



# Standard Consumer Safety Specification for Non-Powder Gun Projectiles and Propellants<sup>1</sup>

This standard is issued under the fixed designation F590; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

## 1. Scope

1.1 This consumer safety specification covers projectiles and propellants manufactured for use with non-powder guns intended for target shooting, educational, and recreational purposes and is to be used in conjunction with Consumer Safety Specification F589. Non-powder guns are commonly identified as BB guns, air guns, or pellet guns.

1.2 The projectiles and propellants covered by this consumer safety specification are BB cal, .177 cal (4.5 mm), .22 cal (5.5 mm), and .25 cal (6.4 mm) air gun shot of various materials; .177 cal (4.5 mm), 5 mm, .22 cal (5.5 mm), .25 cal (6.4 mm) pellets and .177 cal (4.5 mm), 5 mm, .22 cal (5.5 mm), and .25 cal (6.4 mm) darts and propellants identified as 8 and 12-g type CO<sub>2</sub> cylinders with both small and standard-sized necks as well as refillable CO<sub>2</sub> or compressed air cylinders and reservoirs.

1.3 This consumer safety specification does not cover propellants such as dichlorodifluoromethane or projectiles that are propelled by a combustible release of energy; non-powder gun projectiles used with products identified as blow guns, sling shots, cork guns, toy guns, or archery cross bows and other such devices; projectiles designed for adult use in obsolete non-powder guns, custom-made non-powder guns, and non-powder guns designed for and used by law enforcement, scientific, veterinary or military use; paint ball markers, ammunition for airsoft/softair guns and shot used with shotguns in the firearm classification. Test methods for refilling cylinders do not purport to address all of the safety issues, if any, associated with the safe handling and transfilling of small cylinders. It is the responsibility of the user of this standard to establish appropriate safety practices and determine the applicability of regulatory limitations, such as but not limited to DOT, CGA and OSHA, prior to use.

1.4 The following precautionary caveat pertains only to the test method portion, Section 7, 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 and health practices and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

2.1 ASTM Standards:<sup>2</sup>

F589 Consumer Safety Specification for Non-Powder Guns  
F2030 Specification for Paintball Cylinder Burst Disk Assemblies

## 3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

### *Projectiles*

3.1.1 *air-gun dart*—a .177 cal, 5 mm, .22 cal, or .25 cal non-powder gun projectile having a pointed configuration on one end and tufts on the other (see Fig. 1).

3.1.1.1 *tuft*—the material that is added to the body of a dart.

3.1.2 *air-gun shot*—a BB, .177, .22-cal, or .25 cal ball-shaped, non-powder gun projectile made primarily of lead, lead alloy, or steel (see Fig. 2).

3.1.2.1 *air-gun shot, lead*—a shot made of lead or lead alloy which may or may not have a protective finish.

3.1.2.2 *air-gun shot, lead-coated*—a shot made of steel that has a thin, uniform coating of lead or lead alloy. It may or may not have a protective finish.

3.1.2.3 *air-gun shot, steel*—a shot made of steel that is coated with a protective finish.

3.1.2.4 *dimension across flats*—the diameter of an air-gun shot, as measured across the flats.

3.1.2.5 *maximum spherical diameter*—the largest diameter of an air-gun shot, as measured with a ring gage.

3.1.3 *caliber*—the nomenclature used to indicate the bore size of a non-powder gun and the compatible projectile intended for use with that bore size.

3.1.4 *non-powder gun projectile*—a projectile that is designed for and intended to be discharged from a non-powder gun.

<sup>1</sup> This consumer safety specification is under the jurisdiction of ASTM Committee F15 on Consumer Products and is the direct responsibility of Subcommittee F15.06 on Safety Standards for Non-Powder Gun Products.

Current edition approved Feb. 1, 2012. Published March 2012. Originally approved in 1978. Last previous edition approved in 2005 as F590 – 05. DOI: 10.1520/F0590-12.

<sup>2</sup> 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.

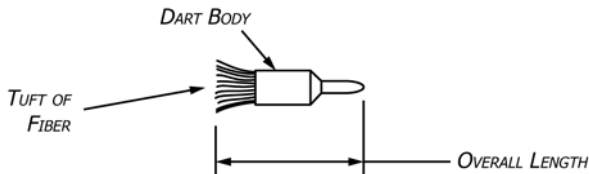


FIG. 1 Air-Gun Dart

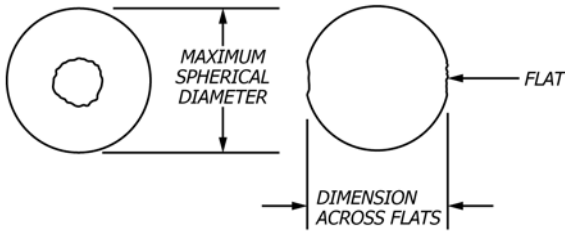


FIG. 2 Air-Gun Shot

3.1.5 *pellet*—a .177 cal, 5 mm, .22 cal, or .25 cal nonspherical, semihollow non-powder gun projectile made of lead, lead alloy, or other material, or a combination thereof. Typical examples are shown in Fig. 3.

