POWDER CHARGES

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MAIN PRODUCTION RANGE

- **NITROCELLULOSE**
  - *POWDER GRADE*
  - *DYNAMITE GRADE*
  - *INDUSTRIAL GRADE*
- **POWDERS**
  - *SINGLE BASE*
  - *DOUBLE BASE*
  - *SPHERICAL*
  - *ROCKET PROPELLANTS*
- **POWDER CHARGES**
- **COMBUSTIBLE COMPONENTS**
  - *CHARGE FOR CAL.125mm*
- **CELLULOID AND CELLULOID CONTAINERS**

- *POWDER CHARGES 105 mm*
- *POWDER CHARGES 122 mm*
- *POWDER CHARGES 130 mm*
- *POWDER CHARGES FOR 155 mm HOWITZER SYSTEMS*
- *MONO-BLOCK POWDER CHARGES for HOWITZER SYSTEMS155 mm 45 and 52 cal. MC Zone 8, MC Zone 9 and MC Zone 10*
- *POWDER FOR BASIC AND INCREMENT CHARGES FOR MORTAR SHELLS*

ВОЈНА КОНТРОЛА КВАЛИТЕТА

SRPS ISO 9001
SORS 9000
SRPS ISO 14001
SRPS ISO 45001

POWDER CHARGES 105 mm

Powder charge M67 HE, M1 ~1,2 kg

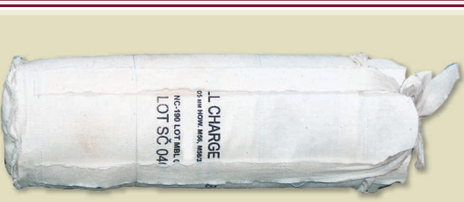
Powder NCD-11 NCD-21			Howitzer M2A2; M101/ M101A1		Howitzer M102, M2A1; M18/61; M56	
			Vo, m/s	Range, m, max	Vo, m/s	Range, m, max
NCD-11	1	~240 g	198,1	3510	205	3700
NCD-11	2	~42 g	216,4	4110	223	4300
NCD-21	3	~71 g	237,7	4860	247	5200
NCD-21	4	~97 g	266,7	5950	278	6300
NCD-21	5	~155 g	310,9	7650	325	8100
NCD-21	6	~245 g	376,4	9380	393	9600
NCD-21	7	~370 g	472,4	11270	494	11500

Powder charge, reduced variable M02 105mm, HE ER M02 for howitzer 105mm M56/33 (SH-2M) or M2A1/33 (SH-3)

Powder NC-50	Full	First	Second
Charge weight, ω, g	~2230	~1880	~1420
Muzzle velocity, Vo, m/s	675	580	475
Standard deviation of Vo, rv, m/s	≤ 2,0	≤ 1,7	≤ 1,5
Max. pressure, Pm_{mean}, bar	≤ 2350	-	-
Range, m, max	15000	13000	11000

Powder charge, full, M02-BB 105mm, HE ER-BB M02 for modified howitzer 105mm M56/33 (SH-2M) or M2A1/33 (SH-3)

Powder NC-190	Full
Charge weight, ω, g	~2200
Muzzle velocity, Vo, m/s	670
Standard deviation of Vo, rv, m/s	≤ 2,0
Max. pressure, Pm_{mean}, bar	≤ 2650
Range, m, max	18000



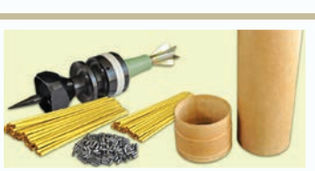
POWDER CHARGES 122 mm

Powder charge, full, M78, projectile OF-462, for howitzer 122 mm D-30

Powder NC-43, NC-122	Full
Charge weight, ω, g	~ 3600
Muzzle velocity, Vo, m/s	690
Max. pressure, Pm_{mean}, bar	≤ 2450
Range, m, max	15300

Powder charge,reduced variable M78, projectile OF-462, for howitzer 122 mm D-30

Powder NC-27, NC-37	4	3	2	1	Reduced
Charge weight, ω, g	~ 600	~ 350	~ 3x550		~ 2600
Muzzle velocity, Vo, m/s	276	335	417±4,2	493±4,9	565
Standard deviation of Vo, rv, m/s	≤ 1,5	-	-	-	≤ 2
Max. pressure, Pm_{mean}, bar	≥ 590	-	-	-	≤ 2450
Range, m, max	-	-	-	-	12840



