

SUBJECT SUBJECT SSSYBS SUSUBM	FIREARM TEST FIRING PROTOCOL
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8.0 Firearm Test Firing Protocol

- 8.1 Ensure that the firearm is SAFE to fire including that the bore is unobstructed. **Always wear appropriate eye and ear protection. Always ensure that the in-use warning lights of the indoor shooting areas are activated during test firing.**
- 8.2 Use ammunition designed for the firearm.
- 8.2.1 There will be exceptions to the above when the perpetrator has fired ammunition components in a firearm that was not designed to fire them. e.g. 16 gauge shotgun shell in a 12 gauge shotgun or a .357 Magnum fired in a 30-30 rifle.
- On those occasions where ammunition not designed for a firearm must be fired in that firearm, extreme caution should be maintained. Firing the firearm remotely may be the best option.
- 8.3 Fire at least two (2) rounds and any more that may be needed. Only load one round at a time in a magazine for semiautomatic/automatic firearms.
- 8.4 In certain cases it may be necessary to clean the bore after the first test shots before firing any more test shots. The firearm should first be fired as it was received except when the bore is rusted, corroded, or blocked by mud/dirt such that it could not have been fired and left in that condition.
- 8.4 The examiner may choose to pre-mark the test cartridge cases with marks to assist in phasing during microscopic examination or marks indicating sequence of fire e.g. Place a phase mark on the ogive of the bullet extending down on to the casing and chamber the round with the mark at 12 o'clock.
- 8.5 Use proper safety equipment such as ear protectors and safety glasses.

SUBJECT SUBJECT SSSYBS SUSUBM	FIREARM TEST FIRING PROTOCOL
--	-------------------------------------

- 8.6 Treat every barrel of multiple barreled firearms separately.
- 8.7 Use the appropriate bullet recovery system.
 - 8.7.1 Horizontal water recovery tank. (Indoor Range)
 - 8.7.2 Vertical water recovery tank. (Section)
 - 8.7.3 Twelve (12') foot or five (5') foot waste cotton box. (Indoor Range)
- 8.8 Retrieve test bullets immediately after firing to prevent mix-up with another gun in same case or with a different case.
- 8.9 Tests should be marked with a "T" or test number in sequential order. e.g. Test bullets fired in and from the K-1 pistol are marked T-1 and T-2 and their respective test cartridge cases are also marked T-1 and T-2. If there is a second firearm in the case, test bullets would be marked T-3 and T-4 and the cartridge cases likewise.
- 8.10 A small manilla envelope should be used to hold test shots. One side of the envelope should be marked with the following information:
 - 8.10.1 Caliber - The caliber of the firearm.
 - 8.10.2 SBI Lab# - Self explanatory.
 - 8.10.3 Manufacturer - Manufacturer of firearm.
 - 8.10.4 Model - Model of firearm, if known.
 - 8.10.5 SN# - Serial number of firearm, if present.

SECTION	FIREARM TEST FIRING PROTOCOL
----------------	-------------------------------------

8.10.6 GRC'S - The general rifling characteristics of the barrel of the firearm.

8.10.7 Item# - The "K" number assigned this firearm.

8.10.8 LWD GWD \pm - The land impression measurement of the test fired bullets, the groove impression measurements of the test fired bullets, and the degree of latitude in thousands of an inch. e.g .095" .115" \pm .003"

8.10.9 Test Fires Include a description of the test ammo used and the "T" numbers assigned to the test fired bullets and/or cartridge cases/shotgun shells.

8.10.10 Date of Offense - Self explanatory. Information needed for IBIS entries.

8.10.11 County Self explanatory. Information need for IBIS entries.

8.10.12 Type of Case - Self Explanatory. Information needed for IBIS entries.

8.10.13 IBIS Entries - Which test fires were entered into IBIS.

8.10.14 Initials - Self Explanatory. Information needed to assist IBIS Technician in returning test fires.

8.10.15 Agency Agency submitting firearm. Information needed for IBIS entries.

8.10.16 File # Agency OCA (case identifying number). Information needed for IBIS entries.

8.11 Test fires are reference items and are not evidence. Each examiner will retain their own test fires in an unsealed envelope labeled with at

SECTION	FIREARM TEST FIRING PROTOCOL
----------------	-------------------------------------

least the unique case identifier in a designated and dedicated area of the examiner's work area. Test fires will be retained for a minimum period of one (1) year or longer as deemed appropriate by the examiner. Upon retiring or otherwise leaving employment with the SBI Crime Laboratory Division, an examiner's test fires will be retained for a minimum period of one (1) year or longer as deemed appropriate SAC of the Firearm and Tool Mark Section. After the one (1) year period test fires may be disposed of. The disposal of test fires need not be witnessed, but the means of disposal of test fires must be approved in advance each year by the SAC of the Firearm and Tool Mark Section.

