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Baseline Specifications for Law Enforcement Service Pistols with Security Technology

U.S. Department of Justice
Office of Justice Programs
810 Seventh St. N.W.
Washington, DC 20531

Loretta E. Lynch

Attorney General

Karol V. Mason

Assistant Attorney General

Nancy Rodriguez, Ph.D.

Director, National Institute of Justice

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Introduction

On April 29, 2016, the U.S. Departments of Justice (DOJ), Homeland Security (DHS), and Defense (DoD) submitted a joint report to the President outlining a strategy to expedite deployment of gun safety technology, in response to Presidential Memorandum, *Promoting Smart Gun Technology*. The report described the potential benefits of advanced gun safety technology, but noted that additional work was required before this technology is ready for widespread adoption by law enforcement agencies. In particular, the report stressed the importance of integrating this technology into a firearm's design without compromising the reliability, durability, and accuracy that officers expect from their service weapons.

To address these issues, the report called on law enforcement agencies to develop “baseline specifications,” which would outline the agencies’ operational requirements for any firearms equipped with gun safety technology. By developing baseline specifications, federal, state, and municipal law enforcement agencies can make clear to private manufacturers what they expect from this technology. It is hoped that this document can inform research and development efforts focused on incorporating additional features into law enforcement pistols.

DOJ and DHS recently assembled a working group of experts in firearms technology to identify operational needs and prepare a draft document that defines generic baseline specifications for law enforcement service pistols with additional technology to enhance the security of firearms. The additional security specifications found in section 4.18 that may be addressed by smart gun technology are distinguished from more familiar firearm safety mechanisms found in section 4.17. The distinction between safety and security can be nuanced, and the additional security specifications may also function as safety features under certain circumstances. However, this distinction forms the basis of the use of the different terminology.

The working group was led by the National Institute of Justice (NIJ) and was comprised of subject matter experts from federal law enforcement agencies, including:

Department of Justice

- Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF)
- Drug Enforcement Administration (DEA)
- Federal Bureau of Investigation (FBI)
- Office of the Deputy Attorney General (ODAG)

U.S. Marshals Service (USMS)

Department of Homeland Security

Customs and Border Protection (CBP)

Federal Emergency Management Administration (FEMA)

Federal Law Enforcement Training Center (FLETC)

Federal Protective Service (FPS)

Immigration and Customs Enforcement (ICE)

Office of the Secretary / Office of the Military Advisor

Office for State and Local Law Enforcement (OSLLE)

Office of the Chief Security Officer (OCSO)

Science and Technology Directorate (S&T)

U.S. Coast Guard (USCG)

U.S. Secret Service (USSS)

Department of Defense

Office of the Chief of Staff of the Air Force (CSAF)

Pentagon Force Protection Agency (PFPA)

US Army RDECOM - Armament Research, Development and Engineering Center (ARDEC)

The development process for this document followed a consensus-based approach. The limited amount of time available to publish a final version of the document required using already existing specifications and test procedures. The content is drawn from actual Federal procurement actions and represents a reasonable set of physical characteristics and performance requirements achievable by pistols today for general purpose use by law enforcement, Section 4.18 notwithstanding. The information detailed in this document is informed in part by specifications enumerated in recent handgun solicitations by the FBI and ICE, which are publicly available on FedBizOpps (<http://www.fbo.gov>) under solicitation numbers RFP-OSCU-DSU1503 and HSCEMS-16-R-00003, respectively.

A draft version of this document was published for public comment for 60 days on the Federal Register (<https://www.federalregister.gov/d/2016-16759>). The public comment period opened on July 15, 2016 and closed on September 13, 2016. DOJ and DHS also convened a number of federal, state, and local law enforcement agencies and law enforcement professional associations on August 17-18, 2016 in Washington, DC to review and discuss the draft specifications prepared by the interagency working group.

Any features discussed in the April 2016 report, public comments to NIJ, and the topical meeting over the summer of 2016 that are not included in this document are due to the lack of time to achieve consensus on how to best incorporate these features into law enforcement firearms. This should in no way imply that these features should not be explored by both law enforcement end users and industry.

This document is not a procurement action. Any manufacturer's claim of meeting the specifications herein does not obligate the Government to award a contract. Any such claim shall be subject to verification. Agencies that acquire firearms should take appropriate

steps to consider whether including such technology in specifications for acquisition of firearms would be consistent with operational needs.

This document uses the following in accordance with international standards:

- “shall” indicates a requirement;
- “should” indicates a recommendation;
- “may” indicates a permission;
- “can” indicates a possibility or a capability.

Please send written feedback on this document by email to gunsafetytechnology@usdoj.gov. Please include “Baseline Specifications” in the subject line and address comments to the attention of the Policy and Standards Division Director.

