Chapter 1

PROPELLANT AND HIGH EXPLOSIVES

0.38"

General

Single base disk form propellant contains Nitrocellulose (NC), Diphenylamine (DPA) and additives. It is glazed with graphite. This propellant is used in 0.38 inch caliber cartridges for 0.38 pistols (Colt and Revolver)

TECHNICAL SPECIFICATIONS	
Diameter	1.8 ± 0.5 mm
Thickness	0.4 ± 0.1 mm
Diphenylamine (DPA)	1-2 %
Ash	Max. 0.4 %
Graphite	Max. 0.4 %
Moisture & volatile	0.4 - 1.3 %
Stability at 134.5 °C	≥ 60 min

BALLISTIC SPECIFICATIONS	
Total charge	~ 0.4 gr
Average Velocity (normal)	290 ± 5 m/s
Average Velocity (flat head)	240 ± 6 m/s
Std. dev. of velocity	≤ 8 m/s
Average Pressure at +21°C	≤ 1200 bar
Pressure of single round at 21°C, +71°C and -33°C	≤ 1520 bar

9×19 mm

General

Single base non-perforated cylindrical grain contains Nitrocellulose (NC), Diphenylamine (DPA) and additives. It is glazed with graphite. This propellant is used in 9 ×19 cartridges for Parabellum SIG ،S&W ،CZ 99 ،Beretta and equivalent pistol.

TECHNICAL SPECIFICATIONS	
Length	1.4 ± 0.3 mm
Diameter	0.5 ± 0.1 mm
Diphenylamine(%)	1 - 2 %
Graphite (%)	≥ 0.2 %
Ash (%)	≥ 0.4 %
Moisture & Volatiles (%)	≥ 1.6 %
Heat of explosion (cal/gr)	≥ 1000
Stability at 134.5 °C (min)	≥ 40

BALLISTIC SPECIFICATIONS	
Total charge	~ 0.34 gr
Average Velocity (HEI)	395 ± 6 m/s
Std. dev. of velocity	≤ 8 m/s
Average Pressure at +21°C	≤2350 bar
Pressure of single round at 21°C, +71°C and -33°C (bar)	≤ 2800 bar

7.62×39 mm BLANK

General

Single base seven perforated cylindrical grain contains Nitrocellulose (NC), Diphenylamine (DPA) and additives. It is used in 7.62×39mm blank cartridges for Kalashnikov rifle.

TECHNICAL SPECIFICATIONS

Length	1.5 ± 0.5 mm
Diameter	1.0 ± 0.3 mm
Hole diameter	0.1-0.2 mm
Diphenylamine	1-2 %
Graphite	≤ 0.4 %
Ash	≤ 0.4 %
Heat of explosion	≤ 1000 cal/gr
Moisture & volatiles	1.2-1.6 %
Stability at 134.5 °C	≥ 60 min

BALLISTIC SPECIFICATIONS

Total charge	0.8 gr
Average Pressure	≤ 1200 bar

12.7×77 mm

General

Single base one perforated propellant cylindrical grain contains Nitrocellulose (NC), Diphenylamine (DPA), Dinitrotoluene (DNT), Dibutyl Phthalate (DBP) and Potassium Sulfate. It is glazed with graphite. This propellant is used in 12.7 × 77 cartridges for spotting rifle of 106mm guns.

TECHNICAL SPECIFICATIONS

Length (mm)	2.25 ± 0.1 mm
Diameter (mm)	0.9 ± 0.1 mm
Hole diameter (mm)	0.19 ± 0.01 mm
Diphenylamine (DPA) (%)	1-2 %
Graphite (%)	≤ 0.2 %
Ash (%)	≤ 0.1 %
Moisture & volatiles (%)	≤ 1.6 %
Heat of explosion (cal/gr)	980 ± 5
Stability at 134.5 °C (min)	≥ 60

BALLISTIC SPECIFICATIONS

Average Velocity (m/s)	538 ± 7 m/s
Std. dev. of velocity (m/s)	≤ 6 m/s
Average Pressure at +21°C (bar)	≤ 2500 bar
Pressure of single round at 21°C, +71°C and -33°C (bar)	≤ 2800 bar

12.7×108 mm (Dushka)

General

Single base seven perforated cylindrical grain contains Nitrocellulose (NC), Diphenylamine (DPA), Dibutyl Phthalate (DBP) and Potassium Salt. It is glazed with graphite. This propellant is used in 12.7 ×108 cartridges for DShK machine gun.

TECHNICAL SPECIFICATIONS

Length	3.25 ± 0.15 mm
Diameter	2.2 ± 0.2 mm
Hole diameter	0.2 ± 0.05 mm
Web thickness	0.4 ± 0.05 mm
Graphite	≥ 0.4 %
Ash	≥ 0.4 %
Residue Solvent	≥ 0.6 %
External Moisture	1.0-1.8 %
Total Volatile	≥3.5 %
Stability at 134.5 °C	≥ 60 min

BALLISTIC SPECIFICATIONS

Total charge	~ ? gr
Average Velocity (HEI)	828 ± 7 m/s
Std. dev. of velocity	≥ 8 m/s
Average Pressure× at +21°C	≥3200 bar
Pressure× of single round at 21°C, +71°C and -33°C	≥ 3500 bar

14.5×114 mm

General

Single base seven perforated propellant cylindrical grain (5/7) contains Nitrocellulose (NC), Diphenylamine (DPA) and additives. It is glazed with graphite. This propellant is used in 14.5×114mm cartridges for 14.5mm machine gun.

TECHNICAL SPECIFICATIONS

Length	2.9-3.8 mm
Hole diameter	0.16 – 0.24 mm
Outer web thickness	0.45 - 0.75 mm
Inner web thickness	0.3 - 0.6 mm
Diphenylamine (DPA)	1-2 %
Heat of explosion	900-1000 cal/gr
Moisture and volatile	0.75 – 1.5 %
Stability at 134.5 °C	≥ 60 min

BALLISTIC SPECIFICATIONS

Total charge	~ 30 gr
Average Velocity (HEI)	980 ± 20 m/s
Std. dev. of velocity	≤ 7 m/s
Average Pressure× at +21°C	≤ 3600 bar
Max. Pressure of single round	≤ 3800 kg/cm²

20 mm OERLIKON

General

Single base one perforated cylindrical grain contains Nitrocellulose (NC), Diphenylamine (DPA) and additives. It is glazed with graphite. This propellant is used in 20mm cartridges for Oerlikon antj-aircraft gun.

TECHNICAL SPECIFICATIONS

Length	1.5 ± 1.8 mm
Hole diameter	0.1 - 0.2 mm
Diameter	1.2 - 1.5 mm
Diphenylamine (DPA)	1 - 2 %
Heat of explosion	Max. 900 cal/gr
Moisture & Volatile	≤ 1.5 %
Ash	≤ 0.4
Stability at 134.5 °C	≥ 40 min

BALLISTIC SPECIFICATIONS

Total charge	~ 58 gr
Average Velocity (HEI)	1050 ± 15 m/s
Std. dev. of velocity	≤ 8 m/s
Average Pressure at +21°C	≤ 4200 kg/cm²
Pressure of single round at 21°C, +71°C and -33°C	≤ 4500 kg/cm²

23×152 mm

General

Single base seven perforated propellant cylindrical grain contains Nitrocellulose (NC), Diphenylamine (DPA), Camphor and additives. It is glazed with graphite. This propellant is used in 23×152mm cartridges for 23mm automatic anti- aircraft gun (ZU 23 or equivalent).

TECHNICAL SPECIFICATIONS

Length	3.4 ± 0.4 mm
Hole diameter	0.10 – 0.25 mm
Internal Web thickness	0.5 ± 0.1 mm
External Web thickness	0.65 ± 0.15 mm
Diphenylamine (DPA)	1-2 %
Residue solvent	≥ 0.8 %
External moisture	≥ 1.2 %
Total volatile	≤ 3.5 %
Heat of explosion	Max. 920 cal/gr
Stability at 134.5 °C	≥ 60 min

BALLISTIC SPECIFICATIONS

Total charge	~ 77 gr
Average Velocity (HEI)	965 ± 10 m/s
Average Velocity (APT)	970 ± 10 m/s
Std. dev. of velocity	≤ 8 m/s
Average Pressure at +21°C	≤ 2925 kg/cm²
Pressure of single round at 21°C+71°C and -33°C	≤ 3200 kg/cm²

30 mm- F7

General

Single base seven perforated propellant cylindrical grain (6/7) contains Nitrocellulose (NC), Diphenylamine (DPA) and additives. It is glazed with graphite.
This propellant is used in 30mm cartridges for aircraft gun (F7 warplane).

TECHNICAL SPECIFICATIONS

Length	4.5 ± 0.3 mm
Hole diameter	0.15 ± 0.05 mm
Internal Web thickness	0.5 ± 0.2 mm
External Web thickness	0.65 ± 0.15 mm
Diphenylamine (DPA)	1 - 2 %
Moisture & volatile	≤ 1.5 %
Heat of explosion	870 - 950 cal/gr
Stability at 134.5 °C	≥ 60 min

BALLISTIC SPECIFICATIONS

Total charge	~ 70 gr
Average Velocity (HEI)	790 ± 10 m/s
Std. dev. of velocity	≤ 10 m/s
Average Pressure× at +21°C	≤ 2650 bar
Pressure of single round at 21°C, +71°C and -33°C	≤ 3000 bar

30 mm- MIG 29

General

Single base seven perforated propellant cylindrical grain (6/7) contains Nitrocellulose (NC), Diphenylamine (DPA) and additives. It is glazed with graphite.
This propellant is used in 30mm cartridges for aircraft gun (MIG 29)

TECHNICAL SPECIFICATIONS

Length	4.5 ± 0.3 mm
Hole diameter	0.15 ± 0.05 mm
Internal Web thickness	0.5 ± 0.2 mm
External Web thickness	0.65 ± 0.15 mm
Diphenylamine (DPA)	1-2 %
Moisture & volatile	≤ 1.5 %
Heat of explosion	870-950 cal/gr
Stability at 134.5 °C	≥ 60 min

BALLISTIC SPECIFICATIONS

Total charge	~ 118 gr
Average Velocity (HEI)	870 ± 10 m/s
Std. dev. of velocity	≥ 8 m/s
Average Pressure× at +21°C	≤ 3000 bar
Pressure× of single round at 21°C, +71°C and -33°C	≤ 3400 bar

30×165 mm

General

Single base seven perforated propellant cylindrical grain (6/7) contains Nitrocellulose (NC), Diphenylamine (DPA) and additives. It is glazed with graphite.
This propellant is used in 30×165 mm cartridge for 2A42 automatic gun or equivalent (armored personnel carrier)

TECHNICAL SPECIFICATIONS

Length	4.5 ± 0.3 mm
Hole diameter	0.10 – 0.25 mm
Internal Web thickness	0.5 ± 0.2 mm
External Web thickness	0.65 ± 0.15 mm
Diphenylamine (DPA)	1-2 %
Residue solvent	≥ 0.3 %
External moisture	≥ 0.5 %
Total volatile	≤ 3.5 %
Heat of explosion	≤ 920 cal/gr
Stability at 134.5 °C	≥ 60 min

BALLISTIC SPECIFICATIONS

Total charge	~ 120 gr
Average Velocity (HEI)	960 ± 10 m/s
Average Velocity (APT)	970 ± 10 m/s
Std. dev. of velocity	≤ 10 m/s
Average Pressure at +21°C	≤ 3600 kg/cm²
Pressure of single round at 21°C, +71°C and -33°C	≤ 3800 kg/cm²

35×228 mm

General

Single base one perforated propellant cylindrical grain contains Nitrocellulose (NC), Diphenylamine (DPA), Camphor and additives. It is glazed with graphite.
This propellant is used in 35×228mm cartridge for 35mm anti-aircraft gun (automatic Oerlikon gun or equivalent).

