U.S. Department of Justice
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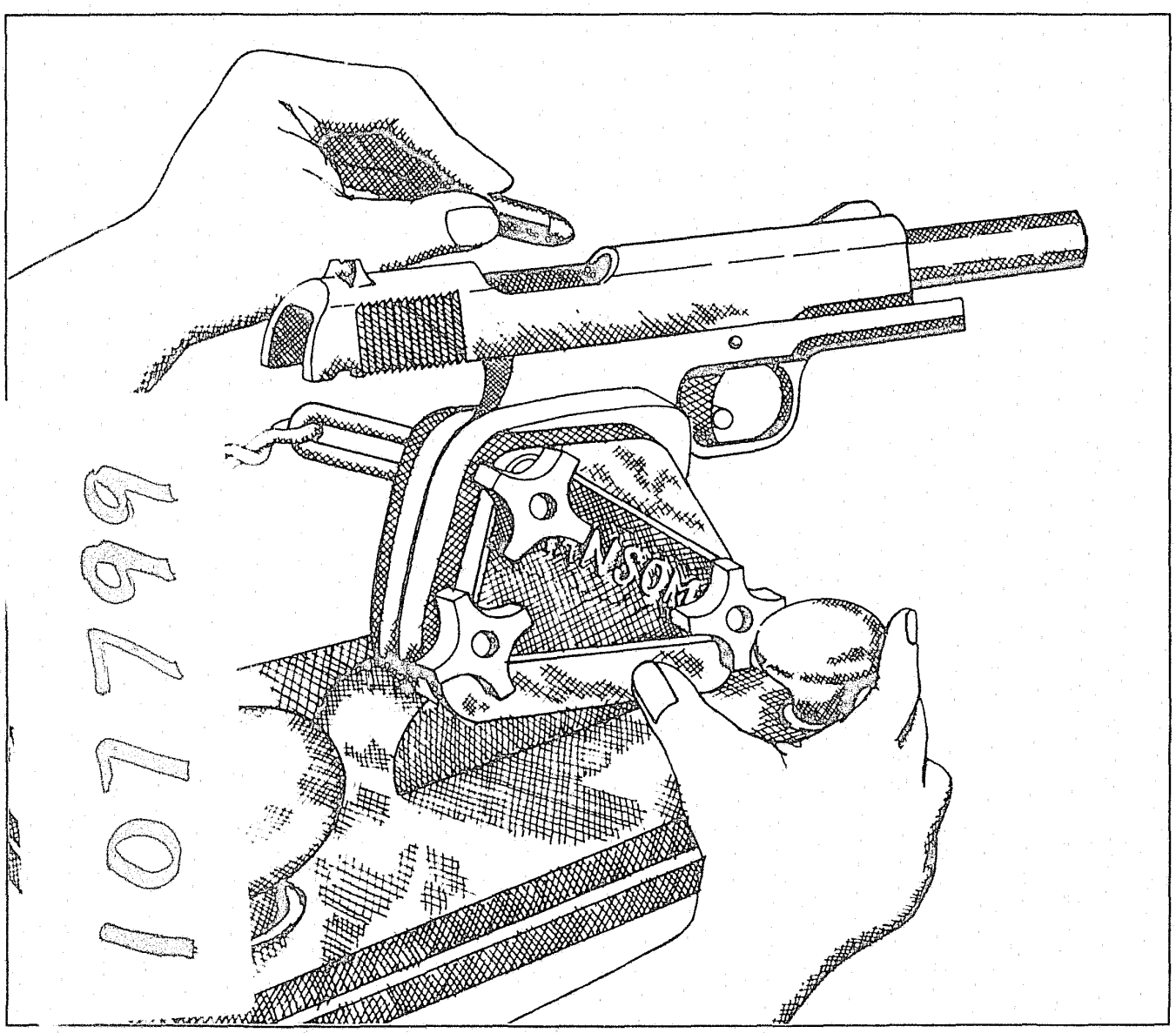
TECHNOLOGY ASSESSMENT PROGRAM

Equipment Performance Report: 9mm and .45 Caliber Autoloading Pistol Test Results



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Equipment Performance Report:
9mm and 45-Caliber Autoloading Pistol Test Results

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About the Technology Assessment Program

The Technology Assessment Program (TAP) is an applied research project of the National Institute of Justice (NIJ). TAP develops minimum performance standards for law enforcement equipment and tests equipment based on these standards.

To accomplish program tasks, NIJ coordinates the activities of two organizations: the TAP Information Center (TAPIC) and the Law Enforcement Standards Laboratory (LESL) of the National Bureau of Standards. LESL prepares equipment standards, reports, and guides; TAPIC coordinates testing of law enforcement equipment by independent laboratories and publishes the test results. LESL, TAPIC, and the National Institute support one another in accomplishing the program tasks and goals.

TAP's major tasks and goals are:

Coordination of the TAP Advisory Council. Composed of nationally recognized professionals from Federal, State, and local criminal justice agencies, the Advisory Council helps the National Institute set priorities for developing new equipment standards and for testing available products.

Coordination of equipment testing. TAPIC develops Requests for Proposals to select testing laboratories, evaluates proposals with assistance from LESL, selects laboratories, and monitors the testing activities.

Compilation and dissemination of test results. TAPIC compiles and analyzes the test results and, after review by NIJ and LESL, publishes the results in the TAP Alert and Equipment Performance Reports such as this one.

Dissemination of Information. TAP educates the criminal justice community about its resources and services in a number of ways. Staff prepare articles for criminal justice periodicals, develop exhibits, make presentations at major criminal justice conferences, and serve as a clearinghouse of information about equipment and technology.

For more information or to add your name to TAPIC's mailing list, call toll free 800-24-TAPIC. (In Maryland and the Metropolitan Washington, D.C., area call 301-251-5060.)

James K. Stewart
Director
National Institute of Justice

Executive Summary

Today's law enforcement executives face rising crime rates, increasing public demand for police services, and, at the same time, face the pressure of dwindling resources. Just as research and experimentation have revealed better alternatives to traditional policing methods, National Institute of Justice (NIJ) research also has led to improved ways of selecting law enforcement equipment. Ineffective equipment can hamper police operations and pose a threat to officer safety. In addition, the costs associated with maintenance and replacement of inferior equipment could be astronomical.

One of the most important items of equipment a police officer carries is a service weapon. A properly functioning weapon can be the difference between life and death. As a result of several sensational news stories about police officers being "outgunned" on the streets, many law enforcement agencies have considered switching from revolvers to autoloading pistols. This report describes in detail the results of testing 20 different models of autoloading pistols against the minimum performance requirements established by NIJ Standard-0112.00 for 9mm and 45-caliber autoloading pistols. The standard describes the parameters that are critical to the safety and reliability of service weapons.

None of the 20 models of autoloading pistols complied with every requirement of the standard. Several models, however, did comply with all but the user information requirements. In no case did the manufacturers provide, with the user information, a certificate of compliance with the standard as required, and the majority of the models did not include a statement on ammunition known to be beyond the design limits of the pistol and/or known not to function in the pistol.

Table 1 presents an overall summary of the 9mm test results for the six primary requirements. Table 2 presents an overall summary of the 45-caliber test results. Since none of the pistols complied with the user information requirement, that requirement is not included in either table.

It should be noted that the requirements of the NIJ standard are stringent, for they represent the level of performance that should be demanded for a pistol that is fully capable of service use (i.e. a combat ready pistol).

No attempt has been made to rank pistols according to their test results; rather, TAP recommends that law enforcement agencies base their purchase decisions on the extent that failure to comply with a specific requirement limits the pistol's ability to meet an agency's individual needs. TAP further recommends that agencies closely scrutinize the results of the firing and drop safety requirements before purchasing pistols for their officers.

The test results indicate that the majority of the pistols were not ready for police use right out of the box. Purchasers who are interested in obtaining a combat-ready pistol should stipulate in their purchase order that the weapon must comply with the requirements of NIJ Standard-0112.00, 9mm and 45-Caliber Autoloading Pistols, April 1986.

Even then, each pistol should be examined by a qualified armorer and judged to be combat ready before it is issued to an officer.

We encourage you to take the time to read the entire report on pistol testing and call the TAP Information Center if you have any questions concerning the test results.

Table 1

Summary of 9mm Autoloading Pistol Test Results

C = Complies with the requirements of the standard.
N = Does not comply with the requirements of the standard.

