



Designation: F3398 – 21

Standard Specification for Face and Ear Protective Devices for Air Soft Sports¹

This standard is issued under the fixed designation F3398; 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 (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification applies to face and ear protective devices (FEPDs) designed for use by participants in the sport of air soft with 6-mm air soft projectiles. These FEPDs are designed to be used in conjunction or in some cases include the eye protection discussed in Specification [F2879](#) to minimize or significantly reduce injury to the face and ears as a result of impact and penetration of air soft projectiles.

1.2 FEPDs meeting the requirements of this specification offer protection to portions of the face and ears of the user and not necessarily the entire head.

1.3 *Units*—The values stated in SI units are to be regarded as the standard. No other units of measurement are included in this standard.

1.4 The following information is provided for the laboratory conducting the test for the protection of their personnel: *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.*

2. Referenced Documents

2.1 ASTM Standards:²

[F2679](#) Specification for 6 mm Projectiles Used with Airsoft Guns

[F2748](#) Specification for Airsoft Guns

[F2879](#) Specification for Eye Protective Devices for Airsoft Sports

2.2 CSA Standards:³

[Z262.6-02](#) Specifications for Facially Featured Head Forms

[Z262.6-14](#) Specifications for Facially Featured Head Forms

2.3 EN Standard:⁴

[EN 168](#) Personal Eye Protection—Non-Optical Test Method—Section 17 Head Forms

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *air soft field, n*—area where participants actively target and shoot each other with air soft projectiles using air soft guns.

3.1.2 *air soft gun, n*—device specifically designed to expel air soft projectiles as the result of the release of energy by compressed air, compressed carbon dioxide (CO₂), mechanical springs, battery, or a combination thereof as defined in Specification [F2748](#).

3.1.3 *air soft projectile, n*—6 mm projectiles used with an air soft gun which is defined in Specification [F2679](#).

3.1.4 *cleanable, adv*—ability of an FEPD to be made readily free of dirt or grime without being damaged during an appropriate cleaning process, such as the use of soap and water.

3.1.5 *dislodgement, n*—relating to the movement or shifting during impact testing as described in Section 7 that would result in a gap between the eye protection device used in conjunction with the FEPD of more than 3.0 mm that did not exist prior to the testing or the breaking free of any FEPD components.

3.1.6 *eye protective device (EPD), n*—device that provides protection to the wearer's eyes against specific hazards encountered in sports.

3.1.7 *face and ear protective device (FEPD), n*—device that provides protection to the wearer's face and ears against specific hazards encountered in sports.

¹ This specification is under the jurisdiction of ASTM Committee [F08](#) on Sports Equipment, Playing Surfaces, and Facilities and is the direct responsibility of Subcommittee [F08.57](#) on Eye Safety for Sports.

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² 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 Available from Canadian Standards Association (CSA), 178 Rexdale Blvd., Toronto, ON M9W 1R3, Canada, <http://www.csagroup.org>.

⁴ Available from European Committee for Standardization (CEN), Avenue Marnix 17, B-1000, Brussels, Belgium, <http://www.cen.eu>.

3.1.8 *FEPD retention component(s)*, *n*—components that are designed to retain FEPD on the users face and ears.

3.1.9 *fracture*, *n*—any breach, rip, rupture, or visible crack in the FEPDs components.

3.1.10 *head form*, *n*—as utilized within this standard for the as-worn assessment of FEPDs, key dimensions of which are as provided in CSA Z262.6-02, CSA Z262.6-14 (see notations in 6.4.2.1 and 6.4.2.2 related to this head form) or EN 168.

3.1.11 *tactical sport*, *n*—within the context of this standard, an activity in which participants actively target and shoot at each other with air soft projectiles using an air soft gun.

4. Performance Requirements

4.1 Mechanical Requirements:

4.1.1 When tested in accordance with 7.2 (Projectile Test Procedure):

4.1.1.1 Any visible damage of the FEPD that results in any component of the FEPD to become dislodged or allows the passing through the protector of an air soft projectile as defined in 3.1.3 constitutes a failure.

