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Z299.7 RIMFIRE AND CENTERFIRE FIREARMS

4. ABUSIVE MISHANDLING

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.

Exceptions

1. This Standard does not apply to muzzle loading and black powder firearms of any type.
2. 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).
3. The conditions of abusive mishandling are representative of field and conditions that can be repeated under controlled test conditions. They do not cover [REDACTED]

Definitions (See Appendix A for definitions.)

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I. CHARACTERISTICS SECTION

4.1.1 DROP TEST - RIFLES AND SHOTGUNS.

This test simulates the abusive dropping of the firearm.

4.1.1.1 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 concrete backed mat.

4.1.1.2 The firearm shall not fire a chambered empty unfired cartridge or shell 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.

4.1.2 JAR-OFF TEST - APPLIES TO: RIFLES AND SHOTGUNS.

4.1.2.1 This test simulates the abusive impacting (bumping) of the firearm against a hard surface with the firearm in a condition of maximum readiness.

4.1.2.2 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 concrete backed mat.

4.1.2.3 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.

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4.1.3 ROTATION TEST - APPLIES TO: RIFLES AND SHOTGUNS.

4.1.3.1 This test simulates the abusive fall of a firearm when left leaning against a vertical surface.

4.1.3.2 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 (barrel perpendicular to mat) position with its butt resting on the surface of a concrete backed mat.

4.1.3.3 The firearm shall not fire a chambered empty unfired 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.

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II. PROCEDURES SECTION

4.2.1 DROP TEST - RIFLES AND SHOTGUNS.

4.2.1.1 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 mat to the center of gravity of the firearm. The gun shall be caught after its first bounce from the mat so that it strikes the mat only one time. The center of gravity shall be determined to an accuracy of \pm one inch (25.4 mm) 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 and checked to ensure that the primer has not been fired. 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.

4.2.1.2 Test Procedure - The firearm or firearms shall be dropped in such a way as to cause them to strike the mat surface in each of the following attitudes:

- 4.2.1.2.1. Barrel vertical, muzzle down.
- 4.2.1.2.2. Barrel vertical, muzzle up.
- 4.2.1.2.3. Barrel horizontal, bottom up.
- 4.2.1.2.4. Barrel horizontal, bottom down.
- 4.2.1.2.5. Barrel horizontal, left side up.
- 4.2.1.2.6. Barrel horizontal, right side up.

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

4.2.1.4. The test shall be conducted with the magazine fully loaded with dummy cartridges and locked in place.

4.2.1.5. 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.

4.2.1.6. The primed case shall be fired after each drop to verify the primed case was capable of firing.

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4.2.2. JAR-OFF TEST - APPLIES TO: RIFLES AND SHOTGUNS.

4.2.2.1. 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 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.

4.2.2.2. Test Procedure - The firearm or firearms shall be dropped in such a way as to cause them to strike the mat surface one time only in each of the following attitudes:

- 2.3.2.1. Barrel vertical, muzzle down.
- 2.3.2.2. Barrel vertical, muzzle up.
- 2.3.2.3. Barrel horizontal, bottom up.
- 2.3.2.4. Barrel horizontal, bottom down.
- 2.3.2.5. Barrel horizontal, left side up.
- 2.3.2.6. Barrel horizontal, right side up.

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

4.2.2.4. The test shall be conducted with the magazine, clip or remaining revolver cylinder chambers fully loaded with dummy cartridges and locked in place.

4.2.2.5. 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.

4.2.2.6. The primed case shall be fired after each drop to verify the primed case was capable of firing.

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4.2.3 ROTATION TEST - APPLIES TO: RIFLES AND SHOTGUNS.

4.2.3.1. 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 gun shall be caught after its first bounce from the mat so that it strikes the mat only one time. The fire arm shall be recocked and reset to the "Safe Carrying" condition after each drop or a separate firearm may be used for each drop.

4.2.3.2. The firearm shall be tested so as to fall once on its right side and once on its left side.

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

4.2.3.4. The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and locked in place.

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4.2.3.6. The primed case shall be fired after each drop to verify the primed case was capable of firing.

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III. EQUIPMENT SECTION

4.3.1 DROP TEST - RIFLES AND SHOTGUNS.

4.3.1.1 The drop mat shall be made from 85±5 Durometer (Shore A) material, one inch thick (2.54 cm), lying on concrete. The 85 Durometer mat is representative of an average surface density that firearms may contact in abusive mishandling.

4.3.2 JAR-OFF TEST - APPLIES TO: RIFLES AND SHOTGUNS.

4.3.2.1 The drop mat shall be made from 85±5 Durometer (Shore A) material, one inch thick (2.54 cm), lying on concrete. The 85 Durometer mat is representative of an average surface density that firearms may contact in abusive mishandling.

4.3.3 ROTATION TEST - APPLIES TO: RIFLES AND SHOTGUNS.

4.3.3.1 The drop mat shall be made from 85±5 Durometer (Shore A) mat, one inch thick (2.54 cm), lying on concrete. The 85 Durometer mat is representative of an average surface density that firearms may contact in abusive mishandling.

