



Designation: F 1236 – 96 (Reapproved 2001)

Standard Guide for Visual Inspection of Electrical Protective Rubber Products¹

This standard is issued under the fixed designation F 1236; 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 approval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 The purpose of this guide is to present methods and techniques for the visual inspection of electrical protective rubber products. This guide also includes descriptions and photographs of irregularities found in these products.

NOTE 1—It is not the purpose of this guide to establish the acceptance level of any irregularity described herein. That shall be established by the standard for each product.

1.2 The values stated in inch-pound units are to be regarded as standard. The SI units in parentheses are for information only.

1.3 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*

F 496 Specification for In-Service Care of Insulating Gloves and Sleeves²

F 819 Definitions of Terms Relating to Electrical Protective Equipment for Workers²

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *abrasions and scratches*—surface damage that normally occurs when a product makes contact with an abrasive surface. Scuff-like damage can also occur from a brush contact with a hot object such as a soldering iron. This can sometimes look like the graining on leather (see Fig. 1 and Fig. 2).

3.1.2 *age cracks*—surface cracks that may look like the crazing of glazed ceramics and become progressively worse with time. It is normally a slow oxidation process caused by exposure to sunlight and ozone in the atmosphere and starts in areas of the rubber that are under stress (see Fig. 3).



FIG. 1 Abrasion

3.1.3 *breakdown*—the electrical discharge or arc occurring between the electrodes and through the equipment being tested (see Fig. 4).

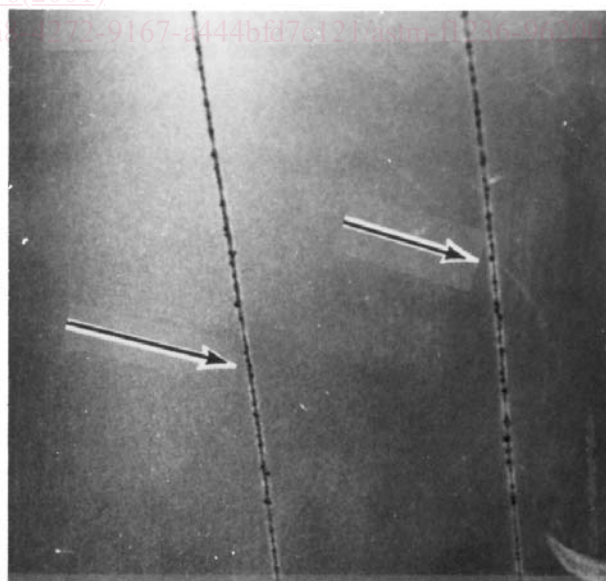


FIG. 2 Scratches

¹ This guide is under the jurisdiction of ASTM Committee F18 on Electrical Protective Equipment for Workers and is the direct responsibility of Subcommittee F18.60 on Terminology.

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² *Annual Book of ASTM Standards*, Vol 10.03.



