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Standard Safety Specification for Non-Integral Firearm Locking Devices[1]

This standard is issued under the fixed designation F2369; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

INTRODUCTION

This specification is intended to establish means of determining whether firearm locking devices applied to a firearm adequately serve the purpose of deterring the unauthorized use of firearms.

Subcommittee F15.53 on Non-Integral Firearm Locking Devices has been working to develop a performance standard for these products. Our first meeting was held in April 2001, after the Consumer Products Safety Commission and others requested that ASTM organize an effort to develop a standard for gun locks. Representatives of manufacturers, purchasers, user groups, and others have voluntarily contributed their time and energy toward a common goal.

The subcommittee defined the scope of their work to exclude lock boxes, and Subcommittee F15.55 has since been formed to work on a standard for those products. Subcommittee F15.53 decided to target a single, minimum performance standard for all devices, as opposed to defining several "grades" or performance levels. Finally, the subcommittee focused on test methods that were objective, realistic, reliable, and repeatable.

1. Scope

1.1 This specification covers non-integral firearm locking devices used to deter unauthorized use of unloaded firearms. These devices can be mechanical, electromechanical, or a combination thereof.

1.2 This specification contains functional, operational, and safety requirements for non-integral firearm locking devices.

1.3 The specification is intended to apply only to non-integral locks or locking mechanisms applied to, in, around, or about a firearm, either external to the firearm or by some method of introduction to or within the firearm. The specification is not intended to set evaluation standards by which safety levers, firing pin blocks, or other traditional discharge prevention mechanisms are evaluated, notwithstanding the fact that these mechanisms may prevent inadvertent discharge. This specification is not applicable to devices used for, or intended for, the prevention of theft or other intentional misuse of firearms.

NOTE 1—Tests described are laboratory type tests and although they may simulate some field conditions, they do not duplicate all field conditions.

NOTE 2—There is no apparent comparable ISO/IEC standard.

1.4 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

1.5 The following precautionary caveat pertains only to the test method portions of this specification. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

F883 Performance Specification for Padlocks

NOTE 3—A shock impact fixture and a cutting fixture are illustrated and detailed in Specification F883. Fixtures shall be constructed utilizing the same designs as illustrated and detailed in Specification F883.

[1] This specification is under the jurisdiction of ASTM Committee F15 on Consumer Products and is the direct responsibility of Subcommittee F15.53 on NonIntegral Firearm Locking Devices.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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2.2 *ASME Standards:*

ASME B107.20M Pliers (Lineman's, Iron Worker's, Gas, Glass, Fence, and Battery)[3]

ASME B107.25M Pliers—Performance Test Methods[3]

NOTE 4—A cable cutting fixture shall be constructed that meets the requirements of ASME B107.20M. One example implementation of a fixture designed to meet these requirements is detailed in Appendix X2.

2.3 *ANSI Standards:*[4]

ANSI Z535.4 Product Safety Signs and Labels

ANSI Z535.6 Product Safety Information in Product Manuals, Instructions and Other Collateral Materials

3. Terminology

3.1 *Definitions:*

3.1.1 *action, n*—combination of the receiver or frame and breech bolt together with the other parts of the mechanism by which a firearm is loaded, fired, and unloaded.

3.1.2 *barrel, n*—firearm component through which a projectile travels. May be rifled or smooth bore.

3.1.3 *cartridge, n*—single round of ammunition consisting of the case, primer, and propellant with or without one or more projectiles. It also applies to a shotshell.

3.1.4 *case, n*—main body of a single round of ammunition into which other components are inserted to form a cartridge.

3.1.4.1 *Discussion*—It usually refers to centerfire and rimfire cartridges and serves as a gas seal during firing of the cartridge. It is usually made of brass, steel, copper, aluminum, or plastic, and is also referred to as a shell case.

3.1.5 *chamber, n*—in a rifle, shotgun, or pistol, the rearmost part of the barrel that has been formed to accept a specific cartridge or shotshell. In a revolver, the holes in the cylinder that have been formed to accept a cartridge.

3.1.6 *code entry mechanism, n*—in a combination locking device, it is a dial, wheel, or buttons which allow the user to input a predetermined code to open the lock.

3.1.7 *combination locking device, n*—a firearm locking device designed to provide controlled opening of the firearm locking device by entry of a combination known only by an authorized user(s).

3.1.8 *disabled, v*—defeating the firearm locking device, thereby rendering the firearm capable of firing.