* Measured by copper crusher

TECHNICAL SPECIFICATIONS

Length	2.2-3.0 mm
Diameter	1.7-2.0 mm
Hole diameter	0.10 - 0.25 mm
Web thickness	0.7 - 1.0 mm
Diphenylamine (DPA)	1-2 %
Moisture	0.8 – 1.3 %
Heat of explosion	≤ 750 cal/gr
Stability at 134.5 °C	≥ 40 min

BALLISTIC SPECIFICATIONS

Total charge	~ 340 gr
Average Velocity (HEI)	1175 ± 15 m/s
Std. dev. of velocity	≤ 10 m/s
Average Pressure at +21°C	≤ 3600 bar
Pressure of single round at 21°C, +71°C and -33°C	≤ 3900 bar

40 mm L60 & L70

General

- Single base seven perforated cylindrical grain contains Nitrocellulose (NC), Diphenylamine (DPA) and additives. It is used in 40mm L60 Bofors gun.
- Single base one perforated cylindrical grain contains Nitrocellulose (NC), Diphenylamine (DPA) and additives. It is used in 40mm L70 ammunition (for Bofors 40mm naval gun or similar guns).

TECHNICAL SPECIFICATIONS

Type	L60	L70
Length (mm)	5 ± 0.3	6 ± 1
Diameter (mm)	2.6 ± 0.2	1.8 ± 0.2
Hole diameter (mm)	0.2 ± 0.05	0.25 ± 0.1
Web thickness (mm)	0.5 ± 0.1	0.8 ± 0.15
Diphenylamine(%)	1-2	1-2
Graphite (%)	≤ 0.4	≤ 0.4
Moisture & Volatiles (%)	0.4-2	0.4-2
Heat of explosion (cal/gr)	≤ 800	≤ 900
Stability at 134.5 °C (min)	≥ 40	≥ 40

BALLISTIC SPECIFICATIONS

Type	L60	L70
Total charge (gr)	~ 380	~ 450
Average Velocity (m/s)	860 ± 10	1000 ± 5
Std. dev. of Velocity (m/s)	≤ 7	≤ 8
Average Pressure at +21°C (bar)	≤ 2900	≤ 4030
Max. Pressure at +63°C (bar)	≤ 3400	≤ 4500

40 mm GMG

General

Single base one perforated cylindrical grain contains Nitrocellulose (NC), Diphenylamine (DPA) and additives. It is used in 40mm gun machinery grenade ammunition.

TECHNICAL SPECIFICATIONS

Length	1.8-2.5 mm
Diameter	0.45-0.65 mm
Hole diameter	0.1-0.2 mm
Diphenylamine	1-2 %
Moisture & Volatiles	0.4-2 %
Heat of explosion	950-1020 cal/gr
Stability at 134.5 °C	≥ 40 min

BALLISTIC SPECIFICATIONS

Total charge	~ 0.4 gr
Average Velocity	241 ± 3 m/s
Std. dev. of Velocity	≤ 3.7 m/s

57 mm Anti Aircraft

General

Single base seven perforated propellant cylindrical grain, category 11/7 is a kind of single base propellant containing Nitrocellulose (NC) and Diphenylamine (DPA).

Applications

This propellant is used as anti-aircraft ammunition for anti-aircraft gun type S60 and ZSU-57-2.

TECHNICAL SPECIFICATIONS

Length	15.00 ± 0.80 mm
Hole diameter	0.53 ± 0.06 mm
Web thickness	1.15 ± 0.10 mm
External moisture	1.3 ± 0.3 %
Residual solvent	≥ 0.8 %
Stability at 134.5 °C	≥ 55

BALLISTIC SPECIFICATIONS

Total charge	1180 (approx.) gr
Muzzle Velocity	1000 m/s
Max. Pressure at 15 °C	3180 bar

76.62 mm NAVAL

General

Single base seven perforated cylindrical grain contains Nitrocellulose (NC), Diphenylamine (DPA), Dinitrotoluene(DNT) and additives. It is used in 76mm ammunitions (for 76mm Oto-Melara cannon or equivalent).

TECHNICAL SPECIFICATIONS

Length	14.4 ± 0.5 mm
Diameter	6.4 ± 0.25 mm
Hole diameter	0.45 ± 0.05 mm
Diphenylamine	1-2 %
Total volatiles	≤ 1.7 %
Moisture	0.6 ± 0.2 %
Heat of explosion	800 ± 20 cal/gr
Stability at 134.5 °C	≥ 40 min

BALLISTIC SPECIFICATIONS

Total charge	~ 2400 gr
Average Velocity	900 ± 10 m/s
Std. dev. of Velocity	≤ 3 m/s
Average Pressure	≤ 3155 bar

105 mm

General

Single base one and seven perforated propellant cylindrical grain contains Nitrocellulose (NC), Diphenylamine (DPA), Dinitrotoluene (DNT), Dibutyl Phthalate (DBP) and Potassium Sulfate. The powder charge consists of seven charges. One perforated propellant is used for charges NO.1-2 and seven perforated propellants for charges NO.3-7. This powder charge is used for 105mm HE ammunition.

TECHNICAL SPECIFICATIONS

	one perforated	seven perforated
Length (mm)	6 ± 1	9 ± 1
Diameter (mm)	1.2 ± 0.1	4 ± 0.2
Hole diameter (mm)	0.4 ± 0.05	0.6 ± 0.1
Web thickness (mm)	0.40 ± 0.05	0.56 ± 0.1
Total volatiles (%)	≤ 1.6	≤ 1.8
Moisture (%)	0.6 ± 0.2	0.6 ± 0.2
Residual solvent (%)	≤ 0.8	≤ 1.0
Stability at 134.5 °C (min)	≥ 40	≥ 40

BALLISTIC SPECIFICATIONS

	one perforated	seven perforated
Total charge (gr)	~ 280	~ 960
Average Velocity (m/s)	216 ± 5	471 ± 5 (Full Charge)
Std. dev. of Velocity (m/s)	≤ 1.8.	≤ 1.8
Average Pressure at 15°C (bar)	-	≤ 2450 (Full Charge)

105 mm HEPT

General

Single base seven perforated cylindrical grain contains Nitrocellulose (NC), Diphenylamine (DPA) and additives. It is used in 105mm HEPT anti-armor ammunition.

TECHNICAL SPECIFICATIONS

Length	10.5 ± 1.5 mm
Diameter	4.3 ± 0.4 mm
Hole diameter	0.4 ± 0.1 mm
Web thickness	0.7-0.95 mm
Diphenylamine	1-2 %
Heat of explosion	≤ 800 cal/gr
Total volatiles	≤ 1.25 %
moisture	0.6 ± 0.2 %
Stability at 134.5 °C	≥ 40 min

BALLISTIC SPECIFICATIONS

Total charge	2500 gr
Average Velocity	731.5 ± 8 m/s
Std. dev. of Velocity	≤ 3.0 m/s
Average Pressure	≤ 1862 bar
Max. Pressure at +63°C	≤ 2145 bar

122 mm (Reduced Charge - Full Charge)

General
Reduced charge:

Single base seven perforated propellant cylindrical grain, category 9/7 is a kind of single base propellant containing Nitrocellulose (NC) and Diphenylamine (DPA).This propellant plus increments of one perforated granular propellant type 4/1, and type 3/1 as flash reducer is used as a reduced charge for 122mm Howitzer.

Full Charge:

Single base seven perforated propellant cylindrical grain, category 12/7 is a kind of single base propellant containing Nitrocellulose (NC) and Diphenylamine (DPA).This propellant plus two increments (a) one perforated tubular propellant type 12/1 - 27, (b) granular propellant type 3/1 as flash reducer is used as a full charge for 122mm Howitzer.

TECHNICAL SPECIFICATIONS

	Reduced charge			Full Charge		
Type of propellant	9/7	4/1	3/1	12/7	12/1 - 27	3/1
Length(mm)	11.5 - 12.6	5.5 -7.5	1.6 -2.1	13.5 -15.6	258 - 270	1.6 -2.1
Hole diameter (mm)	0.4 - 0.6	0.25 -0.35	0.1 -0.25	0.5 - 0.7	2.4 -2.8	0.1 -0.25
Web thickness(mm)	0.95 -1.10	0.4 -0.55	0.28 -0.36	1.15 -1.25	1.1 -1.25	0.28 -0.36
Total volatiles (%)	≤ 4.5	≤ 3.8	≤ 3.7	≤ 4.8	≤4.5	≤ 3.7
External moisture (%)	1.0 -1.8	1.0 -1.8	1.0 -1.8	1.0 -1.8	1.0 -1.8	1.0 -1.8
Residual solvent (%)	≥ 0.9	≥ 0.6	≥ 0.5	≥ 1.0	≥ 1.2	≥ 0.5
Stability at 134.5 °C	≥ 40	≥ 40	≥ 40	≥ 40	≥ 40	≥ 40

BALLISTIC SPECIFICATIONS

	Reduced charge			Full Charge		
Type of propellant	9/7	4/1	3/1	12/7	12/1 - 27	3/1
Weight of charge(gr)	~ 1885	600	20	~ 3700	200	75
Average muzzle velocity(m/s)	565 ± 5 (charge No.0)			690 ± 5		
Average max pressure 15 °C (bar)	2300			2750		
Std. dev. of Velocity (m/s)	≤ 2			≤ 2		

125 mm HE, HEAT &APFSDS

General

Single base seven perforated propellant cylindrical grain, 12/7 VA containing Nitrocellulose (NC) and Diphenylamine (DPA) and tubular propellants: 15/1-240 and 15/1-352 is a kind of single base propellant containing Nitrocellulose (NC) and Diphenylamine (DPA).
12/7 VA propellant is used for 125mm Heat and HE ammunition. This ammunition is used for 125mm gun fitted on T-72 8T-80 tank.
12/7 VA, 15/1-240 and 15/1-352 propellants are used in propelling charge in APFSDS ammunition for 125mm tank gun type T72.

TECHNICAL SPECIFICATIONS

Type of propellant	Seven perforated (12/7 VA)	Tubular 15/1 – 240	Tubular 15/1 – 352
Length (mm)	13.5 -15.6	235 - 240	344 -352
Hole diameter (mm)	0.50 - 0.70	1.50 - 1.6	1.85 -2.0
Web thickness(mm)	1.1 -1.25	1.45 -1.55	1.45 -1.55
Total volatiles (%)	≤ 3.7	≤ 3.5	≤ 3.8
External moisture (%)	1.0 -1.8	1.0 -1.6	1.0 -1.8
Residual solvent (%)	≥ 1	≥ 1.3	≥ 1.3
Stability at 134.5 °C	≥ 40	≥ 40	≥ 40

BALLISTIC SPECIFICATIONS

Type of propellant	HE	HEAT	APFSDS (BM42)
Total charge (gr)	~ 5200	~ 5200	~ 8200
Average Velocity (m/s)	850 ± 7	905 ± 7	1700
Std. dev. of Velocity (m/s)	3	3	≤ 6.5
Average pressure at 15° (kg /cm²)	≤ 3500	≤ 3000	≤ 4350
Average pressure at +63°C	≤ 4050	3500	5200

130 mm Reduced Charges

General

Single base seven perforated propellant cylindrical grain, category 9/7 contains Nitrocellulose (NC) and Diphenylamine (DPA).This propellant plus increments of one perforated tubular propellant type 12/1 – 72 is used as reduced charge for 130mm gun M-46 and type 59.

