

**CALIFORNIA DEPARTMENT OF JUSTICE**

**TITLE 11. LAW**

**DIVISION 1. ATTORNEY GENERAL**

**CHAPTER 11. POLICE BODY ARMOR**

**TEXT OF PROPOSED REGULATIONS**

**Article 1. Certification of Body Armor.**

**§ 941. Scope.**

~~This article shall apply to body armor to be purchased for State peace officers and shall establish minimum requirements and testing methods to ensure ballistic resistance for certification purposes. Police body armor submitted by manufacturers for certification by the Department of Justice shall meet the minimum standards specified in these regulations.~~

~~The test standards specified in this article do not apply to design characteristics such as weight, size, shape, comfort, concealability, and durability which shall be determined by the State Armor Committee as part of the procurement specifications at the time a purchase contract is requested by a member agency of this committee.~~

~~The State Armor Committee shall consist of representatives from the following agencies:~~

~~California Highway Patrol, Department of Justice, and the Department of General Services.~~

~~Only body armor that meets the current State requirements for acquisition and purchase at the time the Department of General Services announces a need to bid a new purchase contract shall be accepted for ballistics certification testing by the Department of Justice.~~

~~Note: Authority cited: Section 31355, Penal Code. Reference: Sections 31310, 31315, 31320, 31325, 31330, 31335, 31340, 31345, 31350 and 31355, Penal Code.~~

**§ 942. Definitions.**

~~Wherever these terms are used in this article, the following definitions shall apply:~~

~~(a) Angle of Incidence. The "angle of incidence" is the angle between the line of flight of a bullet and a perpendicular to the vertical plane tangent to the surface of the body armor at the point of impact (Figure 1).~~

(b) ~~Approved Laboratory.~~ An “approved laboratory” has facilities and equipment for testing body armor according to the standards in this title and has been accepted by the department for such testing after an on-site inspection by a representative of the department or other departmental designate.

(c) ~~Backing Material.~~ The material against which the armor specimen is securely positioned for ballistic testing to allow an analysis and comparison of the backface deformation resulting from the impact of nonpenetrating rounds.

(d) ~~Ballistic Panels.~~ “Ballistic panels” are removable armor portions of vests with carriers or entire vests that do not have carriers. Ballistic panels are distinguished by type of materials, the treatment and/or conditioning of the material for stiffness, ballistic resistance, or water repellency and the type of construction or assembly used in forming a complete ballistic panel.

(e) ~~Body Armor.~~ “Body armor” is popularly called a “bulletproof vest”. For purposes of these regulations, “body armor” means those parts of a complete armor that provide ballistic resistance to the penetration of the test ammunition for which a complete armor is certified. In certain models, the body armor consists of ballistic panels without a carrier. Other models have a carrier from which the ballistic panels may be removed for cleaning or replacement.

(f) ~~Carrier.~~ A “carrier” is a washable cloth covering designed to hold and position ballistic panels on the torso.

(g) ~~Chronograph.~~ A “chronograph” is an instrument that times projectiles in flight. It consists of triggering screens and electronic time measurement controls (Figure 2).

(h) ~~Deformation.~~ “Deformation” means the maximum momentary change in the shape of the clay backing surface behind the armor test specimen, caused by a fair hit that does not penetrate the armor.

(i) ~~Fair Hit.~~ A “fair hit” is an impact in which the bullet strikes the armor at an angle of incidence no greater than 5 deg and no closer to the edge of the armor part, or to a prior hit, than 5 cm (2 in.), except as specified for the first three rounds at the approximate center of each front armor panel.

(j) ~~Penetration.~~ “Penetration” is complete perforation of an armor test sample by a test bullet or bullet fragment, or fragments of the armor evidenced by the presence of the bullet or fragment in the backing material, or by a hole that passes through a ballistic panel or vest.

(k) ~~Strike Face.~~ “Strike face” is the surface of an armor designated by the manufacturer as the surface that the bullet should hit.