Please send written feedback on this document by letter to:

Director
National Institute of Justice
810 7th Street NW
Washington, DC 20531
Attn: Policy and Standards Division Director

Baseline Specifications for Law Enforcement Service Pistols with Security Technology

1 Scope

- 1.1 This document defines generic baseline specifications for law enforcement service pistols with additional technology to enhance the security of firearms.
- 1.2 The pistols defined by this document shall be semi-automatic, recoil-operated, magazine-fed, striker-fired, and fire 9 mm Luger or .40 S&W ammunition.
- 1.3 Class I and Class II pistols shall have the same operating system and control mechanisms with the only difference being the slide, barrel, frame, and grip dimensions.
- 1.4 This document defines performance and testing requirements in addition to the baseline specifications.
- 1.5 Unless a specific class of pistol defined in Section 3 is deliberately called out in the document, any given specification or requirement shall be understood to apply to all pistols within the scope of this document.
- 1.6 This document does not define any specifications or performance and testing requirements related to ammunition other than requiring the use of 9 mm Luger or .40 S&W ammunition.
- 1.7 This document shall not be understood as addressing all of the safety risks associated with testing firearms. The user of this document is responsible for following appropriate safety practices when handling or operating firearms.

2 Normative references

ANSI/SAAMI Z299.3 – 2015, *American National Standard Voluntary Industry Performance Standards for Pressure and Velocity of Centerfire Pistol and Revolver Ammunition for the Use of Commercial Manufacturers*, Sporting Arms and Ammunition Manufacturers' Institute, 2015.

ANSI/SAAMI Z299.5 – 1996, *American National Standard Voluntary Industry Performance Standards Criteria for Evaluation of New Firearms Designs Under Conditions of Abusive Mishandling for the Use of Commercial Manufacturers*, Sporting Arms and Ammunition Manufacturers' Institute, 2015.

AR 70-38, *Research, Development, Test and Evaluation of Materiel for Extreme Climatic Conditions*, Department of the Army, 15 September 1979.

ISO/IEC Directives, Part 2, *Principles and rules for the structure and drafting of ISO and IEC documents*, Seventh edition, 2016.

“Maximum Cartridge / Minimum Chamber: 40 Smith & Wesson,” *Cartridge and Chamber Drawings, Centerfire Pistol and Revolver*, Sporting Arms and Ammunition Manufacturers' Institute, January 25, 2009.

“Maximum Cartridge / Minimum Chamber: 9mm Luger / 9mm Luger P+,” *Cartridge and Chamber Drawings, Centerfire Pistol and Revolver*, Sporting Arms and Ammunition Manufacturers' Institute, January 25, 2009.

MIL-STD-810G w/ Change 1, *Environmental Engineering Considerations and Laboratory Tests*, U.S. Army, 15 April 2014.

MIL-STD-1913, *Dimensioning of Accessory Mounting Rail for Small Arms Weapons*, U.S. Army, 3 February 1995.

John Olson, *Olson's Encyclopedia of Small Arms*, Piscataway, NJ: Winchester Press, 1985.

Test Operations Procedure (TOP) 3-2-045, *Small Arms - Hand and Shoulder Weapons and Machineguns*, U.S. Army, 17 September 2007.

TOP 1-2-512, *Electromagnetic Compatibility Tests*, U.S. Army, 15 May 1995.

3 Terms and definitions

Class I Compact Pistol

A Class I Pistol is defined as a pistol with a barrel length of no less than 3.75” and no greater than 4.25” and a minimum magazine capacity of 14 rounds.

Class II Full Size Pistol

A Class II Pistol is defined as a pistol with a barrel length of no less than 4.26” and no greater than 5.20” and a minimum magazine capacity of 16 rounds.

Pistol

The pistol shall be defined as all parts and features of the firearm system including any externally worn items, such as rings, wristbands, or tokens that may be associated with the security device. The definition shall exclude ammunition.

Product Kit

The product kit shall include night sights, six magazines, any additional accessories required for normal operation, an agency-approved gun lock, an operator's manual written in English, and a stackable hard plastic container.

SAAMI

Sporting Arms and Ammunition Manufacturers' Institute.

4 Baseline specifications

4.1 Action

4.1.1 Pistols shall be semi-automatic, recoil-operated, magazine-fed, and striker-fired.

4.1.2 Pistols shall not have a hammer, either external or internal.

4.2 Caliber

4.2.1 Pistols shall be chambered for 9 mm Luger or .40 S&W cartridges, which are compliant with SAAMI standards.

4.3 Barrel

4.3.1 The Class I Pistol barrel shall be a minimum of 3.75 inches and shall not exceed 4.25 inches.

4.3.2 The Class II Pistol barrel shall be a minimum of 4.26 inches and shall not exceed 5.20 inches.

4.3.3 The barrel lengths between the two classes of pistol shall not be closer than 0.5 inches.

4.3.4 The chamber headspace shall meet dimensional tolerances as specified by SAAMI standards for 9 mm Luger or .40 S&W ammunition.