TECHNICAL SPECIFICATIONS

Type of propellant	9/7	12/1 – 72
Length (mm)	11.5 - 12.6	690 -720
Hole diameter (mm)	0.4 - 0.6	2.4 -2.8
Web thickness (mm)	0.95 -1.10	1.1 - 1.25
Total volatiles (%)	≤ 4.5	≤ 4.5
External moisture (%)	1.0 -1.8	1.0 -1.8
Residual solvent (%)	≥ 0.9	≥ 1.2
Stability at 134.5 °C (min)	≥ 40	≥ 40

BALLISTIC SPECIFICATIONS

Charge No.	No.2	No.3	No.4
Charge weight (approx.) for propellant type 9/7 (gr)	5700	4450	3200
Charge weight(approx.)for propellant type 12/1 – 72 (gr)	700	700	700
Average muzzle velocity (m/s)	700-710	615-625	520-530
Average max pressure at 15 °C (kg/cm²)	≤ 2750	-	≥ 1100
Std. dev. of Velocity (m/s)	≤ 2.5	≤ 2.5	≤ 2.5

152 mm Reduced Charge

General

Single base seven perforated propellant cylindrical grain, category 9/7 is a kind of single base propellant containing Nitrocellulose (NC) and Diphenylamine (DPA).This propellant plus increments of one perforated granular propellant type 4/1, and tubular type 8/1-41 is used as a reduced charge for 152mm howitzer type D -20.

TECHNICAL SPECIFICATIONS

Type of propellant	9/7	4/1	8/1
Length (mm)	11.5 - 12.6	5.5 -7.5	395 -410
Hole diameter (mm)	0.4 - 0.6	0.25 -0.35	2.7 -3.0
Web thickness (mm)	0.95 -1.10	0.4 -0.55	0.70-0.85
Total volatiles (%)	≤ 4.5	≤ 3.8	≤ 3.5
External moisture (%)	1.0 -1.8	1.0 -1.8	1.0 -1.8
Residual solvent (%)	≥ 0.9	≥ 0.6	≥ 0.9
Stability at 134.5 °C	≥ 40	≥ 40	≥ 40

BALLISTIC SPECIFICATIONS

Charge No.	No.2	No.3	No.4	No.5	No.6
Charge weight (approx.)for propellant type 9/7 (g)	2650	1590	1060	530	0
Charge weight for propellant type 8/1–41 (g)	100	100	100	100	100
Charge weight for propellant type 4/1 (g)	1175	1175	1175	1175	1175
Average muzzle velocity at 15°C(m/s)	511 ± 5	427	380	335	282
Average bore pressure at 15°C (kgf/cm²)	≤ 2300	-	-	-	-
Std. dev. of Velocity (m/s)	≤ 2	-	-	-	-

155 mm (Green & White Bag Charges)

General

Single base one and seven perforated propellant cylindrical grains contain Nitrocellulose (NC), Diphenylamine (DPA), Dinitrotoluene (DNT), Dibutyl Phthalate (DBP) and Potassium Sulfate. One perforated propellant is used in zone 1-5 (green bag charge) and seven perforated propellant is used in zone 3-7 (white bag charge). These charges are used in 155mm gun.

TECHNICAL SPECIFICATIONS

	one perforated	seven perforated
Length (mm)	7.2 ± 1	11 ± 1
Diameter (mm)	1.3 ± 0.1	5 ± 0.5
Hole diameter (mm)	0.4 ± 0.1	0.4 ± 0.1
Web thickness (mm)	0.40 ± 0.05	0.9 ± 0.1
Moisture (%)	0.6 ± 0.2	0.6 ± 0.2
Residual solvent (%)	≤ 0.8	≤ 1.25
Stability at 134.5 °C (min)	≥ 40	≥ 40

BALLISTIC SPECIFICATIONS

	Green bag	White bag
Total charge (gr)	~ 2500	~ 6200
Average Velocity (m/s)	375 ± 7.5	564 ± 7.5
Std. dev. of Velocity (m/s)	≤ 1.8	≤ 1.8
Average Pressure at +21°C (bar)	1240-1930	2206-2294
Individual Max. Pressure at 21°C (bar)	2103 (Zone 5)	2793 (Zone 7)
Individual Max. Pressure at +63°C (bar)	-	3041 (Zone 7)

155 mm IK

General

Single base seven perforated propellant cylindrical grain category 12/7 is a kinds of single base propellant containing Nitrocellulose (NC) and Diphenylamine (DPA).
This propellant is used in 155mm Krasnopol (Basir) cannon-launched guided projectiles.

TECHNICAL SPECIFICATIONS

Length	13.5 - 15.6 mm
Hole diameter	0.5 - 0.7 mm
Web thickness	1.15 - 1.25 mm
Volatile solvents	≥ 1.0 %
External moisture	1-1.8 %
Stability at 134.5°C	≥ 40

BALLISTIC SPECIFICATIONS

Total charge	~ 5100 gr
Average Velocity	502 ± 5 m/s
Mean Pressure at +21°C	1600 bar

155 mm (ZONE 8 CHARGE)

General

Single base seven perforated propellant cylindrical grain contains Nitrocellulose (NC), Diphenylamine (DPA), Dinitrotoluene (DNT), Dibutyl Phthalate (DBP) and Potassium Sulfate. This propellant is used in zone 8 charge for 155mm ammunitions.

TECHNICAL SPECIFICATIONS

Length	18 ± 1 mm
Diameter	8.8 ± 0.5 mm
Hole diameter	0.7 ± 0.1 mm
Outer Web thickness	1.7 ± 0.2 mm
Inner Web thickness	1.8 ± 0.2 mm
Graphite	≤ 0.2 %
Total volatiles	≤ 2%
Moisture	0.8 ± 0.2 %
Heat of explosion	760 - 800 cal/gr
Stability at 134.5 °C	≥ 40 min

BALLISTIC SPECIFICATIONS

Total charge	~ 9000 gr
Average Velocity	686 ± 7.7 m/s
Std. dev. of Velocity	≤ 2.1 m/s
Average Pressure at 21°C	≤ 2552 bar
Max. Pressure at +63°C	≤ 2827 bar

203 mm

General

Single base seven perforated propellant cylindrical grain contains Nitrocellulose (NC), Diphenylamine (DPA), Dinitrotoluene (DNT) and Dibutyl Phthalate (DBP). These propellants are used in 203mm gun ammunition.

TECHNICAL SPECIFICATIONS	
Length	14 ± 0.3 mm
Diameter	6.3 ± 0.2 mm
Hole diameter	0.9 ± 0.1 mm
Outer web thickness	1.1 ± 0.1 mm
Inner web thickness	1.0 ± 0.1
Total volatiles	Max. 1.4 %
Stability at 134.5 °C	≥ 40 min

BALLISTIC SPECIFICATIONS	
Average Velocity	610 ± 15 m/s
Std. dev. of Velocity	≤ 1.8 m/s
Max. Pressure	2400 – 2600 Kg/cm²

100 mm (Anti-Aircraft)

General

Double base one perforated propellant tubular grain, category SF3-18/1-26 is a kind of double base propellant containing Nitrocellulose (NC), Nitroglycerine (NG), Dinitrotuloene (DNT), Dibutyl Phthalate (DBP), Centralite and wax.
This propellant is used in 100mm anti-aircraft and also 100mm anti-tank ammunition.

TECHNICAL SPECIFICATIONS	
Type of propellant	SF3-18/1-26
Length	260_{-8} mm
Hole diameter	2.1 -2.3 mm
Web thickness	1.75 -1.90 mm
Moisture	Max. 0.7 %
Heat of explosion	765 ± 10 cal/g
Stability at 120 °C	≥ 40 min.

BALLISTIC SPECIFICATIONS	
Total charge	5500 gr
Muzzle Velocity	900 ± 10 m/s
Average Pressure at 15°C	≤ 3000 bar
Std. Dev. of Velocity (m/s)	≤ 2.3 m/s

106 mm

General

Double base seven perforated propellant cylindrical grain, category M26 is a kind of double base propellant containing Nitrocellulose (NC), Nitroglycerine (NG), Barium Nitrate, Potassium Nitrate, Centralite and Graphite (as glazing agent).
This propellant is used in 106mm anti-tank and anti-personnel ammunitions for M40 recoilless gun.

TECHNICAL SPECIFICATIONS	
Average length (L)	13 ± 1 mm
Diameter (D)	5.5 ± 0.5 mm
Web (W)	0.9 ± 0.1 mm
Perforation diameter (d)	0.55 ± 0.05 mm
Total volatiles	Max. 0.7 %
Chemical stability (120 °C)	40 min.
Heat of explosion (Max.)	1020 cal/gr

BALLISTIC SPECIFICATIONS		
Tested items	Antitank	Antipersonnel
Total charge (gr)	~3600	~3800
Mean Muzzle Velocity (m/s)	503 ± 15	485 ± 15
Average Pressure at 21°C (kg/cm²)	≤ 680	≤ 680
Std. Dev. of Velocity (m/s)	≤ 3.5	≤ 3.5

130 mm (Full Charge)

General

Double base one perforated propellant Tubular grain, category SF3-23/1-37 is a kind of double base propellant containing Nitrocellulose (NC), Nitroglycerine (NG), Dinitrotuloene (DNT), Dibutyl Phthalate (DBP), Centralite and wax.
These propellants are used in full propelling charges for 130mm gun type59 or M46.

TECHNICAL SPECIFICATIONS	
Length	370_{-8} mm
Hole diameter	2.3-2.6 mm
Web thickness	2.2-2.35 mm
Moisture	≤ 0.7 %
Heat of Explosion	765 ± 10 cal/gr
Stability at 120 °C	≥ 40 min.

BALLISTIC SPECIFICATIONS	
Total charge	~12900 gr
Muzzle Velocity	930 ± 8 m/s
Average Pressure at 15°C	≤ 3200 kfg/cm²
Std. Dev. of Velocity (m/s)	≤ 2.3 m/s

152 mm (Full Charge)

General

Double base one perforated propellant Tubular grain, category SF3-16/1-17.5 and SF3-16/1-29 is a kind of double base propellant containing Nitrocellulose (NC), Nitroglycerine (NG), Dinitrotuloene (DNT), Dibutyl Phthalate (DBP), Centralite and wax.
These propellants are used as full propelling charges for 152mm howitzer type D20.