4.1.1.2 Any dislodging of a retention component from the FEPD constitutes a failure.

4.1.1.3 Any opening in the FEPD that would permit contact of a 4.5 mm diameter +0.10 mm and −0.10 probe to the face or inner ear canal area of the head form constitutes a failure. No significant force is to be applied to force the probe through any opening.

4.1.1.4 Any visible fracture of any FEPD component constitutes a failure.

4.1.1.5 Any dislodging of any FEPD component constitutes a failure.

4.2 *Ventilation Openings Requirements*—Any ventilation opening in the FEPD that would permit direct contact of a 4.5 mm diameter probe +0.10 mm and −0.10 to the protected facial area of the head form constitutes a failure. No significant force is to be applied to force the probe through any opening. Any evaluation must be conducted with the FEPD installed in accordance with the manufacturer's instruction manual on the head form as specified in 6.4.

5. General Requirements

5.1 Materials of Construction:

5.1.1 The manufacturer is responsible that the materials selected meet the following criteria and may confirm compliance by providing the testing laboratory with a declaration letter regarding the suitability of the materials for inclusion with the final test report:

5.1.1.1 Materials exposed to sunlight shall not undergo significant loss of physical properties.

5.1.1.2 Materials coming into contact with the wearer's face shall not be of a type known to cause skin irritation.

5.1.1.3 Materials coming into contact with the wearer's face shall not undergo significant loss of strength, flexibility, or other physical change as a result of perspiration, oil, or grease from the wearer's skin and hair.

5.2 Openings:

5.2.1 All openings in the FEPD, such as those for ventilation, shall not allow the passage of a 4.5 mm diameter probe +0.10 mm and −0.10. In cases where a foam or air permeable barrier is used to cover ventilation openings of the FEPD, the underlying structure (under the foam or air permeable barrier) shall not allow the passage of a 4.5 mm diameter probe +0.10 mm and −0.10.

5.2.2 All opening for ventilation on the FEPD shall be inspected by the method described in 4.2.

5.3 *Level of Head Coverage*—The level of head coverage provided by a FEPD will be described as indicated in Table 1. The testing and requirements for each level of coverage is referenced on this chart as well.

6. Sample Preparation

6.1 Face and Ear Protective Devices:

6.1.1 Only new and complete FEPDs as offered for sale shall be tested.

6.1.2 A minimum of five FEPDs will be required for the tests.

6.1.3 The FEPD and the air soft projectiles shall be conditioned for a minimum of 4 h at the specified conditioning temperature before each test.

6.2 Conditioning Temperatures:

6.2.1 *Cold Conditioning*, $-12.2 \pm 2^{\circ}\text{C}$.

6.2.2 *Ambient Conditioning*, $23 \pm 2^{\circ}\text{C}$.

6.2.3 *Hot Conditioning*, $37.8 \pm 2^{\circ}\text{C}$.

6.3 *Air Soft Projectiles*—Air soft projectiles used in the tests contained within this specification shall be in conformity with Specification F2679 with a stated weight of 0.25 g. A manufacturer's declaration of compliance with the standard will be considered acceptable verification.

6.4 Head Form:

6.4.1 The manufacturer shall normally specify to the testing facility the type and size of head form to be used for testing within this standard. This selection will be based upon the design and size of the FEPD.

6.4.2 In the case where the head form referenced in CSA Z262.6-14 is used, the following information may serve as guidance:

6.4.2.1 *Youth (Small)*—50th percentile 6-year-old child (CSA Z262.6-14 Size 515, 50 Shore A Cadex Head Form Part Number DM185-5150).

6.4.2.2 *Adult (Medium)*—50th percentile 25-year old adult female (CSA Z262.6-14 Size 535, 50 Shore A Cadex Head Form Part Number DM185-5350).

6.4.3 In the case where the manufacturer does not specify a specific head form or size the testing laboratory may select the head form based on availability and suitability.

TEST METHODS

7. Mechanical Tests

7.1 Test Equipment:

7.1.1 The propelling device(s) shall be capable of hurling 0.25-g air soft projectiles horizontally at $175 -0/+3$ m/s. Each test velocity shall be measured and, if not within this tolerance, that impact is not valid.

