International body armor standards

NIJ Standard 0101.04

Armor Type	Test- Bullet	Bullet- Producer	Bullet- Weight [g] [gr.]	Bullet- Velocity [m/s] [ft/s]	Distance [m]	Max. BFD [mm]	Angle Test [° Nato]	Wet test yes/no	Padding down yes/no	No. of shots per panel	No.of tests
I	.22 caliber LR LRN	not spec.	2.6 40	329 +- 9 1080 +- 30	5	44	0° 4x 30° 2x	yes **only**	**Yes**	6	4
	.380 ACP FMJ RN	not spec.	6.2 95	322 +- 9 1055 +- 30	5	44	0° 4x 30° 2x	yes **only**	**Yes**	6	4
II-A	9 mm FMJ RN	not spec.	8.0 124	341 +- 9 1120 +- 30	5	44	0° 4x 30° 2x	yes **only**	**Yes**	6	4
	.40 S&W FMJ RN	not spec.	10.2 158	322 +- 9 1055 +- 30	5	44	0° 4x 30° 2x	yes **only**	**Yes**	6	4
II	9 mm FMJ RN	not spec.	8.0 124	367 +- 9 1205 +- 30	5	44	0° 4x 30° 2x	yes **only**	**Yes**	6	4
	.357 Mag. JSP	not spec.	10.2 158	436 +- 9 1430 +- 30	5	44	0° 4x 30° 2x	yes **only**	**Yes**	6	4
III	9 mm FMJ RN	not spec.	8.0 124	436 +- 9 1430 +- 30	5	44	0° 4x 30° 2x	yes **only**	**Yes**	6	4
	.44 Mag. JHP	not spec.	15.6 240	436 +- 9 1430 +- 30	5	44	0° 4x 30° 2x	yes **only**	**Yes**	6	4
III	7.62 mm Nato FMJ	not spec.	9.6 148	847 +- 9 2780 +- 30	15	44	0°	yes **only**		6	2
IV	.30 caliber M2 AP	not spec.	10.8 166	878 +- 9 2880 +- 30	15	44	0°	yes **only**		1	2

Particularities:

Backing material: Roma No. 1 19mm +- 2mm (1.03 kg sphere from 2m height)
Wet test: 3 min spraying from each side expect the V50 panels
Temperature test: No
Measurement back face deformation: Shot No. 1 + shot No. 2 or 3 (higher velocity fair hit)
V50 requirements: level I, II-A, II and III-A additional 2 panels V50 using 9 mm
Min distance from the edges: 76 mm
Min distance from previous shots: 51 mm

NIJ Standard 0101.04, USA

NIJ Standard 0101.06, USA

NIJ Standard 0101.06

Armor Type	Test- Bullet	Bullet- Producer	Bullet- Weight [g] [gr.]	Bullet- Velocity [m/s] [ft/s]		Distance [m]	Max. BFD [mm]	Angle Test [° Nato]	Padding down yes/no	No. of shots per panel	No.of tests and conditioning	
				New	Conditioned						New	Conditioned
II-A	9 mm FMJ RN	Remington	8.0 124	373 ± 9 1225 ± 30	355 ± 9 1165 ± 30	5	44	0° 4x 30/45° each 1x	yes	6	8 wet	4 dry
	.40 S&W FMJ	Remington	11.7 180	352 ± 9 1155 ± 30	325 ± 9 1065 ± 30	5	44	0° 4x 30/45° each 1x	yes	6	8 wet	4 dry
II	9 mm FMJ RN	Remington	8.0 124	398 ± 9 1305 ± 30	379 ± 9 1245 ± 30	5	44	0° 4x 30/45° each 1x	yes	6	8 wet	4 dry
	.357 Mag. JSP	Remington	10.2 158	436 ± 9 1430 ± 30	408 ± 9 1340 ± 30	5	44	0° 4x 30/45° each 1x	yes	6	8 wet	4 dry
III-A	.357 SIG FMJ FN	Speer	8.1 125	448 ± 9 1470 ± 30	430 ± 9 1410 ± 30	5	44	0° 4x 30/45° each 1x	yes	6	8 wet	4 dry
	.44 Mag. JHP	Speer	15.6 240	436 ± 9 1430 ± 30	408 ± 9 1340 ± 30	5	44	0° 4x 30/45° each 1x	yes	6	8 wet	4 dry
III	7.62 mm Nato FMJ	not spec.	9.6 148	-	847 ± 9 2780 ± 30	5	44	0°	-	6	-	4 wet (24 shots)
IV	.30 caliber M2 AP	not spec.	10.8 166	-	878 ± 9 2880 ± 30	15	44	0°	-	1-6	-	4-24 swet (24 shots)