Manufacturer	Model	Visual	Dimensional	Functional*	Drop Safety/Func.	Firing
Astra	A90	C	C	N (1)	C/C	C
Beretta	92F	N	C	N (1)	C/C	C
Glock	17	C	C	N (1)	C/C	N
Heckler & Koch	P7M8	C	N	C	C/C	C
Heckler & Koch	P7M13	C	C	N (1)	C/C	C
Sig Sauer	P220	C	C	C	C/N	C
Sig Sauer	P225	C	C	N (1)	C/C	N
Sig Sauer	P226	C	C	N (1)	N/C	C
Smith & Wesson	439	C	C	C	C/C	C
Smith & Wesson	459	C	C	C	C/C	C
Smith & Wesson	469	C	C	N (1)	C/C	C
Smith & Wesson	639	N	C	C	C/C	C
Smith & Wesson	659	C	C	C	C/C	C
Smith & Wesson	669	C	C	C	C/C	N
Steyr	GB	C	C	C	C/C	C
Walther	P5	N	C	N (2)	C/C	C

* Tests of 6 functional parameters were conducted; the number of parameters the model failed to comply with are in parentheses.

Table 2

Summary of 45-Caliber Autoloading Pistol Test Results

C = Complies with the requirements of the standard.
N = Does not comply with the requirements of the standard.

Manufacturer	Model	Visual	Dimensional	Functional*	Drop Safety/Func.	Firing
Astra	A90	C	C	N (1)	Not completed/N	N
Sig Sauer	P220	C	C	C	C/C	N
Smith & Wesson	645	N	C	C	C/C	C
Star	PD	C	C	N (1)	C/C	N

* Tests of 6 functional parameters were conducted; the number of parameters the model failed to comply with are in parentheses.

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Introduction

Police officers very rarely have reason to use their weapons in defense of their lives or the lives of others. But on those critical occasions when an officer does use a weapon, it must be in perfect operating order.

The Technology Assessment Program Advisory Council, in recognition of the extraordinarily important role that handguns play in law enforcement, recommended that NIJ establish performance standards for revolvers and pistols and that handguns be tested against those standards. The latest of two handgun standards, NIJ Standard-0112.00, 9mm and 45-Caliber Pistols[1] was issued as a voluntary national standard in April 1986. This Equipment Performance Report presents the results of testing 20 pistols according to the requirements of that standard.

NIJ standards are stringent. They establish minimum levels of performance that determine the safety and reliability of the pistol and its suitability for service use.[2] A pistol that fully complies with the requirements of the standard is truely combat ready. Many large police departments have their weapons examined by an armorer and modified or adjusted to assure combat-ready performance. Regrettably many departments, particularly the smaller ones, do not possess or have access to this capability.

NIJ Standard-0112.00 establishes 14 separate parameters each pistol must comply with in addition to having proper user information. Each parameter is evaluated through visual inspection, operational tests, and dimensional measurements. Two pistols of each model are tested. In addition, 600 rounds of ammunition are fired to evaluate performance and the pistols are subjected to actual drop tests. After the drop test, the pistol is expected to operate with a minimum number of malfunctions.

None of the pistols that were tested complied with all of the minimum performance requirements of the standard. Some, however, did comply with all but the user information requirements. An overall comparison of the performance of the 20 different models of pistols is presented in Tables 1 and 2.

Readers should review the test results with an eye toward which requirements are most critical to their particular needs. A department may consider noncompliance with one or another of the functional requirements insignificant if the pistol can be easily adjusted to conform to the standard and the department has the personnel to do so. Noncompliance with other parameters could, however, require major rework or modifications requiring the service of a skilled gunsmith to achieve an acceptable level of performance. Thus, one agency's critical need may be unnecessary to another agency. Some requirements of the NIJ standard, however, such as the drop safety or firing requirements, should be scrutinized universally because they are essential to the basic performance and safety of the pistol.

The most important warning that TAP can offer as a result of this test program is that agencies should not assume that a weapon is ready for police service until it has been inspected by an armorer. Even though each pistol that was tested was donated directly by its manufacturer or distributor, only a few were totally combat ready. TAP therefore encourages

[1] NIJ issued a companion standard, NIJ Standard-0109.00 for 38- and 357-Caliber Revolvers, in July 1983.

[2] Appendix A, Commentary--NIJ Standard-0112.00, contains a discussion of the basis for the requirements included in the standard and the criticality of those requirements.

all departments that purchase pistols for police use to stipulate in their purchase orders that the weapons must comply with the requirements of NIJ Standard-0112.00, 9mm and 45-Caliber Autoloading Pistols, April 1986.

TAP does not endorse particular products, and no attempt is made to compare the performance of one model of pistol with another, or to rank the pistols according to the test results. However, because Equipment Performance Reports are the product of carefully controlled tests and critical analysis of the data, we believe that the results will help law enforcement agencies identify those pistols that most closely meet their needs.

The Test Program

According to the TAP equipment testing program procedures (discussed in Appendix B), TAPIC solicited bids to test pistols from independent testing laboratories. Two laboratories were selected based on their proposal scores: H.P. White Laboratories in Street, Maryland, and Denver Research Institute in Denver, Colorado.

One of the first steps in the testing procedure involved a review of all models of pistols that were available to police. After LESL and TAPIC identified pistols to be included in the testing, TAPIC contacted the manufacturers/distributors to invite their participation in the program. Seven manufacturers/distributors sent TAPIC a total of 20 models of pistols for testing. The models are identified in Tables 3 and 4. The pistols were then distributed equally between the two laboratories.

Staff members from TAPIC, LESL, and the National Bureau of Standards Laboratory Accreditation Program attended preliminary testing to make sure the laboratories were staffed appropriately, had the correct equipment, and followed the procedures spelled out in NIJ Standard-0112.00. For preliminary tests, each laboratory tested one model. After TAP reviewed and approved the preliminary testing results, the laboratories began testing the remaining 18 models. Staff members from TAPIC and LESL visited the labs periodically during the testing.

Once the testing was completed, LESL staff members assisted TAPIC in the analysis of the data and the compilation of results that are presented in this Equipment Performance Report.

Table 3
9mm Pistols Tested

Manufacturer	Model	Magazine Capacity
Astra	A90	15
Beretta	92-F	15
Glock	17	17
Heckler & Koch	P7M8	8
Heckler & Kock	P7M13	13
Sig Sauer	P220	9
Sig Sauer	P225	8
Sig Sauer	P226	15
Smith & Wesson	439	8
Smith & Wesson	459	14
Smith & Wesson	469	12
Smith & Wesson	639	8
Smith & Wesson	659	14
Smith & Wesson	669	12
Steyr	GB	18
Walther	P5	8

Table 4
45-Caliber Pistols Tested

Manufacturer	Model	Magazine Capacity
Astra	A90	8
Sig Sauer	P220	7
Smith & Wesson	645	8
Star	PD	6

Minimum Performance Requirements and Methods of Testing

NIJ Standard-0112.00, 9mm and 45-Caliber Pistols, April 1986, established requirements and methods of testing for seven broad categories of pistol performance. The discussion that follows summarizes the specific requirements and briefly describes the manner in which compliance is tested or determined. TAPIC will gladly provide a copy of the standard upon request.

1. User Information

The standard requires that the manufacturer provide six items of user information with each pistol: (a) field disassembly and assembly instructions and diagrams identifying all parts; (b) cleaning instructions; (c) a description of each safety feature designed into the pistol, how each safety feature is intended to function, and for those under shooter control, how the shooter should operate each safety feature; (d) a statement on ammunition known to be beyond the design limits of the pistol and/or known not to function in the pistol; (e) a parts list and ordering instructions; (f) certification of compliance with NIJ Standard-0112.00.

Compliance is determined by examining the information provided with each pistol to determine if all items are included and if the documentation is suitable for its intended purpose.

2. Visual Inspection

(a) In the single action mode, the hammer shall have sufficient overtravel to assure achievement of the full-cocked position. Compliance is determined by operating the hammer and visually confirming the presence of sufficient overtravel.

(b) There shall be no loose shavings or filings in the pistol. Compliance is determined through visual inspection.

(c) The pistol shall have no chips, scratches, burrs, or rust spots. There shall be no sharp edges or corners that could cut the shooter's hand, and the pistol shall be inherently rust resistant.

Compliance is determined through visual inspection.

3. Dimensional Requirements

(a) The barrel bore diameter shall be not less than .340 inches or more than .351 inches for the 9mm and not less than .428 inches nor more than .445 inches for the 45-caliber pistol.

Compliance is determined by measuring the diameter of the barrel bore with a caliper/micrometer or other suitable method.

