

# MORTAR SHELLS


## 60 MM

**HE M73**




- explosive charge is trotyl (TNT)
- explosive charge weight: 220 g
- fuse safety: 8 m (at lowest muzzle velocity)
- killing range radius: 10 m

**SMOKE M73**



- smoke charge weight: 190 g
- fuse safety: 8 m (at lowest muzzle velocity)

**ILLUMINATING M67**



- illuminating candle 200 g
- illuminating power: 180.000 Cd
- illuminating duration: 35 s
- mine parachute descent: 2,5 m/s

**Basic tactical and technical characteristics:**

**Ballistic data:**  
60mm Mortar M57, barrel length 720mm

Caliber	Length with fuse	Weight with fuse	Fuse	Maximum range (0+4)	Minimum range (0)	Maximum pressure in barrel
HE M73	291 mm	1,35 kg	UT M68 P1 impact fuse	2550 m	94 m	414 bar
Smoke M73	286 mm	1,35 kg	UT M68 P1 impact, superquick action	2550 m	94 m	414 bar
Illumination M67	330 mm	3,05 kg	TP M67 pyrotechnical time	2450 m	400 m	414 bar

- Ignition cartridge M80 (waterproof).
- Shell is completed with ignition cartridge and 4 increment charges (0+4). Shell Illumination M67 completed with waterproof increment charges.
- High safety during transportation, handling and parachuting.
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.

**Complete set:**

**HE M73**

- 1 complete shell per carton
- 12 cartons per wooden case
- Wooden packing case:
  - \* dimensions: 520x400x200 mm
  - \* gross weight: 29 kg
  - \* volume: 0,042 m<sup>2</sup>

**SMOKE M73**

- 1 complete shell per carton
- 12 cartons per wooden case
- Wooden packing case:
  - \* dimensions: 520x400x200 mm
  - \* gross weight: 29 kg
  - \* volume: 0,042 m<sup>2</sup>

**ILLUMINATING M67**

- 1 complete shell per carton
- 12 cartons per wooden case
- Wooden packing case:
  - \* dimensions: 520x400x200 mm
  - \* gross weight: 27 kg
  - \* volume: 0,042 m<sup>2</sup>

# MORTAR SHELLS

## 81/82 MM

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### HE M72/M74



- explosive charge is trotyl (TNT)
- explosive charge weight: 680 g
- fuse safety: 8 m (at lowest muzzle velocity)
- killing range radius: 14 m

### SMOKE M72/M74



- smoke charge weight: 550 g
- fuse safety: 8 m (at lowest muzzle velocity)

### ILLUMINATING M67



- illuminating candle 400 g
- illuminating power: 500.000 Cd
- illuminating duration: 40 s
- mine parachute descent: 2,5 m/s

### Basic tactical and technical characteristics:

Basic tactical and technical characteristics:				<b>Ballistic data:</b> <i>81/82mm Mortar M69 B-D, barrel length 1450mm</i>		
Caliber	Length with fuse	Weight with fuse	Fuse	Maximum range (0+6) (M67 0+4)	Minimum range (0)	Maximum pressure in barrel
HE M72/M74	375 mm	3,05 kg	UT M68 P1 impact fuze	5070 m	91 m	647 bar
Smoke M72/74	375 mm	3,05 kg	UT M68 P1 impact, superquick action	5070 m	91 m	647 bar
Illumination M67	410 mm	2,95 kg	TP M67 pyrotechnical time	<sup>(0+4)</sup> 3650 m	<sup>(0+1)</sup> 250 m	422 bar

- Shell M72/M74 is completed with ignition cartridge and 6 increment charges (0+6). Shell Illumination M67 with ignition cartridge and 6 waterproofs increment charges (0+4)
- High safety during transportation, handling and parachuting.
- Reliable function of shell is obtained within temperature range of -30°C to 50°C

### Complete set:

- HE M72/M74**
- 1 complete shell per carton
  - 12 cartons per wooden case
  - Wooden packing case:
    - \* dimensions: 520x440x160 mm
    - \* gross weight: 29 kg
    - \* volume: 0,038 m<sup>2</sup>

