



Standard Test Method for Determining The Arc Rating Of Face Protective Products¹

This standard is issued under the fixed designation F 2178; 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 test method is used to measure the arc rating of products intended for use as face protection for workers exposed to electric arcs.

1.2 This test method will measure the arc rating of face protective products. The faceshield or other applicable portions of the complete product must meet ANSI Z87.1. This excludes the textile or non ANSI Z87.1 testable parts of the hood assemblies or other tested products. This standard does not measure optical and impact properties (See ANSI Z87.1).

1.3 The materials used in this method are in the form of faceshields attached to the head by protective helmets (hard hats), headgear, or hood assemblies.

1.3.1 Fabric layers used in hood assemblies or other items tested under this standard meet flammability requirements of Specification F 1506.

1.4 This standard shall be used to measure and describe the properties of materials, products, or assemblies in response to convective and radiant energy generated by an electric arc under controlled laboratory conditions and does not purport to predict damage from light other than the thermal aspects measured.

1.5 *Units*—The values stated in either SI units or in other units shall be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system must be used independently of the other, without combining values in any way.

1.6 This standard shall not be used to describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire assessment, which takes into account all of the factors, which are pertinent to an assessment of the fire hazard of a particular end use.

1.7 This standard does not purport to describe or appraise the effect of the electric arc fragmentation explosion and subsequent molten metal splatter, which involves the pressure wave containing molten metals and possible fragments of other materials except to the extent that heat energy transmission due to these arc explosion phenomena is reduced by test specimens.

1.8 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. For specific precautions, see Section 7.

2. Referenced Documents

2.1 ASTM Standards:

C 177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus²

D 123 Terminology Relating to Textiles³

D 4391 Terminology Relating to the Burning Behavior of Textiles⁴

E 457 Test Method for Measuring Heat-Transfer Rate Using a Thermal Capacitance (Slug) Calorimeter⁵

F 1494 Terminology Relating to Protective Clothing⁶

F 1506 Specification for Flame Resistant Textile Materials for Wearing Apparel for Use by Electrical Workers Exposed to Momentary Electric Arc and Related Thermal Hazards⁷

F 1958 Test Method for Determining the Ignitability of Non-Flame-Resistant Materials for Clothing by Electric Arc Exposure Method Using Mannequins⁷

F 1959 Test Method for Determining the Arc Thermal Performance Value of Materials for Clothing⁷

2.2 ANSI/IEEE Standards:

IEEE Standard Dictionary of Electrical and Electronics Terms⁸

ANSI Z87.1-1999 Practice for Occupational and Educational Eye and Face Protection⁹

3. Terminology

3.1 *Definitions*—For definitions of other textile terms used

² Annual Book of ASTM Standards, Vol 04.06.

³ Annual Book of ASTM Standards, Vol 07.01.

⁴ Annual Book of ASTM Standards, Vol 07.02.

⁵ Annual Book of ASTM Standards, Vol 15.03.

⁶ Annual Book of ASTM Standards, Vol 11.03.

⁷ Annual Book of ASTM Standards, Vol 10.03.

⁸ Available from Institute of Electrical and Electronics Engineers, Inc., 445 Hoes Ln., P.O. Box 1331, Piscataway, NJ 05584-1331.

⁹ Available from American National Standards Institute, 25 W. 43rd St., 4th Floor, New York, NY 10036.

¹ This test method is under the jurisdiction of ASTM Committee F18 on Electrical Protective Equipment for Workers and is the direct responsibility of Subcommittee F18.65 on Wearing Apparel.

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