

*Voluntary Industry Performance Standards
Criteria for Evaluation of New
Firearms Designs Under Conditions
of Abusive Mishandling
for the Use of Commercial Manufacturers*

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Approved September 25, 2023

Abstract

This Standard provides procedures for evaluating new firearms designs and applies to rifles, shotguns, pistols and revolvers. In the interest of safety, these tests are structured to demonstrate to the designer of new firearms that the product will resist abusive mishandling. These procedures are specifically understood not to apply to muzzle loading and black powder firearms of any type.

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Foreword

This Voluntary Industry Performance Standard provides the firearm designer and manufacturer with recommendations for test procedures to evaluate new designs of rifles, shotguns and handguns as defined under the U.S. Federal Gun Control Act of 1968. Test parameters simulate conditions where abusive mishandling could possibly result in accidental discharge.

These test procedures specifically do not apply to muzzle loading and black powder firearms of any type.

Suggestions for improvement of this standard are welcome. They should be sent to: admin@saami.org.

SAAMI's criteria for obtaining consensus on all proposed standards is a majority of the consensus body casting a vote (counting abstentions) and at least two-thirds (2/3) of those voting approve (not counting abstentions).

The consensus body for this standard consisted of the following individuals and their respective affiliations:

<u>Interest Category</u>	<u>Name</u>	<u>Affiliation</u>
Expert	Buford Boone	Boone Ballistics
Expert	Earl Griffith	Individual, Retired Chief Firearms and Ammunition Technology Division, Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF)
General Interest	James E. Hamby	Association of Firearms & Tool Mark Examiners
General Interest	Gentry Boswell	Individual, Retired US Air Force General Officer, Competitive Shooter, Avid User
General Interest	Ken Kees	Individual, Retired Ammunition Engineer and Avid User
General Interest	Paul Szabo	Individual, Retired Ammunition Engineer, Expert Witness
Government	Jason Armstrong	The Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) - Firearms & Ammunition Technology Division
Government	Lowell Johnson	Department of Homeland Security (DHS) – National Armory
Government	Mark Greene	National Institute of Justice (NIJ) - Office of Technology and Standards
Government	A. Scott Patterson	Federal Bureau of Investigation (FBI) - Ballistic Research Facility
Producer	Adelar Garcia	Companhia Brasileira de Cartuchos (CBC)
Producer	Raymond Gross	Manson Precision Reamers
Producer	Melissa Maze	PCB Piezotronics, Inc.
Producer	John Miller	DEWESoft, LLC
Testing Laboratory	Dan Gubernat	United States Army Research Laboratory
Testing Laboratory	Kyle North	NTS Technical Systems
User	Jennifer Floyd	Arkansas State Crime Lab
User	Samuel Perry	Birmingham Proof House
User	Jeromey Schroeder	Royal Canadian Mounted Police (RCMP)
User	Cody Walton	Naval Surface Warfare Center, Crane Division

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1. Scope

This Voluntary Industry Performance Standard provides the firearm designer and manufacturer with recommendations for test procedures to evaluate new designs of rifles, shotguns and handguns as they are defined by the Federal Gun Control Act of 1968. The test parameters simulate conditions where the firearm is subjected to abusive mishandling to demonstrate the ability of the firearm to withstand this abuse without discharging.

2. Purpose

In the interest of safety, the purpose of this Standard is to provide test procedures that will aid the designer and manufacturer in evaluating the performance of new designs of firearms under certain conditions of abusive mishandling.

3. Exceptions

- a) This Standard does not apply to muzzle loading and black powder firearms of any type.
- b) The requirements of this Standard are not appropriate for firearms primarily intended for formal target shooting, and therefore this Standard does not apply to firearms whose trigger pull is designed to be less than three pounds (1.36 kg).

4. Definitions

Definitions as found in the SAAMI Glossary located at www.saami.org.

Double Barrel Shotgun - A shotgun with two barrels adjacent to each other in the horizontal plane (See Side-by Side). If arranged vertically, it is usually termed an “over/under” shotgun.

Drop Test Surface – A 85±5 Durometer (Shore A) “rubber” sheet, one (1) inch thick (2.54 cm), backed by concrete. The exterior dimensions of the rubber sheet and concrete shall be large enough so that when the gun is dropped it will fall and come to rest without interference within the perimeter of the rubber sheet. A list of known suppliers and contact information can be found at www.saami.org.

NOTE: The hardness of the “rubber” sheet should be checked on a regular basis as the hardness may change over time.

Firing Pin - That part of the firearm mechanism which strikes the primer or the rim of a cartridge to initiate ignition in order to fire the cartridge.

Hammer - A component part of the firing mechanism which strikes the firing pin or primer sometimes through one or more transfer members. A firearm may have a concealed hammer or an exposed hammer.

Handgun - A firearm designed to be held and fired with one hand.

