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Standard Specification for Electrically Insulating Aprons¹

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1. Scope

1.1 This specification covers the acceptance testing of electrically insulating aprons for the protection of workers from incidental contact with live electrical apparatus or circuits.

1.2 The objective of this specification is to prescribe function and performance criteria for insulating aprons that meet a minimum level of electrically insulating and physical performance characteristics.

1.3 Three types of aprons are provided and are designated as Type I, non-resistant to ozone, Type II and Type III, resistant to ozone.

1.4 Six classes of insulating aprons, differing in electrical characteristics, are provided and are designated as Class 00, Class 0, Class 1, Class 2, Class 3, and Class 4.

2. Referenced Documents

2.1 ASTM Standards:²

D 1048 Specification for Rubber Insulating Blankets

F 819 Terminology Relating to Electrical Protective Equipment for Workers

F 1742 Specification for PVC Insulating Sheeting

F 2320 Specification for Rubber Insulating Sheeting

3. Terminology

3.1 Definitions:

~~3.1.1 For definitions of other terms, refer to Terminology F 819.~~

3.1.1 *exposed area*—the area of the electrically insulating apron that does not contain any stitching or fasteners.

3.1.2 *exposure zone*—the area on the front of the electrically-insulated apron 1 in. from the fasteners and stitching or borders.

3.1.3 For definitions of other terms, refer to Terminology F 819.

4. Significance and Use

4.1 This specification covers the minimum electrical, chemical and physical properties, and design characteristics for insulating aprons and the procedures by which properties are to be determined. The purchaser may as his/her option, perform or have performed any of these tests in order to verify any manufacturer claim. Claims for failure to meet the specification are subject to verification by the manufacturer.

4.2 The insulating materials used in aprons in this specification are designed for personal protection; therefore, when authorizing its use a margin of safety shall be allowed between the maximum voltage at which it is used and the proof-test voltage at which it is tested. The relationship between proof-test and the maximum voltage at which materials shall be used is shown in Table 1.

4.3 Work practices vary from user to user, depending upon many factors. These factors may include, but are not limited to, operating system voltages, design, work procedures and techniques, weather conditions, etc. Therefore, except for the restrictions set forth in this specification because of design limitations, the use and maintenance of the equipment is beyond the scope of this specification.

4.4 It is common practice and the responsibility of the user of this type of protective equipment to prepare complete instructions and regulations to govern the correct and safe use of such equipment.

¹ 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 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.

² Current edition approved Oct. 1, 2008. Published November 2008. Originally approved in 2008 as F 2677 - 08.

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TABLE 1 Voltage Requirements

Class Designation of Apron	Maximum Use Voltage rms, V	AC Retest Voltage, rms, V	Maximum DC Use Voltage rms, V	DC Retest Voltage, avg, V
00	500	2500	750	10 000
0	1000	5000	1500	20 000
1	7500	10 000	11 250	40 000
2	17 500	20 000	25 500	50 000
3	26 500	30 000	39 750	60 000
4	36 000	40 000	54 000	70 000

5. Classification

5.1 Insulating aprons covered under this specification shall be designated as Type I, Type II or Type III; and as Class 00, Class 0, Class 1, Class 2, Class 3, or Class 4.

5.1.1 *Type I*, non-resistant to ozone, made from a high-grade *cis*-1,4-polyisoprene rubber compound of natural or synthetic origin, properly vulcanized.

5.1.2 *Type II*, ozone-resistant, made of any elastomer or combination of elastomeric compounds.

5.1.3 *Type III*, ozone-resistant, made of any combination of elastomer and thermoplastic polymers, elastic in nature.

5.1.4 The class designation shall be based on the electrical properties as shown in Table 1.

6. Ordering Information

6.1 Orders for insulating aprons under this specification should include the following information:

6.1.1 Type,

6.1.2 Class, and

6.1.3 Design or catalogue number. ~~Note 1—The~~

6.1.4 The listing of types and classes is not intended to mean all shall necessarily be available from manufacturers; it signifies only that, if made, they shall conform to the details of this specification.

7. Manufacture and Marking

7.1 The electrical insulating aprons shall be Type I, Type II or Type III materials and shall be free of irregularities as defined in Section 11. The electrical insulating apron material may be backed with fabric, or may have one or more fabric inserts. Any such backing or fabric insert shall not affect adversely the dielectric characteristics of the insulating apron. See Fig. 1.

7.2 Each piece of electrical insulating aprons shall be marked clearly and permanently with the name of the manufacturer or supplier, ASTM F 2677, type, and class.

8. Chemical and Physical Requirements

8.1 The material used to make the exposed area of the apron shall meet the chemical and physical properties of either D 1048, F 1742, or F 2320 in their entirety.

9. General Performance Requirements

9.1 The materials used in manufacture of the electrically insulating aprons shall be electrically non-conductive.

9.2 The stitching, thread, bindings, zipper tapes, or fasteners, or combination thereof, used to manufacture the aprons shall not degrade the dielectric properties.

9.3 No stitching or fasteners shall be located in the exposure zone of the apron.

10. Electrical Requirements

10.1 The material used to make the exposed area of the apron shall meet the electrical requirements of either D 1048, F 1742, or F 2320 in their entirety.

10.2 The material used to construct the insulating apron shall be proof tested in accordance with the appropriate standard above prior to manufacturing.

11. Workmanship and Finish

11.1 Aprons shall be free on both the inner and outer surfaces of harmful physical irregularities that can be detected by thorough test and inspection.

11.1.1 Harmful physical irregularities may be defined as any feature that disrupts the uniform, smooth surface contour and represents a potential hazard to the user, such as pinholes, cracks, blisters, cuts, conductive embedded foreign matter, creases, pinch marks, voids (entrapped air), prominent ripples, and prominent mold marks.

11.2 Non-harmful physical irregularities may be defined as surface irregularities present on the inner and outer surfaces of the rubber garment due to imperfections on forms or molds and inherent difficulties in the manufacturing process. These irregularities