(b) The headspace shall be not less than .745 inches nor more than .776 inches for the 9mm and not less than .897 inches nor more than .920 inches for the 45-caliber pistol.

Compliance is determined by inserting a headspace gauge into the chamber, releasing the slide slowly until the slide stops and extending the gauge until it rests against the recess in the chamber. The measured length of the gauge is the headspace. Alternative, two gauges machined to the minimum and maximum tolerances can be used to determine if headspace complies with the standard.

4. Functional Requirements

(a) The slide shall operate smoothly without binding or sticking when operated by hand, during the firing tests, and after the drop function tests.

Compliance is determined by observation of evidence of sticking, binding, grittiness, or hesitation.

(b) The ejection mechanism shall eject cases without hangup during the firing tests and after the drop function tests. Compliance with this requirement is determined by firing a full magazine of ammunition and noting any failure to eject and whether the slide remains open after the last round. The same is noted during the firing test and after the drop function test.

(c) The single action trigger pull force shall be not less than 3 lbf nor more than 8 lbf, the double action trigger pull force shall be no more than 18 lbf.

Compliance is determined by measuring the trigger pull force in both modes.

(d) The hammer shall operate smoothly and shall not release under an applied load of 10.25 lbf.

Compliance is determined by operating the hammer and applying the required load in the cocked position.

(e) The pistol shall have one or more design features to prevent inadvertent firing and active safety devices shall be designed so that the pistol can be made fire-ready by releasing the safeties with the shooting hand.

Compliance is determined by operating the safety features and observing their operation.

(f) The magazine shall have a minimum capacity of six rounds and shall be capable of being released without removing the shooting hand from the pistol.

Compliance is determined by loading the magazine to maximum capacity and also by inserting an unloaded magazine into the pistol and releasing it.

5. Firing Requirements

The pistol shall fire 600 rounds of ammunition with no structural or mechanical failures and no more than five malfunctions. Of the five allowable malfunctions, no more than three shall be firing malfunctions (failure to feed, fire, or eject a round).

Compliance is determined by firing a total of 600 rounds of ammunition. After every 200 rounds loose screws are tightened and trigger pull and headspace are measured.

6. Drop Safety

The pistol shall not fire when drop tested.

Compliance is determined by dropping the pistol onto a solid slab of concrete from a height of 39.4 inches (1 meter). The pistol is loaded with an empty case with a primer installed. The pistol is dropped from the normal firing position, upside down, on grip, on the muzzle, on either side, and on the exposed hammer or striker or rearmost point of the pistol. After each drop, it is noted if the primer fires. If the primer is indented a new primed case is used for the next drop.

7. Drop Function Test

After completing the drop safety test, the pistol shall fire 20 rounds with no more than three malfunctions.

Compliance is determined by firing the required number of rounds with no more than three malfunctions. If there are more than three malfunctions, the 20 round firing test is repeated. If there are no more than three malfunctions during the repeat firing test, the pistol meets the requirements.

Test Results

To meet all the requirements of the NIJ Standard-0112.00 for 9mm and 45-caliber pistols, two samples of a model must meet the user information, visual inspection, dimensional, functional, firing, drop safety, and drop function requirements of the standard.

TAP's evaluation of the 20 models submitted by manufacturers for testing according to NIJ Standard-0112.00 revealed that none of the models tested complied with all the requirements of the standard.

1. User Information

Of the 20 models tested, none passed the user information requirement because the manufacturer did not provide certification of compliance with the standard. Also, most of the pistols failed this requirement because the manufacturer did not include a statement on ammunition known to be beyond the design limits of the pistol.

2. Visual Inspection

Three-quarters of the pistols (16 of 20) passed the visual inspection requirements of the standard. The pistols that failed this requirement, failed because of surface scratches.

3. Dimensional Requirements

All but one pistol model (19 of 20) passed the dimensional requirements of the standard. The one pistol model that failed this requirement, failed because of headspace problems.

4. Functional Requirements

Half the pistols (10 of 20) passed the functional requirements of the standard. The majority of the pistols that failed this requirement, failed because the slide did not operate smoothly.

5. Firing Requirements

Just under three-quarters of the pistols tested (14 of 20) were capable of firing the required 600 rounds of ammunition without failures described in the standard.

6. Drop Safety Requirements

All but two pistol models tested (18 of 20) passed the drop safety requirement of the standard. One pistol model failed the requirement and the other pistol model broke prior to completing the drop safety test.

7. Drop Function Requirements

All but two pistol models tested (18 of 20) passed the drop function requirements.

The detailed test results for the Astra, Beretta, and Glock pistols are presented in Appendix C, Heckler and Koch and Sig Sauer in Appendix D, Smith & Wesson in Appendix E, and Star, Steyr, and Walther in Appendix F. In each case, test results are presented for 9mm pistols, followed by the results for the 45-caliber pistols.

The test results for each pistol model include a cover sheet that provides full manufacturer designation, the characteristics of the model including empty weight, an overall summary of the test results, and an explanation of any footnotes on the data sheets. The cover sheet is followed by a data sheet for each of the two pistol samples that were tested. In those instances in which the pistol did not comply with the requirement of the standard, the noncomplying parameter is identified by an asterisk (*).

For completeness of result presentation, certain of the test results are footnoted and a detailed comment for that footnote

is found on the cover sheet for that pistol model.

The standard allows for two methods of measuring headspace:

1. Adjustable headspace gauges will indicate an actual headspace measurement. When adjustable headspace gauges were used, actual headspace measurements were recorded on the data sheets.

2. Go, no-go headspace gauges indicate whether the headspace is within the allowable tolerances of the standard. When go, no-go gauges were used the data sheets indicated if the headspace tolerance complied with the standard.

For the trigger pull, numbers were rounded to the nearest tenth of a pound except when rounding caused ambiguities. The weight of the weapon was rounded to the nearest tenth of an ounce.

Appendix A: Commentary—NIJ Standard-0112.00

NIJ Standard-0112.00, 9mm and 45-Caliber Autoloading Pistols, establishes minimum performance standards for "combat ready" police autoloading pistols (autoloaders).

This section discusses the purposes of each requirement in NIJ Standard-0112.00 and how the value limits were set. The firearms industry has specifications for some of the parameters applicable to firearms and ammunition; these are maintained by the Sporting Arms and Ammunition Manufacturer's Institute, Inc. (SAAMI, pronounced as Samey). Subject to laboratory verification, the SAAMI value for certain parameters were used if appropriate.

User Information

The majority of the user information requirement is self-explanatory; however, two items require explanation. The first is a statement requiring that the manufacturer identify any ammunition known to be outside the pistol's design limits or known not to function in the autoloader because the design of certain autoloaders precludes the use of other than a single type of ammunition. For example, when the standard was being developed, one autoloader with a magazine capacity of nine rounds would not function if more than five hollowpoint rounds were loaded into its magazine. The manufacturer, when contacted, stated that this particular autoloader was designed to use only military full metal jacketed bullets. This essential fact was not available in the information provided with the autoloaders.

The second item is the manufacturer's certification that the autoloader model complies with the standard. This requirement ensures that there is agreement between the purchasing entity and the autoloader manufacturer that the standard does indeed apply to the item purchased and forms the basis for rejecting a particular autoloader or the entire purchase lot if the autoloaders are found not to meet the standard.

Visual Inspection

The three visual inspection parameters either affect the pistol's performance, indicate the quality of workmanship, or affect the appearance.

Dimensional Requirements

Barrel Bore Diameter. This requirement assures the correct barrel has been fitted in the autoloader; the specification is the same as the SAAMI specification.

Headspace. Headspace is critical to the reliable and safe operation of an autoloader. Excessive headspace can permit a minimum size cartridge to extend so far into the chamber that the firing pin will not reach the cartridge to fire it. Too little headspace can cause case rupture or keep the pistol from functioning. The 45-caliber headspace values used in the standard are the SAAMI specification. During the laboratory phase of developing the standard, engineers found a 9mm autoloading pistol with a design that compensated for short chambers, thus permitting the autoloader to perform at an acceptable level. The manufacturer's specification was used for the minimum 9mm headspace so as to not disqualify an otherwise satisfactory autoloader and the SAAMI specification was used for the maximum headspace requirement.

Functional Requirements

Action. The slide, a major functioning part of an autoloading pistol, must operate smoothly without binding. The fit of the slide to the pistol can be assessed by operating it slowly by hand. Any hesitation or binding will affect mechanical operation of the pistol.