(l) ~~Velocity.~~ Acceptable “velocity” is the approximate average speed, 2.5%, attained by test bullets using common handguns of specified barrel length and U.S. commercial ammunition. The powder charge of commercial ammunition may be reloaded to achieve the precision specified.

Note: Authority cited: Section 31355, Penal Code. Reference: Sections 31310, 31315, 31320, 31325, 31330 and 31355, Penal Code.

### **§ 943. Abbreviations.**

The following abbreviations are used in this article:

AP	Armor Piercing	LRHV	Long Rifle High Velocity
BK	Buckshot	LRN	Lead Round Nose
FMJ	Full Metal Jacket (same as MC)	MAG	Magnum
		MC	Metal Case (same as FMJ)
HV	High Velocity (or super velocity)	MJ	Metal Jacket (gilding metal, 90% copper alloy)
JHP	Jacketed Hollow Point		
JSP	Jacketed Soft Point		
L	Lead alloyed with hardening agents	RF	Rimfire
		RS	Rifled Slug
LHP	Lead Hollow Point	SWC	Semi Wadcutter
LR	Long Rifle	WC	Wadcutter

Note: Authority cited: Section 31355, Penal Code. Reference: Sections 31310, 31315, 31320, 31325, 31330 and 31355, Penal Code.

**~~§ 944. Type of Armor Certified.~~**

~~Police body armor is classified into four types, as determined by resistance to gunfire (Table 1). The type of body armor submitted for ballistic certification by the Department of Justice shall be specified by the State Armor Committee and must:~~

- ~~(a) meet the current State requirements for acquisition and purchase as determined by the Department of General Services in consultation with the State user agencies represented on the State Armor Committee.~~
- ~~(b) be made by a manufacturer who has an established quality control program acceptable to the Department of General Services as specified in Section 954.~~

~~Note: Authority cited: Section 31355, Penal Code. Reference: Sections 31310 and 31315, Penal Code.~~

**~~§ 945. Test Sequence.~~**

~~Body armor certified by the department shall be examined for the requirements of subsection (a) through (d). If the armor meets these requirements, then they shall be tested for requirements in subsections (e) through (g).~~

- ~~(a) Configuration. Body armor may be manufactured in various models, but every model shall be designed to protect the front and back torso and may, in addition, protect the sides of the torso and the groin or a combination of these.~~
- ~~(b) Protective carrier. If its ballistic panels can be damaged by washing, a vest shall have a washable carrier from which the panels can be removed. If, however, laundering according to instructions does not impair the ballistic resistance of a vest, no washable covering is required.~~
- ~~(c) Workmanship. Each armor vest shall be free from wrinkles, blisters, cracks, fabric tears, crazing, chipped or sharp corners, stains and other evidences of poor workmanship.~~
- ~~(d) Labeling. Each armor vest shall be clearly and durably marked to provide the following information:~~

- ~~(1) Name, designation, or logo of manufacturer~~
- ~~(2) Type of armor, according to Section 944 of this title~~
- ~~(3) Size~~

(4) Serial number

(5) Month and year of manufacture, if not identifiable in the serial number

(6) Strike face, if any

(7) Cleaning instructions for the armor panels and armor carrier, if any

(8) A warning, when applicable, that ballistic resistance may be severely reduced when the armor is wet

(e) Ballistic Protection. Body armor shall protect against the standard test rounds specified in Section 946 of this title. It shall also provide protection against the lesser threats listed in Table 1 for Type I, such as 12 gauge 00 buckshot, 22 caliber Long Rifle, High Velocity, 38 Special, and most other factory loads in 357 Magnum and 9 mm rounds.

(f) Penetration. Body armor shall protect against penetration. Penetration by any fair hit shall constitute failure of the armor tested.

(g) Deformation. The maximum momentary change in the shape of the back surface of the armor test specimens caused by a fair hit that does not penetrate the armor.

Note: Authority cited: Section 31355, Penal Code. Reference: Sections 31310, 31315, 31320, 31325, 31330 and 31355, Penal Code.

