



# Propellants



# History of Explosia a.s.

SINCE 1920

Production of smokeless powders, black powders and explosives in Explosia a.s. has a long tradition. The company was established in 1920 under the name “Czechoslovak Joint-stock Factory for Explosive Materials in Prague”. Production plant was erected in Semtín near Pardubice (in 1921). In 1934 the name of the company was changed to “Explosia”. Later, in 1958, the company merged with its affiliated company Synthesia and other companies to “East Bohemian Chemical Works Synthesia n.p.” After 1990 Synthesia was divided to parts and one of them, the producer Explosia joint-stock company was founded to governmental structure. Since 2002 is Republic. The Research Institute of Industrial can offer know-how in R&D of propellants and and powders for commercial and military ammunition, 155 mm bimodular charge



## Types of propellants

Explosia a.s. produces two basic types of powders – single base powders and double base powders with certain percentage of nitroglycerine. Triple base propellants are also produced with main application for 155 mm ammunition. The powders are produced in the form of flakes, extruded tubular or seven perforated grains or spherical grains. Explosia a. s. produces many different propellants for all commonly used calibers.

### Single base powders (marking S)

Nitrocellulose is the main component (90-98 %) of single base powders. Various additives such as stabilizers, surface treatment agents, flame reducing agents and ingredients affecting the burning characteristics are used as well.

The shape of the powder grain is cylindrical, single or multi perforated, or flake. Most single base propellants produced in Explosia a.s. are surface coated to achieve the progressiveness of burning. Single base propellants are used mainly in handguns, antiaircraft guns, recoilless systems and howitzers.

### Double base powders (marking D)

In addition to nitrocellulose powders double base powders contain also other energetic components – nitro esters, usually nitroglycerine (10-38 %). These powders contain also small percentage of stabilizers or other additives as single base powders. Double base powders are of higher energetic value than single base powders. Their calorific value varies between 3 800 and 5 200 kJ/kg, ballistic performance is better. The shape of powder grain is cylindrical, single perforated, spherical or flake.

## Quality assurance



Explosia a. s. guarantees, that each lot of powder will provide the loaded cartridges with required velocity and pressure parameters. To achieve this, the powders produced are subjected to strict quality control. Physical (dimensions, bulk density, water content), chemical (composition, ash, stability) and ballistic parameters are determined with cartridges loaded with powder conditioned for 24 hours at recommended temperatures and  $60 \pm 5$  % humidity.

Quality management system, as to the extent corresponding with ISO 9001 standard, was introduced in the company in 1998. Since 2003, after successful passing through the re-certification audit, Explosia a.s. has become the holder of the certificate according to standard system ISO 9001: 2000 and in 2004 the holder of certificate of conformity of quality system with AQAP 110 requirements.

## Research and development of propellants

Research is performed in the field of production technologies of smokeless powders, combustible masses, propellants, their physical structure, methods of parameters determination, stability problems and analytical procedures for determination of powder composition, processing properties of nitrocellulose etc.

Development work involves solution of propelling charges for small calibre ammunition up to 155 mm, modular charges 155 mm, mortars up to calibre 120 mm, rocket motors up to calibre 122 mm, kinetic energy (KE) ammunition for calibres up to 125 mm, including technology and technological equipment.

Research and development in the field of measuring of ballistic parameters involves measuring in weapons and closed vessels. Development in the field of ballistic simulators includes evaluation and simulation programmes.

## Packaging

All here stated powders can be packed into:

- Cardboard boxes
- Fibreboard drums
- 500 g or 1000 g containers for reloading purposes

The powders are packed into fibreboard or cardboard drums or boxes with conductive PE–bags. The quantity of powder contained in a drum varies mostly between 8 and 50 kg according to the individual type of powder and the risk connected with its inflammation.

The powders can be packed also into other types of containers (hermetic steel container etc.) This requires an agreement with the producer of the powder. The containers used shall meet the requirements of the rules of transport of dangerous goods.