Particularities:

Backing material: Roma No. 1, 19mm ± 2mm, all indiv. values > 16 < 22 mm (1.03 kg sphere from 2m height)
Wet test: 30 min. vertical immersion, 10 min dripping of the unaged panels
Temperature test: No
Measurement BFD: Shot No. 1, 2 and 3 < 44mm, if not estimated probability of BFD >44 mm has to be < 20%; also measured for aged panels, but no fail criteria if > 44mm
Min distance from the edges: Lighter bullet min. not greater than 51 mm (2"), heavier bullet min. not greater than 76 mm (3")
Min distance from previous shots: 51 mm

Particularities level II-A, II and III-A:

Panel sizes: S-di. sizes speci ed. Manufacturer has to choose range of sizes. Smallest and largest size have to be tested 50/50% for perforation and BFD test
Conditioning: Tumbling for 10 d at 65°C (149 °F) and 80% RLH with 5 ± 1 rpm (72.000 ± 1500 rotations)
V50 requirements: New: 120 shots (10 panels) each caliber largest size. No penetr. below max. ref. speed, (V0.5 new Vref. new)
Conditioned: 24 shots (2 panels) for each caliber largest size. No penetration below max. ref. speed
Shoot pattern: Shots 4, 5 and 6 have to be within a 100 mm (3.94") circle

Particularities level III and IV:

Conditioning: 10 d at 65°C (149°F) and 80% RLH + 24h between -15°C and + 90°C + 2 drops
V50 requirements: level III Conditioned: 24 shots (4 plates). No penetration below max. ref. speed
Level IV Conditioned: 12 shots (2-12 plates). No penetration below max. ref. speed

HOSDB Body Armor Standards (2007), UK

Armor Type	Test- Bullet	Bullet- Producer	Bullet- Weight [g] [gr.]	Bullet- Velocity [m/s] [ft/s]	Distance [m]	Max. BFD UDL [mm]	No. of vest panels	No. of shots per panel	Shooting Angle [° Nato]	Padding down yes/no
HG1/A	9 mm FMJ	DM 11 A1B2 Dyn. Nobel	8.0 124	365 ± 10	5	44	2x Size S 3x Size M 1x Size L	3 6 6	45°, 0°, 0° 6x 0° 45°, 3x 0°, 45°, 0°	Yes
	.357 Mag. JSP	R357M3 Remington	10.2 158	390 ±10	5	44	2x Size S 3x Size M 1x Size L	3 6 6	45°, 0°, 0° 6x 0° 45°, 3x 0°, 45°, 0°	Yes
HG1	9 mm FMJ	DM 11 A1B2 Dyn. Nobel	8.0 124	365 ± 10	5	25	2x Size S 3x Size M 1x Size L	3 6 6	45°, 0°, 0° 6x 0° 45°, 3x 0°, 45°, 0°	Yes
	.357 Mag. JSP	R357M3 Remington	10.2 158	390 ± 10	5	25	2x Size S 3x Size M 1x Size L	3 6 6	45°, 0°, 0° 6x 0° 45°, 3x 0°, 45°, 0°	Yes
HG2	9 mm FMJ	DM 11 A1B2 Dyn. Nobel	8.0 124	430 ± 10	5	25	2x Size S 3x Size M 1x Size L	3 6 6	45°, 0°, 0° 6x 0° 45°, 3x 0°, 45°, 0°	Yes
	.357 Mag. JSP	R357M3 Remington	10.2 158	455 ± 10	5	25	2x Size S 3x Size M 1x Size L	3 6 6	45°, 0°, 0° 6x 0° 45°, 3x 0°, 45°, 0°	Yes
HG3	Carbine 5.56x45 Nato	Federal Tactical Bonded	4.01 62	750 ± 15	10	25	2x Size S 3x Size M 1x Size L	3 6 6	45°, 0°, 0° 6x 0° 45°, 3x 0°, 45°, 0°	Yes
RF1	Rifle 7.62 mm Calibre	BAE Systems Nato Ball L2 A2	9.3 144	830 ± 15	10	25	2	3	0°	no
RF2	Rifle 7.62 mm Calibre	BAE Systems Nato Ball L40A1	9.7	850 ± 15	10	25	2	3	0°	no
SG1	Shotgun 12 gauge True cylinder	Winchester 1 oz. Rifled Lead Slug 12RS1S or 12RSE	28.4 437	435 ± 25	10	25	2	1	0°	-

