



Designation: F1236 – 23

Standard Guide for Visual Inspection of Electrical Protective Rubber Products¹

This standard is issued under the fixed designation F1236; 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 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 values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *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.*

2. Referenced Documents

2.1 ASTM Standards:²

F478 Specification for In-Service Care of Insulating Line Hose and Covers

F479 Specification for In-Service Care of Insulating Blankets

F496 Specification for In-Service Care of Insulating Gloves and Sleeves

F819 Terminology Relating to Electrical Protective Equipment for Workers

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.

Current edition approved May 1, 2023. Published May 2023. Originally approved in 1989. Last previous edition approved in 2019 as F1236 – 19. DOI: 10.1520/F1236-23.

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. 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 (see Fig. 1 and Fig. 2).

3.1.1.1 *Discussion*—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.

3.1.2 *age cracks*—surface cracks that may look like the crazing of glazed ceramics and become progressively worse with time (see Fig. 3).

3.1.2.1 *Discussion*—It is a slow oxidation process caused by exposure to sunlight (or other environmental conditions) and starts in areas of the rubber that are under stress; see 3.1.14 for ozone cracks damage.

3.1.3 *breakdown*—the electrical discharge or arc occurring between the electrodes and through the equipment being tested (see Figs. 4-6).

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 manufacturing process of the finished product (see Fig. 7), caused by the natural aging process.

3.1.4.1 *Discussion*—Not to be confused with 3.1.10 *glove discoloration*.

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. 8).

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. 9).

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. 10).

3.1.8 *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. 11).



FIG. 1 Abrasion



FIG. 2 Scratches

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

3.1.10 *glove discoloration*—a non-harmful surface discoloration on a rubber insulating glove caused by the leaching of the tanning chemicals in leather protectors when protectors are left on the rubber insulating glove for an extended time; this is accelerated when the protectors are wet (see Figs. 12-14).

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. 15-18).

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 Fig. 19 and Fig. 20).

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. 21, and Fig. 22).

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 Figs. 23-26).

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 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. 27).

3.1.17 *protuberance*—bulge or swelling that protrudes above the surface of the rubber that may have occurred during the manufacturing process (see Fig. 28).

3.1.18 *puncture*—penetration by a sharp object through the entire thickness of the rubber product (see Fig. 29).

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. 30).

3.1.20 *runs*—raised flow marks that may occur on the fingers of rubber gloves during the dipping process (see Fig. 31).

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 the manufacturing process.

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 (see Fig. 32).

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. 33 and Fig. 34).

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 Figs. 35-37).

4. Significance and Use

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

4.2 This guide also contains photographs that illustrate the descriptions of terms listed in Section 3 and in Definitions F819.

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