in mortar ----- 647 bars

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 54x44x16 cm
- Total mass ----- 29 kg
- Total volume ----- 0,038 m<sup>3</sup>



**81/82 mm SMOKE MORTAR SHELL M72P3/M74P3**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 400 mm
- Mass of mortar shell with fuze ----- 3180 g
- Weight of smoke charge (WP) ----- 550 g
- Shell is assembled with impact fuze UT M88P1
- Muzzle safety at lowest initial speed is ----- 70 m
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition cartridge M06 ----- waterproof
- Reliable function of shell is obtained at temperature range of -46°C do 63°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 5070 m
  - Minimum range (0) ----- 91 m
- Max mean operating pressure in mortar ----- 618 bars

**C. PACKING**

- 1 complete shell per carton
- 5 carton per wooden box
- Box dimensions ----- 57,7x47x15,4 cm
- Total mass ----- 29 kg
- Total volume ----- 0,042 m<sup>3</sup>





**81/82 mm SMOKE MORTAR SHELL M91**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 478 mm
- Mass of mortar shell with fuze ----- 4100 g
- Weight of smoke charge (WP) ----- 700 g
- Shell is assembled with impact fuze UT M88 P1
- Muzzle safety at lowest initial velocity is ----- 70 m
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition charge M94 ----- waterproof
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 6500 m
  - Minimum range (0) ----- 90 m
- Max mean operating pressure in mortar ----- 647 bars

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 58x55x16 cm
- Total mass ----- 34 kg
- Total volume ----- 0,051 m<sup>3</sup>



**81/82 mm SMOKE MORTAR SHELL Mk11**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 478 mm
- Mass of mortar shell with fuze ----- 4100 g
- Weight of smoke charge (WP) ----- 700 g
- Shell is assembled with impact fuze UT M88 P1
- Muzzle safety at lowest initial velocity is ----- 70 m
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition charge M11 ----- waterproof
- Reliable function of shell is obtained within temperature range of -46°C to 63°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 6500 m
  - Minimum range (0) ----- 90 m
- Max mean operating pressure in mortar ----- 647 bars

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 58x55x16 cm
- Total mass ----- 34 kg
- Total volume ----- 0,051 m<sup>3</sup>





**81/82 mm HIGH-SMOKE MORTAR SHELL M88**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 410 mm
- Mass of mortar shell with fuze ----- 2950 g
- Mass of HC composition ----- 850 g
- Smoking time ----- min 120 s
- Average fall speed of smoke box ----- 20 m/s
- Shell is completed with TP M67 pyrotechnical time fuze
- Shell is completed with ignition cartridge and four increment charges (0+4).
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69, barrel length 1150 mm:
  - Maximum range (0+4) ----- 3400 m
  - Minimum range (0+1) ----- 300 m
- Max mean operating pressure in mortar ----- 422 bars

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 54x48x16 cm
- Total mass ----- 29 kg
- Total volume ----- 0,042 m<sup>3</sup>



**81/82 mm HIGH-SMOKE MORTAR SHELL M88P1**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 410 mm
- Mass of mortar shell with fuze ----- 2950 g
- Mass of HC composition ----- 850 g
- Smoking time ----- min 120 s
- Average fall speed of smoke box ----- 20 m/s
- Shell is completed with TP M67 pyrotechnical time fuze
- Shell is completed with ignition cartridge and four increment charges (0+4)
- Ignition charge M06 ----- waterproof.
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69, barrel length 1150 mm:
  - Maximum range (0+4) ----- 3400 m
  - Minimum range (0+1) ----- 300 m
- Max mean operating pressure in mortar ----- 422 bars

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 54x48x16 cm
- Total mass ----- 29 kg
- Total volume ----- 0,042 m<sup>3</sup>



**81/82 mm HIGH-SMOKE MORTAR SHELL M95**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 480 mm
- Mass of mortar shell with fuze ----- 4250 g
- Mass of HC composition ----- 850 g
- Smoking time ----- min 120 s
- Average fall speed of smoke box ----- 20 m/s
- Shell is completed with TP M67 pyrotechnical time fuze
- Shell is completed with ignition cartridge and six increment charges (0+6)
- Ignition charge M94 ----- waterproof.
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 5480 m
  - Minimum range (0+1) ----- 300 m
- Max mean operating pressure in mortar ----- 647 bars

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 61x54x16 cm
- Total mass ----- 35 kg
- Total volume ----- 0,053 m<sup>3</sup>



**81/82 mm HIGH-SMOKE MORTAR SHELL M09**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 480 mm
- Mass of mortar shell with fuze ----- 4250 g
- Mass of HC composition ----- 850 g
- Smoking time ----- min 120 s
- Average fall speed of smoke box ----- 20 m/s
- Shell is completed with TP M67 pyrotechnical time fuze
- Shell is completed with ignition cartridge and six increment charges (0+6)
- Ignition charge M09 ----- waterproof.
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 5480 m
  - Minimum range (0+1) ----- 300 m
- Max mean operating pressure in mortar ----- 647 bars

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 61x54x16 cm
- Total mass ----- 35 kg
- Total volume ----- 0,053 m<sup>3</sup>





### 81/82 mm HIGH-SMOKE MORTAR SHELL Mk11



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 480 mm
- Mass of mortar shell with fuze ----- 4250 g
- Mass of HC composition ----- 850 g
- Smoking time ----- min 120 s
- Average fall speed of smoke box ----- 20 m/s
- Shell is completed with TP M67P2 pyrotechnical time fuze
- Shell is completed with ignition cartridge and six increment charges (0+6)
- Ignition charge M11 ----- waterproof.
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 5480 m
  - Minimum range (0+1) ----- 300 m
- Max mean operating pressure in mortar ----- 647 bars

#### C. PACKING

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 61x54x16 cm
- Total mass ----- 35 kg
- Total volume ----- 0,053 m<sup>3</sup>



### 81/82 mm ILLUMINATING MORTAR SHELL M67



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 410 mm
- Mass of mortar shell with fuze ----- 2950 g
- Mass of illuminating candle ----- 400 g
- Shell is completed with TP M67 pyrotechnical time fuze.
- Illuminating power ----- 500.000 Cd for 40 s
- Mean rate of parachute descent with candle ----- 2,5 m/s
- Shell is completed with ignition cartridge and four increment charges (0+4).
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+4) ----- 3650 m
  - Minimum range (0+1) ----- 250 m
- Max mean operating pressure in mortar ----- 422 bars

#### C. PACKING

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 54x48x16 cm
- Total mass ----- 29 kg
- Total volume ----- 0,042m<sup>3</sup>





**81/82 mm ILLUMINATING MORTAR SHELL M67P2**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 410 mm
- Mass of mortar shell with fuze ----- 2950 g
- Mass of illuminating candle ----- 400 g
- Shell is completed with TP M67 pyrotechnical time fuze.
- Illuminating power ----- 500.000 Cd for 40 s
- Mean rate of parachute descent with candle ----- 2,5 m/s
- Shell is completed with ignition cartridge and four increment charges (0+4)
- Ignition charge M06 ----- waterproof..
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+4) ----- 3650 m
  - Minimum range (0+1) ----- 250 m
- Max mean operating pressure in mortar ----- 422 bars

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 54x48x16 cm
- Total mass ----- 29 kg
- Total volume ----- 0,042m<sup>3</sup>



**81/82 mm ILLUMINATING MORTAR SHELL M09**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 410 mm
- Mass of mortar shell with fuze ----- 2950 g
- Mass of illuminating candle ----- 400 g
- Shell is completed with TP M67 pyrotechnical time fuze.
- Illuminating power ----- 500.000 Cd for 40 s
- Mean rate of parachute descent with candle ----- 2,5 m/s
- Shell is completed with ignition cartridge and four increment charges (0+4)
- Ignition charge M09 ----- waterproof..
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+4) ----- 3650 m
  - Minimum range (0+1) ----- 250 m
- Max mean operating pressure in mortar ----- 422 bars

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 54x48x16 cm
- Total mass ----- 29 kg
- Total volume ----- 0,042m<sup>3</sup>



**81/82 mm ILLUMINATING MORTAR SHELL M95**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 530 mm
- Mass of mortar shell with fuze ----- 4250 g
- Shell charge weight ----- 700 g
- Shell is completed with TP M67P2 pyrotechnical time fuze.
- Illuminating power ----- 750.000 Cd for 40 s
- Mean rate of parachute descent with candle ----- 3 m/s
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition cartridge M94 ----- waterproof
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 5480 m
  - Minimum range (0+1) ----- 300 m
- Max mean operating pressure in mortar ----- 647 bars

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 61x54x16 cm
- Total mass ----- 35 kg
- Total volume ----- 0,053m<sup>3</sup>



**81/82 mm ILLUMINATING MORTAR SHELL Mk11**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 530 mm
- Mass of mortar shell with fuze ----- 4250 g
- Shell charge weight ----- 700 g
- Shell is completed with TP M67P2 pyrotechnical time fuze.
- Illuminating power ----- 750.000 Cd for 40 s
- Mean rate of parachute descent with candle ----- 3 m/s
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition cartridge M11 ----- waterproof
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

- When using 81/82 mm Mortar M69 B-D, barrel length 1450 mm:
  - Maximum range (0+6) ----- 5480 m
  - Minimum range (0+1) ----- 300 m
- Max mean operating pressure in mortar ----- 647 bars

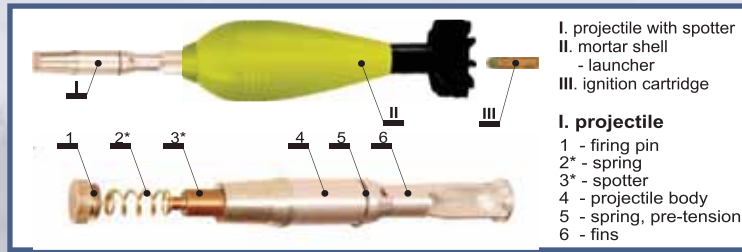
**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 61x54x16 cm
- Total mass ----- 35 kg
- Total volume ----- 0,053m<sup>3</sup>

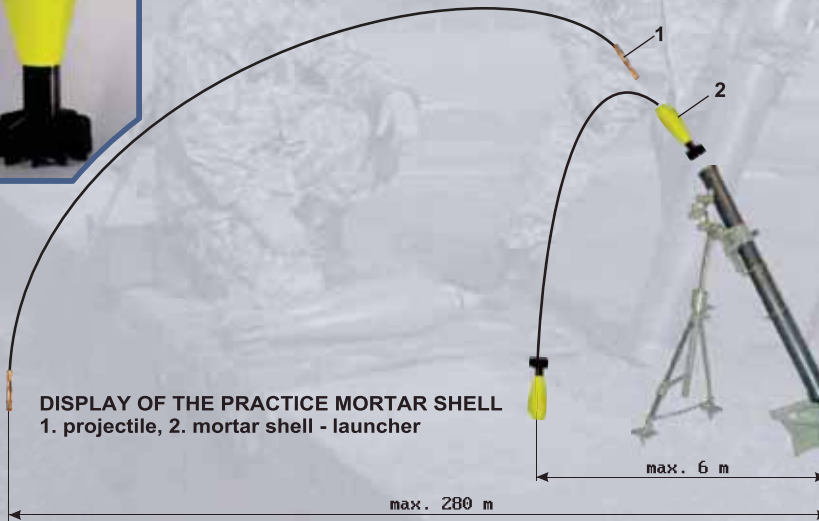
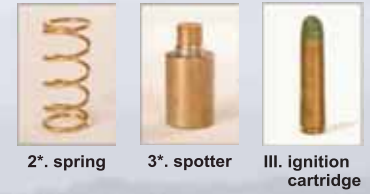




**81/82 mm PRACTICE MORTAR SHELL M62**



**DISPOSABLE ELEMENTS:**



**A. TECHNICAL DATA**

- Length of mortar shell - launcher ----- 287 mm
- Projectile length ----- 193 mm
- Mass of mortar shell - launcher ----- 2480 g
- Mass of projectile ----- 235 g

**B. BALLISTIC DATA**

- Maximum range ----- 280 m
- Minimum range ----- 50 m

**C. PACKING**

- 1 complete shell per carton
- 5 cartons per wooden box
- Box dimensions ----- 68x46x16 cm
- Total mass ----- 20 kg
- Total volume ----- 0,050 m<sup>3</sup>

**81/82 mm PRACTICE SHELL M68 ( Parachute target )**



**A. TECHNICAL DATA**

- Round length ----- 380 mm
- Round mass ----- 2300 g
- Target size ----- 250x 850 mm
- Ignition charge mass ----- 8,6 g
- Increment charge mass ----- 8,1 g
- Firing is performed at 75 - 85° elevation, with elements falling to the ground at a distance of 150 – 160 m from the firing post.

**B. BALLISTIC DATA**

- Average height of target launch at 80° angle ----- 600 m
- Minimum range ----- 90 m
- Target descent velocity ----- 5 - 7 m/s

**C. PACKING**

- 5 parachute targets per wooden box
- Box dimensions ----- 62x40x16 cm
- Total mass ----- 20 kg
- Total volume ----- 0,034 m<sup>3</sup>





## 120 mm MORTAR SHELLS



## 120 mm HE MORTAR SHELL M62P8



### A. TECHNICAL DATA

- Length of shell with fuze ----- 606 mm
- Mass of mortar shell with fuze ----- 12600 g
- Explosive charge is hexolite (RDX/ TNT) or trotyl (TNT)
- Mass of explosive charge ----- 2450 g
- Shell is assembled with impact fuze UTU M93 SQ/D
- Muzzle safety at lowest initial velocity is ----- 50 m
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition cartridge M74
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

### B. BALLISTIC DATA

- When using 120 mm Mortar M75, barrel length 1500 mm:
  - Maximum range (0+6) ----- 6500 m
  - Minimum range (0) ----- 255 m
- Max mean operating pressure in mortar ----- 961 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 20 m

### C. PACKING

- 1 complete shell per carton
- 2 cartons per wooden box
- Box dimensions ----- 71x35x18 cm
- Total mass ----- 38 kg
- Total volume ----- 0,045 m<sup>3</sup>



### 120 mm HE MORTAR SHELL M95



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 800 mm
- Mass of mortar shell with fuze ----- 14800 g
- Explosive charge is hexolite (RDX/ TNT) or trotyl (TNT)
- Mass of explosive charge ----- 2900 g
- Shell is assembled with impact fuze UTU M93 SQ/D
- Muzzle safety at lowest initial velocity is ----- 50 m
- Shell is completed with ignition cartridge and eight increment charges (0+8)..
- Ignition cartridge M95 ----- waterproof
- Reliable function of shell is obtained within temperature range of -46°C do 63°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 120 mm Mortar M75, barrel length 1500 mm:
  - Maximum range (0+8) ----- 7400 m
  - Minimum range (0) ----- 255 m
- Max mean operating pressure in mortar ----- 961 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 24 m

#### C. PACKING

- 1 complete shell per carton
- 2 cartons per wooden box
- Box dimensions ----- 93x35x18 cm
- Total mass ----- 44 kg
- Total volume ----- 0,058 m<sup>3</sup>



### 120 mm HE MORTAR SHELL M12P1



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 800 mm
- Mass of mortar shell with fuze ----- 14800 g
- Explosive charge is hexolite (RDX/ TNT) or trotyl (TNT)
- Mass of explosive charge ----- 2900 g
- Shell is assembled with impact fuze UTU M93 SQ/D
- Muzzle safety at lowest initial velocity is ----- 50 m
- Shell is completed with ignition cartridge and eight increment charges (0+8).
- Ignition cartridge M12 ----- waterproof
- Reliable function of shell is obtained within temperature range of -46°C do 63°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 120 mm Mortar M75, barrel length 1500 mm:
  - Maximum range (0+8) ----- 7400 m
  - Minimum range (0) ----- 255 m
- Max mean operating pressure in mortar ----- 961 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 24 m

#### C. PACKING

- 1 complete shell per carton
- 2 cartons per wooden box
- Box dimensions ----- 93x35x18 cm
- Total mass ----- 44 kg
- Total volume ----- 0,058 m<sup>3</sup>





### 120 mm HE MORTAR SHELL M12P1-L



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 800 mm
- Mass of mortar shell with fuze ----- 14800 g
- Explosive charge is hexolite (RDX/ TNT) or trotyl (TNT)
- Mass of explosive charge ----- 2900 g
- Shell is assembled with impact fuze UTU M93 SQ/D
- Muzzle safety at lowest initial velocity is ----- 50 m
- Shell is completed with ignition cartridge and ten increment charges (0+10)..
- Ignition cartridge M12 ----- waterproof
- Reliable function of shell is obtained within temperature range of -46°C do 63°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 120 mm Mortar M95, barrel length 1800 mm:
  - Maximum range (0+10) ----- 9400 m
  - Minimum range (0) ----- 275 m
- Max mean operating pressure in mortar ----- 1300 bars
- Killing range ( 1 penetration / m<sup>2</sup> ) - radius ----- 24 m

#### C. PACKING

- 1 complete shell per carton
- 2 cartons per wooden box
- Box dimensions ----- 93x35x18 cm
- Total mass ----- 44 kg
- Total volume ----- 0,058 m<sup>3</sup>



### 120 mm SMOKE MORTAR SHELL M64P2



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 606 mm
- Mass of mortar shell with fuze ----- 12600 g
- Weight of smoke charge ( WP ) ----- 2450 g
- Shell is assembled with impact fuze UT M68 P1.
- Muzzle safety at lowest initial velocity is ----- 8 m
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition cartridge M74
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 120 mm Mortar M75, barrel length 1500 mm:
  - Maximum range (0+6) ----- 6500 m
  - Minimum range (0+1) ----- 255 m
- Max mean operating pressure in mortar ----- ≤922 bars

#### C. PACKING

- 1 complete shell per carton
- 2 cartons per wooden box
- Box dimensions ----- 71x35x18 cm
- Total mass ----- 38 kg
- Total volume ----- 0,045 m<sup>3</sup>





### 120 mm SMOKE MORTAR SHELL M64P3



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 606 mm
- Mass of mortar shell with fuze ----- 12600 g
- Weight of smoke charge ( WP )----- 2450 g
- Shell is assembled with impact fuze UT M88 P1.
- Muzzle safety at lowest initial velocity is ----- 70 m
- Shell is completed with ignition cartridge and six increment charges (0+6).
- Ignition cartridge M74
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 120 mm Mortar M75, barrel length 1500 mm:
  - Maximum range (0+6) ----- 6500 m
  - Minimum range (0+1) ----- 255 m
- Max mean operating pressure in mortar ----- ≤922 bars

#### C. PACKING

- 1 complete shell per carton
- 2 cartons per wooden box
- Box dimensions ----- 71x35x18 cm
- Total mass ----- 38 kg
- Total volume ----- 0,045 m<sup>3</sup>



### 120 mm SMOKE MORTAR SHELL M95



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 800 mm
- Mass of mortar shell with fuze ----- 14800 g
- Weight of smoke charge ( WP )----- 2450 g
- Shell is assembled with impact fuze UT M88 P1.
- Muzzle safety at lowest initial velocity is ----- 70 m
- Shell is completed with ignition cartridge and eight increment charges (0+8).
- Ignition cartridge M95 ----- waterproof
- Reliable function of shell is obtained within temperature range of -46°C do 63°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 120 mm Mortar M75, barrel length 1500 mm:
  - Maximum range (0+8) ----- 7400 m
  - Minimum range (0+1) ----- 255 m
- Max mean operating pressure in mortar ----- ≤922 bars

#### C. PACKING

- 1 complete shell per carton
- 2 cartons per wooden box
- Box dimensions ----- 93x35x18 cm
- Total mass ----- 44 kg
- Total volume ----- 0,059 m<sup>3</sup>



### 120 mm SMOKE MORTAR SHELL Mk12



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 800 mm
- Mass of mortar shell with fuze ----- 14800 g
- Weight of smoke charge ( WP )----- 2450 g
- Shell is assembled with impact fuze UT M88 P1.
- Muzzle safety at lowest initial velocity is ----- 70 m
- Shell is completed with ignition cartridge and eight increment charges (0+8).
- Ignition cartridge M12 ----- waterproof
- Reliable function of shell is obtained within temperature range of -46°C do 63°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 120 mm Mortar M75, barrel length 1500 mm:
  - Maximum range (0+8) ----- 7400 m
  - Minimum range (0+1) ----- 255 m
- Max mean operating pressure in mortar ----- ≤922 bars

#### C. PACKING

- 1 complete shell per carton
- 2 cartons per wooden box
- Box dimensions ----- 93x35x18 cm
- Total mass ----- 44 kg
- Total volume ----- 0,059 m<sup>3</sup>



### 120 mm HIGH-SMOKE MORTAR SHELL M89



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 670 mm
- Mass of mortar shell with fuze ----- 11250 g
- Mass of smoke pot ( HC composition) ----- 1650 g
- Smoking time ----- min 210 s
- Average fall speed of smoke box ----- 20 m/s
- Shell is completed with TP M87 pyrotechnical time fuze.
- Shell is completed with ignition cartridge and five increment charges (0+5).
- Ignition cartridge M74
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 120 mm Mortar M75, barrel length 1500 mm:
  - Maximum range (0+5) ----- 6000 m
  - Minimum range (0+1) ----- 400 m
- Max mean operating pressure in mortar ----- 620 bars

#### C. PACKING

- 1 complete shell per carton
- 2 cartons per wooden box
- Box dimensions ----- 78x35x18 cm
- Total mass ----- 36 kg
- Total volume ----- 0,049 m<sup>3</sup>





### 120 mm ILLUMINATING MORTAR SHELL M87P1



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 670 mm
- Mass of mortar shell with fuze ----- 10700 g
- Mass of illuminating candle ----- 1200 g
- Shell is completed with TP M87 pyrotechnical time fuze.
- Illuminating power ----- 1.000.000 Cd for 60 s
- Mean rate of parachute descent with candle ----- 3 m/s
- Shell is completed with ignition cartridge and five increment charges (0+5).
- Ignition cartridge M74
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 120 mm Mortar M75, barrel length 1500 mm:
  - Maximum range (0+5) ----- 6000 m
  - Minimum range (0+1) ----- 400 m
- Max mean operating pressure in mortar ----- 620 bars

#### C. PACKING

- 1 complete shell per carton
- 2 cartons per wooden box
- Box dimensions ----- 78x35x18 cm
- Total mass ----- 35 kg
- Total volume ----- 0,049 m<sup>3</sup>



### 120 mm ILLUMINATING MORTAR SHELL M87P2



#### A. TECHNICAL DATA

- Length of shell with fuze ----- 670 mm
- Mass of mortar shell with fuze ----- 10700 g
- Mass of illuminating candle ----- 1200 g
- Shell is completed with TP M87 pyrotechnical time fuze.
- Illuminating power ----- 1.000.000 Cd for 60 s
- Mean rate of parachute descent with candle ----- 3 m/s
- Shell is completed with ignition cartridge and four increment charges (0+4).
- Ignition cartridge M74
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

#### B. BALLISTIC DATA

- When using 120 mm Mortar M75, barrel length 1500 mm:
  - Maximum range (0+5) ----- 5900 m
  - Minimum range (0+1) ----- 400 m
- Max mean operating pressure in mortar ----- 450 bars

#### C. PACKING

- 1 complete shell per carton
- 2 cartons per wooden box
- Box dimensions ----- 78x35x18 cm
- Total mass ----- 35 kg
- Total volume ----- 0,049 m<sup>3</sup>





**120 mm ILLUMINATING MORTAR SHELL M01**



**A. TECHNICAL DATA**

- Length of shell with fuze ----- 752 mm
- Mass of mortar shell with fuze ----- 11500 g
- Mass of illuminating candle ----- 1200 g
- Shell is completed with TP M87 pyrotechnical time fuze.
- Illuminating power ----- 1.000.000 Cd for 60 s
- Mean rate of parachute descent with candle ----- 3 m/s
- Shell is completed with ignition cartridge and five increment charges (0+5)..
- Ignition cartridge M95 ----- waterproof
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.
- High safety during transportation, handling and parachuting.

**B. BALLISTIC DATA**

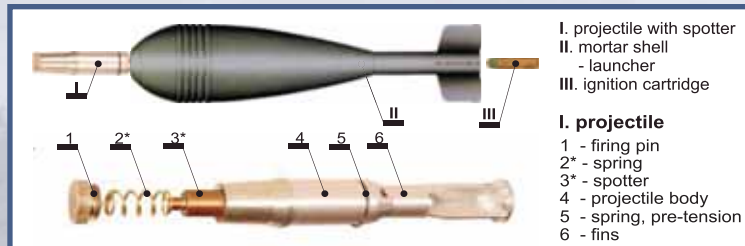
- When using 120 mm Mortar M75, barrel length 1500 mm:
  - Maximum range (0+5) ----- 6600 m
  - Minimum range (0+1) ----- 400 m
- Max mean operating pressure in mortar ----- 980 bars

**C. PACKING**

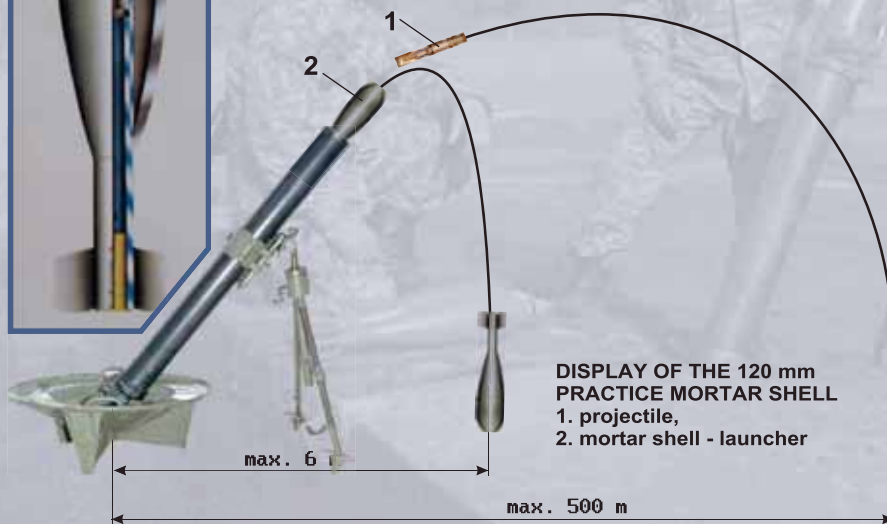
- 1 complete shell per carton
- 2 cartons per wooden box
- Box dimensions ----- 86x35x18 cm
- Total mass ----- 37 kg
- Total volume ----- 0,054 m<sup>3</sup>



**120 mm PRACTICE MORTAR SHELL M63P2**



**DISPOSABLE ELEMENTS:**



**A. TECHNICAL DATA**

- Length of mortar shell - launcher ----- 508 mm
- Projectile length ----- 280 mm
- Mass of mortar shell - launcher ----- 11600 g
- Mass of projectile ----- 400 g

**B. BALLISTIC DATA**

- Maximum range ----- 500 m
- Minimum range ----- 50 m

**C. PACKING**

- 1 complete shell per carton
- 2 cartons per wooden box
- Box dimensions ----- 71x35x18 cm
- Total mass ----- 32 kg
- Total volume ----- 0,045 m<sup>3</sup>



• prvi partizan •  
Ammunition & Components



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Prvi Partizan Uzice - PPU company is located in south-western Serbia. We are manufacturing small arms ammunition since 1928. Hunters and sportsmen, armed with our products. Tradition and experienced personnel have ranked us among well known ammunition producers. Quality is our priority, achieved with innovative solutions and quality cartridges in all our 'old' and 'new' calibers. Through research and innovation we have developed a wide assortment of ammunition.

Development of partnership with our customers and employee satisfaction are strategic objectives and form a part of our strategy.

Dobrosav Andric  
General Manager

## QUALITY



Maintaining high quality is the most important factor of our success. We achieve this by the consistent implementation of Quality Management System in all phases, from recognition of customer requests, control, delivery and the satisfaction of our customers.

PPU has QMS in accordance ISO 9001:2008 approved by Military Quality Control - Ministry of Defense of Republic of Serbia.

PPU ammunition is CIP approved by Hungarian Proof House.



OSCAR FOR QUALITY FOR YEAR 2014  
National award for business excellence  
FQCE, Fund for Quality Culture and Excellence

THE BEST COMPANY FOR 2015  
European Association of Southeast and Central Europe  
Managers, Zenica, Bosnia and Herzegovina

THE BEST COMPANY FOR 2015  
European Business Assembly, The Socrates Committee  
Oxford, United Kingdom





## HISTORY



**1927** The story of Prvi Partizan starts at the beginning of the 20th century. In 1927, the founder of the factory, Jakob Posinger, in cooperation with the army and the government of the Kingdom of Yugoslavia, moved his workshop from Kranj (Slovenia) to Uzice.

**1935** In 1935 the authorities of the town of Uzice decided to give Mr. Posinger, as a present, land for building new factory. The laying of the foundation stone on June 20th 1935 marked the beginning of the factory's history. The factory was named „Factory of Arms and Ammunition in Uzice,“ (FOMU).

**1941-1947** In 1941 factory started to work under the control of the Partisan military authorities. The ammunition production facilities and tool shop was moved to underground tunnel safe of the National Bank. During that time Uzice was the only town in Yugoslavia, and possibly in Europe, in which arms factory was working under occupation. On September 5th 1947, the factory in Uzice was renamed Prvi Partizan and it became a state owned company.

2

## TODAY



**1970** At the end of the 1970, Prvi Partizan started work on the construction of new buildings and infrastructure. This resulted in the expansion of capacities and the introduction of new articles in production.

**2000-2017** The beginning of the 21st century has been especially important for the technological development of Prvi Partizan. Until the end of 2015 we built new facilities: new facility for bullet production and new and modern facility for case production. New conditions for our employees.

3

## PRODUCTION



By using the most modern technology, associated with nearly one century of experience, Prvi partizan produces high quality ammunition.

new product. Some of the processes that precede the production are selection of input materials, bullet attention is being paid to optimum harmonization of all components which make one quality cartridge. The production process consists of cartridge case production, bullet production, cartridge assembling, all followed with a sequence of tests, in all stages of production.

### CASE

Input material for case production is cup or brass disc. Mechanical operations include deep drawing and case wall thickness reducing.

forming and removing excess material

Between individual mechanical operations, there are heat and chemical treatments which include – degreasing, annealing and washing.

### CARTRIDGE ASSEMBLING

Final operation of the cartridge production is assembling of the cartridge, which includes assembling its elements – case, primer, powder and bullet into unique product.

### BULLET

Input material for the bullet jacket is cup made of brass from which the jacket is made by the process of the deep drawing.

Antimony-lead wire is used for manufacturing of the lead core, which is formed by plastic deformation into the desired shape and dimension.

If the core is made of two parts, steel part of the core is made from steel wire, by forging operation and HT processing.

<

### PACKAGING

Inspected and tested ammunition is packed acceptance by the authorized quality control.



4

## CONTROL



To ensure the best quality of our products, our ammunition production inspection consists of:

- É Input control of the raw materials and components
- É Control during the manufacturing process
- É @c

Final control consists of laboratory tests which include following inspection:

- É Marking and packaging control
- É Control of: cartridge length and shape, case and bullet length, cartridge weight, bullet weight, powder charge weight, bullet extraction force, case hardness
- É Watertightness of cartridge and packaging

S tested on shooting range. Following characteristics are controlled:

- É Velocity on test barrels
- É Powder gases pressure (Crusher and piezo methods)
- É Accuracy on the ballistic barrels
- É L



## NEW PRODUCTS



### 6,8 mm Remington SPC

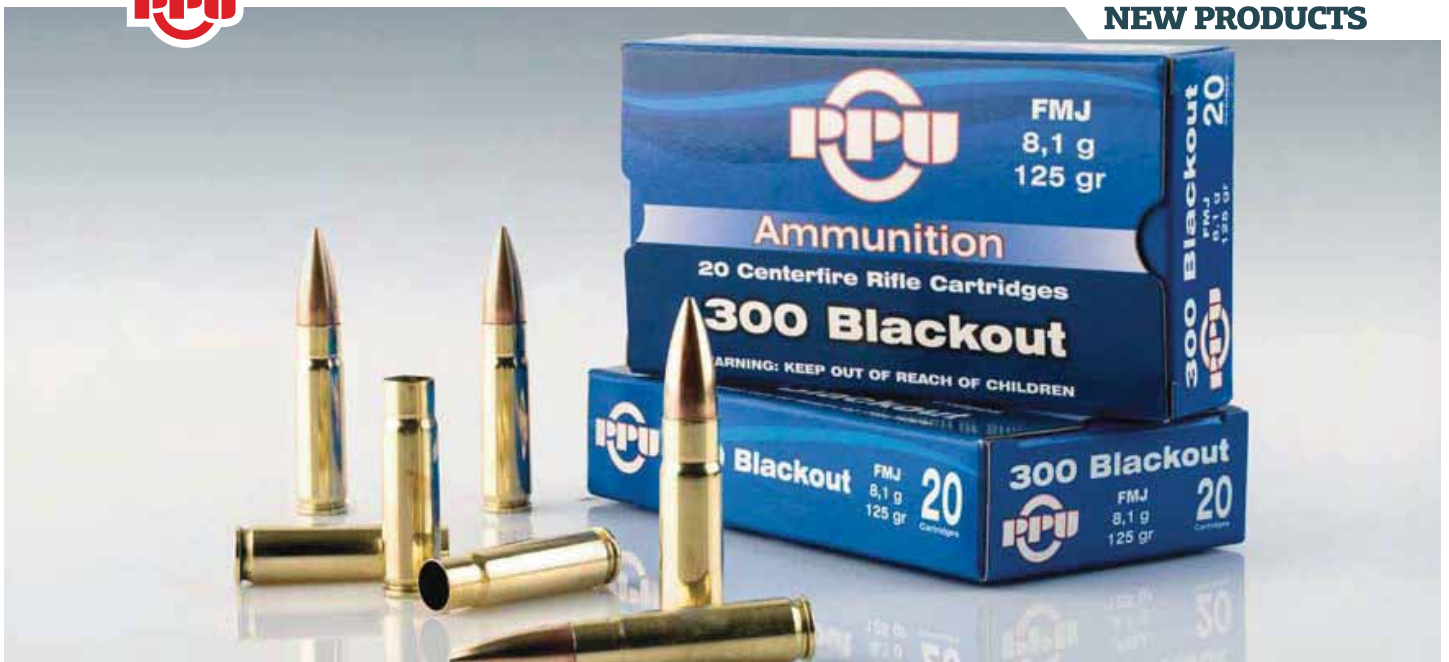
6,8 mm Remington Special Purpose cartridge (6,8x43 mm) is intended to replace 5,56 HNF) cM <L <o) L diameter and muzzle energy is between 5,56x45 mm NATO and 7,62x51 mm NATO.

6,8 mm Remington SPC is available in two variants: FMJ BT 115 gr and HP BT 115 gr

Main characteristics of 6,8 mm Remington SPC ammunition:

- É <i l
- É >\_NI
- É Terminal ballistics advantage over 5,56x45 mm
- É Allows operator to carry more ammunition

## NEW PRODUCTS



### 300 AAC Blackout

300 AAC Blackout cartridge developed for use in the M4 carbine. Its purpose is to achieve ballistics similar to 7,62x39 mm cartridge in a AR-15 platform while using standard AR-15 magazines at their normal capacity.

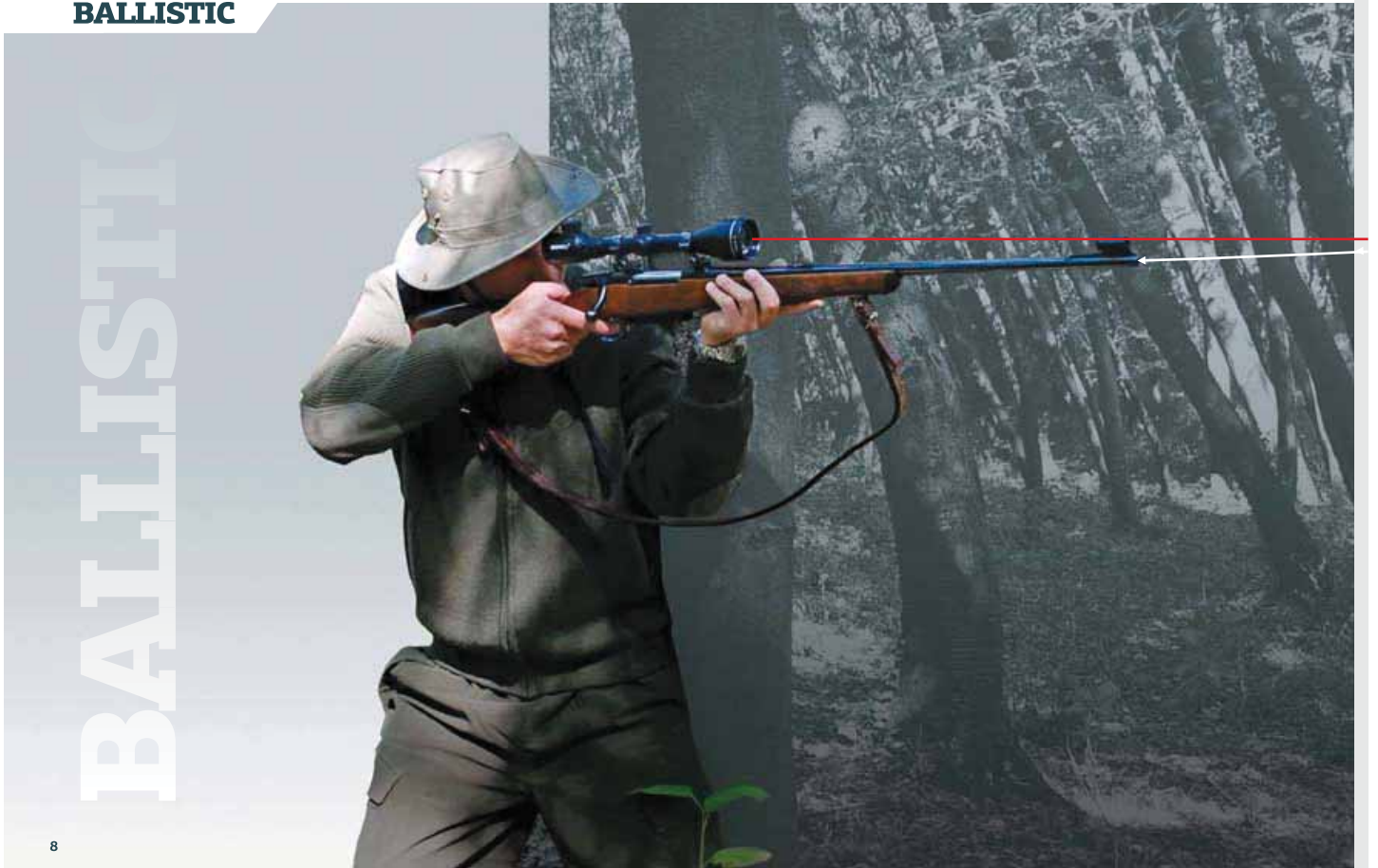
300 AAC Blackout is available in two variants: FMJ 125 gr and HP 125 gr

Main characteristics of the 300 AAC Blackout ammunition:

- É Reliable compact .30-cal solution for AR platform
- É iii
- É Compatible supersonic ammunition that matches 7,62x39 mm ballistics
- É Capabilities in a shorter, lightweight, durable and low recoiling package
- É Ability to penetrate barriers with high-mass projectiles

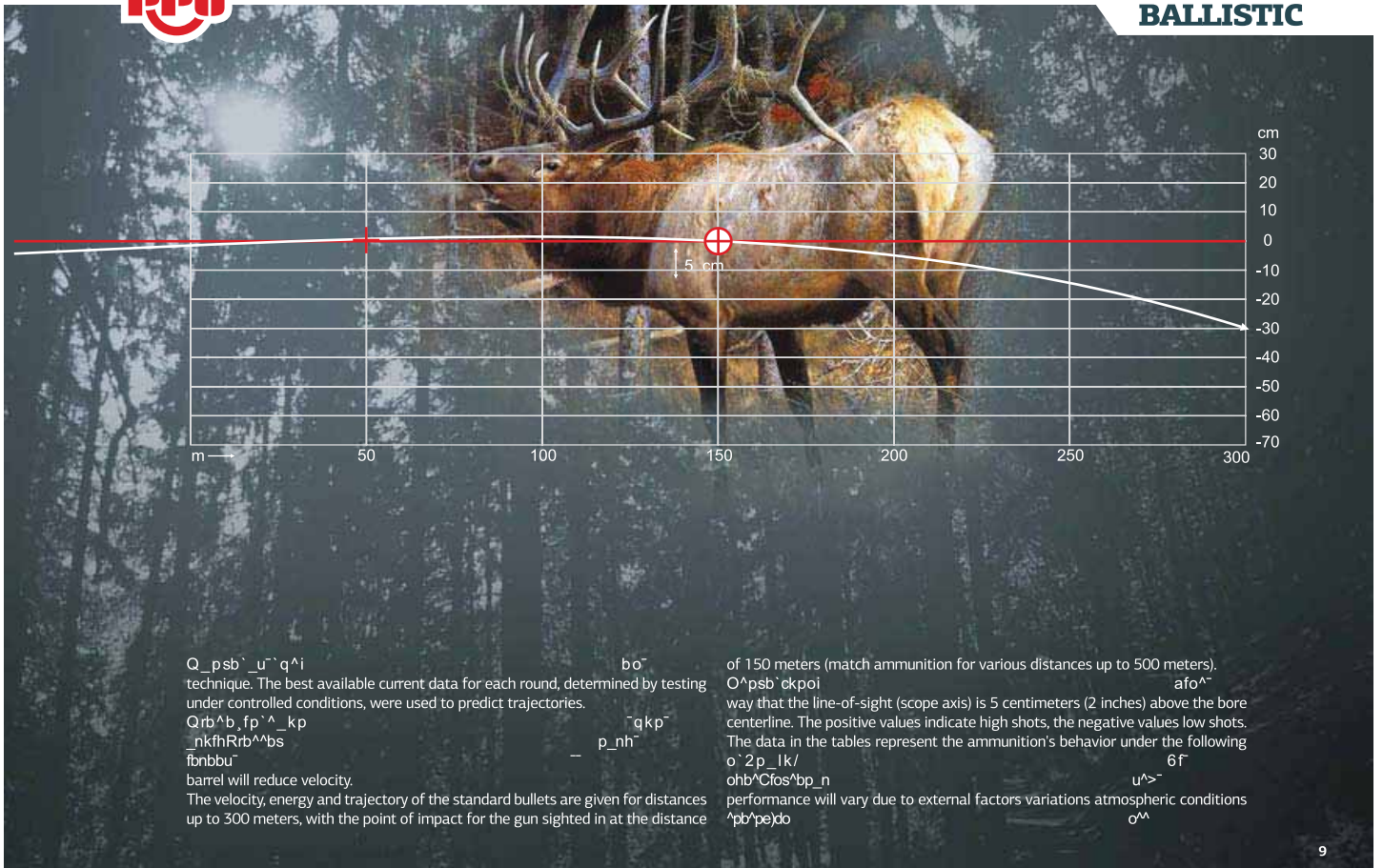


# BALLISTIC



8

# BALLISTIC



Q\_psb`\_u`q^i  
 technique. The best available current data for each round, determined by testing  
 under controlled conditions, were used to predict trajectories.  
 Qrb^b`\_fp`^\_kp  
 \_nkfhRrb^bs  
 fbnnbu`  
 barrel will reduce velocity.  
 The velocity, energy and trajectory of the standard bullets are given for distances  
 up to 300 meters, with the point of impact for the gun sighted in at the distance

bo`  
 O^psb`\_okpoi  
 way that the line-of-sight (scope axis) is 5 centimeters (2 inches) above the bore  
 centerline. The positive values indicate high shots, the negative values low shots.  
 The data in the tables represent the ammunition's behavior under the following  
 o`2p`lk/  
 ohb^Cfos^bp\_n  
 performance will vary due to external factors variations atmospheric conditions  
 ^pb^pe)do