Ejection. An autoloader uses a single barrel and a single chamber. Failure to eject a fired/empty case prevents the loading of a fresh cartridge into the chamber. This is a major stoppage and renders the autoloader inoperable until corrective action is taken.

Trigger. There are two trigger pulls to consider, single and double action. If a trigger pull is too light it represents a safety hazard. If it is too heavy the autoloader may be too hard to shoot accurately or may represent problems in the firing mechanism. Laboratory tests of single action trigger pulls established that a range of 3 to 8 pounds is reasonable to assure ease of operation without sacrificing safety, and allows latitude for design and manufacturing. For double action trigger pulls, laboratory and field experience has determined that more than 18 pounds is a difficult trigger pull for most shooters to maintain accuracy.

Hammer. When the internal parts of trigger and hammer fit correctly, the hammer will come to single action full cock and stay there until the trigger is actuated. This parameter, generally called "push off," verifies that the single action cocking surfaces mate properly and that the hammer will not release prematurely. Laboratory experiments using an experienced armorer showed that 10 pounds was a reasonable load to verify that the full cock hammer notch was properly fitted to the sear.

Safety Features. Each manufacturer of autoloaders includes in their design features/parts that give some degree of safety to their product. Without passing judgment on the effectiveness of the safety features, the requirement stipulates that the safety features shall be present. In other words, all of the parts intended in the design must be in the pistol, and they must work in the way the manufacturer says they work.

Magazine. For police duty service an autoloader should have at least the ammunition capacity of a duty revolver. In addition if the officer is to realize the rapid reloading potential of the autoloader, it must be possible to remove an empty magazine from the pistol without shifting the shooting hand on the pistol.

Firing Requirement

The firing requirement examines the autoloader's ability to fire full metal jacketed round nose and blunt nosed hollow point factory ammunition. For informational purposes, headspace and trigger pull is measured after each 200 rounds fired. The autoloader fails the test if it has feeding, firing, or ejection problems or if the slide fails to remain in the open position after the last round in each magazine is fired.

Now, how many rounds represent a reasonable amount of ammunition? It is not expected that any two people will agree on a single number. In advance of laboratory research, discussions were held with numerous gunsmiths and armorers. There was general agreement that most problems resulting from firing tended to become apparent during the first 200 or so rounds. This was verified through laboratory tests, and the final 600-round firing test was established to ensure identification of all firing problems.

Drop Safety Requirement

When police service weapons occasionally are dropped, it is necessary that they not discharge. Generally weapons fall as they are drawn from the holster or returned to the holster. Usually a weapon will be ready to use when it is dropped and generally it is dropped on hard surfaces such as roads, walkways, and inside buildings. Therefore, the drop safety test in this section is from a height of 1 meter (3.3 feet) to a concrete floor.

Drop Function Requirement

During laboratory tests it was found that due to the general ruggedness of autoloading pistols it was safe to fire them after they were dropped. Since a handgun is used after all else fails, it is desirable that it work even after it has been dropped. Autoloaders generally

are capable of meeting such a requirement so it was included in the standard.

Criticality of Requirement

A requirement that may be critical to one police department may not be too important to another department. Most autoloader problems are easy to correct by replacing the nonfunctioning part or removing burrs to smooth the operation. Those problems that cannot be corrected easily usually must be returned to the factory for correction. The type of work expected from armorers, gunsmiths, and manufacturers is defined below. For departments that do not have armorers or gunsmiths, every parameter is basically critical. For those departments that do have armorers, the department must decide if it wants a portion of the armorer's time used adjusting "brand new guns right from the box."

Armorer. An armorer installs new parts in an autoloader adjusting the parts with small hand tools (files, stones, hammers, etc.) at those places on the part designated by the manufacturer as adjustment locations.

Gunsmith. In addition to the work of an armorer, a gunsmith uses machine tools (drill presses, lathes, milling machines, etc.) to alter premanufactured parts so that they fit a particular autoloader.

Manufacturer. A manufacturer uses many different types of equipment to design and create an autoloader from raw materials.

Table A lists the autoloading pistol requirements defined in NIJ Standard-0112.00. An attempt has been made to indicate the lowest level, closest to the police department, at which the parameter can be adjusted. It should be noted that most problems can either be solved by a departmental armorer or they should be solved by the manufacturer.

Table A-1

The Person Who Can Most Easily Adjust Autoloaders to Meet the NIJ Standard

Requirement	Armorer	Gunsmith	Manufacturer
User Information			*
Hammer Travel	*		
Particles	*		
Surface		*	*
Barrel Bore Diameter	*		*
Headspace			*
Action	*	*	*
Ejection	*	*	*
Trigger	*		
Hammer	*		
Safety Features	*		*
Magazine			*
Firing Requirement			*
Drop Safety Requirement			*
Drop Function Requirement			*

Appendix B: Testing Program Procedures

The National Institute of Justice (NIJ) Technology Assessment Program Advisory Council was originally established to recommend research priorities consistent with the "real time" needs of the law enforcement community. Based on the recommendations of the Advisory Council, NIJ subsequently established an equipment testing program to evaluate equipment in accordance with the performance standards that NIJ issues for voluntary national use and to publish the test results as Equipment Performance Reports.

Each year, the Advisory Council gives NIJ its recommendations for testing equipment. The recommendations are given in priority order according to overall interest and importance to State and local law enforcement agencies. Funding considerations normally limit the scope of testing programs to two items of equipment, which NIJ selects from the Advisory Council recommendations.

The testing program is complex, involving NIJ, the Technology Assessment Program Information Center (TAPIC), two organizations of the Department of Commerce National Bureau of Standards (NBS), and independent testing laboratories. The result of the testing program is the availability of valid, unbiased test results that assist law enforcement agencies in selecting and procuring equipment suitable for their needs. Moreover, the program is structured so that manufacturers can continue to have their products tested according to the NIJ standard and the results disseminated to users as new products are tested.

Following the decision to test an item of equipment, TAPIC and the NBS Law Enforcement Standards Laboratory (LESL) identify manufacturers and the specific models that are available. The TAPIC staff then contacts the manufacturers to invite them to participate in the program. When TAPIC knows the number of models to be tested, LESL and NIJ assist TAPIC in developing a Request for Proposal (RFP) to solicit bids from independent testing laboratories. The NBS Laboratory Accreditation Program staff develop a laboratory questionnaire to assist in the initial evaluation of the testing laboratory capabilities, which is used as part of the RFP. A laboratory that is captive to a manufacturer or derives a major portion of its income from such a manufacturer is prohibited from bidding on the testing effort.

TAPIC seeks to award contracts to two independent testing laboratories. Since equipment manufacturers are found in all geographic locations, TAPIC makes every effort to select one laboratory east of the Mississippi and one west of the Mississippi. Manufacturers are permitted to have their products tested at their own expense after the TAP test program, and manufacturers may wish to use the laboratory closer to their plant. Two laboratories also allow manufacturers to obtain competitive bids, and should one laboratory withdraw from the program, the other is still available.

When the responses to the RFP are received, LESL, TAPIC, and the NBS Laboratory Accreditation Program staff evaluate each proposal independently and rate it according to the scoring criteria specified in the RFP. A final rank is then established, and TAPIC recommends to NIJ two laboratories for contract award.

Each laboratory awarded a contract is required to demonstrate its competence and ability to properly conduct tests in accordance with the NIJ standard. This is accomplished through an onsite inspection by representatives of TAPIC, LESL, and the NBS Laboratory Accreditation Program staff. During the inspection, a single item of equipment is tested, and the staff evaluate all the factors associated with laboratory competence. Once a laboratory has been

found fully capable to conduct tests in accordance with the NIJ standard and its test report found adequate, it becomes a TAPIC approved independent laboratory for future tests of that item of equipment. Should a laboratory not be competent, it is eliminated from the program and another laboratory is awarded a contract and also subjected to full evaluation.

Approved laboratories are authorized to proceed with the remaining or "main quantity" testing. Representatives of TAPIC and LESL periodically visit the laboratories during the final testing.

After TAPIC has received the final test reports, LESL and TAPIC staff analyze and interpret the results to ensure accuracy and validity. Data are reviewed with the laboratories to resolve any ambiguities prior to preparation of the Equipment Performance Report.

Manufacturers are encouraged to test additional items of equipment after the NIJ Equipment Performance Report is published. Such testing must be accomplished according to NIJ standards, by a TAPIC-approved laboratory, and subject to TAPIC administrative controls. TAPIC issues supplements to the Equipment Performance Report as new equipment is found to conform to NIJ standards.