TECHNICAL SPECIFICATIONS		
Type of propellant	SF3-16/1-17.5	SF3-16/1-29
Length (mm)	175-5	290-8
Hole diameter (mm)	1.3-1.6	1.3-1.6
Web thickness (mm)	1.65-1.75	1.63-1.75
Moisture (%)	≤ 0.7	≤ 0.7
Heat of Explosion (cal/gr)	765 ± 10	765 ± 10
Stability at 120 °C	≥ 40	≥ 40
Heat of explosion (cal/g)	765 ± 10	765 ± 10
Stability at 134.5 °C (min.)	≥ 40	≥ 40

BALLISTIC SPECIFICATIONS	
Total charge (approx.)	8150 gr
Muzzle Velocity	655 m/s
Average Pressure at 15°C	≤ 2350 kgf/cm²
Std. Dev. of Velocity (m/s)	2 m/s

105 mm HEAT

General

Triple base seven perforated propellant cylindrical grains, category 15/7 (M30) is a kind of triple base propellant containing Nitrocellulose (NC), Nitroglycerine (NG), Nitroguanidine (NQ), Cryolite and Centralite.
This propellant is used in 105mm HEAT ammunition for tank gun type M60.

TECHNICAL SPECIFICATIONS	
Length	~16.5 mm
Hole diameter	~0.5 mm
Web thickness	~1.5 mm
Total volatile	≤ 0.7 %
Stability at 120 °C	≥ 40 min.

BALLISTIC SPECIFICATIONS	
Total charge (approx.)	5100 gr
Muzzle Velocity at 21°C	1173.5 m/s
Average Pressure at 21°C	≤ 436.40 MPa
Std. Dev. of Velocity at 21°C	≤ 2.38 m/s

155 mm B.B

General

Nineteen perforated cylindrical propellant type M30A1, is a kind of triple base powder mainly containing Nitrocellulose (NC), Nitroglycerine (NG) and Nitroguanidine (NGu).
This triple-base propellant (M30A1) is used in zone 8S for Gun 155mm GC-45 HOWITZER

TECHNICAL SPECIFICATIONS	
Length	16.5 - 17. 5mm
Hole diameter	0.30 - 0.38 mm
Inner Web Thickness	2.20 - 2.50 mm
Outer Web Thickness	2.50 - 2.90 mm
External Diameter	16.0 - 16.6 mm
Heat of Explosion	940 - 980 cal/g
Total volatile	≤ 0.5%
Stability at 120 °C	≥ 40 min.

BALLISTIC SPECIFICATIONS		
Weight of Charge	~ 16	000 gr
Average Muzzle Velocity	897 m/s	
Average Chamber Pressure	≤ 348 ma	
Std. Dev. of Velocity at 21°C	≤ 2.4 m/s	

0.22"

General

Application: propellant for 0.22 inch cartridge for colt.
Packaging: Ball powder (0.22 inch) is packed in seal metal drum or fiber drum and packages are placed on pallet in Shrinkage form. Net weight of each drum is 40 kg.
Storage: Ball powder (0.22 inch) should be stored in -10 up to +30°C.
Shelf life: 20 years

TECHNICAL SPECIFICATIONS

Charge	0.09 gr
Projectile mass	2.1 gr
Muzzle velocity	330 ± 15 m/s
Standard Deviation of velocity	Max. 8 m/s
Average pressure	Max. 1800 bar
Average Grain Diameter	0.3 ± 0.05 mm
Appearance density	0.75 - 0.80
Stability at 120 °C	Min.60 min
Moisture & Volatile	Max.0.8 %

5.56×45 mm

General

Application: propellant for 5.56 ×45mm cartridge for M16 , FNC and equivalent rifle.
Packaging: Ball powder (5.56×45mm) is packed in seal metal drum or fiber drum and packages are placed on pallet in Shrinkage form. Net weight of each drum is 40 kg.
Storage: Ball powder (5.56×45mm) should be stored in -10°C up to +30°C.
Shelf life: 20 years

TECHNICAL SPECIFICATIONS

Charge	1.5-1.7 gr
Projectile mass	3.55 ± 0.10 gr
Muzzle velocity	965 ± 6 m/s
Standard Deviation of velocity	Max. 8 m/s
Average pressure	Max. 3450 bar
Average Grain Diameter	0.5 ± 0.05 mm
Appearance density	Min. 930 g/lit
Stability at 120 °C	Min. 60 min
Moisture & Volatile	Max.1.25

7.62×39 mm

General

Application: propellant for 7.26 ×39mm cartridge (Ball & AP) for Kalashnikov rifle.
Packaging: Ball powder (7.26 ×39mm) is packed in seal metal drum or fiber drum and packages are placed on pallet in Shrinkage form. Net weight of each drum is 40 kg.
Storage: Ball powder (7.26 ×39mm) should be stored in -10°C up to +30°C.
Shelf life: 20 years

TECHNICAL SPECIFICATIONS

	AP	Ball
Charge (gr)	1.58 ± 0.05	1.6 ± 0.05
Projectile mass (gr)	8.0 ± 0.15	8.1 ± 0.1
Muzzle velocity (m/s)	747 ± 7	716 ± 10
Standard Deviation of velocity (m/s)	8	8
Average pressure (bar)	Max. 3100	Max. 3100
Average Grain Diameter (mm)	0.50 ± 0.05	0.55 ± 0.05
Appearance density (g/lit)	Min. 910	Min. 910
Stability at 120 °C (min)	Min. 60	Min. 60a
Moisture & Volatile	Max.1.25	Max.1.25

7.62×51 mm

General

Application: propellant for NATO 7.62 × 51 mm cartridges (Ball & AP) for G-3 rifle.
Packaging: Ball powder (7.62×51mm) is packed in seal metal drum or fiber drum and packages are placed on pallet in Shrinkage form. Net weight of each drum is 40 kg.
Storage: Ball powder (7.62×51mm) should be stored in -10 up to +30°C.
Shelf life: 20 years

TECHNICAL SPECIFICATIONS

	AP	Ball
Charge (gr)	2.55 ± 0.05	2.8 ± 0.1
Projectile mass (gr)	9.45 ± 0.1	9.30 ± 0.15
Muzzle velocity (m/s)	838 ± 5	838 ± 5
Standard Deviation of velocity (m/s)	Max. 6	Max. 6
Average pressure (bar)	Max. 3310	Max. 3310
Average Grain Diameter (mm)	0.55 ± 0.05	0.65 ± 0.05
Appearance density (g/lit)	Min. 910	Min. 910
Stability at 120 °C (min)	Min.60	Min.60
Moisture & Volatile (%)	Max.1.25	Max.1.25

7.62×54 mm

General

Application: propellant for 7.26 ×54mm cartridge (Ball & AP) for Grinov machine gun and Dragunov sniper rifle.
Packaging: Ball powder (7.62×54mm) is packed in seal metal drum or fiber drum and packages are placed on pallet in Shrinkage form. Net weight of each drum is 40 kg.
Storage: Ball powder (7.62×54mm) should be stored in -10°C up to +30°C.
Shelf life: 20 years

TECHNICAL SPECIFICATIONS

	Grinov		Dragunov
	AP	Ball	
Charge (gr)	3.0 ± 0.2	2.9 ± 0.1	3.2 ± 0.1
Projectile mass (gr)	9.6 ± 0.1	11.2 ± 0.1	9.6
Muzzle velocity (m/s)	820 ± 7	785 ± 7	830 ± 7
Standard Deviation of velocity (m/s)	Max. 6	Max. 6	Max. 5
Average pressure (bar)	Max. 3300	Max. 3000	Max. 3200
Average Grain Diameter (mm)	0.6 ± 0.05	0.65 ± 0.05	0.67 ± 0.05
Moisture & volatile (%)	Max.1.25	Max.1.25	Max.1.25
Appearance density (g/lit)	Min.945	Min.940	Min.940
Stability at 120 °C (min)	Min.60	Min.60	Min.60

7.92×57 mm (BERNO)

General

Application: propellant for Berno rifle
Packaging: Ball powder (Berno) is packed in seal metal drum or fiber drum and packages are placed on pallet in Shrinkage form. Net weight of each drum is 40 kg.
Storage: 20mm Volcan Ball powder should be stored in -10°C up to +30°C
Shelf life: 20 years

TECHNICAL SPECIFICATIONS

Charge	2.8-3.2 gr
Projectile mass	12.75 gr
Muzzle velocity	870 m/s
Average pressure	Max.3300 bar
Average Grain Diameter	0.65 ± 0.05 mm
Appearance density	940-980 g/lit
Stability at120 °C	Min. 60 min
Moisture & Volatile	Max. 1.25 %

9 ×19 mm

General

Application: propellant for 9mm pistol cartridge for Parabelum SIG ،S&W ،CZ 99 ،Beretta and equivalent pistol and tommy gun.
Packaging: Ball powder (9 ×19mm) is packed in seal metal drum or fiber drum and packages are placed on pallet in Shrinkage form. Net weight of each drum is 40 kg.
Storage: Ball powder (9 ×19mm) should be stored in -10°C up to +30°C.
Shelf life: 20 years

TECHNICAL SPECIFICATIONS	
Charge	0.37-0.4 gr
Projectile mass	8 ± 0.1 gr
Muzzle velocity	385 ± 6 m/s
Standard Deviation of velocity	8 m/s
Average pressure	Max. 2350 bar
Average Grain Diameter	0.45 ± 0.05
Appearance density	960-970 g/lit
Stability at 120 °C	Min. 60 min
Moisture & Volatile	Max. 1.25 %

12.7×77 mm

General

Application: Propellant for 12.7×77mm cartridges for M8C spotting rifle (or equivalent) of 106mm guns.
Packaging: Ball powder (12.7×77mm) is packed in seal metal drum or fiber drum and packages are placed on pallet in Shrinkage form. Net weight of each drum is 40 kg.
Storage: Ball powder (12.7×77mm) should be stored in -10°C up to +30°C.
Shelf life: 20 years

TECHNICAL SPECIFICATIONS	
Charge	7-7.7 gr
Projectile mass	53 ± 0.2 gr
Muzzle velocity	538 ± 7 m/s
Standard Deviation of velocity	Max. 6 m/s
Average Pressure	Max. 2500 bar
Average Grain Diameter	0.7 ± 0.05
Appearance density	Min 900 g/lit
Stability at120 °C	60 min
Moisture & Volatile	Max. 1.25 %

12.7×99 mm

General

Application: propellant for 12.7 ×99 cartridge for 0.50 caliber machine gun and sniper rifle.
Packaging: Ball powder (12.7 ×99mm) is packed in seal metal drum or fiber drum and packages are placed on pallet in Shrinkage form. Net weight of each drum is 40 kg.
Storage: Ball powder (12.7×99mm) should be stored in -10°C up to +30°C.
Shelf life: 20 years

TECHNICAL SPECIFICATIONS

	Machine gun	Sniper
Charge (gr)	14.5 ± 0.5	14 ± 0.5
Projectile mass (gr)	45 ± 0.5	42.5 ± 0.5
Muzzle velocity (m/s)	887 ± 7	860 ± 6
Standard Deviation of velocity (m/s)	Max.8	Max. 7
Average pressure (bar)	Max. 3650	Max. 3400
Average Grain Diameter (mm)	0.7 ± 0.1	0.75 ± 0.1
Appearance density (g/lit)	920 - 960	900 - 950
Stability at 120 °C (min)	Min. 60	Min. 60
Moisture & Volatile(%)	Max. 1.25	Max. 1.25

12.7×108 mm

General

Application: propellant for 12.7×108mm cartridge for DShK machine gun.
Packaging: Ball powder (12.7×108mm) is packed in seal metal drum or fiber drum and packages are placed on pallet in Shrinkage form. Net weight of each drum is 40 kg.
Storage: Ball powder (12.7×108mm) should be stored in -10°C up to +30°C.
Shelf life: 20 years