4.3.5 The barrel shall be matte black or dark grey in color.

4.3.6 The barrel shall have a corrosion resistant bore and exterior finish.

4.3.7 The barrel shall be rifled with a twist rate of 1 revolution to 12 inches or faster.

4.3.8 The barrel shall not be ported.

4.4 Bore axis

4.4.1 Pistols shall have a bore axis height of less than 1.75 inches.

4.4.2 The bore axis height shall be verified by measuring from the centerline of the bore to the lowest point in the grip back strap from the highpoint on the grip where the web of the firing hand rests in accordance with Figure 1.

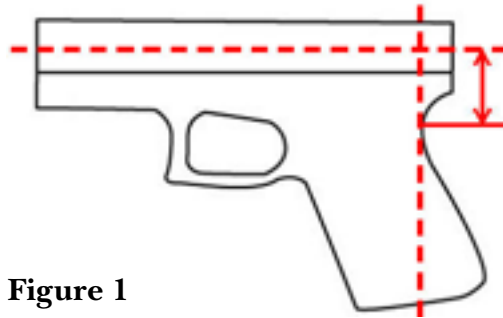


Figure 1

4.4.3 The bore axis height shall be measured with a medium back strap and/or grip panels and/or chassis grip installed.

4.5 Weight

4.5.1 Class I Pistols shall not exceed 35.0 ounces in weight with an unloaded standard capacity magazine.

4.5.2 Class II Pistols shall not exceed 42.0 ounces in weight with an unloaded standard capacity magazine.

4.6 Height

4.6.1 The Class I Pistol height shall be no less than 4.75 inches and no greater than 5.60 inches.

4.6.2 The Class II Pistol height shall be no greater than 6.00 inches.

4.6.3 The height shall be measured with a fully seated standard capacity magazine.

4.6.4 The height shall encompass the highest and lowest most protrusions of the pistol.

4.6.5 Height shall be measured with a medium back strap and/or grip panels and/or chassis grip installed.

4.7 Length

4.7.1 Class I Pistols shall not exceed 8.00 inches in length.

4.7.2 Class II Pistol shall not exceed 9.00 inches in length.

4.7.3 The length shall be measured with a fully seated standard capacity magazine.

4.7.4 The length shall encompass the forward and rearward most protrusions of the pistol.

4.7.5 Length shall be measured with a medium back strap and/or grip panels and/or chassis grip installed.

4.8 Width

4.8.1 The duty pistol shall not exceed 1.35 inches.

4.8.2 Width shall be measured with a medium back strap and/or grip panels and/or chassis grip installed.

4.8.3 The width shall encompass the furthest most left and right protrusions of the pistol.

4.9 Magazines

4.9.1 Class I magazines shall hold a minimum of 14 cartridges.

4.9.2 Class II magazines shall hold a minimum of 16 cartridges.

4.9.3 Magazines shall positively lock in the magazine well.

4.9.4 Class II magazines shall fit in Class I pistols and the pistol shall function as designed.

4.9.5 Extended magazines, or “+” floor plates, shall not be permitted.

4.9.6 The magazine shall have a release method and mechanism allowing the magazine to fall free from the pistol, regardless of the number of cartridges contained within the magazine and regardless of the position of the slide (i.e., forward or locked to the rear), and when the pistol is held with the sights level and with the magazine floorplate oriented down.

4.9.7 All magazine components shall be constructed of a material which is rust and corrosion resistant. A finish may be applied to metal magazines.

4.9.8 The follower shall move freely in the magazine body without binding and shall position each round for positive feeding.

4.9.9 The follower should be a high visibility color, such as orange, red, or yellow.

4.9.10 Magazines shall have witness holes which will permit viewing the number of rounds in at least 5 round intervals. Witness holes should exist for each cartridge contained in the magazine starting with cartridge number 4 and showing every cartridge contained in the magazine thereafter.

4.9.11 The magazine floor plate shall:

- Be removable for magazine disassembly without the use of specially designed tools. Use of the supplied armorer’s tool is acceptable.
- Remain securely affixed when dropped from a height of 48” onto a hard surface regardless of the number of cartridges contained in the magazine or the orientation of the magazine upon impact.

- Aid in the positive seating of the magazine during loading.
- Enable positive gripping and rapid manual extraction of the magazine if the magazine is locked in place as a result of a malfunction (e.g., double feed) or if the operator is wearing gloves.
- Have a small ledge (“toe”) on the front of the magazine to aid the operator in rapid extraction of the magazine. This ledge shall protrude forward of the grip (nominally 0.10” - 0.15”) to enable the non-shooting hand to strip the magazine from the pistol.

4.9.12 Magazines shall be matte black or grey in color and corrosion resistant.

4.10 Magazine disconnecter/safety

4.10.1 The pistol shall fire with the magazine removed and a live round in the chamber.

4.11 Magazine well

4.11.1 The Class II Pistol should have a flared magazine well entrance that extends no more than 0.100” beyond the outside of the grip on each side.

4.12 Magazine catch/release

4.12.1 The magazine catch should be located on the frame near the junction of the trigger guard and the grip.

4.12.2 The magazine catch should be of a lateral push button design.

4.12.3 The magazine catch shall be ambidextrous or reversible. The magazine catch button can be moved from the left side to the right side by a gunsmith.