3.1.9 *firearm, n*—assembly of a barrel and action from which a projectile is propelled through a deflagration (burning) of propellant.

3.1.10 *firearm locking device, n*—device that is non-integral to the firearm, that locks and that is intended to deter unauthorized users from firing a firearm.

3.1.11 *key, n*—an object intended by the manufacturer to be inserted into the keyway as a means to lock or unlock the firearm locking device.

3.1.12 *key locking device, n*—a firearm locking device that requires a key or token to provide controlled opening of the firearm locking device.

3.1.13 *keyway, n*—opening in a key locking device that is shaped to accept a key.

3.1.14 *primer, n*—cartridge ignition component consisting of brass or gilding metal cup, priming mixture, anvil, and foil disc, which fires the cartridge when struck with sufficient force.

3.1.15 *trigger guard, n*—rigid loop that partially surrounds the trigger to reduce the possibility of accidental discharge.

4. Calibration and Standardization

4.1 *General:*

4.1.1 All tests shall be conducted within the following tolerances as applicable:

4.1.1.1 Force: 0.5 % of working range.

4.1.1.2 Height: ±6 mm (0.24 in.).

4.1.1.3 Torque: 4.0 % of reading.

4.1.1.4 Weight: ±10 g (0.02 lbm).

4.1.2 All tests shall be conducted at temperatures between 16 °C and 27 °C (61 °F to 81 °F).

4.1.3 Test methods shall be performed on each firearm locking device model submitted for testing pursuant to this standard in an attempt to disable the device.

4.1.4 Open and close the firearm locking device fully 100 times prior to testing.

5. General Requirements

5.1 Removal of a firearm locking device shall be by key, combination, or other unique method, or a combination thereof, as defined by the instructions accompanying the firearm locking device. In the case of biometric recognition features, these are programmed into the locking device by the authorized user(s) prior to use in accordance with the manufacturer's instructions.

5.2 Each combination locking device shall open with only one of a minimum of 1000 actual combinations.

5.3 Key locking devices shall have a minimum of 130 unique key configurations and the operability of each firearm locking device shall be limited to only one of these unique key configurations.

5.4 Firearm locking devices that function by insertion into the chamber or barrel of a firearm shall not be of such a color or design that they may be confused for a cartridge. The purpose is to prevent an observer from seeing a live cartridge or shell in the chamber and thinking it is the firearm locking device.

5.5 When used in the manner designed and intended by the manufacturer, the firearm locking device shall be capable of repeated use and shall pass the testing procedures described in this specification.

5.6 The firearm locking device, when installed in the manufacturer's use position on a firearm, shall not be disabled through disassembly of the firearm, and subsequent reassembly of that firearm.

[3] Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Two Park Ave., New York, NY 10016-5990, http://www.asme.org.

[4] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

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5.7 Digital locking devices with biometric recognition lock features shall be received by the user in a condition such that locks shall not open with the biometric entry method until the authorized user programs a unique biometric method into the firearm locking device.

6. Performance Requirements

6.1 *Picking Requirement for Firearm Locking Devices with a Keyway:*

6.1.1 The firearm locking device shall be subjected to the picking test as described in 7.1.

6.1.2 If the lock is disabled during the test picking, repeat 7.1 on three additional samples. Failure occurs if any one of the three additional samples is disabled.

6.1.3 This test does not apply if the device does not have a keyway.

6.2 *Manipulation Requirement for Combination Locking Devices:*

6.2.1 The firearms locking device shall be subjected to the manipulation test as described in 7.2.

6.2.2 This test does not apply if the firearm locking device is not a combination locking device.

6.2.3 Failure occurs if the firearm locking device is disabled without the proper combination being entered during the test procedure.