Particularities:

Measurement Back Face Deformation: BFD to be measured after each shot
UPL: Upper prediction limit for BFD, is calculated based on the 0° BFD values measured on all medium size test samples
Backing material/ plasticity: Roma No. 1 15mm ± 1.5mm (1.043 kg sphere from 1.5m height)
Temperature test: No
V50 requirements: No V50 test required
Min. distance from the edge: 50 mm
Min. distance from previous shots: 50 mm
MQT (Manufacturers Quality Testing): MQT 1 and MQT 2 to be conducted after a speci c No. of armors being produced to ensure quality

Technische Richtlinie March 2008, Germany*

* Version September 2009 - For particularities see VPAM 2006

Class	Test- Bullet	Bullet- Producer	Bullet- Weight [g]	Bullet- Velocity [m/s]	Distance [m]	No. of shots performed under following conditions 1 panel for each kind of test					
						0°	65°	0° contact shot	0° climat.	0° -20°C	0° +70°C
SK L	9mm Luger FMJ/RN/SC; tinned	DAG, DM41	8.0 ± 0.1	360 ± 10	5 ± 0.5	3+1	3	3	3	3	3
SK L	9mm Luger FMJ/ RN/SC; tinned	DAG, DM41	8.0 ± 0.1	415 ± 10	5 ± 0.5	3+1	3	3	3	3	3
	9 x 19 QD-PEP II/S	MEN	6.0 ± 0.1	460 ± 10	5 ± 0.5		3	3			
	9 x 19 Action 4	RUAG	6.1 ± 0.1	460 ± 10	5 ± 0.5		3	3			
SK 2	.357 Mag FMs/CB	DAG, Special	7.1 ± 0.1	580 ± 10	5 ± 0.5	3	3		3	3	3
SK 3	223 Rem. FMJ/PB/SCP	MEN, SS 109	4.0 ± 0.1	950 ± 10	10 ± 0.5	3	3		3	3	3
	308 Win. FMJ/PB/SC	MEN, DM 111	9.55 ± 0.1	830 ± 10	10 ± 0.5	3	3		3	3	3
SK 4	308 Win. FMJ/PB/HC	FNB or CBC-MEN, P 80	9.7 ± 0,2	820 ± 10	10 ± 0.5	3	3		3	3	3

Technische Richtlinie March 2008, Germany

Russia-Gost R 50744-95

VPAM 2006

Inspection Level	Ammunition				Distance	Bullet velocity [m/s]	No. of shots performed under the following conditions							Padding down
	Test-Bullet		Bullet weight [g]	Bullet producer			0	65°	0° / contact shot	0°	0°	0°	V50	
									optional					
							+20°C	+20°C	+20°C	+40°C climat	-20°C	+70°C		
1	22 Long ri e	L/RN	2.6 ± 0.1	Winchester	10 + 0.5	360 ± 10	3+1	3	3	3	3	3	yes	yes
2	9mm Luger	FMJ/RN/SC; tinned	8.0 ± 0.1	DAG, DM 41	5 + 0.5	360 ± 10	3+1	3	3	3	3	3	yes	yes
3	9mm Luger	FMJ/RN/SC; tinned	8.0 ± 0.1	DAG, DM 41	5 + 0.5	415 ± 10	3+1	3	3	3	3	3	yes	yes
4	.357 Mag.	FMJ/CB/SC	10.2 ± 0.1	Geco	5 + 0.5	430 ± 10	3	3	-	3	3	3		
	.44 Rem. Mag.	FMJ/FN/SC	15.6 ± 0.1	Speer	5 + 0.5	440 ± 10	3	3	-	3	3	3		
5	.357 Mag.	FMs/CB	7.1 ± 0.1	DAG, Special	5 + 0.5	580 ± 10	3	3	-	3	3	3		
6	7.62 x 39	FMJ/PB/FeC	8.0 ± 0.1	PS	10 + 0.5	720 ± 10	3	3	-	3	3	3		
7	223 Rem	FMJ/PB/SCP	4.0 ± 0.1	MEN, SS 109	10 + 0.5	950 ± 10	3	3	-	3	3	3		
8	7.62 x 39	FMJ/PB/HCI	7.7 ± 0.1	BZ	10 + 0.5	740 ± 10	3	3	-	3	3	3		
9	308 Win.	FMJ/PB/HC	9.45 ± 0.1	FNB, P 80	10 + 0.5	820 ± 10	3	3	-	3	3	3		
10	7.62 x 54 R	FMJ/PB/HCI	10.4 ± 0.1	B32	10 + 0.5	860 ± 10	3	3	-	3	3	3		
11	308 Win.	FMJ/PB/WC	8.4 ± 0.1	Nammo, AP 8	10 + 0.5	930 ± 10	3	3	-	3	3	3		
12	308 Win.	FMJ/PB/WC	12.7 ± 0.1	SWISS P AP	10 + 0.5	810 ± 10	3	3	-	3	3	3		
13	50 Browning	FMJ/PB/HC	43.0 ± 0.5	SWISS P Penetrator	-	930 ± 20	3	3	-	3	3	3		
14	14.5 x 114	FMJ/PB/HCI	63.4 ± 0.5	B32	-	911 ± 20	3	3	-	3	3	3		

