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SPORTING ARMS AND AMMUNITION MANUFACTURERS' INSTITUTE, INC.  
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February 25, 1981

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To: Members, Firearms Section, SAAMI Technical Committee

Gentlemen:

TU-79 - FIREARMS DESIGN TESTS

Find attached an updated series of fire control tests which have been proposed for long guns and are a result of the review of the minutes of the Firearms Technical Committee and Firearms Task Force meetings through the January 15, 1981, meeting.

Would each of you review this material and be prepared to discuss and hopefully finalize them at the April 30, 1981, meeting in Denver, Colorado.

Sincerely,

*T. W. Van Wilgen*  
T. W. Van Wilgen  
Chairman, Firearms Section

TWVW:dg  
Attachment

cc: Mr. E. F. Barrett

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DROP TEST FOR RIFLES AND SHOTGUNS

The test is to simulate free dropping of the firearm.

1. Drop Test - With the safety in the "on" (safe) position, the firearm should be capable of passing the below test criteria for drop testing from a height of four feet (1.22 meters) onto a 50-60 Durometer, Shore A, rubber mat, one inch (25.4 mm) thick backed by concrete. The four feet (1.22 meters) shall be measured from the surface of the rubber mat to the center of gravity of the firearm. As an alternate to free dropping, other methods, such as the use of a parallel pendulum apparatus, may be substituted if they provide equivalent impact velocity, energy and impulse levels.
2. Criteria - The firearm shall not fire an empty primed case of its designated cartridge when tested in accordance with this procedure. The firearm must be capable of being unloaded in its normal manner after each drop, to pass the test.
3. Test Procedure - The drop test shall be conducted so that the firearm does not rotate before striking the mat and will be dropped once in each of the following attitudes:
  - a) Barrel vertical, muzzle down
  - b) Barrel vertical, muzzle up
  - c) Barrel horizontal, striking on top
  - d) Barrel horizontal, striking on bottom
  - e) Barrel horizontal, striking on left side
  - f) Barrel horizontal, striking on right side
4. Drop testing of firearms which have a trigger pull force below three pounds (1.36 kg) is not covered by this procedure.
5. Drop tests should be conducted with the trigger pull force within the manufacturer's limits.
6. The drop test shall be conducted with the magazine or clip fully loaded with inert dummy ammunition inserted into the firearm and an empty primed case in the chamber. It is recommended that firearm weight variations introduced by commonly used combinations of accessories be considered.
7. Parts breakage or other damage as a result of drop testing does not constitute failure as long as the empty primed case does not fire and the gun can be unloaded in the normal manner. A separate firearm may be used for each drop.
8. Empty primed cases and inert dummy cartridges should be made to SAAMI recommended practices.

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JAR-OFF TEST FOR RIFLES AND SHOTGUNS

This test is to simulate the impacting (bumping) of the firearm against a hard surface.

1. Jar-Off Test - With the gun cocked and the safety in the "off" (fire) position, the firearm should be capable of withstanding jar-off shock equivalent to being dropped from a height of twelve inches (.305 meters) onto a hard surface (e.g., concrete). The twelve inches (.305 meters) will be measured from the test surface to the lowest point on the firearm. As an alternative to free dropping, other methods, such as the use of a parallel pendulum apparatus, may be substituted if they provide equivalent impact velocity, energy and impulse levels.
2. Criteria - The firearm shall not fire an empty primed case of its designated cartridge when tested in accordance with this procedure. The firearm must be capable of being unloaded in its normal manner after each drop, to pass the test.
3. Test Procedure - The jar-off test shall be conducted so that the firearm does not rotate before striking the hard surface and will be dropped once in each of the following attitudes:
  - a) Barrel vertical, muzzle down
  - b) Barrel vertical, muzzle up
  - c) Barrel horizontal, striking on top
  - d) Barrel horizontal, striking on bottom
  - e) Barrel horizontal, striking on left side
  - f) Barrel horizontal, striking on right side
4. Jar-Off testing of firearms which have a trigger pull force below three pounds (1.36 kg) is not covered by this procedure.
5. Jar-Off tests should be conducted with the trigger pull force within the manufacturer's limits.
6. The jar-off test shall be conducted with the magazine or clip fully loaded with inert dummy ammunition inserted into the firearm and an empty primed case in the chamber. It is recommended that firearm weight variations introduced by commonly used combinations of accessories be considered.
7. Parts breakage or other damage as a result of jar-off testing does not constitute failure as long as the empty primed case does not fire and the gun can be unloaded in the normal manner. A separate firearm may be used for each drop.
8. Empty primed cases and inert dummy cartridges should be made to SAAMI recommended practices.