Pistol - A firearm intended to be fired with one hand in which the chamber(s) are integral to the barrel(s).

Revolver - A firearm, usually a handgun, with a cylinder having several chambers so arranged as to rotate around an axis and be discharged successively by the same firing mechanism through a common barrel.

Rifle - A firearm having spiral features in the bore to impart spin to a single projectile and designed to be fired from the shoulder.

"Safe Carrying" condition - The condition in which it is contemplated that a particular design of firearm is to be carried.

Safety - A device on a firearm intended to provide protection against unintended discharge under normal usage when properly engaged.

1. "On" - A term describing the position of a component of the safety device when set in a manner to provide protection against unintended discharge under normal usage.
2. "Off" - A term describing the position of a component of the safety device when set in a manner to allow the firearm to be discharged.

Shotgun - A smooth bore firearm designed to fire cartridges containing numerous pellets or a single slug and designed to be fired from the shoulder. In some cases, shotgun bores or choke tubes are rifled to be used specifically with slugs.

Striker - A spring-driven rod-like firing pin, or a separate component which impacts the firing pin, which travels in a linear path to strike the primer.

Trigger - That part of a firearm mechanism which is moved manually to cause the firearm to discharge.

Trigger Pull Force - The peak force which must be applied to the trigger of a firearm, approximately parallel to the bore line, to cause the sear, striker, or hammer to release.

5. Drop Test

5.1. Applies to: Rifles, Shotguns and Handguns

5.1.1. This test simulates the abusive dropping of the firearm.

5.1.2. With the firearm in the "Safe Carrying" condition, the firearm shall be capable of passing the below test criteria for drop testing from a height of four (4) feet (1.22 m) onto the Drop Test Surface. The drop height shall be measured from the top of the Drop Test Surface to the center of gravity of the firearm. The center of gravity shall be determined to an accuracy of \pm one (1) inch (2.54 cm) by any recognized method for finding the center of gravity of an irregularly shaped object. The firearm shall be re-cocked and reset in the "Safe Carrying" condition after each drop or a separate firearm may be used for each drop. As an alternative to free dropping, other methods may be substituted if they provide equivalent impact characteristics.

5.2. **Criterion** – The firearm shall not fire a chambered empty primed case of its designated cartridge when tested in accordance with this procedure. In a multi-chambered gun, such as a revolver or double barrel shotgun, the primed case(s) shall be inserted in the chamber(s) directly in front of the firing pin(s). Parts breakage or other damage resulting from drop testing does not constitute failure as long as the empty primed case does not fire, and the firearm can be unloaded safely after each drop.

5.3. **Test Procedure** – The firearm or firearms shall be dropped in such a way as to cause them to strike the Drop Test Surface in each of the following attitudes:

- a) Barrel vertical, muzzle down.
- b) Barrel vertical, muzzle up.
- c) Barrel horizontal, bottom up.
- d) Barrel horizontal, bottom down.

- e) Barrel horizontal, left side up.
 - f) Barrel horizontal, right side up.
- 5.3.1. The test shall be conducted with the trigger pull force set at the minimum force specified by the manufacturer.
 - 5.3.2. The test shall be conducted with the magazine, clip, or all remaining chambers, in the case of a multi-chamber gun, fully loaded with SAAMI-compliant gun functioning dummy cartridges and locked in place.
 - 5.3.3. The test shall be conducted with firearms of minimum and maximum weight configurations of a given model, as well as variations which may affect the severity of impact such as butt plate or recoil pad, hard or soft grips, etc. offered by the manufacturer.

6. Exposed Hammer Test

- 6.1. **Applies to:** Handguns with exposed hammers or strikers
 - 6.1.1. This test simulates the dropping of the handgun on its exposed hammer or striker.
 - 6.1.2. Handguns with exposed hammers or strikers shall be capable of passing the following test criteria with the firearm in the “Safe Carrying” condition. The firearm shall be dropped the distance specified in the Test Procedure section below, striking the rear of the hammer spur or exposed striker upon a mild steel block of at least fifty (50) pounds (22.7 kg) weight with the barrel vertical, muzzle up, a total of six (6) times. The same firearm shall be used throughout the test.
 - 6.1.3. Alternate Procedure – Instead of dropping the firearm, as above, a mild steel weight equal to the weight of a fully loaded firearm and accessories as cataloged by the manufacturer may be dropped the distance specified in the Test Procedure section below, striking the exposed hammer or striker with the firearm held with barrel vertical and muzzle down, its muzzle resting on a mild steel block of at least fifty (50) pounds (22.7 kg) weight, a total of six (6) times. The same firearm shall be used throughout the test.
- 6.2. **Criterion** – The firearm shall not fire a chambered empty primed case of its designated cartridge when tested according to this procedure. In the case of a multi-chambered gun, such as a revolver, the primed case(s) shall be in the chamber(s) directly in front of the firing pin(s). If at any time during the test there is any observable damage to a part of the firearm without the firing of the primed case, said part may be replaced and the test continued, unless the damaged part bears the serial number of the firearm. Damage to the serial-numbered part without discharge of the primed case after all six drops shall not constitute failure of this test, as long as the firearm can be unloaded safely after each drop.
- 6.3. **Test Procedure** - The drop height for this test shall be:
 - Handguns 36 inches (0.914 m)The height shall be measured from the impact surface to the contact point on the exposed hammer of the firearm.
 - 6.3.1. The test shall be conducted with the trigger pull force set at the minimum force specified by the manufacturer.
 - 6.3.2. The test shall be conducted with the magazine, clip, or all remaining chambers, in the case of a multi-chambered gun, fully loaded with dummy cartridges and locked in place.

