



Standard Specification for Paintballs Used in the Sport of Paintball¹

This standard is issued under the fixed designation F 1979; 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 approval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

INTRODUCTION

This specification sets forth a set of guidelines and testing procedures for the manufacturing of 0.68 caliber paintballs. The goal is to provide paintball manufacturers with a specification that promotes safety in the sport of paintball.

1. Scope

1.1 This specification establishes testing procedures and critical characteristics of 0.68 caliber paintballs which help define whether a paintball is suitable for use in the sport of paintball. Furthermore, the specification establishes minimum warning and package labeling to help ensure that the paintballs are used in a safe manner and that the risk of injury is reduced.

1.2 *This specification does not purport to address all of the safety issues associated with the sport of paintball. It is the responsibility of the user of this specification to establish appropriate safety and health practices and to comply with all applicable laws and regulations.*

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

2. Terminology

2.1 *Definitions of Terms Specific to This Standard:*

2.1.1 *fill*—the liquid inside of a paintball.

2.1.2 *paintball*—a spherical ball, commonly with a diameter of 17.3 mm (0.68 in.), comprised of a shell and a fill, and designed to be expelled from a paintball gun.

2.1.3 *paintball gun*—a device specifically designed to discharge paintballs.

2.1.4 *shell*—a rigid to semirigid material (generally of gelatin) that encapsulates the fill of a paintball.

3. General Requirements

3.1 *pH of Fill Material*—The pH of the fill used in the paintball shall measure between 4.5 and 7.5 as measured using a 10 % solution of the fill in distilled water. Measurements shall be made using a properly calibrated pH meter.

3.2 *Paintball Fill Compatibility With Polycarbonate*—When tested in accordance with Section 4, no more than one of

the three polycarbonate tensile bars exposed to the fill material shall develop a visible crack that is greater than 6.5 mm, (0.256 in.) in length.

3.3 *Maximum Weight*—The paintballs shall not weigh more than 3.5 g.

3.4 *Diameter of Paintball*—The diameter of the paintball as measured both polar and at the seam shall measure between 16.5 mm, (0.650 in.) and 18 mm (0.709 in.).

3.5 *Impact Breakage*—The impact breakage of the paintball shall be tested in accordance with Section 5. All 10 of the paintballs that impact the target shall break upon impact.

3.6 *Environmental Safety*—Paintballs shall not contain environmentally hazardous substances as defined in CERCLA² Regulations 40CFR302.4; SARA Toxic Chemical List³ Section 313; Clean Air Act⁴, Section 112B; and RCRA Regulations⁵ 40FR261.24 through 40CFR261.33.

TEST METHODS

4. Paintball Compatibility with Polycarbonate

4.1 *Scope*—This test method is intended to determine the compatibility of the paintball fill with polycarbonate, the plastic material currently universally used for protective eye-wear lenses in paintball.

4.2 *Summary of Test Method*—This test method involves bending polycarbonate tensile bars in a test fixture while these

² U.S. Environmental Protection Agency, "Designation of Hazardous Substances List of Hazardous Substances and Reportable Quantities," *Comprehensive Environmental Response Compensation and Liabilities Act*, Bureau of Federal Affairs, 40CFR302.4, April 4, 1985.

³ U.S. Environmental Protection Agency, "Superfund Amendment and Reauthorization Act," *Environmental Protection Agency Regulation*, Bureau of Federal Affairs, Title III, 1986.

⁴ U.S. Environmental Protection Agency, "National Emission Standards for Air Pollutants List of Hazardous Air Pollutants," *Clean Air Act*, Bureau of Federal Affairs, Section 112B, 1967.

⁵ U.S. Environmental Protection Agency, "Definition of Characteristic and Listed Hazardous Waste, Identification and Listing of Hazardous Waste," *Resource Conservation and Recovery Act*, Bureau of Federal Affairs, 40CFR261, May 19, 1980.

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bars are exposed to the paintball fill material and observing how these tensile bars react to the fill. A control test is also conducted using tap water in place of the paintball fill material.

4.3 *Significance and Use*—This test method provides a means to help determine the suitability of specific paintball fill material for use in the sport of paintball. This test method provides a relative indicator of the reaction that a polycarbonate lens would have to the paintball fill material being tested.