8.12 A sample of a form that may be used on test fired envelopes can be viewed on this page.

CALIBER:	SBI LAB #:	
MANUFACTURER		
MODEL:	SN #:	
GRC'S:	ITEM #:	
LWD:	GWD:	(±):
TEST FIRES:		
DATE OF OFFENSE:	COUNTY:	
TYPE OF CASE:		
IBIS ENTRIES:	INITIALS:	
AGENCY:	FILE #:	

SECTION	FIREARM TEST FIRING PROTOCOL
----------------	-------------------------------------

8A.0 Protocol for Ejection Pattern Tests

8A.1 Standard ejection pattern test.

- 8A.1.1 Use the suspect firearm and the same manufacturer and type of ammunition received from the requesting Agency or determined by the examiner from the fired ammunition components received.
- 8A.1.2 Fire all ejection pattern tests at the outdoor range.
- 8A.1.3 Shoot the tests at shoulder height. With pistols use the strong hand and a strong grip and have the shooting arm extended. A measurement should be made from the ejection port to a point on the ground directly below the ejection port.
- 8A.1.4 A minimum of five (5) rounds should be fired.
- 8A.1.5 A technician or second examiner may be needed to mark the points on the ground where the fired cartridge cases first land or the examiner may elect to use a parachute or other large drop cloth to determine where the fired cartridges first land.
- 8A.1.6 Measurements should be taken from the point on the ground directly below the ejection port to the ejected cartridge cases and the general direction (right/left of shooter, front/rear of shooter) of the ejected cartridge cases should be noted.
- 8A.1.7 The examiner may draw a sketch to illustrate the results.

8A.2 A non-standard ejection pattern test.

- 8A.2.1 When information is provided to the examiner about the

SECTION

FIREARM TEST FIRING PROTOCOL

conditions/situations of a shooting incident and the requesting agency asks that an ejection pattern test be conducted simulating those conditions/situations then the following protocol will be followed:

- First, conduct a standard ejection pattern test.
- Next, using the information provided about the conditions of the shooting incident (e.g. shooter was 6' 6" tall, using a two-handed grip with the gun canted to the right or shooter was aiming gun down at a 45 degree angle) the examiner will devise a method to best simulate those conditions. Since the variables are infinite - no set procedures will be established for simulating these variables. It will be up to the examiner to best determine the methodology to be used.
- A minimum of five (5) rounds should be fired.
- A technician or second examiner may be needed to mark the points on the ground where the fired cartridge cases first land or the examiner may elect to use a parachute or other large drop cloth to determine where the fired cartridges first land.
- Measurements should be taken from the point on the ground directly below the ejection port to the ejected cartridge cases and the general direction (right/left of shooter, front/rear of shooter) of the ejected cartridge cases should be noted.
- The examiner may draw a sketch to illustrate the results.

8A.3 Reporting results

8A.3.1 Standard ejection pattern test:

- Results should be reported in general terms unless asked by the requesting Agency for more specific information.

SECTION

FIREARM TEST FIRING PROTOCOL

- E.G. Using the K-1 pistol and ammunition like the K-1A cartridges an ejection pattern test was conducted. The K-1 pistol was held at shoulder height (approximately 58 inches) (*always include the approximate height in inches*) with a firm grip in the examiners strong hand. Fired cartridge cases landed or tended to land to the right and rear of the shooter.
- Examiner may include distances in their results. E.G. Using the K-1 SKS rifle and the K-2 ammunition an ejection pattern test was conducted. The rifle was held at shoulder height (approximately 58 inches) (*always include the approximate height in inches*) and fired cartridge cases were ejected to the right front of the shooter from 16 feet to 32 feet.

8A.3.1 Non-standard ejection pattern test:

- First, report the results of a standard ejection pattern test.
- Next, report the results of the non-standard ejection pattern test including a explanation of all the variables used to conduct the examination.
- E.G. With the K-1 pistol held at a height of approximately 72 inches in a two handed grasp and with the pistol canted to the right at an approximate 45 degree angle, fired cartridge cases were ejected or tended to be ejected to the right of the shooter at distances from 2 feet to 4 feet.