4.12.4 The magazine catch should be activated by depressing the catch with a lateral movement by the operator’s thumb/finger.

4.12.5 The magazine catch may not be activated by a downward movement.

4.12.6 The magazine catch should be designed to allow for positive release of the magazine when fully depressed by the operator.

4.12.7 The magazine catch shall be designed and positioned to reduce the likelihood of inadvertent release of the magazine during handling and/or firing.

4.12.8 The magazine catch shall release with a minimum of 4 lbs. of pressure and shall require no more than 7 lbs. of pressure to release.

4.12.9 The magazine catch should be available in standard and extended sizes.

4.13 Trigger

4.13.1 The trigger pull shall be consistent in both length of travel and weight of pull for the first shot and all subsequent shots.

- 4.13.2** The trigger shall have a single smooth and consistent mode of operation.
- 4.13.3** If a trigger safety is present, it should match the contour of the trigger bow.
- 4.13.4** The trigger pull weight shall have the following characteristics:
- Trigger pull weight shall be no less than 4.5 pounds nor exceed 8.0 pounds.
 - Pistol shall fire with 8.0 pounds of pressure and shall not fire with less than 4.5 pounds of pressure.
- 4.13.5** The trigger pull weight for each gun shall be consistent with a maximum deviation of plus or minus (+/-) 0.5 pounds measured from 10 trigger pulls from each gun.
- 4.13.6** The trigger pull weight should be measured electronically with the gun mounted in a fixture.
- 4.13.7** The trigger shall not be manually adjustable.
- 4.13.8** The trigger shall have a reset distance not to exceed 0.50 inches.
- 4.13.9** The trigger shall return to the forward-most position after firing or manually cycling the action.
- 4.13.10** When the striker/firing pin is in the ready-to-fire position, the trigger shall return to the forward-most position if partially pressed and released (i.e., not fired).
- 4.13.11** The trigger shall be contoured to prevent a finger or gloved finger from binding or obstructing the articulation of the trigger.

4.14 Frame/receiver

- 4.14.1** The frame shall not contain finger grooves.
- 4.14.2** The frame may be constructed primarily of polymer type material.
- 4.14.3** The frame shall have a non-slip surface on the area of hand contact for both right- and left-handed operators.
- 4.14.4** Frames shall allow for at least three different hand sizes, commonly referred to as small, medium, and large.
- 4.14.5** The pistol shall have one or two acceptable methods of accommodating for different hand sizes as follows:
- Multiple frame sizes, such that two alternate sizes shall be available and supplied with each pistol.

— Grip/frame inserts, such that two alternate sizes shall be available and supplied with each pistol.

- 4.14.6** The size of a frame or insert shall be marked on an exterior surface (e.g., “M” for medium, “L” for large) for rapid identification without disassembly.
- 4.14.7** The frame shall have a locking slot groove/rail, forward of the trigger guard, to securely affix a tactical light, such as the Streamlight TLR-1®.
- 4.14.8** The locking slot groove/rails shall be a Picatinny rail (0.206 inches wide) in accordance with MIL-STD-1913.
- 4.14.9** The frame may incorporate a UID bar code permanently engraved or affixed to the exterior of the frame which is durable and resistant to abrasion, wear, and solvents.
- 4.14.10** Should a UID bar code be incorporated, the UID shall be readable utilizing a handheld scanner/reader, such as the Honeywell 1900G-HD 2D®.
- 4.14.11** The edges at the entrance of the magazine well shall be beveled on at least three sides in order to aid in the ease of reloading.

4.15 Slide

- 4.15.1** The rear grasping surface of the slide shall have grasping grooves, serrations, checkering, and/or stippling on both the left and right sides of the slide to the rear of the ejection port.
- 4.15.2** The rear grasping surface of the slide is the area located on the right and left sides of the slide near the rearmost portion of the slide where readily accessible to the operator; however, the slide may have a second set of grasping grooves to be located towards the muzzle of the pistol.
- 4.15.3** A maximum of 21 pounds of force shall be necessary to manually move the slide from the forward locked position to the rear most limit of the slide movement.
- 4.15.4** With the exception of the chamber portion of the barrel, the slide shall fully cover the barrel, allowing for no more than 0.25” of the muzzle to be exposed.
- 4.15.5** The slide shall not utilize a removable barrel bushing.
- 4.15.6** The slide may be permanently marked with the serial number of the corresponding frame.
- 4.15.7** The slide shall incorporate a dovetail slot for the mounting of a rear sight.
- 4.15.8** The slide shall incorporate a dovetail or staking or screw design to affix the front sight firmly to the slide.
- 4.15.9** The slide shall lock to the rear upon firing the last round with a fully seated magazine in the pistol.

4.15.10 The slide shall lock to the rear when manually pulled fully to the rear, with a fully seated empty magazine in the pistol.