6.3 *Shock Requirement:*

6.3.1 The firearms locking device shall be subjected to the shock test as described in 7.3.

6.3.2 Failure occurs if the firearm locking device is disabled.

6.4 *Tensile Requirement:*

6.4.1 The firearms locking device shall be subjected to the tensile test as described in 7.4.

6.4.2 Failure occurs if the firearm locking device is disabled.

6.5 *Cutting Requirement for Shackles:*

6.5.1 The firearms locking device shall be subjected to the cutting test as described in 7.5.

6.5.2 Failure occurs if the firearm locking device is disabled or shackle is cut, or both.

6.5.3 This test does not apply if the device does not have a shackle.

6.6 *Requirement for Cables:*

6.6.1 *Cutting Requirement:*

6.6.1.1 The firearms locking device shall be subjected to the cutting test as described in 7.6.

6.6.1.2 Failure occurs if the firearm locking device is disabled or cable is cut, or both.

6.6.1.3 This test does not apply if the device does not have a cable.

6.6.2 *Impact Requirement:*

6.6.2.1 The firearms locking device shall be subjected to the impact test as described in 7.7.

6.6.2.2 Failure occurs if the firearm locking device is disabled.

6.6.2.3 This test does not apply if the device does not have a cable.

6.7 *Trigger Impact Requirement:*

6.7.1 The firearms locking device shall be subjected to the impact test as described in 7.8.

6.7.2 Failure occurs if the trigger lock is disabled, or if the halves of the trigger lock separate from the surface of the handgun trigger guard fixture by 5 mm (0.2 in.) or more.

6.7.3 This test does not apply if the device does not lock the trigger or trigger guard.

6.8 *Torque Requirement for Keyway:*

6.8.1 The firearms locking device shall be subjected to the torque test as described in 7.9.

6.8.2 Failure occurs if the firearm locking device is disabled.

6.8.3 This test does not apply if the device does not have a keyway.

6.9 *Sawing Requirement:*

6.9.1 The firearms locking device shall be subjected to the sawing test as described in 7.10.

6.9.2 Failure occurs if the firearm locking device is disabled.

6.9.3 This test does not apply if the test cannot be performed on device.

NOTE 5—The sawing test is designed to determine the firearm locking device's resistance to sawing of exposed components. Exposed components may include, but are not limited to, cables, lock bodies, and hinges.

7. Testing Procedures

7.1 *Picking Test:*

7.1.1 *Test Equipment:*

7.1.1.1 A metallic paper clip made of 1.02 mm (0.040 in.) diameter wire.

7.1.1.2 A metallic paper clip with a 0.8 mm (0.03 in.) diameter wire.

7.1.1.3 A flat tipped screwdriver which has a shank that fits sufficiently within the depth of the keyway (minimum depth for testing is 6.33 mm (¼ in.).

7.1.1.4 A stopwatch capable of measuring a 2-minute time period.

7.1.2 *Test Procedure:*

7.1.2.1 Attempt to pick and open the firearm locking device with the use of the 1.02 mm (0.04 in.) diameter paper clip for a total of 2 minutes. It is permissible to bend the wire of the paper clip into any shape needed. Time shall be counted only while the paper clip is in contact with the firearm locking device and while the paper clip is being actively manipulated.

7.1.2.2 Attempt to pick and open the firearm locking device with the use of the 0.8 mm (0.03 in.) diameter paper clip for a total of 2 minutes. It is permissible to bend the wire of the paper clip into any shape needed. Time shall be counted only while the paper clip is in contact with the firearm locking device and while the paper clip is being actively manipulated.

7.1.2.3 Attempt to pick and open the firearm locking device with the use of the screwdriver that will fit in the keyway for a total of 2 minutes. Time shall be counted only while the screwdriver is in contact with the firearm locking device and while the screwdriver is being actively manipulated.

7.2 *Combination Manipulation Test:*

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7.2.1 *Test Equipment:*

7.2.1.1 A stopwatch capable of measuring a 2-minute time period.

7.2.2 *Test Procedure:*

7.2.2.1 Manipulate the code entry mechanism by dialing the combination wheels or pushing the combination buttons or manipulating the code entry mechanism by hand for a total of 2 minutes. Manipulation is limited to the code entry mechanism. Time shall be counted only while hands are manipulating the code entry mechanism.

7.3 *Shock Test:*

7.3.1 *Test Equipment:*

7.3.1.1 Rigid support surface 19 mm (¾ in.) thick plywood over a rigid concrete floor.

7.3.1.2 A 50.8 mm ± 0.127 mm (2 in. ± 0.005 in.) diameter steel ball with a chrome finish weighing at least 0.537 kg (1.18 lb). The steel ball may be dropped through a length of 63.5 mm (2.5 in. nominal) pipe with an inner diameter measuring 62.1 mm ± 6.35 mm (2.44 in. ± 0.25 in.) of PVC or similar rigid material to ensure that the steel ball strikes the sample accurately. Alternatively, the steel ball may be suspended by a cord and swung as a pendulum, dropping through the same vertical distance necessary to cause it to strike the lock with the specified impact.