FIG. 3 Age Cracks

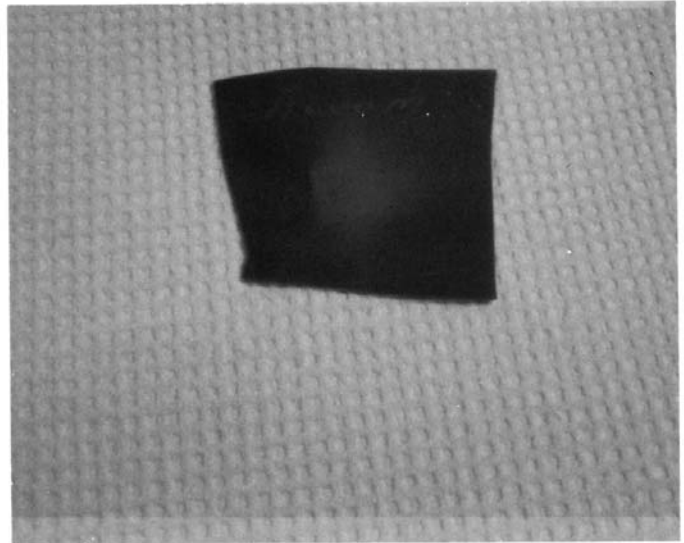


FIG. 5 Chemical Bloom

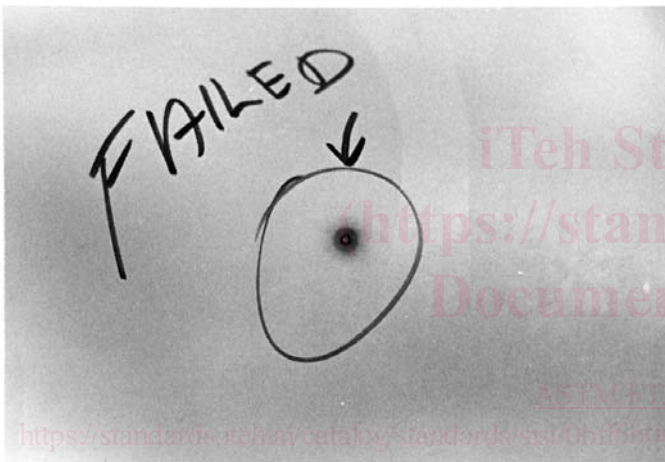


FIG. 4 Breakdown (Dielectric Failure)



FIG. 6 Color Splash

3.1.4 *chemical bloom*—a white or yellowish discoloration on the surface of a rubber product caused by the migration to the surface of chemical additives used in the manufacture of the finished product (see Fig. 5).

3.1.5 *color splash*—a spot or blotch on the surface of a rubber product that occurred during the manufacturing process when a contrasting colored particle of unvulcanized rubber became embedded into the finished product (see Fig. 6).

3.1.6 *cuts*—smooth incisions in the surface of the rubber that are usually caused by a sharp-edged object that can increase in size when they are placed under strain (see Fig. 7).

3.1.7 *depressions or indentations*—a shallow recess in the surface of the rubber that exhibits a thinner rubber thickness at the bottom of the depression than in the surrounding areas (see Fig. 8).

3.1.8 *detergent cracks*—cracks that appear on the inside surface of a glove or sleeve that encircle the outline of a spot of detergent residue that was not removed during the cleaning and rinsing of the form prior to the dipping process.

3.1.9 *embedded foreign matter*—a particle of non-rubber material that has been molded into the finished product and may appear as a bump when the rubber is stretched (see Fig. 9).

