

ANSI/SAAMI Z299.5-1996

# American National Standard

ANSI/SAAMI Z299.5-1996

REAFFIRMATION OF  
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**

11 West 42nd Street  
New York, New York  
10036

# ***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:***

A-Square Company  
Alliant Techsystems, Inc., Smokeless Powder Group  
Beretta U.S.A. Corporation  
Blount, Inc.  
Browning Arms Company  
Federal Cartridge Company  
Fiocchi of America, Inc.  
H & R 1871, Inc.  
Hornady Manufacturing Company  
The Marlin Firearms Company  
O. F. Mossberg & Sons, Inc.  
Olin Corporation, Winchester Division  
Remington Arms Co., Inc.  
SIGARMS, INC.  
Smith & Wesson  
Sturm, Ruger & Company, Inc.  
Taurus International Firearms  
Thompson/Center Arms  
U. S. Repeating Arms Company  
Weatherby, Inc.

***Associate Members:***

***Expro Chemical Products, Inc.  
SNC Industrial Products***

***Approved November 5, 1985  
Reaffirmed October 8, 1990  
Reaffirmed February 8, 1996***

***American National Standards Institute, Inc.***

***Abstract*** This Standard provides procedures for evaluating new firearms designs and applies to rifle, 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 Z299.5-1996 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 re-affirm, revise or withdraw this standard no later than five years from the date of approval. Purchasers of American National Standards may receive current information of all standards by calling or writing the American National Standards Institute.

### ***Published by***

***Sporting Arms and Ammunition Manufacturers' Institute, Inc.  
Flintlock Ridge Office Center  
11 Mile Hill Road  
Newtown, CT 06470-2359***

Copyright © 1996 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 approval of the publisher.

Printed in the United States of America

## **Foreword**

(This foreword is not part of American National Standard Z299.5-1996)

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 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 the Sporting Arms and Ammunition Manufacturers' Institute, Inc., P. O. Box 262, Frankfort, NY 13340-0262.

Consensus for this standard was achieved by the 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 individual or organization concurred with the submittal of the standard to ANSI:

Colt's Manufacturing Co., Inc. - D. Overbury  
D.W.M. Laboratory - P. M. Dougherty  
Federal Bureau of Investigation - T. L. Hollabaugh  
Forensic Science Service - L. C. Haag  
Gourley Associates - G. E. Gourley  
Guilford Engineering - D. Findlay, P. E.  
J. Hamby, M. A. - Firearm and Toolmark Examiner  
Heckler & Koch, Inc. - P. Carroll  
R. L. Hillberg - Independent Expert  
Interarms - R. Melcher  
ARDEC - L. Miller  
Savage Arms, Inc. - C. Hildebrandt  
Tioga Engineering Co., Inc. - W. C. Davis, Jr., P. E.  
National Institute of Standards and Technology - Dr. D. E. Frank  
H. P. White Laboratory - D. Dunn  
North American Arms - J. Wiggins

# 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



## 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.

"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 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 feet (1.22 m) onto a 85±5 Durometer (Shore A) rubber mat, one inch thick (2.54 cm), backed by concrete. The mat 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 mat. The drop height shall be measured from the surface of the rubber mat to the center of gravity of the firearm. The center of gravity shall be determined to an accuracy of ± one inch by any recognized method for finding the center of gravity of an irregular shaped object. The firearm shall be recocked 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 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 rubber mat 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 remaining revolver cylinder chambers fully loaded with 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, including weight variations introduced by accessories catalogued 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 pounds (22.7 kg) weight with the barrel vertical, muzzle up, a total of six times. The same firearm shall be used throughout the test.



6.1.3 Exposed Hammer Test (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 catalogued 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 pounds (22.7 kg) weight, a total of six 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, 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 remaining revolver cylinder chambers 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, including weight variations introduced by accessories catalogued 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 inches (0.305 m) onto a 85±5 Durometer (Shore A) rubber mat, one inch (2.54 cm) thick, backed by concrete. The mat and concrete shall be large enough so that when the gun is dropped it will fall completely within the perimeter of the mat. The drop height shall be measured from the surface of the rubber mat to the lowest point on the firearm. The gun shall be caught after its first bounce from the mat so that it strikes the mat only one time. 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. 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, 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 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.
- 7.3.1 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 remaining revolver cylinder chambers fully 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, including weight variations introduced by accessories catalogued 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 surface of a  $85\pm 5$  Durometer (Shore A) rubber mat, one inch (2.54 cm) thick, backed by concrete. The mat 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 mat. The firearm shall be recocked 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 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 or clip 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, including weight variations introduced by accessories catalogued by the manufacturer.



**"RUBBER" MAT SOURCES**  
**85 ± 5 DUROMETER SHORE A - 1" THICK**

**FOAM CUTTING ENGINEERS**

1235 NATIONAL AVENUE

ADDISON, IL 60101

(708) 543-2855

Contact Person: **J. Anthony Bushnell**

**ROCK RUBBER COMPANY**

23 LAUREL ROAD

ROCKY HILL, CT 06067

(203) 529-8689

Contact Person: **Noel Roberts**

**UNIVERSITY RUBBER COMPANY**

42 BROCKFORD STREET

CAMBRIDGE, MA 02140

(800) 486-5527

Contact Person: **Mark Gallagher**

**NOTE: The hardness of the "Rubber" Mat  
should be checked on a regular basis as  
the hardness may change over time.**