4.4 *Apparatus*—This test method shall be conducted using a test fixture as shown in Fig. 1. The tensile bars⁶ used in the test shall be molded of clear 121 grade Lexan⁷, polycarbonate (Fig. 2).

4.5 *Procedure:*

4.5.1 Test 3 separate tensile bars for each type of paint being tested. Test a total of 2 tensile bars in the control test using tap water.

4.5.2 Place the fill from 4 paintballs of the tested paint into a polyethylene bag, (the zip-lock variety works well), along with one tensile bar. Place 15 mL (1/2oz) of tap water, along with one tensile bar into each of the 2 control sample polyethylene bags. Wrap each bag around the bar so that the fill or water is in contact with the center of the bar, and seal the bag to prevent fill leakage or evaporation.

4.5.3 Bend the bagged tensile bars between the two stops on the test fixture (Fig. 1), which induces a 1.0 % strain or approximately 175.75 k/cm² (2500 psi). Store the bent tensile bars in the test fixture at room temperature, 23 ± 2°C (73 ± 3.5°F), for 7 days. During the entire 7-day period, the paintball fill material shall be in contact with the center of the tensile bars. Inverting the test fixture is one method of ensuring this contact. Wrapping the bag snugly around the tensile bars is another proven method.

4.5.4 After 7 days, remove the tensile bars from the test fixture and rinse with clean tap water. Dry the tensile bars and inspect for cracks.

4.6 *Report*—Inspect the tensile bars for cracks by holding the bars vertically facing either direct sunlight or a bright light source. Tilt the bars slightly to highlight any cracks. Record and report the length of the longest crack on each tensile bar. If either of the tensile bars used in the control test exhibit a

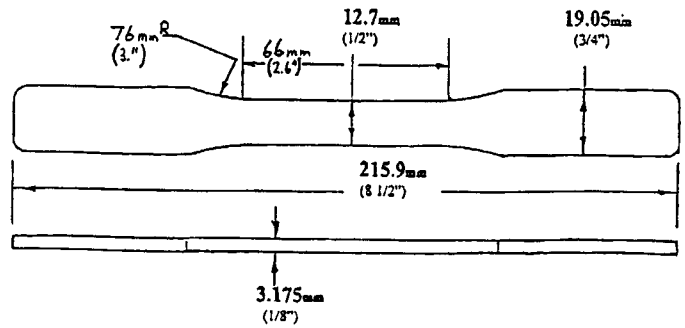


FIG. 2 Tensile Bar

crack of 3 mm (0.112 in.) in length, and cracks longer than 6.5 mm have also been found in two of the three tensile bars exposed to the fill material, the test may be considered invalid and performed again using a different batch of tensile bars.

4.7 *Precision and Bias*—No information is presented about either the precision or bias of this test method since this test method is nonquantitative.

5. Paintball Impact Breakage Test

5.1 *Scope*—This test method is intended to determine the ability of the paintballs to burst upon impact.

5.2 *Summary of Test Method*—This test method involves shooting paintballs from a paintgun at a target, within the parameters of this specification, to test for the breakage of the paintballs upon the target.

5.3 *Significance and Use*—In the sport of paintball, a player who is marked with fill of a paintball is eliminated from the game, and thus it is desirable that a paintball be designed within parameters such that its outer shell can split open and allow its fill to mark the player. This test method provides a means of identifying the breakage ability of paintballs within parameters that reasonably approximate conditions common in the game of paintball. This test method provides a means of identifying the breakage of paintballs by impacting a target at a velocity common in the game of paintball.

5.4 *Sampling*—Select 30 paintballs at random from the lot of paintballs being tested.

5.5 *Apparatus:*

5.5.1 The propelling device shall be capable of hurling paintballs horizontally at a speed of 85.3 ± 6 m/s (280 ± 20 ft/s). Each muzzle velocity shall be measured and if not within tolerance, that impact is not valid.

5.5.2 Equipment employed to measure the speed of the test paintball shall be accurate to within ±0.5 m/s (±20 ft/s) muzzle velocity.

