



Designation: F2748 – 19

## Standard Specification for Airsoft Guns<sup>1</sup>

This standard is issued under the fixed designation F2748; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### INTRODUCTION

To perform as intended, an airsoft gun requires a level of power which, if misused, can cause serious injury. This specification is intended to reduce the hazards associated with airsoft gun use. This specification cannot control careless use or eliminate all hazards of misuse. Terminology is standardized in this specification, so that conforming products will be identified in the same manner, and critical dimensions are standardized to assure safe interchangeability of projectiles in all conforming airsoft guns. Product performance hazards are identified and requirements are established to minimize these hazards. This specification is written within the current state-of-the-art of airsoft gun technology. The intent is to revise this specification whenever substantive information becomes available which justifies revising existing requirements or adding new requirements.

### 1. Scope

1.1 This specification covers airsoft guns which propel a projectile by means of energy released by compressed gas, compressed CO<sub>2</sub>, mechanical springs, battery or a combination thereof, used in the sport commonly called airsoft or air soft, and is to be used in conjunction with Specification F2654.

1.2 *Limitations*—This specification does not cover the following types of products: Non-powder guns as specifically defined in Consumer Safety Specification F589 and which are commonly referred to as BB or pellet guns; paintball markers as specifically defined in Specification F2272; toy products; and non-recreational air guns, for example, those used by law enforcement, scientific, military, industrial, or theatrical entities.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 *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.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standard-*

*ization 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:<sup>2</sup>

- F589 Consumer Safety Specification for Non-Powder Guns
- F590 Consumer Safety Specification for Non-Powder Gun Projectiles and Propellants
- F1750 Specification for Paintball Marker Threaded-Propellant Source Interface
- F2030 Specification for Paintball Cylinder Burst Disk Assemblies
- F2272 Specification for Paintball Markers
- F2553 Specification for Warnings on Refillable CO<sub>2</sub> Cylinders Used In the Sport of Paintball
- F2653 Specification for Paintball Valve Male Threaded Connection for Use with Approved Cylinders
- F2654 Specification for Airsoft Gun Warnings
- F2679 Specification for 6 mm Projectiles Used with Airsoft Guns

#### 2.2 Code of Federal Regulations:<sup>3</sup>

- 15 CFR 272 Marking of Toy, Look-Alike and Imitation Firearms

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee F08 on Sports Equipment, Playing Surfaces, and Facilities and is the direct responsibility of Subcommittee F08.27 on Airsoft.

Current edition approved Oct. 1, 2019. Published October 2019. Originally approved in 2008. Last previous edition approved in 2019 as F2748 – 15 (2019). DOI: 10.1520/F2748-19.

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

<sup>3</sup> Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.

### 3. Terminology

#### 3.1 Definitions of Terms Specific to This Standard:

3.1.1 *airsoft gun, n*—commonly referred to as airsoft gun, air soft gun, or soft air gun, or any combination thereof, or a low energy air gun (LEAG), refers to a device specifically designed to expel a projectile as described in Specification **F2679**, by the release of energy by compressed air, compressed gas, mechanical springs, battery, or a combination thereof.

3.1.2 *airsoft gun projectile, n*—spherical, of 6 mm (.24 cal) diameter, non-metallic and non-liquid filled projectile to be used in an airsoft gun as specifically referred to in Specification **F2679**.

3.1.2.1 *Discussion*—These are also referred to as airsoft BB's.

3.1.3 *backstop, n*—object intended to stop an airsoft gun projectile.

3.1.4 *barrel, n*—that portion of an airsoft gun through which the projectile is discharged.

3.1.5 *CO<sub>2</sub> (carbon dioxide) cylinder non-refillable, n*—cylinder that holds carbon dioxide in a liquid-gas combination generally referred to as disposable cartridges which are discarded after use and are not refillable for use with airsoft guns.

3.1.6 *CO<sub>2</sub> (carbon dioxide) cylinder refillable, n*—cylinder that holds carbon dioxide in a liquid-gas combination consisting of a cylinder and a self-activating on/off valve assembly for use with airsoft guns.

3.1.6.1 *Discussion*—These refillable cylinders can be safely removed from the airsoft gun without loss of the stored pressure.

3.1.7 *cocking, v*—action that allows the user to store manual energy.

3.1.8 *hammer, n*—device which, when released, discharges the stored energy.

3.1.9 *hop-up, n*—device that changes the spin on a projectile to affect its trajectory.

3.1.10 *magazine, n*—device used in an airsoft gun to store projectiles.