4.15.11 The slide shall not be ported.

4.16 External slide stop lever or slide catch/release

4.16.1 The slide stop lever shall lock the slide to the rear position upon firing the last round in the magazine.

4.16.2 The slide stop lever should be easily engaged or disengaged by the operator while maintaining positive control of the pistol.

4.16.3 The slide stop lever shall disengage using only a single finger or thumb.

4.16.4 The slide stop lever shall be articulable during one-handed use by either a finger or thumb while maintaining a positive grip of the pistol.

4.16.5 The slide stop lever should be easily manipulated by both right- and left-handed operators.

4.16.6 The slide stop lever should not allow the operator to inadvertently engage or override the control during normal firing.

4.16.7 Slide stop levers may be ambidextrous.

4.16.8 Slide stop levers shall be available in two sizes, standard and extended.

4.16.9 The slide stop lever shall prevent inadvertent movement or function by the operator during one-handed or two-handed thumbs-forward grip purchase.

4.16.10 The slide stop lever shall allow the slide to return to battery from the locked-open position when:

— The operator pulls the slide fully to the rear and, without touching the slide catch/release, the operator then releases the slide, without a magazine inserted in the pistol or with a partially loaded or fully loaded magazine inserted into the pistol.

— The operator depresses the slide stop lever with a partially loaded or fully loaded magazine inserted into the pistol.

4.17 Safety devices

4.17.1 Pistols shall not have a manual external thumb, finger, or grip-actuated safety device.

4.17.2 Pistols shall not have a manual external thumb, finger, or grip-actuated decocking device or lever.

4.17.3 Pistols shall not have a magazine disconnect which prevents the firearm from firing when the magazine is removed from the pistol.

- 4.17.4 Pistols may have an integral trigger safety which is deactivated by the normal placement of the trigger finger on the trigger during firing.
- 4.17.5 Pistols shall have an internal safety device or mechanism to prevent the firing pin/striker from moving forward without manipulation of the trigger.
- 4.17.6 Pistols shall have an internal safety device or mechanism to prevent the pistol from firing when dropped.
- 4.17.7 Pistols shall have an internal safety device or mechanism to prevent firing out of battery.
- 4.17.8 Pistols shall have an internal safety device or mechanism to prevent the firing pin/striker from being released while the trigger is held to the rear after firing.

4.18 Security devices

- 4.18.1 Pistols shall have an integrated “lock-out” security device as a permanent part of the pistol that disables the firing mechanism except when in the control of authorized individuals.
- 4.18.2 The security device shall be understood to include any externally worn items, such as rings, wristbands, or tokens that perform functions associated with the security device
- 4.18.3 The security device shall include a programmable authorization system that can be set to allow one or more operators to fire the pistol.
- 4.18.4 The security device shall not inhibit the operator from firing in either hand, one-handed or two-handed, with and without gloves, in any orientation.
- 4.18.5 The security device shall not alter the normal operation of grasping and firing the pistol as a pistol of the same design that is not equipped with the security device.
- 4.18.6 The security device shall not increase the time required by the operator to grasp, draw from a holster, and fire the pistol as a pistol of the same design that is not equipped with the security device.
- 4.18.7 The security device shall not emit audible sounds or visible signals.
- 4.18.8 If the security device may be susceptible to electromagnetic interference, either intentional or unintentional, the device shall be equipped with countermeasure detection technology that permits the operator to fire the gun when an attempt to block the authorization process is detected.
- 4.18.9 The security device shall covertly indicate when the pistol is ready to fire.
- 4.18.10 If the security device uses batteries, the batteries can be rechargeable but shall be replaceable.
- 4.18.11 Low power to the security device shall be indicated covertly with sufficient time to safely take action.

4.18.12 If the security device malfunctions, it shall default to a state to allow the pistol to fire.

4.18.13 The security device should be easy for an operator to quickly reset or disengage if there is a malfunction.

4.19 Grip

4.19.1 The grip shall be textured to provide a positive non-slip surface when wet or dry.

4.19.2 The grip shall be universal for a left or right handed operator.

4.19.3 The grip shall have a replaceable back strap and/or grip panels and/or chassis grip to accommodate at least three different hand sizes.

4.19.4 The grip shall not be secured by screws.

4.19.5 The removal of the back strap and/or grip panels shall not prevent the pistol from firing.

4.19.6 The replaceable back strap and/or grip panels shall not require specialized or proprietary tools to replace and/or exchange.

4.19.7 Chassis style systems may be used; however, any and all tools required to replace the chassis style grip shall be provided with the pistol.

4.20 Sights

4.20.1 Sights shall be made of steel or other appropriate metal.

4.20.2 Sights shall be durable and capable of withstanding:

- Durability testing described in section 5.2.
- One-handed immediate action drills where the operator will utilize the front edge of the rear sight by supporting it against the edge of a ballistic shield, holster, etc., and cycling the slide.

4.20.3 Sights shall have a low-profile design to reduce interference when holstering and drawing, specifically when utilizing a concealing garment.