9



# RIFLE AMMUNITION



## RIFLE AMMUNITION

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	Velocity (m/s)							Energy (J)							Trajectory (cm)							Box/Case (Rds.)	Gross weight (kg)
						0	50	100	150	200	250	300	0	50	100	150	200	250	300	0	50	100	150	200	250	300		
																							<b>22 Hornet</b>					
A-193	B-193	SP	2,9	45	610	740	642	552	472	403	351	316	798	601	445	325	237	179	145	-5	+3.4	+5.8	00	-16.9	-49	-101	50/2000	16.80
																							<b>222 Remington</b>					
A-032	B-032	SP	3,24	50	610	955	870	790	714	643	575	513	1478	1226	1010	826	669	537	427	-5	+0.1	+2.0	00	-6.9	-19.6	-40.2	20/1000	12.40
A-203	B-212	FMJ BT	3,56	55	610	920	856	796	735	682	628	577	1508	1307	1128	969	828	704	594	-5	+0.2	+2	00	-6.6	18.5	-36.2	20/1000	12.70
																							<b>223 Remington</b>					
A-132	B-132	SP	3,56	55	610	990	911	836	765	698	634	573	1747	1478	1245	1043	867	716	585	-5	-0.2	+1.7	00	-5.8	-16.8	-33.6	20/1000	12.70
A-188	B-212	FMJ BT	3,56	55	610	990	923	859	798	740	684	631	1747	1518	1315	1135	975	834	709	-5	-0.3	+1.5	00	-5.3	-15.2	-30.3	20/1000	12.70
A-616	B-616	HP BT	3,56	55	610	990	920	854	791	731	673	618	1747	1509	1300	1115	950	808	681	-5	-0.3	+1.6	00	-5.4	-15.5	-31.0	20/1000	12.70
A-615 <sup>(H)</sup>	B-615	FMJ BT	3,56	55	610	990	923	859	798	740	685	631	1747	1518	1316	1136	977	835	710	-5	-0.3	+1.5	00	-5.3	-15.1	-30.3	20/1000	12.70
A-419	B-419	FMJ BT	4,0	62	610	930	873	818	765	714	665	618	1738	1530	1343	1175	1024	889	768	-5	+0.1	+1.9	00	-6	-16.9	-33.3	20/1000	13.20
A-535 <sup>(H)</sup>	B-535	HP BT	4,47	69	610	865	814	765	717	672	629	588	1669	1482	1308	1151	1008	885	773	-5	+0.5	+2.3	00	-7.2	-19.8	-38.2	20/1000	14.00
A-481 <sup>(H)</sup>	B-481	HP BT	4,86	75	610	830	787	746	705	666	629	592	1674	1506	1351	1209	1079	960	852	-5	+0.7	+2.6	00	-7.6	-20.7	-39.5	20/1000	14.40
																							<b>22-250 Remington</b>					
A-253	B-032	SP	3,24	50	610	1160	1060	968	882	801	725	653	2180	1822	1519	1261	1040	852	691	-5	-1	+0.8	00	-4	-11.7	-24.3	20/500	9.60
A-211	B-211	SP	3,56	55	610	1120	1032	950	874	801	732	666	2235	1899	1610	1360	1143	954	791	-5	-0.9	+0.9	00	-4.2	-12.1	-24.7	20/500	9.80
A-212	B-212	FMJ BT	3,56	55	610	1120	1046	976	909	846	786	728	2235	1949	1697	1474	1276	1100	944	-5	-1	+0.8	00	-3.8	-11.0	-22.1	20/500	9.80
																							<b>243 Winchester</b>					
A-270	B-131	SP	5,8	90	610	945	893	843	793	746	701	657	2603	2322	2067	1835	1624	1433	1260	-5	-0.1	+1.7	00	-5.5	-15.4	-30.5	20/500	13.00
A-134	B-134	SP	6,5	100	610	905	859	815	772	730	690	651	2654	2392	2151	1931	1728	1543	1373	-5	+0.1	+1.9	00	-5.9	-16.6	-32.4	20/500	13.30
																							<b>6 mm Remington</b>					
A-131	B-131	SP	5,8	90	610	975	921	870	820	772	726	681	2772	2474	2205	1961	1739	1537	1354	-5	-0.3	+1.5	00	-5.1	-14.2	-28.1	20/500	13.10
A-271	B-134	SP	6,5	100	610	945	898	852	808	765	724	682	2894	2611	2353	2116	1898	1698	1515	-5	-0.2	+1.6	00	-5.3	-14.8	29.0	20/500	13.40

<sup>(H)</sup> For rifle AR-15 <sup>(H)</sup> 9" or faster twist barrels

## RIFLE AMMUNITION

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	Velocity (m/s)							Energy (J)						Trajectory (cm)						Box/Case (Rds.)	Gross weight (kg)
						0	50	100	150	200	250	300	0	50	100	150	200	250	300	0	50	100	150	200		



### 25-06 Remington

A-046	B-046	HP	5,8	90	610	1045	980	919	860	803	749	697	3183	2810	2460	2154	1881	1636	1417	-5	-0.7	+1.1	00	-4.5	-12.7	-25.3	20/500	13.40
A-047	B-047	PSP	6,5	100	610	980	928	878	829	783	737	694	3112	2789	2496	2228	1985	1762	1560	-5	-0.4	+1.4	00	-5	-13.9	-27.4	20/500	13.60



### 6,5 mm Grendel

A-484	B-484	FMJ BT	7,1	110	610	840	802	765	730	695	661	628	2515	2294	2088	1897	1721	1557	1406	-5	+0.6	+2.3	00	-7	-19.2	-37	20/500	10.00
A-485	B-485	HP-BT	7,8	120	610	815	778	741	706	671	637	605	2584	2351	2135	1935	1751	1580	1423	-5	+0.8	+2.7	00	-7.7	-20.8	-39.6	20/500	10.00
A-483	B-483	SP	8,0	123	610	810	768	727	687	649	611	575	2615	2349	2105	1882	1677	1490	1319	-5	+1	+2.8	00	-8.1	-21.8	-41.8	20/500	10.00



### 6,5 x 52 Carcano

A-205	B-117	SP	8,0	123	610	785	757	730	704	679	654	629	2465	2294	2134	1983	1841	1708	1584	-5	+1.0	+2.7	00	-7.8	-21.3	-40.6	20/500	11.40
A-207	B-084	SP BT	9,0	139	610	740	716	693	671	649	627	606	2464	2310	2163	2025	1895	1771	1655	-5	+1.5	+3.2	00	-8.8	-23.3	-44.7	20/500	12.00
A-208	B-083	FMJ BT	9,0	139	610	740	716	693	671	649	627	606	2464	2310	2163	2025	1895	1771	1655	-5	+1.5	+3.2	00	-8.8	-23.3	-44.7	20/500	12.00
A-352 <sup>NEW</sup>	B-352	SP	8,0	123	610	785	757	730	704	679	654	629	2465	2294	2134	1983	1841	1708	1584	-5	+1.0	+2.7	00	-7.8	-21.3	-40.6	20/500	12.50
A-605 <sup>NEW</sup>	B-605	FMJ BT	9,0	139	610	740	716	693	671	649	627	606	2464	2310	2163	2025	1895	1771	1655	-5	+1.5	+3.2	00	-8.8	-23.3	-44.7	20/500	12.50
A-118	B-118	SP RN	10,1	156	610	700	680	660	641	622	603	585	2474	2334	2199	2072	1951	1836	1727	-5	+2.0	+4.1	00	-11.7	-32.1	-61.8	20/500	13.00



### 6,5 x 54 Mannlicher Schoenauer

A-571	B-118	SP RN	10,1	156	610	730	681	633	587	544	503	464	2694	2341	2025	1743	1495	1279	1090	-5	+2.2	+4	00	-11.4	-31.5	-60.9	20/500	13.00
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### 6,5 x 55 Swedish

A-539	B-485	HP BT	7,8	120	610	830	792	755	719	684	651	618	2679	2440	2218	2012	1822	1645	1483	-5	+0.7	+2.5	00	-7.3	-19.9	-38.1	20/500	12.50
A-184	B-117	SP	8,0	123	610	825	782	741	701	662	624	588	2712	2439	2188	1957	1747	1554	1377	-5	+0.8	+2.7	00	-7.7	-21	-40	20/500	12.50
A-084	B-084	SP BT	9,0	139	610	775	739	704	670	637	604	573	2705	2459	2257	2020	1825	1645	1477	-5	+1.3	+3.2	00	-8.6	-23	-44.1	20/500	13.10
A-083	B-083	FMJ BT	9,0	139	610	775	739	704	670	637	604	573	2705	2459	2257	2020	1825	1645	1477	-5	+1.3	+3.2	00	-8.6	-23	-44.1	20/500	13.10
A-227	B-118	SP RN	10,1	156	610	730	681	633	587	544	503	464	2694	2341	2025	1743	1495	1279	1090	-5	+2.2	+4.0	00	-11.4	-31.5	-60.9	20/500	13.60

<sup>1)</sup> 6,8 mm (.268") bullets

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## RIFLE AMMUNITION

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	Velocity (m/s)							Energy (J)						Trajectory (cm)						Box/Case (Rds.)	Gross weight (kg)
						0	50	100	150	200	250	300	0	50	100	150	200	250	300	0	50	100	150	200		



### 6,5 x 57 Mauser

A-117	B-117	SP	8,0	123	610	845	802	760	719	680	641	605	2846	2562	2311	2061	1840	1640	1456	-5	+0.6	+2.4	00	-7.3	-19.8	-38.1	20/500	12.50
A-228	B-228	SP BT	9,0	139	610	790	754	718	684	650	617	586	2811	2558	2345	2104	1903	1716	1544	-5	+1.1	+3.0	00	-8.3	-22.2	-42.1	20/500	13.10
A-229	B-083	FMJ BT	9,0	139	610	790	754	718	684	650	617	586	2811	2558	2345	2104	1903	1716	1544	-5	+1.1	+3.0	00	-8.3	-22.2	-42.1	20/500	13.10
A-230	B-230	SP RN	10,1	156	610	740	690	642	596	552	511	472	2768	2408	2085	1796	1541	1319	1126	-5	+2	+3.9	00	-11	-30.4	-59.0	20/500	13.60



### 264 Winchester Magnum

A-114	B-114	PSP	9,1	140	610	920	888	856	826	796	766	738	3840	3576	3327	3093	2873	2665	2468	-5	+0.1	+1.6	00	-5.2	-14.3	-27.3	20/500	16.20
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### 6,8 mm Remington SPC

A-603	B-603	FMJ BT	7,45	115	610	800	752	705	660	615	575	535	2385	2101	1845	1614	1410	1223	1058	-4	+1.9	+3.4	00	-9.1	-24.8	-48.1	20/500	12.50
A-604	B-604	HP BT	7,45	115	610	800	751	703	657	613	570	530	2385	2097	1837	1603	1397	1209	1043	-4	+1.9	+3.4	00	-9.2	-25.0	-48.5	20/500	12.50

**NEW**  
**NEW**



### 270 Winchester

A-161	B-161	SP	8,4	130	610	930	884	839	796	754	714	675	3641	3289	2966	2670	2397	2146	1916	-5	+0.1	+1.7	00	-5.5	-15.3	-30.1	20/500	13.30
A-027	B-027	SP	9,7	150	610	865	826	787	750	714	678	644	3637	3313	3012	2733	2475	2237	2017	-5	+0.4	+2.1	00	-6.5	-17.8	-34.7	20/500	13.80







### 7 mm - 08 Remington

A-401	B-401	HP	7,8	120	610	915	866	819	773	729	686	645	3255	2916	2607	2324	2066	1831	1618	-5	+0.1	+1.9	00	-5.9	-16.5	-32.3	20/500	12.50
A-400	B-400	PSP BT	9,1	140	610	870	835	801	767	735	703	672	3434	3162	2908	2670	2448	2240	2047	-5	+0.3	+2.0	00	-6.1	-16.8	-32.7	20/500	13.10

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## RIFLE AMMUNITION






Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	Velocity (m/s)					Energy (J)					Trajectory (cm)					Box/Case (Rds.)	Gross weight (kg)							
						0	50	100	150	200	250	300	0	50	100	150	200	250	300	0			50	100	150	200	250	300	
																						<b>7 x 57</b>							
A-051 <sup>(4)</sup>	B-051	SP	9,0	139	610	810	769	729	691	653	617	581	2955	2663	2394	2148	1921	1713	1523	-5	+1.0	+2.8	00	-8.0	-21.6	-41.3	20/500	13.00	
A-396 <sup>(4)</sup>	B-105	GROM	10,2	158	610	750	715	680	647	614	582	552	2880	2614	2368	2141	1931	1736	1559	-5	+1.7	+3.5	00	-9.2	-24.6	-47.8	20/500	13.70	
<b>NEW</b>	A-649	B-630	Z-GROM	10,2	158	610	750	715	680	647	614	582	552	2880	2614	2368	2141	1931	1736	1559	-5	+1.7	+3.5	00	-9.2	-24.6	-47.8	20/500	13.70
A-052 <sup>(4)</sup>	B-067	SP	11,2	173	610	750	718	686	656	625	597	568	3153	2888	2641	2411	2196	1996	1811	-5	+1.6	+3.4	00	-9.1	-24.0	-46.0	20/500	14.20	
<b>NEW</b>	A-141 <sup>(4)</sup>	B-127	FMJ BT	11,34	175	610	750	717	684	653	622	592	563	3153	2879	2625	2388	2168	1963	1775	-5	+1.6	+3.5	00	-9.1	-24.2	-46.6	20/500	14.20
																						<b>7 mm Mauser</b>							
A-478 <sup>(4)</sup>	B-478	SP	9,0	139	610	810	769	729	691	653	617	581	2955	2663	2394	2148	1921	1713	1523	-5	+1.0	+2.8	00	-8.0	-21.6	-41.3	20/500	13.00	
A-556 <sup>(4)</sup>	B-105	GROM	10,2	158	610	750	715	680	647	614	582	552	2880	2614	2368	2141	1931	1736	1559	-5	+1.7	+3.5	00	-9.2	-24.6	-47.8	20/500	13.70	
<b>NEW</b>	A-650	B-630	Z-GROM	10,2	158	610	750	715	680	647	614	582	552	2880	2614	2368	2141	1931	1736	1559	-5	+1.7	+3.5	00	-9.2	-24.6	-47.8	20/500	13.70
A-558 <sup>(4)</sup>	B-558	SP	11,2	173	610	750	718	686	656	625	597	568	3153	2888	2641	2411	2196	1996	1811	-5	+1.6	+3.4	00	-9.1	-24.0	-46.0	20/500	14.20	
																						<b>7 x 57 R</b>							
A-098	B-051	SP	9,0	139	610	790	750	710	672	635	599	565	2811	2530	2272	2035	1817	1618	1436	-5	+1.2	+3.1	00	-8.5	-22.7	-43.9	20/500	13.30	
<b>NEW</b>	A-376	B-105	GROM	10,2	158	610	730	695	661	628	596	565	534	2728	2474	2239	2021	1820	1635	1467	-5	+1.9	+3.8	00	-9.7	-26.4	-51.3	20/500	13.90
<b>NEW</b>	A-651	B-630	Z-GROM	10,2	158	610	730	695	661	628	596	565	534	2728	2474	2239	2021	1820	1635	1467	-5	+1.9	+3.8	00	-9.7	-26.4	-51.3	20/500	13.90
A-090	B-067	SP	11,2	173	610	730	698	667	637	608	579	552	2987	2733	2497	2276	2070	1880	1700	-5	+1.9	+3.7	00	-9.5	-25.5	-49.3	20/500	14.40	
<b>NEW</b>	A-232	B-127	FMJ BT	11,34	175	610	730	697	665	634	604	574	546	2987	2725	2519	2211	2044	1849	1671	-5	+1.9	+3.7	00	-9.6	-25.8	-49.9	20/500	14.40
																						<b>7 x 64</b>							
A-064	B-051	SP	9,0	139	610	870	827	786	745	706	668	631	3409	3081	2779	2500	2245	2010	1795	-5	+0.4	+2.1	00	-6.6	-18.2	-35.3	20/500	13.80	
A-402	B-400	PSP BT	9,1	140	610	865	830	796	763	730	698	667	3395	3125	2873	2638	2417	2212	2021	-5	+0.3	+2.1	00	-6.2	-17.1	-33.2	20/500	13.80	
A-405	B-405	HP BT	9,7	150	610	840	802	765	730	695	661	628	3429	3128	2848	2587	2346	2123	1916	-5	+0.6	+2.3	00	-7.0	-19.2	-37.0	20/500	15.10	
<b>NEW</b>	A-105	B-105	GROM	10,2	158	610	800	763	727	693	660	626	594	3276	2982	2709	2457	2223	2005	1806	-5	+1.0	+2.9	00	-8.0	-21.6	-41.0	20/500	15.40
<b>NEW</b>	A-630	B-630	Z-GROM	10,2	158	610	800	763	727	693	660	626	594	3276	2982	2709	2457	2223	2005	1806	-5	+1.0	+2.9	00	-8.0	-21.6	-41.0	20/500	15.40
A-403	B-403	PSP BT	10,4	160	610	810	780	751	723	695	668	641	3401	3157	2926	2709	2500	2313	2133	-5	+0.7	+2.5	00	-7.3	-19.8	-37.7	20/500	15.40	
<b>NEW</b>	A-067	B-067	SP	11,2	173	610	780	747	715	684	653	623	594	3410	3128	2865	2620	2391	2178	1979	-5	+1.2	+3.1	00	-8.3	-22.3	-42.1	20/500	15.90
<b>NEW</b>	A-167	B-127	FMJ BT	11,34	175	610	780	746	713	680	649	618	588	3410	3119	2874	2595	2360	2142	1939	-5	+1.2	+3.1	00	-8.4	-22.5	-42.5	20/500	15.90
A-404	B-404	PSP BT	11,3	174	610	780	753	727	701	676	651	627	3430	3198	2978	2770	2574	2389	2214	-5	+1.1	+2.9	00	-8.0	-21.3	-40.3	20/500	15.80	
A-122	B-067	SP	11,2	173	610	760	728	696	665	635	606	577	3238	2967	2714	2479	2260	2056	1866	-5	+1.5	+3.3	00	-8.8	-23.4	-44.6	20/500	15.90	

14 <sup>(4)</sup> C.I.P. <sup>(5)</sup> SAAMI

## RIFLE AMMUNITION






Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	Velocity (m/s)					Energy (J)					Trajectory (cm)					Box/Case (Rds.)	Gross weight (kg)							
						0	50	100	150	200	250	300	0	50	100	150	200	250	300	0			50	100	150	200	250	300	
																						<b>7 mm Remington Magnum</b>							
A-407	B-401	HP	7,8	120	610	1025	972	921	871	824	778	734	4085	3672	3296	2953	2641	2355	2095	-5	-0.6	+1.1	00	-4.4	-12.4	-24.3	20/500	15.60	
A-406	B-400	PSP BT	9,1	140	610	945	908	872	836	802	769	736	4051	3738	3446	3174	2919	2680	2457	-5	-0.3	+1.5	00	-5.0	-13.8	-26.6	20/500	16.20	
A-123	B-123	SP	9,4	145	610	930	889	848	809	772	735	699	4064	3710	3382	3078	2797	2536	2295	-5	-0.1	+1.7	00	-5.4	-14.7	-28.8	20/500	16.30	
A-410	B-405	HP BT	9,7	150	610	915	875	836	799	762	726	691	4069	3722	3399	3100	2822	2563	2323	-5	0.0	+1.8	00	-5.5	-15.2	-29.7	20/500	16.50	
A-378	B-105	GROM	10,2	158	610	850	812	775	739	704	670	636	3699	3375	3074	2794	2535	2295	2073	-5	+0.5	+2.2	00	-6.8	-18.6	-35.9	20/500	16.70	
<b>NEW</b>	A-652	B-630	Z-GROM	10,2	158	610	850	812	775	739	704	670	636	3699	3375	3074	2794	2535	2295	2073	-5	+0.5	+2.2	00	-6.8	-18.6	-35.9	20/500	16.70
A-408	B-403	PSP BT	10,4	160	610	880	849	818	788	759	731	703	4015	3735	3471	3223	2989	2768	2560	-5	+0.2	+1.9	00	-5.8	-15.7	-40.7	20/500	16.80	
A-409	B-404	PSP BT	11,3	174	610	845	817	789	762	736	710	684	4026	3762	3512	3275	3051	2839	2639	-5	+0.4	+2.2	00	-6.3	-17.2	-33.0	20/500	17.30	
A-115	B-115	SP	11,3	174	610	845	812	780	749	719	689	660	4026	3720	3433	3164	2912	2675	2454	-5	+0.5	+2.2	00	-6.6	-18.0	-34.7	20/500	17.30	
A-127	B-127	FMJ BT	11,34	175	610	845	813	782	752	723	694	665	4026	3730	3452	3190	2944	2713	2497	-5	+0.5	+2.2	00	-6.5	-17.8	-34.3	20/500	17.30	
																						<b>30 Carbine</b>							
A-204	B-204	SP RN	7,1	110	508	610	540	476	419	372	337	312	1326	1038	807	626	495	405	346	-5	+6	+8.3	00	-22.5	-62.8	-124.7	50/500	6.80	
A-273	B-273	HSP	7,1	110	508	610	540	476	419	372	337	312	1326	1038	807	626	495	405	346	-5	+6	+8.3	00	-22.5	-62.8	-124.7	50/500	6.80	
A-024	B-010	FMJ RN	7,1	110	508	610	540	476	419	372	337	312	1326	1038	807	626	495	405	346	-5	+6	+8.3	00	-22.5	-62.8	-124.7	50/500	6.80	
																						<b>300 AAC Blackout</b>							
A-636	B-636	FMJ	8,0	125	406,4	710	667	626	586	549	513	480	2016	1779	1565	1374	1203	1052	920	-5	+2.4	+4.4	00	-11.4	-31.1	-60.1	20/500	8.1	
<b>NEW</b>	A-638	B-63																											

## RIFLE AMMUNITION


Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	Velocity (m/s)							Energy (J)							Trajectory (cm)							Box/Case (Rds.)	Gross weight (kg)
						0	50	100	150	200	250	300	0	50	100	150	200	250	300	0	50	100	150	200	250	300		
						<b>7,5 x 54 French</b>																						
A-346	B-007	FMJ	9,0	139	610	830	788	748	709	671	634	598	3104	2800	2520	2262	2026	1809	1611	-5	+0.7	+2.6	00	-7.5	-20.5	-39.2	20/500	16.20
						<b>7,5 x 55 Swiss</b>																						
A-345	B-345	FMJ BT	11,3	174	610	770	741	713	685	658	632	606	3344	3098	2867	2650	2446	2254	2074	-5	+1.3	+3.1	00	-8.3	-22.3	-42.0	20/500	17.20
A-428	B-428	SP	11,3	174	610	770	730	691	654	617	582	548	3343	3005	2695	2411	2150	1911	1695	-5	+1.5	+3.3	00	-9.0	-24.0	-46.8	20/500	17.20
						<b>30-06 Springfield</b>																						
A-479	B-460	FMJ	8,0	123	610	960	903	849	797	746	698	651	3673	3252	2872	2530	2221	1942	1691	-5	-0.2	+1.6	00	-5.4	-15.2	-30.2	20/500	12.90
A-062	B-062	SP	9,7	150	610	885	838	792	748	705	664	624	3807	3412	3051	2720	2419	2144	1894	-5	+0.3	+2.1	00	-6.5	-18.0	-35.0	20/500	13.70
A-094	B-099	FMJ	9,7	150	610	885	846	809	771	735	700	666	3807	3478	3173	2889	2626	2382	2156	-5	+0.2	+2.0	00	-6.0	-16.6	-32.4	20/500	13.70
A-612	B-099	FMJ	9,7	150	610	838	797	761	725	690	657	624	3389	3090	2813	2555	2316	2095	1891	-5	+0.6	+2.4	00	-7.2	-19.5	-37.5	20/500	13.70
A-364	B-362	PSP BT	10,7	165	610	855	819	784	750	716	684	652	3908	3586	3286	3006	2744	2501	2276	-5	+0.4	+2.2	00	-6.5	-18.0	-34.7	20/500	14.20
A-365	B-363	HP BT	10,9	168	610	855	821	788	755	724	693	663	3908	3604	3318	3051	2801	2567	2349	-5	+0.4	+2.1	00	-6.4	-17.6	-34.0	20/500	14.30
A-323	B-323	GROM	11,0	170	610	810	771	732	695	659	624	590	3614	3271	2954	2662	2393	2145	1917	-5	+0.9	+2.8	00	-7.9	-21.4	-40.7	20/500	14.30
<b>NEW</b> A-628	B-628	Z-GROM	11,0	170	610	810	771	732	695	659	624	590	3614	3271	2954	2662	2393	2145	1917	-5	+0.9	+2.8	00	-7.9	-21.4	-40.7	20/500	14.30
A-449	B-449	FMJ BT	11,34	175	610	830	799	769	739	710	682	654	3906	3620	3351	3097	2859	2635	2426	-5	+0.6	+2.3	00	-6.9	-18.7	-35.8	20/500	14.50
A-066	B-066	SP	11,7	180	610	820	783	746	711	677	643	611	3922	3573	3250	2950	2672	2415	2177	-5	+0.8	+2.6	00	-7.5	-20.4	-39.0	20/500	14.70
A-418	B-367	HP BT	12,3	190	610	800	771	743	715	688	662	636	3940	3661	3397	3148	2915	2694	2487	-5	+0.9	+2.7	00	-7.5	-20.3	-38.6	20/500	15.00
						<b>300 Winchester Magnum</b>																						
A-119	B-119	FMJ BT	9,4	145	610	1000	957	916	876	837	800	763	4698	4306	3943	3606	3294	3000	2734	-5	-0.6	+1.2	00	-4.4	-12.4	-24.0	20/500	16.10
A-116	B-062	SP	9,7	150	610	990	939	890	842	797	752	710	4764	4285	3848	3450	3085	2752	2448	-5	-0.4	+1.3	00	-4.8	-13.4	-26.3	20/500	16.20
A-370	B-362	PSP BT	10,7	165	610	930	892	855	819	784	750	716	4624	4253	3908	3586	3286	3005	2744	-5	-0.1	+1.6	00	-5.3	-14.4	-27.9	20/500	16.70
A-371	B-363	HP BT	10,9	168	610	920	884	850	816	783	750	719	4607	4257	3929	3622	3334	3065	2813	-5	-0.1	+1.7	00	-5.4	-14.6	-28.1	20/500	16.80
A-377	B-323	GROM	11,0	170	610	875	834	794	755	717	680	645	4217	3829	3470	3138	2831	2549	2289	-5	+0.3	+2.1	00	-6.3	-17.6	-34.2	20/500	16.80
<b>NEW</b> A-634	B-628	Z-GROM	11,0	170	610	875	834	794	755	717	680	645	4217	3829	3470	3138	2831	2549	2289	-5	+0.3	+2.1	00	-6.3	-17.6	-34.2	20/500	16.80
A-124	B-066	SP	11,7	180	610	885	846	808	771	735	700	666	4568	4174	3808	3467	3151	2858	2588	-5	+0.2	+2.0	00	-6.0	-16.6	-32.4	20/500	17.20
A-372	B-367	HP BT	12,3	190	610	865	854	824	795	766	738	710	4822	4493	4182	3889	3613	3352	3106	-5	+0.1	+1.9	00	-5.7	-15.4	-29.8	20/500	17.50
						<b>7,62 x 39</b>																						
A-210	B-210	PSP	8,0	123	610	750	699	650	603	557	515	475	2242	1946	1683	1447	1238	1057	900	-5	+1.9	+3.8	00	-10.6	-29.5	-57.6	20/1000	18.50
A-030	B-030	SP RN	8,0	123	610	750	680	614	552	495	443	398	2242	1845	1504	1216	978	782	631	-5	+2.4	+4.4	00	-12.8	-35.2	-70.8	20/1000	18.50
A-041	B-074	FMJ	8,0	123	610	750	701	655	610	566	526	487	2242	1961	1708	1481	1278	1101	946	-5	+1.9	+3.8	00	-10.2	-28.6	-56.0	20/1000	18.50


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## RIFLE AMMUNITION


Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	Velocity (m/s)							Energy (J)							Trajectory (cm)							Box/Case (Rds.)	Gross weight (kg)
						0	50	100	150	200	250	300	0	50	100	150	200	250	300	0	50	100	150	200	250	300		
						<b>7,62 x 54 R</b>																						
A-452	B-382	SP BT	9,7	150	724	865	815	776	737	700	664	629	3561	3230	2925	2642	2381	2141	1920	-5	+0.5	+2.2	00	-6.8	-18.7	-36.1	20/500	12.60
A-219	B-219	FMJ BT	9,7	150	724	865	817	779	742	706	671	637	3561	3243	2947	2673	2420	2186	1969	-5	+0.4	+2.2	00	-6.7	-18.5	-35.6	20/500	12.60
A-450	B-437	FMJ BT	11,0	170	724	815	785	755	726	697	670	643	3659	3391	3140	2902	2680	2471	2274	-5	+0.7	+2.5	00	-7.2	-19.6	-37.4	20/500	13.70
A-031	B-125	SP BT	11,7	180	724	805	768	732	697	663	630	598	3780	3441	3127	2836	2567	2318	2087	-5	+0.9	+2.8	00	-7.9	-21.3	-40.5	20/500	14.00
A-169	B-169	FMJ BT	11,8	182	724	800	772	744	717	690	664	639	3774	3511	3263	3029	2808	2600	2404	-5	+0.8	+2.6	00	-7.5	-20.2	-38.4	20/500	14.00
A-601	B-006	FMJ BT	12,3	190	724	785	758	731	704	678	653	628	3794	3533	3286	3053	2833	2626	2431	-5	+1.0	+2.8	00	-7.9	-21.1	-39.9	20/500	14.50
						<b>7,65 x 53 Argentine</b>																						
A-176	B-382	SP BT	9,7	150	610	860	819	780	741	704	667	632	3595	3262	2954	2669	2406	2164	1941	-5	+0.4	+2.2	00	-6.7	-18.5	-35.7	20/1500	13.30
A-129	B-143	FMJ BT	11,3	174	610	800	771	742	714	686	659	633	3608	3348	3102	2870	2653	2448	2256	-5	+0.9	+2.7	00	-7.6	-20.4	-38.8	20/1500	14.00
A-179	B-125	SP BT	11,7	180	610	775	739	704	670	637	604	573	3503	3184	2889	2616	2363	2130	1913	-5	+1.3	+3.2	00	-8.6	-23.0	-44.1	20/1500	14.30
						<b>303 British</b>																						
A-382	B-382	SP BT	9,7	150	610	820	780	742	705	668	633	598	3268	2960	2674	2411	2169	1946	1741	-5	+0.8	+2.6	00	-7.7	-20.8	-39.7	20/500	13.20
A-143	B-143	FMJ BT	11,3	174	610	750	722	694	667	640	614	589	3171	2936	2714	2506	2310	2126	1954	-5	+1.5	+3.3	00	-8.9	-23.5	-44.2	20/500	13.50
A-125	B-125	SP BT	11,7	180	610	750	715	685	647	614	582	552	3281	2978	2698	2439	2199	1978	1776	-5	+1.7	+3.5	00	-9.2	-24.6	-47.8	20/500	14.20
						<b>7,92 x 33 Kurz</b>																						
A-424	B-424	FMJ BT	8,0	124	406	685	639	594	552	512	474	439	1886	1641	1421	1225	1055	905	775	-5	+2.9	+5.0	00	-13.4	-36.0	-68.9	20/500	9.80
						<b>8 x 51 R Lebel</b>																						
A-417	B-417																											

## RIFLE AMMUNITION

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	Velocity (m/s)						Energy (J)						Trajectory (cm)						Box/Case (Rds.)	Gross weight (kg)				
						0	50	100	150	200	300	0	50	100	150	200	300	0	50	100	150	200	250			300			
																						<b>8 x 57 IS</b>							
A-162*	B-162	SP	9,0	139	610	820	771	723	677	632	590	549	3028	2674	2353	2063	1801	1565	1356	-5	+1.0	+2.9	00	-8.2	-22.3	-43.7	20/500	13.20	
A-528*	B-350	HP BT	11,34	175	610	775	737	699	663	628	594	561	3406	3077	2773	2493	2236	1999	1783	-5	+1.4	+3.2	00	-8.8	-23.4	-45.2	20/500	14.30	
A-575*	B-349	PSP BT	11,34	175	610	775	739	704	670	637	604	573	3406	3096	2809	2543	2297	2070	1860	-5	+1.3	+3.2	00	-8.6	-23.0	-44.1	20/500	14.30	
A-321*	B-321	GROM	12,0	185	610	750	710	670	633	596	560	527	3372	3018	2695	2399	2128	1882	1663	-5	+1.8	+3.6	00	-9.4	-26	-50.8	20/500	14.60	
<b>NEW</b>	A-629*	B-629	Z-GROM	12,0	185	610	750	710	670	633	596	560	527	3372	3018	2695	2399	2128	1882	1663	-5	+1.8	+3.6	00	-9.4	-26	-50.8	20/500	14.60
A-128*	B-128	SP	12,7	196	610	750	710	671	633	596	561	527	3572	3198	2856	2542	2255	1995	1763	-5	+1.8	+3.7	00	-9.4	-26	-50.8	20/500	15.00	
A-213*	B-022	FMJ BT	12,85	198	610	740	712	684	657	631	605	580	3513	3251	3004	2772	2555	2351	2158	-5	+1.7	+3.5	00	-9.1	-24.1	-45.6	20/500	15.00	
A-471*	B-471	FMJ BT	16,3	250	610	660	636	612	589	567	545	524	3529	3276	3038	2813	2602	2406	2223	-5	+2.7	+4.5	00	-11.8	-31.5	-59.8	20/500	16.70	


																						<b>8 x 57 IRS</b>						
A-475	B-128	SP	12,7	196	610	730	690	652	614	578	544	511	3384	3026	2698	2397	2123	1877	1657	-5	+2.0	+3.9	00	-10.1	-28.0	-54.6	20/500	16.00
A-564	B-564	FMJ BT	12,96	200	610	720	692	665	639	613	587	563	3359	3106	2867	2634	2433	2235	2051	-5	+2.0	+3.8	00	-9.6	-25.4	-48.7	20/500	16.00


																						<b>8 mm Mauser</b>							
A-462*	B-462	SP	9,0	139	610	795	753	713	674	636	599	563	4014	3603	3226	2881	2565	2276	2014	-5	+1.2	+3.0	00	-8.4	-22.6	-43.8	20/500	13.50	
A-350*	B-350	HP BT	11,34	175	610	710	674	638	604	570	538	508	2858	2572	2309	2066	1844	1643	1463	-5	+2.2	+4.1	00	-10.7	-29.4	-56.9	20/500	14.30	
A-349*	B-349	PSP BT	11,34	175	610	710	676	642	610	578	548	519	2858	2589	2340	2109	1896	1703	1527	-5	+2.2	+4.1	00	-10.4	-28.5	-55.2	20/500	14.30	
A-351*	B-321	GROM	12,0	185	610	665	627	591	555	522	490	460	2651	2358	2091	1850	1634	1441	1267	-5	+3.1	+5.2	00	-13.4	-35.9	-68.0	20/500	14.70	
<b>NEW</b>	A-647*	B-629	Z-GROM	12,0	185	610	665	627	591	555	522	490	460	2651	2358	2091	1850	1634	1441	1267	-5	+3.1	+5.2	00	-13.4	-35.9	-68.0	20/500	14.70
A-459*	B-459	SP	12,7	196	610	665	627	591	556	522	490	460	2809	2499	2216	1960	1732	1527	1343	-5	+3.1	+5.1	00	-13.4	-35.9	-68.0	20/500	15.00	
A-022*	B-022	FMJ BT	12,85	198	610	665	638	612	587	562	539	516	2837	2615	2407	2211	2029	1861	1706	-5	+2.7	+4.5	00	-11.8	-31.8	-60.5	20/500	15.00	


																						<b>8 x 60 S</b>							
A-474	B-459	SP	12,7	196	610	780	739	699	660	622	586	551	3864	3465	3100	2765	2459	2179	1927	-5	+1.4	+3.2	00	-8.8	-23.5	-45.9	20/500	15.00	
A-531	B-321	GROM	12,0	185	610	800	785	717	678	640	603	567	3836	3445	3086	2757	2456	2181	1930	-5	+1.1	+3.0	00	-8.3	-22.3	-43.1	20/500	15.00	
<b>NEW</b>	A-648	B-629	Z-GROM	12,0	185	610	800	785	717	678	640	603	567	3836	3445	3086	2757	2456	2181	1930	-5	+1.1	+3.0	00	-8.3	-22.3	-43.1	20/500	15.00


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## RIFLE AMMUNITION

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	Velocity (m/s)						Energy (J)						Trajectory (cm)						Box/Case (Rds.)	Gross weight (kg)			
						0	50	100	150	200	300	0	50	100	150	200	300	0	50	100	150	200	250			300		
																						<b>338 Lapua Magnum</b>						
A-421	B-421	FMJ BT	16,2	250	690	900	873	847	822	797	772	748	6561	6180	5817	5472	5144	4831	4533	-5	00	+1.7	00	-5.4	-14.5	-27.6	20/400	19.50
A-423	B-423	HP BT	16,2	250	690	900	873	847	822	797	772	748	6561	6180	5817	5472	5144	4831	4533	-5	00	+1.7	00	-5.4	-14.5	-27.6	20/400	19.50

																						<b>9,3 x 62</b>						
A-330	B-330	SP	18,5	285	610	690	649	610	572	535	501	468	4398	3896	3434	3018	2648	2319	2026	-5	+2.7	+4.5	00	-12.5	-33.7	-64.3	20/500	19.00
A-637	B-633	Solid HP	16,20	250	610	720	677	635	596	558	522	488	4200	3079	3269	2873	2519	2205	1930	-5	+2.27	+4.19	00	-11.0	-30.0	-58.0	20/500	18.00

																						<b>9,3 x 74 R</b>						
A-461	B-330	SP	18,5	285	610	690	649	610	572	535	501	468	4398	3896	3434	3018	2648	2319	2026	-5	+2.7	+4.5	00	-12.5	-33.7	-64.3	20/500	19.00
A-633	B-633	Solid HP	16,20	250	610	720	677	635	596	558	522	488	4200	3079	3269	2873	2519	2205	1930	-5	+2.27	+4.19	00	-11.0	-30.0	-58.0	20/500	18.00

																						<b>375 H&amp;H Magnum</b>						
A-265	B-265	FMJ RN	19,5	300	610	775	723	673	625	578	535	494	5838	5079	4401	3794	3253	2781	2371	-5	+1.6	+3.5	00	-9.5	-26.9	-53.1	20/400	18.30
A-267	B-267	SP RN	19,5	300	610	775	723	673	625	578	535	494	5838	5079	4401	3794	3253	2781	2371	-5	+1.6	+3.5	00	-9.5	-26.9	-53.1	20/400	18.30
A-425	B-425	Solid RN	19,5	300	610	750	694	640	588	540	494	452	5468	4678	3981	3365	2832	2376	1986	-5	+2.0	+3.9	00	-11.3	-31.3	-60.7	20/400	18.30
A-426	B-426	GROM	19,5	300	610	750	694	640	588	540	494	452	5468	4678	3981	3365	2832	2376	1986	-5	+2.0	+3.9	00	-11.3	-31.3	-60.7	20/400	18.30
A-631	B-631	Solid HP	17,50	270	610	770	727	685	645	607	570	535	5188	4619	4104	3639	3219	2841	2502	-5	+1.49	+3.36	00	-9.26	-25.2	-48.7	20/400	17.30

																						<b>45-70 Government</b>						
A-448	B-448	SJFP	26,25	405	610	405	370	342	320	304	290	278	2152	1793	1531	1345	1209	1103	1016	-5	+15.6	+18.3	00	-42.0	-110.1	-206.8	20/500	20.00

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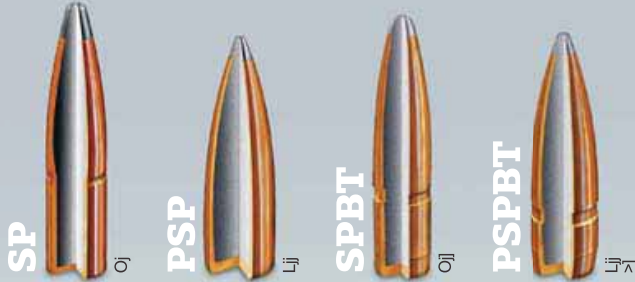


## RIFLE BULLETS



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## RIFLE BULLETS



Standard bullets are designed to provide controlled expansion when expansion and by the progressively tapered jacket in its ogival part which provides uniform mushrooming and good penetration.

PSP bullets have a sharp lead nose which causes bullet expansion upon impact and maximum striking energy at longer ranges.