3.1.11 *propellant, refillable non-removable, n*—reservoir contained within the airsoft gun which by its design is not easily removable however is refillable with a non-flammable gas.

3.1.12 *propellant, refillable removable, n—also known as re-movable HPA cylinders refillable, a cylinder and regulator assembly which is removed from the airsoft gun to be refilled with a non-flammable gas.*

3.1.13 *propulsion system, combination, n*—propulsion system in which a combination of spring, spring-piston, pneumatic, or gas systems can be used to provide the energy to propel the projectile.

3.1.14 *propulsion system, electronic, n*—propulsion system in which an electronic system is used to provide the energy to propel the projectile.

3.1.15 *propulsion system, gas, n*—propulsion system in which a stored gas system, including CO<sub>2</sub>, is used to provide the energy to propel the projectile. CO<sub>2</sub> propulsion system is a type of gas propulsion system.

3.1.16 *propulsion system, spring-piston (also known as spring-air), n*—propulsion system in which the projectile is propelled by air pressure that is created by a piston moved by a spring.

3.1.17 *propulsion system, pneumatic, n*—propulsion system in which compressed air is stored under pressure and, when released, provides the energy to propel the projectile.

3.1.17.1 *Discussion*—A pneumatic airsoft gun normally has a pump system to provide the compressed air.

3.1.18 *propulsion system, pre-charged pneumatic, n*—propulsion system in which the energy is provided by compressed gas, normally compressed air, stored in a refillable cylinder charged by an external source.

3.1.18.1 *Discussion*—The release of the compressed gas provides the energy to propel the projectile.

3.1.19 *pumping mechanism (pneumatic gun), n*—mechanical device used to compress air.

3.1.20 *range, n*—maximum distance to which an object may be propelled, whether limited by energy or an obstacle.

3.1.21 *safety device, n*—device which, when activated, disables a part of the airsoft gun, usually the trigger, to prevent unintentional discharges and must be released to allow the airsoft gun to be discharged by the movement of the trigger.

3.1.21.1 *Discussion*—The device is sometimes referred to as the “safety,” “safety button,” or “safety lever.” An electronic on/off switch is considered a safety device when placing it in the “off” position renders the airsoft gun inoperable.

3.1.22 *standard ambient temperature and pressure (SATP), n*—used to describe a substance at the pressure of 1 bar (1.01325 atmospheres, 750 mm Hg, 14.5 psi, 100 kPa) and a temperature of 25°C (77°F).

3.1.23 *target, n*—object at which the airsoft gun is discharged.

3.1.24 *trigger, n*—device operated by the user to discharge an airsoft gun.

3.1.25 *trigger guard, n*—rigid, firmly attached component that must totally enclose the trigger area and be wider than the trigger.

3.1.25.1 *Discussion*—There can be no more than 38 mm (1.5 in.) of space from any point on the face of the trigger to the trigger guard, and no more than 13 mm (0.5 in.) from the lowest point of the trigger to the trigger guard. All measurements under this rule are to be taken after excluding any removable attachments to the trigger.

3.1.26 *trigger pull, n*—force required to move the trigger from its start or recycle/reset position to a position that discharges the airsoft gun.

### 4. Significance and Use

4.1 This specification establishes performance requirements and test methods for airsoft guns.

## 5. Conformance

5.1 Airsoft guns shall not, either by label or other means, indicate conformance with this specification unless, at the time of manufacture, they conform with all applicable requirements contained herein.

## 6. General Requirements

6.1 *Literature*—Each airsoft gun shall include the product literature as specified in Specification **F2654**.

6.2 *Packaging*—The packaging of each airsoft gun shall comply, as applicable, with Specification **F2654**.

6.3 *Product Marking*—Airsoft guns shall be marked in accordance with Specification **F2654**.

6.4 *Finish*—The exposed edges of all airsoft guns shall be smooth and free of sharp edges, burrs, and splinters.

### 6.5 Shipping:

6.5.1 Each airsoft gun shall be shipped in an unloaded, uncharged, and uncocked condition.

6.5.2 All airsoft guns must shoot at an energy level under 2.9 joules at the time of shipment at SATP.

### 6.6 Design:

6.6.1 All airsoft guns with an exposed trigger shall have a trigger guard.

6.6.2 It is the responsibility of the manufacturer to determine whether federal markings are required on its airsoft guns and to follow all applicable regulations (see 15 CFR 272).