TECHNICAL SPECIFICATIONS

Charge	16-18 gr
Projectile mass	46 ± 1 gr
Muzzle velocity	828 ± 7 m/s
Standard Deviation of velocity	10 m/s
Average Pressure	Max. 3200 bar
Average Grain Diameter	0.8 ± 0.1 mm
Appearance density	Min. 900 g/lit
Stability at 120 °C	Min. 60 min
Moisture & Volatile	Max. 1.25 %

20 mm (VOLCAN)

General

Application: Propellant for 20mm Volcan cartridge in Volcan gun (naval or air to surface gun).
Packaging: 20mm Volcan Ball powder is packed in seal metal drum or fiber drum and packages are placed on pallet in Shrinkage form. Net weight of each drum is 40 kg.
Storage: 20mm Volcan Ball powder should be stored in -10°C up to +30°C.
Shelf life: 20 years

TECHNICAL SPECIFICATIONS	
Charge	38-40 gr
Projectile mass	68 gr
Muzzle velocity	1030 ± 15 m/s
St. deviation of velocity	Max. 8 m/s
Average pressure	Max. 3600 bar
Average Grain Diameter	0.85 ± 0.1 mm
Appearance density	Min 900 g/lit
Stability at120 °C	Min. 60 min
Moisture & Volatile	Max. 1.25 %

6.68 mm (Winchester 270)

General

Application: Propellant for 6.68mm cartridge for Winchester 270 rifle.
Packaging: Ball powder (6.68mm) is packed in seal metal drum or fiber drum and packages are placed on pallet in Shrinkage form. Net weight of each drum is 40 kg.
Storage: Ball powder (6.68mm) should be stored in -10°C up to +30°C.
Shelf life: 20 years

TECHNICAL SPECIFICATIONS	
Charge	2.7-3 gr
Projectile mass	9.60 ± 0.1 gr
Muzzle velocity	876 ± 5 m/s
Standard Deviation of velocity	Max. 3300 m/s
Average pressure	0.55 ± 0.05 bar
Average Grain Diameter	Min 945 mm
Appearance density	Min. 60 g/lit
Stability at 120 °C	Max.1.25 min
Moisture & Volatile	Max.1.25

Blank , Anti-Riot & Hunting Power

General

Application: Propellant for blank, Anti-riot and Hunting cartridge.
Packaging: Ball powder (Blank) is packed in seal metal drum or fiber drum and packages are placed on pallet in Shrinkage form. Net weight of each drum is 40 kg.
Storage: Ball powder (Blank) should be stored in -10°C up to +30°C.
Shelf life: 20 years (min)

TECHNICAL SPECIFICATIONS

	Blank	Anti-riot	Hunting
Charge weight (gr)	1.04 ± 1.08	1.05 ± 0.01	1.6 ± 0.1
Ball weight (gr)	-	7 - 8	36
Mean velocity (m/s)	-	340 - 380	500 - 560
St. Deviation of velocity (m/s)	-	≤ 8	≤ 8
Average pressure (bar)	500 - 700	Max. 700	Max. 700
Average Grain Diameter (inch)	0.024 ± 0.001	0.024 ± 0.001	0.026 ± 0.001
Appearance density (g/lit)	Max. 750	Max. 800	Max. 800
Stability at 120 °C (min)	Min. 60	Min. 60	Min. 60
Moisture & Volatile (%)	Max. 0.8	Max. 0.8	Max. 0.8
Type	7.62 × 39 7.62 × 51	7.62 × 39	12 cal.

FAJR 1 (107mm)

General

Specifications: This propellant belongs to the extruded double-base propellants group and can be produced by solventless process.
Application: One set of this product is used as a propellant in rocket 107mm (mini Katyusha)
Storage: should be stored in -10°C up to +30°C
Shelf life: 15 years (min)

TECHNICAL SPECIFICATIONS	
Length	403 ± 4 mm
External diameter	32.7 ± 0.8 mm
Internal diameter	6.5 ± 0.5 mm
Single grain weight	510 ± 6 mm
One set grain weight (7 grain)	3570 ± 42 gr
Specific gravity	min 1.57 gr/c^3
Heat of explosion	850 ± 8 cal/gr

FAJR 2

General

Specifications: This propellant belongs to the extruded double-base propellants group and can be produced by solventless process.
Application: It can be used as a propellant in 240mm FAJR 2 rocket (artillery system).
Storage: This propellant should be stored in -10°C up to +30°C
Shelf life: 15 years (min)

TECHNICAL SPECIFICATIONS	
Length	1676 ± 6 mm
External Diameter	208.5 ± 3.5 mm
Internal Diameter	55 ± 1 mm
Grain Weight	85 kg
Specific gravity	min 1.57 gr/c^3
Heat of explosion	850 ± 8 cal/gr

FAJR 3

General

Specifications: This propellant belongs to the extruded double-base propellants group and can be produced by solventless process. One set of this propellant consists of large and small grains.
Application: It can be used as a propellant in 240mm FAJR 3 rocket (artillery system).
Storage: This propellant should be stored in -10°C up to +30°C
Shelf life: 15 years (min)

TECHNICAL SPECIFICATIONS

Type	Small Grain	Large Grain
Length (mm)	1616 ± 6	1676 ± 6
External Diameter (mm)	189.5 ± 3	208.5 ± 3.5
Internal Diameter (mm)	33.5 ± 1	55 ± 1
Single Grain Weight (kg)	71	85
One Set Weight (large & small grains) (kg)	156	
Specific gravity (gr/c³)	min 1.57	min 1.57
Heat of explosion (cal/gr)	850 ± 8	850 ± 8

FAJR 4

General

Specifications: This propellant belongs to the extruded double-base propellants group and can be produced by solventless process.
Application: It can be used as a propellant in 333mm FAJR 4 rocket (artillery system).
Storage: should be stored in -10°C up to +30°C
Shelf life: 15 years (min)

TECHNICAL SPECIFICATIONS

Length	2110 ± 8 mm
External Diameter	295 ± 5 mm
Internal Diameter	75 ± 2 mm
Grain Weight	212 kg
Specific gravity	min 1.57 gr/c³
Heat of explosion	850 ± 8 cal/gr

FAJR 5

General

Specifications: This propellant belongs to the extruded double-base propellants group and can be produced by solventless process. A set of propellant consists of large and small grains.
Application: It can be used as a propellant in 333mm FAJR 5 rocket (artillery system).
Storage: Should be stored in -10°C up to +30°C
Shelf life: 15 years (min)

TECHNICAL SPECIFICATIONS

Type	Small Grain	Large Grain
Length (mm)	2100 ± 8	2110 ± 8
External Diameter (mm)	275 ± 5	295 ± 5
Internal Diameter (mm)	55 ± 2	75 ± 2
Single Grain Weight (kg)	190	212
One Set Weight (large & small grains) (kg)	402	
Specific gravity (gr/c^3)	min 1.57	min 1.57
Heat of explosion (cal/gr)	850 ± 8	850 ± 8

122mm (Standard Arash-KATYUSHKA)

General

Specifications: This propellant belongs to the extruded double-base propellants group and can be produced by solventless process.
Application: One set of this product is used as a propellant in 122mm rocket-standard range ARASH (Katyushka)
Storage: Should be stored in -10°C up to +30°C
Shelf life: 15 years (min)

TECHNICAL SPECIFICATIONS

	Long grain	Short grain
length (mm)	893 ± 7	893 ± 7
External Diameter (mm)	103.5 ± 2.5	93.5 ± 2.5
Internal Diameter (mm)	24.5 ± 1	13.5 ± 1
Single Grain Weight with inhibiting crown and spacer strip (kg)	11.2 ± 0.3	9.4 ± 0.3
One Set Weight (large & small grains) (kg)	20.6 ± 0.20	
Specific gravity (gr/c^3)	min 1.57	min 1.57
Heat of explosion (cal/gr)	850 ± 8	850 ± 8

FALAQ 1 & FALAGH 2

General

This propellant belongs to the extruded double-base propellants group and can be produced by solventless process.
Application: It can be used as a propellant in FALAQ 1 & 2 rockets (artillery system). One set propellant consists of 7 grains.
Storage: Should be stored in -10°C up to +30°C
Shelf life: 15 years (min)

TECHNICAL SPECIFICATIONS

Type	FALAGH 1	FALAGH 2
Length (mm)	510 ± 0.8	580 ± 0.5
External Diameter (mm)	74.5 ± 0.3	104 ± 0.5
Internal Diameter (mm)	14 ± 0.2	24 ± 0.2
Single Grain Weight (kg)	3.45 ± 0.050	7.6 ± 0.060
One set weight (7 grains) (kg)	24.15	53.2
Specific gravity (gr/c^3)	min 1.57	min 1.57
Heat of explosion (cal/gr)	850 ± 8	850 ± 8

MONTAQEM 1 & 2

General

This propellant belongs to the extruded double-base propellants group and can be produced by solventless process.
Application: One set propellant Montaghem1 and Montaghem2 consists of seven grains. This product can be used in Montaghem1 and Montaghem2 rockets (artillery system).
Storage: should be stord in -10°C up to +30°C Shelf life: 15 years (min)

TECHNICAL SPECIFICATIONS

Type	MONTAGHEM 1	MONTAGHEM 2
Length (mm)	1500 ± 5	1760 ± 6
External diameter (mm)	104.5 ± 0.5	126
Internal diameter (mm)	25	25
Weight of each grain (kg)	19.1	33.5
One set weight (7 grains) (kg)	133.4 ± 1	234.5 ± 1
Specific gravity (gr/c^3)	min 1.57	min 1.57
Heat of explosion (cal/gr)	850 ± 8	850 ± 8

PHO propellant

General

Specifications: This propellant belongs to the extruded double-base propellants group and can be produced by solventless process. One set consists of 4 grains.
Application: This product is used in Krosnopol (Basir) projectile, a kind of smart field artillery ammunition for 155mm gun.
Storage: Should be stored in -10°C up to +30°C.
Shelf life: 15 years (min)

TECHNICAL SPECIFICATIONS	
Length	224 mm
External diameter	50.2 mm
Internal diameter	9 mm
Weight	0.700 Kg
One set weight (4 grains)	2.8 Kg
Specific gravity	min 1.60 gr/cm^3
Heat of explosion	991 ± 10 cal/gr

RP120

General

Specifications: This propellant belongs to the extruded double-base propellants group and can be produced by solventless process.
Application: This propellant can be used in 120mm Rocket Assistant mortar.
Storage: Should be stored in -10°C up to +30°C
Shelf life: 15 years (min)

TECHNICAL SPECIFICATIONS	
Length	195 ± 0.3 mm
External diameter	76 ± 0.1 mm
Internal diameter	50 ± 1.5 mm
	14 ± 0.5 mm
Weight	1158 ± 5 gr
Specific gravity	min 1.57 gr/cm^3
Heat of explosion	850 ± 8 cal/gr

M9

General

Specifications: This propellant belongs to the extruded double-base propellants group and can be produced by solventless processes.
Application: After insulating, this product can be used in SIDEWANDER rocket (air to air) as a propellant.
Storage: Should be stored in -10°C up to +30°C
Shelf life: 15 years (min)

TECHNICAL SPECIFICATIONS	
Length	1550 ± 5 mm
External diameter	114.35 ± 0.4 mm
Internal diameter	8-fin star-shaped
Weight	17.9 ± 0.2 kg
Specific gravity	min 1.57 gr/cm³
Heat of explosion	880 ± 10 cal/gr