Particularities:

Backing material/ plasticity: Weible clay: 20mm ± 2mm (1.04 kg sphere from 2m height)
Back Face Deformation: Concealable vest: 1 x investigated plasticity value + 22m (constant)
Concealable vest: 1 x investigated plasticity value; pressed shot 1 x investigated plasticity value + 22mm (constant)
Wet test: No wet test required
Edge test: For Level 1,2 and 3 one shot 30mm ± 5mm from the edge is required
Min. distance from the edge: 75 mm (expect edge shot, 30mm from the edge, 75 from the corner)
Min. distance from previous shots: 75 mm
Pressed shot: 100 ± 5 N force, total mass 50 ± 1kg
Volume: = (0.134 x plasticity - 1.13) x 70 Joule, measured if Back Face Deformation is 20mm not for pressed shot

CHINA GA141-2010

Class	Test-Bullet	Bullet Weight [g]	Shoting Distance [m]	Bullet Velocity [m/s]	Test Condition	Performance				No. of shots/ No. of plates
						No.of shots at 0° angel single	No.of shots 30° & 45°angle	Max.BFD [mm]	No.of shots/ No. of vest panels	
1	7.6 x 25 (64 type) SC FMJ RN	4.87	5	320±10	New bullet-proof vest	4	2	25	12/2	-
					Environmental test	3	0		24/8	-
2	7.62 x 25 SC FMJ RN (P54 51 type)	5.6	5	445±10	New bullet-proof vest	4	2	25	12/2	-
					Environmental test	3	0		24/8	-
3	7.62 x 25 SC FMJ RN (M79 51 type)	5.6	5	515±10	New bullet-proof vest	4	2	25	12/2	-
					Environmental test	3	0		24/8	-
4	7.62 x 25 HC FMJ RN (M79 51 type)	5.68	15	515±10	New bullet-proof vest	6	0	25	-	6/1
					Environmental test	3	0		-	12/4
5	7.62 x 39 HC FMJ PB (56 type)	8.05	15	725±10	New bullet-proof vest	6	0	25	-	6/1
					Environmental test	3	0		-	12/4
6	7.62 x 54 HC FMJ PB (56 type)	9.6	15	830±10	New inserted plate	2	0	25	-	2/1

Particularities:

The backing material: Must be calibrated by a steel ball (diameter 63,5mm ± 0,5mm, weight 1000g ± 10g)
The drop height is 2000mm ± 10mm; at least 5 drops per test, single indentation is 20mm ± 3mm
Environmental test: Eight vest panels to be conditioned
• Two for 4 hours under 55°C ± 2°C
• Two for 4 hours under -20°C ± 2°C
• Two for 240 hours under 70°C ± 2°C - at 80% relative humidity
• Two for 30 minutes immersion into water
Class 1 to 3: The shooting angle of shots 4 and 5 is 30° respectively 45°
The max distance in between shots 4 to 6 <100 mm
Shot to shot distance: 51mm, Shot to edge distance 71mm