6.6.3 All CO<sub>2</sub> (carbon dioxide) cylinder non-refillable used in airsoft guns shall meet the requirements of Specification **F590**.

6.6.4 All CO<sub>2</sub> (carbon dioxide) cylinder refillable used in airsoft guns shall meet the requirements of Specifications **F1750**, **F2030**, **F2553**, and **F2653**.

6.6.5 All propellant, refillable removable—also known as re-movable HPA cylinders refillable—used in airsoft guns shall meet the requirements of Specifications **F1750**, **F2030**, and **F2653**.

## 7. Performance Requirements

7.1 *Airsoft Gun Function*—Cocking, pumping, loading, or charging of an airsoft gun shall not cause the airsoft gun to discharge except in accordance with the manufacturer's instructions. This does not limit the use of "auto-triggers."

7.2 *Safety Device*—Safety devices shall be provided on all airsoft guns and all such devices can be activated whether or not the airsoft gun is cocked. All such devices shall be clearly marked to indicate the "safe" and "fire" or "on" and "off" positions, or an indicator on the safety device which exposes both a red color and a groove when the airsoft gun is in the "fire position." All such devices shall be capable of preventing the airsoft gun from being discharged when a weight of 9.1 kg (20 lb) is applied to the trigger. Tests shall be conducted in accordance with **8.3**.

7.3 *Accidental Discharge*—Airsoft guns should not accidentally discharge when exposed to a drop in accordance with **8.4**.

7.4 *Trigger Mechanism*—The weight applied to the trigger necessary to fire an airsoft gun shall be more than  $1 \pm 0.05$  lb ( $0.45 \pm 0.09$  kg) weight and less than  $16 \pm 0.20$  lb ( $7.3 \pm 0.09$  kg). Tests shall be conducted in accordance with **8.5**.

7.5 *Barrel Diameter Size*—The barrel diameter (excluding hop-up mechanism) of an airsoft gun must be no less than the maximum size of projectile designed for that airsoft gun (for example, 6 mm for an airsoft gun which will shoot 6 mm projectiles).

7.6 *Structural Integrity Requirement for Airsoft Guns Using CO<sub>2</sub> or Compressed Gas Propulsion Systems*:

7.6.1 Airsoft guns using these propulsion systems shall be constructed to prevent the full or partially filled cylinder from being propelled from the gun while the cylinder is being emptied, installed, or removed.

7.6.2 Airsoft guns intended to be used with refillable cylinders shall be able to withstand input pressure of three thousand pounds per square inch 207 bar (3000 psi) without catastrophic failure. Leaking in a manner which would not cause injury to the operator shall not constitute failure.

7.7 *Temperature Test for Airsoft Guns Using CO<sub>2</sub> (Carbon Dioxide) Cylinder Non-refillable*—Airsoft guns using CO<sub>2</sub> (carbon dioxide) cylinder non-refillable shall be capable of retaining the CO<sub>2</sub> and the cylinder in a pierced state when both are heated to a temperature of  $160 \pm 5^\circ\text{F}$  ( $71 \pm 2.7^\circ\text{C}$ ) and maintained for ½ h without structural failure of the airsoft gun. Tests shall be conducted in accordance with **8.6**. Seal failure between the airsoft gun and cylinder is acceptable.

7.8 *Muzzle Energy*—Airsoft guns shall have a muzzle energy of 2.9 joule or less. Tests shall be conducted in accordance with **8.8**.

## 8. Test Methods

8.1 No precision statement on any of the following test methods is available at this time.

### 8.2 Airsoft Gun Function Test:

8.2.1 *Significance*—This method is performed to ensure that the airsoft gun, when operated in accordance with the manufacturer's operating instructions, will not discharge except in accordance with the manufacturer's instructions during cocking, pumping, loading, and charging.

### 8.2.2 Apparatus:

8.2.2.1 Manufacturer's operating instructions for the airsoft gun.

8.2.2.2 Projectiles conforming to Specification **F2679** and manufacturer's recommended propellants.

### 8.2.2.3 Appropriate back stop.

8.2.3 *Test Specimen*—The test specimen shall consist of a new airsoft gun, selected in accordance with the manufacturer's usual quality assurance practices.

### 8.2.4 Procedure:

8.2.4.1 Conduct the test at room temperature ( $60$  to  $80^\circ\text{F}$  ( $16$  to  $27^\circ\text{C}$ )).

8.2.4.2 Insert the manufacturer's recommended propellant (if required) and load the projectile magazine or chamber of an airsoft gun to capacity.