

ANSI/SAAMI Z299.5-1990

ANSI/SAAMI Z299.5-1990

American National Standard

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



American National Standards Institute

1430 Broadway
New York, New York
10018

ANSI/SAAMI
Z299.5-1990

Revision of
ANSI/SAAMI
Z299.5-1985

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

Sponsor

Sporting Arms and Ammunition Manufacturers' Institute, Inc.

Members:

Blount, Inc.
Browning Arms Company
Federal Cartridge Company
Hercules Incorporated
Hornady Manufacturing Company
O. F. Mossberg & Sons, Inc.
Olin Corporation - Winchester Division
Remington Arms Company, Inc.
Smith & Wesson
Sturm, Ruger & Company, Inc.
Thompson/Center Arms
U. S. Repeating Arms Company, Inc.
Weatherby, Inc.

Associate Members:

Expro Chemical Products, Inc.

Approved

American National Standards Institute, Inc.

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.

AMERICAN
NATIONAL
STANDARD

An American National Standard implies a consensus of those substantially concerned with its scope and provisions. The data presented in ANSI/SAAMI Standard Z299.5-1990 is directed solely to the needs and interests of commercial manufacturers of firearms. It does not provide techniques or specifications for design or manufacturing nor does it imply that firearms not meeting this Standard are necessarily unsafe.

Approval of an American National Standard requires verification by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of approval. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Published by
Sporting Arms and Ammunition Manufacturers' Institute, Inc.
555 Danbury Road, Wilton, Connecticut 06897

Copyright© 1990 by
Sporting Arms and Ammunition Manufacturers' Institute, Inc.
All rights reserved.

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.

Printed in the United States of America

Foreword (This foreword is not a part of American National Standard Z299.5-1990.)

This Voluntary Industry Performance Standard provides the firearm designer and manufacturer with recommendations for test procedures to evaluate new designs of centerfire and rimfire rifles, shotguns and handguns as defined under the Federal Gun Control Act of 1968. Test parameters simulate conditions where abusive mishandling of the firearm 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 will be welcome. They should be sent to Sporting Arms and Ammunition Manufacturers' Institute, Inc., 555 Danbury Road, Wilton, Connecticut 06897.

Consensus for this standard was achieved by use of the Canvass Method.

The following individuals and organizations recognized as having an interest in the standardization of safety requirements for firearms of new designs were contacted prior to the approval of this standard. Inclusion in this list does not necessarily imply that the organization or individual concurred with the submittal of the standard to ANSI:

Anschutz - E. A. Johnson
Beretta, U.S.A. - R. Bonaventure
Charter Arms - D. Ecker
Colt Industries - R. Costello
Col. E. B. Crossman, Ordnance Corps, Ret. - Independent Expert
D.W.M. Laboratory, Inc. - P. M. Dougherty
Federal Bureau of Investigation - J. C. Hall
Forensic Science Service - L. Haag
Gourley Associates - G. E. Gourley
Guilford Engineering Associates, Inc. - D. Findlay, P.E.
J. Hamby, M. A. - Firearm & Tool Mark Examiner
Heckler & Koch, Inc. - Dr. F. Deltgen
R. L. Hillberg - Independent Expert
Interarms - R. S. Winter
National Bureau of Standards & Technology - D. E. Frank, PhD.
National Rifle Association - P. Dickey
National Skeet Shooting Association - M. Hampton
Picatinny Arsenal - R. Wagner
Rock Island Arsenal - R. Elbe
Savage Arms - E. Kryzwik
Sporting Arms, Inc. - L. Stuckman
Tioga Engineering Co., Inc. - W. D. Davis, Jr., P.E.
U. S. Department of Justice - L. D. Shubin
H. P. White Laboratory, D. Dunn

CONTENTS	SECTION	PAGE
1.	Scope.....	1
2.	Purpose.....	1
3.	Exceptions.....	1
4.	Definitions.....	1-2
5.	Drop Test.....	2-3
6.	Exposed Hammer Test.....	3-4
7.	Jar-Off Test.....	5-6
8.	Rotation Test.....	6

SAAMI VOLUNTARY PERFORMANCE STANDARDS

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

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 handgun in which the chamber is part of the barrel.

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.

Rifle. A firearm having spiral grooves in the bore and designed to be fired from the shoulder.

SAAMI VOLUNTARY PERFORMANCE STANDARDS

"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 accidental 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 accidental discharge under normal usage.
2. "Off" - To allow the firearm to be discharged.

Shotgun. A smooth bore shoulder firearm designed to fire shells containing numerous pellets or a single slug.

Striker. A rod-like firing -pin or a separate component which impinges on the firing-pin.

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

Trigger pull. The average force which must be applied to the trigger of a firearm to cause sear or hammer release with the force applied approximately parallel to the bore line.

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 The firearm shall be dropped in the manufacturer's recommended "Safe Carrying" condition.

5.2 Drops will be from a height of four feet (1.22m), measured from the center of gravity of the firearm.

5.2.1 The firearm shall be dropped onto a 85 ± 5 Durometer (Shore A) rubber mat, one inch thick (2.54 cm), backed by concrete. The mat and concrete backing shall be large enough so that when the gun is dropped it will come to rest without interference within the perimeter of the mat.

5.2.2 The test shall be conducted with the trigger pull force set at the minimum force specified by the manufacturer.

SAAMI VOLUNTARY PERFORMANCE STANDARDS

5.2.3 The test shall be conducted with firearms of minimum and maximum weight configurations of a given model family including weight variations introduced by accessories catalogued by the manufacturer.