**L****VEX**<sup>®</sup>  
propellants

# L<sup>•</sup>VEX<sup>®</sup> S015-01



Type of propellant	single base – disc
Bulk density approx.	500 g/l
Main application	12/70
Weight of shots	28 g
Wad	plastic wad
Powder charge approx.	1.23 g
V <sub>2</sub>	370 m/s
P <sub>aver.</sub>	670 bar
Other calibre application	12/70 – 32 g

# L<sup>•</sup>VEX<sup>®</sup> S030-02



Type of propellant	single base – tubular
Bulk density approx.	650 g/l
Main application	12/70
Weight of shots	28 g
Wad	plastic wad
Powder charge approx.	1.60 g
V <sub>2</sub>	420 m/s
P <sub>aver.</sub>	600 bar
Other calibre application	12/70 – 32 g

# L<sup>•</sup>VEX<sup>®</sup> S032-02



Type of propellant	single base – tubular
Bulk density approx.	650 g/l
Main application	12/70
Wad	plastic wad
Weight of shots	32 g
Powder charge approx.	1.70 g
V <sub>2</sub>	400 m/s
P <sub>aver.</sub>	600 bar
Other calibre application	12/70 – 34 g

# L<sup>•</sup>VEX<sup>®</sup> S035-01



Type of propellant	single base – flake
Bulk density approx.	580 g/l
Main application	12/70
Weight of shots	36 g
Wad	felt wad
Powder charge approx.	2.00 g
V <sub>2</sub>	390 m/s
P <sub>aver.</sub>	600 bar
Other calibre application	12/70 – 36 g



## **VEX®** D013-01



Type of propellant	double base – disc
Bulk density approx.	525 g/l
Main application	12/70
Weight of shots	24 g
Wad	plastic wad
Powder charge approx.	1.20 g
$V_2$	400 m/s
$P_{aver.}$	600 bar
Other calibre application	12/70 – 28 g

## **VEX®** D015-01



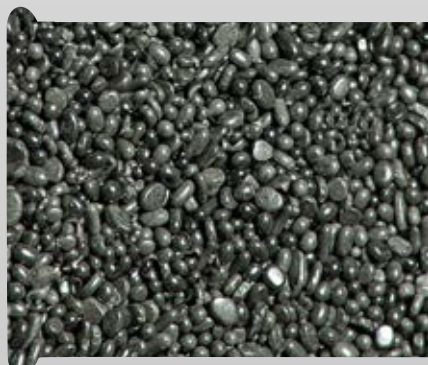
Type of propellant	double base – flake
Bulk density approx.	500 g/l
Main application	12/70
Weight of shots	24 g
Wad	plastic wad
Powder charge approx.	1.30 g
$V_2$	400 m/s
$P_{aver.}$	600 bar
Other calibre application	12/70 – 28 g

## **VEX®** D030-01



Type of propellant	double base – spherical
Bulk density approx.	590 g/l
Main application	12/70
Weight of shots	24 g
Wad	plastic wad
Powder charge approx.	1.45 g
$V_2$	420 m/s
$P_{aver.}$	600 bar
Other calibre application	12/70 – 28 g

## **VEX®** D032-05 SUBSONIC



Type of propellant	double base – spherical
Bulk density approx.	560 g/l
Main application	12/70 Subsonic
Weight of shots	28 g
Wad	plastic wad
Powder charge approx.	0.80 g
$V_2$	300 m/s
$P_{aver.}$	600 bar
Other calibre application	12/17 – 24 g subsonic

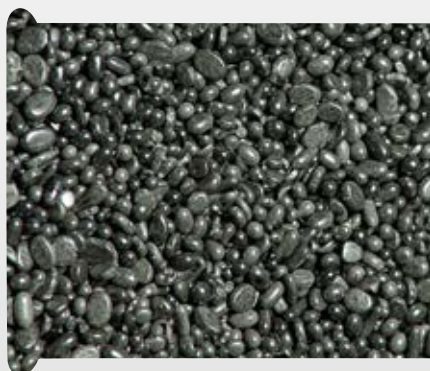


# L VEX® D033-01



Type of propellant	double base – spherical
Bulk density approx.	720 g/l
Main application	12/70
Weight of shots	32 g
Wad	plastic wad
Powder charge approx.	1.60 g
$V_2$	400 m/s
$P_{aver.}$	600 bar
Other calibre application	–

