



# Standard Specification for Paintball Marker Barrel Blocking Devices<sup>1</sup>

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## INTRODUCTION

This standard is intended to outline basic performance requirements for barrel blocking devices. A barrel blocking device is a critical piece of safety equipment used in the sport of paintball.

Paintball is a sport that, like all sports, has intrinsic hazards. These hazards include being hit by paintballs. Protective equipment cannot eliminate all injuries but will substantially reduce their severity and frequency. A barrel blocking device is an additional safety device that, when meeting this standard and properly used, can substantially reduce the severity and frequency of injuries. Paintball marker barrels are not all the same inside diameter, thus necessitating performance specifications for barrel blocking devices that match the barrel blocking device to a barrel diameter. This specification is written within the current state-of-the-art of paintball marker barrel and paintball barrel blocking device 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 paintball barrel blocking devices that may be inserted or otherwise function to prevent a paintball from leaving the muzzle or the confines of the barrel blocking device intact.

1.2 The values stated in SI units are to be regarded as the standard. The inch-pound units given in parentheses are provided for information only.

1.3 *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 requirements prior to use.*

## 2. Referenced Documents

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

**F1979** Specification for Paintballs Used in the Sport of Paintball

**F2272** Specification for Paintball Markers

<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 F08.24 on Paintball and Equipment.

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<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.

## 3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *Paintball Marker Terms:*—

3.1.1.1 *auto-trigger*—a trigger which, when held in the discharge position, will automatically cause the paintball marker to discharge when the pump or bolt action is manipulated.

3.1.1.2 *barrel*—that portion of a paintball marker through which the paintball is discharged.

3.1.1.3 *barrel blocking device*—a safety device that prevents an intact paintball from being accidentally discharged from the muzzle of the paintball marker or leaving the confines of the barrel blocking device.

3.1.1.4 *burst mode marker*—a burst mode marker may discharge two or more times per trigger cycle or may discharge two or more times with the pull and release of the trigger.

3.1.1.5 *discharge mode*—a mode that controls the number of paintballs discharged per trigger cycle.

3.1.1.6 *enhanced trigger mode marker*—a paintball marker that at some point discharges more than one paintball per trigger cycle. This includes markers that “store” the number of trigger.

3.1.1.7 *fully-automatic mode marker*—a marker that discharges when the triggering device is actuated and continues to discharge until the trigger returns to its reset or recycle position.

3.1.1.8 *modified fully automatic mode 1 marker*—a semiautomatic mode marker which, after the trigger is pulled at least

three times within 1 s, is able to function in a fully automatic mode with a firing rate not to exceed 15 shots per second until the trigger is released.

3.1.1.9 *modified burst mode 2 marker*—a semi-automatic mode marker which, after the trigger is pulled at least three times within 1 s, is able to cycle more than one time per trigger pull with a firing rate not to exceed 15 shots per second.

3.1.1.10 *muzzle*—the end of the barrel at which the ball exits the barrel.

3.1.1.11 *muzzle diameter*—the inside barrel diameter as measured at the muzzle.

3.1.1.12 *paintball*—a spherical ball, commonly with a diameter of 17.3 mm (0.68 in.), comprised of a shell and a fill, designed to be expelled from a paintball marker and conforming to Specification **F1979**.

3.1.1.13 *paintball marker*—a device specifically designed to discharge paintballs.

3.1.1.14 *pump mode marker*—a marker that requires the operator to manually cock or engage the sear of the marker before each shot by a means of a pump, bolt, lever, cocking handle, or similar device.

3.1.1.15 *semi-automatic mode marker*—a semi-automatic marker discharges one time with each trigger cycle. Markers that “store” the number of trigger pulls and discharge more than one paintball at some point do not meet this definition. Markers that operate in any other discharge mode(s) do not meet this definition.

3.1.1.16 *standard ambient temperature (SAT)*—used to describe a substance at a temperature of  $25 \pm 2^\circ\text{C}$  ( $77 \pm 4^\circ\text{F}$ ).

## 4. Significance and Use

4.1 This specification establishes performance requirements and test methods to provide a reasonable degree of safety in the normal use of barrel blocking devices in paintball markers.

## 5. Conformance

5.1 Barrel blocking devices shall not, either by label or other means, indicate conformance with this specification unless they conform to all applicable requirements contained herein.

## 6. General Requirements

6.1 *Performance*—Upon any discharge of a paintball from a paintball marker with a barrel blocking device properly installed according to the manufacturer’s instructions, the barrel blocking device must remain inserted or over the muzzle and prevent an intact paintball from exiting the muzzle or the confines of the muzzle blocking device. Tests shall be conducted in accordance with **7.2**.

6.2 All barrel blocking devices shall completely cover or block the exit orifice of the barrel. Some barrel blocking devices make use of a vent port that allows the release of excess pressure in the barrel of the marker. The total calculated area of all ports of this type in any barrel blocking device must be less than  $15 \text{ mm}^2$ .

## 7. Test Methods

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

### 7.2 Barrel Blocking Device Retention Test:

7.2.1 *Significance*—This method is performed to ensure that the barrel blocking device will remain in or over the barrel and prevent an intact paintball or shell fragment equal to or greater than 3 mm (0.118 in.) by 5 mm (0.196 in.) from exiting the muzzle or the confines of the barrel blocking device.