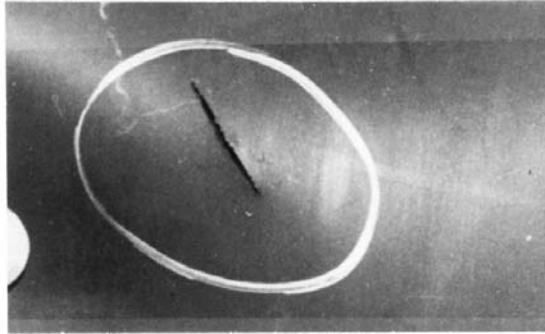


FIG. 7 Cuts

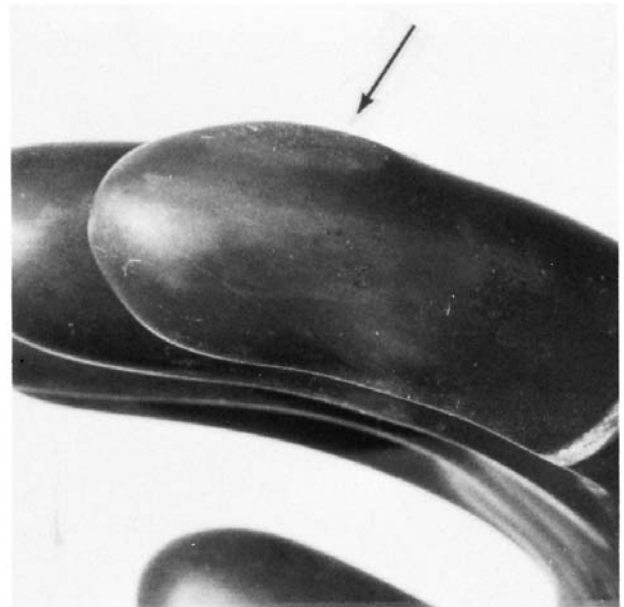


FIG. 10 Hard Spot

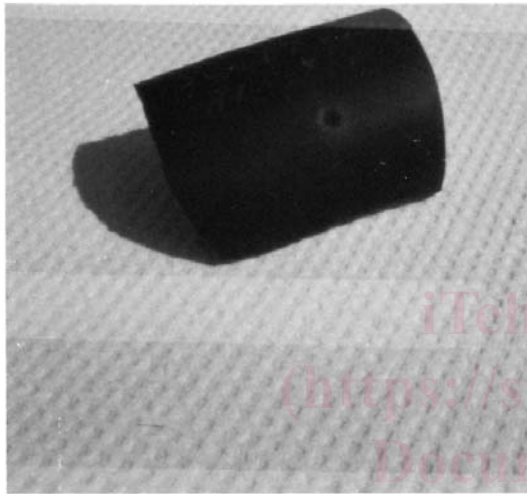


FIG. 8 Depressions or Indentations



FIG. 11 Hard Spot

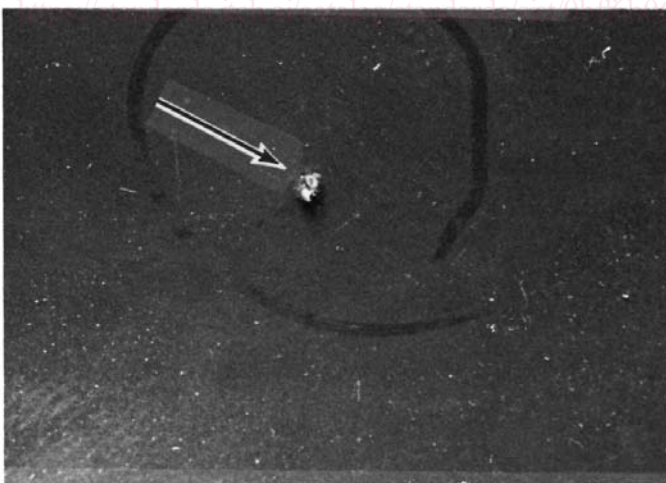


FIG. 9 Foreign Matter

3.1.10 *form marks*—a raised or indented section on the surface of the rubber that was caused by an irregularity in the form.

3.1.11 *hard spot*—a hardened area on the rubber surface that is usually caused by exposure to high heat or chemical attack (see Figs. 10-13).

3.1.12 *mold marks*—a raised or indented section on the surface of the rubber that was caused by an irregularity in the mold (see Figs. 14 and 15).

3.1.13 *nicks, snags, or scratches*—angular tears, notches, or chip-like injuries in the surface of the rubber that have been caused by barbed wire, sharp pointed tools, staples, splinters or similar sharp edged hazards (see Fig. 2, Fig. 16, and Fig. 17).

3.1.14 *ozone cracks*—a series of interlacing cracks that may start at stress points and quickly worsen as a result of rapid oxidation in a highly concentrated ozone atmosphere usually produced by electrical arcing (see Fig. 18 and Fig. 19).



FIG. 12 Hard Spot



FIG. 13 Hard Spot

3.1.15 *parting line or flash line*—a ridge of rubber left on finished products occurring at mold joints during the manufacturing process.