HOOT Accelerator

General

Specifications: This propellant belongs to the extruded double-base propellants group and can be produced by solventless process. One set consists of 12 grains.
Application: This product is used as accelerator propellant of under-surface rocket (HOOT).
Storage: Should be stored in -10°C up to +30°C
Shelf life: 15 years (min)

TECHNICAL SPECIFICATIONS	
Length	1121 mm
External diameter	71.5 ± 0.2 mm
Internal diameter	15.7 ± 0.2 mm
Weight of each grain	7.5 ± 0.1 Kg
One set weight (12 grains)	91 Kg
Specific gravity	1.62 min gr/c³
Heat of explosion	893 ± 8 cal/gr

S8 (FADAK)

General

Specifications: This propellant belongs to the extruded double-base propellants group and can be produced by solventless process.
Application: It can be used as a propellant in S8 air-base rocket.
Storage: Should be stored in -10°C up to +30°C
Shelf life: 15 years (min)

TECHNICAL SPECIFICATIONS	
Length	732_{-2}^{m} m
External diameter (calycle-shaped)	$64.2_{-0.7}^{m}$ m
Internal diameter	Special shape
Weight	3.100 - 3.150 kg
Specific gravity	min 1.57 gr/c³
Heat of explosion	790 ± 20 cal/gr

S24

General

Specifications: This propellant belongs to the extruded double-base propellants group and can be produced by solventless process.
Application: Seven grains are charged inside the rocket. It can be used as a propellant in Shafagh(S24) air-base rocket.
Storage: Should be stored in -10°C up to +30°C

TECHNICAL SPECIFICATIONS	
Length	1024 ± 1 mm
External diameter	73 ± 0.5 mm
Internal diameter	20.5 + 0.5 mm
Weight	6.6 ± 0.030 kg
One set weight (Seven grains)	46.2 ± 0.2 kg
Specific gravity	min 1.56 gr/cm³
Heat of explosion	850 ± 10 cal/gr

RAAD Launching & Flight Propellants

General

Specifications: These propellants belong to the extruded double-base propellants group and can be produced by solvent process.
Application: These products are used in RAAD rocket as launching and Flight propellant, a kind of guided anti-armor systems.
Storage: Should be stored in -10°C up to +30°C
Shelf life: 10 years (min)

TECHNICAL SPECIFICATIONS

Type	Launching	Flight
Length (mm)	91 ± 0.5	254 ± 0.5
External diameter (mm)	112.3 ± 0.4	70.4
Internal diameter (mm)	78.8 ± 0.3	-
Weight of each grain (gr)	685 ± 15	1500 ± 40
Specific gravity (gr/c^3)	min 1.56	min 1.56
Heat of explosion (cal/gr)	895 ± 10	895 ± 10

FM80

General

Specifications: This propellant belongs to the extruded double-base propellants group and can be produced by solventless process.
Application: One set (two grains) of this product can be used in missile FM80 called as a surface to air missile.
Storage: Should be stored in -10°C up to +30°C
Shelf life: 15 years (min)

TECHNICAL SPECIFICATIONS

Length	555 mm
External diameter	146.5 mm
Internal diameter (special geometry)	8-fin star-shaped
Weight of each grain	13.2 kg
One set weight (2 grains)	26.4 kg
Specific gravity	min 1.57 gr/cm^3
Heat of explosion	850 ± 8 cal/gr

RPG 7 (FATH)

General

1. Double base rocket propellant, Tubular grains, is a kind of double base propellant containing Nitrocellulose (NC), Nitroglycerine (NG), Dinitrotuloene (DNT),Burning rate catalyst, Centralite and wax. It can be produced by solventless extrusion process.
2. Double base Strip propellant is kind of double base propellant containing Nitrocellulose (NC), Nitroglycerine (NG), plasticizer and Stabilizer.

Application:

1. Double base tubular grain is used as flight propellant in shoulder lunched RPG-7 Family.
2. Double base strip type propellant is used as start ignition charges for RPG-7 Family.

Storage: these propellant should be stored in -10°C up to +30°C
Self-life: 15 years (min)

TECHNICAL SPECIFICATIONS		
Type	Start Ignition Charge	Flight Propellant
Length(mm)	225 ± 1.5	220 ± 1
External diameter (mm)	-	$30.9_{-0.5}$
Internal diameter (mm)	-	12.7 ± 0.2
Thickness (mm)	0.45 ± 0.4	-
Width (mm)	6 ± 0.3	-
Weight (gr)	-	210 - 220
Specific gravity (gr/cm³)	-	min 1.57
Heat of Explosion (cal/gr)	1240 ± 20	880 ± 10
Stability at 120 °C	≥ 40	≥ 40

SPG 9 (ZAFAR)

General

1- Double base rocket propellant, Tubular grains, is a kind of double base propellant containing Nitrocellulose (NC), Nitroglycerine (NG), Dinitrotuloene (DNT),Burning rate catalyst, Centralite and wax. It can be produced by solventless extrusion process.
2- Double base Strip propellant is a kind of double base propellant containing Nitrocellulose (NC), Nitroglycerine (NG), plasticizer and Stabilizer.

Application:

1- Double base tubular grain is used as flight propellant in SPG-9 rocket family.
2- Double base strip type propellant is used as start ignition charges for SPG-9 rocket family.

Storage: should be stord in -10°C up to +30°C
Shelf life: 15 years (min)

TECHNICAL SPECIFICATIONS		
Type	Start Ignition Charge	Flight Propellant
Length(mm)	272 ± 1	215.5 ± 0.8
External diameter (mm)	6 ± 0.3	42.4 ± 0.45
Internal diameter (mm)	-	10.45 ± 0.3
Thickness (mm)	0.6 ± 0.05	-
Width (mm)	7.5 ± 0.3	-
Weight (gr)	-	465 - 480
Specific gravity (gr/cm³)	-	1.61 min
Heat of Explosion (cal/gr)	1160 ± 20	1040 ± 25
Stability at 120 °C	≥ 40	≥ 40

PG29 (QADIR)

General

Single base one perforated tubular propellant, containing Nitrocellulose (NC) and Diphenylamine (DPA). It is used in PG29 anti-tank rocket.

TECHNICAL SPECIFICATIONS

Form	Tubular
Weight of grain	3.30 - 3.35 gr
Length	176.5 ± 2 mm
Outside Diameter	4.8 - 4.95 mm
Internal diameter	2.7 - 2.8 mm
Web thickness	0.40 ± 0.05 mm
Heat of explosion	975 - 990 cal/gr
Moisture	≤ 1.0 %
Residual solvent	≥ 0.5 %
Stability at 134.5 °C	≥ 55 min

MK5 (Flare Target) & MK34 (JATO)

General

Specifications: This propellant belongs to the extruded double-base propellants group and can be produced by solventless process.

Application:

MK5 product is used as a propellant in Flare Target.

MK34(JATO) propellant is used as a launching propellant in controlled aircrafts.

Storage: Should be stored in -10°C up to +30°C

Shelf life: 15 years (min)

Shelf life: 15 years (min)

TECHNICAL SPECIFICATIONS

Type	MK5	MK34
Length (mm)	554 ± 0.5	315 ± 0.5
External Diameter (mm)	44.5 ± 0.5	39 ± 0.3
Internal Diameter (mm)	14.9 ± 0.3	9 ± 0.2
Grain Weight (gr)	1185 ± 15	575 ± 7
Specific gravity (gr/cm^3)	min 1.57	min 1.57
Heat of explesion (cal/gr)	850 ± 8	850 ± 8

60 mm (Split Ring Ans Flake)

General

These increments charges are fired by all 60mm mortar. These propellants are kinds of double-base propellants containing NC, NG, plasticizer and stabilizer.

Packing Split Ring:
It is charged in Viscose rayon ring shape bag, and each set is packed inside PE bags.
Packing flake: It is charged in horseshoe celluloid and each set is packed inside PE bags.
Storage: Should be stored in -10 up to +30°C
Shelf life: 15 years (min)

TECHNICAL

Form	60mm Split ring	60mm Flake	60mm LR Split ring
Dimension (mm)	-	2 × 2	-
Inner Diameter (mm)	24.3 ± 1	-	27.3 ± 1
Outer Diameter (mm)	50 ± 1	-	49.5 ± 1
Thickness (mm)	0.12 - 0.18	0.15 ± 0.03	0.30 - 0.35
Moisture (%)	< 0.5	< 0.5	< 0.5
Heat of explosion (cal/gr)	1250 ± 20	1250 ± 20	1210 ± 20
Stability at 120°C (min)	≥ 40	≥ 40	≥ 40

BALLISTIC SPECIFICATIONS

Form	60mm Split Ring	60mm Flake	60mm LR Split Ring
Total charge (gr)	~18 (ch 3)	~18 (ch 3)	~36 (ch 4)
Velocity at 21°C(m/s)	198 ± 3	198 ± 3	215 ± 3
Std. Dev. of Velocity at 21°C (m/s)	≤ 1.8	≤ 1.8	≤ 1.8
Max. pressure at 21°C (bar)	≤ 350	≤ 350	≤ 450

Note: Another kind of increment charge is are produced for 60mm mortar with single-base propellant (M10) charged in horseshoe celluloid.

81 mm (Split Ring Ans Flake)

General

These increments charges are fired by all 81mm mortars. There are kinds of double-base propellants containing NC, NG, plasticizer and stabilizer.

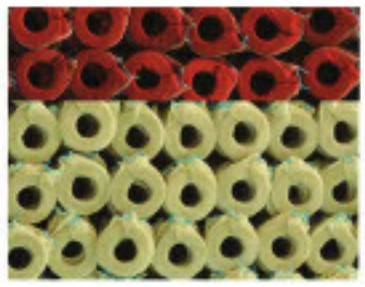
Packing Split Ring

It is charged in Viscose rayon ring shape bag, and each set is packed inside PE bags.

Packing flake: It is charged in horseshoe celluloid and each set is packed inside PE bags.

Storage: Should be stored in -10 up to +30°C

Shelf life: 15 years (min)



TECHNICAL SPECIFICATIONS

Form	Split ring	Flake	Split ring LR
Dimension(mm)	-	2.5 × 2.5	-
Inner Diameter(mm)	32.2 ± 1	-	29.0 ± 1
Outer Diameter(mm)	60.5 ± 1	-	53 ± 1
Web thickness (mm)	0.27 - 0.33	0.25 ± 0.3	0.44-0.48
Moisture (%)	< 0.5	< 0.5	< 0.5
Heat of explosion (cal/gr)	1250 ± 20	1250 ± 20	1250 ± 20
Stability at 120°C(min)	≥ 40	≥ 40	≥ 40

BALLISTIC SPECIFICATIONS

	81mm	81mm LR
Total charge (gr)	~100 (ch 6)	~150 (ch 6)
Velocity at 21°C (m/s)	286 ± 3	310 ± 4
Std. Dev. of Velocity at 21°C (m/s)	≤ 1.5	≤ 1.5
Max. pressure at 21°C (bar)	790	790

Note: Another kind of increment charges are produced for 81mm mortar with single-base propellant (M10) charged in horseshoe celluloid.

120 mm (Split Ring Ans Flake)

General

These increments charge are fired by all 120mm mortar. There are kinds of double-base propellants containing NC, NG, plasticizer and stabilizer.