# L VEX® D033-02



Type of propellant	double base – spherical
Bulk density approx.	720 g/l
Main application	12/70
Weight of shots	32 g
Wad	plastic wad
Powder charge approx.	1.70 g
$V_2$	400 m/s
$P_{aver.}$	600 bar
Other calibre application	–





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## **L** **VEX**<sup>®</sup> S040-01



Type of propellant	single base – tubular
Bulk density approx.	820 g/l
Main application	.22 Hornet
Bullet	SP – 2.9 g
Powder charge approx.	0.560 g
V <sub>5</sub>	710 m/s
P <sub>aver.</sub>	2 000 bar
Other calibre application	.30 Carbine

## **L** **VEX**<sup>®</sup> S053-01



Type of propellant	single base – tubular
Bulk density approx.	860 g/l
Main application	7.62 x 39
Bullet	FMJ – 8.0 g
Powder charge approx.	1.55 g
V <sub>5</sub>	730 m/s
P <sub>aver.</sub>	2 600 bar
Other calibre application	.222 Remington

## **L** **VEX**<sup>®</sup> S060-01



Type of propellant	single base – tubular
Bulk density approx.	890 g/l
Main application	7.62 x 54 R
Bullet	SP – 11.70 g
Powder charge approx.	2.72 g
V <sub>5</sub>	780 m/s
P <sub>aver.</sub>	3 000 bar
Other calibre application	.308 Win., 8 x 57 JS, 8 x 57 JR

## **L** **VEX**<sup>®</sup> S060-02



Type of propellant	single base – tubular
Bulk density approx.	880 g/l
Main application	.308 Winchester
Bullet	FMJ – 9.30 g
Powder charge approx.	2.80 g
V <sub>5</sub>	830 m/s
P <sub>aver.</sub>	3 800 bar
Other calibre application	7.62 x 54 R



## **VEX® S062-01**



Type of propellant	single base – tubular
Bulk density approx.	890 g/l
Main application	8 x 57 JS
Bullet	SP – 12.70 g
Powder charge approx.	3.20 g
V <sub>5</sub>	780 m/s
P <sub>aver.</sub>	3 800 bar
Other calibre application	8 x 57 JRS, .30-06 Springfield

## **VEX® S065-01**



Type of propellant	single base – tubular
Bulk density approx.	910 g/l
Main application	7 x 57
Bullet	SP – 9.0 g
Powder charge approx.	3.00 g
V <sub>5</sub>	780 m
P <sub>aver.</sub>	3 000 bar
Other calibre application	7 x 57 R, 7 x 64.7 x 65 R, .30-06 Springfield

## **VEX® S070-01**



Type of propellant	single base – tubular
Bulk density approx.	920 g/l
Main application	.30-06 Springfield
Bullet	SBT – 11.7 g
Powder charge approx.	3.68 g
V <sub>5</sub>	825 m/s
P <sub>aver.</sub>	3 600 bar
Other calibre application	7 x 64, .300 Win. Mag., .270 Win.

## **VEX® S070-02**



Type of propellant	single base – tubular
Bulk density approx.	910 g/l
Main application	.338 LAP Magnum
Bullet	HPBT – 16.2 g
Powder charge approx.	5.60 g
V <sub>5</sub>	840 m/s
P <sub>aver.</sub>	4 000 bar
Other calibre application	.30-06 Spr., .270 Win., .300 Win. Mag.



# **VEX® S071-01**



11

Rifle Propellants



Type of propellant	single base – tubular
Bulk density approx.	910 g/l
Main application	7 mm Rem. Mag.
Bullet	SBT – 11.70 g
Powder charge approx.	4.40 g
V <sub>5</sub>	900 m/s
P <sub>aver.</sub>	4 300 bar
Other calibre application	.30–06 Spr., .300 Win. Mag.