7.3.1.3 For locks with a keyway, a screwdriver with a flat tip which can enter into the opening of the keyway.

7.3.2 *Test Procedure:*

7.3.2.1 Place the firearm locking device on the rigid support surface. Orient the firearm locking device so that a flat blade screwdriver can impinge upon and penetrate along the rotation axis into the keyway, or for a combination locking device, onto the code entry mechanism.

7.3.2.2 Drop the steel ball over a vertical distance of 1.875 m (73.8 in.) achieving an impact of 9.76 J (7.2 ft-lb) on the surface impacted. For locks with a keyway, the surface impacted is the screwdriver impinging upon the keyway. For combination locking devices, the surface impacted is the code entry mechanism. Do not allow the ball to bounce after the initial strike.

7.3.2.3 Repeat on the same surface for a total of five impacts.

7.3.2.4 Reorient the firearm locking device so that an opposite side surface can be impacted. For locks with a keyway, remove the flat tip screwdriver from the keyway and orient the lock so that a side opposite the keyway can be impacted. For combination locking devices, orient the lock so that a side opposite the combination lock's code entry mechanism can be impacted. Repeat the impact on the reoriented side surface for a total of five impacts.

7.4 *Tensile Test:*

7.4.1 *Test Equipment:*

7.4.1.1 A vice or similar tool to hold the test sample in place while applying the prescribed tension to the test sample.

7.4.1.2 A gauge to measure the applied 1000 N –0/+25 N (225 lbf –0/+10.25 lbf) of tension.

7.4.2 *Test Procedure:*

7.4.2.1 For firearm locking devices that have clamping components, support the firearm locking device in a fixture designed to enable application of forces in tension along a central axis of the mating locking components of the firearm locking device.

7.4.2.2 For firearm locking devices that have cable locking components, support the firearm locking device in a fixture designed to enable application of forces in tension along a central axis.

7.4.2.3 Apply 1000 N (225 lbf) of force slowly along the axis.

7.5 *Shackle of Padlock Cutting Test:*

7.5.1 *Test Equipment:*

7.5.1.1 Two blades made of steel, hardened to a minimum hardness of Rc50.

7.5.1.2 *Cutting Fixture*—See Specification F883 for details.

7.5.2 The shearing assembly must then be placed in a device having a compression load capability and compressed with a force of 4450 N (1000 lbf).

7.6 *Cable Cutting Test:*

7.6.1 *Test Equipment:*

7.6.1.1 Fixture that meets the requirements of ASME B107.20M-2004, Sections 6.1.1 Wire Cutting, 6.1.2 Paper Cutting, 6.1 Cut Test, and 6.2 Hardness Test for Type 1 (Lineman's).

7.6.1.2 Pliers in accordance with ASME B107.25M, Sections 5.2.1 Wire Cut Test, 5.2.2 Paper Cut Test, and 5.3.3.2 Jaws (Pliers Hardness Test).

7.6.2 *Test Procedure:*

7.6.2.1 Apply a machine force of 3336 N (750 lbf) gradually over not less than 10 s, for a duration of 30 s with the firearm locking device supported on both sides of the point of the shear cut with allowance for blade clearance.

7.7 *Cable Lock Impact Test:*

7.7.1 *Test Equipment*—Cable lock impact test fixture shown in Appendix X3.

7.7.2 Attach the cable of the lock to the test fixture so that the nearest surface of the body of the lock is 50 mm (2 in.) from the cable-clamping point on the fixture.

7.7.3 Orient the firearm locking device so that the side of the lock impacts the anvil squarely.

7.7.4 Set the test fixture so that the lock achieves a speed of 10 to 11.5 m/s (33 to 38 ft/s) before striking the anvil.

7.7.5 Perform three tests on each surface, excluding the surface(s) where the cable attaches to the body of the lock and the surface opposite the surface where the cable attaches to the body of the lock.

7.8 *Trigger Lock Impact Test:*

7.8.1 *Test Equipment*—Handgun trigger guard fixture is shown in Appendix X1.

7.8.2 Affix the firearm locking device to the handgun trigger guard fixture in accordance with the instructions accompanying the firearm locking device.

7.8.3 Attach the handgun trigger guard fixture to the test fixture drop mechanism so that the side projection of the trigger lock will impact the edge of the anvil.