#### **§ 946. Testing Equipment and Supplies.**

The following equipment and supplies shall be used in ballistic testing of body armor for approval by the department:

(a) Firearm. A test barrel or a firearm with a barrel length as recommended in Table 2 shall be used to fire all test rounds within the velocities specified for each test round required for each armor type (Table 2).

(b) Ammunition. Ammunition shall be manufactured in the United States for commercial consumption. To insure uniformity, test ammunition is listed by a common manufacturer's order number, but any equivalent ammunition or handloaded components may be substituted.

(1) For Type I Armor:

(A) The 38 SPL test bullets shall be LEAD R.N. (Remington #3854) with nominal mass of 10.2 grams (158 grains) and measured velocities of  $259 \pm 6$  m/s ( $850 \pm 21$  ft.) per sec.

(B) The 22 LRHV test bullet shall be LEAD R.N. with nominal mass of 2.6 grams (40 grains) and measured velocities of  $320 \pm 8$  m/s ( $1050 \pm 26$  ft.) per sec.

(2) For Type IIA Armor:

(A) The 357 MAG test bullets shall be LEAD SWC or equivalent JSP (Remington #357M5), with nominal mass of 10.2 grams (158 grains) and measured velocities of  $397 \pm 10$  m ( $1300 \pm 33$  ft.) per sec.

(B) The 9 mm test bullets shall be FMJ (Remington #R9MM2) with nominal mass of 8 grams (124 grains) and with measured velocities of  $336 \pm 9$  m ( $1100 \pm 28$  ft.) per sec.

(3) For Type II Armor:

(A) The 357 MAG test bullets shall be JSP (Remington #R57M3) with nominal masses of 10.2 grams (158 grains) and with measured velocities of  $425 \pm 11$  m/s ( $1395 \pm 35$  ft.) per sec.

(B) The 9 mm test bullets shall be FMJ (Remington R9MM2) with nominal masses of 8 grams (124 grains) and with measured velocities of  $358 \pm 9$  m/s ( $1175 \pm 30$  ft.) per sec.

(4) For Type III Armor: The 7.62 mm (308 Win) bullets shall be FJM (U.S. Government Issue) with a nominal mass of 9.7 grams (150 grains) and with measured velocities of  $873 \pm 22$  m/s ( $2863 \pm 72$  ft.) per sec.

(5) For Type IV Armor: The 30-06 bullet shall be AP (U.S. Government Issue) with a nominal mass of 10.8 grams (166 grains) and with measured velocities of  $838 \pm 21$  m/s ( $2750 \pm 69$  ft.) per sec.

(c) Optional Ammunition. The agencies for which armor is to be certified may elect to add agency issued ammunition used by the user agency to the test ammunition specified for each armor type in determining the minimum ballistic performance.

(d) Chronograph. The chronograph shall have a precision of 1 microsecond and an accuracy of 2 microseconds. Its two triggering screens shall be of either the photoelectric type or the conductive screen type.

(e) Backing Material. Backing material for ballistic tests shall be a block of non-hardening, oil base modeling clay, 30 cm wide, 30 cm high, and 10 cm thick (12 x 12 x 4 in.) placed in contact with the back of the armor test specimen during ballistic testing.

(f) ~~Steel Testing Cylinder.~~ A steel cylinder with a mass of 1 kg (2.2 lb.), diameter of 45 mm (1.75 in.), and a round striking end shall be used to test the consistency of the clay backing material.

(g) ~~Sheet of Cardboard.~~ A large sheet of cardboard through which the preliminary test round is fired shall be used as a "witness panel" for positioning test rounds on the armor.

Note: Authority cited: Section 31355, Penal Code. Reference: Sections 31310 and 31315, Penal Code.