SP BT and PSP BT bullets have a specially shaped back part with reduced diameter successful shooting at longer distances at which the bullet maintains striking energy

Pk

B-193	SP	B-032	SP	B-132*	SP	B-211**	SP	B-642	SP	B-131	SP	B-134	SP	B-047	PSP	B-117	SP	B-483	SP	B-084	SP BT	B-118	SP RN	B-114	PSP	B-230	SP RN	B-352	SP		
2,90g	45gr	3,24g	50gr	3,56g	55gr	3,56g	55gr	3,88g	60gr	5,80g	90gr	6,50g	100gr	6,50g	100gr	8,00g	123gr	8,00g	123gr	9,00g	139gr	10,10g	156gr	9,10g	140gr	10,10g	156gr	8,00g	123gr		
Cal. 22	22	Cal. 22	22	Cal. 22	22	Cal. 22	22	Cal. 22	22	Cal. 6mm	6mm	Cal. 6mm	6mm	Cal. 25	25	Cal. 6,5mm	6,5mm	Cal. 6,5mm	6,5mm	Cal. 6,5mm	6,5mm	Cal. 6,5mm	6,5mm	Cal. 6,5mm	6,5mm	Cal. 6,5mm	6,5mm	Cal. 30	30		
Da.(Inch) 222	222	Da.(Inch) 224	224	Da.(Inch) 224	224	Da.(Inch) 224	224	Da.(Inch) 224	224	Da.(Inch) 242	242	Da.(Inch) 242	242	Da.(Inch) 257	257	Da.(Inch) 263	263	Da.(Inch) 264	264	Da.(Inch) 263	263	Da.(Inch) 263	263	Da.(Inch) 263	263	Da.(Inch) 263	263	Da.(Inch) 268	268		
BC 0.143		BC 0.195		BC 0.215		BC 0.206		BC		BC 0.321		BC 0.355		BC 0.327		BC 0.537		BC 0.363		BC 0.604		BC 0.524		BC 0.516		BC 0.266		BC 0.537			
CALIBER 22								CALIBER 6 mm				CALIBER 25				CALIBER 6,5 mm															
*223 Remington bullet **22-250 Remington bullet																															
B-161	SP	B-027	SP	B-478	SP	B-051	SP	B-400	PSP BT	B-123	SP	B-403	SP BT	B-558	SP	B-067	SP	B-404	PSP BT	B-115	SP	B-204	SP RN	B-273	HSP	B-062	SP	B-028	FSP	B-362	PSP BT
8,4g	130gr	9,70g	150gr	9,00g	139gr	9,00g	139gr	9,10g	140gr	9,40g	145gr	10,40g	160gr	11,20g	173gr	11,20g	173gr	10,30g	174gr	11,30g	174gr	7,10g	110gr	7,10g	110gr	9,70g	150gr	9,70g	150gr	10,70g	165gr
Cal. 270	270	Cal. 270	270	Cal. 7mm	7mm	Cal. 7mm	7mm	Cal. 7mm	7mm	Cal. 7mm	7mm	Cal. 7mm	7mm	Cal. 7mm	7mm	Cal. 7mm	7mm	Cal. 7mm	7mm	Cal. 7mm	7mm	Cal. 30	30	Cal. 30	30	Cal. 30	30	Cal. 30	30	Cal. 30	30
Da.(Inch) 277	277	Da.(Inch) 277	277	Da.(Inch) 284	284	Da.(Inch) 285	285	Da.(Inch) 284	284	Da.(Inch) 284	284	Da.(Inch) 284	284	Da.(Inch) 284	284	Da.(Inch) 285	285	Da.(Inch) 284	284	Da.(Inch) 284	284	Da.(Inch) 307	307	Da.(Inch) 307	307	Da.(Inch) 308	308	Da.(Inch) 308	308	Da.(Inch) 308	308
BC 0.360		BC 0.408		BC 0.372		BC 0.376		BC 0.457		BC 0.404		BC 0.511		BC 0.456		BC 0.460		BC 0.555		BC 0.476		BC 0.171		BC 0.171		BC 0.342		BC 0.235		BC 0.439	
CALIBER 270								CALIBER 7 mm								CALIBER 30															

When ordering, check the table with ammunition articles to see where desired bullet is assembled.

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## RIFLE BULLETS



### FSP bullets

These bullets are suitable for use in carbines with tubular magazines as they reduce the expansion.

They expand reliably and penetrate deeply on light to medium game. HSP bullets have a cavity in the nose which causes expansion and helps mushrooming during penetration.

SP RN bullets have a blunt rounded nose and are suitable for short range shooting, especially in the bushes or in woods. The large lead weight exposed in the nose assures high energy impact and bullet mushrooming that is reliable even at lower velocities. These bullets have larger weights depending on length.

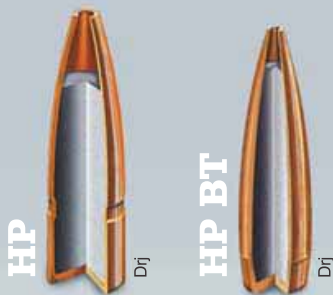
### Pk

<b>B-200</b> FSP 11,0g   170gr Cal. 30 Dia.(Inch) .308 BC 0.250	<b>B-428</b> SP 11,3g   174gr Cal. 30 Dia.(Inch) .308 BC 0.370	<b>B-066</b> SP 11,7g   180gr Cal. 30 Dia.(Inch) .308 BC 0.413	<b>B-210</b> FSP 8,00g   123gr Cal. 7,62mm Dia.(Inch) .310 BC 0.283	<b>B-030</b> SP RN 8,00g   123gr Cal. 7,62mm Dia.(Inch) .310 BC 0.355	<b>B-382</b> SP BT 9,70g   150gr Cal. 303mm Dia.(Inch) .311 BC 0.385	<b>B-125</b> SP BT 11,70g   180gr Cal. 303mm Dia.(Inch) .311 BC 0.416	<b>B-462</b> SP 9,00g   139gr Cal. 8mm Dia.(Inch) .322 BC 0.360	<b>B-162</b> SP 9,00g   139gr Cal. 8mm Dia.(Inch) .323 BC 0.360	<b>B-349</b> PSP BT 11,34g   175gr Cal. 8mm Dia.(Inch) .322 BC 0.413	<b>B-459</b> SP 12,70g   196gr Cal. 8mm Dia.(Inch) .32 BC 0.365	<b>B-128</b> SP 12,70g   196gr Cal. 8mm Dia.(Inch) .323 BC 0.363	<b>B-561</b> SP 13,50g   208gr Cal. 8mm Dia.(Inch) .330 BC 0.355
CALIBER 30			CALIBER 7,62 mm		CALIBER 303		CALIBER 8 mm					

<b>B-330</b> SP 18,50g   285gr Cal. 9,3mm Dia.(Inch) .365 BC 0.334	<b>B-267</b> SP 19,50g   300gr Cal. 375 Dia.(Inch) .375 BC 0.284	<b>B-448</b> SP FI 26,25g   405gr Cal. 45 Dia.(Inch) .458 BC 0.225
CALIBER 9,3 mm	CALIBER 375	CALIBER 45

When ordering, check the table with ammunition articles to see where desired bullet is assembled.

## RIFLE BULLETS



HP and HP BT are designed primarily for shooting competitions. Due to a cavity in the nose, the center of gravity is placed back to initiate rapid expansion on impact.

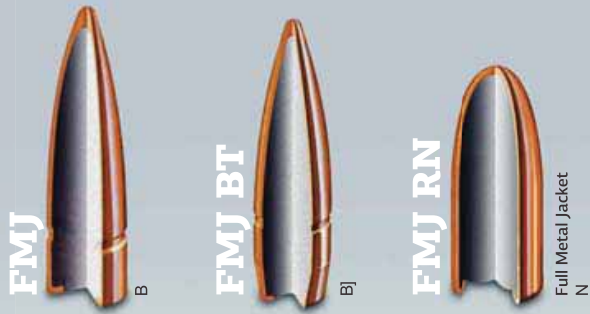
HP BT bullets have a small meplat, long ogival and boat tail design. These features initiate rapid expansion on impact.

### Esk

When ordering, check the table with ammunition articles to see where desired bullet is assembled.

<b>B-616</b> HP BT 3,56g   55gr Cal. 22 Dia.(Inch) .224 BC 0.243	<b>B-535*</b> HP BT 4,47g   69gr Cal. 22 Dia.(Inch) .224 BC 0.311	<b>B-481*</b> HP BT 4,86g   75gr Cal. 22 Dia.(Inch) .224 BC 0.360	<b>B-046</b> HP 5,80g   90gr Cal. 25 Dia.(Inch) .257 BC 0.270	<b>B-485</b> HP BT 7,80g   120gr Cal. 6,5mm Dia.(Inch) .264 BC 0.415	<b>B-604</b> HP BT 7,45g   115gr Cal. 6,8mm Dia.(Inch) .277 BC 0.308	<b>B-401</b> HP 7,80g   120gr Cal. 7mm Dia.(Inch) .284 BC 0.334	<b>B-405</b> HP BT 9,70g   150gr Cal. 7mm Dia.(Inch) .284 BC 0.415
CALIBER 22 *223 Remington Bullet			CALIBER 25	CALIBER 6,5 mm	CALIBER 6,8 mm	CALIBER 7 mm	
<b>B-638</b> HP BT 8,10g   125gr Cal. 30 Dia.(Inch) .308 BC 0.322	<b>B-363</b> HP BT 10,90g   168gr Cal. 30 Dia.(Inch) .308 BC 0.460	<b>B-592</b> HP BT 11,34g   175gr Cal. 30 Dia.(Inch) .308 BC 0.521	<b>B-367</b> HP BT 12,30g   190gr Cal. 30 Dia.(Inch) .308 BC 0.589	<b>B-350</b> HP BT 11,34g   175gr Cal. 8mm Dia.(Inch) .322 BC 0.391	<b>B-423</b> HP BT 16,32g   250gr Cal. 338 Dia.(Inch) .338 BC 0.605	<b>B-633</b> Solid HP 16,2g   250gr Cal. 9,3mm Dia.(Inch) .365 BC 0.328	<b>B-631</b> Solid HP 17,50g   270gr Cal. 375 Dia.(Inch) .375 BC 0.343
CALIBER 30				CALIBER 8 mm	CALIBER 338	CALIBER 9,3 mm	CALIBER 375

## RIFLE BULLETS



**BFm<sup>^</sup>** are nonexpanding bullets with a full-length jacket opened at the base only. Due to their sharp nose, these bullets provide good penetration. They are suitable for target shooting, but also for varmint hunting as they cause minimum tissue damage and leave a small exit hole.

**FMJ RN** bullets with a rounded nose are suitable for short range shooting. They provide maximum penetration when hunting dangerous game.

**FMJ BT** bullets are specially shaped bullets designed to reduce air resistance. The rear cone in combination with an aerodynamically shaped ogival part provide high ballistic performance.

Model	Weight	Caliber	Diameter	BC
<b>B-212 FMJ BT</b>	3,56g	22	.224	0.256
<b>B-615 FMJ BT</b>	3,56g	22	.224	0.256
<b>B-419 FMJ BT</b>	4,00g	22	.224	0.290
<b>B-484 FMJ BT</b>	7,10g	6,5mm	.264	0.411
<b>B-083 FMJ BT</b>	9,00g	6,5mm	.263	0.413
<b>B-605 FMJ BT</b>	9,00g	6,5mm	.268	0.604
<b>B-603 FMJ BT</b>	7,45g	6,8mm	.277	0.315
<b>B-127 FMJ BT</b>	11,34g	7mm	.284	0.442
<b>B-010 FMJ</b>	7,10g	30	.307	0.171
<b>B-636 FMJ</b>	8,10g	30	.308	0.325
<b>B-007 FMJ</b>	9,00g	30	.308	0.369
<b>B-119 FMJ BT</b>	9,40g	30	.308	0.401
<b>B-009** FMJ BT</b>	9,40g	30	.308	0.419
<b>B-436 FMJ BT</b>	9,70g	308	.311	0.467
<b>B-099 FMJ</b>	9,70g	308	.311	0.413
<b>B-345 FMJ BT</b>	11,30g	308	.311	0.512
<b>B-366** FMJ BT</b>	11,34g	308	.311	0.503
<b>B-449 FMJ BT</b>	11,34g	308	.311	0.502
<b>B-074 FMJ</b>	8,00g	7,62mm	.310	0.330
<b>B-219 FMJ BT</b>	9,70g	308	.311	0.330
<b>B-437 FMJ BT</b>	11,00g	308	.311	0.513
<b>B-143 FMJ BT</b>	11,30g	308	.311	0.525
<b>B-169 FMJ BT</b>	11,80g	308	.311	0.544
<b>B-006 FMJ BT</b>	12,30g	308	.311	0.560

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\*\*22-250 Remington bullet



## RIFLE AMMUNITION



When ordering, check the table with ammunition articles to see where desired bullet is assembled.

Model	Weight	Caliber	Diameter	BC
<b>B-424 FMJ BT</b>	8,00g	8mm	.323	0.295
<b>B-022 FMJ BT</b>	12,85g	8mm	.322	0.517
<b>B-564 FMJ BT</b>	12,96g	8mm	.322	0.510
<b>B-001 FMJ BT</b>	12,85g	8mm	.323	0.510
<b>B-384 FMJ BT</b>	13,50g	8mm	.330	0.480
<b>B-471 FMJ BT</b>	16,30g	8mm	.323	0.560
<b>B-417 FMJ BT</b>	12,96g	8mm	.327	0.516
<b>B-421 FMJ BT</b>	16,20g	338	.388	0.605
<b>B-265 FMJ RN</b>	19,5gr	375	.375	0.284
<b>B-444 FPI</b>	19,50g	375	.375	0.257

Designed according to market demands, improved by the precious suggestions of solutions, long-term special research work of ballistics and hunting experts. It is made of high quality raw materials and components carefully chosen according to its application. We also considered, to perfection severe demands of numerous passionate shooters, tolerances, providing uniform quality of the ammunition. Besides standard expanding own design, with very high performances on the target.

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**GROM (THUNDER)<sup>®</sup>**



**GROM (THUNDER)<sup>®</sup>**

*High Performances Bullet*



**GROM (THUNDER)<sup>®</sup>**

Art.	Caliber	Dia. [inch]	Type	Weight [g]	Weight [gr]
B-105	7 mm	.284	Grom	10,2	158
B-323	30	.308	Grom	11,0	170
B-321	8 mm	.322	Grom	12,0	185

Art.	Caliber	Dia. [inch]	Type	Weight [g]	Weight [gr]	
B-630	7 mm	.284	Z-Grom	10,2	158	<b>NEW</b>
B-628	30	.308	Z-Grom	11,0	170	<b>NEW</b>
B-629	8 mm	.322	Z-Grom	12,0	185	<b>NEW</b>

Attentively analyzing your needs and wishes we designed a new bullet type made of a copper alloy with a small lead core. The bullet type with an optimum balance of characteristics when penetrating: controlled and reliable expansion, deep penetration, maximum weight retention, good accuracy and satisfying energy. GROM ammunition is intended for big game hunting.

When ordering, check the table with ammunition articles to see where desired bullet is assembled.

*"Old soldiers never die"*

over 100 years and is still very much alive. As a short range woods or bush cartridge for all big game from deer to grizzly bear, 45-70 will remain its own with our modern developments. Its greatest fault deliver very impressive knockdown on our heaviest species of big game.

**45-70  
GOVERNMENT**



**SOLID BULLETS**



Performance grooves      Special brass



Triangular Cavity

Following market demands for development of nature and h They enable good expansion, big energy transfer and maximum adequately to these requirements. This year we proudly present remaining mass of bullet. Good position of grooves enables a complete ecological line of cartridges with lead free bullets. pressure reduction and outstanding precision.

Bullets meet expectations of hunters and are available in following calibers:

A-637	9,3 x 62	250 gr	Solid HP
A-633	9,3 x 74 R	250 gr	Solid HP
A-631	375 H & H Magnum	270 gr	Solid HP

**Interior ballistic advantages of SOLID bullets:**

- É Less barrel friction
- É Less gun barrel heating
- É Lower energy loss of the bullet
- É Less gun barrel wear
- É Low friction on the surface

**Exterior ballistic advantages of SOLID bullets:**

- É Excellent accuracy
- É Projectiles respond fast and safe
- É F
- É Maximum retain of mass
- É Excellent penetration
- É B\_s







## MATCH AMMUNITION



PPU Match Line ammunition is designed for accurate shooting in shorter and longer ranges. The most popular calibers designed primarily for those who wish to make competition quality ammunition on their own. The exceptional accuracy of PPU Match ammunition is the result of special production procedures and control which make possible the manufacture of parts with very narrow

















tolerances. PPU Match components are made with materials of high quality and on special equipment. For loading ammunition we use reliable primers of uniform quality and carefully chosen powders so that they provide consistent ballistic characteristics.



## RIFLE MATCH BULLETS



When ordering, check the table with ammunition articles to see where desired bullet is assembled.

 <b>B-399* HP BT</b> 4,47g   69gr Cal. 224 Dia.(Inch) .224 BC 0.310 <b>CALIBER 22</b> *9" or faster twist barrels	 <b>B-495* HP BT</b> 4,86g   75gr Cal. 224 Dia.(Inch) .224 BC 0.350 <b>CALIBER 22</b>	 <b>B-540 HP BT</b> 4,86g   75gr Cal. 224 Dia.(Inch) .224 BC 0.400 <b>CALIBER 22</b> 6,5 mm	 <b>B-499 HP BT</b> 9,70g   150gr Cal. 7mm Dia.(Inch) .284 BC 0.415 <b>CALIBER 7 mm</b>	 <b>B-625 HP BT</b> 10,04g   155gr Cal. 308 Dia.(Inch) .308 BC 0.450 <b>CALIBER 308</b>	 <b>B-594** Solid HP</b> 10,10g   156gr Cal. 308 Dia.(Inch) .308 BC 0.485 <b>CALIBER 308</b> **308 Winchester Bullet with three groove	 <b>B-496 HP BT</b> 10,90g   168gr Cal. 308 Dia.(Inch) .308 BC 0.450 <b>CALIBER 308</b>	 <b>B-500 FMJ BT</b> 11,34g   175gr Cal. 308 Dia.(Inch) .308 BC 0.485 <b>CALIBER 308</b>	 <b>B-593 HP BT</b> 11,34g   175gr Cal. 308 Dia.(Inch) .308 BC 0.475 <b>CALIBER 308</b>	 <b>B-497 HP BT</b> 12,30g   190gr Cal. 308 Dia.(Inch) .308 BC 0.510 <b>CALIBER 308</b>
 <b>B-529 FMJ BT</b> 11,80g   182gr Cal. 308 Dia.(Inch) .311 BC 0.520 <b>CALIBER 308</b>	 <b>B-348 FMJ BT</b> 12,85g   198gr Cal. 8mm Dia.(Inch) .322 BC 0.517 <b>CALIBER 8 mm</b>	 <b>B-541 FMJ BT</b> 12,96g   200gr Cal. 8mm Dia.(Inch) .322 BC 0.500 <b>CALIBER 8 mm</b>	 <b>B-498 FMJ BT</b> 16,30g   250gr Cal. 8mm Dia.(Inch) .323 BC 0.560 <b>CALIBER 8 mm</b>	 <b>B-583 HP BT</b> 16,20g   250gr Cal. 338 Dia.(Inch) .338 BC 0.598 <b>CALIBER 338</b>	 <b>B-429 Solid</b> 47,00g   725gr Cal. 50 Dia.(Inch) .50 BC 0.817 <b>CALIBER 50</b> with two grooves				



## MATCH AMMUNITION

### 223 Remington MATCH HP BT 4,47 g/69 gr

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	BC G1
A-399	B-399	HPBT	4,47	69	610	.310
D (m)	0m	100m	200m	300m	400m	500m
V (m/s)	870	773	682	597	519	450
E (J)	1692	1334	1039	797	603	453
100m	-5	x	-11.5	-43.9	-104.9	-202.3
200m	-5	+5.7	x	-26.7	-82.0	-173.6
300m	-5	+14.6	+17.8	x	-46.3	-129.0
400m	-5	+26.2	+41.0	+34.8	x	-71.1
500m	-5	+40.5	+69.4	+77.4	+56.9	x

\*9" or faster twist barrels

### 223 Remington MATCH HP BT 4,86 g/75 gr

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	BC G1
A-495	B-495	HPBT	4,86	75	610	.350
D (m)	0m	100m	200m	300m	400m	500m
V (m/s)	830	746	666	592	523	461
E (J)	1674	1351	1079	852	665	516
100m	-5	X	-12.8	-47.3	-110.9	-210.5
200m	-5	+6.4	x	-28.1	-85.4	-178.5
300m	-5	+15.8	+18.8	x	-47.9	-131.6
400m	-5	+27.7	+42.7	+35.9	x	-71.8
500m	-5	+42.1	+71.4	+79.0	+57.5	x

\*9" or faster twist barrels

### 6,5x55 Swedish MATCH HP BT 7,8 g/120 gr

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	BC G1
A-540	B-540	HPBT	7,8	120	610	.400
D (m)	0m	100m	200m	300m	400m	500m
V (m/s)	830	755	684	618	556	500
E (J)	2679	2218	1822	1483	1203	973
100m	-5	x	-12.2	-45.5	-104.1	-196.4
200m	-5	+6.1	x	-27.1	-79.6	-165.8
300m	-5	+15.2	+18.1	x	-43.4	-120.6
400m	-5	+26.0	+39.8	+32.6	x	-66.3
500m	-5	+39.3	+66.3	+72.3	+53.0	x



### 7 mm Remington MATCH HP BT 9,7 g/150 gr

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	BC G1
A-499	B-499	HPBT	9,7	150	610	.400
D (m)	0m	100m	200m	300m	400m	500m
V (m/s)	915	836	762	691	625	562
E (J)	4069	3399	2822	2323	1897	1534
100m	-5	x	-9.1	-35.0	-81.7	-152.8
200m	-5	+4.5	x	-21.4	-63.5	-130.1
300m	-5	+11.7	+14.3	x	-35.0	-94.5
400m	-5	+20.4	+31.8	+26.3	x	-50.7
500m	-5	+30.6	+52.0	+56.7	+40.6	x

### 308 Winchester MATCH HP BT 10, 0 g/155 gr

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	BC G1
A-625	B-625	HPBT	10,04	155	610	.450
D (m)	0m	100m	200m	300m	400m	500m
V (m/s)	850	783	719	658	601	546
E (J)	3629	3080	2598	2178	1821	1497
100m	-5	x	-10.9	-41.0	-93.2	-173.1
200m	-5	+5.4	x	-24.7	-71.5	-146.0
300m	-5	+13.7	+16.5	x	-38.5	-104.8
400m	-5	+23.3	+35.7	+28.9	x	-56.7
500m	-5	+34.6	+58.4	+62.9	+42.3	x

### 308 Winchester MATCH Solid 10,1 g/156 gr

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	BC G1
A-594	B-594	Solid	10,1	156	610	.485
D (m)	0m	100m	200m	300m	400m	500m
V (m/s)	835	773	715	658	605	553
E (J)	3524	3024	2581	2191	1848	1548
100m	-5	x	-11.3	-42.1	-95.0	-174.8
200m	-5	+5.6	x	-25.2	-72.4	-146.7
300m	-5	+14.0	+16.8	x	-38.9	-104.7
400m	-5	+23.7	+36.2	+29.1	x	-56.1
500m	-5	+35.0	+58.7	+62.8	+44.9	x

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## MATCH AMMUNITION

### 308 Winchester MATCH HP BT 10,9 g/168 gr

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	BC G1
A-496	B-496	HPBT	10,9	168	610	.450
D (m)	0m	100m	200m	300m	400m	500m
V (m/s)	795	731	669	611	556	504
E (J)	3440	2906	2439	2032	1680	1385
100m	-5	x	-13.5	-48.8	-110.1	-205.2
200m	-5	+6.8	x	-28.5	-83.0	-171.3
300m	-5	+16.3	+19.0	x	-45.0	-123.8
400m	-5	+27.5	+41.5	+33.7	x	-67.6
500m	-5	+41.0	+68.5	+74.3	+54.0	x

### 308 Winchester MATCH FMJ BT 11,34 g/175 gr

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	BC G1
A-500	B-500	FMJBT	11,34	175	610	.485
D (m)	0m	100m	200m	300m	400m	500m
V (m/s)	790	730	674	619	567	519
E (J)	3539	3025	2572	2173	1824	1526
100m	-5	x	-13.5	-48.7	-108.6	-201.3
200m	-5	+6.8	x	-28.3	-81.6	-167.4
300m	-5	+16.2	+18.9	x	-43.8	-120.2
400m	-5	+27.2	+40.8	+32.8	x	-65.5
500m	-5	+40.3	+67.0	+72.1	+52.4	x

### 308 Winchester MATCH HP BT 11,34 g/175 gr

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	BC G1
A-593	B-593	HPBT	11,34	175	610	.475
D (m)	0m	100m	200m	300m	400m	500m
V (m/s)	790	729	671	620	577	535
E (J)	3539	3015	2555	2181	1885	1625
100m	-5	x	-13.6	-49.0	-108.8	-199.7
200m	-5	+6.8	x	-28.6	-81.6	-165.7
300m	-5	+16.3	+19.1	x	-43.5	-118.0
400m	-5	+27.2	+40.8	+32.6	x	-63.7
500m	-5	+39.9	+66.3	+70.8	+51.0	x



### 308 Winchester MATCH HP BT 12,3 g/190 gr

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	BC G1
A-497	B-497	HPBT	12,3	190	610	.510
D (m)	0m	100m	200m	300m	400m	500m
V (m/s)	755	700	647	596	548	503
E (J)	3509	3014	2576	2187	1848	1557
100m	-5	x	-15.2	-53.2	-119.5	-220.1
200m	-5	+7.6	x	-30.4	-89.1	-182.0
300m	-5	+17.7	+20.3	x	-48.5	-131.3
400m	-5	+29.9	+44.5	+36.4	x	-70.7
500m	-5	+44.0	+72.8	+78.8	+56.5	x

### 7,62x54 R MATCH FMJ BT 11,8 g/182 gr

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	BC G1
A-529	B-529	FMJBT	11,8	182	724	.520
D (m)	0m	100m	200m	300m	400m	500m
V (m/s)	800	744	690	639	589	542
E (J)	3774	3263	2808	2405	2046	1734
100m	-5	x	-12.8	-46.4	-103.0	-189.2
200m	-5	+6.4	x	-27.2	-77.4	-157.2
300m	-5	+15.5	+18.1	x	-41.1	-111.9
400m	-5	+25.7	+38.7	+30.8	x	-60.5
500m	-5	+37.8	+62.9	+67.2	+48.4	x

### 8x57 IS MATCH FMJ BT 12,96 g/200 gr

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	BC G1
A-541	B-541	FMJBT	12,96	200	610	.500
D (m)	0m	100m	200m	300m	400m	500m
V (m/s)	740	684	631	580	532	487
E (J)	3549	3035	2580	2180	1834	1539
100m	-5	x	-16.1	-56.0	-126.6	-232.5
200m	-5	+8.0	x	-31.9	-94.4	-192.3
300m	-5	+18.7	+21.3	x	-51.9	-139.2
400m	-5	+31.6	+47.2	+38.9	x	-74.3
500m	-5	+46.5	+76.9	+83.5	-59.4	x

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## MATCH AMMUNITION



8x57 IS MATCH FMJ BT 16,3 g/250 gr						
Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	BC G1
A-498	B-498	FMJBT	16,3	250	610	.550
D (m)	0m	100m	200m	300m	400m	500m
V (m/s)	660	612	567	524	484	446
E (J)	3529	3038	2602	2223	1894	1609
100m	-5	x	-20.7	-73.3	-161.9	-290.1
200m	-5	+10.4	x	-42.2	-120.4	-238.2
300m	-5	+24.4	+28.1	x	-64.2	-168.8
400m	-5	+40.5	+60.2	+48.1	x	-64.2
500m	-5	+58.0	+95.3	+100.8	+70.2	x



8 mm Mauser MATCH FMJ BT 12,85 g/198 gr						
Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	BC G1
A-348	B-348	FMJBT	12,85	198	610	.500
D (m)	0m	100m	200m	300m	400m	500m
V (m/s)	665	613	562	516	472	432
E (J)	2832	2407	2029	1706	1429	1195
100m	-5	x	-20.8	-73.9	-163.7	-296.0
200m	-5	+10.4	x	-42.7	-122.1	-244.0
300m	-5	+24.6	+28.5	x	-65.1	-172.8
400m	-5	+40.9	+61.0	+48.9	x	-91.4
500m	-5	+59.2	+97.6	+103.7	+73.1	x



8 mm Mauser MATCH FMJ BT 12,96 g/200 gr						
Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	BC G1
A-542	B-541	FMJBT	12,96	200	610	.500
D (m)	0m	100m	200m	300m	400m	500m
V (m/s)	665	613	562	516	472	432
E (J)	2866	2431	2050	1723	1433	1207
100m	-5	x	-20.8	-73.9	-163.7	-296.0
200m	-5	+10.4	x	-42.7	-122.1	-244.0
300m	-5	+24.6	+28.5	x	-65.1	-172.8
400m	-5	+40.9	+61.0	+48.9	x	-91.4
500m	-5	+59.2	+97.6	+103.7	+73.1	x

338 Lapua Magnum MATCH HP BT 16,2 g/250 gr						
Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	BC G1
A-583	B-583	HPBT	16,2	250	690	.598
D (m)	0m	100m	200m	300m	400m	500m
V (m/s)	900	847	797	748	701	656
E (J)	6561	5817	5144	4533	3981	3483
100m	-5	x	-8.8	-32.7	-74.4	-136.3
200m	-5	+4.4	x	-19.6	-56.8	-114.4
300m	-5	+10.9	+13.0	x	-30.7	-81.8
400m	-5	+18.6	+28.4	+23.0	x	-43.4
500m	-5	+27.3	+45.7	+49.1	+34.7	x



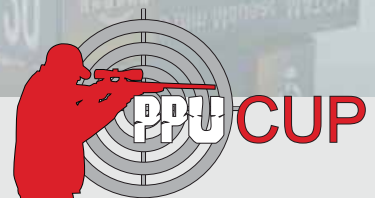
50 Browning MATCH Solid 47 g/725 gr						
Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	BC G1
A-595	B-429	Solid	47.0	725	737	.817
D (m)	0m	100m	200m	300m	400m	500m
V (m/s)	800	764	729	695	662	630
E (J)	15034	13715	12487	11348	10292	9313
100m	-5	x	-11.5	-41.8	-92.6	-165.6
200m	-5	+5.8	x	-24.5	-69.6	-136.7
300m	-5	+13.9	+16.3	x	-36.9	-95.9
400m	-5	+23.2	+34.8	+27.7	x	-49.8
500m	-5	+33.1	+54.7	+57.6	+39.8	x



## MATCH AMMUNITION



# MATCH



## HANDGUN AMMUNITION



Tradition is one of the most important preconditions for the large assortment production of high quality ammunition. Prvi Partizan has this tradition, especially with pistol and revolver ammunition






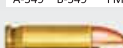

more than 80 years ago amazing variety consisted of now forgotten calibers: 4.25mm Liliput, 5.8mm Veldog, 8mm Gasser, 9mm Steyr, Montenegrin Gasser 11.2mm and others.

Nowadays, these calibers are substituted with the large collection

This assortment is being enlarged constantly, because our goal is to satisfy the needs of every handgun user. Regardless of its usage the ammunition should have an extraordinary performance, excellent accuracy and above all, it should be safe and reliable.




## PISTOL AMMUNITION


Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	Velocity (m/s)						Energy (J)						Trajectory (cm)						Rds. Box/case	Gross weight																				
						0	10	20	30	40	50	0	10	20	30	40	50	0	10	20	30	40	50																						
																						<b>25 Auto</b>																							
A-160	B-016	FMJ	3,25	50	51	235	232	229	227	224	221	89	87	85	83	81	79	-1.0	+0.8	+0.7	-1.2	-5.1	-10.9	50/1000	5,60																				
																						<b>32 Auto</b>																							
A-150	B-015	FMJ	4,6	71	102	275	271	267	264	260	257	174	169	166	160	156	151	-1	+0.4	+0.5	-0.8	-3.6	-7.7	50/1000	8,50																				
A-175	B-175	JHP	4,6	71	102	275	271	267	264	260	257	174	169	166	160	156	151	-1	+0.4	+0.5	-0.8	-3.6	-7.7	50/1000	8,50																				
																						<b>7,63 Mauser</b>																							
A-413	B-012	FMJ	5,5	85	150	460	448	436	424	413	403	583	552	523	496	471	447	-1	-0.2	+0.1	-0.2	-1.0	-2.3	50/500	6,00																				
																						<b>7,62 Tokarev</b>																							
A-147	B-012	FMJ	5,5	85	250	525	511	498	484	471	458	759	720	682	646	612	579	-1	-0.3	00	-0.1	-0.6	-1.5	50/500	6,00																				
A-174	B-174	JHP	5,5	85	250	510	492	474	457	440	424	716	666	618	575	533	424	-1	-0.3	00	-0.1	-0.7	-1.8	50/500	6,00																				
																						<b>7,65 Parabelum</b>																							
A-549	B-549	FMJ	6,0	93	150	390	380	371	363	355	347	560	436	371	396	379	363	-1.0	-0.1	+0.1	-0.3	-1.6	-3.6	50/1000	11,20																				
																						<b>380 Auto</b>																							
A-144	B-014	FMJ	6,1	94	95	290	286	282	279	275	272	259	252	245	239	233	227	-1	+0.3	+0.4	-0.7	-3.1	-6.8	50/1000	10,10																				
A-145	B-145	JHP	6,1	94	95	290	284	278	273	268	263	259	248	236	226	218	210	-1	+0.3	+0.4	-0.8	-3.2	-7.1	50/1000	10,10																				
																						<b>9 mm Makarov</b>																							
A-215	B-102	FMJ	6,0	93	100	320	313	306	300	194	289	307	293	281	270	259	250	-1	+0.2	+0.3	-0.6	-2.6	-5.7	50/1000	10,50																				
A-172	B-172	JHP	6,15	95	100	310	303	297	292	287	282	280	269	258	248	240	231	-1	+0.2	+0.3	-0.6	-2.8	-6.1	50/1000	10,60																				





## PISTOL AMMUNITION

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	Velocity (m/s)					Energy (J)					Trajectory (cm)					Rds. Box/case	Gross weight																										
						0	10	20	30	40	50	0	10	20	30	40	50	0	10	20			30	40	50																							
																						<b>9 mm Luger</b>																										
A-398	B-398	FMJ	6,15	95	102	390	377	365	354	344	335	468	438	410	386	365	346	-1,0	-0,1	+0,2	-0,3	-1,6	-3,7	50/1000	11,30																							
A-480	B-480	SIFP	6,5	100	102	385	369	355	344	334	325	480	440	409	383	361	342	-1,0	-0,1	+0,2	-0,4	-1,7	-4,0	50/1000	11,70																							
A-112	B-112	FMJ	7,45	115	102	360	352	344	338	330	324	483	460	440	422	406	391	-1,0	0,0	+0,2	-0,4	-1,9	-4,3	50/1000	12,60																							
A-044	B-044	TMJ	7,45	115	102	360	352	344	338	330	324	483	460	440	422	406	391	-1,0	0,0	+0,2	-0,4	-1,9	-4,3	50/1000	12,60																							
A-101	B-101	JHP	7,45	115	102	360	349	340	331	323	316	483	455	430	408	389	372	-1,0	0,0	+0,2	-0,4	-2,0	-4,4	50/1000	12,60																							
A-033	B-033	FMJ	8,0	124	102	345	338	332	326	320	315	476	457	440	424	410	396	-1,0	0,0	+0,2	-0,5	-2,1	-4,7	50/1000	13,00																							
A-171	B-171	JHP	8,0	124	102	345	332	320	310	301	293	476	440	410	385	363	344	-1,0	+0,1	+0,3	-0,5	-2,3	-5,2	50/1000	13,00																							
A-201	B-192	LRN	8,0	124	102	345	337	330	324	318	312	476	453	434	417	402	388	-1,0	+0,1	+0,2	-0,5	-2,1	-4,7	50/1000	13,00																							
A-297	B-297	TMJ	8,0	124	102	345	338	332	326	320	315	476	457	440	424	410	396	-1,0	0,0	+0,2	-0,5	-2,1	-4,7	50/1000	13,00																							
A-191	B-191	FPI	8,1	125	102	340	334	328	323	318	314	464	448	433	420	407	395	-1,0	+0,1	+0,2	-0,5	-2,1	-4,8	50/1000	13,00																							
A-329	B-329	SISP	8,4	130	102	330	324	318	312	307	303	459	441	426	411	398	386	-1,0	+0,1	+0,3	-0,5	-2,3	-5,2	50/1000	13,40																							
A-166	B-166	FMJ	9,5	147	102	310	307	303	300	297	294	458	448	438	430	421	413	-1,0	+0,1	+0,3	-0,6	-2,6	-5,7	50/1000	14,50																							
A-455	B-455	TMJ	9,5	147	102	310	307	303	300	297	294	458	448	438	430	421	413	-1,0	+0,1	+0,3	-0,6	-2,6	-5,7	50/1000	14,50																							
A-163	B-163	JHP	9,5	147	102	310	306	302	298	294	290	458	445	433	422	412	402	-1,0	-0,2	+0,3	-0,6	-2,7	-5,8	50/1000	14,50																							
A-457	B-457	FMJ	10,2	158	102	300	294	289	284	279	275	461	444	428	413	400	387	-1,0	+0,3	+0,4	-0,7	-2,9	-6,4	50/1000	15,20																							

																						<b>9 mm Browning Long</b>																										
A-164	B-164	FMJ	7,0	108	128	350	339	329	321	313	306	429	402	379	359	342	327	-1,0	0,0	+0,2	-0,5	-2,1	-4,8	50/1000	11,70																							


																						<b>9 x 21</b>																										
A-198	B-013	FMJ	8,0	124	150	360	350	341	332	325	318	521	492	466	444	424	406	-1,0	0,0	+0,2	-0,4	-2,0	-4,4	50/1000	13,10																							
A-192	B-192	LRN	8,0	124	150	360	350	344	335	328	322	521	492	468	448	431	414	-1,0	0,0	+0,2	-0,4	-1,9	-4,3	50/1000	13,10																							


																						<b>357 SIG</b>																										
A-446	B-446	FPI	8,1	125	150	470	458	446	435	424	414	895	849	807	767	729	694	-1,0	-0,3	0,0	-0,2	-0,9	-2,2	50/1000	14,00																							


																						<b>38 Super Auto +P</b>																										
A-354	B-354	FMJ	8,4	130	127	370	360	352	344	337	331	577	546	522	500	480	461	-1,0	0,0	+0,2	-0,4	-1,8	-4,1	50/500	7,30																							


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## PISTOL AMMUNITION

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	Velocity (m/s)					Energy (J)					Trajectory (cm)					Rds. Box/case	Gross weight																										
						0	10	20	30	40	50	0	10	20	30	40	50	0	10	20			30	40	50																							
																						<b>40 S&amp;W</b>																										
A-614	B-614	FPI	10,7	165	102	305	301	297	293	290	286	497	484	471	459	448	438	-1,0	+0,2	+0,4	-0,6	-2,8	-6,1	50/500	8,20																							
A-415	B-361	FPI	11,0	170	102	300	293	287	281	276	271	496	474	454	436	420	404	-1,0	+0,3	+0,4	-0,7	-3,0	-6,6	50/500	8,40																							
A-353	B-353	TMJ	11,7	180	102	295	291	287	284	280	277	508	494	482	470	458	448	-1,0	+0,3	+0,4	-0,7	-3,0	-6,5	50/500	8,80																							
A-196	B-196	JHP	11,7	180	102	295	291	288	285	282	279	508	496	484	473	463	453	-1,0	+0,3	+0,4	-0,7	-3,0	-6,5	50/500	8,80																							
A-197	B-195	FPI	12,3	190	102	275	272	270	268	265	263	466	457	449	441	433	426	-1,0	+0,4	+0,5	-0,8	-3,4	-7,5	50/500	9,00																							

																						<b>10 mm Auto</b>																										
A-361	B-361	FPI	11,0	170	150	340	329	319	311	303	296	637	596	562	532	506	483	-1,0	+0,1	+0,3	-0,5	-2,3	-5,2	50/500	8,60																							
A-194	B-196	JHP	11,7	180	150	330	324	319	314	309	304	635	613	592	574	556	541	-1,0	+0,1	+0,3	-0,5	-2,3	-5,1	50/500	9,00																							
A-194A	B-196	JHP	11,7	180	150	365	355	347	338	331	325	777	737	700	668	641	618	-1,0	0,0	+0,2	-0,4	-1,9	-4,2	50/500	9,00																							
A-195	B-195	FPI	12,3	190	150	320	316	312	309	305	302	630	615	601	587	574	562	-1,0	+0,1	+0,3	-0,6	-2,4	-5,3	50/500	9,30																							
A-195A	B-195	FPI	12,3	190	150	355	348	342	336	331	327	776	747	721	697	676	658	-1,0	0,0	+0,2	-0,4	-1,9	-4,3	50/500	9,30																							

																						<b>45 HP</b>																										
A-206	B-181	SJHP	12,0	185	127	270	268	266	264	262	260	437	430	423	417	410	400	-1,0	+0,4	+0,5	-0,8	-3,6	7,8	50/500	9,40																							
A-186	B-180	FMJ	14,9	230	127	250	248	246	244	243	241	466	459	452	445	439	433	-1,0	+0,6	+0,6	-1,0	-4,2	-9,1	50/500	10,80																							

																						<b>45 Auto</b>																										
A-181	B-181	SJHP	12,0	185	127	285	282	280	278	275	273	487	478	470	462	455	447	-1,0	+0,3	+0,4	-0,7	-3,1	-6,9	50/500	9,40																							
A-214	B-214	FMJ	13,0	200	127	270	267	265	263	260	258	472	464	455	447	438	431	-1,0	+0,4	+0,5	-0,8	-3,6	-7,9	50/500	10,20																							
A-079	B-180	FMJ	14,9	230	127	255	253	251	249	247	246	485	477	470	463	456	449	-1,0	+0,6	+0,6	-1,0	-4,1	-8,7	50/500	10,80																							
A-303	B-303	TMJ	14,9	230	127	255	253	251	249	247	246	485	477	470	463	456	449	-1,0	+0,6	+0,6	-1,0	-4,1	-8,7	50/500	10,80																							
A-202	B-202	LRN	14,9	230	127	255	253	251	249	247	246	485	477	470	463	456	449	-1,0	+0,6	+0,6	-1,0	-4,1	-8,7	50/500	10,80																							







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## REVOLVER AMMUNITION



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## REVOLVER AMMUNITION

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	Velocity (m/s)						Energy (J)						Trajectory (cm)						Rds. Box/case	Gross weight																								
						0	10	20	30	40	50	0	10	20	30	40	50	0	10	20	30	40	50																										
																						<b>22 Remington Jet Magnum</b>																											
A-414	B-193	SP	2,9	45	257	675	676	657	638	619	601	705	666	629	594	560	527	-1.0	-0.4	-0.1	00	-0.1	-0.4	50/1000	9,40																								
																						<b>7,62 Nagant</b>																											
A-470	B-470	FPJ	6,35	98	150	225	223	221	219	216	214	161	158	155	152	149	146	-1.0	+0.9	+1.1	-1.3	-5.4	-11.6	50/500	6,50																								
																						<b>32 S&amp;W Long</b>																											
A-081	B-081	LRN	6,35	98	135	240	238	236	234	232	230	174	170	167	165	162	159	-1	+0.7	+0.7	-1.1	-4.7	-10.2	50/500	5,20																								
A-298	B-298	WC	6,35	98	135	225	220	215	210	205	200	164	156	149	142	136	130	-1	+0.9	+0.8	-1.4	-5.8	-12.6	50/1000	10,00																								
																						<b>38 S&amp;W</b>																											
A-089	B-089	LRN	9,4	145	135	210	204	197	191	186	180	207	195	183	172	162	152	-1.0	+1.2	+1.0	-1.7	-7.0	-15.2	50/1000	14,50																								
																						<b>38 Special</b>																											
A-613	B-613	FMJ	8,4	130	196	310	306	301	297	293	290	405	393	382	372	363	354	-1.0	+0.2	+0.3	-0.6	-2.7	-5.9	50/500	7,20																								
A-158	B-111	FMS	10,2	158	196	275	269	263	257	252	247	387	370	353	338	324	311	-1.0	+0.4	+0.5	-0.9	-3.7	-8.1	50/500	8,00																								
A-584	B-339	FPJ	10,2	158	196	275	272	271	267	265	262	387	380	372	365	358	352	-1.0	+0.4	+0.5	-0.8	-3.5	-7.5	50/500	8,00																								
A-344	B-338	SJFP	10,2	158	196	275	272	271	267	265	262	387	380	372	365	358	352	-1.0	+0.4	+0.5	-0.8	-3.5	-7.5	50/500	8,00																								
A-159	B-135	SJHP	10,2	158	196	275	272	269	267	264	261	387	379	371	364	357	350	-1.0	+0.4	+0.5	-0.8	-3.5	-7.6	50/500	8,00																								
A-050	B-017	LRN	10,2	158	196	275	272	269	266	263	260	387	378	370	361	353	346	-1.0	+0.4	+0.5	-0.8	-3.5	-7.6	50/500	8,00																								
A-140	B-140	SWC	10,2	158	196	275	272	271	267	265	262	387	380	372	365	358	352	-1.0	+0.4	+0.5	-0.8	-3.5	-7.5	50/500	8,00																								
A-136	B-136	SWC HP	10,2	158	196	275	272	269	267	264	261	387	379	371	364	357	350	-1.0	+0.4	+0.5	-0.8	-3.5	-7.6	50/500	8,00																								
A-049	B-053	WC	9,6	148	196	245	238	231	224	218	211	288	271	255	241	227	215	-1.0	+0.7	+0.7	-1.2	-5.0	-10.8	50/500	7,60																								
																						<b>38 Special + P</b>																											
A-332	B-332	TMJ	10,2	158	102	270	267	265	262	260	258	373	366	359	533	346	340	-1.0	+0.4	+0.5	-0.8	-3.6	-7.9	50/500	8,10																								

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## REVOLVER AMMUNITION

Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	Velocity (m/s)						Energy (J)						Trajectory (cm)						Rds. Box/case	Gross weight
						0	10	20	30	40	50	0	10	20	30	40	50	0	10	20	30	40	50		



### 357 Magnum

A-111	B-111	FMS	10,2	158	254	470	459	448	437	427	417	1131	1077	1026	977	932	889	-1.0	-0.3	00	-0.2	-0.9	-2.2	50/500	8,60
A-339	B-339	FPI	10,2	158	254	490	478	465	453	422	431	1229	1167	1108	1052	999	949	-1.0	-0.3	00	-0.1	-0.7	-1.9	50/500	8,60
A-135	B-135	SJHP	10,2	158	254	490	477	464	451	439	427	1229	1164	1101	1042	987	935	-1.0	-0.3	00	-0.1	-0.8	-1.9	50/500	8,60
A-338	B-338	SJFP	10,2	158	254	490	478	465	453	422	431	1229	1167	1108	1052	999	949	-1.0	-0.3	00	-0.1	-0.7	-1.9	50/500	8,60



### 44 Remington Magnum

A-221	B-221	FPI	11,7	180	210	550	532	514	496	480	463	1764	1649	1540	1438	1341	1250	-1.0	-0.3	00	-0.1	-0.5	-1.4	50/500	11,00
A-154	B-154	JHP	11,7	180	210	550	537	524	511	498	486	1764	1680	1599	1522	1448	1377	-1.0	-0.3	00	-0.1	-0.5	-1.3	50/500	11,20
A-222	B-222	FPI	15,6	240	210	470	458	447	436	425	415	1718	1632	1552	1476	1406	1338	-1.0	-0.3	00	-0.2	-1.5	-2.1	50/500	12,80
A-156	B-156	JHP	15,6	240	210	470	458	447	437	426	416	1718	1634	1556	1482	1412	1347	-1.0	-0.3	00	-0.2	-0.9	-2.2	50/500	12,80
A-580	B-580	SJHP	15,6	240	210	470	458	447	437	426	416	1718	1634	1556	1482	1412	1347	-1.0	-0.3	00	-0.2	-0.9	-2.2	50/500	12,80
A-359	B-359	SJFP	15,6	240	210	470	458	446	436	425	415	1718	1632	1552	1476	1405	1338	-1.0	-0.3	00	-0.2	-1.3	-2.2	50/500	12,80
A-320	B-320	SJFP	19,5	300	210	390	382	376	367	361	354	1479	1418	1363	1311	1263	1219	-1.0	-0.1	00	-0.3	-1.5	-3.5	50/500	14,50



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## HANDGUN BULLETS



**Jacketed Hollow Point bullets** have a full-length jacket with a hollow point. This construction provides deep penetration with controlled expansion and also enables reliable feeding into the chamber and good functioning in auto loading pistols. These very accurate bullets are suitable for revolvers too.