4.20.4 Sights shall be matte black in color.

4.20.5 Sights shall be non-reflective.

4.20.6 Front and rear sight must allow the operator to acquire the proper sight alignment rapidly.

4.20.7 The proper alignment of the sights will be consistent with “equal height, equal light” sight alignment.

- 4.20.8 The front and rear sights shall remain securely in place during firing and other law enforcement related activities.
- 4.20.9 The rear sight shall be adjustable for windage within a dovetail. Windage adjustments of the firearm shall only be made with the rear sight by the use of a tool specifically designed for sight adjustment, such as a sight pusher.
- 4.20.10 A minimum of three different sight height options shall be provided, such as standard, low, and high.
- 4.20.11 The sights shall be marked with a number or symbol indicating its relative height that can be identified without the aid of magnification.
- 4.20.12 Elevation and windage adjustments shall allow for the range of sight adjustments to move the point of impact at least 3" radially from the point of aim using agency service ammunition fired at a distance of 25 yards.
- 4.20.13 Sights shall be corrosion resistant.
- 4.20.14 Sights shall not be damaged by commonly used and commercially available firearm solvents and lubricants.

4.21 Low-light sights or night sights

- 4.21.1 The front and rear sights shall be equipped with self-luminous capsules which allow the operator to align the sights in low light conditions.
- 4.21.2 The night sights shall allow for a horizontal sight alignment of the three self-luminous capsules in a row.
- 4.21.3 The front night sight shall contain one capsule and the rear night sight shall contain two capsules which will align on the left and right of the front sight.
- 4.21.4 The night sights shall contain tritium or an equivalent self-luminous material all of the same green color.
- 4.21.5 The front sight shall have photo luminescent paint in addition to the tritium night sight.
- 4.21.6 The night sights shall have a minimum service life of 10 years from date of delivery to the agency.
- 4.21.7 The night sights shall be corrosion resistant.
- 4.21.8 The night sights shall not be damaged by commonly used and commercially available pistol solvents and lubricants.
- 4.21.9 The luminous portion of the night sights shall not be visible from the muzzle end of the pistol.

4.21.10 The luminous portion of the night sights may have a white color outline visible to the operator.

4.21.11 The night sights shall be Trijicon, Bright & Tough™ Night Sights, or similar.

4.22 High visibility sights

4.22.1 Pistols shall be provided with high visibility sights.

4.22.2 The high visibility sights should be Trijicon HD™ night sights (GL101O) or similar high visibility sights.

4.22.3 The high visibility sights may have a “U” notch in the rear sight.

4.22.4 Front and rear sights shall be removable by agency gunsmiths.

4.23 Exterior finish

4.23.1 All exposed parts, including the frame, slide, and barrel, shall have a finish that is:

- Matte black or dark grey.
- Non-reflective.
- Durable and abrasion resistant.
- Rust resistant.
- Salt water corrosion resistant.

4.23.2 All exterior parts shall be devoid of gouges, sharp edges or rough areas which could snag on holsters, clothing or cause injury or discomfort to the operator.

4.23.3 The frame and slide should be available, as an option, in a tan color similar to Flat Dark Earth and a green color similar to Ranger Green.

4.23.4 The inert training pistol shall have a red frame and matching red slide.

4.23.5 The Man Marker training pistol shall have a black or blue frame and have a blue slide, or may have blue inserts instead.

4.24 Internal finish

4.24.1 All internal surfaces shall be devoid of rough surfaces at critical points of movement and polished as necessary to provide minimal friction and wear to promote functional reliability.

4.24.2 Internal parts finish shall be durable, rust resistant, and salt water corrosion resistant.

4.25 Holster compatibility

4.25.1 Pistols shall be compatible with various commercially available holsters.

4.26 Maintainability

4.26.1 Maintenance requirements should be held to a level that the average officer operator can perform.

4.26.2 Pistols shall not require the use of any tools for field stripping.

4.26.3 Pistols shall be capable of repeated maintenance without damage or decrease in performance.

4.26.4 An agency's gunsmith or armorer should be able to perform most diagnostic tests and repairs without seeking assistance from the manufacturer.

4.26.5 Pistols shall come with an operator's manual written in English.

4.27 Environmental exposure

4.27.1 Pistols shall function equally across a temperature range from -33°C (-28°F)—which corresponds to the lower bound of the induced air temperature for the Basic Cold (C1) profile defined in AR 70-38—up to 63°C (145°F)—which corresponds to the upper bound of the induced air temperature for Basic Hot (A2).

4.27.2 Pistols shall function equally across a relative humidity range tending toward saturation at -33°C (-28°F) and varying from 5% to 44% RH at 63°C (145°F)—which correspond to the induced relative humidities at the C1 and A2 profiles.

4.27.3 Pistols shall be able to function when exposed to constant high humidity of 95% to 100% RH at 27°C (80°F)—which corresponds to the induced relative humidity and induced air temperature for Constant High Humidity (B1).

4.27.4 Pistol performance shall not degrade when exposed to transient splashes of water, such as a rain shower or exposure to an indoor sprinkler system.