3.1.16 *pitting*—a pit-like depression in the surface of the rubber that may have been created by the rupturing of an air bubble at or near the surface of the rubber during the manufacturing process (see Fig. 20).

3.1.17 *protuberance*—bulge or swelling that protrudes above the surface of the rubber that may have occurred during manufacture (see Fig. 21).

3.1.18 *puncture*—penetration by a sharp object through the entire thickness of the rubber product (see Fig. 22).

3.1.19 *repair marks*—an area on the surface of the finished product that has a different texture due to the repair or reworking of an irregularity in the mold or form (see Fig. 23).

3.1.20 *runs*—raised flow marks that may occur on the fingers of rubber gloves during the dipping process.

3.1.21 *skin breaks*—cavities in the surface of the rubber with filmy ragged edges and smooth interior surfaces that are normally caused by embedded dirt specks during manufacture.

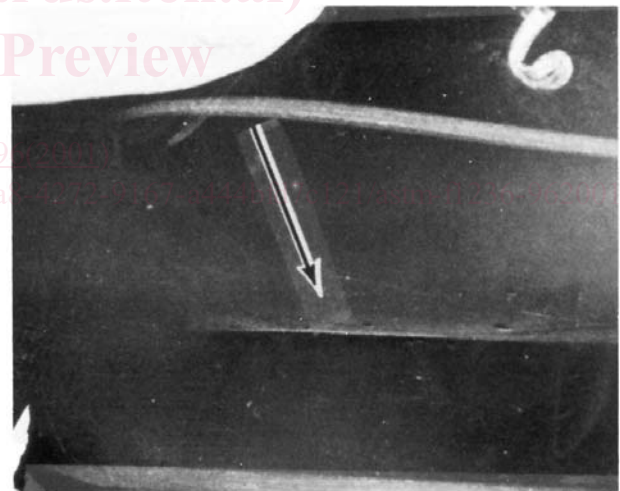


FIG. 14 Mold Marks

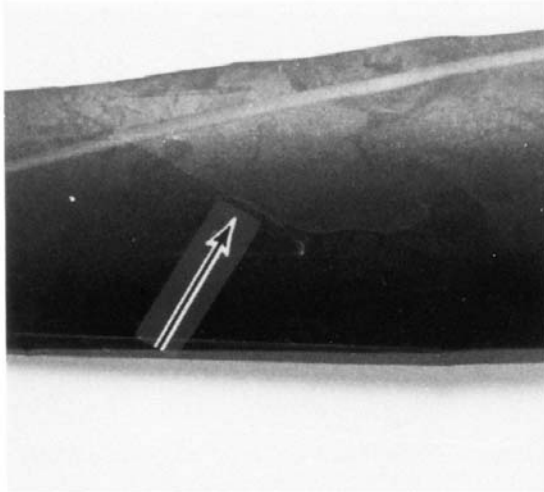


FIG. 15 Mold Marks



FIG. 17 Snag

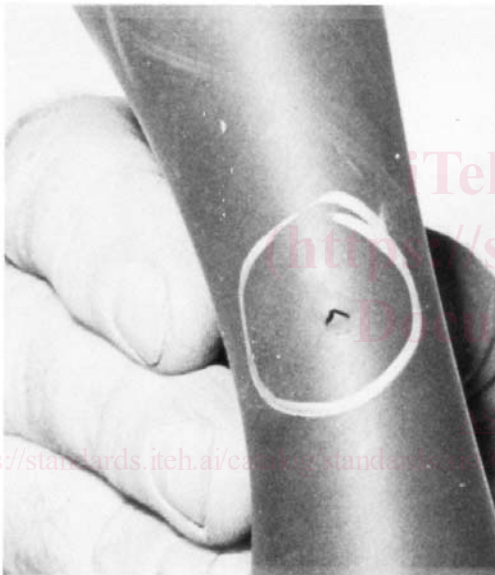


FIG. 16 Nick



FIG. 18 Ozone Cracks



FIG. 19 Ozone Cracks

3.1.22 *soft spots*—surface areas of the rubber that have become soft and sometimes tacky as a result of exposure to heat, oils, or chemical solvents.