3.1.5.1 *nose of pellet*—the forwardmost portion of a pellet.

3.1.5.2 *overall length of pellet*—the maximum dimension of a pellet as measured parallel to the axis.

3.1.6 *shot-start force*—the force that is required to insert a non-powder gun projectile into a cavity of standard size for a given caliber.

*Propellants*

3.1.7 *CO<sub>2</sub> (carbon dioxide) cylinder non-refillable*—a cylinder that holds carbon dioxide in a liquid-gas combination and consists of a main body or container and a neck containing the cap and seal (see Fig. 4) for use in non-powder guns.

3.1.7.1 *cap, CO<sub>2</sub> cylinder*—the section of the cylinder neck containing the seal that is punctured to release CO<sub>2</sub> for use in the non-powder gun.

3.1.7.2 *neck diameter, CO<sub>2</sub> cylinder*—the outside diameter of the neck of a CO<sub>2</sub> cylinder.

3.1.7.3 *neck length, CO<sub>2</sub> cylinder*—the distance the neck of a cylinder enters into a hole equal to the maximum allowable neck diameter (see Fig. 5).

3.1.7.4 *overall length, CO<sub>2</sub> cylinder*—the length measured parallel to the longitudinal axis of the cylinder.

3.1.7.5 *outside diameter, CO<sub>2</sub> cylinder*—the diameter of the main body of the CO<sub>2</sub> cylinder.

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

3.1.9 *propellant, CO<sub>2</sub> (carbon dioxide)*—a propellant in which the energy source is obtained from compressed carbon dioxide gas.

3.1.10 *propellant, compressed*—a propellant in which the energy source is obtained from compressed air or other nonflammable gas.

3.1.11 *propellant, refillable removable*—also known as *removable CO<sub>2</sub> cylinders refillable*, a cylinder and valve assembly which is removed from the non-powder guns to be refilled.

3.1.12 *propellant, refillable non-removable*—a reservoir contained within the non-powder guns which by its design is not easily removable however is refillable with a non-flammable gas.

3.1.13 *propellant, non-refillable*—also known as *CO<sub>2</sub> cylinders, non-refillable*, generally referred to as disposable cartridges which are discarded after use and are not refillable for use in non-powder guns.

*Fill Stations*

3.1.14 *fill station*—a device designed to attach to a CO<sub>2</sub> or compressed air cylinder and to a refillable non-powder guns cylinder to facilitate transfilling of the non-powder gun's cylinder or a device designed to attach a CO<sub>2</sub> or compressed air cylinder to a non-powder gun to facilitate the transfilling a non-removable reservoir contained within the non-powder guns.

3.1.15 *authorized retester*—a facility registered with and approved by DOT for the re-qualification of refillable CO<sub>2</sub> cylinders.

3.1.16 *blow-down valve*—a valve which is part of a fill station assembly for refilling CO<sub>2</sub>, which is intended to vent gas from the cylinder and fill station.

3.1.17 *DOT*—Department of Transportation.

3.1.18 *TC*—Transport Canada.

3.1.19 *valve twist test*—a test done by hand whereas the user grasps the valve with one hand and the bottle with the other and attempts to turn the valve by hand in a counter-clockwise direction (left).

3.1.19.1 *Discussion*—If the valve does move, the valve and bottle should not be filled and should be repaired or serviced, or both, by the manufacturer or its authorized representative. If the valve does not move then the valve passes the test and may be filled provided it passes all other requirements. The test should only be done when the cylinder is empty and without any tools.