4.27.5 Pistol performance shall not degrade when exposed to temporary immersion in water, such as a swimming pool, lake, or river.

4.27.6 Pistol performance shall not degrade when exposed to mild corrosive substances, such as human sweat, pool water, or river water.

4.27.7 Pistol performance shall not degrade when exposed to a dusty environment.

4.27.8 Pistol performance shall not degrade when exposed to electromagnetic interference.

4.27.9 Any externally worn items, such as rings, wristbands, or tokens that may be associated with the security device, shall have to meet the same environmental exposure requirements as the pistol.

4.28 Mechanical shock

4.28.1 Pistol performance shall not degrade when exposed to mechanical shock, such as being dropped on pavement or concrete following the SAAMI drop test.

4.29 Parts interchangeability

4.29.1 Pistols shall be capable of being disassembled and reassembled using parts from another pistol of the same make and model.

5 Performance and testing requirements

5.1 Accuracy and dispersion

5.1.1 Pistols shall be fired to determine accuracy and dispersion characteristics in accordance with TOP 3-2-045 Test Procedure 4.4.

- Pistols shall be cleaned and lubricated in accordance with the owner's manual.
- Targets shall be positioned perpendicular to the line of fire at a range of 25 yards.
- If firing is conducted outside, velocity of the transverse wind shall not exceed 16 km/hr (10 mph) and shall not vary by more than 8 km/hr (5 mph), and velocity of the wind parallel to the line of fire shall not exceed 24 km/hr (15 mph) and shall not vary by more than 12 km/hr (7.5 mph).
- The firearm shall be zeroed in accordance with the owner's manual.
- Three targets shall be fired at standard ambient conditions.
- Ten rounds shall be fired from the pistol at each target from a bench rest or mechanical mount.
- X and Y coordinates of each impact relative to the aim point shall be recorded.
- The velocity as corrected to muzzle shall be recorded using appropriate instrumentation for each shot.

5.2 Reliability and durability

5.2.1 Pistols shall exhibit a mean overall malfunction or failure rate of no greater than 1 in 2,000, or shall exhibit a mean rounds between failure of no less than 2,000.

5.2.2 Pistols shall be durable and exhibit no failures due to wear or damage for a total of 10,000 rounds. Parts may be replaced in accordance with the manufacturer's specification for regular preventative maintenance. The replacement of parts per the manufacturer's maintenance schedule does not constitute a parts failure. This durability specification also applies to the security device on the pistol as well as any periphery devices that may be required to be used with the security device.

5.2.3 Life cycle testing shall follow the test procedures below.

- Firing shall be performed in 250-round cycles of two types:
- Type 1: 190 rounds shall be fired with two hands, 30 rounds shall be fired strong hand only, and 30 rounds shall be fired weak hand only.
- Type 2: 250 independent presentations from a holster firing one round per presentation.
- Six (6) pistols shall each be fired 10,000 rounds, or 40 cycles, and evaluated for their performance, for a total of 60,000 cumulative rounds fired.
- The 10,000 rounds, or 40 cycles, shall be divided into 9,000 rounds, or 36 cycles, of Type 1 cycle and 1,000 rounds, or 4 cycles, of Type 2 cycle.
- Accuracy and dispersion testing in accordance with section 5.1.1 shall be conducted on each pistol before and after life cycle testing.
- Pistols shall be cleaned and lubricated in accordance with the owner's manual after every cycle.
- Each pistol shall be inspected after every cycle. A periodic detailed examination shall be performed at least every 1,000 rounds fired, or 4 cycles, and may be performed more frequently at the discretion of the operator.
- Testing shall be conducted, in part, with the operator wearing shooting style gloves.
- Each pistol shall be rated for its ability to complete 250-round firing cycles. Rating shall be cumulative for all six pistols based on the total of 40 cycles and on the total malfunctions exhibited by all six pistols.

5.3 Environmental exposure

5.3.1 Pistols shall be rated on their ability to fire after high temperature exposure following the test procedures below.

- Three (3) pistols shall be subjected to this test.
- Pistols shall be cleaned and lubricated in accordance with the owner's manual.
- Pistols shall be loaded with a round chambered and a magazine loaded with 14 rounds before initiation of testing.
- The pistol shall be temperature conditioned in an environmental chamber at 145 ± 5 °F, with 0 ± 5 percent humidity for eight hours in accordance with MIL-STD-810G 501.6.
- Fifteen (15) rounds of ammunition per pistol shall be subjected to the same temperature conditioning.

- Each pistol shall fire 15 rounds of ammunition upon conclusion of high temperature exposure.
- Firing shall begin within one minute of removal from the environmental chamber.
- Firing shall be completed within three minutes of removal from the chamber.
- Firing shall be conducted with two hands standing.
- Rating shall be cumulative for all three pistols.

5.3.2 Pistols shall be rated on their ability to fire after low temperature exposure following the test procedures below.