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APPENDIX A - DEFINITIONS

- "Safe Carrying Condition"** The condition in which it is contemplated that a particular design of firearm is to be carried.
- "Safety (Mechanism)"**
1. A device on a firearm intended to help provide protection against accidental or unintentional discharge under normal usage when properly engaged.
 2. **On** - A term describing the position of a component of the safety device when set in a manner to provide protection against accidental or unintentional discharge under normal usage.
 3. **Off** - To allow the firearm to be discharged.
- "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.
- "Unfired Primed Case"** This is a new cartridge case, manufactured to SAAMI specifications, that has a live primer in it. It is not loaded with a bullet and powder.
- "Dummy Cartridges"** (See "Cartridge, Dummy" on SAAMI web site - www.saami.org.)

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3. The conditions of abusive mishandling are representative of field and general use conditions that can be repeated under controlled test conditions. They do not cover, nor are intended to cover, all possible circumstances of abusive mishandling.

Definitions (See Appendix A for definitions.)



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I. CHARACTERISTICS SECTION

4.1.1 DROP TEST - RIFLES AND SHOTGUNS.

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4.1.1.1 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 concrete backed mat.

4.1.1.2 The firearm shall not fire a chambered empty unfired cartridge or shell 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.

4.1.2 JAR-OFF TEST - APPLIES TO: RIFLES AND SHOTGUNS.

4.1.2.1 This test simulates the abusive impacting (bumping) of the firearm against a hard surface with the firearm in a condition of maximum readiness.

4.1.2.2 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 concrete backed mat.

4.1.2.3 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.

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4.1.3 ROTATION TEST - APPLIES TO: RIFLES AND SHOTGUNS

4.1.3.1 This test simulates the abusive fall of a firearm when left leaning against a vertical surface.

4.1.3.2 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 (barrel perpendicular to mat) position with its butt resting on the surface of a concrete backed mat.

4.1.3.3 The firearm shall not fire a chambered empty unfired 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.

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II. PROCEDURES SECTION

4.2.1 DROP TEST - RIFLES AND SHOTGUNS.

4.2.1.1 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 mat to the center of gravity of the firearm. The center of gravity shall be determined to an accuracy of \pm 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 and checked to ensure that the primer has not been fired. 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.

4.2.1.2 Test Procedure - The firearm or firearms shall be dropped in such a way as to cause them to strike the mat surface in each of the following attitudes:

- 4.2.1.2.1. Barrel vertical, muzzle down.
- 4.2.1.2.2. Barrel vertical, muzzle up.
- 4.2.1.2.3. Barrel horizontal, bottom up.
- 4.2.1.2.4. Barrel horizontal, bottom down.
- 4.2.1.2.5. Barrel horizontal, left side up.
- 4.2.1.2.6. Barrel horizontal, right side up.

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

4.2.1.4. The test shall be conducted with the magazine fully loaded with dummy cartridges and locked in place.

4.2.1.5. 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.

4.2.1.6. The primed case shall be fired after each test to verify the primed case was capable of firing.

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4.2.2. JAR-OFF TEST - APPLIES TO: RIFLES AND SHOTGUNS.

4.2.2.1. 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 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.

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- 2.3.2.1. Barrel vertical, muzzle down.
- 2.3.2.2. Barrel vertical, muzzle up.
- 2.3.2.3. Barrel horizontal, bottom up.
- 2.3.2.4. Barrel horizontal, bottom down.
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4.2.3.2. The firearm shall be tested so as to fall once on its right side and once on its left side.

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

4.2.3.4. The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and locked in place.

4.2.3.5. 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.

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III. EQUIPMENT SECTION

4.3.1 DROP TEST - RIFLES AND SHOTGUNS.

4.3.1.1 The drop mat shall be made from 85±5 Durometer (Shore A) material, one inch thick (2.54 cm), lying on concrete. The 85 Durometer mat is representative of an average surface density that firearms may contact in abusive handling.

4.3.2 JAR-OFF TEST - APPLIES TO: RIFLES AND SHOTGUNS.

4.3.2.1 The drop mat shall be made from 85±5 Durometer (Shore A) material, one inch thick (2.54 cm), lying on concrete. The 85 Durometer mat is representative of an average surface density that firearms may contact in abusive handling.

4.3.3 ROTATION TEST - APPLIES TO: RIFLES AND SHOTGUNS.

4.3.3.1 The drop mat shall be made from 85±5 Durometer (Shore A) mat, one inch thick (2.54 cm), lying on concrete. The 85 Durometer mat is representative of an average surface density that firearms may contact in abusive handling.