#### **§ 947. Preparation for Tests.**

Preliminary procedures for ballistic testing of bulletproof vests shall include:

(a) ~~Conditioning of Clay Backing.~~ Clay backing material shall be conditioned by being kept for at least 3 hr. at a temperature between 20 to 28 deg. C (68-82 deg F). Before testing, the clay shall be worked thoroughly to eliminate any air pockets. Its pretest consistency shall be such that a depression of  $25 \pm 3$  mm ( $1 \pm 0.1$  in.) results when the steel cylinder specified in Section 946(e) is dropped from a height of 2 m (6.5 ft.) onto the 45-cm-sq face of the clay. The steel cylinder shall be dropped three times, and the center of each impact shall be at least 75 mm (3 in.) from a previous impact and from any edge of the block. The depth of penetration of each impact shall be recorded as the distance between the point of maximum depression and the undisturbed surface of the clay backing material. After each impact is recorded, the clay shall be reshaped to its specified dimensions and smoothed.

(b) ~~Warm-up of Equipment.~~ All electronic equipment shall be allowed to warm up for 30 min or until stability is achieved, whichever time is greater.

(c) ~~Atmospheric Conditions.~~ Throughout testing, the ambient temperature shall be 18 to 28 deg C (65 to 82 deg F), and the relative humidity 30 to 70%.

Note: Authority cited: Section 31355, Penal Code. Reference: Sections 31310, 31315, 31320, 31325, 31330 and 31355, Penal Code.

#### **§ 948. Test Procedure.**

Test equipment for ballistic testing shall be positioned as diagrammed in Figure 2.

- (a) ~~Test Weapon.~~ The required test weapon or test barrel shall be firmly clamped with barrel horizontal and in such a manner that the alignment of the weapon does not alter when the weapon discharges. When a test barrel is used, the barrel length and the muzzle to armor distance are not critical as long as the specified velocity is attained at the chronograph screen distances specified in Figure 2.
- (b) ~~Chronograph Screens.~~ Two chronograph triggering screens shall be placed 1.5 to 2.0 m (4.9 to 6.5 ft.) and 2.5 m (8.2 ft.) from the end of the muzzle of the test weapon and perpendicular to the bullet's line of flight. Distance between screens shall be measured within an accuracy of 1 mm (0.04 in.).
- (c) ~~Cardboard Sheet.~~ For the pretest rounds the cardboard witness panel shall be positioned no more than 3 m (10 ft.) from the end of the muzzle of the test weapon.
- (d) ~~Backing Material.~~ The back face of the sample armor to be tested shall be secured to the backing material with tape or other means that will not interfere with the test.

~~Note: Authority cited: Section 31355, Penal Code. Reference: Sections 31310, 31315, 31320, 31325, 31330 and 31355, Penal Code.~~

#### **§ 949. Pretest.**

~~Before the official tests, a pretest round shall be fired through a cardboard witness panel or the conductive screens of the chronograph to determine the line of flight and the bullet's point of impact.~~

~~Note: Authority cited: Section 31355, Penal Code. Reference: Sections 31310, 31315, 31320, 31325, 31330 and 31355, Penal Code.~~

#### **§ 951. Dry Armor Ballistic Tests.**

~~The front and rear ballistic panels of each armor type shall be tested with the type of ammunition specified in Section 946(b) for each armor type. The dry weight of each armor specimen (without a removable carrier) shall be determined and recorded prior to the start of ballistic testing. Armor with separate removable carriers do not require that the carrier be ballistically tested.~~



(a) Preparation. The assembly of the armor and the clay backing shall be placed behind the cardboard witness panel with the armor strike face perpendicular to the line of flight of the bullet so that the desired point of impact touches the bullet hole in the cardboard or the line of sight through the holes in the chronograph screens. Then the cardboard shall be removed.

(b) Test Round. For each type of ammunition and starting with a front armor panel positioned on the clay backing, a test round shall be fired within a 2 in target area at the approximate center of the front armor panel.

(c) Recording. The time the bullet takes to pass between the two triggering screens, as determined by the chronograph, and the calculated bullet velocity shall be recorded.