#### 7.2.2 Apparatus:

7.2.2.1 *Paintball Marker*, capable of hurling paintballs horizontally at a speed of  $100.6 \pm 6 \text{ m/s}$  ( $330 \pm 20 \text{ f/s}$ ) per Specification **F2272**.

7.2.2.2 *Paintballs*, per Specification **F1979**.

7.2.2.3 *Barrel Blocking Device*.

7.2.2.4 *Appropriate Backstop*.

7.2.2.5 Equipment employed to measure the speed of the test paintball shall be used in accordance with the manufacturer’s instructions to measure the velocity of paintballs and shall be accurate to within  $\pm 0.5 \text{ m/s}$  ( $\pm 1.6 \text{ ft/s}$ ) muzzle velocity.

#### 7.2.3 Conditioning:

7.2.3.1 All testing shall be done using paintballs manufactured according to Specification **F1979**.

7.2.3.2 Paintball storage and the non-test handling shall be done at a relative humidity below 65 % and at SAT.

7.2.3.3 Paintballs shall be conditioned in their original sealed container for at least 4 h at the humidity and temperature specified in **7.2.3.2**.

7.2.3.4 The barrel shall be conditioned for at least 4 h at SAT.

7.2.3.5 The testing shall be conducted at the temperatures specified in **7.2.3.2** and shall be completed within 10 min after removal of the paintball from the sealed container. The paintball container shall be resealed immediately after each paintball is removed.

7.2.3.6 The barrel blocking device to be tested will be conditioned for at least 4 h at SAT.

#### 7.2.4 Test Specimen:

7.2.4.1 The test specimen shall consist of a barrel blocking device properly installed into or over the muzzle.

#### 7.2.5 Procedure:

7.2.5.1 Conduct the test at SAT.

7.2.5.2 The barrel is attached to the paintball marker in accordance with the barrel and paintball marker manufacturer’s instructions.

7.2.5.3 **Standard Velocity Test:** The paintball marker shall be adjusted so that the velocity of a paintball discharged from the marker would be  $100.6 \pm 6 \text{ m/s}$  ( $330 \pm 20 \text{ ft/s}$ ) when measured within 1 m (3.3 ft) of the muzzle.

7.2.5.4 The muzzle shall be immersed in paintball fill material for  $30 \pm 5 \text{ s}$  at a minimum depth of 2.5 cm (1 in.) beyond the maximum point of insertion of the barrel blocking device. Upon removal from the fill material, the barrel will be hung vertically with the muzzle down for  $30 \pm 5 \text{ s}$ .

7.2.5.5 Install a new unused barrel blocking device according to manufacturer’s instructions.

7.2.5.6 Placing the end of the barrel and blocking device into a clean container that is devoid of all paintball shell and fill

materials, discharge paintballs into the barrel blocking device, firing a volley of three paintballs per second, repeating this two times for a total of 6 paintballs fired, with 5 s between volleys.

7.2.5.7 Observe the test container for signs of a paintball breaching the barrel blocking device. Inspect the barrel blocking device for signs of damage or physical failure. Any signs of either will result in a failure for this test.

7.2.5.8 **High Velocity Test:** The paintball marker shall be adjusted so that the velocity of a paintball discharged from the marker would be  $(410 \pm 20 \text{ ft/s})$  when measured within 1 m (3.3 ft) of the muzzle.

7.2.5.9 The muzzle shall be immersed in paintball fill material for  $30 \pm 5 \text{ s}$  at a minimum depth of 2.5 cm (1 in.) beyond the maximum point of insertion of the barrel blocking device. Upon removal from the fill material, the barrel will be hung vertically with the muzzle down for  $30 \pm 5 \text{ s}$ .

7.2.5.10 Install a new unused barrel blocking device according to manufacturer's instructions.

7.2.5.11 Placing the end of the barrel and blocking device into a clean container that is devoid of all paintball shell and fill materials, discharge one paintball into the barrel blocking device.

7.2.5.12 Observe the test container for signs of a paintball breaching the barrel blocking device. Inspect the barrel blocking device for signs of damage or physical failure. Any signs of either will result in a failure for this test.

## 8. Identification of Manufacturer

8.1 *Significance*—Every barrel blocking device shall contain a permanent, printed indicia, identifying the manufacturer (or distributor), and including contact information.

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8.1.1 This indicia shall be printed in English, in a minimum 8 point, font.

8.1.2 This indicia shall be printed in a conspicuous location on the barrel blocking device.

## 9. Inclusion of Instruction Manual

9.1 *Significance*—Barrel blocking devices come in many designs, with most designs requiring a certain amount of adjustment/fitment to each marker in order for the device to function effectively. It is recommended that every barrel blocking device being sold individually to the end user include a user's manual outlining the proper installation and usage of the device as detailed below.

### 9.2 Users Manual Specifications:

9.2.1 The user's manual may be included in various formats such as permanently printed directly onto the device itself, an accompanying pamphlet, an instruction sheet, or included on the product packaging.

9.2.2 Instructions must be printed in a minimum 8 point font.

9.2.3 The minimum instructions included with a barrel blocking device will be: how to properly install and use the device.

9.2.4 At the manufacturer's discretion additional information may be included with the barrel blocking device including but not limited to adjustment of the barrel blocking device, how to inspect the device for wear or damage, proper cleaning and storage of the barrel blocking device.

## 10. Keywords

10.1 paintball; paintball barrel blocking devices; paintball barrel plugs; paintball markers; paintball sports