Appendix C: Results for the Astra, Beretta, and Glock Pistols

Astra Model A90
9mm, single/double action autoloading pistol
(15-round magazine capacity; weight 34 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) F8696 and F8697

Results: The pistol complied with the Visual, Dimensional, Firing, Drop Safety, and Drop Function Requirements of the standard. The pistol did not comply with the User Information and Functional Requirements of the standard.

Footnotes: [1]SN F8696 - During the Drop Function test it was noted that the hammer spur broke and the hammer lowering lever and recoil spring guide were bent as a result of the Drop Safety test. However, the pistol still completed the Drop Function test.

[2]SN F8697 - During the Drop Function test it was noted that the hammer spur broke and the hammer lowering lever and recoil spring guide were bent as a result of the Drop Safety test. However, the pistol still completed the Drop Function test.

Astra Model A90, Serial Number F8696

Test Results

User Information: Did not include cleaning instructions, an ammunition statement, a parts list or ordering instructions, and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .347 in.; Headspace .765 in.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 5.1 lb. single action (SA); 13.4 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: [1]Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	5.1/13.4	.765	N/A	N/A
200	4.6/12.5	.765	None	None
400	4.4/12.6	.765	None	None
600	4.6/12.4	.765	None	None

*Failed to comply with the requirements of the standard.
Footnotes are on the cover page.

Astra Model A90, Serial Number F8697

Test Results

User Information: Did not include cleaning instructions, an ammunition statement, a parts list or ordering instructions, and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .347 in.; Headspace .763 in.

Functional Requirements:

Action: Operated smoothly by hand and during the firing test. After the drop function test the slide would not lock to the rear with an empty magazine.*

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 3.6 lb. single action (SA); 12.1 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: [2]Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	3.6/12.1	.763	N/A	N/A
200	3.6/11.4	.763	None	None
400	3.6/11.4	.763	None	None
600	3.4/10.9	.763	None	None

*Failed to comply with the requirements of the standard.
Footnotes are on the cover page.

Astra Model A90
45-caliber, single/double action autoloading pistol
(8-round magazine capacity; weight 32.6 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) F9229 and F9230

Results: The pistol complied with the Visual Inspection and Dimensional Requirements of the standard. The pistol did not comply with the User Information, Functional, Firing, and Drop Function Requirements of the standard. The Drop Safety test was not completed on one sample due to a breakage during the test.

Footnotes: [1]SN F9229 - During the Drop Safety test the recoil spring guide bent making the pistol inoperable. Further testing was stopped.

Astra Model A90, Serial Number F9229

Test Results

User Information: Did not include cleaning instructions, an ammunition statement, a parts list or ordering instructions, and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .443 in.; Headspace .914.

Functional Requirements:

Action: Operated smoothly by hand and during the firing test. Bound after the drop function test.*

Ejection: Ejected all cases without hangup during the firing test. Test not performed after the drop function test.

Trigger: 3.9 lb. single action (SA); 11.6 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement:[1] (six drops from a height of 39.4 in., 6 cardinal orientations): Test not completed.

Drop Function Requirement: Failed to meet the requirement of the standard.*

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions*
0	3.9/11.6	.914	N/A	N/A
200	3.6/11.1	.914	None	4 Failures to Feed 10 Failures to Eject
400	3.4/10.9	.914	None	2 Failures of Slide to remain open
600	3.4/10.4	.914	Trigger Pin Backing Out*	3 Failures to Feed 18 Failures to Eject

* Failed to comply with the requirements of the standard.
Footnotes are on the cover page.

Astra Model A90, Serial Number F9230

Test Results

User Information: Did not include cleaning instructions, an ammunition statement, a parts list or ordering instructions, and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .443 in.; Headspace .911.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 3.4 lb. single action (SA); 12.1 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions*
0	3.4/12.1	.911	N/A	N/A
200	3.1/11.1	.911	None	1 Failure of Slide to Remain Open 2 Failures to Eject 1 Failure to Feed
400	3.4/11.1	.911	None	2 Failures to Feed 2 Failures to Eject
600	3.1/10.6	.911	None	2 Failures to Eject 1 Failure of Slide to Remain Open

*Failed to comply with the requirements of the standard.

Beretta Model 92F
9mm, single/double action autoloading pistol
(15-round magazine capacity; weight 34.1 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) C67169Z and C67181Z

Results: The pistol complied with the Dimensional, Firing, Drop Safety, and Drop Function Requirements of the standard. The pistol did not comply with the User Information, Visual Inspection, and Functional Requirements of the standard.

Footnotes: None.

Beretta Model 92F, Serial Number C67169Z

Test Results

User Information: Did not include an ammunition statement, a parts list or ordering instructions, and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .346 in.; Headspace complied with the standard.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 6.1 lb. single action (SA); 11.8 lb. double action (DA).

Hammer: Operation was gritty.* Resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	6.1/11.8	Complied	N/A	N/A
200	4.9/11.6	Complied	None	None
400	4.9/10.8	Complied	None	None
600	4.9/11.1	Complied	None	None

* Failed to comply with the requirements of the standard.

Beretta Model 92F, Serial Number C67181Z

Test Results

User Information: Did not include an ammunition statement, a parts list or ordering instructions, and certification of compliance with this standard.*

Visual Inspection: The barrel showed wear through finish where slide travels along barrel.*

Dimensional Requirements: Barrel bore diameter .346 in.; Headspace complied with the standard.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 5.9 lb. single action (SA); 13.1 lb. double action (DA).

Hammer: Operation was gritty.* Resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	5.9/13.1	Complied	N/A	N/A
200	5.9/13.9	Complied	None	None
400	5.4/12.1	Complied	None	None
600	5.6/12.9	Complied	None	None

* Failed to comply with the requirements of the standard.

Glock Model 17
9mm, double action only autoloading pistol
(17-round magazine capacity; weight 24.2 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) AT775 and AT779

Results: The pistol complied with the Visual Inspection, Dimensional, Drop Safety, and Drop Function Requirements of the standard. The pistol did not comply with the User Information, Functional and Firing Requirements of the standard.

Footnotes: None.

Glock Model 17, Serial Number AT775

Test Results

User Information: Did not include cleaning instructions, an ammunition statement, a parts list or ordering instructions, and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .345 in.; Headspace .755.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: Single action (SA) not applicable; 5.6 lb. double action (DA).

Hammer: Not applicable.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	5.6/NA	.755	N/A	N/A
200	6.4/NA	.756	None	None
400	6.1/NA	.756	None	None
600	6.4/NA	.756	None	None

* Failed to comply with the requirements of the standard.

Glock Model 17, Serial Number AT779

Test Results

User Information: Did not include cleaning instructions, an ammunition statement, a parts list or ordering instructions, and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .345 in.; Headspace .756.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Did not eject all cases without hangup during the firing test.* Ejected all cases without hangup after the drop function test.

Trigger: Single action (SA) not applicable; 5.9 lb. double action (DA).

Hammer: Not applicable.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	5.9/NA	.756	N/A	N/A
200	6.9/NA	.756	None	None
400	6.9/NA	.756	None	6 Failures to Eject*
600	6.7/NA	.756	None	None

* Failed to comply with the requirements of the standard.

Appendix D: Results for the Heckler and Koch and Sig Sauer Pistols

Heckler and Koch Model P7-M8
9mm, single action autoloading pistol
(8-round magazine capacity; weight 30.4 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) 89478 and 89479

Results: The pistol complied with the Visual Inspection, Functional, Firing, Drop Safety, and Drop Function Requirements of the standard. The pistol did not comply with the User Information and Dimensional Requirements of the standard.

Footnotes: None.

Heckler and Koch Model P7M8, Serial Number 89478

Test Results

User Information: Did not include certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .344 in.; Headspace .746 in.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 5.4 lb. single action (SA); double action (DA) not applicable.

Hammer: Not applicable.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	5.4/NA	.746	N/A	N/A
200	5.4/NA	.736	None	1 Failure to Feed 1 Failure to Eject
400	5.4/NA	.743	None	None
600	5.4/NA	.742	None	None

* Failed to comply with the requirements of the standard.

Heckler and Koch Model P7M8, Serial Number 89479

Test Results

User Information: Did not include certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .348 in.; Headspace .742 in.*

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 5.0 lb. single action (SA); double action (DA) not applicable.

Hammer: Not applicable.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	5.0/NA	.742*	N/A	N/A
200	5.4/NA	.739	None	1 Failure to Eject
400	5.4/NA	.739	None	None
600	5.1/NA	.737	None	None

* Failed to comply with the requirements of the standard.