**SJHP bullets** provide optimum expansion with controlled penetration. Due to the partly exposed lead in the nose they are less suitable for pistols and are mainly used in revolver ammunition.

**SJFP bullets** are suitable for short range shooting with revolvers. They provide deeper penetration with less expansion than SJHP bullets, which provide deep penetration with controlled expansion and good functioning in auto loading pistols.

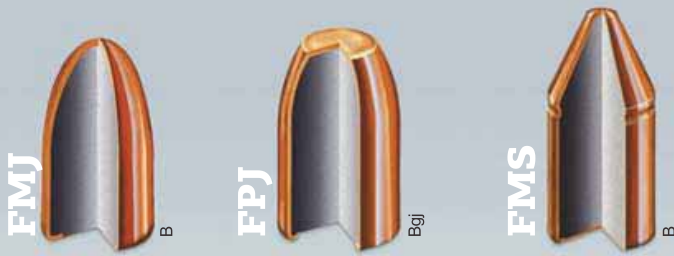
<b>B-174 JHP</b> 5,50g   85gr Cal. 7,62mm Dia.(inch).3065 BC 0.120 <b>CALIBER 7,62 mm</b>	<b>B-175 JHP</b> 4,60g   71gr Cal. 5,22 Dia.(inch).3080 BC 0.119 <b>CALIBER 32</b>	<b>B-101 JHP</b> 7,45g   115gr Cal. 9mm Dia.(inch).3545 BC 0.105	<b>B-171 JHP</b> 8,00g   124gr Cal. 9mm Dia.(inch).3545 BC 0.110	<b>B-329 SJ SP</b> 8,40g   130gr Cal. 9mm Dia.(inch).3545 BC 0.140 <b>CALIBER 9 mm</b>	<b>B-163 JHP</b> 9,50g   147gr Cal. 9mm Dia.(inch).3545 BC 0.165	<b>B-145 JHP</b> 6,10g   94gr Cal. 9mm Dia.(inch).3555 BC 0.134	<b>B-135 SJ HP</b> 10,20g   158gr Cal. 38 Dia.(inch).3555 BC 0.156	<b>B-338 SJ FP</b> 10,20g   158gr Cal. 38 Dia.(inch).3555 BC 0.156 <b>CALIBER 38</b>
<b>B-172 JHP</b> 6,15g   95g Cal. 9mm Makarov Dia.(inch).3645 BC 0.105 <b>CALIBER 9 mm Makarov</b>	<b>B-196 JHP</b> 11,70g   180gr Cal. 10mm Dia.(inch).3995 BC 0.154 <b>CALIBER 10 mm</b>	<b>B-154 JHP</b> 11,70g   180gr Cal. 44 Dia.(inch).4285 BC 0.181	<b>B-156 JHP</b> 15,60g   240gr Cal. 44 Dia.(inch).4285 BC 0.175	<b>B-580 SJ HP</b> 15,55g   240gr Cal. 44 Dia.(inch).4285 BC 0.175	<b>B-359 SJ FP</b> 15,60g   240gr Cal. 44 Dia.(inch).4285 BC 0.175	<b>B-320 SJ FP</b> 19,50g   300gr Cal. 44 Dia.(inch).4285 BC 0.201	<b>B-181 SJ HP</b> 12,00g   185gr Cal. 45 Dia.(inch).4500 BC 0.174 <b>CALIBER 45</b>	

When ordering, check the table with ammunition articles to see where desired bullet is assembled.

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## HANDGUN BULLETS



**FMJ bullets** are general purpose bullets suitable for auto loading pistols. They provide excellent cartridge feeding into the weapon chamber and good penetration. These bullets are a good choice for practice shooting.

**FPJ bullet** to improve the stopping power of the FMJ bullets. They are suitable for primarily for revolver ammunition but are also used in pistol ammunition.

**FMS** is our bullet with a conical nose used in 357 Magnum and 38 Special cartridges. The main characteristic of this bullet is excellent penetration capability.

C°

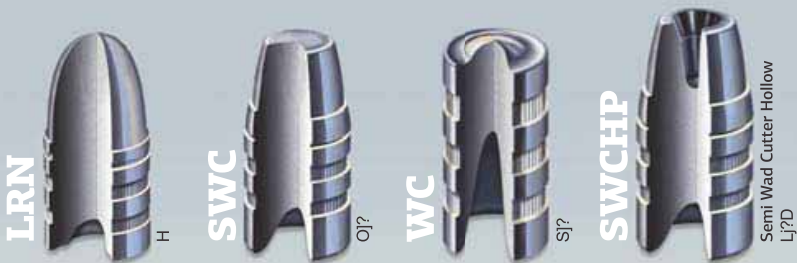
<b>B-016 FMJ</b> 3,25g   50gr Cal. .25 Dia.(Inch) 2500 BC 0.120 CALIBER 25	<b>B-012 FMJ</b> 5,50g   85gr Cal. 7,62mm Dia.(Inch) 3065	<b>B-470 FPJ</b> 6,35g   98gr Cal. 7,62mm Dia.(Inch) .307	<b>B-549 FMJ</b> 6,00g   93gr Cal. 7,65mm Dia.(Inch) 3080 BC 0.154 CALIBER 7,65 mm	<b>B-015 FMJ</b> 4,60g   71gr Cal. .32 Dia.(Inch) 3080 BC 0.119 CALIBER 32	<b>B-398 FMJ</b> 6,15g   95gr Cal. 9mm Dia.(Inch) 3545	<b>B-112 FMJ</b> 7,45g   115gr Cal. 9mm Dia.(Inch) 3545	<b>B-013 FMJ</b> 8,00g   124gr Cal. 9mm Dia.(Inch) 3545	<b>B-446* FPJ</b> 9mm Cal. 9mm Dia.(Inch) 3545	<b>B-191** FPJ</b> 8,10g   125gr Cal. 9mm Dia.(Inch) 3545	<b>B-354 FMJ</b> 8,40g   130gr Cal. 9mm Dia.(Inch) 3545	<b>B-166 FMJ</b> 9,50g   147gr Cal. 9mm Dia.(Inch) 3545
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\*9 mm Luger Bullet \*\*357 SIG Bullet

<b>B-457 FMJ</b> 10,20g   158gr Cal. 9mm Dia.(Inch) 3545 BC 0.103 CALIBER 9 mm	<b>B-014 FMJ</b> 6,10g   94gr Cal. 9mm Dia.(Inch) 3555	<b>B-164 FMJ</b> 7,00g   108gr Cal. 9mm Dia.(Inch) 3585	<b>B-102 FMJ</b> 6,00g   93gr Cal. 9mm Dia.(Inch) 3645	<b>B-614 FMJ</b> 8,40g   130gr Cal. .38 Dia.(Inch) 3555	<b>B-399 FPJ</b> 10,20g   158gr Cal. .38 Dia.(Inch) 3555	<b>B-111 FMS</b> 10,20g   158gr Cal. .38 Dia.(Inch) 3555	<b>B-614 FPJ</b> 10,70g   165gr Cal. 10mm Dia.(Inch) 3995	<b>B-361 FPJ</b> 11,00g   170gr Cal. 10mm Dia.(Inch) 3995	<b>B-195 FPJ</b> 12,30g   190gr Cal. 10mm Dia.(Inch) 3995	<b>B-221 FPJ</b> 11,70g   180gr Cal. .44 Dia.(Inch) 4285	<b>B-222 FPJ</b> 15,60g   240gr Cal. .44 Dia.(Inch) 4285	<b>B-214 FPJ</b> 13,00g   200gr Cal. .45 Dia.(Inch) 4500	<b>B-180 FMJ</b> 14,90g   230gr Cal. .45 Dia.(Inch) 4500
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When ordering, check the table with ammunition articles to see where desired bullet is assembled.

## HANDGUN BULLETS



**LRN bullets** are versatile, economical bullets for general purpose used mainly in revolvers. They are very accurate and especially suitable for practice. **WC bullets** are specially designed lead bullets with excellent accuracy intended for shooting competitions. These cylindrical bullets cut clean holes in the target for easy reading of results. Because of low recoil they are suitable for training. **SWC HP bullets** with a nose cavity They leave clean holes in paper targets.

<b>B-081 LRN</b> 6,35g   98gr Cal. .32 Dia.(Inch) 3125 BC 0.174 CALIBER 32	<b>B-298 WC</b> 6,35g   98gr Cal. .32 Dia.(Inch) 3125 BC 0.102 CALIBER 32	<b>B-192 LRN</b> 8,00g   124gr Cal. 9mm Dia.(Inch) 3550 BC 0.143 CALIBER 9 mm	<b>B-053 WC</b> 9,60g   148gr Cal. .38 Dia.(Inch) 3575 BC 0.100	<b>B-017 LRN</b> 10,20g   158gr Cal. .38 Dia.(Inch) 3575 BC 0.156	<b>B-140 SWC</b> 10,20g   158gr Cal. .38 Dia.(Inch) 3575 BC 0.156	<b>B-326* SWC</b> 10,20g   158gr Cal. .38 Dia.(Inch) 3575 BC 0.156	<b>B-136 SWCHP</b> 10,20g   158gr Cal. .38 Dia.(Inch) 3575 BC 0.156	<b>B-089 LRN</b> 9,40g   145gr Cal. .38 Dia.(Inch) 3590 BC 0.100	<b>B-202 LRN</b> 14,90g   230gr Cal. .45 Dia.(Inch) 4115 BC 0.196 CALIBER 45
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When ordering, check the table with ammunition articles to see where desired bullet is assembled.

## HANDGUN BULLETS



Total Metal Jacket (TMJ) bullets are FMJ bullets of special design in which the lead is not exposed. The enclosed base eliminates lead vaporization.

Q

<b>B-044</b> TMJ	<b>B-297</b> TMJ	<b>B-455</b> TMJ	<b>B-332</b> TMJ	<b>B-353</b> TMJ	<b>B-303</b> TMJ
7,45g   115gr	8,00g   124gr	9,50g   147gr	10,20g   158gr	11,70g   180gr	14,90g   230gr
Cal. 9mm	Cal. 9mm	Cal. 9mm	Cal. 38	Cal. 10mm	Cal. 45
Dia.(Inch).3545	Dia.(Inch).3545	Dia.(Inch).3545	Dia.(Inch).3555	Dia.(Inch).3995	Dia.(Inch).4500
BC 0.147	BC 0.143	BC 0.225	BC 0.149	BC 0.139	BC 0.196
CALIBER 9 mm			CALIBER 38	CALIBER 10 mm	CALIBER 45



When ordering, check the table with ammunition articles to see where desired bullet is assembled.

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## PA BLANK

## PA BLANK



9 mm PA Blank cartridge is intended for use in starting pistols. Cartridge is suitable for various applications, primarily for starting signals at sports events and for personal defense.

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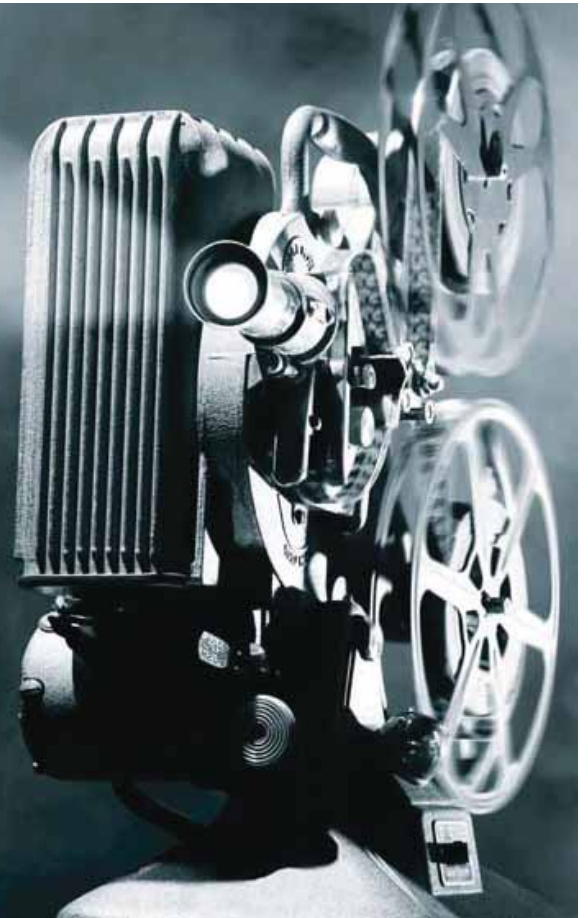
## BLANK AMMUNITION

grown from our long term experience in the production of blank ammunition for military purposes. Our wide range of high quality requests. Once made of steel with chambers for Berdan primers, PPU now manufactures brass cases for blank ammunition with chambers for standard Boxer type primers. In addition to cases, PPU also produces and delivers to our buyers blank ammunition

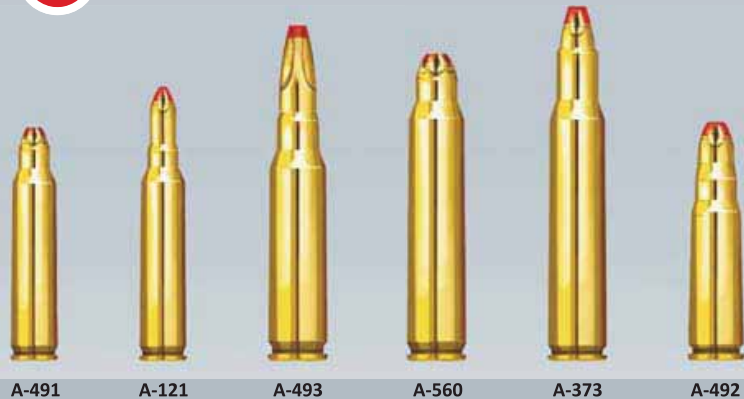


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BLANK AMMUNITION



## BLANK AMMUNITION



Ctg. Art.	Caliber
A-491	5,56x45 Blank
A-121	5,56x45 Blank Long
A-493	7,62x51 Blank
A-560	7,62x63 Blank
A-373	7,62x63 Blank Long
A-492	7,62x39 mm Blank
A-476	7,62x39 mm Blank Long
A-374	7,62x54 R Blank
A-375	303 British Blank
A-494	7,9x57 Blank
A-301	9 mm PA Blank
A-380	9x19 Blank
A-538	38 Short Colt Blank
A-552	45 Auto Blank

NEW

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## RIFLE CASES

Art.	Caliber
C-011	5,45 x 39
C-193	22 Hornet
C-032	222 Remington
C-132	223 Remington
C-211	22-250 Remington
C-134	243 Winchester
C-131	6 mm Remington
C-046	25-06 Remington
C-483	6,5 mm Grendel
C-385	6,5 x 51 R Arisaka (Japanese) <sup>(1)</sup>
C-569	6,5 x 51 R Arisaka (Japanese) <sup>(2)</sup>
C-118	6,5 x 52 Carcano <sup>(2)</sup>
C-352	6,5 x 52 Carcano <sup>(3)</sup>
C-571	6,5 x 54 Mannlicher Schoenauer
C-083	6,5 x 55 Swedish
C-117	6,5 x 57 Mauser
C-114	264 Winchester Magnum
C-603	6,8 mm Remington SPC <b>NEW</b>
C-027	270 Winchester
C-400	7 mm – 08 Remington
C-051	7x57 <sup>(4)</sup>
C-478	7 mm Mauser <sup>(5)</sup>
C-098	7 x 57 R
C-064	7x64
C-122	7 x 65 R
C-115	7 mm Remington Magnum
C-024	30 Carbine
C-636	300 ACC Blackout <b>NEW</b>
C-570	7,35 x 51 Carcano
C-020	308 Winchester
C-028	30-30 Winchester
C-346	7,5 x 54 French
C-345	7,5 x 55 Swiss
C-062	30-06 Springfield
C-116	300 Winchester Magnum
C-030	7,62 x 39

Art.	Caliber
C-031	7,62 x 54 R
C-129	7,65 x 53 Argentine
C-125	303 British
C-536	303 Savage
C-383	7,7 x 58 Japanese
C-424	7,92 x 33 Kurz
C-417	8 x 50 R Lebel
C-384	8 x 56 RS Mannlicher
C-128	8 x 57 IS <sup>(4)</sup>
C-475	8 x 57 IRS
C-474	8 x 60 S
C-022	8 mm Mauser <sup>(5)</sup>
C-330	9,3 x 62
C-461	9,3 x 74 R
C-421	338 Lapua Magnum
C-608	338 Lapua Magnum <sup>(6)</sup>
C-265	375 H&H Magnum
C-448	45-70 Government
C-337	12,7 x 57
C-258	50 Browning
C-254	12,7 mm DShK (Berdan)

- <sup>(1)</sup> 6,60 mm (.260") bullets  
<sup>(2)</sup> 6,70 mm (.264") bullets  
<sup>(3)</sup> 6,80 mm (.268") bullets  
<sup>(4)</sup> C.I.P.  
<sup>(5)</sup> SAAMI  
<sup>(6)</sup> Primer Ø 6,5 mm



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## CASES

E	
Art.	Caliber
C-414	22 Rem Jet Mag
C-160	25 Auto
C-150	32 Auto
C-081	32 S&W Long
C-413	7,63 mm Mauser
C-147	7,62 mm Tokarev
C-470	7,62 mm Nagant
C-549	7,65 mm Parabellum
C-144	380 Auto
C-215	9 mm Makarov
C-033	9 mm Luger
C-164	9 mm Browning Long
C-198	9 x 21
C-446	357 SIG
C-354	38 Super Auto (+P)
C-089	38 Smith & Wesson
C-050	38 Special
C-049	38 Special WC
C-332	38 Special + P
C-111	357 Magnum
C-196	40 Smith & Wesson
C-195	10 mm Auto
C-154	44 Remington Magnum
C-186	45 HP
C-079	45 Auto



### Blank Brass Cases

Ctg. Art.	Caliber	Case Length mm
C-120	5,56x45 Blank	48,45
C-394	5,56x45 Blank Long	56,00
C-477	30 Carbine Blank	42,16
C-420	7,62x51 Blank	68,70
C-451	7,5x55 Swiss Blank	68,00
C-456	7,62x63 Blank	63,35
C-373	7,62x63 Blank Long	73,00
C-393	7,62x39 Blank	49,00
C-374	7,62x54 Blank	72,77
C-375	303 British Blank	72,77
C-391	7,9x57 Blank	71,00
C-301	9 PA Blank	22,05
C-380	9x19 Blank	30,20
C-552	45 Auto Blank	33,00 <b>NEW</b>

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## PRACTICAL SHOOTING

# PISTOL AMMUNITION FOR PRACTICAL SHOOTING

Practical shooting is very attractive and dynamic sports discipline, with the increasing number of sportsman and fans all around the world. Helping development of this sports discipline, PPU is sponsor of IPSC Association of Serbia. For the needs of competitors we have developed ammunition 9mm Luger, 40 S&W and 38 Super Auto. Using PPU ammunition, IPSC team of Serbia achieves important results on the competitions worldwide.



Ctg. Art.	Bullet Art.	Bullet Type	Bullet Weight [g]	Bullet Weight [gr]	Barrel Length [mm]	Velocity (m/s)						Energy (J)						Trajectory (cm)						Rds. Box/case	Gross weight
						0	10	20	30	40	50	0	10	20	30	40	50	0	10	20	30	40	50		
<b>9 mm Luger for Practical shooting</b>																									
A-577	B-577	FMJ	9,5	147	102	270	267	264	262	259	257	347	340	333	327	320	314	-1.0	+0.4	+0.5	-0.9	-3.6	-7.9	50/2000	29,20
<b>9 x 21 for Practical shooting</b>																									
A-597	B-597	FMJ	8,0	124	102	320	314	308	302	297	292	411	395	380	367	355	343	-1.0	+0.2	+0.3	-0.6	-2.5	-5.6	50/1500	26,40
<b>40 Smith &amp; Wesson for Practical shooting</b>																									
A-578	B-578	FPJ	12,3	190	102	280	277	275	272	270	267	483	474	465	456	448	4480	-1.0	+0.4	+0.5	-0.8	-3.3	-7.1	50/1500	27,20
<b>45 Auto for Practical shooting</b>																									
A-598	B-598	FMJ	14,9	230	127	230	228	227	225	223	222	326	321	316	312	307	303	-1.0	+0.8	+0.8	-1.2	-5.2	-11.1	50/1000	21,90

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## PPU SHOOTING



STRELJAČKI KLUB  
"PRVI PARTIZAN"-Ušice



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## COMMERCIAL MARKET

<p><b>USA</b> TR&amp;Z USA Trading Co. -General importer 2499 Main St. Stratford, CT 06615 Phone: +203 375-8544 Fax: +203 375-8547 e-mail: zivko@trzusa.com www.ppu-usa.com</p>	<p><b>Germany</b> Leader Trading GmbH -exclusive distributor Spindecksfeld 122, 40883 Ratingen Phone: +49 2102 60313 Fax: +49 2102 60322 e-mail: info@leader-trading.com www.leader-trading.com</p>	<p><b>United Kingdom</b> Henry Krank &amp; Co -exclusive distributor 100-104 Lowton, Pudsey West Yorkshire, LS289AY Phone: +44 113 2569163 Fax: +44 113 2574962 e-mail: sales@henrykrank.com www.henrykrank.com</p>	<p><b>Italy</b> Cheddite S.R.L. -Exclusive distributor Via del Giaggiolo 189 57124 Livorno Phone: +39 0586 854295 Fax: +39 0586 854393 e-mail: info@chedditeitaly.it www.chedditeitaly.com</p>
<p><b>France</b> E.S.P. - distributor Zone Artisanale 38200 VILLETTE DE VIENNE Phone: +33 474579966 Fax: +33 474570987 e-mail: contact@espfrance.com www.espfrance.com</p>	<p><b>Spain</b> Antonio Izquierdo Moreno Redce 32Y - distributor Gval Munoz grandes, 6, 13630 Socuellamos, Phone: + 926 531146 Fax: + 926 531146 e-mail: info@a-izquierdo.com www.a-izquierdo.com</p>	<p><b>Switzerland</b> Lagardere -exclusive distributor BD des Explotures 21 2300 Lachas-de-Fonds Phone: +41 32 9266066 Fax: +41 32 9266035 e-mail: infos@lagardere.ch www.lagardere.ch</p>	<p><b>Netherlands</b> Bold Action BV - exclusive distributor Daltonstraat 54 3316 GD Dordrecht Phone: +31 78 65131100 Fax: +31 78 6177390 e-mail: info@bold-action.com www.bold-action.com</p>
<p><b>Belgium</b> Import- Export FRANK BVBA -distributor Waterrijstraat 60 3920 Lommel Tel: +32 11 800950 Fax: +32 11 800959 e-mail: frank@wapenhandel.be www.wapenhandel.be</p>	<p><b>Norway</b> XXL Grossist Norge AS -distributor Bonntjennsvegen 13 Gardermoen Naeringspark 2050 Jessheim Tel: +47 24 08 40 95 Fax: +47 24 08 40 90 e-mail: erik.s@xxl.no www.xxl.no</p>	<p><b>Norway</b> Magne Landro AS - distributor Stillverksveien 1 N-2004 Lillestrom Phone: +47 64 847575 Fax: +47 64 847570 e-mail: rune@landro.no www.landro.no</p>	<p><b>Greece</b> ZACHARIAS IPERIFANOS -distributor Kalavriton 78 street 12462 Haidari Athens Tel: +30 210 5139330 Fax: +30 210 5155760 E-mail: info@iperifanos.gr www.iperifanos.gr</p>

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## COMMERCIAL MARKET

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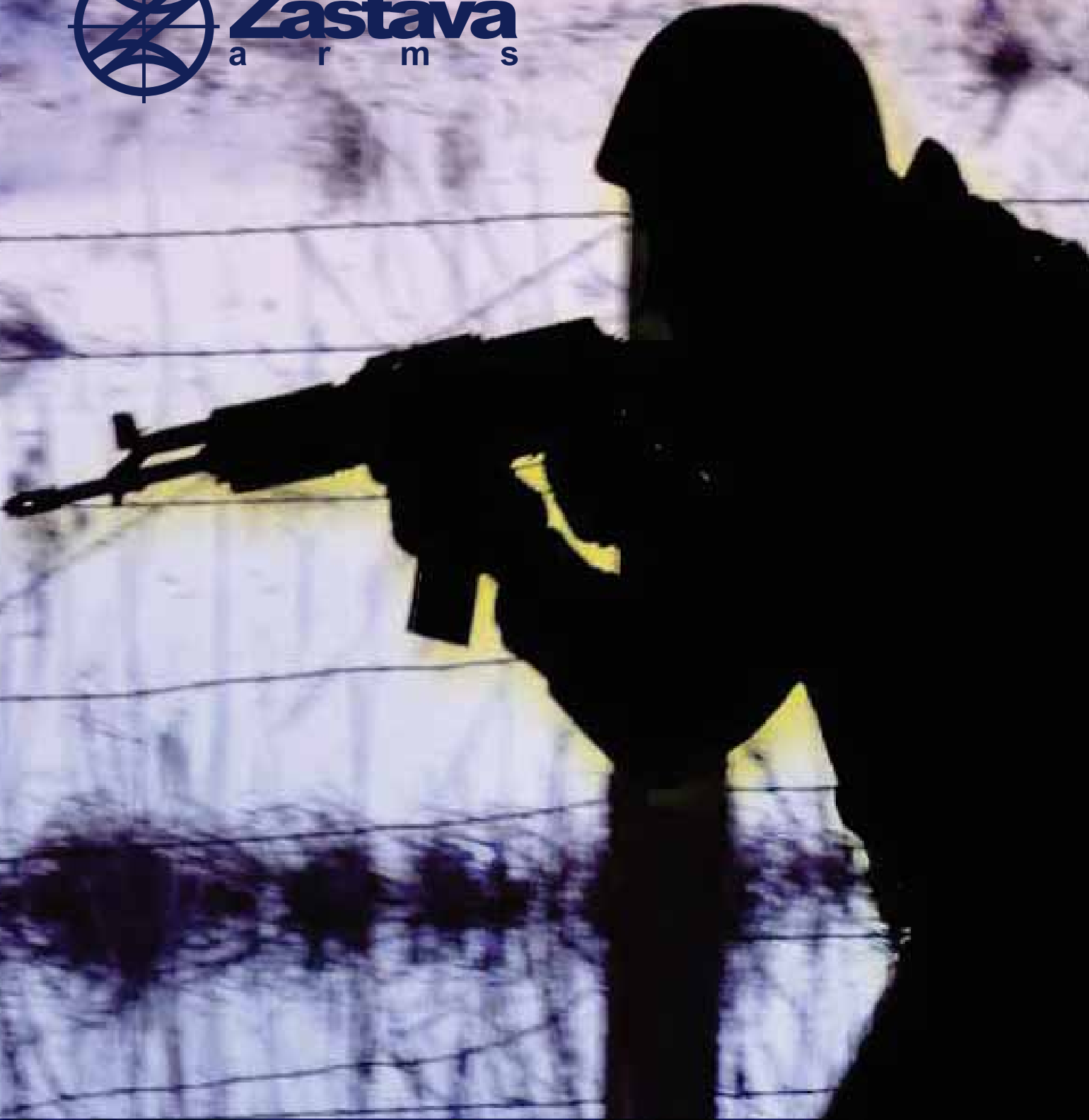
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**military guns**  
| Zastava arms

**catalogue**<sup>®</sup>  
| Serbia



# long tradition



Zastava arms is the cradle of Serbian industry. In 1851 a decision was made to move the Gun Foundry from Belgrade to Kragujevac and in 1853 first cannon barrels were cast. This ended the efforts of the Principality of Serbia to have its own production of arms and equipment.

Gun Foundry in Kragujevac, the center of the Principality of Serbia, quickly developed in material and spiritual way. The Gun Foundry had first steam engines, first electric light, first technical school, first quality system and at the World Fair in Paris, in 1889, the Gun Foundry won several medals.

Before the Second World War, the factory was a real industrial giant, with almost twelve thousand employees and ten thousand machines.

After the war, Zastava arms continued production and today it produces modern arms and military equipment.

Years of experience in the field of development of products, technology and capacities created conditions for the transfer of technology to other countries.

As we use CATIA software to design our products, we can quickly respond to the demands of the market.

Strategic decision of Zastava arms is a good position of our products in global world market and cooperation with arms manufacturers in the world.

By applying Quality Management System (QMS) Zastava arms constantly endeavors to improve the quality of products and all processes. QMS (SRPS ISO 9001:2008 and SORS 9000/05) is valid until 2019. Permanent investment in education of staff and purchase of state-of-the-art computer equipment and technology results in placement of new products that follow trends in the world market.

With systematic, skilled and creative work, based on tradition of 163 years, Zastava arms tends to keep the trust of the users of products and services.

Content of the buyers is the measure of success of Zastava arms.

General manager  
 Miloško sc. Brzakovic, B.Sc.M.E.




## military guns catalogue

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 Serbia  
[www.zastava-arms.rs](http://www.zastava-arms.rs)

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5.56 x 45 mm

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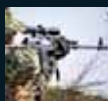
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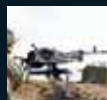


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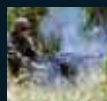
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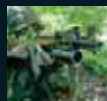
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**automatic grenade launcher**

M93

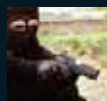
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# group 5,56 x 45mm

| submachine gun M21 |

| assault rifle M21 S |

| assault rifle M21 A |

| submachine gun M21 BS |

| assault rifle M21 S BS |

| assault rifle M21 A BS |

Battlefield complexity demands weapons of great firing ability, functioning in all environments. The solution is group M21 in calibre 5.56 mm. The weapons belonging to the group are designed on the basis of famous, highly reliable Kalashnikov system.

#### Main Characteristics

- ▣ ergonomically designed, with perfect balance
- ▣ low recoil
- ▣ highly efficient and reliable locking system
- ▣ proven and safe type of trigger mechanism
- ▣ ambidextrous fire selector
- ▣ possibility for night aiming (tritium tubes)
- ▣ polymer stock enabling quick change of position
- ▣ magazine made of high-quality sheet metal (option: polymer)
- ▣ made of best possible raw materials
- ▣ hammer forged barrel with chromium plated interior ensuring high accuracy

Picatinny rails or mounts with Picatinny rails enable the assembly of optical and electronic devices. Flash hider hides the position of the shooter. At the same time it functions as a stabilizer during shooting.

#### Accessories

- 4 spare 30rds magazines
- cleaning rod
- cleaning kit
- oil can
- slings

Description of each separate weapon shows additional contents of the accessories - if any.



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| submachine gun M21 |


**Submachine Guns**  
 Light-weight and compact.

| assault rifle M21 A |



| assault rifle M21 S |


**Assault Rifles**  
 Accuracy and precision of a sniper rifle.  
 Quick and simple assembly of underbarrel  
 grenade launcher (see Optional characteristics)

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# M21

5.56 x 45 mm



Base for optical devices

**Optional  
 Assault Rifles**

On customer's demand, underbarrel grenade launcher (BGP 40mm) can be included in the rifle set. Stock assembled rubber buffer, which is a part of the underbarrel launcher accessories, enables more comfortable shooting from the launcher.


 ambidextrous  
 fire selector


Underbarrel grenade launcher (optional)

**Technical Characteristics**

Model	C	MC	W	WM	TL	BL	TF	O	LS	RF
Submachine Gun M21	5.56 x 45	30	3.91	0.15 / 0.35	825 / 575	290	Semi&Auto	Gas	Rotating bolt	600 ± 50
Assault Rifle M21 S	5.56 x 45	30	4.07	0.15 / 0.35	915 / 666	375	Semi&Auto	Gas	Rotating bolt	600 ± 50
Assault Rifle M21 A	5.56 x 45	30	4.15	0.15 / 0.35	1000 / 750	460	Semi&Auto	Gas	Rotating bolt	600 ± 50

C- Calibre (mm), MC- Magazine capacity, W- Weight of weapon with metal magazine (kg), WM- Weight of polymer/metal magazine (kg), TL- Total length Weapon/Weapon with folded stock (mm), BL- Barrel length (mm), TF- Type of fire, O- Operation, LS- Locking system, RF- Rate of fire (rds/min)

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| submachine gun M21 BS |

| assault rifle M21 A BS |

| assault rifle M21 S BS |

**Submodels BS**

- ▣ Picatinny rail on the receiver cover enables the assembly of optical sight
- ▣ Two additional Picatinny rails at 12 o'clock and 6 o'clock on handguards enable the assembly of optical-electronic equipment

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# M21 BS

5.56 x 45 mm


**BGP 40x46 mm on the M21 SBS**

**Optional**

- On customer's request, the following can be included in the set
- ▣ Underbarrel grenade launcher BGP 40 mm
  - ▣ Underbarrel grenade launcher BGP 40x46 mm
  - ▣ Telescopic stock can be assembled to rifle, instead of standard folding stock, on customer's demand.
  - ▣ Foregrip used for easier handling of the gun can be included in the set of all BS guns.


**Technical Characteristics**

Model	C	MC	W	WM	TL	BL	TF	O	LS	RF
Submachine Gun M21 BS	5.56 x 45	30	4.00	0.15 / 0.35	825 / 575	290	Semi&Auto	Gas	Rotating bolt	600 ± 50
Assault Rifle M21 SBS	5.56 x 45	30	4.2	0.15 / 0.35	915 / 666	375	Semi&Auto	Gas	Rotating bolt	600 ± 50
Assault Rifle M21 ABS	5.56 x 45	30	4.30	0.15 / 0.35	1000 / 750	460	Semi&Auto	Gas	Rotating bolt	600 ± 50

C- Calibre (mm), MC- Magazine capacity, W- Weight of weapon with metal magazine (kg), WM- Weight of polymer/metal magazine (kg), TL- Total length Weapon/Weapon with folded stock (mm), BL- Barrel length (mm), TF- Type of fire, O- Operation, LS- Locking system, RF- Rate of fire (rds/min)

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# group 7.62 x 39mm<sup>®</sup>

| assault rifle M05 E1 |

| assault rifle M05 E2 |

| assault rifle M05 E3 |

| submachine gun M92 |

| assault rifle M70 B3, AB3 |

| light machine gun M72 |

A group of guns designed on the basis of Kalashnikov system, proven in numerous wars fought worldwide in the last sixty years.

#### Main Characteristics

- ▣ ergonomically designed with perfect balance
- ▣ excellently balanced weapon with low recoil ensures easy fire control
- ▣ functional in all environments
- ▣ light weight and compact
- ▣ the best raw materials contribute to extreme durability
- ▣ highly efficient and reliable locking system
- ▣ possibility for night aiming (tritium tubes)
- ▣ proven and safe type of trigger mechanism

#### Accessories

- 4 spare 30rds magazines
- cleaning rod
- cleaning kit
- oil can
- sling

#### Optional

Optical sight and mount can be included in the rifle set on customer's request (exception is model M05E1).



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# M05E

7.62 x 39mm

| assault rifle M05 E1 |

| assault rifle M05 E2 |

| assault rifle M05 E3 |



Group M05E consists of new models of assault rifles in caliber 7.62x39 mm. All excellent characteristics of well known assault rifles M70 are kept in this model and many upgraded characteristics are result of modern tactic demands.

Common characteristics for all M05E models:

- Hammer forged barrel ensures excellent precision
- Mechanical and applied safety
- Automatic and semiautomatic mode
- 30 rds metal sheet or polymer magazine
- Muzzle brake also suppresses flash
- Iron sights with tritium tubes ensure aiming at night
- Two-piece polymer handguards with good thermal isolation ensure comfortable grip
- 12 o'clock and 6 o'clock Picatinny rails on the handguards

- Polymer stock with easy and reliable mechanism for right side folding

Differences between M05E models  
 M05E1 is basic model without possibility to attach optical sight mount to the receiver.

M05E2 has dovetail rail on the left side of the receiver to attach mount with Picatinny rail. Mount with Picatinny rail can be included in set of rifle on customer's request.

M05E3 has full length Picatinny rail on the receiver cover.

#### Options

Underbarrel grenade launcher BGP 40mm or BGP 40x46 mm

#### Technical Characteristics

Model	C	MC	W	WM	TL	BL	TF	O	LS	RF
Assault Rifle M05 E1	7,62 x 39	30	4,05	0,15 / 0,37	934 / 689	415	Semi&Auto	Gas	Rotating bolt	620 ± 60
Assault Rifle M05 E2	7,62 x 39	30	4,15	0,15 / 0,37	934 / 689	415	Semi&Auto	Gas	Rotating bolt	620 ± 60
Assault Rifle M05 E3	7,62 x 39	30	4,25	0,15 / 0,37	934 / 689	415	Semi&Auto	Gas	Rotating bolt	620 ± 60

C- Calibre (mm), MC- Magazine capacity, W- Weight of weapon with metal magazine (kg), WM- Weight of polymer/metal magazine (kg), TL- Total length Weapon/Weapon with folded stock (mm), BL- Barrel length (mm), TF- Type of fire, O- Operation, LS- Locking system, RF- Rate of fire (rds/min)

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| assault rifle M05E2 |

| assault rifle M05E1 |

| assault rifle M05E3 |

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| assault rifle M70 B3 |



| submachine gun M92 |



| assault rifle M70 AB3 |



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## previous models

7.62 x 39mm



BGP 40mm - underbarrel grenade launcher can be included in set of rifles M70 AB3 and M70 B3, on customer's request.



| light machine gun M72 B1 |



### Technical Characteristics

Model	C	MC	W	WM	TL	BL	TF	O	LS	RF
Assault Rifle M70B3	7.62 x 39	30	4.10	0.37	920	415	Semi&Auto	Gas	Rotating bolt	620 ± 60
Assault Rifle M70AB3	7.62 x 39	30	3.90	0.37	915 / 670	415				
Submachine Gun M92	7.62 x 39	30	3.57	0.37	795 / 550	254				
Light Mach. Gun M72 B1/AB1	7.62 x 39	30	5.37	0.37	1025	542				

C- Calibre (mm), MC- Magazine capacity, W- Weight of weapon (kg), WM- Weight of magazine (kg), TL- Total length Weapon/Weapon with folded stock (mm), BL- Barrel length (mm), TF- Type of fire, O- Operation, LS- Locking system, RF- Rate of fire (rds/min)

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# M05N

7.62x51N

| assault rifle M05N1 |

| assault rifle M05N2 |

| assault rifle M05N1 |



Group M05N consists of new models of assault rifles in caliber 7.62x51 mm. All excellent characteristics of previous version M77 are kept in this model and many upgraded characteristics are result of modern tactic demands.