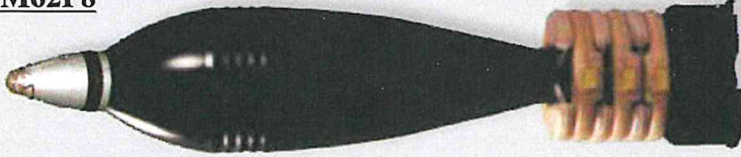
- SMOKE M72/74**
- 1 complete shell per carton
  - 12 cartons per wooden case
  - Wooden packing case:
    - \* dimensions: 520x440x160 mm
    - \* gross weight: 29 kg
    - \* volume: 0,038 m<sup>2</sup>

- ILLUMINATING M67**
- 1 complete shell per carton
  - 12 cartons per wooden case
  - Wooden packing case:
    - \* dimensions: 520x400x200 mm
    - \* gross weight: 27 kg
    - \* volume: 0,042 m<sup>2</sup>

# MORTAR SHELLS 120 MM

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## HE M62P8



- explosive charge is hexolite (RDX/TNT) or trotyl (TNT)
- explosive charge weight: 2,45 kg
- fuse safety: 50 m (at lowest muzzle velocity)
- killing range radius: 20 m

## SMOKE M64P2



- smoke charge weight: 2,45 kg
- fuse safety: 8 m (at lowest muzzle velocity)

## ILLUMINATING M87P1



- illuminating candle 1,2 kg
- illuminating power: 1.000.000 Cd
- illuminating duration : 60 s
- mine parachute descent: 3 m/s

### Basic tactical and technical characteristics:

### Ballistic data:

120mm Mortar M57, barrel length 1500mm

	Caliber	Length with fuse	Weight with fuse	Fuse	Maximum range (0+6) (M67 0+4)	Minimum range (0+1)	Maximum pressure in barrel
HE M62P8		606 mm	12,6 kg	UTU M93P1 SQ/D impact fuze	6500 m	255 m	961 bar
Smoke M64P2	120 mm	600 mm	12,6 kg	UT M68 P1 impact, superquick action	6500 m	255 m	961 bar
Illumination M87P1		670 mm	10,7 kg	TP M67 pyrotechnical time	(0+5) 6000 m	(0+1) 400 m	620 bar

- Shells HE M62P8 and Smoke M64P2 are completed with ignition cartridge and 6 increment charges M74 (0+6), and shell Illumination M87P1 with ignition cartridge and 5 waterproof increment charges M74 (0+5).
- High safety during transportation, handling and parachuting.
- Reliable function of shell is obtained within temperature range of -30°C to 50°C.

### Complete set:

#### HE M62P8

- 1 complete shell per carton
- 2 cartons per wooden case
- Wooden packing case:
  - \* dimensions: 710x350x180 mm
  - \* gross weight: 38 kg
  - \* volume: 0,045 m<sup>2</sup>

#### SMOKE M64P2

- 1 complete shell per carton
- 2 cartons per wooden case
- Wooden packing case:
  - \* dimensions: 710x350x180 mm
  - \* gross weight: 38 kg
  - \* volume: 0,045 m<sup>2</sup>

#### ILLUMINATING M87P1

- 1 complete shell per carton
- 2 cartons per wooden case
- Wooden packing case:
  - \* dimensions: 780x350x180 mm
  - \* gross weight: 35 kg
  - \* volume: 0,049 m<sup>2</sup>

ARTILLERY MUNITIONS

# Illuminating / Practice

## 122 mm

## 152 mm



### CHARACTERISTICS

Type of charge	Full	Reduced	Full	Reduced
	Type	ILLUMINATING PRACTICE		ILLUMINATING
Grenade weight (fused)	21,3 kg		41,95 kg	
Charge weight	7,835 kg	6,435 kg	16,36 kg	12,01 kg
Illumination intensity	>1.000.000 cd		>1.000.000 cd	
Muzzle velocity	690 m/s	565 m/s	652 m/s	509 m/s
Range	15,3 km	12,5 km	16,65 km	13,17 km
Rate of descent	7,5 - 9,5 m/s		7,5 - 9,5 m/s	
Burning time	i50 s		i50 s	
Safe operational temperature range	-40° to 50°C		-40° to 50°C	

