



## Protection Levels of Ballistic Body Armor.

### Russian, US, German and European Standards

Most ballistic requirements to bullet proof military and force enforcement vests are set by state standards (for example NIJ). Many organizations including Russian Standard Committee take part in the development of ballistic requirements in Russia.

A threat level of a bullet is determined based on the bullet caliber, type, mass and velocity.

The following are the ballistic body armor levels defined by:

- Russian State Standards
- DIN (Germany)
- NIJ (USA)
- Committee European Normalization
- STANAG 4569

and tentative correlation between them

### BALLISTIC BODY ARMOR LEVELS DEFINED BY RUSSIAN STATE STANDARDS

LEVEL	THREAT	CARTRIDGE	CORE TYPE	MASS (g)	VELOCITY(m/s)
Special	Cut and thrust weapon	-	-	Impact energy 45-50 J	
1	Makarov pistol	9 mm 57-H-181C pistol type	Steel	5.9	305-325
	'Nagan' revolver	7.62 mm 57-H-122 revolver type	Lead	6.8	275-295
2	Small-gage pistol	5.45 mm 7H7 pistol type	Steel	2.5	310-335
	Tokarev pistol	7.62 mm 57-H-134C pistol type	Steel	5.5	415-445
2a	Shooting gun 12 caliber	18.5mm shooting type	Lead	35.0	390-410
3	Machine-gun	5.45 mm 7H6	Steel	3.5	890-910



	AK-74				
	Machine-gun AKM	7.62 mm 57-H-231 1943 year type	Steel	7.9	710-740
4	Machine-gun AK-74	5.45 mm 7H10	Steel heat-treated	3.4	890-910
5	Sniper rifle	7.62 mm 57-H-323C rifle type	Steel	9.6	820-840
	Machine-gun AKM	7.62 mm 57-H-231	Steel heat-treated	7.9	710-740
5a	Machine-gun AKM	7.62 mm 57-BZ-231	Steel heat-treated	7.4	720-750
6	Sniper rifle	7.62 mm CT-M2 rifle type	Steel heat-treated	9.6	820-840
6a	Sniper rifle	7.62 mm 7-BZ-3 rifle type	Steel heat-treated	10.4	800-835

\* The ballistic tests have been carried at the following distance muzzle to a target :

- 10mm for pistol and revolver cartridges
- 25mm for machine gun and rifle cartridges

**BALLISTIC BODY ARMOR LEVELS DEFINED BY DIN (GERMANY)**

LEVEL	CALIBER	CARTRIDGE TYPE	BULLET TYPE	MASS (g)	VELOCITY (m/s)
L	9 mm	Parabellum	VMR\WK	8.00 g	365 <sup>+</sup> /-.5
I	9 mm	Parabellum	VMR\WK	8.00 g	410 <sup>+</sup> /-. 10
II	.357	Magnum	MsF	7.50 g	570 <sup>+</sup> /-. 20
III	.223	Remington	WK + P	4.00 g	920 <sup>+</sup> /-. 10
	.308	Winchester	VMS/WK	9.55 g	830 <sup>+</sup> /-. 10
IV	.308	Winchester	VMS/HK	9.75 g	820 <sup>+</sup> /-. 10

- VMR/WK - full metal jacket bullet and soft core
- MsF - flat nose brass bullet
- WK+P - bullet with soft core and armor-piercing cap
- VMS/WK - solid metal jacket bullet with sharp nose and soft core
- VMS/HK - solid metal jacket bullet with sharp nose and hard core

**BALLISTIC BODY ARMOR LEVELS DEFINED BY NIJ (USA)**

LEVEL	SUBLEVEL	CALIBER	CARTRIDGE	MASS	MIN. BULLET V.
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			TYPE	(g)	(m/s)
I	1	special 38 22	RN/ lead bullet	10.20 g	259 m/s
	2		LRHV/ lead bullet	2.60 g	320 m/s
II-A	1	.357 Magnum 9 mm	JSP	10.20 g	381 m/s
	2		FMJ	8.00 g	332 m/s
II	1	.357 Magnum 9 mm	JSP	10.20 g	425 m/s
	2		FMJ	8.00 g	358 m/s
III-A	1	.44 Magnum 9 mm	SWC/ lead bullet	15.55 g	426 m/s
	2		FMJ	8.00 g	426 m/s
III	-	7.62 mm Winchester	FMJ	9.70 g	838 m/s
IV	-	.30	AP	10.80 g	869 m/s