Heckler and Koch Model P7M13
9mm, single action autoloading pistol
(13-round magazine capacity; weight 34.2 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) 75168 and 75169

Results: The pistol complied with the Visual Inspection, Dimensional, Firing, Drop Safety, and Drop Function Requirements of the standard. The pistol did not comply with the User Information and Functional Requirements of the standard.

Footnotes:[1] SN 75168 and 75169. The firing test revealed that under rapid fire conditions it was possible to heat the weapon to the point where the slide would not function properly.

Heckler and Koch Model P7M13, Serial Number 75168

Test Results

User Information: Did not include an ammunition statement, a parts list or ordering instructions, and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .342 in.; Headspace .748 in.

Functional Requirements:

Action: Operated smoothly by hand. Did not operate smoothly during the firing test and after the drop function test.*

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 6.6 lb. single action (SA); double action (DA) not applicable.

Hammer: Not applicable.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:[1]

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	6.6/NA	.748	N/A	N/A
200	6.1/NA	.748	None	1 Failure of Slide to Remain Open
400	6.1/NA	.745	None	None
600	5.9/NA	.748	None	1 Failure to Feed 2 Failures of Slide to Remain Open

* Failed to comply with the requirements of the standard.

Heckler and Koch Model P7M13, Serial Number 75169

Test Results

User Information: Did not include an ammunition statement, a parts list or ordering instructions, and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .343 in.; Headspace .751 in.

Functional Requirements:

Action: Operated smoothly by hand. Did not operate smoothly during the firing test and after the drop function test.*

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 5.8 lb. single action (SA); double action (DA) not applicable.

Hammer: Not applicable.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:[1]

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	5.8/NA	.751	N/A	N/A
200	5.3/NA	.748	None	None
400	5.9/NA	.749	None	2 Failures of Slide to Remain Open
600	5.6/NA	.748	None	None

* Failed to comply with the requirements of the standard.

Sig Sauer Model P220
9mm, single/double action autoloading pistol
(9-round magazine capacity; weight 28.9 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) G118568 and G125643

Results: The pistol complied with the Visual Inspection, Dimensional, Functional, Firing and Drop Safety Requirements of the standard. The pistol did not comply with the User Information and Drop Function Requirements of the standard.

Footnotes: None.

Sig Sauer Model P220, Serial Number G118568

Test Results

User Information: Did not include an ammunition statement and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .348 in.; Headspace .756 in.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 5.1 lb. single action (SA); 12.8 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	5.1/12.8	.756	N/A	N/A
200	4.6/12.6	.756	None	None
400	4.6/12.4	.756	None	None
600	4.6/12.1	.757	None	None

* Failed to comply with the requirements of the standard.

Sig Sauer Model P220, Serial Number G125643

Test Results

User Information: Did not include an ammunition statement and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .348 in.; Headspace .761 in.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 5.4 lb. single action (SA); 12.4 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and funtioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Failed to comply with the standard: 5 failures to feed during the firing of 20 rounds; 4 failures to feed during the 20-round retest.*

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	5.4/12.4	.761	N/A	N/A
200	4.4/12.4	.761	None	None
400	4.6/12.4	.761	None	None
600	4.6/12.3	.761	None	None

* Failed to comply with the requirements of the standard.

Sig Sauer Model P225
9mm, single/double action autoloading pistol
(8-round magazine capacity; weight 28.2 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) M534540 and M534592

Results: The pistol complied with the Visual Inspection, Dimensional, Drop Safety, and Drop Function Requirements of the standard. The pistol did not comply with the User Information, Functional, and Firing Requirements of the standard.

Footnotes: [1]SN M534540 - During the Firing Test, the magazine consistently released after the last round was fired, allowing the slide to close.

[2]SN M534592 - During the Firing Test, the magazine released on 42 occasions after the last round was fired. This allowed the slide to close. At round 310 the magazine released during 8 shots and the same occurred at round 335.

Sig Sauer Model P225, Serial Number M534540

Test Results

User Information: Did not include an ammunition statement and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .348 in.; Headspace complied with the standard.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 4.4 lb. single action (SA); 12.9 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/Mechanical Failures[1]	Malfunctions
0	4.4/12.9	Complied	N/A	N/A
200	4.7/12.1	Complied	Mechanical Failure*	1 Failure to Feed
400	4.4/12.6	Complied	Mechanical Failure*	4 Failures to Feed*
600	4.6/11.9	Complied	Mechanical Failure*	None

* Failed to comply with the requirements of the standard.
Footnotes are on the cover page.

Sig Sauer Model P225, Serial Number M534592

Test Results

User Information: Did not include an ammunition statement and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .345 in.; Headspace complied with the standard.

Functional Requirements:

Action: Bound when operated by hand.* Operated smoothly during the firing test and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 4.6 lb. single action (SA); 13.6 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/[2] Mechanical Failures	Malfunctions
0	4.6/13.6	Complied	N/A	N/A
200	4.4/13.1	Complied	Mechanical Failure*	None
400	4.9/14.9	Complied	Mechanical Failure*	1 Failure to Feed
600	5.1/13.6	Complied	Mechanical Failure*	None

* Failed to comply with the requirements of the standard.
Footnotes are on the cover page.

Sig Sauer Model P226
9mm, single/double action autoloading pistol
(15-round magazine capacity; weight 31.2 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) U125069 and U125908

Results: The pistol complied with the Visual Inspection, Dimensional, Firing, and Drop Function Requirements of the standard. The pistol did not comply with the User Information, Functional, and Drop Safety Requirements of the standard.

Footnotes: None.

Sig Sauer Model P226, Serial Number U125069

Test Results

User Information: Did not include certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .349 in.; Headspace complied with the standard.

Functional Requirements:

Action: Sticky when operated by hand, and after the drop function test.* Operated smoothly during the firing test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 4.9 lb. single action (SA); 12.9 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunction
0	4.9/12.9	Complied	N/A	N/A
200	5.6/12.4	Complied	None	None
400	4.9/12.4	Complied	None	None
600	4.9/12.4	Complied	None	None

* Failed to comply with the requirements of the standard.

Sig Sauer Model P226, Serial Number U125908

Test Results

User Information: Did not include certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .350 in.; Headspace complied with the standard.

Functional Requirements:

Action: Sticky when operated by hand and after the drop function test.* Operated smoothly during the firing test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 5.9 lb. single action (SA): 13.6 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): 1 Fired Primer.*

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	5.9/13.6	Complied	N/A	N/A
200	4.4/13.1	Complied	None	None
400	4.4/11.9	Complied	None	None
600	4.4/12.6	Complied	None	None

* Failed to comply with the requirements of the standard.

Sig Sauer Model P220
45-Caliber, single/double action autoloading pistol
(7-round magazine capacity; weight 29.6 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) G136453 and G136673

Results: The pistol complied with the Visual Inspection, Dimensional, Functional, Drop Safety and Drop Function Requirements of the standard. The pistol did not comply with the User Information and Firing Requirements of the standard.

Footnotes: None.

Sig Sauer Model 220, Serial Number G136453

Test Results

User Information: Did not include an ammunition statement and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .433 in.; Headspace .904 in.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 5.4 lb. single action (SA); 14.4 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	5.4/14.4	.904	N/A	N/A
200	4.6/12.1	.904	None	Numerous Failures to Feed*
400	4.4/11.4	.904	None	1 Failure to Feed
600	4.6/12.1	.905	None	5 Failures to Feed*

* Failed to comply with the requirements of the standard.

Sig Sauer Model 220, Serial Number G136673

Test Results

User Information: Did not include an ammunition statement and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .433 in.; Headspace .902 in.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 4.9 lb. single action (SA); 14.9 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	4.9/14.9	.902	N/A	N/A
200	4.6/12.4	.902	None	Numerous Failures to Feed*
400	4.4/11.9	.902	None	None
600	4.6/14.6	.902	None	3 Failures to Feed

*Failed to comply with the requirements of the standard.

Appendix E: Results for the Smith & Wesson Pistols

Smith and Wesson Model 439
9mm, single/double action autoloading pistol
(8-round magazine capacity; weight 28.1 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) A806744 and A818271

Results: The pistol complied with the Visual Inspection, Dimensional, Functional, Firing, Drop Safety, and Drop Function Requirements of the standard. The pistol did not comply with the User Information Requirements of the standard.

Footnotes: [1]SN A818271 - During the firing test, round 123 failed to eject as a result of ammunition problem.