(d) Examination for Penetration. After each round the armor and the backing material shall be examined to determine whether or not penetration occurred when a bullet traveling at an acceptable velocity ( Table 2 ) made a fair hit.

(e) Examination for Deformation. After each nonpenetrating round, the depression formed in the clay shall be examined and the depth, base diameter, and general shape (i.e. hemispherical, elliptical, pyramidal, etc.) shall be recorded for each fair hit.

(f) Repetition and Recording. The armor panel shall be repositioned on the clay backing and test firing continued until at least five fair hits, at acceptable velocities, have been recorded for each front and rear panel tested. Rounds that strike the armor over previous hits or less than 1 in. from any broken thread resulting from a previous round shall not be counted as fair hits. The backing material shall be repositioned (as required) to prevent over lapping of depressions in the clay.

Note: Authority cited: Section 31355, Penal Code. Reference: Sections 31310 and 31315, Penal Code.

#### **§ 952. Wet Armor Ballistic Tests.**

If no ballistic penetration occurs on the dry armor, additional armor of the same specific type shall be tested wet. However, only armor that is not enclosed in a permanent waterproof cover shall be subjected to ballistic wet testing. All ballistic sections comprising either the front or back torso (excluding any removable carrier) shall be treated as one unit and tested as follows:

~~(a) Determining Dry Mass. Before immersion, the dry mass of each front or back ballistic unit is determined to an accuracy of  $\pm 1$  gm.~~

~~(b) Wet Armor Conditioning. Each unit shall be immersed in water of  $25 \pm 5$  deg C ( $77 \pm 9$  deg F) for 1 hour with one to two minutes of flexing and agitation at about 10 minute intervals.~~

~~(c) Determining Wet Mass. Immediately on removal from the water, the armor units are hung to drain and periodically weighed until each front or back unit achieves a water retention (WR) value of 10 to 12% expressed as a percentage of the dry mass:~~

$$\%WR = (WM - DM) / DM \times 100$$

~~Ballistic units which do not achieve a 10 to 12% WR value shall be immersed for an additional 30 minutes as described above. Ballistic units which do not achieve a 10 to 12% WR after 90 minutes shall not be wet tested.~~

~~(d) Testing. Each front or back ballistic unit shall be tested within 1 hour of achieving a WR of 10 to 12%. The %WR and the time it was determined shall be recorded immediately before and after the test rounds fired at each unit and referenced to the time of the first and last rounds. Wet ballistic test procedures shall be the same as those specified for dry armor.~~

Note: Authority cited: Section 31355, Penal Code. Reference: Sections 31310, 31315, 31320, 31325, 31330 and 31355, Penal Code.

### **§ 953. Performance Requirements for Ballistic Tests.**

To be certified, body armor tested shall meet the following minimum requirements:

~~(a) Each armor type shall evidence no sign of penetration after the number of fair hits, by the rounds specified, for each armor type as specified in Table 2, when tested dry (Section 951). Non-penetrating rounds that exceed the velocity ranges specified, but otherwise qualify as a fair hit, shall be counted as fair hits.~~

~~(b) Armor that is not enclosed in a permanent water repellent cover, shall in addition, evidence no sign of penetration after the number of fair hits, by the rounds specified, for each armor type as specified in Table 2, when tested wet (Section 952).~~

~~(c) Each torso front or back ballistic panel(s) shall not be used for more than a total of eight hits wherein at least five out of the eight shall be fair hits.~~

(d) The minimum performance requirements for ballistic deformation have not been conclusively established. The deformation of all fair hits shall be measured and reported for the consideration of prospective user. The deformation performance standard recommended in the NILECJ standard 0101.01 (Dec. 1978) is that the deformation shall not exceed an average depth of 44 mm (1.73 in.) for the number of fair hits required for each armor type.

Note: Authority cited: Section 31355, Penal Code. Reference: Sections 31315 and 31355, Penal Code.