POWDER CHARGES 130 mm

Powder charge, reduced variable, projectile OF-482, for gun M46 130 mm

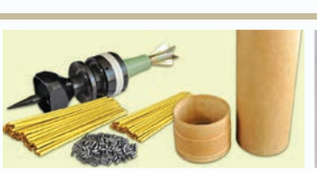
Powder NC-37, NC-123	4	3	2
Charge weight, ω, g	~3300	~4600	~5900
Muzzle velocity, Vo, m/s	525	621	705
Max. pressure, Pm_{mean}, bar	≥ 1079	-	≤ 2648
Range, m, max	-	-	19150

Powder charge, full variable, M92 130mm, projectile OF–482, gun M46 130 mm

Powder NCD-19, NC-123	First	Full variable
Charge weight, ω, g	~ 11500	~ 13600
Muzzle velocity, Vo, m/s	810	930
Max. pressure, Pm_{mean}, bar	≥ 1700	≤ 3090
Range, m, max	-	27480

Powder charge, full variable, M92 130mm, projectile OF–482, gun M46 130 mm

Powder NGH-285	First	Full variable
Charge weight, ω, g	~ 11000	~ 13000
Muzzle velocity, Vo, m/s	810	930
Max. pressure, Pm_{mean}, bar	≥ 1700	≤ 3090
Range, m, max	-	27480



POWDER CHARGES 152 mm

Powder charge, full variable, M90,projectile TF M84, for KT M46/86 152mm/45cal, and gun-howitzer M84B1 and M84B2 (NORA)

Powder NCD-191, NC-80	Base	Full
Charge weight, ω, g	~ 10700	~ 12500
Muzzle velocity, Vo, m/s	725	810
Max. pressure, Pm_{mean}, bar	≥ 1100	≤ 2950
Range, m, max	-	24000

Powder charge, super M90,projectile TF M84, for KT M46/86 and gun-howitzer M84B1 and M84B2 (NORA)

Powder NCD-19, NC-80	
Charge weight, ω, g	~ 16500
Muzzle velocity, Vo, m/s	900
Max. pressure, Pm_{mean}, bar	≤ 2950
Range, m, max	27500

Powder charge, reduced variable, projectile OF-540, "Ž-546U" for howitzer 152mm D-20

Powder NC-27, NC-37, NC-125	N6 NC-27	N5 NC-37	N4 NC-37	N3 NC-37	N2 NC-37
Charge weight, ω, g	~1350	~ 560	~ 560	~ 560	~ 2 x 560
Muzzle velocity, Vo, m/s	282	335	383	425	511
Max. pressure, Pm_{mean}, bar	735	-	-	-	≤ 2059
Range, m, max	-	-	-	-	13400

Powder charge, full variable, OF-540, for howitzer 152mm D-20

Powder NGH-295	First	Full variable
Charge weight, ω, g	7700	8350
Muzzle velocity, Vo, m/s	606	655
Max. pressure, Pm_{mean}, bar	-	< 2300
Range, m, max	-	-

POWDER CHARGES 155 mm HOWITZER SYSTEMS

Powder charge M3A1 (green), projectile HE, M107, for howitzer M1 and M65 155mm

Powder NCD-13	1	2	3	4	5
Charge weight, ω, g	~950	~250	~350	~430	~ 700
Muzzle velocity, Vo, m/s	207	235	274	317	375
Max. pressure, Pm_{mean}, bar	-	-	-	-	≤ 1930
Range, m, max	-	-	-	-	9700

Powder charge M4A2, projectile HE, M107, for howitzer M1 and M65 155mm

Powder NCD-27	3	4	5	6	7
Charge weight, ω, g	~2100	~600	~800	~1300	~1500
Muzzle velocity, Vo, m/s	274	317	375	463	564
Max. pressure, Pm_{mean}, bar	-	-	-	-	≤ 2648
Range, m, max	-	-	-	-	14500

Powder charge M119A2, projectile M107 for artillery systems 155mm / 39cal and 45cal

Powder NCD-26, NC-70	
Charge weight, ω, g	~ 9500
Muzzle velocity (at 21^{0}C), Vo, m/s	686
Max. pressure (at 63^{0}C), Pm_{mean}, bar	2827

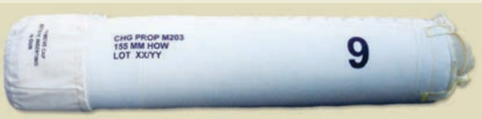
POWDER CHARGES 155 mm

Powder charge M119A1 (ZONE 8), projectile M107, for artillery systems 155mm/39cal and 45cal

Powder NCD-26, NC-80	
Charge weight, ω, g	~ 9000
Muzzle velocity, Vo, m/s	685
Max. pressure, Pm_{mean}, bar	≤ 2206
Range, m, max	17800

