



Designation: F3258 – 21

# Standard Specification for Protectors for Rubber Insulating Gloves Meeting Specific Performance Requirements<sup>1</sup>

This standard is issued under the fixed designation F3258; 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.

## 1. Scope

1.1 This specification establishes specifications and test requirements for protectors to be worn over electrical workers' rubber insulating gloves.

1.2 It is intended that the protectors specified herein fit snugly over rubber insulating gloves specified in Specification D120 without causing mechanical damage to the rubber insulating glove. Cinching at the wrist is allowed.

1.3 This specification covers the use of a material or combination of materials which do not compromise the integrity of the rubber insulating glove.

1.4 Specification F696 was used to establish minimums for this specification.

1.5 Protectors meeting this specification do not provide any electrical shock protection if used on their own.

1.6 This specification specifies the response of protectors to electric arc, puncture and cut under controlled conditions.

1.6.1 Field conditions will not directly correlate to testing methods.

1.7 The values stated in SI units are to be regarded as the standard except as noted. See IEEE/ASTM SI-10.

1.8 The following safety hazards caveat pertains only to the test method portion, Sections 6 and 7, of this specification. *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.*

1.9 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 specification is under the jurisdiction of ASTM Committee F18 on Electrical Protective Equipment for Workers and is the direct responsibility of Subcommittee F18.15 on Worker Personal Equipment.

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## 2. Referenced Documents

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

- D120 Specification for Rubber Insulating Gloves
- D3389 Test Method for Coated Fabrics Abrasion Resistance (Rotary Platform Abrader)
- D3884 Guide for Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method)
- D7138 Test Method to Determine Melting Temperature of Synthetic Fibers
- F496 Specification for In-Service Care of Insulating Gloves and Sleeves
- F696 Specification for Leather Protectors for Rubber Insulating Gloves and Mittens
- F2675 Test Method for Determining Arc Ratings of Hand Protective Products Developed and Used for Electrical Arc Flash Protection
- F2992 Test Method for Measuring Cut Resistance of Materials Used in Protective Clothing with Tomodynamometer (TDM-100) Test Equipment
- IEEE/ASTM SI-10 American National Standard for Metric Practice

### 2.2 ANSI Standard:<sup>3</sup>

- ANSI/ISEA 105 American National Standard for Hand Protection Selection Criteria

### 2.3 NFPA Standard:<sup>4</sup>

- NFPA 1971 Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting

## 3. Terminology

### 3.1 Definitions:

3.1.1 *protector, n*—a glove or mitten designed to be worn over dielectric rubber insulating gloves.

3.1.1.1 *Discussion*—A protector is designed to provide mechanical and thermal protection for the dielectric rubber insulating glove.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

<sup>4</sup> Available from National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169-7471, <http://www.nfpa.org>.

3.1.2 *attachments, n*—an additional material applied to a specific area of protective product to make the portion of the protective product more resistant to wear, to fit better, such as a cinch or elastic, or to add protection, such as impact protection.

#### 4. Significance and Use

4.1 The protector provides resistance to mechanical hazards such as cut and puncture, for the rubber insulating gloves.

4.2 Protectors enhance protection from the thermal effects of an electric arc and shall not be used alone for electrical shock protection.

4.3 It is the responsibility of the user of this type of protective equipment to effectively train workers on the safe use of this equipment.

4.4 Testing is performed on new protective equipment; users are advised that product performance can be reduced due to routine use or contamination, or both.

4.5 Launder or recondition protectors according to the manufacturer's instructions or employer's procedure, or both.

#### 5. Performance Requirements

5.1 Protectors shall conform to the requirements listed in **Table 1** as outlined in Section 7.

5.2 All tests in this standard are design tests and shall be performed on the production design and anytime the design of the protector changes, which could affect the testing results, including but not limited to material changes, coating changes, thread changes (if sewn) and any design change which could affect the testing results.

#### 6. Test Methods

##### 6.1 Cut Resistance:

6.1.1 Both the palm and the back of the protector (if the materials or construction are different) shall be tested for cut resistance in accordance with ANSI 105, and the lowest cut level achieved shall be reported.

6.1.2 If the palm and the back of the protectors are of the same material and construction, only one side shall be tested.

6.1.3 When reinforcements are used on the protector design, they shall be removed to test only the base layer(s) of material.

##### 6.2 Arc Rating:

##### 6.2.1 Arc Testing:

6.2.1.1 Protectors shall be tested in accordance with Test Method **F2675** and the arc rating shall be reported in cal/cm<sup>2</sup>.

6.2.1.2 Protectors shall have a minimum arc rating of 4 cal/cm<sup>2</sup>. This has been determined by testing to prevent ignition of rubber insulated gloves.

6.2.1.3 Protectors shall be tested in their most basic layer model to determine the minimum arc rating (other areas of the glove may have greater protection but only the minimum protective area of the hand can receive an arc rating). When different areas have different base materials, all areas shall be evaluated. The protector shall be assigned the arc rating of the area having the lowest level of protection.

6.2.1.4 Where the front and back of a protector have distinctly different lay up constructions, both need to be tested in accordance with the requirement above. Where the front and back of a glove are different based on reinforcement layers, the lay up with the fewest layers will only be evaluated based on the requirement above.

(1) When attachments are used on the protector design, they shall be removed for the arc rating if the placement of these attachments can affect the arc rating.

(2) All protectors and attachments in a configuration as sold shall then be evaluated for ignition, melting and dripping by an arc test described in 6.2.2. These could include but are not limited to cuffs, draw straps, elastics, reflective trim, impact protection or attached reinforcements.

(3) For example, a label on the back of the hand of a glove may raise the rating and would not be allowed in the arc rating test but must be evaluated by arc testing in accordance with this section to ensure it does not increase injury.

6.2.1.5 The average afterflame time of all exposures within 20 % of the arc rating shall be calculated. The average afterflame time shall not exceed 15 s.

6.2.2 *Ignition Withstand*—The protector with complete attachments shall be arc tested in accordance with Test Method **F2675** and shall not ignite or melt and drip when exposed to the energy levels prescribed in **Table 2**. At least one arc exposure consisting of four specimens shall be tested for this evaluation.

6.2.2.1 Ignition withstand can be accomplished using a representative protector with all attachments or with each style as sold.

##### 6.3 Puncture Resistance:

**TABLE 1 Requirements for Protectors**

Characteristics	Test Standard	Requirement
Cut Resistance	ANSI 105 Section 5.1.1 using Test Method <b>F2992</b> and report the ANSI 105 level.	Report Level(s)
Puncture Resistance	ANSI 105 Section 5.1.2 Test Method <b>F2675</b>	Minimum Level 1 Report Level from ANSI 105 AR is minimum 4 cal/cm <sup>2</sup> . Report AR in whole numbers, cal/cm <sup>2</sup> (round down and to the nearest whole number)
Arc Rating (AR)	Test Method <b>F2675</b>	Maximum 15 s average afterflame time for any component within 20 % of the AR
Average Afterflame time in Arc Test	Test Method <b>F2675</b>	Maximum 15 s average afterflame time for any component within 20 % of the AR
Arc Ignition Withstand	<b>6.2.2</b>	Shall not ignite, or melt and drip
Thread	Shall meet either Test Method <b>D7138</b> and shall not melt at 260 °C or the thread shall meet the requirements of ASTM Specification <b>F696</b> . Thread used when performing the arc testing shall not be changed for production as thread may affect arc rating level of some products.	
Other optional tests may be added in accordance with agreement with the end user from <b>Appendix X1</b> .		Report Levels

TABLE 2 Ignition Withstand Test Levels

Base Arc Rating Range cal/cm <sup>2</sup>	Ignition Withstand Evaluation Level Four Exposures within range or greater cal/cm <sup>2</sup>	Criterion cal/cm <sup>2</sup>
<14	20-25	No ignition <20
14 to 19	30-40	No ignition <30
20 to 24	40-50	No ignition <40
25 to 39	50-60	No ignition <50
40 to 49	55-65	No ignition <55
50-60	65-75	No ignition <65
>60	10 % greater than arc rating	No ignition under 10 % greater than rating

6.3.1 Both the palm and the back of the protector shall be tested in accordance with ANSI/ISEA 105 and shall achieve a minimum puncture resistance classification of Level 1.

6.3.2 If the palm and the back of the protector are identical, only one side requires testing.

6.4 Thread Requirements:

6.4.1 Sewing thread if utilized in the construction of protectors shall meet one of two requirements:

6.4.1.1 An inherently flame-resistant fiber which does not melt when tested at a temperature of 260 °C (500 °F) in accordance with Test Method D7138, Method 1 or 2, or a thread meeting the thread requirements of Specification F696.

7. Other Requirements

7.1 The finished protectors are typically lightly dusted inside with a talc that is not damaging to the rubber to reduce surface friction between protector and rubber insulating gloves.

7.2 Length Measurement:

7.2.1 The overall length of the protector being supplied shall be measured laid flat as shown in Fig. 1 and the length shall be marked on the protector.

7.2.2 The actual length of the new (unused) protector glove shall not exceed the marked length nor shall the actual length be shorter than the marked length by more than 19 mm (¾ in.).

7.2.3 Measuring instruments for length shall be capable of accuracy ±1 mm (0.039 in.).

7.3 The protector shall consist of a glove or mitten that covers the hand portion of the rubber insulating glove and covers a portion of the wrist and arm area of the rubber insulating glove.

7.4 The overall length of the protector shall be measured laid flat as shown in Fig. 1. These protectors shall not exceed the length required by the Specification F496 (Table 4) standard to prevent flashback.

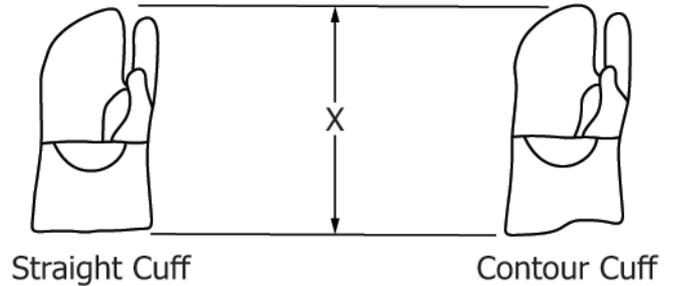
7.5 The protectors shall be formed to proper shape and full size, with seams properly worked and smooth, if seams are present.

7.6 When worn as a system with a rubber insulating glove, the protector shall not result in wrinkling or folding of the rubber insulating glove.

8. Product Marking

8.1 Each protector shall be clearly and legibly marked with:

- 8.1.1 Manufacturer name or logo, or both.
- 8.1.2 This standard designation “ASTM FXXXX”.



X = Overall Protector Length

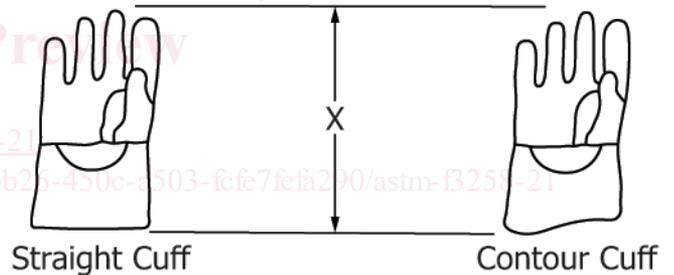


FIG. 1 Method of Measuring Overall Length of Protectors

8.1.3 The hand size(s) of the rubber insulating glove it is designed to cover.

8.1.3.1 Size markings shall be permitted to be in single sizes or dual sizes such as 9/9 ½, 10/10½, 11/11½, or 12.

8.1.4 The overall length of the protector.

8.1.5 The arc rating with the designation ARC X in accordance with Table 1 received in Test Method ASTM F2675 test method

8.1.6 Optional Marking:

8.1.6.1 Cut Resistance Level(s).

8.1.6.2 Type and level of any special characteristics in accordance with Appendix X1.

8.2 Each pair of protectors, at the time of purchase, shall be accompanied by a warning that the protectors are to be used only for protection for the rubber insulating gloves, and shall not be used for electrical protection. The warning shall also indicate the correct length of protector is found in Specification F496.