Common characteristics for all M05 N models:

- Hammer forged barrel ensures excellent precision
- Chromium plated barrel interior
- Gas flow regulator
- Mechanical and applied safety
- Automatic and semiautomatic mode
- 20 rds metal sheet magazine
- Flash hider
- Iron sights with tritium tubes ensure aiming at night
- Full length Picatinny rail on the receiver cover
- Two-piece polymer handguards with good thermal isolation ensure comfortable grip



| assault rifle M05N1 |



- 12 o'clock and 6 o'clock Picatinny rails on the handguards
- Polymer stock with easy and reliable mechanism for right side folding

Differences between M05 N models

**M05 N1** is basic model with fire selector on the right side of the receiver

**M05 N2** is equipped with ambidextrous fire selector

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| assault rifle M05N2FS |



\*S in model name indicates the version with shorter barrel

\*F in model name indicates the version with fixed stock

| assault rifle M05N1FS |



| assault rifle M05N2 |



Technical Characteristics

Model	C	MC	W	WM	TL	BL	TF	O	LS	RF
Assault Rifle M05N1 & M05N2	7.62x 51N	20	4.45	0.25	1049/804	500	Semi&Auto	Gas	Rotating bolt	620 ± 60
Assault Rifle M05N1S & M05N2S			4.35		955/710					

C- Calibre (mm), MC- Magazine capacity, W- Weight of weapon (kg), WM- Weight of magazine (kg), TL- Total length Weapon/Weapon with folded stock (mm), BL- Barrel length (mm), TF- Type of fire, O- Operation, LS- Locking system, RF- Rate of fire (rds/min)

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## sniper rifles

| sniper rifle M91 |

| sniper rifle M07 AS|

| sniper rifle M07 AF|

Primary demand for this kind of product - high accuracy at large distances - is fulfilled and confirmed in hardest exploiting conditions. The best results are obtained at ranges up to 800m.

This group was designed after long and careful study of combat tactics and experience of military and police special forces world wide.

### Main Characteristics

- ▣ ergonomically designed with perfect balance
- ▣ easily controlled
- ▣ easy handling and maintenance
- ▣ possibility of mounting of different types of optical devices
- ▣ possibility to install a silencer
- ▣ possibility of adjusting to different types of fields for easier aiming

18 military guns catalogue



military guns catalogue 19



## sniper rifle M91

| sniper rifle M91 7.62x54R |



Semi-Automatic Sniper Rifle M91 is designed on the bases of well-known Kalashnikov system provided with possibility of propellant gas flow regulation.

Primary demand for this kind of product - high accuracy at large distances - is fulfilled and confirmed in hardest exploiting conditions. The best results are obtained at ranges up to 800m. The possibility of aiming with iron sight is 1000m.

Optical sight, (magnification 6x) included in the standard set of the weapon, additionally contributes to extraordinary accuracy and precision of the rifle. Bipod can be included in the rifle set on customer's request

### Technical Characteristics

Model	C	MC	W	WM	TL	BL	TF	O	LS	MER
Sniper Rifle M91	7.62 x 54 R	10	5.49	0.2	1200	620	Semi	Gas	Rotating bolt	1000

C- Calibre (mm), MC- Magazine capacity, W- Weight of weapon (M91 with optical sight)(kg), WM- Weight of magazine (kg), TL- Total length (mm), BL- Barrel length (mm), TF- Type of fire, O- Operation, LS- Locking system, MER- Maximum effective range (m)

20 military guns catalogue

## sniper rifle M91N

| sniper rifle M91 7.62x51N |



### Technical Characteristics

Model	C	MC	W	WM	TL	BL	TF	O	LS	MER
Sniper Rifle M91N	7.62 x 51 N	10	5.49	0.2	1200	620	Semi	Gas	Rotating bolt	1000

C- Calibre (mm), MC- Magazine capacity, W- Weight of weapon (M91 with optical sight)(kg), WM- Weight of magazine (kg), TL- Total length (mm), BL- Barrel length (mm), TF- Type of fire, O- Operation, LS- Locking system, MER- Maximum effective range (m)

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# sniper rifle M07

| sniper rifle M07 AF |



| sniper rifle M07 AS |



Technical Characteristics

Model	C	MC	W	WOB	WM	TL	BL	TF	O	LS	MER
Sniper Rifle M07 AF	7.62 x 54 R	3/5	5.40	6.91	0.1	1182/930	650	Single	Bolt action	Rotating bolt	1000
Sniper Rifle M07 AS	7.62 x 51 N		5.25	6.76		1182					

**C-** Calibre (mm), **MC-** Magazine capacity **7.62x54R/7.62x51N**, **W-** Weight of rifle with empty magazine (kg), **WOB-** Weight of rifle with empty mag, optical sight and bipod (kg), **WM-** Weight of magazine (kg), **TL-** Total length (mm), **BL-** Barrel length (mm), **TF-** Type of fire, **O-** Operation, **LS-** Locking system, **MER-** Maximum effective range (m)

22 military guns catalogue

The design of the Sniper Rifle is based on the famous Mauser M98 Action, which in combination with heavy, hammer forged barrel, guarantees extremely high reliability and accuracy.

Versions:

о јуо ш□□ ит —г—кљ уљ—г' ит

о јуо ш□□ ия —г' у—љљ ит□

Adjustable comb height and length of pull enable each shooter to set the rifle to fit his own body shape.

The receiver is of polygonal shape, with built-in Picatinny rail (the receiver and the rail are made from one block of steel).

Optical sight 4-16x56 mm and adjustable, folding bipod are included in the set of the rifle.



military guns catalogue 23



| long range rifle M12 cal. .50Browning |



| long range rifle M12 cal. 12.7x108 |


**Technical Characteristics**

Model	C	MC	W	WM	TL	BL	TF	O	LS	MER
Long Range Rifle M12	12.7 x 108	5	13.46	0.78	1700	1007	Single	Bolt action	Rotating bolt	1800
Long Range Rifle M12	.50 Browning	5	12.93	0.78	1533	840	Single	Bolt action	Rotating bolt	1600

C- Calibre (mm), MC- Magazine capacity, W- Weight of weapon (M91 with optical sight)(kg), WM- Weight of magazine (kg), TL- Total length (mm), BL- Barrel length (mm), TF- Type of fire, O- Operation, LS- Locking system, MER- Maximum effective range (m)

24 military guns catalogue

# long range rifle

M12 black spear

A long range anti-material rifle is a bolt action weapon capable of destroying various targets at large distances and in different climate and terrain conditions.

**Main Characteristics**

- ▣ locking - Mauser system
- ▣ bolt guided along the whole length of its movement in the receiver
- ▣ heavy barrel ensures accurate and precise path of fired projectile of large energetic potential
- ▣ chromium plated barrel interior
- ▣ adjustable trigger pull
- ▣ Picatinny rail is made together with the receiver from one block of steel
- ▣ muzzle brake reduces the recoil and facilitates shooting
- ▣ adjustable aluminium stock has built-in buffer, which significantly reduces the effect of recoil
- ▣ butt spike, adjustable in height
- ▣ adjustable folding bipod
- ▣ standard catch for the bipod assembly enables the assembly of other types of bipods, of user's choice
- ▣ optical sight 4-16x56 is included in set of rifle



military guns catalogue 25



| long range rifle M93 12.7 x 10 8mm |

| long range rifle M93 .50 Browning |

## Technical Characteristics

Model	C	MC	W	WM	TL	BL	TF	O	LS	MER
Long Range Rifle M93	12.7 x 108	5	15.0	0.78	1670	1007	Single	Bolt action	Rotating bolt	1800
Long Range Rifle M93	.50 Browning	5	14.6	0.78	1500	837	Single	Bolt action	Rotating bolt	1600

C- Calibre (mm), MC- Magazine capacity, W- Weight of weapon (M91 with optical sight)(kg), WM- Weight of magazine (kg), TL- Total length (mm), BL- Barrel length (mm), TF- Type of fire, O- Operation, LS- Locking system, MER- Maximum effective range (m)

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# long range rifle

 M93 **black arrow**

## Main Characteristics

- ▣ excellent balance
- ▣ stock with two spring buffers
- ▣ muzzle brake facilitating shooting (decreasing recoil by 62%)
- ▣ stock and forehand made of polymer, reinforced with glass fibres
- ▣ adjustable folding bipod - able to fit the size of the cover behind which the rifle is placed
- ▣ locking - Mauser system
- ▣ bolt guided along the whole length of its movement in the receiver
- ▣ heavy barrel for accurate and precise path of fired projectile of large energetic potential
- ▣ chromium plated barrel interior
- ▣ barrels are made with the technology used on heavy machine gun barrels of the same calibre, which have a ballistic life of more than 5 000 rounds.
- ▣ fluted barrel

A set of spares, tools and accessories belongs to each weapon.

A long range rifle, made on the basis of Mauser system, which was, during its one hundred years long combat history, proven to be the most accurate and most reliable bolt-action system.

Primary purpose of this rifle is long range engagement of hardly visible targets and due to that, besides the iron sights, it is provided with optical sight, which is included in the rifle set. Its mount can accept the sights of other manufacturers as well.



detachable magazine



muzzle brake

# machine guns

| M84 |  
| M86 |

| M87 |  
| M87 NAVAL |  
| M02 Coyote |  
| M07 |

Each experienced infantryman knows that sustained machine gun fire is his best friend when coming from his own side, and his worst enemy when coming from the other. These machine guns are capable of delivering long range accurate fire in all weather and ground conditions, day and night. They also have a credit of a key weapon in many combats, capable of solving almost impossible tactical situations.

- ▣ gas flow regulator to cope with extreme weather and terrain conditions
- ▣ for cooling purposes and for longer service life of the weapon, the barrel can be detached or replaced in the matter of seconds
- ▣ front and rear mechanical sights (except MG M86)

#### Main Characteristics

- ▣ all metal parts made of high tensile steel
- ▣ hammer forged barrel
- ▣ chromium plated barrel interior
- ▣ machining of functional parts done on state-of-the-art CNC machinery
- ▣ all parts and subassemblies thoroughly controlled prior to final assembly
- ▣ after assembly, each machine gun tested and approved
- ▣ belt-fed, belts placed in appropriate ammo boxes

28 military guns catalogue



military guns catalogue 29



# machine gun M84

| machine gun M84 |  
 | bipod |



## Machine Gun M84

Intended for the realization of infantry units demands.

- ▣ can be delivered with or without tripod
- ▣ can be used on a folding bipod enabling shooting on different terrains
- ▣ stable tripod mount and mild recoil of the gun provide very accurate fire

- ▣ height of the mount can be adjusted to fit the size of the cover behind which it is placed
- ▣ the mount is equipped with an attachment that allows shooting at air targets

### Technical Characteristics

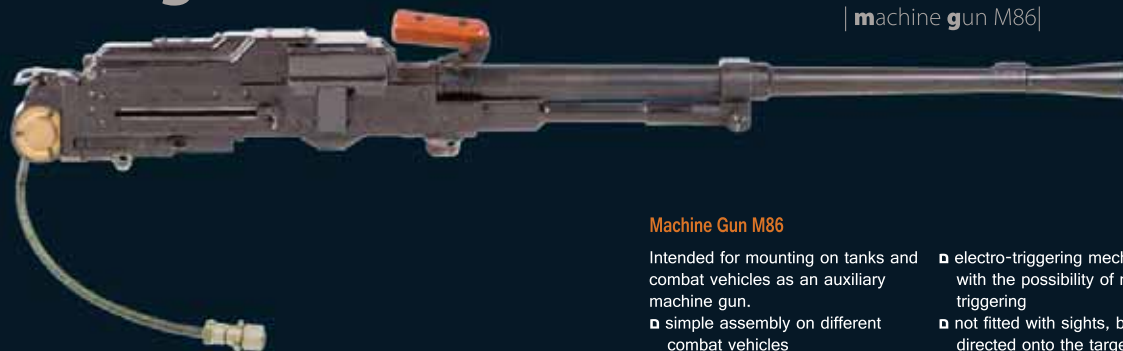
Model	C	W	WOM	TL	BL	TF	O	LS	RF	MER
Light Machine Gun M84	7.62 x 54 R	8.8	-	1175	603	Automatic	Gas	Rotating Bolt	700-800	1000
Machine Gun M84	7.62 x 54 R	13.3	4.5	1175	603	Automatic	Gas	Rotating Bolt	700-800	1000
Machine Gun M86	7.62 x 54 R	11.6	-	1100	780	Automatic	Gas	Rotating Bolt	700-800	1000

C- Calibre (mm), W- Weight of weapon (kg), WOM- Weight of mount (kg), TL- Total length (mm), BL- Barrel length (mm), TF- Type of fire, O- Operation, LS- Locking system, RF- Rate of fire (rds/min), MER- Maximum effective range (m)

30 military guns catalogue

# machine gun M86

| machine gun M86 |



## Machine Gun M86

Intended for mounting on tanks and combat vehicles as an auxiliary machine gun.

- ▣ simple assembly on different combat vehicles

- ▣ electro-triggering mechanism with the possibility of mechanical triggering

- ▣ not fitted with sights, being directed onto the target by the tank fire control system

Spares and Accessories, two types of ammunition boxes (250/100 rds) and belt loading machine (as an option, on customer's demand) are delivered with machine guns M84 and M86.



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# machine gun M87



ammunition boxes (60 rds)

belt loading machine

## Machine Gun M87

M87 heavy machine gun uses design of the famous NSV, the best heavy machine gun ever designed. This design provides reliable, jam-proof operation in any ground or weather conditions.

- ▣ empty cases ejected forward
- ▣ spare barrel prolongs the service life of the weapon

## PURPOSE

- \* anti-aircraft machine gun on battle tanks and armoured vehicles
- \* providing efficient anti-aircraft protection for highly mobile, light mountain infantry units, but also providing heavy, long-range accurate fire on ground targets
- \* providing efficient fire against water-surface and costal targets

Spares (including spare barrel), accessories, ammunition boxes (60 rds), cartridge belts and belt filler (as an option, on customer's demand) are delivered with each machine gun.

Depending on purpose and the type of combat means on which it is placed, the gun is used with appropriate mount.

### Technical Characteristics

Model	C	W	WOS	TL	BL	TF	O	LS	RF	MER
Machine Gun M87	12.7 x 108 .50 Browning	24.8	9.3	1560	1100	Automatic	Gas	Open bolt	700	1500

**C**- Calibre (mm), **W**- Weight of weapon (kg), **WOS**- Weight of spare barrel (kg), **TL**- Total length (mm), **BL**- Barrel length (mm), **TF**- Type of fire, **O**- Operation, **LS**- Locking system, **RF**- Rate of fire (rds/min), **MER**- Maximum effective range (m)

32 military guns catalogue

## | machine gun M87 NAVAL |



### Machine Gun M87 NAVAL

Machine Gun M87 - NAVAL version is formed when the tank version of Machine Gun M87 is assembled to the bell-shaped mount. The Machine Gun M87 - NAVAL can be fixed to a boat or a vehicle by connecting the mount to the foundation with screws. Primary function of M87 Naval is provision of efficient fire against water-surface and costal targets. Depending on the type of mount, together with the weapon, accessories for the mount are delivered. At customer's request, described versions of machine guns can be assembled to other transport means.

## | machine gun M87 TANK |



### Machine Gun M87 TANK

Machine Gun M87 - TANK version is formed when the Machine Gun M87 is set to Rotating base. Rotating base can easily and quickly change elevation through elevation mechanisms and springs. Chosen position is fixed by a stop on the elevation device. This mount is assembled to tanks or light armoured vehicles. Primary function of M87 TANK VERSION is provision of efficient fire against water-surface and costal targets.

### Technical Characteristics

Model	C	W	WOM	TL	BL	TF	O	LS	RF	MER
Machine Gun M87 NAVAL	12.7 x 108 .50 Browning	125.8	101	2400	1100	Automatic	Gas	Open bolt	700	1500
Machine Gun M87 TANK	12.7 x 108 .50 Browning	63.3	38.5	1750	1100	Automatic	Gas	Open bolt	700	1500

**C**- Calibre (mm), **W**- Weight of weapon (kg), **WOM**- Weight of mount (kg), **TL**- Total length (mm), **BL**- Barrel length (mm), **TF**- Type of fire, **O**- Operation, **LS**- Locking system, **RF**- Rate of fire (rds/min), **MER**- Maximum effective range (m)

military guns catalogue 33

# machine gun M07

| machine gun M07 |



### Machine Gun M07

Machine Gun M07 is formed when the Machine Gun M87 is set to a cradle fixed to a post on a vehicle. Spade grip with trigger mechanism is assembled to the machine gun. Area covered with fire from transport means can be limited, so as to provide maximum safety of the crew of the transport means.

Primary purpose of M02 Coyote and M07 is provision of efficient anti-aircraft protection for highly mobile, light mountain infantry units, but also provision of heavy, long-range accurate fire on ground targets.



# machine gun M02

| machine gun M02 COYOTE |



### Machine Gun M02 Coyote

Machine Gun M02 Coyote is formed when the Machine Gun M87 is set to the cradle fixed to a tripod. Pistol trigger mechanism and stock with buffer are assembled to the machine gun. These assemblies provide high mobility of the gun, with excellent control of fire.



#### Technical Characteristics

Model	C	W	WOM	TL	BL	TF	O	LS	RF	MER
Machine Gun M07	12.7 x 108	43.8	19	1760	1100	Automatic	Gas	Open bolt	700	1500
Machine Gun M02 Coyote	.50 Browning	48.8	24	1970	1100	Automatic	Gas	Open bolt	700	1500

C- Calibre (mm), W- Weight of weapon (kg), WOM- Weight of mount (kg), TL- Total length (mm), BL- Barrel length (mm), TF- Type of fire, O- Operation, LS- Locking system, RF- Rate of fire (rds/min), MER- Maximum effective range (m)

34 military guns catalogue

# automatic grenade launcher

| M93 30 mm |

Automatic Grenade Launcher M93 is an infantry weapon intended for destruction of uncovered and covered live force at distances up to 1700 m, as well as for destruction of light armoured vehicles at distances up to 1000 m.

The interior of the barrel is chrome plated. Automatic Grenade Launcher M93 can only fire bursts, and the rate of fire can be changed.

Automatic Grenade Launcher M93 is loaded from a belt that is placed in the drum. The drum has the capacity of 29 grenades. It uses 30 mm HE, HEAT, practice and practice - marker grenades.

The design of tripod enables quick change from marching to combat position and vice versa.

Complete set of the weapon includes sighting device NSBG-1, that enables direct, semi-direct and indirect aiming and aiming when the visibility is low.

Automatic Grenade Launcher M93 set includes: 30 mm Grenade Launcher, mount, sighting device NSBG-1, ammunition boxes with belts (30 links).



As option, at customer's request in set can be included belt filler and rectification sight DR - 30.

At customer's request and depending on tactical purpose, Automatic Grenade Launcher M93 is assembled to combat vehicles and helicopters.



#### Technical Characteristics

Model	C	DC	W	WT	TL	BL	TF	O	LS	MER
Automatic Grenade Launcher 30 mm	30	29	38	14	1305	300	Automatic	Blowback	Inertial	1700

C- Calibre (mm), DC- Drum capacity, W- Weight of weapon with drum (kg), WT- Weight of tripod (kg), TL- Total length (mm), BL- Barrel length (mm), TF- Type of fire, O- Operation, LS- Locking system, MER- Maximum effective range (m)

military guns catalogue 35



# underbarrel grenade launcher BGP-40x46 mm

BGP 40x46 mm is intended for annihilation of live forces, firearms, and unarmoured motor vehicles at the distances from 50 to 400 m by direct firing. It is intended to be assembled to submodels BS of M21 group and M05 rifles.

| BGP-40 x46 mm |

**Main features:**

- ▣ Assembled to the Picatinny rail placed on the lower side of the handguard
- ▣ Barrel interior is chrome plated
- ▣ Breech loaded
- ▣ Trigger mechanism is Double Action
- ▣ BGP can operate independently from the automatic rifle and then it is delivered with the stock, as an option when an order is placed.



**Technical Characteristics**

Model	C	W	TL	BL	TF	SDD
BGP - 40x46 mm	40x46	1.6 / 2.4	315 / 655	235	Single shot	50-400

**C**- Calibre (mm), **W**- Weight of weapon, without stock/ with stock (kg), **TL**-Total length, without stock/ with stock (mm), **BL**- Barrel length (mm), **TF**- Type of fire, **SDD**-Sight division for direct aiming (m)

36 military guns catalogue

# underbarrel grenade launcher BGP-40 mm



| BGP-40mm |

Underbarrel Grenade Launcher is intended for neutralization of enemy's live force, firearms and unarmoured vehicles:

- 50 to 350 m direct fire (bottom part of angles on sighting device)
- 200 to 300 m indirect fire (bottom part of angles on sighting device)

Underbarrel Grenade Launcher can accept the following ammunition:

- ▣ HE grenade
- ▣ HEAT grenades
- ▣ incendiary
- ▣ smoke
- ▣ practice

The design prevents firing from Underbarrel Grenade Launcher when it is not on the rifle, although it functions as a system that is separate from the rifle.

The interior of the barrel is chrome plated. Rubber buffer is set to the rifle to reduce the blow during firing.

In direct firing, aiming is done through iron sights (front and rear).

In indirect aiming, the shooter uses plummet. Underbarrel Grenade Launcher is carried in its holster or on a combat vest (when stripped)

The complete set of the gun includes a carrying bag for 10 grenades.

At customer's request, Underbarrel Grenade Launcher can be adapted to fit the rifles of other manufacturers.

**Versions:**

BGP - 40 mm is a version that is assembled to Assault Rifles: M21A, M21S, M70B3 and M70AB3  
 BGP - 40 mm - M70 is a version that is assembled to Assault Rifles M70B1 and M70AB2

The difference between these two versions is in dimensions of parts used for assembly to the rifle.



BGP-40mm M70



Rubber buffer



Underbarrel grenade launcher

**Technical Characteristics**

Model	C	W	TL	BL	TF	SDD	SDI
BGP - 40 mm	40	1.5	323	120	Single shot	50-400	200-350
BGP - 40 mm M70	40	1.5	323	120	Single shot	50-400	200-350

**C**- Calibre (mm), **W**- Weight of weapon (kg), **TL**-Total length (mm), **BL**- Barrel length (mm), **TF**- Type of fire, **SDD**-Sight division for direct aiming (m), **SDI**- Sight division for indirect aiming (m)

military guns catalogue 37





# pistols

**PISTOL CZ999**

Pistol CZ999 is a semi-automatic gun, functioning on the principle of short recoil of the barrel. Locking is achieved by vertical oscillation of the barrel, that comes into the hole on the slide. Pistol is a modern weapon used as service gun and as self-defence gun. Due to excellent design, ergonomics, state-of-the-art technology methods in production, gun is distinguished by precision, accuracy and functionality. The frame of the pistol is made of aluminium alloy, so a robust gun has small weight. Chrome plated barrel guarantees long service life and easy maintenance.

It functions as a single action or a double action pistol. Feeding is done from a double-row detachable magazine with the capacity of 10 or 15 rounds. All controls on the pistol are ambidextrous and they can be used either with the left or the right hand. The design of the pistols enables the controls to have several functions. Loaded chamber indicator shows whether a round is in the barrel. Sights are square, with white dots and they provide easier aiming when the visibility is low.

**PISTOL EZ9**

The basic design for pistol EZ9 is Pistol CZ999. Additional characteristics are a mounted rail, enabling the assembly of all optical and electronic devices corresponding to NATO standard and open-type hammer.

**PISTOL EZ9 Compact**

PISTOL EZ9 Compact is a version of standard pistol EZ 9 with the barrel that is shorter by 10mm. All other characteristics, except the ones regarding the barrel length (length of the slide and the pistol, weight) are identical to the characteristics of standard models.

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**Technical Characteristics**

Model	C	MC	W	TL	BL	H
CZ 999	9 x 19	15 / 10	0.92	198	108	140
EZ 9	9 x 19	15 / 10	0.95	198	108	140
EZ 9 Compact	9 x 19	15 / 10	0.90	188	98	140

C- Calibre (mm), MC- Magazine capacity, W- Weight of weapon (kg), TL- Total length (mm), BL- Barrel length (mm), H- Height (mm)

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# UKROBORONPROM

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# UKROBORONPROM FOR PARTNERS

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Our mission is to provide security and peace for our country. Our ultimate aim is to ensure that Ukrainian army is strongly equipped to protect the nation against any threat.

## WE ARE:

- world class design and development specialists in the area of armoured vehicles
- the network of enterprises and affiliated companies/subsidiaries, focused on engineering, research and development, science and technology
- the chain of subsidiaries, involved in complementary industries such as Radar, Radio Communication, Air Defence Systems and Rocket artillery weapons and munitions
- cooperating with more than 90 countries
- highly qualified production personnel and engineers
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## OUR GOALS ARE:

To raise equity and debt financing, bringing Defence Industry to world standards in both smart technology and operation

To ensure that UKROBORONPROM enterprises-participants are supplied with everything necessary to perform at their best, so that we could expand the product line with the world class technologies

Implementation of the leading production approach to ensure operating and marginal efficiencies

To implement best management practices into the HQ operations, procedures as well as of our enterprises



# ROCKET ARTILLERY WEAPONS AND MUNITIONS

## WE DO:

- high-precision guided weapons
- various caliber artillery systems
- propelling charges, explosives, powder and blast initiation means
- design and development of ammunitions
- recycling of ammunitions



# SKIF

## MAN PORTABLE ANTI-TANK MISSILE SYSTEM

Skif man-portable antitank missile system is designed to destroy stationary and moving modern armored targets with combined, carried or monolithic armor, including ERA (explosive reactive armor), and also pinpoint targets like permanent fire positions, a tank in a trench, light-armored objects and helicopters.

RK-2S, RK-20F	RK-2M-K, RK-2M-OF
Firing range at day time: 100-5000 m	Firing range at day time: 100-5500 m
Firing range at night time: 100-3000 m	Firing range at night time: 100-3000 m
Flight time at maximum range: not more than 25 s	Flight time at maximum range: not more than 25 s
Weight of missile in container: 29,5 kg	Weight of missile in container: 38 kg
Missile calibre: 130 mm	Missile calibre: 152 mm
Container length: 1360 mm	Container length: 1435 mm
Container outer diameter: 140 mm	Container outer diameter: 162 mm
Operating temperature range: from -40 to +60 °C	Operating temperature range: from -40 to +60 °C



The system is equipped with 130 mm and 152 mm missiles in transport and launching containers with tandem hollow-charge (RK-2S, RK-2M-K) and high-explosive fragmentation (RK-20F, RK-2M-OF) warheads.

Skif can guide the missile at the target from closed emplacements and shelters to reduce the risk of the operator destruction by return fire attack of the enemy.

### Main Specifications:

	RK-2S, RK-20F	RK-2M-K, RK-2M-OF
Guidance system	by laser beam with target tracking in automatic mode	
Warhead:		
■ tandem hollow-charge, armour penetration behind ERA	not less than 800 mm	not less than 1100 mm
■ high-explosive fragmentation with EFP, armour penetration	not less than 60 mm	not less than 120 mm
Weight:		
■ launcher		32 kg
■ guidance device		15 kg
■ remote control		10 kg
■ thermal imager		6 kg











# BARRIER

## VEHICLE CARRIED ANTITANK MISSILE SYSTEM

“Barrier” is a vehicle-carried antitank missile system, mounted on a turret of a fighting vehicle (like ICV or APC), designed to destroy stationary and moving modern armoured targets with combined, carried or monolithic armour, including ERA (explosive reactive armour), as well as pinpoint targets such as permanent fire positions, a tank in a trench, light armoured objects and helicopters.

-  Maximum firing range:  
5000 m
-  Flight time at maximum range:  
23 s
-  Weight of missile in container:  
29,5 kg
-  Missile calibre:  
130 mm
-  Container length:  
1360 mm
-  Container outer diameter:  
140 mm



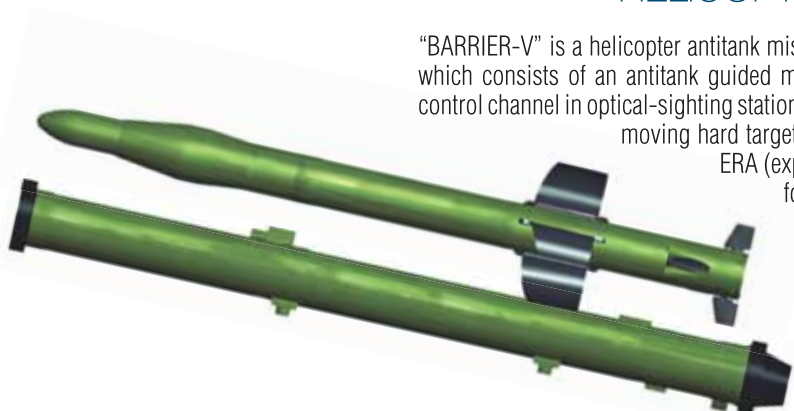
**Main Specifications:**

Guidance system	Semi-automatic by laser beam
Warhead:	
■ type	tandem hollow-charge
■ armour penetration behind ERA	not less than 800 mm
■ high-explosive fragmentation with EFP, armour penetration	not less than 60 mm
Operating temperature range	from - 40 to +60 °C

# B


## HELICOPTER ANTITANK MISSILE SYSTEM

“BARRIER-V” is a helicopter antitank missile system, used for modernization of MI-24 helicopters, which consists of an antitank guided missile (in a transport and launching container) and laser control channel in optical-sighting station. “BARRIER-V” is designed for destruction of stationary and moving hard targets with combined, carried or monolithic armour, including ERA (explosive reactive armour) as well as pinpoint targets such as fortified emplacements, a tank in a trench, light-armoured objects and helicopters.



**Main Specifications:**

Guidance system	by laser beam with target tracking in automatic mode
Warhead:	
■ type	tandem hollow-charge
■ armour penetration behind ERA	not less than 800 mm
Operating temperature range	from -40 to +60 °C

- Maximum firing range:  7500 m
- Weight of missile in container:  47 kg
- Missile calibre:  130 mm
- Container length:  1917 mm
- Container outer diameter:  140 mm



# CORSAR

## LIGHT PORTABLE ANTITANK MISSILE SYSTEM

Corsar light portable antitank missile system is designed for destruction of stationary and moving armoured targets and other objects with combined, carried or monolithic armour, including ERA (explosive reactive armour), as well as pinpoint targets such as permanent fire positions, a tank in a trench, light-armoured objects and helicopters.



Maximum firing range:  
2500 m



Flight time at maximum range:  
13 s



Weight of missile in container:  
26 kg



Missile calibre:  
107 mm



Container length:  
1120 mm



Container outer diameter:  
113 mm



### Main Specifications:

Guidance system	Semi-automatic by laser beam
Warhead:	
■ type	tandem hollow-charge
■ armour penetration behind ERA	not less than 550 mm
■ high-explosive fragmentation with EFP, armour penetration	not less than 50 mm
Operating temperature range	from -40 to +60 °C

# GUIDED MORTAR ARMAMENT SYSTEM



Guided mortar armament system is designed to destroy modern armoured and unarmoured, moving and stationary equipment as well as pinpoint engineering constructions.

The system includes:

- 120-mm high-precision guided mine;
- laser target designator range-finder;
- shot synchronization system;
- installable device that provides initial data input into the guided mine control system;
- radio stations that ensure digital and voice communication.

### Main Specifications:

Guidance system (on the end of trajectory)	laser semiautomatic homing
Warhead:	
■ type	high-explosive fragmentation
Target hit probability	0,75-0,80
Operating temperature range	from -40 to +60 °C

Maximum firing range:  
7500 m



Weight of missile in container:  
28,7 kg



Guided mine calibre:  
120 mm



Container length:  
1490 mm






# KVITNYK

## HIGH PRECISION GUIDED ARTILLERY PROJECTILE WITH LASER SEMI-ACTIVE HOMING

The projectile of «Kvitnyk» type is designed for high-precision defeat of the various targets at fire from artillery system as a part of a complex of guided artillery arms.

«Kvitnyk» is designed for effective defeating of: tanks, IFVs, armored vehicles, multiple rocket launchers, self-propelled artillery systems, artillery pieces, both on the move and stationary, located in the open or in pits, command, control, communications centers, bridges, crossings, defensive fortifications, surface targets (combatant, landing or transport ships) etc. with a high probability by one shot.



 Maximum firing range:  
not more than 20 km

 Missile calibre:  
152 (155) mm

 Length:  
1250 mm

### Main Specifications:

Combat part type	high-explosive fragmenting
Weight of explosives	not more than 8 kg
Weight of projectile	not more than 52 kg
Operating temperature range	from -40 to +50 °C



# STUGNA


## ROUND COMPRISING ANTITANK GUIDED MISSILE





STUGNA gun-launched missile is designed for firing from the T-55 tank or MT-12 anti-tank artillery gun against stationary and moving modern armored objects with combined, carried or monolithic armor, including ERA (explosive reactive armor), as well as against pinpoint targets like permanent fire positions, a tank in a trench, light-armored objects and helicopters.


### Main Specifications:

Guidance system	Semi-automatic by laser beam
Warhead:	
■ type	tandem hollow-charge
■ armour penetration behind ERA	not less than 550 mm
Round weight	not more than 24,5 kg
Operating temperature range	from -40 to +60 °C

Maximum firing range:  5000 m

Flight time at maximum range:  16,8 s

Missile calibre:  100 mm

Round length:  1196 mm







# KOMBAT

## ANTITANK GUIDED MISSILES

KOMBAT gun-launched missile is designed for firing from tanks T-80UD, T-84, T-72, modernized T-64 against stationary and moving modern armored targets with combined, carried or monolithic armor, including ERA (explosive reactive armor), and also against pinpoint targets like permanent fire positions, a tank in a trench, light-armored objects and helicopters.

-  Maximum firing range:  
5000 m
-  Flight time at maximum range:  
16,3 s
-  Round weight:  
not more than 30,45 kg
-  Missile calibre:  
125 mm
-  Main part length:  
675 mm
-  Tail part length:  
408 mm

### Main Specifications:






Guidance system	semiautomatic by laser beam
Warhead:	
■ type	tandem hollow-charge
■ armour penetration behind ERA	not less than 750 mm
Operating temperature range	from -40 to +60 °C



# KONUS

## ROUND COMPRISING ANTITANK GUIDED MISSILE

Round comprising antitank guided missile is designed to destroy, when firing from tanks T-84-120, T-72-120, stationary and moving modern armoured targets with combined, carried or monolithic armour, including ERA (explosive reactive armour), and also against pinpoint targets like permanent fire positions, a tank in a trench, light-armoured objects and helicopters.

- Maximum firing range:  5000 m
- Flight time at maximum range:  16,3 s
- Round weight:  28 kg
- Missile calibre:  120 mm
- Round length:  1074 mm

### Main Specifications:

Guidance system	semiautomatic by laser beam
Warhead:	
■ type	tandem hollow-charge
■ armour penetration behind ERA	not less than 700 mm
Operating temperature range	from -40 to +60 °C



## FALARICK 90

### ROUND COMPRISING ANTITANK GUIDED MISSILE

Round comprising antitank guided missile is designed for firing from the LCTS90 weapon system gun against stationary and moving modern armoured targets with combined, carried or monolithic armour, including ERA (explosive reactive armour), and also against pinpoint targets like permanent fire positions, a tank in a trench, light-armoured objects and helicopters.



Maximum firing range:  
4000 m



Flight time at maximum range:  
14 s



Round weight:  
20,05 kg



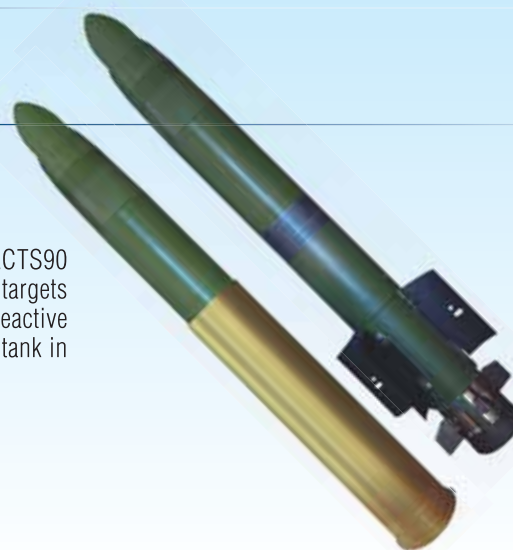
Missile calibre:  
90 mm



Round length:  
977 mm

#### Main Specifications:

Guidance system	semiautomatic by laser beam
Warhead:	
■ type	tandem hollow-charge
■ armour penetration behind ERA	not less than 550 mm
Operating temperature range	from -40 to +60 °C



## FALARICK 105

### ROUND COMPRISING ANTITANK GUIDED MISSILE

Round comprising antitank guided missile is designed for firing from the CT-CVTM weapon system gun against stationary and moving modern armoured targets with combined, carried or monolithic armour, including ERA (explosive reactive armour), and also against pinpoint targets like permanent fire positions, a tank in a trench, light-armoured objects and helicopters.



#### Main Specifications:

Guidance system	semiautomatic by laser beam
Warhead:	
■ type	tandem hollow-charge
■ armour penetration behind ERA	not less than 550 mm
Operating temperature range	from -40 to +60 °C

Maximum firing range:  
5000 m



Flight time at maximum range:  
17 s



Round weight:  
24 kg



Missile calibre:  
105 mm



Round length:  
1015 mm





# ROUND COMPRISING ANTITANK

## G

Round comprising antitank guided missile is designed for firing from the armoured vehicle BMP-3 against stationary and moving modern armoured targets with combined, carried or monolithic armour, including ERA (explosive reactive armour), and also against pinpoint targets like permanent fire positions, a tank in a trench, light-armoured objects and helicopters.



Maximum firing range:  
5500 m



Flight time at maximum range:  
not more than 20 s



Round weight:  
21,6 kg



Missile calibre:  
100 mm



Round length:  
1180 mm

### Main Specifications:

Guidance system	semiautomatic by laser beam
Warhead:	
■ type	tandem hollow-charge
■ armour penetration behind ERA	not less than 550 mm
Operating temperature range	from -40 to +60 °C



# SURFACE TO AIR GUIDED MISSILE

Surface to air guided missile (SAGM) is designed to destroy with high-explosive blast fragmentation manned and unmanned means of air attack that are flying at both subsonic and supersonic speeds on the head-on and pursuit courses. SAGM defeats targets at day-and-night time, under any aspect angle at front and aft hemisphere of a target, under ordinary and adverse weather conditions, under informational and manoeuvrable enemy's counteractions.

### Main Specifications:

Impact area:	
■ by range, km	1,5 – 20,0 km
■ by altitude	0,025 – 10,000 km
Guidance system	radio command
SAGM maximum speed	850 m/s
SAGM maximum normal overload	25 g
SAGM launching mass	140 kg

Weight SAGM with transport  
and launching container:  
180 kg



Weight warhead:  
18 kg



SAGM calibre:  
130/260 mm



Length SAGM:  
3160 mm



Length transport and launching container:  
3235 mm





# 9K51 GRAD

## Multiple Rocket System Upgrade



### Mission

The modernised 9K51 Grad MRS is designed to defeat unsheltered and bunkered manpower, soft-skinned materiel and tanks in concentration areas, artillery and mortar batteries, fixed- and rotary-wing aircraft on landing strips, command posts and other targets, as well as to lay antitank mines.