SECTION	FIREARM TEST FIRING PROTOCOL
----------------	-------------------------------------

8B.0 Protocol for Testing Silencers

8B.1 Test should be performed at the firing range.

8B.2 Calibrate sound meter using the acoustical calibrator as follows
(the manual found inside the calibrators case contains these instructions):

8B.2.1 Insert the microphone of the Digital Sound Level Meter into the Acoustical Calibrator Probe. Be sure the microphone fits snugly and is inserted completely.

8B.2.2 Set the sound meter on a stable flat surface using the tripod stand built into the back of the meter. Turn on the Sound Level Meter and select the 50 - 100 dB range. Turn the sound level "speed" selector switch to "slow".

8B.2.3 Move the switch on the Acoustical Calibrator to the "Battery Test" position. Be sure the LED lights up indicating a good battery.

8B.2.4 Move the switch to the "ON" position.

8B.2.5 Using the small screwdriver provided with the sound meter, turn the calibration adjustment screw on the sound meter until the display reads 94 dB in the C scale. (Reading can vary slightly from A to C weighting scales, but should be within the accuracy specifications.)

8B.2.6 The meter is now calibrated and ready to use. The examiner will document in the case notes that the meter was calibrated immediately prior to use.

8B.3 Set up the Digital Sound Level Meter.

8B.3.1 Place the sound meter on a flat surface using the tripod built into the back approximately 10 feet from where the firearm will be fired. Point the microphone toward the firearm.

8B.3.2 Move the power switch to the "ON(DC)" position.

SECTION	FIREARM TEST FIRING PROTOCOL
----------------	-------------------------------------

8B.3.3 Place the A/C weighting selector switch into the “C” position for C scale weighting.

8B.3.4 Set the range selector the 80 - 100 dB range.

8B.3.5 Set the speed selector to “PEAK”.

8B.4 Test fire the firearm without the silencer. After each test fire...

8B.4.1 Read the LCD reading of the sound level and record. Accuracy is ± 1.5 dB.

8B.4.2 Reset the “PEAK” reading by moving the speed selector to “FAST” and then back to “PEAK”.

At least five (5) tests should be fired. Adjust the range selector if necessary.

8B.5 Test fire the firearm with the silencer attached to the muzzle. After each test fire...

8B.5.1 Read the LCD reading of the sound level and record. Accuracy is ± 1.5 dB.

8B.5.2 Reset the “PEAK” reading by moving the speed selector to “FAST” and then back to “PEAK”.

At least five (5) tests should be fired. Adjust the range selector if necessary.

8B.6 These readings should be included in the case notes.

8B.7 If, when equipped with the silencer, the sound level is reduced by any measurable amount, the silencer functions to reduce the sound. The accuracy of the Sper Scientific Digital Sound Level Meter is ± 1.5 dB and this should be considered when determining if the reduction is significant.

SECTION	FIREARM TEST FIRING PROTOCOL
----------------	-------------------------------------

8C.0 Protocol for Testing Muzzle Velocity

8C.1 Test should be performed at the outdoor firing range.

8C.2 Assemble the Oehler Skyscreens as described in the operating instructions.

8C.3 Place the assembled skyscreens approximately eight (8) to ten (10) feet in front of the muzzle. The triangular light diffusers should form a triangle-within-a-triangle sight picture as you look down the barrel at the target from your normal shooting position.

8C.4 Connect the cables from the skyscreens to the input jacks of the Oehler model 35P as described in the operating manual. Make sure the plugs are pushed all the way into the jacks.

8C.5 Place the Chronograph at a convenient location well behind the muzzle to protect it from muzzle blast.

8C.6 The display will read - - - **0** to show that it is ready to begin a new group. If it does not, push the RESET button.

8C.7 The firearm should be test fired a minimum of five (5) times without an erroneous reading. Allow the chronograph to print the result of each test fire before firing the next. If an erroneous reading occurs (indicated by an asterisk “*”) press the OMIT button one (1) time to erase this reading from the memory. A minimum of five (5) valid readings should be taken.

8C.8 Upon completion of test firing, press the SUMMARY button to print a summary of the test velocities. These figures should be included in the examiner’s notes. The print summary will show:

the high velocity denoted by	+
the low velocity denoted by	-
the extreme velocity spread denoted by	E
the average velocity denoted by	M
and the standard deviation denoted by	S