# **VEX® D063-01**



Type of propellant	double base – spherical
Bulk density approx.	970 g/l
Main application	7.62 x 39
Bullet	FMJ – 8.0 g
Powder charge approx.	1.50 g
V <sub>5</sub>	725 m/s
P <sub>aver.</sub>	2 600 bar
Other calibre application	.222 Rem., .223 Rem.

# **VEX® D073-01**



Type of propellant	double base – spherical
Bulk density approx.	980 g/l
Main application	.223 Remington
Bullet	FMJ – 3.60 g
Powder charge approx.	1.62 g
V <sub>5</sub>	1 000 m/s
P <sub>aver.</sub>	3 600 bar
Other calibre application	.222 Rem., 5.6 x 50 R Mag., 5.6 x 52 R

# **VEX® D073-04**



Type of propellant	double base – spherical
Bulk density approx.	970 g/l
Main application	.223 Remington
Bullet	FMJ – 3.60 g
Powder charge approx.	1.64 g
V <sub>5</sub>	870 m/s
P <sub>aver.</sub>	3 600 bar
Other calibre application	.270 Win., .223 Rem.



## **VEX® D073-05**



Type of propellant	double base – spherical
Bulk density approx.	970 g/l
Main application	.223 Remington
Bullet	FMJ – 3.60 g
Powder charge approx.	1.67 g
$V_5$	970 m/s
$P_{aver.}$	3 600 bar
Other calibre application	.270 Win., .223 Rem.

## **VEX® D073-06**



Type of propellant	double base – spherical
Bulk density approx.	960 g/l
Main application	.308 Winchester
Bullet	HPBT – 10.90
Powder charge approx.	2.95 g
$V_5$	830 m/s
$P_{aver.}$	3 900 bar
Other calibre application	.270 Win., .223 Rem.

## **VEX® D083-01**



Type of propellant	double base – spherical
Bulk density approx.	960 g/l
Main application	.308 Winchester
Bullet	HPBT – 10.90
Powder charge approx.	3.00 g
$V_5$	830 m/s
$P_{aver.}$	3 700 bar
Other calibre application	7.22 x 54 R





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## **VEX® S011-01**



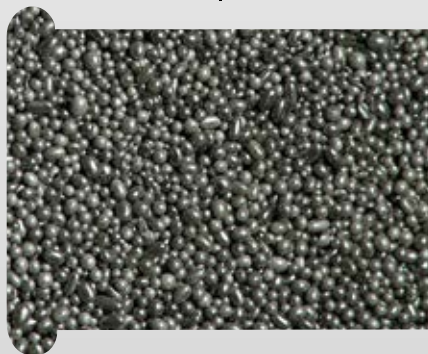
Type of propellant	single base – tubular
Bulk density approx.	640 g/l
Main application	.45 Auto
Bullet	FMJ – 14.90 g
Powder charge approx.	0.345 g
$V_5$	260 m/s
$P_{aver.}$	1 250 bar
Other calibre application	.38 Special

## **VEX® S020-02**



Type of propellant	single base – tubular
Bulk density approx.	660 g/l
Main application	9 mm Luger
Bullet	FMJ – 7.5 g
Powder charge approx.	0.330 g
$V_5$	375 m/s
$P_{aver.}$	2 300 bar
Other calibre application	9 mm Brow., 7.65 Brow., 6.35 Brow.