### Composition

- BM-21-1 combat vehicle with automated laying and fire control system and launch preparation equipment
- 9T254 transporter-loader with 9F37M unified set of racks
- multi-purpose rocket-assisted projectiles with enhanced range and power

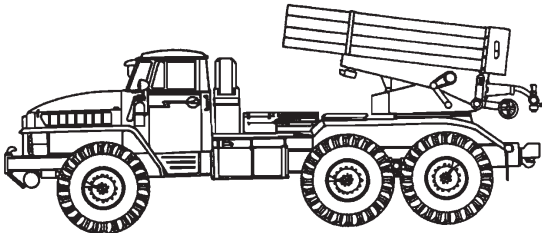
### Modernisation programme

- launch range increase to 40 km
- ability to hit soft-skinned targets and tanks
- firing from unsurveyed sites
- laying of the launch tube cluster with the crew staying in the cabin
- autonomous initial orientation, determination of a current position angle and combat vehicle's coordinates on the move or when parked
- visual representation of graphical information on launch tube cluster laying and CV route with indication of its position, point of destination and direction of movement
- reduction of launch preparation period from the moment of receiving target designation data to the time of opening fire in a battery composition
- enhanced survivability due to reduction of CV time at fire position

### Basic specifications

Calibre, mm	122
Range of fire, km:	
maximum	up to 40
minimum	5
Full launch time, sec	20
Number of launch tubes	40
Weight, kg:	
basic rocket projectile	66.6
loaded CV	13,700
loaded TL	13,600
Combat crew	3
Loading time, min	7
Number of projectiles in rack, pcs	60

## 122-mm Multiple Rocket Launcher BM-21

	<b>Weapons &amp; Ammunition Types</b>  122-mm rocket  Frag-HE	<b>Typical Combat Load</b>    40
<p><b>SYSTEM</b>  <b>Alternative Designations:</b> BM-21 GRAD (Hail) MRL  <b>Date of Introduction:</b> 1963  <b>Proliferation:</b> At least 50 countries  <b>Description:</b>          Crew: 5 (8 with 9K51 Complex)          Chassis/Carriage: Ural 375-D 6x6 wheeled          Combat Weight (mt): 13.7          Chassis Length Overall (m): 7.35          Height Overall (m): 3.09          Width Overall (m): 2.40</p> <p><b>Automotive Performance:</b>          Engine Type: ZIL 375, 180 hp water-cooled, V-8 gasoline engine          Cruising Range (km): 450 km          Speed (km/h):              Max Road: 75              Max Off-Road: 35              Cross-Country: INA              Max Swim: N/A          Fording Depths (m): Unprepared: 1.5          Emplacement Time (min): 3          Displacement Time (min): 2</p> <p><b>Radio:</b> R-123M</p> <p><b>Protection:</b>          Armor, Front (mm): None          Armor Side (mm): None          Armor Roof (mm): None          Self-Entrenching Blade: No          NBC Protection System: No          Smoke Equipment: No</p> <p><b>ARMAMENT</b>  <b>Launcher:</b>          Caliber, Type, Name: 122-mm, 9P132          Number of Tubes: 40 (4 rows of 10 tubes)          Launch Rate:              Full Salvo Time: 40 rounds in 20 seconds              Single Rocket Interval: .5 seconds per rocket          Loader Type: Manual          Reload Time: 10 minutes          Launcher Drive: Electric          Traverse: (θ):              Left: 102              Right: 70              Total: 172          Elevation (ē) (-/+): - 0/+55°</p>	<p><b>FIRE CONTROL</b>  <b>Indirect Fire:</b> PG-1M Panoramic Telescope (PANTEL)  <b>Collimator:</b> K-1  <b>Fire Control Computer:</b> None  <b>Position Location System:</b> None</p> <p><b>VARIANTS</b>  <b>BM-21V:</b> Russian 12-tube version for airborne divisions  <b>BM-21B:</b> Russian 36-tube MRL on a 6x6 ZIL-131 chassis  <b>Grad-P:</b> Russian 1 round rocket launcher  <b>BM-11:</b> North Korean 30-tube version  <b>Type 81:</b> Chinese 40- rail-launched version  <b>RM-70:</b> Czechoslovakian 40-tube version  <b>Sakr:</b> Egyptian 40- tube version</p> <p><b>MAIN ARMAMENT AMMUNITION</b>  <b>Caliber, Type, Name:</b>          122-mm Frag-HE, 9M22U          Indirect Fire Range (m):              Minimum Range: 5000              Maximum Range: 20,380          Warhead Weight (kg): 18.4 (M21OF)          Rocket Length: (m): 2.87          Maximum Velocity: INA          Fuze Type: MRV-U (PD)</p> <p>122-mm Frag-HE, 9M28F          Indirect Fire Range (m):              Minimum Range: 1500              Maximum Range: 15,000          Warhead Weight (kg): 21.0          Rocket Length: (m): 2.87          Maximum Velocity: INA          Fuze Type: MRV-U (PD) or AR-6 (proximity)</p> <p>122-mm Frag-HE, Type 90A (Chinese)          Indirect Fire Range (m):              Minimum Range: 12,700              Maximum Range: 32,700          Warhead Weight (kg): 18.3          Rocket Length: (m): 2.75          Maximum Velocity: INA          Fuze Type: PD</p> <p><b>Other Ammunition Types:</b> Smoke, Incendiary, Chemical, RF Jammer, Illumination, Antitank mines, Antipersonnel mines</p>	

### NOTES

The BM-21 is unquestionably the world's most widely used MRL. The launcher with supporting equipment is referred to as the complex 9K51. A special electric generator powers the launcher. The 9V170 firing device is cab mounted. But, the rockets can be fired using a remote-firing device that has a 64-meter-long cable.





# BUMBLE-BEE (BUMBAR) SHORT RANGE ANTITANK GUIDED WEAPON SYSTEM



Bumbar short range anti-armour missile system features SACLOS (semi automatic command to line of sight) guidance method to keep the missile flying directly towards the target while the operator keeps the sight reticule onto desired point of impact.

Bumbar is man portable, short range guided anti-armour weapon system, designed in accordance with following development drive lines:

Terminal effectiveness allowing destruction of modern and prospective main battle tanks of the first decade in 21st century,

#### General Information:

- Time of flight to target at 600 m: 4.6 s
- Warhead penetration: over 1000mm
- RHA penetration: 800mm
- Range: up to 1000m
- Weapon length in traveling position: 1164mm
- Low disclosing signature at firing position
- Capable of firing in closed spaces
- Night firing capability
- Mass of missile in transporting/launching tube: 14 kg
- Secondary warhead caliber: 55mm
- LC axis superelevation angle: 10°

**Hit probability of more than 90% against moving targets under all weather and climate conditions at ranges up to 600m, range 70 to 1000m,**

- Firing sequence less than 6 seconds,
- Confined space launching capability,
- Simple transition into operation both for shoulder or prone firing mode,
- High protection against the natural and artificial jamming,
- One man portability which could be satisfied with the total mass, of the weapon less than 21 kg and length less than 1.2 m.

**Special design concept of the Bumbaerystabled meeting these stringent requirements:**

- Large clabber, powerful tandem shaped charged warhead, penetrating more than 800 mm RHA behind explosive reactive armour,
- High manoeuvrability, direct thrust vector control system located at the missile's center of gravity,
- Separated ejection and sustained rocket engines, the first enabling soft launching and the second ensuring high thrust and flight velocity with short flight time up to maximum range,
- CCD localized and guidance computer within the firing post provide excellent anti-jamming protection,
- Major parts of the weapon made of nonmetal, plastics or light-metal alloys so the weapon retains lightweight structure.



## TANK AMMUNITION

### 120mm HE DM 11 Tank Ammunition



Rheinmetall's latest ammunition product is the DM 11, a 120mm HE tank round. Owing to its time-delay fuse, it is especially suitable for supporting infantry units tasked with taking lightly fortified positions as well as for engaging light and medium-weight armoured vehicles. After loading, an electronic module programs the time-delay fuse to detonate at a specific point in the projectile's flight path: the round can be timed to explode for maximum effect either above, in front or inside of a target (e.g. after penetrating a wall). The DM 11 is thus a perfect match for the altered operational requirements of modern main battle tanks.

### 120mm KE DM63 / DM53 A1 Tank Ammunition



Rheinmetall has developed the world's first temperature-independent high-performance tank ammunition, the DM 63 and DM 53 A1 (the latter is an upgraded version of the DM 53). What sets this round apart is its temperature-independent propulsion system (TIPS), which maintains its internal ballistic characteristics at a constant level through a broad temperature span. This new generation of ammunition is considerably more accurate and causes substantially less barrel erosion. The DM 63 can be used in climatic zones C2 to A1, and fired from any 120mm smoothbore tank gun.

### 120mm PELE Tank Ammunition



The company's newly developed 120mm PELE is an inert round. It contains no explosive and is therefore extremely safe to handle. When it hits its target, the low-density material inside the projectile becomes so compressed that it causes the warhead to burst, resulting in a large number of fragments, which travel exclusively in the round's trajectory. This is especially advantageous in the case of semi-hard targets. PELE can be retrofitted into multipurpose ammunition or armour piercing



**duayen**



**DEFENSE APPLICATIONS**

## SECURITY & DEFENSE APPLICATIONS

When it comes to protecting buildings, vehicles or other structures from violent attacks, Duayen™ Spray System offers a unique solution. Used in combination with other components, Duayen™ Spray System provides you with your ultimate protection against ballistic impact, blast and other targeted attacks with explosives. Duayen™ spray-on durable coatings and linings help deflect the energy from ballistics and explosive blasts. The encapsulating and protective properties of the Duayen™ Spray System reinforce concrete, masonry and steel structures. These properties permit the structures to stay intact and help prevent shrapnel and flying debris from causing serious injury or death.

Technology edge of Duayen™ stems from its R&D capabilities and partnerships with the branches concerned of the Turkish Military and Security Forces, government contractors and equipment suppliers to provide durable, unmatched protection for everything from personnel to equipment and entire buildings.

*Duayen™ Sprey Sistemi, binaları, araçları veya diğer yapıları şiddetli saldırılara karşı korumak için benzersiz bir çözüm sunar. Duayen™ Sprey Sistemi, diğer bileşenlerle birlikte kullanıldığında, balistik darbelere, patlamalara ve patlayıcılarla yapılan diğer saldırılara karşı en yüksek korumayı sağlar. Duayen™ dayanıklı püskürtme kaplamaları, balistik darbe ve patlayıcı infilaklarında meydana gelen enerjinin yönünün değiştirilerek dağıtılmasına yardım eder. Duayen™ Sprey Sisteminin sarmalayıcı ve koruyucu özellikleri beton, duvar ve çelik yapıları güçlendirir. Bu özellikler yapıların sağlam kalmasına imkân sağlarken, şarapnelin ve uçan döküntünün ciddi yaralanmalara veya ölümlere neden olmasını önlemeye yardımcı olur.*

*Duayen™'in teknolojik üstünlüğü, onun Ar-Ge yeteneklerinden ve personelden teçhizat ve bütün binalara kadar her şey için dayanıklı, benzersiz koruma sağlamak üzere emniyet ve güvenlik güçlerimiz ve savunma sanayimizin önde gelen üreticileriyle yaptığı ortak çalışmalarından kaynaklanmaktadır.*



- Beyond Armor
- Spall Liner
- Blast Mitigation & Facility Protection
- Fuel Tank Self-Sealing Technology
- Other Military Applications

- Zırhın Ötesinde
- Spall Liner
- İnfilak Basıncı Azaltma ve Tesis Koruma
- Yakıt Tankı Kendinden Sızdırmazlık Teknolojisi
- Diğer Askeri Uygulamalar



## BEYOND ARMOR

Duayen™ coating and lining systems form a seamless, monolithic blanket of protection. They provide superior solutions against abrasion, corrosion, impact and blast and are used to enhance composite armor products. Once applied, the coatings tightly adhere to any properly prepared substrate. Better still, they conform to any unusual shape or contour. Since the products can be applied to your desired thickness in a single coat or multi-pass application, you control the level of Duayen™ protection, from light to extreme. Duayen™ Spray System products are developed from a two-component 100% solid polyurea with high tear-tensile strength and chemical and water resistance. They are zero VOCs (volatile organic compounds) and have an excellent thermal shock resistance (-40°C - +200 °C). Duayen™ has the best solution for:

*Duayen™ kaplama sistemleri, dikişsiz ve yekpare bir koruma örtüsü oluşturur. Aşınma, korozyon, darbe ve patlamaya karşı üstün çözümler sağlayarak, kompozit zırh ürünlerini geliştirmek için kullanılırlar. Kaplamalar uygun bir şekilde hazırlanmış herhangi bir alt tabakaya sıkıca yapışırlar. Daha da iyisi, herhangi bir alışılmadık şekil veya görünüşe dahi uyum gösterirler. Ürünler tek katta veya çoklu geçiş uygulamasında istenilen kalınlığa kadar uygulanabileceğinden, Duayen™ koruma seviyesi en hafiften en yükseğe kadar tercihe bağlı olarak ayarlanabilir. Duayen™ Sprey Sistemi ürünleri, yüksek çekme gerilimi ile kimyasal ve su direncine sahip, iki bileşenli, % 100 katı poliüreadan geliştirilmiştir. Bunlar % 100 solventsiz ve mükemmel bir termal şok direncine sahiptirler (-40 ° C - +200 ° C). Duayen™ aşağıdaki konularda en iyi çözümleri sunmaktadır:*

- Body armor and ballistic protective helmets
- Ballistic protective shields
- Armor and spall liner panels for APC, vessels, helicopters and other vehicles
- Tank, ATV and wheeled vehicle protection
- Blast Mitigation - Buildings & structural walls
- Mobile accommodation and offices
- CARC compatible systems
- Fuel trucks and storage tank protection
- Sand and abrasive resistant surfaces
- Non-slip requirements
- Marine and safe boat surfaces
- Balistik koruyucu yelek ve miğferler
- Balistik koruyucu kalkanlar
- Zırhlı personel taşıyıcı, gemi, helikopter ve diğer araçlar için zırh ve spall liner panelleri
- Tank, taktik zırhlı araç ve tekerlekli araç koruması
- İnfilak Basıncı Azaltma - Binalar ve yapısal duvarlar
- Geçici üs bölgesi tesisleri, hafif mobil yapılar
- Kimyasal ajanlara karşı dirençli sistemler
- Yakıt tankeri ve yakıt depolama tankı koruması
- Kum ve aşınmaya karşı dayanıklı yüzeyler
- Kaymaz yüzeyler
- Deniz ve güvenli tekne yüzeyleri





## SPALL LINER

When a bullet hits armored plating, part of the bullet breaks up into tiny shards of metal that fly out at high pressure. It is these shards that cause injury or even death. Duayen™ MS-800 was developed to absorb the impact from projectiles, therefore stopping both the projectile and the armor plating from spalling.

*Bir mermi zırh tabakasına çarptığında, merminin bir kısmı yüksek basınçla fırlayan küçük metal parçalarına ayrılır. İşte yaralanma ya da hatta ölüme neden olan bu metal parçalarıdır. Duayen™ MS-800, mermi darbesini sönmüleyerek, hem mermi hem de zırh plakasından parçacıkların kopmasını durdurmak üzere geliştirilmiştir.*

Duayen™ spall liner (MS-800) can be applied to armored vehicles, armored plates, UHMWPE panels, body armor plates, ballistic protective helmets, ballistic protective shields and other military equipment. MS-800 has quick curing times and offers exceptional adhesion properties to practically any properly prepared substrate.

*Duayen™ spall liner (MS-800) zırhlı araçlara, zırh plakalarına, UHMWPE (ultra yüksek molekül ağırlıklı polietilen) panellere, balistik koruyucu yelek balistik koruyucu plakalarına, balistik koruyucu miğferlere, balistik koruyucu kalkanlara ve diğer askeri teçhizata uygulanabilir. MS-800 hızlı kurlenme süresine sahiptir ve pratik olarak uygun bir şekilde hazırlanmış herhangi bir yüzeye olağanüstü yapışma özellikleri sunar.*

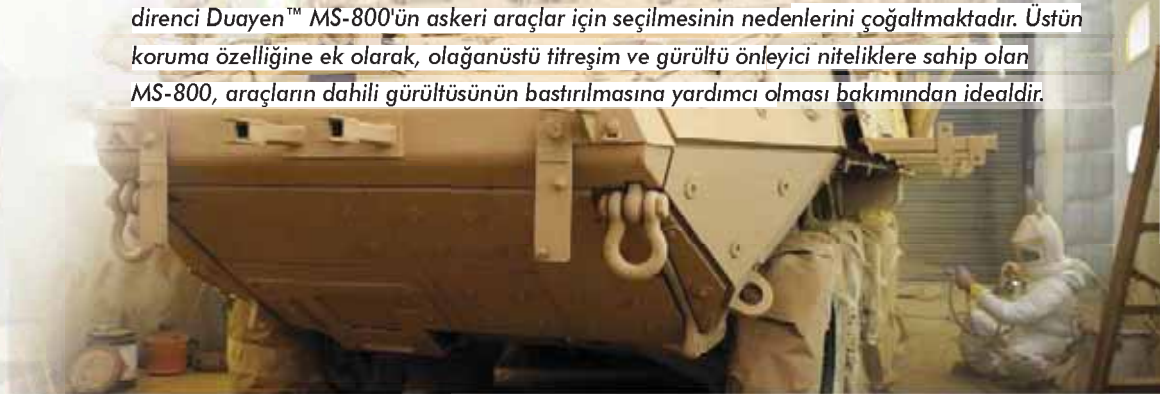


Duayen™ MS-800 is used as a coating on steel, UHMWPE, ceramic and ceramic composite body armor plates due to its ability to absorb the impact of a bullet, preventing the most common injuries to soldiers, being wounded by spall. MS-800 enhances the ballistic performance of the plates. It also produces an excellent skin formulation for chemical resistance, allowing the vests to be decontaminated in the event of chemical contact.

*Duayen™ MS-800, mermi darbesini sönmüleme yeteneğinden dolayı çelik, UHMWPE, seramik veya seramik kompozit malzemeden üretilmiş balistik koruyucu yelek balistik koruyucu plakalarının kaplanmasında kullanılarak, askerlerin maruz kaldığı en yaygın yaralanma olan parça tesirinden yaralanmayı önler. MS-800 plakaların balistik performansını artırırken, aynı zamanda, yüksek kimyasal dayanım için mükemmel bir kaplama çözümü oluşturarak, kimyasal temas durumunda koruyucu yeleklerin dekontaminasyonuna imkân sağlar.*

Military vehicles operate in harsh and rough terrain, which have a tendency for rocks, stones and debris to be thrown up causing damage to the vehicle. The impact absorbing qualities and the resistance to rust and corrosion add to the reasons why Duayen™ MS-800 is being specified for military vehicles. In addition to its superior protective feature, Duayen™ MS-800 has outstanding vibration and noise dampening qualities, which makes it ideal for the vehicles to assist with internal noise suppression.

*Askeri araçlar, araçlarda hasara yol açan kaya, taş ve döküntülerin fırlamasına meyilli sert ve engebeli arazide faaliyet gösterirler. Darbe emici özellikleri ile pas ve korozyona karşı direnci Duayen™ MS-800'ün askeri araçlar için seçilmesinin nedenlerini çoğaltmaktadır. Üstün koruma özelliğine ek olarak, olağanüstü titreşim ve gürültü önleyici niteliklere sahip olan MS-800, araçların dahili gürültüsünün bastırılmasına yardımcı olması bakımından idealdir.*



## BLAST MITIGATION & FACILITY PROTECTION

Blast mitigation is a form of defense to protect people, facilities and assets by decreasing or preventing the effects of a bomb blast. During an explosion, most devastation occurs from the massive pressure that blows apart a structure. By forming a strong skin that holds the structure together and reduces fragmentation, the blast is less likely to cause severe damage.

*İnfilak basıncı azaltma, bir bomba patlamasının etkilerini önleyerek veya azaltarak personeli, tesisleri ve varlıkları koruyan bir savunma şeklidir. Bir patlama sırasında çoğu yıkım, bir yapıyı parçalara ayıran büyük basınçtan kaynaklanır. Yapıyı bir arada tutan ve parçalanmayı azaltan güçlü bir kaplama oluşturulduğunda, patlamanın ciddi hasara neden olma olasılığı düşüktür.*

Duayen™ anti-blast coatings (MS-800G, MS-801, MS-801G) are applied to blast mitigation projects, including targeted attacks with explosives and combustible environments such as chemical plants and refineries. The goal is to create a blast-resistant barrier that reduces structural damage and injury or even death. Duayen™ coated walls withstand explosions, staying together due to its high elongation, toughness and adhesion.

*Duayen™ anti-blast kaplamaları (MS-800G, MS-801, MS-801G), patlayıcılar ile yapılan saldırılar ve kimyasal tesisler ve rafineriler gibi yanıcı ortamlar içeren hedeflere yönelik saldırılar dahil olmak üzere, blast mitigation projelerine uygulanır. Amaç yapısal hasarları, yaralanmaları ya da ölümleri azaltan patlamaya karşı dayanıklı bir bariyer yaratmaktır. Duayen™ kaplanan duvarlar, yüksek uzama, çekme ve kopma direnci ve olağanüstü yapışma özellikleri nedeniyle bir arada kalarak patlamalara dayanır.*

In addition to concrete masonry units (CMU) structures, Duayen™ anti-blast coatings can be sprayed on other substrates such as metal, concrete, wood, brick, plasterboard and foam blast mats. They are also a perfect retrofit coating for lightweight structures like containers, which strengthens these structures to be able to withstand potential bomb blasts. While our coatings have been used for the military, applications in today's terrorism-prone world extend much further.

*Duayen™ anti-blast kaplamalar; briket, bims, gaz beton vb. beton duvar üniteleri ile örülen yapılara ilave olarak, metal, beton, ahşap, tuğla, alçıpan ve anti blast köpük hasırları gibi diğer yüzeylere de püskürtülebilir. Bunlar ayrıca, konteyner tarzı hafif yapıların potansiyel bomba patlamalarına dayanabilmesi için kullanılan mükemmel güçlendirme kaplamalarıdır. Duayen™ kaplamalar askeri maksatlı kullanılmakla birlikte, günümüzün teröre maruz dünyasında uygulamalar çok daha geniş bir alana uzanmaktadır.*



- Military Vehicles, Equipment, Bunkers and Facilities
- Political / Government Facilities, Executive Residences
- Public Buildings and High Visibility Venues
- Armored Vehicles, Banks
- Police Vehicles, Water Patrol Vessels, Barricades
- Limousines and Other Transportation Targets
- Exposed Pipes, Bridges, Chemical Tanks
- Sensitive Facilities Attracting Protestors
- Combustible environments – chemical plants, refineries



- Askeri araçlar, teçhizat, sığınak ve tesisler
- Siyasi bina ve tesisler, yönetici konutları
- Kamu binaları, öne çıkan mekân ve toplanma alanları
- Zırhlı araçlar, bankalar
- Polis araçları, su üstü devriye botları, barikatlar
- Limuzinler ve diğer ulaşım vasıtaları hedefleri
- Açıkta korumasız borular, köprüler, kimyasal tanklar
- Protestocuları çeken hassas tesisler
- Yanıcı ortamlar - kimyasal tesisler, rafineriler





## FUEL TANK SELF-SEALING (FTSS) SYSTEM

Tankers that hold potentially dangerous fuels and chemicals can be protected from the effects of shrapnel and spalling with the unique self-sealing characteristics of Duayen™ FTSS (Fuel Tank Self-Sealing) System. Duayen™ FTSS System is an innovative technology designed to minimize or prevent fuel leakage on fuel tankers due to small-arms fire, which can cause hazardous conditions for troops transporting fuel as well as operational risks caused by the resulting lack of fuel.

Potansiyel olarak tehlikeli olan yakıt ve kimyasal madde taşıyan tankerler, Duayen™ FTSS (Yakıt Tankı Kendinden Sızdırmazlık) Sisteminin benzersiz kendi kendini tamir özellikleri sayesinde, şarapnel ve parça tesirlerinin etkilerinden korunabilir. Duayen™ FTSS Sistemi, yakıt taşımacılığında görevli ikmal birlikleri için tehlikeli durumlara hem de yakıt ikmalindeki aksamanın neden olduğu operasyonel risklere yol açabilen hafif silah ateşlerinden kaynaklanan yakıt tankerlerindeki yakıt sızıntılarını en aza indirmek veya önlemek için tasarlanmış yenilikçi bir teknolojidir.

Duayen™ FTSS System is the appropriate technology to bring to any vulnerable vehicle, train or ship-based fuel tank. This technology is applicable to storage tanks, pipelines and other fuel structures as well. Forming a self-sealing membrane, Duayen™ FTSS System delivers fuel leakage protection from blasts of IEDs, mines and small firearms. In addition, the FTSS System also provides corrosion and abrasion protection to coated surfaces, along with enhancing the fuel tank's structural integrity.

Duayen™ FTSS Sistemi, hassas durumdaki herhangi bir araç üstü, tren üstü veya gemi üstü yakıt tankına uygulamak için uygun bir teknolojidir. Bu teknoloji depolama tankları, boru hatları ve diğer yakıt yapılarına da uygulanabilir. Kendiliğinden kapanan bir membran oluşturan Duayen™ FTSS Sistemi, el yapımı patlayıcıların infilak etkisi, mayınlar ve hafif silah atışlarına karşı yakıt sızıntısı koruması sağlar. Buna ilaveten, FTSS Sistemi yakıt tankının yapısal bütünlüğünü arttırmakla birlikte kaplanan yüzeylere korozyon ve aşınma korunması da temin eder.





## THERMAL INSULATING COATINGS

Duayen™ insulating products are specifically designed to reduce unwanted summer time heat gain and unwanted winter time heat loss from buildings, trucks, and tanks to which they have been applied. Our products act in a manner similar to foil radiant barrier film, which is commonly used in the construction industry. Our products reflect heat, thereby enabling a more comfortable and temperature stable environment with less heating and cooling requirements. Duayen™ insulating products are used effectively on military vehicles, particularly on armored ones.

*Duayen™ yalıtım ürünleri, uygulandıkları binalar, araçlar ve tanklardan kışın istenilmeyen ısı kayıplarını, yazın istenilmeyen ısı kazanımını azaltmak amacıyla özel olarak tasarlanmıştır. Ürünlerimiz inşaat endüstrisinde yaygın olarak kullanılan folyo ışıma bariyer filmine benzer bir şekilde hareket eder. Ürünlerimiz ısıyı yansıtır ve böylece daha az ısıtma ve soğutma gereksinimi ile daha konforlu ve sabit sıcaklıkta bir ortam sağlar. Duayen™ yalıtım ürünleri askeri araçlarda, özellikle de zırhlı araçlarda etkin bir şekilde kullanılmaktadır.*

## INTUMESCENT FIRE PROTECTION COATINGS

Duayen™ offers intumescent fire protection coatings tested to the highest standards to complement fire safety objectives for both life safety and property protection. Structural steelwork is the most commonly protected material but protection can include other materials such as aluminium and plastic. Our intumescent coatings also meet the fire protection specifications of military helicopters' Flight Data Recorders.

*Duayen™, hem can güvenliği hem de mülkiyet koruması için yangın güvenliği hedeflerini tamamlayan en yüksek standartlara göre test edilmiş, şişen yangın koruma kaplamaları sunmaktadır. Yapısal çelik işi en yaygın şekilde korunan malzemedir ancak koruma, alüminyum ve plastik gibi diğer malzemeleri de içerebilir. Duayen™ şişen yangın koruma kaplamaları ayrıca, askeri helikopterlerin Uçuş Veri Kayıt Cihazlarının yangın koruma gereksinimlerini de karşılamaktadır.*



## SPRAY FOAM INSULATION & SOUND ATTENUATION

Duayen™ SPF (spray polyurethane foam) products are an all-in-one insulation, air-sealing system for temporary and permanent building and structures. Duayen™ SPF has a fast rise and cure time to allow for fast installation. It offers a high R-value to help reduce hot/cold spots in a building envelope and improve energy efficiency and comfort. Since this foam is monolithic, it forms a secondary moisture-vapor barrier to reduce moisture intrusion and potential mold. Better still, Duayen™ SPF will add structural integrity to walls and roofs. In addition to being a great insulator, Duayen™ SPF will also help attenuate sound between floors or common walls. A few inches of Duayen™ SPF in the floor or walls can dramatically reduce sound vibrations. Duayen™ SPF foam fills all the open areas and gaps in a structure that could be short cuts for sound.

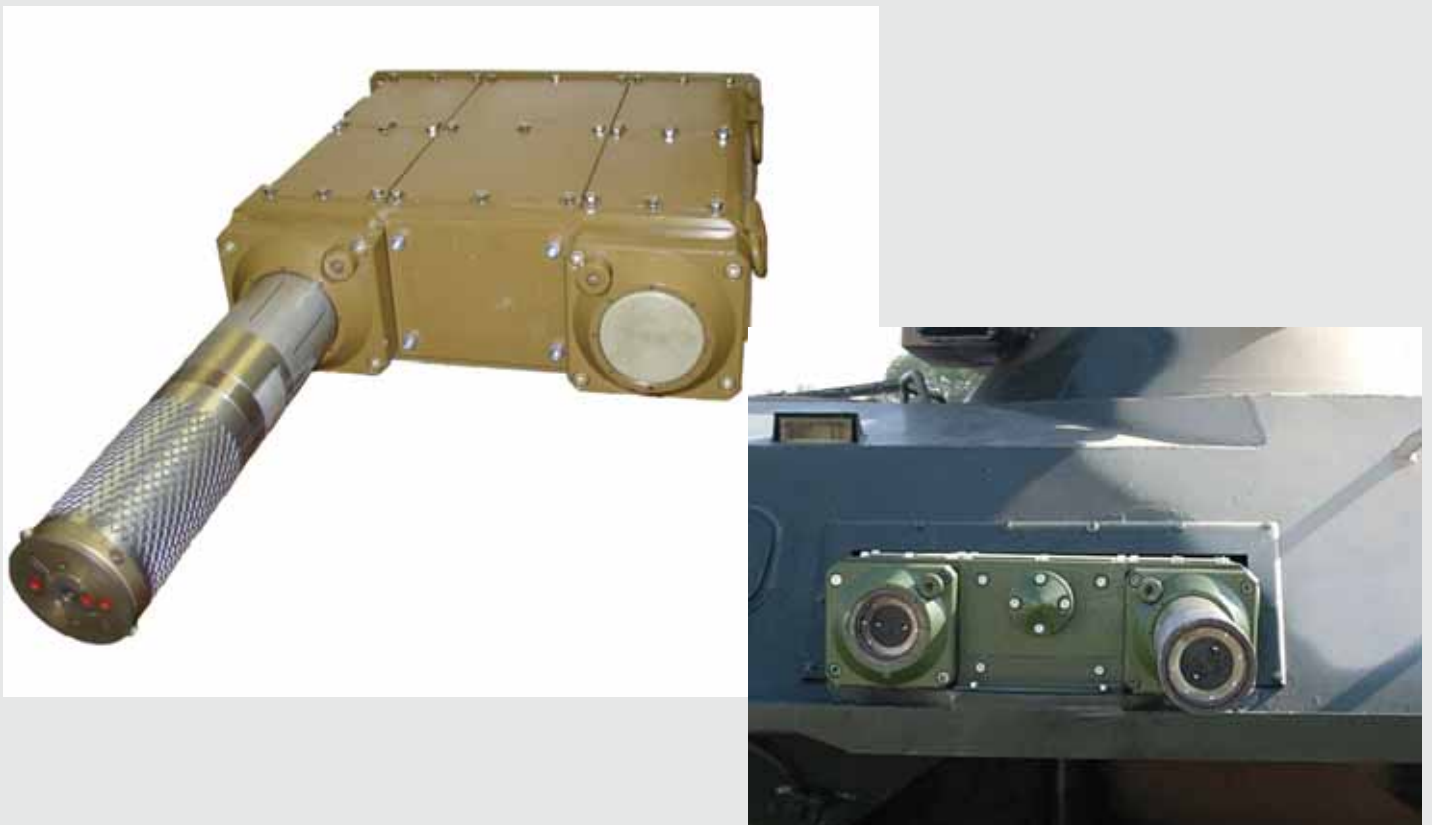
*Duayen™ SPF (püskürtme poliüretan köpük) ürünleri geçici ve kalıcı bina ve yapılar için hepsi bir arada yalıtım ve hava sızdırmazlık sistemidir. Duayen™ SPF, hızlı uygulama için hızlı bir kabarma ve kürlenme süresine sahiptir. Bir bina çerçevesindeki sıcak ve soğuk noktaların azaltılmasına yardımcı olmak ve enerji verimliliği ve konforu iyileştirmek için yüksek bir R-değeri sunar. Bu köpük yekpare olduğundan, nem girişimi ve potansiyel küfleri azaltmak için ikincil bir nem-buhar bariyeri oluşturur. Daha da iyisi, Duayen™ SPF duvarlara ve çatılara yapısal bütünlük katacaktır. Duayen™ SPF, mükemmel bir yalıtım olmasının yanı sıra zeminler veya ortak duvarlar arasındaki sesi azaltmaya da yardımcı olacaktır. Zeminde veya duvarlarda birkaç inç Duayen™ SPF, ses titreşimlerini önemli ölçüde azaltabilir. Duayen™ SPF köpük bir yapıda ses için kısa yol olabilecek bütün açık alanları ve boşlukları doldurur.*

# The active protection system ZASLON

The active protection system ZASLON was designed and developed by the Base Center for Critical Technologies Microtech in Kyiv. It is designed to protect stand-alone fixed or moving targets against antitank weapons of all types, including hand-held anti-tank grenade launchers, anti-armor projectiles, ATGW missiles, and armor-piercing and shaped-charge artillery rounds approaching their targets at 70 to 1,200 m/s. ZASLON detects incoming threats at shortest required ranges, provides enhanced countermeasures resistance, is almost 'invisible', and operates with a high degree of efficiency on the battlefield.

The active protection system ZASLON has modular architecture, which makes it suitable for integration with tanks of all types, light and heavyweight armored infantry fighting vehicles and also fixed installations, without the need for the host platform to be previously redesigned. Importantly, ZASLON does not add to the host platform's overall dimensions, hence visual profile. The mass total of the system is a factor of the desirable protection level to be achieved, i.e., the number of protective modules used. For reliable protection, one armored fighting vehicle typically needs from three to six such modules to be installed, each containing two rounds of countermunition and weighing from 50 to 130 kg. In its configuration tailored to battle tanks, the system consists of a control panel housed in the tank turret, and several armored-shell modules, each containing two rounds of dedicated countermunition. Four such modules are arranged symmetrically on both sides in niches atop the tracks for concealment purposes. For detecting incoming threats, each round is fitted with a millimeter-wave radar sensor which continuously emits signals to 2.5m within an arc of 150o-180o in azimuth and -6o to +20o in elevation. Once a potential threat is detected, the system releases a dense cloud of fast-moving splinters in the trajectory path of the incoming threat, creating a 360o kill zone between the incoming threat and the host vehicle, while a backup munition is automatically deployed ready to fire once the first round is disposed of. In contrast to rival active protection system designs featuring traverse launchers and using launched countermunitions (TROPHY, AWiSS and the like), the protective module ZASLON contains countermunitions that do not need to be fired in the direction of the incoming threat to disable it, which provides for the ZASLON a time advantage for responding to the incoming threat, and also enables it to intercept fast-moving targets. For example, response time for ZASLON is claimed to be 0.001- 0.005 second as compared to 0.07 second for Russia's ARENA. Pressure or impulse from resulting blast wave makes the threat detonate or deflect its flight path such that the threat will miss the intended target.

The splinters themselves are arranged in a dedicated container in such a way that, once being released, they are either ejected far away to a safe distance from the object under protection or may hit the vehicle's core armor at very sharp angles, thereby reducing their own hitting power to the minimum and leaving the protected vehicle such as tank or armored personnel carrier virtually intact. ZASLON provides protection against ATGW weapons with diving trajectories. The design also provides room for integration with an explosive reactive armor (ERA) system. ZASLON is also suitable for the protection of lightweight armored fighting vehicles. The system's mission capability has already been proven for conventional armor-piercing projectiles and small-caliber anti-armor gun rounds. The lighter variant, designated ZASLON-L, consists of several nonrecoverable detachable modules of various kinds, with two accommodated on the armored vehicle's upper forebody and as many mounted on its sides. The ZASLON-L is effective against RPG-7 and RPG-9 rounds, as well as ATGW missiles.





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# **COMMERCIAL CATALOGUE**

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“Sloboda” Company falls into a category of large and powerful companies. The headquarters of “Sloboda” Company are in the town called Čačak. Čačak is situated 140 km south-west from Belgrade, the capital of Serbia and Montenegro. Čačak is the industrial and trading center of the area. It is well connected to Belgrade and other big and important cities, to the Port of Bar and the airports in Belgrade and Niš. Čačak has a population of 100,000 people and it is a large industrial, cultural, educational and scientific center. It also has a rich historical inheritance.

”Sloboda” is an ordnance factory founded in 1948. Long time experience in continuous investments in materials and the experienced of the Company staff are a guarantee for a world by high level quality of products, designmanagement and system engineering according to the key-turn system.

Quality control is performed in the laboratories belonging to the Company itself. Actually, the Company possesses its own laboratories specialized in various kinds of measurements such as length, pressure and angle measuring and in these laboratories all mechanical and chemical properties of materials are tested.

Engineering department plays an important role in the Company. It is in charge of the technology transfer, as well as of the choice, supply and installment of equipment, all in accordance with the requirements of the customer.

The received certificate ISO 9001:2000 is the best indication of the high standards and quality of our products and services.



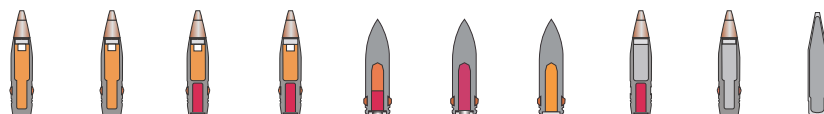
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## AMMUNITION

### 20, 23, 30, 37, 40 and 57 mm

#### AMMUNITION 20mm x 110 FOR ANTI-AIRCRAFT GUN 20mm M55, HS 404 AND HS 804 "HISPANO"



NATO DESIGNATION	HE	HEI	HE-T	HEI-T	API-T	API	AP-T	TP-T	TP	BLANK
WEIGHT										
projectile (g)	122	122	122	122	142	142	142	122	122	min 70
propellant (g)	29	29	29	29	32	32	32	29	29	29
explosive (g)	12.1	12.1	6.1	6.1	none	none	none	none	none	none
complete round (g)	246	246	246	246	265	265	265	246	246	195
EXPLOSIVE TYPE	RDX	RDX+AL	RDX	RDX+AL	none	none	none	none	none	none
LENGHT (mm) complete round	184	184	184	184	182	182	182	184	184	184
MUZZLE VELOCITY (m/s)	845	845	845	845	844	844	844	845	845	none
SELF-DESTRUCTION TIME (s)	4,5 - 8	4,5 - 8	4,5 - 8	4,5 - 8	none	none	none	none	none	none
TRACER BURNING TIME (s)	-	-	3.5	3.5	3.5	3.5	-	3.5	-	-

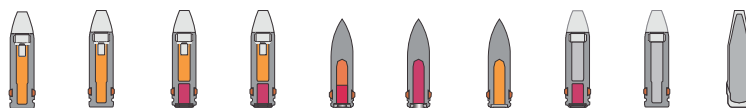
**PACKING:**

100 rounds in wooden case  
Case gross mass: 34kg  
W/C dimensions: 660mm x 232mm x 200mm  
Case volume: 0,03m<sup>3</sup>



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## AMMUNITION 20mm x 110RB FOR ANTI-AIRCRAFT GUN 20mm MK-IV "OERLIKON"



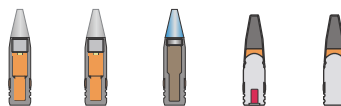
NATO DESIGNATION	HE	HEI	HE-T	HEI-T	API-T	API	AP-T	TP-T	TP	BLANK
WEIGHT										
projectile (g)	119	119	122	122	142	142	142	122	119	min 70
propellant (g)	29	29	29	29	32	32	32	29	29	29
explosive (g)	12.1	12.1	6.1	6.1	none	none	none	none	none	none
complete round (g)	246	246	246	246	265	265	265	246	246	195
EXPLOSIVE TYPE	RDX	RDX+AL	RDX	RDX+AL	none	none	none	none	none	none
LENGHT (mm) complete round	184	184	184	184	182	182	182	184	184	184
MUZZLE VELOCITY (m/s)	845	845	845	845	844	844	844	845	845	none
SELF-DESTRUCTION TIME (s)	4,5 - 9	4,5 - 9	4,5 - 9	4,5 - 9	none	none	none	none	none	none
TRACER BURNING TIME (s)	-	-	3.5	3.5	3.5	-	3.5	3.5	-	-

**PACKING:**

100 rounds in wooden case  
Case gross mass: 34kg  
W/C dimensions: 600mm x 232mm x 200mm  
Case volume: 0,030m<sup>3</sup>



## AMMUNITION 23mm x 115 FOR AIRCRAFT GUN GSh-23L AND GSh-23LU



NATO DESIGNATION	HE	HEI	TP	API-T	API
WEIGHT					
projectile (g)	174	174	174	168	174
propellant (g)	37	37	37	37	37
explosive (g)	16.3	16.3	none	none	none
complete round (g)	329	329	331	321	331
EXPLOSIVE TYPE	RDX	RDX+AL	none	none	none
LENGHT (mm) complete round	197.9	197.9	197.9	197.8	197.8
MUZZLE VELOCITY (m/s)	720	720	720	720	720
TRACER BURNING TIME (s)	none	none	none	3,5	none

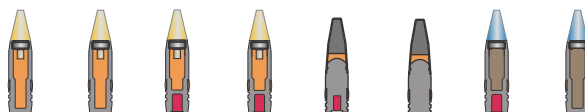
**PACKING:**

100 rounds in wooden case  
Case gross mass: 42kg  
W/C dimensions: 705mm x 250mm x 202mm  
Case volume: 0,035m<sup>3</sup>





## AMMUNITION 23mm x 152B FOR ANTI-AIRCRAFT GUN ZU-2 AND ZSU-4



NATO DESIGNATION	HE	HEI	HE-T	HEI-T	API-T	API	TP-T	TP
WEIGHT								
projectile (g)	182	182	190	190	190	190	190	182
propellant (g)	78	78	78	78	78	78	78	78
explosive (g)	19,6	19,6	16,3	16,3	5	5	none	none
complete round (g)	440	440	450	450	450	450	450	440
EXPLOSIVE TYPE	RDX	RDX+AL	RDX	RDX+AL	none	none	none	none
LENGHT (mm) complete round	236	236	236	236	236	236	236	236
MUZZLE VELOCITY (m/s)	970	970	970	970	970	970	970	970
SELF-DESTRUCTION TIME (s)	5,6-11,2	5,6-11,2	5,6-11,2	5,6-11,2	none	none	none	none
TRACER BURNING TIME (s)	none	none	3.5	3.5	3.5	-	3.5	-

**PACKING:**

80 rounds in wooden case  
Case gross mass: 44kg  
W/C dimensions: 688mm x 286mm x 229mm  
Case volume: 0,045m<sup>3</sup>



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## AMMUNITION 30mm x 165 FOR ANTI-AIRCRAFT GUN 30mm AO 18



NATO DESIGNATION	HE	HEI	HE-T	HEI-T	AP	AP-T	TP-T	TP
WEIGHT								
projectile (g)	389	389	385	385	400	400	385	389
propellant (g)	121	121	121	121	126	126	121	121
explosive (g)	49	49	11.5	11.5	none	none	none	none
complete round (g)	839	839	835	835	853	853	835	839
EXPLOSIVE TYPE	RDX	RDX+AL	RDX	RDX+AL	none	none	none	none
LENGHT (mm) complete round	291	291	291	291	292	292	292	292
MUZZLE VELOCITY (m/s)	890	890	890	890	890	890	890	890
SELF-DESTRUCTION TIME (s)	13-19	13-19	13-19	13-19	none	none	none	none
TRACER BURNING TIME (s)	none	none	10	10	none	3.5	10	none

**PACKING:**

30 rounds in wooden case  
Case gross mass: 37kg  
W/C dimensions: 576mm x 338mm x 218mm  
Case volume: 0,042m<sup>3</sup>



## AMMUNITION 30mm x 165 FOR AIRCRAFT GUN 30mm GSh 301



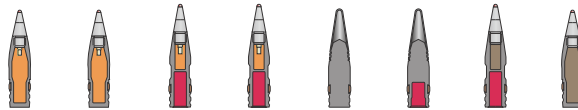
NATO DESIGNATION	HE	HEI	AP	AP-T	TP
WEIGHT					
projectile (g)	389	389	400	400	389
propellant (g)	121	121	126	126	121
explosive (g)	49	49	none	none	none
complete round (g)	840	840	850	850	840
EXPLOSIVE TYPE	RDX	RDX+AL	none	none	none
LENGHT (mm) complete round	290	290	292	292	290
MUZZLE VELOCITY (m/s)	860	860	860	860	860
TRACER BURNING TIME (s)	none	none	none	3.5	none