- Three (3) pistols shall be subjected to this test.
- Pistols shall be cleaned and lubricated in accordance with the owner's manual.
- Pistols shall be loaded with a round chambered and a magazine loaded with 14 rounds before initiation of testing.
- The pistols shall be temperature conditioned in an environmental chamber at $-28\pm 5^{\circ}\text{F}$, with 0 ± 5 percent humidity for eight hours in accordance with MIL-STD-810G 502.6.
- Fifteen (15) rounds of ammunition per pistol shall be subjected to the same temperature conditioning.
- Each pistol shall fire 15 rounds of ammunition upon conclusion of low temperature exposure.
- Firing shall begin within one minute of removal from the environmental chamber.
- Firing shall be completed within three minutes of removal from the chamber.
- Firing shall be conducted with two hands standing.
- Rating shall be cumulative for all three pistols.

5.3.3 Pistols shall be rated on their ability to fire after sand and dust exposure following the test procedures below.

- Three (3) pistols shall be subjected to this test.
- Pistols shall be cleaned and lubricated in accordance with the owner's manual.
- Pistols shall be loaded with a round chambered and a magazine loaded with 14 rounds before initiation of testing.

- The pistols shall be subjected to a one-directional blowing sand and dust environment for 90 minutes at ambient temperature in accordance with MIL-STD-810G 510.6 Procedure II.
- Each pistol shall fire 15 rounds of ammunition upon conclusion of sand and dust exposure.
- Firing shall be conducted with two hands standing.
- Rating shall be cumulative for all three pistols.

5.3.4 Pistols shall be rated on their ability to fire after immersion conditioning following the test procedures below.

- Three (3) pistols shall be subjected to this test.
- Pistols shall be cleaned and lubricated in accordance with the owner's manual.
- Pistols shall be loaded with a round chambered and a magazine loaded with 14 rounds before initiation of testing.
- The pistols shall be immersed in 5 ± 1 percent (by weight) saline solution at a depth of six inches for one minute in accordance with MIL-STD-810G 512.6.
- Upon removal from the saline solution, the duty pistols shall be subjected to environmental conditioning at $70\pm 5^{\circ}\text{F}$ and 70 ± 5 percent specific humidity for 24 hours in an environmental conditioning chamber.
- Each pistol shall fire 15 rounds of ammunition upon conclusion of environmental conditioning.
- Firing shall begin within one minute of removal from the environmental chamber.
- Firing shall be completed within three minutes of removal from the chamber.
- Firing shall be conducted with two hands standing.
- Rating shall be cumulative for all three pistols.

5.3.5 Pistols shall be rated on their ability to fire in the presence of electromagnetic interference (EMI) following the test procedures below.

- Three (3) pistols shall be subjected to this test at each frequency identified for testing.
- Pistols shall be cleaned and lubricated in accordance with the owner's manual.
- Pistols shall be loaded with a round chambered and a magazine loaded with 14 rounds before initiation of testing.

- The pistols shall be fired in the presence of electromagnetic radiation that could cause interference with the security device. The specific frequencies that will need to be assessed will depend on the specific test item; however, the appropriate tests shall be done in accordance with TOP 1-2-512. A realistic signal strength should be used for testing.
- The transmitter shall be turned on five minutes prior to firing.
- Each pistol shall fire 15 rounds of ammunition while the transmitter is turned on.
- After all rounds have been fired, the transmitter shall be turned off.
- Firing shall be conducted with two hands standing.
- Rating shall be cumulative for all three pistols.

5.4 Mechanical shock

5.4.1 Pistols shall be rated on their ability to fire after exposure to mechanical shock following the test procedures below:

- Two (2) pistols shall be subjected to this test.
- Pistols will be cleaned and lubricated in accordance with the owner's manual
- The drop height shall be four feet.
- The impact surface shall be a concrete floor.
- An electromagnet or other method shall be used to hold and release the duty pistols.
- The pistols shall be loaded with a primed casing in the chamber.
- A new primed casing shall be used for each test segment.
- The duty pistol shall be in battery when dropped.
- The pistol shall have a fully loaded magazine inserted in the pistol when dropped.
- Ammunition used in the magazine will be metallic dummy rounds to simulate the approximate weight of live ammunition.
- Each sample shall be dropped in the following orientations.
 1. Muzzle down: Muzzle shall be closest part of the duty pistol to the concrete floor.
 2. Muzzle up: Muzzle shall be the farthest part of the duty pistol to the concrete floor.

3. Slide up, horizontal: Top of the slide shall be the farthest part of the duty pistol to the concrete floor.
 4. Slide down, horizontal: Top of the slide shall be the closest part of the duty pistol to the concrete floor.
 5. Right side, horizontal: Right side of the duty pistol shall be oriented as the closest part of the pistol to the concrete floor.
 6. Left side, horizontal: Left side of the duty pistol shall be oriented as the closest part of the pistol to the concrete floor.
- After each test (1 through 6), each duty pistol shall fire 15 rounds of ammunition.
 - Firing shall be with two hands standing.
 - Rating shall be cumulative for all three pistols.
 - Should any pistol experience a stoppage, the number and class of malfunction shall be documented.