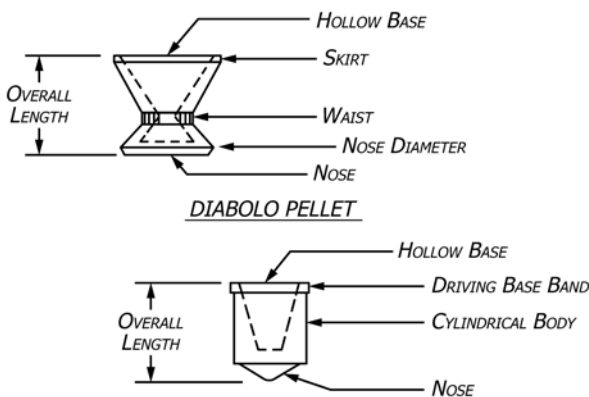


FIG. 3 Air-Gun Pellets

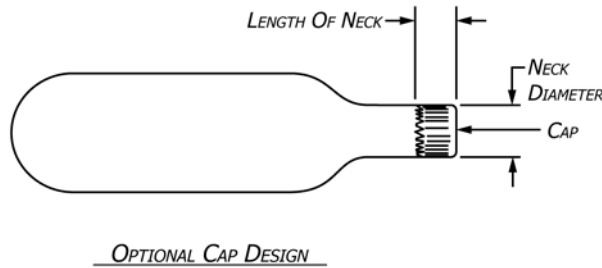
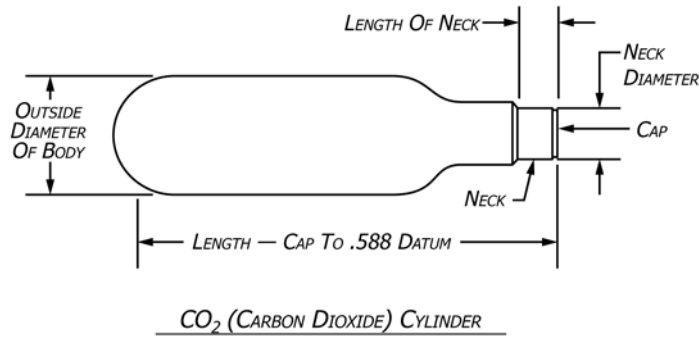
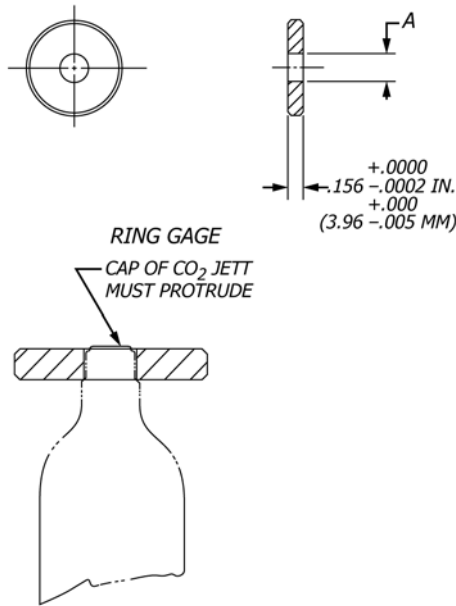


FIG. 4 CO<sub>2</sub> (Carbon Dioxide) Cylinder Non-Refillable



Neck Size	Dimension A, in. (mm)
Standard	0.346 + 0.0002, -0.0000 (8.79 + 0.005, -0.000)

FIG. 5 CO<sub>2</sub> Cylinder Non-Refillable Combination Gage (C.R.S.) Maximum Neck Diameter and Minimum Neck Length (Standard Neck Cylinder)

4.1.1 *Air-Gun Shot, Steel*—Air-gun shot, steel, shall conform to the minimum and maximum diameter dimensions specified in Table 1 when measured in accordance with 7.1 and 7.2.

4.1.2 *Air-Gun Shot, Lead*—Air-gun shot, lead, shall conform to the minimum diameter dimensions specified in Table 2 when measured in accordance with 7.3 and shall conform to the maximum shot-start force as specified in Table 3 when measured in accordance with 7.4.

4.1.3 *Pellets*—Pellets shall conform to the minimum and maximum length dimensions as specified in Table 4 when measured in accordance with 7.5 and shall conform to the maximum shot-start force as specified in Table 5 when measured in accordance with 7.4.

4.1.4 *Air-Gun Darts*—Air-gun darts shall conform to the minimum and maximum length dimensions as specified in Table 6 when measured in accordance with 7.5 and shall conform to the maximum shot-start force as specified in Table 7 when measured in accordance with 7.4.

4.1.5 *Finish and Appearance*—The outermost surfaces of all projectiles that require protection against deterioration shall have a protective finish.

TABLE 1 Air-Gun Shot (Steel)—Diameters

Projectile Type	Maximum Spherical Diameter, in. (mm)	Minimum Dimension Across Flats, in. (mm)
Air-gun shot, steel, BB cal (.177 cal)	0.175 (4.44)	0.162 (4.11)
Air-gun shot, steel, .22 cal	0.2198 (5.583)	0.205 (5.21)

## 4. Requirements

### 4.1 Projectiles: