Designation: F2178 – 12

Standard Test Method for Determining the Arc Rating and Standard Specification for Eye or Face Protective Products[1]

This standard is issued under the fixed designation F2178; 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 and product specification is used to measure the arc rating and specify the requirements for products intended for use as eye or face protection for workers exposed to electric arcs that would generate heat flux values from 84 to 25 120 kW/m^2 [2 to 600 cal/cm^{2}s]. Products are tested as sold.

1.2 This test method determines an arc rating for eye or face protective products. The faceshield, safety spectacle, goggle or 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) but does specify requirements for optical and impact properties.

1.3 The materials covered by this standard are in the form of faceshields attached to the head by protective helmets (hard hats), headgear, hood assemblies, safety spectacles or goggles. Faceshields, safety spectacles or goggles are tested with or without other face and head protective products, for example, sock hoods, balaclavas, sweat shirt hoods or jacket hoods.

1.3.1 Fabric layers used in hood assemblies or other items tested under this standard shall meet the requirements of Specification F1506.

1.4 This test method 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 The values stated in SI units shall be regarded as standard except as noted. Within the text, alternate units are shown in brackets. The values stated in each system may no be exact equivalents; therefore, alternate systems must be used independently of the other. Combining values from the systems described in the text may result in nonconformance with the method.

1.6 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.

1.7 *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.*

1.8 *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:*[2]

C177 Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus

D123 Terminology Relating to Textiles

D3776 Test Methods for Mass Per Unit Area (Weight) of Fabric

D4391 Terminology Relating to The Burning Behavior of Textiles

E457 Test Method for Measuring Heat-Transfer Rate Using a Thermal Capacitance (Slug) Calorimeter

F1494 Terminology Relating to Protective Clothing

F1506 Performance Specification for Flame Resistant and Arc Rated Textile Materials for Wearing Apparel for Use

[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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[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.

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