Packing Split Ring:
It is charged in Viscose rayon ring shape bag, and each set is packed inside PE bags.
Packing flake: It is charged in horseshoe celluloid and each set is packed inside PE bags.
Storage: Should be stored in -10 up to +30°C
Shelf life: 15 years (min)

TECHNICAL SPECIFICATIONS

Form	Split ring	Flake
Dimension (mm)	-	5 × 5
Inner Diameter(mm)	55 ± 1	-
Outer Diameter (mm)	105 ± 1	-
Mean web thickness (white bag charge) (mm)	0.48 - 0.54	0.5 - 0.6
Mean web thickness (red bag charge) (mm)	0.17 - 0.23	0.27 - 0.33
Moisture (%)	< 0.5	< 0.5
Heat of explosion (cal/gr)	1250 ± 20	1250 ± 20
Stability at 120°C(min)	≥ 40	≥ 40

BALLISTIC SPECIFICATIONS

Form	120mm	120mm LR
Total charge (gr)	~360 (ch 9)	~420 (ch 9)
Velocity at 21°C (m/s)	306 ± 4	306 ± 4
Std. Dev. of Velocity at 21°C (m/s)	≤ 2	≤ 2
Max. pressure (bar)	900	900
Moisture (%)	< 0.5	< 0.5
Heat of explosion (cal/gr)	1250 ± 20	1250 ± 20
Stability at 120°C(min)	≥ 40	≥ 40

Note: Another kind of increment charges are produced for 120mm mortar with single-base propellant (M10) charged in horseshoe celluloid.

Double Base Propellant for 60, 81 & 120 mm Ignition Charges

General

These charges are used for initial ignition that fires increment charges for 60, 81 and 120mm. They are kinds of double base propellants containing NC, NG, plasticizer and stabilizer.
Storage: Double base flake (for Ignition Cartridge) should be stored in -10°C up to +30°C.
Shelf life: 15 years

TECHNICAL SPECIFICATIONS

Type	60mm	60mm L.R	81mm	81mm LR	120mm
Form	Flake	Strip	Flake	Flake	Flake
Dimension (mm)	1.5 × 1.5	200 × 40	2 x 2	2 x 2	2 x 2
Thickness (mm)	0.1 - 0.2	0.1 - 0.2	0.1 - 0.2	0.1 - 0.2	0.1 - 0.2
Moisture (%)	≤ 0.5	≤ 0.5	≤ 0.5	≤ 0.5	≤ 0.5
Heat of explosion (cal/gr)	1300 ± 20	1210 ± 20	1300 ± 20	1300 ± 20	1300 ± 20
Stability at 120°C (min.)	≥ 40	≥ 40	≥ 40	≥ 40	≥ 40

BALLISTIC SPECIFICATIONS

	60mm	60mm L.R	81mm	81mm LR	120mm
Total charge (gr)	5	3	9	9	30
Velocity (m/s)	88 ± 2	60 ± 2	68 ± 2	77 ± 2	80 ± 2

Ball Powder for 81 & 120 mm Ignition Charges

General

Ball powder for Ignition Cartridge of 81mm and 120mm mortar.
Packaging: Ball powder (for Ignition Cartridge) is packed in seal metal drum or fiber drum and packages are placed on pallet in Shrinkage form. Net weight of each drum is 40 kg
Storage: Ball powder (for Ignition Cartridge) should be stored in -10°C up to +30°C.
Shelf life: 15 years

TECHNICAL SPECIFICATIONS

	81mm	120mm
Charge (gr)	9	34
Muzzle velocity (m/s)	80 ± 2	68 ± 2
Average Grain Diameter (mm)	0.55 ± 0.05	0.6 ± 0.05
Appearance density (g/lit)	900 - 950	920 - 960
Stability at 120°C (min)	Min. 60	Min. 60
Moisture & Volatile	Max. 0.8	Max. 0.8

TNT

Description

Military grade TNT is widely used as bursting charge for high explosive shell, aircraft bombs, grenades, naval mines, torpedoes, etc. It is by far the most important explosive for blasting charges of all weapons.
It is either used alone or mixed in given proportions with other explosives such as hexogen (RDX) to form hexotol (composition B), hexogen and aluminium to form hexotonal (torpex), PETN to form pentolite, ammonium nitrate to form amatol, etc.
TNT is also used in boosters, detonators, demolition charges, as an ingredient in slurries and for mining industries and other blasting materials.

TECHNICAL SPECIFICATIONS

Parameter	Type II	Type III	Type IV
Freezing Point (°C)	Min. 80.4	Min. 80.2	Min. 79.5
Moisture (%)	Max. 0.1	Max. 0.1	Max. 0.1
Acidity as sulfuric acid (%)	Max. 0.005	Max. 0.005	Max. 0.005
Insoluble material in toluene (%)	Max. 0.05	Max. 0.05	Max. 0.05
Appearance	Flakes of light yellow to yellow orange color		

Packaging

- Polyethylene bags, 40 kg net, Palletized.
- UN. No: 0209

PETN

Description

PETN is one of the most powerful and most brisant explosives; its stability is satisfactory while it is extremely sensitivity.
It is used in high-efficiency blasting-cap fillings and detonation cords. If phlegmatized with a small amount of wax and pressed, it may be used to produce boosters and fillings for smaller caliber projectiles. PETN can be used incorporated with gelatinous, industrial explosives (e.g. for seismic prospecting).
It is also used in fused, NPED detonators, pentolite Boosters, and inductive charges, molding charges, primary demolition of naval mines, small bullets, and grenades, mixed with Nitrocellulose or synthetic rubbers for production of plastic explosives.
We offer also desensitized PETN that called PENTASTITE (PETN 94%).

TECHNICAL SPECIFICATIONS

Parameter	
Appearance	White crystalline
Melting Point	Min. 140 °C
Insoluble in Acetone	Max. 0.1 %
Acidity As HNO_3	Max. 0.01 %
Ash	Max. 0.02 %
Vacuum Stability At 120 °C	Max. 5 ml

Packaging

- Polyethylene bag, 25 kg net of dry substance in wooden box or barrel.
- UN. No: 0150 , 0411

RDX (Hexogen - Cyclonite-Cyclotrimethylene Trinitramine)

Description

Hexogen (RDX) is a white crystalline powder. Among the manufactures in the world, hexogen has a different production process. Our process is according to Bachman method (Type II).
Phlegmatized and pressed RDX is used as highly brisance material for the manufacture of boosters and hollow charges. Non phlegmatized RDX in combination with TNT is also used as parable mixture for hollow charges and brisant explosive charges, (composition B), mixture of cyclonite and Aluminium powder are used as torpedo charges (hexotonal, torpex).
Sometime this material could be used as an additive in manufacture of smokeless powders in manufacturing explosive charges which are required to have a certain mechanical strength or rubber elastic toughness. Cyclonite is incorporated with curable plastic materials such as polyurethanes, polybutadiene or polysulfide and is poured into molds (plastic explosive).

Application

- Melt-cast and pressed explosive ammunition
- Energetic charges for LOVA composite propellants
- Pyrotechnics: cap-relay explosives, cutting cords, detonators, boosters
- Initiation and main charges for oil well perforating charges
- Cast PBX charges for insensitive munitions
- Energetic charges for composite solid propellants

Packaging

- Polyethylene bag, 25 kg net of dry substance in wooden box or barrel.
- UN. No: 0072

TECHNICAL SPECIFICATIONS	
Parameter	Type II
Melting point	Min. 190 °C
Acidity (as acetic acid)	Max. 0.02 %
Total Insoluble in acetone	Max. 0.05 %
Inorganic Insoluble	Max. 0.03 %
Granulation	Based on customer order
Appearance	White crystalline

HMX (Octogen- Cyclotetramethylene Tetranitramine)

Description

HMX is a very powerful military explosive with similar properties to RDX. It is very stable and requires a powerful detonator or booster charge to detonate. HMX appears in four modifications, of which only the β-modification displays a particularly high density and hence a particularly higher detonation rate.
HMX is the best explosive for penetrator and anti-armor warhead like Tow missile, anti-ship missile, heat resistant explosives, shock tube, etc.
It is used as an Oxidizer in solid rocket and Gun propellants. We also offer an ultra-high purity grade of HMX with 99.8% (Min) β-HMX. This grade is primarily used in the manufacturing of perforators for the oil drilling industry.
RS-HMX also produced by HMX product of modified Bachmann process (for cast-cured compositions).

Application

Melt-cast and pressed explosive ammunition
Cast PBX charges for insensitive munitions
Detonating and non-detonating cords
Initiation and main charges for oil well perforating charges

Packaging

Polyethylene bag, 25 kg net of dry substance in wooden box or barrel.
UN. No: 0226, 0484

TECHNICAL SPECIFICATIONS			
Parameter	Type A	Type B	Type HP
Appearance	White crystalline	White crystalline	White crystalline
Melting point (°C)	Min. 277	Min. 277	Min. 277
Purity (%)	Min. 93	Min. 98	Min. 99.8
RDX (%)	Max. 7	Max. 2	Max. 0.2
Total Insoluble in acetone (%)	Max. 0.05	Max. 0.05	Max. 0.05
Inorganic Insoluble (%)	Max. 0.03	Max. 0.03	Max. 0.03
Granulation	Based on customer order	Based on customer order	Based on customer order

Cyclotol

Description

Cyclotol is a special mixture that is found in three different types based on composition percentage. It is comprised of various mixtures of RDX and TNT. It is used in forming shaped explosives, specialized fragmentation projectile, and grenades.

Packaging

Polyethylene bags, 25 kg net in wooden box.

TECHNICAL SPECIFICATIONS

Parameter	Type I	Type II	Type III
RDX (%)	75 ± 2	70 ± 2	50 ± 2
TNT (%)	25 ± 2	30 ± 2	50 ± 2
Appearance	Yellow to yellow brownish free from mechanical impurities		

OCTOL

Description

Octol is a mixture of HMX and TNT. It is used as primary charge of bomb and Scott-missiles.

Packaging

Polyethylene bags, 25 kg net in wooden box.

TECHNICAL SPECIFICATIONS

Parameter	Type I	Type II
HMX	75 ± 2 %	70 ± 2 %
TNT	25 ± 2 %	30 ± 2 %
Moisture	Max. 0.25 %	Max. 0.25 %

Hexal

Description

Hexal is the mixture of RDX, Aluminium powder and wax (as phlegmatizer). It is used, press-molded, as filling of Anti-Aircraft gun shells. Owning to the Aluminum component, both an incendiary and explosive effect are obtained. It is also used in explosive compounds for Airburst, elevating and ejecting, making big bubbles under water, production of flake primers.

Packaging

- Polyethylene bags, 25 kg net in wooden box.
- UN. No: 0483

TECHNICAL SPECIFICATIONS

Parameter	Type I	Type II
RDX (%)	76.5 ± 2	62 ± 1
Al. Powder (%)	19.5 ± 2	35 ± 1
Graphite (%)	Max. 1	1 ± 0.5
Wax (%)	Min. 3	2 ± 0.5

Composition A

Description

Composition A is made of Phlegmatized Cyclonite (RDX) and the only difference between them is their various kinds and amount of wax they contain. They are used as booster charge, shaped charges, mines charge, missile warhead and RPG in ammunition primer and etc.
We offer RDX Composition product with WAX, Graphite, Viton and etc. according to the customer requirements.