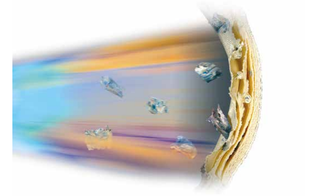
RUSSIA - GOST R 50744-95

Class	Type of Weapon	Calibre [mm]	Ammunition		Test Conditions		
			Type	Mass [g]	Shot Distance [m]	Bullet Velocity 1) [m/s]	Max. BFD [mm]
Special class							
S	Knife	-	-	-	-	49 ± 1 Joule	-
S1	Hunting Ri e	18.5	Leadcore	34.0 ± 1.0	5 ± 0.5	400 ± 10	17
S2	FSP	-	Steel sphere Ø 6.35 mm	1.05	-	V 50% 2)	-
Main class							
BR1	9mm APS	9x18	Hardened Fe Core 7N21	5.9	5 ± 0.1	455 ± 10	17
BR2	SR-1 Vector	9x21	Lead Core, 7N28	7.93	5 ± 0.1	390 ± 10	17
BR3	Jarygin PJa	9x19	Hardened Fe Core, 7N21	5.2	5 ± 0.1	455 ± 10	17
BR4	AK74	5.45x39	Hardened Fe Core, 7N10	3.5	10 ± 0.1	895 ± 15	-
	AKM	7.62x39	Mild Steel Core, 57N231	7.9	10 ± 0.1	720 ± 15	-
BR5	Dragunov SVD	7.62x54	Hardened Fe Core (PP), 7N13	9.4	10 ± 0.1	830 ± 15	-
	Dragunov SVD	7.62x54	Armor Piercing (API), 7BZ3	7.9	10 ± 0.1	810 ± 15	-
BR6	OSW-96	12.7x108	Armor Piercing (API), 57BZ542	48.2	50 ± 0.5	830 ± 20	-

Particularities:

1) Bullet velocities measured 3 ± 0.1 m behind the muzzle, Fragment velocities measured 0.75 m in front of the target.
2) Exact procedure and Steelball described in GOST 3722.

Fragments



MIL-STD-662F

TEST METHOD

Witness system: Aluminum alloy sheet 2024 T3, 0.51mm thick, tensile strength 440N/mm², 15.2cm behind armor
Striking angle: Has to be specified by contractor
Yaw: Max. yaw 5° (measured for each shot by a yaw card)
Distances: At least 2 projectile diameters from any previous impact, disturbed area, crack or edge
Complete penetration: Any projectile which perforates the witness system (light shines through)
V50 de nition: "Average of an equal number of highest partial and lowest complete penetration velocities in a spec. velocity range"

No. of shots/velocity span

No. of shots required		Velocity span	
partial penetr.	complete penetr.	[m/s]	[ft/s]
2	2	18	60
4	4	27	90
6	6	30	100
10	10	38	125

Has to be specified by contractor

Stanag 2920

TEST METHOD

Barrel for bullets: Must be rifled
Barrel for FSP's: Rifled or smoth, with or without sabot
Fixing: Firmly clapmed in a rigid framework; no backing within 30 mm of any point of impact
Witness system: Aluminum alloy sheet (AlCuMg1) 0.5mm thick, tensile strength 440N/mm², 15cm behind armor
Striking angle: 0°; max. yaw 5°
Distances: Min. 30mm from any clamping point, edge, previous impact, deformation or disturbance
No two impact should be made on the same **yarn**
Complete penetration: Any projectile which activates/perforates the witness system
V50 de nition: Velocity for which the probability of penetration of the chosen projectile is exactly 0.5
V50 calculation: Mean value of partial and complete penetrations

No. of shots required		Max. delta
partial penetr.	complete penetr.	[m/s]
3	3	40
5	5	50
7	7	60

If the highest partial velocity exceeds the lowest complete velocity by more than 60m/s, testing should be repeated on a new sample of material.

List of FSP's

Weight [g]	Weight [gr]	Diameter [mm]
1.102 ± 0.02	17.0 ± 0.3	5.385
0.162 ± 0.01	2.5 ± 0.2	2.642
0.237 ± 0.01	3.7 ± 0.2	3.251
0.486 ± 0.02	7.5 ± 0.3	4.064
2.786 ± 0.02	43.0 ± 0.3	7.493
0.325 ± 0.01	5.0 ± 0.2	3.600

Hardness HRC: 30 ± 2
Shape: see drawings in Stanag 2920 standard

Disclaimer

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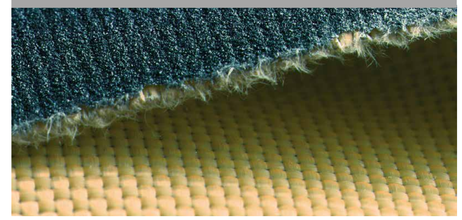
Stab standards



Technische richtlinie april 2003, germany

Test method: Drop test
Backing material: Weible clay (plasticity as for shooting)
Blade: Engineered test blade P1B (High Speed and Carbide)
Stab Energy: 25 J (2.38kg, 1.07m)
Angle of attack: 0°; in case of overlapping also 65°
No. of attacks: 3x roomtemp.; 3x climat.; 3x 80/70°C; 3x -20°C
Max. penetration into backing: 20mm (max. deformation incl. penetr. 40 mm)
Measurement of penetration: Cutting into the clay to the deepest point of the mark
Min. distances: 75 mm from the edges and any previous attack produce no CP.