**PACKING:**

30 rounds in wooden case  
Case gross mass: 37kg  
W/C dimensions: 576mm x 338mm x 218mm  
Case volume: 0,042m<sup>3</sup>



## AMMUNITION 30mm x 165 FOR ANTI-AIRCRAFT GUN 30mm 2A72, 2A42 AND 2A38M



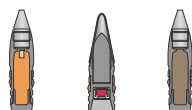
NATO DESIGNATION	HE	HEI	HE-T	HEI-T	AP	AP-T	TP-T	TP
WEIGHT								
projectile (g)	385	389	385	385	400	400	385	389
propellant (g)	121	121	121	121	126	126	121	121
explosive (g)	49	49	11.5	11.5	none	none	none	none
complete round (g)	833	833	835	835	853	853	835	833
EXPLOSIVE TYPE	RDX	RDX+AL	RDX	RDX+AL	none	none	none	none
LENGHT (mm) complete round	292	292	291	291	292	292	291	291
MUZZLE VELOCITY (m/s)	960	960	960	960	970	970	960	960
SELF-DESTRUCTION TIME (s)	7.5-14.5	7.5-14.5	7.5-14.5	7.5-14.5	none	none	none	none
TRACER BURNING TIME (s)	none	none	10	10	none	3.5	10	none

**PACKING:**

30 rounds in wooden case  
Case gross mass: 37kg  
W/C dimensions: 576mm x 338mm x 218mm  
Case volume: 0,042m<sup>3</sup>



## AMMUNITION 30mm x 210B FOR ANTI-AIRCRAFT GUN 30mm AK-230



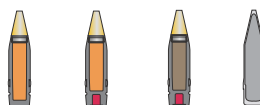
NATO DESIGNATION	HEI	AP-T	TP
WEIGHT			
projectile (g)	356	350	356
propellant (g)	190	190	190
explosive (g)	31.1	none	none
complete round (g)	1066	1050	1066
EXPLOSIVE TYPE	RDX+Al	none	none
LENGHT (mm) complete round	304	304	304
MUZZLE VELOCITY (m/s)	1060	1095	1060
SELF-DESTRUCTION TIME (s)	12-17	none	none
TRACER BURNING TIME (s)	none	min. 2	none

**PACKING:**

24 rounds in wooden case  
Case gross mass: 37kg  
W/C dimensions: 670mm x 355mm x 176mm  
Case volume: 0,041m<sup>3</sup>



## AMMUNITION 30mm x 220 FOR ANTI-AIRCRAFT GUN 30/2 M53, 53/59 (CS)



NATO DESIGNATION	HEI	HEI-T	TP-T	BLANK
WEIGHT				
projectile (g)	435	435	435	min 250
propellant (g)	195	195	195	195
explosive (g)	40,8	35,7	none	none
complete round (g)	1.140	1.140	1.140	min. 960
EXPLOSIVE TYPE	RDX+AL	RDX+AL	none	none
LENGHT (mm) complete round	331	331	331	331
MUZZLE VELOCITY (m/s)	997	997	997	-
SELF-DESTRUCTION TIME (s)	9 - 13	9 - 13	none	none
TRACER BURNING TIME (s)	none	4	4	none

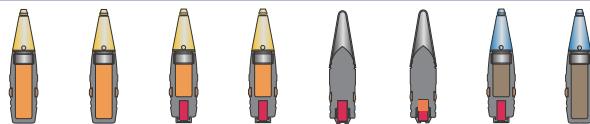
**PACKING:**

40 rounds in wooden case  
Case gross mass: 61kg  
W/C dimensions: 642mm x 384mm x 298mm  
Case volume: 0,073m<sup>3</sup>





## AMMUNITION 37mm x 252 FOR ANTI-AIRCRAFT GUN 37mm M39 (SU)



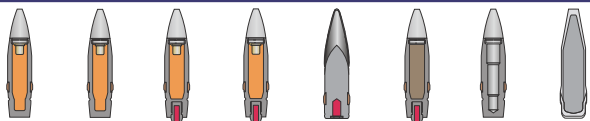
NATO DESIGNATION	HE	HEI	HE-T	HEI-T	AP-T	API-T	TP-T	TP
WEIGHT								
projectile (g)	732	732	732	732	760	732	732	732
propellant (g)	200	200	200	200	200	200	200	200
explosive (g)	40	40	38	38	none	none	none	none
complete round (g)	1480	1480	1480	1480	1480	1480	1480	1480
EXPLOSIVE TYPE	RDX	RDX+AL	RDX	RDX+AL	none	none	none	none
LENGHT (mm) complete round	385	385	385	385	385	385	385	385
MUZZLE VELOCITY (m/s)	850	850	850	850	850	850	850	850
SELF-DESTRUCTION TIME (s)	7-14	7-14	7-14	7-14	none	none	none	none
TRACER BURNING TIME (s)	none	none	6	6	6	6	6	none

**PACKING:**

30 rounds in wooden case  
Case gross mass: 55kg  
W/C dimensions: 680mm x 455mm x 258mm  
Case volume: 0,079m<sup>3</sup>



## AMMUNITION 40mm x 311 FOR ANTI-AIRCRAFT GUN 40mm L/60



NATO DESIGNATION	HE	HEI	HE-T	HEI-T	AP-T	TP-T	TP	BLANK
WEIGHT								
projectile (g)	910	910	910	910	900	910	910	800
propellant (g)	310	310	310	310	320	310	310	310
explosive (g)	78	78	78	78	none	78	none	none
complete round (g)	2100	2100	2100	2100	2120	2100	2100	1900
EXPLOSIVE TYPE	RDX	RDX+AL	RDX	RDX+AL	none	none	none	none
LENGHT (mm) complete round	447	447	447	447	447	447	447	447
MUZZLE VELOCITY (m/s)	880	880	880	880	880	880	880	none
SELF-DESTRUCTION TIME (s)	8-12	8-12	8-12	8-12	none	8-12	8-12	none
TRACER BURNING TIME (s)	none	none	5	5	3.5	5	none	none

**PACKING:**

16 rounds in wooden case  
Case gross mass: 46kg  
W/C dimensions: 564mm x 343mm x 318mm  
Case volume: 0,061m<sup>3</sup>



## AMMUNITION 40mm x 365 FOR ANTI-AIRCRAFT GUN 40mm L/70 "BOFORS"



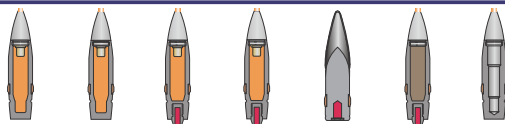
NATO DESIGNATION	HE	HEI	HE-T	HEI-T	PFHE	AP-T	TP-T	TP	BLANK
<b>WEIGHT</b>									
projectile (g)	964	964	964	964	880	930	964	964	920
propellant (g)	480	480	480	480	480	480	480	480	480
explosive (g)	95	95	83	83	83	none	none	none	none
complete round (g)	2500	2500	2500	2500	2420	2470	2500	2500	2450
<b>EXPLOSIVE TYPE</b>	RDX	RDX+AL	RDX	RDX+AL	RDX	none	none	none	none
LENGHT (mm) complete round	535	535	535	535	534.5	497	535	535	535
MUZZLE VELOCITY (m/s)	1005	1005	1005	1005	1025	1025	1005	1005	none
SELF-DESTRUCTION TIME (s)	8-13	8-13	8-13	8-13	3.5-10	none	none	none	none
TRACER BURNING TIME (s)	-	-	4	4	-	4	4	-	-

**PACKING:**

20 rounds in wooden case  
Case gross mass: 65kg  
W/C dimensions: 650mm x 393mm x 363mm  
Case volume: 0,092m<sup>3</sup>



## AMMUNITION 57mm x 348 FOR SELF-PROPELLED ANTI-AIRCRAFT GUN 57mm S/68 AND S/60



NATO DESIGNATION	HE	HEI	HE-T	HEI-T	AP-T	TP-T	TP
<b>WEIGHT</b>							
projectile (g)	2850	2850	2850	2850	2850	2850	2850
propellant (g)	1180	1180	1180	1180	1180	1180	1180
explosive (g)	153	153	153	153	none	none	none
complete round (g)	6350	6350	6350	6350	6350	6350	6350
<b>EXPLOSIVE TYPE</b>	RDX	RDX+Al	RDX	RDX+Al	none	none	none
LENGHT (mm) complete round	max 536,61	max 536,61	max 536,61	max 536,61	max 536,61	max 536,61	max 536,61
MUZZLE VELOCITY (m/s)	1000	1000	1000	1000	1000	1000	1000
SELF-DESTRUCTION TIME (s)	13 - 17	13 - 17	13 - 17	13 - 17	none	none	none
TRACER BURNING TIME (s)	none	none	10	10	10	10	none

**PACKING:**

5 rounds in wooden case  
Case gross mass: 40kg  
W/C dimensions: 694mm x 605mm x 204mm  
Case volume: 0,085m<sup>3</sup>





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# ***SMALL AMMUNITION CALIBER***



## ROUND 30mm HE, M93 P1

<b>NATO DESIGNATION</b>	<b>HE</b>
MASS OF ROUND (g)	360
MASS OF PROJECTILE (g)	273
LENGTH (mm)	132
MUZZLE VELOCITY (m/s)	185
MAXIMUM RANGE (m)	1700
<b>FUZE</b>	
type	UT - M99 SD
self destruction (s)	27
fuze safe action limit (m)	60
safety distance	10 m in front of barrel

**PACKING:**

48 grenades per sheet metal box  
 1 metal box with 48 grenades in wooden case  
 Case gross mass: 44kg  
 W/C dimensions: 455mm x 375mm x 221mm  
 Case volume: 0,03m<sup>3</sup>



## ROUND 30mm TP, M93

<b>NATO DESIGNATION</b>	<b>TRAINING PRACTICE</b>
MASS (g)	360
MASS OF PROJECTILE (g)	273
LENGTH (mm)	132
MUZZLE VELOCITY (m/s)	185
MAXIMUM RANGE (m)	1700

**PACKING:**

48 grenades per sheet metal box  
 1 metal box with 48 grenades in wooden case  
 Case gross mass: 44kg  
 W/C dimensions: 455mm x 375mm x 221mm  
 Case volume: 0,03m<sup>3</sup>



## ROUND 30mm PM, M93 P1

<b>NATO DESIGNATION</b>	<b>PM</b>
MASS (g)	360
MASS OF PROJECTILE (g)	273
LENGTH (mm)	132
MUZZLE VELOCITY (m/s)	185
MAXIMUM RANGE (m)	1700
<b>FUZE</b>	
type	UT - M02, PM-SD
self destruction (s)	27
fuze safe action limit (m)	60
safety distance	10 m in front of barrel

### PACKING:

48 grenades per sheet metal box  
 2 metal box with 48 grenades in wooden case  
 Case gross mass: 44kg  
 W/C dimensions: 455mm x 375mm x 221mm  
 Case volume: 0,03m<sup>3</sup>



## GRENADE 40mm x 46 HEPD-SD M99

<b>NATO DESIGNATION</b>	<b>HEPD-SD</b>
CALIBER (mm)	40
COMPLETE GRENADE LENGTH (mm)	104
MASS OF GRENADE (g)	250
PROJECTILE LENGTH (mm)	82
MASS OF PROJECTILE (g)	200
MASS OF EXPLOSIVE (RDX) (g)	48
MUZZLE VELOCITY (m/s)	78
ARMING DISTANCE OF FUZE (m)	8 to 30
MAXIMUM RANGE (m)	400
SELF DESTRUCTION (s)	15 to 20

### PACKING:

3 grenades is packed in a polyethylene bag  
 54 polyethylene bags into a cardboard box or wooden case  
 Case gross mass: 53kg  
 W/C dimensions: 540mm x 400mm x 348mm  
 Case volume: 0,066m<sup>3</sup>



## GRENADE 40mm x 46 HEDP-SD M99 (Dual Purpose)

NATO DESIGNATION	HEDP-SD
CALIBER (mm)	40
COMPLETE GRENADE LENGTH (mm)	104mm
MASS OF GRENADE (g)	250
PROJECTILE LENGTH (mm)	82
MASS OF PROJECTILE (g)	200
MASS OF EXPLOSIVE (RDX) (g)	35
MUZZLE VELOCITY (m/s)	78
ARMING DISTANCE OF FUZE (m)	8 to 30
MAXIMUM RANGE (m)	400
SELF DESTRUCTION (s)	15 to 20
PENETRATION (mm)	min 25 (armour steel plate)



**PACKING:**

3 grenades is packed in a polyethylene bag  
 54 polyethylene bags into a cardboard box or wooden case  
 Case gross mass: 53kg  
 W/C dimensions: 540 x 400 x 348mm  
 Case volume: 0,066m<sup>3</sup>



## GRENADE 40mm x 46 TPSFM M99

NATO DESIGNATION	TPSFM
CALIBER (mm)	40
COMPLETE GRENADE LENGTH (mm)	104
MASS OF GRENADE (g)	233
PROJECTILE LENGTH (mm)	82
MASS OF PROJECTILE (g)	181
MUZZLE VELOCITY (m/s)	76
ARMING DISTANCE OF FUZE (m)	8 to 25
MAXIMUM RANGE (m)	max 400
SELF DESTRUCTION (s)	15 to 20



**PACKING:**

3 grenades is packed in a polyethylene bag  
 54 polyethylene bags into a cardboard box or wooden case  
 Case gross mass: 53kg  
 W/C dimensions: 540mm x 400mm x 348mm  
 Case volume: 0,066m<sup>3</sup>





## GRENADE 40mm x 46 RED STAR WITH PARACHUTE - M04

NATO DESIGNATION	RED STAR WITH PARACHUTE
CALIBER (mm)	40
COMPLETE GRENADE LENGTH (mm)	114
MASS OF GRENADE (g)	250
PROJECTILE LENGTH (mm)	82
MASS OF PROJECTILE (g)	200
MUZZLE VELOCITY (m/s)	78
DELAY TIME (s)	2 to 3
BURNING TIME OF STAR (s)	min 15
LIGHT INTENSITY OF STAR (cd)	min 10000
THE HIGH OF PARACHUTE OPENING DURING FIRING AT THE ANGLE OF 45° (DEGREES) (m)	min 150
FLARE TYPE	green, blue, yellow, white

**PACKING:**

3 grenades is packed in a polyethylene bag  
54 polyethylene bags into a cardboard box or wooden case  
Case gross mass: 58kg  
W/C dimensions: 540mm x 400mm x 348mm  
Case volume: 0,066m<sup>3</sup>



## GRENADE 40mm x 46 ILLUMINATING WITH PARACHUTE - M04

NATO DESIGNATION	ILLUMINATING WITH PARACHUTE
CALIBER (mm)	40
COMPLETE GRENADE LENGTH (mm)	114
MASS OF GRENADE (g)	250
PROJECTILE LENGTH (mm)	82
MASS OF PROJECTILE (g)	200
MUZZLE VELOCITY (m/s)	78
DELAY TIME (s)	2 to 3
BURNING TIME OF STAR (s)	min 15
LIGHT INTENSITY OF STAR (cd)	min 80000
THE HIGH OF PARACHUTE OPENING DURING FIRING AT THE ANGLE OF 45° (DEGREES) (m)	min 150

**PACKING:**

3 grenades is packed in a polyethylene bag  
54 polyethylene bags into a cardboard box or wooden case  
Case gross mass: 58kg  
W/C dimensions: 540mm x 400mm x 348mm  
Case volume: 0,066m<sup>3</sup>



## GRENADE 40mm x 46 SMOKE WHITE - M99

NATO DESIGNATION	SMOKE WHITE
CALIBER (mm)	40
COMPLETE GRENADE LENGTH (mm)	106
MASS OF GRENADE (g)	230
PROJECTILE LENGTH (mm)	76
MASS OF PROJECTILE (g)	180
MUZZLE VELOCITY (m/s)	78
DELAY TIME (s)	2 to 3
SMOKE TIME (s)	min 20
FIRING RANGE (m)	50 to 400
FLARE TYPE	white, red, green, yellow

**PACKING:**

3 grenades is packed in a polyethylene bag  
 54 polyethylene bags into a cardboard box or wooden case  
 Case gross mass: 54kg  
 W/C dimensions: 540mm x 400mm x 348mm  
 Case volume: 0,066m<sup>3</sup>



## GRENADE 40mm x 46 SMOKE CS - M99

NATO DESIGNATION	
CALIBER (mm)	40
COMPLETE GRENADE LENGTH (mm)	106
MASS OF GRENADE (g)	220
PROJECTILE LENGTH (mm)	76
MASS OF PROJECTILE (g)	170
MUZZLE VELOCITY (m/s)	78
DELAY TIME (s)	2 to 3
SMOKE TIME (s)	min 20
FIRING RANGE (m)	50 to 400

**PACKING:**

3 grenades is packed in a polyethylene bag  
 54 polyethylene bags into a cardboard box or wooden case  
 Case gross mass: 54kg  
 W/C dimensions: 540mm x 400mm x 348mm  
 Case volume: 0,066m<sup>3</sup>



## GRENADE 40mm x 46 STUN - M99

NATO DESIGNATION	
CALIBER (mm)	40
COMPLETE GRENADE LENGTH (mm)	106
MASS OF GRENADE (g)	230
PROJECTILE LENGTH (mm)	76
MASS OF PROJECTILE (g)	180
MUZZLE VELOCITY (m/s)	78
DELAY TIME (s)	2 to 3
FIRING RANGE (m)	50 to 400
SOUND INTENSITY (db)	120



**PACKING:**

3 grenades is packed in a polyethylene bag  
 54 polyethylene bags into a cardboard box or wooden case  
 Case gross mass: 54kg  
 W/C dimensions: 540mm x 400mm x 348mm  
 Case volume: 0,066m<sup>3</sup>



## GRENADE 40mm x 46 BUCKSHOT - M04

NATO DESIGNATION	
CALIBER (mm)	40
COMPLETE GRENADE LENGTH (mm)	106
MASS OF GRENADE (g)	250
PROJECTILE LENGTH (mm)	76
MASS OF PROJECTILE (g)	190
MUZZLE VELOCITY (m/s)	50
FIRING RANGE (m)	30
NUMBER OF PELLETS	min 24
PELLET DIAMETER (mm)	8



**PACKING:**

3 grenades is packed in a polyethylene bag  
 54 polyethylene bags into a cardboard box or wooden case  
 Case gross mass: 56kg  
 W/C dimensions: 540mm x 400mm x 348mm  
 Case volume: 0,066m<sup>3</sup>





## GRENADE 40mm x 46 FLASH - M99

NATO DESIGNATION	
CALIBER (mm)	40
COMPLETE GRENADE LENGTH (mm)	106
MASS OF GRENADE (g)	230
PROJECTILE LENGTH (mm)	76
MASS OF PROJECTILE (g)	180
MUZZLE VELOCITY (m/s)	78
DELAY TIME (s)	2 to 3
FIRING RANGE (m)	50 to 400
SOUND INTENSITY (db)	120
LIGHT INTENSITY (cd)	2000000

**PACKING:**

3 grenades is packed in a polyethylene bag  
 54 polyethylene bags into a cardboard box or wooden case  
 Case gross mass: 54kg  
 W/C dimensions: 540mm x 400mm x 348mm  
 Case volume: 0,066m<sup>3</sup>



## GRENADE 40mm x 46 FLECHETTE - M05

NATO DESIGNATION	
CALIBER (mm)	40
COMPLETE GRENADE LENGTH (mm)	106
MASS OF GRENADE (g)	250
PROJECTILE LENGTH (mm)	76
MASS OF PROJECTILE (g)	200
MUZZLE VELOCITY (m/s)	50
FIRING RANGE (m)	50 to 100
NUMBER OF FLECHETTES (pcs.)	min 50
LENGTH OF FLECHETTES (mm)	50
FLECHETTE DIAMETER (mm)	2

**PACKING:**

3 grenades is packed in a polyethylene bag  
 54 polyethylene bags into a cardboard box or wooden case  
 Case gross mass: 56kg  
 W/C dimensions: 540mm x 400mm x 348mm  
 Case volume: 0,066m<sup>3</sup>



## ROUND 40mm HE M03

NATO DESIGNATION	HE
CALIBER (mm)	40
MASS (g)	225
LENGTH (mm)	106
MUZZLE VELOCITY (m/s)	76
MAXIMUM RANGE (m)	400
FUZE	
type	UT - M00 SD
self destruction (s)	15 - 20
fuze safe action limit (m)	50
safety distance (m)	15 m in front of barrel
GRENADA EFFECTS	Must have min 80 penetrations through a board 20mm thick, at pen test D=20m and 1,5m high
ACTION OF FRAGMENTS IN FIELD (mm)	100mm in dia.

### PACKING:

3 grenades is packed in a polyethylene bag  
 21 polyethylene bags into a cardboard box or wooden case  
 Case gross mass: 24kg  
 W/C dimensions: 455mm x 375mm x 221mm  
 Case volume: 0,03m<sup>3</sup>



## ROUND 40mm ILL, M01

NATO DESIGNATION	ILLUMINATING
CALIBER (mm)	40
MASS (g)	265
LENGTH (mm)	130
MUZZLE VELOCITY (m/s)	76
STAR BURNING TIME (s)	min. 20
LIGHT INTENSITY (cd)	80000
RANGE OF PARACHUTE OPENING AT FIRING UNDER 45° (m)	250

### PACKING:

3 grenades is packed in a polyethylene bag  
 21 polyethylene bags into a cardboard box or wooden case  
 Case gross mass: 24kg  
 W/C dimensions: 455mm x 375mm x 221mm  
 Case volume: 0,03m<sup>3</sup>



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## ROUND 40mm S, M01

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NATO DESIGNATION	SMOKE
CALIBER (mm)	40
MASS (g)	250
LENGTH (mm)	115
MUZZLE VELOCITY (m/s)	75
MAXIMUM RANGE (m)	400
SMOKE DURATION (s)	60

**PACKING:**

3 grenades is packed in a polyethylene bag  
21 polyethylene bags into a cardboard box or wooden case  
Case gross mass: 24kg  
W/C dimensions: 455mm x 375mm x 221mm  
Case volume: 0,03m<sup>3</sup>



## RIFLE GRENADE HE - M91, P1 WITH BULLET TRAP

NATO DESIGNATION	HE
CALIBER (mm)	30
TYPE	fragmentation
LENGTH (mm)	315
MASS (g)	555
FUZE	Impact, superquick action (UT-M91, P1)
SAFETY DISTANCE (m)	Min. 20m in front of barrel
ARMING DISTANCE (m)	Grenade must act. upon cardboard 2mm thick, at the distance of 50m.
GRENADE EFFECT	Must have min. 180 penetrations through a board 20mm thick at pen test D=20m and 1,5m high.
ACTION ON FRAGMENTS IN FIELD (m)	100m in dia.
GRENADE EFFECT	Have 350 penetrations trough a board 20mm tick, at pen test D=10m and 1,5m high.

### BALLISTIC DATA

	V <sub>0</sub> (m/s)	Accuracy	Range (m)	
			Under 14°	max 45°
5,56 x 45 SS 109	58	When firing at angle 14° the shot pattern in field is	150	300
7,62 x 51	72	R <sub>max</sub> - R <sub>min</sub> = max 15m Span in travers max 3m.	250	450

### PACKING:

40 grenades per sheet metal box  
1 box with 40 grenades in wooden case  
W/C dimension: 700mm x 420mm x 240mm  
Case gross mass: 34kg  
Case volume: 0,072m<sup>3</sup>



## RIFLE GRENADE HE - M99 WITH BULLET TRAP

NATO DESIGNATION	HE
CALIBER (mm)	30
TYPE	fragmentation
LENGTH (mm)	315
MASS (g)	555
FUZE	Impact, superquick action (UT-M00, SD)
SAFETY DISTANCE (m)	Min. 15m in front of barrel
ARMING DISTANCE (m)	Grenade must act. upon cardboard 1mm thick, at the distance of 50m. Self destruction time 15-20s.
GRENADE EFFECT	Must have min. 180 penetrations through a board 20mm thick at pen test D=20m and 1,5m high.
ACTION ON FRAGMENTS IN FIELD (m)	100m in dia.
GRENADE EFFECT	Have 350 penetrations trough a board 20mm tick, at pen test D=10m and 1,5m high.

### BALLISTIC DATA

	V <sub>0</sub> (m/s)	Accuracy	Range (m)	
			Under 14°	max 45°
5,56 x 45 SS 109 7,62 x 39	58	When firing at angle 14° the shot pattern in field is	150	300
7,62 x 51	72	R <sub>max</sub> - R <sub>min</sub> = max 15m Span in travers max 3m.	250	450

### PACKING:

40 grenades per sheet metal box  
1 box with 40 grenades in wooden case  
W/C dimension: 700mm x 420mm x 240mm  
Case gross mass: 34kg  
Case volume: 0,072m<sup>3</sup>



## RIFLE GRENADE HE, BT - M03 WITH BULLET TRAP

NATO DESIGNATION	HE
CALIBER (mm)	40
TYPE	fragmentation
LENGTH (mm)	270
MASS (g)	450
FUZE	Impact, superquick action (UT-M00, SD)
SAFETY DISTANCE (m)	Min. 15m in front of barrel
ARMING DISTANCE (m)	Grenade must act. upon cardboard 1mm thick, at the distance of 50m. Self destruction time 15-20s
GRENADE EFFECT	Must have min. 100 penetrations through a board 20mm thick at pen test D=20m and 1,5m high.
ACTION ON FRAGMENTS IN FIELD (m)	100m in dia.
GRENADE EFFECT	Have 100 penetrations trough a board 20mm tick, at pen test D=10m and 1,5m high.

### BALLISTIC DATA

	V <sub>0</sub> (m/s)	Accuracy	Range (m)	
			Under 14°	max 45°
5,56 x 45 SS 109	58	When firing at angle 14° the shot pattern in field is	150	350
7,62 x 51	72	R <sub>max</sub> - R <sub>min</sub> = max 15m Span in travers max 3m.	300	500

### PACKING:

40 grenades per sheet metal box  
1 box with 40 grenades in wooden case  
W/C dimension: 650mm x 320mm x 250mm  
Case gross mass: 30kg  
Case volume: 0,052m<sup>3</sup>



## RIFLE GRENADE, ANTITANK M60

NATO DESIGNATION	ANTITANK
CALIBER (mm)	60
TYPE	antitank
LENGTH (mm)	390
MASS (g)	610

### BALLISTIC DATA

V <sub>0</sub> (m/s)	Accuracy (cm) at 100m H + L	Range (m)	
		Efficient	max 45°
61	175	150	330

### PACKING:

20 grenades per sheet metal box  
1 box with 20 grenades in wooden case  
W/C dimension: 450mm x 450mm x 350mm  
Case gross mass: 28kg  
Case volume: 0,071m<sup>3</sup>

Penetration at 100 m  
Penetrating armour - plate, 200 mm in thickness



## RIFLE GRENADE, SMOKE M62

NATO DESIGNATION	SMOKE
CALIBER (mm)	40
TYPE	smoke
LENGTH (mm)	330
MASS (g)	475

### BALLISTIC DATA

$V_0$ (m/s)	Time of burring delay element	Range (m) max 45°	Time of smoke screening (s)
70	7,5	350	70-100

### PACKING:

40 grenades per sheet metal box  
 1 box with 40 grenades in wooden case  
 W/C dimension: 650mm x 320mm x 250mm  
 Case gross mass: 32kg  
 Case volume: 0,065m<sup>3</sup>



## RIFLE GRENADE, ILLUMINATING M62

NATO DESIGNATION	ILLUMINATING
CALIBER (mm)	40
TYPE	illuminating
LENGTH (mm)	330
MASS (g)	450

### BALLISTIC DATA

$V_0$ mean (m/s)	Time of burning delay element	Time of flare burning (s)	Intensity of illuminating (Cd)	Range of parachute opening at firing under 45°
71	4,3 - 5,1	min 24	70-100	200 m

### PACKING:

40 grenades per sheet metal box  
 1 box with 40 grenades in wooden case  
 W/C dimension: 650mm x 400mm x 250mm  
 Case gross mass: 31kg  
 Case volume: 0,065m<sup>3</sup>





## RIFLE GRENADE, FRAGMENTATION

NATO DESIGNATION	FRAGMENTATION
CALIBER (mm)	30
TYPE	fragmentation
LENGTH (mm)	307
MASS (g)	520

### BALLISTIC DATA

V <sub>o</sub> mean (m/s)	Accuracy	Range (m)	
		under 14°	max 45°
67	When firing at angle 14° the shot pattern in field is: H <sub>max</sub> - H <sub>min</sub> = max 15 m Span in traverse max 3 m	200	410

### PACKING:

40 grenades per sheet metal box  
 1 box with 40 grenades in wooden case  
 W/C dimension: 640mm x 380mm x 230mm  
 Case gross mass: 36kg  
 Case volume: 0,057m<sup>3</sup>



HE-M60P1  
SC - 01/01



K O M P A N I J A  
***Sloboda*** A.D.  
ČAČAK - SRBIJA I CRNA GORA



***ROCKET WEAPON***  
***64, 90 and 120mm***




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## 64mm HAND ANTITANK ROCKET RBR M80

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<b>NATO DESIGNATION</b>	
CALIBER (mm)	64
TYPE	HEAT
LENGTH IN TRAVELING POSITION (mm)	800
LENGTH IN COMBAT POSITION (mm)	1200
MASS (g)	3200
FUZE	Impact, superquick, piezoelectric with self destruction, (UT PE M80 SP)
MUZZLE VELOCITY (m/s)	187
EFFECTIVE RANGE (m)	200
MAXIMUM RANGE (m)	1280
PENETRATION (mm)	> 300 (on homogeneous armour plate)

**PACKING:**

The unit is packed in travelling position, in a vacuumed polyethylene bag, 4 units thus packed being then put in a wooden case on holders used to fix the unit. Cases are adapted for any form of transportation and carrying and for paratropping. The mass of such packing is appr. 25 kg.



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## 90mm ROCKET HEAT, M79A FOR HAND ROCKET LAUNCHER 90mm M79

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<b>NATO DESIGNATION</b>	
CALIBER (mm)	90
TYPE	HEAT
LENGTH (mm)	672
MASS (g)	3630
FUZE	Impact, superquick, piezoelectric with self destruction, (UT PE M80 SP)
MUZZLE VELOCITY (m/s)	245
EFFECTIVE RANGE (m)	350
MAXIMUM RANGE (m)	1960
PENETRATION (mm)	> 450 (on homogeneous armour plate)

**PACKING:**

1 rocket in 1 container  
 3 container in wooden case  
 W/C dimension: 800mm x 460mm x 220mm  
 Case gross mass: 25,3kg  
 Case volume: 0,07976m<sup>3</sup>

## RBR 120mm M90 LIGHT ANTITANK WEAPON



<b>NATO DESIGNATION</b>	
CALIBER (mm)	120
TYPE	HEAT
LENGTH (mm)	1350
MASS (kg)	13
FUZE	Impact, superquick, piezoelectric with self destruction, (UT PE M80 SP)
MUZZLE VELOCITY (m/s)	205
EFFECTIVE RANGE (m)	250
MAXIMUM RANGE (m)	1960
PENETRATION (mm)	> 800 (on homogeneous armour plate)

**PACKING:**

2 rocket in wooden case  
W/C dimension: 1450mm x 530mm x 300mm  
Case gross mass: 56kg  
Case volume: 0,30m<sup>3</sup>

# ***ARTILLERY AMMUNITION***



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**ROUND 76mm, SEPARATE LOADED  
FOR GUN 76mm M48B1**

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NATO DESIGNATION	HE Shell M55	SMOKE Shell M60
<b>WEIGHT</b>		
projectile (kg)	6,2	5,9
explosive (kg)	0,43	0,45
propeling charge (kg)	0,32	0,32
cartridge case (kg)	1,55	1,55
<b>EXPLOSIVE TYPE</b>	TNT	WP
<b>LENGTH (mm)</b>		
projectile	max 347	max 347
cartridge case	385	385
<b>MUZZLE VELOCITY (m/s)</b>	398	398
<b>MAXIMUM RANGE (m)</b>	8750	8750
<b>FUZE: impact, superquick and delay action</b>	UTI, M68 UTIU, M02 UTIU, M03	UTI, M68

**PACKING:**

3 rounds in wooden case  
W/C dimension: 690mm x 455mm x 200mm  
Case gross mass: 39kg  
Case volume: 0,06m<sup>3</sup>

## ROUND 100mm, FIXED FOR GUN 100mm ON TANK T55, SPG 100mm M44 AND COAST GUN 100mm M87



NATO DESIGNATION	HE shell M63	HE shell M63P1	HE shell M63P2	HEAT-T shell M69
WEIGHT				
projectile (kg)	15,6	15,6	15,6	12,2
propellant (kg)	5,5	5,5	5,5	4,25
explosive (kg)	1,41	1,48	1,58	1,00
complete round (kg)	30	30	30	25,6
EXPLOSIVE TYPE	TNT	TNT	RDX+Al	RDX
LENGTH (mm)				
complete round	1095	1095	1095	1094
projectile	492	492	492	638
cartridge case	695	695	695	695
MUZZLE VELOCITY (m/s)	900	900	900	900
MAXIMUM RANGE (m)	20618	20618	20618	3000*
PENETRATION (mm)	-	-	-	300
TRACER BURNING TIME (s)	-	-	-	5
FUZE: impact, superquick and delay action	UTIU, M72 B1 UTIU, M02 UTIU, M03	UTIU, M72 B1 UTIU, M02 UTIU, M03	UTIU, M72 B1 UTIU, M02 UTIU, M03	UT - PE, M69

\* combat range

### PACKING:

2 rounds in wooden case  
W/C dimension: 1260mm x 440mm x 260mm  
Case gross mass: 21,8kg  
Case volume: 0,144m<sup>3</sup>



**ROUND 105mm, SEMI FIXED FOR HOWITZERS  
105mm M56, M18/61, M2A1 AND M4**



NATO DESIGNATION	HE Shell M1A1	SMOKE Shell M60
WEIGHT		
projectile (kg)	14,9	15,0
explosive (kg)	2,15	1,85
propeling charge (kg)	1,31	1,31
cartridge case (kg)	2,68	2,68
EXPLOSIVE TYPE	TNT	WP
LENGTH (mm)		
projectile	496	496
cartridge case	372	372
MUZZLE VELOCITY (m/s)	491	491
MAXIMUM RANGE (m)	11620	11620
FUZE: impact, superquick and delay action	UTIU, M72 B1 UTIU, M02 UTIU, M03	UTIU, M72 B1

**PACKING:**

2 rounds in wooden case  
W/C dimension: 950mm x 310mm x 200mm  
Case gross mass: 16,8kg  
Case volume: 0,05m<sup>3</sup>



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**ROUND 105mm, SEMI FIXED FOR HOWITZERS  
105mm M56 HE ER M02**

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<b>NATO DESIGNATION</b>	<b>HE ER</b>
<b>WEIGHT</b>	
projectile (kg)	13
explosive (kg)	2,15
propeling charge (kg)	2
cartridge case (kg)	2,68
<b>EXPLOSIVE TYPE</b>	<b>TNT</b>
<b>LENGTH (mm)</b>	
projectile with fuze	565
cartridge case	372
<b>MUZZLE VELOCITY (m/s)</b>	<b>675</b>
<b>MAXIMUM RANGE (m)</b>	<b>14000</b>
FUZE: impact, superquick and delay action	UTIU, M02 UTIU, M03

**PACKING:**

2 rounds in wooden case  
W/C dimension: 950mm x 310mm x 200mm  
Case gross mass with two rounds: 50kg  
Case volume: 0,057m<sup>3</sup>



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**ROUND 105mm, SEMI FIXED FOR HOWITZERS  
105mm M56/33; M2A1 HE ER M02**

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NATO DESIGNATION	HE ER
WEIGHT	
projectile (kg)	13
explosive (kg)	2,3
propeling charge (kg)	2
cartridge case (kg)	2,68
EXPLOSIVE TYPE	TNT
LENGTH (mm)	
projectile with fuze	565
cartridge case	372
MUZZLE VELOCITY (m/s)	675
MAXIMUM RANGE (m)	1.5000
FUZE: impact, superquick and delay action	UTIU, M02 UTIU, M03

**PACKING:**

2 rounds in wooden case  
W/C dimension: 966mm x 410mm x 210mm  
Case gross mass with two rounds: 57kg  
Case volume 0,06m<sup>3</sup>



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**ROUND 105mm, SEMI FIXED FOR HOWITZERS  
105mm M56 HE ER-BB M02**

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<b>NATO DESIGNATION</b>	<b>HE ER-BB</b>
<b>WEIGHT</b>	
projectile (kg)	14,070
explosive (kg)	2,15
propeling charge (kg)	2,2
cartridge case (kg)	2,68
<b>EXPLOSIVE TYPE</b>	<b>TNT</b>
<b>LENGTH (mm)</b>	
projectile with fuze	565
cartridge case	372
<b>MUZZLE VELOCITY (m/s)</b>	<b>670</b>
<b>MAXIMUM RANGE (m)</b>	<b>17000</b>
FUZE: impact, superquick and delay action	UTIU, M02 UTIU, M03

**PACKING:**

2 rounds in wooden case  
W/C dimension: 950mm x 310mm x 200mm  
Case gross mass with two rounds: 50kg  
Case volume: 0,057m<sup>3</sup>



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**ROUND 105mm, SEMI FIXED FOR HOWITZERS  
105mm M56/33; M2A1 HE ER-BB M02**

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<b>NATO DESIGNATION</b>	<b>HE ER-BB</b>
<b>WEIGHT</b>	
projectile (kg)	14,070
explosive (kg)	2,3
propeling charge (kg)	2,2
cartridge case (kg)	2,68
<b>EXPLOSIVE TYPE</b>	<b>TNT</b>
<b>LENGTH (mm)</b>	
projectile with fuze	565
cartridge case	372
<b>MUZZLE VELOCITY (m/s)</b>	<b>670</b>
<b>MAXIMUM RANGE (m)</b>	<b>18000</b>
FUZE: impact, superquick and delay action	UTIU, M02 UTIU, M03

**PACKING:**

2 rounds in wooden case  
W/C dimension: 966mm x 410mm x 210mm  
Case gross mass with two rounds: 50kg  
Case volume 0,06m<sup>3</sup>



## ROUND 122mm, SEPARATED LOADED FOR HOWITZER D-30, D30J AND SP 2S1



NATO DESIGNATION	HE Shell TF-462A1	HE Shell TF-462A1	SMOKE M60	SMOKE M60
<b>WEIGHT</b>				
projectile (kg)	21,88	21,88	21,76	21,76
explosive (kg)	3,60	3,60	3,60	3,73
propelling charge (kg)	2,47 reduced charge	3,80 full charge	2,47 reduced charge	3,80 full charge
cartridge case (kg)	3,66	3,66	3,66	3,66
<b>EXPLOSIVE TYPE</b>	TNT	TNT	WP	WP
<b>LENGTH (mm)</b>				
projectile	561	561	561	561
cartridge case	447	447	447	447
<b>MUZZLE VELOCITY (m/s)</b>	565	690	565	690
<b>MAXIMUM RANGE (m)</b>	12840	15300	12840	15300
<b>FUZE: impact, superquick and delay action</b>	UTIU, M72 B1 UTIU, M02 UTIU, M03	UTIU, M72 B1 UTIU, M02 UTIU, M03	UTIU, M72 B1	UTIU, M72 B1

**PACKING:**

2 rounds in wooden case  
W/C dimension: 980mm x 500mm x 230mm  
Case gross mass: 18kg  
Case volume 0,1m<sup>3</sup>



## ROUND 122mm, SEPARATED LOADED FOR HOWITZER 122mm M38



NATO DESIGNATION	HE Shell TF-462A1	SMOKE M60
WEIGHT		
projectile (kg)	21,88	21,88
explosive (kg)	3,60	3,60
propeling charge (kg)	2,20	2,20
cartridge case (kg)	2,94	2,94
EXPLOSIVE TYPE	TNT	WP
LENGTH (mm)		
projectile	561	561
cartridge case	284	284
MUZZLE VELOCITY (m/s)	515	515
MAXIMUM RANGE (m)	11800	11800
FUZE: impact, superquick and delay action	UTIU, M72 B1 UTIU, M02 UTIU, M03	UTIU, M72 B1

**PACKING:**

2 rounds in wooden case  
Wooden case dimension 770mm x 50cm x 300mm  
Case gross mass with two rounds 18kg  
Case volume 0,1m<sup>3</sup>



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**ROUND 125mm, SEPARATE LOADED  
FOR TANK GUN D-81, TM (2A46)**

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<b>NATO DESIGNATION</b>	HE Shell M86P1
<b>WEIGHT</b>	
projectile (kg)	23
explosive (kg)	3,35
propelling charge (kg)	5
increment charge (kg)	-
<b>EXPLOSIVE TYPE</b>	TNT/RDX
<b>LENGTH (mm)</b>	
projectile	675
cartridge case	138
<b>MUZZLE VELOCITY (m/s)</b>	850
<b>MAXIMUM RANGE (m)</b>	12220
<b>TRACER BURNING TIME (s)</b>	-
<b>FUZE: impact, superquick and delay action</b>	UTIU, M85 P1

**PACKING:**

1 rounds in wooden case  
W/C dimension: 810mm x 410mm x 210mm  
Case gross mass: 22kg  
Case volume: 0,07m<sup>3</sup>

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**ROUND 125mm, SEPARATE LOADED  
FOR TANK GUN D-81, TM (2A46)**

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NATO DESIGNATION	HEAT-T Shell M88
<b>WEIGHT</b>	
projectile (kg)	19
explosive (kg)	1,76
propelling charge (kg)	5
increment charge (kg)	-
<b>EXPLOSIVE TYPE</b>	HMX
<b>LENGTH (mm)</b>	
projectile	678
cartridge case	138
<b>MUZZLE VELOCITY (m/s)</b>	905
<b>MAXIMUM RANGE (m)</b>	1010*
<b>TRACER BURNING TIME (s)</b>	5
<b>FUZE: impact, superquick and delay action</b>	UT - PE, M87 P1

\* combat range

**PACKING:**

1 rounds in wooden case  
W/C dimension: 850mm x 430mm x 270mm  
Case gross mass: 22kg  
Case volume: 0,1m<sup>3</sup>



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**ROUND 125mm, SEPARATE LOADED  
FOR TANK GUN D-81, TM (2A46)**

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NATO DESIGNATION	APFSDS-T M88
<b>WEIGHT</b>	
projectile (kg)	3,61
explosive (kg)	-
propelling charge (kg)	5
increment charge (kg)	3,40
<b>EXPLOSIVE TYPE</b>	-
<b>LENGTH (mm)</b>	
projectile	591
cartridge case	138
<b>MUZZLE VELOCITY (m/s)</b>	1800
<b>MAXIMUM RANGE (m)</b>	21.20*
<b>TRACER BURNING TIME (s)</b>	4,5

\* combat range

**PACKING:**

1 rounds in wooden case  
W/C dimension: 810mm x 410mm x 210mm  
Case gross mass: 22kg  
Case volume: 0,07m<sup>3</sup>



**ROUND 130mm, SEPARATE LOADED  
FOR GUN 130mm M46**



NATO DESIGNATION	HE Shell M79	HE Shell M79
WEIGHT		
projectile (kg)	33,40	33,40
explosive (kg)	3,64	3,64
propeling charge (kg)	13,50 full charge M46	6,75 reduced charge M46
cartridge case (kg)	11,35	11,35
EXPLOSIVE TYPE	TNT	TNT
LENGTH (mm)		
projectile	671	671
cartridge case	846	846
MUZZLE VELOCITY (m/s)	930	705
MAXIMUM RANGE (m)	27490	19310
FUZE	UTIU, M72 B1 UTIU, M02 UTIU, M03	UTIU, M72 B1 UTIU, M02 UTIU, M03

**PACKING:**

2 rounds in wooden case  
W/C dimension: 950mm x 310mm x 200mm  
Case gross mass: 16,8kg  
Case volume: 0,057m<sup>3</sup>

**ROUND 152mm, SEPARATE LOADED  
FOR GUN-HOWITZER D-20**



NATO DESIGNATION	HE Shell OF-540	HE Shell OF-540
WEIGHT		
projectile (kg)	43	43
explosive (kg)	5,86	5,86
propeling charge (kg)	8,80 full charge	4,20 reduced charge
cartridge case (kg)	7,50	7,50
EXPLOSIVE TYPE	TNT	TNT
LENGTH (mm)		
projectile	700	700
cartridge case	547,5	547,5
MUZZLE VELOCITY (m/s)	655	511
MAXIMUM RANGE (m)	17400	13400
FUZE	UTIU, M72 B1 UTIU, M02 UTIU, M03	UTIU, M72 B1 UTIU, M02 UTIU, M03

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**ROUND 155mm, FOR HOWITZERS M198,  
FH70, FH77, M109 A2 AND GUN 45**

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NATO DESIGNATION	ERFB/BB	ERFB	HE M88
<b>WEIGHT</b>			
projectile (kg)	47,6	45,54	42,6
explosive (kg)	8,71	8,71	8,0
<b>EXPLOSIVE TYPE</b>	TNT, RDX	TNT, RDX	TNT
<b>LENGTH (mm)</b>			
projectile	861	843	807
<b>MUZZLE VELOCITY (m/s)</b>	925 (52 cal.)	925 (52 cal.)	925 (52 cal.)
<b>MAXIMUM RANGE (m)</b>	41850 (52 cal.)	34000 (52 cal.)	32000 (52 cal.)
<b>FUZE</b>	UTIU, M02 UTIU, M03	UTIU, M02 UTIU, M03	UTIU, M02 UTIU, M03

Ballistical data depends on howitzers type and propelling charge type





K O M P A N I J A  
***Sloboda*** A.D.  
ČAČAK - SRBIJA I CRNA GORA



## ***POLICE PROGRAM***

## SIGNAL AMMUNITION 26,5mm ABC/LP 57

DESIGNATION	ABC/LP 57
LENGTH (mm)	170
HEIGHT OF CLIMBING (m)	200±25
BURNING TIME (s)	6±1,5
PIPE DURATION (s)	6±1,5
LIGHT INTENSITY (Cd)	10000

**PACKING:**

10 cartridges is packed in a cardboard box  
 50 cardboard box is packed in a wooden case  
 W/C dimension: 1064mm x 380mm x 368mm  
 Case gross mass: 83kg  
 Case volume: 0,143m<sup>3</sup>



## SIGNAL AMMUNITION 26,5mm YELLOW WITH PARACHUTE /LP 57

DESIGNATION	YELLOW WITH PARACHUTE /LP 57
LENGTH (mm)	155
HEIGHT OF CLIMBING (m)	85±15
BURNING TIME (s)	> 12
LIGHT INTENSITY (Cd)	20000
COLOR SATURATION	> 78%
MIDDLE WAVE LENGTH	589±3

**PACKING:**

10 cartridges is packed in a cardboard box  
 50 cardboard box is packed in a wooden case  
 W/C dimension: 914mm x 380mm x 368mm  
 Case gross mass: 52kg  
 Case volume: 0,125m<sup>3</sup>



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**SIGNAL AMMUNITION 26,5mm WHITE, RED, GREEN/LP 57**

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DESIGNATION	WHITE/LP 57	RED/LP 57	GREEN/LP 57
LENGTH (mm)	80	80	80
HEIGHT OF CLIMBING (m)	120±20	120±20	120±20
BURNING TIME (s)	8±1,5	8±1,5	8±1,5
LIGHT INTENSITY (Cd)	20000	20000	10000
COLOR SATURATION	< 58%	> 70%	> 57%
MIDDLE WAVE LENGTH (nm)	580±3	609±3	554±3
FLARE TYPE	white	red	green

**PACKING:**

10 cartridges is packed in a cardboard box  
 50 cardboard box is packed in a wooden case  
 W/C dimension: 814mm x 380mm x 268mm  
 Case gross mass: 46kg  
 Case volume: 0,08m<sup>3</sup>



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## SIGNAL AMMUNITION 26,5mm SMOKE, VIOLET/LP 57

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DESIGNATION	SMOKE VIOLET/LP 57
LENGTH (mm)	80
HEIGHT OF CLIMBING (m)	1.20± 20
FLARE TYPE	violet, white, red, green...