Powder charge M203 (ZONE 9), projectile HE and HEER, for artillery systems 155mm/39cal, 45cal and 52cal

Powder NCD-191, NC-80	
Charge weight, ω, g	~ 13000
Muzzle velocity, Vo, m/s	825
Max. pressure, Pm_{mean}, bar	≤ 3250
Range, m, max	30100



Powder charge M11 (ZONE 10), projectile ERFB Mk 10/2 and ERFB-BB for artillery systems 155mm/45cal and 52cal

Powder NCD-19, NC-80	
Charge weight, ω, g	~ 17000
Muzzle velocity, Vo, m/s	895
Max. pressure, Pm_{mean}, bar	≤ 3000
Range, m, max	39000

COMBUSTIBLE COMPONENTS for main and front powder charge of 125 mm tank ammunition

A combustible components represents propulsive-energetic material obtained by impregnation of nitrocellulose-cellulose paper with trinitrotoluene.

Chemical composition
- nitrocellulose
- trinitrotoluene

Shape and dimensions: Must meet requirements of structural drawings

Physical – chemical properties
- Ash, % m/m, max. 0,5
- Inflammation temperature, °C, min 170
- Density, g/cm^3 ..... 1,0 – 1,45
- Stability test at 134.5 °C
  Methyl-violet test, minutes, min. 45

Mechanical properties
- Tensile strength, N/mm^2, min. 16
- Impact tensile strength, kJ/m^2, min. 16

POWDER CHARGES
for tank gun 125 mm, D-81

MAIN POWDER CHARGE M88/4Ž40 for assembling of 125mm round with HE-I, HEAT-T and APFSDS-T M88 and MK-1 and MK-2

Technical characteristics	
Powder mass (approx.):	
- NC-16 (15/1), kg	2,9
- NC-44 (12/7), kg	2,2 - 2,5
Mass of combustible components, g	~ 750
Charge mass (approx.), kg	5,9 ÷ 6,4
Charge height, mm	406 ÷ 408
Primer	KT.EU. M-84/GUV - 7
Ballistic data at +15°C	
Muzzle velocity, Vo, m/s	
- for projectile HE	850
- for projectile HEAT-T	905

PACKING: metal or fibre box in wooden case

POWDER CHARGES
for tank gun 125 mm, D-81

FRONT POWDER CHARGE
for APFSDS 125 mm round

Projectile APFSDS-T M88 (BM-15)

Technical characteristics	
Front charge mass, g	~ 3400
Combustible components mass, g	~ 740
Shell mass with core, g	~ 5860
Mass of loaded shell, kg	~ 10
Temperature range	-40°C to +50°C
Ballistic data	
Muzzle velocity, Vo, m/s	~ 1785
Velocity at 2000m , V_{2000}, m/s	1527
Mean max. pressure, Pm_{mean}, bar	≤ 4590
Penetration	
Maximum penetration at 2000 m through homogenous armour-piercing plate of HP-5 quality	
120 mm thickness at 23° angle	
150 mm thickness at 30° angle	
200 mm thickness at 52° angle	

Projectile APFSDS-T MK-1 and MK-2

Technical characteristics	
Penetrator	TUNGSTEN
Projectile mass, g	MK-1 ~ 7865 | MK-2 ~ 7600
Charge weight, g	~ 3200
Combustible components mass, g	~ 750
Temperature range	-40°C to +50°C
Ballistic data	
Muzzle velocity, Vo, m/s	~1660
Mean max. pressure, at +15°C, Pm_{sr}, max, MPa	570
Maximum pressure at +50°C, Pm_{mean}, max, MPa	600
Penetration	
Penetration at 2000m, mm	> 550

PACKING: metal or fibre box in wooden case

MONO-BLOCK POWDER CHARGES
for howitzer systems 155 mm, 45 and 52 cal.

The powders are placed inside rigid combustible cases hermetically sealed and made from propulsive energetic material obtained by impregnation of nitrocellulose paper, having a geometry which is adjusted to the function of the automatic loading device on the weapon, in colours according to the buyer's request.

