



Standard Test Method for ELECTROSTATIC CHARGE¹

This standard is issued under the fixed designation D 2679; 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.

¹ NOTE—Sections 7 and 12 were editorially added in July 1978.

1. Scope

1.1 This method covers the determination of the amount of electrostatic charge present on or in a specimen or of the electrostatic charge transferred between two material objects upon contact. The method is useful for a wide range of materials such as solid sheet, film, fabric, powder, liquids, and gases. In principle, the method may be used with materials having a wide range of electrical conductivity and in differing environments.

2. Applicable Documents

2.1 ASTM Standards:

D 618 Conditioning Plastics and Electrical Insulating Materials for Testing²

E 104 Recommended Practice for Maintaining Constant Relative Humidity by Means of Aqueous Solutions²

3. Summary of Method

3.1 Electrostatic charge on or in a specimen is determined by enclosing the specimen in a Faraday cage and measuring the voltage developed on the cage. The specimen can be charged in any appropriate way; several charging techniques are mentioned in the method.

4. Significance

4.1 Electrostatic charge transfer is significant in all systems where the accumulated charge can lead to a high field strength causing electric breakdown (sparking) or a mechanical force on the object. Usually, the charge itself is not as objectionable as are the side effects such as heat and light from the discharge, etc.

5. Definition

5.1 *electrostatic charge*—the algebraic sum of all positive and negative electric charges present in a specific volume or surface element.

6. Apparatus

6.1 Figure 1 shows a block diagram of typical components necessary for the test, while Fig. 2 shows the schematic diagram.

6.2 *Display Unit*—The display unit indicates the charge in the Faraday cage. This unit may consist of a meter, showing instantaneous charge, or of more complicated equipment such as stripchart recorder giving charge as function of time; digital readout units, etc.

6.3 *Electrometer*—The electrometer voltmeter measures the voltage developed on the cage (and shunt capacitors). The voltmeter must have a high input impedance (such as 100 TΩ) and a low drift rate, concordant with the time of the measurement.

6.4 *Shunt Capacitors*—The shunt capacitors are used to increase the capacitance which results in a reduced measured voltage and increases the total range of charge measurements. Trimmers can be used to bring the capacitance to convenient values such as 100 pF or 10 nF. These capacitors must have very

¹ This method is under the jurisdiction of ASTM Committee D-9 on Electrical Insulating Materials and is the direct responsibility of Subcommittee D09.12 on Electrical Tests.

Current edition approved Aug. 27, 1973. Published October 1973. Originally issued as D 2679-69. Last previous edition D 2679-72a.

² *Annual Book of ASTM Standards*, Part 39.