



# Standard Test Method for Evaluating Paintball Barrier Netting<sup>1</sup>

This standard is issued under the fixed designation F2278; 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

This standard is intended to provide a basic test method that would allow the user to determine the effectiveness of paintball barrier netting. The use of safe paintball barrier netting at paintball playing facilities is critical to protect non-players from accidental impact of a paintball.

This specification is written within the current state-of-the-art of paintball barrier netting 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 test method is designed to evaluate paintball barrier netting that may be used to delineate playing fields, chronograph areas, target ranges, and other “goggle-on” areas of an active paintball site. An apparatus is suggested to evaluate paintball barrier netting in a laboratory. On site testing does not require such an apparatus.

1.2 This standard is designed to be used in conjunction with Guide F2184.

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

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 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.*

<sup>1</sup> This test method 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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## 2. Referenced Documents

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

F1979 Specification for Projectiles Used in the Sport of Paintball

F2184 Guide for Installation of Paintball Barrier Netting

F2272 Specification for Paintball Markers

## 3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *caliber, n*—the term used to refer to the size of a paintball projectile. Related to the measurement of the diameter of the paintball as described in Specification F1979.

3.1.2 *“goggles-on” area, n*—areas in which all persons are required to wear paintball goggles, such as and not limited to playing fields, game areas, chronograph areas, and target ranges.

3.1.3 *muzzle, n*—the end of the paintball marker through which the paintball is discharged, also referred to as the end of the barrel.

3.1.4 *paintball, n*—a projectile comprised of a shell and a fill, designed to be expelled from a paintball marker and conforms to Specification F1979.

3.1.5 *paintball barrier netting, n*—netting used in the sport of paintball as a protective barrier.

3.1.6 *paintball marker, n*—a device specifically designed to discharge paintballs. The device is sometimes referred to as a paintball gun.

<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.

3.1.7 *playing field, n*—an area delineated by a boundary marker, in which paintball games are conducted.

3.1.8 *shell, n*—a rigid to semi-rigid material (generally of gelatin) that encapsulates the fill of a paintball.

3.1.9 *standard ambient temperature (SAT), n*—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 method is performed to evaluate if paintball barrier netting will prevent an intact paintball or shell fragments exceeding 3 by 5 mm (0.118 by 0.197 in.) from passing through the netting.

4.2 This test method provides accurate results about the current effectiveness of the test specimen when field-tested in an existing installation. Laboratory results are particularly useful for testing the relative effectiveness of multiple test specimens.

4.3 The results stemming from the use of this test method may be used to evaluate the effectiveness of paintball barrier netting represented by the test specimen for use in delineating “goggles-on” areas found at paintball playing fields.

4.4 The base procedure outlined below is applicable to “field-testing.” Additional requirements for “laboratory” testing are noted.

#### 5. Interferences

5.1 Laboratory testing does not account for variations that can be found in field tests. These variations include and are not limited to temperature, UV exposure, wind direction, precipitation, and method of installation.

5.1.1 This test method is also useful to evaluate the relative performance of one test specimen to another, particularly in the laboratory.

#### 6. Apparatus

6.1 *Paintball Marker or Markers*, of various calibers, capable of discharging paintballs horizontally at a speed of  $94.5 \pm 6$  m/s ( $310 \pm 20$  ft/s) and conforming to Specification F2272.

6.2 *Paintballs*, of the required calibers, per Specification F1979.

6.3 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  $\pm 0.5$  m/s ( $\pm 1.6$  ft/s) muzzle velocity.

6.4 An appropriate backstop placed  $30.5 \pm 2.5$  cm ( $12 \pm 1$  in.) directly behind and parallel to the test specimen. The backstop shall be a minimum of  $244 \pm 5$  cm ( $96 \pm 2$  in.) high and  $122 \pm 5$  cm ( $48 \pm 2$  in.). The backstop shall be a hard, smooth surface that can withstand the impact of a paintball and can be readily cleaned (see Fig. 1).

6.5 If testing in a laboratory, the following apparatus shall be used:

6.5.1 *Paintball Barrier Netting Rack*, see Figs. 2 and 3. This rack is capable of holding the  $244 \pm 5$  cm ( $96 \pm 2$  in.) test

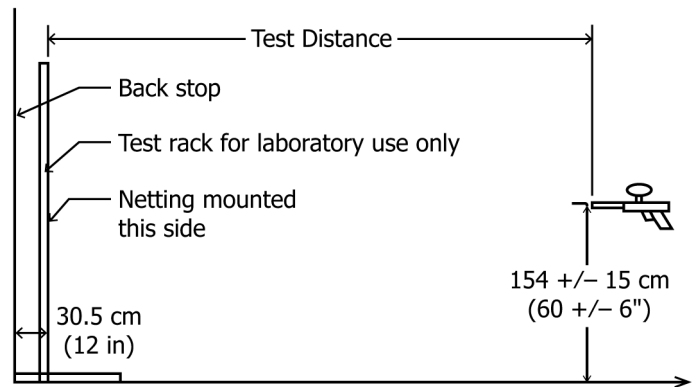


FIG. 1 Testing Apparatus Layout

specimen off the floor and providing vertical support  $122 \pm 1$  cm ( $48 \pm 0.5$  in.) apart at the center of the test specimen (see Figs. 2 and 3). The bottom crossbar must have a minimum length of 2.74 m (108 in.) and a weight of  $5.6 \pm 0.1$  kg ( $12.3 \pm 0.2$  lb).

#### 7. Hazards

7.1 Failure of the test specimen, particularly if an intact paintball passes through the test specimen, will render the test specimen unusable until the test specimen is repaired or replaced.