- 6.3.3. The test shall be conducted with firearms of minimum and maximum weight configurations of a given model, as well as variations which may affect the severity of impact such as butt plate or recoil pad, hard or soft grips, etc. offered by the manufacturer.

7. Jar-Off Test

- 7.1. **Applies to:** Rifles, Shotguns and Handguns
- 7.1.1. This test simulates the abusive impacting (bumping) of the firearm against a hard surface with the firearm in a condition of maximum readiness.
- 7.1.2. With the firearm cocked and in the ready-to-fire condition (Safety "Off") the firearm shall be capable of passing a jar-off shock equivalent to being dropped from a height of twelve (12) inches (0.305 m) onto Drop Test Surface. The drop height shall be measured from the top of the Drop Test Surface to the lowest point on the firearm. The gun shall be caught after its first bounce from the Drop Test Surface so that it strikes the surface only one time. The firearm shall be re-cocked and reset in the ready-to-fire condition after each drop or a separate firearm may be used for each drop. As an alternative to free dropping, other methods may be substituted if they provide equivalent impact characteristics.
- 7.2. **Criterion** - The firearm shall not fire a chambered empty primed case of its designated cartridge when tested in accordance with this procedure. In the case of a multi-chambered gun, such as a revolver or double barrel shotgun, the primed case(s) shall be in the chamber(s) directly in front of the firing pin(s). Parts breakage or other damage resulting from drop testing does not constitute failure as long as the empty primed case does not fire, and the firearm can be unloaded safely after each drop.
- 7.3. **Test Procedure** - The firearm or firearms shall be dropped in such a way as to cause them to strike the Drop Test Surface one time only in each of the following attitudes:
- a) Barrel vertical, muzzle down.
 - b) Barrel vertical, muzzle up.
 - c) Barrel horizontal, bottom up.
 - d) Barrel horizontal, bottom down.
 - e) Barrel horizontal, left side up.
 - f) Barrel horizontal, right side up.
- 7.3.1. The test shall be conducted with the trigger pull force set at the minimum force specified by the manufacturer.
- 7.3.2. The test shall be conducted with the magazine, clip, or all remaining chambers, in the case of a multi-chambered gun, loaded with dummy cartridges and locked in place.
- 7.3.3. The test shall be conducted with firearms of minimum and maximum weight configurations of a given model, as well as variations which may affect the severity of impact such as butt plate or recoil pad, hard or soft grips, etc. offered by the manufacturer.

8. Rotation Test

- 8.1. **Applies to:** Rifles and Shotguns

- 8.1.1. This test simulates the abusive fall of a firearm when left leaning against a vertical surface.
- 8.1.2. With the rifle or shotgun in the "Safe Carrying" condition, the firearm shall be capable of passing the below test criteria when allowed to fall freely from an upright position with its butt resting on the Drop Test Surface. The firearm shall be re-cocked and reset to the "Safe Carrying" condition after each drop or a separate firearm may be used for each drop.
- 8.2. **Criterion** - The firearm shall not fire a chambered empty primed case of its designated cartridge when tested in accordance with this procedure. In a multi-chambered gun, such as a double barrel shotgun, the primed case(s) shall be inserted in the chamber(s) directly in front of the firing pin(s). Parts breakage or other damage resulting from drop testing does not constitute failure as long as the empty primed case does not fire and the firearm can be unloaded safely after each drop.
- 8.3. **Test Procedure** - The firearm shall be tested so as to fall once on its right side and once on its left side.
 - 8.3.1. The test shall be conducted with the trigger pull force set at the minimum force specified by the manufacturer.
 - 8.3.2. The test shall be conducted with the magazine, clip, or all remaining chambers, in the case of a multi-chambered gun, fully loaded with dummy cartridges and locked in place.
 - 8.3.3. The test shall be conducted with firearms of minimum and maximum weight configurations of a given model, as well as variations which may affect the severity of impact such as butt plate or recoil pad, hard or soft grips, etc. offered by the manufacturer.