7.8.4 Set the test fixture so that the lock is dropped 1.5 m (59 in.) before striking the anvil.

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7.8.5 Perform three drops at each orientation and perform the test so that the lock is impacted in six directions 90° apart (once for each direction in the *XYZ* axes).

7.9 *Keyway Torque Test:*

7.9.1 *Test Equipment:*

7.9.1.1 A supporting fixture such as a vice.

7.9.1.2 A torque wrench capable of measuring 10 N-m (89 in.-lbf).

7.9.1.3 A flat tipped screwdriver which has a shank with a diameter that fits within the entire depth of the keyway.

7.9.2 *Test Procedure:*

7.9.2.1 Install the firearm locking device in a supporting fixture to support it firmly but not to restrict free rotation of the cylinder.

7.9.2.2 Insert a screwdriver with the largest flat blade (but not to exceed ⅝ in. or 16 mm) that will fit into the keyway.

7.9.2.3 Apply a torque load of 10 N-m (89 in.-lbf).

7.10 *Sawing Test:*

7.10.1 *Test Equipment:*

7.10.1.1 *Handsaw*—New standard carbon steel hacksaw blade with 32 teeth per inch (2.54 cm) with a constant vertical downward force of 44.5 N (10 lb).

7.10.1.2 *Fixture*—The firearm locking device shall be held with an appropriate fixture to hold the device steady while sawing.

7.10.1.3 A stopwatch capable of measuring a 2-minute time period.

7.10.2 *Test Procedure:*

7.10.2.1 The firearm locking device shall be held with an appropriate fixture to hold the device steady while sawing.

7.10.2.2 If the saw test is being conducted on a flexible component of the firearm locking device, then the flexible component shall be clamped as shown in Appendix X4. The saw blade shall be applied to the flexible component in accordance with Appendix X4.

7.10.2.3 The test shall consist of 120 cycles with no time limit. One cutting cycle is defined as the combination of one 6-in. forward and one 6-in. backward cutting motion. The saw attack may consist of a series of separate 120 cutting cycle attacks, but in no instance shall more than 120 cutting cycles be applied to any one "specified" location. For example, the testing agent may identify (specify) the hinge and lock body areas of a firearm locking device as vulnerable to attack. A total of 120 cutting cycles may be applied to the hinge of the device and an additional 120 cutting cycles may be applied to the lock body of the device.

7.10.2.4 Manipulate the firearm locking device for 1 min by hand in an attempt to disable the firearm locking device.

8. Marking and Labeling

8.1 *Product Labeling:*

8.1.1 All product labels shall comply with ANSI Z535.4.

8.1.2 The manufacturer or make and model, including traceability information (such as lot number, date code, or serial number) of the firearm locking device shall appear on the product.

8.2 *Package Labeling:*

8.2.1 All package labels shall comply with ANSI Z535.4.

8.2.2 When a compliance statement is made, the package labeling must clearly identify the intended applications and indicate that the product may not be appropriate for other firearms.

9. Instructions

9.1 Instructions shall be provided with the firearms locking device.

9.2 All product instructions shall comply with ANSI Z535.6.

9.3 Instructions shall be provided to the consumer on how to install the firearm locking device, how to engage and disengage the locking mechanism, and how to check to ensure the device is functioning properly when installed and the locking mechanism engaged. Text and visual depiction is required.

9.4 Each firearms locking device shall include the following warnings:

9.4.1 **WARNING**—Using this device on a loaded firearm may result in discharge which may cause death or serious injury. Completely unload the firearm before installing this device.

9.5 Each firearms locking device shall address the following information:

9.5.1 Read all instructions BEFORE using this firearm locking device. KEEP INSTRUCTIONS FOR FUTURE USE.

9.5.2 Read the owner's manual and instructions supplied with your firearm before attempting to operate the firearm and before attempting to install this firearm locking device.

9.5.3 Always keep the muzzle pointed in a safe direction when handling any firearm.

9.5.4 Always store unloaded and locked firearms in a safe place, inaccessible to children and other unauthorized persons. Store ammunition in a separate locked or secure location.

9.5.5 Do not store the key or combination to the firearm locking device in the same place as your firearm.

9.5.6 While your firearm lock is an important part of rendering your firearm inaccessible to children and other unauthorized persons, it is not a substitute for safe and responsible firearm handling and proper storage.

10. Keywords

10.1 firearms; gun locks; guns; safety standard; security devices

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