P1/B

Technische Richtlinie March 2008, Germany

Test method: See VPAM May 2011, Class K1

P1/B

VPAM May 2011

Backing material: Weible clay (plasticity as for shooting)
Blade: Engineered test blade P1B (Wenger S.A. Switzerland)
No. of attacks: 3x roomtemp (+20°C); 3x 70°C, 3x -20°C
Measurement of penetration: Cutting into the clay to the deepest point of the mark
Min. distances: 50 mm from the edges and 80 mm from any previous attack
Potentioal weak areas have to be tested with additional attacks at 65°

Class	Energy [J]	Angle [°]	Highest single penetration [mm]	Drop-Test	
				Height [m]	Weight [kg]
K1/D1	25	0	< 20	1.02	2.5
		65			
K2/D2	40	0	< 20	1.63	2.5
		65			
K3/D3	65	0	< 20	1.33	5
		65			
K4/D4	80	0	< 20	1.63	5
		65			

HOSDB Body Armor Standards 2007, UK

Test method: Drop test/ double punch (drop weight 1900 g)
Backing material: Composition of layers of foam and rubber, for shaped armor Roma clay No. 1
Blade: Engineered test blade PSDB/P1/B
Spike: Engineered test spike PSDB/SP/B
Stab Energies:

	Blade:	Spike:
Level 1	E1 = 24J	E2 = 36J
Level 2	E1 = 24J	E2 = 50J
Level 3	E1 = 43J	E2 = 65J

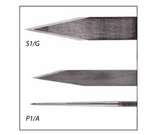
P1/B

No. of attacks: **Blade:** 30x E1 at 0°; 10x E2 at 0°
Angle attack at 45° only at potential weak areas
Spike: 10x E1 at 0°
Max. penetration into backing: **Blade:** 7mm for E1 and 20mm for E2 (1x up to 30 mm perm.)
Spike: 1penetration out of 10 strikes permitted
Measurement of penetration: blade protruding length; width of the cut; blade into clay
Min distances: 50 mm from the edges and any previous attack
Particularities: Blade only and blade + spike protection permitted, spike only not permitted

NIJ Standard 0115.00, USA

Test method: Drop test/ double punch (drop weight 1900 g)
Backing material: Composition of layers of foam and rubber
Blade: Engineered test blades PSDB/P1/A and PSDB/S1/G
Spike: Engineered test spike
Stab Energies:

	Blade:	Spike:
Level 1	E1 = 24J E2 = 36J	E1 = 24J E2 = 36J
Level 2	E1 = 30J E2 = 50J	E1 = 30J E2 = 50J
Level 3	E1 = 43J E2 = 65J	E1 = 43J E2 = 65J



S1/G

P1/A

No. of attacks: 4x E1 at 0°; 4x E2 at 0°; 4x E1 at 45°
with each blade and or the spike
Max. penetration into backing: 7mm for E1 and 20mm for E2
Measurement of penetration: blade/spike protruding length; witness paper
Min distances: 51 mm from the edges and any previous attack
Particularities: Blade/ spike only and Blade + spike protection permitted

Index

AP	Armor Piercing	FSP	Fragment Simulating (rojectile	PB	Pointed Bullet
BFD	Back Face Deformation	HC	Steel Hard Core	RN	Round Nose
CB	Coned Bullet	HCI	Steel Hard Core, Incendiary	SC	Soft Core
FeC	Iron Core	JHP	Jacketed Hollow Point	SCP	Lead Soft Core With Steel Penetrator
FMJ	Full Metal Jacket	LR-HV	Long Rifle High Velocity	SWC	Semi-Wadcutter
FMS	Brass At Nose	LRN	Lead Round Nose	WC	Tungsten Carbide
FMSJ	Full Metal Steel Jacket	Mag.	Magnum		
FN	At Nose	P	Penetrator		