## **VEX® D010-02**



Type of propellant	double base – spherical
Bulk density approx.	880 g/l
Main application	.22 Long Rifle HV
Bullet	2.33 g
Powder charge approx.	0.10 g
$V_5$	400 m/s
$P_{aver.}$	1 200 bar
Other calibre application	.22 LR HV, .22 Short, 6.8/11

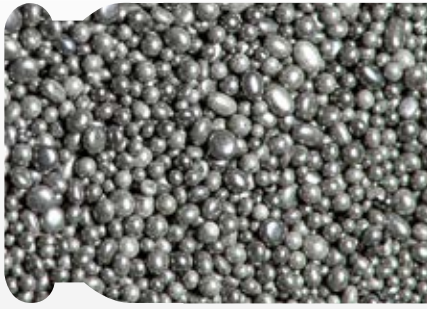
## **VEX® D010-04**



Type of propellant	double base – spherical
Bulk density approx.	940 g/l
Main application	.22 WMR
Bullet	2.92 g
Powder charge approx.	0.10 g
$V_5$	480 m/s
$P_{aver.}$	1 800 bar
Other calibre application	.22 LR



# L VEX® D032-03



Type of propellant	double base – spherical
Bulk density approx.	650 g/l
Main application	9 mm Luger
Bullet	FMJ – 7.5 g
Powder charge approx.	0.320 g
V <sub>5</sub>	380 m/s
P <sub>aver.</sub>	2 300 bar
Other calibre application	9 mm Brow., 7.65 Brow., 6.35 Brow.

# L VEX® D036-01



Type of propellant	double base – spherical
Bulk density approx.	940 g/l
Main application	.357 Magnum
Bullet	FMJ – 10.25 g
Powder charge approx.	0.670 g
V <sub>5</sub>	420 m/s
P <sub>aver.</sub>	2 800 bar
Other calibre application	9 mm Luger, .40 S&W

# L VEX® D036-03



Type of propellant	double base – spherical
Bulk density approx.	960 g/l
Main application	.357 Magnum
Bullet	FMJ – 158/10.25
Powder charge approx.	0.62 g
V <sub>5</sub>	420 m/s
P <sub>aver.</sub>	2 800 bar
Other calibre application	9 mm Luger, .40 S&W

# L VEX® D036-05



Type of propellant	double base – spherical
Bulk density approx.	950 g/l
Main application	9 mm Luger
Bullet	FMJ – 8.0 g
Powder charge approx.	0.380 g
V <sub>5</sub>	365 m/s
P <sub>aver.</sub>	2 250 bar
Other calibre application	9 mm Luger, .40 S&W

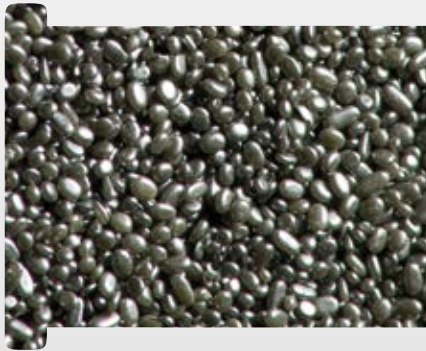


## **VEX®** D037-01



Type of propellant	double base – spherical
Bulk density approx.	960 g/l
Main application	.357 Magnum
Bullet	FMJ – 10.25 g
Powder charge approx.	0.732 g
$V_5$	340 m/s
$P_{aver.}$	1 300 bar
Other calibre application	9 mm Luger, .40 S&W

## **VEX®** D037-02



Type of propellant	double base – spherical
Bulk density approx.	950 g/l
Main application	.44 Rem. Mag.
Bullet	FMJ – 15.60 g
Powder charge approx.	1.35 g
$V_5$	430 m/s
$P_{aver.}$	2 500 bar
Other calibre application	.41 Rem. Mag.





# LOW-TOX propellants

Ammunition was “cleaned” during last years from heavy metals by changing of design. Frequently used compounds emitting heavy metals were changed for “clean” or “green” and design of bullets was changed to prevent lead pollution during shooting.

LowTox propellants are opening new line of products produced by Explosia a.s., which is next logical step following job done on bullets and primers on ammunition. Powders and products of combustion are as low toxic as possible. First product was introduced for 9 mm Luger and tests were done with Sellier & Bellot NonTox® primer.