Smith and Wesson Model 439, Serial Number A806744

Test Results

User Information: Did not include an ammunition statement and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .347 in.; Headspace complied with the standard.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 7.6 lb. single action (SA); 14.1 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	7.6/14.1	Complied	N/A	N/A
200	7.4/13.9	Complied	None	None
400	6.6/14.4	Complied	None	None
600	6.6/12.9	Complied	None	None

* Failed to comply with the requirements of the standard.

Smith and Wesson Model 439, Serial Number A818271

Test Results

User Information: Did not include an ammunition statement and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .346 in.; Headspace complied with the standard.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 7.9 lb. single action (SA); 13.9 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions[1]
0	7.9/13.9	Complied	N/A	N/A
200	7.9/13.9	Complied	None	None
400	7.9/13.6	Complied	None	None
600	7.9/12.9	Complied	None	None

* Failed to comply with the requirements of the standard.
Footnotes are on the cover page.

Smith and Wessons Model 459
9mm, single/double action autoloading pistol
(14-round magazine capacity; weight 30.8 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) A829373 and A829385

Results: The pistol complied with the Visual Inspection, Dimensional, Functional, Firing, Drop Safety, and Drop Function Requirements of the standard. The pistol did not comply with the User Information Requirements of the standard.

Footnotes: [1]SN A829373 - During the first 200 rounds of the firing test, there were five instances where the slide failed to remain open after the last round was fired and one failure to feed. During the second 200 rounds of the firing test there were three instances where the slide failed to remain open after the last round was fired. It was subsequently determined that the malfunctions were caused by the magazine and not the pistol.

Smith and Wesson Model 459, Serial Number A829373

Test Results

User Information: Did not include a description of the safety features, an ammunition statement, and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirement: Barrel bore diameter .345 in.; Headspace .765 in.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 5.6 lb. single action (SA); 13.4 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions[1]
0	5.6/13.4	.765	N/A	N/A
200	5.6/13.4	.765	None	1 Failure to Feed
400	5.4/12.9	.765	None	None
600	5.4/13.1	.765	None	None

*Failed to comply with the requirements of the standard.
Footnotes are on the cover page.

Smith and Wesson Model 459, Serial Number A829385

Test Results

User Information: Did not include a description of the safety features, an ammunition statement, and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .345 in.; Headspace .771 in.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 6.4 lb. single action (SA); 13.1 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	6.4/13.1	.771	N/A	N/A
200	6.1/12.6	.771	None	None
400	5.9/12.4	.771	None	None
600	6.1/12.6	.771	None	None

* Failed to comply with the requirements of the standard.

Smith and Wesson Model 469

9mm, single/double action autoloading pistol
(12-round magazine capacity; weight 26 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) TAJ8172 and TAJ8757

Results: The pistol complied with the Visual Inspection, Dimensional, Firing, Drop Safety, and Drop Function Requirements of the standard. The pistol did not comply with the User Information and Functional Requirements of the standard.

Footnotes: None.

Smith and Wesson Model 469, Serial Number TAJ8172

Test Results

User Information: Did not include a description of the safety features, an ammunition statement, and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .344 in.; Headspace .758 in.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 8.1 lb.* single action (SA); 12.6 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	8.1*/12.6	.758	N/A	N/A
200	7.9/12.6	.758	None	None
400	7.6/12.6	.758	None	None
600	7.2/12.4	.758	None	None

* Failed to comply with the requirements of the standard.

Smith and Wesson Model 469, Serial Number TAJ8757

Test Results

User Information: Did not include a description of the safety features, an ammunition statement, and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .344 in.; Headspace .762 in.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 7.1 lb. single action (SA); 13.1 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	7.1/13.1	.762	N/A	N/A
200	7.1/12.9	.762	None	None
400	7.4/12.4	.763	None	None
600	6.9/12.3	.763	None	None

* Failed to comply with the requirements of the standard.

Smith and Wesson Model 639

9mm, single/double action autoloading pistol
(8-round magazine capacity; weight 37 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) TAL0763 and TAL0864

Results: The pistol complied with the Dimensional, Functional, Firing, Drop Safety, and Drop Function Requirements of the standard. The pistol did not comply with the User Information and Visual Inspection Requirements of the standard.

Footnotes: [1]SN TAL0864 - During the entire 600 round firing test, one magazine was sticking when it was released. This failure is attributable to the magazine and not the weapon.

Smith and Wesson Model 639, Serial Number TAL0763

Test Results

User Information: Did not include an ammunition statement and certification of compliance with this standard.*

Visual Inspection: Scratches near front of trigger guard*

Dimensional Requirements: Barrel bore diameter .346 in.; Headspace complied with the standard.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 5.4 lb. single action (SA); 12.4 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	5.4/12.4	Complied	N/A	N/A
200	5.4/11.6	Complied	None	3 Failures to Eject
400	5.6/12.1	Complied	None	None
600	5.6/12.0	Complied	None	None

* Failed to comply with the requirements of the standard.

Smith and Wesson Model 639, Serial Number TAL0864

Test Results

User Information: Did not include an ammunition statement and certification of compliance with this standard.*

Visual Inspection: Scratches on the slide.*

Dimensional Requirements: Barrel bore diameter .347 in.; Headspace complied with the standard.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 6.4 lb. single action (SA); 12.6 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/Mechanical Failures[1]	Malfunctions
0	6.4/12.6	Complied	N/A	N/A
200	6.4/12.4	Complied	None	None
400	6.6/12.9	Complied	None	None
600	6.4/12.4	Complied	None	None

* Failed to comply with the requirements of the standard.
Footnotes are on the cover page.

Smith and Wesson Model 659
9mm, single/double action autoloading pistol
(14-round magazine capacity; weight 39.4 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) TAK9462 and TAL0391

Results: The pistol complied with the Visual Inspection, Dimensional, Functional, Firing, Drop Safety, and Drop Function Requirements of the standard. The pistol did not comply with the User Information Requirements of the standard.

Footnotes: None.

Smith and Wesson Model 659, Serial Number TAK9462

Test Results

User Information: Did not include a description of the safety features, an ammunition statement, and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .344 in.; Headspace .761 in.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 6.9 lb. single action (SA); 12.1 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	6.9/12.1	.761	N/A	N/A
200	6.9/11.8	.762	None	None
400	6.6/11.9	.762	None	None
600	6.5/11.9	.762	None	None

* Failed to comply with the requirements of the standard.

Smith and Wesson Model 659, Serial Number TAL0391

Test Results

User Information: Did not include a description of the safety features, an ammunition statement, and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .344 in.; Headspace .762 in.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 5.6 lb. single action (SA); 12.9 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	5.6/12.9	.762	N/A	N/A
200	5.6/13.4	.762	None	None
400	5.4/12.1	.763	None	None
600	5.4/12.4	.763	None	None

* Failed to comply with the requirements of the standard.

Smith and Wesson Model 669
9mm, single/double action autoloading pistol
(12-round magazine capacity; weight 24.6 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) TAL2567 and TAL2843

Results: The pistol complied with the Visual Inspection, Dimensional, Functional, Drop Safety and Drop Function Requirements of the standard. The pistol did not comply with the User Information and Firing Requirements of the standards.

Footnotes: [1]SN TAL2843 - During the firing of rounds 201-400 it was noted that the recoil spring guide bushing was cracked. Testing was continued.

Smith and Wesson Model 669, Serial Number TAL2567

Test Results

User Information: Did not include an ammunition statement and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .347 in.; Headspace complied with the standard.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 7.1 lb. single action (SA); 13.4 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	7.1/13.4	Complied	N/A	N/A
200	6.1/12.1	Complied	None	1 Failure to Eject
400	6.6/11.4	Complied	None	None
600	6.6/11.6	Complied	None	None

* Failed to comply with the requirements of the standard.

Smith and Wesson Model 669, Serial Number TAL2843

Test Results

User Information: Did not include an ammunition statement and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .347 in.; Headspace complied with the standard.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 5.4 lb. single action (SA); 12.9 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/Mechanical Failures[1]	Malfunctions
0	5.4/12.9	Complied	N/A	N/A
200	6.4/13.4	Complied	None	None
400	6.1/11.6	Complied	Structural Failure*	1 Failure to Eject
600	5.1/12.9	Complied	None	None

*Failed to comply with the requirements of the standard.
Footnotes are on the cover page.