MC Zone 8, MC Zone 9 and MC Zone 10

Barrel length: 52 cal Powder chamber: 23 l	Projectile M107		ERFB-BT		ERFB-BB		HEER-BB	
	Vo, m/s	Range, m	Vo, m/s	Range, m	Vo, m/s	Range, m	Vo, m/s	Range, m
MC Zone 8 (L = 530 ± 20mm; Ø158 $^{-1}$ mm) NCD-26 ~ 8 kg	690	18400	680	20620	-	-	-	-
MC Zone 9 (L = 720± 20mm; Ø158 $^{-1}$ mm) NCD-191 ~ 11,5 kg	-	-	820	26650	829	34000	-	-
MC Zone 10 (L = 920± 20mm; Ø158 $^{-1}$ mm) NCD-19 ~ 15,5 kg	-	-	920	32400	925	41200	-	-
MC Zone 10 M22 (L = max. 940; Ø159 $^{-0,5}$ mm) NGH-305 ~ 16 kg	-	-	945	~33500	935	~42000	935	~42000

PACKING: fibre box in wooden case - pallet

CELLULOID, CELLULOID CONTAINERS AND OTHER CELLULOID PRODUCTS

For more than a half century "MB-Namenska" has been producing celluloid in various colours and various sheet thicknesses. The sheets can be transparent or opaque, polished or non-polished, non-reinforced or reinforced with polyamide cloth.

By using the thermo-plastic properties of celluloid "MB-Namenska" possesses technologies for production of a wide range of celluloid containers for increment powder charges of 60, 81, 82 and 120 mm cal. mortar shells. To the request of the customer other celluloid containers can also be produced as well as various celluloid components for various artillery and rocket systems.

The technical characteristics of celluloid containers are:

- minimal ratio between mass and volume
- optimal ratio between powder and combustible containers
- transparency and stability of shape
- thermoplasticity, which enables the manufacturing of most versatile geometric shapes (horse-shoe, cylinder, ring and other)

POWDERS FOR BASIC AND INCREMENT CHARGES FOR MORTAR SHELLS

"MB-Namenska" produces various types of powders (double base, powders-ballistite, extruded impregnated powders or single base powders), which are used for basic and increment charges for mortar shells.

Type of propellant	Main application	
NGB-051 – flake *(basic & increment charge)*	**60 mm**	M73, M90, M91 – high explosive shells M73, M91 – smoke shells M67, M91 – illuminating shells M62 – practice shells
(basic charge)	**81/82 mm**	M72/M74, M81, M86, M91, M67, M71
NGB-021 – flake *(increment charge)* **EMB-021 – tubular** *(increment charge)*	**81/82 mm**	M72/M74, M81, M86, M91 – high explosive shells M72/M74, M89 – smoke shells M67 – illuminating shells M62, M68 – practice shells
NGB-161 – strip *(basic charge)* **EMB-161 – long tubular** *(basic charge)*	**120 mm**	M62, M91, M93, M62P8 – high explosive shells M64, M88, M64P3, M87P1 – smoke shells M87 – illuminating shells M63 – practice shells
NGB-261 – flake *(increment charge)* **EMB-261 – tubular** *(increment charge)*	**120 mm**	M62, M91, M93, M62P8 – high explosive shells M64, M88, M64P3, M87P1 – smoke shells M87 – illuminating shells M63 – practice shells
M8M – disc, flake *(increment charge)*	**60/81/120/160 mm**	(for increment charges)
EMB-171 – long tubular *(basic charge)* **EMB-271 – tubular** *(increment charge)*	**60 mm**	M90 HE (long range), MK10
EMB-181 – long tubular *(basic charge)* **EMB-281 – tubular** *(increment charge)*	**81/82 mm**	M91 HE (long range), MK11
EMB-161 A – long tubular *(basic charge)*	**120 mm**	M92 HE (long range), MK12
NC-311 – tubular *(increment charge)* **NGB-034 – strip** *(basic charge)*	**120 mm**	M38, HE 843
NC-411 – tubular *(increment charge)* **NGB-043 – strip** *(basic charge)*	**160 mm**	M43, HE 852
NGB-301 – flake *(increment charge)* **NGB 302 – flake** *(increment charge)* **NGB-095 – strip** *(basic charge)*	**160 mm**	M160, HE 853

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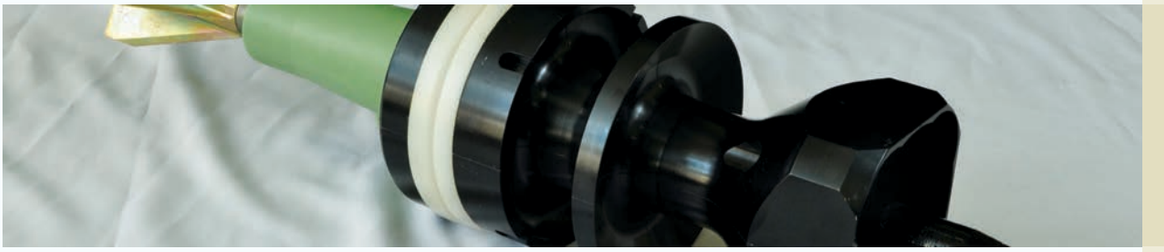

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