Main advantages:

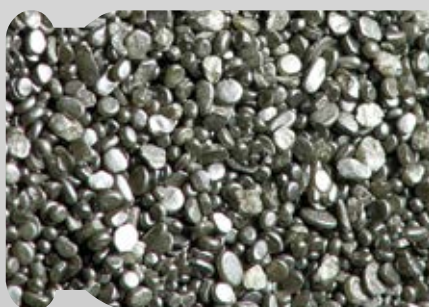
- ⊙ No toxic stabilizer and no toxic product of ageing of powder
- ⊙ Reduced quantity of toxic products of burning (CO, HCN, etc.)
- ⊙ Unburned residues of powder less than 1 %
- ⊙ Thermal uniformity of ammunition within range from -54 to +52 °C
- ⊙ Stability of powder according to STANAG 4582

## LOW-TOX D025-03



Type of propellant	double base - tubular, impregnated
Bulk density approx.	680 g/l
Main application	9 mm Luger – NONTOX
Bullet	7.5 g (8.0 g)
Powder charge approx.	0.380 g
V <sub>5</sub>	380 m/s
P <sub>aver.</sub>	2 250 bar
Other calibre application	no other

## LOW-TOX D036-07



Type of propellant	double base – spherical
Bulk density approx.	900 g/l
Main application	9 mm Luger
Bullet	FMJ – 7.5 g
Powder charge approx.	0.375 g
V <sub>5</sub>	375 m/s
P <sub>aver.</sub>	2 300 bar
Other calibre application	9 mm Brow., 7.65 Brow.

Further details upon request.



MILITARY





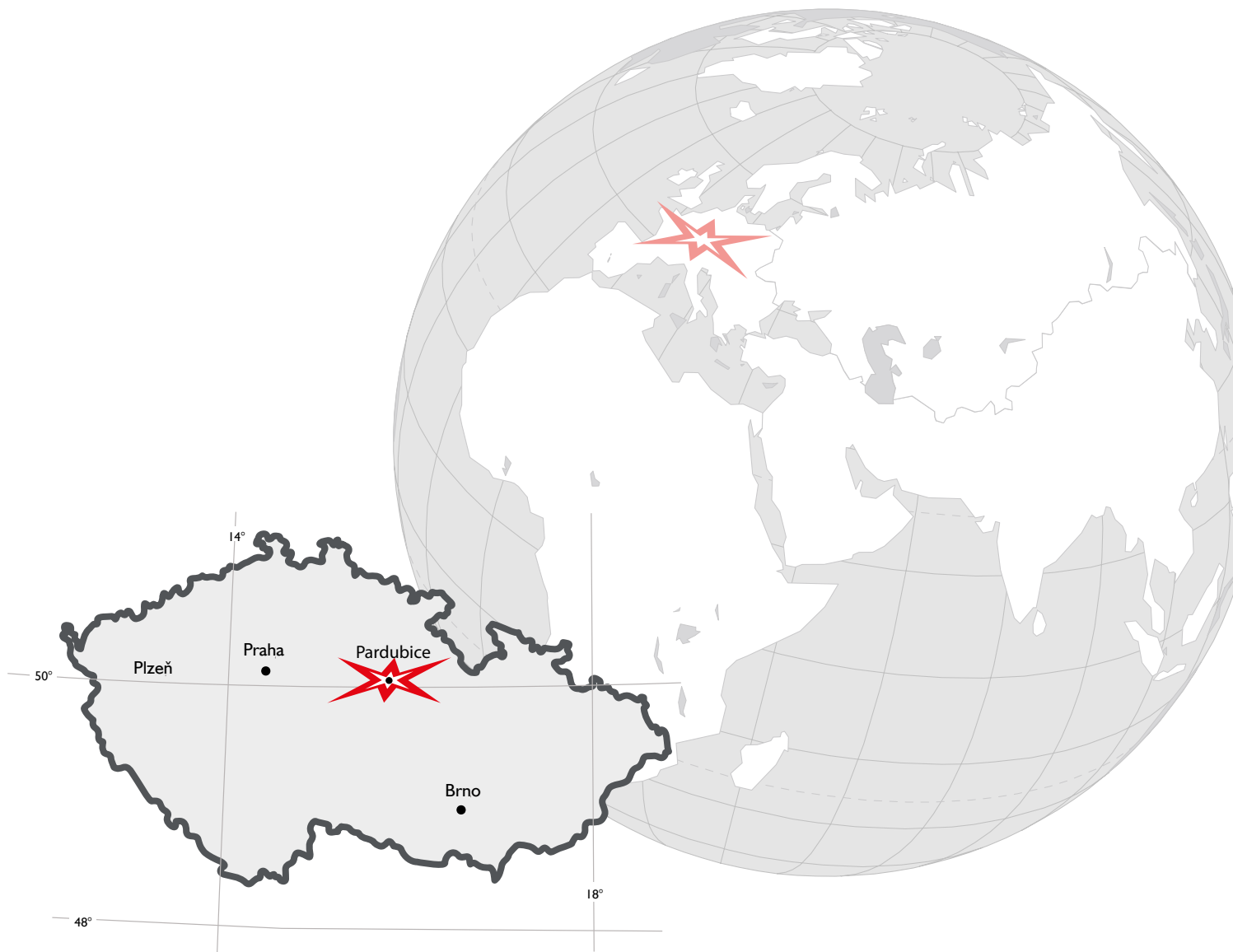
## Propellants for military and law enforcement use