5.2.4 The test shall be conducted with appropriate size, primed empty case(s) in the chamber(s) resting under the firing pin(s) of the firearm being tested. The magazine clip, or remaining revolver cylinders shall be fully loaded with dummy cartridges and locked in place.

5.3 TEST PROCEDURE - The firearms(s) shall be dropped in such a way as to strike the rubber mat 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.

5.3.1 The firearm shall be reset to the "Safe Carrying" condition after each drop or a separate firearm may be used for each drop.

5.4 ACCEPT/REJECT CRITERIA

5.4.1 The firearm shall not fire a chambered empty primed case of its designated cartridge when tested in accordance with these requirements and the given test procedure. 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.

6. EXPOSED HAMMER HANDGUN DROP TEST - This test simulates abusive dropping of handguns with exposed hammers.

6.1 APPLICATION - Handguns with exposed hammers or strikers.

6.2 TEST REQUIREMENTS

6.2.1 The firearm shall be dropped in the manufacturer's recommended "Safe Carrying" condition.

SAAMI VOLUNTARY PERFORMANCE STANDARDS

- 6.2.2 Drops shall be from a height of 36" (.914 m) measured from the impact surface to the contact point on the exposed hammer or striker of the firearm. In the case of a striker, the line of force shall be directed so as to force the striker directly toward the primer of the empty primed case resting in the chambers.
- 6.2.3 The firearm shall be dropped onto a block of mild steel of at least 50 lb. (22.7 kg) weight, having a vertical dimension of at least 3 inches (76.2 mm) having a minimum hardness of Rc 30.
- 6.2.4 The test shall be conducted with the trigger pull force set at the minimum force specified by the manufacturer.
- 6.2.5 The test shall be conducted with firearms of minimum and maximum weight configurations of a given model family including weight variations introduced by accessories catalogued by the manufacturer.
- 6.2.6 The test shall be conducted with appropriate size primed empty case(s) resting in the chamber(s) under the firing pin(s) of the firearm being tested. The magazine, clip, or remaining revolver cylinders shall be fully loaded with dummy cartridges and locked in place.

6.3 TEST PROCEDURE

- 6.3.1 The firearm shall be dropped so as to strike the rear of the hammer spur or exposed striker, barrel vertical, muzzle up, a total of six times. The same firearm shall be used throughout the test.

6.3.2 (ALTERNATE PROCEDURE)

Instead of dropping the firearm as in paragraph 6.3.1, a mild steel weight equal to the weight of a fully loaded firearm may be dropped the distance specified in the paragraph 6.2.2 to strike the exposed hammer or striker. When struck, the line of force shall be directed tangentially to the arc of the falling hammer so as to force the hammer directly toward the firing pin.

In the case of a striker, the line of force shall be directed so as to force the striker directly toward the primer of the empty case resting in the chamber.

SAAMI VOLUNTARY PERFORMANCE STANDARDS

6.4 ACCEPT/REJECT CRITERIA

6.4.1 The firearm shall not fire a chambered empty primed case of its designated cartridge when tested in accordance with these requirements and the given test procedure. 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. Damage to any part(s) 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.

7. JAR-OFF TEST - This test simulates the abusive impacting (bumping) of a firearm against a hard surface with the firearm in a condition of maximum readiness.

7.1 APPLICATION - Rifles, shotguns and handguns.

7.2 REQUIREMENTS

- 7.2.1 The firearm shall be dropped in a condition of maximum readiness, (safety "off") cocked and ready to fire.
- 7.2.2 Drops will be from a height of 12 inches (30.48 cm) measured from the center of gravity of the firearm to the impact surface.
- 7.2.3 The firearm shall be dropped onto a 85 ± 5 Durometer (Shore A) rubber mat, one inch (2.54 cm) thick backed by concrete. The mat and concrete backing shall be large enough so that when the gun is dropped it will come to rest without interference within the perimeter of the mat.
- 7.2.4 The test shall be conducted with the trigger pull force set at the minimum force specified by the manufacturer.
- 7.2.5 The test shall be conducted with firearms of minimum and maximum weight configurations of a given model family, including weight variations introduced by accessories catalogues by the manufacturer.
- 7.2.6 The test shall be conducted with the appropriate size, primed empty case(s) in the chamber(s) resting under the firing pin(s) of the firearm being tested. The magazine, clip, or remaining revolver cylinders shall be fully loaded with dummy cartridges and locked in place.

SAAMI VOLUNTARY PERFORMANCE STANDARDS

7.3 TEXT PROCEDURE

7.3.1 The firearms(s) shall be dropped in such a way as to strike the rubber mat 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.

7.3.2 The firearm shall be recocked and reset in the ready to fire condition after each drop or a separate firearm may be used for each drop.

7.4 ACCEPT/REJECT CRITERIA

7.4.1 The firearm shall not fire a chambered empty primed case of its designated cartridge when tested in accordance with these requirements and the given test procedure. 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. ROTATION TEST - This test simulates the abusive fall of a firearm when left leaning against a vertical surface.

8.1 Application - Rifles and shotguns.

8.2 Test Requirements

8.2.1 The firearm shall be tested in the manufacturer's recommended "Safe Carrying" condition.

8.2.2 The firearm shall be allowed to impace on a 85 \pm 5 Durometer (Shore A) rubber mat, one inch (25.4 cm) thick backed by concrete. The mat and concrete shall be large enough so that when the firearm impacts, it will come to rest without interference within the perimeter of the mat.

8.2.3 The test shall be conducted with the trigger pull force set at the minimum force specified by the manufacturer.