

General basis for ballistic material, construction and product tests

- Requirements, test levels and test procedures -

VPAM APR 2006

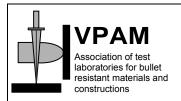
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4 Test conditions

4.1 Tests with standardized types of ammunition

Table 1: Classification of the test levels

Test level	Type of weapon	Calibre	Ammunition and projectile			Test conditions			
						shot	Bullet		
			Туре	Mass [g]	Manufacturer Type	distance [m]	velocity [m/s]		
1	K/L	22 Long Rifle	L/RN	2,6 ± 0,1	Winchester	10 + 0.5	360 ± 10		
2	K	9 mm Luger ⁵⁾	FMJ/RN/SC, tinned	8,0 ± 0,1	DAG, DM 41	5 + 0.5	360 ± 10		
3	K	9 mm Luger ⁵⁾	FMJ/RN/SC, tinned	8,0 ± 0,1	DAG, DM 41	5 + 0.5	415 ± 10		
4 ¹⁾	К	357 Magnum	FMJ/CB/SC	10,2 ± 0,1	Geco	5 + 0.5	430 ± 10		
		44 Rem. Mag.	FMJ ^{*)} /FN/SC	15,6 ± 0,1	Speer	5 + 0.5	440 ± 10		
5	K	357 Magnum	FMs/CB	7,1 ± 0,1	DAG special	5 + 0.5	580 ± 10		
6	L	7,62 x 39	FMJ/PB/FeC	8,0 ± 0,1 core 3,6	PS cold hardened	10 + 0.5	720 ± 10		
7 ¹⁾	L	223 Rem. ²⁾	FMJ/PB/SCP	4,0 ± 0,1	MEN, SS 109	10 + 0.5	950 ± 10		
'		308 Win.	FMJ/PB/SC	9,55 ± 0,1	MEN, DM 111	10 + 0.5	830 ± 10		
8	L	7,62 x 39	FMJ/PB/HCI	7,7 ± 0,1 core 4,1 hardness 65 HRC	BZ	10 + 0.5	740 ± 10		
9	L	308 Win. ³⁾	FMJ/PB/HC	9,70 ± 0,2 core 4,0 ± 0,1 hardness 62 ± 2 HRC	MEN/CBC, FNB, P 80	10 + 0.5	820 ± 10		
10	L	7,62 x 54 R	FMJ/PB/HCI	10,4 ± 0,1 core 5,3 hardness 63 HRC	B32	10 + 0.5	860 ± 10		
11	L	308 Win. 3)	FMJ/PB/WC	8,4 ± 0,1 core 5,9	Nammo, AP 8	10 + 0.5	930 ± 10		
12	L	308 Win. ³⁾	FMJ/PB/WC	12,7 ± 0,1 core 5,58 hardness 1330 HV 10	SWISS P AP	10 + 0.5	810 ± 10		
13	L	50 Browning	FMJ/PB/HC	43,0 ± 0,5 core 35,0 hardness 55 ± 2 HRC	SWISS P penetrator	6)	930 ± 20		
14	L	14,5 x 114 ⁴⁾	FMJ/PB/HCI	63,4 ± 0,5	B32	6)	911 ± 20		
	The rates of twist can be gathered from the dimension sheets (TDCC) of the C.I.P.								



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Legend for the abbreviations used in table 1

FMJ *) CB RN PB FN L SC FeC SCP HC WC FMs I	full metal jacket (steel) full metal jacket (copper) coned bullet round nose pointed bullet flat nose full lead lead-soft core mild-steel core lead-soft core steel penetrator hard core wolfram-carbide full brass Incendiary	C.I.P. TDCC DAG Geco MEN Nammo FNB Speer 1) 2) 3) 4) 5) 6)	Permanent international commission for the testing of small arms Dimension sheets of the C.I.P. RUAG Ammotec, Germany RUAG Ammotec, Germany Metallwerk Elisenhuette Nassau, Germany Nammo AS, Norway FN Herstal, Belgium Federal Cartridge Company, USA In theses steps both calibres are to use. twist rates 178 mm ± 5% twist rates 254 mm ± 5% twist rates arbitrary test barrel with a transition of 7,5 mm arbitrary shot distance. Appropriate hits have to be ensured in terms of velocity, oscillation and impact point
		K L	handgun rifle

The test steps 1 to 14 mentioned in table 1 are listed in increasing order according to their ballistic resistance. Test step 1 offers the lowest, step 14 the highest resistance against penetration. If a test specimen meets a particular level of resistance all underlying levels are also met.

For constructions and vehicles to be tested with a hard core or mild-steel core ammunition, splits, joints and overlaps will be additionally tested with soft core ammuniton.

Step 6 and 8 are to be additionally tested with projectile FMJ/PB/SC calibre 7,62 x 39.

Step 9 is to be additionally tested with the projectile in test step 7 calibre 308 Win.

Step 10 is to be additionally tested with projectile type D (FMJ/PB/SC), 11.8 ± 0.1 g, v_0 : 810 ± 10 m/s calibre 7.62×54 R.