APPENDIX A - DEFINITIONS

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

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- "Safety"** A device on a firearm intended to provide protection against unintentional discharge under normal usage when properly engaged.
- "Safety On"** A term describing the position of a component of the safety device when set in a manner to provide protection against unintentional discharge under normal usage.
- "Safety Off"** To allow the firearm to be discharged.
- "Trigger Pull"** The average force applied to the trigger of a firearm to cause the sear or hammer to release. The force is applied approximately parallel to the bore line and through the centerline of the trigger bow.
- "Unfired Primed Case"** This is a cartridge case that has a live primer in it. It is not loaded with a bullet and powder.
- "Dummy Cartridges"** (See "Cartridge, Dummy" on SAAMI web site - www.saami.org.)

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Definitions (See Appendix A for definitions.)

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I. CHARACTERISTICS SECTION

1.4.1 DROP TEST - RIFLES AND SHOTGUNS.

This test simulates the abusive dropping of the firearm.

1.4.1.1 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 concrete backed mat.

1.4.1.2 The firearm shall not fire a chambered empty unfired cartridge or shell 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.

1.4.2 JAR-OFF TEST - APPLIES TO: RIFLES AND SHOTGUNS.

1.4.2.1 This test simulates the abusive impacting (bumping) of the firearm against a hard surface with the firearm in a condition of maximum readiness.

1.4.2.2 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 concrete backed mat.

1.4.2.3 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.

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1.4.3 ROTATION TEST - APPLIES TO: RIFLES AND SHOTGUNS

1.4.3.1 This test simulates the abusive fall of a firearm when left leaning against a vertical surface.

1.4.3.2 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 (barrel perpendicular to mat) position with its butt resting on the surface of a concrete backed mat.

1.4.3.3 The firearm shall not fire a chambered empty unfired 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.

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II. PROCEDURES SECTION

2.4.1 DROP TEST - RIFLES AND SHOTGUNS.

2.4.1.1 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 mat to the center of gravity of the firearm. The gun shall be caught after its first bounce from the mat so that it strikes the mat only one time. The center of gravity shall be determined to an accuracy of \pm one inch (25.4 mm) 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 and checked to ensure that the primer has not been fired. 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.

2.4.1.2 Test Procedure - The firearm or firearms shall be dropped in such a way as to cause them to strike the mat surface in each of the following attitudes:

- 2.4.1.2.1 Barrel vertical, muzzle down.
- 2.4.1.2.2. Barrel vertical, muzzle up.
- 2.4.1.2.3. Barrel horizontal, bottom up.
- 2.4.1.2.4. Barrel horizontal, bottom down.
- 2.4.1.2.5. Barrel horizontal, left side up.
- 2.4.1.2.6. Barrel horizontal, right side up.

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

2.4.1.4 The test shall be conducted with the magazine fully loaded with dummy cartridges and locked in place.

2.4.1.5 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.

2.4.1.6 The primed case shall be fired after each drop to verify the primed case was capable of firing.

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2.4.2. JAR-OFF TEST - APPLIES TO: RIFLES AND SHOTGUNS.

2.4.2.1. 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 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.

2.4.2.2. Test Procedure - The firearm or firearms shall be dropped in such a way as to cause them to strike the mat surface one time only in each of the following attitudes:

- 2.4.2.2.1 Barrel vertical, muzzle down.
- 2.4.2.2.2 Barrel vertical, muzzle up.
- 2.4.2.2.3 Barrel horizontal, bottom up.
- 2.4.2.2.4 Barrel horizontal, bottom down.
- 2.4.2.2.5 Barrel horizontal, left side up.
- 2.4.2.2.6 Barrel horizontal, right side up.

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

2.4.2.4. The test shall be conducted with the magazine; clip or remaining revolver cylinder chambers fully loaded with dummy cartridges and locked in place.

2.4.2.5. 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.

2.4.2.6. The primed case shall be fired after each drop to verify the primed case was capable of firing.

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2.4.3 ROTATION TEST - APPLIES TO: RIFLES AND SHOTGUNS.

2.4.3.1 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 gun shall be caught after its first bounce from the mat so that it strikes the mat only one time. The fire arm shall be recocked and reset to the "Safe Carrying" condition after each drop or a separate firearm may be used for each drop.

2.4.3.2 The firearm shall be tested so as to fall once on its right side and once on its left side.

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

2.4.3.4 The test shall be conducted with the magazine or clip fully loaded with dummy cartridges and locked in place.

2.4.3.5 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.

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III. EQUIPMENT SECTION

3.4.1 DROP TEST - RIFLES AND SHOTGUNS.

3.4.1.1 The drop mat shall be made from 85±5 Durometer (Shore A) material, one inch thick (2.54 cm), lying on concrete. The 85 Durometer mat is representative of an average surface density that firearms may contact in abusive mishandling.

3.4.2 JAR-OFF TEST - APPLIES TO: RIFLES AND SHOTGUNS.

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3. **Off** - To allow the firearm to be discharged.

"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.

"Unfired Primed Case"

This is a new cartridge case, manufactured to SAAMI specifications, that has a live primer in it. It is not loaded with a bullet and powder.

"Dummy Cartridges"

(See "Cartridge, Dummy" on SAAMI web site - www.saami.org.)