Below mentioned is for information only. Ask the Explosia's sales department for full technical specification of each propellant.

Mark	Type	Main application of the powder
D020-01	Spherical powder	40 x 53 mm grenade
D025-01	Tubular impregnated powder	9 x 19 mm NATO, 7.5 g, 8.0 g bullet, REACH type
D036-08	Spherical powder	9 x 19 mm NATO, 7.5 g FMJ bullet (M882)
D060-03	Tubular impregnated powder	40 x 53 mm grenade HV
D063-03	Spherical powder	7.62 x 39 mm M43
D073-02	Spherical powder	5.56 x 45 mm, M193, tracer M195
D073-03	Spherical powder	5.56 x 45 mm NATO, SS109, M855 (M856 tracer)
D073-05	Spherical powder	5.56 mm Ball M855, tracer M856, REACH type
D075-01	Spherical powder	5.45 x 39 mm
D083-01	Spherical powder	7.62 x 54R
D083-02	Spherical powder	7.62 x 51 mm NATO (M80)
D083-03	Spherical powder	7.62 x 51 mm NATO (M80), REACH type
D100-01	Spherical powder	12.7 x 99 mm NATO, M33
D100-02	Spherical powder	12.7 x 107 mm
D103-01	Spherical powder	20 mm TP M55, HEI M56
S020-01	Flake powder	9 x 19 mm NATO, 9 x 18 mm Makarov
S022-01	Flake powder	7.62 x 39 mm M43 – Blank
S053-01	Tubular powder	7.62 x 39 mm M43
S060-01	Tubular powder	7.62 x 54R, 7.62 x 51 mm NATO
S070-01	Tubular powder	.338 WM
S101-01	7-perforated powder	14.5 x 114 mm
S102-01	7-perforated powder	23 x 152 mm ZU
S102-02	7-perforated powder	23 x 152 mm – APFSDS-T, 130 g
S102-03	7-perforated powder	23 x 115 mm NS, KM, NR-23
S102-04	7-perforated powder	12.7 x 108 mm, ball B32
S105-01	7-perforated powder	30 x 165 mm 2A42
S105-04	7-perforated powder	30 x 173 mm NATO
S110-01	Tubular powder	30 x 210 mm
S110-02	7-perforated powder	40 mm L/60 (40 x 311 mm R)

Explosia a.s. has capabilities for production of single base and double base propellants according to Russian or NATO standards for artillery ammunition 100 mm, 122 mm, 125 mm, 152 mm, 155 mm and mortars ammunition 60 mm, 81 mm, 82 mm, 98 mm and 120 mm as well.





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