**§ 954. Quality Control Program Requirements.**

Manufacturers of body armor certified by the Department of Justice shall establish a formal quality control program plan prior to procurement of the vests by the State. The plan shall meet, in essence, the criteria specified in "Inspection System Requirements", military specification number MIL I 45208A (December 16, 1963), except all references to "government" or "military" shall read "State of California".

Note: Authority cited: Section 31355, Penal Code. Reference: Sections 31310, 31315, 31320, 31325, 31330 and 31355, Penal Code.

**§ 955. Test Samples.**

The approved laboratory selected by the Department of Justice to test body armor in accordance with the requirements of this title shall determine the number of complete armors or armor panels needed for testing.

Certification of one specific design and construction of ballistic panels or vest of a manufacturer shall convey certification to all armor of the same manufacturer that incorporate ballistic panels with the same specific design and construction.

Additional samples of armor certified under these regulations shall be tested for conformance with the certification standards as part of the quality control requirements of any purchase contract issued by the Department of General Services.

Note: Authority cited: Section 31355, Penal Code. Reference: Sections 31310, 31315, 31320, 31325, 31330 and 31355, Penal Code.

**§ 956. Submission of Test Samples.**

The Department shall announce to all known domestic manufacturers of police body armor a schedule for certification testing, sample submission requirements, and procedures contingent on the Department of General Service's need to bid a new purchase contract to supply police body armor for State peace officers.

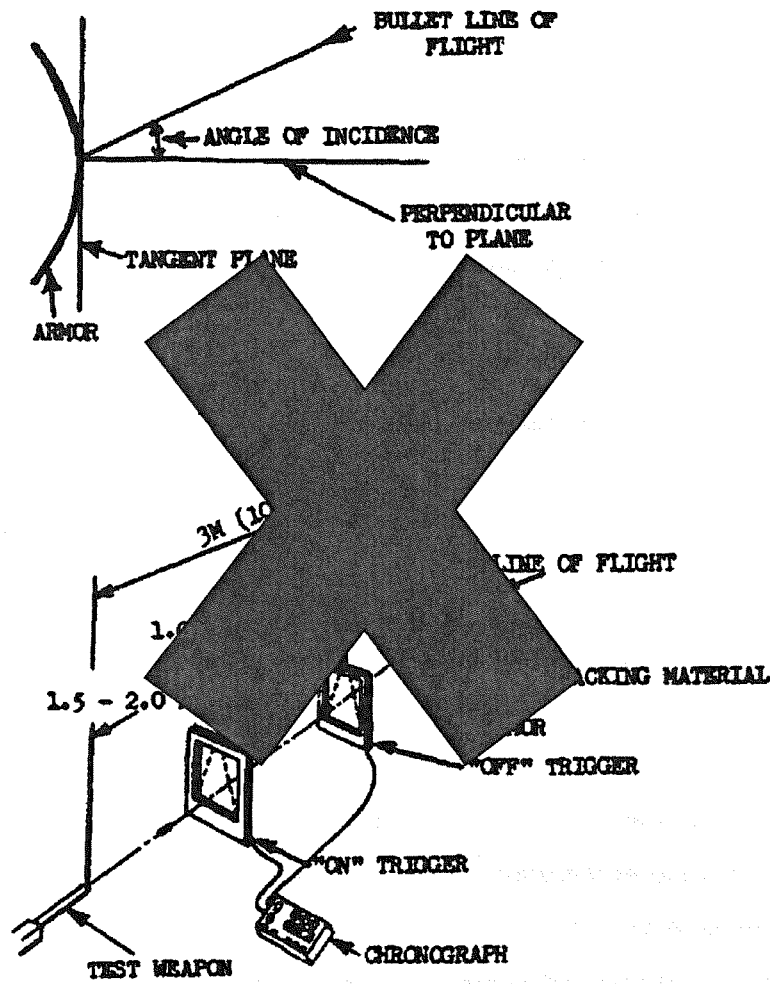


FIGURE 2. BALLISTIC TEST SETUP

TABLE 1. PROTECTION AFFORDED BY POLICE BODY ARMOR

FOOTNOTE (1): Refer to Table 2 for specific rounds and velocities for type IIA and II armor.