Smith and Wesson Model 645
45-caliber, single/double action autoloading pistol
(8-round magazine capacity; weight 39.4 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) TAK4129 and TAK4336

Results: The pistol complied with the Dimensional, Functional, Firing, Drop Safety and Drop Function Requirements of the standard. The pistol did not comply with the User Information and Visual Inspection Requirements of the standards.

Footnotes: None.

Smith and Wesson Model 645, Serial Number TAK4129

Test Results

User Information: Did not include certification of compliance with this standard.*

Visual Inspection: Slide and area by slide release lever had scratches.*

Dimensional Requirements: Barrel bore diameter .442 in.; Headspace complied with the standard.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 6.1 lb. single action (SA); 13.9 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	6.1/13.9	Complied	N/A	N/A
200	6.4/12.9	Complied	None	None
400	6.4/12.6	Complied	None	None
600	6.4/12.4	Complied	None	None

* Failed to comply with the requirements of the standard.

Smith and Wesson Model 645, Serial Number TAK4336

Test Results

User Information: Did not include certification of compliance with this standard.*

Visual Inspection: Slide scratched.*

Dimensional Requirements: Barrel bore diameter .443 in.; Headspace complied with the standard.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 5.9 lb. single action (SA); 13.4 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	5.9/13.4	Complied	N/A	N/A
200	5.9/12.9	Complied	None	1 Failure to Feed
400	5.6/13.6	Complied	None	None
600	5.4/12.4	Complied	None	2 Failures to Feed

*Failed to comply with the requirements of the standard.

Appendix F: Results for the Star, Steyr, and Walther Pistols

Star Model PD
45-caliber, single action autoloading pistol
(6-round magazine capacity; weight 24.6 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) 1690827 and 1690828

Results: The pistol complied with the Visual Inspection, Dimensional, Drop Safety and Drop Function Requirements of the standard. The pistol did not comply with the User Information, Functional and Firing Requirements of the standard.

Footnotes: [1]SN 1690827 - During the initial 200 rounds of the Firing Test, after the first 100 rounds were fired, the slide would not close completely when chambering the first round of the magazine. This continued throughout the firing test.

During the firing of the second 200 rounds, the slide failed to remain open on 11 occasions after firing the last round of the magazine. Round number 399 misfed.

During the firing of the third 200 rounds, the slide failed to remain open on 28 occasions after firing the last round of the magazine.

It was noted that the recoil spring guide buffer exhibited signs of wear after firing 600 rounds.

[2]SN 1690828 - During the intial 200 rounds of the firing test, the slide failed to remain open on 14 occasions after firing the last round of the magazine. It was noted that the recoil spring guide buffer was cracked and worn.

During the firing of the second 200 rounds, the slide failed to remain open on 19 occasions after firing the last round of the magazine. The recoil spring guide buffer showed additional wear.

During the firing of the third 200 rounds, the slide failed to remain open on 27 occasions after firing the last round of the magazine. The recoil spring guide buffer is no longer functioning properly and damage is occurring to the barrel and slide due to recoil forces. Rounds 544 and 590 misfired and the slide did not close completely.

Star Model PD, Serial Number 1690827

Test Results

User Information: Did not include an ammunition statement and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .445 in.; Headspace complied with the standard.

Functional Requirements:

Action: Operated smoothly by hand. Bound during the firing test and after the drop function test.*

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 6.9 lb. single action (SA); double action (DA) not applicable.

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions[1]
0	6.9/NA	Complied	N/A	N/A
200	6.6/NA	Go Gauge Won't Go (indicates head-space too small)	None	Slide Failed to Close Completely*
400	7.9/NA	Go Gauge Won't Go (indicates head-space too small)	None	11 Failures of Slide to Remain Open* 1 Failure to Feed
600	7.1/NA	Go Gauge Won't Go (indicates head-space too small)	None	28 Failures of Slide to Remain Open*

* Failed to comply with the requirements of the standard.
Footnotes are on the cover page.

Star Model PD, Serial Number 1690828

Test Results

User Information: Did not include certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .445 in.; Headspace complied with the standard.

Functional Requirements:

Action: Sticky by hand.* Operated smoothly during the firing test and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 7.4 lb. single action (SA); double action (DA) not applicable.

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions[2]
0	7.4/NA	Complied	N/A	N/A
200	8.4/NA	Complied	Structural Failure*	14 Failures of Slide to Remain Open*
400	8.4/NA	Complied	None	19 Failures of Slide to Remain Open*
600	8.1/NA	Complied	None	27 Failures of Slide to Remain Open* 2 Failures to Fire 2 Failures of Slide to Close Completely

*Failed to comply with the requirements of the standard.
Footnotes are on the cover page.

Steyr Model GB
9mm, single/double action autoloading pistol
(18-round magazine capacity; weight 34.6 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) P16209 and P16519

Results: The pistol complied with the Visual Inspection, Dimensional, Functional, Firing, Drop Safety, and Drop Function Requirements of the standard. The pistol did not comply with the User Information Requirements of the standard.

Footnotes: [1]SN P16519 - During the Drop Function test it was noted that the hammer fell when the slide was released but the primers were unfired and unmarked. The hammer remained cocked during subsequent firings.

Steyr Model GB, Serial Number P16209

Test Results

User Information: Did not include a parts list or ordering instructions and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .343 in.; Headspace .764.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 5.4 lb. single action (SA); 13.6 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirements: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	5.4/13.6	.764	N/A	N/A
200	5.1/13.4	.764	None	None
400	5.1/13.3	.764	None	None
600	4.9/13.3	.764	None	None

*Failed to comply with requirements of the standard.

Steyr Model GB, Serial Number P16519

Test Results

User Information: Did not include a parts list or ordering instructions and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .343 in.; Headspace .766.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 4.6 lb. single action (SA); 13.6 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds and was capable of being released without removing shooting hand from pistol.

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement:[1] Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	4.6/13.6	.766	N/A	N/A
200	4.6/13.3	.766	None	None
400	4.4/13.3	.766	None	None
600	4.1/12.8	.766	None	None

*Failed to comply with requirements of the standard.
Footnotes are on the cover page.

Walther Model P5
9mm, single/double action autoloading pistol
(8-round magazine capacity; weight 26.5 oz. unloaded)

TEST SUMMARY

Pistols: Serial Number (SN) 46848 and 46849

Results: The pistol complied with the Dimensional, Firing, Drop Safety, and Drop Function Requirements of the standard. The pistol did not comply with the User Information, Visual Inspection, and Functional Requirements of the standard.

Footnotes: None.

Walther Model P5, Serial Number 46848

Test Results

User Information: Did not include an ammunition statement and certification of compliance with this standard.*

Visual Inspection: Complied with the standard.

Dimensional Requirements: Barrel bore diameter .348 in.; Headspace complied with the standard.

Functional Requirements:

Action: Operated smoothly by hand, during the firing test, and after the drop function test.

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 5.9 lb. single action (SA); 11.4 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds. Was not capable of being released without removing shooting hand from pistol.*

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	5.9/11.4	Complied	N/A	N/A
200	5.4/10.4	Complied	None	None
400	5.6/10.3	Complied	None	1 Failure to Feed 1 Jammed Slide
600	5.1/10.1	Complied	None	None

*Failed to comply with requirements of the standard.

Walther Model P5, Serial Number 46849

Test Results

User Information: Did not include an ammunition statement and certification of compliance with this standard.*

Visual Inspection: Trigger guard was chipped/scratched.*

Dimensional Requirements: Barrel bore diameter .348 in.; Headspace complied with the standard.

Functional Requirements:

Action: Operated smoothly by hand and during the firing test. The slide did not always close completely after the drop function test.*

Ejection: Ejected all cases without hangup during the firing test and after the drop function test.

Trigger: 6.4 lb. single action (SA); 11.4 lb. double action (DA).

Hammer: Operated smoothly and resisted 10.25 lb. force without firing.

Safety Features: Present and functioned properly. Active safeties could be released with shooting hand.

Magazine: Had minimum capacity of six rounds. Was not capable of being released without removing shooting hand from pistol.*

Drop Safety Requirement: (six drops from a height of 39.4 in., 6 cardinal orientations): Complied with the standard.

Drop Function Requirement: Complied with the standard.

Firing Test:

Rounds	Trigger Pull SA/DA (average)	Headspace	Structural/ Mechanical Failures	Malfunctions
0	6.4/11.4	Complied	N/A	N/A
200	5.6/9.9	Complied	None	1 Failure to Feed
400	5.9/9.9	Complied	None	1 Failure to Feed
600	4.9/9.9	Complied	None	None

*Failed to comply with requirements of the standard.