### WEAPON SYSTEM

D-30 howitzer  
2S1 self-propelled howitzer

D-20 howitzer  
2S3 self-propelled howitzer and its modifications

### PACKING

Dimensions	1210 x 435 x 258 mm	835 x 488 x 280 mm
Rounds in a case	2	1
Gross weight	83 kg	80 kg
		82 kg
		78 kg

# ARTILLERY MUNITIONS HE / SMOKE

## 76 mm



## 105 mm



## 122 mm



### CHARACTERISTICS

	76 mm		105 mm		122 mm	
	HE SHELL M70	SMOKE SHELL M60	HE SHELL M1A1	SMOKE SHELL M60	HE SHELL TF-462A1	HE SHELL TF-462A1
NATO designation						
Projectile weight	6,2 kg	6,2kg	15,1 kg	15 kg	21,8 kg	
Explosive weight	0,61 kg	0,43 kg	2,15 kg	1,85 kg	3,6 kg	
Propelling charge weight	1,32 kg		1,31 kg		reduced charge 2,47 kg	full charge 3,8 kg
Cartridge case weight	1,55 kg		2,68 kg		3,66 kg	
Explosive type	TNT	WP	TNT	WP	TNT	
Projectile length	347 mm		496 mm		561 mm	
Cartridge case length	385 mm		372 mm		447 mm	
Muzzle velocity	398 m/s		491 m/s	491,472 m/s	565 m/s	690 m/s
Maximum range	8,75 km		11,62 km		12,84 km	15,3 km
Fuse type	UTIU, M68 P1		UTIU, M72 B1 UTIU, M02 UTIU, M03	UTIU, M72 B1	UTIU, M72 B1 UTIU, M02 UTIU, M03	
Fuse action	impact, superquick and delay action		impact, superquick and delay action		impact, superquick and delay action	
WEAPON SYSTEM	GUN 76 MM M48B1		SEMI FIXED HOWITZERS 105mm M56, M18/61, M2A1 AND M4		HOWITZER 122mm D30, D30J AND SP 2S1	
PACKING						
Dimensions	690 x 440 x 215 mm		950 x 310 x 200 mm		980 x 500 x 230 mm	
Rounds in a case	3		2		2	
Gross weight / volume	39 kg / 0,06 m <sup>3</sup>		55 kg / 0,05 m <sup>3</sup>		80 kg / 0,1 m <sup>3</sup>	

# MULTI-TUBE ROCKET LAUNCHER

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**GRAD M21 OF****GRAD MB21****PLAMEN-A M63****PLAMEN-C****PLAMEN-D M87**

## Basic tactical and technical characteristics:

	Caliber	Weight	Length	Warhead weight	Maximum range	Minimum range	Maximum velocity
GRAD M21 OF	122 mm	66,18 kg	2875 mm	19,1 kg	21 km	5 km	690 m/s
PLAMEN-A M63	128 mm	23,1 kg	837 mm	2,61 kg	8,6 km		
PLAMEN-D M87		25,5 kg	670 mm	3,3 kg	12,625 km		

- Crew can fire the rockets from the cab or from a trigger at the end of a cable. All 40 rockets can be fire away in as little as 20 - 40 seconds, but can also be fired individually or in small groups in several-second intervals.
- "Plamen C" fires two types of missiles: PLAMEN-A M63 and PLAMEN-D M87 with extended range.
- GRAD 122 mm MB21 area of effect: against manpower - 708m<sup>2</sup>, against combat equipment - 225 m<sup>2</sup>
- PLAMEN 128 mm radius of effect is 30 m.

## Complete set:

### **GRAD M21 OF**

- 1 rocket in wooden case
- Wooden packing case:
  - \* dimensions: 2807x280x252 mm
  - \* gross weight: 100 kg