3.1.23 *tears*— a separation of the rubber through its entire thickness, usually at an edge, that has been created by a forceful pulling apart of the rubber (see Fig. 24).

3.1.24 *tracking*—the formation of a carbonized path on the surface of a solid insulating medium, resulting from excessive current leakage over the surface (see Fig. 25 and Fig. 26).

4. Significance and Use

4.1 This guide provides inspection techniques that may be used to examine electrical protective rubber products for irregularities. The methods have applications in manufacturing locations, testing facilities, and in the field where the products are used.

4.2 This guide also contains photographs that supplement the descriptions of terms listed in Section 3 and in Definitions F 819.

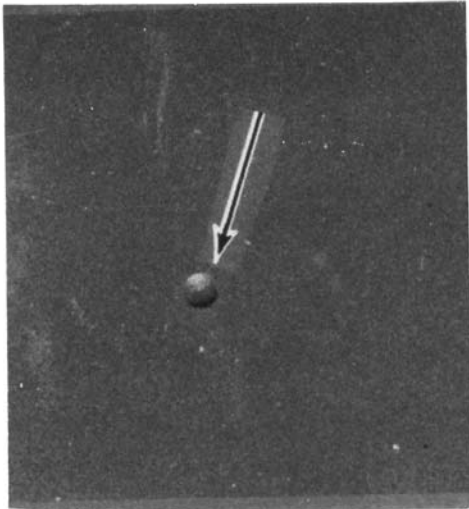


FIG. 20 Pitting



FIG. 22 Puncture



FIG. 21 Protuberance



FIG. 23 Repair Marks

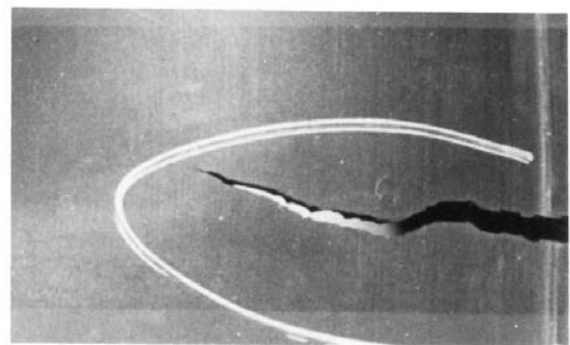


FIG. 24 Tear

5. Inspection Methods

5.1 Rolling:

5.1.1 Inspect glove and sleeve surface areas by gently rolling their entire outside and inside surface areas between the hands. This technique requires gently squeezing together the inside surfaces of the glove or sleeve to bend the outside surface area and create sufficient stress to inside surfaces of the glove or sleeve to highlight cracks, cuts, or other irregularities. When the entire outside surface area has been inspected in this manner, turn the glove or sleeve inside-out and repeat the inspection on the inside surface (now on the outside). If necessary, a more careful inspection of suspicious areas can be achieved by gently pinching and rolling the rubber between the fingers. Never leave a glove or sleeve in an inside-out condition. Stretch the thumb and finger crotches by pulling apart adjacent thumb and fingers to look for irregularities in those areas (see Fig. 27 and Fig. 28).

5.1.2 Place rubber blankets on a clean, flat surface and roll up tightly starting at one corner and rolling toward the

diagonally opposite corner. Inspect the entire surface for irregularities as it is rolled up. Unroll the blanket and roll it up again at right angles to the original direction of rolling. Repeat the rolling operations on the reverse side of the blanket (see Fig. 29).

5.1.3 Examine the inside surfaces of the insulating line hose by holding the hose at the far end from the lock and placing both hands side-by-side palms down around the hose. With the