

ESD association technical report

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***for the Protection of
Electrostatic Discharge
Susceptible Items –***

ESD Glove and Finger Cots

Author:

E.W. Chase, ETS, Inc.



*Electrostatic Discharge Association
7900 Turin Road, Bldg 3, Ste 2
Rome, NY 13440*

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ESD Association Standard Technical Report for the Protection of Electrostatic Discharge Susceptible Items-ESD Glove and Finger Cots

1.0 Purpose

The purpose of this technical report is to review the existing known industry test methods for the qualification of ESD Protective Gloves and Finger Cots. The results of this study would be used to determine if ESD Association Standard Test Methods for ESD Protective Gloves and Finger Cots are necessary.

2.0 Scope

This technical report will include responses from industry on all known glove and finger cot test methods. These would include glove and finger cot resistance tests and charge accumulation testing. This document will give references to all known available ESD test methods. This review will not include data in connection with ordinance, flammables, explosive items or electrically initiated explosive devices.

Although glove and finger cot cleanliness is a crucial issue, it is not within the scope of this document to cover this area.

3.0 Introduction

Electrostatic discharge (ESD) protective gloves and finger cots are made of various materials. These materials may include textiles, such as cotton, with metallic fibers woven into the fabric, Nylon®, pink poly and many other types of synthetics such as vinyl and nitrile. They are used in many applications for the handling of ESD sensitive items where contamination is an important issue.

The oils and materials residing on human hands and fingers are very corrosive. You may have noticed that a partial fingerprint on a copper penny can last for many years. Often the acidic nature of residues on fingers will actually etch materials leaving signatures that are almost impossible to remove by normal cleaning procedures such as degreasing. Industry has recognized this problem and taken steps to protect contamination sensitive products from being adulterated by human hands and fingers. In many cases the materials chosen for gloves perform well in preventing contamination, but unfortunately are very good accumulators of static charge and maybe also very good static charge generators.

There is a need to have standardized ESD testing for gloves that industry can use to qualify glove and finger cots for their particular applications. In the following sections existing tests will be tabulated and reviewed.

4.0 Glove and Finger Cot Resistance and Charge Propensity Test Methods - Test Method-ATP # G1000/ August 1998 ¹

4.1. Purpose

4.1.1 The purpose of this test procedure is to determine the electrical resistance and relative static charging propensity of gloves used for ESD control applications.

4.1.2 It is not the purpose of this test procedure to set standards of acceptance.

4.2. Scope

This test procedure is intended for use with gloves of all construction and materials.

4.3. Principle

4.3.1 The beneficial contribution of electrical conductivity to the dissipation of static charges generated by persons using gloves in ESD control work functions has long been recognized. Gloves with reasonable conductivity across the surface and to the hand help keep static charges to a minimum. However, conductivity is not sufficient to characterize the ESD performance of a glove for work with all products and materials.

4.3.2 When gloves have a reasonable conductivity they typically will keep to a minimum the static charges on conductive materials which are being handled. When insulative materials such as plastic IC packages and fiberglass substrates are handled, many gloves - even though conductive - impart high static charges through triboelectric effects.

4.3.3 This test procedure characterizes gloves for their electrostatic effects on most products.

4.4 Safety Precautions

4.4.1 Note: these safety precautions are for information purposes only. The precautions are ancillary to the testing procedures and are not intended to be all-inclusive. It is the users responsibility to use safe and proper techniques in handling materials in this test method. Manufacturers MUST be consulted for specific details such as material safety data sheets and other manufacturers recommendations. All OSHA standards and rules must also be consulted and followed.

4.4.2 Where electrical instrumentation is required, all manufacturers' recommendations for safety must be adhered to as well as all applicable electrical codes of practice. If test personnel are not familiar with safety precautions, a competent electrical technician or electrician must be consulted.

4.5 Apparatus and Materials

4.5.1 **Test area:** Standard test conditions for this test method require a room or large enclosure which can be maintained at 22 ± 2 C and at a relative humidity of 12 ± 3 % and suitable means for monitoring these conditions. Special requirements of end use may dictate the use of other testing conditions. Audit measurements shall be at the recorded ambient conditions during the tests.

4.5.2 **Ohmmeter:** Electrical resistance measurement instrumentation capable of reading the expected range of resistance. Typically this range for static protective gloves should be between 10 kilo Ohms and 100 Gig Ohms. The electrical resistance-measuring