#### 8. Test Specimen

8.1 The test specimen shall consist of paintball barrier netting installed in actual use conditions, or

8.2 For laboratory test only:

8.2.1 The top of the test specimen is draped over the top crossbar and fastened to itself with tie-wraps spaced  $15.2 \pm 1$  cm ( $6 \pm 0.5$  in.) apart. The tie-wraps must encircle the top crossbar.

8.2.2 The bottom of the test specimen is draped over the bottom crossbar (on the same side as the top) and fastened to itself with tie-wraps spaced  $15.2 \pm 1$  cm ( $6 \pm 0.5$  in.) apart, such that the overall length of the test specimen, including the pipes, is  $244 \pm 5$  cm ( $96 \pm 2$  in.). The tie-wraps must encircle the bottom crossbar.

8.2.3 The test specimen is suspended on the test rack with the paintball barrier netting flush, against the test rack and not touching the floor.

8.3 The test specimen shall have a minimum horizontal dimension of  $305 \pm 5$  cm ( $120 \pm 2$  in.) and a minimum vertical dimension of  $244 \pm 5$  cm ( $96 \pm 2$  in.).

#### 9. Conditioning

9.1 The paintball barrier netting to be tested will be conditioned for at least 4 h. If tested in a laboratory, the paintball barrier netting will be conditioned at SAT.

9.2 All testing shall be done using paintballs manufactured within the previous eight months.

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

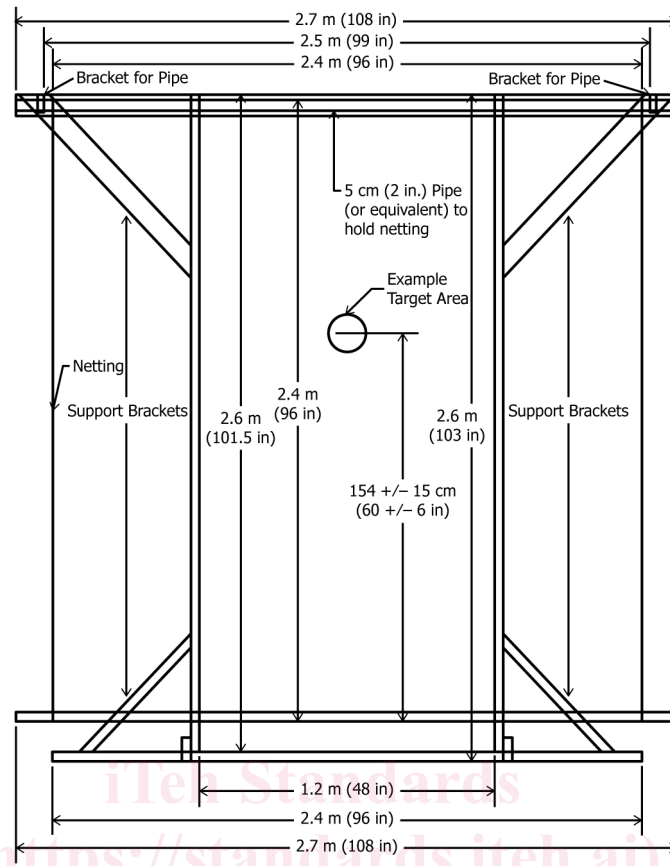


FIG. 2 Netting Test Rack (Front View)

9.4 Paintballs shall be conditioned in their original sealed container for at least 4 h at the humidity and temperature specified in 9.1.

9.5 The testing shall be conducted at SAT for laboratory tests. Testing 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.

## 10. Procedure

10.1 The paintball marker shall be adjusted so that the velocity of a paintball discharged from the marker will be  $94.5 \pm 6$  m/s ( $310 \pm 20$  ft/s).

10.2 The muzzle of the paintball marker shall be placed at a distance of 4.6 m (15 ft) from the test specimen.

10.3 The muzzle of the paintball marker shall be placed nominally normal to the test specimen, at a distance of  $154 \pm 15$  cm ( $60 \pm 6$  in.) from the bottom and centered horizontally to the middle of the test specimen.

10.3.1 If an area to be tested is above  $154 \pm 15$  cm ( $60 \pm 6$  in.), the bottom of the test specimen, the muzzle, will be maintained at  $154 \pm 15$  cm ( $60 \pm 6$  in.) and the marker aimed at the test area, immediately vertical from the nominally normal position.

10.4 In a safe manner, discharge ten paintballs that impact the test specimen at a distance of 4.6 m (15 ft) within a 15.4 cm (6 in.) diameter circle centered  $154 \pm 15$  cm ( $60 \pm 6$  in.) from

the bottom and centered horizontally to the middle of the test specimen, at 1-s intervals between discharges.

10.5 Observe any material passing through the paintball barrier netting, noting if the netting allows intact paintballs or shell fragments greater than 3 by 5 mm (0.118 by 0.197 in.) to pass through.

10.6 Paintball barrier netting that does allow an intact paintball or a shell fragment larger than 3 by 5 mm (0.118 by 0.197 in.) to pass through during this test procedure will be recorded as failed.

10.7 This test is to be completed with the largest and smallest calibers or types of paintball that the subject paintball barrier netting is intended to prevent an intact paintball or shell fragments exceeding 3 by 5 mm (0.118 by 0.197 in.) from passing through.

10.8 In laboratory test situations record the date, time, air temperature, atmospheric pressure, relative humidity, and results of the test at the time of testing.

## 11. Product Marking

11.1 The manufacturer or distributor of the paintball barrier netting will supply the initial purchaser information regarding the caliber(s) and type of paintball with which the netting has been tested to be effective.

11.2 This information will also include a statement that will convey the following: "This paintball barrier netting has been