5.6 *Conditioning:*

5.6.1 All impact testing shall be done using paintballs manufactured within the previous 8 months.

5.6.2 Paintball storage and the non-test handling shall be done at a relative humidity below 65 % and a temperature between 19°C (66°F) and 27°C (80°F).

5.6.3 Paintballs shall be conditioned in their original sealed container for at least 4 h at the humidity and temperature specified in 5.6.2.

5.6.4 The testing shall be conducted at the temperatures specified in 5.6.2 and shall be completed within 10 min after

⁶ Available from Hi Tech Mold and Tool Inc., 1520 East St., Pittsfield, MA 01201, (413) 443-9184.

⁷ Lexan is a trademark of GE Plastics.

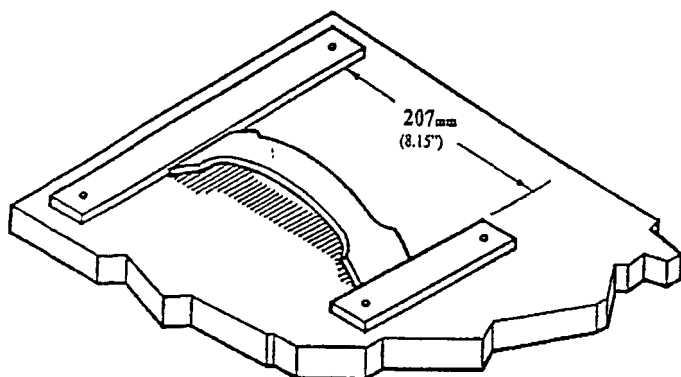


FIG. 1 Tensile Bar Shown Without Wrapping

removal of the paintball from the sealed container. The paintball container shall be resealed immediately after each group of paintballs is removed.

5.7 Procedure:

5.7.1 Secure a plywood target with a minimum thickness of 10-mm vertically at a distance of 24.4 ± 0.3 -m (80 ± 1 -ft) linear ground distance from the muzzle of the propelling device. Width and length of the target to be of a size that the laboratory determines necessary to hit the target.

5.7.2 Measure the velocity of the paintball within 1.0 m (3.3 ft) of the muzzle of the propelling device. Paintball velocity shall be 85.3 ± 6 m/s (280 ± 20 ft/s).

5.7.3 Impact the plywood target with 10 paintballs at an angle nominally normal to the target and at the distance in accordance with 5.7.1. Only those shots that are within the velocity tolerance in accordance with 5.7.2 shall be used in this test method.

5.8 *Precision and Bias*—No information is presented about either the precision or bias of this test method since this test method is nonquantitative.

6. Product Marking

6.1 General Instructions:

6.1.1 Warnings, instructions, and the name and address of the manufacturer or distributor shall appear on the exterior of each point of sale container in which a manufacturer packages its paintballs.

6.1.2 The lot number of paintballs shall appear on each point of sale container containing 500 or more paintballs.

6.1.3 The size of the print for warnings, instructions, and manufacturer's information shall be of a type size of at least 8 points. The add letters in the word WARNING shall be at least 50 % larger than the letters in the other words in the cautionary statement.

6.2 *Warning Information*—The following warning information or its equivalent shall appear as defined in 6.1.

6.2.1 These paintballs are intended only for use in the sport of paintball; follow all rules for safe paintball play.

6.2.2 Goggles, facemasks, and ear protection designed specifically for use in paintball games are mandatory at all times for all persons who are within paintball gun range.

6.2.3 Failure to follow the rules for safe paintball play, and the instructions and recommendations in this specification, may result in bodily injury including face, eye, and ear injury; blindness; or deafness.

6.2.4 Do not shoot paintballs at a speed in excess of 300 ft/s (92 m/s).

6.2.5 Do not ingest.

6.3 *Instruction Information*: The following instruction information or its equivalent shall be in accordance with 6.1.

6.3.1 Failure to follow these storage instructions may adversely affect performance and quality and increase the possibility of injury.

6.3.2 Instructions on how to properly store paintballs including: temperature and humidity ranges for storage and packaging requirements.

7. Keywords

7.1 paintball; paintball sports

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