



Designation: D1048 – 24

Standard Specification for Rubber Insulating Blankets¹

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This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This specification covers acceptance testing of rubber insulating blankets for protection of workers from accidental contact with live electrical conductors, apparatus, or circuits.

1.2 Two types of blankets are provided and are designated as Type I, not resistant to ozone, and Type II, and Type III ozone resistant.

1.3 Five classes of blankets, differing in electrical characteristics, are provided and are designated as Class 0, Class 1, Class 2, Class 3, and Class 4.

1.4 Two styles of blankets, differing in construction characteristics, are provided and are designated as Style A and Style B.

1.5 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered standard.

1.6 The following safety hazards caveat pertains only to the test method portion, Sections 16 – 19, 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.*

1.7 *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.*

¹ This specification is under the jurisdiction of ASTM Committee F18 on Electrical Protective Equipment for Workers and is the direct responsibility of Subcommittee F18.25 on Insulating Cover-Up Equipment. This standard replaces ANSI Standard J 6.4, which is no longer available.

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2. Referenced Documents

2.1 ASTM Standards:²

D149 Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies

D297 Test Methods for Rubber Products—Chemical Analysis

D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension

D518 Test Method for Rubber Deterioration—Surface Cracking (Withdrawn 2007)³

D570 Test Method for Water Absorption of Plastics

D573 Test Method for Rubber—Deterioration in an Air Oven

D624 Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers

D1388 Test Method for Stiffness of Fabrics

D2865 Practice for Calibration of Standards and Equipment for Electrical Insulating Materials Testing

F819 Terminology Relating to Electrical Protective Equipment for Workers

2.2 American National Standards:

ANSI/IEEE C2 National Electrical Safety Code⁴

C84.1 Electric Power Systems and Equipment—Voltage Ratings (60 Hz)⁵

3. Terminology

3.1 Definitions:

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 The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from Institute of Electrical and Electronics Engineers, Inc. (IEEE), 445 Hoes Ln., P.O. Box 1331, Piscataway, NJ 08854-1331, <http://www.ieee.org>.

⁵ Available from National Electrical Manufacturers Association (NEMA), 1300 N. 17th St., Suite 900, Arlington, VA 22209, <http://www.nema.org>.

3.1.1 *beaded edge, n*—a narrow border of thicker rubber which extends completely around the outer edges of the blanket.

3.1.2 *breakdown, n*—the electrical discharge or arc occurring between the electrodes and through the equipment being tested.

3.1.3 *designated person, n*—an individual who is qualified by experience or training to perform an assigned task.

3.1.4 *electrical testing facility, n*—a location with qualified personnel, testing equipment, and procedures for the inspection and electrical testing of electrical insulating protective equipment.

3.1.5 *electrode clearance*—the shortest path from the energized electrode to the ground electrode.

3.1.6 *flashover, n*—the electrical discharge or arc occurring between electrodes and over or around, but not through, the equipment being tested.

3.1.7 *insulated, adj*—separated from other conducting surfaces by a dielectric substance (including air space) offering a high resistance to the passage of current.

3.1.7.1 *Discussion*—When any object is said to be insulated, it is understood to be insulated in a suitable manner for the conditions to which it is subjected. Otherwise, it is, within the purpose of this definition, uninsulated. Insulating covering of conductors is one means of making this conductor insulated.

3.1.8 *ozone, n*—a very active form of oxygen that may be produced by corona, arcing, or ultra-violet rays.

3.1.9 *ozone cutting and checking, n*—cracks produced by ozone in a material under mechanical stress.

3.1.10 *rubber, n*—a generic term that includes elastomers and elastomer compounds regardless of origin.

3.1.11 *user, n*—the employer or entity purchasing the equipment to be utilized by workers for their protection; in the absence of such an employer or entity, the individual purchasing or utilizing the protective equipment.

3.1.12 *voltage, maximum retest, n*—voltage, either ac rms or dc avg, that is equal to the proof-test voltage for new protective equipment.

3.1.13 *voltage, retest, n*—voltage, either ac rms or dc avg, that used protective equipment must be capable of withstanding for a specified test period without breakdown.

3.1.14 *voltage, nominal design, n*—a nominal value consistent with the latest revision of ANSI C84.1, assigned to the circuit or system for the purpose of conveniently designating its voltage class.

3.1.15 *voltage, maximum use, n*—the ac voltage, (rms), classification of the protective equipment that designates the maximum nominal design voltage of the energized system that may be safely worked. The nominal design voltage is equal to phase-to-phase voltage on multi-phase circuits.

3.1.15.1 *Discussion*—If there is no multi-phase exposure in a system area, and the voltage exposure is limited to phase (polarity on dc systems) to ground potential, the phase (polarity on dc systems) to ground potential shall be considered to be the nominal design voltage.

3.1.15.2 *Discussion*—If electrical equipment and devices are insulated or isolated, or both, such that the multi-phase exposure on a grounded wye circuit is removed, then the nominal design voltage may be considered as the phase-to-ground voltage on that circuit.

3.1.15.3 *Discussion*—The work practices and methods associated with removing multi-phase exposures at any given work site are not addressed in this specification. Users should refer to ANSI C2, National Electrical Safety Code, Section 44, for proper work practices.

3.2 For definitions of other terms, refer to Terminology F819.

4. Significance and Use

4.1 This specification covers the minimum electrical, chemical, and physical properties guaranteed by the manufacturer and the detailed procedures by which such properties are to be determined. The purchaser may, at his option, perform or have performed any of these tests in order to verify the guarantee. Claims for failure to meet the specification are subject to verification by the manufacturer.

4.2 Blankets are used for personal protection; therefore, when authorizing their use, a margin of safety shall be provided between the maximum voltage at which they are used and the proof-test voltage at which they are tested. The relationship between proof-test voltage and the nominal maximum voltage at which blankets 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, construction 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 this equipment is beyond the scope of this specification.

4.3.1 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.

5. Classification

5.1 Blankets covered under this specification shall be designated as Type I, Type II, or Type III; Class 0, Class 1, Class 2, Class 3, or Class 4; Style A or Style B.

TABLE 1 Proof/Design-Test/Use Voltage Relationship

Class of Blanket	AC Proof-Test Voltage, ^A rms, V	Maximum AC Use Voltage AC, rms, V	DC Design-Test Voltage, avg, V	Maximum DC Use Voltage avg, V
0	5 000	1 000	20 000	1 500
1	10 000	7 500	40 000	11 250
2	20 000	17 000	50 000	25 500
3	30 000	26 500	60 000	39 750
4	40 000	36 000	70 000	54 000

^A Except for Class 0 equipment, the maximum use voltage is based on the following formula:

Maximum use voltage (maximum nominal design voltage) 0.95 ac proof-test voltage – 2000