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EXPOSED HAMMER OR STRIKER IMPACT TEST

- a) With the firearm in the "safe" position as defined in the owner's instruction manual for the firearm being tested. It should be capable of withstanding the impact of being dropped from a height of 12 inches (305 mm), striking the rear of the hammer spur or the exposed striker upon a mild steel block of at least 50 pounds (22.7 kg) weight, with the barrel vertical, muzzle up. As an alternative to free dropping, other methods, such as the use of a parallel pendulum apparatus, may be substituted if they provide equivalent velocity, energy and impulse levels.
- b) Criteria -- The firearm shall not fire an empty primed case of its designated caliber when tested in accordance with this procedure.
- c) Test Procedure -- The firearm will be dropped once, without rotation, as described in paragraph a).
- d) Impact test should be conducted with the trigger-pull force within the manufacturer's limits.
- e) The impact test shall be conducted with the magazine or clip fully loaded with inert dummy ammunition inserted into the firearm and an empty primed case in the chamber and the gun in the battery position. It is recommended that firearm weight variations introduced by combinations of accessories catalogued by the gun manufacturer be considered.
- f) Parts breakage or other damage as a result of the impact test does not constitute failure as long as the empty primed case does not fire and the gun can be unloaded in the normal manner.
- g) Empty primed cases and inert dummy cartridges should be made to SAAMI recommended practices.

IMPACT TEST

- a) With the firearm in the fully cocked position and the safety in the "off" (fire) position, the gun will be struck a minimum of ten blows randomly from muzzle to butt with a prescribed mallet and in the manner shown. A primed empty case should be inserted in the chamber and the gun in the battery position.
- b) Criteria -- The firearms shall not fire an empty primed case of its designated caliber when tested in accordance with this procedure.
- c) Mallet -- The mallet used for this test shall have an approximate weight of 16 ounces and a handle approximately 10 inches in length. It shall have an aluminum body faced with rubber (plastic) at each end with a durometer reading of \_\_\_\_\_. [NOTE: More definitive specifications for the mallet will be firmed up in the near future.]
- d) Drop -- The mallet will be held at the end of the handle approximately six inches (152 mm) above the place to be struck and the hammer head allowed to fall of its own weight without exerting manual pressure. Reset (recock) action parts between each blow.

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IMPACT TEST (Continued)

Comment from minutes of October 1, 1980, Firearms Technical Committee meeting - "Energy level as a standard fixture for testing to maintain uniformity."

- e) Impact test should be conducted with the trigger pull force within the manufacturer's limits.
- f) Empty primed cases should be made to SAAMI recommended practices.

General

- 1) Comment from minutes of October 1, 1980, Firearms Technical Committee meeting - "Committee felt procedure required additional definition."
- 2) Should test be performed with the safety both in the "on" and "off" positions?

ROTATION TEST (LONG GUNS ONLY)

This test is to simulate the fall of a firearm when left leaning against a vertical surface.

- a) With the safety in the "safe" position as defined in the owner's instruction manual for the firearm being tested and a primed empty case in the chamber, the gun with its butt resting on a hard surface (concrete) and held in a vertical position shall be allowed to fall freely once on its right-hand side and once on its left-hand side. Reset parts between each drop, i.e., recock.
- b) Criteria -- The firearm shall not fire an empty primed case of its designated caliber when tested in accordance with this procedure.
- c) The rotation test shall be conducted with the trigger pull forces within the manufacturer's limits.
- d) Parts breakage or other damage as a result of the rotation test does not constitute failure as long as the empty primed case does not fire and the gun can be unloaded in the normal manner.
- e) Empty primed cases should be made to SAAMI recommended practices.

TRIGGER RECOVERY TESTING

The Firearms Technical Committee meeting on October 1, 1980, decided this should be part of Fire Control Testing and not a separate item. To date no standard, method or criteria have been written for this test.

FIRE CONTROL TESTING

General requirement for testing of trigger systems is already contained in the various Technical Committee manual for firearms. Specific items to be tested

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FIRE CONTROL TESTING (Continued)

would depend on the design of the particular firearm. It was the opinion of the committee that detailed requirements in this area be left to the individual companies. This item will be dropped as a subject for discussion.

Comment in minutes of the October 1, 1980, meeting of the Firearms Technical Committee is as follows: -- "To be kept open. The committee recommended review of current statements in manuals and consideration of testing fully assembled gun vs. trigger mechanism only."