- AP- armor-piercing
- FMJ - full metal Jacket bullet
- JSP - jacket soft point bullet
- LRHV - high-velocity long-length gun
- RN - round nosed bullet
- SWC - soft conical winding (cutting)

**BALLISTIC BODY ARMOR LEVELS DEFINED BY COMMITTEE EUROPEAN NORMALIZATION (CEN)**

LEVEL	THREAT	CALIBER	CARTRIDGE	MASS (g) <sup>1</sup>	VELOCITY +/- 10 m/s
BR 1	rifle	0.32	RN/lead	2.6	360
BR 2	pistol	9 mm Parabellum	JF <sup>2</sup> /RN/SC	8.0	400
BR 3	pistol	0.357 Magnum	JF <sup>3</sup> /CN/SC	10.2	430
BR 4	pistol	0.44 Magnum	JF <sup>4</sup> /FN/SC	15.6	440
BR 5	rifle	5.56 x 45	JF <sup>4</sup> /PB/SCP	4.0	950
BR 6	rifle	7.62 x 51	JF <sup>2</sup> /PB/SC	9.5	830
BR 7	rifle	7.62 x 51	JF <sup>2</sup> /PB/HC	9.8	820
SG 1	short-length gun	12/70	full lead jacket <sup>5</sup>	31.0	420
SG 2	short-length gun	12/70	full lead jacket <sup>5</sup>	31.0	420

- RN - round nosed
- FN - flat nosed
- CN - conical bullet

<sup>1</sup> -rated value,  
clearance +/-0.1 g  
<sup>2</sup> -full metal jacket (tombac)



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- SC - soft lead core
- SCP - soft lead core and steel armor-piercing nose (type SS109)
- PB - pointed bullet
- HC - hard steel core, mass<sup>1</sup> = 3.8 g, rigidity is above 63 HRC (accordind to Rockwell)
- FJ - full jacketed

- alloy galvanostery)
- <sup>3</sup> -full metal jacket
- <sup>4</sup> -full tompac alloy jacket
- <sup>5</sup> -brennex

**BALLISTIC BODY ARMOR LEVELS DEFINED BY STANAG (STANAG 4569)**

LEVEL	KE-THREAT	ARTILLERY
I	Rifles 7.62x51 NATO Ball Distance: 30m Velocity: 833m/s Angle: azimuth 360°. Elev. 0°-30°	20mm FSP Velocity: 400m/s Angle: azimuth 360°. Elev. 0°-11° simulated range or burst 150m
	Rifles 5.56x45 NATO SS109 Distance: 30m Velocity: 937m/s Angle: azimuth 360°. Elev. 0°-30°	
II	Infantry Rifles 7.62x51 AP P80 Distance: 30m Velocity: 833m/s Angle: azimuth 360°. Elev. 0°-30°	20mm FSP Velocity: 600m/s Angle: azimuth 360°. Elev. 0°-15° simulated range or burst 120m
III	Sniper rifles 7.62x51 AP (WC) (7.62 Dragunov B32) Distance: 30m Velocity: 930m/s Angle: azimuth 360°. Elev. 0°-30°	20mm FSP Velocity: 680m/s Angle: azimuth 360°. Elev. 0°-20° simulated range or burst 90m
IV	Heavy machine Gun 14.5x114 AP / B32 Distance: 200m Velocity: 911m/s Angle: azimuth 360°. Elev. 0°	20mm FSP Velocity: 1000m/s Angle: azimuth 360°. Elev. 0°-90° simulated range or burst 25m
V	Automatic Cannon	20mm FSP



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25mm APDS-TM-791 or TLB 073 Distance: 500m Velocity: 1254.5m/s Angle: azimuth -frontal arc to centerline $\pm 30^\circ$ . Elev. $0^\circ$	Velocity: 1200m/s Angle: azimuth $360^\circ$ . Elev. $0^\circ$ - $90^\circ$ simulated range or burst 10m
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**Tentative correlation between ballistic body armor levels defined by Russian Standards, USA standards, Germany Standards and Committee European Normalization**

RUSSIA	USA	GERMANY	CEN
1	I	L	BR1
2	II - IIIA	I	BR2, BR3
2a	-	II	SG1, SG2
3	-	II	BR4
4	III	III	BR5
5	-	-	BR6
6	IV	IV	BR7