**TABLE I. PROTECTION AFFORDED BY POLICE BODY ARMOR**

TYPICAL THREAT LEVELS	BALLISTIC PROTECTION AFFORDED				
	TYPE I ARMOR	TYPE IIA ARMOR	TYPE III ARMOR	TYPE IIIA ARMOR	TYPE IV ARMOR
22 LRHV (Handgun) 25 AUTO 32 AUTO 38 SPL LEAD 12 GAUGE #4 LEAD SHOT	NO	YES	NO	YES	YES
357 MAG. LEAD, or JSP 9mm LUGER FMJ 38 SPL HV 22 LRHV (RIFLE) 45 AUTO 12 GAUGE OO BIC	NO	NO	NO	YES	YES
7.62 mm FMJ 44 MAG. LEAD or JSP 41 MAG. 30-06 JSP 30 CARBINE 12 GAUGE R.S.	NO	NO	NO	YES	YES
30-06 AP	NO	NO	NO	NO	YES

TABLE 2. TEST SUMMARY

**TABLE 2. TEST SUMMARY**

ARMOR TYPE	TEST AMMUNITION	TEST VARIABLES		PERFORMANCE REQUIREMENTS <sup>1</sup>		
		NOMINAL BULLET WEIGHT	SUGGESTED BARREL LENGTH	BULLET VELOCITY <sup>1</sup>	FAIR HITS	
					PER ARMOR HIT	WITH NO PENETRATION
I	38 SPL RN LEAD 22 LR LEAD	16.5 gm	16.5 cm	250 m/s	5°	70 dry 10 wet 10 dry 10 wet
IIA	357 MAG. LEAD SWC 9mm FMJ	8 gm 124 gr	16.5 cm	250 m/s 250 ft/s	5°	70 dry 10 wet 10 dry 10 wet
II	357 MAG. JSP 9mm FMJ	10 gm	16.5 cm	250 m/s	5°	70 dry 10 wet 10 dry 10 wet
III	7.62 mm (308 WIN) FMJ	10 gm	28 cm 28 in	250 m/s	5°	70 dry 10 wet
IV	30-06 AP	10.5 gm 166 gr	56 cm 22 in	838 ± 21 m/s 2750 ± 60 ft/s		Not Established

~~\* The total hits per each armor part designed to cover the front or back torso shall not exceed eight, of which five may be fair hits.~~

~~(1) Performance requirements for optional, agency issued, ammunition, Section 946(e), shall be specified as part of the certification testing announcement and scheduled by the Department.~~

~~(2) Non-penetrating rounds that exceed the velocity range specified, but otherwise qualify as a fair hit shall be counted as fair hits.~~

~~Note: Authority cited: Section 31355, Penal Code. Reference: Section 31330, Penal Code.~~

#### ~~§ 957. References-Publications.~~

~~These references are available from the U.S. Government Printing Office, Washington, DC 20402:~~

~~(a) Military specifications number MIL-I 45208A (12/16/63). See Section 954 of this title.~~

~~(b) Informational publications of the National Institute of Law Enforcement and Criminal Justice, Law Enforcement Assistance Administration, U.S. Department of Justice:~~

~~(1) Body Armor, Lightweight Body Armor for Law Enforcement Officials, May 1976 (Stock No. 027-000-00409-1)~~

~~(2) Body Armor, Blunt Trauma Data, May 1976 (Stock No. 027-000-00408-3)(3) Body Armor, Medical Assessment, May 1976 (Stock No. 027-000-00407-5)~~

~~(c) NILCJ-STD-0101.01 "Ballistic Resistance of Body Armor", December 1978, available from National Bureau of Standards, Law Enforcement Standards Laboratory.~~

~~Note: Authority cited: Section 31355, Penal Code. Reference: Sections 31310 and 31315, Penal Code.~~