Packaging

- Polyethylene bags, 25 kg net, in wooden box.
- UN. No: 0483

TECHNICAL SPECIFICATIONS

Parameter	Composition A3	Composition A4	Composition A5
Appearance	White crystalline free from mechanical impurities	White crystalline free from mechanical impurities	Gray-black powder free from mechanical impurities
RDX (%)	91 ± 0.7	97 ± 0.5	98 (min)
Wax (%)	9 ± 0.7	3 ± 0.5	-
Stearic Acid (%)	-	-	1.7 ± 0.1
Graphite (%)	-	-	0.3 ± 0.1
Moisture (%)	Max. 0.1	Max. 0.1	-
Volatile Matter (%)	-	-	Max. 0.05

Composition B&B4 (Hexotol-Hexolite)

Description

Composition B is RDX mixed with moldable amounts of TNT. Sometimes other agents are added to make it more stable. Composition B is used primarily in army rockets and land mines, as well as in other projectiles, airplane bombs, torpedoes, anti-tank weapon, molding such as missile warhead and munitions' charges. We produce the below compounds of Hexotol.

Packaging

- Polyethylene bags, 25 kg net in wooden box.
- UN. No: 0118

TECHNICAL SPECIFICATIONS

Parameter	Composition B	Composition B4
RDX (%)	59.5 ± 2	60 ± 2
TNT (%)	39.5 ± 2.3	39.5 ± 2
Wax (%)	1 ± 0.3	-
Calcium Silicate (%)	-	0.5 ± 0.15
Moisture (%)	Max. 0.2	Max. 0.2
Appearance	Yellow to yellow brownish free from mechanical impurities	

Composition C4 (Plastic Explosive-PE4)

Description

This is a military plastic explosive, consisting of cyclonite (RDX) and plasticizer, which itself may or may not be explosive. It can be used for explosive welding of metals, casting metals, sweeping mine filed, reactive armors, non-sensitive ammunitions and hollow charge of destruction.

Packaging

- Polyethylene bags, 25 kg net in wooden box.
- UN. No: 0084

TECHNICAL SPECIFICATIONS

Parameter	
Appearance	pasty material of dirty White to light brown color
RDX	91 ± 1 %
Binder (PIB + OIL + DOA)	9 ± 1 %
Moisture	Max. 0.25 %

Coat Explosive Material (CXM)

Description

CXM compounds are produced by desensitizing RDX, HMX and PETN with DOA, DOS. It is used for production of cast-cured PBX's, composite propellant (based on customer requirements).

Packaging

- Polyethylene bags, 25 kg net in wooden box.

Plastic Bonded Explosives (PBX' S)

Description

Plastic Bounded Explosives (PBXs) are the new class of explosives which have been widely used in modern ammunitions due to their low sensitivity to accidental explosions, applicable chemical and physical properties and high mechanical strength.
Cast-cure and pressed are two types of PBXs. In cast-cure type, explosive powder is bound together in a polymer matrix to making the PBX very intensive to accidental detonation. In pressed type, explosive powder are coated with plastic materials and then pressed in into ammunitions.
Due to high pressing density, better mechanical strength, more thermal stability, processing and transportation safety, PBXs have performance than common explosives.
We offer various compositions of HMX and RDX that coated with binder (PBXs). These compounds are used as booster or main charge, in different application such as OCFOL, LX14, PBXN-5, ECH-310, etc.
× The ECH-310 compound is used as main charge in perforator gun in oil drilling industry.

Packaging

- Polyethylene bags, 25 kg net in wooden box.

TECHNICAL SPECIFICATIONS

Parameter	OCFOL	LX-14	PBXN-5	ECH-310
HMX (%)	96 ± 0.5	95.5 ± 0.5	95 ± 0.5	99 ± 0.3
Binder (%)	4 ± 0.5 (Wax)	4.5 ± 0.5 (Estane 5703)	5 ± 0.5 (Viton)	1 ± 0.3 (Viton) With or without graphite

PBXN-109

Description

It has been used as main explosive charge in Krasnopol (Basir) warhead, Bina Warhead (YZ9), Kheybar Grenade breach through doors (Simon)

Packaging

Warhead shells contain of PBXN-109 is packaged into wooden boxes or wooden support and handled on the wooden pallet. The transportation of the product shall be done according to Iran Defence Standard-532.
Warhead shells containing PBXN-109 is stored in area with temperature less than 300C and ambient humidity condition.
Shelf life: Min. 20 years Hazard class: 1.1D

TECHNICAL SPECIFICATIONS

Density	1.6-1.7 gr/cm^3
Vacuum stability	≤ 0.5 ml/gr
Auto-ignition	≥ 200 ^oC
Impact sensitivity	≥ 15
Friction sensitivity	≥ 250 n
Hardness (Shore A)	≥ 30
Tensile strength	≥ 60 psi
Elongation	12 %
Velocity of detonation	≥ 7100 m/s
Blast test (as TNT)	1.4 %

PBXIH-135

Description

It has been used as explosive material in ThermoQadir and Anti-fortifications, Raad Thermobaric, Al-qareah warheads.

Packaging

Warhead shells containing PBXN is packaged in wooden boxes or wooden support and handled on the wooden pallets. The transportation of the product shall be done according to Iran Defence Standard-532.
Warhead shells containing PBXN is stored in area with temperature less than 300C and ambient humidity
Shelf life: Min. 20 years
Hazard class: 1.1D

TECHNICAL SPECIFICATIONS	
Density	1.65 ± 0.05 gr/cm^3
Yield strength	≥ 30 psi
Strain at Yield strength	≥ 10 %
Critical diameter	5.5 mm
Velocity of detonation	6900 m/s
Impact sensitivity	≥ 20 nm
Friction sensitivity	≥ 250 n
Electrostatic discharges sensitivity	10-20 mj
Auto-ignition temperature	≥ 200 ^{0}C
Stability at vacuum condition (48h@ 100°C)	≤ 0.5 ml/gr
Cap sensitivity	NO

CRX-203

Description

It has been used as explosive material in Thermo-Qadir, Thermo-Fath, Thermo-Zafar Warhead (SR-107)

Packaging

Warhead shells containing CRX-203 is packaged in wooden boxes or wooden support and handled on the wooden pallets. The transportation of the product shall be done according to Iran Defence Standard-532.
Warhead shells containing CRX-203 is stored in area with temperature less than 300C and ambient humidity
Shelf life: Min. 20 years
Hazard class: 1.1D

TECHNICAL SPECIFICATIONS	
Density	1.65 ± 0.05 gr/cm^3
Yield strength	≥ 30 psi
Strain at Yield strength	≥ 10 %
Critical diameter	5.5 mm
Impact sensitivity	≥ 20 nm
Friction sensitivity	≥ 250 n
Auto-ignition temperature	≥ 200 ^{0}C
Stability at vacuum condition (48h@ 100°C)	≤ 0.5 ml/gr
Cap sensitivity	NO

Black Powder

Black powder is a mixture of potassium nitrate, sulphur and charcoal processed into different grain sizes. It is used for ignition charge, primer charge and blasting charge as explosives. It is commonly used in detonation cords for fireworks and crackers.

To size the grain it is classified as seven grades, namely classes No.1, 2, 3, 4, 5, 6, and 7.

Note: it is produced in different sizes by applying the granulation charge based on the user's request.

TECHNICAL SPECIFICATIONS		
Class No.	Grain diameter (mm)	
1	2 - 4	
2	0.5 - 1.2	
3	Max. 0.3	
4	0.5 - 1.0	
5	0.4 - 1.0	
6	0.6 - 1.0	
7	0.2 - 0.5	
Appearance	Glossy	Uniform grains with greyish black to black colour.
Potassium nitrate	75 ± 1.0 %	
Sulphur	10 ± 1.0 %	
Charcoal	15 ± 1.0 %	
Moisture	Max. 1.0 %	
Specific gravity	1.3 - 1.7 gr/cm^3	

Ammonium Perchlorate (AP)

Application

AP has been used as proper oxidizer comprising 70-80% of rocket solid propellants.

Packaging

Ammonium perchlorate is stored in metal drum (max 50 kg) and kept in dry condition. The transportation for AP is not done according to dangerous material rule. It is carried by trucks and then is stored in a covered area without water spray and any moisture.

Shelf life: This product cannot be stored more than 3 years. In case of use after 3 years, it is necessary to test AP as per performance and quality parameters.

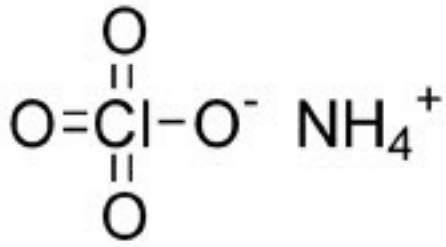
Hazard class: 1.1D

Specification and performance

Composite propellants are the most important group for rocket solid propellant. Basically the composite propellant including ammonium perchlorate (60-80%) is a viscous material such as HTPB (10-15%) and metal fuel such as aluminium powder (15-20%).

Since Ammonium Perchlorate comprises high percentage of a composite propellant and with regard to the considered strategy in defense department that is based on rocket industries.

Ammonium Perchlorate is specified technically in four different grades and 19 tests have been designed in term of quality control for AP, but the main performance properties of AP include purity, moisture, average size, granulation, chloride and particle morphology.



TECHNICAL SPECIFICATIONS

	Type I	Type III	Type IV
Purity (as NH4ClO4) (%)	≥ 99.3	≥ 99.0	≥ 99.3
Chlorate (NH4ClO3) (%)	≤ 0.04	≤ 0.04	≤ 0.04
Chloride (NH4Cl) (%)	≤ 0.05	≤ 0.10	≤ 0.10
Iron (as Fe2O3) (%)	≤ 0.002	≤ 0.0036	≤ 0.0036
Sulfated Ash (%)	≤ 0.25	≤ 0.25	≤ 0.25
Bromate (as NH4BrO3) (%)	≤ 0.004	≤ 0.004	≤ 0.004
Moisture (%)	≤ 0.05	≤ 0.08	≤ 0.08
Water Insoluble (%)	≤ 0.006	≤ 0.05	≤ 0.05
PH	4.5 - 5.8	4.3 - 5.8	4.3 - 5.8
Size (micron)	100 - 120	260 ± 20	400 ± 20

N2 04

Description

Di Nitrogen Tetroxide is a brownish red toxic gas with a pungent odor, which is in equilibrium with its dimer. N2O4 has many applications because of its strong oxidizing action. For example it is used in Oxidation reaction (Catalyst), Inhibitor (distillation of acrylates), Explosive and Rocket propellant production.

Packaging

- This product is available in bulk (ISO tank).
- UN NO. 1067

TECHNICAL SPECIFICATIONS

Parameter	
N_2O_4	Min. 90 %

Nitric Acid (HNO3 98%)

Description

Concentrated Nitric Acid acts as a strong oxidizing agent. Nitric Acid is used as a nitrating agent in the preparation of explosives.

Applications

This compound in mixture with N2O4 is used as a missile propellant.

Packaging

- This product is available in bulk (ISO tank).
- UN NO. 2031 , 2032

TECHNICAL SPECIFICATIONS

Parameter	
Acidity	98 ± 0.5 %
CL	Max. 0.01 %
SO_4	Max. 0.005 %
HNO_2	Max. 0.2 %
Ash	Max. 0.02 %