\* The smoke composition starts burning directly before the smoke cartouch reaches the trajectory apex and emits smoke until cartouch fall to the ground.

### PACKING:

10 cartridges is packed in a cardboard box  
50 cardboard box is packed in a wooden case  
W/C dimension: 81.4mm x 380mm x 268mm  
Case gross mass: 46kg  
Case volume: 0,08m<sup>3</sup>



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## CARTRIDGE 38mm, ILLUMINATION - ONE PART

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DESIGNATION	ILLUMINATION - ONE PART
CALIBER (mm)	38
LENGTH (mm)	70
BURNING TIME (s)	5
LIGHT INTENSITY (Cd)	3 x 1.20000
MAXIMUM HEIGHT FIRED AT 45° (m)	70

### PACKING:

5 cartridges is packed in a polyethylene bag  
20 polyethylene bags into a cardboard box or wooden case



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## CARTRIDGE 38mm, ILLUMINATION - THREE PART

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DESIGNATION	ILLUMINATION - THREE PART
CALIBER (mm)	38
LENGTH (mm)	70
BURNING TIME (s)	5
LIGHT INTENSITY (Cd)	3 x 1.20000
MAXIMUM HEIGHT FIRED AT 45° (m)	70

**PACKING:**

5 cartridges is packed in a polyethylene bag  
20 polyethylene bags into a cardboard box or wooden case



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## CARTRIDGE 38mm, ILLUMINATION - SIGNAL

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DESIGNATION	ILLUMINATION SIGNAL
CALIBER (mm)	38
LENGTH (mm)	70
BURNING TIME (s)	5
LIGHT INTENSITY (Cd)	3 x 1.20000
MAXIMUM HEIGHT (m)	80
LIGHT INTENSITY (Cd)	
red	40000
green	20000
white	1.00000

**PACKING:**

5 cartridges is packed in a polyethylene bag  
20 polyethylene bags into a cardboard box or wooden case



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## CARTRIDGE 38mm, RUBBER BALLS

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DESIGNATION	RUBBER BALLS
CALIBER (mm)	38
LENGTH (mm)	123
MASS OF CARTRIDGE (g)	120
MAX RANGE (m)	150
NUMBER OF BALLS (pcs.)	28
START SPEED (m/s)	100

PACKING:

5 cartridges is packed in a polyethylene bag  
20 polyethylene bags into a cardboard box or wooden case



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## CARTRIDGE 38mm, SINGLE BATON RUBBER

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DESIGNATION	SINGLE BATON RUBBER
CALIBER (mm)	38
LENGTH (mm)	123
MASS OF CARTRIDGE (g)	180
MAX RANGE (m)	100
HAGOMESS OF RUBBER	70 shore
SHELF LIFE	10 years

PACKING:

5 cartridges is packed in a polyethylene bag  
20 polyethylene bags into a cardboard box or wooden case





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## CARTRIDGE 38mm, STUN

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DESIGNATION	STUN
CALIBER (mm)	38
LENGTH (mm)	137,5
DELAY TIME (s)	2
SOUND INTENSITY (dB)	120
MASS OF CARTRIDGE (g)	190

**PACKING:**

5 cartridges is packed in a polyethylene bag  
20 polyethylene bags into a cardboard box or wooden case



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## GRENADE HAND SMOKE

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DESIGNATION	SMOKE
CALIBER (mm)	45
LENGTH (mm)	130
DELAY TIME (s)	3
SMOKE TIME (s)	60
MASS OF GRENADE (g)	240

**PACKING:**

1 grenade is packed in a polyethylene bag  
36 grenades in polyethylene bags are packed into a wooden case with metal sheet box  
Case net mass: 8,5kg  
Case gross mass: 19kg  
Case volume: 0,044m<sup>3</sup>



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## GRENADE HAND STUN

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DESIGNATION	STUN
CALIBER (mm)	45
LENGTH (mm)	130
DELAY TIME (s)	3
SOUND INTENSITY (dB)	120
MASS OF GRENADE (g)	180

**PACKING:**

1 grenade is packed in a polyethylene bag  
36 grenades in polyethylene bags are packed into a wooden case with metal sheet box  
Case net mass: 6,5kg  
Case gross mass: 1,7kg  
Case volume: 0,044m<sup>3</sup>



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## GRENADE HAND STUN AND FLASH

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DESIGNATION	STUN AND FLASH
CALIBER (mm)	45
LENGTH (mm)	130
DELAY TIME (s)	3
SOUND INTENSITY (dB)	120
MASS OF GRENADE (g)	180
LIGHT INTENSITY (Cd)	200000

**PACKING:**

1 grenade is packed in a polyethylene bag  
36 grenades in polyethylene bags are packed into a wooden case with metal sheet box  
Case net mass: 6,5kg  
Case gross mass: 1,7kg  
Case volume: 0,044m<sup>3</sup>



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## SHOT CARTRIDGE, ILLUMINATING

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DESIGNATION	ILLUMINATING
CALIBER (mm)	26,5
COMPLETE CARTRIDGE LENGTH (mm)	114
CARTRIDGE WEIGHT (g)	90
BURNING TIME OF ILLUMINATING SIGNAL (s)	min 15
LIGHT INTENSITY OF THE ILLUMINATING SIGNAL (Cd)	min 10000
SOUND SIGNAL FORCE (dB)	min 115
HIGHT OF THE RISING OF SOUND SIGNAL (m)	min 10

### PACKING:

25 pieces of cartridges are packed into a small wooden box  
4 small wooden boxes are packed into a wooden case  
Case net mass: 24kg  
Case gross mass: 30kg  
Case volume: 0,046m<sup>3</sup>





**122 mm 9M28F  
“GRAD-1” ROCKET**



The 122 mm rocket is designed for destroying mortars, field and rocket artillery and motorized units, defeating manpower and enemy firepower in entrenchments and trenches, destroying communication lines, strongpoints and field defense constructions, making passages in defense wirings and outlook posts, destroying enemy's back areas (railway junctions, headquarters, concentrated military forces) and large-area simultaneous destruction of group targets through volley fire.

**CHARACTERISTICS**

Weight of rocket, kg	55,300
Maximum range, m	14000
Maximum velocity, m/s	500
Spoiler rings	Small and big one
Area of effect:	
- against manpower, m <sup>2</sup>	708
- against combat equipment, m <sup>2</sup>	225
Safe operational temperature range, °C	-50...50

**SYSTEM**

BM-21 “GRAD” Multiple-Launch Rocket System

**PACKING**

Dimensions, mm	2236x290x250
1 rocket in a case	
Gross weight, kg	82





## 122 mm HE-FRAG PRACTICE ROUND

The 122 mm HE-FRAG practice round is a separate loading munition. It is a live round with a practice warhead and is used for training of personnel and target firing exercise with hits indication.

The practice round possesses the same overall dimensions, weight and ballistic characteristics as the live ammunition.

The use of practice rounds preserves the practice targets at firing ranges, reduces the risk of fire and increases the safety while conducting demonstrative and training firing.



### CHARACTERISTICS

	Full	Reduced
Type of charge	Full	Reduced
Grenade weight, kg	21,760	21,760
Charge weight, kg	7,830	6,440
Muzzle velocity, m/s	690	565
Maximum range, m	15300	12500
Safe operational temperature range, °C	-40...50	-40...50

### WEAPON SYSTEM

D-30 howitzer,  
2S1 self-propelled howitzer

### PACKING

Dimensions, mm	1210x435x258	1210x435x258
2 rounds in a wooden case		
Weight, kg	83	80





## KO-7V ROUND WITH KO-7 HOLLOW-CHARGE FRAGMENTATION GRENADE



It is intended for destroying tanks, self-propelled guns and other armour-protected fire power and mechanized troops, for defeating enemy troops in the open, in trenches, light field-type shelters and urban-type brick fortifications. The grenade warhead is a combination of a hollow-charge fragmentation bursting charge and semiready fragments.

### CHARACTERISTICS

Grenade launcher caliber, mm	40
Warhead caliber, mm	57
Round weight, kg	2,970
Grenade weight, kg	2,580
Propellant charge weight, kg	0,390
Number of fragments 2 g in weight	270
Muzzle velocity, m/s	98
Maximum range, m	2000
Armour penetration of steel homogeneous armour, mm	260
Safe operational temperature range, °C	-40...50
Rate of fire, rds/min	4...6

### WEAPON SYSTEM

RPG-7V portable anti-tank grenade launcher equipped with combined optical-mechanical sight

### PACKING

Dimensions, mm	880x450x270
6 rounds in a case	
Gross weight, kg	36





**OFG-7V ROUND  
WITH OFG-7  
HE-FRAGMENTATION GRENADE**



It is intended for use against enemy personnel in the open, in trenches, light field-type shelters as well as against hostile light armoured or unarmoured vehicles. The grenade is equipped with a warhead containing semiready fragments.

**CHARACTERISTICS**

Grenade launcher calibre, mm	40
Warhead calibre, mm	57
Round weight, kg	2,950
Grenade weight, kg	2,560
Propellant charge weight, kg	0,390
Number of fragments 2 g in weight	360
Muzzle velocity, m/s	99
Maximum range, m	2000
Direct fire range, m	250
Safe operational temperature range, °C	-40...50
Rate of fire, rds/min	4...6

**WEAPON SYSTEM**

RPG-7V portable anti-tank grenade launcher with combined optical-mechanical sight

**PACKING**

Dimensions, mm	880x450x270
6 rounds in a case	
Gross weight, kg	36





**OG-15VM ROUND  
WITH OG-9M  
FRAGMENTATION GRENADE**



It is designed for destroying the enemy troops in the open, in trenches, field-type shelters or brick fortifications.

**CHARACTERISTICS**

Caliber, mm	73
Round weight, kg	4,570
Grenade weight, kg	3,680
Propellant charge weight, kg	0,890
Muzzle velocity, m/s	290
Maximum range, m	4500
Safe operational temperature range, °C	-40...50
Rate of fire, rds/min	6...8

**WEAPON SYSTEM**

2A28 gun mounted on BMP-1

**PACKING**

Dimensions, mm	1082x520x298
6 rounds in a case	
Gross weight, kg	52





**OG-7V ROUND  
WITH 40 mm OG-7  
FRAGMENTATION GRENADE**



It is designed for use against enemy personnel in the open, in trenches, light field-type shelters as well as against hostile light armoured or unarmoured vehicles.

**CHARACTERISTICS**

Grenade launcher calibre, mm	40
Warhead calibre, mm	40
Round weight, kg	1,760
Grenade weight, kg	1,380
Propellant charge weight, kg	0,375
Number of fragments 0,9 g in average weight	>850
Muzzle velocity, m/s	152
Direct fire range, m	170
Maximum range, m	1000
Safe operational temperature range, °C	-40...50
Rate of fire, rds/min	4...6

**WEAPON SYSTEM**

RPG-7V portable anti-tank grenade launcher  
equipped with combined optical-mechanical or mechanical sight

**PACKING**

Dimensions, mm	833x454x262
18 rounds in a case	
Gross weight, kg	50







## OG-7V FRAGMENTATION PRACTICE ROUND



The 40 mm OG-7V fragmentation practice round is a live round with a practice warhead and is used for training of personnel and target firing exercise with hits indication. The practice round possesses the same overall dimensions, weight and ballistic characteristics as the live ammunition. The use of practice rounds preserves the practice targets at firing ranges, reduces the risk of fire and increases the safety while conducting demonstrative and training firing.

### CHARACTERISTICS

Grenade launcher caliber, mm	40
Warhead caliber, mm	40
Round weight, kg	1,760
Grenade weight, kg	1,380
Propellant charge weight, kg	0,375
Muzzle velocity, m/s	152
Direct fire range, m	170
Maximum range, m	1000
Safe operational temperature range, °C	-40...50
Rate of fire, rds/min	4...6

### WEAPON SYSTEM

RPG-7V portable anti-tank grenade launcher fitted with combined optical-mechanical sight or mechanical sight

### PACKING

Dimensions, mm	833x454x262
18 rounds in a case	
Gross weight, kg	50





**OG-9VM ROUND  
WITH OG-9M  
FRAGMENTATION GRENADE**

It is designed for destroying the enemy troops in the open, in trenches, field-type shelters or brick fortifications.



**CHARACTERISTICS**

Caliber, mm	73
Round weight, kg	5,480
Grenade weight, kg	3,680
Propellant charge weight, kg	1,800
Muzzle velocity, m/s	316
Maximum range, m	4500
Safe operational temperature range, °C	-40...50
Rate of fire, rds/min	4...6

**WEAPON SYSTEM**

SPG-9M heavy anti-tank grenade launcher

**PACKING**

Dimensions, mm	1082x520x298
6 rounds in a case	
Gross weight, kg	60





**PG-15V ROUND  
WITH PG-9  
ANTI-TANK GRENADE**



It is designed for destroying hostile armoured vehicles, mechanized troops and manpower in field-type shelters.

**CHARACTERISTICS**

Caliber, mm	73
Round weight, kg	3,495
Grenade weight, kg	2,615
Propellant charge weight, kg	0,875
Muzzle velocity, m/s	400
Direct fire range, m	800
Sighting range, m	1300
Armour penetration, mm	300
Safe operational temperature range, °C	-40...50
Rate of fire, rds/min	4...6

**WEAPON SYSTEM**

2A28 gun mounted on BMP-1

**PACKING**

Dimensions, mm	1082x520x298
6 rounds in a case	
Gross weight, kg	51







**PG-7VL ROUND  
WITH PG-7L  
ANTI-TANK GRENADE**



It is designed for use against hostile armoured vehicles, mechanized troops and manpower in field-type and urban-type shelters.

**CHARACTERISTICS**

Grenade launcher caliber, mm	40
Warhead caliber, mm	93
Round weight, kg	2,600
Grenade weight, kg	2,200
Propellant charge weight, kg	0,390
Muzzle velocity, m/s	112
Direct fire range, m	250
Sighting range, m	300
Armor penetration, mm	500
Safe operational temperature range, °C	-40...50
Rate of fire, rds/min	4...6

**WEAPON SYSTEM**

RPG-7V portable anti-tank grenade launcher equipped with combined optical-mechanical sight

**PACKING**

Dimensions, mm	899x498x294
6 rounds in a case	
Gross weight, kg	38



**PG-7VM ROUND  
WITH PG-7M  
ANTI-TANK GRENADE**



It is designed for use against hostile armoured vehicles, mechanized troops and manpower in field-type and urban-type shelters.

**CHARACTERISTICS**

Grenade caliber, mm	40
Warhead caliber, mm	70,5
Round weight, kg	1,975
Grenade weight, kg	1,600
Propellant charge weight, kg	0,375
Muzzle velocity, m/s	140
Direct fire range, m	300
Sighting range, m	500
Armor penetration, mm	300
Safe operational temperature range, °C	-40...50
Rate of fire, rds/min	4...6

**WEAPON SYSTEM**

RPG-7V portable anti-tank grenade launcher  
equipped with combined optical-mechanical sight

**PACKING**

Dimensions, mm	851x432x273
6 rounds in a case	
Gross weight, kg	32





## PG-7VM HOLLOW-CHARGE PRACTICE ROUND



PG-7VM practice round with hollow-charge is live round with practice warhead and is used for training of personnel and live fire against targets where it leaves traces of impact.

The practice round possesses the same dimensions, weight and ballistic characteristics as a live ammunition.

The use of practice rounds preserves the practice targets at firing ranges, reduces the probability of starting a fire and increases the safety while conducting demonstrative and training firing.

### CHARACTERISTICS

Grenade launcher caliber, mm	40
Warhead caliber, mm	70,5
Weight of round, kg	1,975
Weight of grenade, kg	1,600
Weight of propellant charge, kg	0,375
Muzzle velocity, m/s	140
Direct fire range, m	300
Sighting range, m	500
Safe operational temperature range, °C	-40...50
Rate of fire, rds/min	4...6

### WEAPON SYSTEM

RPG-7V portable anti-tank grenade launcher fitted with combined optical-mechanical sight

### PACKING

Dimensions, mm	851x432x273
6 rounds in a case	
Gross weight, kg	32





**PG-7VT ROUND  
WITH PG-7T  
ANTI-TANK GRENADE**



It is designed for use against hostile armoured vehicles (including ERA-equipped), mechanized troops and manpower in field-type and urban-type shelters.

**CHARACTERISTICS**

Grenade launcher calibre, mm	40
Main warhead calibre, mm	93
Precursor warhead calibre, mm	50
Round weight, kg	3,290
Grenade weight, kg	2,900
Propellant charge weight, kg	0,390
Muzzle velocity, m/s	90
Direct fire range, m	200
Sighting range, m	250
Armor penetration after ERA, mm	>500
Safe operational temperature range, °C	-40...50
Rate of fire, rds/min	4...6

**WEAPON SYSTEM**

RPG-7V portable anti-tank grenade launcher equipped with combined optical-mechanical sight

**PACKING**

Dimensions, mm	1136x474x307
6 rounds in a case	
Gross weight, kg	50





**PG-9V ROUND  
WITH PG-9  
ANTI-TANK GRENADE**



It is designed for destroying hostile armoured vehicles, mechanized troops and manpower in field-type shelters.

**CHARACTERISTICS**

Caliber, mm	73
Round weight, kg	4,385
Grenade weight, kg	2,615
Propellant charge weight, kg	1,770
Muzzle velocity, m/s	435
Direct fire range, m	800
Sighting range, m	1300
Armour penetration, mm	300
Safe operational temperature range, °C	-40...50
Rate of fire, rds/min	4...6

**WEAPON SYSTEM**

SPG-9M heavy anti-tank grenade launcher

**PACKING**

Dimensions, mm	1082x520x298
6 rounds in a case	
Gross weight, kg	58





**PG-9V ROUND  
WITH PG-9  
ANTI-TANK GRENADE**



It is designed for destroying hostile armoured vehicles, mechanized troops and manpower in field-type shelters.

**CHARACTERISTICS**

Caliber, mm	73
Round weight, kg	4,385
Grenade weight, kg	2,615
Propellant charge weight, kg	1,770
Muzzle velocity, m/s	435
Direct fire range, m	800
Sighting range, m	1300
Armour penetration, mm	300
Safe operational temperature range, °C	-40...50
Rate of fire, rds/min	4...6

**WEAPON SYSTEM**

SPG-9M heavy anti-tank grenade launcher

**PACKING**

Dimensions, mm	1082x520x298
6 rounds in a case	
Gross weight, kg	58







**RPG-22  
ROCKET ANTI-TANK GRENADE  
WITH PG-22 ANTI-TANK GRENADE**



The RPG-22 rocket anti-tank grenade is a disposable individual weapon and is used against tanks, self-propelled guns and other armoured vehicles of the enemy, as well as against the enemy troops in the open, in bunkers, light field shelters and urban-type brick-wall fortifications.

**CHARACTERISTICS**

Caliber, mm	72,30
Rocket anti-tank grenade weight, kg	2,700
Grenade weight, kg	1,480
Armour penetration, mm	400
Muzzle velocity, m/s	133
Direct fire range, m	150
Safe operational temperature range, °C	-40...+50
Deployment time, s	8...10

**PACKING**

Dimensions, mm	860x688x364
8 rounds in a case	
Gross weight, kg	48





**S-5KO  
UNGUIDED AIRCRAFT ROCKET**



The S-5KO rocket is with a hollow-charge fragmentation effect and is designed for destroying ground armoured and unarmored targets, such as tanks, self-propelled artillery, APCs, missile launchers, landed aircraft, etc., as well as manpower of the enemy.

**CHARACTERISTICS**

Caliber, mm	57
Rocket weight, kg	4,500
Muzzle velocity, m/s	45
Max. inherent velocity, m/s	586
Casualty-producing fragments 2g in size, pcs.	200...220
Armour penetration, mm	172
Circular error probable, mils of distance:	
- from an aircraft	≤2
- from a helicopter	≤8
Operational temperature range, °C	-60...50

**SYSTEM**

UB-16, UB-32 universal launcher pods and their modifications

**PACKING**

Dimensions, mm	1140x368x251
8 rockets in a case	
Gross weight, kg	53





## UAR-80VMZ UNGUIDED AIRCRAFT ROCKET



The UAR-80VMZ unguided aircraft rocket with a hollow-charge fragmentation warhead is used against ground armoured and unarmoured targets, such as tanks, APCs, missile launchers, radiolocation stations and others, as well as enemy troops.

### CHARACTERISTICS

Caliber, mm	80
Rocket weight, kg	11,300
Muzzle inherent velocity, m/s	55...75
Maximum inherent velocity of rocket, m/s	600
Armour penetration, mm	400
Casualty-producing fragments 3g in size, pcs.	400
Circular error probable, mils of distance:	
- from an aircraft	≤3
- from a helicopter	≤10
Safe operational temperature range, °C	-60...60

### SYSTEM

B8, B8M, B8M1, B80, B8S7 launcher pods for aircraft,  
B8V20A, B8V7 launcher pods for helicopters, and their modifications

### PACKING

Dimensions, mm	1785x317x302
4 rockets in a case	
Gross weight, kg	68







## COMPANY PROFILE



### 1. **Company name:** ARSENAL JSCompany

**ARSENAL JSCo. - Kazanlak** is a distinguished multi-functional infra-structural Company with leading positions in the National Economics and with great experience in design, manufacturing, engineering and trade in military and civilian products.

**ARSENAL JSCo.** was founded in 1878 in Rouse as the first factory meant to serve the newly created Bulgarian Army.

In 1924 due to some strategic considerations the factory was transferred to Kazanlak by the law of the National Assembly and was given the name of State Military Works for production of cartridges and repair of all military equipment for the needs of the Army.

#### **Nowadays, the activities of ARSENAL JSCo. are:**

- design, manufacturing and trade in small arms and artillery armaments, ammunition, primers, powders, charges, pyrotechnic products, hunting and sport weapons and ammunition, cemented carbide tools, tips and inserts, universal milling machines, CNC milling machines, drilling machines, casting, forging etc.;
- engineering activity.

Our Company performs an energetic innovation activity, as well as modernization of the military products.

Development, production and submission of the new and modernized articles are performed without termination of submission of the well-known articles.

The engineering activity of ARSENAL JSCo started in 1987. The Engineering Department performs transfer of know-how, helps a Customer to manufacture weapons and ammunition,

installs workshops and tests equipment in the Customer's country, trains its personnel, performs quality control and gives any necessary technical assistance. During that period numerous Contracts have been concluded with companies all over the world for:

- Factories for production of anti-aircraft systems, grenade launchers, ammunition, etc.;
- Workshops for assembly of assault rifles, machine guns, ammunition for them, etc.;
- Workshops for electroplating and heat treatment;
- Workshops for forging-pressing processing;
- Lines for electro-mechanical machining;
- Lines for deep-hole drilling of work pieces;
- Test ranges for small arms;
- Workshops for production of special tooling, etc.

**ARSENAL JSCo.** has a structured Quality Management System applicable for design and production of armaments, ammunition and their components in accordance with the requirements of NATO Publication- AQAP 2110. This Quality Management System is approved and certified by the Ministry of Defence, Certificate SK No 131/2017.

According to the requirements of ISO 9001, **ARSENAL JSCo.** has structured Quality Management System for design, manufacturing, delivery and service of Milling Machines, Column Drilling Machines, CNC Milling Machines, Machining Centres, Special Purpose Machines in accordance with Customer's specification and accessories. **Lloyd's Register Quality Assurance** (LRQA) with Certificate No. SOF170183, issued at 30<sup>th</sup> August 2000 has approved and certified this Quality Management System.

**2. Company address:** 100, Rozova Dolina Str.,  
6100 Kazanlak, BULGARIA

**3. General Director:** Nikolay Ibushev

**4. Territory and buildings**

- Overall area - 7044267 m<sup>2</sup>;
- Built area - 412510 m<sup>2</sup>

**5. Number of employees** - over 7000

**6. Performing a close cycle of production - from the raw material up to the finished product and its full completion, our Company produces, as follows:**

**6.1. Small arms and artillery systems**

- 9x18, 9x19 mm SHIPKA Sub-machine Guns SMG;
- 5.56x45 mm ARSENAL Assault Rifles AR-SF, AR-M4SF, AR-M2F, AR-M1, AR-M1F, AR-M5FT, AR-M5FTB, AR-M7F, AR-M7FT, AR-M8F, AR-M9, AR-M9F, AR-M11F, AR-M12F, etc.
- 7.62x39 mm ARSENAL Assault Rifles AR, AR-F, AR-SF, AR-M4SF, AR-M2F, AR-M1, AR-M1F, AR-M5FT, AR-M5FTB, AR-M7F, AR-M7FT, AR-M8F, AR-M9, AR-M9F, AR-M11FAR-M12F, AR-M1F41, etc.
- 5.56x45 mm ARSENAL Light Machine Guns LMG, LMG -F;
- 7.62x39 mm ARSENAL Light Machine Guns LMG, LMG -F;
- 7.62x51 mm ARSENAL Machine Guns MG, MG-M1, MG-1M, MG-M1S, MG-1MS, MG-T, MG-1MN, MG-1MV;
- 7.62x54 mm ARSENAL Machine Guns MG, MG-M1, MG-1M, MG-M1S, MG-1MS, MG-T, MG-1MN, MG-1MV;
- 23x152 mm Air Defence Systems ADS and ADS-N (for Land forces and Navy)
- 40 mm AVALANCHE Multi-shot Grenade Launcher - revolver type MSGL;
- 40x46 mm ARSENAL Multi-shot Grenade Launchers MSGL, MSGL-M1and MSGL-L;
- 40x46 mm ARSENAL Stand-alone Grenade Launcher UGGL-M1;
- 40 mm ARSENAL Underbarrel Grenade Launchers UBGL, UBGL-1;
- 40x46 mm ARSENAL Underbarrel Grenade Launchers UBGL-M6, UBGL-M8;
- 40x46 mm ARSENAL Underbarrel Grenade Launchers UBGL-M16 and UBGL-M7
- 60 mm Mortar M60MA;
- 60 mm Commando Mortar M60CMA;

- 81 mm Mortar M81MA;
- Light Anti-tank Grenade Launchers ATGL-L, ATGL-L1, ATGL-L2, ATGL-L3, ATGL-L4, ATGL-L5;
- Heavy Anti-tank Grenade Launchers ATGL-H, ATGL-H1, ATGL-H2, ATGL-H3.

## **6.2. Ammunition and its components**

- 5.56x45 mm Cartridges (SS109, M193, tracer bullet, blank);
- 7.62x39 mm Cartridges (with steelcorebullet, lead core bullet, tracer bullet, blank);
- 7.62x51 mm Cartridges (with steelcorebullet, leadcore bullet, tracer bullet, blank);
- 7.62x54 mm Cartridges (with steelcorebullet, leadcore bullet, tracer bullet, blank);
- 9x18 mm Cartridges;
- 9x19 mm PARABELLUM Cartridges
- 23x115 mm Rounds (with API, HEI, AP-T, HEI-TP projectiles);
- 23x152 mm Rounds (with API-T, API, AP-T, HEI-T, HEI, TPT projectiles);
- 30x165 mm Rounds (with AP, AP-T, API-T, HEI, HE-T, projectiles) for 2A42, 2A72, 2A38 Guns;
- 30x165 mm Rounds (with AP-T, HEI, HEI-T, HE-T projectiles) for GSh-30 Guns Family;
- 30x165 mm Rounds (with HEI and HEI-T projectiles) for AK-630;
- 30 mm Round RHV-HEF with high-explosive fragmentation grenade;
- 30 mm Round RHV-TP with target practice Grenade;
- 40 mm Rounds RLV-F, RLV-FM with fragmentation Grenade;
- 40 mm Rounds RLV-FJ, RLV-FJM with fragmentation jump Grenade;
- 40 mm Round RLV-TB with thermobaric Grenade;
- 40 mm Round RLV-AD with Anti-Diver Grenade;
- 40 mm Practice Round RP;
- 40 mm Round RLV-SMK with smoke Grenade;
- 40 mm Round RLV-ILL-WS with illuminating Grenade;
- 40 mm Round RLV- S&F with Sound & Flash Grenade;
- 40 mm Round RLV-CS-1, RLV-CS-2 with Grenade with CS composition;
- 40 mm Round RLV-CS with Grenade with CS agent;
- 40 mm Round RLV-CS-M with Grenade with CS agent;
- 40x46 mm Round RLV-F with fragmentation Grenade;
- 40x46 mm Round RLV-FJ with fragmentation jump grenade;
- 40x46 mm Round RLV-HEDP with high explosive dual purpose Grenade;
- 40x46 mm Round RLV-TB with thermobaric Grenade;
- 40 x 46 mm Round RLV- AD with Anti-Diver Grenade;
- 40x46 mm Round RLV-S&F with sound and flash grenade;
- 40x46 mm Rounds RLV-CS, RLV-CS-2, RLV-CS-3 with Grenade with CS composition;
- 40x46 mm Round RLV-3RB with 3 Rubber Batons;
- 40x46 mm Round RLV-SMK with smoke grenade;
- 40x46 mm Round RLV-SMK-2 with Smoke Grenade;
- 40x46 mm Round RLV-SMK-O with Smoke Grenade;
- 40x46 mm Round with signalling grenade RLV-WS, RLV-GS, RLV-RS, RLV-YS;
- 40x46 mm Round with illuminating grenade RLV-ILL-YS;
- 40x46 mm Round with Target Practice grenade RLV-TPM;
- 40 mm Round RF-7MA with improved Fragmentation Grenade GF-7MA;
- 40/73 mm Round RHEAT-7MA with Anti-tank Grenade GHEAT-7MA;
- 40/90 mm Round RHEAT-7MA1 with Anti-tank Grenade GHEAT-7MA1;
- 40/65 mm Round RHEF-7LDMA with High-Explosive Fragmentation Long Distance Grenade GHEF-7LDMA;
- 40/73 mm Round RHEF-7MA with High-explosive fragmentation Grenade GHEF-7MA;
- 40/106 mm Round RTB-7MA with Thermobaric Grenade GTB-7MA;
- 73 mm Round RHEF-9MA with High-explosive Fragmentation Grenade GHEF-9MA;
- 73 mm Round RHEF-9MA1 with High-explosive Fragmentation Grenade Anti-personnel Grenade GHEF-9MA;
- 73 mm Round RHEAT-9MA with High-Explosive Anti-Tank Grenade GHEAT-9MA;
- 73 mm Round RTB-9MA with Thermobaric Grenade GTB-9MA;
- 73 mm Round RHEF-15MA with High-explosive Fragmentation



## Grenade

### GHEF-9MA;

- 73 mm Round RHEF-15MA1 with High-explosive Fragmentation Grenade

### GHEF-9MA1;

- 73 mm Round RHEAT-15MA with High-Explosive Anti-Tank Grenade

### GHEAT-9MA;

- 73 mm Round RTB-15MA with Thermobaric Grenade GTB-9MA;

- 60 mm Mortar Bombs HE60MA, HE 60LDMA, TB60, PRACT 60MA, PRACT 60LDMA, PRACT 60LDTM, SMK 60WP, SMK 60RP, ILL60;

- 81 mm Mortar Bombs HE 81LDMA, TB81, PRACT 81LDMA, PRACT 81LDMA, SMK 81WP, SMK 81RP, ILL81;

- 82 mm Mortar Bombs HE82, HE 82LD, TB82, PRACT 82, PRACT 82TM, PRACT 82LD, PRACT 82LDTM, SMK WP82, SMK RP82, ILL82;

- 120 mm Mortar Bombs HE 120, PRACT 120, PRACT 120TM;

- Hand Grenades: Offensive GHO-1,GHO-2; Defensive GHD-2; Thermobaric GHTB, Smoke GH SMK-R, GH SMK-O, GH SMK-W, GH SMK-G; Sound & Flash GH-CS GH S&F-1-01, GH S&F-13; with Irritant action GH-CS-1, GH-CS-2, GH-CS-3, GH-CS-4;

- Fuzes:

- Point detonating, time and super quick, with check action and self- destruction AF41, AF35;

- Point detonating, distance armed, self-destruction fuze with ejection charge AF42, AF43;

- Point detonating with delay action, distance armed and self-destruction AF21, AF32,AF31, AF22; AF33, AF44;

- Point detonating, super quick and distance armed fuze AF61(FPDSQ1), AF62, AF63, AF64; AF-66, AF-67;

- Point detonating, super quick and check action, self-destruction AF71;

- Piezoelectric fuze AF73, AF74;

- Fuzes for hand grenade: distance fuze AF11, AF13 and igniting delay AF14;

- Etc.

- Percussion primers for all small arms and artillery ammunition calibres

- Powders: for small arms cartridges, for artillery ammunition, for mortar ammunition charges, for ammunition for recoilless system, for grenade launcher ammunition; single-base flame reducing powders, for hunting cartridges for smooth shotguns

- Charges: for Rocket engines, mortar bombs, artillery ammunition, grenade launcher ammunition.

## 6.3. Pyrotechnic military

### products

#### 7. Civil production:

- Milling Cutters
- Cemented Carbide Inserts
- Cemented Carbide Tips
- Cemented Carbide SpecialTools
- Hunting Powders "Sokol", "Mars", "Magia"
- Nitrocellulose for Lacquer Production
- Nitrocellulose for Dynamite Production
- Kolloxoline for Lacquer Production
- Corrosion - Resistant Coating"Avtokor"
- Collodion
- 5.56x45 mm Self-loading Hunting Carbines - SLR-100
- 7.62x39 mm Self-loading Hunting Carbines - SLR-100, SLR-95, SLR-96, SLR-97 Lux, SLR-101
- Hunting Cartridges: cal. 12 and 16
- 5.6 mm Sport Cartridges . 22 LR
- Primers for Hunting Cartridges: type "Gevelot" and "Winchester"
- Detonating Primers
- Signal Pyrotechnic Products: 26mm Signal Cartridges, 30mm Jet Signal and

Illuminating Cartridges  
Etc.

**Arsenal JSCo. is officially licensed by the Government of the Republic of Bulgaria for trade in Military Equipment.**

As an export company possessing wide trade experience, ARSENAL JSCo. manufactures high quality and competitive products. More than 90% of the production is exported all over the world.

The detailed information about the full range of ARSENAL JSCo. production can be found at: [www.arsenal2000.com](http://www.arsenal2000.com)

# «TS – 82-81-120 MM»

Training Simulators for  
82, 81 and 120 - Millimeter Mortars









# «TS – 82-81-120 MM»

Training System of an 82, 81 and 120 - Millimetre Mortars



The given system represents the training model of an 82, 81 and 120 millimetre mortars. It is extremely important for armed forces to have an access to such type of a training system as far as it enables to reduce the expenses allocated on trainings and increases the qualification of the trained employees significantly.



Using a real mortar creates a situation similar to real one. Like real shooting, ballistic tables and wind corrections are also used while aiming and steering. As shells there are used training mines which are absolutely safe and do not contain explosive substances. Throwing a mine from a trunk and shooting is carried out by means of carbon dioxide CO<sub>2</sub>. The scale is reduced by 1:10 that enables to deliver trainings on a small-size battlefield.



During trainings there are used real mortars. It does not require any special efforts or remakes in order to shift the mortar from a martial mode to a training one. Mortars keep their martial capacity and characteristics and may be used after the trainings for military purposes as well. Applying the given system will enable to save on shells, reduce the depreciation of a trunk and other parts of a mortar that is also important for keeping mortars in permanent readiness for using them for military purposes.







გენერალ-ლეიტენანტი  
დევი ტჩანკოტაძე  
დირექტორი



Lieutenant General  
Devi Tchankotadze  
Director



115/2

To: "GATSAV" General Director  
Mr. Gursoy Turan

Dear Sir,

We are pleased to confirm an opportunity at the first stage to procure the set of modern 122 mm missiles "Grad" with a maximum range 42km and 6 launchers (for one artillery company). Such approach will allow us at the second stage to establish production of missiles and related launchers with intention for the long modernization in Turkey within maximum of one year.

These missiles are intended to destroy open (sheltered) man-power and lightly-armored enemy forces in places of concentration. One 40-barrel unit could defeat an area of 1050 sq. m. (860 sq. m. for lightly-armored targets), and for the artillery company 6300 sq. m. and 5160 sq. m. respectively.

Among this, in case of moving forward in terms of our negotiations, my company is able to arrange a business trip to Turkey for related specialists who could organize producing cycle and military specialists for combat calculations.

Sincerely,  
Devi Tchankotadze,  
Director,  
Lieutenant-General



devitchankotadze@yahoo.com



გენერალ-ლეიტენანტი  
დევი ტჩანკოტაძე  
დირექტორი



Lieutenant General  
Devi Tchankotadze  
Director



114/2

To: "GATSAV" General Director  
Mr. Gursoy Turan

Dear Sir,

According to your request related to substitution of anti-tank system "KORNET", Russian production, to analogical anti-tank system "SKIF", Ukrainian/Belorussian production, with further organization of its producing in Turkey, I'm pleased to let you know that initial negotiations on this issue has been already conducted.

As a result, in case of procurement of 1 000 rockets and 100 launchers, exclusive exporter is eager to organize production of the modern anti-tank system "SKIF" of medium and long range in Turkey, with intention of further modernization and capacity building for related specialists.

Please kindly note that both systems "KORNET" and "SKIF" have similar combat parameters, while "SKIF" has range of advantages as per some of them.

Looking forward to our further cooperation,

Sincerely,  
Devi Tchankotadze,  
Director,  
Lieutenant-General



devitchankotadze@yahoo.com



# GATSAV

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# KASAN

# GATSAV

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